

# 2007 Survey Protocols

## Emerald Ash Borer

*Agrilus planipennis*



Northeastern Area State and Private Forestry  
Forest Health Protection

June 2007

In September 2006 the USDA Forest Service in cooperation with Michigan State University, Michigan Technological University, and the Forest Service's Northern Research Station, conducted three 'hands on' workshops in Michigan and Ohio to teach effective cutting and peeling techniques to individuals who were preparing to process detection trees (trap trees) later that fall. Peeling trees in search of tiny emerald ash borer (EAB) larvae is an art that puts a premium on patience and good technique. The workshops were designed to permit the participants to work in small groups with instructors to facilitate information exchange, try different equipment, and to hone their peeling techniques. This was the first time that training of this nature was offered across the EAB program to ensure that field personnel had the same base level training in peeling techniques before they began processing detection trees. The workshops were a success and about 100 field personnel received the training. Additional workshops are planned again in fall 2007.

These 2007 EAB survey protocols assimilate the best information to date based upon the past four years of experience in the EAB program; the ongoing development and evaluation of detection methods and technology by federal, state and university scientists and pest management practitioners; and culminating in the "hands on" peeling workshops held last fall. These protocols will be revised periodically as new information, new tools and new recommendations emerge.

**If you have any questions about these survey protocols or about EAB in general contact one of these Forest Health Protection offices:**

Durham Field Office  
Kevin Dodds  
USDA Forest Service  
271 Mast Rd.  
Durham, NH 03824  
[kdodds@fs.fed.us](mailto:kdodds@fs.fed.us)  
603-868-7743

Morgantown Field Office  
Rick Turcotte  
USDA Forest Service  
180 Canfield Rd.  
Morgantown, WV 26505  
[rturcotte@fs.fed.us](mailto:rturcotte@fs.fed.us)  
304-285-1544

St. Paul Field Office  
Steve Katovich  
USDA Forest Service  
1992 Folwell Avenue  
St. Paul, MN 55108  
[skatovich@fs.fed.us](mailto:skatovich@fs.fed.us)  
651-649-5264

### **Introduction:**

Emerald ash borer (EAB), *Agrilus planipennis* Fairmaire (Coleoptera:Buprestidae), is an exotic pest of ash (*Fraxinus* spp.). Feeding by the larval stage of this beetle occurs in the inner bark and phloem. Larval feeding damages a trees ability to move food and water leading to crown dieback and decline. Trees die after several years of repeated attacks. Attacks can occur on small (1-2 inch diameter) to very large diameter trees.

It is very difficult to detect low level EAB populations. Newly infested trees may appear healthy and have no visible symptoms of attack. In smaller trees (< 3-4 inches DBH) a few exit holes may be visible on the trunk. In larger trees the insect is more apt to be located in the canopy for at least the first few years as insect populations build. By contrast trees in areas containing high density EAB populations where the insect has been present for several years, are likely to exhibit decline and mortality and visible signs of infestation such as thin crowns, vertical bark splits, D-shaped exit holes, dead and dying branches, woodpecker damage, and epicormic sprouts.

Traps and attractants for adults are not yet available, although Forest Service, APHIS and university scientists are continuing evaluations of promising lures and traps. However, EAB adults are attracted to ash trees that are girdled to serve as detection trees (often referred to as trap trees). Trap trees work because EAB adults are attracted to trees that are stressed by the girdle. Based on this principle ash trees that are not girdled but which are under stress as indicated by signs and symptoms like branch dieback, stunted growth, and epicormic branching may also be attractive to EAB. These are candidate trees to simply cut down and carefully peel to look for EAB life stages and larval galleries. We refer to these trees as destructive sample trees.

Three EAB detection methods currently being used are:

- Detection trees (girdled trap trees)
- Destructive sampling (cut and peel)
- visual surveys

The use of detection trees and destructive sampling are the primary techniques employed in the USDA National EAB Program for detection of low level populations or new introductions. Visual surveys are not a good method to use to find early infestations of EAB because few signs and tree symptoms are evident. However, if EAB has become well established in an area then visual surveys may be an excellent means for finding the infestation. Visual surveys can also be helpful in identifying candidate trees to destructively sample, and areas in which to deploy detection trees. Whenever possible, it is recommended that detection trees be utilized in EAB surveys that target high-risk points of introduction. Instructions for conducting all three survey methods are addressed in these protocols for 2007.

