Forest Health Chapter
Of
2020 Bear Brook Management Plan

Kyle Lombard
NHDFL Forest Health Program

Historic forest health issues

ALLENSTOWN
Allenstown
Catamount Hill
Catamount
First Church
Little Bear
Evans School
Bear
Smiths Pond
Brook
Boat
Meadow
Old Reservoir
Pinkney Hill
Bear Hill Pond
Blodgett
BOSTON
Pease
1
2
3
3a
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

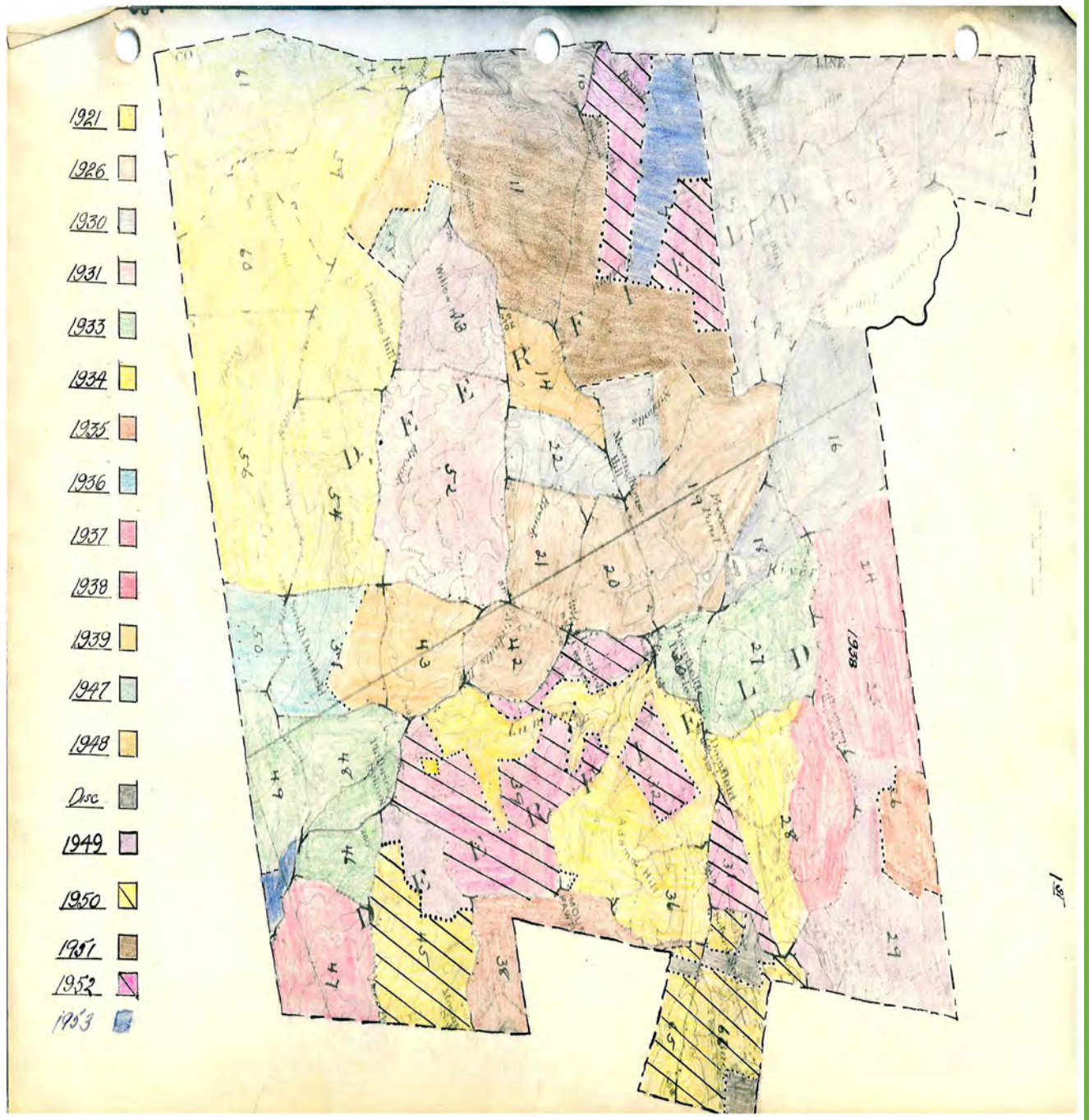
ANNEX COPY

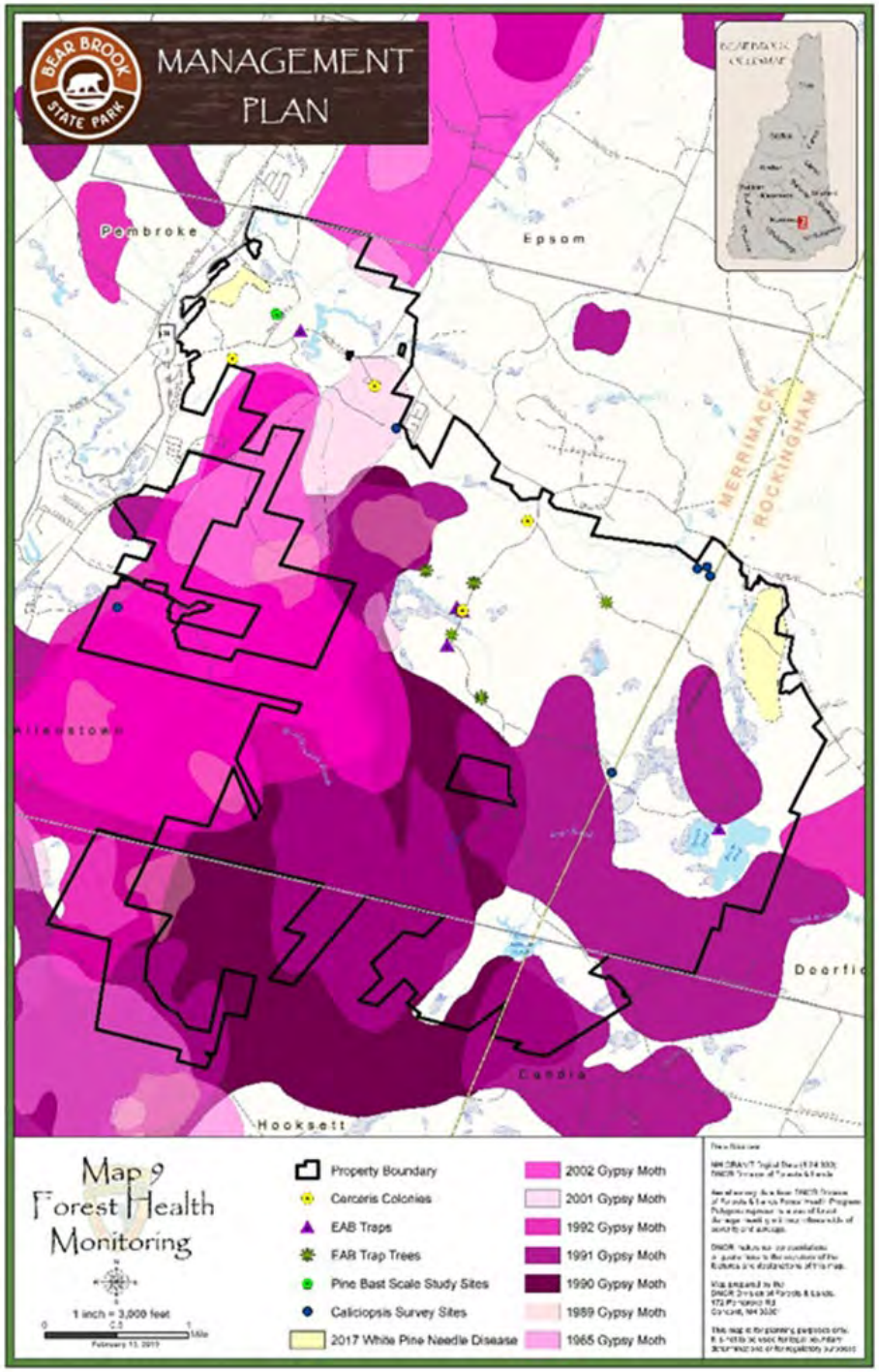
TOWN ALLENSTOWN

TOWN BLISTER RUST CONTROL RECORD

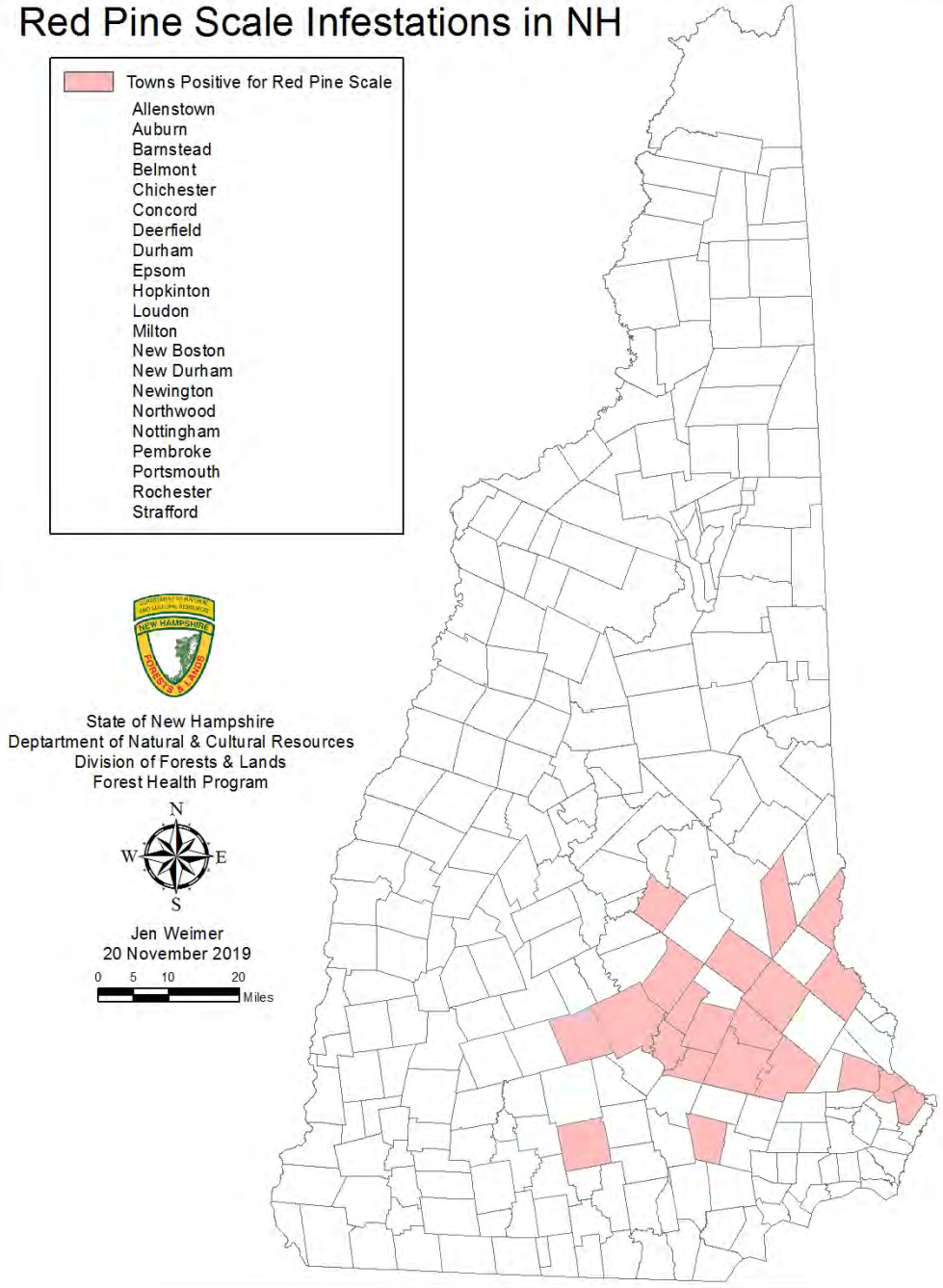
Permanent Record
New Hampshire

YEAR	ROAD BLOCKS INVOLVED	ACRES	RIBES DESTROYED	FUNDS EXPENDED TOWN	FUNDS EXPENDED COOPERATIVE
	9-3-3A-9-14				
1960		3001	10193	199.40	706.23
	2-7-8-17	4757	14100	195.90	1350.52
1961	10 (Bear Brook)	101	250	14.00*	
	10-11-12-14-15-16 (Bear Brook	4456	24932	399.50*	1653.56
1962	16-21	1489	13325	199.10	430.46
1963	1-5-7-9-17-13-18	662	14280	99.35	216.84
1964	1-3-39	733	15535	100.00	343.24
1965	2-3A-14	1046	5965	99.00	448.68
