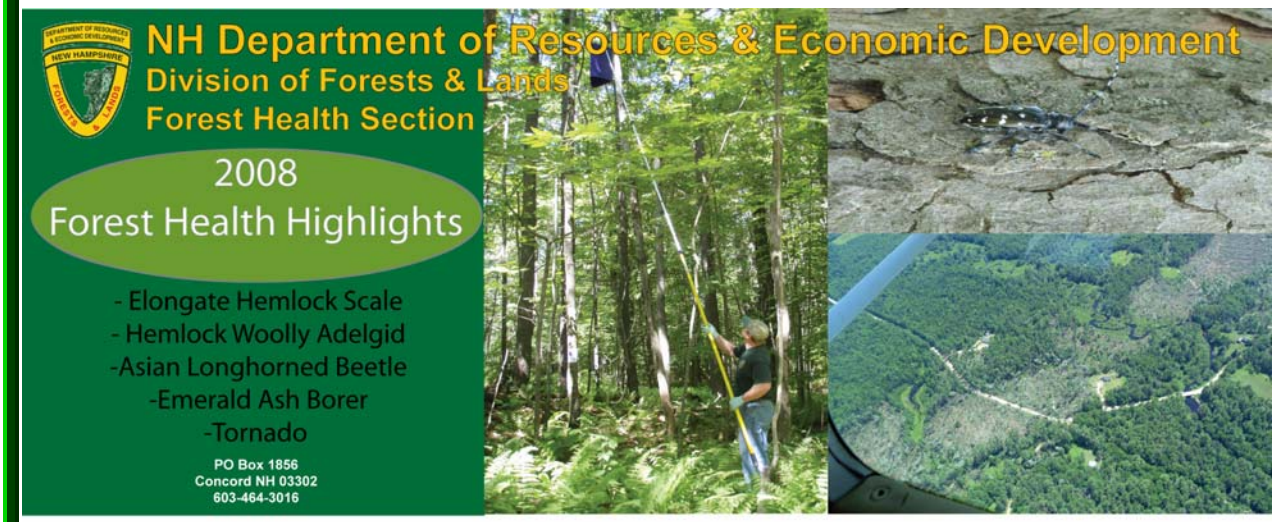

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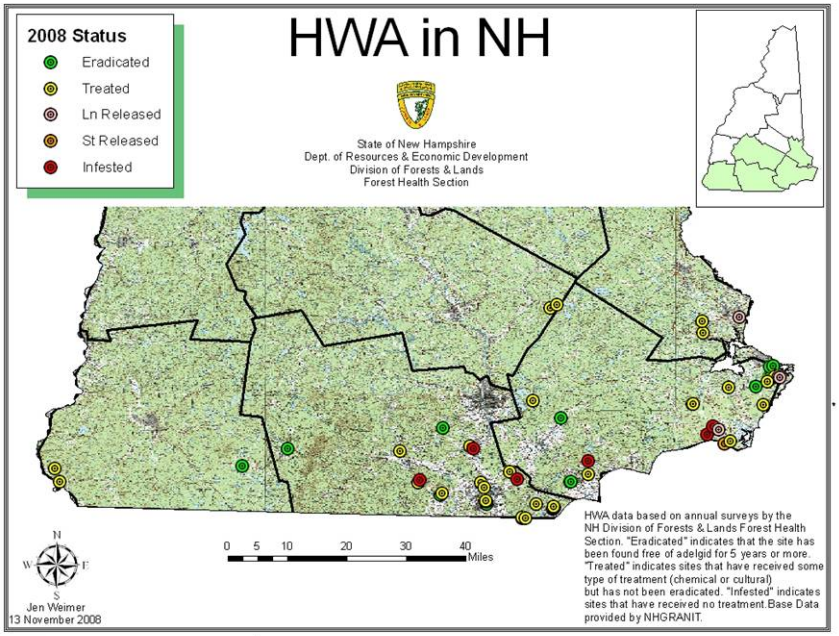
Look for the HYPERLINKS throughout for more information on topics!

FIELD SURVEYS

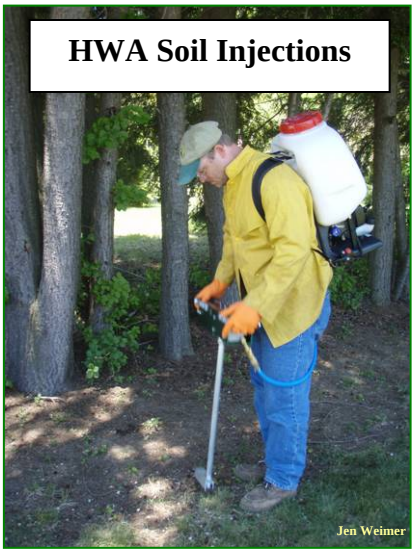
Hemlock Woolly Adelgid

Several surveys for Hemlock Woolly Adelgid (HWA) were conducted in 2008 including post suppression surveys, the Parks and Ponds Survey and a new Road Side Survey in heavily populated towns. New infestations of HWA were found in only 3 towns of the 40 surveyed throughout the southern part of the state. These include the towns of Auburn, Epsom, and Hinsdale.



