





All kinds of ideas to manage beech have been tried.  
Assuming that reducing the amount of beech regeneration and basal area volume is your goal:

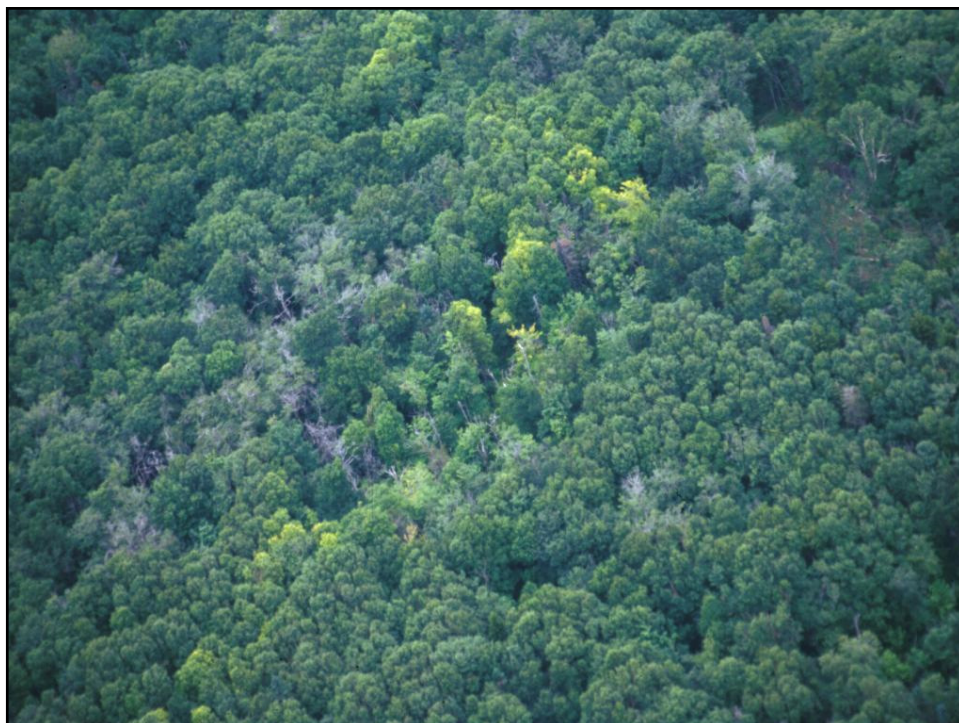
1. Even age management to encourage more species to compete
2. Cut in the winter to reduce logging damage in attempt to limit sprouting
3. Cut in the summer when the root reserves are at their lowest.
4. Leave all the partially resistant beech
5. Don't cut any beech in the harvest area
6. **Leave seemingly resistant beech, cut all of the severely diseased trees AND stump treat with herbicide**







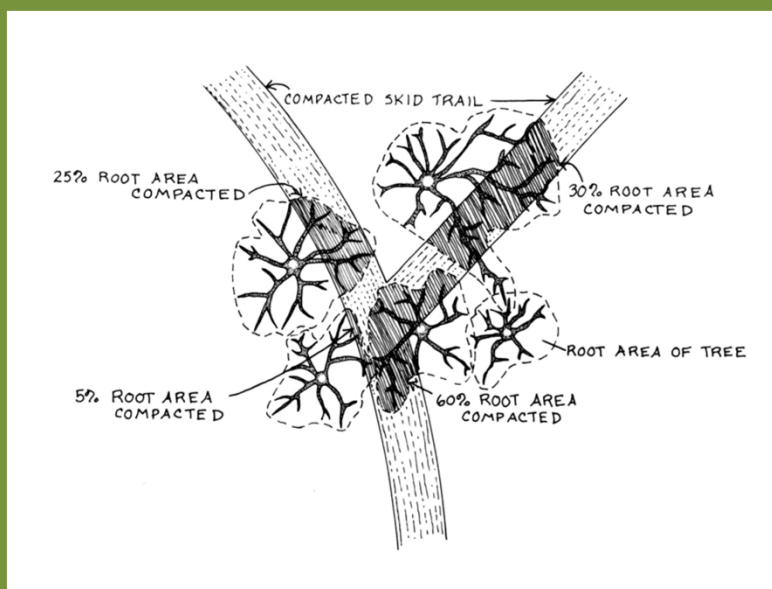






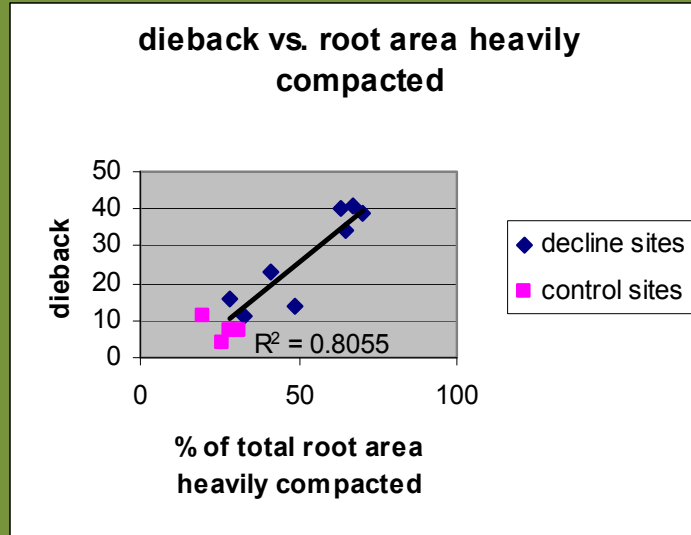


**CORRELATION OF HEAVILY COMPACTED ROOT AREA TO CROWN DIEBACK**





### Correlation between root area compacted and tree dieback



### Thoughts

**Even aged or unevenaged is fine but getting caught in the middle ends up causing too much RSD.**

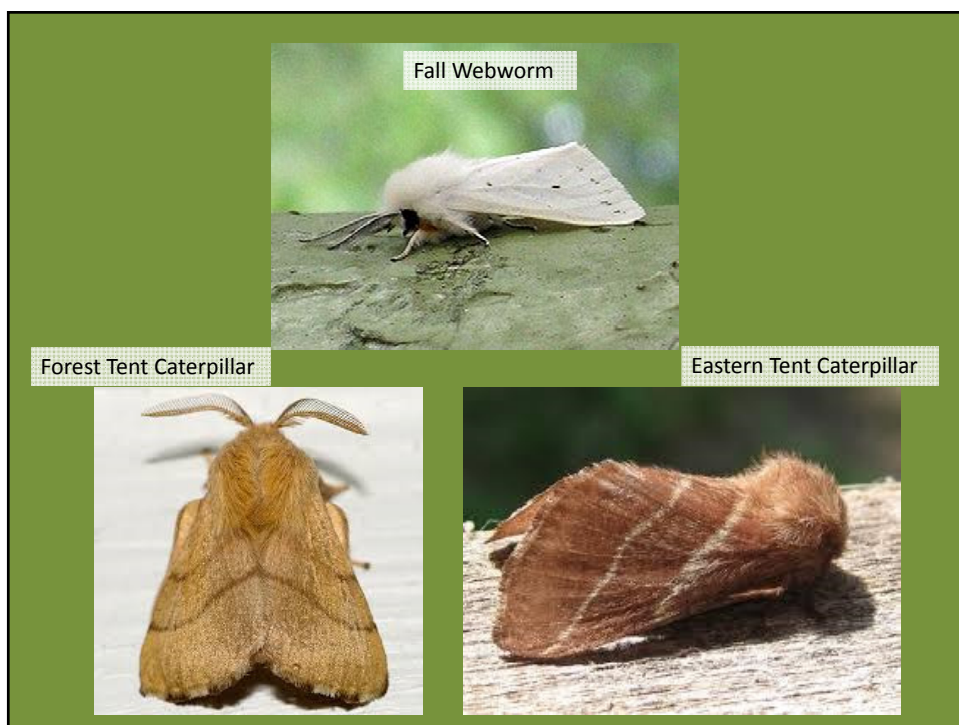
lay out skid trails, work back to front, and encourage smaller equipment, especially chainsaw loggers and cable skidders

Encourage less skid steer equipment if the terrain allows it

**Be diligent about getting off the harvest area before spring break up. Don't let a good idea go bad.**

If RSD is evident don't go back in to remove declining trees. Mortality of trees with 30% dieback is not high. You'll likely just be dealing with a decade of sluggish growth





