# EMERALD ASH BORER COMMUNITY PREPAREDNESS PLAN

Michigan Department of Natural Resources

Michigan Department of Agriculture

11/19/2008

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## INTRODUCTION

Since its discovery in 2002, the Emerald Ash Borer (EAB) has had a dramatic impact on Michigan's urban and community forests. Whether your community is currently dealing with EAB or will be in the future, developing, communicating and implementing an EAB Preparedness Plan will enable you to address public and private needs in an efficient and effective manner. While each community will address its EAB infestation based on local circumstances, all communities should be prepared to manage any disease or invasive insect that threatens their urban forest resource.

The purpose of this document is to assist Michigan communities in preparing for and managing their local emerald ash borer (EAB) impact. It is designed to serve as a tool to help establish a framework for local EAB preparedness and community action by outlining major issues and providing guidance on how to address them.

A well-designed plan will establish a timeline and budget, identify essential personnel, resources, and procedures, and be flexible enough to adjust to changing information. The reality is that once EAB is established, communities may be forced to deal with tough economic, environmental, legal and social issues. Planning in advance allows your community to be better prepared to minimize the severity of these impacts and establish a solid foundation for recovery. **Appendix A** provides a case study of the City of Westland and their EAB response plan.

Federal and State roles and responsibilities vary regarding the type of assistance each can provide communities in preparing for EAB. For this reason, this document has been developed as a cooperative effort between the Michigan Department of Natural Resources (DNR) and Michigan Department of Agriculture (MDA) with assistance from the Southeast Michigan Resource & Development Council (RC&D Council), Michigan State University & Extension (MSU & MSUE), USDA Animal and Plant Health Inspection Service (APHIS) and the USDA Forest Service, State & Private Forestry (USFS). Major roles and responsibilities for each are listed below:

- **DNR -** Tree inventories, management plans, ordinances, tree planting, state and private lands assistance, wood utilization
- **MDA -** State regulatory agency, state quarantine, survey, compliance agreements
- **RC&D Council -** Wood utilization
- **MSU -** Research, treatment options
- **MSU Extension -** Plant diagnostics, outreach and education
- **APHIS -** Federal regulatory agency, federal quarantine and compliance agreements, EAB confirmation
- **USFS -** Technical and financial forestry assistance

A detailed listing of agency contact information is provided in **Appendix B.**

## EAB PREPAREDNESS PLAN ELEMENTS

The elements of an EAB Preparedness Plan described below will help you develop the framework for your community's plan. These elements are offered as suggestions. The plan you develop should be specific to your community's needs and circumstances, while being flexible and including realistic tasks, goals, timelines and budgets.

As you read through this document, you will notice several references to timelines. Developing a timeline for task completion is just as important as identifying the tasks themselves. The timeline will not only assist in tracking plan progress, but will also be critical in budget creation and identifying needed financial resources.

In developing your plan, we recommend that you start with an outline to help organize your thoughts and identify tasks. A sample outline has been provided in **Appendix C**.

### ELEMENT 1: THE TREE INVENTORY

The first and most important step in preparing for EAB is to determine the potential risk to your community's urban forest resource. This can be quickly identified using information contained in a street tree inventory. If your community has an existing inventory, this should be used or updated. If you do not, this should be one of your first priorities.

A tree inventory[1] is the process of counting, characterizing and recording information about the public trees that make up the urban forest in your community. It is a useful tool that documents important information related to the total number of trees, their condition, location and species composition. It will be invaluable in determining the extent of ash trees in your community.

At a minimum, the following information should be collected for each tree as part of the inventory:

- species
- size
- condition
- location and accessibility for removal

Inventories can be completed relatively quickly and simply or be very detailed and sophisticated depending on the needs and capacity of your community. For example, if you decide to use removed trees for lumber and mulch in your community, your inventory should also collect information on available logs. Following is a description of three basic types of inventory/survey.

1. A ***"windshield survey"*** is an inexpensive, quick and effective procedure whereby a cursory visual inspection and count are made by trained personnel from a vehicle. A follow-up ground survey should be conducted to detect more subtle problems such as decay. Inspection may include all public trees or a representative sample.

2. A ***"complete" inventory*** is a systematic approach that examines and records detailed information about all trees on public property including parks. This type of inventory is

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[1] **Tree Inventory Resources**:
Fazio, J.R. "How to Conduct a Street Tree Inventory" (Tree City Bulletin #23, National Arbor Day Foundation)- www.arborday.org
Bassuk, N.L. "Conducting a Street Tree Inventory" (Cornell University)- www.hort.cornell.edu/commfor/inventory/utilizing.html
i-Tree - Tools for Assessing and Managing Urban Forests" (USDA Forest Service)- www.itreetools.org

labor and time intensive and requires trained professionals. Consequently, the expense can be significant.

3. An ***"ash only" inventory*** examines only ash trees on public property. It can be completed relatively quickly and efficiently by in-house staff, by volunteers with minimal training, or by professionals. Inspection may include all public trees or a representative sample.

Ideally, the goal should be a complete community forest inventory. When a complete inventory is not practical or feasible, a rough estimate of the total number of ash trees along public rights-of-way (ROW) can be determined quickly by sampling parts of the community as follows:

1. Determine the total number of community street miles.

2. Survey* all ash along a representative sample of street miles.

3. Extrapolate results to estimate total number of ROW ash in community.

***Example:*** Total street miles = 12
Number of street miles sampled = 3
Number of ash trees in sample = 150
Average number of ash per street mile = 50 (150/3 = 50)
**Estimated total ROW ash = 600 (12x50 = 600)**

*size class & condition should also be noted during this survey.

*For a community that determines they only have a minor component of ash and EAB may not be a threat, a more generalized urban forest management plan that incorporates a section on invasive/exotic pests may be more appropriate. Refer to contacts in* **Appendix B** *for assistance in developing an urban forest management plan.*

The DNR's Urban and Community Forestry (UCF) program (see **Appendix B** for contact information) offers cost-share financial assistance to communities on a competitive basis for conducting tree inventories via professional contracted labor. For a list of tree inventory software programs refer to **Appendix D**.

## ELEMENT 2: SURVEYING YOUR COMMUNITY FOR EAB

After determining your tree inventory needs, the next step in creating your plan is to develop and implement an EAB survey and detection strategy. Below is a brief description of EAB signs and symptoms, followed by a discussion on EAB survey techniques. The survey techniques are based on methodologies developed and utilized by MSU and MDA.

- **EAB Signs and Symptoms[2]**

  Your ash tree may have EAB for a few years before you begin to see outward symptoms of tree decline. Signs and symptoms of an EAB infested tree include:

  - Delayed leaf-out in spring (symptom)
  - Thinning canopy or crown (symptom)
  - Branch dieback from top of tree (symptom)
  - S-shaped galleries (tunneling) under the bark (sign)
  - Woodpecker damage (symptom)
  - Epicormic shoots/water sprouts (symptom)
  - Bark splits (symptom)
  - D-shaped exit holes - first spotted in upper branches of tree (sign)

  For assistance on identifying ash trees and EAB, see contacts in **Appendix B**.

- **EAB Surveys and Inspections**

  The EAB adults typically begin to emerge from ash trees in late May and will continue to emerge, mate and lay eggs through late summer (August-September). Identifying infestations early will give a community more time to implement a management plan before their ash trees are in a late state of decline and become hazardous. There are several different methods of surveying for EAB, each of which has their own advantages and disadvantages. Your community may choose to use a variety of these techniques, finding some more suitable for widespread surveys and others best for high-risk locations. A brief description of these methods is discussed below, and further details and methodology can be found in **Appendix E**.

  - **Visual Survey** techniques include looking for the outwardly visible signs/symptoms of EAB on ash trees. Surveys can be conducted systematically over a given area or by individually selecting trees through an inventory. This survey method requires the least amount of resources, and a large area can be covered in a short amount of time. The main disadvantage is that by the time visual symptoms of EAB are present, it usually means the infestation has been in the area for several years, and protection measures may not be warranted.

  - **Tree Climbing** methods are employed when a closer look of the tree's canopy is warranted. Professional tree climbers should be utilized in this situation. In the tree canopy, small windows on the trunk and branches are peeled back using a drawknife, to look for EAB larvae. An advantage of this method is that inspection occurs in the tree's canopy where EAB signs/symptoms appear first. Time and cost are the main disadvantages to this method.

[2] For photographs of EAB signs and symptoms and an electronic version of the Michigan State University Extension Bulletin *E-2938 "Signs and Symptoms of Emerald Ash Borer."* www.emeraldashborer.info.

- **Destructive Sampling** includes the removal and/or peeling of an ash tree to look for EAB larvae and larval galleries. Ash trees that are destructively sampled can be of any size, but are most efficient to peel when they are between 4”-12” diameter at breast height (DBH= 4.5 feet above the ground). The advantage of this method is the discovery of early EAB infestations. A disadvantage is the destructively sampled ash tree is destroyed.
- **Detection Trees** are created by artificially wounding an ash tree to purposely stress it, which research has shown will attract EAB. The most effective way to wound a tree to attract EAB is to remove a band of bark around the trunk of an ash tree (girdling). This will disrupt the conductive tissues within the tree, and it will no longer be able to transfer water and nutrients. Detection trees are currently the most effective tool available for proactively surveying for EAB. Unfortunately, this method also destroys the ash tree that is used for surveying.

- **Areas to Survey**

The artificial movement of EAB through human activity remains the most important risk-factor for the establishment of EAB populations. Ash nursery stock, sawlogs, and firewood are the primary means of artificial movement of EAB. Focusing survey activities in areas where these articles may be transported is essential for the efficient use of resources and the effectiveness of the survey. The following list summarizes the highest risk sites:

- Nursery Stock: nurseries, newly landscaped public, commercial, residential areas
- Firewood: campgrounds, recreational lakes, cottage communities
- Sawlogs: sawmills, pallet operations, other wood utilization firms

**If EAB is discovered outside of a known quarantine or infested area,** contact the MDA hotline for current reporting procedures toll-free at 1-866-325-0023 or visit www.michigan.gov/eab.

## ELEMENT 3: THE ASH MANAGEMENT POLICY

This element will be the major section of your community's EAB Preparedness Plan. It will describe how your community intends to manage its ash trees and will guide decision-making relative to how the community will address issues such as:

- Removal/Disposal
- Historic/Significant trees
- Hazard tree assessment
- Woodlot management
- Private property trees
- Replanting
- Treatment

- **Cost Options and Estimates**

  - **Removal/Disposal**: Determining tree removal costs will likely be one of the first priorities for your community. This can be accomplished by using information collected during the tree inventory and through tree removal estimates and bids. From your inventory, you should have an actual or estimated total number of ash trees. Likewise, you should be able to determine an average size (diameter) for all trees from the inventory. Combining this information with an estimated removal cost for the average size ash tree in your community, you can estimate the total removal cost for ash trees on public property.

