

# Diagnosing Ash Problems

*and  
Preparing  
for EAB*

Laurie Stepanek  
Nebraska Forest Service



Nebraska  
Forest  
Service



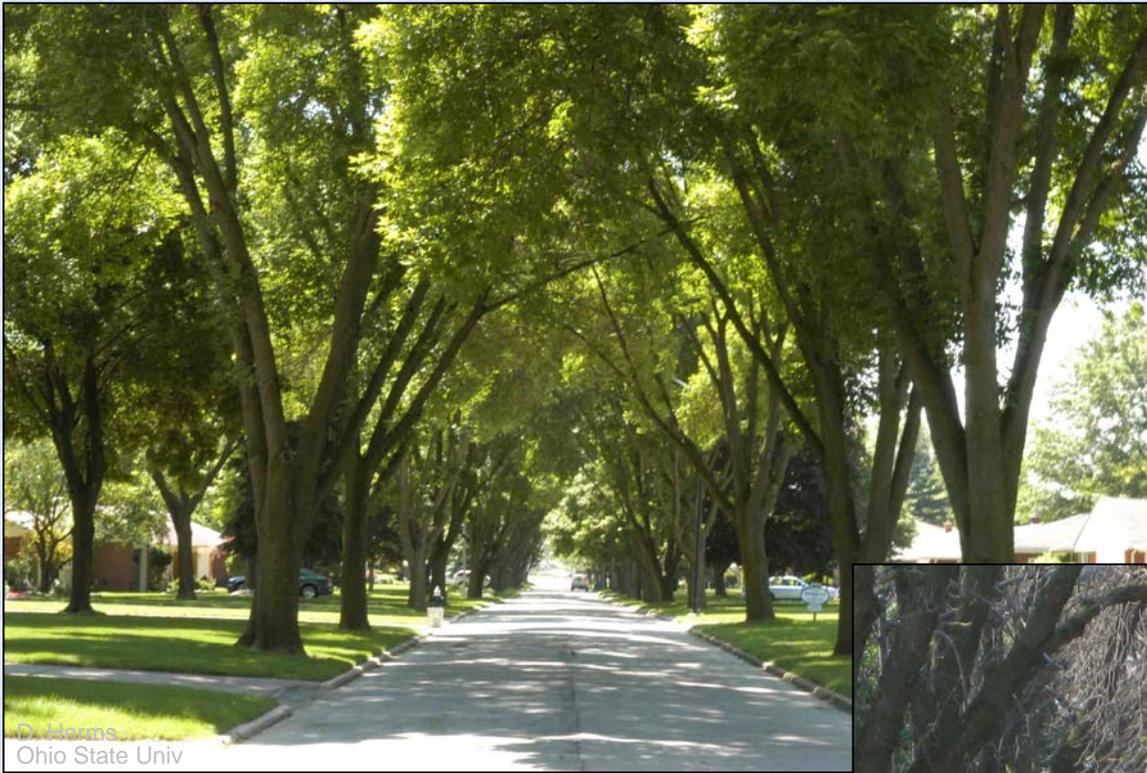
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# Emerald Ash Borer (EAB)

- Aggressive killer
- Exotic species from Asia
- All native ash susceptible
- Easily transported in firewood