1966	9-14-16	1389	10995	99.65	405.74
1967	4-12	924	2360	98.50	235.52
1968	1-5-10	543	1950	100.00	161.86
* "	14-16 (Bear Brook)	992	1750		
1969	1-6-17-18-21	631	1065	99.47	225.89


1921
1926
1930
1931
1933
1934
1935
1936
1937
1938
1939
1947
1948
Dsc
1949
1950
1951
1952
1953


BEAR BROOK STATE PARK
MANAGEMENT PLAN
Pembroke
Epsom
MERRIMACK
ROCKINGHAM
Hooksett
Map 9
Forest Health Monitoring
1 inch = 3,000 feet
Property Boundary
Carceris Colonies
EAB Traps
FAR Trap Trees
Pine Bast Scale Study Sites
Caliciopsis Survey Sites
2017 White Pine Needle Disease
2002 Gypsy Moth
2001 Gypsy Moth
1992 Gypsy Moth
1991 Gypsy Moth
1990 Gypsy Moth
1989 Gypsy Moth
1965 Gypsy Moth

Red Pine Scale Infestations in NH



What To Look For

White woolly ovisacs at the base of needles on the undersides of twigs

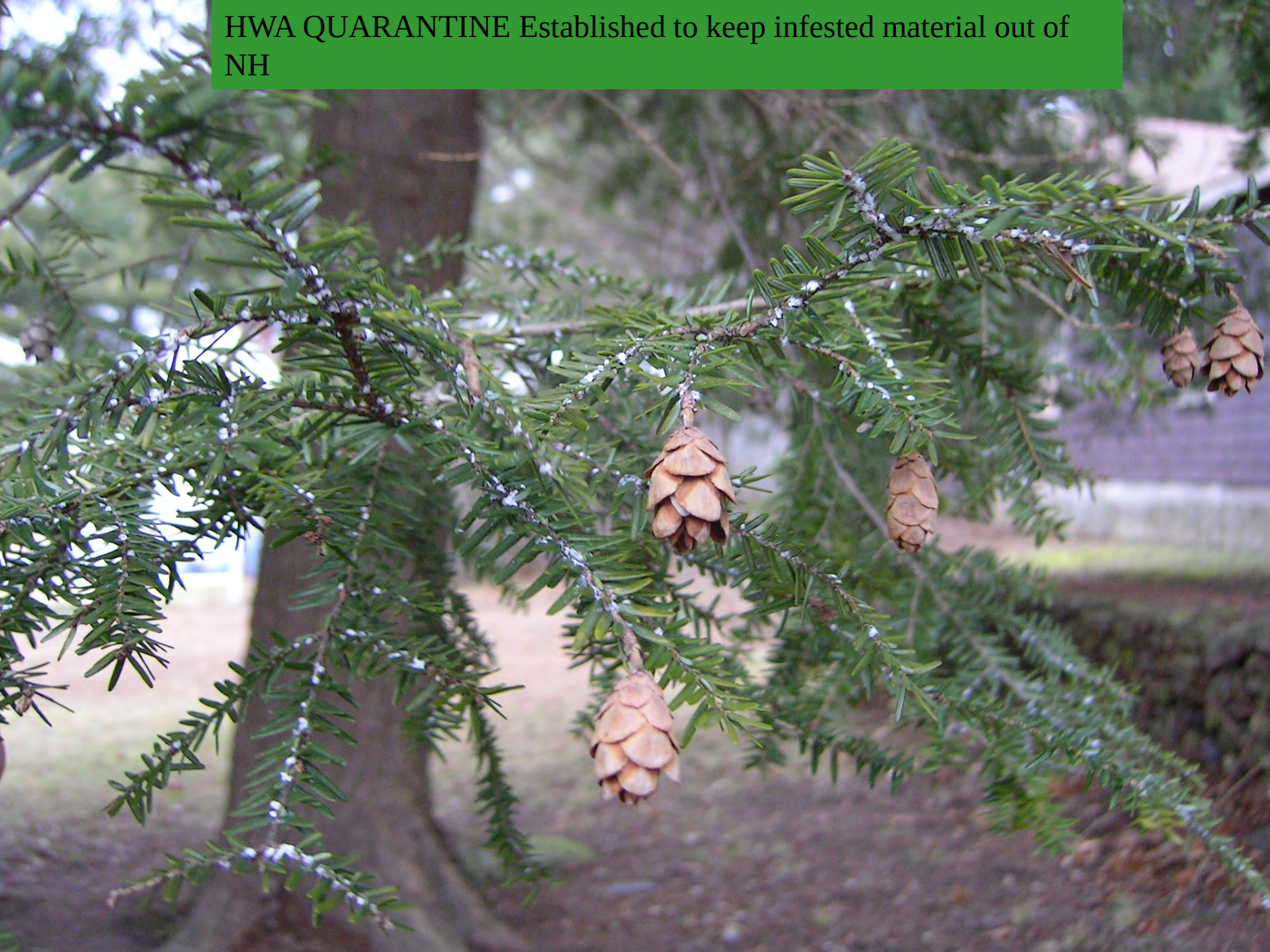
Adelgid 101

Small wingless insect with piercing/sucking mouth parts

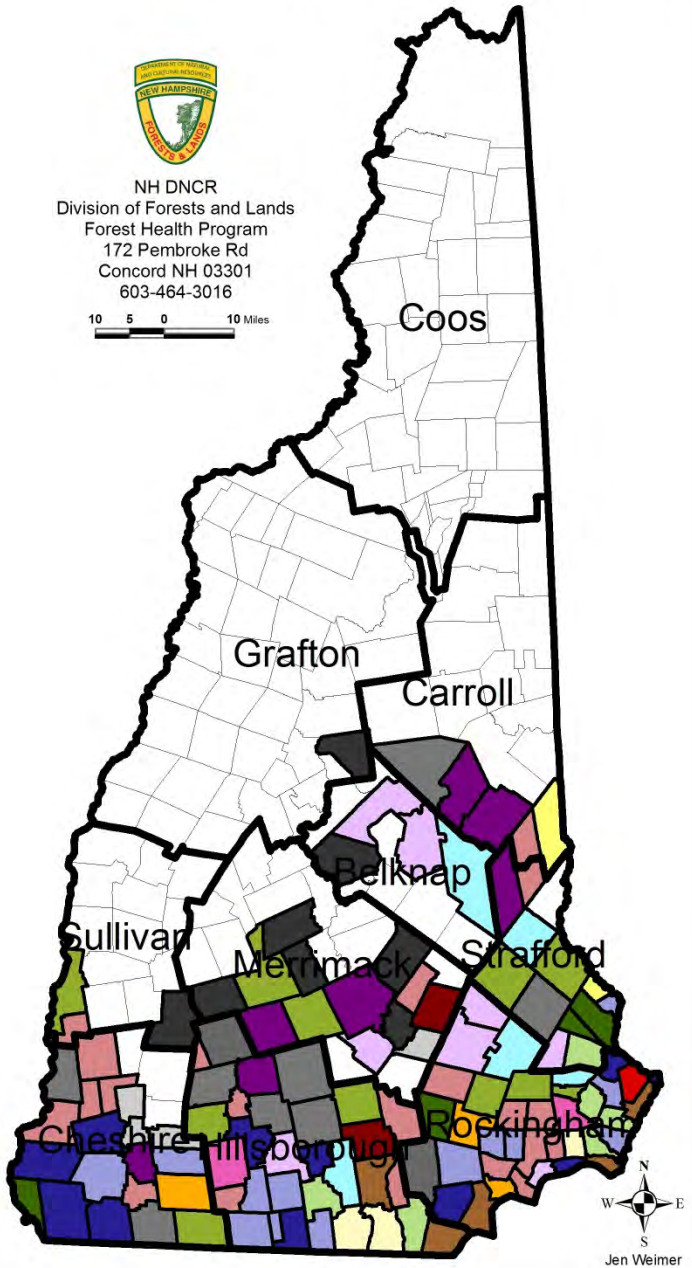
http://www.threatenedforests.com/research/photo-gallery/hwa-gallery/