    ***Example:*** Total number of ash trees in *Townville*: 600
    Average diameter of ash trees in *Townville*: 18"
    Estimated removal cost for 18" tree in *Townville*: $625
    **Townville's estimated total ash removal cost:**
    **$625 x 600 trees = $375,000**

    Local disposal costs should also be estimated as part of total tree removal cost. Keep in mind that, in some areas, disposal costs may be lowered by partnering with neighboring communities and/or local industries that can find profitable uses for the removed trees. Refer to **Appendix F & G** for assistance in determining in-house removal costs and a sample tree removal cost bid sheet.

  - **Replacement**: Create a cost estimate for replanting trees that have been or will be removed due to EAB. Take the number of trees that need to be replaced and contact local nurseries to get price estimates on the size and species of tree you would like to use in replanting. Remember, tree species diversity is the key to creating a healthy urban forest.

  - **Treatment**[3]: MSU, MSUE and USFS continue to conduct research on treatment options and biological control for EAB. Before beginning any treatment program, a community should know the condition of its ash trees and carefully research the available treatment options. Be advised that no treatment option has been proven 100% effective against EAB. Any company that offers chemical treatment services must have a Pesticide Application Business License, as well as a Pesticide Application Certification through the Michigan Department of Agriculture[4]

[3] Communities interested in treating their trees should visit www.emeraldashborer.info for the most current treatment information.
[4] To find a licensed company visit www.michigan.gov/mda and see the Licensing, Certification and Registration section.

In addition to costs for materials and contractors, removal/disposal, replacement and treatment activities may result in some in-house labor and equipment costs. Be sure to include these costs in your overall estimates.

- **Historic/Significant Tree Policy**

  Many communities have trees designated as heritage, historic, memorial or otherwise significant by policy or ordinance. Special consideration may need to be given to the management of ash trees that have been designated as such. In these cases, treatment may be warranted where it would not be otherwise. An arborist can assist with determining if treatment is a viable alternative based on the level of infestation apparent in the tree. It is important to remember that timing is critical in terms of treatment, so a decision on treating historic/significant trees should be made as soon as possible.

  If a decision is made to remove a historic/significant tree, your community may want to consider creating a monument or memorial with the removed wood. Carved statues, furniture, or other lasting wooden structures can be created from these special trees, allowing them to continue to play a prominent role in the community. Remember to review community ordinances and policies to determine if a replacement of the removed tree is required.

- **Woodlot Management[5]**

  Community owned woodlots in parks and other public spaces should be considered when creating the community's EAB preparedness plan. If your community woodlot has a management plan in place (i.e. forest management plan, Forest Stewardship plan, etc.), it should be reviewed/updated to address EAB and be referenced in the preparedness plan. If a plan is not in place, your community may want to contact a consulting forester[6] who can assist in the development of one. A management plan should include the community's goals for the woodlot (i.e. recreation, wildlife, aesthetics and/or timber production), a woodlot inventory, and recommended management activities (i.e. timber harvest, no action). The plan should also specifically discuss whether ash trees are present that will be impacted by EAB, and what the overall impact of potential EAB infestation will have on uses of the woodlot for the goals identified.

  The plan's prescriptions should include measures to mitigate any adverse impacts, including steps to identify and manage potential hazard trees as EAB spreads in the surrounding landscape. In woodlots with very little ash, or only sapling sized ash trees, the impacts may be minimal, and no modifications may be needed to the management plan. In woodlots where ash composition is much greater and impacts due to mortality more severe, it may be appropriate for the plan to describe measures to ensure prompt reforestation, or to improve future woodlot species composition in line with the community's goals for the woodlot.

  We recommend that communities contact a consulting forester to assist with any woodlot management activities, including harvesting. A consulting forester can determine which forestry techniques can be used to reduce the percentage (or dominance) of ash and

[5] **Woodlot Management Resources:**
Michigan Department of Natural Resources. www.michigan.gov/dnr and see the Forest, Land and Water section.
Michigan State University Consulting Forester List. http://forestry.msu.edu/extension/extdocs/consulfor/consult.htm
Michigan State University Extension Bulletin E-2943: *"Emerald Ash Borer and Your Woodland*." www.emeraldashborer.info

improve the overall health of the woodlot, as well as design a timber harvest that is profitable for the community.

- **Removals**

The process of ash tree removals can be undertaken by your community using in-house crews, contractors or a combination of the two. For example, your community may use in-house crews to remove ash trees that are less than 10" DBH, and hire a contractor to remove trees larger than 10"DBH. In some communities, local utility companies, road commissions and the Michigan Department of Transportation may also have tree care responsibilities; remember to discuss tree removal duties with these entities as appropriate.

- **In-House Removals:** If your community chooses to do all or some of the ash removals in-house, several factors should be taken into consideration. The list below is intended to help you begin the process of identifying how your municipality will remove its ash trees, and if in-house removals are a safe and economical method to choose based upon available resources; it is not intended to be an exhaustive list.

  - ❑ Size of the community's forestry staff
  - ❑ Proper equipment for tree removal (record type and condition)
    - Chainsaws
    - Personal protective equipment for staff (head, ear and eye protection, gloves, leg chaps, & heavy work boots)
    - Chipper (capable of chipping large diameter trees such as 20" tow behind)
    - Chip Trailer/Dump Truck
    - Front end loader (for loading logs, brush, etc.)
    - Grapple hooks and winches which will assist in hauling logs from remote areas
    - Trailers for moving equipment and logs
  - ❑ Staff training[6]
    - Electrical hazard awareness training for work near utilities
    - Chainsaw training
    - Certified arborist training
  - ❑ Determine tree sizes community crews can safely remove
    - Determine staff's ability to identify ash in all seasons
  - ❑ Ash tree removal budget
  - ❑ Timeline for ash tree removals
    - Determine crew's ability to meet timelines
  - ❑ Determine Union rules on contracting tree removal work
  - ❑ Plan for ash utilization and disposal of chips
    - Identify if there is a need within your community and/or local industry for wood products that could be made from the removed trees (mulch, lumber, fuel, etc.).

- **Contracting Removals**: When considering a contractor to handle some or part of your community's ash tree removals, it is important to understand the bid process and have clear expectations for the contractor. Be as specific as possible when developing the contract and bid language. If your community would like the contractor to do the stump removal (grinding), be sure to include it in the contract language. If stump removal will be done in-house, the contract should detail the maximum stump height the contractor can leave. Who retains ownership of the trees once they have been cut should also be

[6] **Employee Safety & Training Resources**

Z133.1 Safety Standard, 2006: Personal Protective Equipment & Electrical Safety -www.isa-arbor.com/publications/pdfs/zpart1.pdf
International Society of Arboriculture Tree Worker Safety Computer Based Training
www.isaarbor.com/publications/TreeWorkerSafety.aspx

established in the contract. **Appendix H** provides elements of a tree removal contract and bid language that can be considered for a community bid.

We recommend that you choose tree removal firms that are fully insured, have experience and educational backgrounds in forestry, arboriculture or related fields, certifications from professional organizations (ex: Certified Arborist), and are members of an industry association (example: International Society of Arboriculture). Do not be afraid to ask for references or talk with other communities that use contractors for tree removal and tree care activities. There is currently no state licensing program for tree care companies.

- **Infested vs. Non-Infested Trees -** Proactive and Reactive Tree Removals: Once infested with EAB, ash trees typically begin declining over a period of 2-3 years. The burden of dealing with hundreds or thousands of dead and dying trees in a short period of time can place an enormous strain on community budgets, personnel and resources.

  Some communities (i.e. Bowling Green, OH, Wilmette, IL) have taken the approach of preemptively removing a portion of their non-infested ash trees annually as a way to minimize these impacts over time. Others are reluctant or not financially capable of doing so, and therefore remove only infested or dead ash trees. In general, communities can decide to coordinate ash tree removals in either a proactive or reactive manner. Following are details for each method, including pros and cons.

  Proactive Removal - Removing ash trees that are not infested with EAB.
  *Pros:*
  - ❑ Opportunity to spread removal costs over longer time frame.
  - ❑ Reduces problem of dealing with many dead &/or hazardous ash trees at one time.
  - ❑ Opportunity to start the replanting/recovery process right away.
  - ❑ Greater flexibility in organizing removal and routine work schedules.
  - ❑ Ability to utilize ash wood for products or use it as a local source of firewood.

  *Cons:*
  - ❑ Immediate impacts to tree canopy and aesthetics.
  - ❑ Removing healthy ash may create negative feelings within the community.
  - ❑ Does not take into account that research may find an effective control for EAB.

  Reactive Removal - Removing ash trees which are either infested with EAB or dead
  *Pros:*
  - ❑ Delayed impacts to tree canopy and aesthetics.
  - ❑ No negative public perception of removing healthy trees.
  - ❑ Delayed budgetary impacts until EAB hits.
  - ❑ Further EAB research may offer effective control, minimizing need for removals.

  *Cons:*
  - ❑ Budget impacts can be severe once EAB is in community.
  - ❑ Replanting funds may not be available due to extreme removal costs.

- **Hazard Trees and Liability**[7] Any tree, dead or alive, which has the potential to entirely or partially fail and impact a target, can be considered a hazard. A target can be a vehicle, building, or a place where people gather such as a park bench, picnic table, street, or backyard. Dead and dying ash trees, weakened or killed by EAB, pose a great

[7] How to Recognize Hazardous Trees USDA Forest Service: www.na.fs.fed.us/spfo/pubs/howtos/ht_haz/ht_haz.htm
Urban Tree Risk Management Guide USDA Forest Service: www.na.fs.fed.us/spfo/pubs/uf/utrmm

risk to public safety and therefore are a potential liability for communities if left standing along streets, sidewalks, or other public spaces.

In general, a healthy ash tree would be considered lower risk for breakage or failure by virtue of its inherent wood strength characteristics. However, standing dead ash trees have been observed to deteriorate relatively quickly after being killed by EAB. Initially, trees begin losing their bark as the inner wood tissue dries and separates. Subsequently, branches and limbs become brittle and susceptible to breakage from wind, snow and ice. Likewise, root systems may deteriorate over time, increasing the potential for windthrow and whole tree failure at the ground level.

