Forest Health Update

Bob Heyd
Forest Health Management

MDNR Forest Management Division
Forest Health, Inventory & Monitoring

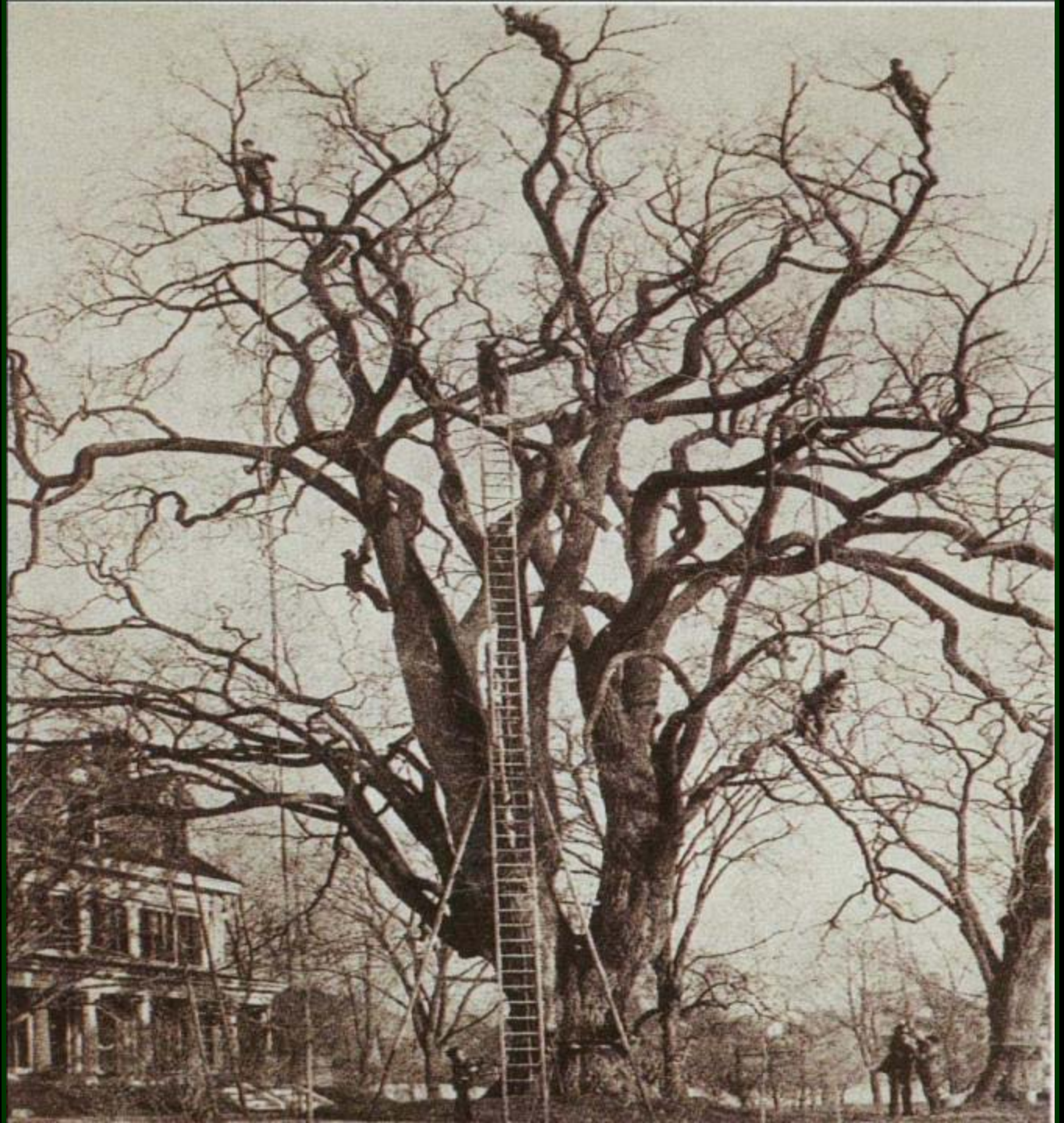
- Exotic Forest Pest and Pest Management
  - Exotic Forest Pests: New and on the horizon
  - Management Strategies for native and exotic pests
- Forest Health Monitoring
  - Aerial Survey
  - Ground Detection and Evaluation surveys
  - Short and Long-Term Monitoring
- Inventory

Aerial Survey

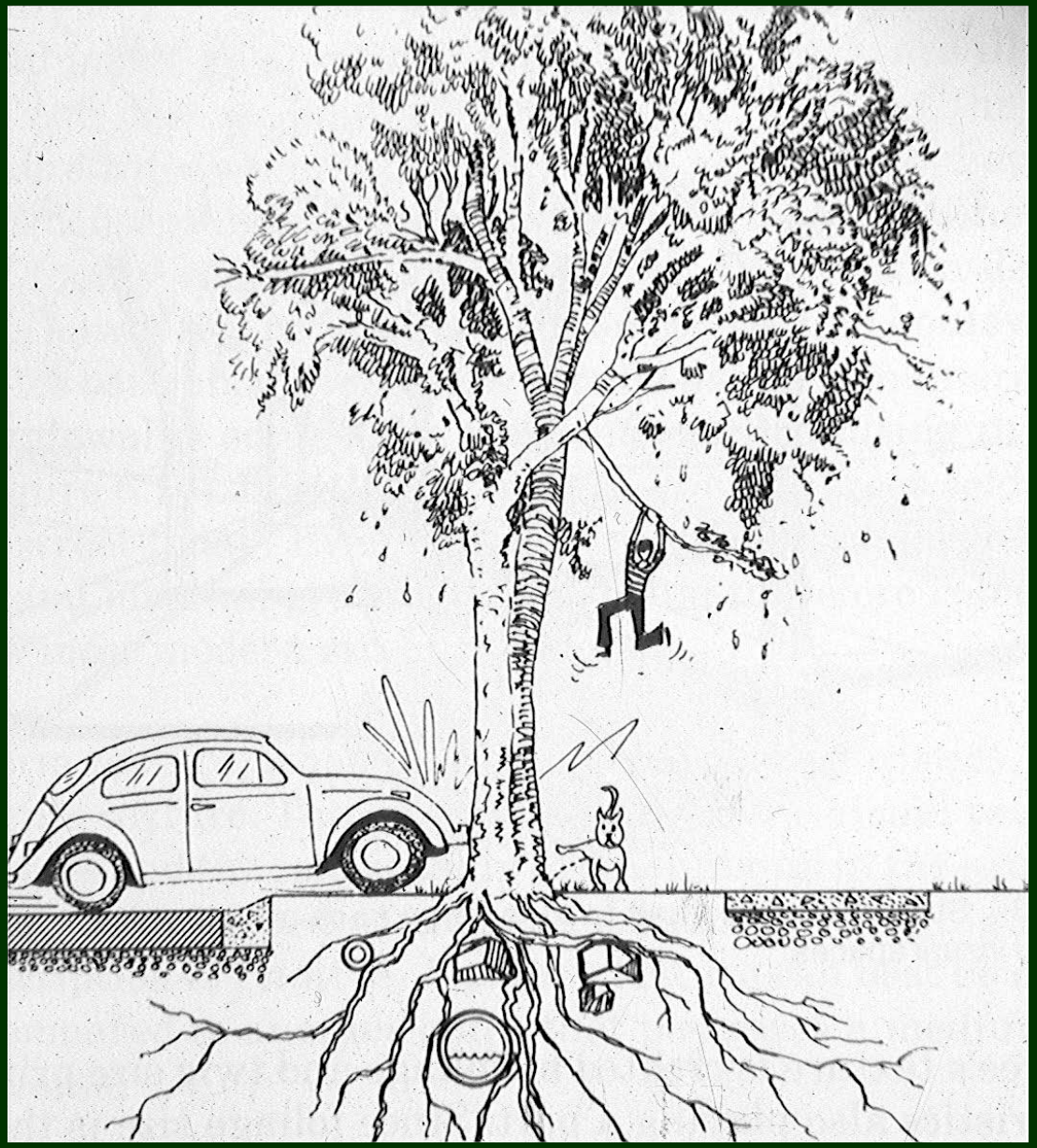
Aerial Surveys

Forest Tent Caterpillar

Beech Bark Disease Impacts



Diagnosing Tree or Forest Health can be tricky.



Beech Bark Disease

- Agent: Sap-feeding Exotic Scale
  - Scale is dispersed by wind & birds
- Disease: Native & Non-native Fungi - *Nectria sp.*
  - Wind borne spores

Three Stages of Invasion

- Advancing Front
  - Scales only
  - 6 miles / year
- Killing Front
  - *Nectria* & Mortality
- Aftermath Forest
  - Few trees; defects & decline in residual trees

