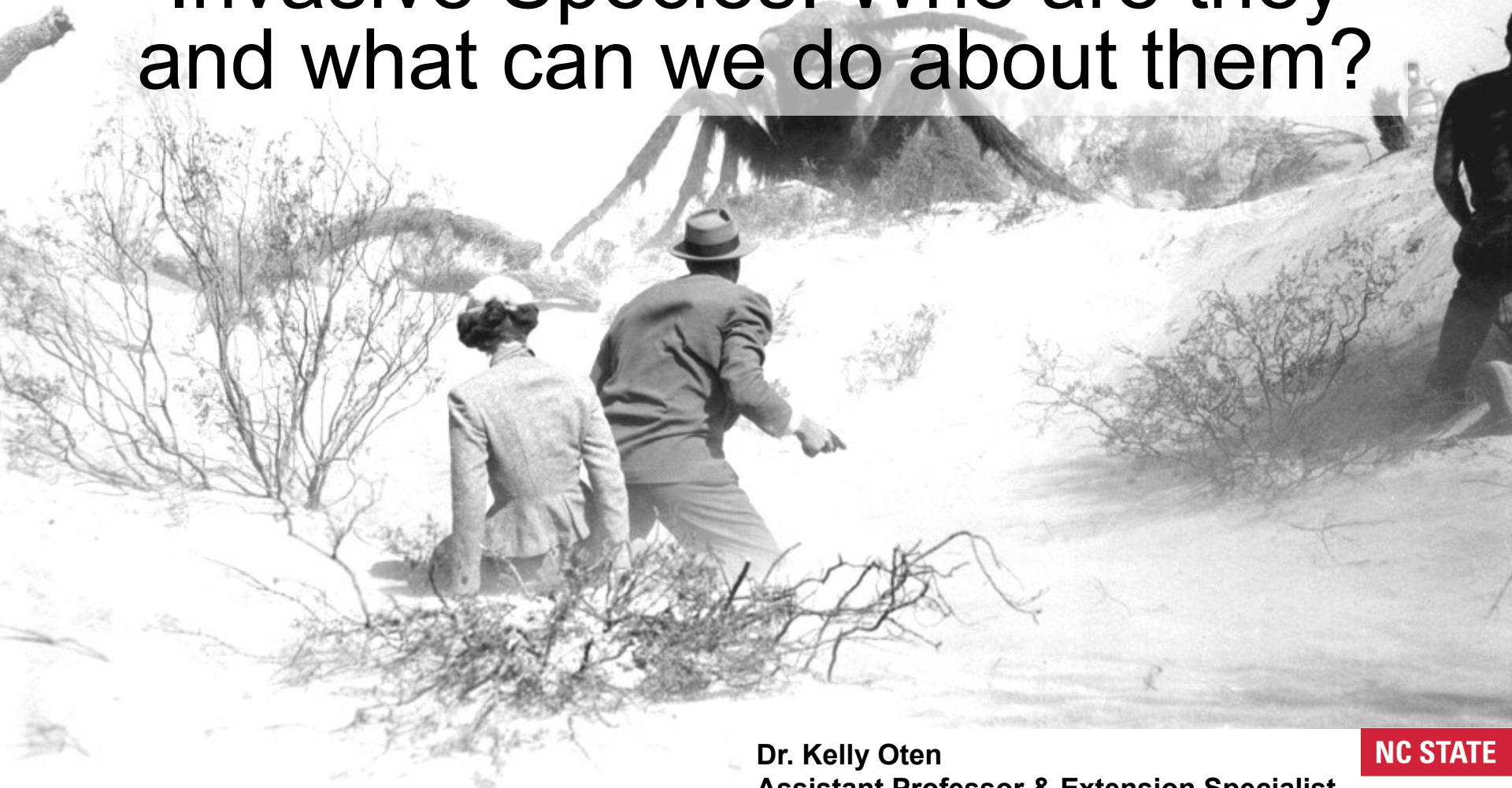


IT'S AN INVASION!

Invasive Species: Who are they and what can we do about them?



Dr. Kelly Oten
Assistant Professor & Extension Specialist
kelly_oten@ncsu.edu

NC STATE
EXTENSION
FORESTRY

BRACE YOURSELF

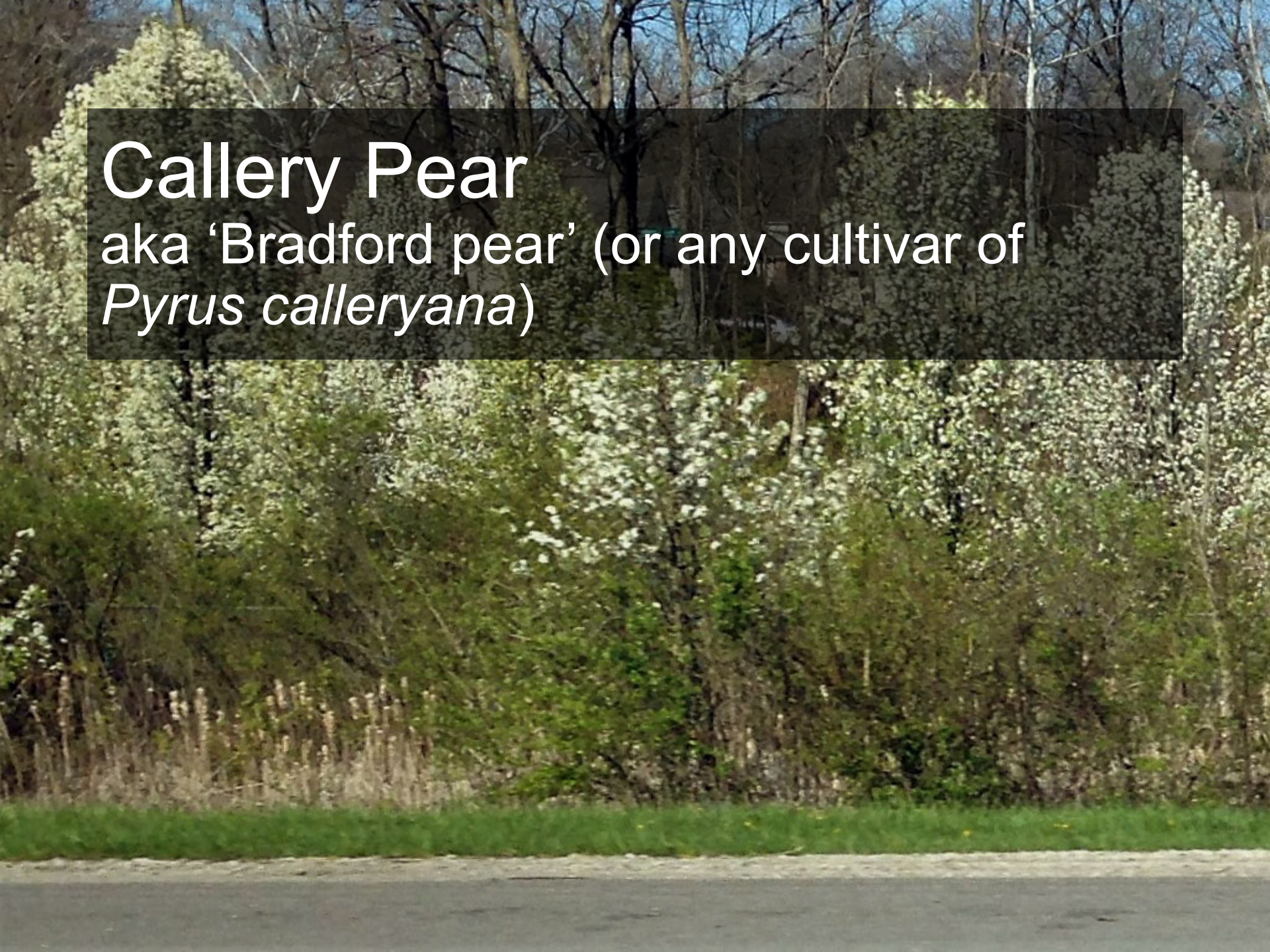


BAD NEWS IS COMING

meme-generator.net

Callery Pear

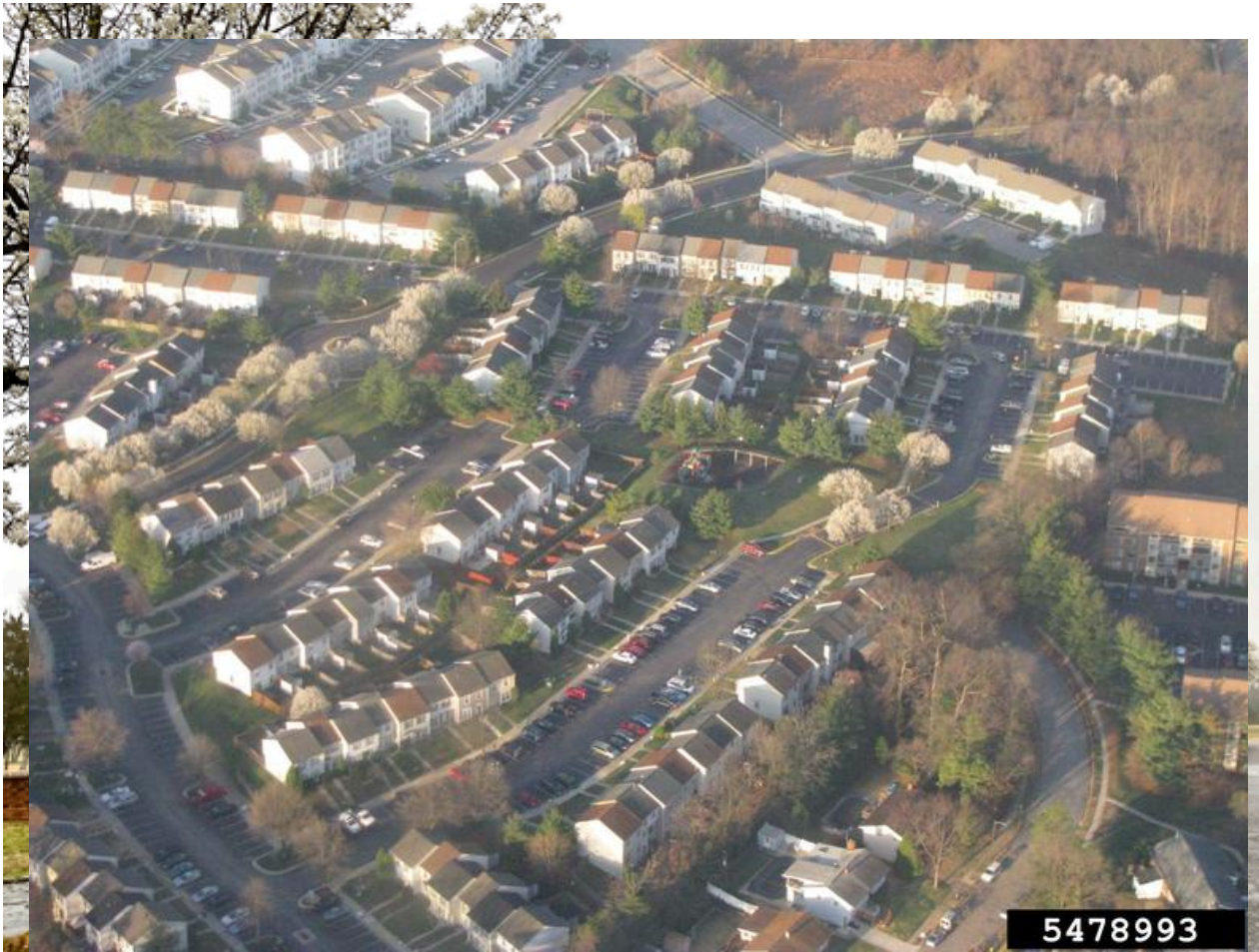
aka 'Bradford pear' (or any cultivar of *Pyrus calleryana*)



For years, was a favorite

1961: Commercially release

2009: \$23M in sales





Yeah, it's
pretty
buuuut....