Hickory Tussock Moth  
*Lophocampa caryae*



Forest Tent Caterpillar

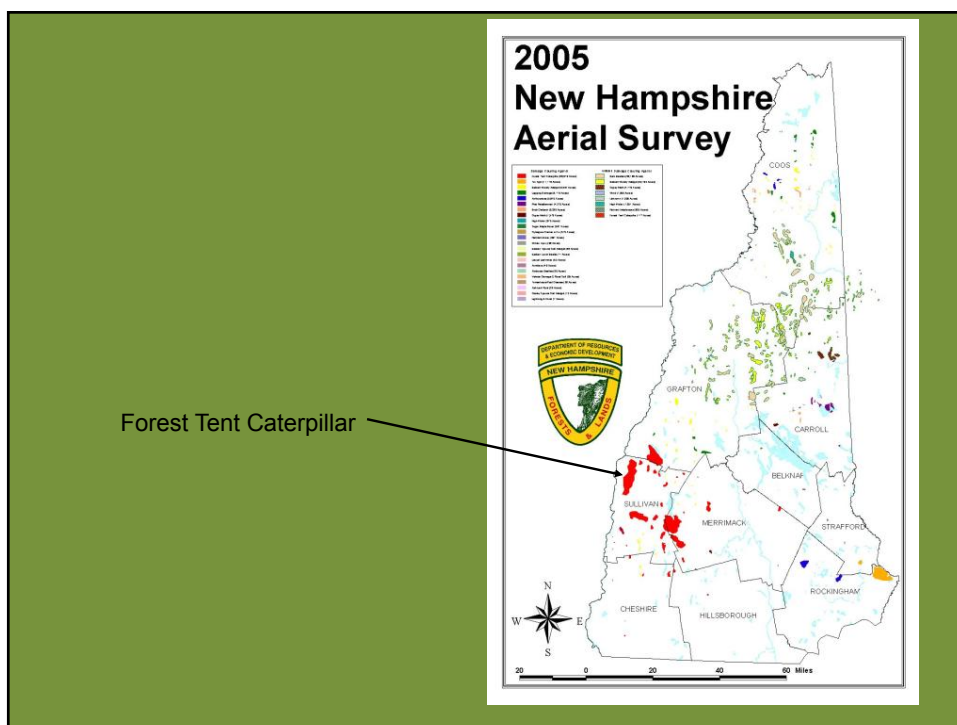
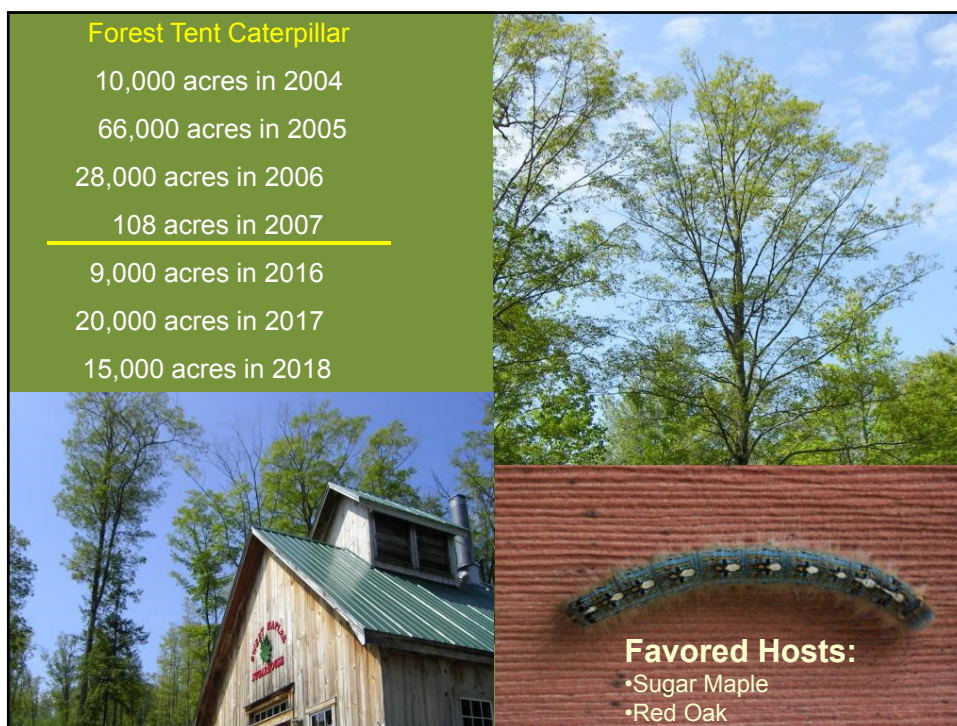