To minimize possible liability issues, communities should review and/or establish a policy and protocol for identifying, marking and mitigating all hazardous trees on public property. Inspecting trees for potential hazard liability is one of the most important components of any tree management plan. Below are some points to consider in developing a hazard tree plan for your community:

- ❑ Appropriate frequency and intensity of inspection
- ❑ Training of inspectors
- ❑ Mapping and marking of trees
- ❑ Minimum DBH (diameter at breast height = 4.5 ft. above ground)
- ❑ Documentation and reporting

Communities assuming that an "act of God" (i.e. wind, rain, and lightning) is a good defense against liability are advised to discuss tree liability issues with an attorney. While this type of defense has been used widely in the past, it is unacceptable in most cases today. Generally, to qualify as an act of God in negligence cases, all of the following elements are needed:

1. The accident must have happened from a force of nature that was both unexpected and unforeseeable.
2. That force must have been the sole cause of the accident.
3. The accident could not have been prevented by using reasonable care.

- **Prioritization -** Regardless of whether your community is removing trees proactively or reactively, there should be a process for prioritizing the order of tree removal. The key to this process is having a current inventory and database of ash trees. The inventory and database will help determine location, size and condition of trees and track and prioritize removals.

  In general, tree removal should be prioritized as follows:

  1. Hazardous trees
  2. Dead, dying, diseased trees
  3. Poor structure/condition trees
  4. Trees causing infrastructure damage
  5. Trees planted or growing in undesirable locations
  6. All other trees

  Utility contractors should be encouraged to remove ash trees within their easements as part of regular line clearance activities. Utility companies are excellent partners in replacement tree planting and communicating messages about proper site and species selection.

- **<u>Private Property Ash Trees</u> -** The majority of a community's trees are typically located on private property. In most cases, the responsibility for tree removal on private property will be that of the property owner. In situations where a hazardous condition exists on a private tree with potential to impact a public right-of-way (ROW), communities should promptly address the problem. This may be accomplished through discussions with the property owner or through corrective actions taken by the community to resolve the issue. Additional authorities related to private tree removals are often contained in municipal ordinances and codes (see section on *Ordinances*). To assist private property owners with ash tree removals, communities may wish to offer curbside pickup, chipping and disposal of infested trees.

- **EAB Regulations**

The following provides details on the current (March 2007) State and Federal EAB regulations. Please note that regulations do change and your community should know and understand current EAB regulations to ensure proper compliance.

- **<u>State of Michigan Quarantine</u> -** The MDA EAB Quarantine limits the movement of regulated articles, such as ash logs and hardwood firewood, from quarantined areas of Michigan (See **Appendix I** for current State quarantine information). These regulations are intended to prevent the artificial spread of EAB through regulatory oversight. MDA Inspectors regularly visit wood processing firms to discuss ways in which they can properly handle and move regulated articles, as to not impede commerce. Once these methods are determined, they are outlined in a Compliance Agreement.

- **<u>Compliance Agreements</u>[*] -** This is a document outlining an agreement between the MDA and a logger, shipper, or wood utilization firm. It shows the firm recognizes that its normal practices may present a potential for the artificial spread of EAB and that the firm will either transport or process regulated articles only under certain conditions. For its part, the MDA agrees that they will assist the firm to meet the terms of the compliance agreement, allowing normal commerce to occur.

  If you are looking to ship regulated articles out of a quarantined area you can do so under the stipulations of a compliance agreement. Regulated articles include: ash nursery stock, ash logs and untreated ash lumber with bark attached, ash limbs and branches, hardwood chips larger than one inch in size in two dimensions, hardwood firewood, and any living stage of EAB. To obtain a compliance agreement, please contact your local MDA office **(Appendix B).**

- **<u>Penalties</u> -** Two Acts authorize MDA's primary actions in the enforcement of the EAB Quarantine*:*

  1. Insect Pests and Plant Diseases Act 72 of 1945, which provides authority for the issuance of a quarantine and;
  2. Insect Pest and Plant Disease Act 189 of 1931 which provides authority for the MDA Directors Determination of Ash Host Plant Nuisance (used to authorize MDA mandated ash tree removals for eradication purposes).

[*] A Federal compliance agreement is needed for the movement of regulated articles out of the State of Michigan. To obtain a Federal compliance agreement, contact the USDA Animal and Plant Health Inspection Service at 866-322-4512.

risk to public safety and therefore are a potential liability for communities if left standing along streets, sidewalks, or other public spaces.

In general, a healthy ash tree would be considered lower risk for breakage or failure by virtue of its inherent wood strength characteristics. However, standing dead ash trees have been observed to deteriorate relatively quickly after being killed by EAB. Initially, trees begin losing their bark as the inner wood tissue dries and separates. Subsequently, branches and limbs become brittle and susceptible to breakage from wind, snow and ice. Likewise, root systems may deteriorate over time, increasing the potential for windthrow and whole tree failure at the ground level.

To minimize possible liability issues, communities should review and/or establish a policy and protocol for identifying, marking and mitigating all hazardous trees on public property. Inspecting trees for potential hazard liability is one of the most important components of any tree management plan. Below are some points to consider in developing a hazard tree plan for your community:

- ❑ Appropriate frequency and intensity of inspection
- ❑ Training of inspectors
- ❑ Mapping and marking of trees
- ❑ Minimum DBH (diameter at breast height = 4.5 ft. above ground)
- ❑ Documentation and reporting

Communities assuming that an "act of God" (i.e. wind, rain, and lightning) is a good defense against liability are advised to discuss tree liability issues with an attorney. While this type of defense has been used widely in the past, it is unacceptable in most cases today. Generally, to qualify as an act of God in negligence cases, all of the following elements are needed:

1. The accident must have happened from a force of nature that was both unexpected and unforeseeable.
2. That force must have been the sole cause of the accident.
3. The accident could not have been prevented by using reasonable care.

- **Prioritization -** Regardless of whether your community is removing trees proactively or reactively, there should be a process for prioritizing the order of tree removal. The key to this process is having a current inventory and database of ash trees. The inventory and database will help determine location, size and condition of trees and track and prioritize removals.

  In general, tree removal should be prioritized as follows:

  1. Hazardous trees
  2. Dead, dying, diseased trees
  3. Poor structure/condition trees
  4. Trees causing infrastructure damage
  5. Trees planted or growing in undesirable locations
  6. All other trees

  Utility contractors should be encouraged to remove ash trees within their easements as part of regular line clearance activities. Utility companies are excellent partners in replacement tree planting and communicating messages about proper site and species selection.

- **Financial**
  - ❑ Create a budget including a timeline for the EAB Preparedness Plan.
    - Budget should include costs for:
      - Developing the plan.
      - Conducting or updating a tree inventory.
      - Ash tree removals.
      - Tree replacement.
    - Timeline should include:
      - Timeframe for completing each task.
  - ❑ Assess the current budget for your community's forestry and tree care operations.
    - Can the implementation of the EAB plan fit seamlessly into the existing budget?
    - Identify any financial constraints that may hamper its implementation.

  Contact your community's funding decision makers, finance department and tree care department to discuss the plan's budget and identify potential sources of funding. Understanding the financial situation of your community will assist in creating a realistic budget and timeline for implementing the EAB preparedness plan.

- **Personnel/Volunteers**:
  - ❑ For each task in the plan, identify the number of trained staff available to complete it.
  - ❑ Identify the number of hours and/or days per week staff can devote to the task.
  - ❑ Identify tasks in which volunteers may be useful.
    - Identify sources of skilled volunteers (example: MSU Master Gardeners).

  Understanding the personnel and volunteer resources and needs will help you determine which tasks can be accomplished in-house and which tasks may need to be contracted out. Remember to take into consideration personnel when creating the timeline for implementation.

- **Facilities/Equipment:** Take an inventory of what facilities and equipment are needed to implement the plan and which are currently owned/leased by the community. Identify if there is a budget to purchase/lease/repair needed equipment, facilities or space.

- **Ordinances:** This is a good time to establish, review and/or update community tree ordinances and policies[8]. Tree ordinances typically outline the authorities and persons responsible for tree planting, care and removal of trees on public property and in certain cases, private property.

  Basic components of a tree ordinance include:
  - ❑ Goals
  - ❑ Tree Board Establishment
  - ❑ Authorities/Responsibilities
  - ❑ Basic Performance Standards
  - ❑ Enforcement/Penalties

  Through code/ordinance, communities may exercise their authority to require infested private property trees to be removed to prevent further spread of the insect or disease. This type of policy, referred to as a "condemnation clause", is still being utilized by many

[8] **Tree Ordinance Resources:**
Tree Ordinance Guidelines (Bernhardt and Swiecki 1991) - www.isa-arbor.com/publications/ordinance.aspx
City of Minneapolis private tree condemnation - www.minneapolisparks.org/default.asp?PageID=542

communities across the country in response to Dutch elm disease. Removal or nuisance abatement costs are subsequently billed to the property owner directly or added to their property taxes.

- **Communication**

Developing and utilizing communication procedures to disseminate EAB information internally to local officials/staff and externally to community residents should be an important component in the preparedness plan. Providing timely, accurate and consistent communication will greatly enhance credibility and community support of your plan and actions.

If your community does not have internal or external communications protocols, the information below can help you in their development. If you intend on utilizing your community's existing protocols, the following may be useful in creating EAB specific procedures. Remember your communication protocols should accurately represent how information is disseminated within your community's structure.

- **Internal Communication Procedure:** This is used for disseminating information to your community's local officials and staff. Below is an example of an internal communication protocol:

  1. Educate and inform all municipal leaders and officials.
     a. Develop an EAB frequently asked questions (FAQ) document.
        i. If EAB has been found, information should be provided on exact location of infestation and plans of how it will be addressed.
        ii. If EAB has not been found, information should be provided on how the community is addressing EAB though the development of the preparedness plan.
     b. Identify person(s) who can answer EAB related questions and provide their contact information.

  2. All municipal leaders should disseminate information to their respective department staff and provide them with the FAQ document and appropriate contact person(s).
     a. It is very important that all staff and local officials that have interaction with residents (public) be provided with accurate, timely and up to date information.

- **External Communication Procedure:** These procedures would be utilized for disseminating information to the community's residents. The community's external communication protocol should work in tandem with the internal protocol.

  1. Inform the community through local media outlets, direct or indirect mailings (i.e. tax/utility bills), newsletters, fliers, public meeting, neighborhood associations and local garden clubs. Always identify a contact person where residents' questions can be directed. Please see **Appendix J** for a sample press release.
     a. If EAB has been found, provide information on EAB[9], the location of infestation, and the community's plans for addressing it.
     b. If EAB has not been found, provide information on how the community is addressing EAB through the development of the preparedness plan.

[9]Information on EAB can be found at the National EAB web site www.emeraldashborer.info

It is very important that your community is prepared for any and all responses that residents may have regarding EAB. Procedures should be in place to handle positive and negative comments from residents.

- **Ash Wood Utilization and Wood Waste Disposal**[10]

By finding creative ways to develop value-added products from the wood generated from ash tree removals, communities can often lessen the economic impact of the insect's damage while strengthening local wood product industries. Many communities in Michigan have found it worthwhile to partner with local members of the wood industry. In some cases, they have lowered disposal costs by allowing businesses to use removed trees for mulch or fuel. Others have worked directly with local sawmills to see their trees turned into lumber and other products, many of which can be used for community projects. Regardless of which option is pursued, local residents generally respond positively to wood reuse programs, satisfied that their community trees are not going to waste.