**YOU KNOW WHAT
SPRING IS MISSING?**



**THE SMELL OF ROADKILL
COMING FROM THE TREES.**



Bradford pear escapes

Bradford pear alone = sterile

Bradford pear + *any other cultivar* = viable seeds







UGA1237072



All the green
understory trees



**Bradford
pear trees**

**Callery
pear trees**

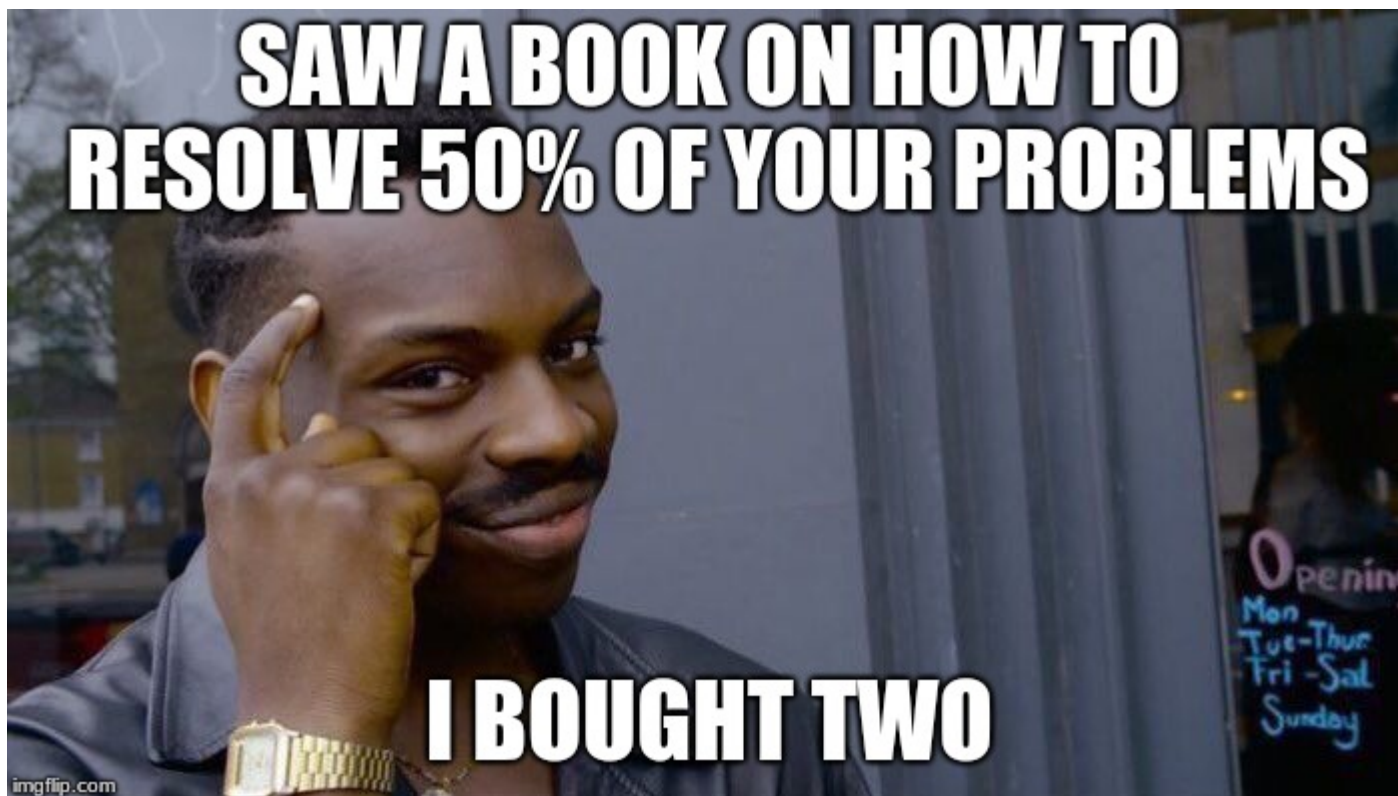
What's



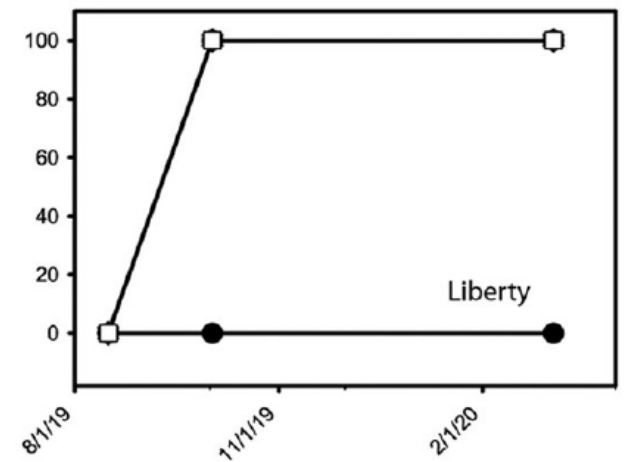
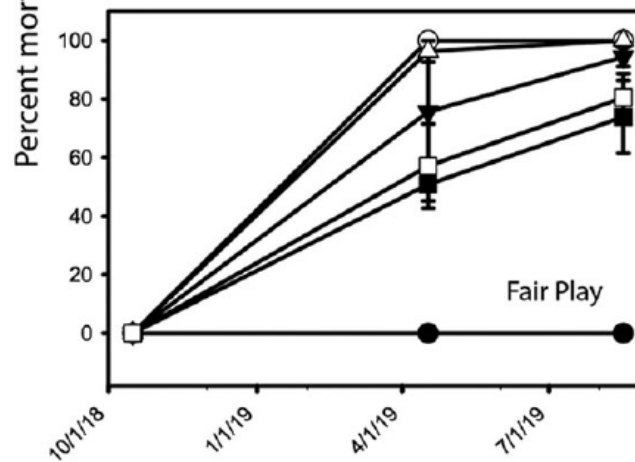
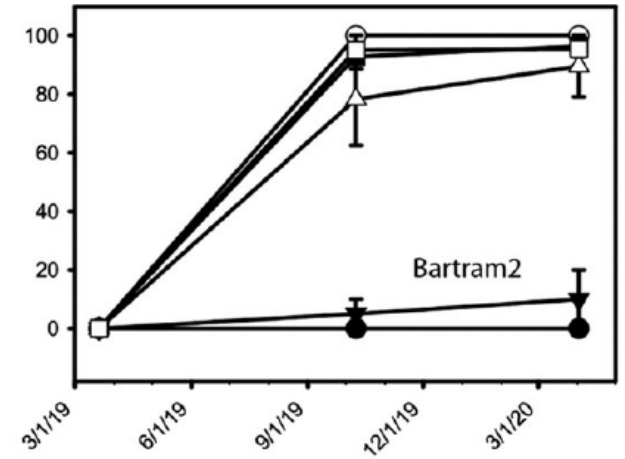
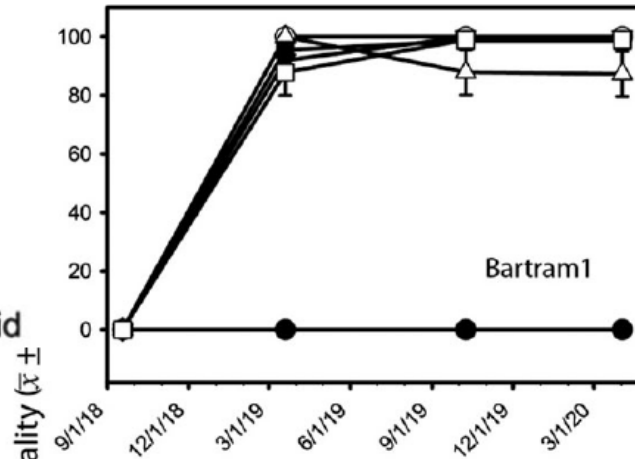
What's the problem?



What can we do about it?



Herbicides do work!



A person wearing a dark blue jacket, orange safety pants, a black and orange helmet with a clear face shield, and yellow gloves is using a chainsaw to cut a tree stump. The person is bent over, focused on the task. The background shows a field of bare trees and a cloudy sky. The text "Cut & stump spray" is overlaid on the left side of the image.

