EMERALD ASH BORER READINESS PLAN
FOR THE
CITY OF OCONOMOWOC, WI

Emerald Ash Borer Adult

D-shaped Exit Hole

Marshalling Yard

Declining Green Ash Tree

PREPARED BY:
WACHTEL TREE SCIENCE, INC.
NOVEMBER 2011
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1. MISSION STATEMENT

EAB PLAN MISSION STATEMENT

It is the mission of this program to maintain and enhance the urban forest maximum long term benefits to the community. The goal is to minimize the impact of the emerald ash borer and potential loss of ash trees to the health of our urban forest using the best scientific advice and lowest cost to the community.

MAP OF EAB LOCATIONS IN NORTH AMERICA
October 4, 2011
Additional counties near La Crosse may be quarantined pending further consideration.
2. EXECUTIVE SUMMARY

Opening Statement

“This plan is completely fluid and needs to be evaluated on an annual basis. EAB is a very complicated and emotional issue. Degree of infestation, new control measures becoming available, and local funding levels all play a part in determining the future direction of this action plan. This plan is not set in stone.”

The City of Oconomowoc has recognized the benefits that a properly maintained urban forest provides to the quality of life, air pollution reduction, energy conservation, increased property values and reduced maintenance costs over time. To develop a system to increase these benefits through effective management, the City contracted with Wachtel Tree Science to conduct an urban forest Geographic Information System (GIS) inventory. The GIS inventory focused on collecting data on all public trees located within public parks and open spaces. Data collection was conducted between July 18th and August 4th of 2011 by Wachtel Tree Science staff. Previously in 2006, the City used the services of a UW-Stevens Point forestry student to collect data for all the existing right-of-way street trees in the City. The results of the ash component from these two inventories include:

STREET TREES

- A total of 296 ash trees were inventoried along Oconomowoc street right-of-ways.
- The ash Genus Fraxinus accounts for 14.6% of the entire street tree population.
- 2 species make up the ash street tree population: Green Ash (38) and White Ash (258).
- 62.8% of all inventoried ash street trees have a condition class rating of 70% or greater.
- The Oconomowoc ash street tree population contains 46.9% in the 1 – 6” diameter range (139 trees), 39.9% in the 7 – 18” diameter range (118 trees), and 13.2% in the 19”+ diameter range (39 trees).

PARK/OPEN SPACE TREES

- A total of 167 ash trees were inventoried within public parks and open space areas.
- The ash Genus Fraxinus accounts for 13.5% of the entire park/open space tree population.
- 3 species make up the ash street tree population: Green Ash (145), White Ash (19) and European Ash (3).
- 91% of all inventoried ash street trees have a condition class rating of 60% or greater.
The Oconomowoc ash park/open space tree population contains 11.4% in the 1 – 6” diameter range (19 trees), 49.1% in the 7 – 18” diameter range (82 trees), and 39.5% in the 19”+ diameter range (66 trees).

**ACTION PLAN (Five Year + Projection)**

**Plan Components**

Since Emerald Ash Borer (EAB) has yet to be discovered in Waukesha County, the City has some time to prepare for its arrival. Another plus is the fact that the overall public ash percentage is less than 15% of the public tree population. Many communities in southeastern Wisconsin have public ash populations of 20% or greater.

To begin the ash management process the City should:

1. Remove and replace those ash identified with a primary maintenance need of “remove” in the GIS street and park/open space tree inventories (16 trees/total cost = $14,600).

2. Using GIS and the public tree databases, remove and replace those ash that currently are growing under overhead utilities, have been severely damaged by storms or are impacted by road improvement projects.

3. City staff needs to assess the availability of qualified outside tree care firms for contractual work, additional training and equipment needs, plus determine which programs may need to be reduced or curtailed if the EAB infestation becomes dramatic.

Once EAB is discovered within 10 miles of the City of Oconomowoc, the following plan components should be put into action:

1. Over a five year period, remove and replace with a diversity of species all public ash trees with diameters less than 7” DBH and greater than or equal to 25” DBH, plus all ash with a condition rating of 65% or less. Removals should be prioritized by removing the lowest condition class trees first, along with at least 1/5th of the smallest diameter trees in order to begin establishing greater species diversity.

2. Selectively, chemically treat those ash that are between 7” DBH and 24” DBH and have a condition rating of 70% or greater based on size, location and significance.

- Following this plan will reduce the public ash tree population percentage from its current 14.2% to 3.4% after five years and keep a majority of the urban street tree canopy that currently exists. As trees are removed, treated tree continue to grow and replacement trees begin putting on new growth.

- Cost of implementation of the 5 year Action Plan - $296,338.00 or approximately $59,270.00 per year.
- After 5 years there will still be approximately 112 public ash remaining. At that point it should be determined, based on the level of EAB activity, if these trees should continue to be treated indefinitely or removed and replaced. The cost of continuing treatment would average $6,980.00 per year.

- The street tree inventory was last performed in 2006; it is recommended that a complete reinventory of public street trees be conducted no later than 2013. The reinventory should include the locating of potential vacant planting sites. This will allow the City to have valuable information on how to best direct future planting efforts with a diverse species mix.
3. DEFINITIONS

EAB Community Readiness Plan Definitions

**condition class or rating** - an overall rating of factors covering tree health and structure including: branching, condition of trunk and roots, decay, vigor, insect and disease problems, growth rate, crown development, life expectancy, etc.

- **0%** Dead tree or vacant planting site.
- **<30%** Trees in poor condition, death likely within three to five years. Trees with this rating usually have some major defect or are at the end of their life cycle.
- **31-50%** Trees with major structural problems and/or in poor health. The trees could live five to ten years but are likely to decline further and be damaged in storms.
- **51-70%** Trees with minor structural defects and little signs of poor health. These trees will benefit the most from proper care (pruning, mulching etc.) especially young trees. Most trees in this class can be expected to live ten or more years.
- **71-90%** Trees with good form and health. They may have some minor problems but they would be easily corrected with proper maintenance. These trees are established in their site and could be expected to live 20 or more years.
- **90%+** Trees in excellent health with no structural defects.

**dbh** – diameter at breast height; represents the diameter in inches of a trunk cross-section measured at 4½’ above ground level; a basis for estimating or identifying tree volume, value, management needs and costs, utilization options, etc.

**delimit** – to establish geographic limits or boundaries; emerald ash borer quarantine areas are determined after delimiting an area of infestation

**EAB** – the emerald ash borer insect; as an adult it measures approximately ½” in length by 1/8” wide, is metallic green in color and somewhat bullet shaped. The larvae can reach a length of a little more than 1” in length, are white to cream colored, have a 10 segmented abdomen with a pair of brown, pincer-like appendages on the last segment.

**EAB readiness team** – a group of people responsible for all aspects of preparing for emerald ash borer within a particular jurisdiction/municipality; team member have specific roles and tasks

**EAB readiness plan** – a document delineating local EAB readiness activities and processes; includes scope & purpose, authority, responsibility, policies & procedures, actions/tasks, available resources, forms & contracts, technical references & support information (such as surveying and reporting protocols), and similar content

**easement** - a limited right to make use of a property owned by another, for example, a right of way across the property
eradication – total elimination of ash trees within a specified geography area where EAB has been verified. This was the initial and only thought process when the DNR EAB Toolkit for Wisconsin Communities was initially developed (February, 2007). With the advent of new information and experiences throughout the nation, other management controls are now being considered as well.

infestation – refers to an area where the ash trees have been positively identified as having a sustained population of EAB.

preemptive removal - in the case of EAB, it refers to removing trees prior to them becoming infested with EAB. As of (February, 2008) it has not been recommended by either the WI-DATCP or WI-DNR to perform this practice, however it is up to each municipality dependent on their fiscal and personnel resources along with the amount of ash trees within their community and the distance from known EAB infestations. It does seem reasonable that if a community has ash trees that are declining or are in conflict with buildings or utilities, that instead of performing a remedial pruning, removal may be a strong option. Other communities have found it cheaper and easier on equipment to phase in ash tree removals earlier and over a broader period of time.

marshalling yard – a fenced-in location within a quarantine area where infested or quarantine-area trees are collected and held for further handling

quarantine area – a defined geographic area from which goods may not be transported; quarantines will be established by federal or state agencies to restrict ash wood movement out of infested areas to avoid emerald ash borer infestation of new areas; quarantines can be applied to an individual property, township, county or entire state

right-of-way - a narrow length of land used for the route of a railroad, electric power line, or public road
4. AUTHORITY

See Appendix B for

*Federal and State Regulations Providing Authority to Control EAB and Other Invasive Pests*

Current Oconomowoc Ordinance Regarding Private Property

CHAPTER 8A URBAN FORESTRY
(Cr. #00-0473)

8A.01 PURPOSE AND INTENT.
It is the policy of the City to regulate and establish regulations for the control of planting, removal, maintenance and protection of trees and shrubs in or upon all public areas and terrace areas owned by the City; to eliminate and guard against dangerous conditions which may result in injury to persons using the streets, alleys, sidewalks or other public areas; to promote and enhance the beauty and general welfare of the City; to prohibit the undesirable and unsafe planting, removal, treatment and maintenance of trees and shrubs located in public areas; and to protect all trees and shrubs, both public and private, within the City against the spread of disease, insects or pests.

8A.02 APPLICATION.
The provisions of this chapter shall apply to trees and shrubs growing or hereafter planted in or upon public-owned areas and terrace areas and also to all trees and shrubs growing or to be planted in or upon any private property which shall threaten the life, health, safety or welfare of the public or of any public areas.

8A.03 DEFINITIONS.
Whenever the following words or terms are used in this chapter, they shall be construed to have the following meanings:

1. **PERSON.** A person, firm, association or corporation.
2. **CITY.** The City of Oconomowoc, Wisconsin.
3. **PUBLIC AREAS.** All public parks and other lands owned, controlled or leased by the City including the terrace areas.
4. **PUBLIC TREES AND SHRUBS.** All trees and shrubs located or to be planted in or upon public areas and terrace areas.
5. **PUBLIC NUISANCE.** Any tree or shrub or part thereof which by reason of its condition or location interferes with the use of any public area, is infected with a plant disease, is infested with injurious insects or pests, is injurious to public improvements or endangers the life, health, safety or welfare of persons or property.
6. **BOULEVARD OR TERRACE AREAS.** The land between the normal location of the street curbing and sidewalk. Where there is no sidewalk, the area between the back of curb or roadway pavement and the property line shall be deemed to be a boulevard for the purpose of this section. "Boulevard" shall have the same meaning as "terrace."
there are only sidewalks, the area between the street and the property line shall be deemed boulevard areas under this section.

(7) SHRUB. Any woody vegetation or a woody plant having multiple stems and bearing foliage from the ground up.

(8) TREE. Any wood plant normally having one stem or trunk bearing its foliage or crown well above ground level to heights of 15 feet or more.

(9) EVERGREEN TREE. Any woody plant normally having one stem or trunk and bearing foliage in the form of needles and crown which extend from ground level through its entire height.

(10) CITY FORESTER. The person designated by the City as authorized to carry out the provisions of this section.

8A.04 AUTHORITY OF CITY FORESTER TO ENTER PRIVATE PREMISES.

(1) PUBLIC BODY. The Oconomowoc Common Council shall be the official governing body controlling tree policy and regulations.

(2) CITY FORESTER DESIGNATED. The City Parks Superintendent shall serve as City Forester and shall carry out the provisions of this section. The Forester shall perform the duties of City Forester required under Ch. 27, Wis. Stats., and the provisions of this chapter.

(3) CITY FORESTER AUTHORITY. The City Forester or the Forester's authorized representative may enter upon private premises at all reasonable times for the purpose of examining any tree or shrub located upon or over such premises and for carrying out any of the provisions of this section.

(4) INTERFERENCE WITH CITY FORESTER PROHIBITED. No person shall interfere with the City Forester or the Forester's authorized representative while engaged in carrying out any work or activities authorized by this section.

8A.05 ABATEMENT OF TREE NUISANCES.

(1) DUTCH ELM AND OTHER TREE DISEASES A PUBLIC NUISANCE. Whereas, the Common Council has determined that there are many trees growing on public and private premises within the City, the loss of which would substantially depreciate the value of public and private property, impair the use and enjoyment of public and private premises and erode the tax base of the City, and that the health and life of such trees is threatened by fatal diseases such as Dutch Elm disease or Oak Wilt. The Council hereby declares its intention to control and prevent the spread of such diseases and the insect pests and vectors which carry such diseases.

(2) INSPECTION.

(a) The property owner shall inspect all trees located on his/her private property to insure the nonexistence of a public nuisance. Public nuisance is defined in §8A.03(5).

(b) The City Forester shall inspect or cause to be inspected all premises and places defined as a public area to determine whether any public nuisance exists thereon.

(c) The Forester will authorize inspections when necessary to determine the existence of tree disease or harboring insects in any tree. The person inspecting
such tree shall remove or cut specimens from the tree in such a manner as to avoid fatal injury thereto and deliver such specimens to the Forester who shall forward them to the Wisconsin Department of Agriculture in Madison for analysis to determine the presence of such nuisances.
(d) The Forester and/or the Forester’s agents or employees shall have authority to enter upon private premises for the purpose of carrying out any of the provisions of this section.

(3) ABATEMENT OF OTHER TREE NUISANCES: DUTY OF FORESTER.

(a) When a tree on private property becomes a nuisance by an act of God or due to a weakened condition and poses an immediate hazardous or dangerous condition to property or to persons using or upon any street, sidewalk, alley, park or other public place, the Forester shall order the immediate removal of such hazard. The cost of removal of such tree from private property will be assessed to the property owner. The tree will only be removed by the City enough to provide for safety, whereupon the property owner will be responsible for the ultimate removal of the tree.

(b) The Forester shall order, direct, supervise and control the abatement of public nuisances as defined in this section by spraying, injecting, removal, burning or by other means which the Forester determines to be necessary to prevent as far as possible the spread of Dutch Elm disease fungus, other deleterious tree diseases or the insect pests or vectors known to carry such diseases.

(c) Whenever the Forester, after inspection or examination, shall determine that a public nuisance as herein defined exists on public property in the City, he/she shall immediately abate or cause the abatement of such public nuisance in such manner as to destroy or prevent as far as possible the spread of deleterious tree diseases or the insect pests or vectors known to carry such diseases.

(d) 1. When the Forester shall determine with reasonable certainty that a public nuisance exists upon private property, the Forester shall immediately serve or cause to be served personally or by registered mail upon the owner of such property, if the owner can be found, or upon the occupant thereof, a written notice of the existence of such nuisance. The notice will specify a time and place for a hearing not less than 14 days after service of such notice on the abatement action to be taken. Such notice shall describe the nuisance and recommend procedures for its abatement and shall further state that the owner shall abate the nuisance in the manner specified in the notice, or shall appear at a hearing with the Common Council to show that such nuisance does not exist or does not endanger the health of trees in the City. If the owner cannot be found, such notice shall be given by publication in a newspaper of general circulation in the City.

2. If after conducting a hearing held pursuant to this subsection it shall be determined by the Common Council that a public nuisance exists, it shall forthwith order the immediate abatement thereof. Unless the property owner abates the nuisance as directed within 5 days after such hearing, the Forester shall proceed to abate the nuisance and cause the cost thereof to be assessed against the property in accordance with the procedures provided in this
chapter. The Forester may extend the time allowed the property owner for abatement work but not to exceed 10 additional days.

(4) SPRAYING.
(a) Whenever the Forester shall determine that any tree or part thereof is infected with a deleterious or fatal tree disease or is in a weakened condition, the Forester may cause all trees within a 1,000-foot radius thereto to be sprayed or injected with an effective disease-destroying concentrate or other insecticide.
(b) In order to facilitate the work and minimize the inconvenience to the public of any spraying operations conducted under this section, the Forster shall cause to be given advance public notice of such operations by newspaper, radio, television, public service announcements or other effective means and shall also cause the posting of appropriate warning notices in the areas and along the streets where trees are to be sprayed at least 24 hours in advance of spraying. Occupants of dwelling units within the 1,000-foot radius of the diseased tree shall be provided personal notification by direct contact by a member of the Parks, Recreation and Forestry Department. When any residue or concentrate from municipal spraying operations can be expected to be deposited on any public street, the Forester shall also notify the Chief of Police, who shall take all necessary steps to make and enforce temporary parking and traffic regulations on such streets as conditions require. Temporary "no parking" notices shall be posted in each block of any affected street at least 24 hours in advance of spraying operations.
(c) When appropriate warning notices and temporary "no parking" notices have been given and posted in accordance with subsection (4)(b) of this section, the City shall not allow any claim for damages to any vehicle caused by such spraying operations.
(d) When trees on private property are to be sprayed, the Forester shall notify the owner of such property and proceed in accordance with the requirements of subsection (3)(d)1.

8A.06 ASSESSMENT OF COSTS OF ABATEMENT.
(1) ABATEMENT ON TERRACE AREAS AND PUBLIC AREAS. The cost of abating any public nuisance on a public area or spraying trees as defined herein shall be the responsibility of the City.
(2) ABATEMENT ASSESSMENT ON PRIVATE PROPERTY. The cost of abating a public nuisance located on private premises when done at the direction and under the supervision of the Forester shall be assessed to the property on which such nuisance; tree or wood is located as follows:
(a) The Forester shall keep a strict account of the cost of such work or spraying and the amount chargeable to each lot or parcel and shall report such work, charges, description of lands to which charged and names and addresses of the owners of such lands to the Common Council.
(b) Upon receiving the Forester's report, the Common Council shall hold a public hearing on such proposed charges, giving at least 14 days advance notice of the time, place and purpose of such hearing to interested persons by publication in a newspaper of general circulation in the municipality and by mail to the owner of each property proposed to be charged. Each property owner shall be notified of the
amount proposed to be assessed against his/her premises and the work for which such charge is being made.
(c) After such hearing, the Common Council shall affirm, modify and affirm, or disapprove such assessments by resolution and shall cause a copy thereof to be published. Upon adoption and publication of such resolution, assessments made thereby shall be deemed final.
(d) The City Finance Director shall mail notice of the amount of such final assessment to each owner of property assessed at his/her last known address, stating that unless paid within 30 days of the date of the notice, such assessment will be entered on the tax roll as a tax against the property; and all proceedings in relation to the collection, return and sale of property for delinquent real estate taxes shall apply to such assessment.
(e) The City hereby declares that in making assessments under this section it is acting under its police power, and no damages shall be awarded to any owner for the destruction of any diseased or infested tree or wood or part thereof.

Below is ordinance language from the City of Middleton that expands upon destructive diseases and insects that pose a threat to the urban forest

20.08 TREES INFECTED WITH DESTRUCTIVE DISEASES OR INSECTS THAT CONSTITUTE A POTENTIAL THREAT OR HAZARD TO THE URBAN FOREST; NUISANCE DECLARED.

(1) Public Nuisance Declared.

(a) The Common Council of the City, having determined that the health of the elm trees within the City is threatened by a fatal disease known as Dutch Elm disease Ceratocystis Ulmi (Buisman) hereby declares the following to be a public nuisance:

1. Any living or standing elm tree or part thereof infected with the Dutch Elm disease fungus or which harbors any of the elm bark beetles Scolytus multistriatus (Marsh.) or Hylargophinus rufipes (Eichh.).

2. Any dead elm tree or part thereof, including logs, branches, stumps, firewood or other elm material from which the bark has not been removed and burned or sprayed with an effective elm bark beetle destroying insecticide.

(b) The Common Council of the City having determined that the health of oak trees within the City is threatened by a fatal disease known as oak wilt disease (Ceratocystis fagacearum) hereby declares the following to be a public nuisance:

1. Any living or standing oak tree or part thereof infected with the oak
wilt disease fungus.

2. Any dead oak tree or part thereof, including logs, branches, stumps, firewood or other oak material from which the bark has not been removed.

(c) The Common Council of the City, having determined that the health of ash and other trees within the City are threatened by destructive insects including but not limited to the Emerald Ash Borer (Agrilus planipennis) or the Asian long-horned beetle (Anoplophora glabripennis) hereby declares the following to be a public nuisance:

1. Any living or standing tree or part thereof infested with these or other destructive insects.

2. Any dead tree or part thereof, including logs, branches, stumps, or other material infested with these or other destructive insects.

3. Any infested firewood or wooden packing or shipping materials infested with these or other destructive insects.

(2) Nuisances Prohibited. No person, firm, or corporation shall permit any public nuisances as defined in subsection (1) of this section to remain on any premises owned or controlled by him or her within the City.

(3) Inspection. The City Forester shall inspect or cause to be inspected all premises and places within the City to determine whether any public nuisance as defined herein exists thereon and shall also inspect or cause to be inspected any trees or materials reported or suspected to be infected with the diseases or insects listed in subsection (1) of this section.

(4) Abatement of Nuisances.

(a) If the City Forester upon inspection or examination in person or by some qualified person acting for him or her, shall determine that any public nuisance as herein defined exists in or upon any public street, alley, park or other public place, including the terrace strip between the curb and lot line within the City, and that the danger to other trees within the City is imminent, she or he shall:

1. Immediately cause it to be removed and the wood to be debarked, covered or chipped, or

2. Otherwise abate the nuisance in such a manner as to destroy or prevent as fully as possible the spread of these or other injurious diseases and insects.
(b) If the City Forester shall determine within reasonable certainty that any public nuisance as herein defined herein exists in or upon private premises and that the danger to other trees within the City is imminent, she or he shall immediately report the existence of such nuisance to the Board of Park, Recreation and Forestry Commissioners and the Board shall, if it determines that such nuisance exists, cause notice to be served that the Board proposes the removal and destruction of such trees or materials as nuisances under this ordinance specifying the location and number of such trees or materials, and that a hearing will be held before the Board for the purpose of ordering the removal and destruction of such trees or materials. Such notice shall be served at least two (2) weeks prior to the date of the hearing before the Board and shall be served on the owner of the lot or parcel of land on which such trees or materials stand or his or her agent, or if neither is known and there is a tenant occupying said property then to such tenant, of the time and place at which said contemplated place of work and removal will be considered by the Board. After such hearing the City Forester, subject to the direction of the Board, shall abandon the work or proceed with it as he or she believes the best interests of the public require. In lieu of such removal by the City Forester, the City Forester may serve or cause to be served upon the owner of the property notice to abate such nuisance within thirty (30) days of the service of said notice. If such owner or occupant does not abate such nuisance within the time limited, the City Forester may cause the same to be abated. No damages shall be awarded to the owner for the destruction of any trees or any part or materials thereof pursuant to this section.

(5) **Assessment of Costs of Abatement.**

(a) The entire costs of abating any public nuisance as defined in subsection (1) of this ordinance may be chargeable to and assessed against the parcel or lot upon which such tree or material stands. The cost of abating any such nuisance which is located in or upon any park or public grounds, boulevards or public way shall be borne by the City.

(b) The City Forester shall keep strict account of the costs of work done under this ordinance for which assessments are to be made, stating and certifying the description of land, lots, parts of lots, or parcels of land and the amount chargeable to each. The City Clerk shall include in her or his report to the Common Council the aggregate amounts chargeable to each lot parcel as recorded by her and him and such amounts shall be levied and assessed against such parcels or lots in the same manner as other special taxes. Before such assessments are entered on the tax roll the Common Council shall hold a public hearing on the proposed assessments and shall give advance notice thereof not less than fourteen (14) days before the time set for such hearing by publication in the official newspaper or posting in at least four (4) conspicuous places.
(6) **Transporting of Wood Prohibited.** No person, firm or corporation shall transport within the City any bark bearing wood material infested with such diseases or insects without first securing the written permission of the City Forester.

(7) **Removal or Pruning of Oak Trees Prohibited.** No person, firm or corporation shall remove, trim or prune any oak tree or portion thereof between April 1 and August 1 without first securing the written permission of the City Forester.

(8) **Interference with City Forester Prohibited.** No person, firm or corporation shall prevent, delay or interfere with the City Forester or any of his or her agents or employees while they are engaged in the performance of duties imposed by this ordinance.

20.09 **VIOLATIONS.** Any person who violates any provision of this ordinance shall be subject to a penalty as prescribed by s. 30.04 of this Code, and shall have the costs of abatement or correction assessed as an additional penalty. Each day such violation continues shall be considered a separate offense. In addition to the forfeiture the
5. REPORTING PROTOCOL

Reporting & Submitting EAB Suspects & Samples

To help ensure that suspect samples are resolved as quickly and thoroughly as possible, all samples are to be sent to the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP). Please call or contact DATCP using the toll-free hotline or the e-mail address:

**HOTLINE:** 1-800-462-2803  
**E-MAIL:** eab@datcp.state.wi.us

All insect samples should be forwarded to DATCP, with a phone call to the hotline in advance to let DATCP staff know that a sample is being delivered. Please use the following address:

**EAB Coordinator**  
**DATCP**  
P.O. Box 8911  
Madison, WI 53708-8911

Photos also can be e-mailed to DATCPEmeraldAshBorer@wisconsin.gov

Please refer to the publication “How to Collect and Preserve Insect Specimens” for mailing instructions. It can be viewed in Section 6.d. of the toolkit.

Suspect samples will be sent to the USDA identifier (Dr. Jim Zablotny, APHIS–PPQ) in Michigan.

Confirmation of Wisconsin samples will be given high priority. The first state record has been and subsequent first county records will be confirmed by USDA.

### QUARANTINE INFORMATION

Confirmation of an *Agrilus planipennis* infestation will result in quarantine regulations covering resources which may spread EAB, including: ash trees, limbs, branches or 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 diameters; or any other item which could harbor any living stage of EAB and could transmit an infestation.