The following strategies are recommended in developing a utilization plan for EAB-related tree removals. Refer to **Appendix K** for more detailed information on wood utilization.

- Decide whether your community has specific needs for wood products. Your utilization plan may differ depending on whether your community needs mulch, lumber, or other products.

- Contact local stakeholders immediately to develop a thorough outline of needs, available resources, limitations, partners, and timelines. Some major groups to include in discussions include: DNR staff (including wood products and urban forestry specialists), MDA staff (including EAB regulatory personnel), foresters, wood industry representatives (including large and small sawmills, biomass energy facilities, firewood, mulch, and other industries), non-profits and community organizations (RC&D Councils, Conservation Districts, other environmental groups, etc.), recycling centers (which may already collect wood residues or which may relate good experience in collecting and transporting residues in urban areas), tree care companies, municipal managers, and others.

- Develop a list of potential wood processors and survey them to gauge interest. Be sure to include industries from throughout the region on a variety of different scales. Ideally, plans should allow for flexibility, creativity, and for wood to be utilized at its highest value. Some examples of industries include:
  - ❑ Large scale/lower value – biomass energy, other major wood industries (large mills, pulp plants, etc.)
  - ❑ Small scale/high value – small mills, woodworkers guilds
  - ❑ Varying scales/lower value – firewood (with restrictions), mulch, bedding, soil amendments

- Effective wood utilization has occurred in Southeast Michigan on all scales -- a few examples include: large scale biomass energy development at Genesee Power Station,

[10]**Wood Utilization Resources:**
Bratkovich, S. *Utilizing Municipal Trees: Ideas From Across the Country*. NA-TP-06-01. USDA Forest Service. www.treesearch.fs.fed.us

Cesa, E.T.; Lempicki, E.A.; and Knotts, H. 2003. *Recycling Municipal Trees: A Guide for Marketing Sawlogs from Street Tree Removals in Municipalities*. NA-TP-02-94. USDA Forest Service. www.fs.fed.us/na/morgantown/frm/cesa/rmt/rmt_index.html

Sherrill, S. 2003. *Harvesting Urban Timber: A Complete Guide*. Fresno, Calif.: Linden Publishing. www.harvestingurbantimber.com

Southeast Michigan RC&D Council's Ash Utilization Options Project. www.semircd.org/ash

large/medium scale mulch processing at J.H. Hart and Environmental Wood Solutions, mid-scale multiple-product processing at LaMont Brothers Tree Service (including sawmilling, firewood, mulch, compost, and boiler fuel), small scale portable milling projects within cities (Monroe, Grosse Pointe Park, Farmington Hills, etc.), and micro-scale projects with local woodworkers (basket makers, woodturners, chainsaw carvers, and others). All of these projects can serve different purposes. Large scale projects can consume huge amounts of wood in need of disposal. Medium and small scale projects can satisfy wood disposal needs where no large scale options exist, sometimes bringing even higher value to the wood, and can often lower community wood disposal costs. Very small scale projects can play an important role in capturing the community's interest in the issue.

- Begin discussions with selected wood industries to determine how they might partner with your community. Be sure to collect information on capacities (what types of processing and/or transportation can the business handle), needs (what types and quantities of wood are they interested in), location, contact information, etc.

- Create collection yards for wood residues by using existing industry or municipal yards, if possible. The use of wood disposal yards has proven to be an effective way to collect the infested wood harvested by various groups (public, private, and homeowners) into one accessible location where it can be sorted, processed, and merchandised. These yards may also play a regulatory role (as "marshalling yards"), enabling state and federal officials to contain large amounts of affected material and inspect finished products efficiently prior to them being shipped out of quarantined areas.

- Be sure to maintain ongoing discussions with industry partners and federal and state regulatory agencies to ensure that proper compliance agreements are used and that wood products are transported safely.

- Create a strong educational plan. There can be many misconceptions about the dangers of using EAB-affected trees. Conduct outreach to educate staff, industry, contractors, homeowners, and potential buyers of wood products about the safety of products and use of compliance agreements. Additionally, both wood generators and wood processors may benefit from additional training on how to work together effectively and safely process the material.

- If possible, create demonstration projects to showcase community utilization projects. While these types of projects require outside funding, the successful partnership of a city and a portable mill or the installation of a reclaimed wood floor in a city building can go a long way in building community support for the EAB program. Non-profit and community organizations may be key partners in this type of project. Successful examples of this type of project include ash floors in Grosse Pointe Park's recreation facility, the Ann Arbor District Library, and Recycle Ann Arbor.

Realize that some utilization strategies can help communities gain higher value from the removed trees over the long term, even once the EAB situation has passed.

- **Replanting Your Community after EAB**[11]

How your community plans on replanting after EAB is another important element that should be included in your community's plan. Trees provide numerous benefits to the residents that live, work and play in your community. They remove pollutants from the air, help improve summer temperatures, reduce storm water runoff, and provide social and psychological benefits. They are also one of the only components of the urban environment that actually increases in value each year.

- **Diversity -** The goal of your community's replanting efforts should be the use of a diverse mix of tree species. The main reason EAB is having such a devastating impact in Michigan's communities is that ash trees have been over planted. Following the loss of American elm (another over-planted tree) to Dutch elm disease, communities looked for a tree that had the shape and stature of their beloved American elm, and they found ash. Ash trees were relatively insect and disease resistant, could survive in almost any landscape, and grew tall and fast; consequently, they became a favorite among municipalities, developers and landscapers. This reliance on the ash tree caused many communities to lose sight of diversity and resulted in ash trees making up a large percentage of their tree population.

  Tree species diversity means planting a variety of tree species on your streets, in your parks, and around your community. Once a tree inventory is completed, you will have an idea of the tree species composition of your community's urban forest. To make increasing species diversity easy, add a few new tree species to your planting projects each year. Practice the "look around rule". Before you plant, observe what tree species are around you, and avoid planting those tree species in that area. If your community has a high percentage (>15%) of any genus (example: *Acer*- Maple), you should consider reducing or eliminating their planting until you can build greater species diversity in your community.

- **Right Tree, Right Place -** One of the most important aspects of tree planting is selecting the proper tree species for the planting location. Always contact Miss Dig (800-482-7171) before planting to locate overhead and underground utilities. If there are overhead utilities, make certain that the tree species you are selecting are appropriately sized for the site to avoid interfering with power lines when they reach mature size. Other factors to consider are soil and light requirements, mature height, and size of planting location. Selecting and planting the right tree for the right location will help ensure its survival and success for years to come.

- **Proper Planting and Mulching -** Many trees do not survive due to improper planting techniques such as planting too shallow or too deep, digging the hole too small, and not backfilling the soil correctly. Incorrect mulching, most often seen as volcano mulch (piling the mulch high around the trunk), can cause a myriad of growth problems from inadequate water to trunk rot. For a tree planting diagram and other tree planting resources, see the footnote on page 16. If you have questions about proper planting, contact the DNR's Urban and Community Forestry program, your local MSU Extension, or county conservation district office for assistance (contact information is in **Appendix B**).

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[11] **Tree planting resources:**
Michigan DNR Urban & Community Forestry Program. www.michigan.gov/dnrucf
USDA Forest Service, Northeastern Area- Urban & Community Forestry. www.na.fs.fed.us/urban/inforesources/index.shtm

- **Maintenance**[12]**-** An equally important component to proper planting is maintaining the trees after they have been planted. The first three years following planting are the most critical to ensure long-term tree survival. Ensure that tree maintenance such as watering, pruning, and mulching, including who will be responsible for implementing these tasks, has been addressed in either your EAB preparedness plan or your community's Urban and Community Forestry plan.

- **Tree Planting with Community Volunteers**[13]**-** Volunteers can play an important role in your community's tree planting efforts. Utilizing volunteers is a good way to make your community resources go farther, while providing residents with an opportunity to make a positive difference in their community. Local community groups (i.e. Rotary Clubs, Girl/Boy Scouts, Church groups, School groups, Master Gardeners, neighborhood associations) are a great place to find eager volunteers interested in participating in tree planting projects. A volunteer tree planting campaign can also provide your community with an opportunity to educate residents on proper tree planting and maintenance techniques that they can apply to the project.

[12] **Tree Maintenance Resources**
Michigan Urban and Community Forestry Program. www.michigan.gov/dnrucf
International Society of Arboriculture. www.treesaregood.org
Treelink. www.treelink.org/docs/res_ucf.php
*How to Prune Trees*. NA-FR-01-95. USDA Forest Service. www.na.fs.fed.us/spfo/pubs/howtos/ht_prune/prun001.htm

[13] **Volunteer Resources**
Lipkis, A and Lipkis K. 1990. *Simple Act of Planting a Tree.* Los Angeles, Calif: Jeremy P. Tarcher, Inc.
National Arbor Day Foundation Volunteer Kit www.arborday.org/programs/volunteers/
Pennsylvania Urban and Community Forestry Council. *Opportunities for Volunteers*
www.dcnr.state.pa.us/forestry/pucfc/applications/fact04.pdf

## APPENDIX A: THE CITY OF WESTLAND: *AN EAB CASE STUDY*

### *The Discovery of EAB*

In 1999, the City of Westland, Michigan, a 217 square mile community in southeast Michigan, began to notice its ash trees were declining. "In 1999, we began trimming the tops out of our ash trees because we knew there was something going on, but didn't know what it was," said Kevin Buford, Superintendent for the City of Westland's Department of Public Services. In the summer of 2002, they received the news that a new insect, the emerald ash borer (*Agrilius planipennis),* was responsible for the death and decline of ash trees in the metropolitan Detroit area.

### *The City's Ash Trees*

In 2002, the City began an aggressive campaign to remove the 3217 ash trees that lined their streets and 1200 of the 2000 ash trees that were in parks and other city owned properties. They were lucky - by conducting a tree inventory in 1998, they knew the locations of all of the publicly owned ash trees in the City. "Our tree inventory was tremendously helpful," said Mr. Buford. "We knew the exact locations of our ash trees, their diameter, year they were planted, if any health issues had been documented, and what we were facing. We were able to be very aggressive with our removals because we knew what we were up against. Without an inventory we would have been lost."

The City started major ash tree removals in 2002 and finished in late 2004 at a cost of over $1,000,000 (includes removals and some stump grinding and site restoration). Their ash trees ranged in size from 4" in diameter up to 48" in diameter, with a median removal cost of $635 per tree. The City of Westland hosted a Michigan Department of Agriculture marshalling yard (a program that no longer exists), which provided a grinder to the City and paid for the transportation costs to haul the chips away. The City was responsible for providing and paying for staff to operate the marshalling yard six days per week. The marshalling yard took ash logs from anyone in the EAB quarantined counties.