Beech Blight Aphid

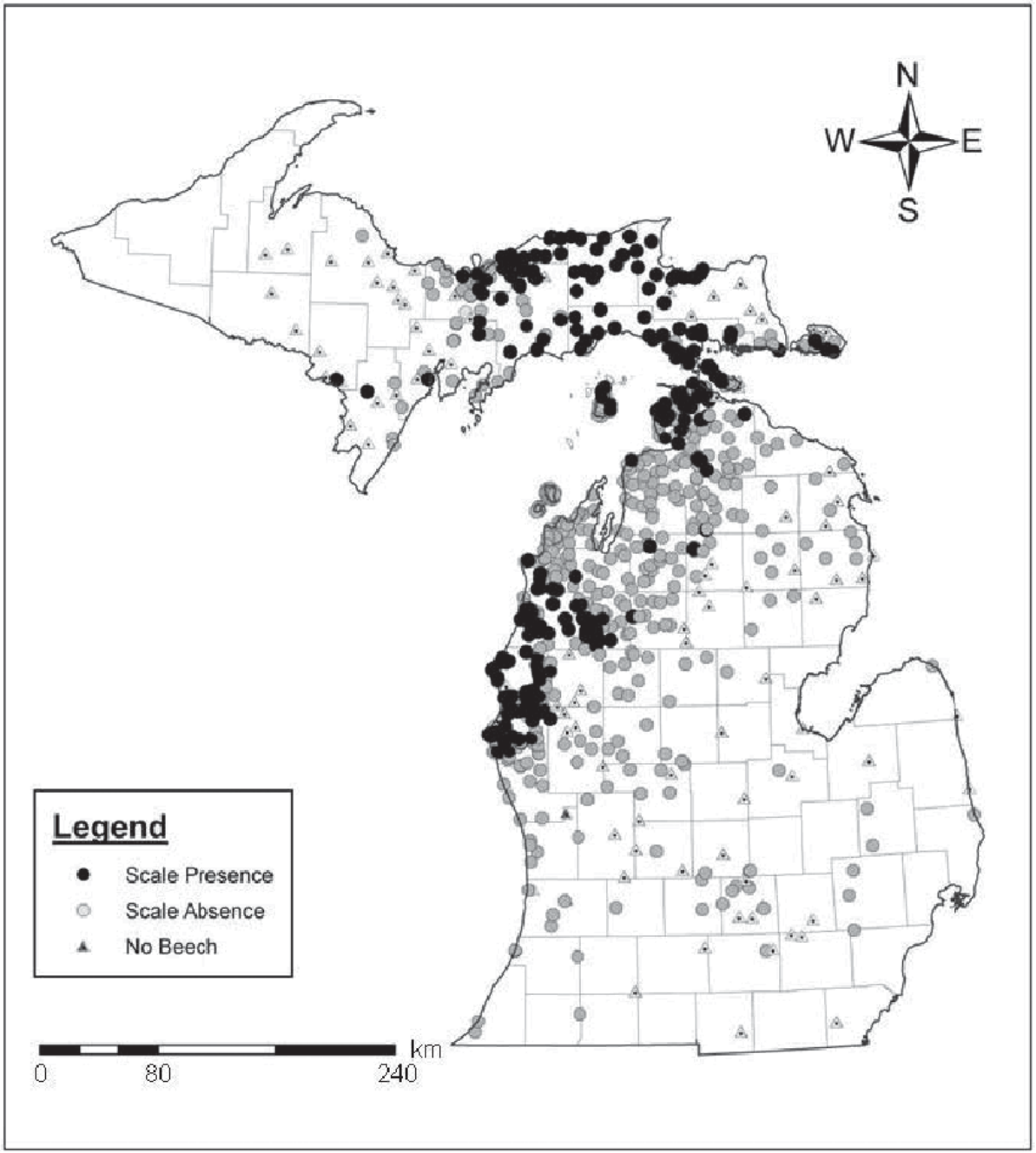
Lichens not Beech Scale

American Beech

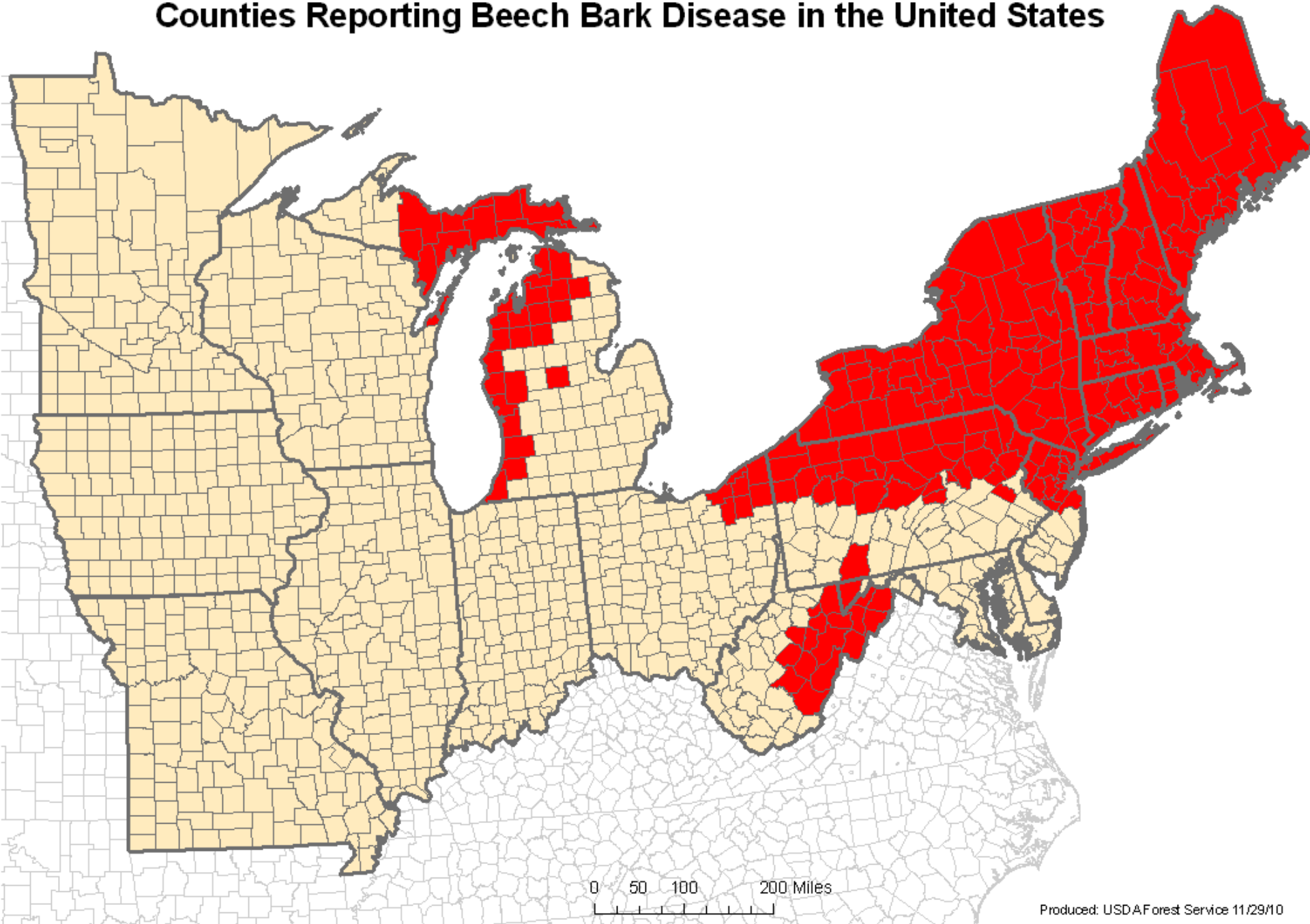
Beech Snap - Reason for:

- Hazard Tree Management
- Salvage Cutting

Beech regeneration mixed with stripped maple


N
W
E
S
Legend
Scale Presence
Scale Absence
No Beech
km
0
80
240

Counties Reporting Beech Bark Disease in the United States



Produced: USDA Forest Service 11/29/10

Resistance Research

- USFS Research Lab, Delaware, OH
  - Collect scions
- MSU - Reporting form
  - database
  - > 9” dbh
  - # tag & painted “R”
  - leave a buffer

Michigan's Upper Peninsula
First Tagged Resistant Tree

Light green lichen on many resistant beech

Not all resistant trees have smooth bark

Burrs developing on greenhouse pollinated grafted beech

Foam traps provide a favorable environment, resulting in enhanced egg-laying

Six-month old cross-progeny seedlings being challenged with 50 egg sac foam pads.

BBD Resistance

- DNR / MTU - Identify resistant beech trees and collect dormant scions
- Delaware, OH - Scions are grafted to beech seedlings using a hot-callus grafting technique.
- Goals:
  - a seed orchard
  - maintain an acceptable level of genetic diversity
  - 20 different resistant trees
  - seed orchard = 300 trees with 15 ramets of each of the 20 resistant genotypes
- To date, scions from 24 different resistant trees from MI
- Once grafted, 3 ramets of each genotype are tested for beech scale resistance
  - place scale eggs against the bark on foam pads.

Brighton Tree Improvement Center
Fall, 2010 - First planting of resistant stock

- Seed collected from:
  - open-pollinated resistant parent
  - open-pollinated susceptible parent
  - susceptible parent cross-pollinated with a resistant parent
  - pairs of resistant parents cross-pollinated with other resistant parents
- Families with highest proportion of resistant seedlings = two resistant parents
- Includes the open-pollinated family from the resistant tree in Sebois County, Maine
  - provides evidence that management directed at the removal of diseased trees can lead to stand improvement.

Update on Asian Longhorned Beetle

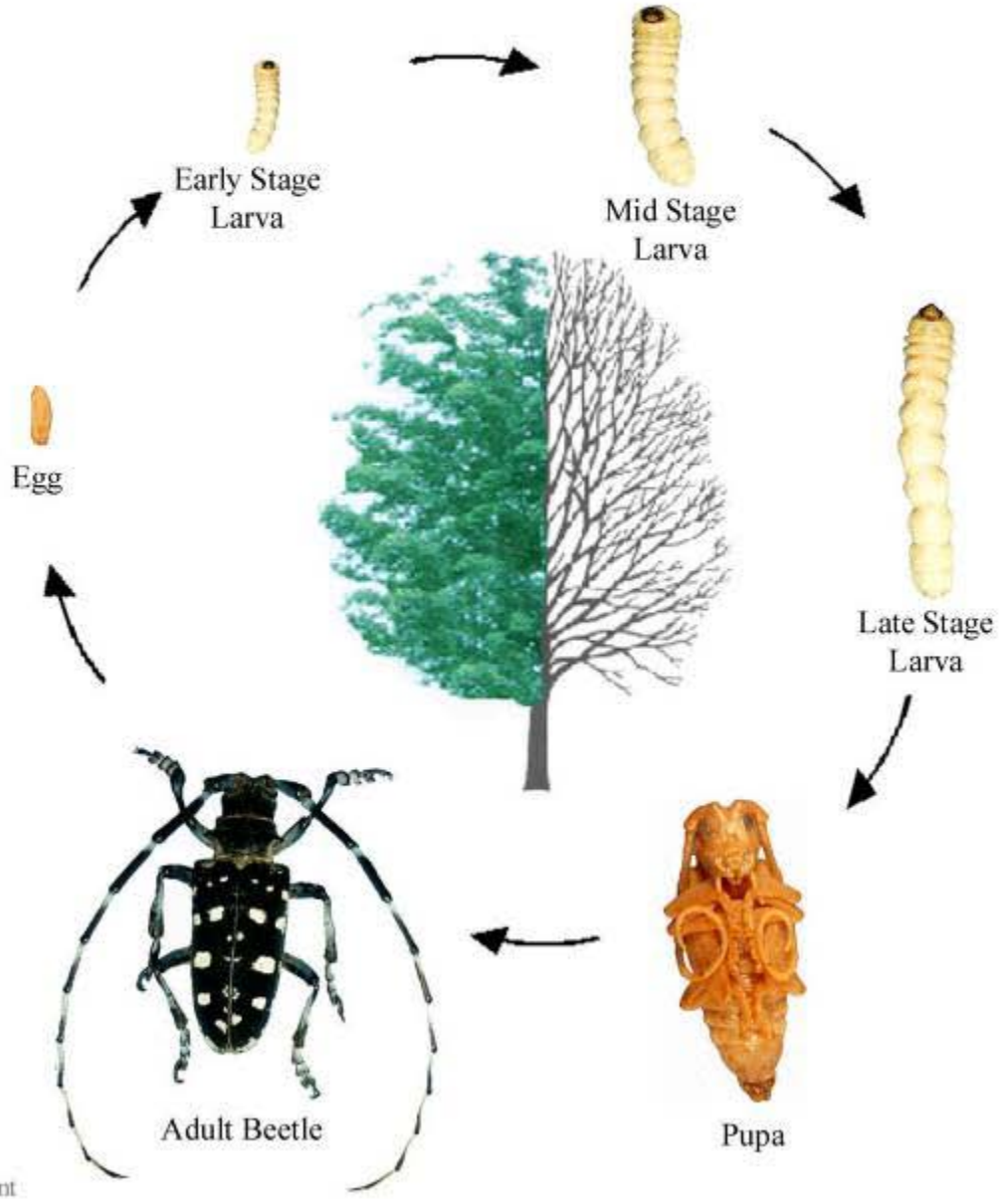
Kevin Dodds & Michael Bohne
Forest Service
Durham Field Office

