United States Department of Agriculture

USDA APHIS PPQ
Emerald Ash Borer Survey Guidelines

Introduction

Survey for emerald ash borer (EAB) has undergone an evolution of tactics, scope, and application since discovery of the pest in 2002. Survey was originally based on visually detectable symptoms (D-shaped EAB exit holes, longitudinal bark cracks, epicormic branching, woodpecker feeding sites, etc.) survey was changed to girdled trees, then to the use of traps with lures.

Visual survey was applied at various levels of intensity and with various techniques (*e.g.*, ground surveys, ladders, climbing devices, bucket trucks). While visual surveys are unlikely to detect newly infested trees, they are useful when setting up EAB parasitoid release sites.

Since 2012, trap placement has been based on a survey sampling design developed in collaboration with the APHIS EAB Program and the U.S. Forest Service's Forest Health Technology Enterprise Team. The current EAB survey will use similar methodology based on last year's survey, but will not be part of the PPQ EAB program. This computer-generated EAB survey sampling design product combines a scientific model of the likelihood of detecting EAB with historical EAB detections. Simply stated, the survey sampling design model will provide general geographic areas to deploy EAB traps resulting in the highest probability of pest detection.

Since the EAB program is placing a greater emphasis on biocontrol activities, the use of traps for detection of EAB will receive less emphasis. Traps and lure will remain available for our cooperators while supplies last. As of January, 2020 some 13,000 purple prism traps and 55,000 Z-3-hexenol lures were available for distribution from our Mission warehouse.

Survey Objective

The EAB Program will not conduct a national survey but will support cooperators to determine whether additional pockets of infestation may exist undetected surrounding the known infested areas, to better define the leading edge, and mainly to identify areas for future biological control activities. The objective of the survey is to detect further spread of EAB along the leading edge and to find suitable locations for the release of biological control organisms.

Visual survey

Visual surveys should be based on symptoms, such as epicormic shoot growth, declining or dead canopy, longitudinal bark cracks, woodpecker damage and D-shaped EAB exit holes. Visual survey is not very effective for newly infested areas, as these infestations are often high in the canopy, but when trees become more heavily infested, they will be easier to detect and may also be amenable to the deployment of EAB parasitoids. (See Appendices A and C of the EAB Biological Control Release and Recovery Guidelines for more signs of EAB infestation.

All survey and public outreach activities should be coordinated with Tribes, Federal, State, and local agencies and organizations to ensure efficient use of resources.

Trap Placement Protocols

The risk-based sampling design generates a science-based, survey within a 100 mile buffer area near newly detected EAB infestations. The sampling design identifies locations where traps may be placed identified by latitude, longitude, county, and state.

Trap placement should be coordinated with State Plant Regulatory Officials and Tribal governments where Tribal lands are involved. Coordination also should occur with other Federal, State, and local agencies, and non-governmental organizations involved in the program. To ensure the highest probability of detecting EAB, traps should be set in trees that meet the criteria as described in the Trap and Sign Placement paragraph on page 5 of these guidelines.

The list of trap locations generated by the survey sampling design includes the latitude and longitude for the center point of each location in which a trap is to be placed. Navigating to each location will require the use of a global positioning system (GPS) unit. Set-up and guidance information for GPS units is provided in Appendix B on page 16.

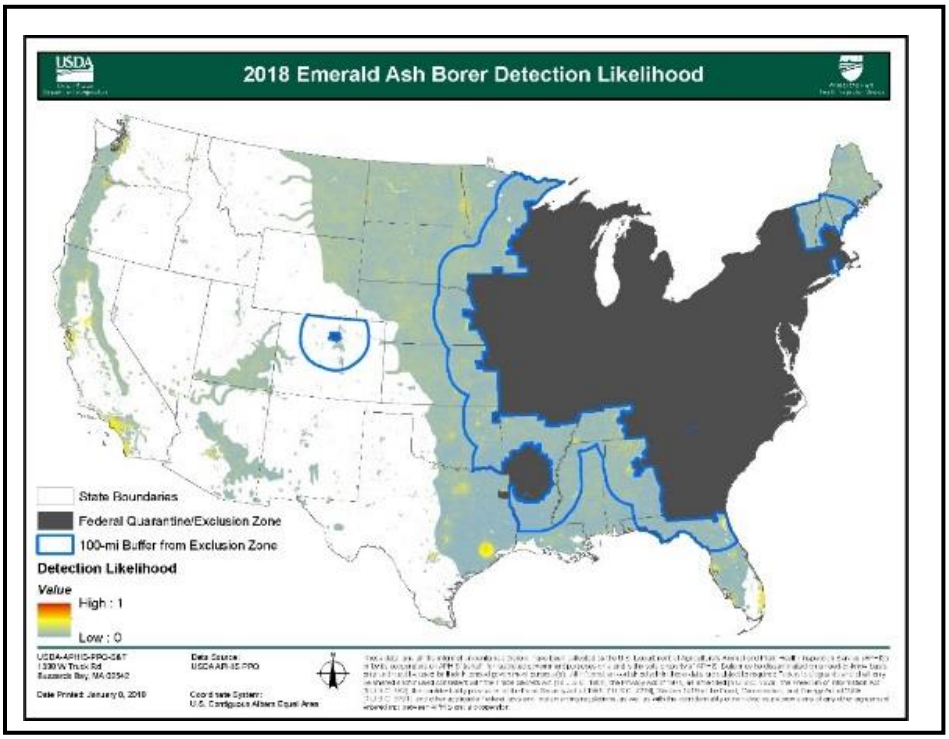

FIGURE 1. Emerald ash borer survey map (Please see page 19 for larger format map).

