Volunteer Survey Guidelines: Asian longhorned beetle

Photo credit: Avi Eitam, USDA APHIS

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Table of Contents:

Overview **3**

Chapter 1: Introduction **4**
Locations 4
Organisms 4
Goals 4

Chapter 2: General Guidelines for Use of Volunteers in a Survey Effort **6**
Considerations when developing a volunteer program 6
Considerations for survey design 6

Chapter 3: Recruitment and Retention **8**
Tips for recruiting volunteers 8
Tips for generating useful data and volunteer retention 8
Suggested target groups for recruiting volunteers 9

Chapter 4: Training **11**
Surveyor experience 11
Training levels 11
Considerations for training 12
Introduction to training 13
Logistics and overview 13
ALB-specific training 14
Local conditions and working in the field 15
Notes 15

Chapter 5: Survey Design & Sampling Methodology **17**
Site selection 17
Tree selection within a site 18
Timing of the survey 18
Required equipment 18
Conducting the survey 19

Chapter 6: Reporting **20**
Data entry and reporting for Volunteer ALB survey – Summary 20
Data reporting 21

Appendices: **22**
Appendix A: Confidentiality agreement 23
Appendix B: Field checklist 24
Appendix C: Survey contact information / emergency form 25
Appendix D: Survey data form postcard-style 26
Appendix E: Survey data form (fillable on-line or printable) 1 28
Appendix F: Survey data form (fillable on-line or printable) 2 30
Appendix G: NAPIS Data Standards—ALB high risk detection survey 32
Appendix H: Certificate of training completion 35
Appendix I: ALB damage 36
Appendix J: Host trees for ALB 37

Overview

Utilization of volunteers in survey efforts has become increasingly popular in recent years. Multiple factors play into this: educators seek novel ways to involve science students with research projects; technology allows volunteers greater access to research projects and researchers than ever before; and state, federal, and university budget reductions have dramatically impacted the availability of salary dollars for field assistants. University researchers, like John Losey and the Lost Ladybug Project (2012), have demonstrated success with use of volunteers in survey efforts (*American Entomologist* 58:1 pg 22-24). Similarly, many initial infestations of invasive forest insects have been detected and reported by local residents rather than through formal survey efforts. Responsible use of volunteers in surveys is currently considered an attractive strategy for leveraging limited resources.

The January 2012 National CAPS Committee meeting involved discussions of the use of volunteers and how to incorporate volunteer surveys into the CAPS program. Following this meeting, a working group was formed to discuss the use of volunteers in CAPS surveys. The working group's objective was to develop methodologies that will be general enough to be applicable to various groups of volunteers and various local circumstances, but with enough detail that there will be consistency among surveys, will motivate volunteers, and result in the ability to report negative data. The working group decided to focus initial efforts on designing a survey to detect a specific pest in order to focus the discussion specifically on the incorporation of volunteers into survey efforts. The resulting survey, designed using Asian longhorned beetle as a target is meant to serve as a template for the development of any pest survey using volunteers.

Chapter 1: Introduction

Early detection of Asian longhorned beetle (ALB) is critical to reducing the real costs associated with eradication of this introduced species, a destructive pest of U.S. hardwoods. ALB is principally detected through visual survey making it an ideal candidate for detection by volunteer survey groups. Additionally, reduced funding for surveyors and field staff at a state and national level necessitates novel approaches to survey efforts. Enlisting help from volunteers in the potentially impacted community is a strategy that has been in recent favor as indicated by the proliferation of programs targeting forest pest outreach to various volunteer organizations. The goal of these guidelines is to provide a framework for acceptable use of volunteers in a CAPS-approved ALB detection survey.

Positive outcomes from the use of volunteers in survey efforts can include increasing the breadth of an ALB detection program both through the use of volunteers in an organized survey and through retention of knowledge gained in training of volunteers outside of an organized survey effort. However, use of volunteers is not without costs. Recruitment, training and organizational efforts associated with this type of survey can be significant and should be considered in plans to incorporate volunteer surveys into detection efforts.

It is recognized that volunteer groups conducting surveys will vary in their abilities, for instance a volunteer group of arborists is likely to have different skills coming into training than an after-school science club. Likewise, survey conditions may vary by season, time of day, weather, and geographic region. In order to maximize participation of a variety of volunteer groups, these guidelines will provide information on how to recruit targeted groups of volunteers, as well as the minimum survey, training and reporting requirements associated with the CAPS-approved volunteer ALB detection survey. Actual training and survey efforts may exceed these minimum requirements dependent on volunteer survey group and survey conditions.

Location of Surveys: Maples and other preferred ALB hosts occur across the contiguous United States, and the scope of this survey is national. Proposed work plans for the CAPS program should be directed through appropriate State Plant Health Directors and Regional Offices.

Organisms to be Surveyed: This survey deals exclusively with detection of Asian longhorned beetle, *Anoplophora glabripennis*, through visual survey. As a visual survey, 1-2 visits to a site by volunteers and the volunteer coordinator should be sufficient. If a suspect tree is reported as potentially infested, follow-up visits by regulatory personnel are mandated.

Goals for the Survey: The primary goal is to survey potential sites, high-risk or otherwise, for the presence of ALB. Past experience with ALB and ALB surveys indicate that *if* ALB is present in an area, it should be detectable by a targeted visual survey. Although this survey cannot state with statistical certainty that ALB is not in an area, it can: 1) state that ALB has not been found in an area; 2) assist in re-designating a site as low-risk rather than high-risk; and 3) provide volunteers with the tools to detect and appropriately report ALB outside of an organized survey effort.

Box 1.1: A note on statistical power:

Because this survey is designed with volunteers in mind, it is beyond the scope to require statistical power. There may be a possibility of making a Type II error, and inferring that a site is free of ALB when the insect is actually present, because too few units have been sampled. If ALB is not detected at a site, that does not indicate that the site is free of ALB, simply that either the volunteers missed the signs or that the site does not have ALB populations at the level detectable through this visual survey.

Another goal of these guidelines is to provide the framework by which volunteer groups can meaningfully participate in survey efforts. By following these guidelines, the results of these efforts should be reportable to NAPIS or any other CAPS-supported national database. The efforts of the volunteer groups can then be combined with efforts from other entities to provide a larger regional vision of ALB detection.

Fig. 1.1: Example of maple tree riddled with ALB exit holes. *Photo credit:Avi Eitam, USDA APHIS*

Chapter 2: General Guidelines for Use of Volunteers in a Survey Effort

These guidelines are an attempt to provide State Survey Coordinators, Pest Survey Specialists, and State Plant Health Directors with general guidance for initiating volunteer survey programs at the local level. This is not intended to be a manual to fit all situations. Decisions should be made at the local level concerning the selection of survey target pests, how and when to implement a volunteer program, and which volunteer groups or individuals to collaborate with.

In order to be effective, this type of work, often termed “Citizen Science,” should be part of a well-designed outreach program that encourages involvement of non-traditional stakeholders in the early detection and reporting of exotic plant pests, pathogens and weeds. A critical element to consider, when drafting a plan that uses volunteers, is how the volunteers will be utilized. Volunteers are unpaid and are donating their time to assist with a project. Allowing volunteers considerable flexibility in the scheduling of survey activities within the framework of the CAPS Program will provide them with a feeling of pride of ownership of the project, provide motivation, and increase the effectiveness of the CAPS Program. It is important for volunteers to understand that negative survey data can be just as important to the program as positive data.