Asian Longhorned Beetle Lifecycle

Adults and ovipostion scars

Emergence holes

Adult emerging from tree



Larva in tree

Pupal chamber in tree

Diagram by Michael Bohne

ALB Signs

Emergence holes

Adult feeding
On leaf midrib and petioles

Not Asian Longhorned Beetle

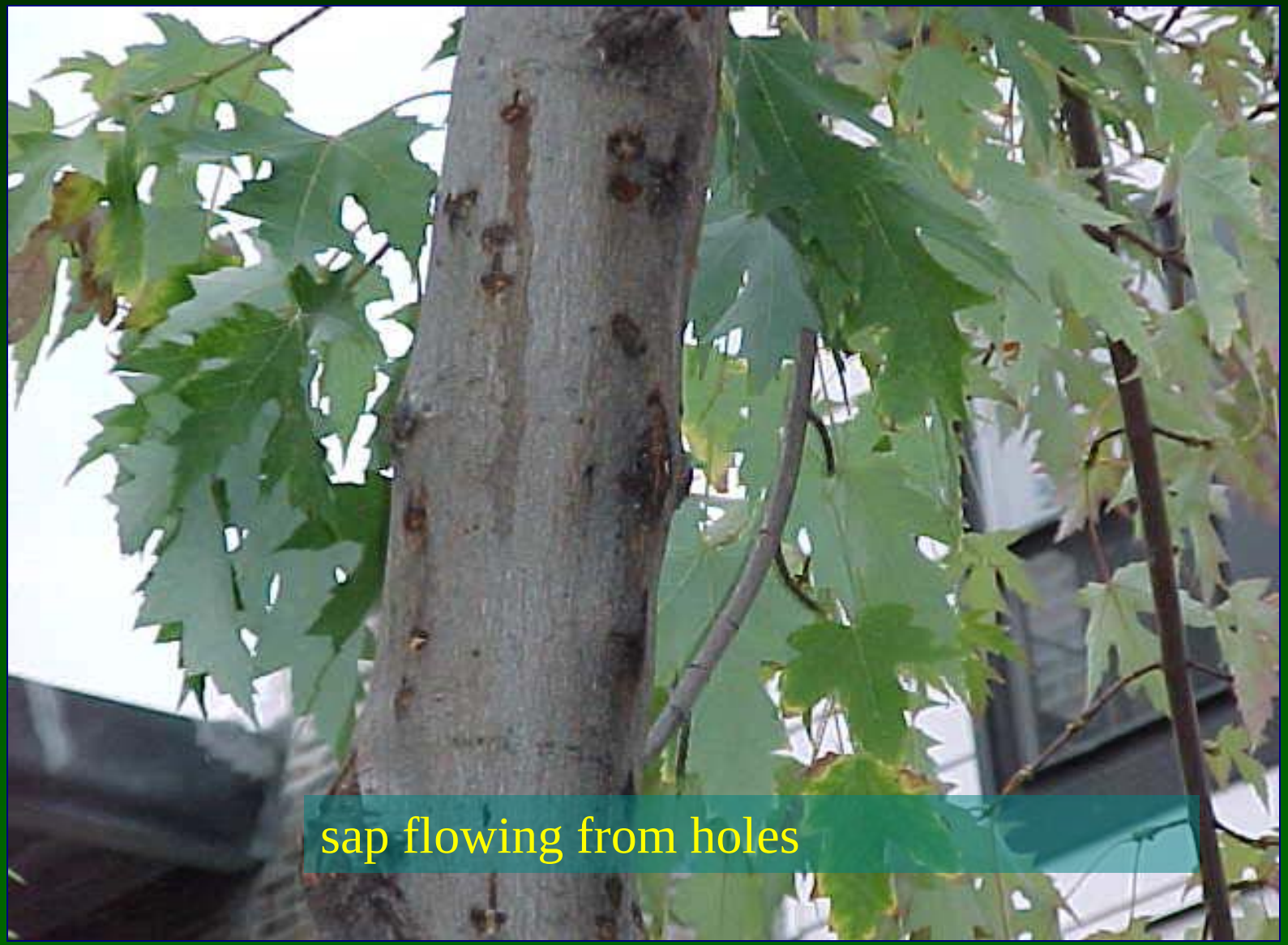

sap flowing from holes

Photo credit: M. Bohne, USDA-FS-FHP

Photo credit: M. Bohne, USDA-FS-FHP


5-7mm

feeding damage under bark

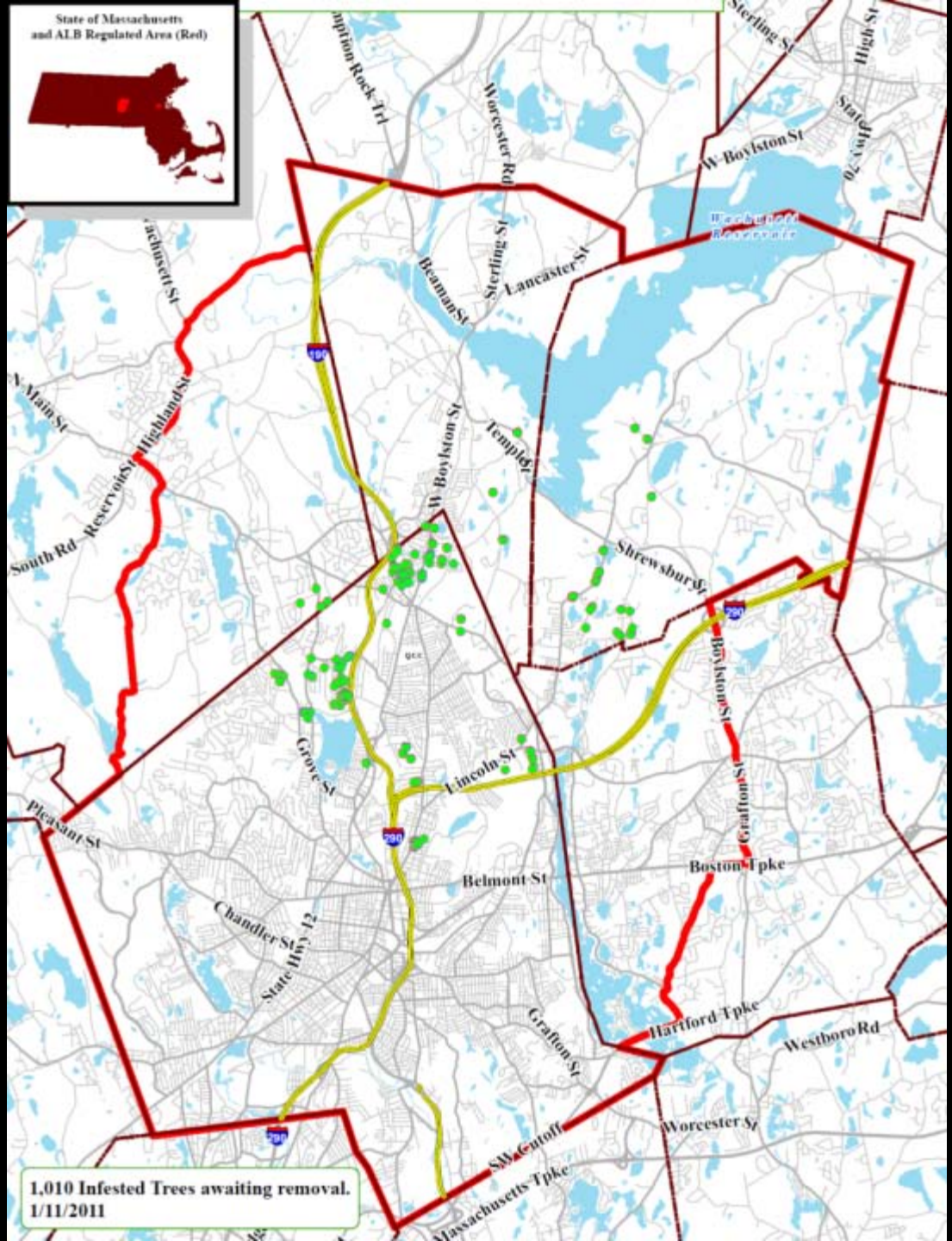
Asian Longhorned Beetle

<u>V. Good Hosts</u>

Maple
Box elder
Horse chestnut
Buckeye
Willow
Elm

<u>Good Hosts</u>

Birch
Sycamore


State of Massachusetts
and ALB Regulated Area (Red)
Worcester Rd
Sterling St
W Boylston St
Lancaster St
Beaman St
Templer
Shrewsbury St
Boylston St
Grafton St
Lincoln St
Grove St
Pleasant St
Belmont St
Chandler St
State Hwy 12
Boston Tpke
Hartford Tpke
Westboro Rd
Worcester St
SW Cutoff
Massachusetts Tpke
W Main St
South Rd
Reservoir St
Highland St
190
290
1,010 Infested Trees awaiting removal.
1/11/2011