### **Survey Goals:**

- Find EAB infestations occurring outside of the known infestations.
- Identify and survey the most likely areas for EAB introduction and establishment.
- Provide a format for reporting and recording survey data.

**Survey Approach:** Identify and visually survey locations within states where introduction of EAB is most likely. Locate and visually survey as many declining and dying ash trees as possible. Cut and peel (destructive sample) a sub-sample of suspect trees found through visual surveys and examine them for the presence of EAB life stages. In areas deemed high risk for introduction establish detection (trap) trees.

**Selecting Survey Sites:** Identify areas where EAB introduction is most likely. These areas include: 1) nurseries that sell or broker ash trees; 2) recreational sites (firewood introductions); 3) hardwood sawmills that use ash, 4) commercial firewood dealers; 5) new housing and commercial developments where ash may have been recently planted; 6) since ash is a commonly used street tree, a cross section of municipalities should be surveyed, and 7) areas with declining, stressed, and/or dead ash trees.

**Number of Survey Sites:** The number of sites surveyed will depend on the number of locations deemed a high risk for introduction. In addition, states closer to the known infested area should have a greater sampling intensity than those further away. At a minimum, all areas deemed a high risk for introduction should be evaluated for the presence of declining or dead ash trees. If declining or dead ash are present, thorough visual surveys should be done at those sites and a subsample of trees should be destructively sampled to look for EAB life stages and galleries. (see page 9 for methods).

**Pro's and Con's of the Three Surveys:** Detection tree surveys may require more time and effort per survey site than the other methods. The reason for this is that they require a minimum of two site visits during the year, one to establish the girdle, the second to cut, peel and sample the tree. However, detection trees are considered the most sensitive survey tool for finding low-level EAB populations. The destructive sampling method can also take multiple visits, the first to locate candidate trees and then later visits to cut and peel the trees. Ash decline and dieback is not uncommon so many potential trees for this type of survey may be encountered. This could overwhelm a survey program that needs to cover a large regional area. Visual surveys can cover large areas quickly, but visual inspection can miss low-level infestations easily. If many trees need to be closely examined, visual inspections can also be very time consuming. In many cases a single detection tree may be a more efficient survey tool than a large scale visual survey.

**Sampling Season:** Many of the signs of EAB infestation (D-shaped exit holes, bark splits and serpentine galleries) can be observed at any time of the year. However, dead and declining trees can be most easily observed during the growing season. Fall coloration can mimic crown decline. Therefore, the best time periods for visual surveys are from June through mid-September. Detection trees must be girdled prior to adult emergence (early June in southern MI, mid April in MD) and should be cut down and peeled after late September. Peeling detection trees prior to late September is not recommended; later peeling allows larvae time to develop in size and to extend galleries that would be more easily observed. Some detection trees can be left

standing for a second summer. This may provide a longer window of opportunity for EAB to locate and infest a girdled tree. These trees should be cut and sampled after late September of the 2<sup>nd</sup> year. Cutting and peeling of suspected EAB trees (i.e. destructive sampling) can be conducted at any time.

**Coordination with Others:** EAB is a state and federally regulated pest. Therefore any potential new finds of EAB outside of the current quarantine areas will need to be verified by federal and state plant pest regulatory agencies (State Departments of Agriculture, USDA APHIS). We strongly recommend that EAB surveys be planned in coordination with the State Plant Pest Regulatory Official (SPRO). In this manner procedures can be developed for processing potential EAB samples; officially verifying positive finds through established procedures; disposing of infested trees; and sharing of data. The coordination will eliminate the potential for duplication of surveys in the same areas by multiple agencies; serve to complement EAB surveys in the state; and permit efficient implementation of EAB surveys across a larger landscape. This will enhance the effectiveness of EAB surveys.

**Public Information and Awareness:** While not specifically addressed in these protocols the benefits of implementing public information and awareness activities along with EAB surveys should not be underestimated. Having more eyes looking for signs and symptoms of EAB can help make better use of the resources available, and help to target other high risk areas and suspect trees for follow-up visits and surveys. EAB-related public information products are available from the Forest Service and APHIS. Many of the Forest Service products can be customized with local contact information upon request. A regional EAB multi-agency communications team made up of public affairs specialists from the Forest Service, APHIS and states in which EAB is known to exist, coordinates regional messages and communications about the EAB program. The website below provides a portal to a vast amount of information about EAB including links to EAB activities by federal, state and local agencies, universities, and more.

