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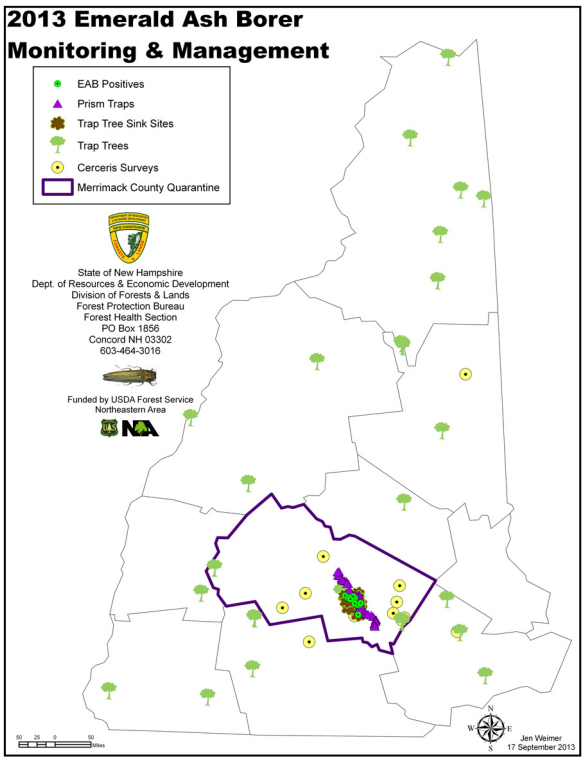
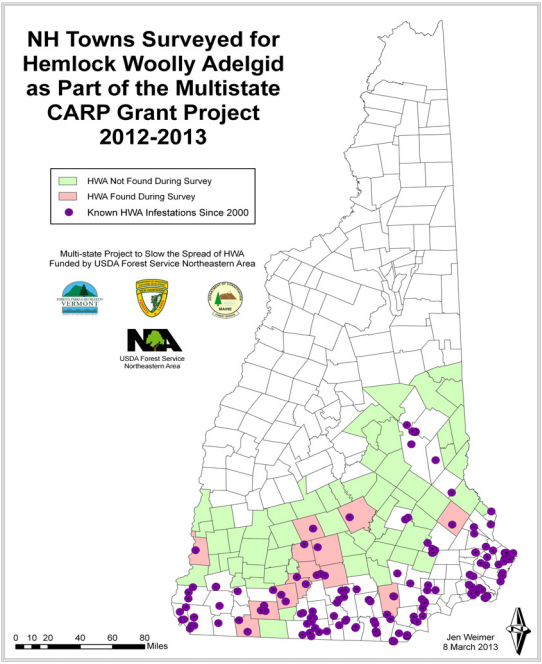
FIELD SURVEYS

Emerald Ash Borer (EAB)

EAB debuted in NH this spring with detections in Concord and Bow. The delimitation survey (see feature article page 7) encompassed a 6 mile radius around the initial find and resulted in a 24-square mile generally infested area (see map page 12). Surveys for additional infestations were also done using bio-monitoring, traps, and trap trees. A total of 51 trap trees were girdled at 25 sites around the state including 16 state campgrounds. These trees will be peeled this winter to look for larvae. In addition 11 sink sites were created around Concord with 5 trees girdled at each site. Purple prism traps were also placed at 50 sites along the Merrimack River in addition to the traps deployed around the state by APHIS. A dozen *Cerceris fumipennis* colonies in and around Concord were also monitored. No additional EAB has been found to date.



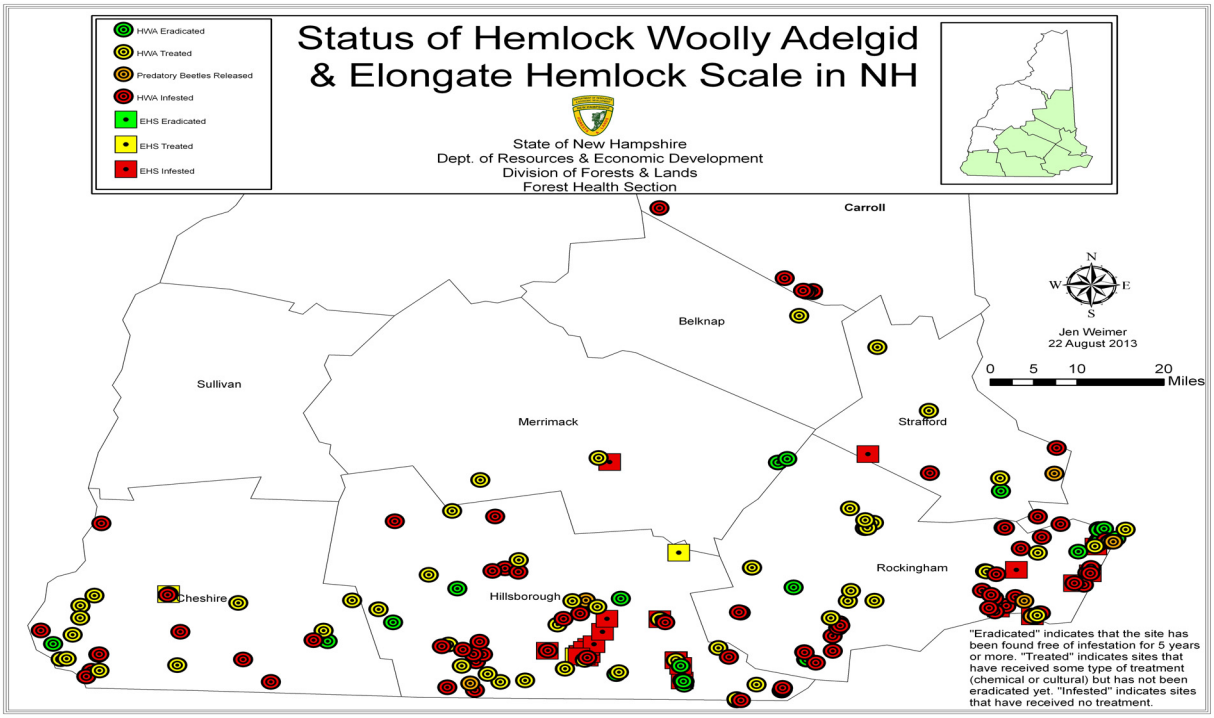


Hemlock Woolly Adelgid (HWA)