Cut & stump spray

treebountync.com



**NORTH CAROLINA
TREE FARM PROGRAM**

THE BRADFORD PEAR BOUNTY

October 15
Matthews, NC

October 22
Monroe, NC

Remove your Bradford
pear tree, get a FREE native
replacement tree!

treebountync.com



Cogongrass

- Top 10 noxious weed in world
- Infests ~500M acres worldwide
- Perfect Invasive:
 - Monocultures/displaces native species
 - Dense
 - Adapted to fires & burns hot
 - Successful in low light
 - Spreads easily
 - Difficult to manage

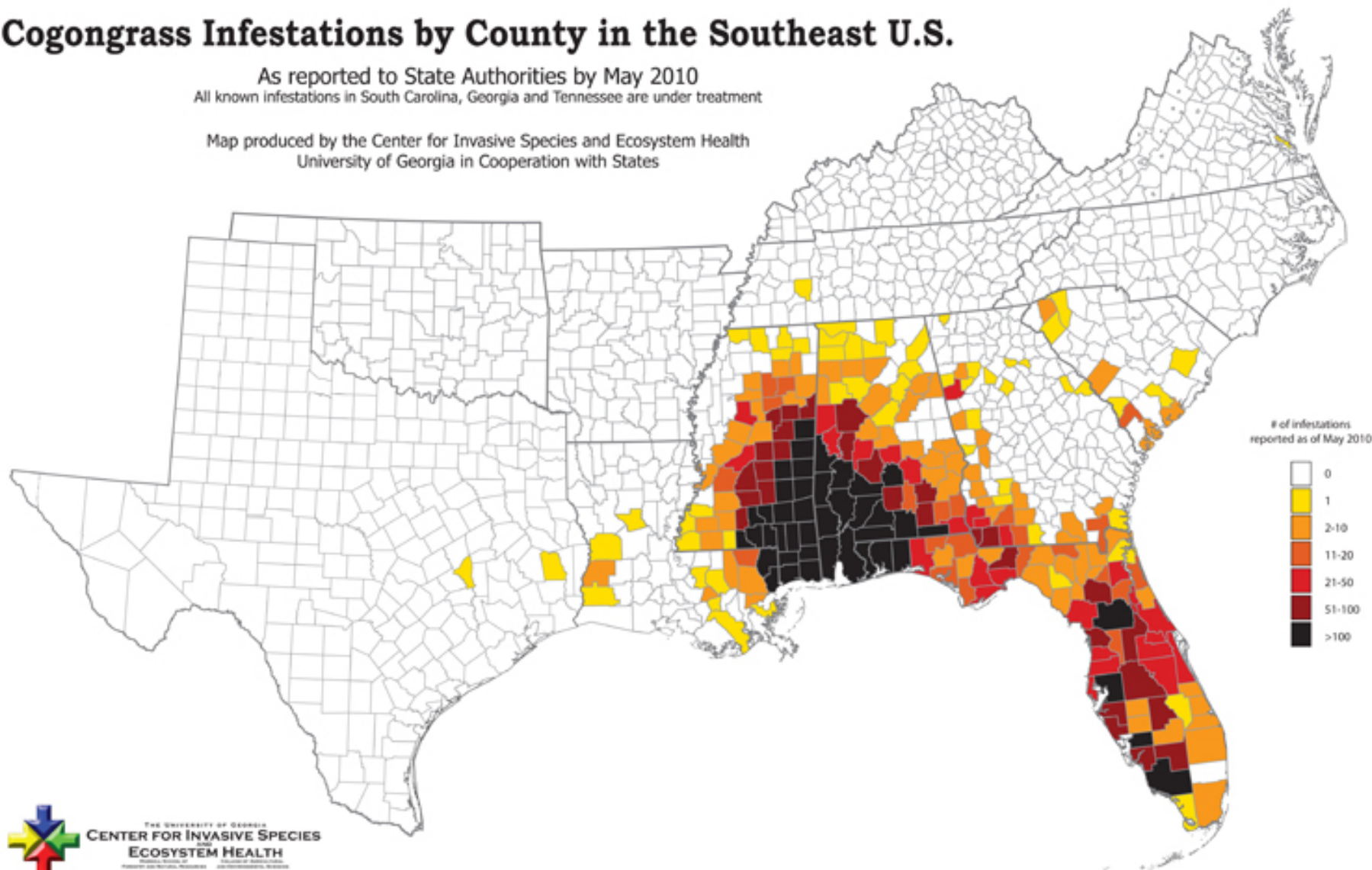


Cogongrass Infestations by County in the Southeast U.S.

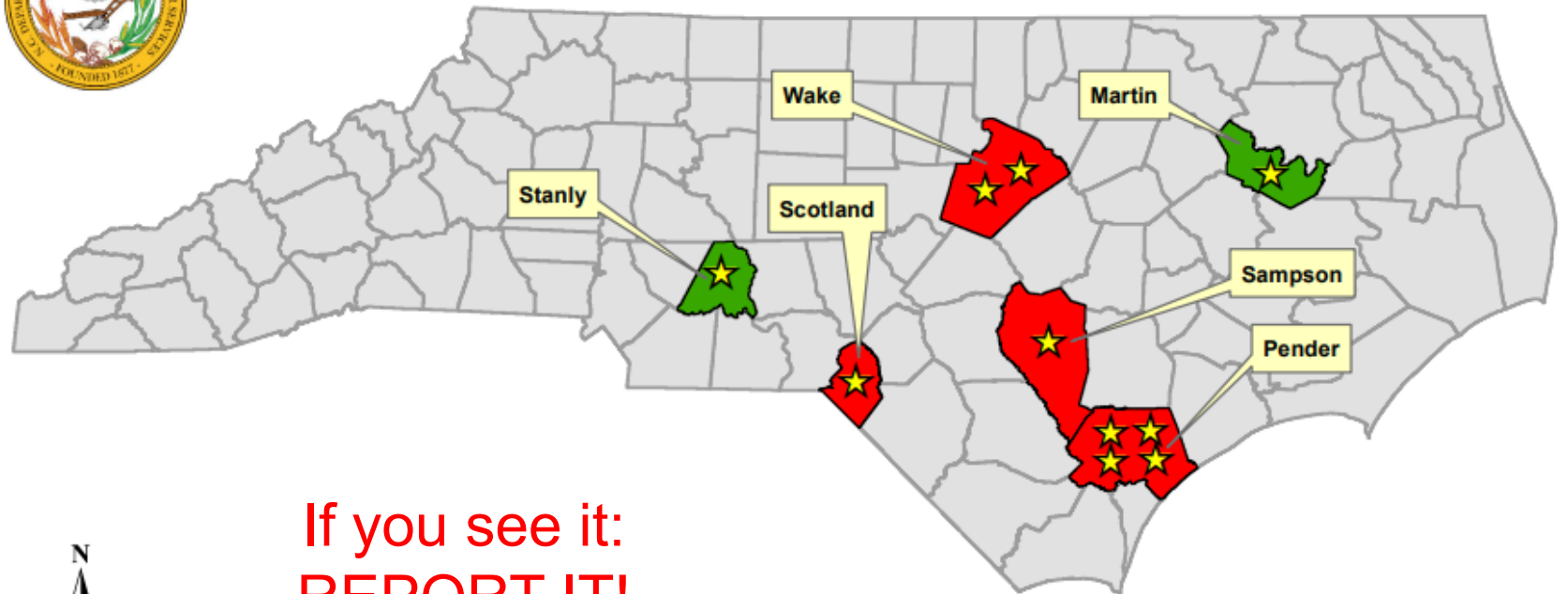
As reported to State Authorities by May 2010

All known infestations in South Carolina, Georgia and Tennessee are under treatment

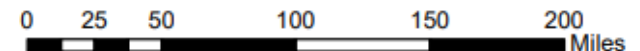
Map produced by the Center for Invasive Species and Ecosystem Health
University of Georgia in Cooperation with States



Infestation of Cogongrass in NC



If you see it:
REPORT IT!



Legend

- ★ CG Affected Counties
- CG In-Progress Counties
- Eradicated Counties

Cogongrass is on the federal noxious weed list and considered one of the top 10 weeds in the world. The grass has the ability to spread through seeds and rhizomes. The invasive weed competes with native plants, grasses and trees, choking them out with its dense root system. The grass isn't suitable for wildlife and its density makes it difficult for small animals to build habitats. It is a serious concern for land managers work with forestry, roadsides, and utility right-of-ways.

This weed has been found 10 times in NC since 2012: Pender #1 (2012), Stanly (2013), Martin (2014), Scotland (2015, In-Progress), Wake #1 (2016), Wake #2 (2016), Pender #2 (2017, Re-infest), Pender #3 and #4 (2017), Sampson (2017) *Updated September 2017*

Cogongrass Identification



Flowering heads
(Mar-May)



Sharp rhizomes



Off-center midvein

Cogongrass Management

- Small
repe
- C
- D
- e
- Her
- ima
- E
- a



KILL IT WITH FIRE!!!

The best way to un-want something

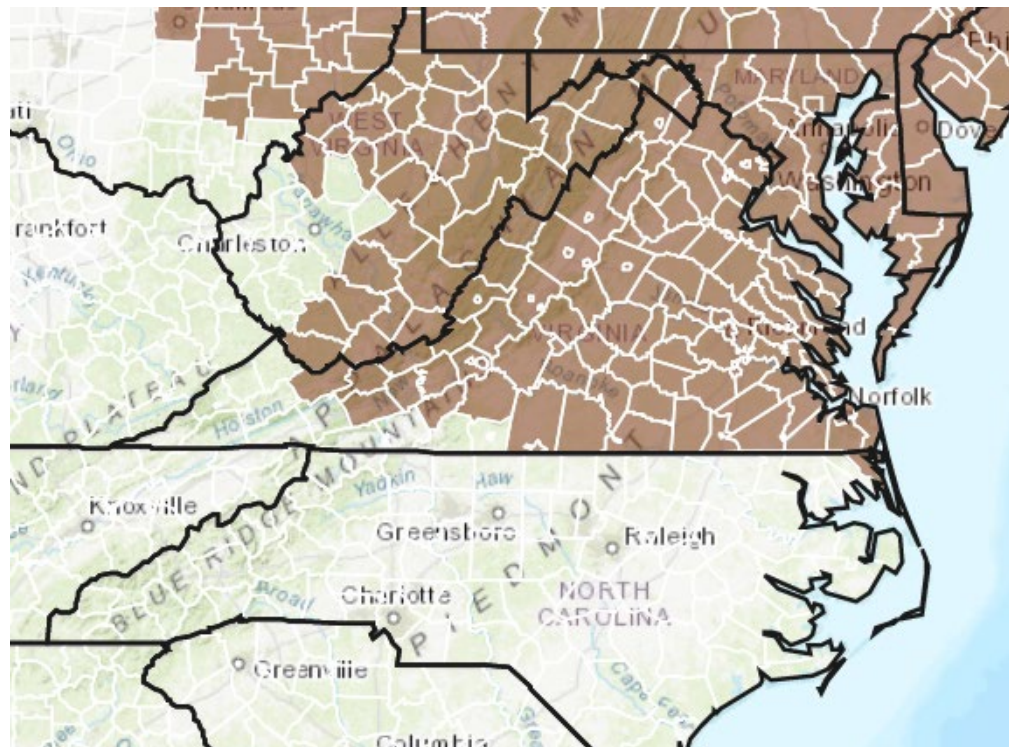
motifake.com

- For best results: Combine
burning, herbicides, & tillage



Spongy Moth

- New name
- Native to Europe but has been here a loooong time
- “Slow the Spread” program