<http://www.emeraldashborer.info>

## **Detection Trees (also referred to as trap trees)**

**Tree Selection:** At sites selected for detection tree surveys, 2-6 trees should be utilized. Tree selection in close proximity to campsites or firewood piles is preferable. However, selected trees should be at a minimum distance of two times their height from campsites, picnic tables, frequently used trails, or other features that a falling tree could damage. Trees can be selected in neighboring woodlots or fencerows. Gain permission from the landowner/land manager prior to selecting detection trees.

Choose a tree that is at least 4 inches dbh, so it won't break in the wind after girdling. Select trees that are no more than 10-12 inches dbh so they are not too difficult to fell, peel and remove.

All of our native ash (*Fraxinus* spp.) will attract EAB adults when girdled. However, if different species are present select by priority, from most to least preferred: (1) green ash, (2) black ash, (3) white ash, and (4) blue ash.

EAB adults appear to prefer trees that get plenty of sun. Rankings for trap tree location (most to least preferred) are:

- Open-grown trees (e.g. along a roadside) – (best, most preferred)
- Hedgerow tree (e.g. 2 sides mostly open)
- Edge tree, trees along the edge of a woodlot, crown open on one side
- Closed canopy tree (least preferred)

Every effort should be made to locate and use an established ash tree as a detection tree. The use of potted or newly planted nursery trees (2-5 inch dbh) is not recommended. However, if local ash trees cannot be used, nursery stock may be substituted as trap trees. For recommendations on how to use nursery trees, contact the Forest Service Northeastern Area Field Office serving your area.

**Postings/Signing Trap-trees:** Selected trap-trees should be clearly designated.

- Staple a weather-proof sign on the tree stating that this is an EAB detection tree, and to contact \_\_\_\_\_ for further information.
- Nail aluminum ID tag to base of tree with survey information in the following format: EAB TT #1, X/X/200X (the date should be the day of girdling)

**Tree Girdling:** Use a draw-knife, chainsaw or other tool to make two parallel cuts, about 4-8 inches apart. Each cut should completely encircle the trunk and should cut down to the surface of the wood, through the bark and phloem. Use a drawknife or chisel to remove all of the bark and phloem in the space between the two cuts.

Trees can be girdled in the fall, winter or spring. However, don't wait too late in the spring to girdle trees. If you plan to girdle trees in the spring, try to have the girdling completed before beetle flight commences. In southern Michigan EAB adults begin to emerge between mid-May and early June. Emergence would be earlier in warmer climates. EAB emergence usually

begins around 450 to 500 degree days, base 50°F. Fall girdling can be more difficult than spring girdling because the bark does not separate easily from the wood. You may wish to carry a chisel or hatchet to help remove the bark and phloem.

Note: just wounding the tree, removing bark on one side or half of the tree, etc. does not attract beetles nearly as well as a complete girdle.

**Sticky Bands:** Do not use sticky bands as part of the Forest Service sponsored EAB survey program.

**Dissecting Detection Trees:** At the end of the season (after late September), trap trees should be felled and as much bark removed (peeled) as possible to look for signs of EAB larval tunneling. Cut the tree trunk a few feet above the ground, but do not cut it through. The tree will hinge at the cut leaving the butt end of the trap tree above the ground. Such a knee high hinge will make it easier to debark the tree while you are standing up. An alternative method is to bring sawhorses with you and set portions of the tree on them. Peeling a tree that is lying on the ground can be extremely tedious and hard on your knees.

Take a drawknife and carefully remove the bark to look for larvae or galleries. It is best to peel the phloem in thin sections, to avoid missing small larvae. You will want to carefully peel the phloem all the way down to the wood surface. The more bark area that is peeled, the better the chance of finding EAB larvae that may be in the tree. Take your time to carefully peel as much of a tree as possible. Be sure to focus efforts in the crown and around branch crotches or elsewhere there may be rough bark or fissures.

- If galleries are detected, collect any larvae or other life stages. Properly preserve material and submit it to the appropriate identifier in your state. If life stages are damaged or not found, photograph and preserve the galleries.
- Clearly mark suspect trees and report possible findings as soon as possible.