Hemlock Woolly Adelgid continues to spread throughout NH. Town surveys for HWA were done again this year in cooperation with Vermont and Maine as part of a regional HWA initiative. A total of 33 towns were surveyed in 2012 and 39 towns were surveyed in 2013 with a minimum of 200 branches per site at 5 high risk sites per town. New infestations of HWA were found in 6 towns in 2012 and 7 towns in 2013. The new towns for 2013 are Barrington, Francestown, New Boston, Londonderry, Walpole, Weare, and Fitzwilliam. Infestations in Hudson, Antrim, Amherst, Temple, New Boston, Hancock, and Moultonboro were also reported by landowners over the year.

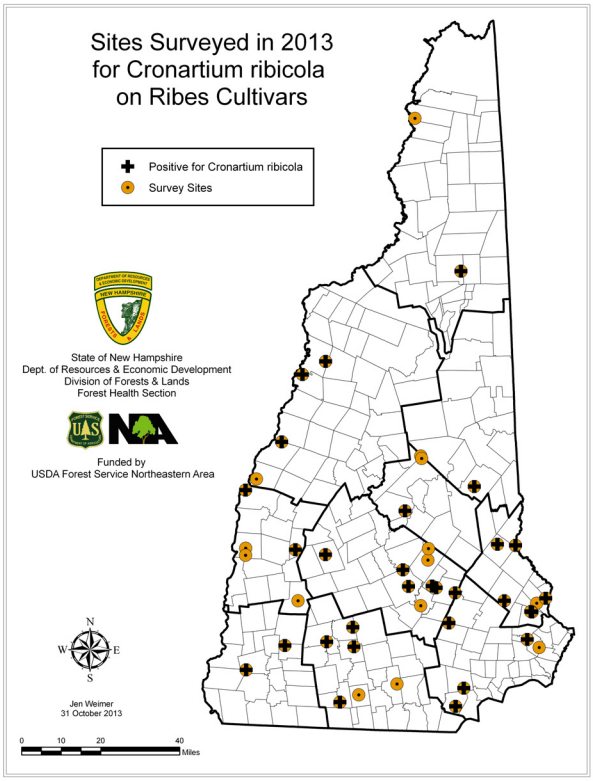
Post suppression surveys were also conducted at all sites treated with insecticides in 2008 to determine if the infestations had been eradicated. In addition a few sites treated in 2006 and 2009 were surveyed. Only a few sites can be considered eradicated and many of the previously treated sites have become re-infested.

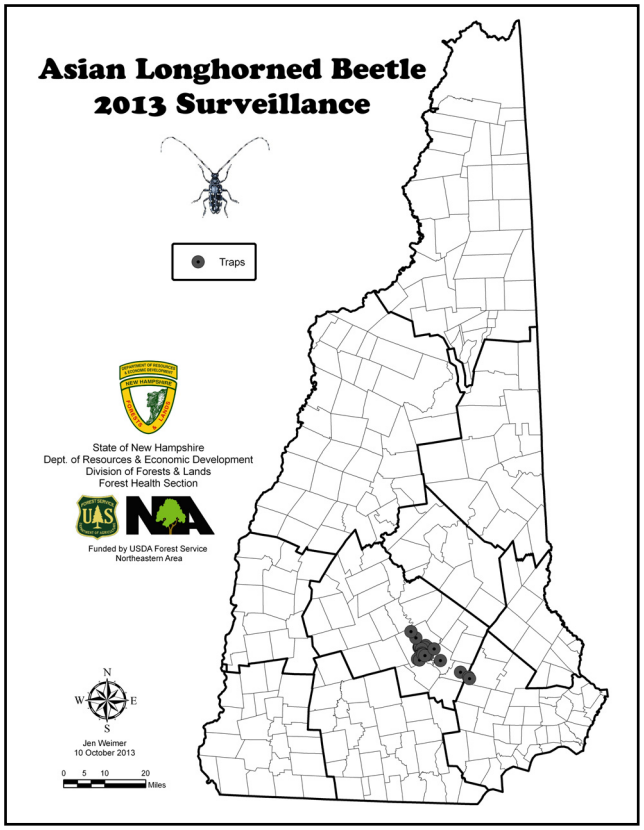
Elongate Hemlock Scale (EHS) also continues to spread and was found at a new site in Merrimack during the HWA post suppression survey. A report of EHS on planted landscape material in Tuftonboro led to the find of numerous infested hemlock and fir nursery stock which were treated with basal bark applications of Dinotefuran.



White Pine Blister Rust (WPBR)

A statewide survey was completed this year to determine the incidence and severity of *Cronartium ribicola* (the fungus that causes WPBR) on planted *Ribes* cultivars in response to the recent discovery of infested immune black currants in CT. With support from the USDA Forest Service 43 sites around the state were surveyed and samples tested positive for the disease in all ten counties. While most varieties had some level of disease the incidence and severity was greatest on the immune black currant varieties Consort, Coronet, and Titania. As a result of the survey the list of approved varieties permitted to be planted in NH has been amended by removing the varieties which are no longer immune. The new list and permit can be found on our website at http://www.nhdfl.org/forest-health/white-pine-blister.aspx.