Eastern Tent Caterpillar

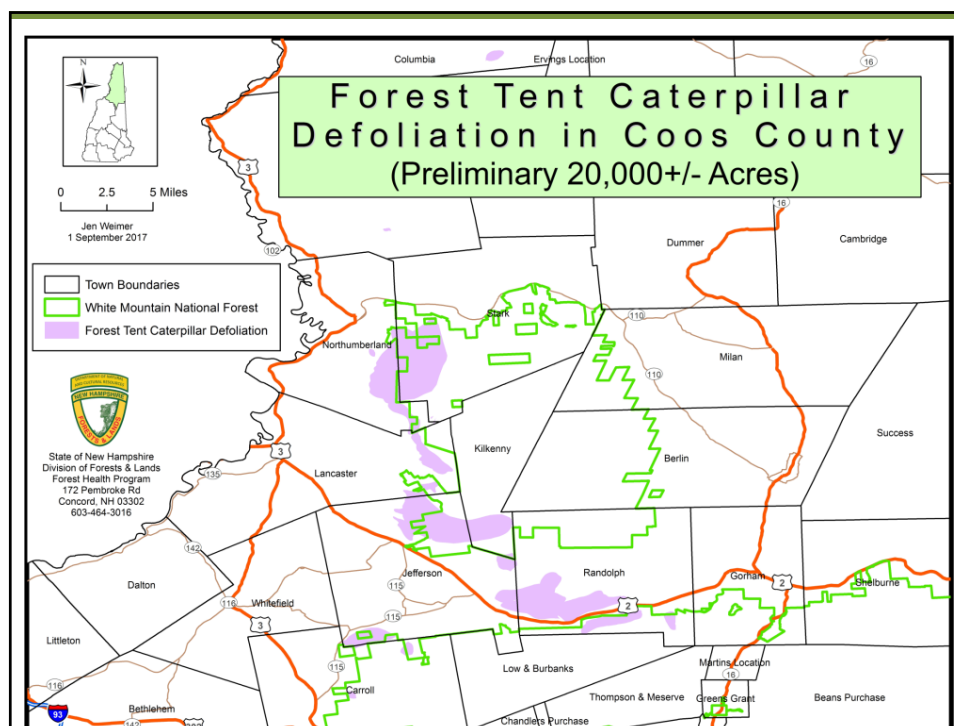


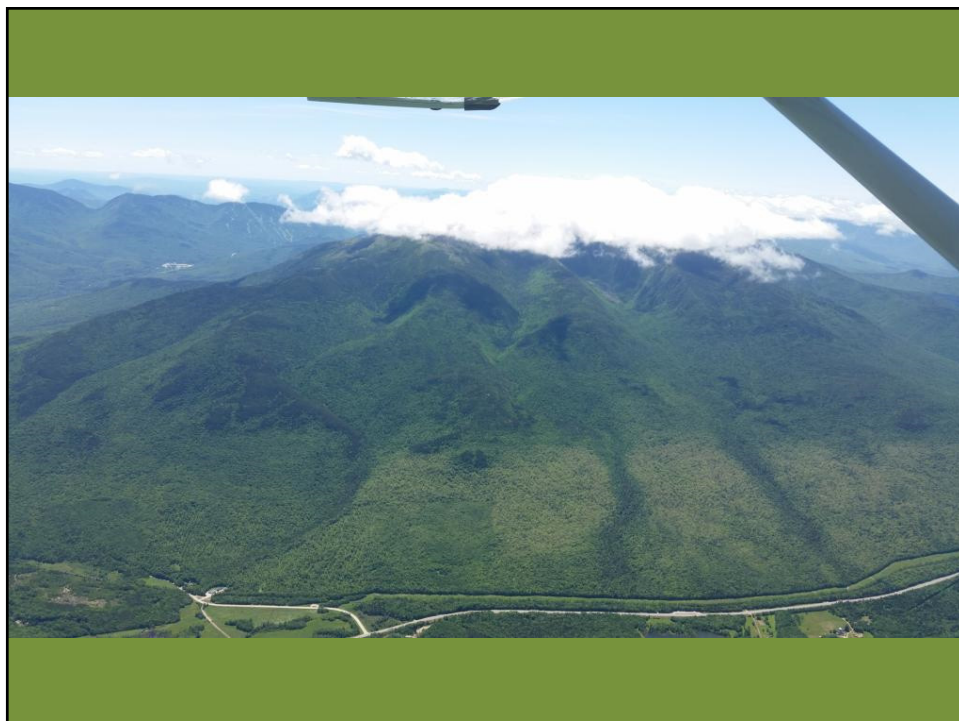












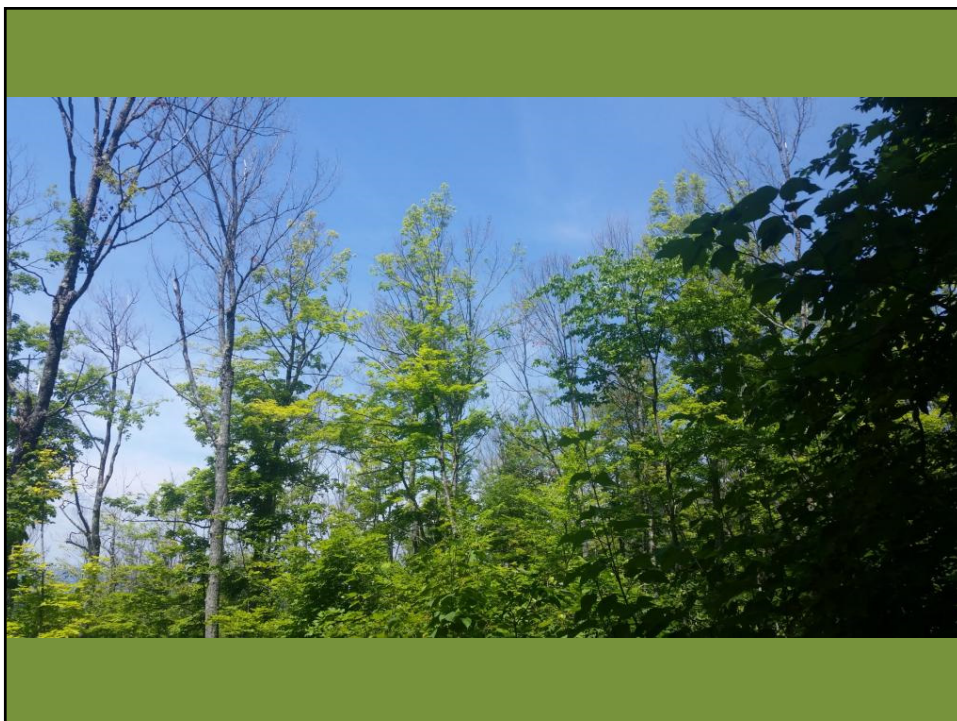
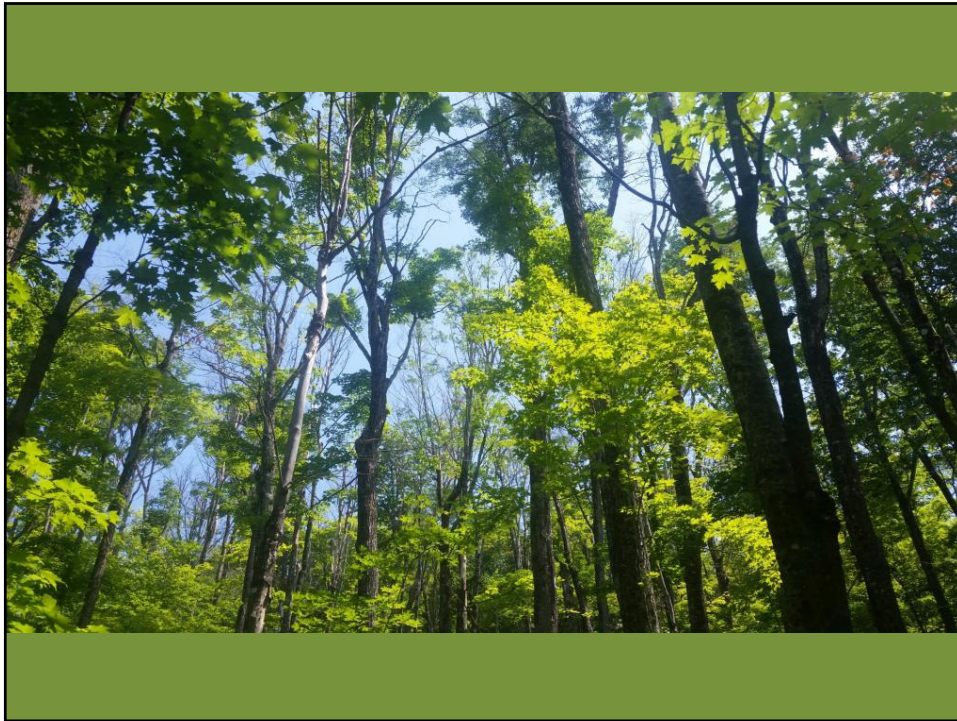




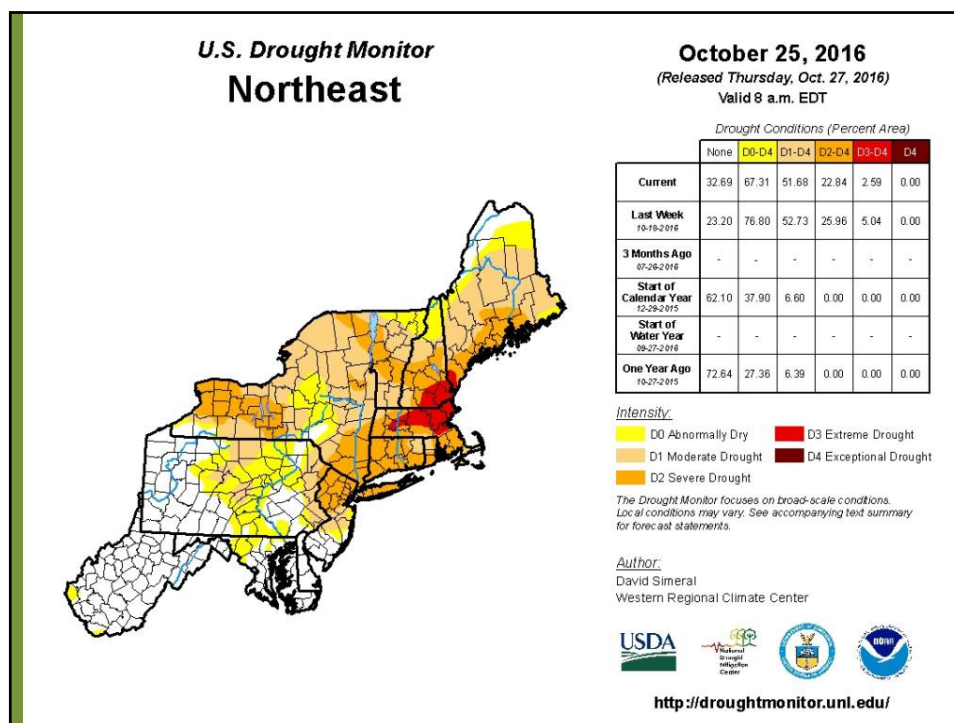












## FTC Biological Control

### Friendly Fly

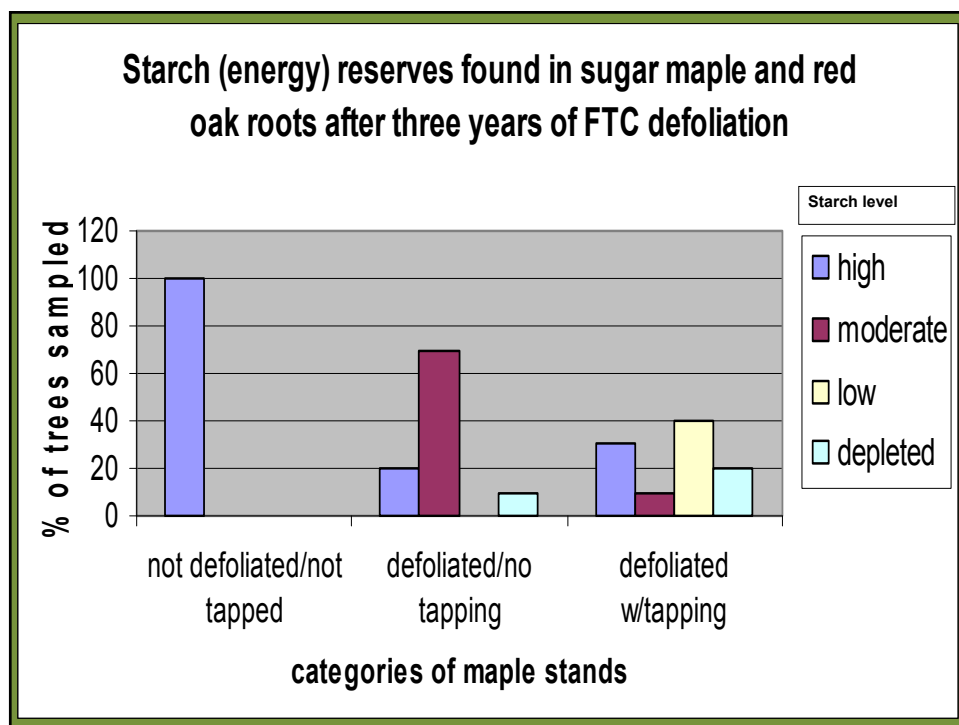
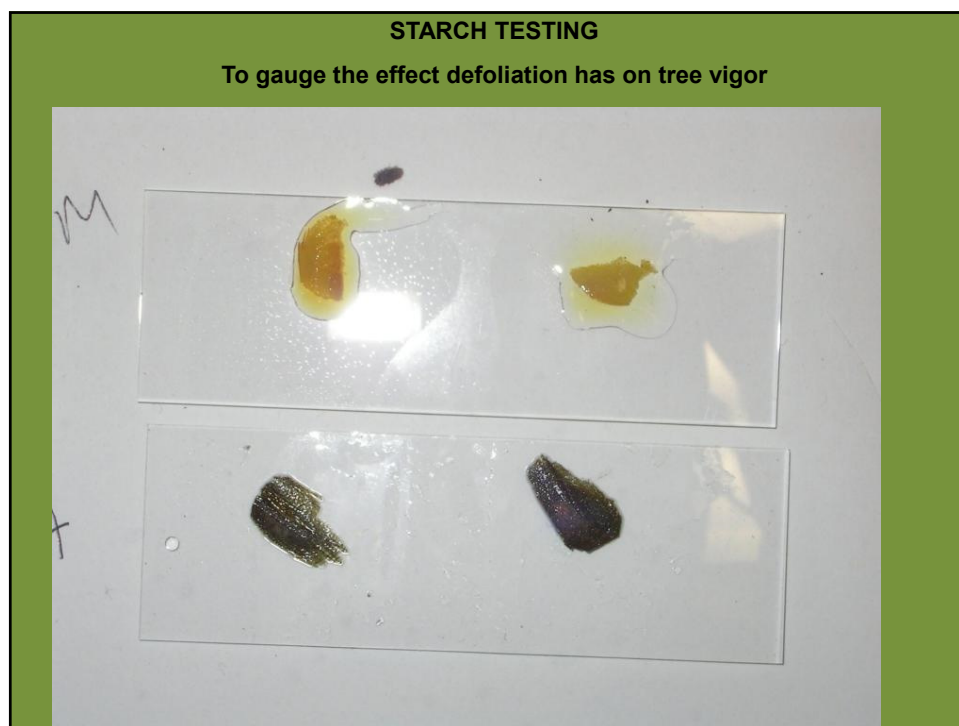
And 40 other predators attack the pupae and eggs of FTC