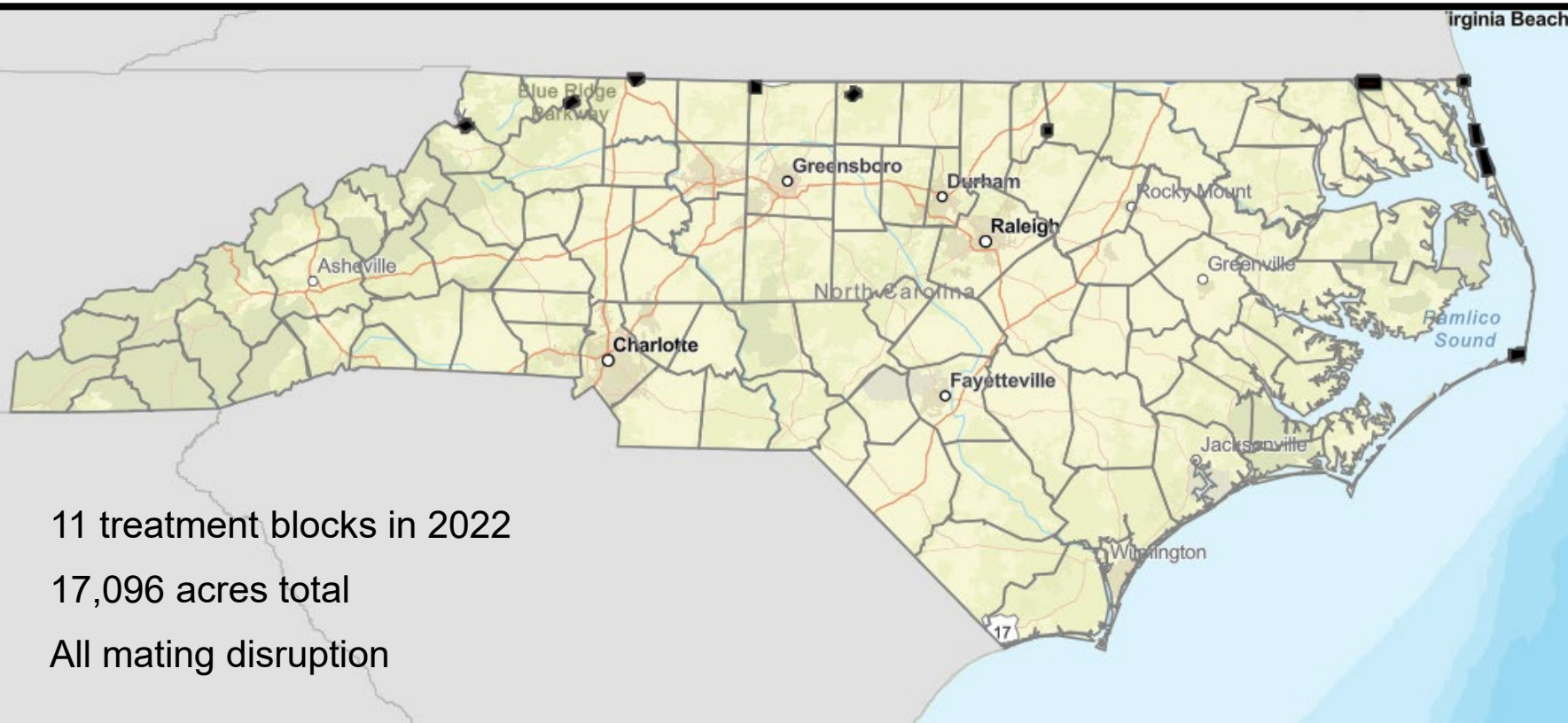
**NCDA&CS
Plant Industry Division
Gypsy Moth Program
Trap Catch 2020**



Map by C. Buddenbaum, NCDA&CS.



2022 Spongy Moth Treatments



Laurel Wilt

- Continues to spread
- 2 new counties this year:
Craven,
Carteret – 16 total





UGA2109039

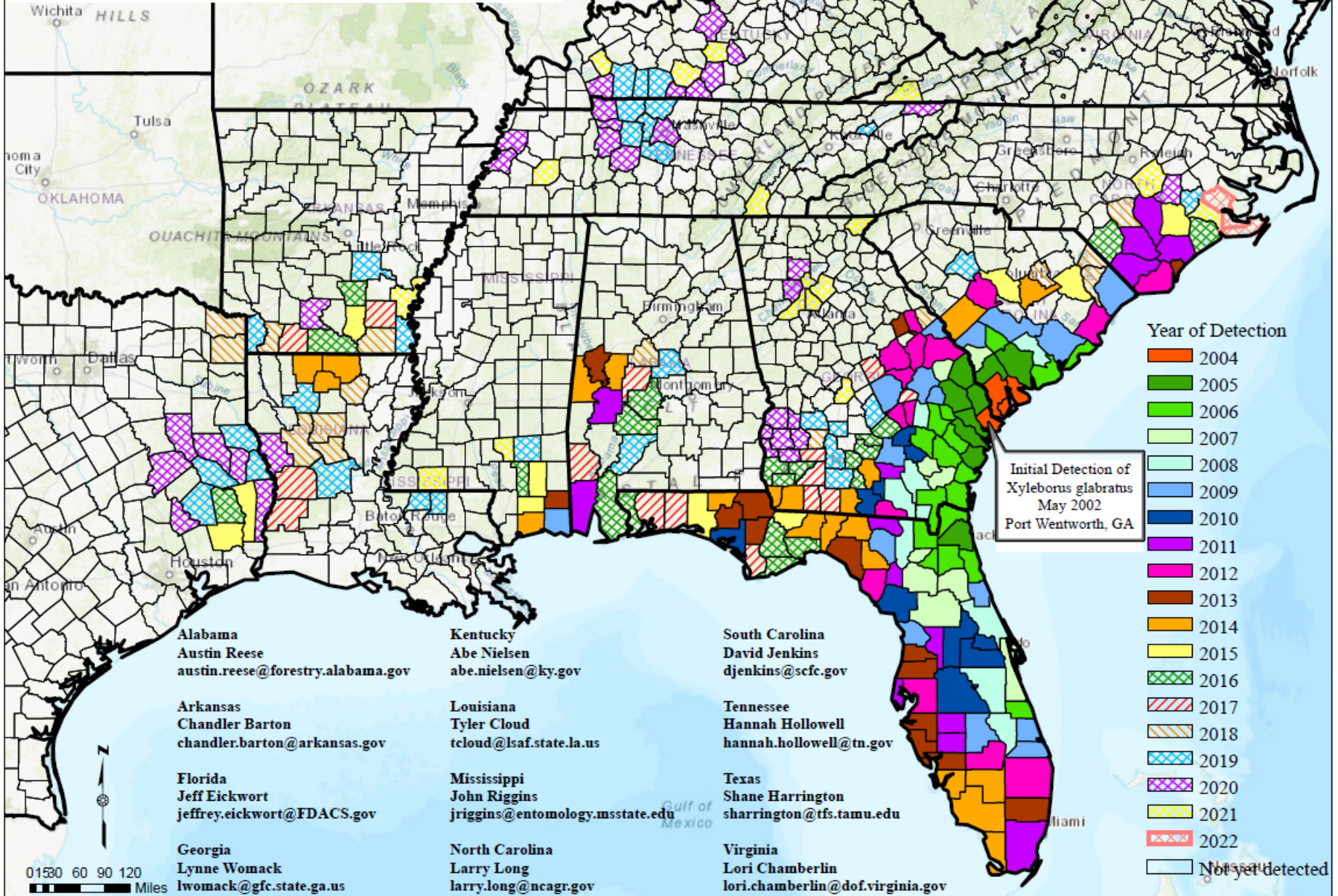


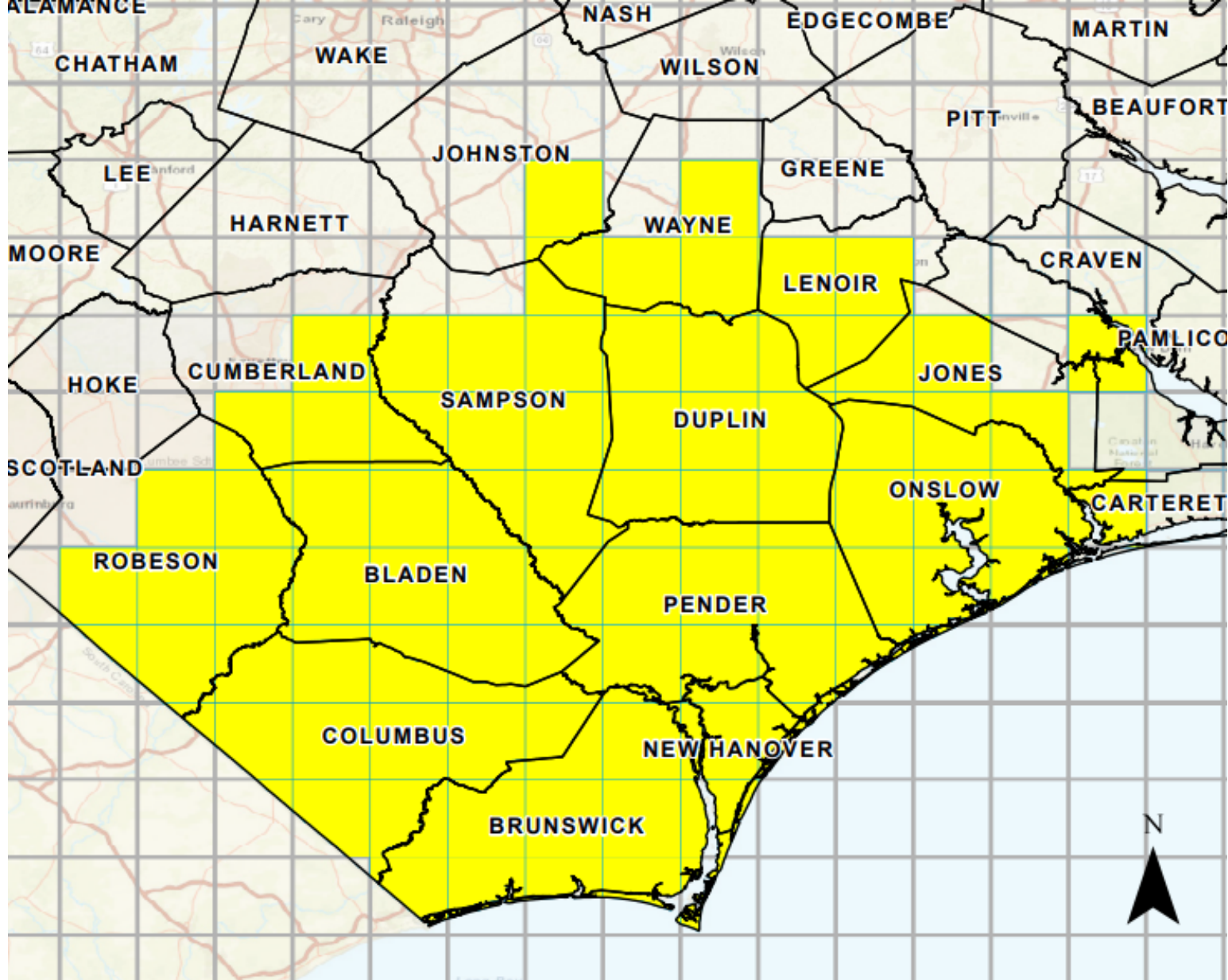


Distribution of Counties with Laurel Wilt Disease* by year of Initial Detection

February 18, 2022

Laurel Wilt Disease is a destructive disease of redbay (*Persea borbonia*), and other species within the laurel family (*Lauraceae*) caused by a vascular wilt fungus (*Raffaelea lauricola*) that is vectored by the redbay ambrosia beetle (*Xyleborus glabratus*). The pathogen has been confirmed through laboratory analysis of host samples collected in the counties highlighted.