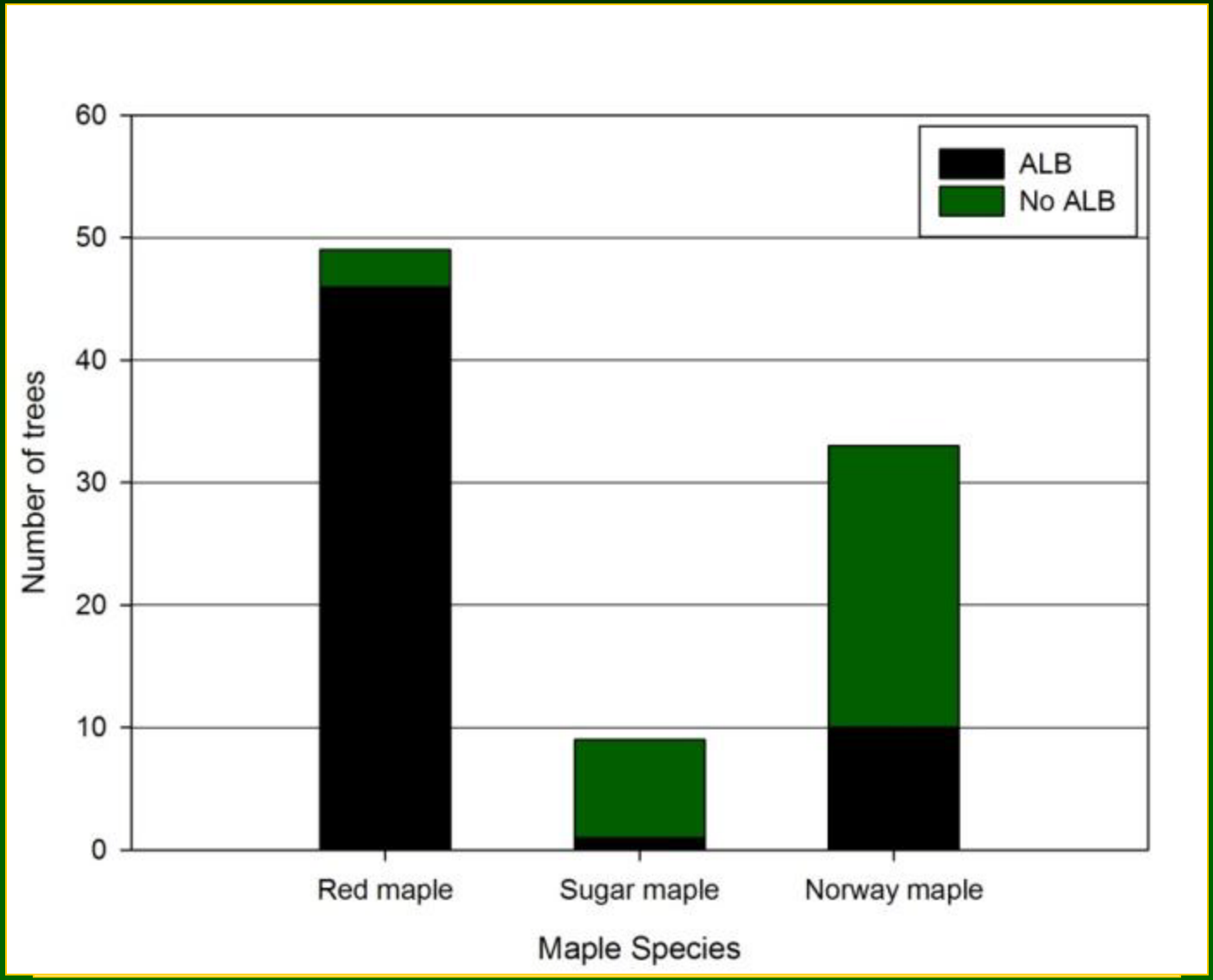
Bovenzi Land Trust

Host tree removal
impacted 91 acres

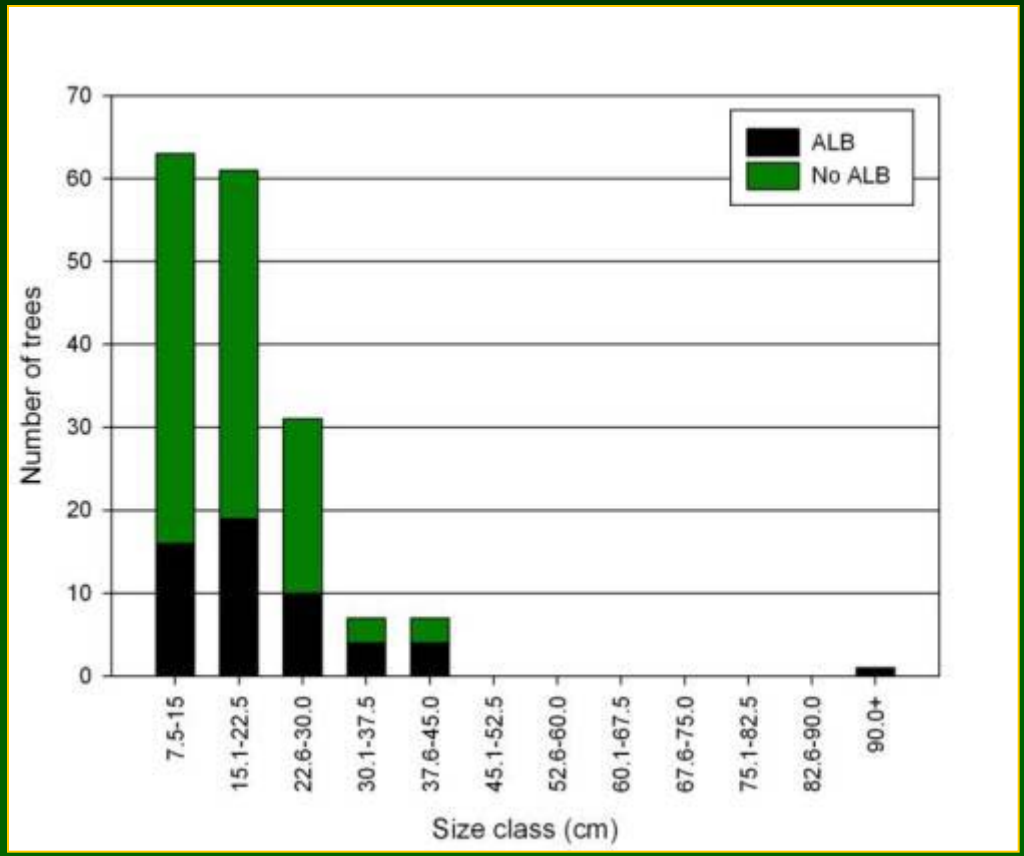

S3 USFS

What's ALB Doing in Natural Forests?

Delaval

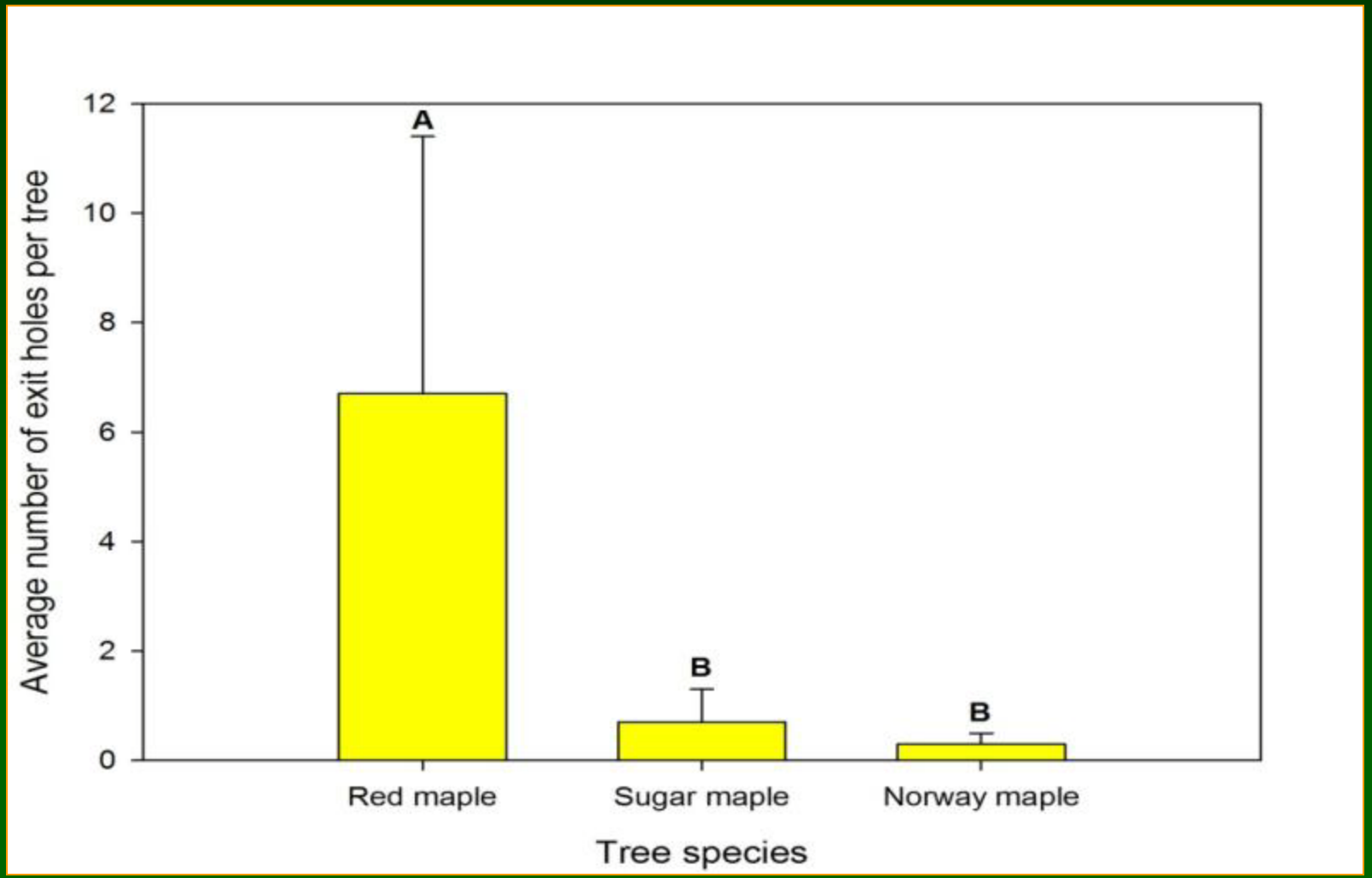

60
50
40
30
20
10
0
Number of trees
ALB
No ALB
Red maple
Sugar maple
Norway maple
Maple Species

Bovenzi

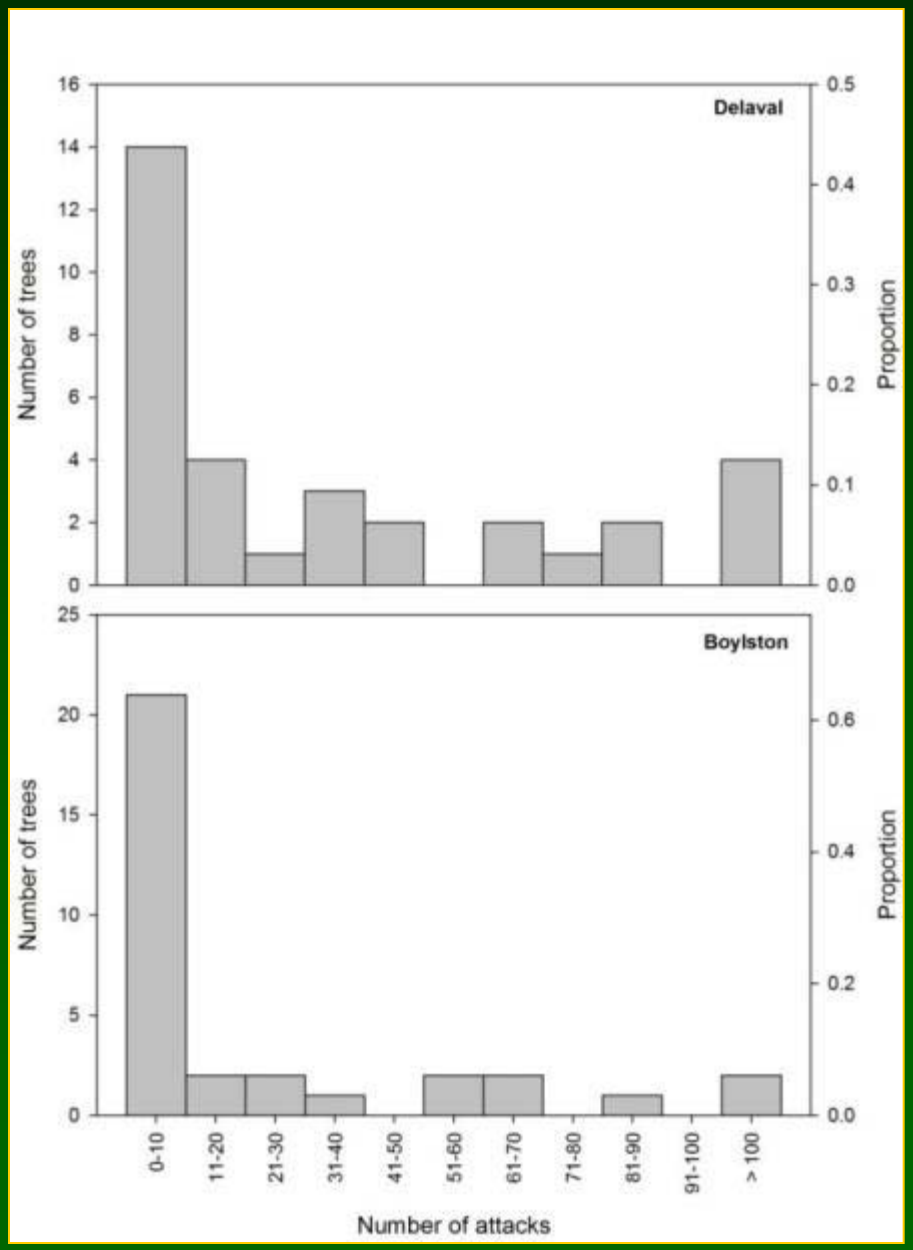

70
60
50
40
30
20
10
0
Number of trees
ALB
No ALB
7.5-15
15.1-22.5
22.6-30.0
30.1-37.5
37.6-45.0
45.1-52.5
52.6-60.0
60.1-67.5
67.6-75.0
75.1-82.5
82.6-90.0
90.0+
Size class (cm)