A limited number of threatened and endangered species of insects could be caught in the purple prism trap. These species include the delta green ground beetle, Hine's emerald dragonfly, Mitchell's satyr butterfly, Saint Francis' satyr butterfly, the Laguna mountains skipper, and the valley elderberry longhorned beetle. Sampling locations within critical habitat areas for potentially affected threatened and endangered insect species were discarded from the sampling design. Traps must not be set in critical habitat areas for these species. In addition, to avoid inadvertent capture of Karner blue butterflies, traps should not be set in jack pine and oak savannah with well drained sandy soils habitat in Massachusetts, New Hampshire, New York, and Wisconsin. Please consult EAB Program management for guidance if needed.

In locations where high-risk facilities or conditions are present and suitable ash trees are located, traps should be located in an ash tree as near as possible to the high-risk facility. Prioritized high-risk facilities should include:

1. Campground, recreation area, cottage community, summer camp
2. Major transportation artery, rest area, truck stop
3. Sawmill, firewood dealer, nursery, tree care company
4. Recently landscaped residential and commercial property
5. Site of high attendance/ high profile cultural event: Pow-Wow ground, hunting lodge, NASCAR track, horse trail ride site, motor cross site, rafting and fishing camp

NOTE: Ash trees within the location exhibiting two or more of the symptoms listed below should also be examined using destructive sampling techniques (*i.e.*, the removal of bark to inspect for EAB):

- Canopy stress/dieback
- Epicormic shoots/suckering
- Bark splits
- Woodpecker damage
- D-shaped exit holes (3-4 mm diameter)
- Larval galleries

Conducting Survey and Inspections:

- Identification of most suitable site and tree within the designated location
- Distribution of educational material where appropriate
- Placement and maintenance of traps
- Visual survey of the environment for ash trees exhibiting signs and symptoms of EAB in proximity of the traps.

NOTE: For various reasons it may not be possible to place a trap in a location as designated by the survey sampling design. Those locations must be recorded according to the following definitions:

Omitted: The location is inaccessible – no trap can be set
Declined: The location is viable but survey resources are limited – no trap can be set

Purple Prism Trap Assembly and Placement

Timing of Trap Placement: Research indicates that an accumulation of 450 growing degree days (base 50°F) results in initial emergence of EAB adults. Traps should be placed just prior to 450 growing degree days (GDD) and lure replacement is recommended to occur just prior to the 60 day expiration date. In order to assist States with timing of trap placement, a map of the United States depicting predictive areas of initial emergence are appended to this document (Please see page 20 for GDD map). Appendix C (see page 17) defines, by state, when initial emergence is predicted to occur.

Trap: A prism trap consisting of three 14" x 24" panels with several holes for trap and lure attachment (Fig. 2) will be used. The trap is constructed from a sheet of pre-glued purple corrugated plastic. An instructional video detailing trap assembly and use can be found on the APHIS website under Pest Management here. (Please note that when assembled the pre-glued face of the panels should be the exterior face.)

After the trap is assembled into its prism shape, spreaders are attached to the trap at holes (labeled 3 in Fig. 2). The lure is attached to a loop on the spreader using a cable tie (Fig. 3).

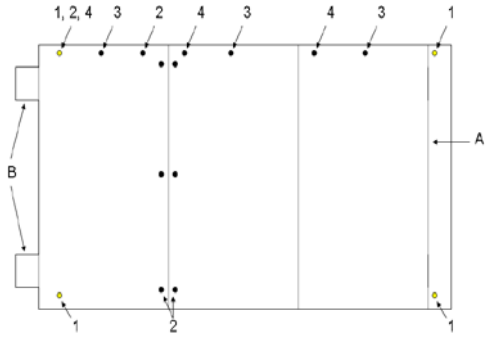

FIGURE 2: Prism trap diagram

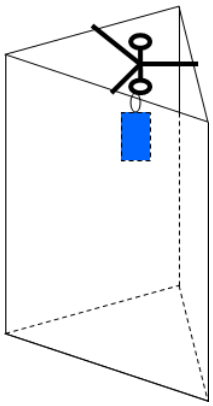

FIGURE 3: Lures hung from loop on spreader using a cable tie

***Lure**:* One pouch of (Z)-3-hexanol lure is recommended to be attached to each trap. The lure provided by commercial firms is produced as a pouch and designed to last in the field for 60 days. Lure attachment to the trap should be reinforced with duct tape placed at the very top to ensure continued attachment during inclement weather. Do not cover the lure with duct tape as that will inhibit the release of the lure. If possible, any unused lure remaining at the end of the trapping season should be stored (refrigerated or frozen) for future use in EAB surveys. Research suggests that the Manuka oil lure provides a negligible increase in trap efficacy, therefore the EAB Program has decided to discontinue its use in the national survey. However, any remaining Manuka oil lure from previous surveys within the past two to three years may also be used.

Lure Handling, Transport, and Storage:

The (Z)-3-hexenol lure pouches emit odors and volatiles which pose safety and health concerns in confined spaces. EAB Program managers have worked closely with the APHIS Safety and Health managers and the lure manufacturer to develop protocols for the safe handling, transport, and storage of the lures. In summary, prior to deployment, lures must be kept cold at all times by storing in a freezer. During transport, lures must be kept in coolers with cold packs or ice and stored in isolation from the vehicle's cab, or, as an alternative, kept in coolers with screw top lids that also must be chilled with cold packs or ice. Coolers should be labeled "NOT FOR FOOD OR BEVERAGE USE". To avoid skin irritation during handling, gloves may be worn. Additional information and precautions can be found in a Job Hazard Assessment and Material Safety Data Sheets for the lure pouches and are available from the local APHIS PPQ Safety Coordinator or supervisor for more details.