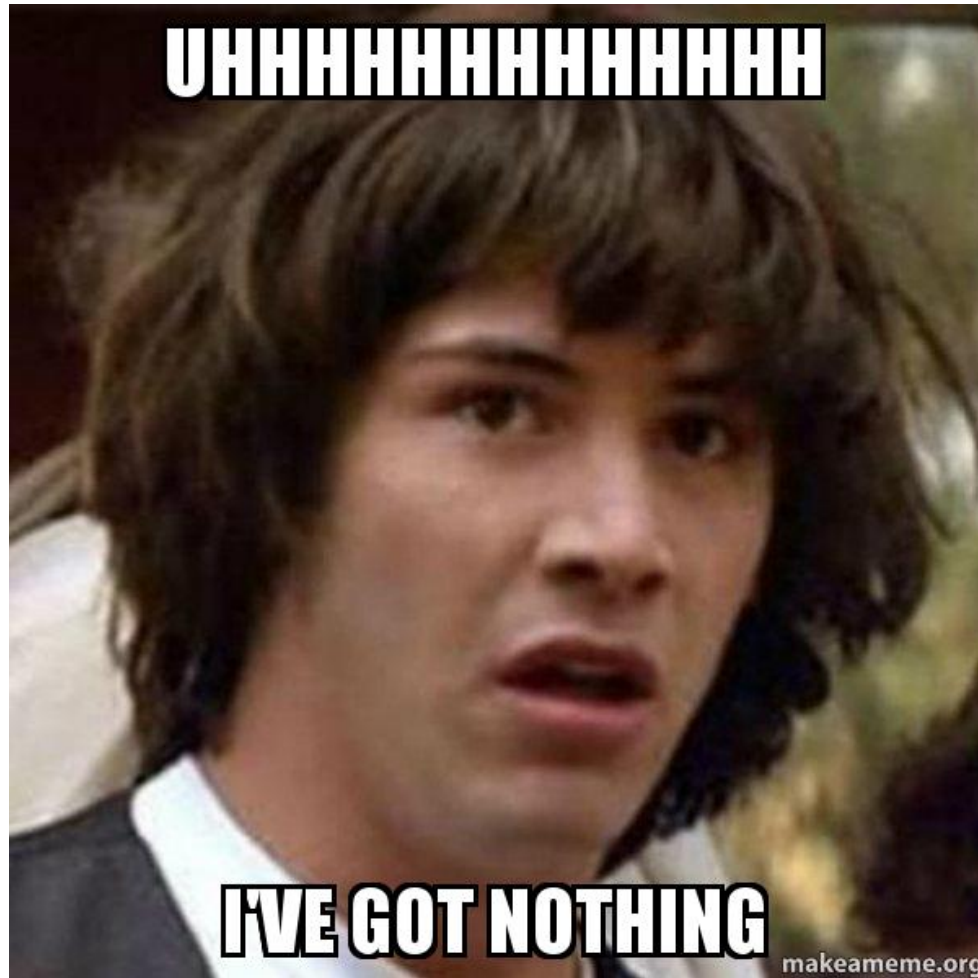
Current known laurel wilt extent



10 minute grid

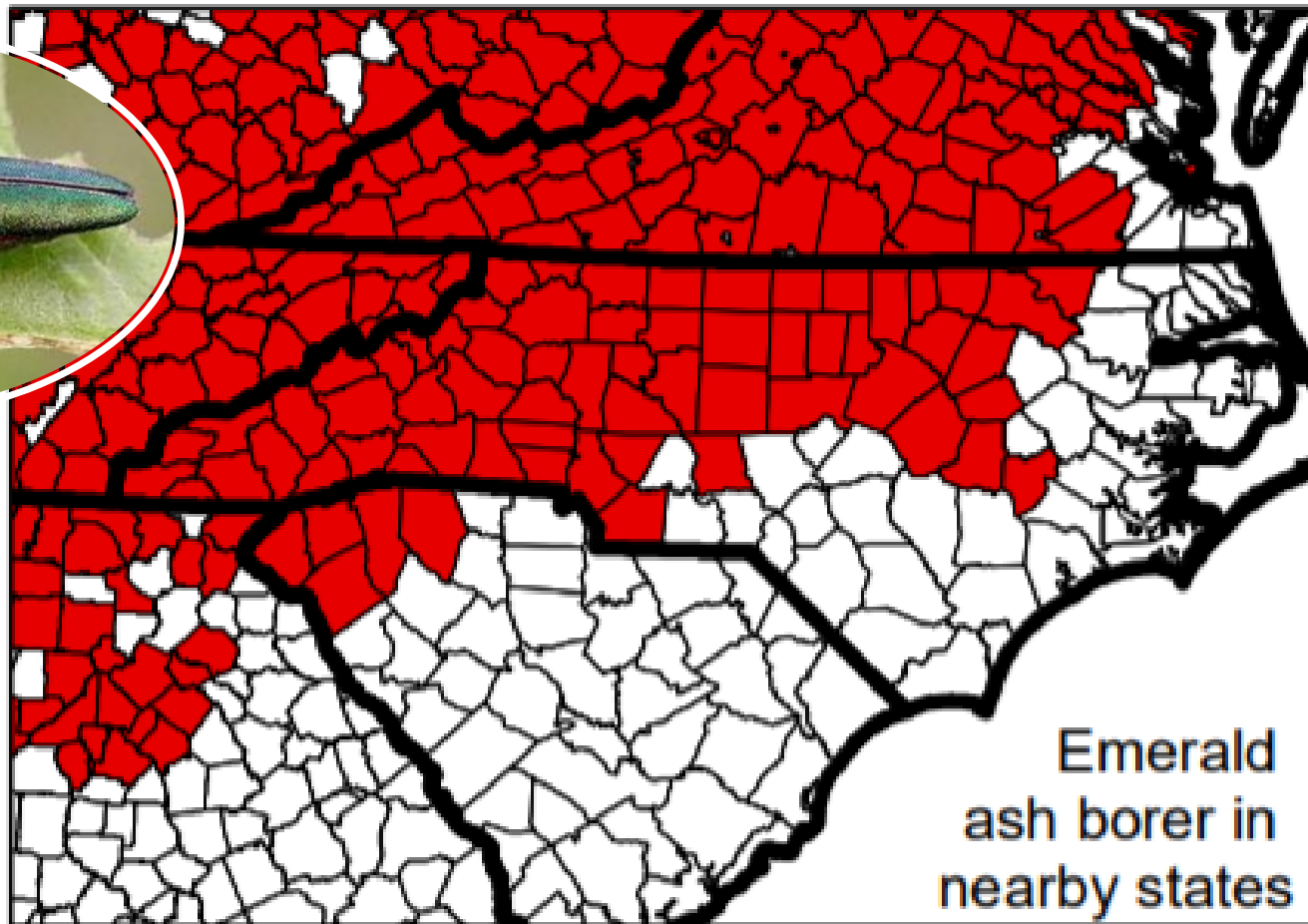
Map created 2/16/2022 by: L.C. Long - FHM Coordinator
Background Map: ESRI World Street Map

LW Management?





Emerald Ash Borer



Staunton River, Virginia

Been
causing
BIG
problems!



Toledo, Ohio before and after Emerald Ash Borer infestations



June 2006



August 2009

**same street*

EAB Identification



Metallic green

Bell-shaped segments





Pesticides work!





Emamectin benzoate

- Very effective!
- Lasts 2-3 years
- Pricey \$\$

• Imidacloprid/dinotefuran

- Inconsistent results
- Cost-effective / DIY
- Last 1 year
- Neonicotinoid = threat to pollinators

Pollinator Protection Act

WRAL.com News Weather Sports Business Opinion Consumer Health & Life

Local State @NCCapitol Education Traffic Investigations Nation World Politics

@NCCapitol

Bee protection bill filed in NC House

Tags: Today@NCCapitol

Posted March 15
Updated March 17

2k Share 23 Reactions



MORE ON THIS

- Life and Science Museum marks pollinator week
- NC Senate has honey of idea to boost bees, agriculture
- House Bill 363 (2017): Pollinator Protection Act

By Laura Leslie

RALEIGH, N.C. — Some House lawmakers are seeking limits on the use of a common pesticide to protect the health of North Carolina's beehives.

House Bill 363, titled the Pollinator Protection Act, would allow the use of neonicotinoid pesticides only by farmers,

licensed applicators and veterinarians. The chemical would be banned for unlicensed home, garden and landscape applications, which constitutes about 25 percent of their use.

The proposal would also require the North Carolina Pesticide Board to study the long-term costs and benefits of neonicotinoids, including the use of seeds coated in the chemical, which is water-soluble and can leach into neighboring soil.

Neonicotinoids, a class of insecticides, have become the most widely used pesticides in the U.S. and around the world, in large part because they've proven less toxic to mammals and birds than older chemicals such as organophosphates.

4/10/2019, 7:55PM

A proposed N.C. bill is causing some buzz in the beekeeping community



THIRD EDITION

Insecticide Options for Protecting Ash Trees from Emerald Ash Borer

North Central
IPM
Center

David A. Hogg
Doreen A. G. McCullough
David R. Smiley
Clifford S. Sadler
Frederick D. Miller
Whitney Calafino

 **The Ohio State University**
COLLEGE OF HOUSING, ARCHITECTURE,
AND ENVIRONMENTAL DESIGN

**MICHIGAN STATE
UNIVERSITY**

PURDUE LOCAL FACES
EXTENSION *Extension Extension*

**Colorado
State**
Extension

How long?