Two levels of quarantine are possible, federal and state. A federal quarantine will regulate interstate (between states, i.e., Michigan to Wisconsin) movement of covered materials; a state quarantine will regulate intrastate (within the state, i.e., Waukesha to Wausauke) movement. Both quarantines may be imposed concurrently—federal quarantines imposed on a statewide level while the state quarantines other geographical units. In almost all cases in Wisconsin, quarantines will be established at the county level. State regulation may be more stringent than federal regulation on movement of materials. Enforcement of
quarantines falls to state and federal agency staff. Financial penalties for violation of quarantines can be substantial.

USDA and DATCP staff will work with affected industries and communities to minimize the impact of quarantines. Compliance agreements are a common tool to allow companies to conduct business while protecting areas of the state not yet infested by the emerald ash borer.

**INITIAL INFESTATION ACTION PLAN**

When Emerald Ash Borer is first identified, the residents, landowners and businesses within the area will have immediate needs for information. Announcements of an infestation will also require a response to other interested parties throughout the state and in adjoining states.

An initial press conference should be held that includes:

- Announcement of find
- Summary of events leading to find
- Regulatory issue/Where do we go from here?
- Partners in response (relevant agency officials)

**Location: Residential Area**

Contacts:

A. Homeowner (EAB Positive Id)
   1. Should be contacted about positive identification prior to press release
   2. Provide information packet containing and discuss in person if possible
   3. Packet should contain: LIST OF PUBLICATIONS (ideas for some: tree removal information; don’t move firewood; landscape/wood checklist (to identify any new plantings and where they came from or if they gave plants or wood away); contact list for further questions; replacement trees

B. Local/City Forester
   1. Should be contacted about positive identification prior to press release
   2. Provide multiple copies of publications: LIST OF PUBLICATIONS

C. DNR Regional Urban Forestry Coordinator
   1. Is the Municipal Liaison and should be contacted about positive identification prior to press release

D. Local Officials (City president, legislators, local emergency planning committee)
   1. Should be contacted about positive identification prior to press release
   2. Offer to provide information packet

E. Public Meeting
   1. Schedule a public meeting as soon as possible after an official notification of a positive identification
   2. Prepare press release, media advisory, contact local media
   3. Attempt to offer an afternoon and evening meeting to accommodate schedules
4. Attendees: University of Wisconsin entomologists; City/local forester; DATCP technical specialists, DATCP PIO; USDA APHIS representative
5. Invite: local officials; UWEX county agents/horticulture agent, DNR warden and/or forester for the area; any nearby residents or landowners (within 1-2 miles of infestation site); nearby businesses
6. Provide maps, information packets for meeting attendees
7. Topics to cover: Survey, tree removal, recovery

**Quick Facts for Municipal Elected Officials**

1. When EAB is first confirmed in your municipality, your chief elected official and/or appropriate staff will promptly be notified by Wisconsin Department of Agriculture, Trade & Consumer Protection (DATCP) or Department of Natural Resources (DNR). Whenever possible, such notification is made by telephone.
2. After local notification, DATCP will issue a media advisory. News media may contact you for an interview. State staff will not call a press conference, but if you do, they will attend if invited.
3. Following notification, you will receive written confirmation of the EAB find. This follow-up letter will contain more complete information.
4. State agency experts may try to determine the extent of the EAB infestation. This surveying can take several months. Municipal staff may be asked to assist, if appropriate.
5. DATCP will quarantine your county and possibly adjacent counties to restrict movement of regulated ash material and all hardwood firewood, limiting further spread of EAB. DATCP will notify and work with affected businesses in the quarantine area to make their products safe for transport within the state, if possible. USDA APHIS will work with businesses on product transport outside Wisconsin.
6. State agencies may provide additional education & assistance for municipal officials and staff, residents, & businesses. DNR will direct you to the right resources to get your questions answered.
7. Generally, neither the federal nor state government will cut your ash trees or require you to cut ash trees. EAB is now considered to be permanently established in the upper Midwest and with current control tools, eradication is not possible.
6. CONTACTS

COMMUNITY READINESS TEAM

Good plans are useless without a way to implement them. A local readiness team can implement and guide the EAB plan, coordinate and communicate information, and keep abreast of changing circumstances. The readiness team leader should have good technical background and be well-connected in the community. Suggested team member roles and descriptions follow. (Note: Customize the team to your needs. A person can fill more than one role. Not all roles must be filled.)

Readiness Team Leader
Name/Title: John Kelliher/Director Parks, Recreation & Forestry Department
Address: 121 S. Silver Lake Street Oconomowoc, WI 53066
Phone: 262-569-2177  Cell: 414-315-0476
Fax: 262-569-3221  E-mail: jkelliher@oconomowoc-wi.gov
Tasks:
- oversee these team positions: Communications/Information/Public Relations Officer, Staff Training Expert, Fiscal Manager and Community Forestry Manager
- municipal contact for authorizing EAB actions; DATCP liaison for potential EAB finds within municipal jurisdiction
- with Communications/Public Relations Officer, assess training needs of municipal staff; approve public awareness messages/projects prior to implementation
- help site/locate marshalling yards with Community Forestry Manager & DATCP
- review municipal policy or ordinances for EAB appropriateness
- establish protocol for reporting EAB within the municipality

Communications/Information/Public Relations Officer
Name/Title: Bob Duffy/Director of Economic Development
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066
Phone: 262-569-2185  Cell: 262-894-1738
Fax: ___________________________  E-mail: bduffy@oconomowoc-wi.gov
Tasks:
- oversee these team positions: Media Relations Expert, Neighborhood Relations Expert, Business Relations Expert
- produce and distribute readiness plan to local officials, media and others as specified in the plan
- oversee public awareness events, arrange for press conferences, write press releases, publish articles in municipal newsletter, maintain EAB domain on municipal Web site
- provide updates to readiness team members

Media Relations Expert
Name/Title: __________________________
Address: __________________________________________
Phone: ___________________________  Cell: ___________________________
Fax: ___________________________  E-mail: ___________________________
Tasks:
- identify media outlets for status and progress reports
- identify sites & methods of providing public information
- identify speaking opportunities for the Communications/Public Relations Officer, such as service/civic organizations
- assist the Communications/Information/Public Relations Officer
Staff Training Expert
Name/Title: ________________________________________________________________
Address: _________________________________________________________________
Phone: ___________________________ Cell: _____________________________________
Fax: ______________________________ E-mail: ___________________________________
Tasks:
- assess staff expertise and experience
- provide or facilitate training for municipal staff, including public liaisons, department heads and public works employees
- provide training updates with changing EAB status

Neighborhood Relations Expert(s)
Ward/District/Geographic Area: All Aldermen and Parks and Recreation Board Members; See Attached Listing at end of document
Name/Title: ________________________________________________________________
Address: ____________________________________________________________________
Phone: ___________________________ Cell: _____________________________________
Fax: ______________________________ E-mail: ___________________________________
Tasks:
- serve as neighborhood contact and liaison between residents and the Communications/Public Relations Officer
- distribute news releases and informational materials as directed by the readiness team; larger communities may need several neighborhood relations experts

Business Relations Expert
Name/Title: ________________________________________________________________
Address: ____________________________________________________________________
Phone: ___________________________ Cell: _____________________________________
Fax: ______________________________ E-mail: ___________________________________
Reports to the Readiness Team Leader & Communications/Information/Public Relations Officer
Tasks:
- may be a chamber of commerce or local business representative, especially one connected with landscaping (e.g., realtor, land developer, nursery grower/retailer, landscaper or landscape service provider); larger communities may want representatives from both the commercial and industrial sectors
- sounding board for local businesses affected by EAB
- possible avenue for developing partnerships or funding

Fiscal Manager
Name/Title: Sarah Kitsembel/Finance Director
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066
Phone: 262-569-3234 Cell: 920-723-9776
Fax: ___________________________ E-mail: skitsembel@oconomowoc-wi.gov
- with Community Forestry Manager, analyze potential costs and budget impact associated with loss of public and private ash trees
- determine public tree reforestation costs
- communicate budget assessment to Public Relations Officer and EAB readiness team
- if infestation occurs, provide recordkeeping and financial oversight on all EAB related community functions
Community Forestry Manager
Name/Title: Bryan Spencer/Superintendent of Parks and Forestry
Address: 622 Worthington Street Oconomowoc, WI 53066
Phone: 262-569-2180 Cell: 262-719-8785
Fax: 262-569-6878 E-mail: bspencer@oconomowoc-wi.gov
Pre–EAB Tasks:
• coordinate with other municipal departments to secure resources for ground operations
• oversee these team positions: Community Forestry Technician, Debris Removal and Marshalling Yard Manager, Reforestation Advisor (Note: The Community Forestry Manager may fill some or all of these roles.)
• inventory/assess public and private ash trees, including number, size, condition
• estimate potential removal costs of public and private trees
• with Reforestation Advisor, produce tree replacement plan, to include species, sizes and root stock; planting timeline; priorities, etc.
• supervise field operations, surveys and site visits
• identify tree service contractors meeting minimum qualifications and municipal standards (e.g., required equipment, safety standards, expertise, insurance, bonding, etc.)
• establish tree service contracts
• create mutual aid agreements with other units of government, as appropriate
• arrange with electric utility to remove interfering ash trees

Tasks Following Infestation:
• oversee municipal tree removal and personnel, with DATCP direction as necessary
• with Debris Removal and Marshalling Yard Manager, secure disposal site and staging areas for marketable wood waste, as appropriate
• determine equipment needs for removals and transportation to marshalling yards
• with Debris Removal/Marshalling Yard manager, determine marshalling yard security needs
• with Fiscal Manager, secure funding or other methods for replacement planting
• with Neighborhood Relations Expert(s), coordinate tree removal and meet with residents about removal and reforestation

Community Forestry Technician
Name/Title: John Dudley/Tree Trimmer
Address: 622 Worthington Street Oconomowoc, WI 53066
Phone: 262-569-2180 Cell: ____________________
Fax: 262-569-6878 E-mail: __________________________
Tasks:
Reports to the Community Forestry Manager
• conduct day-to-day field operations with staff or contractors as directed by the Community Forestry Manager
• determine equipment available for tree removal, clean-up and transportation to marshalling yards
• assess staff qualifications/skills
• determine staffing levels and make work assignments for crews
Debris Removal and Marshalling Yard Manager
Name/Title: Bryan Spencer/Superintendent of Parks and Forestry
Address: 622 Worthington Street Oconomowoc, WI 53066
Phone: 262-569-2180 Cell: 262-719-8785
Fax: 262-569-6878. E-mail: bspencer@oconomowoc-wi.gov
Reports to the Community Forestry Manager
Pre–EAB Tasks:
• recommend and secure sites for marshalling yards, debris disposal or staging areas
• determine capacity, equipment needs and availability
• pre-arrange lease agreements if necessary
Tasks Following Infestation:
• oversee movement of infested wood
• determine transportation routes to marshalling yard in accordance with DATCP rules

Reforestation Advisor
Name/Title: Bryan Spencer/Superintendent of Parks and Forestry
Address: 622 Worthington Street Oconomowoc, WI 53066
Phone: 262-569-2180 Cell: 262-719-8785
Fax: 262-569-6878. E-mail: bspencer@oconomowoc-wi.gov
Reports to the Community Forestry Manager
Tasks:
• assess planting needs; develop species list
• with Community Forestry Manager, identify funding or other opportunities for reforestation
• with Neighborhood Relations Expert, coordinate reforestation meetings and conduct tree plantings
  with neighborhood groups

Additional positions as may be necessary

Name/Title: John Kelliher/Director Parks, Recreation & Forestry Department
Address: 121 S. Silver Lake Street Oconomowoc, WI 53066
Phone: 262-569-2177 Cell: 414-315-0476
Fax: 262-569-3221 E-mail: jkelliher@oconomowoc-wi.gov

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Address: ________________________________________________
Phone: ______________________________ Cell: _________________
Fax: ___________________________ E-mail: ______________________

Name/Title: ____________________________________________
Address: ________________________________________________
Phone: ______________________________ Cell: _________________
Fax: ___________________________ E-mail: ______________________
Neighborhood Relations Experts:
Name/Title: Michael Miller/Alderman
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066
Phone: 262-567-3465

Name/Title: Cathleen Slattery/Alderperson/Parks and Recreation Board Member
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066
Phone: 262-200-2888

Name/Title: Dave Nold/Alderman
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066
Phone: 262-567-2349
Name/Title: Jay Larson/Alderman
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066
Phone: 262-567-2665

Name/Title: Rich Allen/Alderman
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066
Phone: 262-567-3994

Name/Title: Ellie Cochrane/Alderperson
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066
Phone: __________________________

Name/Title: James Hall/Alderman
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066
Phone: 262-567-2126

Name/Title: Robert Morgan/Alderman
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066
Phone: 262-567-3360
Neighborhood Relations Experts (cont.):
Name/Title: Joseph Moroni/ Parks and Recreation Board Member
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066
Phone: 262-569-8074

Name/Title: Charlie Shaw/ Parks and Recreation Board Member
Address: 509 W. Fifth Street Oconomowoc, WI 53066
Phone: 262-569-7805

Name/Title: Bruce White/ Parks and Recreation Board Member
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066
Phone: 262-567-9250

Name/Title: Scott Antonneau/ Parks and Recreation Board Member
Address: 543 N. Oakwood Avenue Oconomowoc, WI 53066
Phone: 262-567-6457

Name/Title: Kiara Caldwell/ Parks and Recreation Board Member
Address: 449 W. Wisconsin Avenue Oconomowoc, WI 53066
Phone: 414-690-1978

Name/Title: Craig Pruschka/ Parks and Recreation Board Member
Address: 329 E. Pleasant Street Oconomowoc, WI 53066
Phone: 414-698-3935
MEDIA CONTACTS

Name/Title: Cynthia Acosta Luksich/Web Editor, Editorial Assistant
Media Outlet: Oconomowoc Focus Newspaper
Address: 810 Cardinal Lane, Hartland, WI 53029
Phone: 262-361-9133 Mobile: None
Fax: 262-367-1136 E-mail: cluksich@jcpgroup.com
Notes:_________________________________________________________________________
____________________________________________________________________________

Name/Title: Bill Yorth/Editor-in-Chief
Media Outlet: Oconomowoc Enterprise Newspaper
Address: 801 N. Barstow Street P.O. Box 7; Waukesha, WI 53087-0007
Phone: 262-513-2671 Mobile: None
Fax: 262-542-9024 E-mail: byorth@conley.net
Notes:_________________________________________________________________________
____________________________________________________________________________

Name/Title: ____________________________
Media Outlet: Oconomowoc Times On-Line
Address: ______________________________________
Phone: 262 613-9134 Mobile: __________________
Fax: _____________________________ E-mail: OT-Online.org
Notes:_________________________________________________________________________
____________________________________________________________________________
PUBLIC OFFICIAL CONTACTS

Name/Title: James Daley/Mayor  
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066  
Phone: 262-569-1111  
E-mail: jdaley@oconomowoc-wi.gov

Name/Title: Joel Kleefisch  
State Representative: 38th Assembly District  
Address: Room 321 East State Capitol P.O. Box 8952 Madison, WI 53708  
Phone: (608) 266-8551  
E-mail: Rep.Kleefisch@legis.wisconsin.gov

Name/Title: Neal Kedzie  
State Senator: 11th Senate District  
Address: Room 313 South State Capitol P.O. Box 7882 Madison, WI 53707-7882  
Phone: 608-266-2635  
E-mail: Sen.Kedzie@legis.wisconsin.gov

Name/Title: Mark Frye/ Public Works Director  
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066  
Phone: 262-569-2184  
E-mail: mfrye@oconomwoc-wi.gov

Name/Title: John Kelliher/Park & Rec. Director  
Address: 121 S. Silver Lake Street Oconomowoc, WI 53066  
Phone: 262-569-2177  
E-mail: jkelliher@oconomowoc-wi.gov

Name/Title: Michael Miller/Alderman  
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066  
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Address: 449 W. Wisconsin Avenue Oconomowoc, WI 53066  
Phone: 414-690-1978

Name/Title: Craig Pruschka/ Parks and Recreation Board Member  
Address: 329 E. Pleasant Street Oconomowoc, WI 53066  
Phone: 414-698-3935
## ORGANIZATION CONTACTS

Below is a list of local advisory groups, educators, local environmental/horticultural groups and tree advocacy groups within the municipality who have a vested interest in the Emerald Ash Borer.

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DULY AUTHORIZED REPRESENTATIVE Form

Name: __________________________________________

Title: __________________________________________

Address: ______________________________________

City/State/Zip: __________________________________

Phone: _________________________________________

Fax: ___________________________________________

Pager: _________________________________________

AfterHours: _____________________________________

Designated Reporting Location for ____________________________

Address __________________________________________

Reporting Location Map:
RESOURCES AVAILABLE FROM MUTUAL AID AGREEMENT OR OTHER MUNICIPALITIES

Resource Available:  □ Staff  □ Equipment  □ Facility

Dates Available: ________________________________________________________________

Resource Particulars: (i.e. staff expertise, type of equipment, size of facility, # of computer jacks etc.______________________________________________________________-

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

Name of Provider Municipality: ___________________________________________________

Contact Name/Title: __________________________________________________________

Address: ______________________________________________________________________

Phone: ______________________________ Mobile: ______________________________

Fax: ________________________________ E-mail: ________________________________

Is there a mutual aid agreement in effect?    □ Yes    □ No

Resource Available:  □ Staff  □ Equipment  □ Facility

Dates Available: ________________________________________________________________

Resource Particulars: (i.e. staff expertise, type of equipment, size of facility, # of computer jacks etc.______________________________________________________________-

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

Name of Provider Municipality: ___________________________________________________

Contact Name/Title: __________________________________________________________

Address: ______________________________________________________________________

Phone: ______________________________ Mobile: ______________________________

Fax: ________________________________ E-mail: ________________________________

Is there a mutual aid agreement in effect?    □ Yes    □ No
7. ASSESSMENT

Complete Urban Forest Inventories

Complete urban forest inventories can be accomplished a number of different ways including on-the-ground sampling and/or remote sensing analysis. The title of a “complete” inventory can be misleading because every tree within a community is typically not measured. The term “complete” more accurately implies that the inventory was designed to capture trees regardless of property boundaries (public and private) across the entire community. Studies have shown that trees on private property comprise 75% - 90% of all urban trees. By omitting this significant portion of the resource, the composition of the urban forest and benefits that it provides can be vastly misrepresented. Complete inventories allow community tree managers to understand what the entire forest population looks like within their community.

When using on-the-ground methods, representative sampling can save time and money relative to trying to document every tree within a community. Representative sampling uses random sample plots from around the community to acquire data. The data extrapolated from such a sample can provide reliable estimates of the community wide urban forest structure, composition, and health. Using this type of inventory isn’t as useful from a day-to-day management perspective because individual trees or locations are not identified. These inventories work well to track entire tree populations over time. Depending on the software, they can also work well for taking a snapshot in time. Modeling software such as the Urban Forest Effects Model (UFORE) that was developed by the U.S. Forest Service utilizes inventory data to quantify the benefits urban trees provide including carbon storage and sequestration, air pollution removal, and energy savings. By quantifying the values of the urban forest, it is much easier to illustrate the significant contributions urban trees make to society.

Urban application of remote sensing technology is an up and coming possibility. This method uses satellite imagery or aerial photographs to map the entire tree canopy within an urban area. The advantage to this method is that it is comprehensive and captures the entire urban tree canopy regardless of property ownership or accessibility issues. A disadvantage is that most of this technology does not yet allow for individual species identification. If tree managers are specifically looking to locate the ash within their community, doing a remote sensing assessment is probably not the best option. There is, however, technology on the horizon called hyperspectral imagery that would enable species identification from satellite imagery. At the moment, the technology is likely too expensive to be considered for an individual community assessment.

Remote sensing analysis also allows for quantifying the benefits associated with urban trees. Modeling programs such as CITYGREEN by American Forests use the GIS layers created during the imagery analysis to make similar benefit estimates as UFORE (carbon storage/sequestration, air pollution, storm water reduction). These numbers can then be taken to community leadership to articulate the value of urban trees and urban forestry.
Street Tree Inventories

Street tree inventories can be used by communities of all sizes to document and manage trees along roads and within the public right-of-way. They are conducted using a variety of on-the-ground sampling methods ranging from a relatively quick windshield survey to the more detailed walking survey using notepads to PDA’s or Personal Digital Assistants. Full documentation of street trees is useful for identifying the species, location, and condition of the trees the community government is responsible for maintaining. This information can then be used to identify areas of susceptibility (high ash component), low diversity (species and/or age), and future planting opportunities. In addition, community forest management plans (planting, pruning, removal) can be developed to provide direction for urban forestry initiatives. The “Inventory Decision Model” matrix (Section 5.c.1) is designed to help determine which inventory approach might be most appropriate for your community based on street tree population, community size as well as available staff to both maintain and use the inventory.

Street tree inventories can be an easier ‘sell’ to community leadership because they only deal with publicly owned trees. With close proximity to many citizens, prompt identification of declining street trees is imperative for liability reasons. Street tree inventories can also help to tie in the importance of trees and their locations compared to other community or departmental infrastructure e.g. street signs, fire hydrants, electric and water lines etc. through GIS or Graphic Information System. Forestry, Water (reduced overland flow), and Utility (maintenance trends) departments can all benefit from maintenance of an integrated inventory.

Commercially available inventory software can streamline the process by assisting with data input and analysis. Many programs can integrate the tree location and condition data with work order requests to help with City wide maintenance planning. While having a higher up front cost, commercial programs can save time/money over time and are generally cost effective for communities choosing to use them.

Free street tree analysis software is also available from the US Forest Service within the i-Tree suite. The Street Tree Management Tool for Urban Forest Managers (STRATUM) uses inventory data to quantify the structure, function and value of a street tree resource. STRATUM provides a snap shot of the street tree resource but should generally not be used for ongoing inventories because it does not define specific locations or conditions of trees.

Should your community be interested in having an inventory performed there are several urban forestry consultants available in our state, refer to: http://dnr.wi.gov/org/land/forestry/uf/resources/ufconsultants2007.pdf. A number of inventory software options (commercial and freeware) for completing in-house work or by a consultant are listed at www.na.fs.fed.us/urban/inforesources/inventory. This is not a comprehensive list and any software omissions are unintentional.
Park and Open Space Inventories

Park and open space 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.

Some trees in parks and open spaces typically do not need to be inventoried as often or as thoroughly as street trees because they are in areas of lower pedestrian traffic. Because of this, these trees pose a lower liability risk and do not need to be documented as intensely. It is still a good idea to keep tabs on the resource in the interest of overall species diversity and forest management practices.

There are other trees within parks that should be more closely monitored; these would be trees within manicured areas (i.e. along trails, picnic tables, playground equipment, mowed areas, etc) which experience higher use. These areas are designed to be inviting and keeping tabs on the health and condition of trees in this area is in the community’s best interest. A documented risk assessment program can help to identify trees prone to failure and preemptively deal with them. 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.
HOW TO CONDUCT A WOODLOT SURVEY

To determine the number of ash per acre use the following steps:

1. Determine how many acres you are surveying.
2. Determine how many sample plots you will need. For small stands (15 acres or less) you will need one sample plot per acre. For areas greater than 15 acres, take one sample plot for every 2 acres (however, 20 to 25 samples should provide an adequate estimate for most stands).
3. To randomly select the sample plots walk 250’ into the woodlot and take the first sample plot. Walk another 250’ and take another sample. Continue to do this in a relatively straight line until you reach the edge of the woodlot. If you do not have enough sample plots, enter the woodlot from a different starting point and continue this process until you have reached the number of sample plots you need.
4. To estimate the number of ash per acre, using a string or tape measure, lay out a circular plot with a radius of 26.3 feet. This circle is 1/20th of an acre in area.
5. Count the number of ash in each size category (small 1 – 4”, medium 5” – 14” and large >15”) in the circle and multiply that number by 20 to estimate the number ash per acre.

Here’s an example:
You have a 5 acre natural area in one of your municipal parks. You would like to determine roughly how many ash are in that area. You select 5 sample plots, each 1/20th of an acre in size, and count the number of ash in each one.

Here are the numbers that you come up with:

<table>
<thead>
<tr>
<th>Plot Number</th>
<th>ASH</th>
<th>ASH</th>
<th>ASH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DBH 1-4”</td>
<td>DBH 5-14”</td>
<td>DBH 15+”</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Sum Total Trees in all Plots</td>
<td>62</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>Divide by # of Plots Tallied</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Average # of trees per plot</td>
<td>12.4</td>
<td>3.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Multiply by PEF¹</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Average number of Trees per Acre</td>
<td>248</td>
<td>64</td>
<td>24</td>
</tr>
<tr>
<td>Multiply by Stand Acres</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Estimated Total trees</td>
<td>1240</td>
<td>320</td>
<td>120</td>
</tr>
</tbody>
</table>

The average number is 16.8 ash per sample plot. Now multiple this number by 20 which equals 336 ash trees per acre. Now multiple 336 ash times the number of acres which equals 1,680 ash trees in your natural area.
WOODLOT SURVEY TALLY SHEET FOR FIXED PLOT SIZE

Property ________________________    Stand _______    Acres _______
Estimator _______________________    Date ___________    Plot Size ______

<table>
<thead>
<tr>
<th>Plot Number</th>
<th>ASH</th>
<th>Total Tree Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DBH 1-4”</th>
<th>DBH 5-14’’</th>
<th>DBH 15+’’</th>
<th>ASH</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sum Total Trees in all Plots

Divide by # of Plots Tallied

Average # of trees per plot

Multiply by PEF

Average number of Trees per Acre

Multiply by Stand Acres

Estimated Total trees

Emerald Ash Borer Readiness Plan – November 2011
City of Oconomowoc Wisconsin

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**Fix Radius Plot Method**

1. Determine Plot Size based on Avg. Stand Diameter
   - Avg. DBH 1-4” use 1/20 ac. plot
   - Avg. DBH 5-14” use 1/10 ac. plot
   - Avg. DBH 15+” use 1/5 acre plot

2. Take sufficient number of plots for stand size
   - < 15 acres: 1 plot per 1 acre (plots about 210’ apart)
   - > 15 acres: 1 plot per 2 acres (plots about 300’ apart)

3. Establish plot center (stake or 2nd person)
4. Systematically Tally the number of all trees in plot using a radius measure (string or tape measure)
5. Compute Avg. # Trees per Acre and Estimated Total # Trees.