2007

HWA QUARANTINE Established to keep infested material out of NH



NH Towns with Known Hemlock Woolly Adelgid Infestations



Infested Towns (year first reported)

- Portsmouth (2000)
- Exeter (2001)
- Peterborough (2001)
- Bedford (2002)
- Epsom (2002)
- Atkinson (2003)
- Chester (2003)
- Jaffrey (2003)
- Hollis (2004)
- Kensington (2004)
- Nashua (2004)
- Merrimack (2006)
- Pelham (2006)
- Rye (2006)
- Salem (2006)
- Seabrook (2006)
- Durham (2007)
- Hampton Falls (2007)
- Hudson (2007)
- Milford (2007)
- North Hampton (2007)
- Stratham (2007)
- Auburn (2008)
- Hinsdale (2008)
- Dover (2008)
- Madbury (2008)
- Nottingham (2009)
- Farmington (2009)
- Newmarket (2009)
- Amherst (2009)
- Alton (2009)
- Chesterfield (2010)
- Greenfield (2010)
- Keene (2010)
- Mason (2010)
- Mont Vernon (2010)
- New Castle (2010)
- Newington (2010)
- Richmond (2010)
- South Hampton (2010)
- Winchester (2010)
- Windham (2010)
- Swanzey (2011)
- Temple (2011)
- New Ipswich (2011)
- Greenville (2011)
- Wilton (2011)
- Brookline (2011)
- Derry (2011)
- Rollinsford (2011)
- Greenland (2011)
- Hampton (2011)
- Sandown (2011)
- Danville (2011)
- Dublin (2011)
- Concord (2012)
- Deering (2012)
- Henniker (2012)
- New Durham (2012)
- Wolfeboro (2012)
- Tuftonboro (2012)
- Marlborough (2012)
- Antrim (2013)
- Barrington (2013)
- Fitzwilliam (2013)
- Francestown (2013)
- Hillsboro (2013)
- Londonderry (2013)
- Moultonborough (2013)
- New Boston (2013)
- Walpole (2013)
- Weare (2013)
- Charlestown (2014)
- Epping (2014)
- Goffstown (2014)
- Hancock (2014)
- Hopkinton (2014)
- Newfields (2014)
- Raymond (2014)
- Rindge (2014)
- Rochester (2014)
- Strafford (2014)
- Warner (2014)
- Bow (2015)
- Deerfield (2015)
- Gilford (2015)
- Lee (2015)
- Lyndeborough (2015)
- Meredith (2015)
- Newton (2015)
- Northwood (2015)
- Alstead (2016)
- Bennington (2016)
- Brentwood (2016)
- Brookfield (2016)
- Candia (2016)
- Chichester (2016)
- East Kingston (2016)
- Fremont (2016)
- Gilsum (2016)
- Hampstead (2016)
- Kingston (2016)
- Langdon (2016)
- Litchfield (2016)
- Plaistow (2016)
- Manchester (2016)
- Middleton (2016)
- Sharon (2016)
- Surry (2016)
- Troy (2016)
- Westmoreland (2016)
- Windsor (2016)
- Bradford (2017)
- Holderness (2017)
- Loudon (2017)
- Pembroke (2017)
- Salisbury (2017)
- Sanbornton (2017)
- Washington (2017)
- Webster (2017)
- Somersworth (2018)
- Wakefield (2018)
- Allenstown (2019)
- Harrisville (2019)
- Roxbury (2019)
- Sullivan (2019)

NH DNCR
Division of Forests and Lands
Forest Health Program
172 Pembroke Rd
Concord NH 03301
603-464-3016

10 5 0 10 Miles

Jen Weimer
11 March 2019


BANDIT
MODEL 250

from BC/Idaho:
Laricobius nigrinus
500 Released in Seabrook, Rye, Hampton Falls, Dover, Amherst, and Merrimack

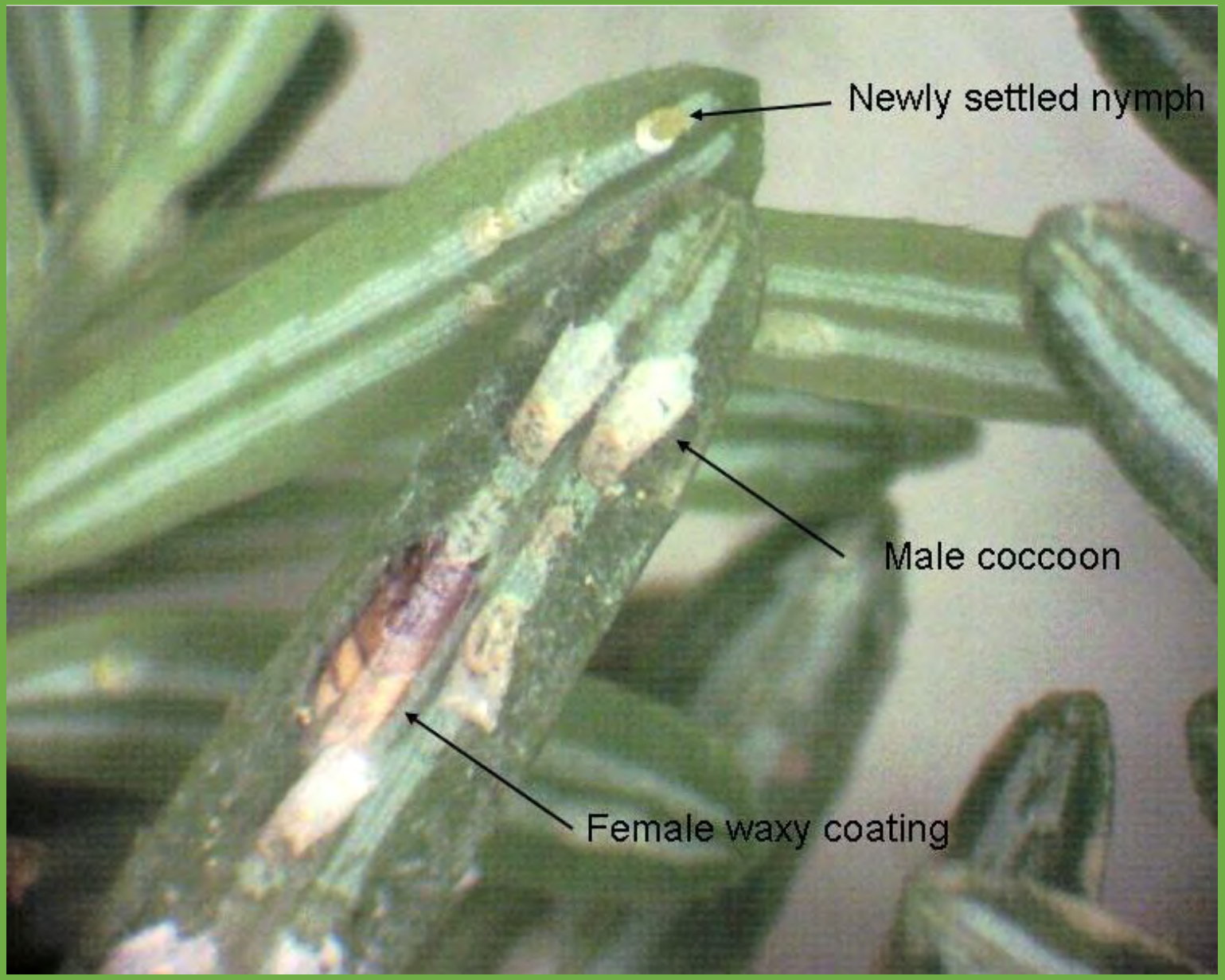
Biological Control

Predatory ladybeetle:
Sasajiscymnus (Psuedoscymnus) tsugae
40,000 Released at 2 sites in Portsmouth and 2 in Rye