Asian Longhorned Beetle (ALB)

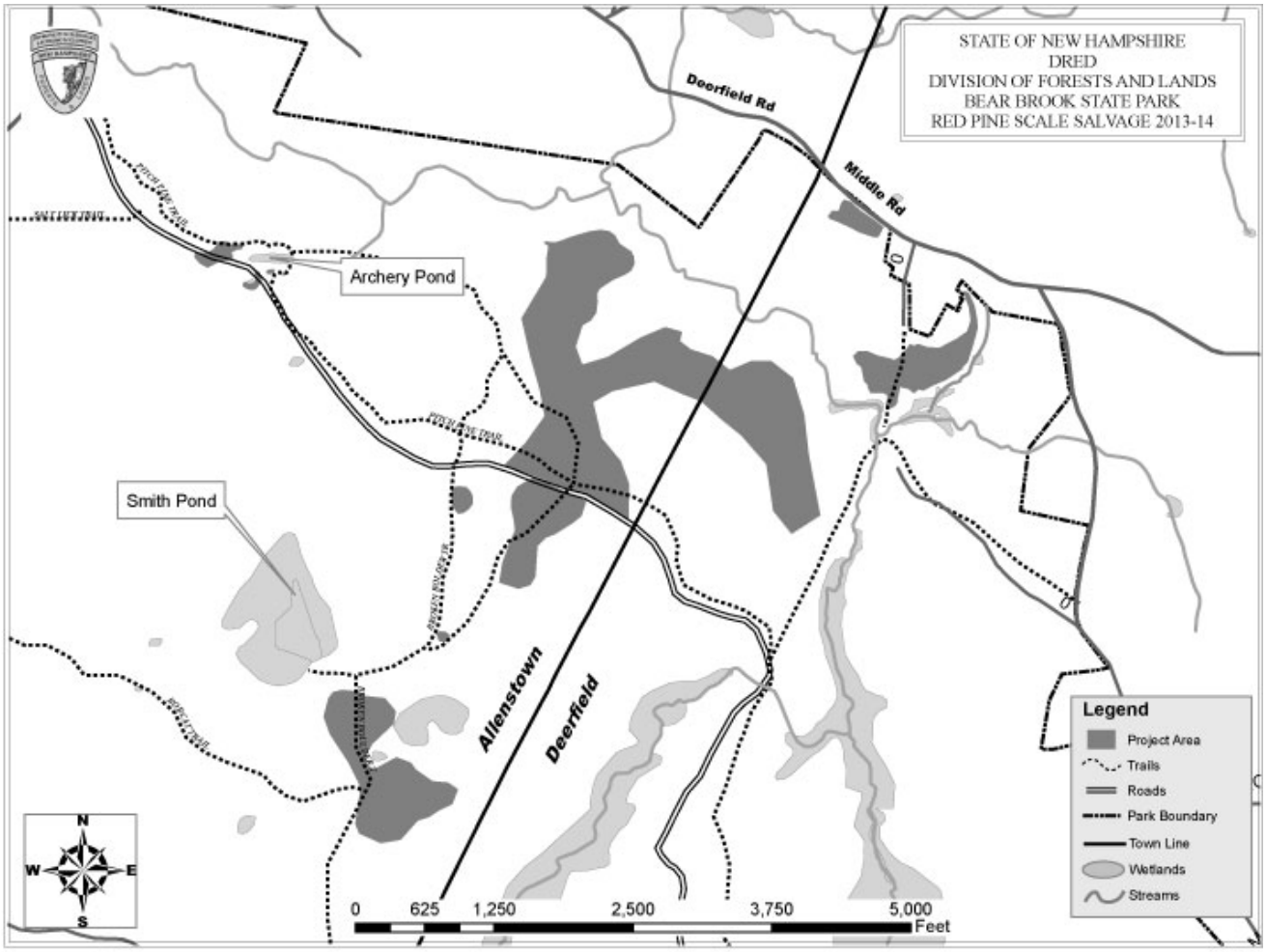
ALB has not been found in NH to date but eradication efforts are still ongoing in New York, Massachusetts, New Jersey, and Ohio. ALB sightings in the Worcester, MA area were slightly up from last year with 19 beetles found in 2013 and 13 in 2012. We continue to look for ALB in NH and this year pheromone traps were hung in high risk areas in Merrimack and Rockingham Counties during the ALB flight season. Over 500 insects were collected in 27 traps. ALB was not collected in any of the traps but one EAB was collected in a Concord trap.

Pheromone Trapping

Each summer pheromone traps are placed around the state to monitor common forest pest populations. In 2013 pheromone traps were placed around the state for spruce budworm, forest tent caterpillar, and oak leaftier. Spruce budworm and forest tent caterpillar remain at endemic levels. Although little defoliation was detected this year oak leaftier catch was up again at some sites and heavy defoliation in isolated areas of Grafton County may be seen next year.

Red Pine Scale Update

Red Pine Scale was first detected in NH last year and infestations continue to slowly spread in Merrimack and Rockingham Counties. A sanitation harvest at Bear Brook State Park was initiated on 118 acres last winter and a second harvest is scheduled for this coming winter to remove recently infested trees on an additional 100 acres of the park. The infested trees occur in small pockets of pure red pine as well as throughout several small mixed stands along Middle Road, Podunk Road and Lower Campground Road and along the Pitch Pine Trail and Broken Boulder Trail in the vicinity of the Smith Pond Shelter area. New infestations were also detected in Epsom this year.



Firewood Quarantine Activities

This year NH Division of Forests and Lands Forest Rangers organized three separate firewood quarantine enforcement details. The first was held Memorial Day weekend in Franconia Notch and resulted in 12 written notices. In July and September details were held at the NH Motor Speedway during their NASCAR races. This was a cooperative effort among forest rangers, forest health personnel, and the NH Department of Agriculture Markets & Food. We worked closely with speedway personnel to inform campers of the quarantine prior to their arrival and ensure a smooth transaction for violators entering the property. Campers entering the speedway from out of state were asked if they had untreated firewood. If they answered yes, they were directed to pull over for inspection. Firewood in violation of the quarantine was confiscated and burned at the local dump. Violators were issued notices and courtesy vouchers for kiln dried wood. Most violators were from New England with a total of 109 notices written from July 10-12. Firewood was also confiscated from Canada and as far away as California, Colorado, and Ohio. This detail was repeated September 18-20th and a total of 86 notices were written and 2 summonses were issued.

Photos: Jen Weimer

NH Aerial Survey Highlights for 2013

NH's annual aerial survey is a cooperative effort between the NH Division of Forests and Lands and the USDA Forest Service Northeastern Area State and Private Forestry. The 2013 NH state aerial survey team mapped 15,251 acres of serious damage or defoliation on state and private lands and the USDA Forest Service mapped an additional 14,378 acres of damage on the White Mountain National Forest (WMNF).