Printed and electronic images of signs and symptoms of EAB infestation are available  
EAB pest alert - available at: [http://www.na.fs.fed.us/spfo/pubs/pest\\_al/eab/eab.pdf](http://www.na.fs.fed.us/spfo/pubs/pest_al/eab/eab.pdf)  
EAB field guide - available at: <http://www.fs.fed.us/na/morgantown/fhp/eab/eabfg.pdf>

**Maintaining Detection Trees for a Second Year:** It may be beneficial to maintain some detection trees at selected locations for a second year. This should only be done if more than two trees were originally girdled at a specific location. Detection trees selected to maintain for a second year should be those that have live foliage and limited crown dieback in the fall of year one. These trees should be cut and dissected (peeled) beginning in late September of year two. No detection trees should be maintained for a third year.

**Tree Disposal:**

- A tree with a positive EAB find will require special handling. The procedures to follow should be identified in consultation with the State Plant Pest Regulatory Official or SPRO before you implement any EAB surveys. The SPRO will have to process any suspect

samples through their established protocols with USDA APHIS, and dispose of infested materials accordingly.

- If no evidence of EAB infestation is found at the site, the wood can be left on site or used for firewood or another wood product.

**Recommended Equipment for Establishing Trap Trees:**

Data sheets or electronic data logger

Clipboard

Binoculars

GPS unit set to NAD 83, decimal degrees (e.g., 44.9632, 74.5523)

Flagging

Collection vials with alcohol

Forceps

Insect net (optional – may help catch flying beetles)

Chain saw

Draw knife

Hatchet/large knife

**Data Requirements and Survey Reporting for Detection Trees:** Figure 1 is the recommended survey form for detection trees. Each tree must have a GPS coordinate recorded in lat/long in decimal degrees. Record the date of girdling on the top right hand side of the data form.

Data collected should be submitted to the Forest Service EAB database. States will be responsible for entering their own data into this database by December 15 of the year surveys were conducted. The Forest Service database can be accessed at the following web address:

XXXXXXXX FHTET SITE XXXXXXXXX  
“Coming Soon”

## **Destructive Sampling (also referred to as cut and peel)**

**Tree Selection:** Locate dead and declining ash by using visual survey data or by requesting the location of suspect trees from groups such as urban foresters, campground hosts, tree care professionals and the public. Selected trees can be any size but large trees will be more difficult to cut, peel and to dispose of if necessary. Gain permission from the landowner/land manager prior to cutting any trees.

If multiple trees are in close proximity then select 1 or 2 individuals to cut and peel. It is probably better to sample a few individual trees from many different locations than large groups of trees from only a few locations. If possible, select trees based on visible external indicators of EAB. These would include any D-shaped exit holes, epicormic sprouts, and bark splitting. These external symptoms can be viewed in the EAB pest alert and in other EAB identification guides.

All of our native ash (*Fraxinus* spp.) will attract EAB adults. However, if different species are present select by priority: (1) green ash, (2) black ash, (3) white ash, and (4) blue ash.

EAB adults appear to prefer trees that get plenty of sun. Therefore, if you have a choice in tree selection, select:

- Open-grown trees (e.g. along a roadside) – (best, most preferred)
- Hedgerow tree (e.g. 2 sides mostly open)
- Edge tree, trees along the edge of a woodlot, crown open on one side
- Closed canopy tree (least preferred)

**Dissecting Selected Trees:** Cutting and peeling methods can be implemented at any time of the year, however fall, winter and spring are best because EAB life stages will be easier to find than during the summer months. Cut the tree trunk a few feet above the ground, but do not cut it through. The tree will hinge at the cut leaving the butt end of the tree above the ground. Such a knee high hinge will make it easier to debark the tree while you are standing up. An alternative method is to bring sawhorses with you and set portions of the tree on them. Peeling a tree that is lying on the ground can be extremely tedious and hard on your knees.

Take a drawknife and carefully remove the bark to look for larvae or galleries. It is best to peel the phloem in thin sections, to avoid missing small larvae. You will want to carefully peel the phloem all the way down to the wood surface. The more bark area that is peeled, the better the chance of finding EAB larvae that may be in the tree. Take your time to carefully peel as much of a tree as possible. Be sure to focus efforts in the crown and around branch crotches or elsewhere there may be rough bark or fissures.

- If galleries are detected, collect any larvae or other life stages. Properly preserve material and submit it to the appropriate identifier in your state. If life stages are damaged or not found, photograph and preserve the galleries.
- Clearly mark suspect trees and report possible findings as soon as possible.