JS for
1 tree

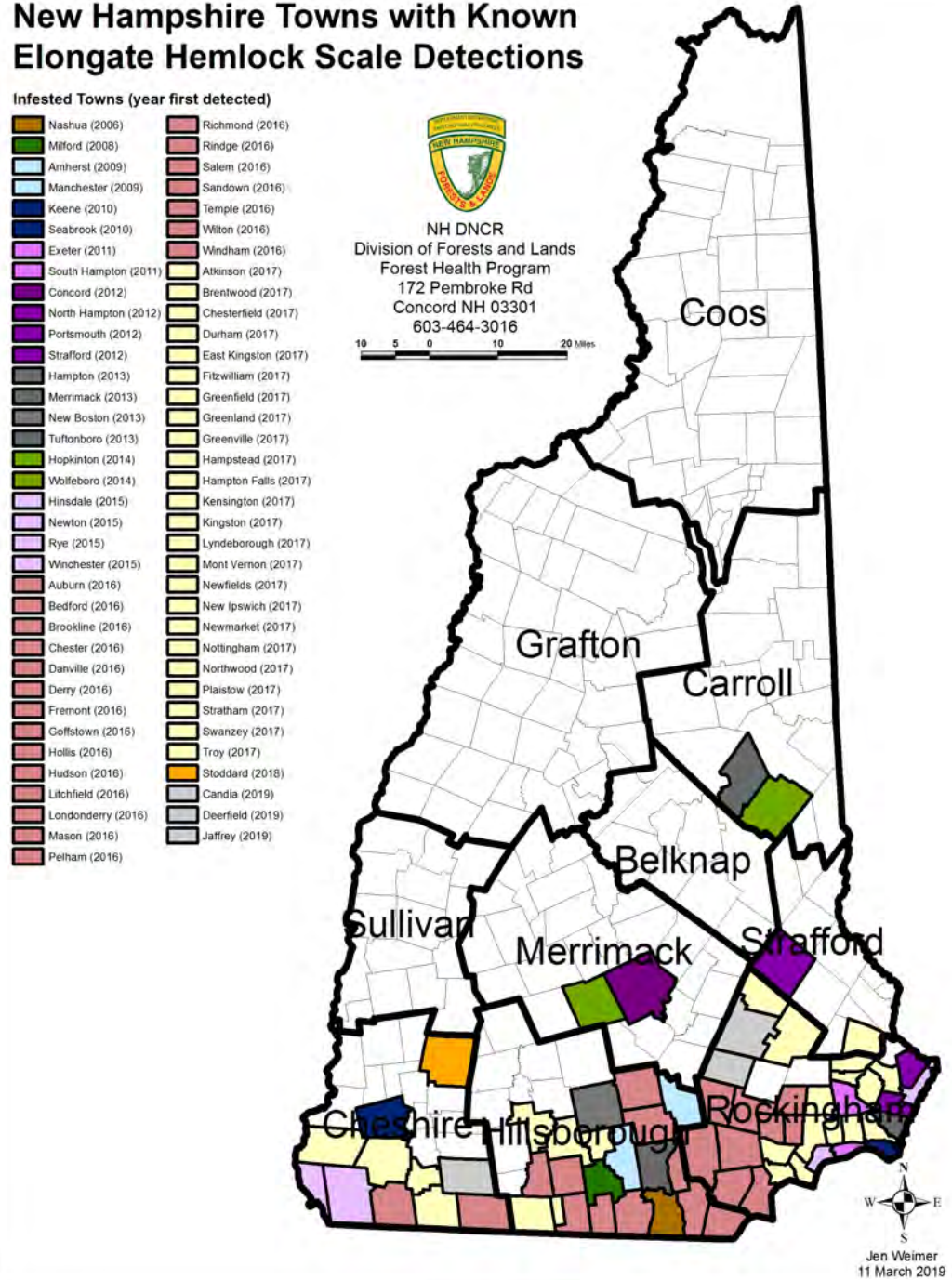
ELONGATE HEMLOCK SCALE

- Introduced into the United States from Japan.
- It was first observed in Queens, New York in 1908.
- Prefers hemlock, fir, spruce
- Other hosts include cedar, pine, yew