Tree Removal





BEFORE

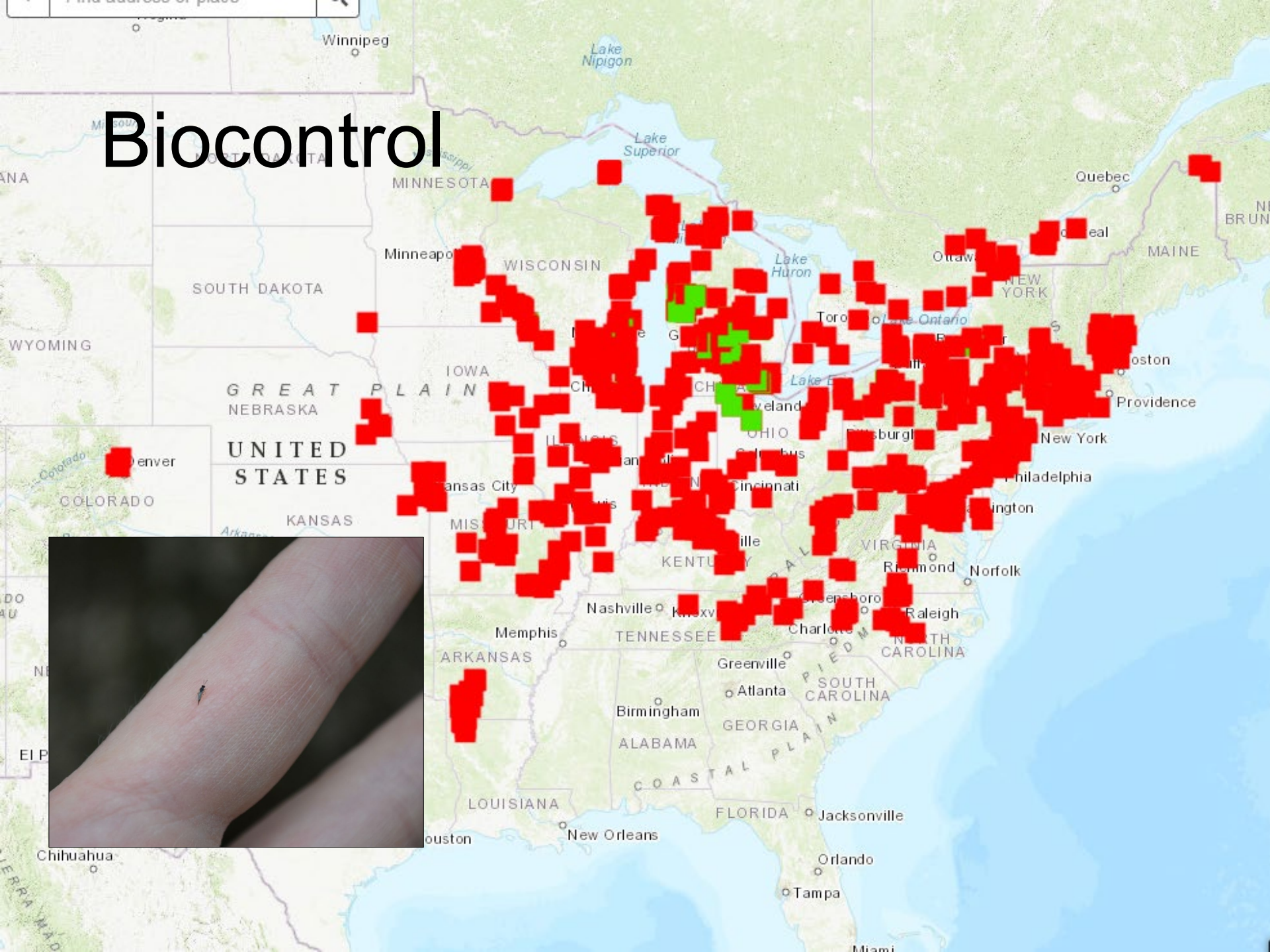
Photo Credit: Rob Gorden

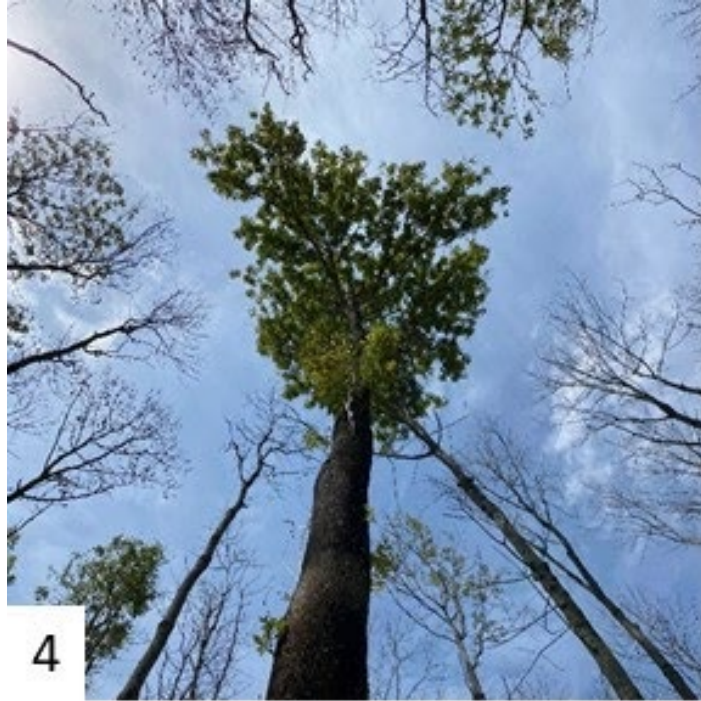


AFTER

Photo Credit: Rob Gorden

Biocontrol





“Lingering
ash”



Reduce the Spread



Great Smoky Mountains

Plan Your Visit ▾ Learn About the Park ▾ Get

Firewood Alert: Destruction

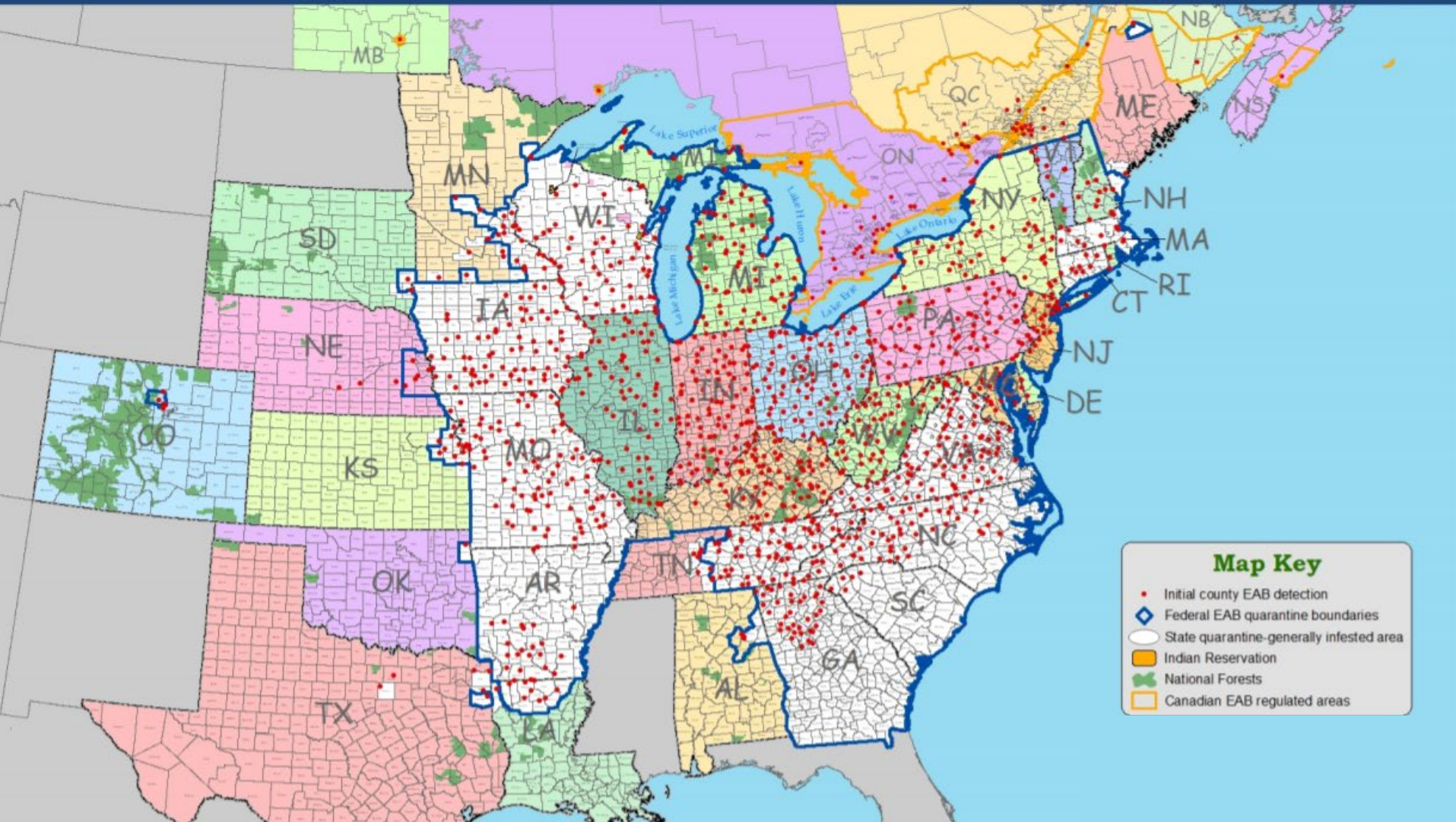
Firewood Regulations: Beginning March 1, 2015 of Agriculture (USDA) or a state agency may be b campfires.

Certified heat-treated firewood is packaged and clear private businesses in communities around the park. C during their operating season (typically March through www.nature.org/firewoodmap for a map of local sto

The federal quarantine regulating EAB & ash material was lifted in 2021.