<table>
<thead>
<tr>
<th>Plot Size (acres)</th>
<th>Radius (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/20 (0.05 ac)</td>
<td>26.33’</td>
</tr>
<tr>
<td>1/10 (0.1 ac)</td>
<td>37.25’</td>
</tr>
<tr>
<td>1/5 (0.2 ac)</td>
<td>52.67’</td>
</tr>
</tbody>
</table>

1. PEF – Plot Expansion Factor

   \[
   PEF = \frac{1}{\text{plot size (acres)}}
   \]

   i.e. 1/20 ac. Plot: \( \frac{1}{1/20} \) = 20 PEF

---

**FIXED RADIUS PLOT**

“Center” of tree at 4½ ft must be within the plot boundary to be tallied.

- Ash tree “in”
- Other tree “in”
- Tree “out”
ASH SPECIES FREQUENCY – STREETS

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Species Count</th>
<th>Species Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Ash</td>
<td>38</td>
<td>12.8%</td>
</tr>
<tr>
<td>White Ash</td>
<td>258</td>
<td>87.2%</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>296</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

ASH SPECIES FREQUENCY – PARKS/OPEN SPACE

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Species Count</th>
<th>Species Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Ash</td>
<td>145</td>
<td>86.8%</td>
</tr>
<tr>
<td>White Ash</td>
<td>19</td>
<td>11.4%</td>
</tr>
<tr>
<td>European Ash</td>
<td>3</td>
<td>1.8%</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>167</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

ASH INVENTORY SUMMARY

**Street Trees**

Ash public street tree population for the City of Oconomowoc 296

*From City of Oconomowoc GIS database as of 10/24/2011*

Size ranges for the ash street trees are as follows:

<table>
<thead>
<tr>
<th>DBH Class</th>
<th># of Trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 3”</td>
<td>99</td>
</tr>
<tr>
<td>4 - 6”</td>
<td>40</td>
</tr>
<tr>
<td>7 - 12”</td>
<td>69</td>
</tr>
<tr>
<td>13 - 18”</td>
<td>49</td>
</tr>
<tr>
<td>19”- 24”</td>
<td>26</td>
</tr>
<tr>
<td>25 – 30”</td>
<td>10</td>
</tr>
<tr>
<td>30” +</td>
<td>3</td>
</tr>
</tbody>
</table>

Condition ratings for the ash street trees are as follows:

<table>
<thead>
<tr>
<th>Condition Class</th>
<th># of Trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good (70%+)</td>
<td>28</td>
</tr>
<tr>
<td>Fair (50-70%)</td>
<td>158</td>
</tr>
<tr>
<td>Poor (30-50%)</td>
<td>107</td>
</tr>
<tr>
<td>Very Poor (&lt;30%)</td>
<td>3</td>
</tr>
</tbody>
</table>
Park/Open Space Trees

Ash public park/open space tree population for the City of Oconomowoc

From Wachtel Tree Science Inventory July 2011

Size ranges for the ash park/open space trees are as follows:

<table>
<thead>
<tr>
<th>DBH Class</th>
<th># of Trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 3”</td>
<td>8</td>
</tr>
<tr>
<td>4 - 6”</td>
<td>11</td>
</tr>
<tr>
<td>7 - 12”</td>
<td>32</td>
</tr>
<tr>
<td>13 - 18”</td>
<td>50</td>
</tr>
<tr>
<td>19” - 24”</td>
<td>47</td>
</tr>
<tr>
<td>25 – 30”</td>
<td>16</td>
</tr>
<tr>
<td>30” +</td>
<td>3</td>
</tr>
</tbody>
</table>

Condition ratings for the ash park/open space trees are as follows:

<table>
<thead>
<tr>
<th>Condition Class</th>
<th># of Trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good (70%+)</td>
<td>2</td>
</tr>
<tr>
<td>Fair (50-70%)</td>
<td>159</td>
</tr>
<tr>
<td>Poor (30-50%)</td>
<td>5</td>
</tr>
<tr>
<td>Very Poor (&lt;30%)</td>
<td>1</td>
</tr>
</tbody>
</table>
Ash Tree Values & Uses

What is the landscape value of a 12” dbh (diameter at breast height) ash street tree in good condition? Based on landscape tree valuation formulas, such a tree is worth approximately $1470. Valuation is a common feature of tree inventory software and can be used to determine landscape value of a municipality’s entire public tree resource or to assess tree damages from construction injury, vandalism, etc. Landscape value is often much higher than the utilization (lumber) value of individual trees in urban settings. These values were derived using guides developed by the Council of Tree & Landscape Appraisers.

What is the lumber value of a 12” dbh ash tree? A 12-inch tree will yield one 8-foot length log or possibly a 16-foot length log. The DNR ash stumpage rates vary by zones within the state (13 zones in all) and depend heavily on log quality as well as other factors. Currently (11-1-07) the average value per thousand board feet taken across those 13 zones is approximately $131, with a low of $90 and a high of $171. A 12”, 8 – foot log would yield approximately 30 board feet at a value of $3.93, to review what values may be applicable in your portion of the state go to the Stumpage Value rate sheet for logs, page 411 of website listed below. http://www.legis.state.wi.us/rsb/code/nr/nr046.pdf Take note that these rates are determined on an annual basis and will vary per micro area, the volume available, along with the current market, but this is at least a starting point.

What is the value of the benefits provided by one healthy 20-year-old urban tree in the upper Midwest? According to USDA Forest Service calculations, such a tree provides $96 per year in energy savings, storm water management and air pollution abatement. The annual cost for that same tree averages $36, which includes planting, pruning, irrigation, sidewalk repair, and other factors. The annual net value of the benefits provided by this 20-year-old tree is $60. USDA Forest Service research data is from: Midwest Community Tree Guide: Benefits, Costs, and Strategic Planting. NS-TP-05-05.

What are some of the uses of our urban ash? Mulch and firewood are most common, but ash can also be milled, on site, into lumber using a portable sawmill, or transported to a mill or a marshalling yard within a quarantined area. Other products include railroad ties, paneling, flooring, moldings, pallets and baseball bats. Ash can also be used for many other products that we see everyday and take for granted - picnic tables in a park, bleacher seating, tree and survey stakes, sideboards for trucks and handles for tools like hammers and rakes; ash chips can even be used for animal bedding.

Are there any lists of companies who use or process wood or wood products? Yes, the Wisconsin Primary Wood Using Directory is a listing of all the companies in Wisconsin using round wood. This is sawmills, veneer plants, particle board plants, log cabin, pulp mills, chip plants. The directory lists the products they produce and the raw material that they need. The Wisconsin Secondary Wood Using Directory is a listing of all the companies in Wisconsin that use products produced by the primary wood using industry to make a product. This is furniture, parts, pallets, moldings, kitchen cabinets, etc. The directory lists the products they produce and the raw material needed. You can use either directory on line or download the access data bases.

http://www.woodindustry.forest.wisc.edu/ Either way has easy to use pull down menus to search the data base. The Wisconsin Wood Residue Brokers list is a listing of the firms that buy sawdust, bark and shaving and market it to other manufactures. The list can be downloaded from the University of Wisconsin Extension web site. http://forest.wisc.edu/extension/publications/103.pdf
Besides the companies that process wood and wood products, are there portable sawmill operators who would come to our municipality and cut lumber for our use, or to be sold? There is no listing of these operators as most do not provide this service as their primary source of income, however the local DNR forester in your county may be aware of these operators. To peruse the list of both DNR and Cooperating foresters per county, use the Forestry Assistance Locator website: [http://dnr.wi.gov/forestry/private/assist/coopforesters/](http://dnr.wi.gov/forestry/private/assist/coopforesters/)

What type of training might be available to municipalities, tree crews and others regarding ash utilization? In other states, workshops on utilization techniques and marketing strategies were held. These training programs have increased the skill level among local industry members (especially for entrepreneurs), but have also encouraged networking and discussion regarding utilization of EAB-impacted ash trees. Classes have been held on chainsaw safety/timber felling (this included some bucking information), how to preserve log value when removing trees, log grading, sawing, railroad tie production, kiln drying, lumber grading and marketing. Any future local and regional wood utilization training opportunities will be posted on the WI-DNR’s Urban Forestry web site [http://www.state.wi.us/forestry/uf/](http://www.state.wi.us/forestry/uf/) and listed in the UF Insider.

**Community Wood Utilization Options**

Please contact the companies listed at this link [http://dnr.wi.gov/forestry/um/utilization_list.htm](http://dnr.wi.gov/forestry/um/utilization_list.htm) for information about their services, products and custom orders. For more information on EAB and wood utilization visit the [WDNR EAB Toolkit](http://www.wdnr.dnr.wi.gov/forestry/eab/) and scroll down to section 8.
COMMUNITY FACT SHEET

The Emerald Ash Borer (EAB) is an exotic woodborer that was found attacking and killing ash trees in Michigan during 2002. Since its detection, EAB has killed millions of ash trees and is now found in Illinois, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, Wisconsin and Ontario and Quebec Canada. EAB is easily spread through the movement of firewood, logs and nursery stock. Even though EAB has NOT been found in Oconomowoc, it may already be here.

The City of Oconomowoc has an estimated:

- 463 public ash trees (streets/parks/open space) that were located and cataloged during public tree inventories conducted in 2006 and 2011

The estimated cost of removal over a 5-year period is:

- $185,545 for 463 publicly owned ash trees

The estimated cost of replanting 463 trees (2” caliper @ $400/tree) is:

- $185,200 for publicly owned trees

Currently, the City of Oconomowoc is doing the following to prepare for the arrival of Emerald Ash Borer:

- Completed a comprehensive street/parks/open space tree inventory for the entire City which included numbers and locations of all other tree species in addition to ash species.
- Exploring various options of remove/replace/treat to come up with the best mix financially and aesthetically for the City
- Reviewing City ordinances to possibly include language about EAB.
- Giving awareness training to City staff who will respond to EAB.
- Continuing a public awareness campaign including publications and an EAB informational session.

Now that EAB has arrived, the Wisconsin Department of Agriculture, Trade and Consumer Protection will continue determine the extent of new infestations, quarantine the affected areas, and develop plans of action based on the infestation and available resources. Removal will most likely be the responsibility of municipalities and private residents per their local ordinances.

Don’t wait until the City looks like this. Let's start planning now.
## STAFF RESOURCES

<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
<th>Phone #</th>
<th>Chain Saw</th>
<th>Felling</th>
<th>Chipper</th>
<th>CDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Dudley</td>
<td>Parks Department</td>
<td>262-569-2180</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Yes</td>
</tr>
<tr>
<td>Justin Hollatz</td>
<td>Parks Department</td>
<td>262-569-2180</td>
<td></td>
<td>X</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Jeff Kessenich</td>
<td>Parks Department</td>
<td>262-569-2180</td>
<td></td>
<td></td>
<td>X</td>
<td>Yes</td>
</tr>
<tr>
<td>Erik Olson</td>
<td>Parks Department</td>
<td>262-569-2180</td>
<td></td>
<td>X</td>
<td>X</td>
<td>Yes</td>
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<tr>
<td>Equipment</td>
<td>Department</td>
<td>Contact</td>
<td>Notes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----------------------------------</td>
<td>-----------------</td>
<td>---------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trucks for Hauling</td>
<td>Department of Public Works</td>
<td>Gary Wohlfeil</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Wheel Loader</td>
<td>Department of Public Works</td>
<td>Gary Wohlfeil</td>
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<tr>
<td>15” Chipper</td>
<td>Parks Department</td>
<td>Bryan Spencer</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>65’ Bucket Truck</td>
<td>Parks Department</td>
<td>Bryan Spencer</td>
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<tr>
<td>Chainsaws</td>
<td>Parks Department</td>
<td>Bryan Spencer</td>
<td></td>
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<tr>
<td>Stump Grinder</td>
<td>Parks Department</td>
<td>Bryan Spencer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small Chipper</td>
<td>Utilities</td>
<td>Dennis Bednarski</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bucket Trucks of Various Working Heights</td>
<td>Utilities</td>
<td>Dennis Bednarski</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### FACILITIES FOR MEETINGS/PRESENTATIONS

**Building/Room: Community Center/Main Meeting Room**  
Address: 324 Wisconsin Avenue  Oconomowoc, WI 53066  
Contact Person: John Kelliher  
Phone #: 262-569-2177  
Email: jkelliher@oconomowoc-wi.gov  
Seating Capacity: 265

<table>
<thead>
<tr>
<th>Room Features</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>X Room darkens/blinds close</td>
<td></td>
<td></td>
<td></td>
<td>X Refreshments allowed</td>
<td></td>
</tr>
<tr>
<td>X Screen/white wall</td>
<td></td>
<td></td>
<td>X Chairs/tables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X PowerPoint projector</td>
<td></td>
<td>X Handicap accessible</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Laptop computer</td>
<td></td>
<td>X Room easily found</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Dry erase/chalk boards</td>
<td></td>
<td></td>
<td>X Microphone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Adequate parking</td>
<td></td>
<td></td>
<td>X Laser pointer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Restrooms</td>
<td></td>
<td></td>
<td>X Power cords</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Building/Room: Community Center/Main Meeting Room 1**  
Address: 324 Wisconsin Avenue  Oconomowoc, WI 53066  
Contact Person: John Kelliher  
Phone #: 262-569-2177  
Email: jkelliher@oconomowoc-wi.gov  
Seating Capacity: 176

<table>
<thead>
<tr>
<th>Room Features</th>
<th></th>
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<tr>
<td>X Room darkens/blinds close</td>
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<td></td>
<td></td>
<td>X Refreshments allowed</td>
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<td>X Screen/white wall</td>
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<td>X Chairs/tables</td>
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<td>X PowerPoint projector</td>
<td></td>
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<td>X Handicap accessible</td>
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<tr>
<td>X Laptop computer</td>
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<td>X Room easily found</td>
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<tr>
<td>X Dry erase/chalk boards</td>
<td></td>
<td></td>
<td>X Microphone</td>
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<tr>
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<td></td>
<td>X Laser pointer</td>
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<tr>
<td>X Restrooms</td>
<td></td>
<td></td>
<td>X Power cords</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Building/Room: Community Center/Main Meeting Room 2**  
Address: 324 Wisconsin Avenue  Oconomowoc, WI 53066  
Contact Person: John Kelliher  
Phone #: 262-569-2177  
Email: jkelliher@oconomowoc-wi.gov  
Seating Capacity: 88
Room Features:

- X Room darkens/blinds close
- X Screen/white wall
- X PowerPoint projector
- X Laptop computer
- X Dry erase/chalk boards
- X Adequate parking
- X Restrooms
- X Refreshments allowed
- X Chairs/tables
- X Handicap accessible
- X Room easily found
- X Microphone
- X Laser pointer
- X Power cords

Building/Room: **Community Center/Meeting Room**

Address: 324 Wisconsin Avenue Oconomowoc, WI 53066

Contact Person: John Kelliher

Phone #: 262-569-2177  Email: jkelliher@oconomowoc-wi.gov

Seating Capacity: 10

Room Features:

- X Room darkens/blinds close
- X Screen/white wall
- X PowerPoint projector
- X Laptop computer
- X Dry erase/chalk boards
- X Adequate parking
- X Restrooms
- X Refreshments allowed
- X Chairs/tables
- X Handicap accessible
- X Room easily found
- X Microphone
- X Laser pointer
- X Power cords

Building/Room: **Community Center/Classroom**

Address: 324 Wisconsin Avenue Oconomowoc, WI 53066

Contact Person: John Kelliher

Phone #: 262-569-2177  Email: jkelliher@oconomowoc-wi.gov

Seating Capacity: 35

Room Features:

- X Room darkens/blinds close
- X Screen/white wall
- X PowerPoint projector
- X Laptop computer
- X Dry erase/chalk boards
- X Adequate parking
- X Restrooms
- X Refreshments allowed
- X Chairs/tables
- X Handicap accessible
- X Room easily found
- X Microphone
- X Laser pointer
- X Power cords
Building/Room: **Community Center/Dance Room**
Address: 324 Wisconsin Avenue Oconomowoc, WI 53066
Contact Person: John Kelliher
Phone #: **262-569-2177** Email: jkelliher@oconomowoc-wi.gov
Seating Capacity: **50**

Room Features:
- [X] Room darkens/blinds close
- [X] Screen/white wall
- [X] PowerPoint projector
- [X] Laptop computer
- [X] Dry erase/chalk boards
- [X] Adequate parking
- [X] Restrooms
- [X] Refreshments allowed
- [X] Chairs/tables
- [X] Handicap accessible
- [X] Room easily found
- [X] Microphone
- [X] Laser pointer
- [X] Power cords
DISTRIBUTION LOCATIONS/EVENTS FOR EAB MATERIALS

Below is a list of public places where EAB information can be distributed. (Examples: library, city hall, display board locations, church, school…)

Name of site/event: City Hall
Contact person (for permission): Diane Coenen
Address: 174 E. Wisconsin Avenue Oconomowoc, WI 53066
Phone: 569-2198 E-mail: dcoenen@oconomowoc-wi.gov
Dates of: original distribution 2012 restocking As needed
List of materials to be distributed at this site:
____________________________________________________________________________
____________________________________________________________________________

Name of site: Parks, Recreation and Forestry Department
Contact person (for permission): John Kelliher
Address: 121 S. Silver Lake Street Oconomowoc, WI 53066
Phone: 262-569-2199 E-mail: oconpr@wisconsin-wi.gov
Dates of: original distribution 2012 restocking As needed
List of materials to be distributed at this site:
____________________________________________________________________________
____________________________________________________________________________

Name of site: City of Oconomowoc Library
Contact person (for permission): Ray McKenna
Address: 200 South Street Oconomowoc, WI 53066
Phone: 262-569-2194 Extension 207 E-mail: www.oconomowoc.lib.wi.us
Dates of: original distribution 2012 restocking As needed
List of materials to be distributed at this site:
____________________________________________________________________________
____________________________________________________________________________
TREE REMOVAL CONTRACTORS (PRE-APPROVED)

Company: ____________________________________________________________

Contact Name/Title: ___________________________________________________

Address: ___________________________________________________________________________

Phone: ____________________________ Mobile: ____________________________

Fax: ____________________________ E-mail: ____________________________

ISA Certified: ___yes ___no   Attended local EAB Procedural Training: ____yes ____no

Bonded: ____yes ____ no (-if applicable- →) Permit obtained: ___yes ___no

Municipal Process: □ Bid submitted □ Bid approved

Qualifications: ___________________________________________________________________

Notes: ____________________________________________________________________________


Company: ____________________________________________________________

Contact Name/Title: ___________________________________________________

Address: ___________________________________________________________________________

Phone: ____________________________ Mobile: ____________________________

Fax: ____________________________ E-mail: ____________________________

ISA Certified: ___yes ___no   Attended local EAB Procedural Training: ____yes ____no

Bonded: ____yes ____ no (-if applicable- →) Permit obtained: ___yes ___no

Municipal Process: □ Bid submitted □ Bid approved

Qualifications: ___________________________________________________________________

Notes: ____________________________________________________________________________

______________________________________________________________________________
DEBRIS HANDLING LOCATIONS

Currently, debris from tree removals is brought to:

Name of site: Department of Public Works Yard
Location of site: 622 Worthington Street Oconomowoc, WI 53066
Is this site used for public drop-off:  □ Yes   X No
Will it be used as a public drop-off site for EAB removals:  □ Yes   X No
Size of area in acres:  3   Will this site be large enough for all EAB removals:  X Yes   □ No
Notes: __________________________________________________________

Other potential debris handling locations:

Sections of municipality to be serviced at this site: __________________________
Location of site: __________________________________________________________
Company: __________________________________________________________________
Contact Name/Title: _________________________________________________________
Phone: ___________________________ Email: _________________________________
Size of site in acres: __________ Distance from municipality: ______________________
Hours of Operation: _______________________________________________________
Approximate costs: _________________________________________________________
Directions for traveling to site to minimize potential spread of EAB: ________________
________________________________________________________________________
________________________________________________________________________
Notes: _____________________________________________________________________
________________________________________________________________________
Sections of municipality to be serviced at this site: _____________________________________
Location of site: ________________________________________________________________
Company: _____________________________________________________________________
Contact Name/Title: _____________________________________________________________
Phone: ________________________________  Email: _________________________________
Size of site in acres: __________  Distance from municipality: ___________________________
Hours of Operation: _____________________________________________________________
Approximate costs: _____________________________________________________________
Directions for traveling to site to minimize potential spread of EAB: _________________
____________________________________________________________________________
____________________________________________________________________________
Notes: ________________________________________________________________________

Sections of municipality to be serviced at this site: _____________________________________
Location of site: ________________________________________________________________
Company: _____________________________________________________________________
Contact Name/Title: _____________________________________________________________
Phone: ________________________________  Email: _________________________________
Size of site in acres: __________  Distance from municipality: ___________________________
Hours of Operation: _____________________________________________________________
Approximate costs: _____________________________________________________________
Directions for traveling to site to minimize potential spread of EAB: _________________
____________________________________________________________________________
____________________________________________________________________________
Notes: ________________________________________________________________________
DEBRIS REMOVAL & TRUCKING CONTRACTORS (PRE-APPROVED)

Company: Kettle Moraine Hardwoods
Contact Name /Title: Bob Wesp
Address: 5261 Aurora Rd., Hartford, WI 53027
Phone: (262) 644-8119 Mobile: (414) 520-9378
Fax: (262) 644-7814 E-mail: bob@kmhardwoods.com
Driver’s insurance current: ___yes ___ no CDL current: (if applicable) ___yes ___ no
Permit obtained: (if applicable) ___yes ___ no
Notes: ______________________________________________________________________
____________________________________________________________________________

Company: White Oak Farm, LLC
Contact Name /Title: __________________________________________________ _________
Address: W360 N8515 Brown Street Oconomowoc, WI 53066
Phone: (920) 355-4042 Mobile: ______________________________
Fax: (920) 355-4043 E-mail: www.monstergrinder.com
Driver’s insurance current: ___yes ___ no CDL current: (if applicable) ___yes ___ no
Permit obtained: (if applicable) ___yes ___ no
Notes: ______________________________________________________________________
____________________________________________________________________________

Company: _____________________________________________________________________
Contact Name /Title: __________________________________________________ _________
Address: ________________________________
Phone: ______________________________ Mobile: __________________________________
Fax: ________________________________ E-mail:___________________________________
Driver’s insurance current: ___yes ___ no CDL current: (if applicable) ___yes ___ no
Permit obtained: (if applicable) ___yes ___ no
Notes: ______________________________________________________________________
____________________________________________________________________________
CHIPPING CONTRACTORS (PRE-APPROVED)

Company: Wachtel Tree Science and Service, Inc.
Contact Name/Title: John Gall
Address: P.O. Box 716 Merton, WI 53056
Phone: 262-538-1900 Mobile: ___________________________
Fax: ___________________________ E-mail: www.healtytrees.com
ISA Certified: _X__yes ____no Attended local EAB Procedural Training: ____yes ____no
Bonded: ____yes ____ no (-if applicable- ➔) Permit obtained: ____yes ____no
Municipal Process: □ Bid submitted □Bid approved
Qualifications:______________________________________________________________
Notes: _________________________________________________________________

Company: First Choice Tree Care, Inc. (Southeast)
Contact Name/Title: Ken Ottman
Address: 9900 Grandville Rd, Mequon, WI 53097
Phone: 262-691-2217 Mobile: ___________________________
Fax: ___________________________ E-mail: info@firstchoicetreecare.com
ISA Certified: _X__yes ____no Attended local EAB Procedural Training: ____yes ____no
Bonded: ____yes ____ no (-if applicable- ➔) Permit obtained: ____yes ____no
Municipal Process: □ Bid submitted □Bid approved
Qualifications:______________________________________________________________
Notes: _________________________________________________________________

Company: Good Tree Care Co.
Contact Name/Title: Greg Good
Address: N55 W28311 Hwy K Hartland, WI 53029
Phone: 262-538-1703 Mobile: 262-719-0100
Fax: ___________________________ E-mail: ___________________________
ISA Certified: _X__yes ____no Attended local EAB Procedural Training: ____yes ____no
Bonded: ____yes ____ no  (-if applicable- →) Permit obtained: ____yes ____ no  
Municipal Process: □ Bid submitted □ Bid approved  
Qualifications:__________________________________________________________________  
Notes: ________________________________________________________________________  
______________________________________________________________________________

Company:  Davey Tree and Lawn Care  
Contact Name/Title:  Chuck Shouse, Manager  
Address:  2180 S. Danny Rd New Berlin, WI 53146  
Phone:  262-561-1860  Mobile: _____________________________  
Fax: _____________________________ E-mail:  
ISA Certified: __X__yes ____no  Attended local EAB Procedural Training: ____yes ____ no  
Bonded: ____yes ____ no  (-if applicable- →) Permit obtained: ____yes ____ no  
Municipal Process: □ Bid submitted □ Bid approved  
Qualifications:__________________________________________________________________  
Notes: ________________________________________________________________________  
______________________________________________________________________________

Company:  Buckley Tree Service  
Contact Name/Title: _____________________________________________________________  
Address:  1700 S. Johnson Rd New Berlin, WI 53146  
Phone:  262-547-4732  Mobile: _____________________________  
Fax: _____________________________ E-mail: office@buckleytree.com  
ISA Certified: __X__yes ____no  Attended local EAB Procedural Training: ____yes ____ no  
Bonded: ____yes ____ no  (-if applicable- →) Permit obtained: ____yes ____ no  
Municipal Process: □ Bid submitted □ Bid approved  
Qualifications:__________________________________________________________________  
Notes: ________________________________________________________________________  
______________________________________________________________________________
## LOCAL ASH BUYERS (POTENTIAL)

| Company: | __________________________________________________________________________________|
| Contact Name/Title: | __________________________________________________________________________________|
| Address: | __________________________________________________________________________________|
| Phone: | ___________________________ Mobile: ___________________________ |
| Fax: | ___________________________ E-mail: ___________________________ |
| Attended local EAB procedures training: | ____yes ____no |
| Willing to pay: | __________________________________________________________________________________|
| Notes: | __________________________________________________________________________________|

| Company: | __________________________________________________________________________________|
| Contact Name/Title: | __________________________________________________________________________________|
| Address: | __________________________________________________________________________________|
| Phone: | ___________________________ Mobile: ___________________________ |
| Fax: | ___________________________ E-mail: ___________________________ |
| Attended local EAB procedures training: | ____yes ____no |
| Willing to pay: | __________________________________________________________________________________|
| Notes: | __________________________________________________________________________________|
ASH UTILIZATION POSSIBILITIES

Idea for Utilization: ___________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
Department/Company Involved: _____________________________________________________
Contact Name/Title: _____________________________________________________________
Address: ______________________________________________________________________
Phone: ______________________ E-mail: _____________________________________________

Idea for Utilization: _____________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
Department/Company Involved: _____________________________________________________
Contact Name/Title: _____________________________________________________________
Address: ______________________________________________________________________
Phone: ______________________ E-mail: _____________________________________________
FUNDING ALTERNATIVES

Now that the emerald ash borer has been identified in Wisconsin, communities are faced with substantial removal and replacement costs. As additional viable treatments are developed, these won’t be free either. Federal, state and local governments and private property owners will all share in these costs.