Newly settled nymph
Male coccoon
Female waxy coating


0.5 mm

New Hampshire Towns with Known Elongate Hemlock Scale Detections

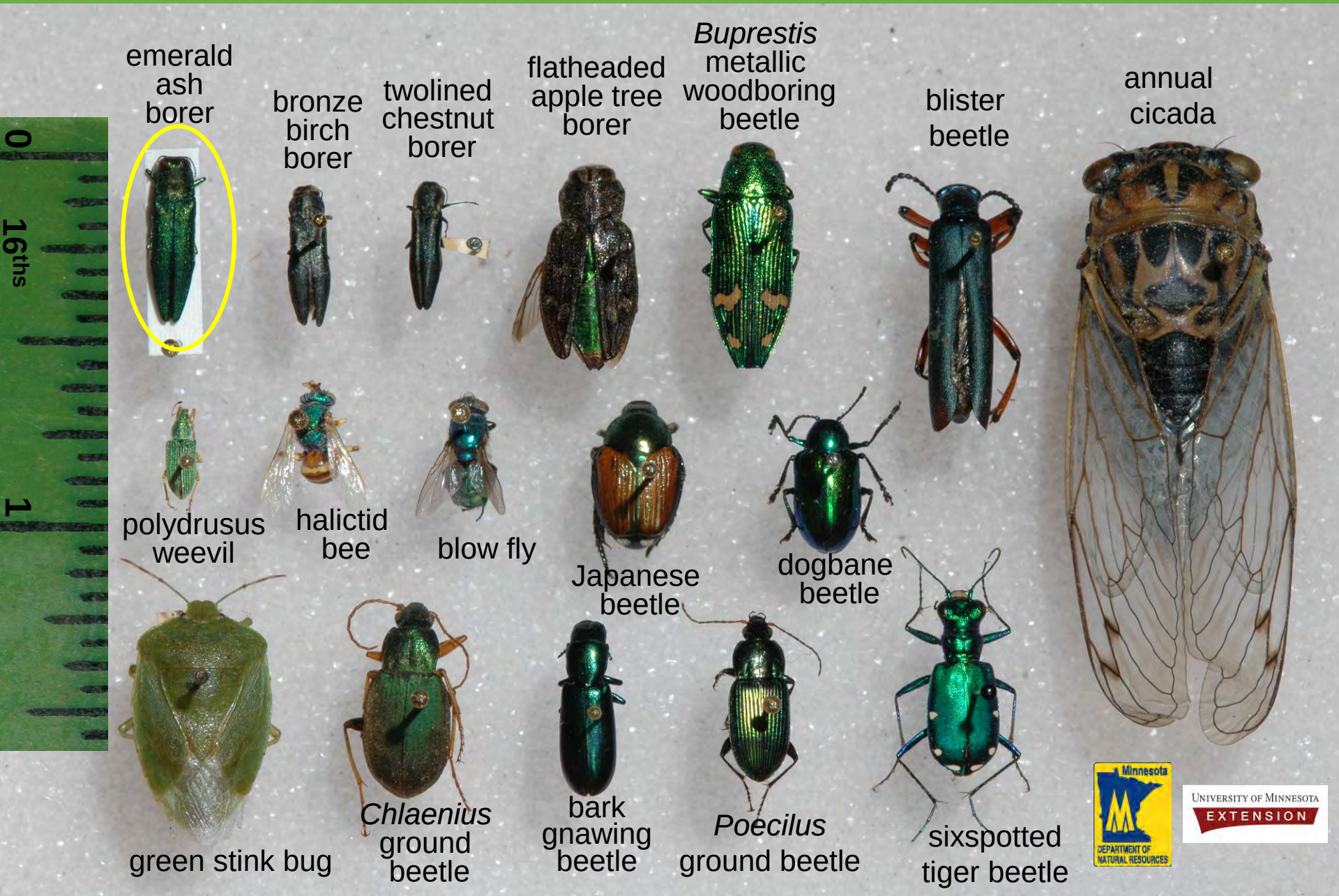


Emerald Ash Borer

Agrilus planipennis

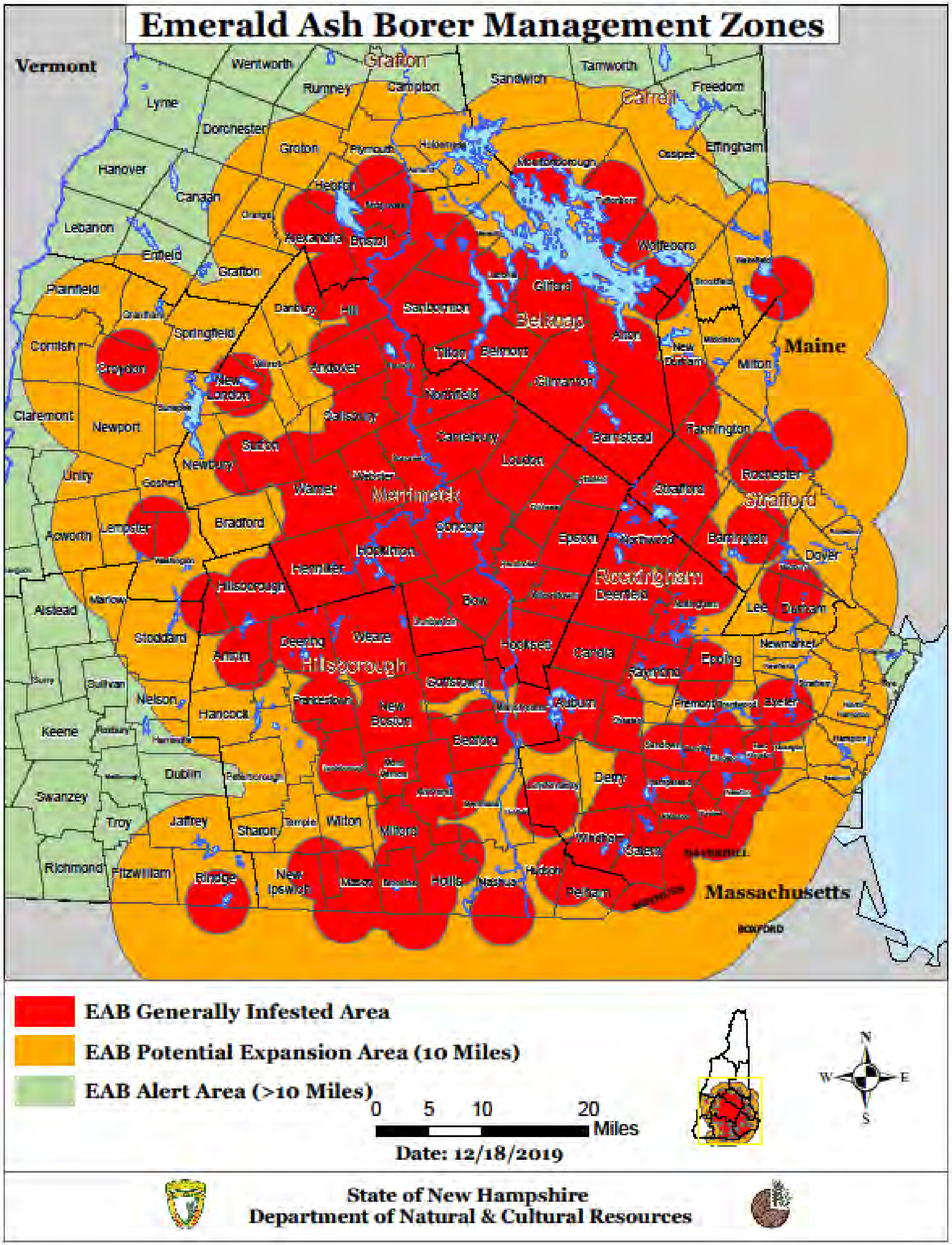

UGA1523082

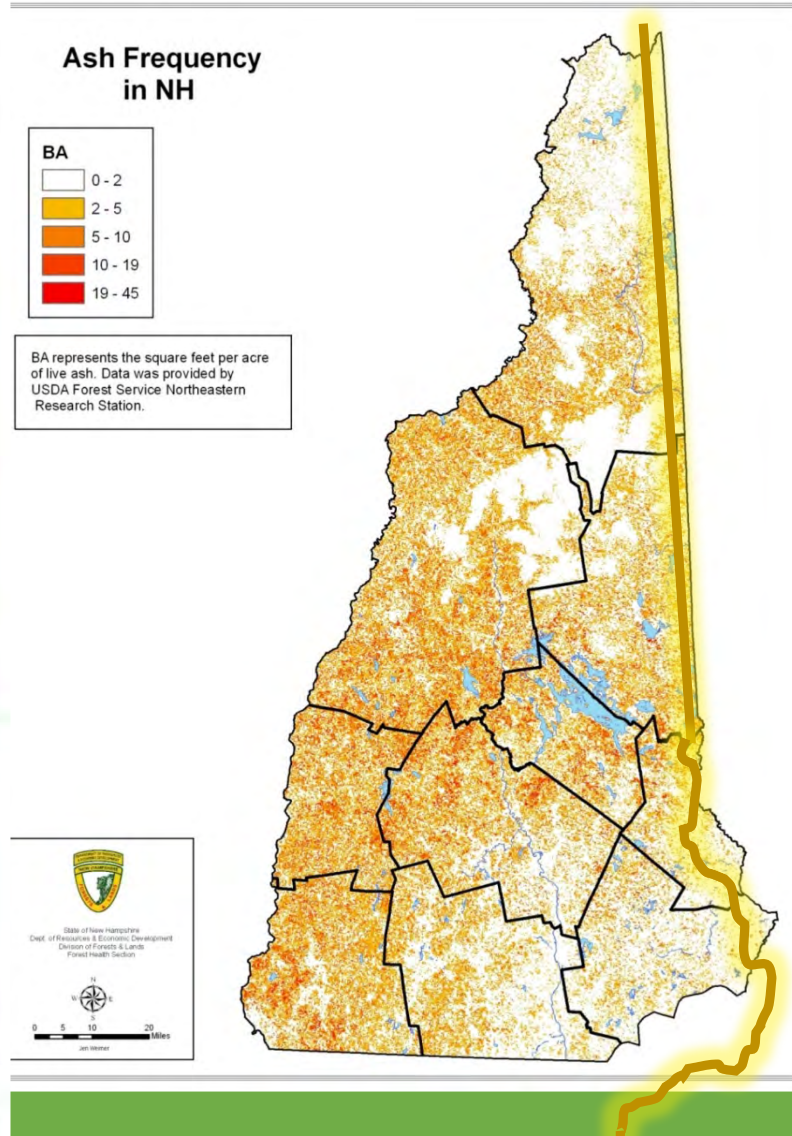
EAB Look-a-likes



Minnesota Department of Natural Resources

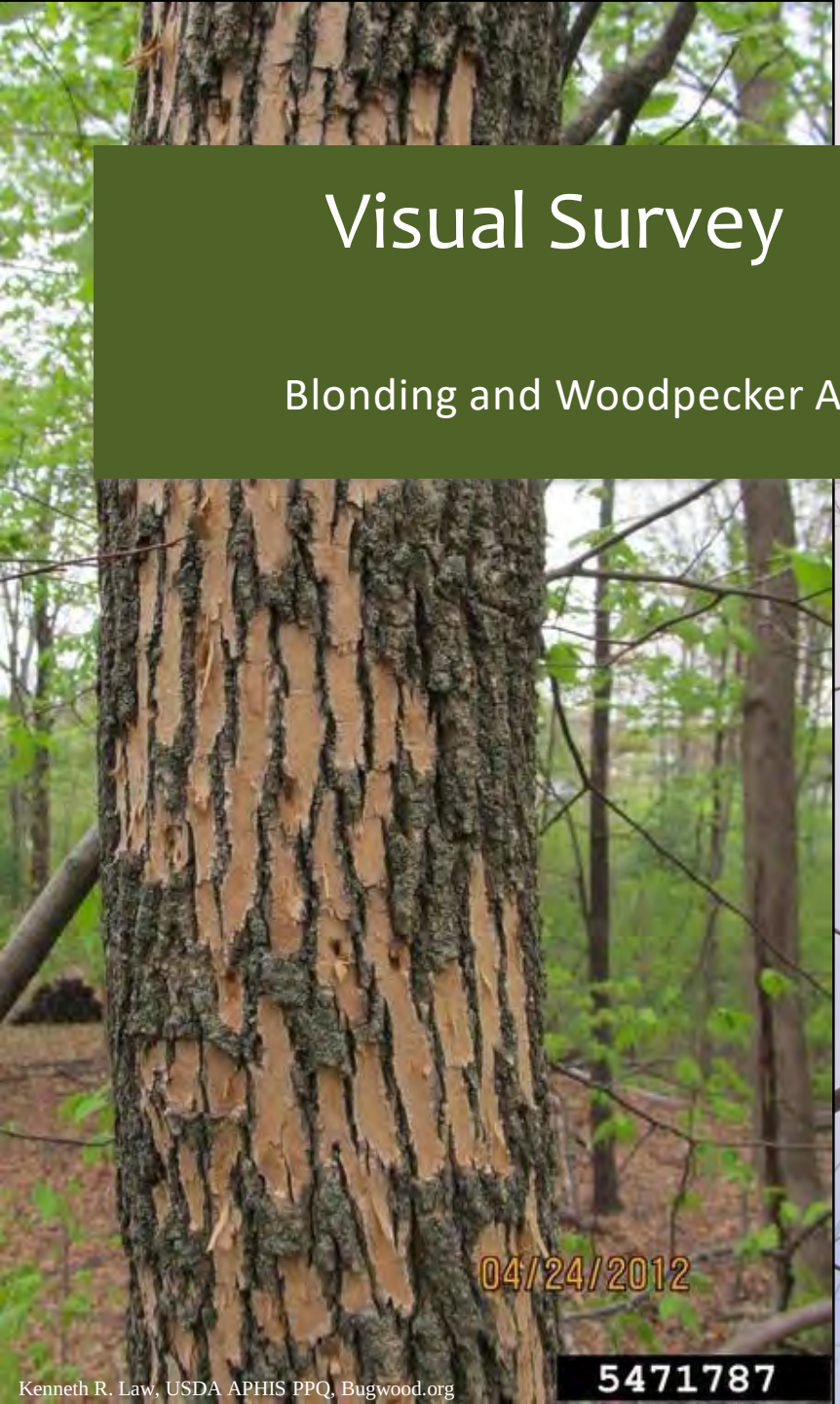
University of Minnesota Extension


Emerald Ash Borer Management Zones
Vermont
Maine
Massachusetts
Grafton
Carroll
Belknap
Merrimack
Hillsborough
Rockingham
Strafford
Wentworth
Rumney
Campton
Sandwich
Tamworth
Freedom
Lyme
Dorchester
Groton
Plymouth
Moultonborough
Ossipee
Effingham
Hanover
Canaan
Hebron
Lebanon
Alexandria
Bristol
Wolfeboro
Enfield
Grafton
Plainfield
Danbury
Hill
Sanbornton
Gilford
Cornish
Springfield
Croydon
Andover
Tilton
Belmont
Alton
New Durham
Milton
New London
Gilmanton
Claremont
Newport
Salisbury
Northfield
Farmington
Canterbury
Barnstead
Sutton
Unity
Goshen
Newbury
Webster
Loudon
Rochester
Warner
Strafford
Bradford
Concord
Acworth
Lempster
Epsom
Northwood
Barrington
Hopkinton
Dover
Henniker
Hillsborough
Deerfield
Alstead
Bow
Lee
Durham
Stoddard
Deering
Weare
Hooksett
Candia
Newmarket
Antrim
Raymond
Epping
Nelson
Francestown
Goffstown
New Boston
Auburn
Fremont
Exeter
Keene
Hancock
Bedford
Dublin
Derry
Swanzey
Troy
Jaffrey
Sharon
Temple
Wilton
Milford
Windham
Salem
Richmond
Fitzwilliam
Rindge
New Ipswich
Mason
Hollis
Nashua
Hudson
Pelham
EAB Generally Infested Area
EAB Potential Expansion Area (10 Miles)
EAB Alert Area (>10 Miles)
0 5 10 20
Miles
Date: 12/18/2019
N
W
E
S
State of New Hampshire
Department of Natural & Cultural Resources


Ash Frequency in NH
BA
0 - 2
2 - 5
5 - 10
10 - 19
19 - 45
BA represents the square feet per acre of live ash. Data was provided by USDA Forest Service Northeastern Research Station.

Visual Survey

Blonding and Woodpecker Activity



Kenneth R. Law, USDA APHIS PPQ, Bugwood.org

Identification - Signs

Serpentine Larval Galleries

Damaging Insects and Diseases | NHBugs - Windows Internet Explorer
http://nhbugs.org/
File Edit View Favorites Tools Help
Favorites Damaging Insects and Diseases | NHBugs
Page Safety Tools

NHBugs

Protecting trees and forests

Main menu

- Invasive Insect Reporting Form
- News
- Damaging Insects and Diseases
  - Emerald Ash Borer
  - Asian Longhorned Beetle
  - Hemlock Woolly Adelgid
  - Elongate Hemlock Scale
  - Red Pine Scale
  - White Pine Blister Rust
  - Native Insects & Diseases
- Photo Gallery

Damaging Insects and Diseases

Emerald Ash Borer

Emerald Ash Borer (EAB) was found in Concord in March 2013. As a non-native insect, EAB lacks predators to keep it in check. Infested trees die within 3 to 5 years. EAB only attacks ash trees, and is responsible for the death of millions of ash trees in the midwest. 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 Merrimack County.