*Sarcophaga aldrichi*





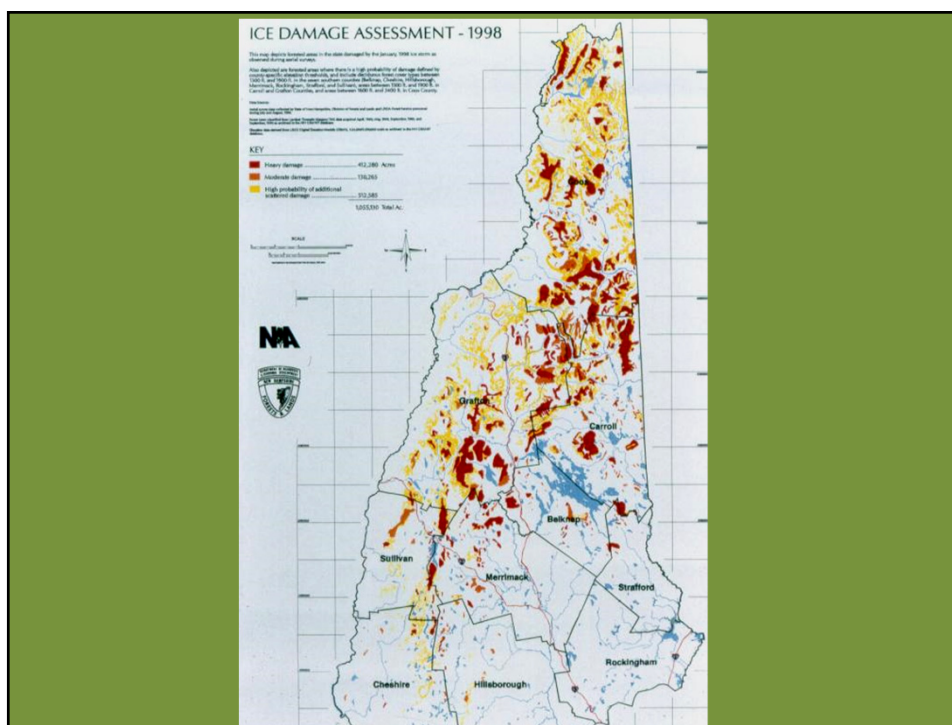




### Recommendations for timber management of defoliated stands

Postpone harvesting until two years post outbreak.

1. current outbreak will concentrate on residual trees
2. don't add soil compaction, root damage and basal wounding to already stressed trees
3. some trees will seriously decline or die from the outbreak. You don't want to leave those and take trees that resisted the outbreak






## ICE STORMS

Softwood trees are designed far better to handle heavy ice loads. The branches collapse on each other helping to distribute the weight.

Sugar maple does not grow like that and must rely on shedding its leaves as defense of winter snow and ice build up.

The ice storm of 1998 in NH broke 20-90 % of branches in most hardwoods found on south aspects between 1200' elevation and 3000' elevation. Today the mortality rate in those areas has been low and the trees have recovered well in most cases. (Poor birches)



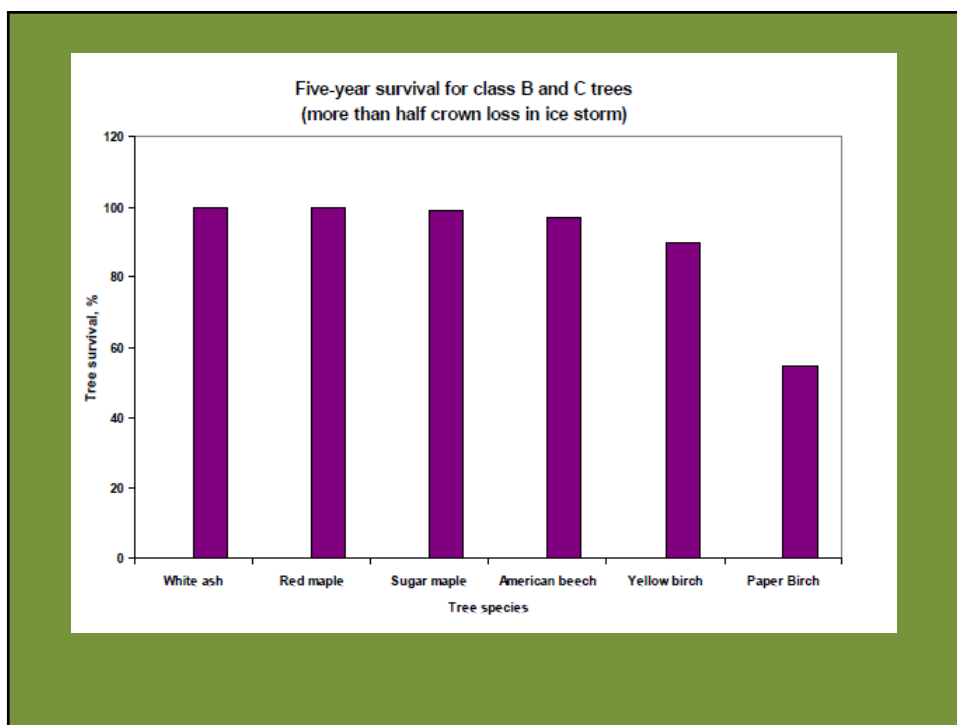


Tree Response Following the 1998 Ice Storm- Walter Shortle, Northern Research Station, Forest Service

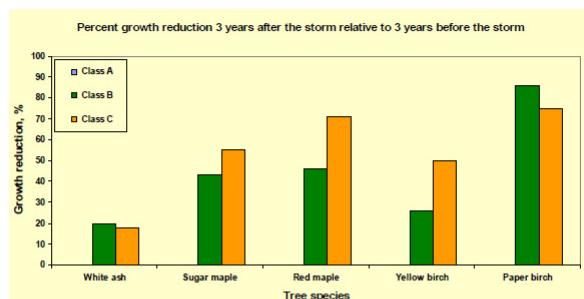
Dr. Walter C. Shortle  
USDA Forest Service  
Northern Research Station  
271 Mast Road  
Durham, NH 03824

Phone: 603-868-7620  
E-mail: wshortle@fs.fed.us


Conclusions:  
"Ice storms are a natural feature of forests of the northeastern United States and will surely occur again. Trees that are healthy and responsive before the storm are more likely to survive and will recover more quickly from storm injury. Timber stand improvement to enhance tree health may be a prudent preventative treatment.  
**Reduced residual logging damage may decrease the chance of root infection and spread of infection within the tree."**








Class A trees had no growth reduction 3 years after the storm relative to 3, 5, or 10 years prior to the storm (remember again there were no class A paper birch). For class B trees, growth reduction ranged from 20% in ash to 70% in paper birch with maples and yellow birch in the intermediate range of 25 to 40%. Growth reductions were about the same or greater in class C trees.




[Adelaide Tyrol](#)




**Maple Leaf Cutter**

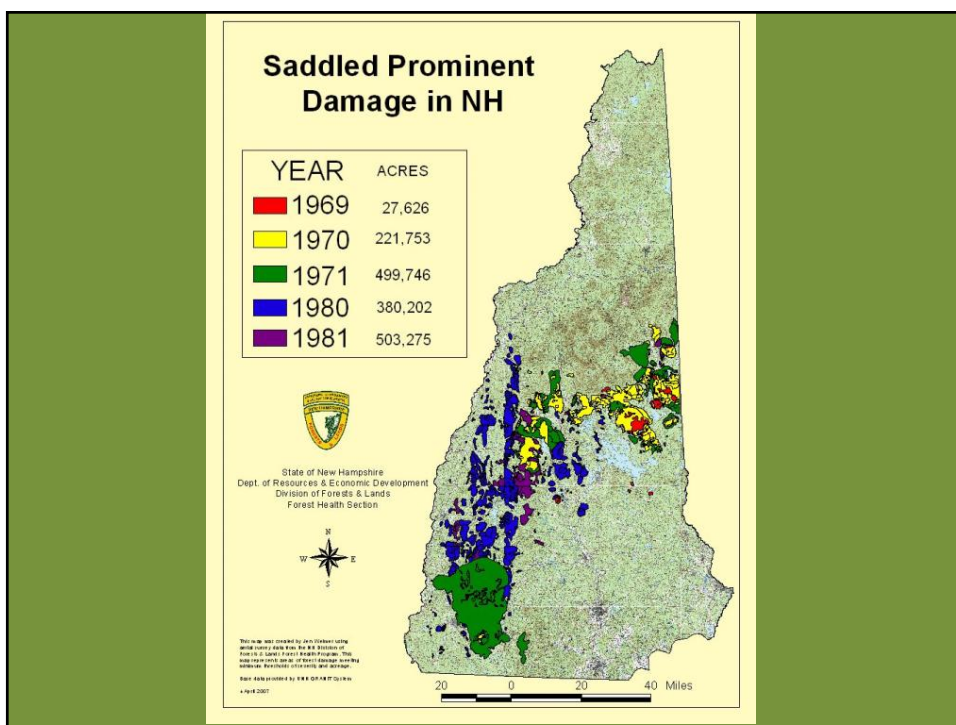
This pest is a Lepidoptera and has been a visible leaf defoliator in NH since the 1950's. The most severe outbreaks took place in the 1970's