Printed and electronic images of signs and symptoms of EAB infestation are available  
EAB pest alert - available at: [http://www.na.fs.fed.us/spfo/pubs/pest\\_al/eab/eab.pdf](http://www.na.fs.fed.us/spfo/pubs/pest_al/eab/eab.pdf)  
EAB field guide - available at: <http://www.fs.fed.us/na/morgantown/fhp/eab/eabfg.pdf>

### **Tree Disposal:**

- A tree with a positive EAB find will require special handling. The procedures to follow should be identified in consultation with the State Plant Pest Regulatory Official (SPRO) before you implement any EAB surveys. The SPRO will have to process any suspect samples through their established protocols with USDA APHIS, and dispose of infested materials accordingly..
- If no evidence of EAB infestation is found at the site, the wood can be left on site or used for firewood or another wood product.

### **Recommended Equipment for Non-girdled Detection Tree Surveys:**

Data sheets or electronic data logger  
Clipboard  
Binoculars  
GPS unit set to NAD 83, decimal degrees (e.g., 44.9632, 74.5523)  
Flagging  
Collection vials with alcohol  
Forceps  
Insect net (optional – may help catch flying beetles)  
Chain saw  
Draw knife  
Hatchet/large knife

**Data Requirements and Survey Reporting for Trap-trees:** Figure 1 is the recommended survey form for destructively sampled trees. Note: This is the same form as the detection tree form. Each tree must have a GPS coordinate recorded in lat/long in decimal degrees.

Data collected should be submitted to the Forest Service EAB database. States will be responsible for entering their own data into this database by December 15 of the year surveys were conducted. The Forest Service database can be accessed at the following web address:

XXXXXXXX FHTET SITE XXXXXXXXX  
“Coming Soon”

## **Visual Surveys**

**Tree Selection:** Document ash trees that show symptoms of ash decline and dieback, and ash trees that have died within the last 1-2 years. Decline and dieback symptoms include:

- Epicormic sprouts on the main stem
- Dead or dying branches in the upper crown
- Yellow or off-color foliage during the growing season

The visual survey data form ([Figure 2](#)) provides space for recording ash trees with no signs or symptoms of decline. Recording apparently healthy trees is recommended so that a record of visual survey locations is maintained.

**Surveying and Reporting on Multiple Trees:** For the visual survey, a tree can be reported as an individual or a report can summarize findings from a number of trees surveyed in a general area. However, a maximum of 12 trees should be represented by a single GPS coordinate. As an example, a visual survey of 10 trees in a campground can be recorded as a single GPS coordinate rather than 10 separate coordinate reports.

The following are some examples of where additional GPS coordinates should be taken:

- Any tree that is deemed a possible EAB infested tree
- Rural trees that are greater than one mile from each other
- City trees that are greater than 3-4 blocks from one another
- After 12 trees have been sampled since the previous GPS reading

**Visual Inspections:** Inspections can be done from the ground since attacks do occur from ground level up into the crown of trees. But, tree climbing or bucket trucks may be helpful for close inspection of suspect trees. In some situations, cutting and peeling suspect trees may be appropriate (destructive sampling). Look closely at the bark surface for:

- D-shaped exit holes. These can be easily observed on younger trees with smooth bark but can be more difficult to locate on older trees with rough bark. If present, they will occur on the main stem and branches larger than 1-2 inches in diameter.
- Vertical bark-splits. EAB attacks often leave a characteristic split in the bark that is 2-5 inches long. The wood surface is often visible with serpentine galleries etched on the wood surface.
- Presence of metallic green beetles. If found, collect and preserve them in alcohol.
- Woodpecker activity that has removed patches of bark can be a sign of EAB infestation.

If possible, remove a portion of the bark and look for evidence of:

- Winding serpentine galleries on both the inner bark surface and the outer wood surface.
- Cream-colored larvae. If present, collect and preserve larvae in alcohol. *Agrilus* larvae have a distinct body shape.