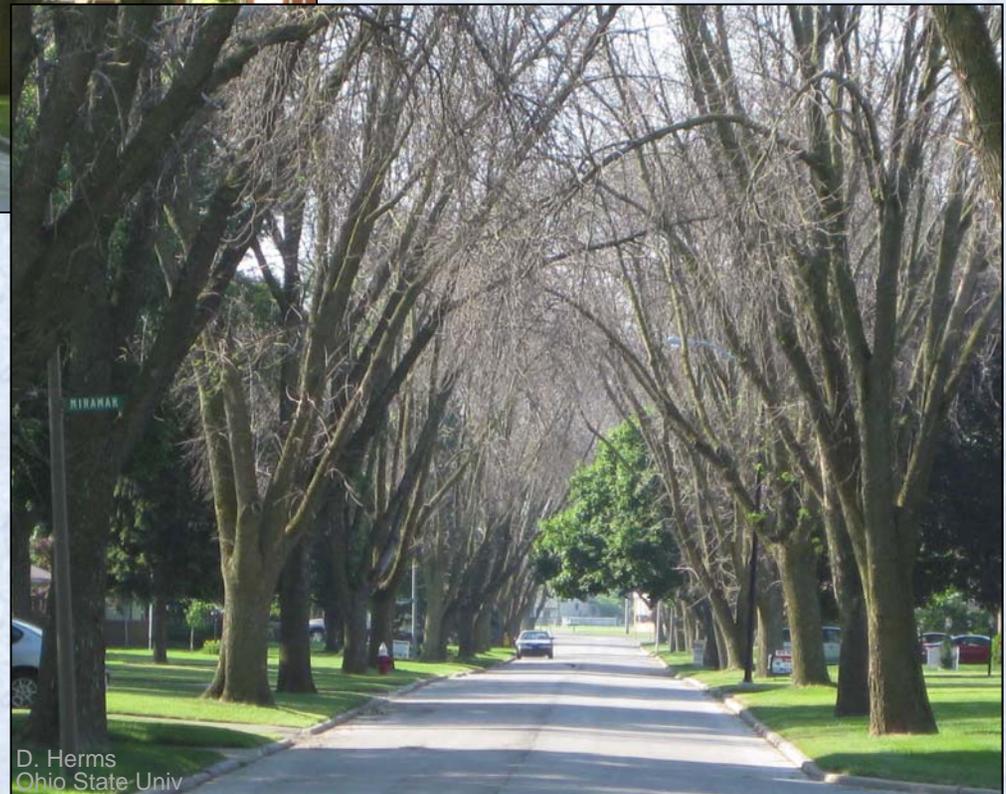


# EAB: aggressive tree killer



Ash-lined street

3 years later

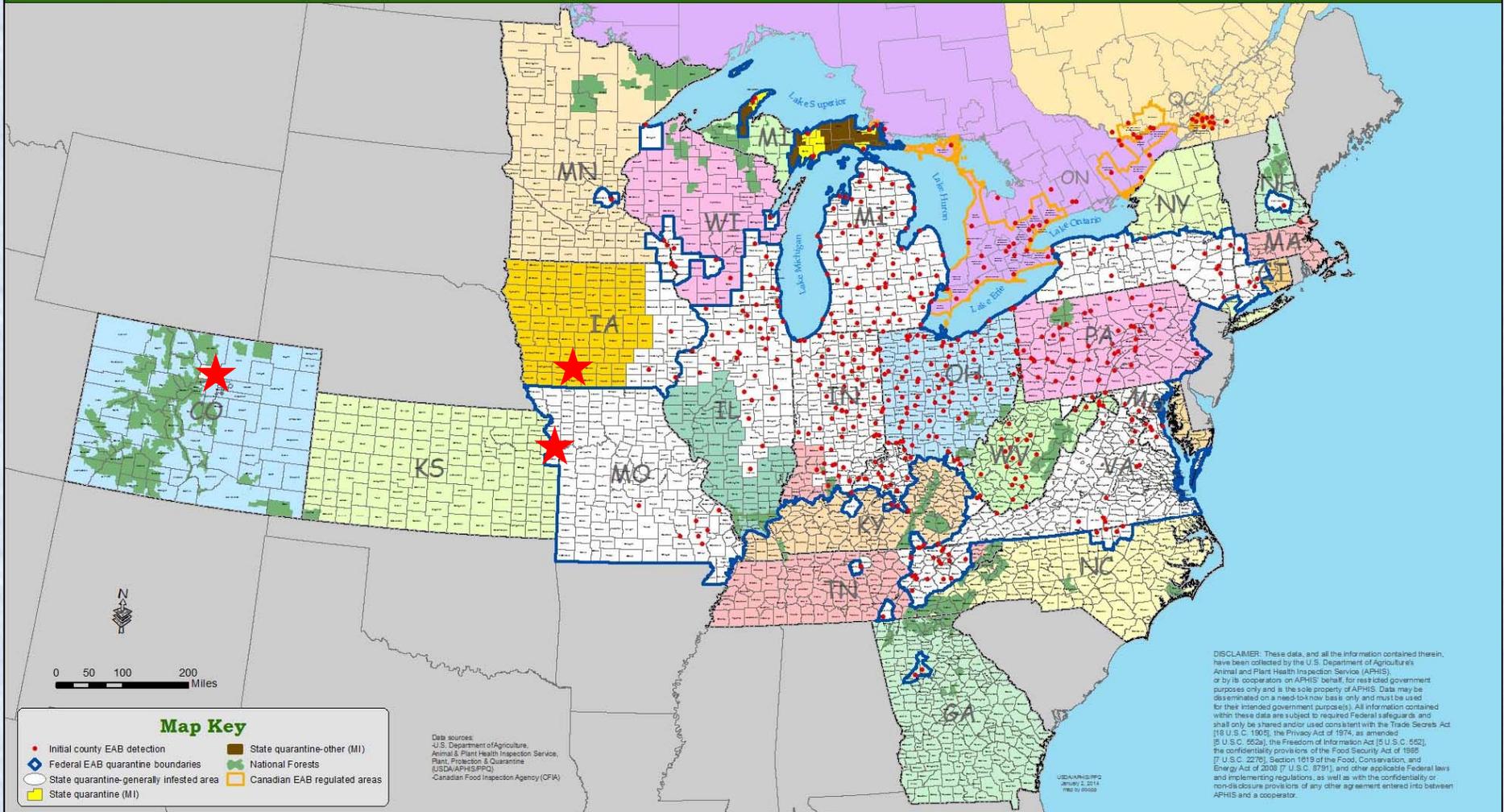




# Cooperative Emerald Ash Borer Project

Initial county EAB detections in North America