This year's survey focused on towns bordering MA, towns bordering the Connecticut River, towns bordering the current quarantine and towns surrounding new infestations. Road sides within heavily populated areas and near ponds were targeted since several infestations in recent years have occurred in these areas. Surveys in NH show that trees at risk for HWA include those along roads or other openings such as fields and ponds. These trees have the greatest chance of appealing to birds that may be carrying HWA.

Numerous new infestations were also reported by landowners this year. These infestations occurred in the towns of Milford, Dover, Madbury, Pelham, and Hinsdale. The homeowner report in Milford led to the discovery of Elongate Hemlock Scale (EHS) on an abutting property that also had HWA. While EHS is often found coexisting with HWA, this is the first known infestation of EHS in NH.

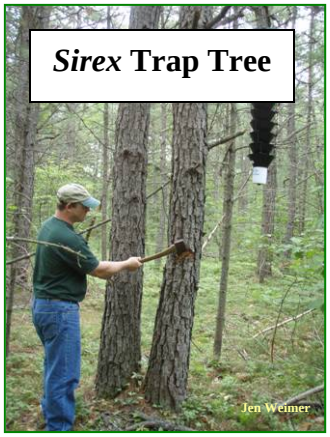


HWA Soil Injections

HWA suppression methods undertaken by the Division this past year included chemical and biological control. We treated numerous small infestations on nine properties with soil injections of Imidacloprid. For these treatments we used Rainbow Treecare's HTI 2000 soil injector with Xytect 75F. We liked this injector much better than the Kioritz injector we had been using. We also utilized biological control with the release of 200 *Laricobius nigrinus* beetles from Idaho and Washington. These beetles were collected by Dave Mausel from the University of Massachusetts who is using these release sites as part of his research on the beetles. *L. nigrinus* is a predatory beetle native to North America and may be better suited to NH than the previously released *Sasajiscymnus (Psuedoscymnus) tsugae* beetles.

Sirex Woodwasp

In 2008 ten sites around the state were chosen as trap tree sites for *Sirex noctilio*. The traps were in place June through October and checked every 2 weeks. Each trap tree (3 per site) was girdled and injected with herbicide to kill it. Funnel traps were also hung in each tree. Red pine, pitch pine, Scotch pine, and jack pine were used. No adult *Sirex noctilio* were collected in the traps and none of the trap trees showed signs of *Sirex* attack. Several of the trees were cut and dissected and a few logs were placed in rearing barrels.

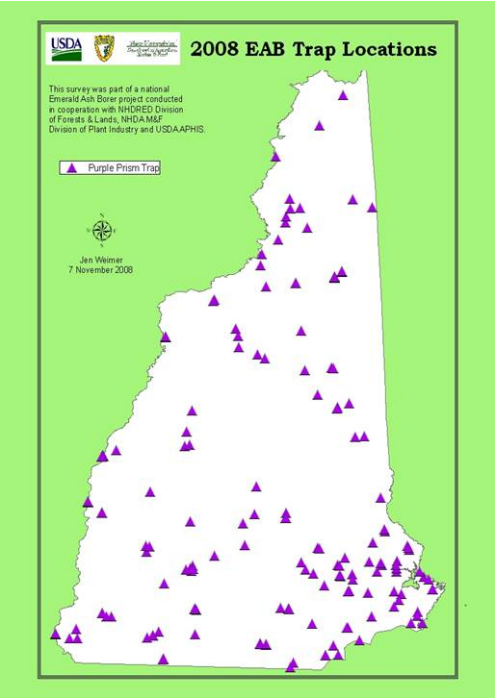


***Sirex* Trap Tree**

EAB Prism Trap

Emerald Ash Borer (EAB)

EAB continues to spread in the Midwest and threaten NH's ash resource. Firewood continues to be the main method of spread. In 2006 a survey was done to determine how many campers were bringing firewood from home. Subsequently an outreach program was started to educate prospective campers about the risk of moving firewood long distances. In 2008 the survey data shows a substantial reduction in the percentage of campers hauling firewood. In the summer of 2007 we started an investigation into what pests have already been accidentally moved by camp firewood. Firewood was voluntarily exchanged at state campgrounds for native wood and placed in rearing barrels for the winter. The following summer insects were fumigated and sorted after spending at least 6 months in the barrel. Results from just 9 samples indicate there are a large number of insects traveling in firewood. A total of 8 different orders of insects were reared. This included four different species of bark beetles; one of which carries the oak wilt disease not yet known to exist in NH. Firewood was collected again this summer and is currently over wintering in the barrels.