**CONTROL**



**Because this pest over winters in the duff layer, prescribed fire in the fall or spring will control building populations**





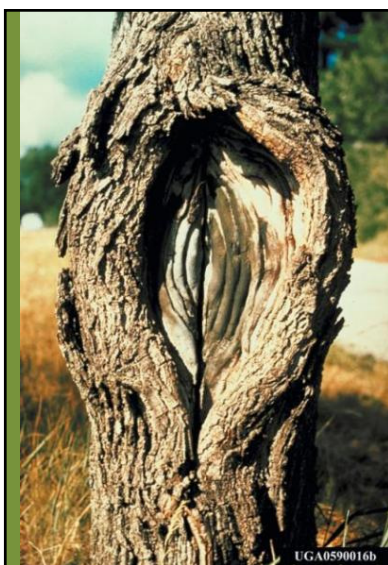
Overstocked pole sized stands are vulnerable  
Stands stressed from logging damage, ice storms, and defoliation are vulnerable.

Cut known infested trees before June emergence  
Just keep the stand as healthy and vigorous as possible

### Sugar Maple borer



UGA3066086



### Nectria Canker



## Eutypella Canker



**Management:** Complete control of the disease is impractical. However, in managed **forest stands** and woodlots, defective trees bearing the canker should be culled and cankered material removed from the stand to reduce inoculum load.

UGA1457002

## Asian Longhorned Beetle

*Anoplophora glabripennis*



UGA0949056

Not in NH YET!





## Exit Holes



## EGG SITE

- oval to round and can be up to ½ inch across







Mike Bohne, USDA Forest Service Northeastern Area



## ALB Look-Alike



**Asian Longhorned Beetle:** feeds on live hardwoods



Male



Female

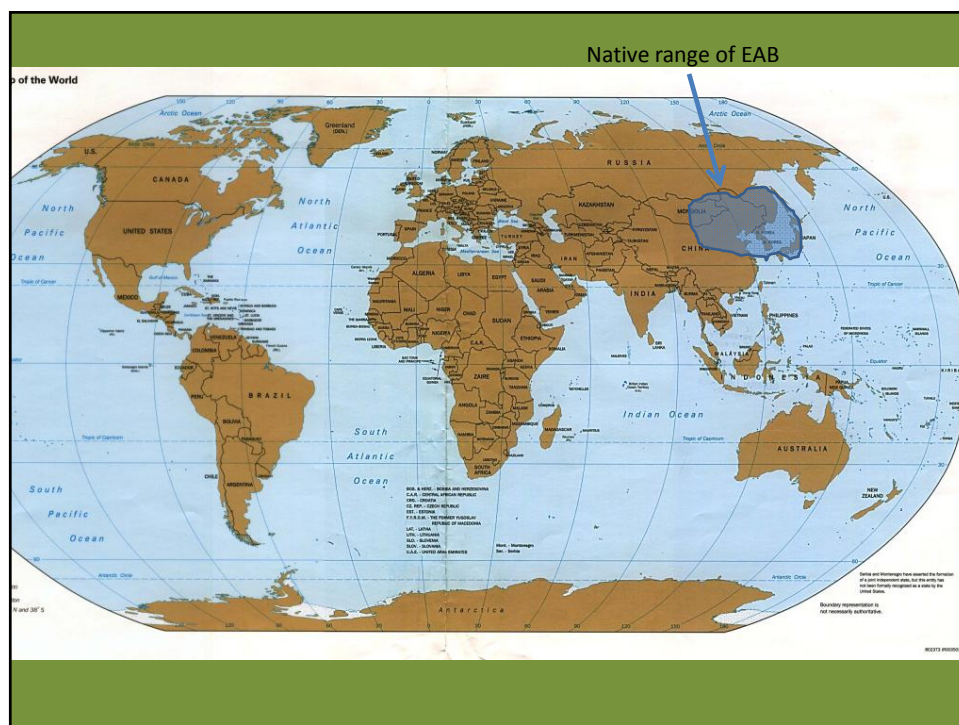
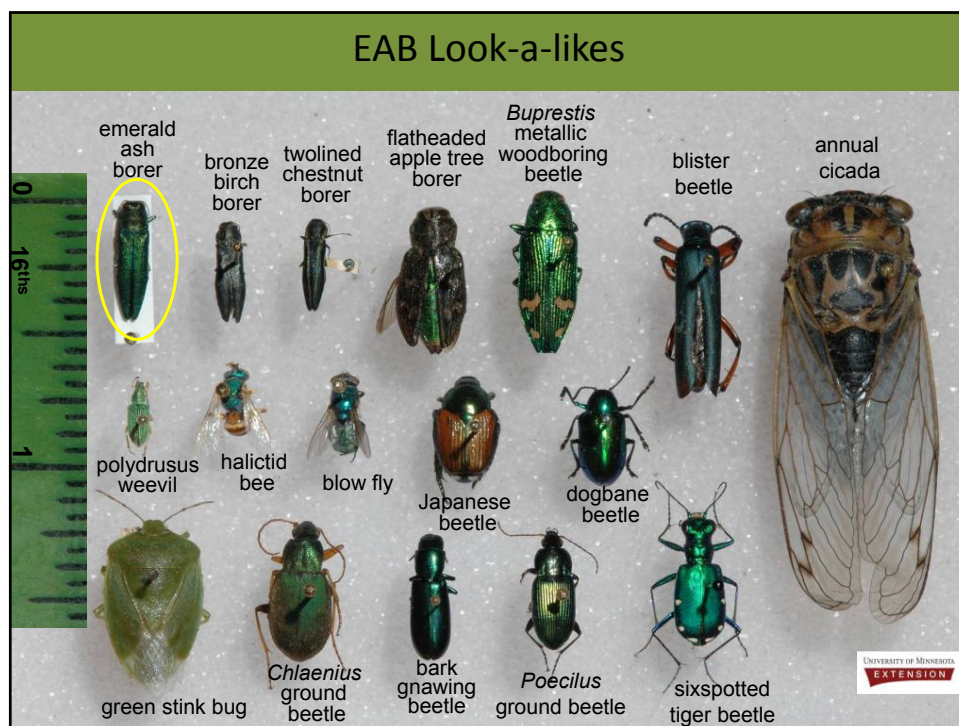
**Whitespotted Sawyer:** feeds on dead & dying conifers



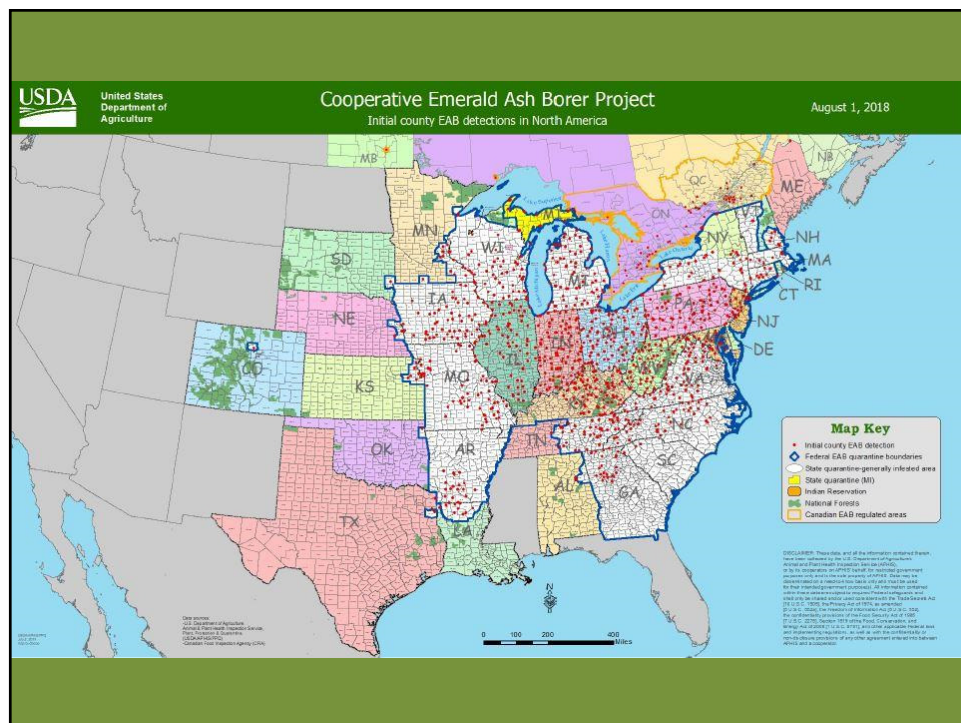
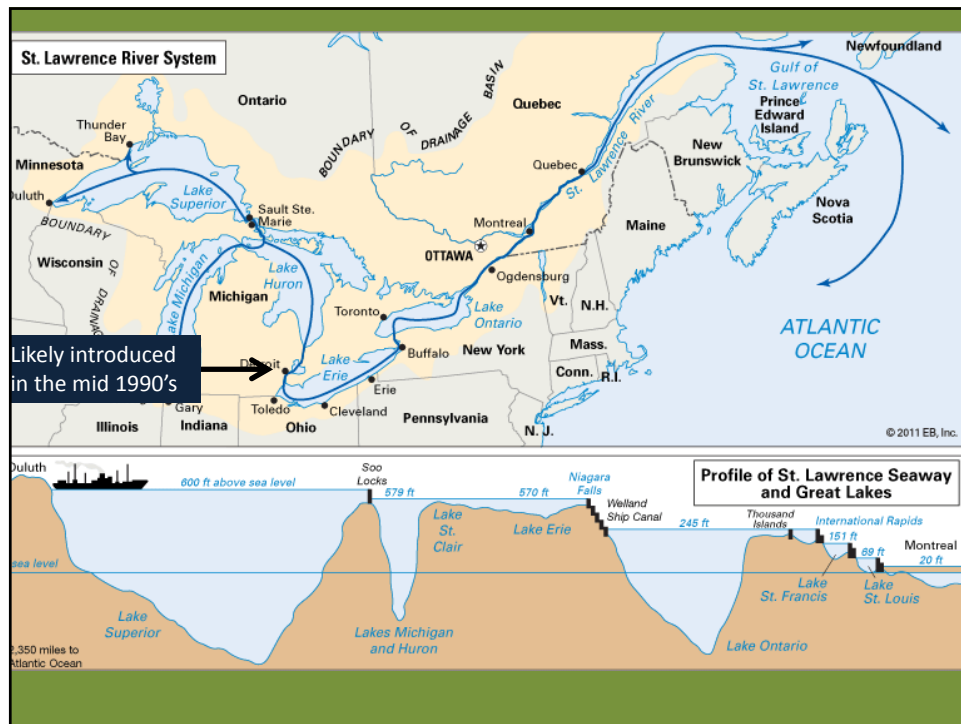
## Emerald Ash Borer