January 2, 2014



★ Boulder, CO  
★ Creston, IA  
★ Kansas City

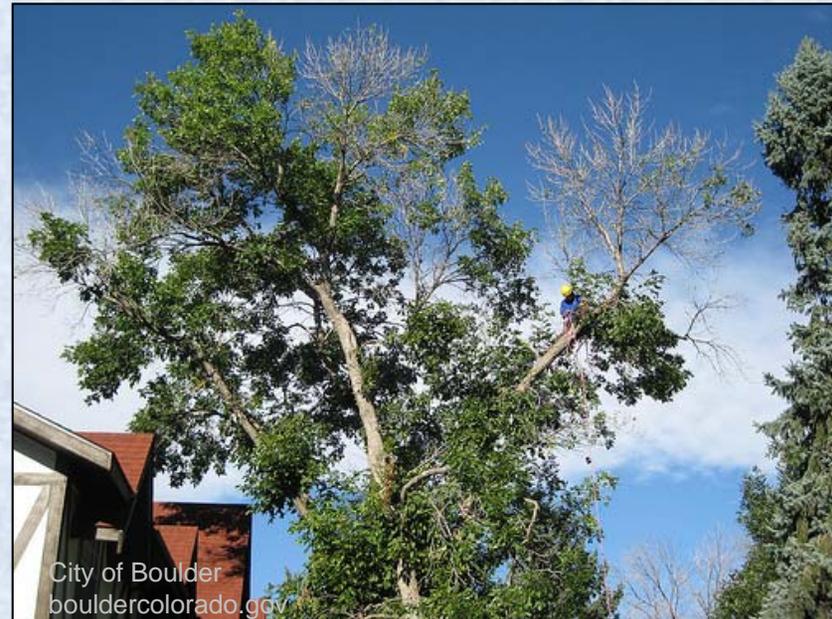
# Emerald Ash Borer in Colorado

- Discovered in Boulder September 2013
- City survey underway
- Detected in multiple locations in Boulder