Defoliation of oak by **frost** and **anthracnose** were the primary damaging causing agents this year with 15,317 acres mapped. The WMNF also mapped 5,641 acres of **hail** damage on northern hardwoods. **Balsam woolly adelgid** mortality was mapped on 3,571 acres. Browning on pine from **needlecast diseases** was observed throughout the state again and 3,552 acres were mapped on the WMNF. Defoliation from **oak leaftier** was mapped on 533 acres and dieback from **logging damage** was mapped on 432 acres. In addition there was defoliation from **forest tent caterpillar** (389 acres) and minor discolor from **red pine scale** (52 acres) mapped.

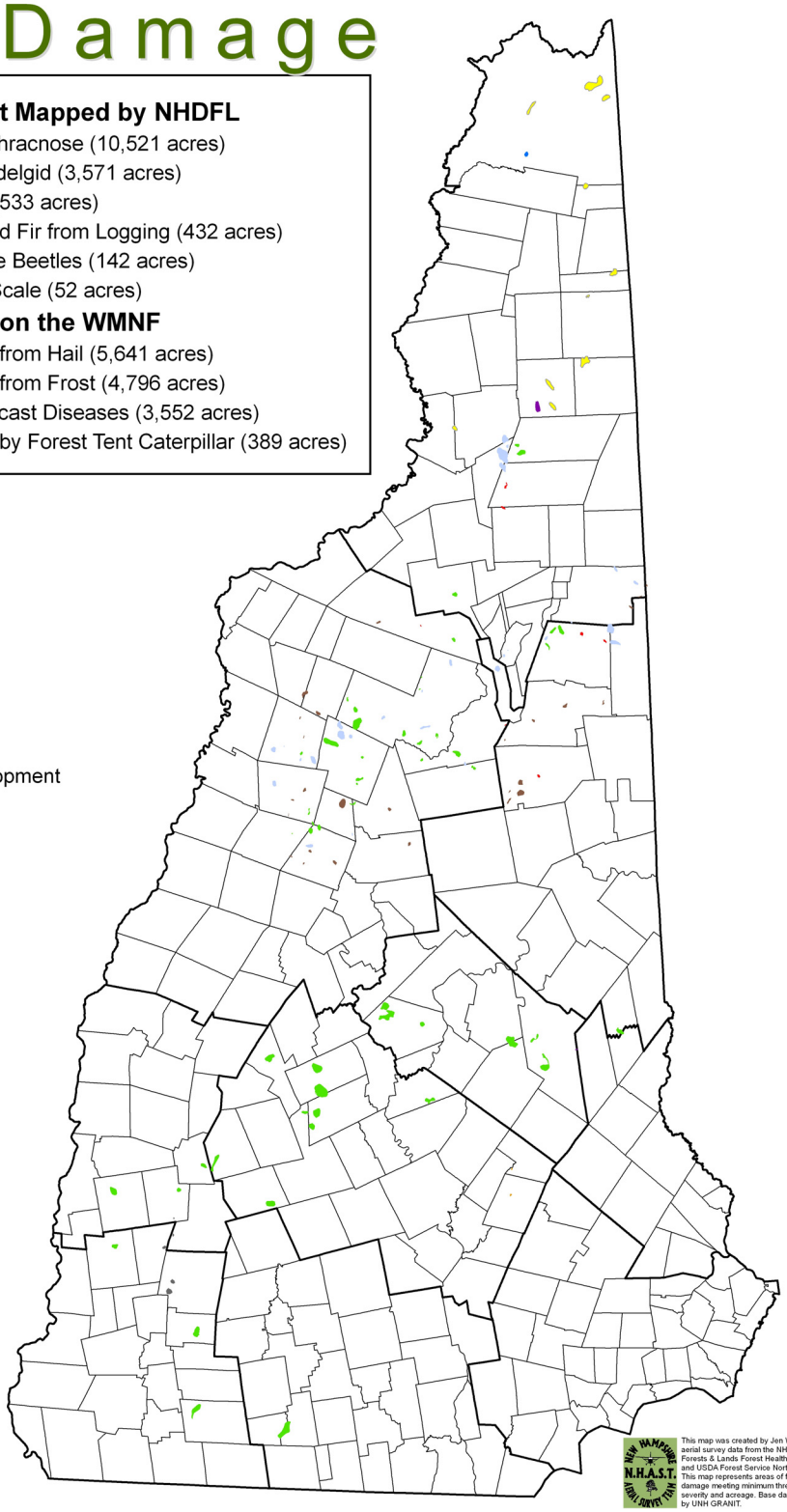
2013 New Hampshire Forest Damage

Primary Damage Causing Agent Mapped by NHDFL

- Defoliation of Oak by Frost and Anthracnose (10,521 acres)
- Mortality of Fir by Balsam Woolly Adelgid (3,571 acres)
- Defoliation of Oak by Oak Leaftier (533 acres)
- Dieback of Northern Hardwoods and Fir from Logging (432 acres)
- Mortality of White Spruce by Spruce Beetles (142 acres)
- Discolor of Red Pine by Red Pine Scale (52 acres)

Primary DCA Mapped by USFS on the WMNF

- Defoliation of Northern Hardwoods from Hail (5,641 acres)
- Defoliation of Northern Hardwoods from Frost (4,796 acres)
- Discolor of White Pine from Neddlecast Diseases (3,552 acres)
- Defoliation of Northern Hardwoods by Forest Tent Caterpillar (389 acres)



State of New Hampshire
Dept. of Resources & Economic Development
Division of Forests & Lands
Forest Protection Bureau
Forest Health Section
PO Box 1856
Concord, NH 03302
603-464-3016

N
W E
S

USDA Forest Service
Northeastern Area

0 5 10 20
Miles

This map was created by Jen Weimer using aerial survey data from the NH Division of Forests & Lands Forest Health Program and USDA Forest Service Northeastern Area. This map represents areas of forest damage meeting minimum thresholds of severity and acreage. Base data provided by UNH GRANIT.