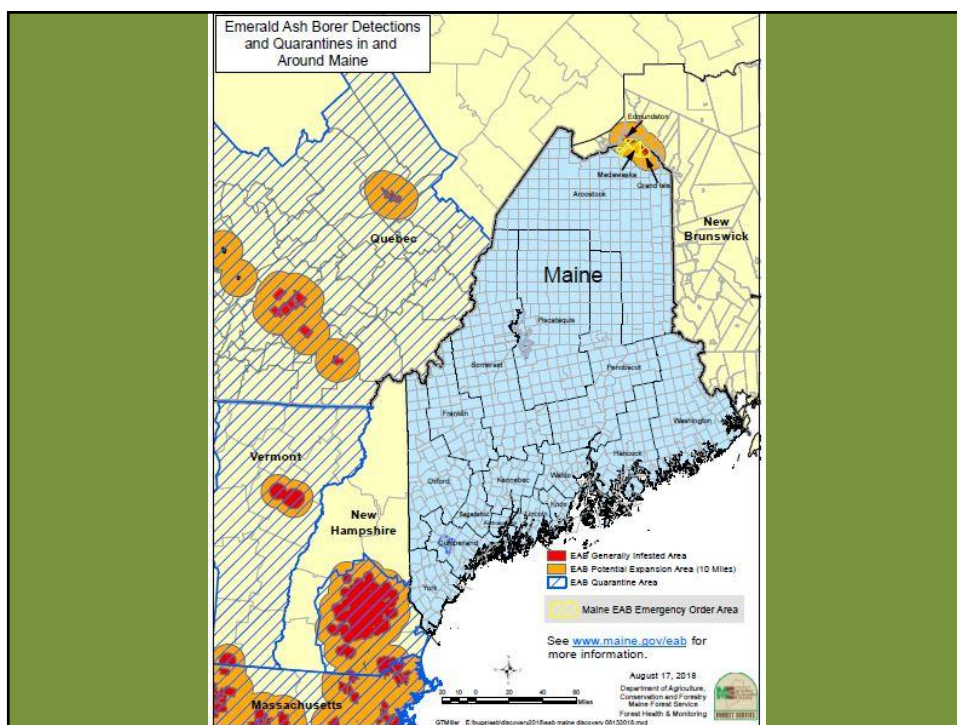
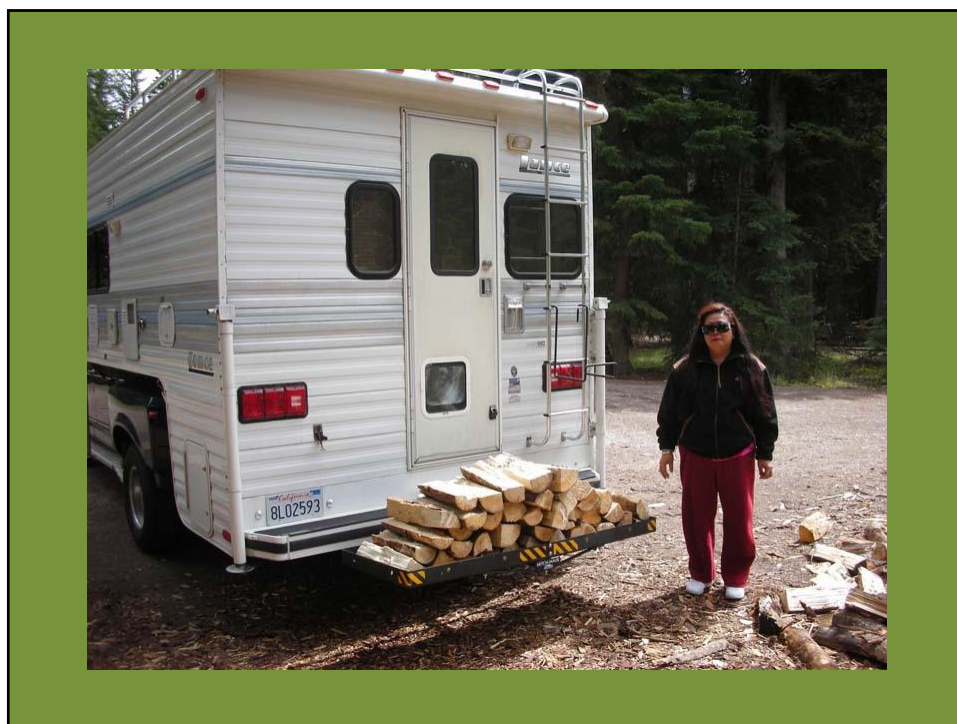
*Agrilus planipennis*