INITIAL COUNTY EAB DETECTIONS IN NORTH AMERICA -- JANUARY 4, 2021

Cooperative Emerald Ash Borer Project



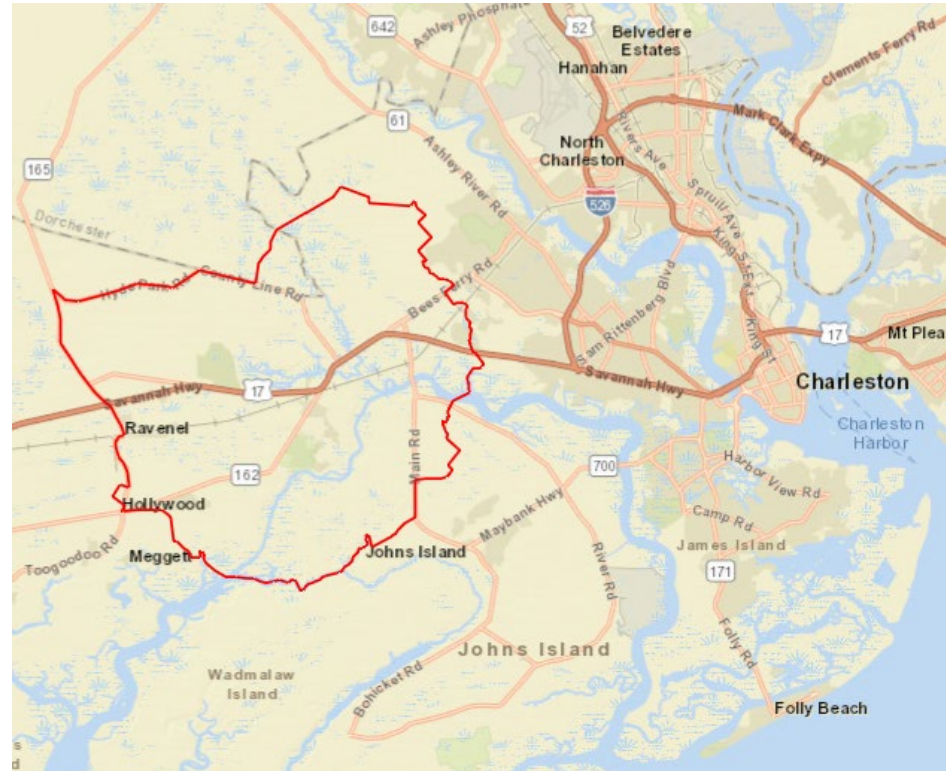
Asian longhorned beetle

- ▶ Native to Asia
- ▶ Detected in US in 1996
- ▶ Not yet found in NC



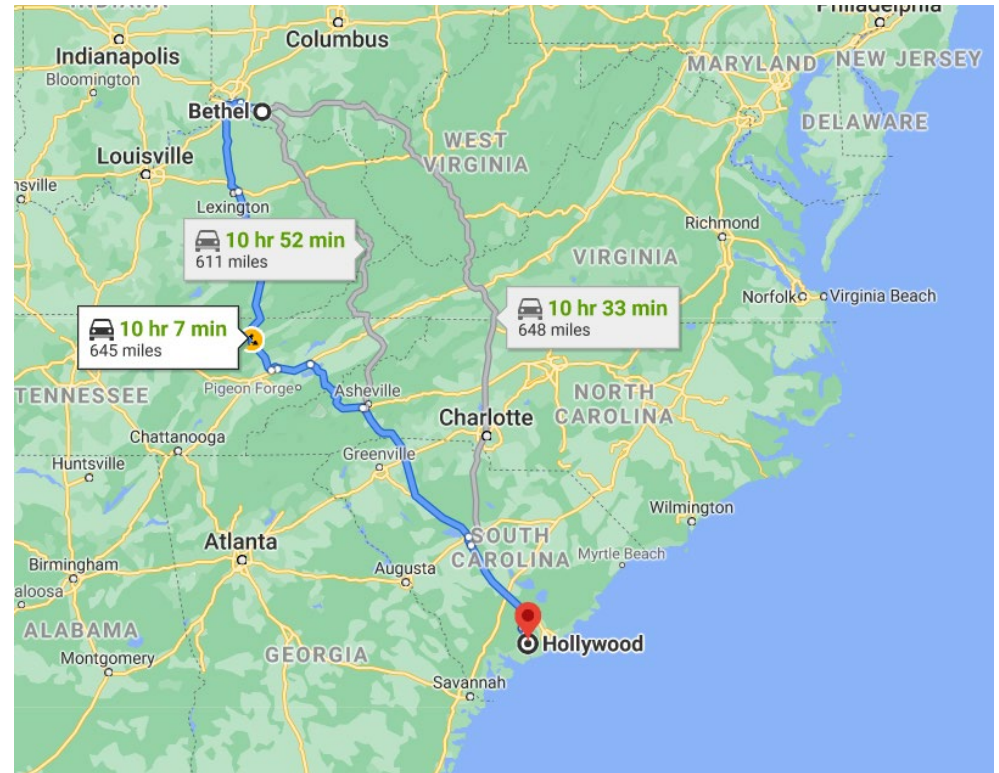
... but it's close!

- Near Charleston, SC
- 70+ sq mi quarantine zone in SC
- 6,449 infested trees



Asian Longhorned Beetle in SC

- Been there at least 10 years
- Genetics match Ohio population (600 mi. away)



At-Risk Host Trees

Infested within SC regulated area

Ash (*Fraxinus* sp.)

Birch (*Betula* sp.)

Elm (*Ulmus* sp.)

Sycamore (*Platanus* sp.)

Maple (*Acer* sp.)

Buckeye (*Aesculus* sp.)

Poplar (*Populus* sp.)

Willow (*Salix* sp.)

Golden raintree

Katsura

Mimosa

Mountain ash

Species	Count	Percent of total
American (<i>americana</i>)	11	0.27%
sp.	13	0.32%
American (<i>occidentalis</i>)	1	0.02%
Red (<i>rubrum</i>)	3940	97.67%
Silver (<i>saccharinum</i>)	11	0.27%
Sugar (<i>saccharum</i>)	6	0.15%
Eastern cottonwood (<i>deltoides</i>)	5	0.12%
Black (<i>nigra</i>)	29	0.72%
sp.	14	0.35%
Weeping (<i>babylonica</i>)	4	0.10%
Total	4000+	



← Exit 2004

U.S. Department of Agriculture
Animal and Plant Health Inspection
Service
Plant Protection and Quarantine
Maryland, 2015
Plant Protection and Quarantine
CERTIFIED UNDER ALL APPLICABLE
FEDERAL OR STATE QUARANTINE
DOMESTIC PLANT PRODUCTS
AND PDS



A close-up photograph of a tree trunk with rough, textured bark. A small, reddish-brown, fibrous mass is embedded in the bark, identified as an egg niche. A white text box with black text is overlaid on the image.

Egg niche

A photograph showing a yellow pencil being used to test the bark of a tree trunk. The pencil is inserted into a hole in the bark. A white text box with black text is overlaid on the image.

Pencil test!

A close-up photograph of a tree trunk with rough, textured bark. A circular hole is visible in the bark, identified as an exit hole. A white text box with black text is overlaid on the image.

Exit hole



Bleeding at egg sites

Sawdust/shavings from larval feeding



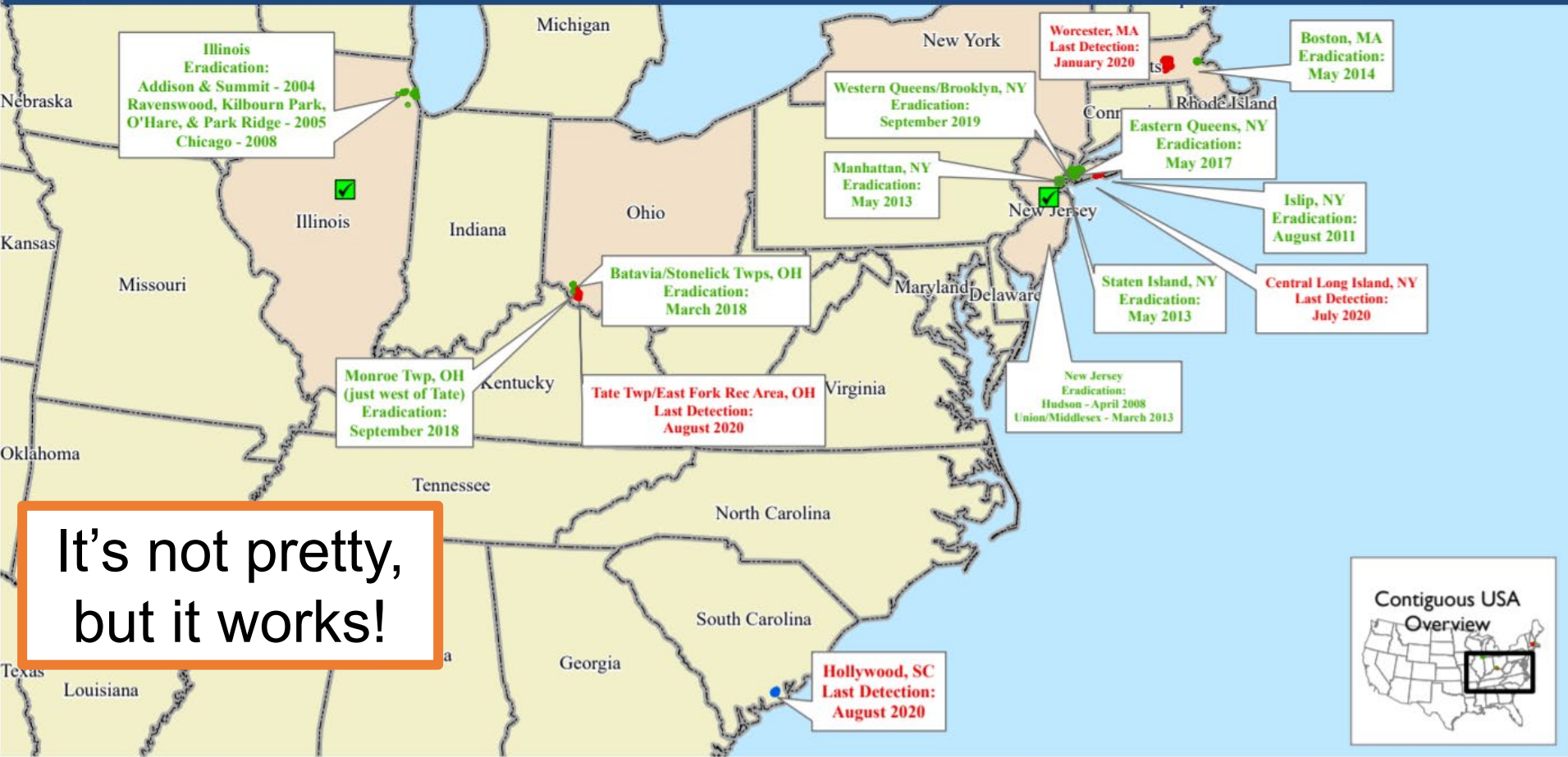
Eradication





3,822 of the 6,449 infested trees removed so far

2020 National ALB Program Overview

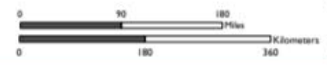


It's not pretty, but it works!