Considerations when developing a volunteer program:

- Do you want to use volunteers to expand the range of an existing CAPS survey, or to cover species not already covered by staff survey efforts?

- Which surveys are most likely to attract participants? Consider your volunteer base. Visual surveys are often ideal for less experienced volunteers, because they do not involve checking traps, dealing with dead insects, etc. But some volunteers (retired scientists or educators, for example) may actually be more interested in a formal trapping survey.

- Make the health and safety of volunteers a top priority. Avoid surveys that involve working with chemicals (such as insect kill strips) unless you are certain the volunteers are trained/licensed.

- Are there opportunities to turn training events into “Train-the-Trainer” events? Can you provide motivated volunteers with the tools (handouts, specimens, PowerPoint, etc.) to train others to assist with surveys?

Considerations for survey design:

- What time constraints do you have? (survey season, weather issues, patience and focus of volunteers, etc.)

- Does the terrain match the volunteer crew? Make sure teams are “field worthy” before sending them into rough terrain.

- Identify “keystone” volunteers early on, and use them as team leaders or to mentor newer or less experienced volunteers.

- Consider property rights when designing a survey. If the survey includes private lands, work closely with landowners so that permissions are clear and they know what to expect. Make sure

volunteers understand your rules regarding property boundaries, and avoid sending them into situations where they might be accused of trespassing.

- Prepare a materials list. What materials will you need to provide for volunteers, and what materials can they bring themselves? Please see the list in Chapter 5.

- Prepare a data form in advance so that you get exactly the information you need from your volunteers (see sample form in Chapter 6: Reporting). Plan out how and when to get this data from the volunteers and make sure that is made clear to all participants.

- Make sure all volunteers understand exactly what to do if they see something suspicious (how to mark the location, who to contact, how soon to contact, and what process is in place to follow up). Also, make sure your program follows up with any volunteer who reports a potential pest find, to let him/her know the conclusion. This not only allows them to fine tune their screening skills, but gives them the satisfaction of seeing the process to its completion.

- Volunteers can get distracted, bored, or discouraged. To minimize this, keep survey scope small and keep survey times short. Break surveys into small pieces (by land, or by number of trees). If you get an eager volunteer, you can always assign him/her additional work after each piece is completed.

- In reality, few volunteers will ever have a true “positive” pest find. They might get discouraged because of this. Consider games to keep them alert when surveying (one program in New England paints small black rocks with white spots and hides them in the survey area).

Chapter 3: Recruitment and Retention

Tips for recruiting volunteers

- Use existing resources to come up with a list of groups or individuals who might want to get involved (use past outreach events, search your emails for contacts, or come up with a list using the examples at the end of this document).

- Use internet search to find lists of environmental and green industry associations in your state. See if one of these organizations keeps a general calendar of environmentally-themed events, you can often use this to find when groups have annual meetings, symposia, etc.

- Tap into any of the following internet resources:

    - ◊ Email lists

    - ◊ Social media (Twitter/Facebook/blog)

    - ◊ Newsletters, email blasts, or websites of relevant organizations (environmental groups, tree wardens, etc.). Often these groups are happy to post these messages for you.

    - ◊ Register events at http://www.volunteer.gov, http://www.activategood.org/about.php, or http://www.volunteermatch.org/nonprofits/

- Write a press release for the local newspaper, radio shows, etc.

- Send direct postcards or letters to potential volunteers (individuals or groups).

- Attend monthly/annual meetings of target groups to make brief presentations

- Table at relevant events to recruit participants (use a sign-up sheet)

- Encourage participation by offering Continuing Education Credits (CEUs) for master gardeners, arborists, foresters, educators, etc. You may be able to tap into groups of highly-trained participants this way.

- Work with a non-profit organization to apply for funding (Farm Bill, CAPS, or some other grant program) to drive a volunteer effort.

Tips for generating useful data and volunteer retention

- Make sure all volunteers understand the mission of the CAPS program and of the specific survey effort they are involved in, and the importance of what they are doing. Think about targeting this message to the types of volunteers (ecological messages for environmental groups, value of trees for a neighborhood group, etc.).

- Volunteer coordinators recommend checking in with volunteers at least every two weeks during the “active” season (add a buffer of a few weeks before and after the survey season). Consider starting an email list, Google Group, Facebook page, etc. to keep in contact with your volunteers

and, perhaps more importantly, to keep them in contact with each other.

- If you have identified “keystone” volunteers to act as team leads/mentors, you may wish to check in with them separately and more frequently.

- Expect to have to chase some volunteers for their data, or take it in unexpected formats (in pencil and paper instead of through a web form, for example).

- Use evaluations at the end of the survey season to gauge how your volunteers felt the project went, to get ideas for improving the survey next year, and to give the volunteers a chance to discuss frustration with the effort. If funds/protocol allows, consider an in-person wrap-up/sunset meeting with refreshments.

- If budget allows, provide volunteers with branded incentive items (t-shirt, bag, hat, etc). This is good for teambuilding, and the branded items advertise your project for you. Some projects have found success at offering these items as an incentive following completion of certain survey tasks (data for X number of trees submitted, for example).

- One of the biggest values you can offer volunteers is the understanding that they contributed to something important and meaningful. Be sure to provide at least a summary of survey results with your volunteers at the end of the season. Use maps, tables and graphs to demonstrate areas covered and number of trees surveyed (take care to maintain confidentiality where needed).

Suggested target groups for recruiting volunteers

Green Industry Groups

- Master Gardeners (typically already organized into regional or statewide groups)

- Local Garden Clubs (some states may also have a statewide Federation of Garden Clubs you can reach out to)

- State associations for arborists, tree wardens, horticulturists, etc.

- Your state’s Nursery and Landscape Association

- Your state’s Horticultural Society

- Agricultural Groups (Farm Bureau, partnerships between Farms and Schools, etc.)

- Society of Municipal Arborists

- Society of American Foresters

- International Society of Arboriculture (local chapters)

- Tree Care Industry Association

- Izaak Walton League of America

- National Alliance of Independent Crop Consultants (membership lists includes retirees)

Youth-Oriented Groups

- Girl Scouts and Boy Scouts (Some CAPS projects have had success encouraging regional scout groups to develop a patch around a survey effort!)
- 4-H Clubs
- Future Farmers of America
- Student Conservation Association
- Environmental Clubs at colleges, high schools, etc.
- Environmental Educator Groups/Teacher trainings
- Homeschooler groups
- High schools and colleges to recruit active students who may be in need of service hours to graduate.