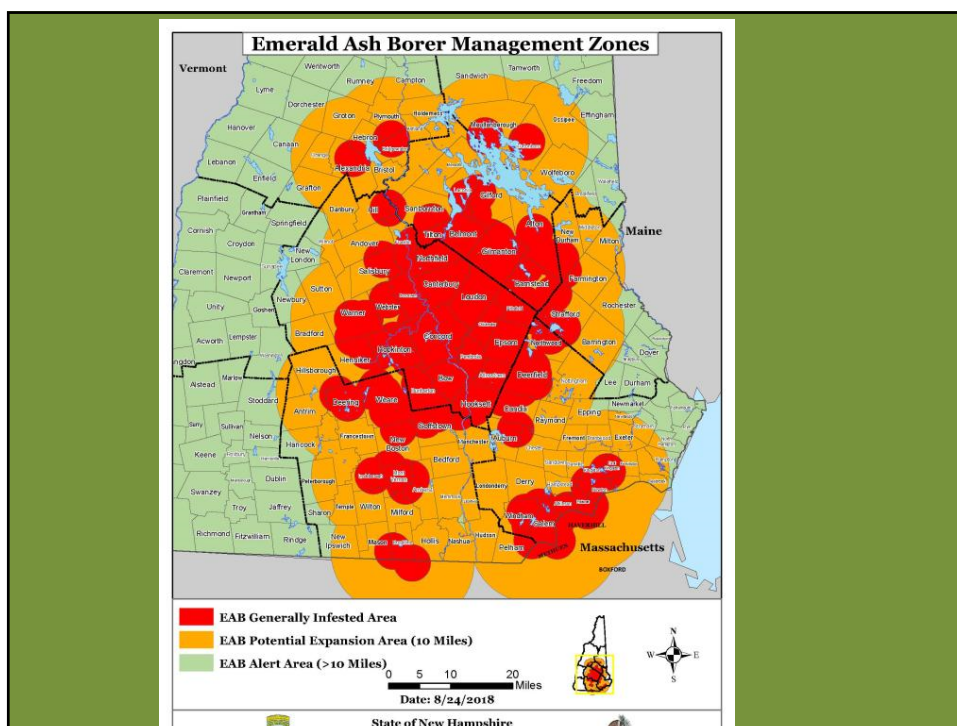








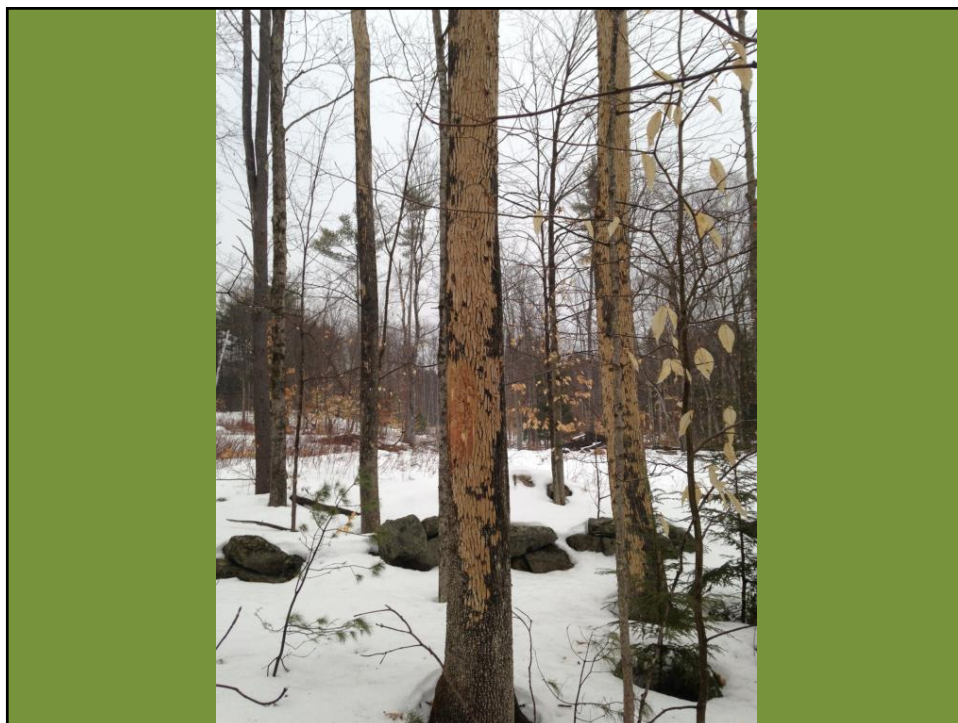
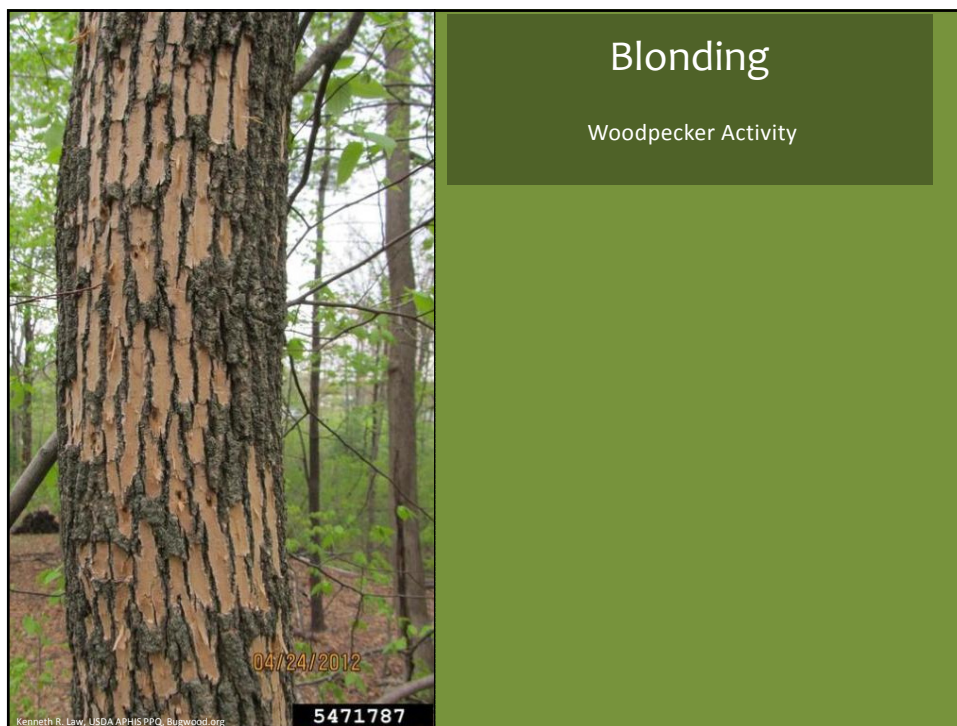




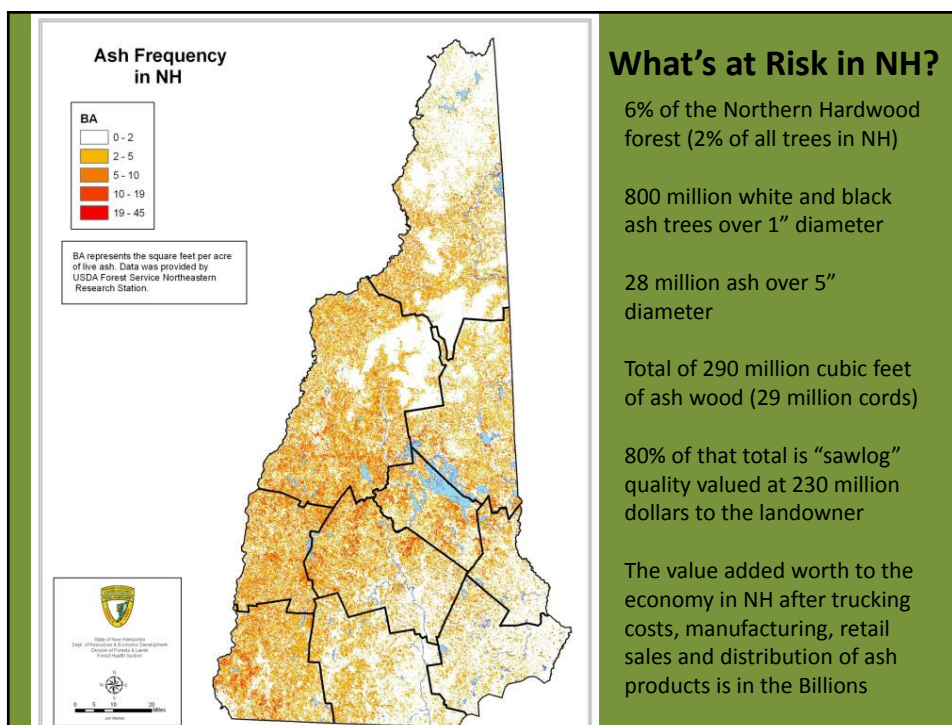














## What We Are Doing Statewide

### Objectives

- Detect new infestations quickly
- Slow the spread of EAB statewide
- Slow ash mortality locally
- Maintain ash in the landscape

### Methods

BMP's  
Biological Control  
IPM  
Continual surveying  
Public outreach

UNHCE leads, target user groups, public, conservation groups

## Biological Control

*Oobius agrili* – egg parasitoid

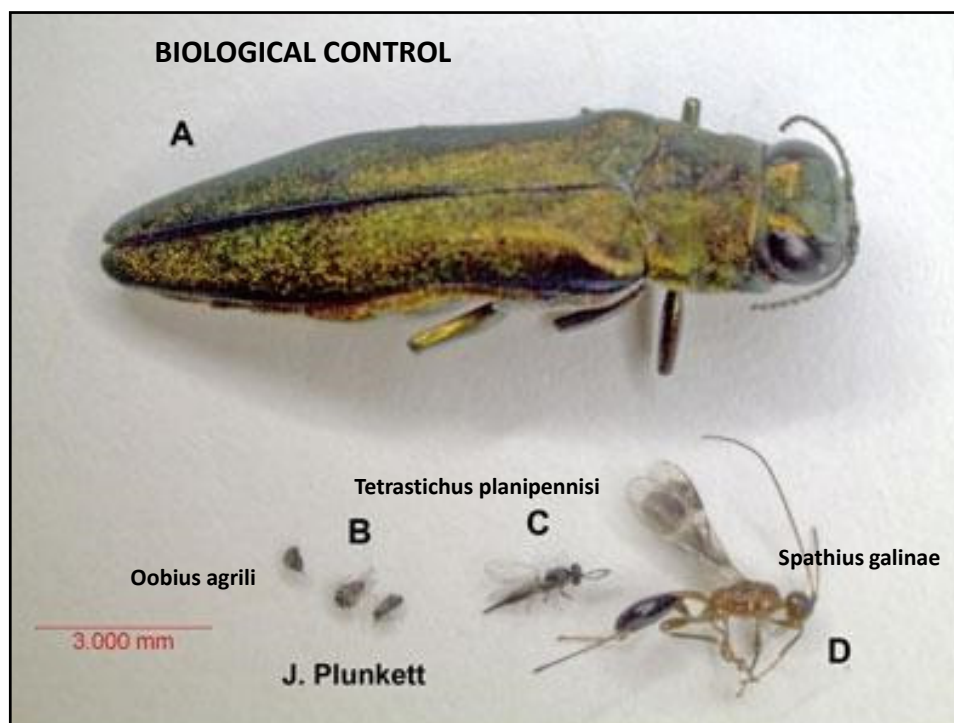
*Tetrastichus planipennisi* – larval parasitoid