Trap and Sign Placement: Traps must be placed in ash trees (*Fraxinus* spp.). If possible, ash trees should be 8" or greater in diameter with *larger or largest ash tree in a stand of trees* located along edges, in open areas, or in open stands such as in parks within the grid cell. Traps should be placed in the lower to mid canopy, but with the bottom edge of the trap no lower than five feet above the ground. They should be placed on the sunny side of the tree, most typically, the south or southwest side.

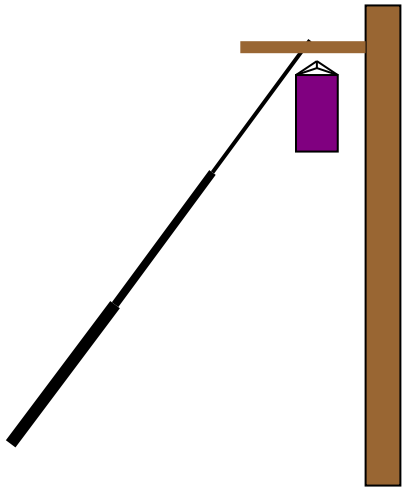

FIGURE 4: Purple prism trap hung using a telescoping pole

A wire hanger will be used to hang purple prism traps (Fig. 4). A telescoping pole that extends to 24' (different models are available at home improvement stores and other retailers), and fitted with a hook to place the purple trap in one of the lower limbs, is recommended. The full extension of the pole may or may not be necessary. If all limbs are too high to reach with a pole, a throw line may be tossed over a limb, and a rope with a trap attached may be hoisted up into the canopy (Fig. 5).

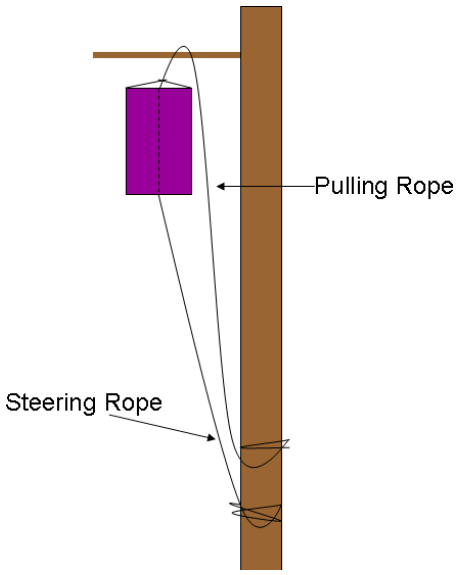

FIGURE 5: Purple prism trap hung using a rope

Trap Maintenance: A lure will last approximately 60 days and should be replaced just prior to expiration. Traps should be inspected for adult EAB at the time of lure replacement.

If trap surfaces are loaded with debris, they should be renewed by removing the debris and scraping the sticky compound. Scraping can be accomplished with a trowel or putty knife. If necessary, stickier compound can be added using a paint roller or trowel. The sticky surface should remain intact throughout the season unless a trap is allowed to come in repeated contact with an adjacent branch or tree bole. Traps must not be removed prior to August 1 and before 1,500 GDDs have been exceeded.

Trap Disposition: While the polypropylene material of the traps is recyclable, the sticky compound that is adhered to the panels renders the traps undesirable to most recyclers. Alternatively, one may seek a user of waste fuel material for trap disposition. Hangers and spreaders are reusable and should be retained for future use. Hangers and spreaders that cannot be reused should be recycled.

Lindgren Green Multi-funnel Trap Assembly and Placement

Timing of Trap Placement: The timing for placement of Lindgren green multi-funnel traps is identical to the purple prism trap. Research indicates that an accumulation of 450 growing degree days (base 50ºF) results in initial emergence of EAB adults. Traps should be placed just prior to 450 growing degree days (GDD) and lure replacement is recommended to occur just prior to the 60 day expiration date. In order to assist States with timing of trap placement, a map of the U.S. depicting predictive bands of initial emergence are appended to this document (see page 20 for GDD map). Appendix C (see page 17) defines, by state, when initial emergence is predicted to occur.

Trap: The trap is constructed from 12 green plastic funnels with a green dome-shaped top and a plastic collection cup at the bottom. Trap funnels and the dome are held together by black pegs. The collection cup is secured to the bottom with a twist-on motion. An eye screw at the top of the trap is used for rope attachment (see Figs. 6, 7). Multi-funnel traps are pre-assembled and pre- coated in a 1:1 solution of Fluon before shipment to field locations. The Fluon application provides a slippery surface that assists with the capture of EAB. Due to the modular nature of the traps, some minor assembly may be required.

FIGURE 6: Multi-funnel traps hanging in ash trees

Trap hanging: A rope should be thrown over a branch at approximately 16-26' above the ground. The limb hanger and pole should not be used for hanging the multi-funnel trap. The branch should be alive and sturdy (> 2" diameter), as smaller or dead branches could snap under the weight of the trap. An arborist throw weight (12, 14, or 16 oz.) can be tied to one end of the rope. Take care to clear the rope from all lower branches so that the trap can be pulled up and down like an elevator when servicing. The rope should have a clear path to the ground. The trap may need to be raised and lowered at an angle from the tree to accomplish this. Give yourself enough slack so that you can tie the rope to an adjacent tree.