Printed and electronic images of signs and symptoms of EAB infestation are available  
EAB pest alert - available at: [http://www.na.fs.fed.us/spfo/pubs/pest\\_al/eab/eab.pdf](http://www.na.fs.fed.us/spfo/pubs/pest_al/eab/eab.pdf)  
EAB field guide - available at: <http://www.fs.fed.us/na/morgantown/fhp/eab/eabfg.pdf>

**Suspect Trees:** If a tree appears to be infested with EAB, or follow-up evaluations are recommended; mark the tree with flagging and document its location to aid follow-up visits. Use maps, sketches and GPS coordinates. Distance and azimuth from a fixed object to a suspect tree may be helpful. Suspect trees may be good candidates for destructive sampling. Submit suspected EAB life stages or signs (galleries, bark with exit holes) to your State Plant Regulatory Official for follow-up and positive identification according to the procedures established with the SPRO prior to implementation of these surveys.

**Recommended Equipment for Visual Surveys:**

- Data sheets or electronic data logger
- Clipboard
- Hatchet/large knife
- Binoculars
- GPS
- Flagging
- Collection vials with alcohol
- Forceps
- Insect net (optional – may help catch flying beetles)
- Detailed road maps, plat books, etc.

**Data Requirements and Survey Reporting for Visual Surveys:** Figure 2 is the recommended survey form for visual surveys. All visual survey sites must have a GPS coordinate recorded in lat/long in decimal degrees. Data collected should be submitted to the Forest Service EAB database. States will be responsible for entering their own data into this database by December 15 of the year surveys were conducted. The Forest Service database can be accessed at the following web address:

XXXXXXXX FHTET SITE XXXXXXXXX  
“Coming Soon”

**Figure 1.** Suggested field data sheet to be used in the detection tree (trap tree) and destructive sampling surveys.

# USDA Forest Service Emerald Ash Borer Detection Tree/Destructive Sampling Data Form (June 2007)

**State:** \_\_\_ **County:** \_\_\_\_\_(where survey site is located) **Date:** \_\_\_\_\_ (Girdling date for detection tree)

**Site Name:** \_\_\_\_\_ (ie. campground name, city street)

**Site Location** (record GPS coordinates for the general site):

**Latitude:** \_\_\_ . \_\_\_\_ Decimal degrees dd.ddddd – NAD83 **Longitude:** - \_\_\_ . \_\_\_\_ Decimal degrees dd.ddddd – NAD83

**Site Ownership:** **P**-Private; **M**-Municipal; **F**-Federal; **S**-State; **C**-County; **O**-Other; **U**-Unknown

**Observer:** \_\_\_\_\_(First name) \_\_\_\_\_(Last name) **Observer organization:** \_\_\_\_\_ (who did the survey? Ex. ODNR)

**Land Use:** **A**-Agricultural; **F**-Forest/woodlot; **RR**-Rural residential; **RC**-Rural commercial; **UR**-Urban residential; **UC**-Urban commercial; **O**-Other

**Site Description:** **FW**-Firewood Dealer; **N**-Nursery; **WP**-Wood/log processing; **L**-Landfill; **RE**-Recreation; **S**-Street Tree; **YT**-Yard Tree; **O**-Other,

| Tree Latitude<br>(decimal degrees<br>dd.ddddd – NAD83) | Tree Longitude<br>(decimal degrees<br>dd.ddddd – NAD83) | Tree # | Potted<br>Tree | DBH<br>(circle one) |      |       |     | Date of<br>Cutting | Date of<br>Peeling | Samples<br>Submitted<br>(Possible EAB) |
|--|---|--------|----------------|---------------------|------|-------|-----|--------------------|--------------------|--|
| <i>Do Not Use UTMs</i>                                 |   |        |                |                     |      |       |     |                    |                    |  |
|  |   |        | Y N            | 1-5                 | 6-10 | 11-15 | >15 |                    |                    | Y N                                    |
|  |   |        | Y N            | 1-5                 | 6-10 | 11-15 | >15 |                    |                    | Y N                                    |
|  |   |        | Y N            | 1-5                 | 6-10 | 11-15 | >15 |                    |                    | Y N                                    |
|  |   |        | Y N            | 1-5                 | 6-10 | 11-15 | >15 |                    |                    | Y N                                    |
|  |   |        | Y N            | 1-5                 | 6-10 | 11-15 | >15 |                    |                    | Y N                                    |
|  |   |        | Y N            | 1-5                 | 6-10 | 11-15 | >15 |                    |                    | Y N                                    |
|  |   |        | Y N            | 1-5                 | 6-10 | 11-15 | >15 |                    |                    | Y N                                    |
|  |   |        | Y N            | 1-5                 | 6-10 | 11-15 | >15 |                    |                    | Y N                                    |
|  |   |        | Y N            | 1-5                 | 6-10 | 11-15 | >15 |                    |                    | Y N                                    |