ALB Exit Holes

Boylston
Delaval

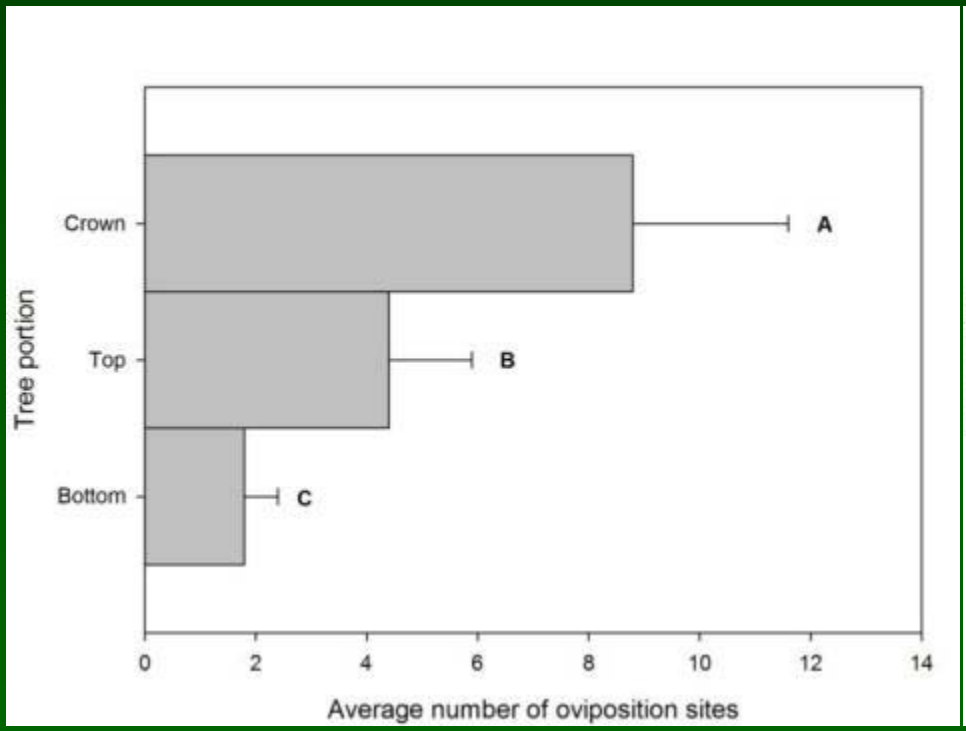


Attack class distribution

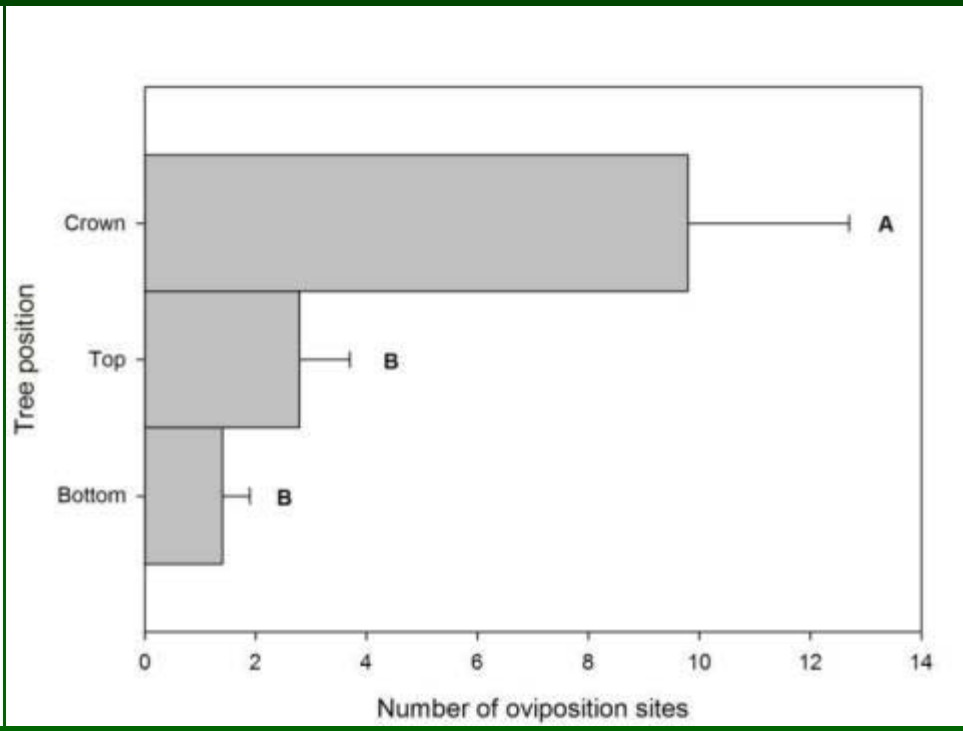


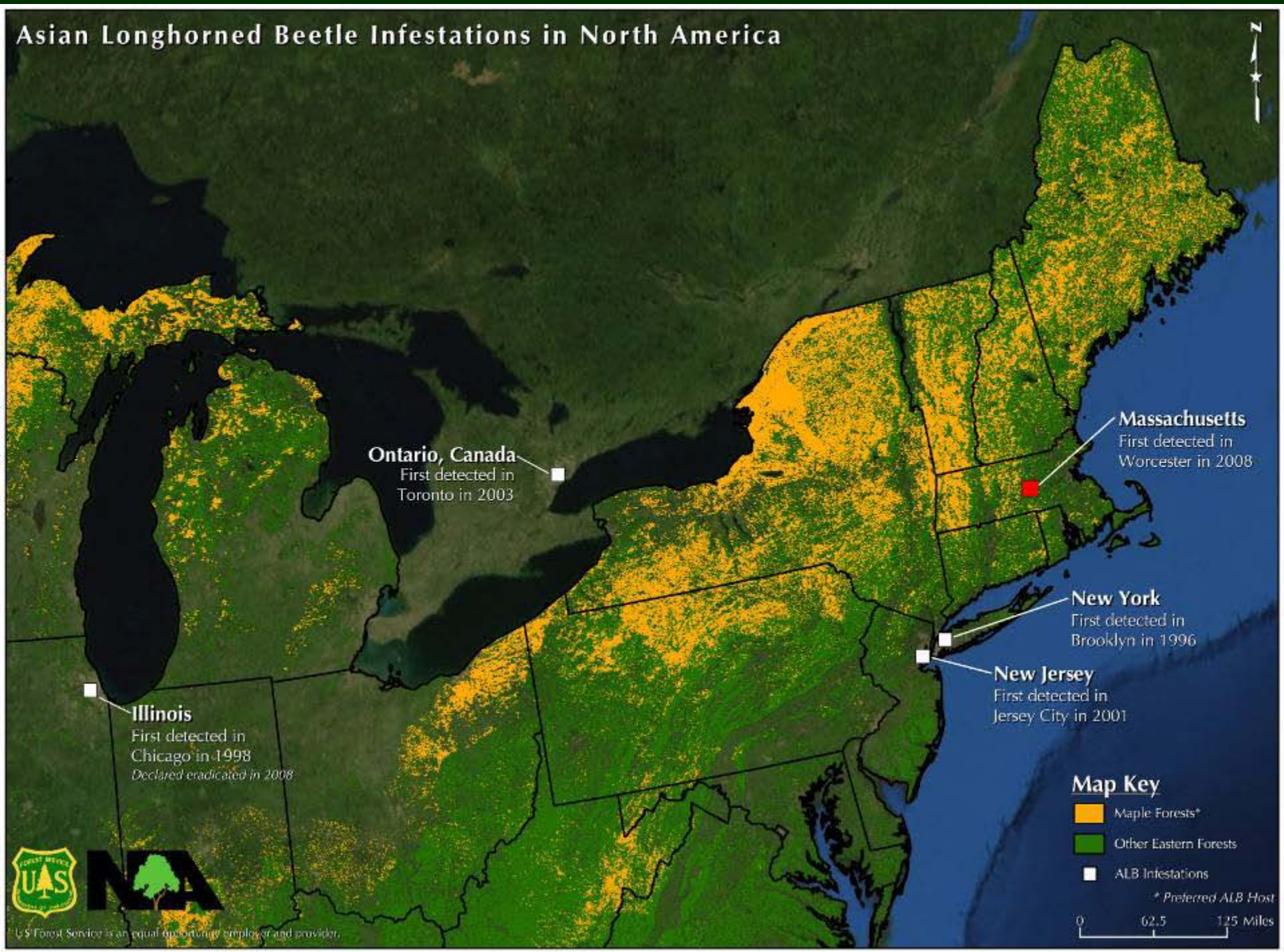
Oviposition Sites by Height

Delaval



Boylston




Asian Longhorned Beetle Infestations in North America
Ontario, Canada
First detected in
Toronto in 2003
Massachusetts
First detected in
Worcester in 2008
New York
First detected in
Brooklyn in 1996
New Jersey
First detected in
Jersey City in 2001
Illinois
First detected in
Chicago in 1998
Declared eradicated in 2008
Map Key
Maple Forests*
Other Eastern Forests
ALB Infestations
* Preferred ALB Host
0
62.5
125 Miles
U.S. Forest Service is an equal opportunity employer and provider.

What Have We Learned?

- **ALB is not outright killing forest trees**
- **ALB found in forest trees of all sizes**
- **ALB attacked and survived at higher rates in red maple**
- **ALB moves throughout forest stands**