The majority of the ash trees, approximately 3000, were removed by in-house City staff. Contractors were hired to remove about 1200 ash trees. The Highway Maintenance Division, with a staff of 22 within the Department of Public Services, is responsible for tree care as well as snow plowing, salting, site restoration, road repair, and leaf pick-up. On a typical day, there are six to eight staff dedicated to tree maintenance, removals and site restoration. During the peak of their aggressive ash tree removal campaign, Mr. Buford had access to all 84 employees in the Department of Public Services.

The City funded their tree removal efforts primarily with the use of general fund dollars (approximately $50,000 for equipment and $250,000 for staff per year) and by utilizing some Federal Community Development Block Grant funds (where appropriate).

### *Replanting after EAB*

With the rapid removal of ash trees, the City also undertook the process of replanting new trees after the loss. "We have concentrated our replanting efforts on our streets first. One of our hardest hit streets was lined with 90 mature trees; 87 of these trees were ash, and they all had to be removed. The street was left with three trees, which had an enormous impact on the character of the neighborhood," said Mr. Buford. By utilizing contractors, they have planted approximately 800 replacement trees at an average cost of $205/tree (includes planting). Tree replacement has been funded through the City's Tree Development Fund and DNR tree planting grants. Money from the Tree Development Fund comes from developers who are required to deposit money into the fund to replace trees lost during development. The Fund money is

strictly for the replacement of trees. The City plans on replacing all of the ash trees lost to EAB by 2012.

***The City of Westland Residents***

**"**Our residents have been shocked and concerned about the loss of city owned ash trees to EAB," said Mr. Buford. "They have been really patient and understanding of our EAB plans. Our main focus was the removal of the ash trees, with the most hazardous ones as our top priority. We worked hard to help homeowners understand that it would take a while for stump removal and site restoration to occur after the city owned tree was removed in front of their house. We really had to prioritize the removal of hazards, and then we could focus on restoring the site."

The City provided education to their homeowners, condominium complexes and apartment building owners by holding EAB meetings around the City. The status of EAB was also discussed at town hall meetings and placed on their Community Access channel.

***Lessons Learned***

When asked what advice Mr. Buford had for communities preparing for EAB, he said, "It's very important that they have a tree inventory to understand what they have. Like I mentioned earlier, you'll be lost without one. Once they have a tree inventory and know what they have, tackle the worst trees first. Once we removed the hazard trees, we had two crews doing removals. We sent one crew to one end of the City and another crew to the opposite end, and they removed ash trees in each section while working toward each other. This made it easier for us to remove trees systematically instead of jumping around the City. When a homeowner contacted us about removing their tree, we would explain our plan and let them know, realistically, how long it might be before their tree was removed. Have a detailed, organized plan to remove the rest of the ash trees and stick to it."

## APPPENDIX B: CONTACTS

***Michigan Department of Natural Resources, Forest, Mineral & Fire Management Division***
*Urban and Community Forestry Program*
**Web site:** www.michigan.gov/dnrucf **Phone:** 517-373-1275

***Michigan Department of Agriculture, Pesticide, Plant Pest Management Division***
**Web site:** www.michigan.gov/mda **Phone:** **5**17-373-1087 1-800-292-3939

***USDA Animal and Plant Health Inspection Service***
**Website**: www.aphis.usda.gov **Phone**: 866-322-4512

***Michigan State University***
*Department of Forestry*
**Web site:** www.for.msu.edu **Phone**: 517-355-0092

*Department of Entomology*
**Web site**: www.ent.msu.edu **Phone:** 517-355-4663

***Michigan State University Extension***
**Web site**: www.msue.msu.edu **Phone:** Check phone book for local MSU Extension Office in your county

***Southeast Michigan Resource Conservation and Development Council***
**Web site**: http://semircd.org/ **Phone**: 734-761-6722 ext. 3

***USDA Forest Service***
**Web site**: www.fs.fed.us

***Michigan Association of Conservation Districts***
**Web site**: www.macd.org **Phone**: Check phone book for local
See list of local Conservation Districts Conservation District in your county

***National Emerald Ash Borer Web Site:*** www.emeraldashborer.info

## APPENDIX C: SAMPLE EAB PREPAREDNESS OUTLINE

1) Purpose of the EAB Preparedness Plan

2) Elements of an EAB preparedness plan
   a) Tree Inventory (number, conditions, size and location)

   b) Surveying for EAB

   c) Ash Management Policy
      i) Cost estimates for:
         (1) Removal/disposal
         (2) Treatment
         (3) Replacement
      ii) Historic/significant tree policy
      iii) Ash Tree Removals
         (1) Evaluate In-house vs. contracted ash tree removals
         (2) Infested vs. non-infested trees (Reactive vs. Proactive Removals)
         (3) Hazard trees
         (4) Prioritization
         (5) Private property trees
         (6) Permits and Regulations (Local, State & Federal)

   d) Identification of internal (community) resources and needs
      i) Financial
      ii) Personnel/volunteers
      iii) Facilities/equipment
      iv) Ordinances
         (1) Enforcement mechanisms (penalties)

   e) Identify funding decision makers and person(s) responsible for tree care

   f) Communication & Public Education
      i) Development of internal (municipal staff) communication protocol
      ii) Development of external (residents) communication protocol
         (1) Public Education
            (a) Adult and K-12

   g) Wood Waste Disposal and Utilization

   h) Replanting/Maintenance

## APPENDIX D: TREE INVENTORY PROGRAMS AND CONTACTS

| Software | Developer(s) | Phone | Email | Web Site | Notes |
|---|---|---|---|---|---|
| ArborPro | ArborPro | 877.844. DATA | info@arborprousa.com | www.arborprousa.com | |
| ArborSoftWorx | ArborSoftWorx | 800.492-7267 | Sales@ArborSoftWorx.com | www.arborsoftworx.com | |
| Canopy | Arbor Vision Software, Inc. | 847.657.1602 | info@canopy-worldwide.com | www.canopy-worldwide.com | |
| Cornell Univ. Tree Inventory Template | USDA Forest Service & Cornell University | 607.255.4586 | Dr. Nina Bussuk nlb2@cornell.edu | www.hort.cornell.edu/commfor/inventory/download.html | FREE |
| i-TREE | USDA Forest Service, Davey Resource Group & National Arbor Day Foundation | 877. 574-8733 | info@itreetools.org | www.itreetools.org | FREE |
| Mobile Community Tree Inventory (MCTI) | USDA Forest Service & Park Department of Springfield, MA | N/A | David Bloniarz dbloniarz@fs.fed.us | www.umass.edu/urbantree/mcti | FREE |
| Silvibase | Natural Resource Planning Services | 352.378.8966 | | www.nrpsforesters.com | Southeast US |
| Treekeeper | Davey Resource Group | 800.828.8312 | tk7sales@davey.com | www.treekeeperonline.com | |
| Software: *Trees In the Hood:* Tree Mgmt. & *TRiM*: Tree Risk Mgmt. | Natural-Path Urban Forestry Consultants | 773.699.7284 | natpath@earthlink.net | www.naturalpathforestry.com | |
| TreePro | Grayhill Solutions, Inc. | 206.633.6083 | treepro@grayhillsolutions.com | www.treeproworld.com | |
| TreeSavvy | Kunde Company | 763.753.5505 | info@TreeSavvy.com | www.kundeco.com | |
| TreeTown | East-West Forestry Associates, Inc. | 415.669.7100 | tg@forestdata.com | www.forestdata.com | West US |
| TRIMS Tree Inventory Systems | TRIMS Software International, Inc. | 800.608.7467 | info@trims.com | www.trims.com | |
| Urban Forestry Inventory System | Natural Resource Technologies | P: 888.848.2146 | info@nrtech.com or sales@nrtech.com | www.nrtech.com | |

## APPENDIX E: EAB SURVEY METHODS

**Visual Survey** techniques include looking for the outwardly visible symptoms of EAB on ash trees. Surveys can be conducted systematically over a given area or by individually selected trees through an inventory. Visual surveys are conducted by persons on the ground evaluating individual ash trees for EAB symptoms. The canopy of the tree should be surveyed for a thinning crown. The use of binoculars can assist in focusing on bark splits or woodpecker damage in the crown of the ash tree. The trunk of the ash tree should be examined for D-shaped exit holes, bark splits, and epicormic shoots. If any of these symptoms are present, the tree is most likely infested with EAB. To determine a positive tree, a life stage of the insect should be obtained by peeling portions of the tree to observe the presence of larvae.

The advantages of visual surveying techniques include few resources that can cover a large area in a short amount of time, as well as the ability to not sacrifice trees to be utilized as traps. The disadvantages are that by the time visual symptoms of EAB are present, it usually means the infestation has been in the area for several years, and protection measures may not be warranted.

**Tree Climbing** methods are employed when a closer look of the tree's canopy is warranted. Professional tree climbers should be utilized in these situations and be trained in an Electrical Hazard Awareness Program. Once in the canopy of the tree, small windows of the canopy's trunk and branches can be peeled back, using a drawknife, to look for EAB larvae. Areas to focus on are thinning branches, bark splits, and woodpecker damage.

Advantages of incorporating tree climbing techniques into surveying methods include a close-up view of the canopy of an ash tree (the area of the tree which will show EAB symptoms first). The disadvantages include the costs of using specialized people and the time it takes to perform this inspection on individual trees.

**Destructive Sampling** includes the removal and/or peeling of an ash tree to look for EAB larvae and larval galleries. Ash trees are selected and removed at the base. Ash trees that are destructively sampled can be of any size, but are the most efficient to peel when they are between 4"-12" Diameter at Breast Height (DBH). The tree should be kept in one piece to aid in the efficiency of peeling. The bark from the tree should be peeled in thin layers, using a draw knife from the top to bottom. Focus first on peeling areas of the tree that include weak branches, bark cracks, epicormic shoots, or woodpecker damage. Keep in mind that the size of the larvae galleries may be very small in young infestations and can even be as small as the size of a dime.

One advantage of destructively sampling ash trees for EAB is the discovery of early infestations. This is a significant factor in determining appropriate management solutions for infested areas. A disadvantage of this technique is the fact that once the tree is removed and peeled, it is destroyed. An example of the types of trees that could be used in this type of survey are trees in road rights-of-ways, ditches, fencerows, edges of woodlots, and trees already exhibiting EAB symptoms where the observation of a life stage is warranted.