Visual surveys, trap trees, and prism traps for EAB were also utilized at numerous sites around the state. A total of 156 landscape ash trees were inspected at 40 major grocery stores. Three trap trees were felled and peeled to look for larvae. We also placed 50 prism traps around the state as part of a larger cooperative effort with the NH Department of Agriculture and the USDA Animal & Plant Health Inspection Service (APHIS). The traps are designed to attract and capture adult beetles. No signs of EAB were found in any of the surveys.

***Cerceris* emerging from nest**

We also participated in a new method of monitoring for EAB known as "Bio-surveillance". For this survey we monitored colonies of *Cerceris fumipennis*, a native digger wasp that preys on buprestid beetles (the same family as EAB). The wasps nest in compacted sandy loam soils in open areas and hunt in nearby trees. They have very distinct yellow markings on their face that makes them easy to identify. They do not sting and it is easy to capture them when they return to their nests with the beetles. By monitoring what type of

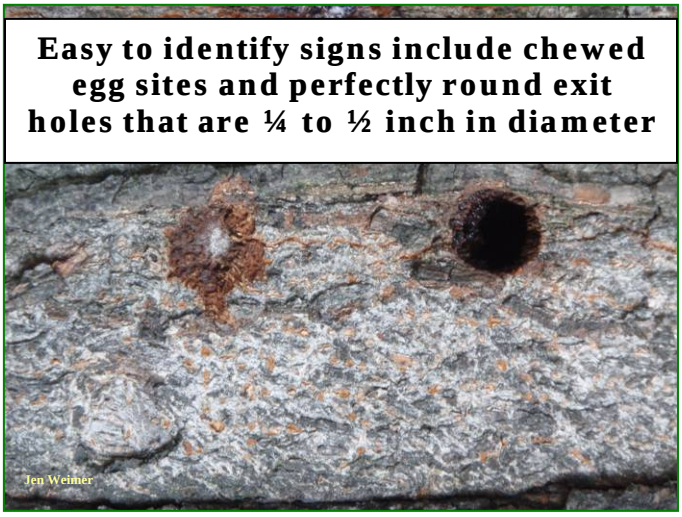
beetles they bring back we can determine if EAB is present in the adjacent forest. We found 4 *Cerceris* colonies this year and hope to find more next season. Let us know if you've seen these wasps. They prefer to nest in open compacted areas such as baseball diamonds, parking lots, and campsites.

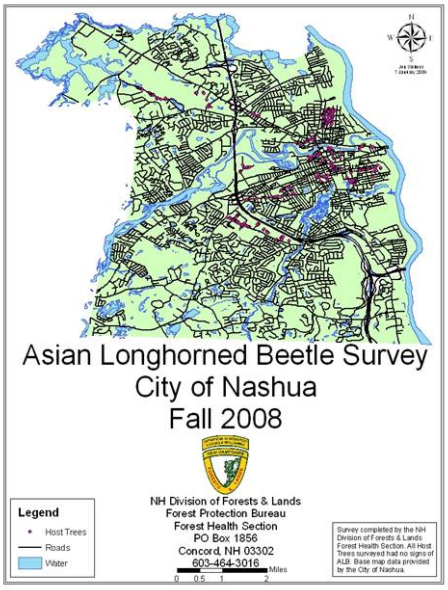
Asian Longhorned Beetle

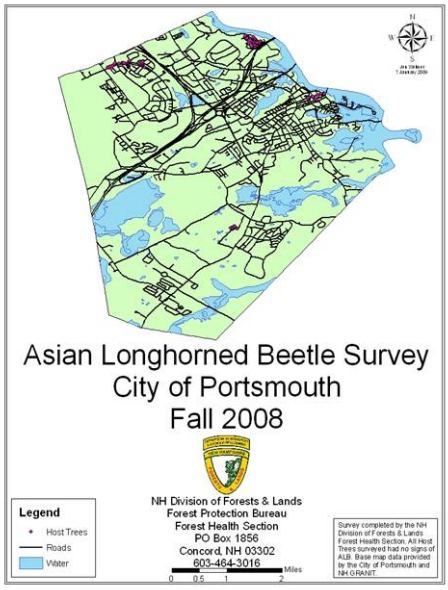
In August ALB was discovered in Worcester, Massachusetts. The infestation is only 40 miles from NH and has possibly been there for 10 years. The removal of 6,000 infested trees within a 2 square mile area will begin in January. The beetle is believed to have been transported to Worcester in wooden pallets from China. This new discovery prompted surveys this fall in Nashua and Portsmouth. We plan to launch a full scale survey of all major high risk cities in NH next summer. We have been surveying for ALB since 1999 and no signs of the beetle have been found in these surveys. We have had numerous reports of sightings but they have all turned out to be native look a likes. See the following page for comparison.