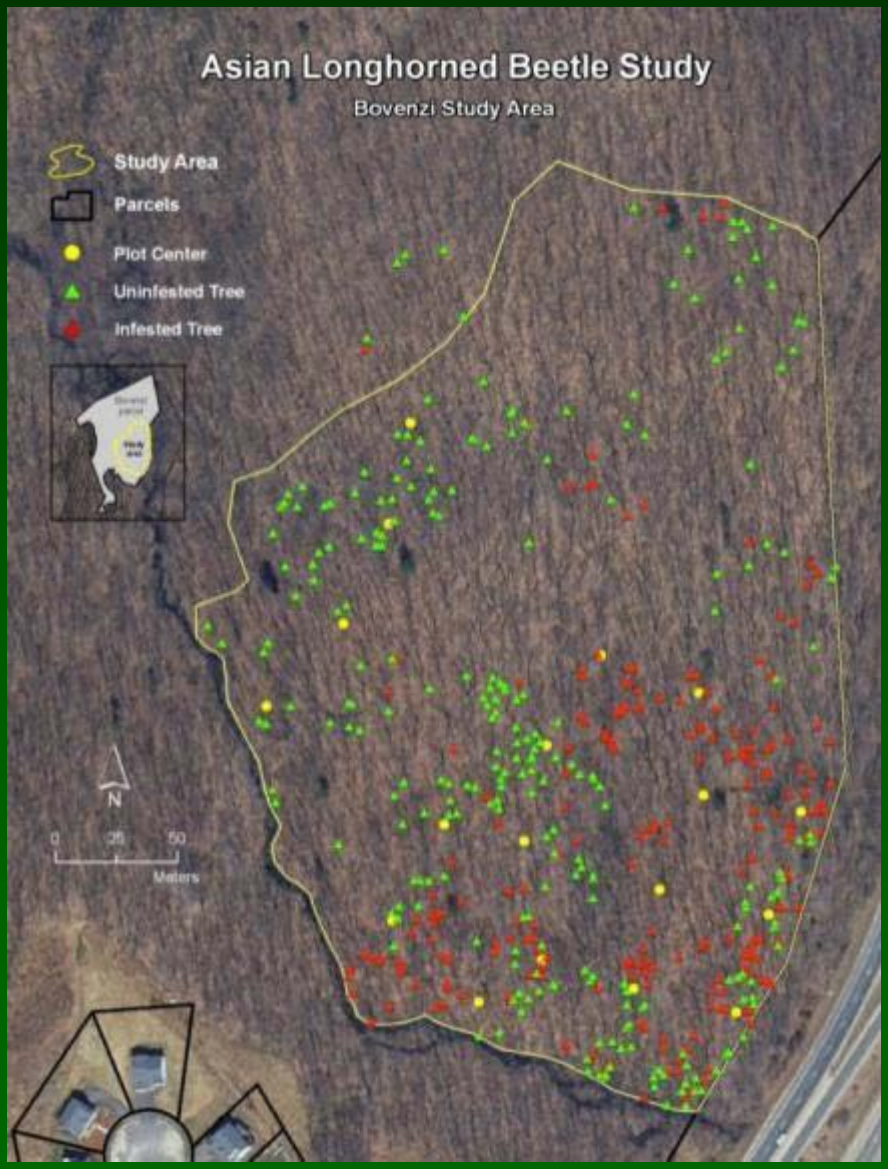
Worcester, MA

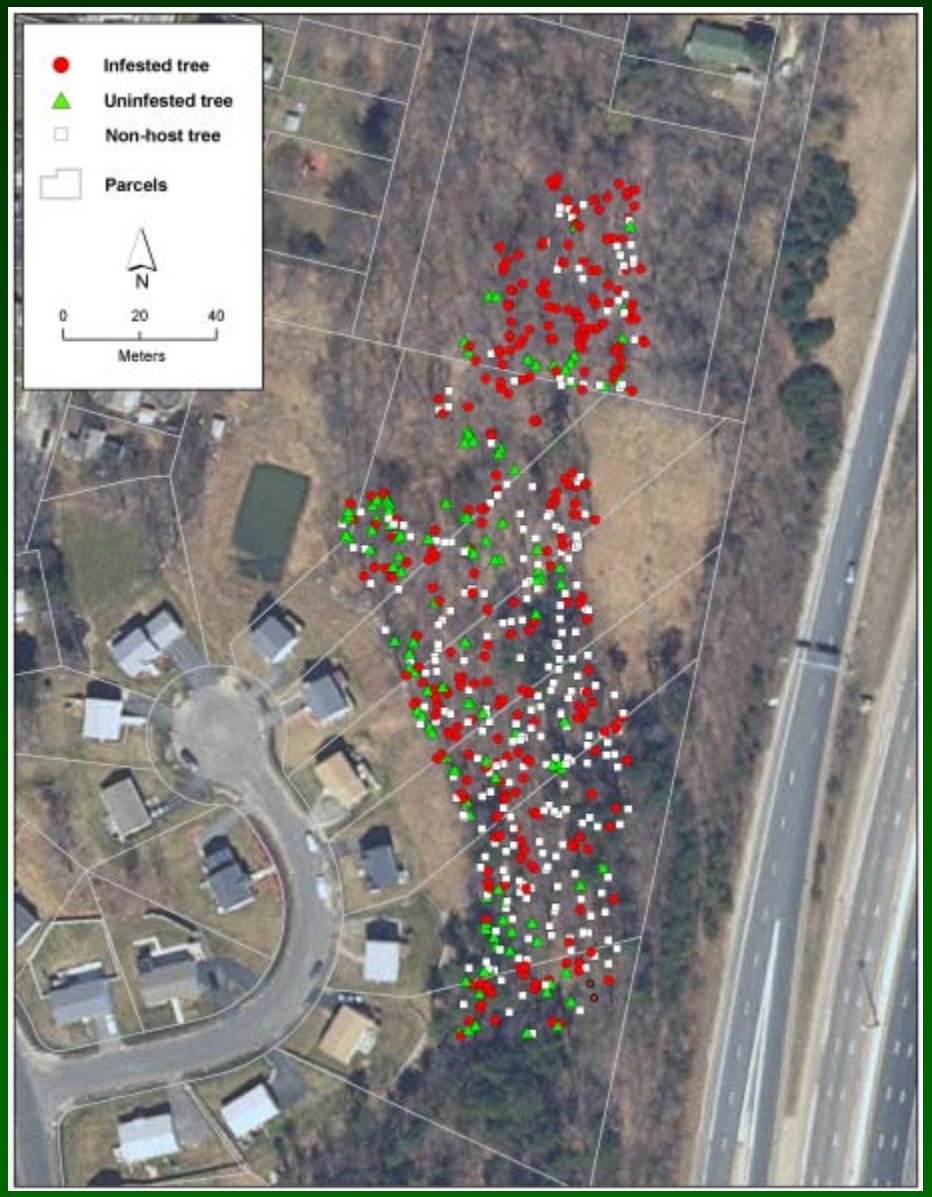
Old Damage is Different

Could go Undetected for a Long Time

Much Evidence is Hard to See

Attacks Throughout a Stand





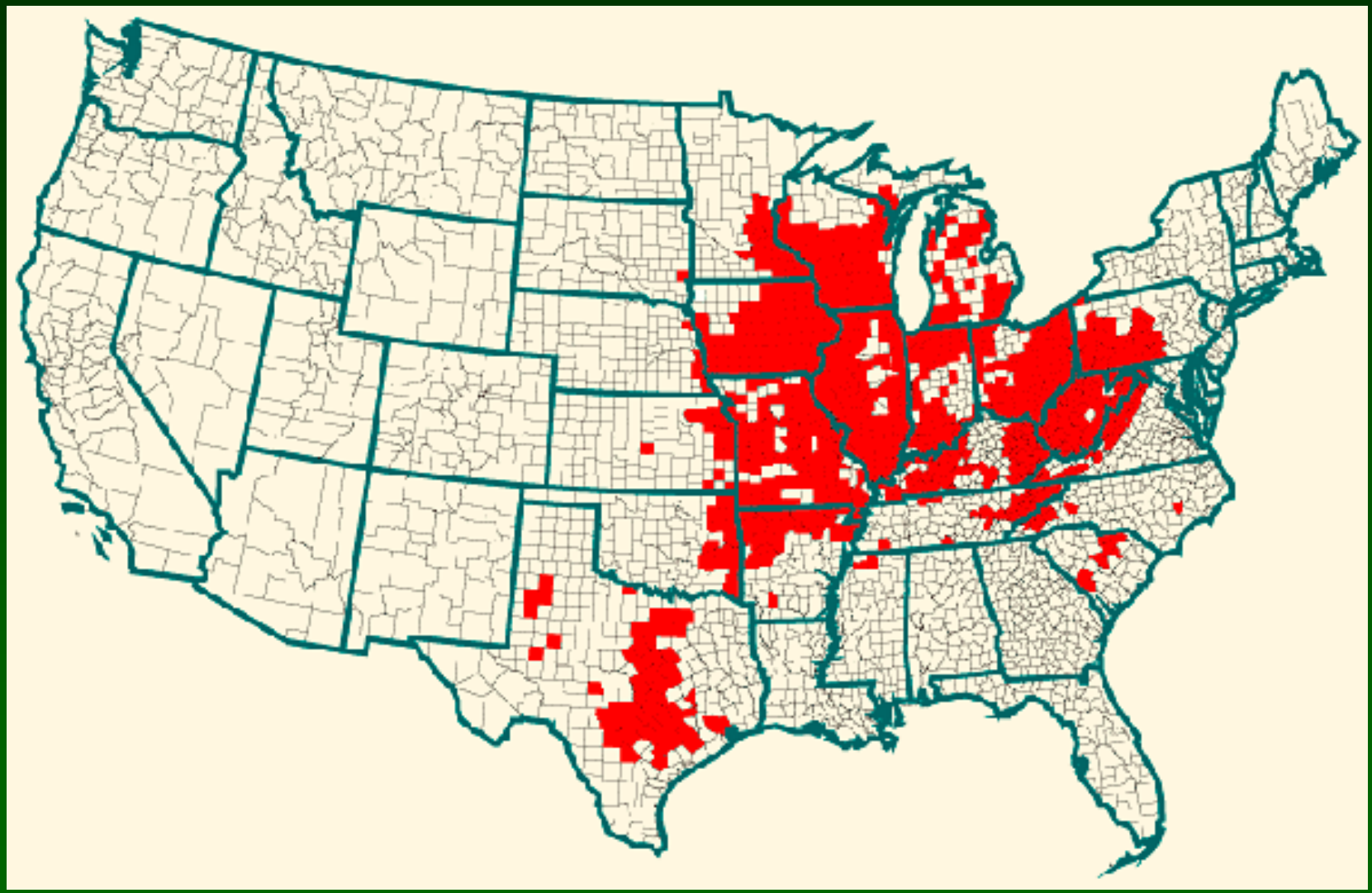
Implications for Survey

Oak Wilt

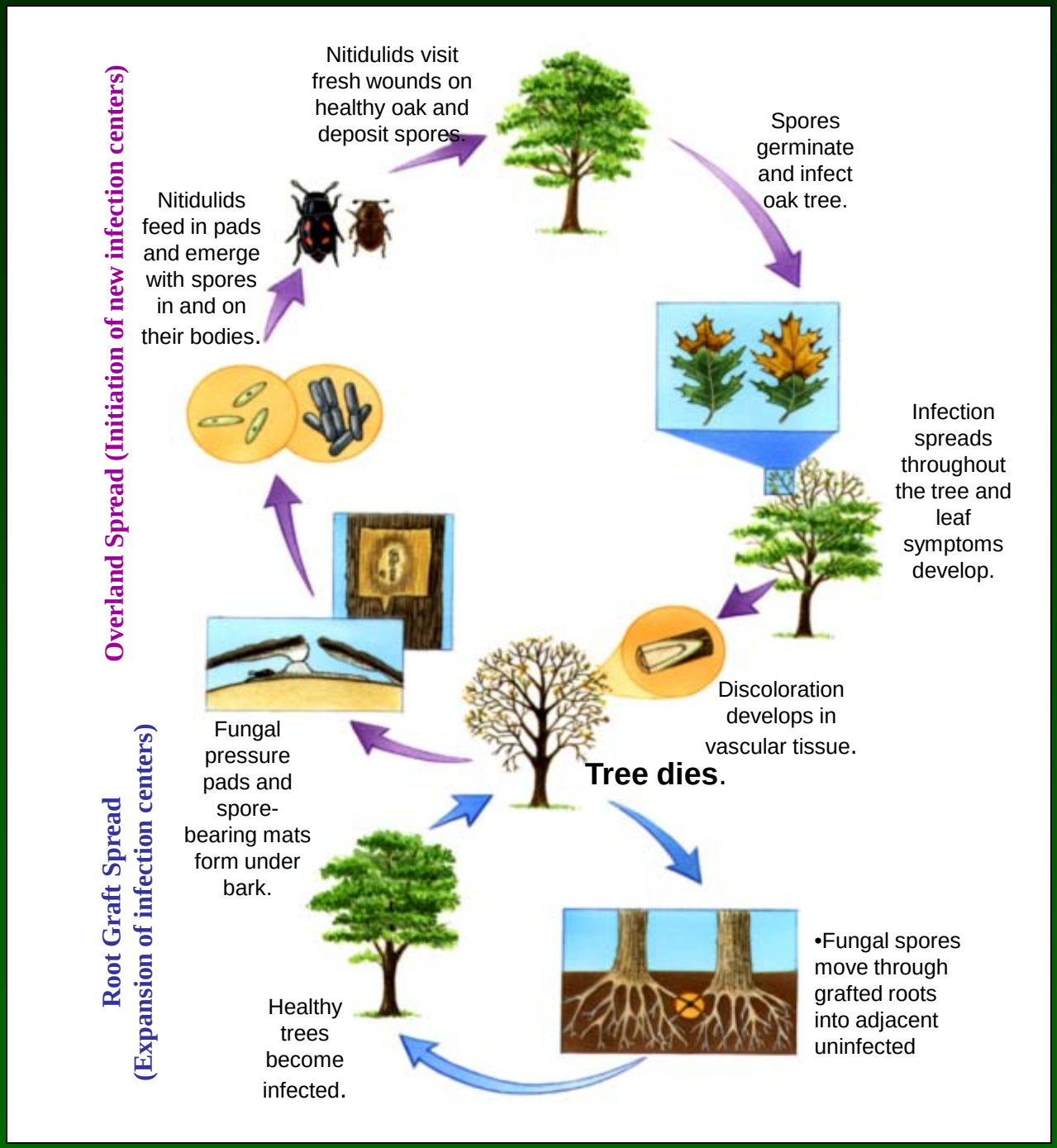
- Suppression efforts
- State lands cutting restriction
- National Database

Firewood Again!