**Detection Trees**[14] Research conducted by the U.S. Forest Service and Michigan State University has shown that EAB beetles are more attracted to stress trees and prefer to lay their eggs on trees that are weak versus trees that are healthy. In addition, work is being done to isolate the exact chemical compound that attracts the insects and to create an artificial trap to

[14] For additional information on using detection trees, see the MSU, MDA and USFS document titled "Using Girdled Trap Trees Effectively for EAB Detection, Delimination & Survey" at www.emeraldashborer.info.

lure the insect for surveying purposes. Currently, a trap has yet to be identified that will work for EAB. In the meantime, research has shown that artificially wounding the tree to purposefully stress it will attract EAB to that tree. The most effective way to wound the tree enough to attract EAB is to remove a band of bark from the trunk of an ash tree (girdling). This will disrupt the conductive tissues within the tree, and it will no longer be able to translocate water and nutrients. Effective girdling of an ash tree includes the following methods:

- Choose a tree between 4”-12” DBH
- Make two parallel cuts in the tree approximately 8” apart (using chainsaw or drawknife)
- The cuts should completely encircle the trunk
- Remove the bark and phloem (spongy tissue just beneath the bark) between the two cuts

Removing the bark from only a portion of the base of the tree is not as effective as completely circling the trunk.

Detection trees are currently the most effective tool available in surveying for EAB. Unfortunately, this method also destroys the ash tree that is used for surveying.

## APPENDIX F: CITY OF TOLEDO LABOR WORKSHEET FOR DETERMINING TREE REMOVAL COSTS (EXAMPLE)

| Maintenance | Diameter Class | Number of Trees | Hours per Tree* | Estimated Hours | Cost per Hour¨ | Estimated Cost^ | Total Est. Hours | Total Est. Cost | Average Cost/Tree^^ |
|---|---|---|---|---|---|---|---|---|---|
| **Removal[1]** | 01" - 06" | | **0.22** | | **$52.464** | | | | **$11.54** |
| | 06" - 12" | | **0.94** | | **$52.464** | | | | **$49.32** |
| | 12" - 18" | | **1.32** | | **$73.435** | | | | **$96.93** |
| | 18" - 24" | | **1.88** | | **$73.435** | | | | **$138.06** |
| | 24" - 30" | | **2.92** | | **$76.611** | | | | **$223.70** |
| | 30" - 36" | | **4.71** | | **$76.611** | | | | **$360.84** |
| | 36" - 42" | | **6.12** | | **$76.611** | | | | **$468.86** |
| | 42" - 48" | | **6.61** | | **$76.611** | | | | **$506.40** |
| | 48" - 54" | | **7.61** | | **$97.582** | | | | **$742.60** |
| **Removal Total:** | | | | | | | **$0.00** | **$0.00** | |
| **Trim[2]** | 01" - 06" | | **0.39** | | **$52.464** | | | | **$20.46** |
| | 06" - 12" | | **0.72** | | **$52.464** | | | | **$37.77** |
| | 12" - 18" | | **0.79** | | **$73.435** | | | | **$58.01** |
| | 18" - 24" | | **1.08** | | **$73.435** | | | | **$79.31** |
| | 24" - 30" | | **1.13** | | **$76.611** | | | | **$86.57** |
| | 30" - 36" | | **1.48** | | **$76.611** | | | | **$113.38** |
| | 36" - 42" | | **1.67** | | **$76.611** | | | | **$127.94** |
| | 42" - 48" | | **1.67** | | **$76.611** | | | | **$127.94** |
| | 48" - 54" | | **2.43** | | **$76.611** | | | | **$186.16** |
| **Trim Total:** | | | | | | | **$0.00** | **$0.00** | |
| **Stump[3]** | 01" - 06" | | **0.32** | | **$41.942** | | | | **$13.42** |
| | 06" - 12" | | **0.32** | | **$41.942** | | | | **$13.42** |
| | 12" - 18" | | **0.32** | | **$41.942** | | | | **$13.42** |
| | 18" - 24" | | **0.38** | | **$41.942** | | | | **$15.94** |
| | 24" - 30" | | **0.44** | | **$41.942** | | | | **$18.45** |
| | 30" - 36" | | **0.59** | | **$41.942** | | | | **$24.75** |
| | 36" - 42" | | **1.00** | | **$41.942** | | | | **$41.94** |
| | 42" - 48" | | **1.59** | | **$41.942** | | | | **$66.69** |
| | 48" - 54" | | **2.21** | | **$41.942** | | | | **$92.69** |
| **Stump Total:** | | | | | | | **$0.00** | **$0.00** | |
| **TOTAL** | | | | | | | **$0.00** | **$0.00** | |

* Values for removals and trims based on: O'Brien,P.R., K.A.Joehlin, and D.J.O'Brien. 1992. Performance standards for municipal tree maintenance. J Arboric. 18(6):307-315.

¨ Hourly rate (2005) for City of Toledo Forestry staff. Includes 45% fringe benefit costs.

^ Estimated Costs= Estimated hours x Cost per hour

^^ Average Cost Per Tree= Hours per tree x Cost per tree

[1] Stump height not to exceed 8" above grade.

[2] Extent of work corresponds to the National Arborists Association class II trim.

[3] Stump and visible surface roots ground to a depth of 6" below grade.

## APPENDIX G: CITY OF TOLEDO- SAMPLE REMOVAL COST BID SHEET

**Contract Item No. 1**

**Removal estimate for approximately XXXX trees in city of Toledo using 2005 contract pricing. Residual wood to be disposed of by Contractor at Contractor sites.**

***** DBH reflects tree diameter at 4.5' above ground. *****

| **DBH** (upper limit of 6" size class) | **Quantity** | **Bid Price** (per size class) | **Cumulative Price** (per size class) |
|---|---|---|---|
| **18"** | | $241.43 | $0.00 |
| **24"** | | $475.00 | $0.00 |
| **30"** | | $650.00 | $0.00 |
| **36"** | | $1,002.00 | $0.00 |
| **42"** | | $1,366.67 | $0.00 |
| **48"** | | $1,400.00 | $0.00 |
| **54"** | | $1,800.00 | $0.00 |
| **60"** | | $2,500.00 | $0.00 |
| | **0** | | **$0.00** |

**Cumulative Total (all size classes)** _____

## APPENDIX H: SAMPLE TREE REMOVAL CONTRACT BID LANGUAGE & ELEMENTS

**Submission of Bids**

All bids shall be submitted in sealed envelopes and shall include the following information on the face of the envelope:

Bidder's Name & Address
Bid Number and Item

Failure to do so may result in a premature opening of, or failure to open, such proposal. All bids must be hand delivered or mailed to: (Community's Address)
Bidders are responsible for submitting proposals before stated closing time. Delays in the mail will not be considered. Any proposal received after the stated deadline will be rejected.

Bidder shall submit a unit price for each item listed.

**Consideration of Proposals**

*The Community* hereby reserves the right, in its sole discretion, to reject any/or all bids, to award the bid in its entirety, in part, or not at all, as it may deem to be in the best interest of *The Community.*

**General Specifications**

- **Contract Term**
  The term of this contract will be from XXXXXX through XXXXXX
- **Notification of Ownership**
  The Contractor shall make the following notifications in writing:
  - When the Contractor becomes aware that a change in its ownership or officers has occurred, or is certain to occur, and that could result in changes in the valuation of its capitalized assets in the accounting records, the Contractor shall notify *The Community* within 30 days.
  - The Contractor shall also notify *The Community* within 30 days whenever changes to asset valuations or any other cost changes have occurred, or are certain to occur, as a result of a change in ownership or officers.
- **Contractor Responsibilities**
  The contractor will be required to assume responsibility for all contractual activities, whether or not that contractor performs them. Further, *The Community* will consider the contractor to be the sole point of contact with regard to contractual matters, including payment of any and all charges resulting from the anticipated contract. If any part of the work is to be sub-contracted, this contract must include a list of sub-contractors, including firm name, address, contact person, and a complete description of work to be sub-contracted. *The Community* reserves the right to approve sub-contractors and to require the contractor to replace sub-contractors found to be unacceptable. The contractor is totally responsible for adherence by the sub-contractor to all provisions of this contract.
- **General Indemnification**
  To the fullest extent permitted by law, the Contractor shall indemnify, defend and hold harmless the State, its departments, divisions, agencies, sections, commissions, officers, employees and agents, from and against all losses, liabilities, penalties, fines, damages and claims (including taxes), and all related costs and expenses (including reasonable attorneys' fees and disbursements, costs of investigation, litigation, settlement, judgments, interest and penalties), arising from or in connection with any of the following:
  - Any claim, demand, action, citation or legal proceeding against *The Community*, its employees and agents arising out of or resulting from (1) the product provided or (2) performance of the work, duties, responsibilities, actions or omissions of the Contractor or any of its sub-Contractors under this Contract.

- Any claim, demand, action, citation or legal proceeding against *The Community*, its employees and agents arising out of or resulting from a breach by the Contractor of any representation or warranty made by the Contractor in this Contract;
- Any claim, demand, action, citation or legal proceeding against *The Community*, its employees and agents arising out of or related to occurrences that the Contractor is required to insure against as provided for in this Contract;
- Any claim, demand, action, citation or legal proceeding against *The Community*, its employees and agents arising out of or resulting from the death or bodily injury of any person, or the damage, loss or destruction of any real or tangible personal property, in connection with the performance of services by the Contractor, by any of its sub-Contractors, by anyone directly or indirectly employed by any of them, or by anyone for whose acts by any of them may be liable; provided, however, that this indemnification obligation shall not apply to the extent, if any, that such death, bodily injury or property damage is caused solely by the negligence or reckless or intentional wrongful conduct of *The Community*;
- Any claim, demand, action, citation or legal proceeding against *The Community*, its employees and agents which results from an act or omission of the Contractor or any of its sub-Contractors in its or their capacity as an employer of a person.