A bowline knot, similar to the one shown here is the preferred method: (http://wow.uscgaux.info/content.php?unit=081-07-04&category=knots-know-how)

Using these knots, tie the rope to two points on each trap. For the multi-funnel trap these points are the top metal hanger and one of the three holes on the bottom funnel used for peg attachment. The knot is important as high winds will sometimes cause the traps to come down if the knots are not tied properly.

When hanging the traps try to rest the top of the trap against the bottom of the tree limb. This should prevent the rope from twisting on itself. When attaching the collection cup, take care to make sure that it is securely attached to the bottom funnel.

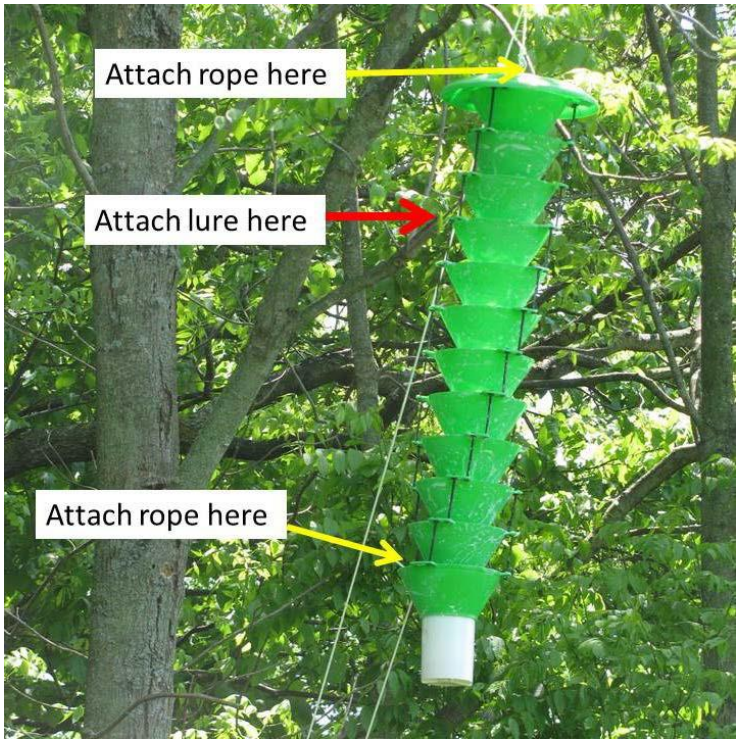

FIGURE 7. Green multi-funnel trap with attachment points for ropes and lures.

Prior to raising the trap in the tree, fill the cup with approximately 2 inches of propylene glycol (RV antifreeze; usually pink in color). Do NOT use any product containing ethanol as products containing this will evaporate over time, especially in hot, dry climates or under drought conditions. Propylene glycol should not be diluted with water prior to filling the cup as it will be diluted by rainwater over time.

Once the trap is hoisted, tie it off to a tree (the one the trap is hanging from will work for this). Take care when tying this rope off to place it out of the reach of children or others who may want to pull it down.

Trap checking: When checking the multi-funnel trap, the contents of the trap should be poured through a paper filter. A paper cone paint strainer is the preferred method (Fig. 8), although a coffee filter may also work but will retain more moisture. The strainer should then be placed inside a leak proof plastic bag. While wire closed bags (e.g., Whirlpaks) are the preferred method, a plastic zipper (e.g., Ziploc) bag will also work. Please make sure to label and seal the bag completely to prevent leaks. A small amount, such as one teaspoon, of ethanol may be added to the bag to help preserve the specimens for sorting in the lab. As long as the liquid in the cup is still pink, and does not smell too badly, it can be reused instead of discarded during traps checks. Place a propylene glycol collection container under the filter when pouring out the sample.

FIGURE 8. Paper cone paint strainer containing a sample of beetles

A (Z)-3-hexanol lure pouch should be hung from the lower loop of the prism trap spreader or from one of the holes used for peg attachment near the top of the multi-funnel trap with a small plastic cable tie. The lure should be changed before its expiration in 60 days.

Trap and Lure Handling, Transport, and Storage:
EAB Program managers have worked closely with the APHIS PPQ Safety and Health Managers and the trap and lure manufacturers to develop protocols for the safe handling, transport, and storage of our traps and lures. The green multi-funnel trap is coated with a fluoropolymer resin commonly referred to as "fluon". EAB Program uses manufacturer pre-treated "fluon" traps only for program use. This slippery resin may be an irritant to some which can be negated through the use of nitrile gloves during handling. Eye protection, such as vented splash goggles and face shield, should be worn while raising the trap into position in order to avoid any propylene glycol spillage contacting the eyes. The (Z)-3-hexanol lure pouches emit odors and volatiles which pose safety and health concerns in confined spaces. Prior to deployment, lures must be kept cold at all times by storing in a freezer. During transport, lures must be kept in coolers with cold packs or ice and stored in isolation from the vehicle's cab, or, as an alternative, kept in coolers with screw top lids that also must be chilled with cold packs or ice. Coolers should be labeled "NOT FOR FOOD OR BEVERAGE USE". To avoid skin irritation during handling, gloves may be worn. During handling of lure, open down-wind in an open well-ventilated environment. Additional information and precautions can be found in a Job Hazard Assessment and Safety Data Sheets for "fluon", propylene glycol, and the (Z)-3-hexanol lure pouches in each sites specific Safety Data Sheet manual. Contact your local APHIS PPQ Safety Coordinator or supervisor for more details.

Trap and Sign Placement: Traps must be placed in ash trees (*Fraxinus* spp.). If possible, ash trees should be 8" or greater in diameter with *larger or largest ash tree in a stand of trees* located along edges, in open areas, or in open stands such as in parks within the grid cell. Traps should be placed in the lower to mid canopy, but with the bottom edge of the trap no lower than five feet above the ground. They should be placed on the sunny side of the tree, most typically, the south or southwest side.