2005 Distribution of Oak Wilt



Oak wilt disease cycle



Oak Wilt Epicenters

Oak Wilt Epicenters

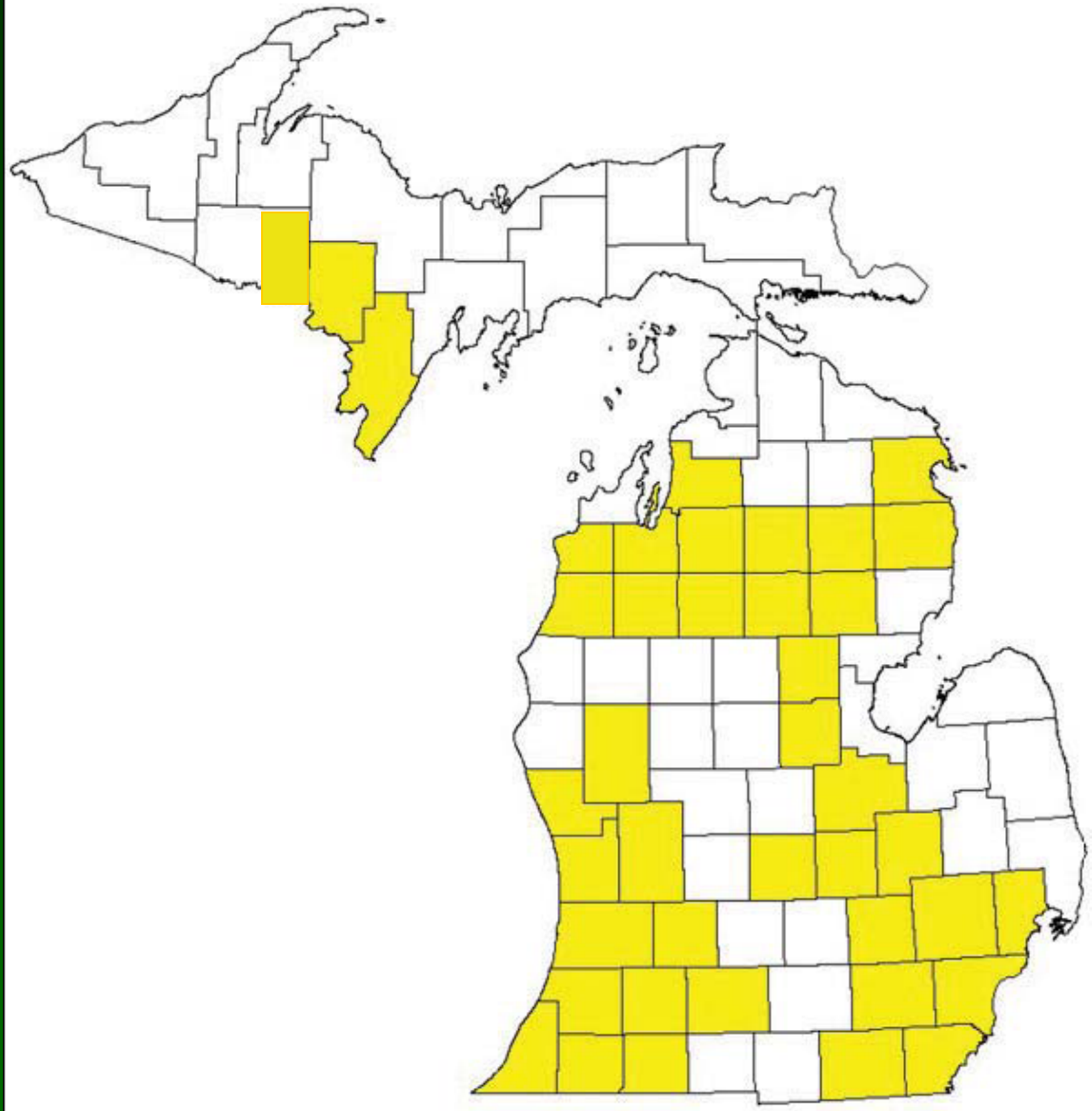
Oak Wilt

- Shakey Lakes, Menominee & Dickinson Counties
  - 38 sites / 20,000 ft plowed in 2010 (Most in Shakey Lakes)
  - Follow up timber sales
- Fall, 2010 detected for the first time in Iron County on state land south of Crystal Falls.
- Effort to remove oak wilt from the UP will continue in 2011.

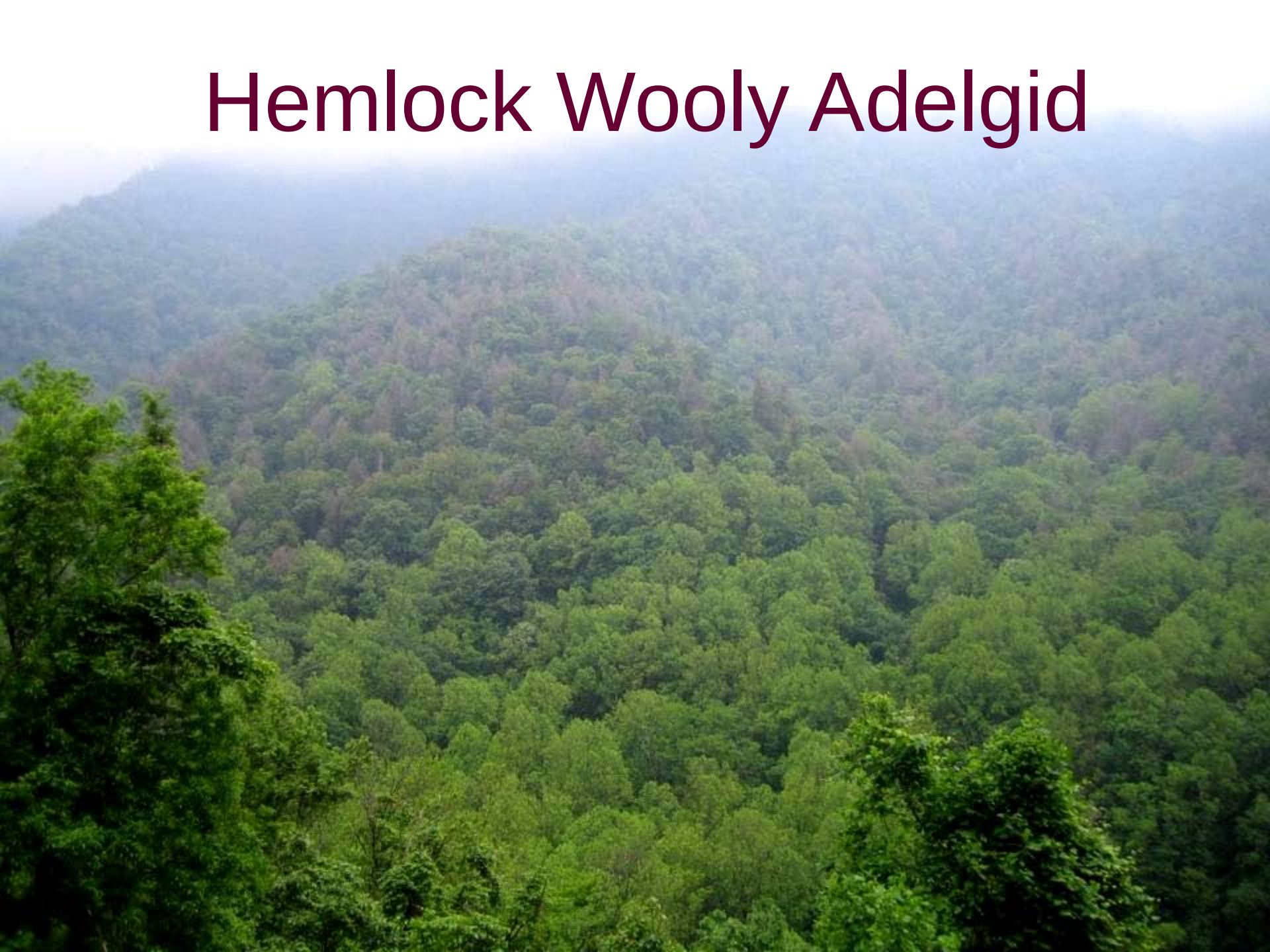
ARRA Oak Wilt Project
Northern Lower Peninsula

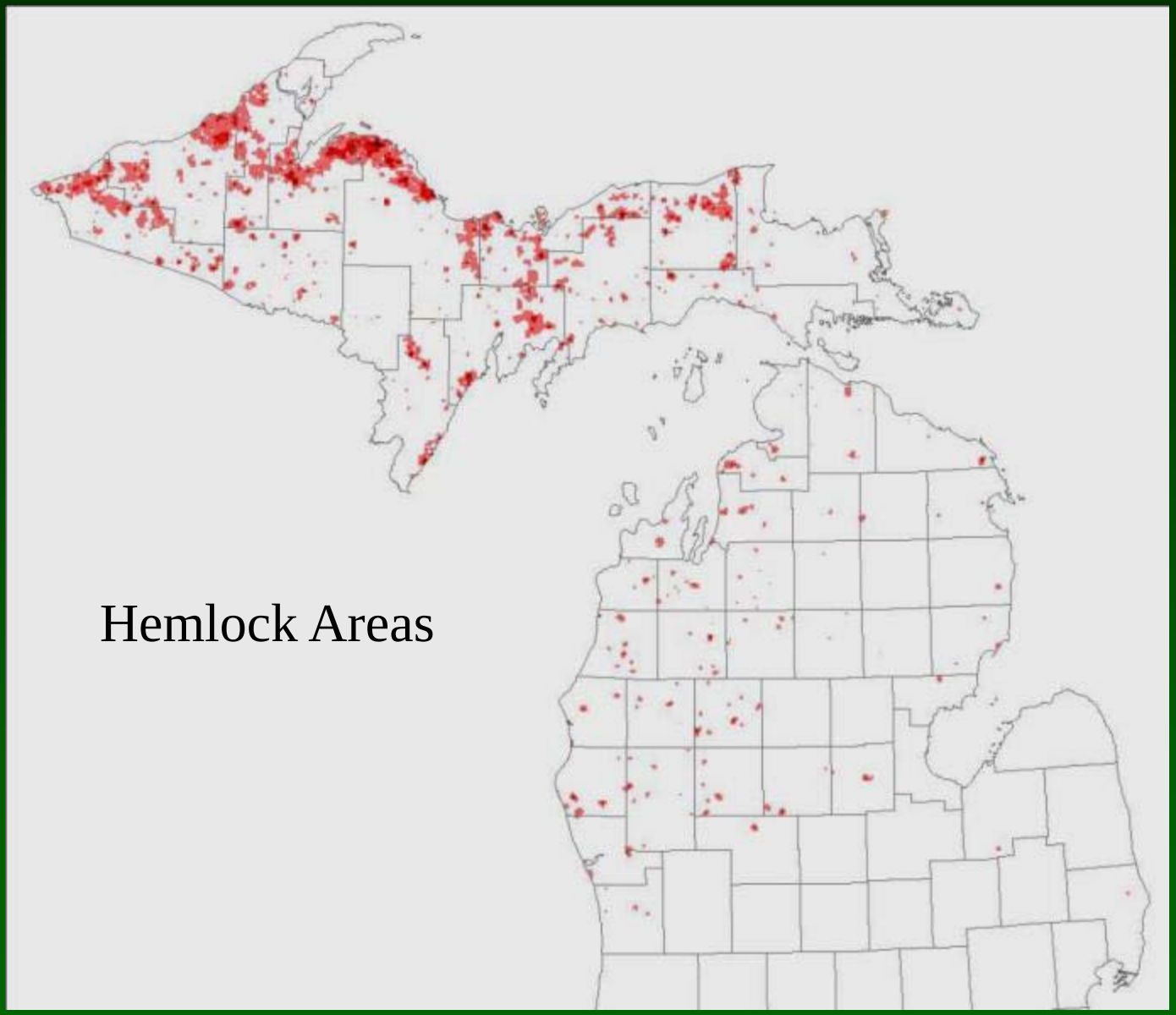
- Identify and treat oak wilt in high-use recreation areas and in high-value stands of red oak
- Aerial and ground surveys identified oak wilt on 3,026 acres of state forestland
  - Crawford, Missaukee and Grand Traverse Counties.
- 47,000 feet of root-graft barriers established
- Oaks chipped or sold for timber if non-threatening.

Counties with Oak Wilt - 2009



Hemlock Wooly Adelgid




Hemlock Areas

2010 HWA Detections

Hemlock Woolly Adelgid: Signs

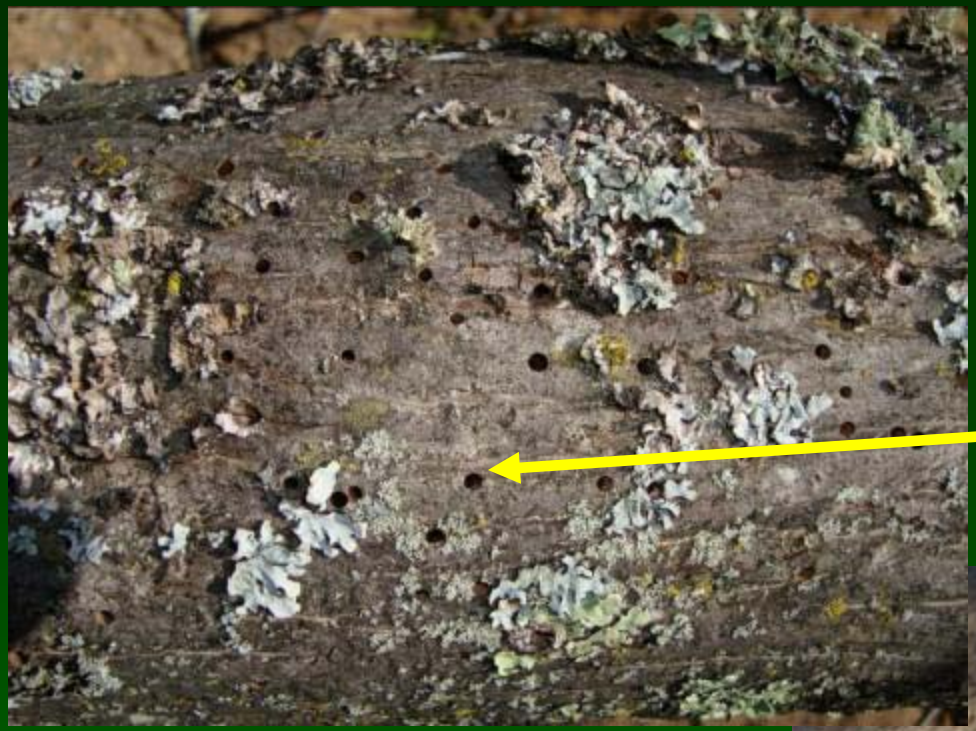
- Cottony material

Hemlock Woolly Adelgid Survey

Hickory Decline

- Menominee County, SW of Shakey Lakes
- Sudden mortality of bitternut hickory in mid-summer, 2010
- Reported in Wisconsin and other NE states since 2005
- Reported by not confirmed in southern Dickinson Co.