- **Liability Insurance**
  - The Contractor is required to provide proof of the minimum levels of insurance coverage as indicated below. The purpose of this coverage shall be to protect *The Community* from claims which may arise out of or result from the Contractor's performance of services under the terms of this Contract, whether such services are performed by the Contractor, or by any sub-Contractor, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable.
  - The Contractor waives all rights against *The Community*, its departments, divisions, agencies, offices, commissions, officers, employees and agents for recovery of damages to the extent these damages are covered by the insurance policies the Contractor is required to maintain pursuant to this Contract.
  - All insurance coverage provided relative to this Contract/Purchase Order is PRIMARY and NON-CONTRIBUTING to any comparable liability insurance (including self-insurances) carried by *The Community*.
  - The insurance shall be written for not less than any minimum coverage specified in this Contract or required by law, whichever is greater.
  - The insurers selected by Contractor shall have an A.M. Best rating of A or better, or as otherwise approved in writing by *The Community*, or if such ratings are no longer available, with a comparable rating from a recognized insurance rating agency.
  - Before both parties sign this Contract or before the purchase order is issued by *The Community,* the Contractor must furnish to *The Community* certificate(s) of insurance verifying insurance coverage ("Certificates"). The Certificate must be on the standard "accord" form or equivalent. **THE CONTRACT OR PURCHASE ORDER NO. MUST BE SHOWN ON THE CERTIFICATE OF INSURANCE TO ASSURE CORRECT FILING.** All Certificate(s) are to be prepared and submitted by the Insurance Provider. All Certificate(s) shall contain a provision indicating that coverage afforded under the policies WILL NOT BE CANCELLED, MATERIALLY CHANGED, OR NOT RENEWED without THIRTY (30) days prior written notice, except for ten (10) days for non-payment of premium, having been given to *The Community.* The notice must include the Contract or Purchase Order number affected and be mailed to: (COMMUNITY CONTACT INFO). Failure to provide evidence of coverage may, at *The Community's* sole discretion, result in this Contract's termination.
  - The Contractor is required to pay for and provide the type and amount of insurance listed below:

    *Commercial General Liability with the following minimum coverage:*

    | | |
    |---|---|
    | $2,000,000 | General Aggregate Limit other than Products/Completed Operations |
    | $2,000,000 | Products/Completed Operations Aggregate Limit |
    | $1,000,000 | Personal & Advertising Injury Limit |
    | $1,000,000 | Each Occurrence Limit |
    | $500,000 | Fire Damage Limit (any one fire) |

    The Contractor must list *The Community,* its departments, divisions, agencies, offices, commissions, officers, employees and agents as ADDITIONAL INSUREDS on the Commercial

General Liability certificate. The Contractor also agrees to provide evidence that insurance policies contain a waiver of subrogation by the insurance company.

*Vehicle Liability Insurance*

If a motor vehicle is used to provide services or products under this Contract, the Contractor must have vehicle liability insurance on any auto including owned, hired and non-owned vehicles used in Contractor's business for bodily injury and property damage as required by law.

- The Contractor must list *The Community*, its departments, divisions, agencies, offices, commissions, officers, employees and agents as ADDITIONAL INSUREDS on the vehicle liability certificate. The Contractor also agrees to provide evidence that insurance policies contain a waiver of subrogation by the insurance company.
- Workers' compensation coverage must be provided in accordance with applicable laws governing the employees' and employers' work activities in the state of the Contractor's domicile. If a self-insurer provides the applicable coverage, proof must be provided of approved self-insured authority by the jurisdiction of domicile. For employees working outside of the state of qualification, Contractor must provide appropriate certificates of insurance proving mandated coverage levels for the jurisdictions where the employees' activities occur.
  - Any certificates of insurance received must also provide a list of states where the coverage is applicable.
  - The Contractor also agrees to provide evidence that insurance policies contain a waiver of subrogation by the insurance company. This provision shall not be applicable where prohibited or limited by the laws of the jurisdiction in which the work is to be performed.
- Employers liability insurance with the following minimum limits:
  - $100,000 each accident
  - $100,000 each employee by disease
  - $500,000 aggregate disease
- Sub-Contractors

  Except where *The Community* has approved in writing a Contractor sub-Contract with other insurance provisions, Contractor shall require all of its Sub-Contractors under this Contract to purchase and maintain the insurance coverage as described in this Section for the Contractor in connection with the performance of work by those Sub-Contractors. Alternatively, Contractor may include any Sub-Contractors under Contractor's insurance on the coverage required in this Section. Sub-Contractor(s) shall fully comply with the insurance coverage required in this Section. Failure of Sub-Contractor(s) to comply with insurance requirements does not limit Contractor's liability or responsibility.
- Certificates of Insurance and Other Requirements
  - Contractor shall furnish to *The Community* certificate(s) of insurance verifying insurance coverage or providing satisfactory evidence of self-insurance as required in this Section (the "Certificates"). Before this Contract is signed, and not less than 20 days before the insurance expiration date every year thereafter, the Contractor shall provide evidence that *The Community* and its agents, officers and employees are listed as additional insured, but only to the extent of liabilities assumed by Contractor as set forth in Indemnification Section of this Contract, under each commercial general liability and commercial automobile liability policy.

  - Contractor shall maintain all required insurance coverage throughout the term of the Contract and any extensions thereto and, in the case of claims-made through the Commercial General Liability policies, shall secure tail coverage for at least three (3) years following the expiration or termination for any reason of this Contract. The minimum limits of coverage specified above are not intended, and shall not be construed, to limit any liability or indemnity of Contractor under this Contract to any indemnified party or other persons. Contractor shall be responsible for all deductibles with regard to such insurance. If Contractor fails to pay any premium for required insurance as specified in this Contract, or if any insurer cancels or significantly reduces any required insurance as specified in this Contract without *The Community's* written consent, at *The Community's* election (but without any obligation to do so) after *The Community* has given Contractor at least thirty (30) days written notice, *The Community* may pay such premium or procure similar insurance coverage from another company or companies; and at *The Community's* election, *The Community* may deduct the

entire cost (or part thereof) from any payment due Contractor, or Contractor shall pay the entire cost (or any part thereof) upon demand by *The Community*.

- **Contractor Warranties**
  The Contract will contain customary representations and warranties by the Contractor, including, without limitation, the following:
  - The Contractor will perform all services in accordance with high professional standards in the industry;
  - The Contractor will use adequate numbers of qualified individuals with suitable training, education, experience and skill to perform the services;
  - The Contractor will use its best efforts to use efficiently any resources or services necessary to provide the services listed in this contract;
  - The Contractor will use its best efforts to perform the services in the most cost effective manner consistent with the required level of quality and performance;
  - The Contractor will perform the services in a manner that does not infringe the proprietary rights of any third party;
  - The Contractor will perform the services in a manner that complies with all applicable laws and regulations;
  - The Contractor has duly authorized the execution, delivery and performance of this Contract;
  - The Contractor is capable in all respects of fulfilling and shall fulfill all of its obligations under this Contract.
  - The Contract signatory has the power and authority, including any necessary corporate authorizations, necessary to enter this Contract, on behalf of Contractor.
  - The Contractor is qualified and registered to transact business in all locations where required.

- **Breach of Contract**
  Failure to comply with articles, sections, or subsections of this agreement, or making any false statement in this agreement, will be considered a material breach of this agreement giving *The Community* authority to invoke any and all remedies available to it under this agreement.

  The Community may cancel this Contract without further liability or penalty for any reasons deemed appropriate by *The Community*.

- **Tree Removal Specifications**
  Description of Work - General
  The contractor shall perform the following work for each tree removal. All of the following is to be included in the unit price per tree removal as applicable:
  - Remove all ash trees designated by *The Community* (typically in the form of an inventory)
  - Grind stumps to 10" below soil surface. Remove stump chips, fill with quality topsoil, and apply appropriate premium grade grass seed.
  - For woodlot trees, remaining stumps must not exceed four (4) in height from ground on all sides.
  - Pick up and chip all fallen branches in areas of tree, yard and surrounding areas.
  - Remove and dispose of all generated debris.
  - Clean, sweep and restore to the condition existing prior to the removal operations all areas of paving, lawns, walkways, sidewalks, fixtures, fences etc. that have been damaged, dirtied, altered or displaced by the tree removal work. All debris shall be removed from the site.
  - If the community desires to keep the generated wood and chips, the contractor should transport all tree(s) and chipped materials to a location as directed by the Community. Otherwise, the contractor may keep the tree material and provide a plan on how they will dispose of it.
  - Trees must be removed using acceptable industry practices for such removal. These practices are outlined by the American National Standards Institute (ANSI) for professional arborists in sections A-300 and Z-133. (See www.tcis.org for more information). Contractor should expect that it might be necessary to climb trees to perform the tree removal for this specification.
  - Driveways and alleys are not to be blocked with generated tree debris beyond the time to complete required work on that site and shall at no time remain over night.
  - The Contractor must relocate any fixtures or property (including but not limited to fences, furniture, gates, etc…) necessary to complete the work of this Contract. Any fixtures or property

removed or altered shall be returned to its original site, repaired to its original condition, or if it is unable to be repaired, then replaced with an item of at least equal quality.

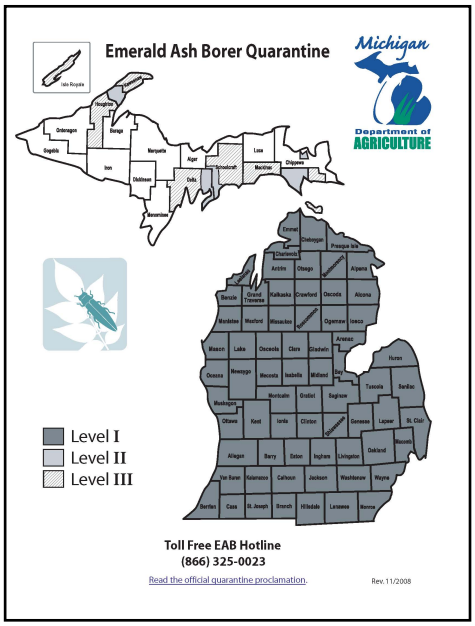
- **Safety Precautions**
  - The contractor shall perform work taking precautions against injury to persons, damage to property and interference with vehicular traffic. The contractor shall take necessary precautions to ensure the safety of all persons engaged in the work of this contract.
  - The contractor is responsible for contacting MISS DIG to determine locations of utilities prior to beginning stump grinding activity at each location.
  - When performing tree removal adjacent to existing sewers, drains, water and gas lines, electric or telephone conduits or cables, poles which are to remain in operation, the contractor shall maintain such utility equipment and structures in place at their own expense and shall cooperate with utility companies, homeowners, or other parties owning or operating such utility equipment or structures.
  - The contractor shall be responsible for any and all signage or barricades necessary to ensure the safety of its workers, homeowners, community employees and the general public.
  - The contractor is responsible for following all pertinent local, state and federal Rules and Regulations throughout the period of this contract.

## APPENDIX I: STATE EAB QUARANTINE INFORMATION

On November 10, 2008, the Michigan Department of Agriculture (MDA) revised it's EAB Quarantine to consolidate all 68 contiguous counties of the Lower Peninsula into one quarantine level.

**Quarantine Level I** – All the sixty-eight contiguous County area of the Lower Peninsula.

**Quarantine Level II** – In the Upper Peninsula - the City of St. Ignace and the townships of Moran, Brevort, and St. Ignace in Mackinac County. In Chippewa County - the area near Brimley State Park. In Houghton County - the City of Hancock, the townships of Torch Lake, Schoolcraft, Calumet,Osceola, Franklin, Hancock, and Quincy. In Delta County - the townships of Fairbanks, Garden, and Nahma. In Schoolcraft County - the townships of Inwood, and Thompson.