**Boulder:**

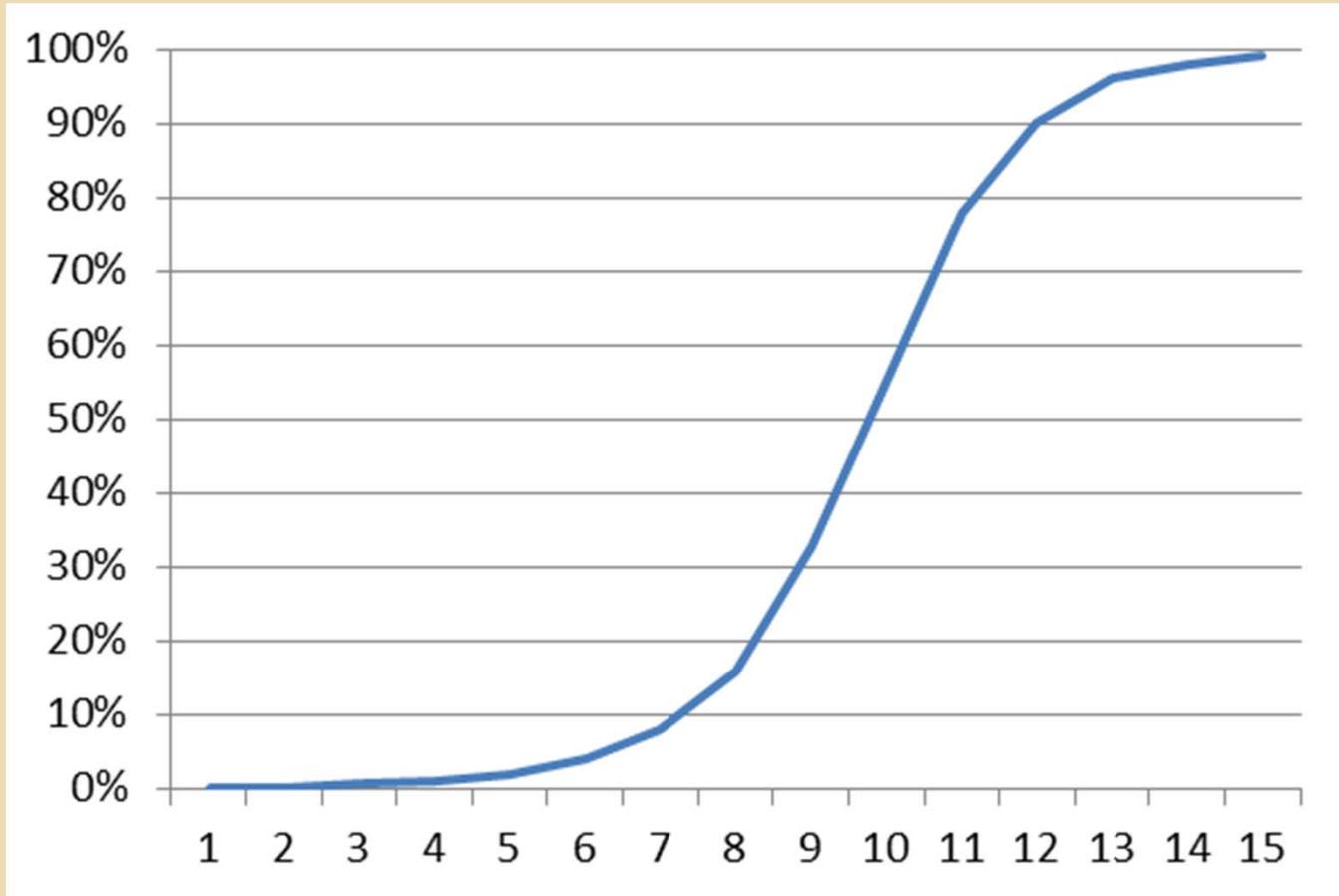
**No EAB Management Plan**

**98,000 ash trees  
5,700 public ash**



# Ash Death Curve

↑  
Ash  
Mortality

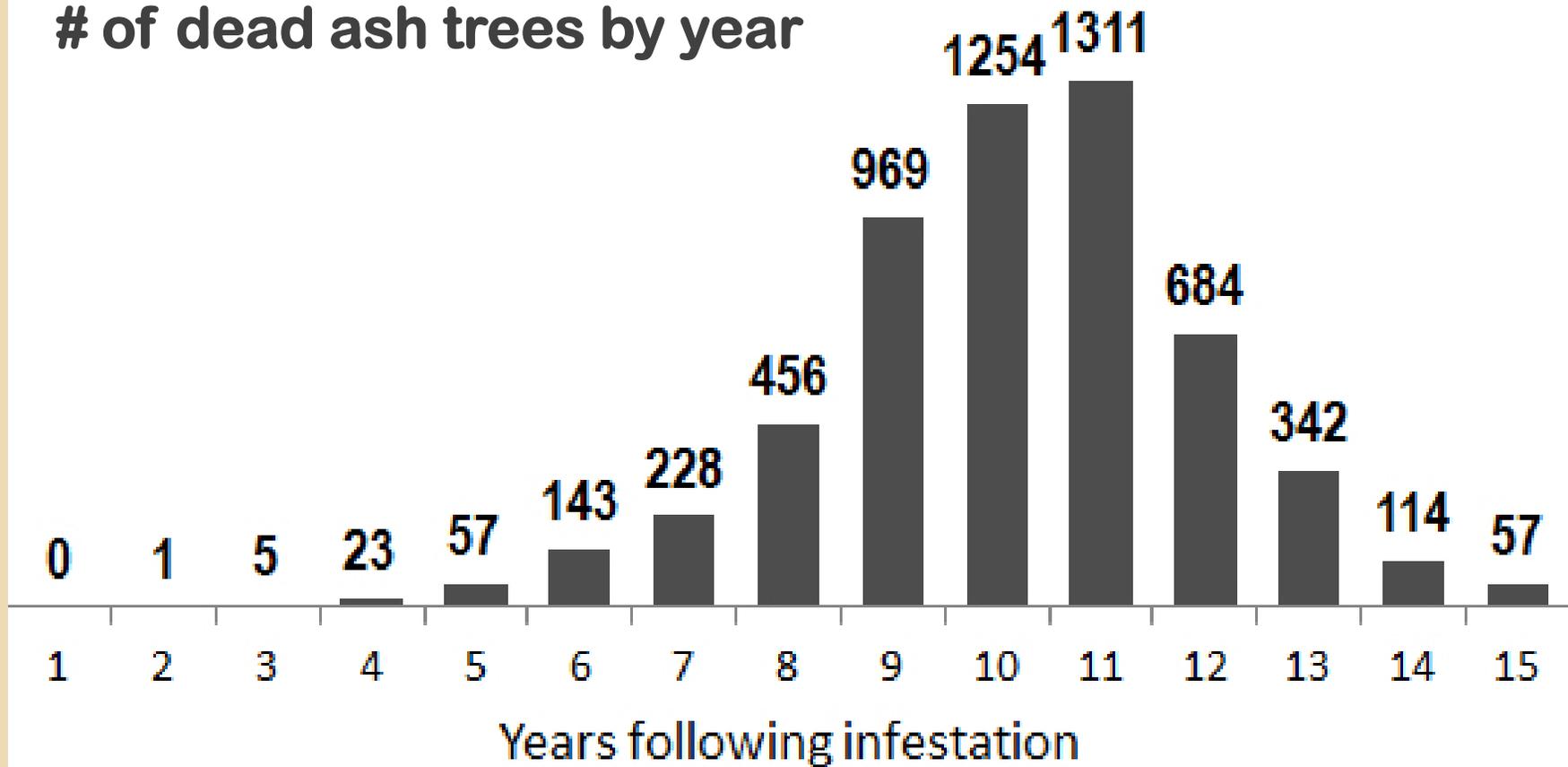


Years →

# Boulder

Public Ash Tree Population: 5700

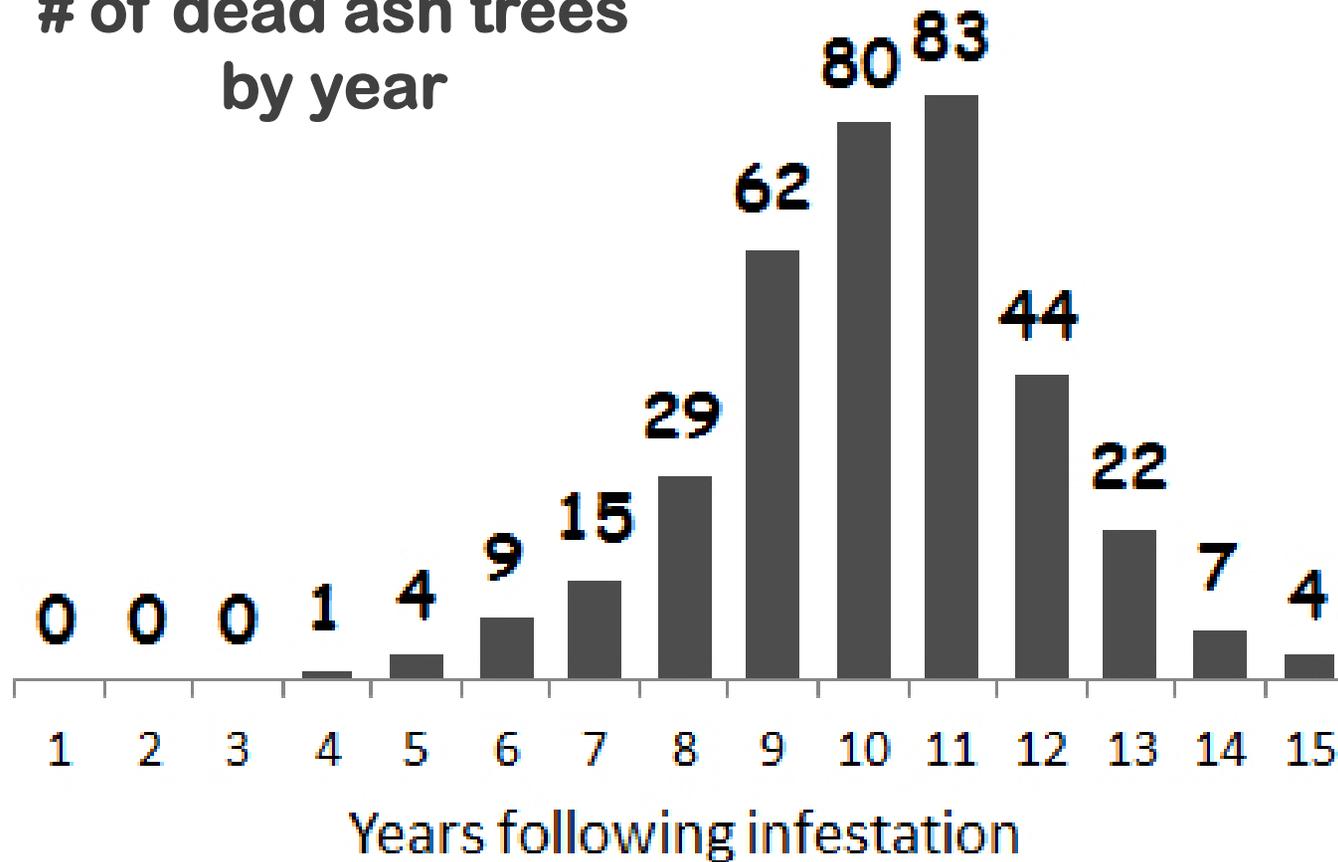
# of dead ash trees by year



# McCook

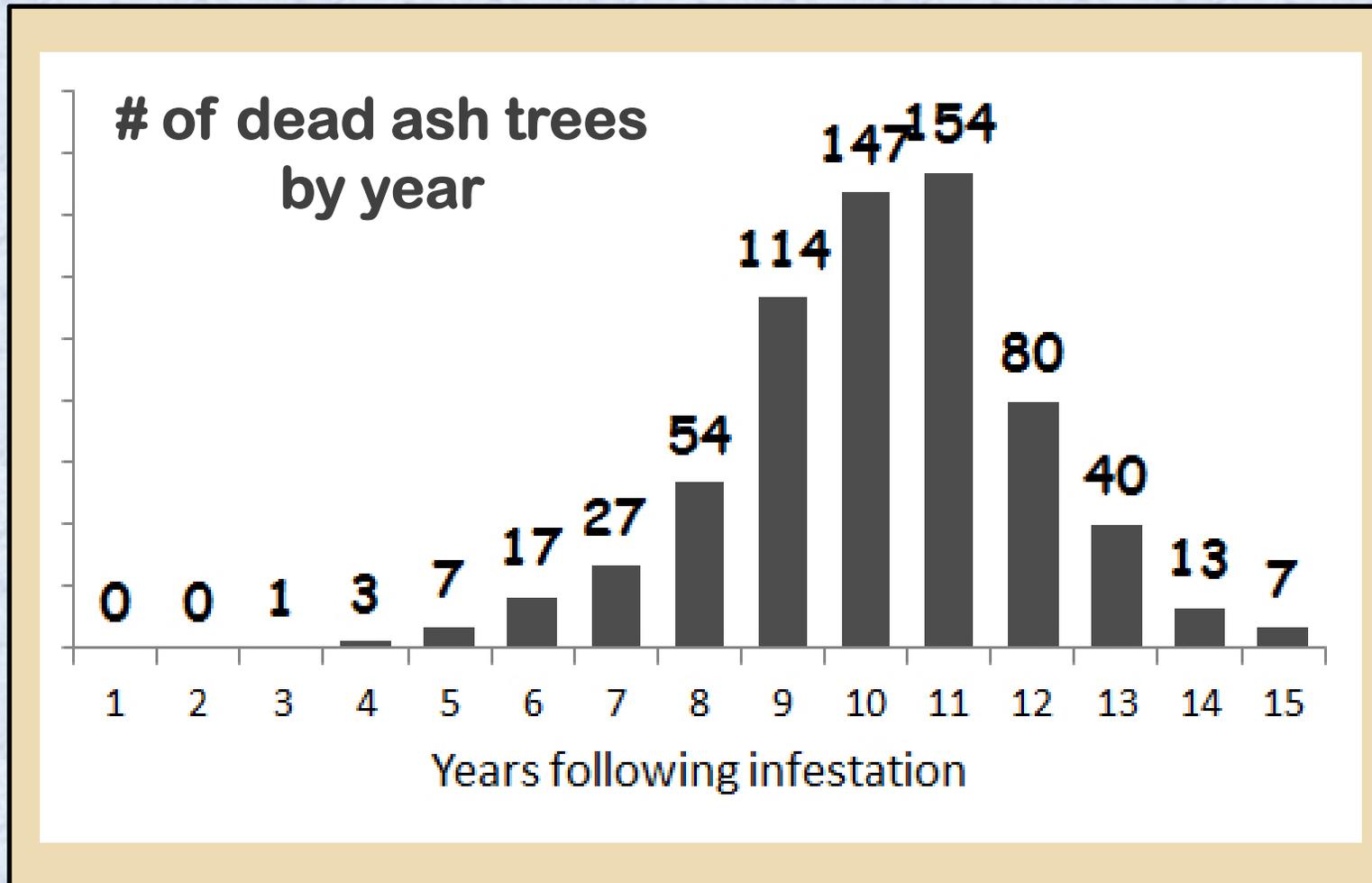
Public Ash Tree Population: 363

# of dead ash trees  
by year



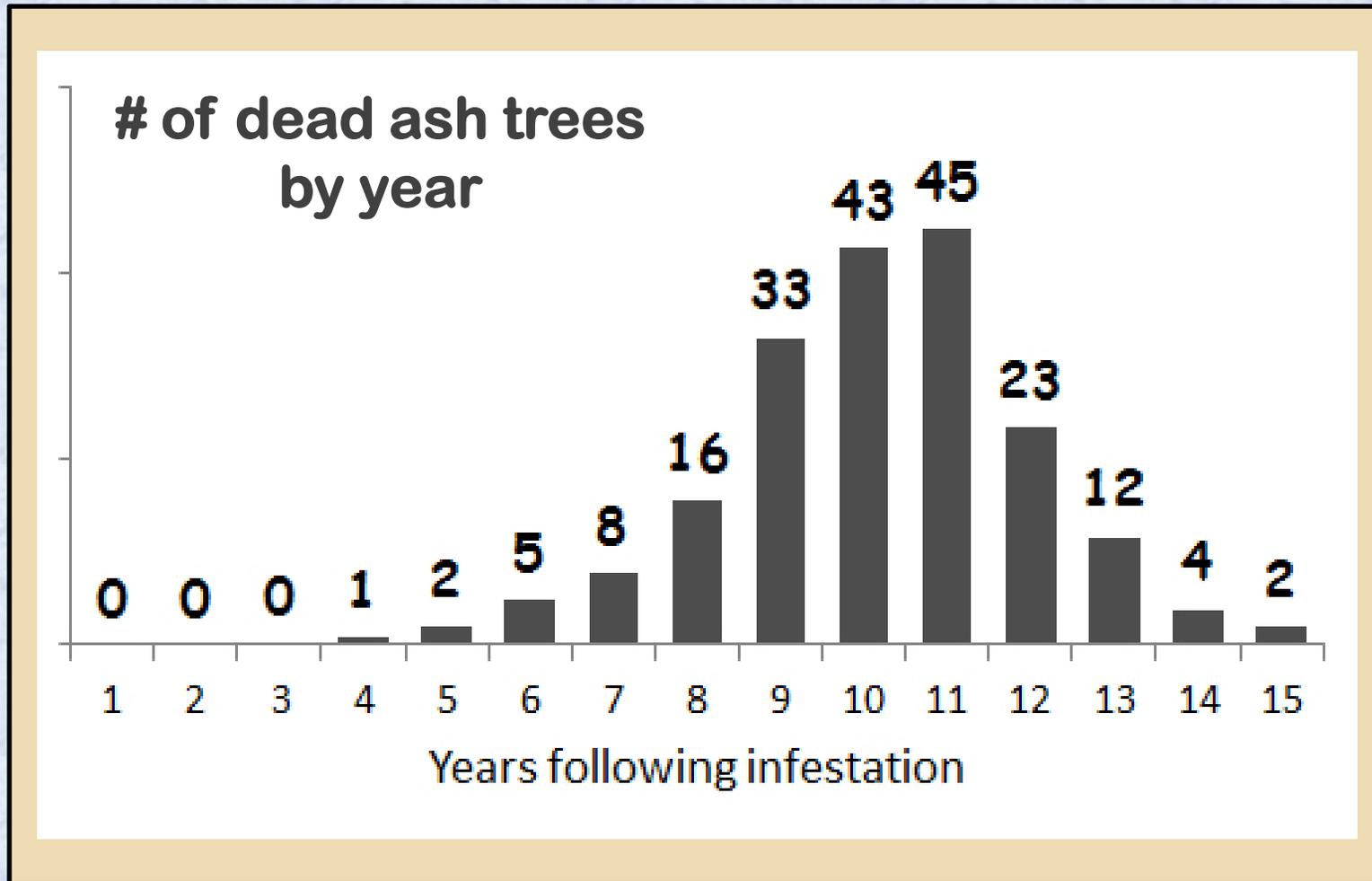
# Dead Ash Trees by Year

North Platte public ash population: 670



# Dead Ash Trees by Year

Lexington public ash population: 195



# Readiness Planning

## What can we do?

- Remove marginal trees
- Check ash trees as they are pruned or removed
- Plant a diversity of trees
- Public awareness to gain citizen support

Nebraska Forest Service

**Emerald Ash Borer:**  
Readiness Planning  