Hickory bark beetle



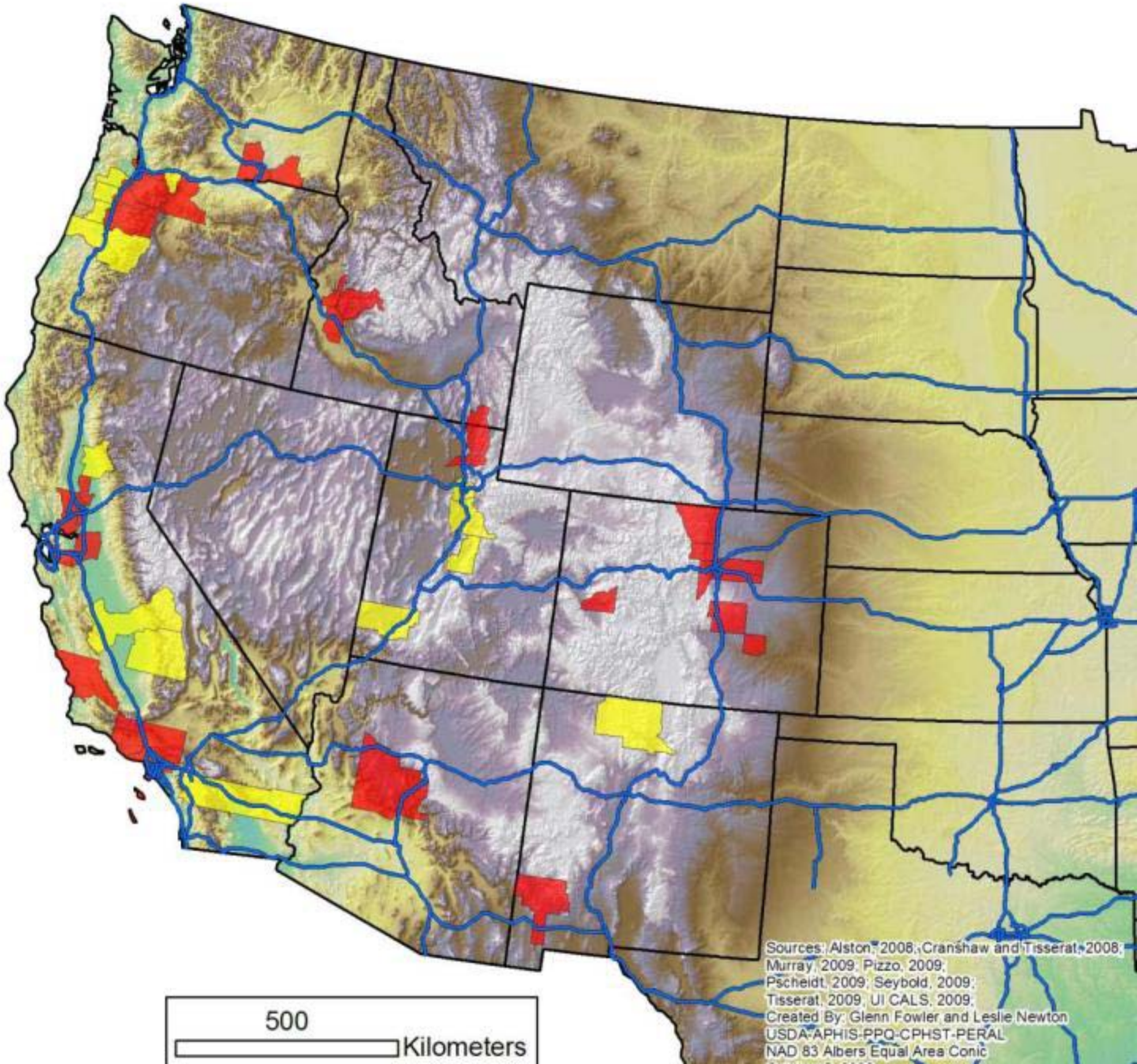
Exit holes

Larval galleries

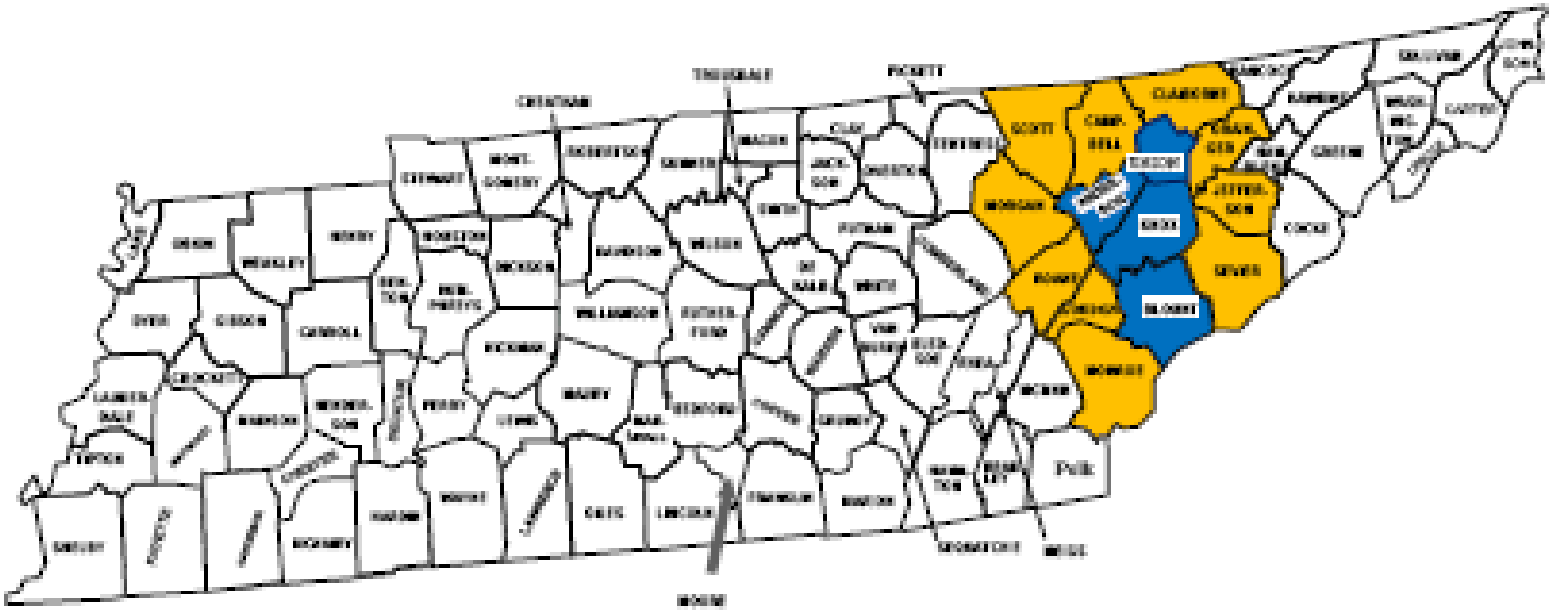
Cankers on Bitternut Hickory

Thousand Cankers Disease of Black Walnut (TCD)

U.S. TCD Distribution



2010
Tennessee
TCD Quarantine



Thousand Cankers Disease September 2010 Quarantined Areas

Anderson, Blount, Knox, Union

Thousand Cankers Disease Buffer Regulated Areas

Campbell, Claiborne, Grainger, Jefferson Loudon, Monroe, Morgan, Roane, Scott, Sevier

October 11, 2010

Annosum root rot

- Caused by the fungus *Heterobasidion annosum* (a.k.a. *Fomes annosus*)

- Attacks pines, spruces, and firs

- In natural forests, plantations, Christmas trees, recreation areas, residential landscapes

- The most destructive disease in coniferous forests worldwide

- In USA, prevalent in SE and West

Heterobasidion annosum

- Spores are produced in fruiting bodies called “conks” that form on stumps and killed trees

from Mark Guthmiller, WI DNR

Sirex noctilio

Sirex noctilio
Symptoms

Hosts: Pinus sp.
(esp. jack & Scotts)

SPRUCE BUDWORM

(*Choristoneura fumiferana*)

30-50 year cycle

- One of the most destructive native insects in spruce/ fir forests of USA & Canada.
- Balsam fir is favorite host
- Defoliation in late spring / early summer.


UGA5036021


UGA5036026


UGA5036022


UGA5036023

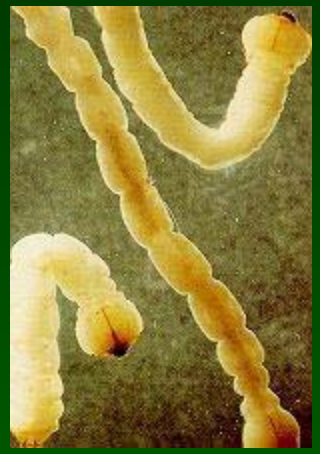

UGA2252019


UGA1398194

Counties with Spruce Budworm Defoliation in 2010

Two-lined Chestnut Borer

Agrilus bilineatus



Grayling – West of I75, 4 Mile Road

Diplodia scrobiculata on White Pine along the AuSable near Grayling

Drought Years	Declines
1930’s	Oak
1950’s	Ash
1976	Aspen
1980	Balsam Fir
1983	Sugar Maple
1987-89	Spruce
1999	
2003	
2005	

What can we do?

- Don’t be a vector (EAB, BBD, OW, ALB, HWA)
- Look for and report resistant beech
- Be familiar with important forest health signs and symptoms
- Report forest health problems
- Proactive management (SBW, JPBW, EAB)

EAB: Ash Management

- Reduce # of larger trees
- Prioritize removals by
  - Proximity to EAB
  - High ash volume / value
  - Ash vigor
    - (low vigor = high risk)

EAB / Ash Management
Western Upper Peninsula Project

Assistance to private landowners in rural forested areas

- CFM Foresters Coordinate Outreach and Ed with the Extension, Conservation Districts, consulting foresters, and Forest Health staff.

- Forest Stewardship plans
  - Ash removal and forest restoration in upland white ash stands
  - Improve species diversity
  - Assure long term sustainability of hardwood stands
- Workshops
  - Target landowners, forestry consultants & municipalities to ensure a greater understanding of the EAB

EAB
ARRA SLAM Project for WUP

Conduct community-based tree inventories & management plans in the SLAM project area communities:

- Manistique
- Hancock
- Laurium
- Calumet
- Calumet Twp
- Copper City

EAB / Ash Management
Northern Lower Peninsula Project

- Urban forests of following cities and rural forest areas within 25 miles radius:
  - Cheboygan
  - Alpena
  - Gaylord
  - Traverse City
  - Petoskey

Thank you

www.michigan.gov