1 October 2013

FEATURE ARTICLE

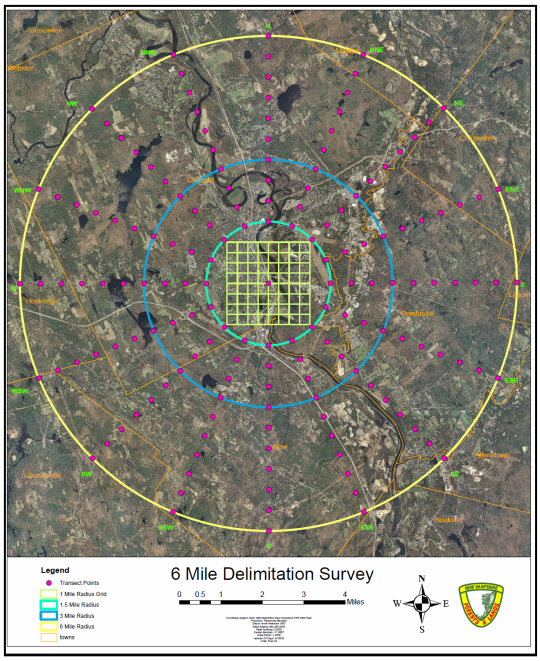
By: Jen Weimer

Concord EAB Delimitation Survey

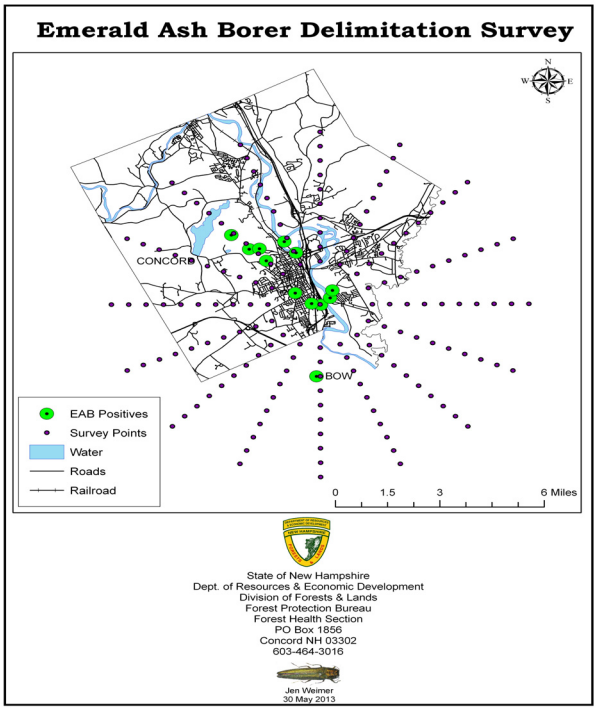
Photo: Tracey Bentley, UNHCE

So the saying goes that March comes in like a lion and out like a lamb but this year it came out all beetles in NH. The menacing Emerald Ash Borer (EAB) wasn't predicted to be in NH until 2015 but it was confirmed in Concord in April (no fool) and March madness soon took on a new meaning. We dusted off the cooperative action plan that had already been developed by the NH Division of Forests and Lands, NH Department of Agriculture Markets & Food, and UNH Cooperative Extension in anticipation of EAB's eventual arrival. Our goal was to unravel where the beetle was, provide outreach, and determine management options for landowners. An empty state warehouse in Concord was located for use as our EAB headquarters for the delimitation survey and a command trailer was dropped off by the forest rangers to serve as my new office. Numerous agencies and organizations responded to our need for assistance and our staff of 2 quickly multiplied as dozens of folks showed up daily to act as surveyors, sawyers, and peelers. In addition we quickly hired 2 seasonal technicians and enlisted our part time entomologist to head up the peeling efforts.

On a daily basis surveyors were deployed to locate ash trees and obtain landowner permissions for tree sampling. If landowners were not home info was left in the door or letters were mailed to initiate contact. Sawyers were sent out to sample trees once written permissions were secured by participating landowners. In addition municipalities within the survey area granted permission for us to sample on town lands and our state foresters quickly identified ash on state lands to sample. Peelers worked like busy beavers back at headquarters peeling bolts brought in by the sawyers. In six weeks we surveyed, sampled, and peeled bolts from a 6-mile radius around the initial detection.

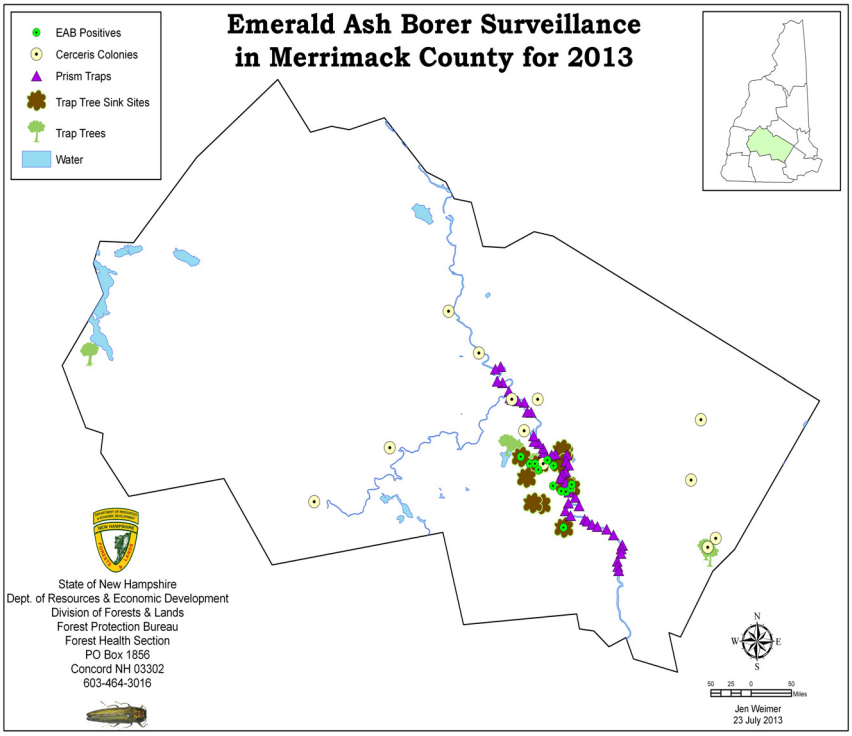


The survey consisted of multiple phases beginning as a grid survey consisting of 64 forty acre cells. The goal was to sample 3 one meter bolts from each of 2 trees per cell. Landowners who wanted to participate were given the option of tree removal or having branches pruned. Trees in forested settings were typically felled with brush left onsite while urban trees were mostly pruned. Work was also contracted out to a local tree care company who worked with our crews to sample trees that required specialized