Environmental Organizations

- Local/regional chapter of The Nature Conservancy
- Tree-planting organizations (regional and local)
- Local land trust groups
- “Friends” groups in the area you are targeting (similar to neighborhood associations but typically with an environmental mission focused on a specific parcel of land or body of water)
- University Extension (possibly for recruitment assistance)

Others

- Neighborhood Associations (their mission is not necessarily environmental but they have a strong stake of ownership for a very specific area)
- Retirement communities (some states have had great success working with these volunteers)

Chapter 4: Training

The success of a detection survey is strengthened by: 1) effective training of the crew, and 2) through field experience. All surveyors are required to:

- Recognize the correct tree species that ALB would attack. ALB host trees are listed in Appendix J.
- Identify the type of damage that ALB produces on a tree, such as emergence holes, oviposition scars, and sawdust. See survey protocols in Chapter 5
- Report data and report damage to the project leaders (Appendices D-F)
- Familiarize themselves with the overall survey goals, and the plan for their geographic area.

A training program will be offered by Project Leaders, where participants can learn about ALB, the goals of the detection survey, and sampling methods for the project. Surveyors will also have training in the field, to test and apply the methods before beginning actual survey. If a new surveyor is untrained and inexperienced, they should have training prior to starting survey activities. If this is not possible, they should accompany an experienced surveyor until they can get the training they need.

Surveyor experience

Another method of ensuring quality data is to standardize the measurements, which in this case is the data-taker (i.e., the surveyor). Standardized data is data collected the same way, using the same methods and protocols. Scientific observations can also be affected by differences in individual personalities, or even from day-to-day moods. This is part of being human and living in a diverse community, and it's OK. But, when we do scientific observations, the protocols must attempt to minimize these variables, whether the study is in the laboratory with chemicals, or in the forest with binoculars.

For the ALB Urban Survey Team (ALBUST) unbalanced observations can affect how data is collected from one site to another. It may also give false results from a survey, giving a false report on a certain area, where the beetle may have invaded. Data quality is standardized by designing valid survey protocols, and by holding to those protocols. Your training and field experience in ALB survey will help you to make strong observations, to record those observations accurately, and to report on the world around you. The more experienced observer eventually becomes an expert, and a leader in training others. The ALBUST training will provide you:

- The ability to recognize life stages, and diagnostic damage from the pest. (lab training, field training, testing)
- The ability to implement the survey protocols
- Follow maps and direction to assigned survey sites field study, (lab training, field training, testing)
- The minimum baseline level of experience to be able to report on the absence of ALB at a survey site.

Training Levels

Can be used to help identify individual experience and efficiency, which would be used to decide when to include someone's survey activities as part of the approved data for CAPS survey. The following list formalizes and quantifies the concept of training levels and also incorporates the baseline minimum training needed to be able to contribute negative data to a program.

LEVEL 1: No Survey experience; no Survey training (cannot contribute data solo)
LEVEL 2: Trained, not Tested (cannot contribute data)
LEVEL 3: Trained, Tested (data accepted)
LEVEL 4: Trained, Tested and Field experience (data accepted, crew leader)
LEVEL 5: Trained, Tested and 10+ hrs Field Experience (data accepted, can be mentor/trainer)
LEVEL 6: Trained, Tested and 50+ hrs Field Experience (data accepted, can be mentor/trainer, guru)"

Considerations for training

- Make sure volunteers understand basic rules of field work (sunscreen, water, proper footwear, stinging/biting insects, poison ivy/sumac, etc.).

- Remind volunteers to respect the property they are surveying and to be smart and safe (don't leave trash behind, do not destroy vegetation or climb trees without explicit permission).

- Decide how and when to train your volunteers. This is going to depend on many factors, including number of participants, budget and time considerations, experience level of the volunteers, and what you are planning to survey for.

- Consider one or more of the following (some volunteers will want more than one of these, even if it is not mandatory. Encourage those volunteers to attend "refreshers" whenever they feel it is needed):

    - ◊ In-person training sessions (classroom or field training)

    - ◊ Online training (webinars)

    - ◊ Written documentation

- Use adult learning principles when designing the training

- Points to consider when using power point to train volunteers.

- Do not "read" slides to audience, talk to audience and use slides to emphasize and illustrate points.

- Credit all photos used in PowerPoint presentation.

- We can have a "sandbox" of PowerPoint slides that people have used and are willing to share.

- Adapt the training to your audience. Environmental groups will want to hear about protecting healthy ecosystems. Parks and rec employees will want to hear about pests that will affect their jobs. Teacher groups will want to hear about projects to involve their students and materials they can share with their students. Master gardeners will want to hear about how invasive species

affect home gardens.

- It is useful to hold the training in a location that has outdoor host trees. After presenting material indoors, go outdoors and demonstrate signs of tree stress, go over host identification, demonstrate how to survey a tree and record data.

- The length of the training designed for volunteers is critical.

- If possible, arrange with your state department of agriculture to grant CEU pesticide certification credits for your training.

- Ask your master gardener coordinators if you can present the training power point to new master gardeners at their new volunteer training workshops.

Introduction to training:

Training should take place both as classroom-type exercises and in the field. Although traditional classroom training, with an instructor available to ensure completion of all parts of the training and to answer questions is preferable, there may be circumstances that do not allow for this. When supervised training is not available, training may be self-paced and either delivered as a series of on-line trainings (not yet developed) or through written documentation, delivered in part through these guidelines. With self-paced training, written examination of the volunteer is warranted to ensure that they have gone through the provided manuals. Training will be broken into multiple sections: logistics and overview, ALB-specific training, and local conditions and working in the field.

Logistics and Overview:

- The information made available in the logistics and overview section should be general background, applicable to any current or future volunteer survey program, as well as to any region of the country. What is the CAPS program?

- What is the value of negative data and how will this data be used?

- Volunteer role (surveying a site based on approved methods and report the results of the survey to the survey coordinator).

- Volunteer responsibilities (maintain confidentiality of survey results; careful survey of site; data recording that allows regulatory personnel to find and re-examine the same surveyed trees if warranted; provide materials needed for safety in the field and other equipment as required by the volunteer coordinator; ensure personal safety including obtaining permission from the appropriate entity for permission to survey an area; being respectful of property during the survey (no climbing of trees, appropriate disposal of trash generated by surveyor, etc.); timely reporting of results; submission of all data sheets, photographs, and collected specimens to the volunteer survey coordinator).

- The regulatory structure and process for follow-up of potential finds (initial survey, report to survey coordinator, potential follow-up by authorized regulatory personnel, submission to and verification of samples by an official identifier, detection, delimitation survey and control plan announcements by APHIS).

- Information on the volunteer contacts for survey (volunteer survey coordinator, SSC, PSS,

SPHD, local emergency room address) and how and when they should be contacted.

- Submission of data (when, where, and how)

ALB-specific training:

The training in this section should give the volunteer confidence in recognizing damage associated with ALB, distinguishing ALB adults from native Cerambycids, ALB life-cycle, and how to conduct and report the survey.

ALB, a history of an invasion:

◊ How does it get to the US?
◊ How can it spread from an initial invasion point?
◊ Where is it currently found in the US?
◊ What is its regulatory status?
◊ What happens when ALB is detected?
◊ What is the value of early detection?