Adults are 1 to 1.5 inches long, not including antennae

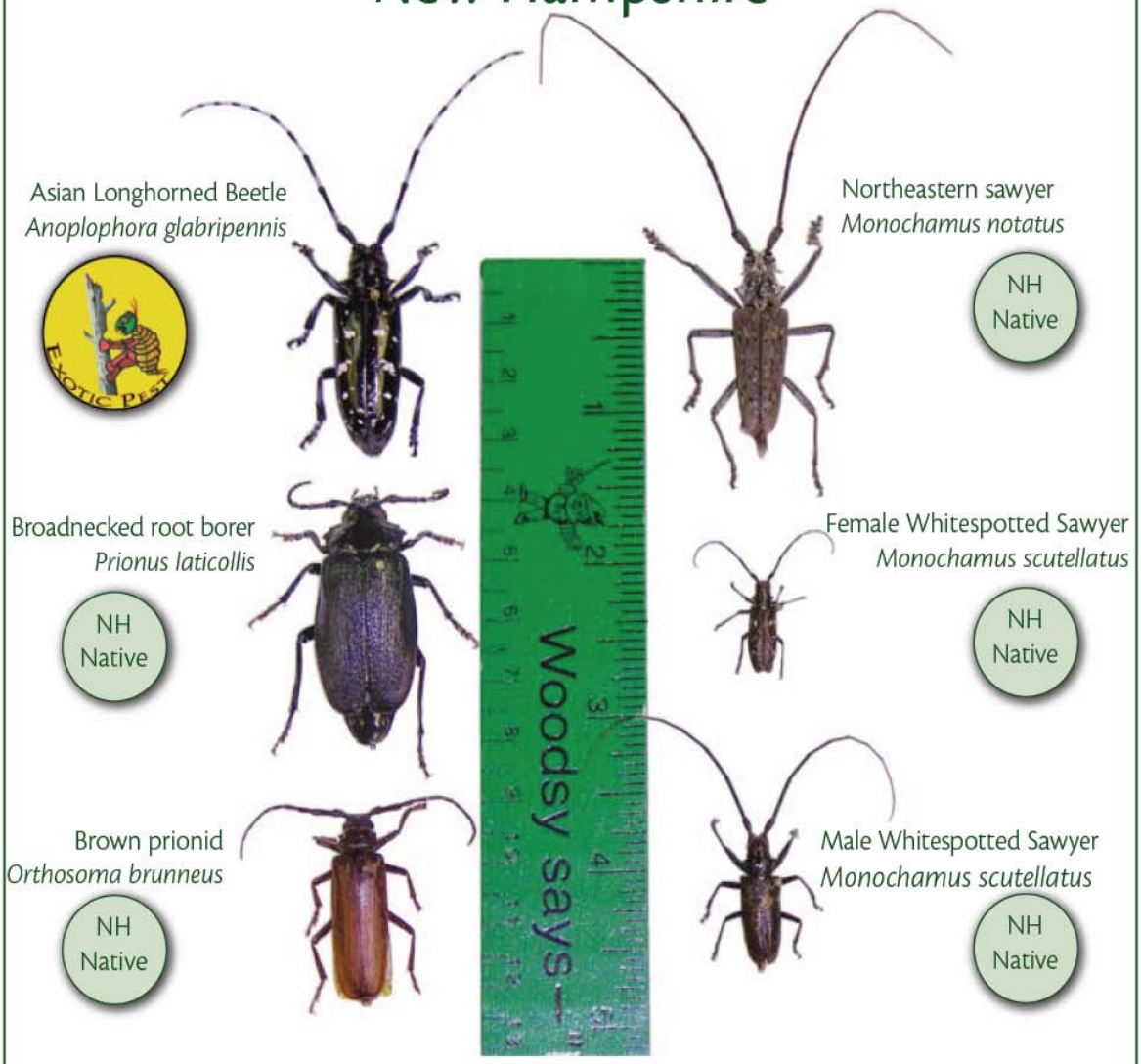
Easy to identify signs include chewed egg sites and perfectly round exit holes that are ¼ to ½ inch in diameter







Comparison of the Asian Longhorned Beetle and longhorned beetles native to New Hampshire



For additional information contact our Forest Health Specialist at (603) 464-3016

N H Department of Resources and Economic Development
Division of Forests and Lands Forest Protection Bureau
172 Pembroke Road P.O. Box 1856 Concord, NH 03302-1856
WWW.NHDFL.COM

RMB 2008

Pheromone Trapping of Forest Pests in NH

Each summer pheromone bucket traps are placed around the state to monitor common forest pest populations. Epidemics can be predicted by analyzing trends over time. In 2008 pheromone traps were put out for Spruce Budworm and Forest Tent Caterpillar. Both of these pests remain at endemic levels. A few Saddled Prominent adults were collected which is consistent with the defoliation mapped in our aerial survey this year. Epidemics of Saddled Prominent have been known to occur shortly following Forest Tent Caterpillar outbreaks.