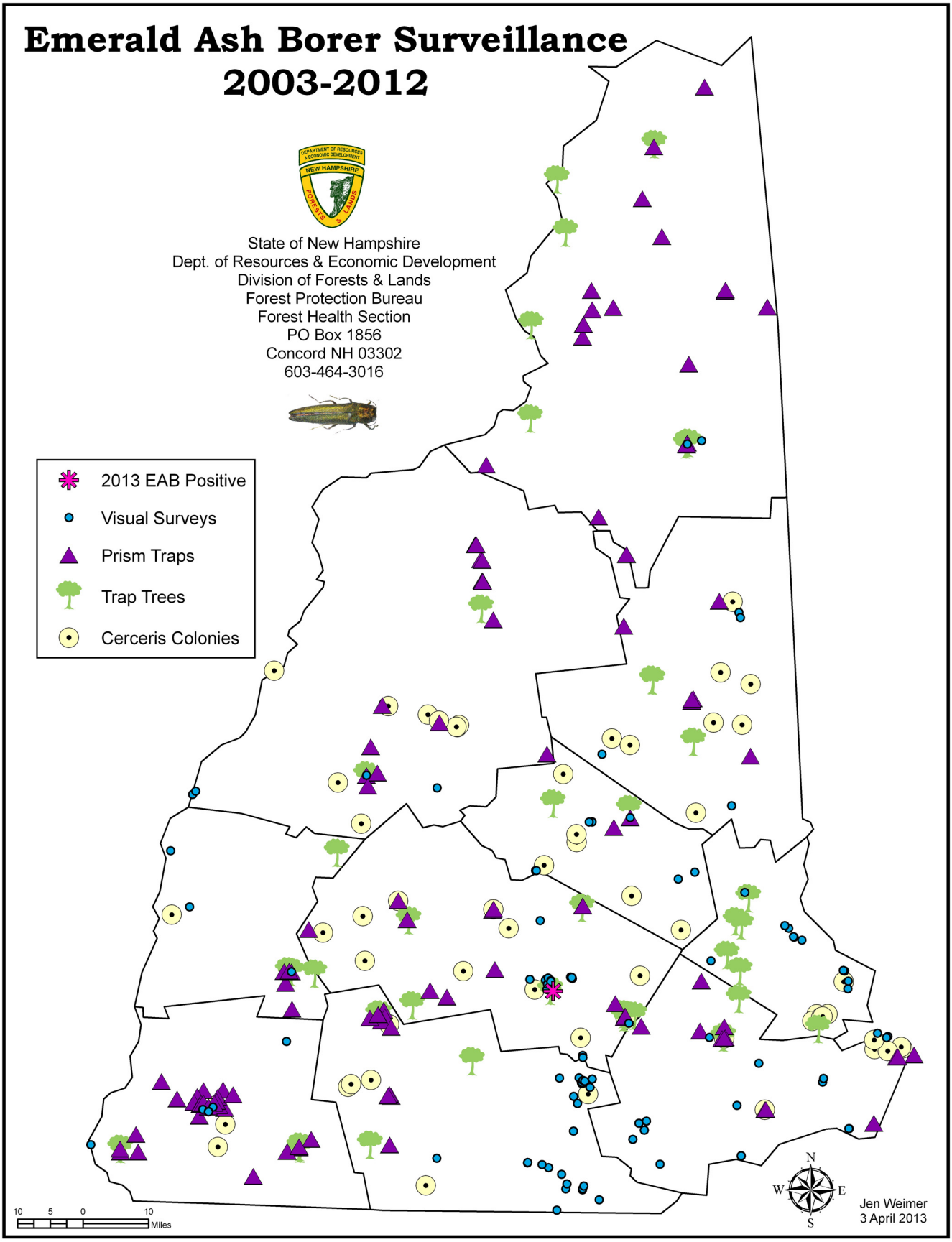


equipment. Chips and debris not left onsite was taken to a site in Concord for processing according to quarantine. By the end of phase one 76 trees were sampled from 61 of the 64 cells in the grid with 16 cells having no ash and 5 cells with EAB positives.

During the grid phase of the survey our forest rangers conducted additional visual surveys and collected samples from recent timber sales in Merrimack County. The survey was expanded to 3 miles out once EAB was confirmed in samples collected north of the grid area and again to 6 miles out soon after. The expanded survey was a transect survey with points located a half mile apart radiating out from the initial grid. The goal was to sample 3 one meter bolts from each of 2 trees per point. Trees were sampled within a ¼ mile radius of the point. A total of 220 trees were sampled from 134 of the 160 transects with 16 points having no ash and 7 points with EAB positives. At the end of six weeks 112-square miles was surveyed and 951 bolts were peeled resulting in a 24-square mile generally infested area encompassing the cities of Concord and Bow. This data was used to create management guidelines for landowners (see page 12).



After examining numerous infested bolts it was determined that the infestation likely began four years ago. Surveillance for additional infestations within Merrimack County was conducted using traps, trap trees, and *Cerceris* wasp colonies. No additional infestations have been detected to date. Trap tree sink sites consisting of 5 girdled trees per site were also created to lure beetles to sites that can be treated with insecticides or cut to reduce beetle populations. Efforts to detect and manage EAB in NH are ongoing.