ALB, the basics:

◊ Taxonomy—a beetle in the family Cerambycidae (long-horned beetles or round-headed woodborers) native to East Asia
◊ Development—life stages, and approx. timing of stages based on local climatic conditions, both photographs and samples should be made available. There should be some mention that as with people, there can be variability in size and coloration.
◊ Ecology—what does it eat, where can it be found, how quickly does it reproduce, how quickly does it spread

ALB, the damage:

◊ Damage caused by adults— includes exit holes, oviposition niches, and leaf and petiole feeding. Although damage caused by adults is the most visible evidence of an infestation, adults are not causing the damage that threatens the health of the trees
◊ Damage caused by larvae—feeding galleries/tunnels throughout the tree trunks and limbs. This damage is hidden from sight until structural integrity is so weakened that the tree begins shedding limbs. Although this damage is mostly invisible to external examination, the larval stage is the one which causes the damage that threatens the health of the tree
◊ Signs and symptoms of an ALB infestation (include photographs and hands-on examples of damage):
    ∗Shed limbs—can be used to select a tree for survey
    ∗Early leaf drop—can be used to select a tree for survey
    ∗Exit holes, a reportable sign in the survey, (characterize for shape and size, location and distribution on the tree, as fresh and aged exit holes)
    ∗Egg niches, a reportable sign in the survey when multiple niches are present, (characterize for shape and size, location and distribution on the tree, as fresh and aged niches)
    ∗Frass—can be used to select a tree for survey, or should cause further examination of a tree when present (discussion of what frass is, where it might be found, and the difficulties of using frass as a distinguishing characteristic of ALB infestation)

ALB, the look-alikes—here there should be some discussion about the distribution and prevalence of the Cerambycid family, potential local ALB look-alikes, and the key characters to look for to distinguish these from ALB

Bring samples to pass around to volunteers: ALB specimens, and specimens of look-alikes, (Monochamus and Rosalia for example), pieces of wood with galleries, oviposition divots and exit holes. Pieces of wood pallets showing IPPC stamps. Pieces wood pallets with galleries and beetle damage. (It would be good to include in this document sources of where to find this type of material, is it available from OTIS?) ALB printed material, pest alerts and brochures.

Local conditions and working in the field

This section should include information on how to conduct the survey (specifics in Chapter 5), report on the survey (specifics in Chapter 6) as well as local precautions (dangerous areas, stinging/biting pests, exposure risks, and how to contact emergency personnel). This section should include a pre-survey visit to a field site to "practice" surveying, looking for signs, etc. If possible, "dummy" signs should be hidden at the preliminary survey site so that volunteers can have positive feedback on their survey techniques. Volunteers should be provided with data sheets, a confidentiality agreement to sign, a training completion certificate (or written exam if classroom training was self-directed), a contact list to complete prior to survey and to take into the field, and a checklist of equipment/supplies needed for survey.

<u>NOTES</u>

Survey Types
Preferred host
Classroom led and practical field exercises/demonstrations
Data collection – what data is required? Training should facilitate data standardization i.e. collection method / procedure
Length of the training – (consideration)
ALB
Origin
History
Distribution (globally and within the USA)
Biology
Life cycle
Size, color shape
Signs and symptoms of an infestation

We use a power point presentation, maybe we could have a "sandbox" of powerpoint slides that people have used and are willing to share. Points to consider when using power point to train volunteers:
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Credit all photos used in pp presentation.

Bring samples to pass around to volunteers: ALB specimens, and specimens of look-alikes, (Monochamus and Rosalia for example), pieces of wood with galleries, oviposition divots and exit holes. Pieces of wood pallets showing IPPC stamps. Pieces wood pallets with galleries and beetle

damage. (It would be good to include in this document sources of where to find this type of material, is it available from OTIS?) ALB printed material, pest alerts and brochures.

Adapt the training to your audience. Environmental groups will want to hear about protecting healthy ecosystems. Parks and rec employees will want to hear about pests that will affect their jobs. Teacher groups will want to hear about projects to involve their students and materials they can share with their students. Master gardeners will want to hear about how invasive species affect home gardens.

It is useful to hold the training in a location that has outdoor host trees. After presenting material in-doors, go outdoors and demonstrate signs of tree stress, go over host identification, demonstrate how to survey a tree and record data.

Arrange with your state department of agriculture to grant CEU pesticide certification credits for your training.

Ask your master gardener coordinators if you can present the training power point to new master gardeners at their new volunteer training workshops.

Chapter 5: Survey Design & Sampling Methodology:

Volunteer groups interested in participating in the Volunteer ALB survey will need to coordinate their activities through their State Plant Health Director's (SPHD) office. Volunteer survey coordinators are responsible for the following:

- The completion of all approved training outlined in these guidelines, including completion of confidentiality training and signing a confidentiality contract.
- The reporting of results from their survey within the timelines established by their SPHD's office.
- The verification that all surveyors have received information on confidentiality of the survey and that active surveyors have received training equivalent to that undergone by the survey coordinator.

Once a volunteer group has completed the requisite training, members are qualified to begin survey efforts. The remainder of this section will outline the minimum elements required in a volunteer ALB visual survey.

Site selection:

The site is the geographic location where the survey will occur. A site is defined as a contiguous area in which at least 10 trees are surveyed. A volunteer group may commit to surveying multiple sites within an area in order to more intensively survey a larger area. The individual trees surveyed within a site are the sample units. Although the site area is not itself defined by the guidelines, the size of the survey site should be recorded, so that there is information on how intensively an area was surveyed. In other words, by the guidelines, the site is simply a contiguous area in which 10 trees are sampled, but the surveyor should provide in square meters, the size of the actual survey site.

ALB is typically introduced through two main pathways: (1) importation on foreign solid wood packing material and other wood products; and (2) movement of firewood or wood debris from an existing domestic infestation to another location. Survey sites should be selected according to the most likely pathways in your state.

For new introductions, sites may include transit sites (ports, rail and container yards), destination sites (importers, wholesalers and retailers of wood products and products requiring solid wood packing material such as pallets and crates), and wood disposal sites (pallet recyclers, wood waste facilities, landfills). Transit sites would be high risk only if cargo is removed from containers at those locations. For secondary infestations, sites may include sawmills, lumber yards, re-load yards, pulp mills and cogeneration plants, and destinations where firewood is moved, such as campgrounds and racetracks.

Surveys need not be conducted at the site of introduction. Rather, it is often useful to survey locations with high frequencies of host trees that are in close proximity to suspect introduction sites. These may include public parks, cemeteries, golf courses, urban, state and national forests, and private property.

Detailed information about the type of site and any adjacent high risk sites should be recorded and reported. Volunteer groups are responsible for ensuring that they have received permission to survey an area from the appropriate property manager/owner; state and federal authorities do not extend to private volunteer groups.

Tree selection within a site:

Although ALB attack many types of hardwood trees, survey efforts should be restricted to maple trees (genus *Acer*). *Acer* is a highly preferred host for ALB, and when ALB is present, it will be present in the surrounding maples (including box elder). Additionally, restricting the survey to *Acer* species reduces the required training and simplifies the types of damage requiring report, as detection of damage can vary between genera. If *Acer* is not a prevalent or economically significant ALB host within the geographic area, then one of the following genera may be selected: *Betula, Aesculus, Ulmus,* or *Salix*. This selection of an alternate host genus from the standard *Acer* should be reported.