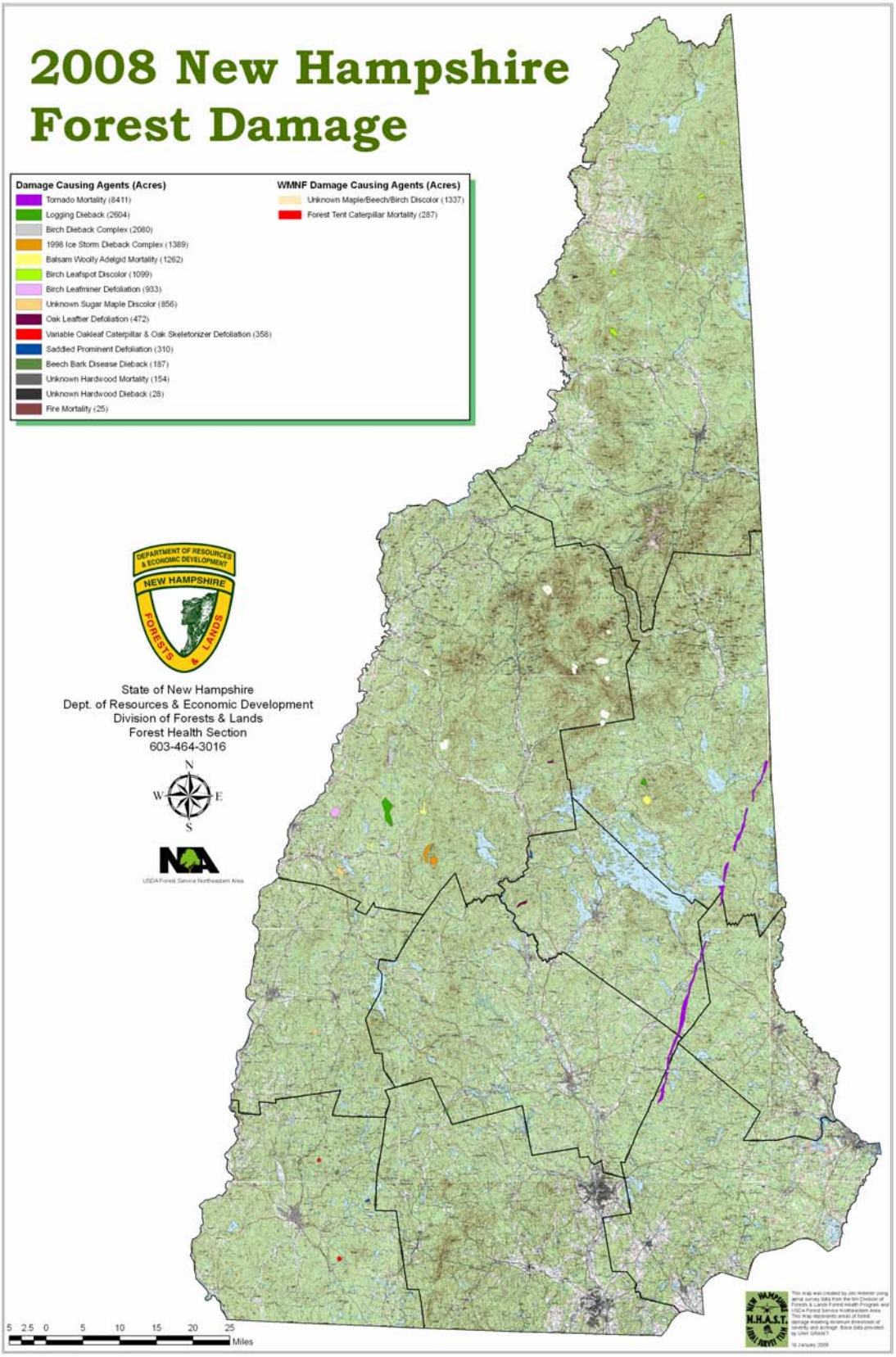
NH Aerial Survey Highlights for 2008

NH's annual aerial survey is a cooperative effort between the State Division of Forests and Lands and the USDA Forest Service Northeastern Area State and Private Forestry. The 2008 State aerial survey mapped 20,168 acres of serious damage or defoliation on state and private lands and the USDA Forest Service mapped an additional 1,624 acres of damage on the White Mountain National Forest.