Trap Maintenance: The lure will last approximately 60 days and should be replaced just prior to expiration. Multi-funnel traps should be checked every two-three weeks and any insects that are captured should be collected. When reattaching cups, please make sure that all pegs are securely locked in place as they may come loose under some weather conditions.

Trap Disposition: Multi-funnel traps are designed to be used over several field seasons. At the end of the season, the collection cups may be gently scrubbed, and dirt may be wiped away from funnels with a cloth, take care not to remove too much of the slippery Fluon coating. Traps will collapse into a smaller form for storage and subsequent reuse.

Screening for Suspect Buprestidae and Specimen Submission

Any suspect Buprestidae adult or suspect EAB adult specimen collected from a trap in a non-quarantined county should be placed in a dry vial. If the specimen is from a purple prism trap, use the sticky compound from the trap to stick the specimen to the side of the vial and/or gently pad with soft tissue placed into the vial on top of the specimen(s) to prevent damage during shipping. Sorted specimens collected from Lindgren traps should be placed in a vial and gently padded with soft tissue placed into the vial on top of the specimen(s) to prevent damage during shipping. Larval samples need to be shipped in a vial containing 70% ethanol. (If guidance is needed on proper packaging to ship larvae in ethanol, please contact your local PPQ Safety Coordinator.) All suspect specimens should be delivered to the State Plant Health Director or an APHIS representative to be packaged and shipped to Dr. James Zablotny along with a completed "Specimens for Determination" PPQ Form 391. Be sure to include any survey record number and GPS coordinates on the PPQ Form 391 so identified specimens can be linked to survey records.

Dr. James Zablotny
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Romulus, MI 48174

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E-mail: james.e.zablotny@aphis.usda.gov

Dr. Zablotny will make a determination and send specimens to the Systematic Entomology Laboratory (SEL), if necessary, for initial State detection confirmation.

Any suspect Buprestidae adult or suspect EAB adult specimen collected from a trap in a quarantined county should be placed in a dry vial. Using the sticky compound from the trap, stick the specimen to the side of the vial and/or gently pad with soft tissue placed into the vial on top of the specimen(s) to prevent damage during shipping. Larval samples need to be shipped in a vial containing 70% ethanol. (If guidance is needed on proper packaging to ship larvae in ethanol, please contact your local PPQ Safety Coordinator.) All suspect specimens should be delivered to the State Plant Health Director or an APHIS representative to be packaged and shipped to Mr. Bobby Brown along with a completed "Specimens for Determination" PPQ Form 391.

Be sure to include any survey record number and GPS coordinates on the PPQ Form 391 so identified specimens can be linked to survey records.

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West Lafayette, IN 47907-2089

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Data Management Structure:

APHIS wants to make it clear that the national "Integrated Plant Health Information System" (IPHIS) is not required as a field data collection tool, however operationally specific data is of great importance and therefore APHIS has designated the IPHIS application to be utilized as the final holding tank or centralized database for EAB data.

IPHIS requires internet access, USDA eAuthentication credentials, and approved access to an IPHIS or cooperator office. If you need USDA eAuthentication USDA employees should contact their supervisors, and all other cooperators should work through their State Plant Regulatory Official and State Plant Health Director.

After receiving network access, eAuthentication credentials and IPHIS access, users can log into the system and utilize two types of data entry methods. These include the IPHIS web interface and an Excel spreadsheet to upload files. The AllInOne Excel spreadsheet upload file, for *initial trap installations* and *omits*, is also available here.

Please use the IPHIS template "EAB Natl Survey" for capturing EAB trapping and omit data.

Note: IPHIS can now receive unlimited uploaded records in a spreadsheet.

The data fields created for the 2012 through 2019 EAB surveys are also used in the EAB survey. APHIS does not ask surveyors to collect symptom data, and the fields for diameter at breast height (DBH) and trap height are optional. Additional optional fields include: (1) site type categories and additional free text, (2) a field for assigned locations with no trap placement, including omitted and declined locations, and (3) fields to record omit reasons for assigned grids and comments.

Please record the state's assigned grid number as IPHIS' Location Name; the IPHIS site name can also be assigned this value. Traps placed outside assigned grid number cell locations should use the following naming convention for location name:

2 letters for state designation + 3 letters for surveyor's initials + 3 digit sequential trap number (e.g., IAJAD003 for Iowa, John A. Doe, Trap 3).

The state's sequential trap number begins with 001 for the first trap not having an assigned grid number and increases by one for each additional trap; second trap is 002, the third is 003 and so on.

For consistency with other state trapping programs, we encourage users to use existing procedures and tools for recording data in the field. A field data form for the manual recording of

data is in Appendix D. Organizations using paper, spreadsheets, or third party software can enter data directly into the web interface or "bulk" upload data from the Excel spreadsheet using the web upload tool.

It is very important for survey personnel to upload data every other week throughout the season!

Technical Support
1 (877) 944-8457 (select option 3)
6:30 am to 8:00 pm ET, Monday - Friday

Communication:

The risk-based survey sampling design continues to determine trap dispersal. A variety of materials will be developed to facilitate communication and understanding among key audiences who include Federal, State, and Tribal partners, survey cooperators and contractors, the media, and the public at large. Materials will include but are not limited to key messages, talking points, and Frequently Asked Questions (FAQ's).