**Comments:** \_\_\_\_\_

**Figure 2.** Suggested field data sheet to be used with visual survey.

# USDA Forest Service Emerald Ash Borer Visual Survey Data Form (June 2007)

**State:** \_\_\_ **County:** \_\_\_\_\_ (where survey site is located) **Date:** \_\_\_\_\_

**Site Name:** \_\_\_\_\_ (ie. campground name, city street)

**Site Location** (record GPS coordinates for the general site):

**Latitude:** \_\_\_ . \_\_\_ \_\_\_ Decimal degrees dd.ddddd – NAD83 **Longitude:** - \_\_\_ . \_\_\_ \_\_\_ Decimal degrees dd.ddddd – NAD83

**Site Ownership:** **P**-Private; **M**-Municipal; **F**-Federal; **S**-State; **C**-County; **O**-Other; **U**-Unknown

**Observer:** \_\_\_\_\_ (First name) \_\_\_\_\_ (Last name) **Observer organization:** \_\_\_\_\_ (who did the survey? Ex. ODNR)

**Land Use:** **A**-Agricultural; **F**-Forest/woodlot; **RR**-Rural residential; **RC**-Rural commercial; **UR**-Urban residential; **UC**-Urban commercial; **O**-Other

**Site Description:** **FW**-Firewood Dealer; **N**-Nursery; **WP**-Wood/log processing; **L**-Landfill; **RE**-Recreation; **S**-Street Tree; **YT**-Yard Tree; **O**-Other,

| Tree   | Ash Species | DBH                | Health (circle one) | EAB Signs (circle all that apply) | Sample submitted  | Follow-up requested | Comments (What is the local ash density? Is firewood used or stored at this location?) |
|--|-------------|--------------------|---------------------|-----------------------------------|---|---------------------|--|
| 1  | WGBOU       | 1-5 6-10 11-15 >15 | H C Y D             | N D S B W E                       | N A L B   | Y N                 |  |
| 2  | WGBOU       | 1-5 6-10 11-15 >15 | H C Y D             | N D S B W E                       | N A L B   | Y N                 |  |
| 3  | WGBOU       | 1-5 6-10 11-15 >15 | H C Y D             | N D S B W E                       | N A L B   | Y N                 |  |
| 4  | WGBOU       | 1-5 6-10 11-15 >15 | H C Y D             | N D S B W E                       | N A L B   | Y N                 |  |
| 5  | WGBOU       | 1-5 6-10 11-15 >15 | H C Y D             | N D S B W E                       | N A L B   | Y N                 |  |
| 6  | WGBOU       | 1-5 6-10 11-15 >15 | H C Y D             | N D S B W E                       | N A L B   | Y N                 |  |
| 7  | WGBOU       | 1-5 6-10 11-15 >15 | H C Y D             | N D S B W E                       | N A L B   | Y N                 |  |
| 8  | WGBOU       | 1-5 6-10 11-15 >15 | H C Y D             | N D S B W E                       | N A L B   | Y N                 |  |
| 9  | WGBOU       | 1-5 6-10 11-15 >15 | H C Y D             | N D S B W E                       | N A L B   | Y N                 |  |
| 10   | WGBOU       | 1-5 6-10 11-15 >15 | H C Y D             | N D S B W E                       | N A L B   | Y N                 |  |
| 11   | WGBOU       | 1-5 6-10 11-15 >15 | H C Y D             | N D S B W E                       | N A L B   | Y N                 |  |
| 12   | WGBOU       | 1-5 6-10 11-15 >15 | H C Y D             | N D S B W E                       | N A L B   | Y N                 |  |
| <b>Ash Species:</b> W-White; G-Green; B-Black; O-Other; U-Undetermined |             |                    |                     |                                   | <b>EAB Signs:</b> N-None; D-D-shaped exit holes; S-Serpentine galleries; B-Bark splits; W-Woodpecker probing; E-Epicormic sprouting |                     |  |
| <b>Health:</b> H-Healthy; C-Crown dieback; Y-Yellow foliage; D-Dead    |             |                    |                     |                                   | <b>Sample Submitted:</b> N-None; A-Adults; L-Larvae, B-Bark or wood   |                     |  |