- Active/Regulated for ALB
- Eradicated/Deregulated for ALB
- Active Infestation

- State Eradicated/Deregulated for ALB



Data Source: USDA-APHIS-PPQ-ALB
 Date Created: 8/12/2020
 USDA-APHIS-PPQ-151/West/Bryant/Dr/Worcester/PAAD1606
These data, and all the information contained therein, have been collected by the U.S. Department of Agriculture's National and Plant Health Inspection Service (APHIS), or by its contractors or APHIS' behalf, for restricted government purposes only and is the sole property of APHIS. See full disclaimer here: aphis.usda.gov/hq/npis-disclaimer

SC \neq NY or Chicago



Can we make trees unsuitable for ALB development?



Spotted Lanternfly



U.S. >

Invasive spotted lanternfly discovered in North Carolina for first time: "Heavy infestation"

JULY 6, 2022 / 6:51 AM / CBS/AP



Spotted lanternfly sighting confirmed in North Carolina

WTVD-AP
Tuesday, July 5, 2022

SPOTTED LANTERNFLY IS IN NC

NCD&CS



WXII 12 NEWS

SPOTTED LANTERNFLY FOUND IN FORSYTH COUNTY
FIRST ESTABLISHED PRESENCE OF INVASIVE BUG IN THE STATE



TECHNICIAN

AEA
ALPHA XI DELTA

A NEW SORORITY JOINING PANHELLENIC!
LEARN MORE AT BEALPHAXI.ORG



First spotted lanternfly, an invasive species, identified in North Carolina

Brayden Marsh, Correspondent Aug 21, 2022



Weekly Newsletter
Top Technician stories delivered to your inbox

Enter email address

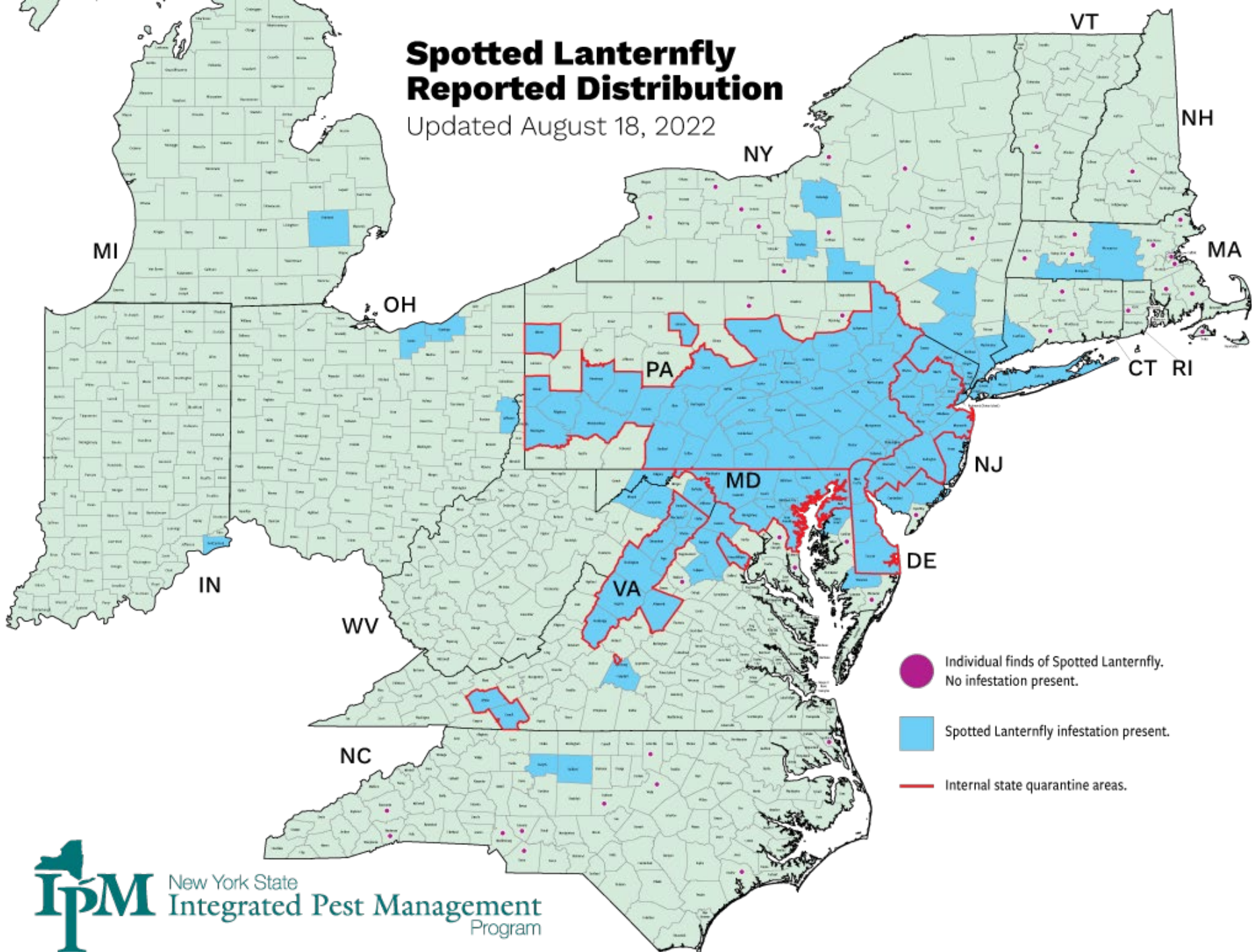
Spotted Lanternfly

- Sap-sucker
- Native to China, Vietnam, Bangladesh
- First US detection: 2014 in PA
- Found in NC in June



Spotted Lanternfly Reported Distribution

Updated August 18, 2022



Spotted Lanternfly Host Plants

Tree-of-heaven

Apples

Birch

Cherry

Grapes

Hops

Lilac

Maple

Poplar

Stone fruits

Walnut

Willow

***100+ species
of host plants***



Spotted lanternfly has many different looks



Egg mass (Oct – May?)



OUTDOOR LIGHTBULB

Brandon Zimmerman



OUTDOOR FURNITURE

Jenny Armstrong Powell



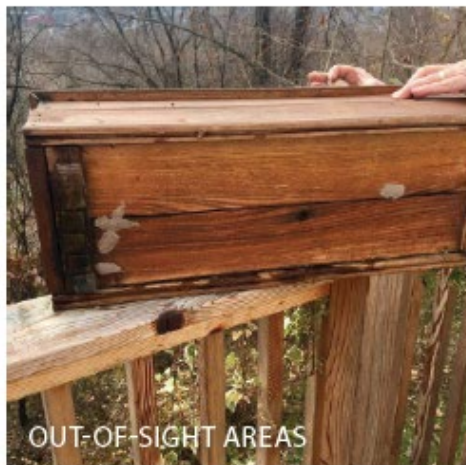
FENCE POSTS

Heather Leach



VEHICLES

Zil Fessler



OUT-OF-SIGHT AREAS

Lori LaCava Beatrice



CAMPING EQUIPMENT

Liz Willow

Nymphs



Adult (June - ??)



What's the big deal?

- Reduced quantity & quality of crops
- Movement of goods
 - Quarantine & permit
- Nuisance
 - Aesthetic
 - Human annoyance



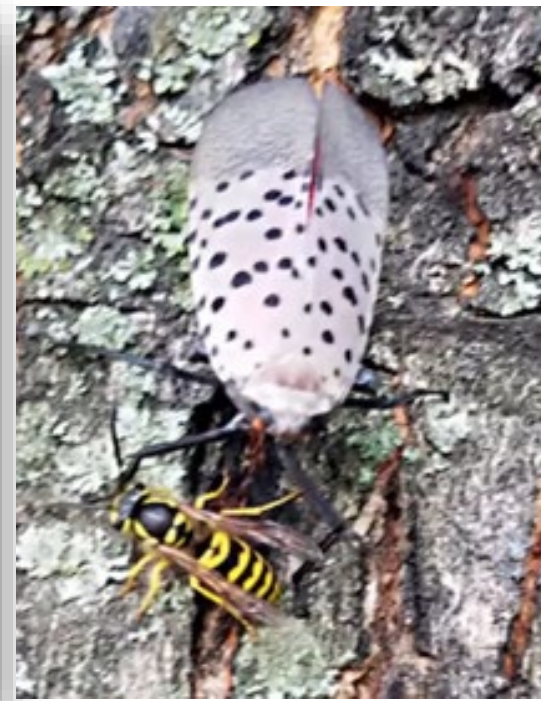
Spotted lanternfly excretes copious amounts of honeydew.



Truck bed cover after owner parked under infested tree.



Base of infested tree; sooty mold and fungal mats growing on honeydew.



Honeydew is sweet and sticky and attracts stinging insects that feed on it.

Mating Swarms



5563434

NCDA&CS Respon

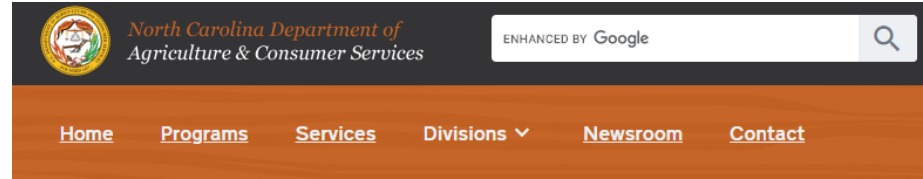
- Actively treating the NC infestation
- Attempting to shrink or eradicate infested area
- Continuing to survey area to delimit size of infestation



Tree-of-heaven photo by Ryan Bohannon

SEE IT? REPORT IT!

ncagr.gov/slf



Plant Industry - Plant Protection Section Entomological Services

Spotted Lanternfly

Report suspect Spotted Lanternfly [HERE](#)

Spotted lanternfly, *Lycorma delicatula*, is an invasive planthopper that was first detected in the United States in Berks County, Pennsylvania, in 2014. The pest is native to northern China and was introduced to Korea in 2004 where it has become a major pest. Since 2014, the pest has been detected in over 12 states. Reproducing infestations of this pest have been found throughout Pennsylvania as well as portions of Connecticut, Delaware, Maryland, Ohio, New Jersey, New York, Virginia, Massachusetts, Indiana, and West Virginia. **The first live population of spotted lanternfly was found in Forsyth County, North Carolina in June 2022.**

Keeping an eye out in NC

Statewide surveys, focusing on “high risk” areas:

Public awareness



NC STATE

EXTENSION
FORESTRY



Elm zigzag sawfly

- Found last month!
- Surry/Stokes County Line
- Unsure how bad this will be



Twitter: @ncforesthealth
Facebook: NC State Forest Health



NC STATE

Kelly Oten

EXTENSION
FORESTRY

kelly_oten@ncsu.edu