The highly visible purple prism traps and Lindgren green multi-funnel traps generate curiosity which often results in public questions and media inquiries. Individuals involved in the actual placement and maintenance of traps should be conversant with survey messages and understand media protocols. Furthermore, the EAB survey provides an opportunity to communicate other program messages addressing control, regulation, and the human-assisted spread of the pest. Communication staff and program personnel should also be broadly familiar with the core program messages about these issues.

Outreach & Education:

The active participation of target audiences to assist in preventing the spread of emerald ash borer throughout the United States is critical. Outreach is an integral element of the EAB Program supporting regulatory, survey, and control.—It is a basic task for all program staff and a value-added opportunity for each personal encounter, engagement, or exchange. Formal strategic communication and outreach campaigns targeting industries that move regulated material should be implemented together with public awareness campaigns designed to provide education to citizens about the dangers of moving infested host materials such as firewood. Since the beetle is difficult to detect, the more people trained to identify EAB symptoms or damage and report suspects, the greater the opportunity for successful outcomes. Outreach activities encourage the public to recognize and report possible beetle damage in their area as well as suspected incidents of quarantine violations.

Appendix A. Details of Survey Sampling Design Construction.

The EAB survey employs a computer-generated risk assessment product to guide the deployment of detection tools in a way which results in the following benefits:

- increase the number of successful EAB detections outside the known infested area
- improve land managers capability of detecting EAB close to the date of a new attack
- find locations that are best suited to implement biological control

The EAB risk assessment model was developed using a combination of statistical models for predicting where EAB was most likely to be detected. This is a major change in modeling procedure from years prior to 2016, which employed the MaxEnt statistical model, which used only positive detections for EAB. Given the last few years of nationally consistent data collection which reports both positive and negative detections, APHIS upgraded the models to utilize that information in order to avoid some major statistical assumptions regarding the data, and discovered that all the models concurred in predicting risk in the known infested area but differed widely in extrapolating that risk to outside the infested area. This is consistent with knowledge concerning the difficulty of pest detection, so an "ensemble" of the models was created to mitigate model uncertainty between statistical platforms. There were two model applications for each statistical platform, both using all 2011-2017 trap data: one model included the distance from any prior year positive trap as a predictor variable (modeling active spread) and one model did not include distance from prior detections as a predictor variable (modeling full geographic potential).

EAB is an actively spreading pest and a false negative could be reported for two reasons: 1) the location is suitable but not yet infested, or 2) the pest is present but undetected. Utilizing negative trap location could be too restrictive in the model fitting process because of the potential for false negatives. While MaxEnt demonstrates flexibility regarding the "potential" of locations of having a pest present, we found that MaxEnt's default assumption of pest prevalence (EAB can occupy up to 50% of the landscape) caused great overestimation of risk compared to models that utilized actual absence information. Since the EAB risk assessment model is updated each year, APHIS is mitigating the issue by allowing the model to update with new information as the pest invades new environmental gradients.

Four parameters were required to run the models. These were:

1) the dependent detection data from the APHIS IPHIS dataset (2011-2018), which consists of both negative and positive trap data
2) selected independent variables that correlate with the presence of EAB
3) a defined geographic area of interest.
4) modeled negative trap data limited to traps within 60 km of a positive trap.

The independent variables were selected in the previous year using the following sources:

1. scientific literature
2. expert opinion
3. anecdotal evidence
4. correlation analyses
5. preliminary statistical analyses.

Dissemination of trap resources is thus determined by this EAB risk assessment model, combined with a spatially balanced sample design. The model has a known inclusion probability for every grid cell and provides an objective and transparent methodology for selecting trap locations. Since we are utilizing an ensemble model which is actually a percentage of model agreement of pest presence (rather than risk of pest presence like in previous years), the sample design will utilize this ranking of model agreement as the inclusion probability surface. The sampling design increases spatial independence among sample locations and therefore, maximizes sampling efficiency and provides the most information available per sample unit.

Each trap location is recommended for placement within a one kilometer square grid cell designated within a United States grid cell, each with a unique identification, and also by the center point of the grid cell (identified by latitude and longitude).

Appendix B. GPS Guidance and Sample Location Information

Initial Requested Information

1. Field Crew Name
    a. Crew ID (State and Affiliation (i.e., PPQ, State Dept. of Ag., Contractor, Volunteer) should be associated to the Crew ID)

Initial GPS Unit Setup Guidance

1. Depending on your GPS unit and what options that are available to you, please use the following guidance for collecting position information.