Within a site, 10 likely candidate trees should be selected for further survey. Factors to consider when selecting trees are: 1) if major scaffolding branches have fallen from the tree; 2) early leaf senescence; 3) crown die-back. Trees selected for examination at each site should be indicated in case of follow-up. Ideally, GPS coordinates will be recorded for each tree. If that is not possible, the surveyor should tag the tree and provide a written description of the tree location. Regardless of the method for identifying the tree, the approximate location of the tree should be marked on a map of the survey site.

Fig. 5.1: Example of a candidate maple in decline. This tree should be selected for survey over one without crown die-back. *Photo credit: Avi Eitam, USDA APHIS*

Timing of the survey:

ALB damage will be more visible when foliage is absent. Exit holes and egg niches will be more visible against surrounding bark when they are fresh. Volunteers should be encouraged to, but not limited to, conduct spring and fall surveys when limbs are not obscured by foliage. If surveys are conducted when foliage is present, per tree observation time should exceed the 2 min minimum. The principle factor for determining the timing of the survey, however, should be the time at which participation by volunteer groups is likely to be highest. The dates at which the survey was conducted should be reported. In order to facilitate detection of exit holes and egg niches, surveys should not be conducted on rainy days, cloudy days, and when foliage and trunks are wet. Light levels are best for detecting the contrast between the bark and damage at noon.

Required equipment:

1) Binoculars
2) Clipboard with data sheets
3) Pen or pencils for data recording
4) GPS or GPS-enabled device, and/or flagging, tags, markers, compass, etc. to map and mark surveyed trees
5) Digital camera to document damage
6) Collection jar
7) Map of the survey site
8) Examples of damage likely to be seen

Conducting the survey:

1) Each tree examined in the survey should be marked on the survey map, and either the GPS co-ordinates for the tree or a verbal description of the location of the tree should be recorded.
2) Trees should be surveyed using binoculars.
3) Surveyors should spend a minimum of 2 min at each tree in order to assay the tree for signs of ALB. Larger trees, trees with foliage, and trees with evidence of frass will need to be examined longer than the 2 min minimum.
4) Each tree should be examined for evidence of multiple egg niches and exit holes. A single egg niche may be difficult to distinguish from other mechanical bark damage, but the presence of multiple egg niches is highly indicative of an ALB infestation (examples of egg niches and exit holes are available in the training section).
5) Frass by itself is not indicative of ALB infestation, but if frass is seen extruding from exit holes or collecting at the base of the tree its presence should be recorded on the data sheet, and examination of the tree beyond the 2 minute minimum is warranted, to verify absence or presence of exit holes and egg niches (information on the identification of frass is available in the training section).
6) Trees should be examined from crown to base from at least three aspects/sides of the tree.
7) Survey time should be principally spent carefully examining upper portions of the trunk and undersides of limbs and branches for exit holes and egg niches.
8) If insects suspected to be adult ALB are found, they should be collected and submitted as per the reporting protocol in Chapter 6.
9) If there is suspicion of larvae present in a tree, the tree needs to be marked and reported as per the reporting protocol in Chapter 6; larvae should not be collected as part of this survey.
10) Damage should be documented with a digital camera, so that initial follow-up may be conducted without a site visit. If digital photography does not rule out ALB infestation, follow-up by regulatory personnel is warranted.

Chapter 6: Reporting

Data entry and reporting for Volunteer ALB survey – Summary

1) *Data collection: How the data is collected.*

Survey records and especially data recording formats should be standardized within the volunteer program. On a national level, a standardized data collection form would improve harmonization in reporting on survey results. Whether data is collected on a paper form, or an online form, the same minimum data elements and measures should be included. The survey form should include the following elements:

- Date of survey
- Site name
- Location of survey, street address, or GPS coordinates, plot name
- Number and type of host trees surveyed
- Type of survey (visual)
- Number of suspect damage (positive) trees
- Description of damage (hole/scar, orientation on tree, number observed on each tree)

Data can be collected and requested in various formats. Several ALB surveys have developed field survey forms. In addition, online reporting forms have been publicized (http://beetlebusters.info/). When developing a survey program, it is important to consider the benefits and challenges associated with different data collection approaches. Some possible data collection options include:

- Fillable form/emailed "In WA we use a fillable word format… e-mail a document that includes a cover letter, host list, survey instructions and data form. Volunteers are told to fill out the data form and e-mail it back. In the past we have also used a postcard with paid postage on it. The electronic form seems to be preferred and works better. …Each field on the data form is a field in a spreadsheet and the data is compiled. We have mapped the survey records. So far the number of survey records and dots on the map is very small, if we can manage to increase our volunteer participation and get a more meaningful map we plan to map the points and post the map on a website (Cascade Conservancy) so volunteers can see their results. We plan to analyze the map for clusters of symptomatic trees, especially near warehouses or other risk sites and those will be shared with WSDA to be included in their woodboring beetle survey or followed up for more visual surveys. We have not yet considered this as a way to report negative survey data for Washington" Yolanda Inguanzo PSS Washington, Alaska. Examples are in Appendices E and F.

  Benefits: cheap and easy to distribute once you have the email addresses as email is cheap for public to return data forms

  *Challenges:*1) difficult to ensure data, 2) rate of return = ?, 3) Cost per unit = ?

- Hard copy form (paper and pencil) - Several types of field survey forms have been developed for ALB survey. See Appendices D-F for examples.

  Benefits: 1) Easy to use pencil/paper; 2) familiar; 3) cheap

  Challenges: 1) Data clarity; 2) takes time entering data after survey

- Smartphone/online form:

  Benefits: 1) Attractive for the tech savvy; 2) instant real-time data; 3) easy to manage data; 4) instant gratification for surveyors

  Challenges: 1) Unattractive for the tech averse; 2) may require additional training; 3) expensive to buy units, maintain data plan; 4) not everyone has one; 5) possible time programming system

Data reporting:

Volunteer programs must decide what type of data reporting will be accomplished. For detection surveys (a.k.a. the reporting of absence or presence), the CAPS program has managed data requirements through NAPIS, ISIS and more recently iPHIS. The NAPIS database still maintains data entry worksheets to define specific data entry requirements for reporting summarized results from surveys (see Appendix G).

Things for the CAPS committee to consider:

1. The terminology for damage should mesh between the data collection form, the methods and the training sections. (Oviposition site vs. egg niche vs. scar)

2. Minimum data requirements for ALB High-risk detection survey still use the old NAPIS data standards (Appendices pg.). The last version was updated in 1999, and is still the acceptable version posted on the CAPS Website (http://caps.ceris.purdue.edu/node/25). These data standards are different than those listed under the ALB national program website (High-Risk Detection Survey). Is it still acceptable to collect and report negative data using the 1999 NAPIS data standards? Consult with John Bowers, Josie Ryan?
3. Data can be collected and requested in various formats. Should we only address one format for the guidelines (i.e., paper and pencil). If we begin considering online, smartphones, ipads etc., this section could get bulky.

4. For the NAPIS code, is it important to have a different code to differentiate the data (collected by volunteers) from that collected by CAPS surveyors? The methodology could be the same, but we would just have a different number so that we could analyze the data separately if we ever needed to.