Report a suspect tree or insect

Caring for ash trees and managing forests

Frequently Asked Questions

Quarantine and compliance agreements

Sign up to receive bug updates

Firewood

Learn more about emerald ash borer

Attend a meeting

Cooperating agencies:

Done
Internet
100%
Start EAB DanburyCC... Inbox - Kyle.Lo... Asian Longhorn... Damaging Ins... 1:53 PM

Gypsy Moth
Oak Wilt
Spotted Lanternfly
Jumping Worms
Native Insects & Diseases
Photo Gallery

Search

roads.
2. Consider insecticide treatment for high-value ash. Ask three licensed pesticide applicators for quotes.
3. Consider removing remaining ash trees while they're still healthy—dying ash can be hazardous to remove.
4. Use the material locally and follow best management practices when transporting logs.

Trees in natural settings:

1. When a stand is being harvested, cut all large ash. Encourage small sizes under 4 inches in diameters. Protect and encourage ash regeneration.
2. Identify several large, mature ash in pairs of a male and female as a seed source. Treat with pesticide every three years using a licensed applicator.
3. If the harvest area isn't heavily infested, girdle 20 to 30 sawlog-size ash in advance of the timber sale. These trap trees will attract egg-laying adults and the larvae will be destroyed when the trees are harvested. Girdle using hand tools in the early spring before the scheduled harvest.
4. Follow best management practices when transporting logs. Consult the Legal transportation of ash wood products from NH & VT to ME, if moving ash into those states.

Potential expansion area- orange zone

Landscape trees:

1. Consider removing ash trees while they're still healthy—dying ash can be hazardous to remove.
2. Consider insecticide treatment for high-value ash. Ask three licensed

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.

Definitions

Diameter at breast height (DBH)- Diameter of a tree at 4.5 feet above the ground

High-value ash- A tree valued for economic, ecological, aesthetic or cultural reasons.

Trap tree- A low-valued ash girdled to attract EAB and monitored by the N.H. Division of Forests & Lands.

State of New Hampshire
BEST MANAGEMENT PRACTICES

Help stop the spread of EMERALD ASH BORER in New Hampshire

Natural spread of Emerald Ash Borer (EAB) takes decades; human-assisted spread takes only hours.

Following best management practices will help protect ash woodlots across New Hampshire and provide valuable time to managers and scientists looking for new control methods.

Signs of EAB infestation include birds removing the outer layer of bark (called "blonding") and "s"-shaped galleries under the bark

EAB was discovered in New Hampshire for the first time in 2013. While EAB has spread into most of NH's counties, it still infests a very small percentage of the state's total ash trees. Close attention to practices described on this card will help keep the outbreak from killing trees for decades.

Learn more at NHBugs.org

How to help minimize risk of spreading Emerald Ash Borer in New Hampshire

When moving ash logs:

- Transport only after September 1 and have processed by June 1

OR

- Ship only to mills willing to debark immediately

OR

- Confirm logs are likely not infested (for the latest information on infested zones , expert contacts and training opportunities visit NHBugs.org)

When moving firewood:

- Remove ash wood from shipments traveling more than 5 miles; deliver ash wood less than 5 miles

OR

- Season ash wood at its place of origin for at least 12 months

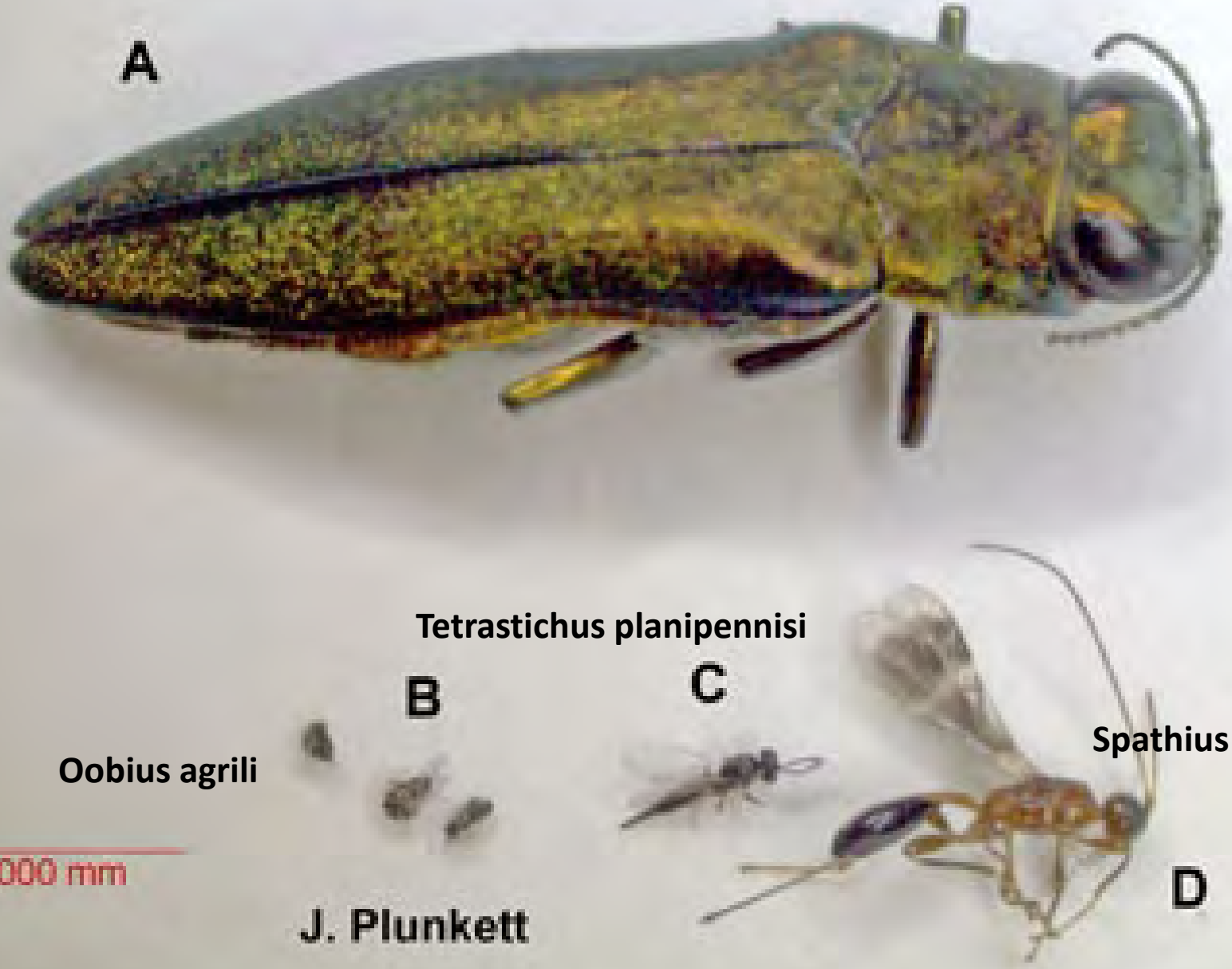
OR

- Deliver ash wood after September 1 and make sure it's burned by June 1

NOTE: Mulch or chips of any size can be moved year round.

New Hampshire
Department of Agriculture, Markets & Food

BIOLOGICAL CONTROL



Biological Control

Oobius agrili – egg parisitoid

Tetrastichus planipennisi – larval parasitoid

	2014	2015	2016	2017
Oob	2600	5000	37,000	50,000
Tet	13,000	25,000	40,000	70,000
Spa				5,000

It’s a burning issue

Alastair Heseltine, a Canadian artist living in the Pacific Northwest


8L02593


Firewood Study

Results:

In 19 samples

We have found:

Ants
Snails
Sow bugs
Spiders
Millipedes
Centipedes
Termites
Bark lice
Woodwasps
woodborers
parasitic wasps
longhorn beetles
flies