for  
Nebraska Communities

*Is your community ready . . .*



Ash-lined street in 2006, Toledo, Ohio.

*. . . for this?*



Same street three years later—all ash trees dead.

Emerald ash borer (EAB) is a pest of historical significance that will change the face of the landscape in your community. The Nebraska Forest Service can help you prepare!

FH22-2014

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# Fairbury, NE

- More than 200 ash in park
- Comprises over 40% of the trees

## The Ash Trees of Crystal Springs Park

**Current Problems:**

- ✓ **Structural weakness**  
Many trees in the park have decay and insect damage making them prone to breakage.
- ✓ **Drought**  
Is killing trees and making them more susceptible to pests.
- ✓ **Over-abundance of ash**  
More than 40% of trees in the park are ash.

Decay, insects and drought are taking their toll on ash trees in Crystal Springs Park.

**Future Problem:**

- ✓ **Emerald Ash Borer**  
This highly aggressive pest will ultimately kill the majority of ash trees in the U.S. Nearly half of the trees in Crystal Springs Park will be lost.

Emerald ash borer has killed millions of ash trees in the eastern U.S.

**Don't Move Firewood!**

Infested firewood is the most common way emerald ash borer is spread long distances.

**Fairbury's Strategy:**

- ✓ **Inventory trees in park**  
Done!
- ✓ **Increase diversity of trees**  
Gradually remove affected ash and replace with a variety of trees.
- ✓ **Develop long-term plans**  
To budget for the future needs of the park and make it a strong asset to our community.

**More Information:**  
City of Fairbury  
Board of Public Works  
402-729-3030

Developed in cooperation with the City of Fairbury and the Nebraska Forest Service

# What about treatments?

- within 15 miles
- high-value
- good condition
- good location
- good size
- environment



Nebraska Forest Service

## Emerald Ash Borer

### Guidelines for Nebraska Homeowners



Ash trees provide shade, autumn color, and many other benefits that enhance the value of a home.

Emerald ash borer (EAB) is a serious threat to valuable ash trees found in home landscapes. Because of the aggressive nature of EAB, trees in infested areas that are to be saved will likely require treatment throughout their lives.

The cost of treatments can be considerable. This brochure provides guidelines to help you evaluate your tree, discusses options for treatment, and provides information on replacing ash trees with other species.



Left: Tree dying from emerald ash borer (EAB). Center and right: EAB adult and larva.