Emerald Ash Borer Surveillance
2003-2012
State of New Hampshire
Dept. of Resources & Economic Development
Division of Forests & Lands
Forest Protection Bureau
Forest Health Section
PO Box 1856
Concord NH 03302
603-464-3016
2013 EAB Positive
Visual Surveys
Prism Traps
Trap Trees
Cerceris Colonies
10 5 0 10
Miles
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S
Jen Weimer
3 April 2013

FEATURE CREATURE

By: Jen Weimer

Emerald Ash Borer (*Agrilus planipennis*)

Originating in Asia and first discovered in the U.S. in 2002, the Emerald Ash Borer (EAB) has killed tens of millions of ash trees as it spreads across the continent. Adult beetles have the ability to fly up to a half mile a year but most of the spread continues to be from the movement of infested firewood and nursery stock. This has resulted in numerous quarantines to limit its spread. NH currently has a firewood quarantine banning the importation of untreated firewood without a commercial or home heating compliance agreement. There is also an EAB quarantine in effect for Merrimack County restricting the movement of ash products and hardwood firewood. EAB is not considered a pest that can be eradicated as it now exists in 22 states in the U.S. and 2 provinces in Canada. Early detection is not easy but critical for successful management.

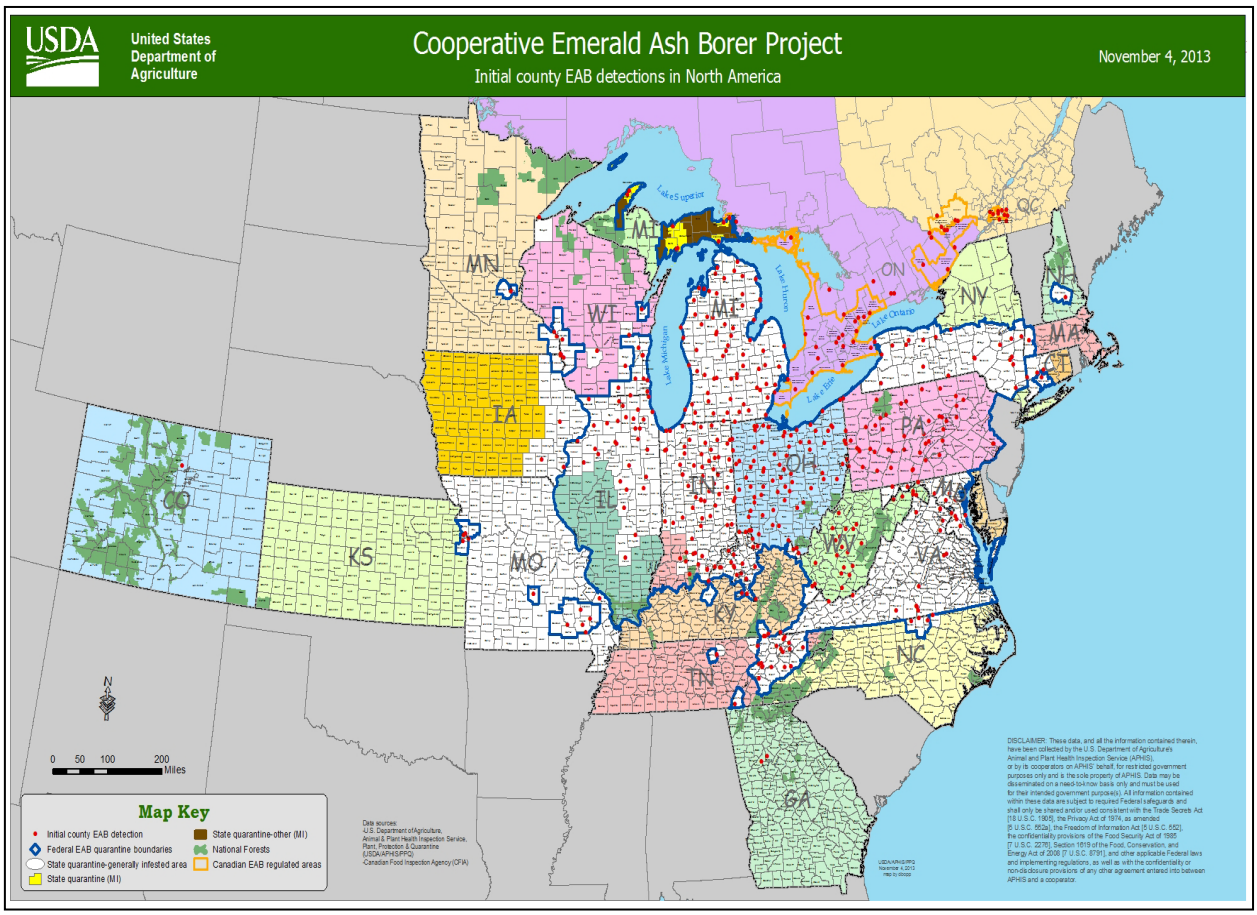


Photo: Jen Weimer

EAB adults are small slender metallic green jewel beetles averaging 1-1.5 cm in length. Adults are active May through August as they mate and lay eggs in the bark of ash (*Fraxinus* species) trees. Eggs hatch into flattened cream-colored larvae with bell shaped segments and average 3 cm in length. The larvae feed on the phloem through October and overwinter under the bark or in the outer sapwood before pupating into adults and emerging through d-shaped holes in May. Typically only one year is required to complete the life cycle but occasionally it can take two years on healthy trees.

Recently infested trees may be difficult to detect without sampling limbs and peeling them for signs of the distinct s-shaped larval galleries. Adult emergence holes are small and difficult to detect in upper branches where infestations usually start. Trees will show more signs of attack as populations increase including epicormic sprouting, bark splits, and a "blonding" effect as woodpeckers peel off the bark in search of larvae. Trees typically die within 3-5 years of initial infestation if left untreated and quickly become hazard trees.