650 insects, 9 orders, 22 different families and an unknown number of species

STATE OF NEW HAMPSHIRE

DEPARTMENT OF NATURAL & CULTURAL RESOURCES

DEPARTMENT OF AGRICULTURE, MARKETS & FOOD

FIREWOOD EXTERIOR QUARANTINE

JOINT QUARANTINE NO. 2

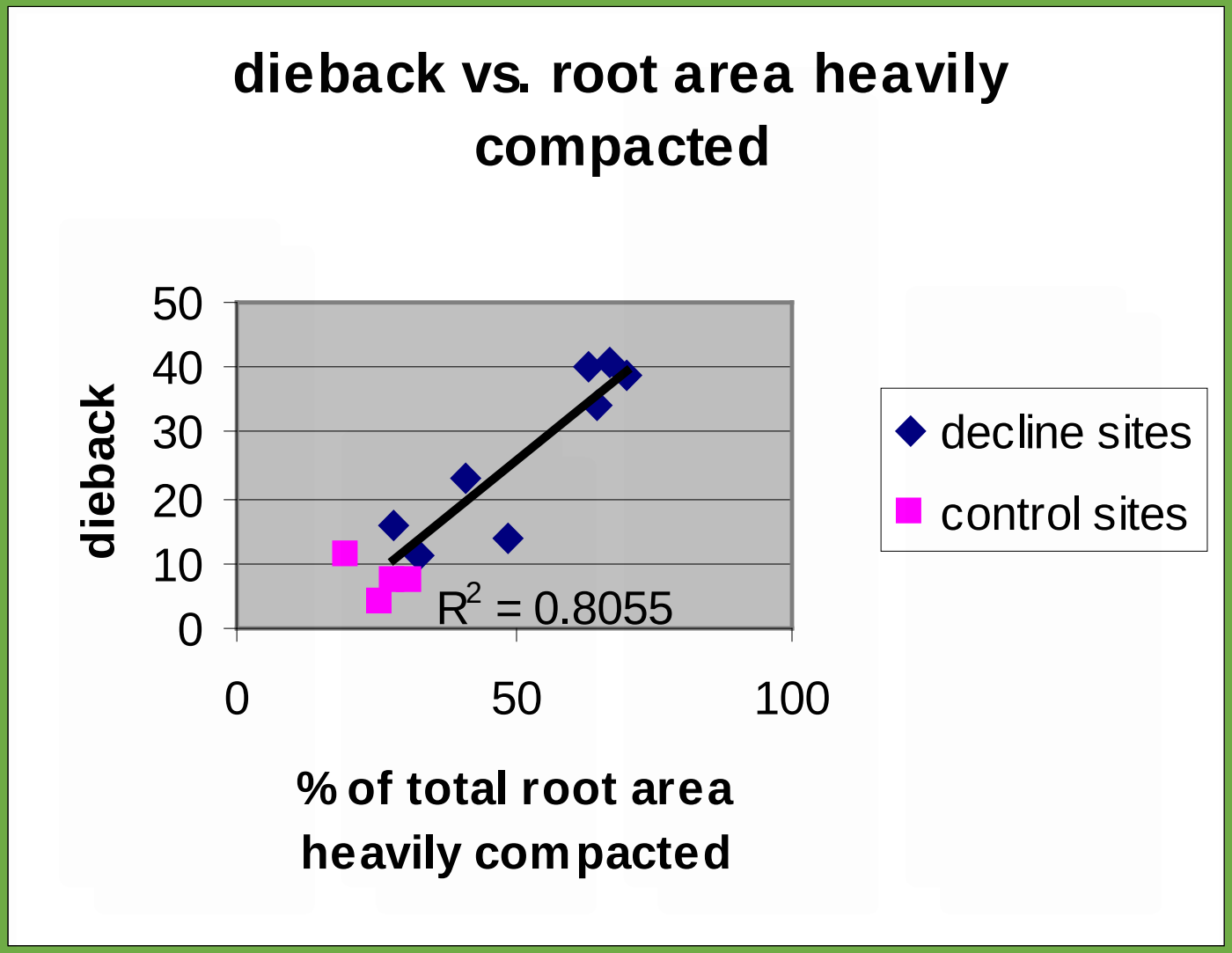
Amendment No. 3

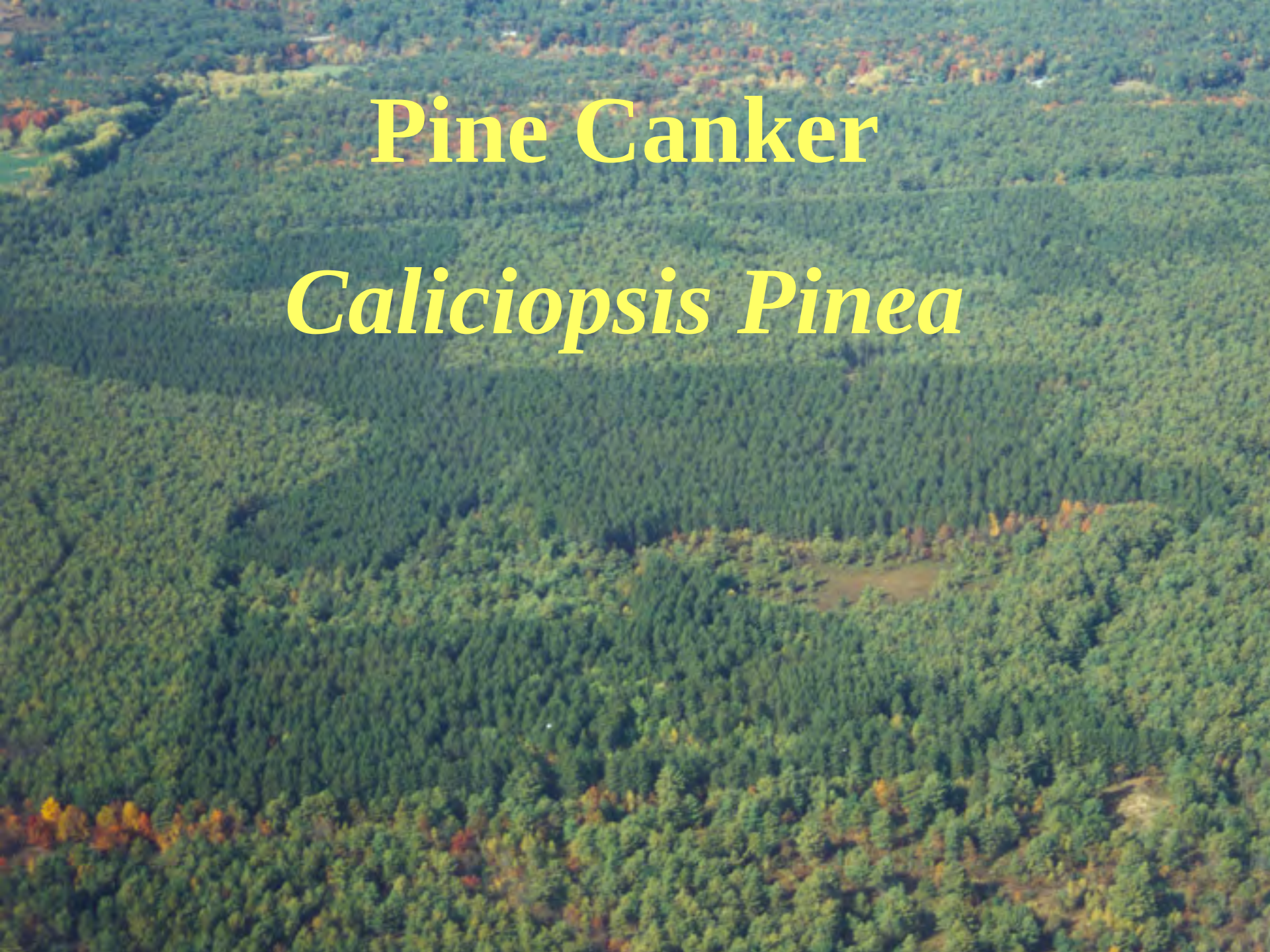
August 2018

Section I. Definitions

CORRELATION OF HEAVILY COMPACTED ROOT

Correlation between root area compacted and tree dieback

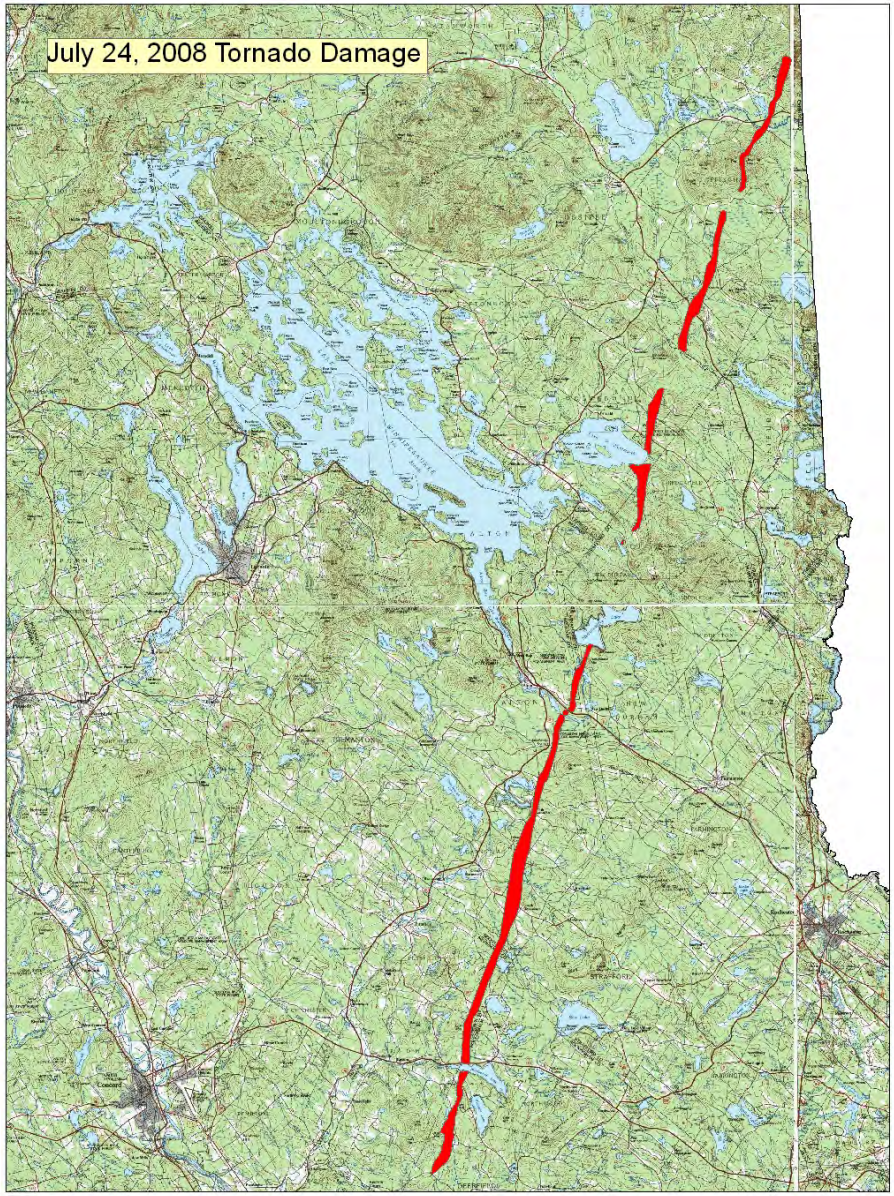



Pine Canker
Caliciopsis Pinea


04/03/2002

Blister rust	Pine canker
Generally infects lower bole	infects thin barked upper bole
Infects through a branch	infects bark directly between whorls
Localized pitch from margins	long pitch streaks throughout canker region
Known to kill trees	literature suggests it's a secondary pathogen
Can cause major tree deformity	rarely kills cambium,
Rarely found on more than 20% Of the mature stand	75% of codominant trees infected is common
Usually only one stem canker	usually many small cankers along upper bole