	2014	2015	2016
<i>Oob</i>	2600	5000	37,000
<i>Tet</i>	13,000	25,000	40,000





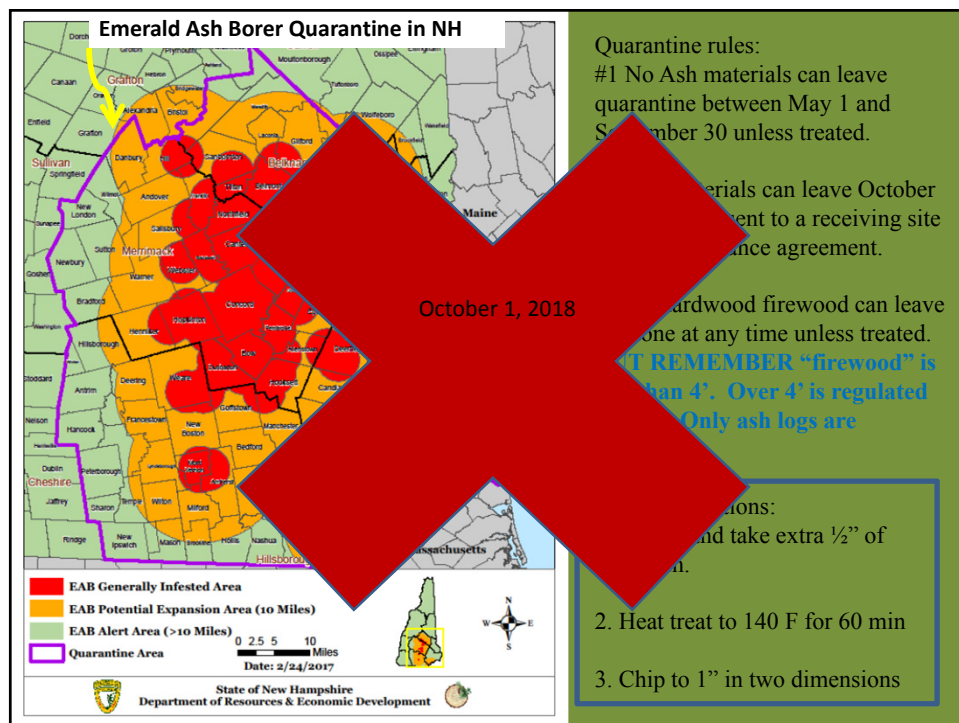
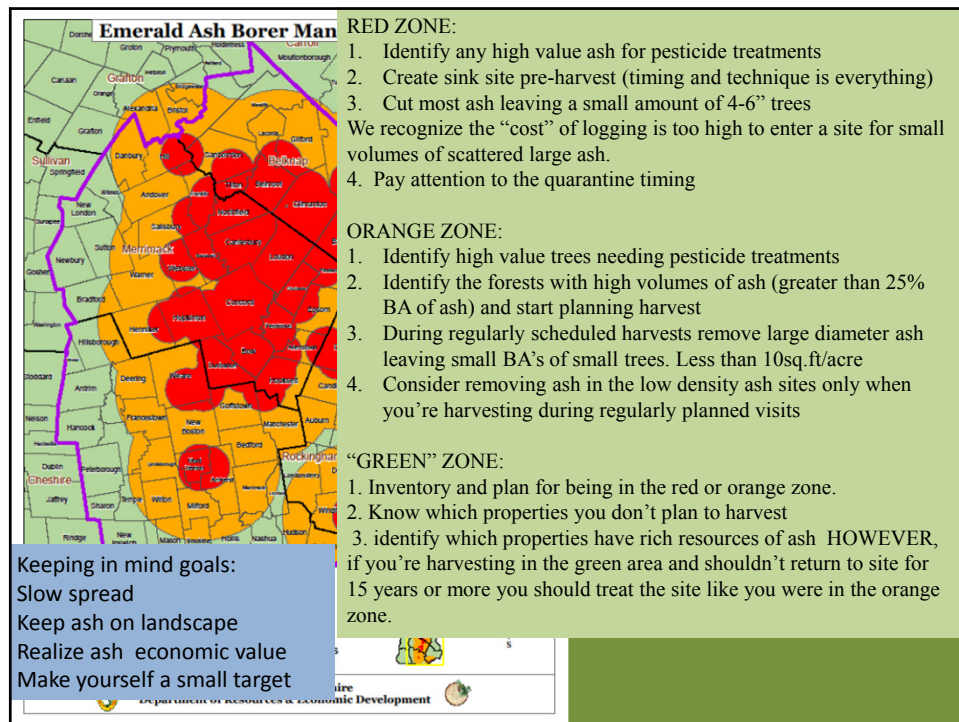


**Forest Management Goals**

1. Maintain ash on your forest in small diameter classes only  
Science will catch up-- bio control shows promise to protect regeneration  
Ash has a niche role--- ash seed is valuable food source
2. Slow the spread of EAB to neighbors  
help create a forest that EAB struggles to generate large population densities  
Reduce vulnerability to loss  
diversify volumes of each tree species  
reduce the big pockets of ash and spread it out
3. Realize economic gains from past management  
Harvest in a timely way to earn what you've gained from ash  
NO KNEE JERK REACTIONS or you will lose value cutting too soon  
Monitor known outbreak locations THEN ACT  
Follow BMP's and Quarantine regulations

Photo by Swift Corwin Jr.





**Emerald Ash Borer Quarantine in NH**

**Public Comment Period Closes **September 21<sup>st</sup>****

Send comments to: [Piera.siebert@agr.nh.gov](mailto:Piera.siebert@agr.nh.gov)  
or visit [www.nhbugs.org](http://www.nhbugs.org)

**Quarantine rules:**  
#1 No Ash materials can leave quarantine between May 1 and September 30 unless treated.

Materials can leave October 1 for processing before May 1; OR

2. Heat treat to 140 F for 60 min  
3. Chip to 1" in two dimensions

State of New Hampshire  
Department of Resources & Economic Development

**STATE OF NEW HAMPSHIRE**  
**WOOD INFESTED BY**  
**THE EMERALD ASH**  
**BORER**

**Best Management Practices**  
**for proper handling**

Signs of EAB: "S" shaped tunnels under the bark and shallow woodpecker excavation (blonding).

**We need your help to slow the spread of this devastating forest pest. Moving infested ash brings EAB to new woodlots and trees.**

**The EAB quarantine** prohibits movement of hardwood firewood and all ash products out of the quarantine area unless specific conditions are met, whether or not materials show signs of infestation.

**Within the quarantine** area, movement of known infested ash products should be treated according to the recommendations on the reverse side of this sheet to reduce accidental spread of EAB.

**You can help minimize the risk of spreading EAB within the quarantine by:**

1. Delivering ash wood within 5 miles of its origin; **OR**
2. Transporting ash firewood or logs to a kiln or mill, after October 1 for processing before May 1; **OR**
3. Cutting and seasoning ash at its place of origin for 12 months before distribution; **OR**
4. Chipping ash material to 1" size chips in two of three dimensions; **AND**
5. Notifying all recipients that there is a risk of infestation from this material and it should be burned, chipped, sawed into lumber, or heat treated by May 1 of the following year.

Responsible shippers may use this page for documentation of BMPs:

Shipper: \_\_\_\_\_

# of BMP employed: \_\_\_\_\_

Delivery Location: \_\_\_\_\_

Date Delivered: \_\_\_\_\_

For more details and current infestation maps please call 603-464-3016 and visit [nhbugs.org](http://nhbugs.org)



Photo: Jeremy Turner

The screenshot shows the NHBugs website (https://nhbugs.org/) with the title "Damaging Insects and Diseases". The main heading is "Emerald Ash Borer". The page includes a sidebar with a "Main menu" and a "Damaging Insects and Diseases" list. The main content area features a paragraph about the Emerald Ash Borer (EAB) and a map of New Hampshire showing infestation locations. The sidebar lists various insects and diseases, including Asian Longhorned Beetle, Hemlock Woolly Adelgid, and others. The main content area also includes buttons for reporting a suspect tree, identifying EAB, receiving bug updates, and getting involved.

**NHBugs**  
Protecting trees and forests

**Main menu**

- Firewood for Campers
- Invasive Insect Reporting Form
- News
- Damaging Insects and Diseases
  - Emerald Ash Borer
  - Asian Longhorned Beetle
  - Hemlock Woolly Adelgid
  - Elongate Hemlock Scale
  - Red Pine Scale
  - Spruce Budworm
  - White Pine Blister Rust
  - Winter Moth
  - Balsam Woolly Adelgid
  - Gypsy Moth
  - Oak Wilt
  - Native Insects & Diseases
- Photo Gallery

**Damaging Insects and Diseases**

**Emerald Ash Borer**

Emerald Ash Borer (EAB) was found in Concord in March 2013, and the [list of towns with known infestations](#) continues to grow. As a non-native insect, EAB lacks predators to keep it in check. EAB attacks ash trees and infested trees die within 3 to 5 years. Help protect New Hampshire's ash trees. [A quarantine of all hardwood firewood, ash wood-products and all ash nursery stock is in effect for Belknap, Hillsborough, Merrimack, and Rockingham counties.](#)

**Report a suspect tree or insect**

**Caring for ash trees & managing forests**

**Identify emerald ash borer, ash trees & learn more**

**Quarantine & compliance agreements**

**Receive bug updates**

**Firewood**

**Get Involved: attend a meeting or order handouts**

**Information for towns and cities**

**Infestation Location & Management Zones**

**Generally infested area**  
Emerald ash borer is in this zone, though not necessarily in all ash trees.

**Potential expansion area**  
Emerald ash borer isn't known to be in the area, but the area is within 10 miles of the outer limits of the known infestation. There is a high probability emerald ash borer will spread naturally to this zone within a few years.

**Alert area**  
Emerald ash borer isn't known to be in the area and it is more than 10 miles from the known infestation.

100%

8:53 AM 8/15/2017