Readiness
It is important to prepare for dealing with EAB in a variety of ways. This includes developing an EAB readiness plan, inventorying your ash resource, estimating the costs of removal and replacement, developing an urban forest management plan, training your staff, and educating your policy makers and publics. Wisconsin DNR Urban Forestry Grants can provide 50-50 cost sharing for these efforts. Contact your Regional Urban Forestry Coordinator for more information.

Survey
Wisconsin is conducting a variety of survey work to detect EAB as early as possible. This work is being paid for by federal funds and by existing state agency funding. Local governments have cooperated with the state by providing the services of their community foresters and allowing use of public trees as detection trees. These services have been provided without remuneration. The extent of future survey work will be dependant on available funds.

Initial Response
According to current policy, when EAB is discovered at a site in Wisconsin, the state Department of Agriculture, Trade and Consumer Protection (DATCP) along with the USDA Animal and Plant Health Inspection Service Plant Protection and Quarantine (APHIS PPQ) will assess:

- The extent and age of the infestation
- The size, geography, and topography of the infested area
- The number, density, and continuity of ash trees in the area
- The likely pathway of introduction and the chance of reintroduction
- The ownership and land use in the infestation
- The availability of funding and other resources

Funding for this assessment will come from APHIS and DATCP. The assessment information will be used to determine what response options are warranted and feasible. Regardless of the response options recommended, it is currently unclear what, if any, federal or state funding would be available for implementation. It is important to let your state and federal representatives know your position on the need for funding the response to a first detection.

Management
Even if federal and state funds are available for managing the first detection, as more infestations are detected, funding will decrease. When that happens, the costs of any removal, replacement or treatment will be born by the property owner, be it public or private. Experience in the infested states has shown that it is less costly if you plan ahead and are ready to respond immediately. It is 2-3 times more expensive to remove a completely dead ash tree than removing a still-living
infested one. Dead ash trees become hazardous quickly and will “explode” into many pieces when felled, causing much greater clean up and removal costs.

So, what are some of the options to pay for EAB?

- **Federal EAB Revolving Loan Fund**
  The recently passed 2008 Farm Bill has a provision establishing an EAB Revolving Loan Fund that is intended to provide low cost loans to local governments with a 20-year pay back provision to help pay for EAB related expenses. The fund does not yet appear to have a budget.

- **Wisconsin DNR Urban Forestry Grants.**
  These limited funds are available to improve urban forest management, EAB readiness, and tree replacement. However, the funds won’t go very far and the state will not fund over-planting of another species, so it will be critical for you to have an inventory and show that any replanting will contribute to species diversity. For more information, visit: [http://dnr.wi.gov/forestry/UF/grants/](http://dnr.wi.gov/forestry/UF/grants/)

- **Wisconsin Forest Landowner Grant Program (DNR)**
  Funding is available to private landowners with 10 or more acres of woodland to cost share development of forest management plans, determining the extent of ash in a woodland, tree planting and other forest management practices. These 50-50 cost-share grants can be up to $10,000. More info: [http://dnr.wi.gov/forestry/private/financial/](http://dnr.wi.gov/forestry/private/financial/)

- **Community Development Block Grants**
  Communities in Michigan and Ohio have used these grants to fund EAB response.

- **Transportation funds**
  Some communities in infested states are using funds designated for their roads to help pay for EAB costs in the rights-of-way. Some are using federal Transportation Enhancement (TE) funds for replanting. Information on Wisconsin’s TE program is available at: [http://www.dot.wisconsin.gov/localgov/aid/te.htm](http://www.dot.wisconsin.gov/localgov/aid/te.htm)

- **Utility companies**
  Some of the utility companies in Wisconsin provide assistance with removing trees that are in conflict with power lines and replacing them with smaller trees. Some have programs to subsidize planting trees for energy conservation.

- **Revenue from wood waste**
  In areas where EAB is killing a lot of trees, communities have developed relationships with private businesses to turn removed ash trees into lumber, furniture, mulch, fuel pellets and other products.

- **Raising taxes**
  Most communities don’t like to even mention the “T” word, but Wilmette, Illinois raised its taxes to deal with the EAB that was discovered in their community in July 2006.
- **Community foundations and TreeBanks**
  Some communities have charitable foundations set up to fund a variety of community activities. Some even have specific tree funds. This is an opportunity to tap into charitable and philanthropic giving as a longer term means of supporting not only EAB response, but your community’s overall tree management program. TreeBank is a program sponsored by the nonprofit TreeLink, that helps communities set up and market local “branches” to receive donations and provide funding for community tree planting, education and stewardship. Find out more at: [http://www.itreebank.org/](http://www.itreebank.org/)

- **Reallocating funds**
  Most communities are going to be faced with some form of fund reallocation to deal with EAB when it hits. As part of your readiness plan, you need to consider where these resources could best come from with the least impact on existing services. Some communities in infested states have set up non-lapsing accounts to have a ready source of funds for quick response. Some have begun to anticipate future expenditures and are acting preemptively to spread potential costs over a longer period of time.

- **Seeking additional support**
  Communities in infested states report that additional funds can come to those who ask. They recommend that community leaders enlist the aid of their state and federal elected officials to increase funding for EAB.

- **Other possible sources:**
  Grants Information Collection - UW Madison  
  [http://grants.library.wisc.edu](http://grants.library.wisc.edu)

  Wisconsin Dept. of Commerce  
  [http://www.commerce.state.wi.us/](http://www.commerce.state.wi.us/)

  National Urban and Community Forestry Advisory Council  

  USDA grant and Partnership Programs  
8. MANAGEMENT GOALS/CONTROL MEASURES

Summary of Management Goals, Tactics and Recommendations

Management Goals

With EAB in all four corners of Wisconsin, it is recommended that communities adopt the following four broad goals whether the insect has been detected in your community or not.

- Base management decisions on an inventory of trees and community resources
- Reduce the risk of introduction and spread of EAB
- Minimize the impact of EAB
- Create a more diverse and resilient urban forest

Management Tactics Prior to a Confirmed Infestation

All Wisconsin communities could use any or all of these tactics to manage their ash trees.

- Inventory the forest resource to determine the potential impact of EAB
- Determine costs and resources for treatment, removal, disposal/utilization and replanting of community ash trees
- Prepare an EAB readiness plan
- Enact or strengthen ordinances
- Enter into compliance agreements with DATCP
- Facilitate early detection of EAB
- Identify and treat large canopy and high value ash with preventive pesticides
- Plant existing vacant planting spaces with diverse species
- Improve condition of all trees through maintenance
- Preserve non-ash large canopy trees
- Preemptively remove selected ash
- Replace removed ash trees with diverse species
- Assess adequacy of existing chippers and review purchase or least options of tub grinders in the local area
- Develop disposal and utilization methods and markets before quarantines are imposed
- Re-evaluate existing firewood permit system to accommodate steps to minimize the spread of EAB
- Educate and involve private property owners by providing technical fact sheets, chemical protection alternatives and proper disposal of residual wood.

Additional Management Tactics after a Confirmed Infestation (Containment)

Communities with known infestations or within existing quarantined counties can employ these additional tactics to manage ash in their communities.

- Remove infested trees
- Attract and destroy EAB using sinks and lethal trap trees
- Treat trees less than 40% infested with systemic pesticides
Emerald Ash Borer Readiness Plan

- Set up procedures for certifying chemical treatment of public trees by private landowners, with the understanding that such treated trees will be removed by the City if they subsequently become infested.
- Selectively remove uninfested ash based on size and condition factors
- Treat, dispose and/or utilize infested wood within the quarantine or through compliance agreements
- Introduce parasitoids

**General Management Recommendations**

These recommendations reflect application of the best science and experience currently available to minimize the impact of EAB on Wisconsin’s urban forests.

1. At a minimum, all communities should conduct a street tree and hi-use park tree inventory and determine the potential impact of ash mortality on their budget (removal, disposal, replanting). However, an inventory of all public and private trees will provide a more complete picture of the economic, social and environmental impact of EAB on the community.
2. All communities should have their staff trained in recognizing EAB symptoms and signs.
3. All communities should educate and involve their residents and businesses in EAB prevention, detection and management.
4. All communities should review their ordinances to make sure they have the authority they need to reduce the risk of introducing EAB and to respond to EAB when it arrives.
5. All communities should begin removing existing poor condition, high-risk ash trees.
6. All communities with greater than 10% ash should develop and begin implementing a plan for preemptive ash removal and/or targeted preventive pesticide treatment.
7. All communities should begin working with their local nurseries to supply a diverse variety of replacement tree species.
8. Communities should avoid planting tree genera and species that are already over-represented in their urban forest.
9. Communities should take steps to improve and protect their existing tree canopy.

**Plan of Action for Oconomowoc (Five Year Projection)**

In order to better manage the public ash population once EAB arrives in the City, the following recommendations are being made. These recommendations should be initialized at the earliest possible date. The goal of these recommendations is to reduce the public ash population to a more manageable level, plus protect the most valuable public ash trees.

In addition, City staff needs to access the level of competency of personnel for safe tree removal and chemical application. Is the staff trained in identifying signs and symptoms of EAB damage? Do we have enough or the correct tree equipment and what about added maintenance cost? Are there qualified tree care firms available to perform a majority of the treatment and removal work that will be required? What programs will have to be reduced or curtailed so adequate staffing is available to manage the infestation?
Listed below is the proposed Action Plan for ash located in the street rights-of-way, parks and open space for a five-year period:

- **Prioritized Preemptive Removals, Treatments and Replanting** – (See Appendices D and E)

  1. Remove and replace all ash that have been identified as “Remove” from the GIS inventory, 16 trees total.
  2. Over a five year period, remove and replace with a diversity of species all public ash trees with diameters less than 7” DBH and greater than 24” DBH, plus all ash with a condition rating of 65% or less. This would involve 351 trees.
  3. Of the 112 trees identified as having a condition rating of 70% or greater, and are between 7” DBH and 24” DBH, determine which may be candidates to be saved using chemical treatments because of size, location, condition or a combination of factors. Treatment would be by soil injection, with annual applications.
  4. **Implementation Cost - $296,338.00 or approximately $59,270.00 per year.**
  5. The above figures are based on the following unit pricing:

    **Removal Cost** (includes stump removal and restoration)
    
    | DBH   | Cost / Inch DBH |
    |-------|-----------------|
    | 1 – 3” | $21.78          |
    | 3 – 6” | $21.78          |
    | 6 – 12”| $26.08          |
    | 12 – 18”| $34.67         |
    | 18 – 24”| $34.67          |
    | 24 – 30”| $48.83          |
    | 30 – 42”| $51.44          |

    **Treatment Cost**
    $3.00 / Inch DBH

    **Replacement Cost**
    $400 / tree
PREVENTION

Restricted Movement of Firewood

The state of Wisconsin now restricts the movement of firewood onto state owned land. Local laws concerning firewood movement are rare in Wisconsin at this time (December 2007), which may be due to the difficulty of enforcing such ordinances. A few Wisconsin counties have adopted firewood restrictions which can be viewed at the following DATCP website: http://www.datcp.state.wi.us/arm/environment/insects/firewood_restrictions/index.jsp

A number of municipalities also have Dutch elm disease and/or firewood storage ordinances that partially address the problem of pest introduction via firewood. The last bulleted item below lists many municipal on-line codes for Wisconsin communities that address this. You may also be able to access similar codes by reviewing the municipalities own website.

Even without a local firewood ordinance or other formal policy, municipalities can take action to reduce the likelihood of introducing EAB into the community via firewood:

- Review the materials in the Other Resources (section 11) area of this toolkit. Consider making copies available in public locations such as libraries, schools and park facilities. Mail firewood educational materials to residents prior to peak camping weekends or include in a tax bill mailing.
- Display EAB firewood posters in campgrounds and where firewood is sold, such as gas stations and other stores. Distribute to local media the firewood press release “Help Stop the Spread of Emerald Ash Borer – Leave Firewood at Home,” found in the Communication (section 9) area of the toolkit.
- Inform local firewood sources about how to spot EAB and about the risk of moving wood. Local suppliers include stores, gas stations, firewood vendors and arborists who sell tree debris as firewood.
- Contact hosts of public events (e.g., music festivals) where large quantities of firewood are brought in from outside the community. Communicate the importance of burning any leftover firewood after the event is finished.
- Stay informed about DATCP’s approval system, scheduled for completion by the end of 2007. If your community is quarantined because of EAB, the approval system would allow parties with a compliance agreement to move firewood out of the area. Contact Bob Dahl of DATCP (Robert.Dahl@datcp.state.wi.us; 608-224-4973) for more information on compliance agreements.
  LexisNexis Municipal Codes – http://municipalcodes.lexisnexis.com/#WI

Quarantines

Confirmation of an Agrilus planipennis infestation will result in quarantine regulations covering resources which may spread EAB, including: ash trees, limbs, branches or 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 diameters; or any other item which could harbor any living stage of EAB and could transmit an infestation.

Two levels of quarantine are possible, federal and state. A federal quarantine will regulate interstate (between states, i.e., Michigan to Wisconsin) movement of covered materials; a state quarantine will regulate intrastate (within the state, i.e., Waukesha to Wausauke) movement. Both quarantines may be imposed concurrently—federal quarantines imposed on a statewide level while the state quarantines other geographical units. In almost all cases in Wisconsin, quarantines will be established at the county level. State regulation may be more stringent than federal regulation on movement of materials. Enforcement of quarantines falls to state and federal agency staff. Financial penalties for violation of quarantines can be substantial.

USDA and DATCP staff will work with affected industries and communities to minimize the impact of quarantines. Compliance agreements are a common tool to allow companies to conduct business while protecting areas of the state not yet infested by the emerald ash borer.

CONTROL OPTIONS

Preemptive Removals

As of January 2009 there is no consensus among the WI-DNR or WI-DATCP as to whether removing ash trees prior to an EAB infestation in or near your community or county is warranted as there are too many variables. However the term Preemptive Removals has been mentioned and is occurring in communities in other states where EAB has a foothold. Simply put, preemptive removal refers to taking trees down prior to them being infested with EAB, with the thought that if done prior to the arrival of EAB it may lessen a budget strain that a community may encounter and help slow the spread to other properties. The upside to this approach is that removals can be completed in a systematic thus potentially lower cost manner; the downside is we just don’t know if and when there may be some more viable control measure discovered allowing valued ash trees to be spared to thrive into the future.

Oconomowoc may decide to remove and replace unhealthy ash trees or those in conflict with electric utility lines before emerald ash borer arrives in the City. WE Energies may be able to help with ash tree removal and replacement options before and/or after EAB arrives.

Chemical Treatments

Emerald Ash Borer: Insecticide Options for Protecting Ash Trees and Their Effectiveness
R. Chris Williamson, Associate Professor, Department of Entomology, University of Wisconsin-Madison

Now that the emerald ash borer (EAB) has been officially confirmed in Wisconsin, many questions have been asked by homeowners and Green industry professionals regarding the capability and need of insecticides for protecting ash trees from EAB. There has been much confusion surrounding the question of whether insecticides are an effective management option
for EAB. Research and experience has shown that insecticides can protect ash trees from being killed by EAB. However, success is not guaranteed! In some university trials, insecticide treatments were effective, but in other trials the same treatments failed. Some studies conducted over multiple years revealed that EAB infestations continued to increase despite ongoing treatment programs. Insecticides are not effective in eradicating EAB infestations, which is why they have not been used as an eradication tool by the Cooperative EAB program in other states. Research suggests that best control can be achieved when insecticide treatments are started in the earliest stages of infestation before visible symptoms are present or possibly the year before trees are infested. It is important to understand that insecticide treatments must be repeated each year. Consequently, it may be more cost-effective to remove and replace the ash tree with an alternative tree to increase species diversity (see charts for Oconomowoc Assessment).

There are several insecticide options available for those people who want to treat their trees. It is important to understand that controlling wood-boring insects with insecticides has always been a difficult proposition. This is especially true with EAB because our native North American ash trees have no known natural resistance to this pest. Insecticide research programs are showing promise, but research on chemical control of EAB is still in early stages. Scientists from universities, government agencies, and companies are conducting intensive studies to understand the circumstances under which insecticide treatments will be most effective.

**Insecticide Options for Controlling EAB**

Insecticides used for control of EAB fall into three categories: 1) systemic insecticides that are applied as soil injections or drenches; 2) systemic insecticides applied as trunk injections or trunk implants; and 3) protective cover sprays that are applied to the trunk, main branches, and (depending on the label) foliage. Insecticide formulations and application methods that have been evaluated for control of EAB are listed in Table 1. Some products can be purchased and applied by homeowners while other can only be applied by professional applicators. Strategies for their effective use are described below. It is important to note that pesticide labels and registrations may change. It is the pesticide applicator’s legal responsibility to read, clearly understand, and follow all current label directions for the specific pesticide product being used.

<table>
<thead>
<tr>
<th>INSECTICIDE FORMULATION</th>
<th>ACTIVE INGREDIENT</th>
<th>APPLICATION METHOD</th>
<th>TIMING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Professional Use Products</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merit® (75WP, 75WSP, 2F)</td>
<td>Imidacloprid</td>
<td>Soil injection or drench</td>
<td>Mid-fall and/or mid- to late spring</td>
</tr>
<tr>
<td>Xytect™ (2F, 75WSP)</td>
<td>Imidacloprid</td>
<td>Soil injection or drench</td>
<td>Mid-fall and/or mid- to late spring</td>
</tr>
<tr>
<td>IMA-jet®</td>
<td>Imidacloprid</td>
<td>Trunk injection, Arborjet</td>
<td>Mid-May to mid-June</td>
</tr>
<tr>
<td>Imicide®</td>
<td>Imidacloprid</td>
<td>Trunk injection, Mauget</td>
<td>Mid-May to mid-June</td>
</tr>
<tr>
<td>Pointer™</td>
<td>Imidacloprid</td>
<td>Trunk injection, Wedgle</td>
<td>Mid-May to mid-June</td>
</tr>
<tr>
<td>TREE-äge™</td>
<td>Emamectin benzoate</td>
<td>Trunk injection, Arborjet</td>
<td>Mid-May to mid-June</td>
</tr>
<tr>
<td>Inject-A-Cide B®</td>
<td>Bidrin</td>
<td>Trunk injection, Mauget</td>
<td>Mid-May to mid-June</td>
</tr>
<tr>
<td>Safari® + PentraBark®</td>
<td>Dinotefuran</td>
<td>Trunk Spray</td>
<td>Late-April to late-May</td>
</tr>
<tr>
<td>Astro®</td>
<td>Permethrin</td>
<td>Preventative</td>
<td>2 applications at 4 week intervals with the first application</td>
</tr>
<tr>
<td>Onyx™</td>
<td>Bifenthrin</td>
<td>Bark and Foliage</td>
<td></td>
</tr>
<tr>
<td>Sevin® SL</td>
<td>Carbaryl</td>
<td>Cover Sprays</td>
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</table>
Using Insecticides to Control EAB

**Soil-Injection/Drench Systemic Insecticides**

Systemic insecticides applied to the soil are taken up by the roots and translocated (moved) throughout the tree. The most widely tested systemic insecticide for control of EAB is imidacloprid. It is available for use by homeowners and professional applicators. The homeowner formulation of imidacloprid is Bayer Advanced Tree & Shrub Insect control. Professional use formulations of soil-applied imidacloprid include Merit 75WP, Merit 75WSP, and Merit 2F. Additional formulations of imidacloprid with different brand names are also becoming available.

All imidacloprid formulations can be applied as a drench by mixing it with water and pouring it directly on the soil at the base of the trunk. The application rates for both the homeowner and professional formulations of imidacloprid are quite similar (1.3 and 1.5 grams of active ingredient per inch of trunk diameter, respectively). Soil drenches offer the advantage of requiring no special equipment to apply (other than a bucket or watering can). However, surface layers of organic matter, such as mulch or leaf litter, can bind the insecticide and reduce uptake. Prior to applying soil drenches, it is important to remove or pull back any mulch or dead leaves so the insecticide solution in poured directly on mineral soil.

Imidacloprid formulations can also be applied as soil injections, which require special equipment, but offer the advantage of placing the insecticide directly into the root zone. Soil injections should be made only deep enough (2-3 inches) to place the insecticide under the turf or mulch layer. Soil injections can be made either at the base of the trunk or on a grid pattern extending to the edge of the tree canopy. Recent research studies have revealed that soil injections made immediately adjacent to the trunk (within 6-18 inches) are more effective than those made on a grid pattern under the tree canopy. Density of fine root hairs is very high at the base of the trunk and declines quickly as you move away from the tree. This pattern of root distribution can be clearly observed on trees that have been recently uprooted in a storm or when taking soil cores under the tree canopy.

Optimal timing for imidacloprid soil drenches or injections is mid-April to mid-May (treat on the early side in southern Wisconsin and on the later side in northern Wisconsin), which allows the 4-6 weeks necessary for uptake and distribution of the insecticide before EAB larvae begin to establish in mid- to late June. Recent tests show that imidacloprid soil treatments can also be successful when applied in the fall.

EAB larvae damage the vascular system (a.k.a. tree plumbing) as they feed, which interferes with the translocation of systemic insecticides. Soil drench or injections are aimed primarily at

<table>
<thead>
<tr>
<th><strong>Product</strong></th>
<th><strong>Insecticide</strong></th>
<th><strong>Application</strong></th>
<th><strong>Timing</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bayer Advanced™ Tree &amp; Shrub Insect Control</td>
<td>Imidacloprid</td>
<td>Soil drench</td>
<td>Mid-April to mid-May</td>
</tr>
<tr>
<td>ACECAP™ 97 Systemic Insecticide Tree Implants</td>
<td>Acephate</td>
<td>Trunk implant</td>
<td>Mid-May to mid-June</td>
</tr>
<tr>
<td>Bonide™ Bullets</td>
<td>Acephate</td>
<td>Trunk implant</td>
<td>Mid-May to mid-June</td>
</tr>
</tbody>
</table>
preventative treatment applications, however; in some cases, this approach may provide corrective control of low populations of EAB infested ash trees. Studies are ongoing to determine how much injury a tree can sustain before systemic insecticide treatments are no longer effective. Research results suggest that ash trees showing >50 percent dieback are not likely to be salvaged, and any damage can reduce the effectiveness of systemic treatments.

**Trunk-Injection/Implant Systemic Insecticides**

Several systemic insecticides can be injected or implanted directly into the trunk of ash trees. Some formulations are applied by professionals, while others are available to homeowners. Imidacloprid is available in several professional use formulations that are injected directly into the trunk using various application systems. These include TREE-äge and IMA-jet, which are injected using various Arborjet injection systems; Mauget Imicide micro-injection capsules; and Pointer, which is injected using Arborsystems Wedgle Direct-Inject injector system. Another option is Mauget Inject-A-Cide B microinjection capsules, which contain Bidrin (dicrotophos). Systemic trunk implants available for purchase and application by homeowners and professionals include ACECAP 97 Systemic Insecticide Tree Implants and Bonide Systemic Insecticide Bullets, both of which contain acephate as the active ingredient. Both products are applied by inserting insecticide-containing capsules into holes drilled in the base of the tree trunk.

Trunk injections and implants have the advantage of being absorbed by the tree more quickly than soil applications, and can be applied where soil treatments may not be practical or effective, including trees growing on excessively wet, compacted, or restricted soil environments. However, trunk injections and implants do injure the trunk, which may cause long-term damage, especially if treatments are applied annually.

Optimal timing of trunk injections and implants is between mid-May to mid-June. Research studies have shown that Inject-A-Cide B injections made as late as August can kill insects in the tree, although substantial feeding damage will have already occurred. If the option exists, applications should be made earlier to prevent EAB larval establishment.

Most efficient uptake of trunk-injected insecticides occurs when tree are actively transpiring. Best results will occur when injections are made on sunny days in the morning when good soil moisture conditions prevail. Uptake will be slow on cloudy days, during hot afternoons, and when the soil is dry.