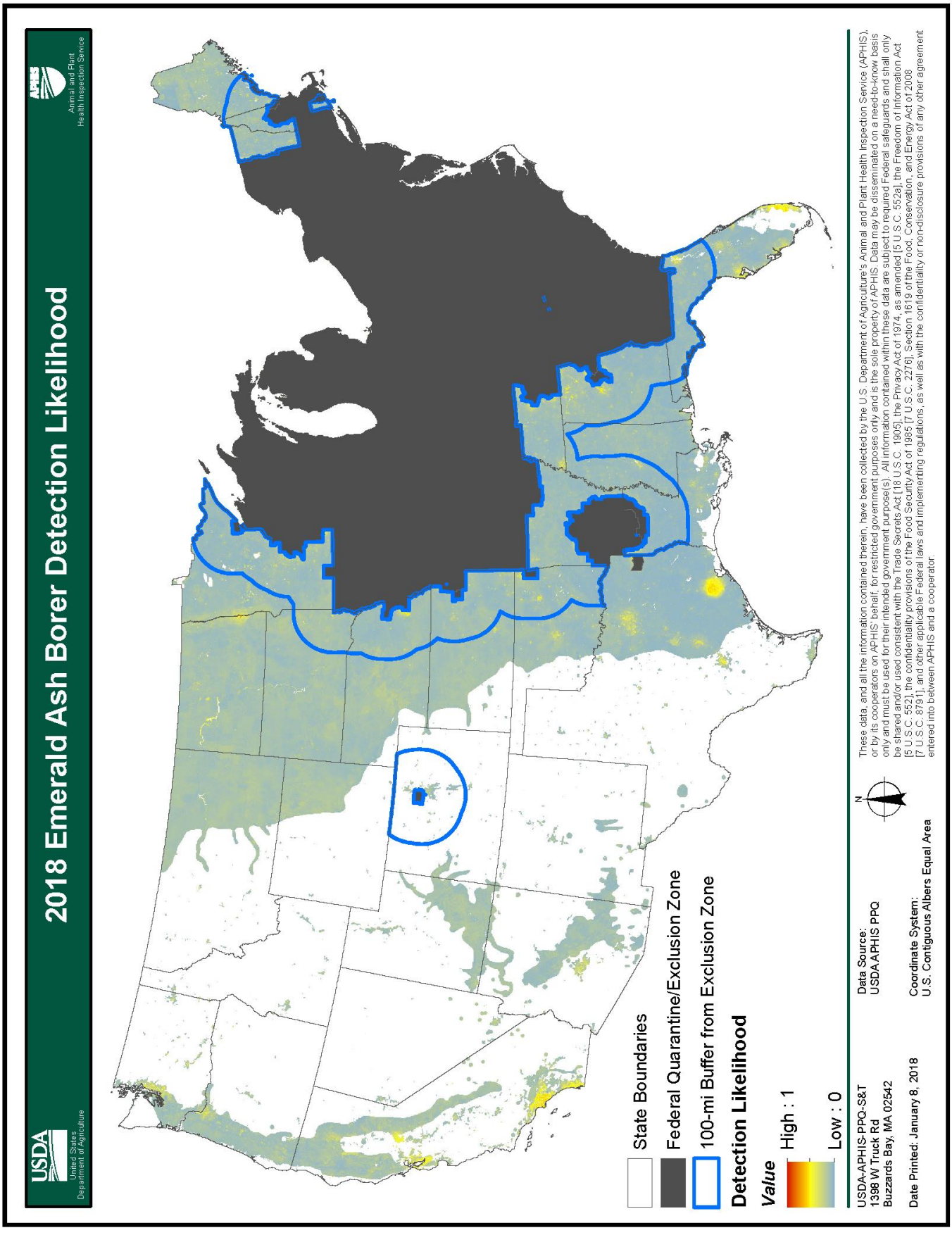
    a. WGS 84 geodetic datum
    b. Latitude/Longitude collected in Decimal Degrees format
    c. Satellite Almanac (where applicable): Download the most recent Satellite Almanac to your unit.
    d. Wide Area Augmentation System (WAAS) to improve the accuracy of the positions

Helpful Tips for Collecting Information at the Site

1. Turn the GPS unit on and allow the GPS unit to start gathering data when you arrive at the tree in which the trap will be hung. It may be helpful to turn the GPS unit on when you leave your vehicle.
2. Place the unit in a stable location while hanging the trap.
3. Collect location data at the tree in which the trap is hung
4. Ensure that you are collecting a signal from at least four satellites.
5. Location Data Collection
    a. Location Name for Grid Cell = Cell_ID
        i. When recording the Cell_ID (Location Name) in IPHIS, the Samp_ST_ID code assigned to each cell designated as a trap placement site by the survey design should be used if available. For cells which do not have a Samp_ST_ID code assigned, please use the following naming convention: 2 letters for State designation, 3 letters for surveyor's initials, and 3 numbers for trap number, e.g., IAJAD003, (Iowa, John A. Doe, Trap 3). Each surveyor should begin with 001 for the first trap which does not have an assigned Cell_ID and increased by one for each subsequent trap (the second such trap is 002; the third is 003 and so on).
    b. Please see Appendix D for EAB Field Data Form.
    c. Latitude/Longitude
    d. Omitted - with drop down list of potential reasons for the omitted cell (e.g. steep slope, inundated with water, dangerous terrain, dangerous neighborhood, etc.)
    e. Notes for the surveyor's assessment of the site conditions (e.g. firewood, riparian, wooded lot, campground, lumber/saw mill, suburban, urban, new development, tree service company, etc.
6. **NOTE: It is very important for survey personnel to upload data every other week throughout the season!**

Appendix C. Predicted Growing Degree Day Zones for Initial EAB Emergence (~400-500Growing Degree Days, base 50)

Alabama	Feb 1	Montana	June 1
Alaska	June 22	Nebraska	May 1
Arizona	Feb 1	Nevada	Feb 22
Arkansas	Mar 15	New Hampshire	June 1
California	Feb 15	New Jersey	May 8
Colorado	Apr 22	New Mexico	Mar 1
Connecticut	May 22	New York	May 15
Delaware	Apr 22	North Carolina	Mar 22
Florida	Jan 22	North Dakota	June 1
Georgia	Feb 15	Ohio	May 1
Hawaii	Jan 22	Oklahoma	Mar 5
Idaho	May 22	Oregon	May 22
Illinois	Apr 22	Pennsylvania	May 1
Indiana	Apr 22	Rhode Island	June 1
Iowa	May 1	South Carolina	Mar 8
Kansas	Apr 8	South Dakota	May 15
Kentucky	Apr 8	Tennessee	Apr 1
Louisiana	Feb 15	Texas	Jan 22
Maine	June 1	Utah	May 11
Maryland	Apr 22	Vermont	June 1
Massachusetts	May 22	Virginia	Apr 8
Michigan	May 22	Washington	May 22
Minnesota	May 22	West Virginia	May 1
Mississippi	Feb 22	Wisconsin	May 15
Missouri	Apr 1	Wyoming	May 22