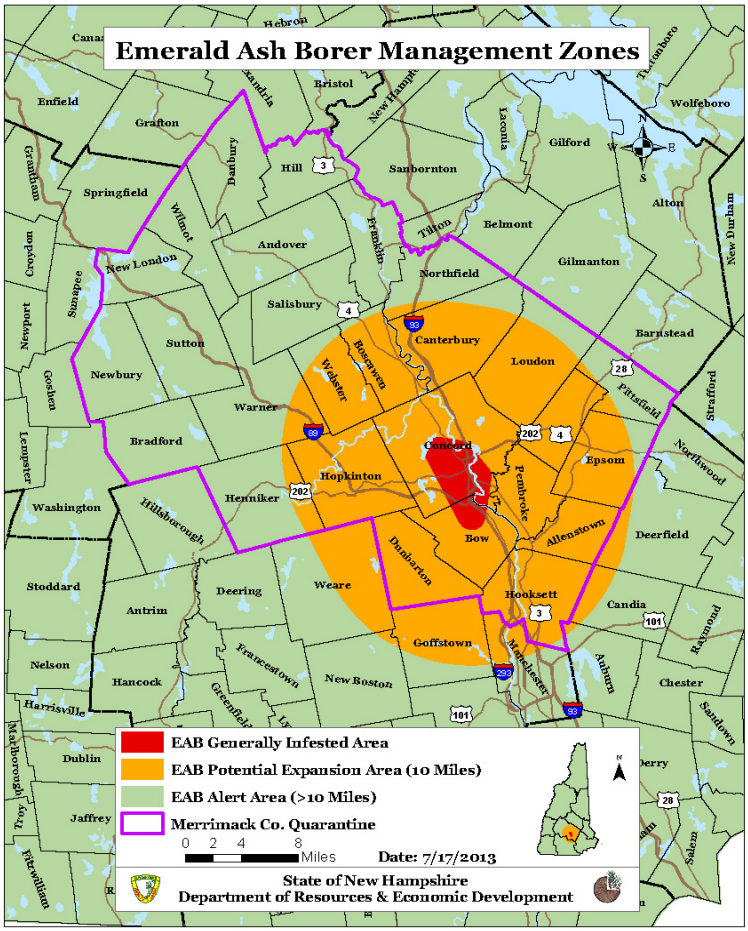
Photo: Jen Weimer

EAB management recommendations have been developed for NH landowners and can be found in detail at nhbugs.org. Recommendations are based on proximity to an EAB infestation and urban versus forested landscapes. In urban settings consider removing low value ash while they are still healthy. Trees larger than 12 inches in diameter should be removed from forested settings leaving smaller ash. Regardless of location it is important to inventory your trees and to evaluate them for signs of EAB. Infested trees or ash within the generally infested area should be treated or removed and handled according to quarantine restrictions.

If infestations are detected early trees can be treated with insecticides to reduce EAB populations and prevent tree mortality. Insecticide recommendations are based on tree size, health, and proximity to EAB infestations (See map and chart on next page). Insecticide treatments are only recommended for high value ash trees and will need to be repeated every 1-3 years. It's best to seek the advice of a NH licensed pesticide applicator that has experience in using the recommended products.

Photo: Jen Weimer

Long term wide scale management of EAB in NH may someday be achieved through biological controls. Several hymenoptera parasitoids are currently being released in the U.S.—*Oobius agrili*, *Spathius agrili*, and *Tetrastichus planipennisi*—and plans are underway to bring some of these to NH. Releases will be made in the spring on public lands in Concord with moderate levels of EAB infested ash trees. Plans are also underway to train detection dogs to sniff out infested trees so stay tuned as new developments in EAB management are ongoing.



	Ash trees are:	
	Less than 18 inches dbh	**More than 18 inches dbh**
Generally infested area		
Ash appear healthy	Imidacloprid, dinotefuran, or emamectin benzoate products	Emamectin benzoate products
Ash are in decline	Emamectin benzoate products	Emamectin benzoate products
Ash have greater than 50% crown dieback or are dead	Tree removal – translocation ability of tree is likely insufficient to deliver chemical for effective treatment	Tree removal – translocation ability of tree is likely insufficient to deliver chemical for effective treatment
Potential Expansion Area (within 10 miles of known EAB infestation)	Imidacloprid, dinotefuran, or emamectin benzoate products	Emamectin benzoate products
Alert Area (more than 10 miles from a known EAB infestation)	Treatment is not recommended. Stay informed about new EAB information.	Treatment is not recommended. Stay informed about new EAB information.

This information is given for educational purposes only and endorsement of insecticides use or the use of any specific insecticide product isn't implied. Seek advice of a New Hampshire licensed pesticide applicator for questions related to products, application costs and treatment efficacy. More info can be found at nhbugs.org.

Office Notes

The NH Forest Health office and lab is located at the Caroline A. Fox Research and Demonstration Forest in Hillsboro. Our EAB headquarters is currently located at the NH DOT building on Stickney Avenue in Concord. The EAB HQ was established upon the detection of EAB in Concord this spring and housed our delimitation survey efforts. We will continue to use space at this site for peeling ash bolts and other EAB management efforts in Concord.

Ray Boivin Shows EAB to Governor Hassan
Photo: Tracey Bentley, UNHCE

We extend our gratitude to Governor Maggie Hassan and the following agencies that graciously helped with our EAB delimitation survey: NH Division of Forests and Lands, UNH Cooperative Extension, NH Department of Agriculture Markets & Food, Society for the Protection of NH Forests, NH Audubon, Maine Forest Service, Massachusetts Department of Conservation and Recreation, Vermont Department of Forests Parks and Recreation, USDA Forest Service Northeastern Area State and Private Forestry, USDA Forest Service WMNF, The Nature Conservancy, the Society of American Foresters, and Urban Tree Care. We also thank the residents and municipalities of Concord, Bow, Pembroke, Chichester, Loudon, Hopkinton, Epsom, Allenstown, and Dunbarton.

We are excited to announce the recent hiring of Molly Heuss to fill a newly created Forest Health Specialist position. Molly will primarily be working on EAB monitoring, management, and outreach. Ray Boivin, our part time Entomologist, worked with us again this year on the EAB delineation survey and trapping for EAB and ALB. Our technicians this year were Garret Dubois and Gabe Horton who worked on the EAB survey and other projects this summer. Garret is now working as a Biological Science Technician for the USDA Forest Service in Alaska and Gabe returned to college.

Please don't hesitate to contact us if you observe any forest pest damage.

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Please note our new email addresses

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JW 12/13