**Trunk-Bark Spray Systemic Insecticide**

Safari 20 SG is a highly systemic insecticide that will move through the bark and will be translocated upward throughout ash trees. Safari 20 SG + PentraBark should be applied before ash trees are heavily infested with EAB and showing obvious symptoms of decline (i.e., < 40% canopy thinning/dieback). Application to heavily infested ash trees may not prevent the decline or death of ash trees due to existing EAB damage and tree stress. Do NOT apply Safari + PentraBark when ash trees are dormant, under drought stress, or not actively taking up water from the soil. Most efficient uptake of trunk-injected insecticides occurs when tree are actively transpiring. Data from field trials indicate that efficacious concentrations of Safari are present
within ash trees by 21 days after application, thus the optimal treatment application timing is late-April to late-May.

**Protective Bark and Cover Sprays**
The objectives of protective bark and cover sprays are to kill newly hatched EAB larvae on the bark before they enter the tree, and depending on the label, adults as they feed on the foliage prior to laying eggs. Products that have been evaluated as cover sprays for control of EAB include Onyx (bifenthrin), Tempo (cyfluthrin), Sevin SL (carbaryl), Orthene (acephate), and BontaniGard (contains spores of the insectkilling fungus Beauveria bassiana). Some of these insecticides have been more effective than others (see discussion below).

Protective cover sprays are designed to prevent EAB infestations and must be timed precisely to be effective. Because protective residues must be present on the tree bark before egg hatch to prevent infestation, applications must be timed to coincide with adult emergence and oviposition (egg laying), which is difficult to monitor because there are no effective pheromone traps for EAB adults. However, first emergence of EAB adults typically corresponds closely with full bloom of black locust (Robinia pseudoacacia), which can serve as a useful phenological indicator for accurately timing applications. Best results with cover sprays have been obtained when two (sequential) applications are made, with the first as black locust reaches full floral bloom (mid-May in southern Wisconsin and late-May to early-June in northern Wisconsin), and the second four weeks later. It is recommended that homeowner hire professional applicators to apply protective bark cover sprays as homeowners typically do not have the appropriate application equipment, especially on larger trees > 15 feet tall.

**When Should EAB Treatments Begin?**
It is quite difficult to determine exactly when to initiate insecticide treatments. Research suggests that best control of EAB will be obtained when treatments are initiated in the earliest stages of EAB infestation before visible symptoms are present, or perhaps even the year before trees are infested. Treatment programs that begin too early represent an unnecessary expense. We suggest that those who want to protect their ash trees initiate EAB insecticide treatments if they are located within an EAB quarantine, or outside a quarantine but within the immediate vicinity (i.e., 10-12 miles) of a known EAB infestation. Locations of EAB infestations, current quarantine maps, and other important information regarding EAB can be found at the following websites: http://www.aphis.usda.gov/planthealth/plantpestinfo/emeraldashborer/downloads/multistateeab.pdf, www.entomology.wisc.edu/emeraldashborer, and http://www.emeraldashborer.wi.gov

**How Effective Are Insecticides for Control of EAB?**
Extensive testing of insecticides for control of EAB has been performed by researchers at Michigan State University and The Ohio State University. Results of many of the Michigan State University trials are posted at the following website: www.emeraldashborer.info.

**Soil-Injection/Drench Systemic Insecticides**
Efficacy of imidacloprid soil injections for controlling EAB has been inconsistent, with some trials providing excellent control, and others yielding poor results. Differences in application protocols and conditions of the trials have varied considerably, making it difficult to reach firm conclusions about sources of variation in efficacy. For example, McCullough et al. (2004) found...
that low-volume soil injections of Merit 75WP applied to small caliper trees (four-inch trunk diameter) using the Kioritz applicator (a hand-held device for making low-volume soil injections) provided very good control at one site. However, control was poor at another site where the same application protocols were used to treat large caliper (13 inch diameter at breast height [DBH]) trees. McCullough et al. (2004) raised the possibility that imidacloprid levels may have been too low in the larger trees to provide adequate control. Much higher pest pressure (populations) may also have contributed to poor control in the larger caliper trees.

In the same trials, high pressure soil injections of Merit 75WP (applied in two concentric rings, with one at the base of the tree and the other halfway to the dripline of the tree canopy) provided excellent control at two sites (McCollough et al. 2004). However, at a third site, soil injections applied using the same rate, timing, and application method were completely ineffective, even though the tree size and EAB larval infestation pressure were very similar to those at the other sites where control was excellent. It should be pointed out that recent research studies have shown that Merit soil injections made at the base of the tree trunk resulted in more effective uptake than applications made on grid or circular patterns extending to the dripline of the tree canopy.

Imidacloprid soil drenches have also generated varied results. In one trial, infestation levels of EAB in trees (with trunk diameter ranging from 7-24 inches) drenched with Merit 75WP did not differ from untreated control trees (Smitley et al. 2005a). In another study, Merit 75WP soil drenches applied to EAB infested ash trees with trunk diameters ranging from 6-30 inches were only slightly more effective, providing 38 percent control (Smitley et al. 2005b). However, control improved after two consecutive years of treatment. In a third study with small trees, soil drenches were very effective. When applied to smaller caliper trees, soil drenches with Merit 75WP and Bayer Advanced Tree & Shrub Insect Control have provided excellent control of EAB when applied in May, June, or October (Smitley et al. 2005b, 2006).

Smitley et al. (2005a, b) concluded that a combination of tree size and degree of pest pressure provides the best explanation for variable efficacy of imidacloprid soil drenches, with soil drenches being most effective when applied to smaller trees, and least effective when applied to larger trees experiencing heavy pest pressure. Recent research studies suggest that for larger trees, imidacloprid soil drenches may have to be applied two years consecutively before dependable control can be achieved.

**Trunk-Injection/Implant Systemic Insecticides**

In several intensive studies conducted by MSU and OSU researchers, a single injection of emamectin benzoate in mid-May or early June provided excellent control of EAB for at least two years, even under high pest pressure. For example, in a highly-replicated study conducted on trees ranging in size from 5- to 20-inch DBH at three sites in Michigan, untreated trees had an average of 68 to 132 EAB larvae per m2 of bark surface, which represents high pest pressure. In contrast, trees treated with emamectin benzoate had, on average, only 0.2 larvae per m2, a reduction of > 99 percent. When additional trees were felled and debarked two years after the emamectin benzoate injection, there were still virtually no larvae in the treated trees, while adjacent, untreated trees at the same sites had hundreds of larvae.

In two OSU studies conducted in Toledo with street trees ranging in size from 15- to 25-inch DBH, a single application of emamectin benzoate also provided excellent control for two years.
There was no sign of canopy decline in treated trees and very few emergence holes, while the canopies of adjacent, untreated trees exhibited severe decline and extremely high numbers of emergence holes.

One study suggests that a single injection of emamectin benzoate may even control EAB for three years. Additional studies to further evaluate the long-term effectiveness of emamectin benzoate are underway. To date, this is the only product that controls EAB for more than one year with a single application. In addition, in side-by-side comparisons with other systemic products (neonicotinoids), emamectin benzoate was more effective.

Imidacloprid trunk injections also provided mixed degrees of control in trials conducted at different sites (McCollough et al. 2004). Degree of control obtained with Mauget Imicide trunk injections varied from 60 to 96 percent, with no apparent relationship between efficacy and trunk diameter or infestation pressure. In 2004, McCullough et al. (2005) initiated additional trials to determine the effects of tree size (8 versus 20 inch DBH) and application date (May 24 versus July 19) on efficacy of Mauget Imicide and Arborjet IMA-jet trunk injections. Several patterns emerged from this study. First, trunk injections made on May 24 were more effective than those made on July 19. Second, the Arborjet IMA-jet trunk injections provided higher levels of control than did the Mauget Imicide trunk injections, likely due to the greater amount of active ingredient injected using the Arborjet method. Finally, they found no definitive pattern with respect to effect of tree size on efficacy of trunk injections. The Arborjet method provide similar levels of control on small and large caliper trees, possibly because the IMA-jet pesticide label recommends the application rate be increased when treating larger caliper trees. Imicide trunk injections were actually less effective on small compared to large caliper trees, likely due to the intensity of pest pressure as it was much higher at the site with small caliper trees.

Smitley et al. (2005a) treated trees with ACECAP 97 Systemic Insecticide Tree Implants for two consecutive years, and found them to be effective the first year under relatively low EAB pressure. However, they were not effective the second year under more intense EAB pest pressure.

In a discouraging study, McCollough et al. (2005) discovered that ash trees continued to decline from one year to the next despite being treated both years with imidacloprid or bidrin trunk injections. Mauget Imicide, Wedgle Pointer, and Inject-A-Cide B trunk injections all suppressed EAB infestation levels in both years, with Imicide generally providing best control under high pest pressure in both small (6 inch DBH) and large (16 inch DBH) caliper trees. However, in all treatments, EAB larval density increased in treated trees from the first to the second year. In addition, canopy dieback increased by about 67 percent in all treated trees (although substantially less than the increased dieback observed in untreated trees). In another study (D. Smitley, personal communication), infestation levels were also observed to increase from one year to the next, even though trees had been treated for two consecutive years with Merit soil drenches or IMA-jet trunk injections. These results suggest that even consecutive years of treatments may only slow ash decline, at least when EAB pest pressure is severe.
**Trunk-Bark Spray Systemic Insecticide**

Although research into Safari’s effectiveness against EAB has been limited, results from Dr. Deb McCollough’s trials show Safari 20SG provides up to an 80% mortality rate in adult ash borers within two weeks of application.

**Protective Bark and Cover Sprays**

McCollough et al. (2004) found that one or two applications of Onyx provided good control of EAB. Sevin SL and Tempo also provided good control of EAB when two applications were applied, with the first application in late-May and the second in early-June. Orthene was less effective. Astro® (permethrin) has not been evaluated against EAB, but has been extremely effective for controlling other species of wood-borers and bark beetles.

Smitley et al. (2005a) also tested Onyx cover sprays, and found that it provided good control the first year under relatively low EAB pressure. However, in the second year, under heavier EAB pressure, it was not effective. BotaniGard® was also ineffective under high EAB pressure (D. Smitley, personal communication).

**Summary**

Insecticides are valuable tools that have shown potential for protecting trees from EAB, including soil-applied systemic insecticides, trunk-injected systemic insecticides, and protective cover sprays applied to the trunk, branches, and (depending on the label) foliage. Some formulations can be purchased and applied by homeowners; others must only be applied by professional applicators. It is important to understand that success is **not** assured, and that trees will have to be treated each year. In many cases, it may be more cost-effective to remove and replace the tree. Insecticides applications have effectively protected ash trees from EAB. However, in some university research trials, trees have continued to decline from EAB attack despite being treated over consecutive years. In other studies, EAB treatments have failed completely! The bottom line is that research on chemical (insecticide) control of EAB remains in the early stages, and we still do not have enough experience to know under what circumstances insecticides treatments will be effective over the long term.

**References**


Acknowledgements
Take this quiz before you hire someone to treat your ash tree for Emerald Ash Borer:

- Does your tree look unhealthy?
- Are you looking for a one-time treatment for your tree?
- Has a tree care company guaranteed treatment will save your tree?

If you answered YES to any of these questions, treatment may not be a good option.

Before paying for treatment consider these points:

- Leading experts do not recommend treatment of ash trees with more than 20% dieback of its canopy. Once a tree shows signs of more than 20% dieback due to EAB, treatments may not be successful. Treatment should be considered primarily to prevent the infestation of healthy trees.

- All of the available insecticide treatments (trunk injection, sprays and soil application) need to be repeated every year. Are you willing to sign on for an annual treatment regimen indefinitely?

- Currently, no treatments have been proven effective as a long-term management option against EAB. Although some applications show potential, be very wary of anyone that claims to have the “solution” or promises to cure or protect your tree. There are no guarantees that available treatment options will work. Call your local Wisconsin University Extension office for the latest treatment information.

- If you do choose to try preventive treatments on valuable trees, it may be helpful to obtain a few different price quotes.

Biological Control

Considering alternatives to eradication

The complete eradication of EAB appears increasingly unlikely. Despite eradication efforts, EAB continues to spread throughout Michigan, Indiana, Ohio, Illinois, Pennsylvania, West Virginia and Maryland. In the event EAB cannot be completely eradicated from North America it is vital that alternative control and management strategies are ready to implement. Researchers are studying the use of selective biological control agents as part of an integrated pest management plan for EAB. Researchers have identified and released three biological control agents in several Midwestern states, including Wisconsin since the summer of 2007. However, their use as a viable management option is still futuristic pending results and further research to develop and improve rearing methods, safety testing and conducting insect releases.
Potential of biological control
Studies conducted in Michigan (2002–06) have identified a variety of native organisms, including parasitoids, predacious beetles, woodpeckers and entomopathogenic fungi, which attack and kill EAB. However, the predation and parasitism rates of these natural enemies are low—just 1 percent of EAB are parasitized by natural enemies and approximately 2 percent are infected and killed by entomopathogenic fungi (*Beauveria bassiana* and *Metarhizium anisopliae*). These low mortality rates are unlikely to suppress existing EAB populations enough to save ash trees.

EAB parasitoids discovered in China
Similar studies to identify natural enemies of EAB were also conducted in China, where EAB is native. Only low-density populations of EAB are found in China, where it is a periodic pest of ash. Its populations are most likely kept in balance by a combination of factors, including host plant resistance and natural enemies.

The following three parasitoids were released in Michigan during the summer of 2007 after extensive studies and a public comment period. The larval parasitoid, *Spathius agrili* (family Braconidae) was found to parasitize up to 90 percent of EAB in one ash stand in China. Other studies found the parasitism rate ranged from 0–50 percent among ash trees in a stand. As of December 2006, *Spathius* is successfully being reared in a U.S. laboratory and a 27 percent parasitism rate has been observed. The host range of *Spathius* seems specific to EAB according to no-choice tests, but additional choice tests are underway to confirm its specific host range.

A second candidate for EAB control is the larval parasitoid *Tetrastichus planipennisi* (family Eulophidae). Up to 50 percent parasitism of EAB by *Tetrastichus* has been documented in at least one ash stand in China. Other studies found the parasitism rate ranged from 0–50 percent among ash trees in a stand. Studies are ongoing to determine a rearing method for this parasitoid in a U.S. quarantine facility. Additional preliminary studies suggest that *Tetrastichus* has excellent host specificity and will not parasitize other non-target organisms.

A third potential parasitoid is *Oobius agrili* (family Encyrtidae). *Oobius* is being successfully reared on EAB eggs in a U.S. quarantine facility. Host-range testing has found that non-target attacks are rare, but do occur on eggs of similar size to EAB such as bronze birch borer and other native *Agrilus*.

The future of biological control for EAB
Hopefully one of the three above-mentioned parasitoids will prove successful against EAB in North America in the near future. However, before releasing any organism into a new environment, host-range studies must first be completed to determine if these parasitoids are monophagous and will not pose a threat to other organisms. Additionally, because biological control agents cannot reduce EAB population densities to zero, they are not considered alternatives that will completely control and manage EAB on their own. Therefore, future management of EAB will depend on an integrated pest management program that includes the use of parasitoids as biological control agents. For more information on biological control options for EAB control, visit [http://www.emeraldashborer.info](http://www.emeraldashborer.info) and click on research.
TREE SPECIES DIVERSITY

The impact of EAB on a community is directly dependent on the number, size and location of ash. The more ash, the more trees will be infested and the faster the insect will spread; the larger the trees, the greater the cost of removal and the greater the loss of environmental services; the more large trees that are next to buildings or other sensitive places, the greater the cost of removal; the more large trees that are shading buildings, parking lots and roadways, 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 or disease. Dutch elm disease should have taught us this lesson, but we weren’t listening. Recent pilot studies show that ash comprises around 12 % of the all tree species within the boundaries of Wisconsin’s communities, but they also show that ash is the second most common street tree in Wisconsin communities (behind Norway maple) and may make up as much as 30% of the street trees in a community. This is a recipe for a disaster. Thank goodness we don’t have a similar threat to Norway maple in Wisconsin … YET!

The DNR, University of Wisconsin and urban forestry profession representatives have begun working on guidelines for urban forest diversity which should be out in the near future. In the meantime, you can still prepare.

First, find out what you have. Inventory the species, size, location and condition of the trees in your community. If you have too many of one or more species, stop or drastically cut back planting them.

How many is too many? That depends. An old rule of thumb is no more than 10% of one species, 20 % of one genus and 30% of one family. If you were to adhere to this, in the case of EAB, you’d lose one fifth of your entire forest. That’s still pretty drastic. Optimally, you’d like to have the greatest diversity of species you can manage. This will vary depending on what part of the state you’re in. If you live in the Southeast, you have the largest pallet to work with. If you live in the Northwest, you have the smallest.

What about size? EAB has been shown to attack all ash regardless of size or condition, so as far as survival, size doesn’t matter. But size does matter for sustainability of the whole forest. If all your trees are the same size/age, they’ll all start to fall apart at the same time and eventually you’ll be faced with the same catastrophic tree loss even without EAB.

When EAB hits big, a lot of trees will come down in a short period of time. There will be tremendous pressure to fill those empty spaces as soon as possible. This is what happened with DED and why we’re set up to fail again. People planted the cheapest, toughest, most plentiful trees available – sugar maple (those weren’t adaptable, but we still didn’t learn) Norway maple, green ash, honeylocust. Don’t fall into this trap again.

The new guidelines will help provide you direction, but start planning now for a more diverse urban forest. Finding a wider variety of species will be harder and more expensive, but it is worth it. This section provides a list of good ash alternatives. Work with your local nurseries to come up with innovative solutions. Educate your policy makers and public on the necessity to do it right,
not fast and cheap. In the long run this will save you money, time, and effort and the benefits a healthy, sustainable urban forest provides.

**Alternative to Ash Trees: Commercially Available Species and Cultivars**

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Santamour (1990) established guidelines for tree planting within a community:  
Plant no more than 30% of a family: i.e. *Aceraceae*  
Plant no more than 20% of a genus: i.e. *Acer × freemanii, Acer rubrum, Acer platanoides, Acer saccharum*, etc. Plant no more than 10% of a species: i.e. *Acer platanoides*

**Large to medium-sized Street/Urban Trees (NOT SUITABLE FOR UNDER POWER LINES)**

*Acer × freemanii*: Freeman maple, Zone 3b-4 (depends on cultivar), native hybrid of red and silver maple, oval to rounded form, ascending branches, 40-60’ tall, 35-40’ wide, moderate to fast growth rate, yellow, orange to red fall color, smooth, light gray bark when young, red samaras in spring, not fall, adaptable to most soils and pH, some cultivars can get chlorotic at very high pH, tolerant to wet soils, drought and urban conditions, moderate salt tolerance, can get verticillium wilt and leaf hoppers, some cultivars prone to included bark formation and narrow branch crotch angles, dioecious (separate male and female flowers produced on separate plants)

‘Celzam’ (Celebration®): upright to oval form, 45’ tall, 25-30’ wide, better branch angles and straight central leader, yellow fall color, fast grower, male, seedless, drought tolerant  
‘DTR 102’ (Autumn Fantasy®): broadly oval form, upright branches, 50’ tall, 40’ wide, bright to dark red fall color, female, produces seeds  
‘Indian Summer’ or ‘Morgan’: broadly oval to rounded form, 45’ tall, 40’ wide, early, bright rosy-red fall color, vigorous, female, produces seeds, very sensitive to flooded soils  
‘Jeffersred’ (Autumn Blaze®): broadly oval form with upright branches, 50’ tall, 40’ wide, bright orange-red to red fall color that is longer lasting, male, seedless, drought tolerant, tends to develop narrow crotch angles, included bark, and multiple leaders  
‘Marmo’: upright, oval form, 55’ tall, 45’ wide, early, fair, mottled blend of deep red and green fall color starts at leaf tips and gradually works its way down leaf, good branching with straight central leader, male, seedless, slower grower  
‘Scarsen’ (Scarlet Sentinel®): upright form becoming oval, 40’ tall, 20’ wide, yellow-orange to orange-red fall color, fast grower, male, seedless  
‘Sienna’ (Sienna Glen®): pyramidal form, 50’ tall, 35’ wide, rusty orange to burgundy fall color, male, seedless, wider branch angles, from northern seed source, less susceptible to frost crack, hardy to zone 3

*Acer miyabei*: Miyabei maple, Zone 4a, native to Japan

‘Morton’ (State Street®), 40’ tall, 25’ wide, upright, oval form, dark green foliage, late, yellow fall color, corky-looking bark, faster grower, grafted higher up than straight
species for street tree clearance, very adaptable to soils and pH, urban tolerant, moderate salt tolerance, not invasive, no pests

*Acer saccharum*: sugar maple, hardy to zone 3a-5 (depends on cultivar), native to eastern U.S., Canada, and Wisconsin (our state tree), upright, oval to rounded form, 60-75’ tall, 35-50’ wide, showy, bright yellow to orange-red fall color, prefers a fertile, moist, well-drained soil, will not tolerate heavy clay, poorly drained, or dry soils, sensitive to drought, salt and air pollution, susceptible to leaf tatter and leaf scorch, verticillium wilt, basal rot, girdling roots, leaf hoppers

*Commemoration®*: oval to rounded, dense form, 50’ tall, 35’ wide, thick, glossy, dark green leaves, yellow-orange to red fall color, vigorous, faster grower, resistant to leaf tatter

*Legacy®*: oval to rounded, dense form, 50’ tall, 35’ wide, glossy, thick, dark green leaves, later reddish-orange to red fall color or none, leaf scorch and leaf tatter resistant, faster grower, heat tolerant,

‘Morton’ (*Cresendo™*): broadly oval form, 45’ tall, 40’ wide, orange-red to red fall color, heat tolerant

‘PNI 0285’ (*Green Mountain®*): broadly oval form, 45-50’ tall, 35’ wide, reddish-orange to red fall color, leathery leaves less subject to leaf scorch, faster growing, more heat tolerant

*Acer ‘Warrenred’*: Pacific Sunset®: zone 4b, hybrid of Norway and Shantung maples, upright, oval to spreading form, good branching, 30-40’ tall, 20-25’ wide, glossy leaves, late yellow to bright orange-red fall color, heat, drought, and urban tolerant

*Celtis occidentalis*: common hackberry, zone 3b, native to eastern and central U.S., Canada, and Wisconsin, vase-shaped when young becoming rounded with drooping branches, moderate to fast growth rate, 50-70’ tall, 40-60’ wide, corky, warty looking bark, small, pea-sized, purplish-black fruit in fall, adaptable to most soils and pH, tolerates dry, sandy, rocky, and compact, heavy clay soils, slow to establish, plant in spring, drought, urban, wind, and wet soils tolerant, but sensitive to salt, susceptible to hackberry nipple gall on leaves, witches’ brooming of twigs, resistant to DED, sensitive to Dicamba herbicides used near tree, branches tend to break in storms, prone to included bark formation, need to train to develop good branch structure

‘Chicagoland’*: broad pyramidal form with upright branches, 55’ tall, 40’ wide, forms a straight central leader, rich green leaves, yellow fall color, warty bark

‘Windy City’*: upright, spreading form, straight, central leader, fast grower

*Corylus colurna*: Turkish filbert, hardy to zone 4b, native to southeastern Europe and western Asia, broad, pyramidal form, formal looking even with age, dense, coarse texture, 40-50’ tall, 20-25’ wide, no fall color, scaly to corky, gray-brown bark, long, pendulous catkins in early spring are showy, may produce nuts, difficult to transplant, heat, urban, and drought tolerant, once established, sensitive to salt
Ginkgo biloba: ginkgo, maidenhair tree, hardy to zone 4b, native to eastern China, living fossil, found in fossil records dating back 150 million years ago, deciduous gymnosperm, pyramidal when young, becoming wide spreading with age to upright, slow grower, 50-80' tall, 30-60' wide, very interesting, fan-shaped leaves, golden-yellow fall color, dioecious (separate male and female flowers produced on separate plants), female trees produce smelly, messy fruit, but not until 20 years old, so plant male cultivars only, tolerant to most soils and pH, prefers a sandy, deep soil, difficult to transplant, plant in spring, heat, salt, urban, and drought tolerant, no pests

‘Autumn Gold’: broadly pyramidal, symmetrical form, 45’ tall, 35’ wide, golden yellow fall color, male, no fruit, good, uniform branching

‘Magyar’: upright form, 50’ tall, 30’ wide, bright yellow fall color, male, no fruit

‘PNI 22720’ (Princeton Sentry®): narrow pyramidal, upright form, 50’ tall, 20-30’ wide, bright yellow fall color, male, no fruit

Gleditsia triacanthos var. inermis: thornless honeylocust, hardy to zone 4a, native to central U.S. and southern Wisconsin (thorny type native, not var. inermis), fine texture, fast growing, vase-shaped form becoming flat-topped, spreading branches, open, 50-70’ tall, 40-50’ wide, early, bright golden-yellow fall color, no thorns, dioecious (separate male and female flowers produced on separate plants), female plants produce long, twisted, black pods that make a slippery, litter mess, tolerant to most soils and pH, tolerant to compacted, heavy clay soil, drought, salt, and urban tolerant, tolerant to periodic flooding, susceptible to leaf hoppers, plant bug, cankers, sunscald on trunk, high maintenance pruning, tends to develop co-dominant branches, can break in storms

‘Impcole’ (Imperial®): rounded form, symmetrical, wide-spreading, with good branching, 35’ tall, 35’ wide, seedless but can throw a few pods, susceptible to leaf hoppers and plant bug

‘Moraine’: uniform, rounded crown with vase-shaped branching, male, no pods, older cultivar