Wind was the primary damaging causing agent in NH again this year. Blowdown and broken stems were found on 8,400 acres as a result of a **Tornado** in July. **Fall Cankerworm** and **Forest Tent Caterpillar** populations crashed with zero acres defoliated in 2008. Balsam Fir mortality from **Balsam Woolly Adelgid** continues in NH with 1,262 acres mapped. Minor defoliation was seen this year by **Saddled Prominent** (310 ac.), **Variable Oakleaf Caterpillar** (358 ac.) and **Oak Leaftier** (472 ac.). We'll be watching closely for outbreaks of these defoliators next year.

Other significant forest damage mapped throughout NH this year include **Birch Leafminer** (933 ac.), dieback from **Logging** damage (2,604 ac.), and **Sugar Maple Chlorosis** (856 ac.).

Map of 2008 major forest damage on the following page


2008 New Hampshire Forest Damage
Damage Causing Agents (Acres)
Tornado Mortality (8411)
Logging Dieback (2604)
Birch Dieback Complex (2080)
1998 Ice Storm Dieback Complex (1389)
Balsam Woolly Adelgid Mortality (1262)
Birch Leafspot Discolor (1099)
Birch Leafminer Defoliation (933)
Unknown Sugar Maple Discolor (856)
Oak Leaftier Defoliation (472)
Variable Oakleaf Caterpillar & Oak Skeletonizer Defoliation (358)
Saddled Prominent Defoliation (310)
Beech Bark Disease Dieback (187)
Unknown Hardwood Mortality (154)
Unknown Hardwood Dieback (28)
Fire Mortality (25)
WMNF Damage Causing Agents (Acres)
Unknown Maple/Beech/Birch Discolor (1337)
Forest Tent Caterpillar Mortality (287)
DEPARTMENT OF RESOURCES & ECONOMIC DEVELOPMENT
NEW HAMPSHIRE
FORESTS & LANDS
State of New Hampshire
Dept. of Resources & Economic Development
Division of Forests & Lands
Forest Health Section
603-464-3016
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FEATURE ARTICLE

The Tornado (By Kyle Lombard)

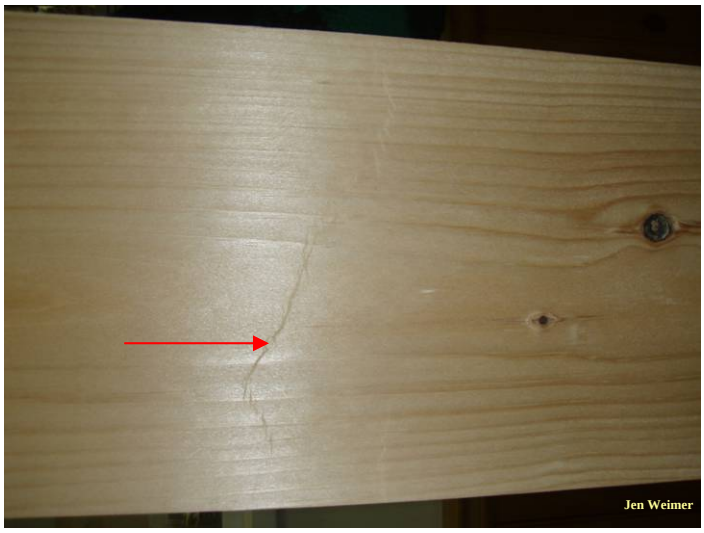
At 10:38am on July 24, 2008 a devastating tornado hit central New Hampshire's forests. (Okay, I just wasted 68 characters stating the obvious.) As rare as this tornado was, did you know that 91 tornados have hit NH since 1950? According to NOAA's National Climatic Data Center we've had two F3 magnitude tornados, 26 F2 tornados, 37 F1 tornados - the remaining 26 were classified "F0". The tornado this summer was determined to be an F2 magnitude. So what does "F2" mean? The F stands for "Fujita", a scale of 1-5 based on a three second wind burst during the event. F0 is a three second gust from 45mph to 78mph and F5 is 262mph and above. The F2 that hit us in July had gusts from 118mph to 161mph. But if you don't actually measure the wind speed of a tornado (most tornados happen so fast that nobody has a chance to) how do we know what the wind speed was? Well, without going into detail about the new "enhanced Fujita" scale, experts base wind speed estimates on 8 levels of damage to 28 different types of structures and vegetation. The National Weather Service gives a brief description of an F2 tornado as "**Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated."** Interestingly, our July tornado may have been rated higher if more urban areas had been hit, but with mostly tree damage and wooden structures to assess the highest ranking obtainable was F2.