USDA
United States
Department of Agriculture
APHIS
Animal and Plant
Health Inspection Service
2018 Emerald Ash Borer Detection Likelihood
State Boundaries
Federal Quarantine/Exclusion Zone
100-mi Buffer from Exclusion Zone
Detection Likelihood
Value
High : 1
Low : 0
N
USDA-APHIS-PPQ-S&T
1398 W Truck Rd
Buzzards Bay, MA 02542
Data Source:
USDA APHIS PPQ
Coordinate System:
U.S. Contiguous Albers Equal Area
Date Printed: January 8, 2018
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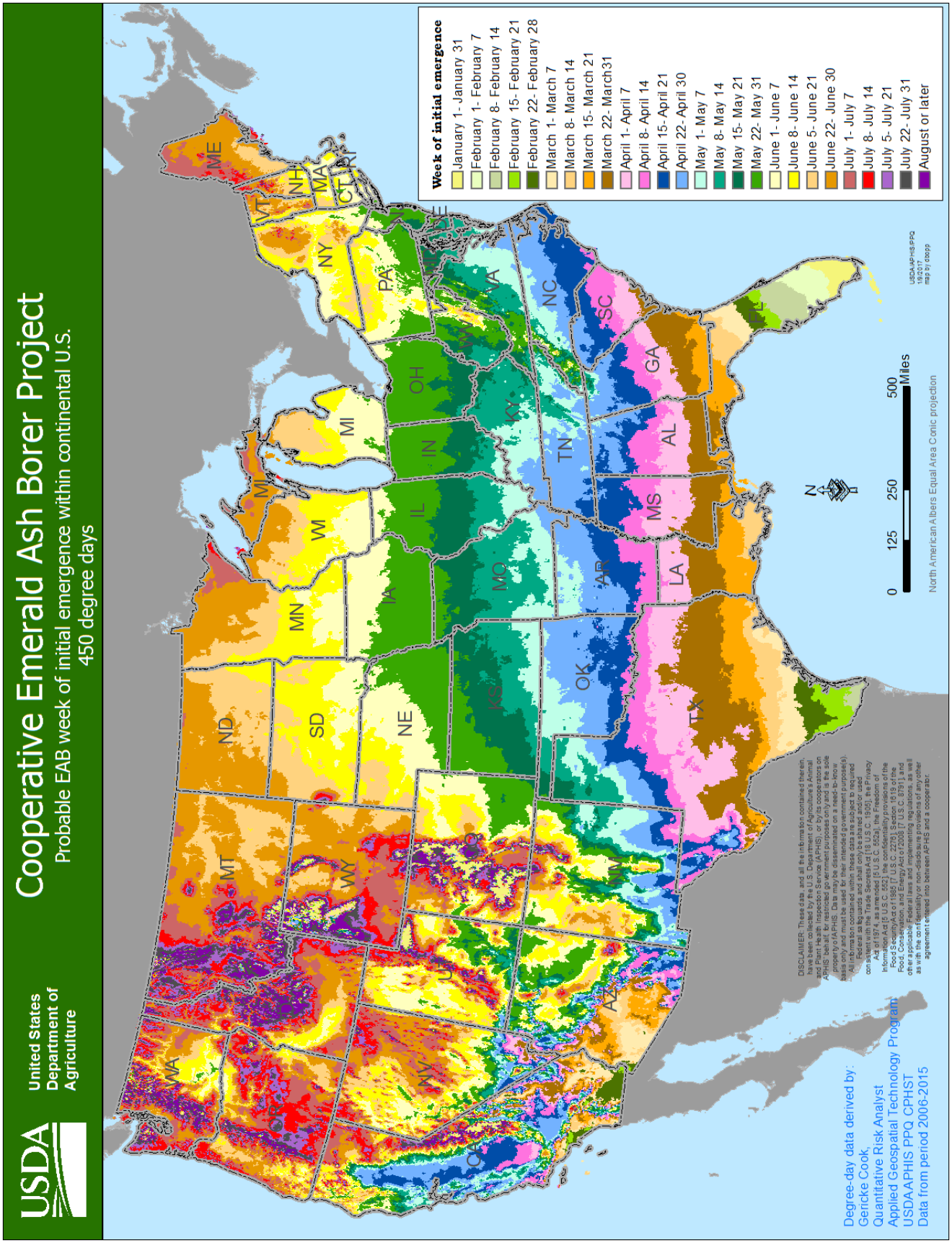
USDA
United States Department of Agriculture
Cooperative Emerald Ash Borer Project
Probable EAB week of initial emergence within continental U.S.
450 degree days
Week of initial emergence
January 1- January 31
February 1- February 7
February 8- February 14
February 15- February 21
February 22- February 28
March 1- March 7
March 8- March 14
March 15- March 21
March 22- March31
April 1- April 7
April 8- April 14
April 15- April 21
April 22- April 30
May 1- May 7
May 8- May 14
May 15- May 21
May 22- May 31
June 1- June 7
June 8- June 14
June 5- June 21
June 22- June 30
July 1- July 7
July 8- July 14
July 5- July 21
July 22- July 31
August or later
0 125 250 500 Miles
N
North American Albers Equal Area Conic projection
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USDAAPHISPPQ 10/2017 map by cloopp
Degree-day data derived by:
Gericke Cook,
Quantitative Risk Analyst
Applied Geospatial Technology Program
USDAAPHIS PPQ CPHST
Data from period 2006-2015