‘PNI 2835’ (Shademaster®): vase-shaped to rounded, irregular form, 45’ tall, 35’ wide, uniform, ascending branches, occasionally, some trees may produce pods

‘Skycole’ (Skyline®): broadly pyramidal form, ascending branches with wider crotch angles, 45’ tall, 35’ wide, develops a strong, central leader better than any other cultivar, male, no pods, bright golden yellow fall color

Gymnocladus dioica: Kentucky coffeetree, hardy to zone 4a, native to central U.S., southern Ontario, and Wisconsin (scattered distribution), vase-shaped form with upright branches becoming irregular and open, 50-75’ tall, 40-50’ wide, slow to moderate grower, coarse texture in winter with sparse branching when young, lacy texture when in leaf, yellow fall color, large, bluish-green leaves, ashy-gray, deeply furrowed bark with exfoliating plates, dioecious (separate male and female flowers produced on separate plants), females produce thick, sausage-like, pendulous pods, that can be a litter problem along with the leaf rachis in fall, adaptable to most soils and pH, slow to establish, tolerates compacted, heavy clay soil, salt, drought, periodic flooding, and urban conditions, no pests, can look a bit “gauntly” when young due to sparse branching
‘Espresso’: oval to vase-shaped form with arching branches, 50’ tall, 35’ wide, large, blue-green leaves, yellowish fall color, male, no pods, newer cultivar

*Phellodendron amurense ‘Macho’: Macho Amur corktree, hardy to zone 3b, native to northern China and Japan, broadly vase-shape, upright form, 40’ tall, 30’ wide, ascending branches, thick, dark green leaves, yellowish-green fall color, male, no fruit, corky bark when older, adaptable to most soils and pH, slow to establish, urban tolerant, moderate salt tolerance, no pests, shallow roots, low branching, avoid female trees as they produce invasive seeds

*Phellodendron lavallei ‘Longenecker’: Eyestopper™ Lavalle corktree, hardy to zone 4b, native to Japan, upright, wide spreading form, 40’ tall, 35’ wide, bright yellow fall color, male, no fruit, corky bark when older, same culture as Amur corktree

*Phellodendron sachalinense ‘His Majesty’: His Majesty Sakhalin corktree, hardy to zone 3b, native to Korea, northern Japan, and western China, broadly vase-shaped to rounded, open form, 35-40’ tall, 35’ wide, yellow fall color, male, no fruit, same culture as Amur corktree

*Sweating*: Most bare root oaks require sweating before planting to break bud. This involves dormant tree liners laid down and covered with wet packing material such as straw, shingle tow, and covered with a sheet of plastic. This should be done indoors, if possible, or in the shade. Temperatures should be between 45-70°F with high humidity (under plastic). Once the buds have begun to swell, usually within a few days, but usually not more than a week, the trees are ready to be lined out. The key to success is after the sweating process. Delay planting of oaks until the weather is warmer and humid (May) for better success after the sweating process. This is critical for success of sweated oak liners. Oaks are best transplanted in spring, rather than fall. It is best to move oaks at 2-2 1/2” caliper or lower, rather than bigger caliper as transplant shock reduces chances for survival. Other species that benefit from the sweating process include: birch, especially river birch, hawthorns, hackberry, ironwood (*Ostrya*), and redbud

*Quercus bicolor*: swamp white oak, hardy to zone 4a, native to eastern U.S. and Wisconsin, pyramidal when young, becoming broad, rounded, wide-spreading with age, 50-60’ tall, 50-60’ wide, slow to moderate growth rate, easier to transplant than bur oak, prefers acidic to neutral pH, but will tolerate a bit higher, but at very high pH, it will get chlorotic, adaptable to most soils including heavy clay, tolerant to wet soil, drought, and urban conditions

*Quercus macrocarpa*: bur oak, hardy to zone 3a, native to eastern and Midwestern U.S. and Wisconsin, pyramidal when young, becoming very wide-spreading, rounded, 70-80’ tall, 60-80’ wide, slow growing, coarse texture, deeply furrowed bark, no fall color, adaptable to most soils and pH, drought and urban tolerant, difficult to transplant

*Quercus muehlenbergii*: chinkapin oak, hardy to zone 4b, native to eastern and Midwestern U.S. and Wisconsin, wide-spreading, rounded, open form, 40-60’ tall, 50-60’ wide, yellow to orangish-brown fall color, ashy-gray, flaky bark, adaptable to most soils and pH, difficult to transplant, drought and urban tolerant
**Quercus robur**: English oak, hardy to zone 5a, native to Europe, northern Africa, and western Asia, oval to rounded form, short trunk, slow to moderate growth rate, 40-60’ tall, 40-50’ wide, no fall color, smaller leaves than other oaks, deeply furrowed bark, adaptable to most soils and pH, does not like compacted soils, urban tolerant, susceptible to powdery mildew, especially fastigiate forms, two-lined chestnut borer, scale, basal canker

‘Pyramich’ (Skymaster®): hardy to zone 5, narrow when young becoming pyramidal, 50’ tall, 25’ wide, straight central leader, good branch crotch angles, fast grower, may be a hybrid as it is vigorous

**Quercus × schuettei**: swamp bur oak, hybrid of *Q. bicolor × Q. macrocarpa*, broad, rounded form, 75’ tall, 70’ wide, faster growing, better tolerance to high pH and easier to transplant, may be susceptible to leaf/twig galls, zone 3b

**Taxodium distichum**: baldcypress, northern provenance is critical, hardy to zone 4b, pyramidal form with straight terminal leader, 50-70’ tall, 25-35’ wide, fine texture, native to southeastern and south-central U.S. into southern IL, mainly in swamps, needs training in nursery or it grows like a large bush, deciduous gymnosperm, feathery, soft, bright green leaves, with rusty-brown to orangish-bronze fall color, reddish-brown to grayish, fibrous, shreidy bark, does not form “knees” in urban conditions, only if grown near water, adaptable to most soils, prefers slightly acidic to neutral soils, can get chlorotic at very high pH, easy to transplant, heat, drought, salt, wet soil, and urban tolerant, few, if any pests

‘Mickelson’ (Shawnee Brave®): narrowly pyramidal form, 55’ tall, 20’ wide, richer green leaves, more upright form

**Tilia americana**: American linden, basswood, hardy to zone 3a, native to northeast and central U.S., Canada, and Wisconsin, pyramidal when young becoming upright-oval with age, 60-80’ tall, 40-50’ wide, fragrant, pale yellow flowers in early summer, small nutlet fruit attached to bract, large, heart-shaped leaves, prefers a deep, fertile soil, pH adaptable, easy to transplant, tolerant to wetter soils, sensitive to salt and air pollution, susceptible to Japanese beetle, linden borer, gypsy moth, basal and stem rots, sunscald on bark, tends to sucker at base, can break in storms, prone to included bark formation and narrow, branch crotch angles, girdling roots

‘Boulevard’: narrowly pyramidal form, 50’ tall, 25’ wide, ascending branches, yellow fall color

‘Lincoln’: pyramidal, compact, dense form, 40’ tall, 25’ wide, upright branches, dark green leaves, yellow fall color

‘Mcksentry’ (American Sentry™): symmetrical, pyramidal form with straight central leader, 45’ tall, 30’ wide, better branch angles, lighter gray bark, yellow fall color

**Tilia × flavescens ‘Glenleven’**: Glenleven linden, hardy to zone 4, hybrid of *T. americana × T. cordata*, pyramidal form, 50’ tall, 30’ wide, yellowish fall color, better branching, more open, larger leaves, faster growing, straight trunk and leader
**Tilia ‘Redmond’**: Redmond linden, hardy to zone 4, hybrid of *T. americana × T. × euchlora*, pyramidal to oval form, upright branches with terminal leader above the foliage, reddish stems and buds, can sucker at base, 50-70’ tall, 30-40’ wide, fragrant, pale yellow flowers in early summer, small nutlet fruit attached to bract, large, heart-shaped leaves

**Tilia tomentosa**: silver linden, hardy to zone 4b, native to southeastern Europe and western Asia, broad pyramidal form becoming upright-oval, formal looking, dark green leaves with silvery-white undersides, pale yellow flowers in summer, small nutlet fruit attached to a bract, no fall color, prefers a deep, fertile soil, but is adaptable, pH adaptable, easy to transplant, more heat, drought, and urban tolerant than other lindens, does not tolerate poorly-drained, compacted soils, same pests as American linden

‘Wandell’ (Sterling®): broadly pyramidal form, 45’ tall, 35’ wide, green leaves with silvery undersides, yellowish fall color, prone to included bark formation

**Ulmus hybrids**: hybrid elms, most are hardy to zone 4-5, all Dutch elm disease resistant, needs pruning in nursery to develop good form, adaptable to most soils and pH, tolerant to compacted, heavy clay soils, moderate salt tolerance, drought, urban, and air pollution tolerant

‘Cathedral’ (UW-Madison intro): hybrid of *U. japonica × U. pumila*, broadly vase-shaped, spreading form, 40-50’ tall, 40-60’ wide, prone to elm leaf beetle, zone 4

‘Homestead’ (from U.S. National Arboretum): hybrid of *U. pumila × (U. × hollandica × U. carpinifolia)*, upright, narrow to oval form, 55’ tall, 35’ wide, upright, arching branches, prone to elm leaf beetle, fast growing, Zone 4b

‘Morton’ (Accolade®) (from Morton Arboretum): hybrid of *U. japonica × U. wilsoniana*, vase-shaped form with arching branches, 70’ tall, 60’ wide, resistant to elm leaf beetle, vigorous, resistant to elm leaf beetle, dark green, glossy leaves, zone 4

‘New Horizon’ (UW-Madison intro): hybrid of *U. japonica × U. pumila*, upright, compact form, 50’ tall, 25’ wide, dark green leaves, wide crotch angles, susceptible to verticillium wilt, zone 3b

**Ulmus japonica ‘Discovery’**: Discovery Japanese elm, hardy to zone 3, native to Japan and Asia, upright, vase-shape, compact form, 35-40’ tall, 35-40’ wide, resistant to DED and elm leaf beetle, yellow fall color

**Ulmus wilsoniana ‘Prospector’** Prospector elm (from U.S. National Arboretum): hardy to zone 4, dense, broad, vase-shaped form, slightly pendulous branches, 40’ tall, 30’ wide, resistant to elm leaf beetle, DED, and phloem necrosis, deep green, glossy leaves, yellow fall color

**Small Urban Area or Street Trees** *(suitable for under power lines)*

**Acer tataricum**: Tatarian maple, Zone 3a, native to southeastern Europe and central Asia, invasive, do not plant near any natural areas, single or multi-stemmed, upright form, 25’ tall, 20’ wide, yellow to reddish-brown fall color, pinkish-red samaras in summer changing to
brown in fall, adaptable to most soils and pH, easy to transplant, drought, salt, and urban tolerant, very susceptible to verticillium wilt

**Acer tataricum subsp. ginnala**: Amur maple, Zone 3a, native to China, Manchuria, and Japan, very invasive, do not plant near any natural areas, multi-stemmed, rounded form, low branches, 15-18’ tall and wide (smaller cultivars are available), dagger-shaped leaves, orange to bright red fall color, red samaras in summer turn brown in fall, adaptable to most soils and pH, easy to transplant, drought, salt, and urban tolerant, very susceptible to verticillium wilt

‗Compactum‘ or ‘Bailey Compact‘: dense, compact, rounded, shrubby form, 6-8’ tall, 6-8’ wide, slower grower, orange to scarlet fall color

‗Flame‘: multi-stemmed, spreading, irregular form, 15-20’ tall, 20-25’ wide, bright orange-red to deep red fall color

**Acer truncatum**: Shantung maple, Zone 3b, use a northern provenance (seed source), native to northern China, Russia, Korea, and Japan, broad-rounded, dense, symmetrical form, 20-30’ tall, 20-30’ wide, yellowish-orange to purple fall color, star-shaped leaves, adaptable to most soils and pH, drought, salt, heat and urban tolerant, no pest problems, harder to find, but worth trying

**Amelanchier × grandiflora**: apple serviceberry, hardy to zone 3a, native hybrid of downy and Allegheny serviceberry, multi or single-stemmed tree to large shrub, upright to irregular form, no suckers, 15-30’ tall, 15-25’ wide, produces bronze to purplish-red, fuzzy leaves in spring that turn smooth and green, white flowers in early spring, edible fruit in June, smooth, gray bark, yellowish-orange to red fall color, can develop chlorosis at high pH, prefers loamy soil, does poorly in poorly drained soils, difficult to transplant, plant in spring

‗Autumn Brilliance‘: upright, spreading form, 20-25’ tall, 15’ wide, orange-red fall color, leaf spot resistant, multi-stemmed

‗Cole’s Select‘: upright, spreading form, 15-20’ tall, 15’ wide, multi-stemmed, orange-red fall color, leaf spot resistant, thicker, glossier leaf

‗Forest Prince‘: oval form, 20’ tall, 15’ wide, red-orange fall color

‗Princess Diana‘: wide spreading form, 15-20’ tall, 15’ wide, multi-stemmed, red-orange fall color, leaf spot resistant

‗Robin Hill‘: upright, open form, 20-30’ tall, 15-20’ wide, flowers pink in bud open to pale pink fading to white, red fall color, single-stemmed

**Amelanchier laevis**: Allegheny serviceberry, hardy to zone 4a, native to eastern and central U.S., Canada, and Wisconsin, upright form, single or multi-stemmed tree, 15-25’ tall, 15-20’ wide, can sucker, produces white flowers in early spring, bronze to purplish-red new leaves in spring that turn green, edible fruit in June, orange to reddish-bronze fall color, prefers moist, loamy soils, does poorly in poorly drained soils, difficult to transplant, plant in spring

**Cumulus®**: upright, open form, 20-30’ tall, 15’ wide, orange-red fall color, minimal suckering, single-stemmed

‗Snowcloud‘: upright, oval form, 25’ tall, 15’ wide, scarlet fall color, single-stemmed
**Cornus mas**: Cornelian cherry dogwood (more of a boulevard tree), hardy to zone 4b, native to Europe and western Asia, bright yellow flowers in early spring, long lasting, fruit is in summer and is bright red changing to dark purple and becoming edible, but tart, adaptable to most soils, but prefers rich soils, pH adaptable, easy to transplant, tolerates partial shade, straight species is sensitive to drought, but cultivars are more tolerant, sensitive to salt, no pest problems, hardy to zone 4b

‘Golden Glory’: narrow, upright form, 20-25’ tall, 10’ wide, much better form and darker green, glossy, thicker leaves, more flowers and fruit, good substitute to invasive tall hedge buckthorn!

‘Pyramidalis’: upright, pyramidal to upright form, 20’ tall, 10-15’ wide, dark green leaves

**Crataegus crus-galli var. inermis**: thornless cockspur hawthorn, hardy to zone 4a, native to eastern and central U.S., Canada, and Wisconsin, multi-stemmed tree, broad, spreading, horizontal, low branches, flat-topped crown, 20-30’ tall, 20-35’ wide, adaptable to most soils and pH, difficult to transplant, plant in spring, drought, salt, and urban tolerant, susceptible to cedar quince rust (on fruit) or cedar hawthorn rust (leaves), this variety has no thorns, white flowers in late spring, deep red fruit in early to mid fall that drops creating a litter problem, bronzish-orange to reddish fall color, dark green, leathery, spoon-shaped leaves

‘Cruzam’ (Crusader®): rounded form, 15’ tall, 15’ wide, thornless, bright red fruit, orange fall color

**Crataegus phaenopyrum**: Washington hawthorn, hardy to zone 4b, native to eastern U.S. and Canada, multi-stemmed tree, vase-shaped to broadly oval form, horizontal, low branches, 20-30’ tall, 20-25’ wide, adaptable to most soils and pH, difficult to transplant, plant in spring, tolerant to poor, sandy soils, drought and urban tolerant, moderate salt tolerance, susceptible to cedar quince rust (on fruit) or cedar hawthorn rust (leaves), has long, sharp thorns, white flowers in late spring to early summer, showy, persistent, glossy, bright-orange-red fruit fall to winter

**Crataegus viridis ‘Winter King’**: Winter King hawthorn, hardy to 4b, native to eastern U.S., vase-shaped to rounded, wide-spreading form, horizontal, low branches, adaptable to most soils and pH, difficult to transplant, plant in spring, drought and urban tolerant, moderate salt tolerance, less susceptible to cedar hawthorn rust but can get cedar quince rust on fruit, white flowers in late spring, very showy, bright orange-red, persistent fruit from mid fall to winter, silvery-gray bark that exfoliates on the trunk revealing orange inner bark, has few if any thorns, yellowish-purple fall color

**Maackia amurensis**: Amur maackia, hardy to zone 4a, native to Manchuria, vase-shaped to rounded form, upright, arching branches, 20-30’ tall, 20-30’ wide, slow grower, silvery and fuzzy leaves in spring turn olive-green and smooth, coppery-green to bronzish-brown, slightly exfoliating bark, off-white flowers in summer, small pods in fall, tolerant to most soils and pH, roots fix atmospheric N, tolerant to poor, infertile soils, urban and salt tolerant, prone to included bark formation, needs pruning when young, no pests, not invasive
‘Starburst’: upright, vase-shaped form with rounded crown, 25-30’ tall, 20’ wide, dark green leaves

Summertime®: upright, rounded form, 18-20’ tall, 12-15’ wide, white flowers in summer

Malus spp.: flowering crabapple, most are hardy to zone 4a and are hybrids with parents originating from Asia, Europe and U.S., size and form are quite variable, adaptable to most soils and pH, prefers low nitrogen to decrease disease susceptibility, drought and urban tolerant, apple scab resistant species and cultivars listed below and have smaller fruit, some cultivars prone to suckering and watersprouts on branches

White Flowers/Red Fruit

‘Adirondack’: narrow, upright form, 18’ tall, 10’ wide, persistent fruit
‘Jewelcole’ (Red Jewel®): upright, pyramidal form, 15’ tall, 12’ wide, persistent fruit, can get fireblight
‘Sutyzam’ (Sugar Tyme®): upright, spreading, oval form, 18’ tall, 15’ wide, persistent fruit

Malus baccata ‘Jackii’: Jackii crabapple, hardy to zone 3, rounded form, 20’ tall, 20’ wide, glossy leaves, zone 3

Malus × zumi var. calocarpa: redbud crabapple, rounded, spreading form, 20’ tall, 24’ wide, persistent fruit

White Flowers/Yellow Fruit

‘Bob White’: dense, rounded form, 20’ tall, 20’ wide, persistent fruit, but is a watersprouter
‘Hargozam’ (Harvest Gold®): upright, oval form, 22’ tall, 18’ wide, persistent fruit, may get some scab
‘Ormiston Roy’: broad, rounded form, 20-25’ tall, 25’ wide, furrowed, orangish bark, yellow fruit with a rosy blush turn orange-brown after a hard frost

Pink or Reddish Flowers/Red to Purplish-Red Fruit

‘Prairifire’: upright, spreading to rounded form, 20’ tall, 20’ wide, slower growing, purple leaves become reddish-green
‘Purple Prince’: rounded form, 20’ tall, 20’ wide, purple leaves become bronzish-green, persistent fruit

Prunus sargentii: Sargent cherry, hardy to zone 4b, native to Japan, oval to vase-shaped form, 25-35’ tall, 20-30’ wide, showy, single, pink flowers in clusters in early spring, small, purplish-black fruit in summer, bronze to orange-red fall color, reddish-gray to chestnut-brown, polished bark, adaptable to most soils and pH, does not tolerate compacted, heavy-clay soils, plant in spring, likes roots kept cool, must have good drainage, resistant to black knot, may form included bark

‘Columnaris’: narrow, columnar to narrow, vase-shape form, 25-35’ tall, 15’ wide, orange to orange-red fall color
**Prunus ‘Accolade’**: Accolade cherry (hybrid with *P. sargentii* and *P. subhirtella*), hardy to zone 4b, 20-25’ tall, 20-25’ wide, horizontal branching with vase-shaped form, semi-double, early, pink flowers in drooping clusters before the leaves in early spring, no fruit, golden to orange fall color.

**Pyrus calleryana**: callery pear, hardy to zone 4b, native to China and Korea, upright, pyramidal to oval form, 25-35’ tall, 20-30’ wide, adaptable to most soils and pH, drought, urban, and salt tolerant, can get fireblight, fast grower, dark green, glossy, leathery leaves, late, reddish-orange to purple fall color, white flowers in mid-spring, small, brown, rounded fruit

‘**Autumn Blaze**’: rounded form, 30’ tall, 25’ wide, earlier, bright red to purplish fall color, wide crotch angles, less prone to included bark formation

‘**Capital**’: narrow, columnar form, 30’ tall, 12’ wide, reddish-purple fall color, susceptible to limb breakage in storms, susceptible to fireblight, zone 5

‘**Cleveland Select**’ or ‘**Glenn’s Form**’ (*Chanticleer®*): formal, upright, narrowly pyramidal form, 25-30’ tall, 15’ wide, late orangish to reddish fall color, not as good as other cultivars for fall color, rarely produces fruit

**Syringa pekinensis**: Peking lilac, hardy to zone 4a, native to northern China, loose, rounded form, 20-25’ tall, 15-20’ wide, moderate to fast grower, no fall color, reddish-brown, shiny bark, creamy-white, large flowers in early summer that do not smell like lilacs but rather like a privet, tends to flower heavily every other year, adaptable to most soils and pH, easy to transplant, salt and urban tolerant, susceptible to bacterial blight and verticillium wilt, resistant to mildew

**Syringa reticulata**: Japanese tree lilac, hardy to zone 3a, native to Japan and Manchuria, upright with a rounded to oval form, 20-25’ tall, 15-20’ wide, no fall color to yellowish, reddish-brown, shiny bark, creamy-white, large flowers in early summer that do not smell like lilacs but rather like a privet, tends to flower heavily every other year, adaptable to most soils and pH, easy to transplant, salt and urban tolerant, susceptible to bacterial blight and verticillium wilt, resistant to mildew

‘**Elliott**’ (*Snowcap™*): upright, more compact form, 15-20’ tall 10-12’ wide, uniform branching, thick, dark green leaves, good form

‘**Ivory Silk**’: over used, upright, spreading becoming oval to rounded, 20’ tall, 15’ wide, susceptible to bacterial blight

‘**Summer Snow**’: broad, rounded, compact form, 20’ tall, 15’ wide, good form, glossy, dark green leaves

‘**Williamette**’ (*Ivory Pillar™*): upright, pyramidal, narrower form, 20-25’ tall, 10-15’ wide

**Midwest wholesale nursery sources used in this guide** (does not imply endorsement by the author of nurseries named, or criticism of similar nurseries not mentioned)

Bailey Nurseries: St. Paul, Minnesota, [www.baileynurseries.com](http://www.baileynurseries.com), (800) 829-8898
Beaver Creek Nursery: Poplar Grove, Illinois, [www.beavercreeknursery.com](http://www.beavercreeknursery.com), (815) 737-8758
Johnson’s Nursery: Menomonee Falls, Wisconsin, [www.johnsonsnursery.com](http://www.johnsonsnursery.com), (262) 252-4980
Mariani Nurseries: Kenosha, Wisconsin, www.marianinurseries.com, (866) 627-4264
Silver Creek Nurseries: Manitowoc, Wisconsin, www.silvercreeknurseries.com, (920) 684-6267

**U.S.D.A. Cold Hardiness Zones**
Zone 3a (cold hardy to \(-35\) to \(-40^\circ\text{F}\)): northwestern Wisconsin
Zone 3b (cold hardy to \(-30\) to \(-35^\circ\text{F}\)): most of northern Wisconsin
Zone 4a (cold hardy to \(-25\) to \(-30^\circ\text{F}\)): northern central and extreme northwestern Wisconsin
Zone 4b (cold hardy to \(-20\) to \(-25^\circ\text{F}\)): southwestern and central Wisconsin and along shore of Lake Superior
Zone 5a (cold hardy to \(-15\) to \(-20^\circ\text{F}\)): southeastern and eastern Wisconsin up to Door County and Madison near the lakes
Zone 5b (cold hardy to \(-10\) to \(-15^\circ\text{F}\)): Milwaukee, Racine, and Kenosha areas near Lake Michigan
The Emerald Ash Borer Cost Calculator developed by Purdue University is a great tool in helping to develop various management strategies for your community based on current ash populations, available personnel, equipment and financial resources unique to your particular community.

Urban Forest managers have 3 options available for managing emerald ash borer

- Treat ash trees with insecticides
- Remove ash trees
- Remove ash trees and replace them with resistant trees

The particular combination of these options that is best for any urban forest depends on the number and size of your ash trees as well as the size of your management budget.

Use this calculator to:

- Compare the annual and cumulative costs over a 25 year period for ANY management strategy that includes a mixture of tree removal, replacement, and insecticide treatment.
- Compare size of the forest remaining over a 25 year period for ANY management strategy that includes a mixture of tree removal, replacement, and insecticide treatment.
- Generate printed reports of projected costs of up to 3 management strategies at a time.

To run the calculator you will need:

- An inventory of the number and size of ash trees
- An estimate of costs for removing and treating trees based on the size of each tree.
- An estimate of costs for replacing each ash tree that is removed.

Instructions

The first time you use this calculator you will be asked to register by providing a username and password. With each user name you can enter tree inventory data, and the various management costs for up to 15 separate urban forest scenarios. There is no limit on the number of user names you can have.

Please review their tutorial for more information on how to use the calculator.