The most phenomenal aspect of the 2008 tornado was its 49.5 mile length. Almost all of the previous 91 tornados in NH were under a half mile long. The National Climatic Data center has this tornado listed as five separate tornados totaling 49 miles but from our aerial observation there was no real break between the five damage areas. Our first aerial survey mapped a swath 49.5 mile long with the width varying from a few hundred feet to half a mile. The total forest area affected was roughly 8,000 acres. Of that 8,000 acres approximately 2000 acres was completely destroyed. As of October, about 1500 acres had been salvaged. The total volume and value of the salvaged timber won't be known until all of the "report of cut" information can be analyzed, but we do know the volume of timber salvaged is considerably less than what was originally estimated based on the full 8,000 acres of damaged forest. Most of the partially damaged and defoliated forests will not receive and don't need immediate treatments to recoup timber value or thwart future insect and disease outbreaks. At this point it seems the estimate will be closer to 10 million board feet of pine salvaged rather than the original estimates that exceeded 40 million.

Questions about how quickly the damaged timber needs to be salvaged and how badly the trees can be damaged and remain viable timber stock for the future will always be raised immediately after big storms. In the case of this tornado the question of where to salvage was fairly obvious but the question of how quickly was far more debatable. To date, six months after the storm, all of the sawlog grade logs are still in great shape. If the trees blew over and the roots were still attached to the bole we expect them to be potential sawlog material for another year or longer. Those trees or portions of trees that snapped off in the storm are probably only going to remain potential sawlog material until early summer of 2009. By then the sawyer beetles and bark beetles will

have had a chance to deeply inoculate the drying wood with blue stain. As for the low quality material, it was pulp immediately after the storm and remains pulp today.

Last week we had a chance to follow several thousand feet of white pine sawlogs, cut from the tornado damaged area, through a local sawmill. The mill has sawn over a million board feet of tornado salvaged pine and has been very pleased with the way it's opened up. As the logs were delivered to the mill the only blue stain seen was on the small end of a couple small diameter logs. There was likely a shatter point just above where these logs were bucked. The overwhelming majority of logs had no sign of stain or defect. The only interesting blemish seen on an estimated 5% of the salvaged lumber was something called "timber break" by the mill manager. It wasn't actually a break in the wood and your fingers really couldn't feel the blemish but it looked like curly or twisted grain in the wood. NELMA does not require a scaling deduction for this and the mill was passing it on to their customers. One expert told me that it was probably a twisting of cellulose in the "S2" layer of the cell wall structure. We collected a few examples and hope to have them examined by a wood tech lab in Maine in the coming months. So, stay tuned!



FEATURE CREATURE

Elongate Hemlock Scale (*Fiornia externa*)

Elongate Hemlock Scale (EHS) is an exotic scale insect from Japan. It was first discovered in Queens, New York in 1908 and can now be found in 13 states including New Hampshire. EHS was discovered in Milford, NH this year during an investigation of an infestation of Hemlock Woolly Adelgid (HWA) that was reported by a homeowner. EHS is often found on trees also infested with HWA. This double trouble leads to widespread hemlock mortality.

EHS has sucking mouthparts and feeds on nutrients in the needles of conifers. It attacks the new growth on the undersides of the needles in the bottom of the crown. Preferred

hosts include: Canadian hemlock, Eastern hemlock, Carolina hemlock, Japanese hemlock, Fir, and Spruce. Cedar, Douglas-fir, Pine, and Yew have also been found infested, but usually only if adjacent to preferred hosts.

EHS over winters as eggs or adult females. The eggs are laid under a waxy cover which is not physically attached to the scale. The first instar nymphs are crawlers which migrate to the newest needles on the tree. After a few weeks the crawlers molt to a second instar and in about another month they emerge as adults. Adult males are winged but are poor flyers and die shortly after mating.

Similar to HWA, EHS is mobile during the crawler stage and populations are easily spread by wind and birds. Scale populations build quickly on stressed trees and cause foliage to turn yellow and drop prematurely. Dieback usually occurs from the bottom of the tree up after scale density reaches about 10 individuals per needle.