Appendices

Appendix A: Confidentiality Agreement

Confidentiality agreements must be in place with any individuals that volunteer to assist in program activities that require the collection of any data/information that may be sensitive or confidential. APHIS, Agreements Service Center has a Confidentiality (Non-Disclosure) Agreement template that can be adapted for use with volunteers.

The confidentiality agreement must include the following statements/requirements:

- some or all of the information collected and compiled should be considered sensitive information;
- information should not be shared or given to anyone except their contact in the program; and
- requests for information must be reported to the PPQ program contact for guidance and determination.

Note: There is no need to site to specific laws; however volunteers must be advised that there are multiple laws governing the use or disclosure of such information, and that they may be held personally liable if they improperly use or disclose information.

Appendix B: Field Checklist

- [ ] Completed Survey contact information / emergency form
- [ ] Binoculars
- [ ] Data sheets
- [ ] Clipboard
- [ ] Pen and/or pencil
- [ ] GPS or GPS-enabled device, and/or flagging, tags, markers, compass
- [ ] Digital camera
- [ ] Collection jar (no plastic bags!)
- [ ] Map of the survey site
- [ ] Examples and/or photographs of damage
- [ ] Sunscreen
- [ ] Water
- [ ] Snack
- [ ] Hat and field appropriate clothes

Appendix C: Survey Contact Information / Emergency Form

Volunteer information:

Volunteer name: _____ Telephone: _____

Emergency contact: _____ Telephone: _____

Relationship: _____

Information of importance to emergency responders:

Site information (to be filled out ahead of time):

Nearest intersection:

Location information:

Survey organization information:

Volunteer survey coordinator: _____

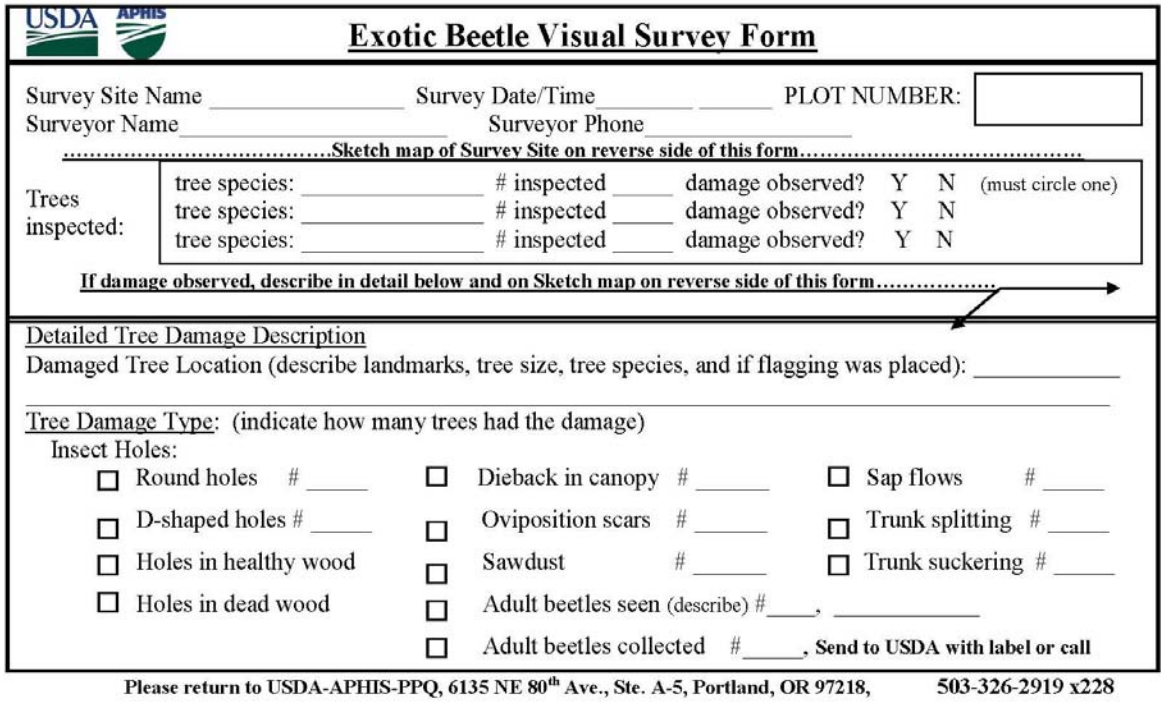
Telephone: _____

Volunteer group organizer (if applicable): _____

Telephone: _____

Data form hand-in date: _____

Appendix D: Survey data form postcard-style



Exotic Beetle Visual Survey Form

Survey Site Name _____ Survey Date/Time _____ _____ PLOT NUMBER:
Surveyor Name _____ Surveyor Phone _____

.....Sketch map of Survey Site on reverse side of this form.....

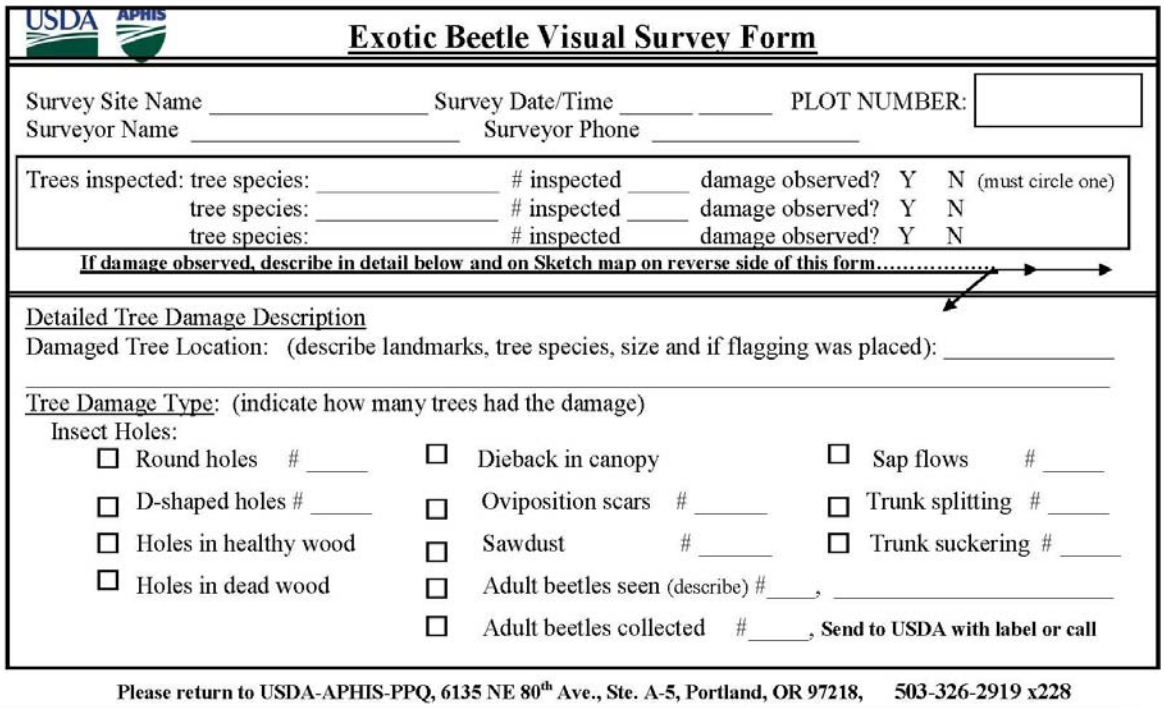
Trees inspected:
tree species: _____ # inspected _____ damage observed? Y N (must circle one)
tree species: _____ # inspected _____ damage observed? Y N
tree species: _____ # inspected _____ damage observed? Y N

If damage observed, describe in detail below and on Sketch map on reverse side of this form.....