A Management Options Report has been created comparing three options:

1. Remove all ash
2. Remove and replace all ash
3. Treat some high value ash and remove and replace all other ash

Costing was spread out over a 5 year period. These reports are in .pdf form and can be found in Appendix E. The City can generate other customized reports (with other options) using the Purdue EAB Cost Calculator link listed above and the inventory data that was collected.
Removal Techniques for Utilization

When considering removal of municipal trees, one of the most important steps to be determined is where the tree will be placed once it is cut. If it is the intention of the homeowner or municipality to gain interest from wood processing mills to haul away the logs (actual payment for the logs is a matter that needs to be addressed for each circumstance), it is very important that the logs be moved to a location adjacent to the street. Mills that have an interest in urban logs typically will not be interested in hunting through a homeowner’s yard to find a single log. Optimally, it would be most advantageous for a municipality to provide a central “yard” to store the logs. This would benefit the mills by reducing their time and transportation expenses.

When cutting, or “bucking” the trunk of the tree, also known as the bole or the stem, the optimal length for the mills is 10’6”-12’6” with a minimum diameter of 10”. Occasionally, logs down to 8’6” in length will be considered.

Skidding arches (pictured below) are logging tools that can be used to move logs with a minimal amount of damage to a homeowner’s yard. As the picture suggests, the arch can be attached to an ATV, tractor or truck. Log trucks and log haulers are other options municipalities can consider, although these options are more expensive.

Skidding Arch

Log Truck and Trailer

[Images of skidding arch and log truck and trailer]
Marshalling Yards

**What is a marshalling yard?** A marshalling yard is a disposal site whose purpose is to help prevent ash wood which could potentially house the emerald ash borer from being transported out of a quarantined area. They can be used as staging sites for wood processing, such as chipping, grinding, debarking and sawing, and related marketing activities. The yards also serve as temporary or emergency storage sites when trees are removed.

**Why do we need a marshalling yard?** Marshalling yards are set up with utilization in mind and are used to merchandise or dispose of wood materials which may or may not be infested. They allow municipalities, tree service companies, utilities and individuals to drop off cut ash material for processing and disposal in a manner to prevent artificial spread. Marshalling yards or wood recycling centers may also accept various species, not just ash, and can make wood disposal more efficient and economical.

**What are the requirements for a disposal site?** The site can be located on public or private property within the quarantined area. It can be contracted or provided by a municipality. Size requirements depend on potential wood volume, proximity of other yards, and merchandising activities that will take place. If there are other disposal sites nearby and the site will only be used for grinding operations, a smaller site (3 to 5 acres) is likely plenty. However, if there are no other disposal sites in the area, a large volume of local wood and multiple utilization objectives, a larger site (~10 acres) would better accommodate processing and storage. The property also needs to be fenced to prevent items other than wood from being disposed at the site as well as to protect the public from accessing potentially dangerous equipment.

**What are the specifications for the material accepted by the Marshalling Yards?** Specifications for the materials brought to marshalling yards need to be developed to encourage sawlog and pulp stick sized wood where possible. By emphasizing this sized wood there is the potential for more value added uses and higher revenues than just chipped material.

**What are the potential problems and barriers with ash disposal?** There will be a huge demand for removal, coupled with a short timeline. There is not a large, viable urban wood industry, and there is a perception of “no value.” Transportation of the material and coordinating the various levels of government and industry will be challenging.
CHIPPING CONTRACT (sample)

This agreement made between the City/City/town of ______________________ and (contractor) ______________________ is for (contractor) ______________________ to provide tree chipping services for all wood brought into the emerald ash borer (EAB) Marshalling Yard, that is deemed to be chipped as designated by the City/City/town.

All wood that is to be chipped/processed will have a finished size measuring less than 1.0 inch in two dimensions.

In order for any wood product to leave the Marshalling Yard within the City/City/town of ______________________ it must meet the above size specifications and shall be inspected by the City/City/town designated forester for conformity when operations first begin and any time as deemed necessary by the designated forester.

Chipping operations may begin no earlier than 7:00 am CST and shall be completed by 5:00 pm CST during the work week (Monday – Friday). Chipping operations may occur on Saturdays between the hours of 8:00 am and 4:00 pm, with no chipping occurring on Sundays.

This contract shall be in effect for one year, beginning on the last date of signature below, or until mutually agreed upon as designated by signatures from both the City/City/town of ______________________and (contractor) ______________________ that the contract will cease prior.

Rate of pay for the operation shall be on a per volume i.e. cu.ft. or weight i.e. per ton of chipped or processed wood, whatever is listed below. Payments to contractor shall occur no more than twice a month, payments will be based on weights or measures verified by signature of company representative.

Rate
$ _______ per cu.ft.
$ _______ per ton

Company/Contractor name ________________________________
Contact Name: First ______________________ Last ____________________________
Mailing Address: Street ___________________________ City ______________________
State _____________ Zip Code ______________________
Phone : __________________ Fax:_________________ Email:______________________

Signature/Title City/City/town official: ______________________________________
Date Signed ____________
Signature/Title company official: __________________________________________
Date Signed ____________
Managing Emerald Ash Borer (EAB) Infested Wood
Regulations and Recommendations for Transport, Storage, Utilization and Disposal

A key aspect of reducing the spread of emerald ash borer is properly managing the wood, brush and stump grindings generated by removal of infested trees. This requires an understanding of the processes that will destroy the insect, but also the USDA APHIS, Wisconsin DATCP, Wisconsin DNR and local regulations that apply to those processes and to the movement, storage and disposal of infested material. In addition, it is important to consider how to best utilize the wood to minimize environmental impact, offset disposal costs or even create a value-added product.

Processing Options to Eliminate EAB
The following options are available for processing infested ash wood to kill EAB or prevent completion of its life cycle and spread to uninfested trees:

- **Chipping** – ash wood, brush and stump grindings must be chipped or ground down to a maximum size of no more than 1” in two dimensions (two of the three measurements - length, width and depth - must be 1” or smaller). The typical chipper used in tree care operations will not reliably create chips that meet this specification. Chippers equipped with a 1” screen will assure compliance.
- **Debarking** – complete removal of all bark plus ½ inch of wood. Note that the removed bark and wood must be chipped down to a maximum size of 1” by 1” in 2 dimensions.
- **Heat treatment** – the wood temperature must reach 160 degrees F for 75 minutes in the center of the piece. Heat treatment chambers or kilns need to be certified by USDA APHIS.
- **Composting** – To compost bark and the additional one-half inch wood, temperatures must reach at least 140 degrees F for four days and the compost pile must be turned after four days.
- **Fumigation** – use labeled fumigants by a process approved by state or federal agencies.
- **Burning** – wood, brush or chips may be burned prior to insect emergence
- **Aging** – ash wood material that is aged for 2 years after tree death will be free of EAB. The wood will have dried to the point EAB can no longer survive in it and any EAB present when the tree died or that infested the wood shortly after cutting will have emerged during the 2 year period. If this processing option is used, it should be understood that EAB will continue to emerge during the 2 year aging period and this wood poses a risk of infestation to living ash in the area where it is being aged. This wood must not be moved out of a quarantined area during the aging period.

Storage Until Processing
Adult emerald ash borers can emerge from infested wood from May through September. Infested wood should be processed by April 30 to avoid risk of emergence. If processing before adult emergence is not possible or if infested wood is found during an emergence period, double-bagging can be used to contain emerging adults.

- **Double-bagging** – this procedure is feasible for small quantities of infested wood. Loosely double bag in 4mil or thicker plastic bags. Keep bags tightly closed until October 1 to contain emerging adults. This is a temporary storage plan; processing should occur after bagging to destroy emerald ash borers.
Utilization Options
The following is a list of the options in recommended order for utilizing properly treated wood waste:

- Use as **lumber** (with no bark present) to produce value added products
- Use as **chipped mulch** for landscaping, trail surfaces and bedding material for farmers.
- Use chipped material as a **carbon source** for compost piles.
- Use as **boiler fuel** in a boiler equipped with the appropriate air pollution control equipment. This generally means industrial and utility boilers approved to burn wood. Consult individual boiler owners for required fuel specifications.
- Use as **firewood** for wood burning stoves and outdoor camp fires. Residential outdoor wood fired boilers are not recommended due to their heavy release of fine particulate matter pollution.

Disposal Options
If wood cannot be utilized by one of the options listed above, it may be disposed using the following options:

- Disposal in a **landfill**.
- Non-landfill **burial**.
- Burn in an **Air Curtain Destructor** or incinerator without energy recovery.
- Burn in a licensed **wood burning site**.

Regulations and Recommendations Within the Quarantine Area

1. Transportation
   - Technically, it is legal to move ash wood material anywhere within the quarantine area. However, movement of untreated infested ash wood material should be avoided to prevent possible spread of EAB to uninfested areas in the quarantine zone, but if transport is absolutely necessary, distance traveled should be minimized.
   - If the logs, brush or chips will be transported for another use such as mulch, compost, boiler fuel or daily cover at a landfill, no DNR Waste Program approvals or licenses are necessary.
   - If the wood is to be landfilled or burned without energy recovery, a DNR solid waste transportation license is required.

2. Storage – Marshalling Yards/Collection Sites
   - Wood may be stored temporarily either on site or at a dedicated marshalling yard for transfer elsewhere without a DNR Waste Program approval or license, if done in a nuisance free and environmentally sound manner.
   - A DNR construction site storm water permit under NR 216, Wis. Adm. Code is necessary if the activity on-site or at a marshalling yard results in a land disturbance of one or more acres which could happen if the stumps are removed or if an area is cleared to accept the wood.

3. Lumber
   - Lumber and the products that are made from it do not have to be treated if they will never leave the quarantine area. Ash logs and 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 DATCP and/or APHIS.

4. **Chipping/Grinding for Mulch**
   - Wood may be ground up for use as landscaping mulch or trail cover. Grinding to no larger than 1” by 1” is not required inside the quarantine area, but it is recommended to reduce possible emergence of adults or if the material will be transported away from its source.
   - No DNR Waste Program approvals or licenses are necessary for grinding or use of this material.

5. **Chipping/Grinding for Compost**
   - Wood may be ground up for use as a supplemental carbon source for composting operations. Grinding to no larger than 1” by 1” is not required inside the quarantine, but it is recommended to reduce emergence of adult EAB that could supplement the local population or start new infestations if the material is transported away from its source.
   - Small compost operations (< 50 cubic yards) utilizing yard and vegetable food waste do not require a DNR Waste Program approval and license, but must be operated in a nuisance free and environmentally sound manner.
   - Existing licensed municipal yard waste composting sites may also be used.

6. **Boiler Fuel**
   - Wood may be used as industrial fuel in large industrial boilers, if authorized by their DNR Air Management operation permit.
   - The boiler would be exempt from DNR Waste Program approvals and licenses but the resulting ash may be subject to testing requirements prior to disposal.
   - Household wood fired boilers are not recommended for this material due to heavy release of fine particulate matter pollution and lack of pollution control equipment.

7. **Firewood**
   - Movement of firewood is believed to be the primary means of overland spread of EAB, so utilization of infested wood for firewood should not be considered unless it can be assured that it will be treated to kill the insects and prevent the completion of their life cycle. Firewood treatments include heat drying, fumigation and debarking (plus removal of ½ inch of wood). These processes must be approved by DATCP if wood will be moved within Wisconsin or APHIS if wood will be moved out of state.
   - Firewood not for commercial sale (homeowner use) legally may be moved within the quarantine area, but users are advised not to move firewood any distance from the area where the wood originated to reduce further spread of EAB. All untreated firewood should be burned before April 30 to prevent insect emergence.
   - Other firewood information can be found at: [http://dnr.wi.gov/invasives/firewood/](http://dnr.wi.gov/invasives/firewood/)

8. **Landfill**
   - Landfills may be able to accept wood waste for disposal.
   - A written exemption may be needed from the DNR Waste Program for brush material.
   - Ground or chipped brush/wood may be acceptable as daily cover at a landfill with DNR Waste Program approval.
9. **Non-landfill Burial**
   - Wood waste may be disposed of by burial without a DNR Waste Program approval or license as long as it is not in a floodplain and is done in a nuisance free and environmentally sound manner. At least 12 to 13 inches of soil cover is needed to prevent emergence of EAB adults.
   - However, burying of large amounts of wood waste may preclude future land uses of property due to methane gas formation and instability concerns.
   - A DNR construction site storm water permit under NR 216, Wis. Adm. Code is necessary if the burial results in a land disturbance of one or more acres.

10. **Air Curtain Destructors**
    - An air curtain destructor is a device which uses a fixed dimension pit and mechanical air supply to reduce the amount of smoke emitted.
    - Air curtain destructors must be approved and licensed by the DNR Waste Program.

11. **Woodburning Site**
    - This option is discouraged unless no other alternatives are available.
    - Wood waste may be open-burned on the property where it is generated without DNR Waste Program approvals or licenses.
    - Wood waste must be burned in a safe manner, when wind and weather conditions are such as to minimize adverse effects on humans and the environment.
    - Burning must conform to local and state fire protection regulations.
    - Wood may not be transported off site and open burned without a DNR Waste Program approval and license. Existing licensed wood burning sites may be utilized as long as the pile is burned in accordance with DNR Air Management Program recommendations and DNR Waste Program rules and approvals.
    - More information on open burning can be found at: [http://dnr.wi.gov/environmentprotect/ob/](http://dnr.wi.gov/environmentprotect/ob/)

### Regulations and Recommendations Outside the Quarantine Area

The regulations and use/disposal options for ash wood material generated outside the quarantine area are the same as those listed above. The major exception is that the material does not need to be treated to eliminate EAB since the insect has not been found outside of the quarantine area. Be aware that any ash wood material brought into the quarantine zone will then be subject to the quarantine except for wood being transported through the quarantined area that is:

- transported through without stops (brief stops for fueling, traffic signals, etc. are allowed) and
- wood is covered securely to prevent access by adult beetles between April 30 and Oct 1 when adult beetles could infest wood.
Regulations for Transporting Ash Wood Materials from the Quarantine Area to the Non-quarantine Area

The intent of these regulations is to prevent the spread of EAB, starting with standing infested trees until the wood and any residue are completely processed.

Compliance Agreements:
All ash wood producers, transporters and processors must sign a compliance agreement with DATCP or APHIS officials before ash wood materials can be moved out of a quarantine area.

- Producers – these include anyone that takes down infested trees and moves the material off site, for example, loggers, commercial arborists or municipal crews. Producers need a compliance agreement to move the infested material away from where the trees were growing or to a certified facility if it is outside the quarantine area.
- Truckers and Transporters - Truckers and transporters that move ash logs and materials out of a quarantine area must sign a compliance agreement stating that the transporter will deliver regulated (ash) logs and materials only to mills or processors with an approved compliance agreement and will only ship the material between October 1 and March 31.
- Mills and Processors - The mill or processor must be visited by a DATCP or APHIS official and a compliance agreement must be completed and signed.

Compliance agreements are not complicated and it’s a simple process to obtain one. Sample copies of compliance agreements are available at: http://emeraldashborer.wi.gov/

The following regulations apply to moving ash wood materials outside a quarantine area:

- Mills and other processors located outside a quarantine area can only receive ash logs and materials from within the quarantine area between October 1 and March 31. (This is after and prior to emergence and flight by adult emerald ash borers.)
- Ash logs and materials must be processed by April 30.
- Residual bark and one-half inch of wood from debarking operations must be utilized or disposed by an approved method by April 30.
  - Chipping - bark and one-half inch wood must be chipped to less than one inch in two dimensions.
  - Composting - bark and one-half inch wood must be composted so that temperatures reach at least 140 degrees for four days and the compost pile must be turned after four days.
- All ash logs or materials at the processor, whether from inside or outside the quarantine area, are considered regulated unless the mills or other facilities can segregate and mark the ash logs or green lumber. If they can keep the different materials separate, then the other non-quarantine ash logs or lumber can be processed as usual.
- Ash green lumber must be free of bark prior to movement out of the mill unless heat treated according to USDA specifications.
Official Contact Information

Wisconsin Department of Agriculture, Trade and Consumer Protection
Bob Dahl, Regulatory Supervisor
608-224-4573 or Robert.dahl@wisconsin.gov

USDA, APHIS, Plant Protection & Quarantine
JoAnn Cruse, State Plant Health Director
608-231-9545 or Joann.m.cruse@aphis.usda.gov

Wisconsin DNR Waste and Materials Management
County contacts:
http://dnr.wi.gov/staffdir/dynamic/solidwaste.asp

Wisconsin DNR Watershed Management
Stormwater staff:
http://dnr.wi.gov/runoff/stormwater/contact.htm

Wisconsin DNR Air Management
Bart Sponseller, Monitoring Section Chief
608-266-1058 or bart.sponseller@wisconsin.gov

Wisconsin DNR Forest Products Utilization and Marketing
Terry Mace, Forest Resource Analyst
608-231-9333 or terry.mace@wisconsin.gov
9. COMMUNICATION

PUBLIC OFFICIAL INFORMATION TOPICS

TOPICS: (The following is a list of possible topics to share with community officials.)

_____ The threat of Emerald Ash Borer
_____ The number of ash trees in the municipality
_____ The cost of removal and replacement of infested trees
_____ Wisconsin Department of Agriculture, Trade and Consumer Protection directives
_____ EAB Readiness Team members and function
_____ Inspection and Verification Protocol
_____ Your community’s level of preparedness (staff, equipment, inventory, ordinance...)
_____ Emerald Ash Borer Biology and life cycle

(List additional topics in the lines provided below.)

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

MATERIALS: (The following is a list of possible materials to share with community officials.)

_____ Community fact sheet
_____ Power Point slide show
_____ Fact sheet
_____ FAQ’s
_____ Trees Pay Us Back

(List additional materials in the lines provided below.)

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
PUBLIC OFFICIAL INFORMATION PRESENTATIONS

Title/Topic: ________________________________
Intended Audience: ________________________________
Presenter: ________________________________ Phone: __________________
Location: ________________________________
Date: ____________ Time: from ____________ to ____________
Notes: __________________________________

Title/Topic: ________________________________
Intended Audience: ________________________________
Presenter: ________________________________ Phone: __________________
Location: ________________________________
Date: ____________ Time: from ____________ to ____________
Notes: __________________________________
STAFF TRAINING TOPICS

TOPICS: (The following is a list of possible topics to share with municipal staff.)

_____ The threat of Emerald Ash Borer
_____ The number of ash trees in the municipality
_____ The cost of removal and replacement of infested trees
_____ Wisconsin Department of Agriculture, Trade and Consumer Protection directives
_____ Local EAB Readiness Team members and function
_____ Established EAB Inspection and Verification Protocol
_____ Emerald Ash Borer Biology and life cycle
_____ EAB identification
_____ Ash tree identification
_____ How to handle media issues and questions
_____ Responding to citizen questions – When to pass the question on to another person
_____ Logistics for wood disposal
_____ Worker safety issues

(List additional topics in the lines provided below.)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

MATERIALS: (The following is a list of possible materials to share with municipal staff.)

_____ Emerald Ash Borer Field Guide
_____ Don’t Be Fooled By Look Alikes
_____ Ash Tree Identification
_____ FAQ’s

(List additional materials in the lines provided below.)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Emerald Ash Borer Readiness Plan – November 2011
City of Oconomowoc Wisconsin
STAFF TRAINING PRESENTATIONS

Title/Topic: ________________________________________________________________
Presenter: ___________________________________________________________________
Location: __________________________________________________________________
Date: _____________________________ Time: from _______________ to _______________
Who attended: _________________________________________________________________
Notes: ______________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

Title/Topic: ________________________________________________________________
Presenter: ___________________________________________________________________
Location: __________________________________________________________________
Date: _____________________________ Time: from _______________ to _______________
Who attended: _________________________________________________________________
Notes: ______________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

Emerald Ash Borer Readiness Plan – November 2011
City of Oconomowoc Wisconsin
PUBLIC EDUCATION & AWARENESS TOPICS

TOPICS: (The following is a list of possible topics to share with the public.)

   _____ Verify confirmation site and it’s location with respect to your municipality
   _____ Wisconsin Department of Agriculture, Trade and Consumer Protection directives
   _____ Local EAB Readiness Team members and function
   _____ Local EAB Protocol for Action
   _____ Current municipal actions to monitor ash trees in the municipality
   _____ How to make a request for an inspection
   _____ Contacts for EAB inspections and reporting
   _____ Established EAB Inspection and Verification Protocol
   _____ Emerald Ash Borer biology and life cycle
   _____ EAB signs and symptoms
   _____ Ash tree identification
   _____ DON’T MOVE FIREWOOD CAMPAIGN
   _____ Control options
   _____ Encourage citizens not to panic yet
   _____ Answers to Frequently Asked Questions
   _____ Information Resources/Internet Sites/Handouts

(List additional topics in the lines provided below.)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

MATERIALS: (The following is a list of possible materials to share with the public.)

   _____ Emerald Ash Borer Pest Alert
   _____ Don’t Be Fooled By Look Alikes
   _____ Ash Tree Identification
   _____ FAQ’s

(List additional materials in the lines provided below.)

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Emerald Ash Borer Readiness Plan – November 2011
City of Oconomowoc Wisconsin
PUBLIC EDUCATION & AWARENESS PRESENTATIONS

Title/Topic: ____________________________________________________________

Presenter: ____________________________________________________________

Phone: ___________________________ E-mail: ______________________________

Location: _____________________________________________________________

Date: ____________________________ Time: from __________ to ______________

Notes: __________________________________________________________________

________________________________________________________________________

Title/Topic: ____________________________________________________________

Presenter: ____________________________________________________________

Phone: ___________________________ E-mail: ______________________________

Location: _____________________________________________________________

Date: ____________________________ Time: from __________ to ______________

Notes: __________________________________________________________________

________________________________________________________________________
10. INFORMATION SECTION

Know about Emerald Ash Borer

Introduction

The emerald ash borer (*Agrilus planipennis*) is an exotic pest, native to Asia, currently threatening the ash (*Fraxinus* spp.) tree resource in the Great Lakes region. The emerald ash borer belongs to a group of insects known as metallic wood-boring beetles (*Buprestidae*). Since its discovery in southeastern Michigan during 2002 it has continued to spread in Michigan and throughout the Midwest. Infestations also exist in Illinois, Indiana, Kentucky, Maryland, Michigan, Minnesota, Missouri, Ohio, Pennsylvania, Virginia, West Virginia, Wisconsin and Canada. Transmission of this pest is accelerated by the inadvertent transportation of larvae in logs, firewood and nursery stock. The subcortical (beneath the bark) feeding habits of emerald ash borer larvae cause extensive damage to an ash tree's vascular system, depriving the crown of water and nutrients. The emerald ash borer appears to attack both stressed and healthy trees, typically killing its host in 1-3 years. In Michigan, this insect has caused wide-ranging mortality, including white, green and black ash species. Likewise, Wisconsin's ash resource is threatened by emerald ash borer infestation. Forest inventory and analysis data shows that Wisconsin has approximately 727 million ash trees in its forests. In August 2008 the emerald ash borer has been found in Wisconsin. We need you to continue to be on the lookout for this pest. Early detection, isolation and eradication are our best defenses against this pest.

Identification and Biology

The emerald ash borer adults are metallic green in color and belong to a group of insects known as the metallic wood-boring beetles (*Buprestidae*). Adults are 3/8 - 1/2 inch long and 1/16 inch wide. Adult emerald ash borer emerge through the bark of ash trees in the early summer, creating a D-shaped exit hole as they chew their way out of the tree. Based on observations of emerald ash borer populations in Michigan, adult emergence is staggered, beginning in early June and continuing through late July. Emerald ash borer adults live approximately 3 weeks and have been observed well into August. Adults are most active during the day, favoring warm, sunny weather. Adults are often found feeding on the margin of ash tree foliage. Mating occurs soon after adult emergence, with egg laying occurring a few days later. Eggs are laid singularly in bark crevices, with females laying 60-90 eggs throughout their lifetime. As eggs hatch first instar larvae chew into the bark until they reach the cambial region.
Emerald ash borer larvae are white in color, slightly flattened and have a conspicuous pair of brown pincher-like appendages (urogomphi) on the last abdominal segment. The size of larvae varies as they pass through each instar, with mature larvae averaging 1¼ inches in length. As larvae feed they wind back and forth, creating characteristic serpentine shaped galleries in the phloem and outer sapwood. As mature larvae complete feeding in the fall they excavate a pre-pupal chamber in the outer sapwood where they stay to overwinter. Pupation occurs in this same chamber the following spring, thus completing the life cycle.

**Host Trees**

The emerald ash borer appears to feed exclusively on ash tree species in North America. Thus, the four native species of ash in Wisconsin, white (*Fraxinus americana*), green (*Fraxinus pennsylvanica*), black (*Fraxinus nigra*) and blue (*Fraxinus quadrangulata*) are all susceptible to this pest. Ash trees are quite abundant in Wisconsin, with estimates as high as 628 million trees total, and are commonly found in both urban and forest settings. Ash is a component of three forest types in Wisconsin including 1) Elm / Ash / Cottonwood, 2) Northern Hardwood and 3) Oak / Hickory. An ash tree is most easily identified by its opposite branching pattern (two branches come off the main stem, one on each side and opposite each other) and compound leaves with 5-11 leaflets. Leaflets are moderately toothed and may be stalked or sessile.

**Symptoms and Signs**

The symptoms associated with emerald ash borer infestations are almost identical to those of other common ash pests and diseases. Therefore, it is important to look for a combination of at least 2 or more symptoms or signs before concluding that the emerald ash borer is present. The following symptoms and signs are commonly associated with emerald ash borer infestations.
Symptoms

**Crown dieback:**
Dieback of the upper and outer crown. Trees begin to show dead branches throughout the canopy, beginning at the top. Foliage in the top of the tree is thin and discolored.

© photo by Jane Cummings
Carlson, WI DNR

**Sprouting:**
Sprouting at the base and/or on the bole of the tree. Trees may sucker excessively both at the base of the tree and on the trunk, often just above where the larvae are feeding.

© photo by Renee Pinski, WI DNR

**Bark splits:**
Vertical splits in the bark are caused due to callus tissue that develops around larval galleries. Larval galleries can often be seen beneath splits.