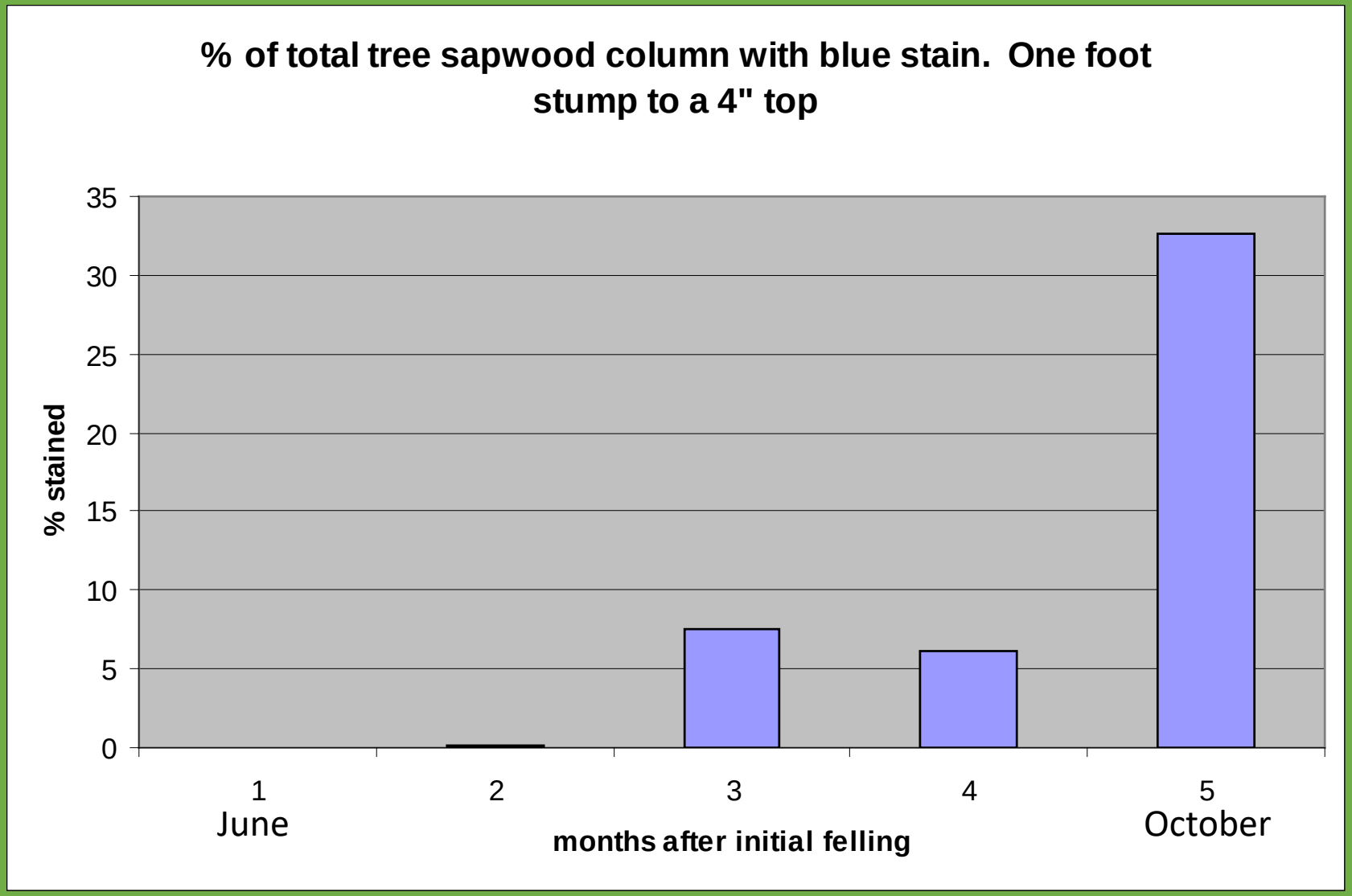
Silviculture


July 24, 2008 Tornado Damage
> 50% of Forest Affected (8411 acres)
State of New Hampshire
Dept. of Resources & Economic Development
Division of Forests & Lands
Forest Health Section
603-464-3016
0 10 20 40 60 80
Miles


Kyle Lombard

May-September, 2007 Blue Stain Monitoring

Fox Research and Demonstration Forest



Risk Tree Plan

ANNUAL TRAINING

Visual Inspection →	**Document** →	**Report** →	**Mitigate**
Annual After storms Regular work duties	Location Species Date Risk Category Reason	To Park Manager Permanent file Track mitigation	Park Staff Division Expertize Contract Arborist


CAUTION
CAUTION

Risk Trees

Factors That Cause Tree Stress/Decline

Things you might see in your Parks

- Site Factors
- Weather
- Insects
- Diseases
- Geography
- Animal
- Land History
- Pollution
- Poor Tree Care (AJ will cover)

Diseases

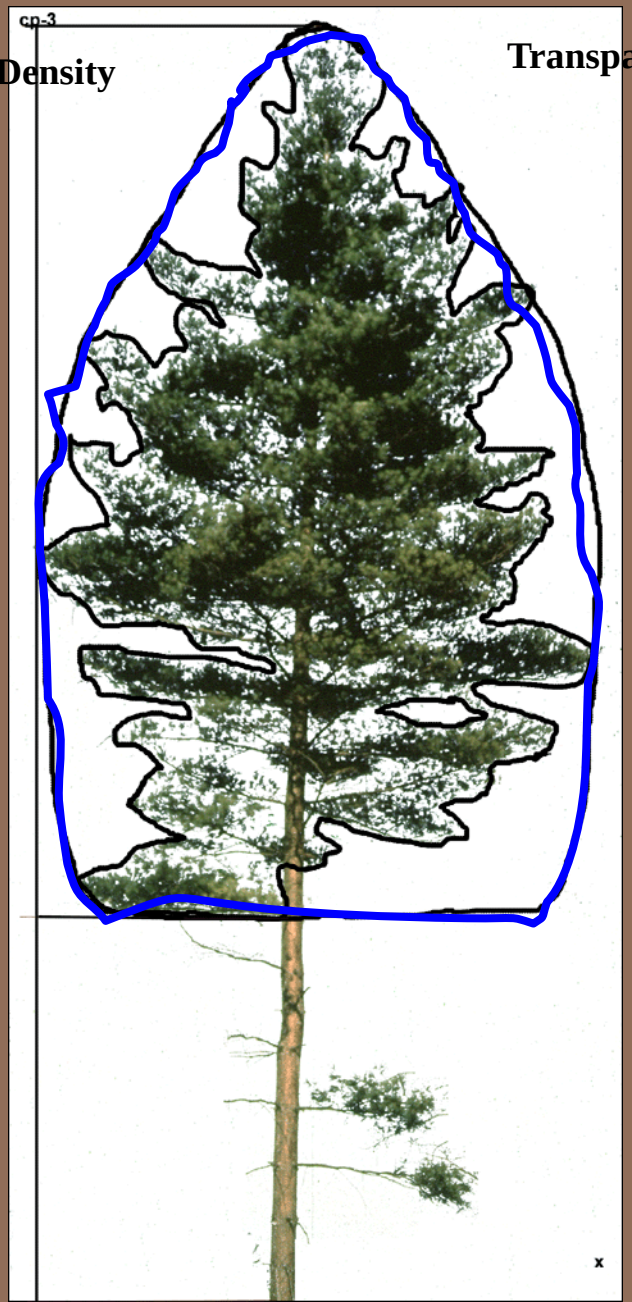
- Root rots
- Decay fungi
- Foliage blights
- Canker diseases

“TREE STRESS AND DECLINE”

Live crown ratio

Density

Transparency



Soil Compaction

- Shallow Soils
- Wet soil
- Texture of soil
- PSI of DCA
- Vibration of DCA
- Frequency of occurrence

Hazard Tree Identification

Widow Maker (Previous Failures)
Failure history is a key element in predicting future failures.

Sharp Bends
Predictable failure points.

Nesting Holes
Nesting holes serve as a potential site of decay columns.

Weak Branch Unions
A weak union occurs when two or more similarly sized branches grow so closely together that bark grows between the branches, inside the union.

Multiple Pruning Wounds & Poor Weight Distribution (Lion Tailing)
Excessive pruning that strips out interior branches increases opportunity for decay at wound sites and failure when weight is concentrated at the end of the branch.

Shear Plane Cracks
Result of wood tissue pulling apart.

Old Wounds
Old wounds serve as a potential source of wood rot and decay.

Wounds/Broken Branches with Poor Wound Closure
Potential source of wood rot and decay.

Ooze/Fungal Activity
Fungal activity, including mushrooms, conks, ooze, and brackets growing on root flares, stems, or branches is an indication of advanced decay.

Epicormic Growth
New growth stimulated by pruning, damage, or infection. Indication that tree is under stress.

Response Growth
Unique bulges and or swollen or sunken bark patterns. An indication of internal decay.

Trunk Taper
The diameter of the trunk should be largest at the base and decrease with tree height. Lack of a taper may indicate root failure.

Wound-Wood Formations
Previous injuries or obstacles in growth can exhibit unique wood fiber patterns, providing information from a period well before a failure.

Cavity
Cavities in trees are an indication of advanced decay, stability of tree is determined by the ratio of sound to decayed wood.

Summary

Be in tune with

- Exit holes
- Fruiting bodies
- Dieback
- Crown ratio
- Frass
- cankers
- Broken, dead or defoliated branches

Call or email me if you have a questionable or unknown sign or symptom 464-3016

http://nhdfl.org/library/pdf/Forest%20Health/2017newsletter.p

nhdfl.org

File Edit Go to Favorites Help

Page Safety Tools

NH Department of Natural & Cultural Resources
Division of Forests & Lands
Forest Health Program

Annual Newsletter
2017

Forest Tent Caterpillar
White Pine Bast Scale
Browntail Moth

172 Pembroke Rd
Concord NH 03301
603-464-3016

IN THIS ISSUE:

Click to add notes

Slide 22 of 22 "Blank Presentation" 73%

8:45 AM
3/12/2018

https://nhbugs.org/

Damaging Insects and Dise...

File Edit View Favorites Tools Help

Page Safety Tools

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

Damaging Insects and Dis

Emerald Ash Borer

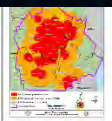
Emerald Ash Borer (EAB) was found in Concord in March 2013, and the list of towns with known infestations continues to grow. As a non-native insect, EAB lacks predators to keep it in check. EAB attacks ash trees and infested trees die within 3 to 5 years. Help protect New Hampshire's ash trees. A quarantine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

Report a suspect tree or insect

Caring for ash trees & managing forests

Identify emerald ash

Quarantine &



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

125%

8:44 AM
3/12/2018