Detailed Tree Damage Description
Damaged Tree Location (describe landmarks, tree size, tree species, and if flagging was placed): _____

Tree Damage Type: (indicate how many trees had the damage)
Insect Holes:
- ☐ Round holes # _____
- ☐ D-shaped holes # _____
- ☐ Holes in healthy wood
- ☐ Holes in dead wood
- ☐ Dieback in canopy # _____
- ☐ Oviposition scars # _____
- ☐ Sawdust # _____
- ☐ Adult beetles seen (describe) #____, _____
- ☐ Adult beetles collected #_____, Send to USDA with label or call
- ☐ Sap flows # _____
- ☐ Trunk splitting # _____
- ☐ Trunk suckering # _____

Please return to USDA-APHIS-PPQ, 6135 NE 80th Ave., Ste. A-5, Portland, OR 97218, 503-326-2919 x228



Exotic Beetle Visual Survey Form

Survey Site Name _____ Survey Date/Time _____ _____ PLOT NUMBER:
Surveyor Name _____ Surveyor Phone _____

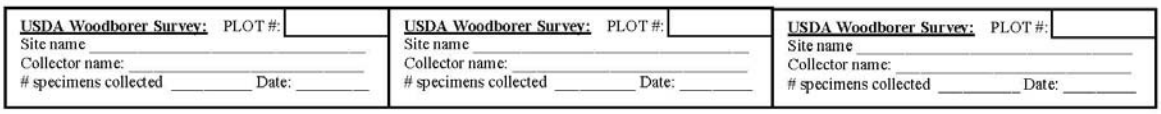
Trees inspected: tree species: _____ # inspected _____ damage observed? Y N (must circle one)
tree species: _____ # inspected _____ damage observed? Y N
tree species: _____ # inspected _____ damage observed? Y N

If damage observed, describe in detail below and on Sketch map on reverse side of this form.....

Detailed Tree Damage Description
Damaged Tree Location: (describe landmarks, tree species, size and if flagging was placed): _____

Tree Damage Type: (indicate how many trees had the damage)
Insect Holes:
- ☐ Round holes # _____
- ☐ D-shaped holes # _____
- ☐ Holes in healthy wood
- ☐ Holes in dead wood
- ☐ Dieback in canopy
- ☐ Oviposition scars # _____
- ☐ Sawdust # _____
- ☐ Adult beetles seen (describe) #____, _____
- ☐ Adult beetles collected #_____, Send to USDA with label or call
- ☐ Sap flows # _____
- ☐ Trunk splitting # _____
- ☐ Trunk suckering # _____

Please return to USDA-APHIS-PPQ, 6135 NE 80th Ave., Ste. A-5, Portland, OR 97218, 503-326-2919 x228

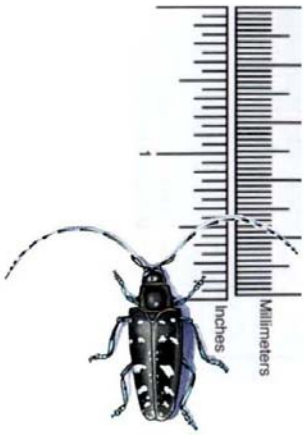


USDA Woodborer Survey: PLOT #:
Site name _____
Collector name: _____
specimens collected _____ Date: _____

USDA Woodborer Survey: PLOT #:
Site name _____
Collector name: _____
specimens collected _____ Date: _____

USDA Woodborer Survey: PLOT #:
Site name _____
Collector name: _____
specimens collected _____ Date: _____

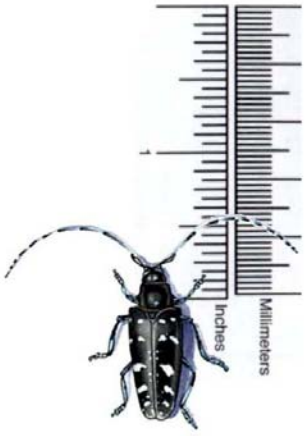
Survey Site Diagram



N _____° W _____°

Other Notes: _____

Survey Site Diagram



N _____° W _____°

Other notes: _____

Return form and specimen to:
USDA-APHIS-PPQ
6135 NE 80th Ave., Ste. A-5
Portland, OR 97218
Call: 503-326-2919 ext 228

Return form and specimen to:
USDA-APHIS-PPQ
6135 NE 80th Ave., Ste. A-5
Portland, OR 97218
Call: 503-326-2919 ext 228

Return form and specimen to:
USDA-APHIS-PPQ
6135 NE 80th Ave., Ste. A-5
Portland, OR 97218
Call: 503-326-2919 ext 228

Appendix E: Survey data form (fillable on-line or printable) 1

United States Department of Agriculture

Marketing and Regulatory Programs

Animal and Plant Health Inspection Service

Plant Protection and Quarantine

Washington State PHD Office

33400 9th Ave South
Suite 200
Federal Way, WA 98003

(253) 944-2040
FAX: 944-2079

Washington State Department of Agriculture

Plant Protection Division

Pest Program

1111 Washington Street SE
Olympia WA 98504

(360/902-2-71
FAX 902-2094

Asian Longhorned Beetle (ALB) Survey Data Form

Please read the instruction sheet for specific information about signs of ALB infestation.
Reminder- please observe at least 10 trees to complete the data form.

Date of Observations:

Name (optional):

Contact information (email or phone, optional):

Location of observations

Street address or closest intersection:

City:

Zip Code:

Time in:			Time out:
Tree Number	Species or Genus of Tree	Signs of ALB? (Y/N)	If Yes, Describe
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

If you did not observe signs of ALB infestation of your trees, check here: ☐

Are you attaching photo? ☐

How did you hear about this survey? (Check all that apply)

Master Gardeners ☐
Green Tacoma Partnership ☐
Green Seattle Partnership ☐
Nature Conservancy ☐
Other (write in)

Attended beetle survey training on (date):

Comments:

Important: each form should represent 10 trees. Make copies of this form and fill out a separate form for each 10 trees inspected.

If you find signs of ALB contact us as soon as possible. Negative surveys are very important to us as well, please fill out this form, save it on your computer and attach it to an e-mail to: yolanda.i.inguanzo@aphis.usda.gov, or print a hard copy and mail to: USDA-APHIS-PPQ 1550 Irving St SW Suite 100, Olympia, WA 98512. Thank you!