© photo by Linda Williams, WI DNR
Signs

D-shaped emergence holes:
As adults emerge from under the bark they create an emergence hole ~ 1/8 inch in diameter.

© photo by Renee Pinski, WI DNR

S-shaped larval galleries:
As larvae feed under the bark they wind back and forth, thus creating galleries that are packed with frass and follow a serpentine pattern.

© photos by Linda Williams, WI DNR

Larvae:
Larvae are cream-colored, dorso-ventrally flattened and have pincher-like appendages (urogomphi) at the end of their abdomen. Mature larvae reach 1 1/4 inches in length and all larvae are found feeding beneath the bark.

© photos by Linda Williams, WI DNR
Adults:
Adult beetles are metallic green in color and are 3/8 - 1/2 inch in length and 1/16 inch in width.

Other Pests and Diseases

There are a number of pests and diseases that cause symptoms similar to those induced by the emerald ash borer. It is important to note that when determining whether the emerald ash borer is present you will typically find a combination of at least two of the symptoms or signs previously described (see Symptoms and Signs).

Insect Pests

Other wood-boring and phloem-feeding pests of ash include moth, beetle and fly larvae. A distinguishing characteristic between these pests and the emerald ash borer is that the exit holes of the former are circular while those of the emerald ash borer are D-shaped. The following pests are the most commonly found developing in ash trees:

Clear winged moths (*Lepidoptera: Sesiidae*)
- Banded Ash Clearwing (*Podosesia aureocincta*)
- Ash borer (trunk borer) (*Podosesia syringae*)

Bark beetle (*Coleoptera: Curculionidae*)
- Eastern ash bark beetle (*Hylesinus aculeatus*)
- Northern Ash Bark Beetle (*Hylesinus criddlei*)
- White-Banded Ash Bark Beetle (*Hylesinus fasciatus*)

Long-horned beetles (*Coleoptera: Cerambycidae*)
- Redheaded ash borer (*Neoclytus acuminatus*)
- Banded Ash Borer (*Neoclytus caprea*)

Diptera: Agromyzidae
- Ash cambium miner (*Phytobia spp.*)
Disease, Decline and Environmental Stressors

Fungi, phytoplasmas and environmental stressors can also be found negatively impacting ash tree vigor in Wisconsin. These biotic and abiotic agents typically induce gradual decline and branch dieback, symptoms similar to those caused by the emerald ash borer. Thus, it is important to look for additional symptoms caused by the emerald ash borer such as D-shaped exit holes and S-shaped larval galleries on and under the bark, respectively. The following biotic and abiotic stressors are typical of ash in Wisconsin:

- Verticillium wilt (*Verticillium dahliae, V. albo-atrum*)
- Ash yellows (*phytoplasmas*)
- Ash decline (environmental agents)
- Drought (environmental)

Links

Detailed information on these pests and diseases can be found at:

- Wisconsin Garden Facts at: [http://uwex.edu/ces/wihort/GardenFacts.html](http://uwex.edu/ces/wihort/GardenFacts.html)

What You Can Do Regarding Firewood

There are a few simple precautionary measures you can take to prohibit the transmission and spread of this pest into Wisconsin.

Firewood Facts, Rules & Advice


- Be on the lookout for this pest!
- Be cautious when transporting or purchasing firewood by knowing where it came from. Never bring firewood from a known emerald ash borer infested area into Wisconsin.
- Keep an eye on the ash trees near your surroundings and maintain tree vigor by watering trees if the weather has been overly dry.
- Report any suspected emerald ash borer infestations (if 2 or more symptoms or signs are present) by contacting the Department of Agriculture, Trade and Consumer Protection on the emerald ash borer Hotline at 1-800-462-2803.
Educational Resources

Information on the Internet

   a. EAB internet portal for Wisconsin sponsored by Wisconsin Department of Agriculture, Trade and Consumer Protection, the Wisconsin Department of Natural Resources and the University of Wisconsin – Madison
   b. Contains information from a Wisconsin perspective on EAB biology, management, survey activities, publications and provides related links

   a. Official emerald ash borer web page administered by Michigan State University
   b. Contains information on EAB biology, distribution, control measures, current research and links to various EAB infested state’s web sites

   a. Wisconsin DNR EAB Web site
   b. Contains information on Wisconsin’s ash resource, EAB biology, signs and symptoms, risk maps, survey plans, how to report EAB and other ash pests

   a. UW–Extension, Dept. of Entomology’s EAB Web site
   b. Contains information regarding EAB biology, signs and symptoms, images of EAB look-alikes

   a. Wisconsin Department of Agriculture, Trade and Consumer Protection’s EAB Web site
   b. Contains the “Wisconsin Emerald Ash Borer Response Plan”, power point presentations; Wisconsin’s EAB survey program and other general information

   a. Multi-state effort administered by Michigan State University to inform people about EAB
   b. Contains a photo album of EAB damage, varied life stages as well as look a like beetles; these photos may be helpful when developing brochures or presentations

   a. This Michigan State University site has all the components of the CD Rom and DVD entitled “Emerald Ash Borer, What You Need to Know”
   b. Components of the DVD are: Ash tree and EAB identification, current EAB research taking place, sample public service announcement, Native American basketmaking with black ash, how to work with the media
   c. Video clips relating to all the components listed above and more may be viewed at this site, to order both the CD Rom and DVD package call the MSU bulletin office at (517) 353-6740 and ask for DVD #024, cost is currently $24.95
Community EAB Websites

Community websites are another avenue for public education and awareness. Municipalities have incorporated EAB into their websites by using links, press releases, frequently asked questions (FAQ’s), inspection requests and more. Here are just a few examples.

FAQ Example:
The City of Madison, Wisconsin has a webpage with links and FAQ’s customized for their City. http://Cityofmadison.com

Municipal Preparation Example:
The City of Kenosha, Wisconsin has a webpage which states what the City has been doing to prepare for EAB and includes links to EAB information. http://kenosha.org

EAB Inspection Request Example:
The City of Wilmette, Illinois has a web page featuring the press release confirming EAB in their City, web links for EAB information and an electronic contact form for a possible EAB inspection. http://wilmette.com
OTHER RESOURCES

Your DNR regional urban forestry coordinator can supply additional copies of the EAB materials listed below.

1) EAB Handouts
   a) General Information
      i) The Green Menace (PUB-FR-348-2006). An introductory EAB handout with biology, symptoms and signs (with photos) and list of several related Web sites. Found in toolkit section 6.b.

   b) Training Tools
vi) **My Ash Tree is Dead… Now What Do I Do?, MSU Extension Bulletin E-2940 (517) 355-2308.** Four pages of information regarding tips when hiring an arborist to remove the tree/s, along with options for value added use of the tree/s. *Found in toolkit section 8.c.*

vii) **WI DNR Forest Health Emerald Ash Borer Activities (2004 – 2006), & 2007 Wisconsin EAB Activities Completed by Various Agencies.** These two documents give a great background regarding EAB survey, outreach, education and firewood inspection activities carried out in Wisconsin by the WI-DNR, WI-DATCP, U of W, WTCAC & USFS. Along with succinct narratives are several maps, photos and charts depicting activities carried out. *Found in toolkit section 1.*

c) **Additional Information**

i) **EAB on the Internet.** A handout listing EAB Web sites geared for Wisconsin audiences. Includes WDNR, UW–Extension, DATCP and the official EAB Web site administered by Michigan State University. Access to information about EAB biology, current research, control measures, distribution and regulatory matters. Informative to all (public, City officials, surveyors). *Found in toolkit section 9.g.*

ii) **Alternative to Ash Trees: Commercially Available Species and Cultivars, Dr. Laura Jull, UW–Madison.** A descriptive list of large-medium and small trees suitable for urban planting. Gives physical characteristics, growth rate and tolerance to environmental stress for each species. Essential to City foresters/ public works employees. *Found in toolkit section 7.d.*

iii) **Wisconsin Wood Residue Brokers, Forestry Facts Publication, UW–Extension.** Gives product information and contacts for companies engaged in the wood residue market. Beneficial to City officials, City foresters/ public works employees. *Found in toolkit section 8.c.*

iv) **Lessons Shared…. Journal from WI-DNR EAB Field Trip to Michigan & Ohio.** This 22 page journal is chocked full of information from the WI-DNR Urban Forestry Working Groups two day trip in August of 2007 to several communities, communicating with state & municipal officials, researchers and arborists who have been on the front lines combating EAB. Read first hand what management, utilization and educational tactics are being employed in states where EAB has been present for several years. *Found in toolkit section 11.*

2) **Internet Resources**


b) **Emerald Ash Borer – What you need to Know.** This DVD and CD compilation of information is perfect for community leaders, Extension educators and regulatory personnel who are looking for resources to spread the word about EAB. Homeowners can also benefit from the information. To receive these materials contact Michigan State University Extension’s bulletin office at 517-353-6740, and ask for DVD-024. The price is $24.95; discount available for orders of 10 or more. These materials can also be previewed on the web at: [http://www.emeraldashborer.info/cdfiles/videos.html](http://www.emeraldashborer.info/cdfiles/videos.html)

3) **Cards**

a) **EAB ID (PUB-FR-353-2006).** Plastic credit-card-sized piece with actual-size photos of EAB adult, larva and exit hole, along with the EAB Web address, [www.emeraldashborer.info](http://www.emeraldashborer.info). Also gives the federal reporting phone number. Beneficial for field surveyors, *found in toolkit section 6.b.*
b) **Folding EAB ID (PUB-FR-290-2006).** A 4” x 3” card (folded size) with Wisconsin’s 1-800 EAB reporting number on it. Opens up to photos of EAB symptoms and signs. Also has the DNR invasive species Web address. Informative public handout, found in toolkit section 6.b.

c) **What’s Your Firewood Hiding? (PUB-FR-356-2006).** A brochure shaped like a burning log that fits into a 4” x 9” envelope. Has “What’s Your Firewood Hiding” on the front and describes the dangers of moving firewood on the back. Informative public handout, found in back pocket of toolkit binder.

4) **Bumper Sticker**  
   a) **Don’t Move Firewood, It Bugs Me.** Magnetic bumper sticker. 1-866-EAB-4512. Informative public handout, found in back pocket of toolkit binder.
Frequently Asked Questions about the Emerald Ash Borer

1. **Where did the emerald ash borer (EAB) come from?** The native range of EAB is eastern Russia, northern China, Japan and Korea.

2. **When was EAB first discovered in North America?** EAB was first identified in southeast Michigan in 2002. It likely arrived several years earlier.

3. **How did it get to North America?** We don’t know exactly, but it most likely traveled in ash wood used for stabilizing cargo in ships or for packing consumer products.

4. **Where is EAB now?** As of September 2011, Illinois, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, Wisconsin and Ontario and Québec Canada.

5. **What does EAB do to ash trees?** The larval stage of EAB feeds under the bark of trees, cutting off the flow of water and nutrients. Infested trees die over a 2- to 4-year period.

6. **Which trees are susceptible?** All sizes and even very healthy ash trees can be killed. All of Wisconsin’s native ash trees (green, white and black ash) as well as many horticultural cultivars are susceptible to infestation by EAB. Mountainash is not a true ash and is not susceptible to EAB infestation. Research studies are ongoing to test for resistance in various cultivars in the hopes that some may survive an infestation.

7. **Is ash an important tree in Wisconsin?** Cities throughout Wisconsin planted ash trees to replace the elms lost to Dutch elm disease in the 1960s and 70s. An estimated 30 percent of Wisconsin’s street trees are ash. According to state officials, tree removal and replanting because of EAB could cost Wisconsin municipalities as much as $2.4 billion. In addition to the cost of tree removal and replacement, homeowners may pay higher electric and water bills because air conditioners may run more and lawn watering may increase. Additionally, there are approximately 717 million ash trees scattered throughout Wisconsin’s forests. Ash serves as an important member of our northern and southern forest and is a key member of forests growing in wet areas including swamps and along river ways.

8. **What does an EAB look like?** The adult beetle is dark metallic green and ½ inch long. Larvae are flat, cream-colored grubs with wide heads and they feed in the inner bark between the wood and the rough outer bark.

9. **How does EAB spread?** EAB is most commonly spread through the movement of infested firewood, nursery stock or ash logs. The adult beetle can also travel short distances through flight. EAB adults typically do not fly far from where they emerge but this is dependent on the availability of food (ash trees).

10. **How can I tell if my ash trees are infested with EAB?** The canopy of heavily infested trees will begin to die, usually near the top of the tree and progressing down the trunk. The other common signs of infestation include: D-shaped exit holes through the bark about 1/8 inch
wide; S-shaped larval galleries just beneath the bark; vertical splits in the bark; thinning canopy; shoots sprouting from the main trunk or base of the tree; and unusually large amounts of woodpecker activity as they feed on the larvae.

11. What is being done about EAB? There is a national effort to limit the spread and impact of EAB. A national plan coordinated by the United States Department of Agriculture, Animal and Plant Health Inspection Service (APHIS) guides what federal, state and local officials should do to manage this insect. Infested areas are quarantined which means selected materials such as ash firewood, nursery stock and ash logs may not be moved out of infested areas. As of December 2006, the states of Illinois, Ohio, Indiana and Lower Michigan have all been quarantined. Public information efforts have focused on early detection of EAB and limiting the movement of firewood. State and federal surveys have focused on high-risk areas such as campgrounds, new developments where ash has been planted in the last 12 years and in the vicinity of businesses that import solid wood packing material or ash logs. Eradication of outlying infestations, where all ash within ½ mile of infested trees are cut and destroyed, is being implemented in selected areas.

12. What is being done in Wisconsin? The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) is currently leading efforts to detect, plan for and limit the chance of EAB movement into and throughout Wisconsin. Regulations are currently in place that will control the movement of ash from quarantined areas into and within Wisconsin. The Department of Natural Resources (DNR), together with DATCP and University of Wisconsin scientists, have been conducting detection surveys of areas deemed at high risk for introduction of EAB. These include camping areas and locations where ash trees may have been planted within the last 12 years. Public information and education focused on reporting possible sightings of EAB and limiting the movement of firewood is well underway. DNR has instituted a rule that prohibits the transport of firewood onto DNR-managed lands if it originated from out-of-state or from an area greater than 50 miles from the DNR property. A plan to collect and preserve the native ash tree population through the collection of ash seed is being developed.

13. Is there anything I can do now to protect the ash trees in my yard from EAB? There are chemical treatments available to protect ash trees from EAB but they are not 100 percent effective. The decision to treat is a personal preference. The state strategy is guided by the national EAB Science Advisory Panel and its success relies heavily on federal funds. The state’s strategy will be constantly evaluated and may change based on new science-based management options, available funding and any national strategic changes. (See Appendix A)

14. Is ash still a viable choice when considering what to plant in my yard? In general, having a diversity of species in your yard, on your street or in your community is your best defense against all tree health problems. If ash comprises 10 percent or more of the tree species in your local area, it would be best to choose an alternative. Studies are ongoing where scientists are testing native ash and cultivars for resistance to EAB feeding injury. Results are preliminary; resistant cultivars may be available at a future date. Check with your state horticulture extension agent for the latest information.
15. What can I do to help? Educate yourself on how to recognize signs and symptoms of EAB. Two excellent sources of information may be found at [www.emeraldashborer.info](http://www.emeraldashborer.info) and [www.emeraldashborer.wi.gov](http://www.emeraldashborer.wi.gov). Report possible sightings of EAB by calling 1-800-462-2803.

Do not move firewood. Purchase or cut all firewood from the same general location where you plan to use it, and when camping or at the cabin, do not bring any that’s left over home with you.

### How to Collect and Preserve Insect Specimens

Please do not to send live insects.

**Adults** – adult beetle samples should be dead. To kill an adult beetle place it in your freezer overnight, or submerse it in rubbing alcohol; hand sanitizer gel can also be used. If you have killed the beetle using rubbing alcohol and are planning to mail the specimen, please note that alcohol is considered a hazardous material and is illegal to ship without proper packaging and certification, so just prior to shipping pour off the alcohol, re-cap the container, place in a crush-proof box, and mail. If you have killed the beetle using other ways please ship the beetle in a crush-proof container. Specimens are difficult to identify if they arrive crushed, broken, or moldy.

**Larvae** – larvae samples should be dead. To kill and preserve a larvae (the white worm-like immature stage of this insect) place it in a small leakproof vial filled with rubbing alcohol or hand sanitizer gel. Medicine, vitamin, and film canisters are commonly used for sample submissions. Mail the vial in a small box to ensure that the vial will not be crushed during transport. If you are planning to mail the specimen please note that alcohol is considered a hazardous material and is illegal to ship without proper packaging and certification, so just prior to shipping pour off the alcohol, re-cap the container, place in a crush-proof box, and mail.

When you send in the samples please include the following information along with the insect:

1. Your name and phone number
2. Date, county, and address where you collected the insect
3. Where did you collect the insect (a tree, the ground, on firewood, etc)
4. Are there ash trees in the area where you collected the insect
5. If you collected it from a tree please list the symptoms that you observed on the tree:
   1. sprouts on trunk of tree  
   2. D-shaped exit holes in bark  
   3. S-shaped winding tunnels under bark  
   4. woodpecker activity on tree  
   5. dieback in the upper crown of the tree

If you have the insect or larva, or clear photos of the insect or larva please upload or send them to:

EAB Coordinator
DATCP
P.O. Box 8911
Madison, WI 53708-8911
Photos also can be e-mailed to DATCPEmeraldAshBorer@wisconsin.gov
EAB INSPECTION REQUEST FORM

DATE: ______________
TIME: ______________

NAME: ________________________________________________
ADDRESS: _______________________________________________
PHONE: ________________________________________________

Is the tree on a PUBLIC or a PRIVATE site?

☐ Public    ☐ Private    ☐ Unsure

Where is the tree located on the lot?

_______________________________________________________
_______________________________________________________
_______________________________________________________

What are the indications of EAB you’ve witnessed?

☐ Epicormic sprouting
☐ Crown dieback
☐ Bark splits
☐ S-shaped larval galleries
☐ D-shaped emergence holes
☐ Woodpecker feeding
☐ Adult beetles
☐ Larvae

(To be completed by the City forester)

Date Inspected: ______________
Inspected By: ___________________________________________
Is EAB present?  □ Yes  □ No  □ Monitor
Notes: _______________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
Date requesting party was contacted: _______________________

Last revised 1/16/2007
Sample Press Releases

No graphics are provided for these stories. You may want to use photos of trees from your community.

DREADED TREE KILLER AT WISCONSIN’S DOORSTEP

Wisconsin’s ash trees now know what’s coming; state scientists, researchers and foresters are preparing management options as this dreaded tree killer continues to be detected in our state.

That killer is the emerald ash borer (EAB), a small, emerald green beetle that hitchhiked from Asia to the Midwest inside cargo packing materials. EAB larvae tunnel beneath the bark of ash trees, cutting off the tree’s food and water supply and killing it within two to five years. Even healthy North American ash trees seem to have no resistance to the borer.

Wisconsin’s communities are facing a hard hit from this insect. Cities throughout the upper Midwest planted ash trees to replace the elms lost to Dutch elm disease. An estimated 20 percent of Wisconsin’s street trees are ash. Emerald ash borer could destroy 5.2 million ash trees within Wisconsin’s urban forest. According to state and federal officials, tree replanting because of EAB could cost Wisconsin municipalities as much as $1.5 billion. Include the expense of removal and disposal, and costs could be two to three times that number! In addition to the cost of tree removal and replacement, homeowners may pay higher electric and water bills because without the shade of ash trees, air conditioners will run more and lawn watering will increase. Storm water peak flows may increase in some areas and pavement degradation may accelerate from the loss of the tree canopy. Property values may also decline.

It is believed that this pest was accidentally introduced to the Detroit area in the early 1990s. Because no one knew that EAB was here, it silently hitchhiked into several other states and Ontario, Canada before it was discovered in 2002. In 2005, EAB was found in the eastern part of Michigan’s Upper Peninsula, then in two other locations near the Mackinac Bridge two years later. In the summer of 2006 the pest was found at a number of sites in northern Illinois, putting it only about 30 miles from Wisconsin. EAB was finally found in southeastern Wisconsin in August 2008.

The emerald ash borer can fit on a penny, but the damage it causes is huge. Able to infest trees as small as one inch in diameter, nearly every ash tree in the path of this insect has been killed. Infested states and areas have lost more than 25 million ash trees and millions of dollars have been spent trying to control it. Symptoms of EAB infestation include a declining leaf canopy, sprouting along the trunk of a live ash tree, bark cracks covering S-shaped larval galleries, and 1/8 inch D-shaped holes made by emerging adults. Adult beetles are dark green and approximately ½ inch long and present from May to August.

The beetle is also elusive, spending nearly all of its life hidden under the bark. Signs of infestation are very difficult to detect until a tree has been infested for two or three years. Currently, the best way to locate EAB is to cut down ash trees and look for the larvae feeding underneath the bark. Using another technique, foresters remove a strip of bark around a live ash tree to weaken it. Since the ash borer prefers to breed in weakened trees, it should infest this wounded tree rather than healthy trees if it is present. The wounded tree is cut down in the fall and the bark is peeled to look for EAB larvae.

Campgrounds and urban areas are thought to be at highest risk of EAB introduction due to accidental transport in firewood. Industries that use ash have taken steps to minimize the risk of
additional EAB spread, but many people are unaware of the risks of long-distance firewood movement. Thus, public awareness is a major key to preventing the spread of EAB and other threats such as the gypsy moth and beech bark disease.

So far, EAB detection efforts in Wisconsin have included visual surveys in campgrounds and in urban areas, peeling declining ash that may harbor EAB, and the preparation of detection trees in state parks and forests, and in the National Forests. Researchers are looking for symptoms of EAB infestation as they walk through forest lands, and City foresters and arborists are on alert in Wisconsin’s urban areas.

Wisconsin's strategic plan to fight the emerald ash borer stresses prevention and early detection. Federal officials have quarantined more than 21,000 square miles in Illinois, Indiana, Michigan, and Ohio to prevent new areas from becoming infested with the pest. In 2006, Wisconsin’s National Forests banned firewood from outside the state, and the DNR has implemented a rule that prevents campers from bringing firewood that was cut more than 50 miles away into a state campground, unless the wood is certified by the Wisconsin Department of Agriculture. These rules may help keep the beetle from doing extensive damage to popular recreational areas.

The public is urged to be on the lookout for EAB and declining ash trees. For more information on emerald ash borer, visit http://emeraldashborer.wi.gov. The public can report suspected emerald ash borer adults or infestations by contacting the Department of Agriculture, Trade and Consumer Protection’s toll-free EAB Hotline at 1-800-462-2803.

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optional sidebar or fill-in section to be customized by municipalities, as desired; examples of information that could be included:

There are more than _____(number) trees on _____(name of municipality) parkways encompassing over _____(number) species and sub-species, of which _____(number) are ash.

In light of the threat of emerald ash borer, the City has not added any ash trees to its parkway tree inventory since _____(year).

_____ (name of municipality) is preparing for emerald ash borer by _____(actions being taken).

[Quote from local municipal forester, “_____.”]

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Note to Editors: Responsibility for public trees varies from City to City. The most complete information about the tree resource in your community, such as which are publicly owned and what the City’s responsibilities are, can be obtained from your City forester or other appropriate City agency.

No graphics are provided for this story. You may want to use photos of trees from your community.
Don’t Move Firewood – Help Stop the Spread of Emerald Ash Borer

When a tree dies in the backyard, many homeowners turn it into firewood and take it up to their cottage or give it to a neighbor. Unfortunately, they may also be giving hidden hitchhikers a ride. Alien tree pests and diseases such as emerald ash borer (EAB), gypsy moth and oak wilt are easily transported long distances on firewood. EAB hitchhiked from Asia to Michigan in cargo packing materials and has since killed more than 25 million ash trees. Now an estimated 727 million ash trees in Wisconsin are threatened by this pest hitchhiking its way on firewood from infested states such as Illinois, Michigan, Indiana, Ohio, Maryland, Pennsylvania or West Virginia. Public care in using firewood is the most effective way to minimize the spread of EAB.

Homeowners can help keep Wisconsin’s urban forests healthy by taking a few precautions:

- Leave your firewood at home and obtain it near your cottage or campsite. Wood purchased or gathered from a local source is at low risk of introducing a new pest or disease.
- Don’t bring firewood home, especially if you’ve been out-of-state. In fact, it is now against the law to take firewood of hardwood trees (including ash) out of Illinois, Indiana, lower Michigan, Ohio and parts of Pennsylvania, Maryland and West Virginia because of the risk of transporting EAB. Even if an area is currently not known to have EAB, it may already be there, but undetected.
- Wood that has loose or no bark is safer than wood with tight bark because most insects and diseases that live beneath the bark need it to be tightly attached to the wood. Check each piece though, because gypsy moth egg masses may still be hiding under loose bark.
- Burn all of the firewood that you obtain. Don’t bring it home or move to another location.

Wisconsin residents can also help by monitoring their ash trees. If three or more of the following symptoms are observed on any species of ash tree (except mountain ash, which is not a true ash), it should be reported immediately to the Department of Agriculture, Trade and Consumer Protection by calling 1-800-462-2803:

- dying branches in the tree canopy
- sprouting on the trunk or at the base of the tree
- splitting bark on the trunk
- increased woodpecker activity
- tiny, D-shaped holes where adult beetles have emerged
- S-shaped trails underneath the bark
- small, bullet-shaped, metallic green beetles present from June to August

For more information on emerald ash borer, visit [http://emeraldashborer.wi.gov](http://emeraldashborer.wi.gov).

[Note to Editors: Responsibility for public trees varies from City to City. The most complete information about the tree resource in your community, such as which are publicly owned and what the City’s responsibilities are, can be obtained from your City forester or other appropriate City agency.]