Quarantine Level III - The entire County of Keweenaw and the remaining portions of Mackinac, Houghton, Delta, and Schoolcraft Counties in the Upper Peninsula not identified in Quarantine Level II above.

**Regulated Articles** – The emerald ash borer, Agrilus planipennis (Fairemaire), in any living stage of development. All hardwood firewood (not just ash) with bark, ash logs with bark, ash lumber with bark, hardwood wood chips greater than one-inch, ash limbs, ash branches, and ash stumps. "Bark" means "the natural bark of a tree, including the ingrown bark around knots and bark pockets between rings of annual growth and an additional 1/2 inch of wood including the vascular cambium."

**Movement –** The movement of hardwood firewood and other regulated articles out of the sixty-eight contiguous county area of the Lower Peninsula is prohibited unless under a valid MDA Compliance Agreement.

The movement of regulated articles originating from a Quarantine Level II area is prohibited out of the Level II area without a valid MDA Compliance Agreement except regulated articles may move from Quarantine Level II of Mackinac County into Quarantine Level I of the Lower Peninsula without a Compliance Agreement.

The movement of regulated articles originating from a Quarantine Level III area is prohibited out of the Level III area without a valid MDA Compliance Agreement except regulated articles may move from a Quarantine Level III area into an adjoining Quarantine Level II area.

**Compliance Agreement Treatments** – Compliance Agreements are typically utilized by those in the forest products industry who can meet approved treatment methods. Approved treatment methods currently include removing 100% of bark and an additional ½ inch of wood or kiln drying, fumigation or heat treating according to an approved treatment schedules.

**Nursery Stock Moratorium** – The sale and/or movement of ash nursery stock within, out of or into Michigan is prohibited under all conditions.

## APPENDIX J: SAMPLE PRESS RELEASE

Contact: Jane Doe, <title here>, XXX-XXX-XXXX

EMERALD ASH BORER FOUND IN SMALLVILLE, MEETING PLANNED

SMALLVILLE, Mich. – Emerald ash borer (EAB), an exotic beetle that infests ash trees, was recently discovered in the Smallville area. Since its discovery near Detroit in the summer of 2002, EAB has killed or infested 15-20 million ash trees in Michigan. It has cost municipalities, property owners, nursery operators, and forest products industries tens of millions of dollars.

The City of Smallville is sponsoring an EAB informational meeting on October 4 at 7 p.m. at the County Administration Building, (street address here). The public is invited. EAB specialists from <education/information resource> and regulatory specialists from the Michigan Department of Agriculture will be on hand to explain what EAB is and how it will be handled in Smallville.

"This pest is very destructive, and people should know what to look for and what to do if they find it," says Jane Doe, <title>. "We will provide information on identifying the pest, the signs and symptoms of EAB infestation, what treatment options are available, and tree species that are good options for replacing ash trees. There will also be information from a Michigan Department of Agriculture representative on EAB regulations and quarantine measures."

For more information, call Doe at XXX-XXX-XXXX. Additional EAB information can be found at the EAB Web site: www.emeraldashborer.info.

## APPENDIX K: WOOD UTILIZATION

Despite the opportunities that exist for successfully utilizing removed ash trees, several major challenges exist:

- **Location**: While much EAB-infested ash resides within "traditional" forested ecosystems, communities are faced with removing high volumes of trees in urban areas. The larger forest product industries do not typically operate in urban forests, making organizing and implementing utilization much more difficult in these areas. Smaller companies (portable sawmills, etc.) and urban-based businesses (mulch industries) are more likely to be interested in partnering with communities.
- **Existing markets**: Ash prices on the general timber markets have been declining in recent years. While this is likely in some part due to EAB, it also may be due to a variety of other factors that bring about fluctuations in timber prices. Due to these relatively low values, most larger-scale buyers of timber are not likely to be interested in ash-only salvage sales. However, this problem can be eliminated by pursuing smaller and/or local markets or by including additional species in sales.
- **Scale**: Urban areas, in particular, can be challenging for collecting wood residues. Systems which rely on single logs being picked up from a variety of areas are inefficient and have little chance of being successful over the long term. Infrastructure has to be developed to allow for residues to be collected, sorted, and merchandised as efficiently as possible, which may necessitate a cooperative effort among many public and private entities.
- **Timeline**: Often, the timeline set for tree removals is quite short once an infestation is discovered in an area. This leaves little time for arranging utilization options once removing trees and clearing debris becomes top priority. Utilization programs have the best chance of success if much of the early groundwork (finding industry partners, organizing collection and transportation, etc.) is completed as much in advance as possible.
- **Expense:** The tree removals, wood disposal, and replanting associated with an EAB outbreak all create huge economic burdens for affected communities. This often makes "one-source solutions" appealing to communities when one company is willing to remove trees and haul away all of the residue. However, this approach may leave out other creative options for higher-value utilization that could further lower the disposal costs.
- **Transportation**: High gasoline prices and congested traffic in urban areas make transporting loads of wood difficult and expensive. Additionally, in most cases, few companies in urban areas have the equipment necessary to lift and transport whole logs. Partnering with multiple businesses, or even multiple communities, may allow access to suitable resources.
- **Varying support from communities**: Community departments are often short-staffed and struggling with tight budgets. Developing and/or incorporating new ideas for how they dispose of wood waste can often be difficult, even if it will result in savings for the city. In many cases, community managers do not have a preference for how wood is disposed of, as long as it is removed from public areas in a timely manner. Following the models of other experienced cities may help in easing the shift to this type of new system.
- **Varying support from local industry:** Often the larger wood products industries in a region may not be interested in salvaged or reclaimed wood (due to concerns about metal, contaminates, and poor log quality). They usually have their own reliable sources for wood resources and are hesitant to try a new untested source. It is important to survey many different types (and sizes) of local industries to find successful partnerships.

## APPENDIX L: EAB BACKGROUND AND CURRENT SITUATION

In July 2002, an exotic Asian beetle previously undetected in North America or Europe was discovered in Southeast Michigan. It is suspected that this newly discovered beetle, the emerald ash borer (*Agrilius planipennis* Fairmaire), was introduced from Asia on solid wood packing material (e.g. cargo crating, pallets) or dunnage (green lumber used to stabilize cargo containers) off-loaded from cargo ships. Evidence suggests EAB has been in Michigan for 10-15 years prior to its discovery. EAB feeds on and kills all species of ash (Fraxinus spp.) whether healthy, stressed or declining. Larvae feed by excavating galleries (e.g. tunnels) in the inner bark and outer sapwood on the tree trunk and large branches. These galleries girdle and kill the tree two or three years after initial infestation.

Over the past 12 to 15 years, ash trees became a popular street and landscape tree due to its large, mature size, fast growth, and relative insect and disease resistance. They also served as a suitable replacement for American elms that were killed by the exotic Dutch elm disease pathogen. Millions of ash trees in urban settings and wood lots have been killed or are dying in Michigan, Ohio, Indiana, Illinois, Maryland and Ontario, Canada, making this exotic pest a national regulatory issue. The immediate and potential impacts of EAB in Michigan, as well as the Midwest, are severe. Ash, particularly white ash, is a valuable lumber species. Black, white, and green ash all provide seeds, cover and habitat for a wide range of wildlife species in forests and lowland natural areas throughout the Lower and Upper Peninsulas of Michigan and the Midwest

The EAB response program is an immense task, but one which must be undertaken if ash is to survive as a species in North America. During the past four years, MDA in cooperation with USDA-APHIS, USDA-FS, MSU and MDNR have put a great deal of effort into survey, education, response efforts, and regulatory activities. However, we are only beginning to address the challenges of this pest. The primary objectives of our collaborative efforts will be to regulate the movement of ash wood products within the state, conduct a statewide detection and delimiting survey for EAB, utilize a variety of control methods to respond to this pest, manage EAB program data, and maximize communication tools to meet the wide variety of EAB information needs in Michigan.

The emerald ash borer's economic, ecological, and cultural costs to Michigan are numerous:

- Cost of ash removals (public & private) in the 21 EAB quarantined counties is estimated at $550 million (Source: MDA, DNR, & local communities).
- Losses to statewide nursery stock sales total $10 million annually due to ash restrictions (Source: MDA).
- Municipal ash tree removal costs in public right-of-ways total $25 million annually (Source: MDA).
- Fifteen million dead and dying ash trees are in the 21 EAB quarantined counties (Source: MDA, DNR & MSUE).
- Removal of ash trees in outlying infestations may total $15 million (Source: (MDA).
- 700 million ash trees in Michigan are at risk (Source: USDA Forest Service FIA Data 1993).
- Ash comprises 8% of the total leaf area of Michigan's forests (Source: USFS FIA Data 1993).
- Michigan's timber industry faces annual losses of 18 million board feet of ash lumber (Source: DNR).
- Current volume of ash lumber in Michigan is estimated at over 2.2 billion board feet (Source: DNR).
- Many wildlife habitats, including those of some threatened and endangered species, depend on an abundant ash resource.
- The Native American culture of basket weaving, which has lasted for hundreds of years, depends on a reliable source of black ash logs.

## APPENDIX M: EAB FREQUENTLY ASKED QUESTIONS

**Q: I think I have EAB. Who do I report it to?**
**A**: Contact the Michigan toll-free hotline for current reporting procedures at: 1-866-325-0023.

**Q: If I have EAB, will the State of Michigan pay to have my tree removed?**
**A:** Michigan's EAB Program focuses on survey, communication and outreach, containment and regulatory enforcement. All tree removal activities that occur as part of the EAB Program are done to contain the pest in isolated areas.

**Q: If I remove my ash tree, how can I legally dispose of my tree?**
**A:** The MDA has a published list of disposal sites that will accept ash material (check www.michigan.gov/eab for current list); however, you are not required to take your ash tree here. You can also burn or chip your ash tree on your property (be sure to check local and state regulations on burning in your community), or you can hire a tree care company to remove and dispose of the tree for you. The wood can be transported within the quarantined area where you live (check www.michigan.gov/eab for current quarantine information); however, it is prohibited from leaving the quarantined area.

**Q: Should I treat my ash tree?**
**A:** There are several products available to treat for EAB for both homeowners and commercial applicators, yet research on longevity and effectiveness is still ongoing. In most cases, annual treatments are required and can be costly. Always read labels and instructions before using any pesticide. If you hire a commercial firm, be sure they are licensed and certified (call your local MDA office for more information on properly applying pesticides).

**Q: Is just ash firewood quarantined?**
**A:** No. All hardwood firewood is quarantined and prohibited from leaving the quarantined area. Please buy firewood locally when you are traveling.

**Q: Can I apply for a permit to move my firewood?**
**A:** Firewood can only be moved from quarantined areas once it is deregulated and no longer poses a threat of spreading EAB. Please buy firewood locally when you reach your destination.