Appendix F: Survey data form (fillable on-line or printable) 2

Surveyor: Genus surveyed: Survey completed (date):

Survey group: ◯ *Acer* ◯ Other:_____ Time of day:

Tree # 1

Exit holes: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Egg niches: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Frass: ◯ Yes ◯ No

Adult collected: ◯ Yes ◯ No

GPS coordinates or tag #:

Notes:

Tree # 2

Exit holes: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Egg niches: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Frass: ◯ Yes ◯ No

Adult collected: ◯ Yes ◯ No

GPS coordinates or tag #:

Notes:

Tree # 3

Exit holes: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Egg niches: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Frass: ◯ Yes ◯ No

Adult collected: ◯ Yes ◯ No

GPS coordinates or tag #:

Notes:

Tree # 4

Exit holes: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Egg niches: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Frass: ◯ Yes ◯ No

Adult collected: ◯ Yes ◯ No

GPS coordinates or tag #:

Notes:

Tree # 5

Exit holes: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Egg niches: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Frass: ◯ Yes ◯ No

Adult collected: ◯ Yes ◯ No

GPS coordinates or tag #:

Notes:

1

Site location name: Site area (m^2):

Nearest intersection: Method for determining area:

Tree # 6

Exit holes: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Egg niches: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Frass: ◯ Yes ◯ No

Adult collected: ◯ Yes ◯ No

GPS coordinates or tag #:

Notes:

Tree # 7

Exit holes: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Egg niches: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Frass: ◯ Yes ◯ No

Adult collected: ◯ Yes ◯ No

GPS coordinates or tag #:

Notes:

Tree # 8

Exit holes: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Egg niches: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Frass: ◯ Yes ◯ No

Adult collected: ◯ Yes ◯ No

GPS coordinates or tag #:

Notes:

Tree # 9

Exit holes: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Egg niches: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Frass: ◯ Yes ◯ No

Adult collected: ◯ Yes ◯ No

GPS coordinates or tag #:

Notes:

Tree # 10

Exit holes: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Egg niches: ◯ Yes # observed: _____ Photo #: _____ ◯ No

Frass: ◯ Yes ◯ No

Adult collected: ◯ Yes ◯ No

GPS coordinates or tag #:

Notes:

2

Appendix G: NAPIS Data Standards—ALB high risk detection survey

October, 1999 NAPIS DATA ENTRY WORKSHEET
ASIAN LONGHORNED BEETLE TREE SURVEY

(Complete 1 record /year /data source /county for negatives.)
(However NEW STATE or COUNTY positives should be reported immediately.)

Observation Number	Observation Date (YEAR)(month)(day)	Data Source
(Assigned locally) create your own record identifier	Date when negative survey was completed in county. or For positive finds enter exact date. [YYYYMMDD]	11=USDA-APHIS 13=STATE AG Dept 15=PRIVATE/COMMERCIAL 16=Joint State/Federal 41=General Public

State-County	EPA Site Code	Crop Life Stage	Crop Situation
State & county FIPS codes	Tree Species code LEAVE CROP-REF file for positive OR 99999-UNKNOWN for negative survey	BLANK	70000 = shipping point 77004 = commercial storage 77000 = industrial property

Location Coordinates		EPA Pest Code
LEAVE BLANK	LEAVE BLANK	I N A L Q C A
Latitude	Longitude	Asian Longhorned Beetle

Pest Life Stage	Pest Status	Survey Method	Quantification
I 5		0 0 0 5 8	
Adult	-=no beetles +=beetles found 2=new state record 3=new cnty record ADD [A - Established or B - Not known to be established]	General Pest Observation	# of beetles collected or # of positive trees

Descriptor Units	Total Units Checked	Positive Units	Observation Duration	Diagnostic Lab

318 = plants infected (trees)	Total number of trees	Number of trees at/in which beetles were found	Number of days between beginning & end of survey	Refer to lab reference file for code if positives were identified
312 = Pests in/on trees				

Confirmation Method	Diagnostic Lab Date (YYYYMMDD)	Biocontrol Target
,	,	LEAVE BLANK ,

90011 - visual ID positive no microscope
90010 - visual survey, negative

Notes

Comments in English or prearranged code about optional information
Field now can contain up to 40 characters.

In iPHIS, there is currently no stand-alone data template for ALB detection survey; however, ALB is included as a pest under the AllInOne-MarkBeetle Detection Survey 2012 (System – version_9):

Location Section

LocationName*
Category*
Type*
Class
Address1*
Address2
City*
Country*
State(* req. for U.S.A.)
Zip Code(* req. for U.S.A.)
County(* req. for U.S.A.)
Township
Range
Section Grid
Latitude*
Longitude*
GeoAccuracy Level
Geo Method*

Contact 1 Section

Has Contact 1?*
ContactName*
Type
Address1
Address2
City
Country
State
County
Zip Code
Phone
Cell Phone
Fax
Email
Website

Contact 2 Section

Has Contact 2?*
ContactName*
Type
Address1
Address2
City
Country
State
County
Zip Code
Phone
Cell Phone
Fax
Email
Website

Site Section

Has Site?*
SiteName*
Number Targeted*
Latitude*
Longitude*
VDOP
HDOP
PDOP
GeoMethod*

Survey Activity Section

Has Activity?*
ActivityDate (mm/dd/yyyy)*
ActivityMethod*
ActivtyAction*
Host Name*
Tool Identifier
Tool Name
LureName
Symptoms
ActivityComment

Sample Section

Has Sample?*
Local Identifier*
SampleType*

Field ID Section

Has Field ID?*
Diagnostic Status *
Pest Name*
BioAgentName*
SpecimenAmount*
SpecimenUnit*
LifeStageName*
DeterminationDate (mm/dd/yyyy)
DeterminedBy
Remarks

Custom Fields Section

Trapper

Appendix H: Certificate of Training Completion

Appendix I: ALB damage

Figure I.1: Example of multiple egg niches chewed into bark by female ALB. *Photo credit Avi Eitam, USDA APHIS*

Figure I.2: Example of egg niche and ALB exit holes. *Photo credit Avi Eitam, USDA APHIS*

Figure I.3: Example of ALB Frass. *Photo credit David Renz, USDA APHIS*

Appendix J: Host trees for ALB

Annotated Categorization of ALB Host Trees

Alan Sawyer
USDA-APHIS-PPQ, Otis Plant Protection Laboratory
Revised Feb , 2010

Category[1]	Genus[2]	Common Name	Host Abundance and other notes[3]	Treated Surveyed[4]
Very good hosts	*Acer*	Maple, boxelder	Very common trees. Many US records, all species: Norway, red, silver, sugar, sycamore maple and boxelder especially favored; Amur maple less favored; Japanese maple seldom attacked.	Yes
	Aesculus	Horsechestnut, buckeye	Fairly common trees. Several US records, some heavily infested.	Yes
	Salix	Willow	Fairly common trees. Several US records: weeping, pussy and white willows highly favored; black willow (oviposition only) less favored.	Yes
	Ulmus	Elm	Very common trees. Many US records: American, Siberian and Chinese elms. Elms are apparently less preferred than maple.	Yes
Good hosts	*Betula*	Birch	Fairly common trees. Several US records: gray, European white and river birches. Some gray birches with many exits. Birches are apparently less preferred than maple.	Yes
	Plantanus	Plane tree, sycamore	Common	Yes

From University of Vermont website, http://www.uvm.edu/albeetle/hosts.htm