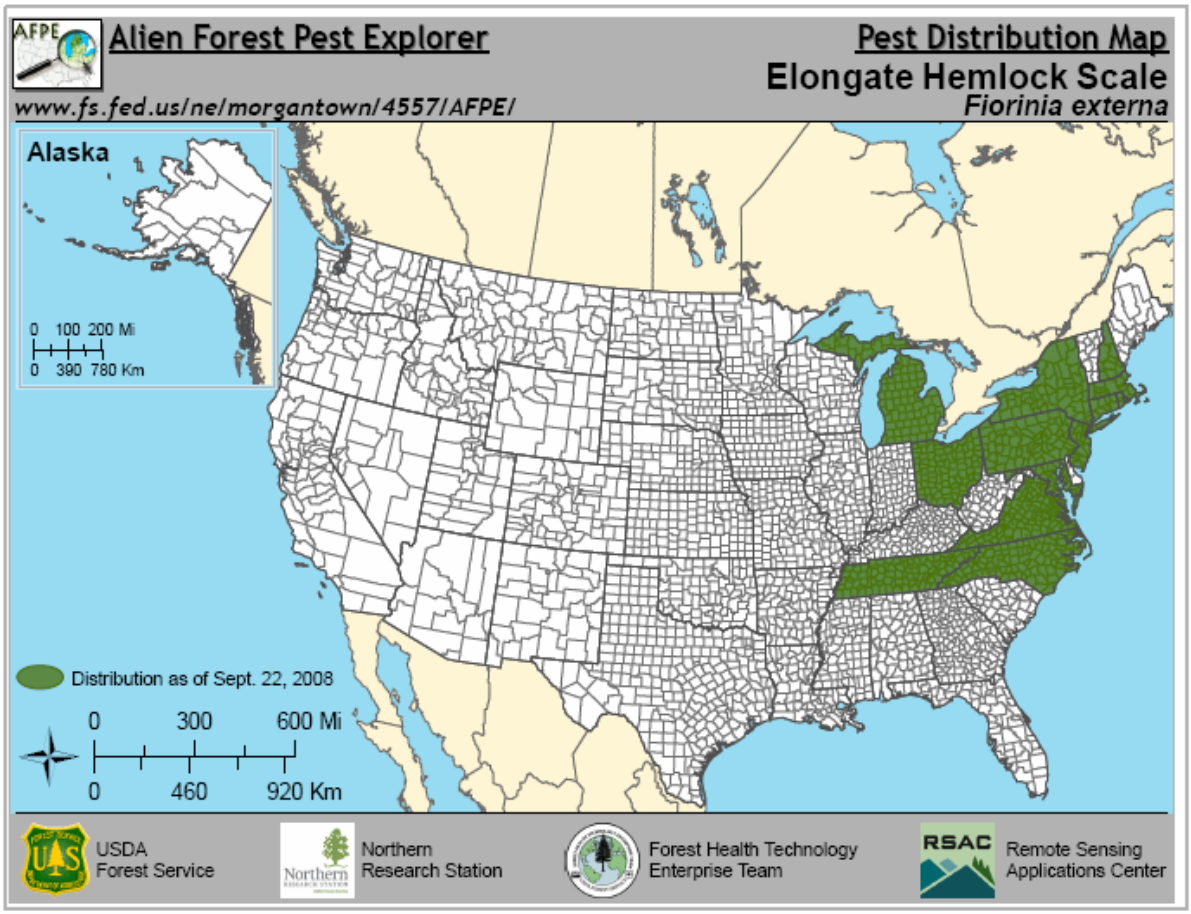
Control is difficult and only feasible on ornamentals that can be sprayed with horticultural oil in the spring when the majority of crawlers are present. All stages of scale may be present during the entire growing season so repeated sprayings may be necessary. Systemic insecticides may also provide some level of control. In forested settings you can keep scale populations down and minimize tree mortality by thinning unhealthy trees from the stand. It is important to keep the trees healthy to discourage the build up of populations but fertilizing is not recommended as this will also favor the scale.

Several natural predators exist for scale but are ineffective. The parasitoid *Aspidiotiphagus citrinus* kills scale in Japan but the life cycles of it and EHS are not synchronized in the northeast. Two beetles, the twice-stabbed ladybird beetle,

Chilocorus stigma and *Microweisea misella*, also attack EHS but not frequently enough to control scale populations.

There are two other scale insects that can be found on hemlock. Both of them are circular instead of elongate. The exotic circular hemlock scale *Nuculaspis tsugae* (formerly *Tsugaspidiotus*) is yellow-brown in color while the native hemlock scale *Abgrallaspis ithacae* is gray-brown. This little difference in color variation makes it difficult to differentiate between them. The exotic circular hemlock scale has not been found yet in NH but the native scale can be found throughout the northeast.

The key to eradicating EHS and any other exotic pest is early detection. Since birds are the primary vector for scale it is important to think like a bird to locate infested trees. This tactic has been very successful for finding HWA infestations in NH. Birds like to congregate along openings, roadways, water, and bird feeders. Hemlocks along these areas should be monitored annually in southern NH for EHS and HWA. Infestations of either of these can be treated when they are small and found early. Please report any findings so that we can monitor the spread of these insects.



Office Notes

The Forest Health Office has moved from its Concord location to its former home at the Caroline A. Fox Research and Demonstration Forest in Hillsboro. With the help of Ray Boivin, our part time entomologist, we have revitalized the lab and updated our collections. Our mailing address has remained the same but please note our new phone number below.

Please don't hesitate to contact us if you observe any forest pest damage. These observations are investigated and often prove helpful to other foresters and specialists working in the woods. Early detection of exotic pests is especially critical for eradication. We appreciate hearing about any possible sightings. If you find "out of the ordinary" insects in your travels please capture them in a hard container, place them in a freezer, and contact us for identification.

NH's Most Unwanted

(Please report any sightings of these insects.)

PA DCNR

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For more information about our program and forest health issues check out our new website.

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