FH17-2012

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## Emerald Ash Borer

### Treatment Options



Mauget Tree Injector



ArborSystems Wedgle Direct-Inject Injection Unit



Arborjet CJIK-jet

Three of many treatment methods available for emerald ash borer control

A variety of treatments are available for controlling emerald ash borer (EAB), including trunk injections and implants, soil treatments, and bark and foliage sprays. The tables in this publication describe the treatments most commonly used.

The trunk injections and implants mentioned include only products registered for use in Nebraska that have been confirmed in one or more independent studies to be effective against EAB. Actual treatment success can vary depending on initial tree condition.

All trunk injections and implants cause damage to trees. Some products cause more damage than others.

#### When to begin treatments

Treatments are generally recommended only when EAB is known to be within **15 miles** of your location. Check product labels for additional guidelines.

FH13-2012

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Debbie Miller  
US Forest Service  
Bugwood.org

**Metallic-green beetle**

**1/2 inch long**

**Begin emerging late spring  
(May-August)**

**Feeds on ash leaves**



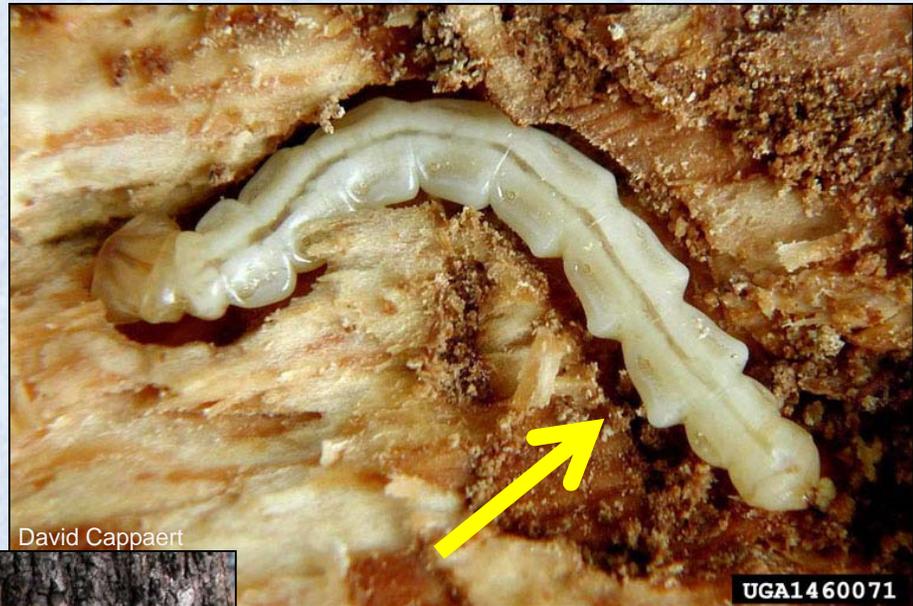
Laurie Stepanek  
Nebraska Forest Service



David Cappaert  
Michigan State Univ.  
Bugwood.org

**UGA2106098**

**Creamy white larva**  
**“Small tapeworm”**  
**Bell-shaped segments**

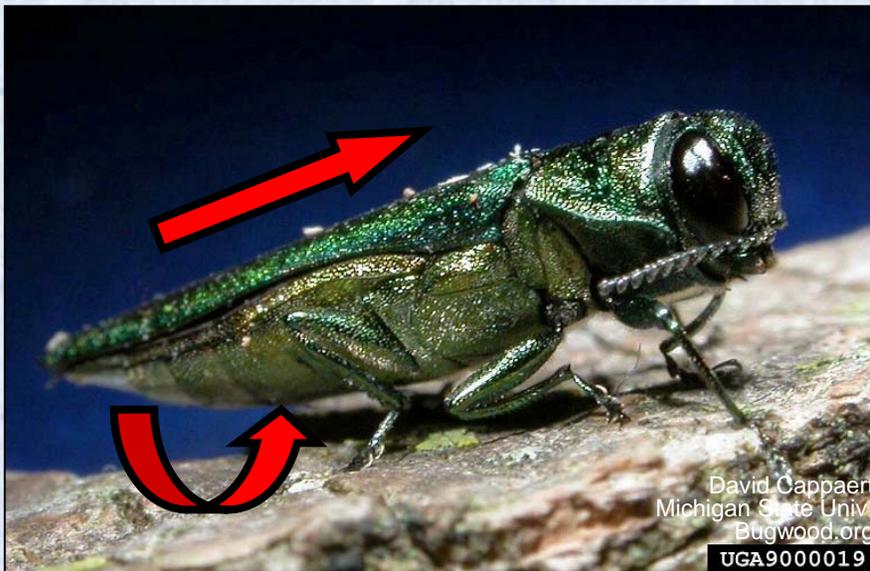


**Winding tunnels**  
**beneath bark**



Joseph O'Brien  
US Forest Service  
Bugwood.org

D-shaped exit holes  
1/8 inch

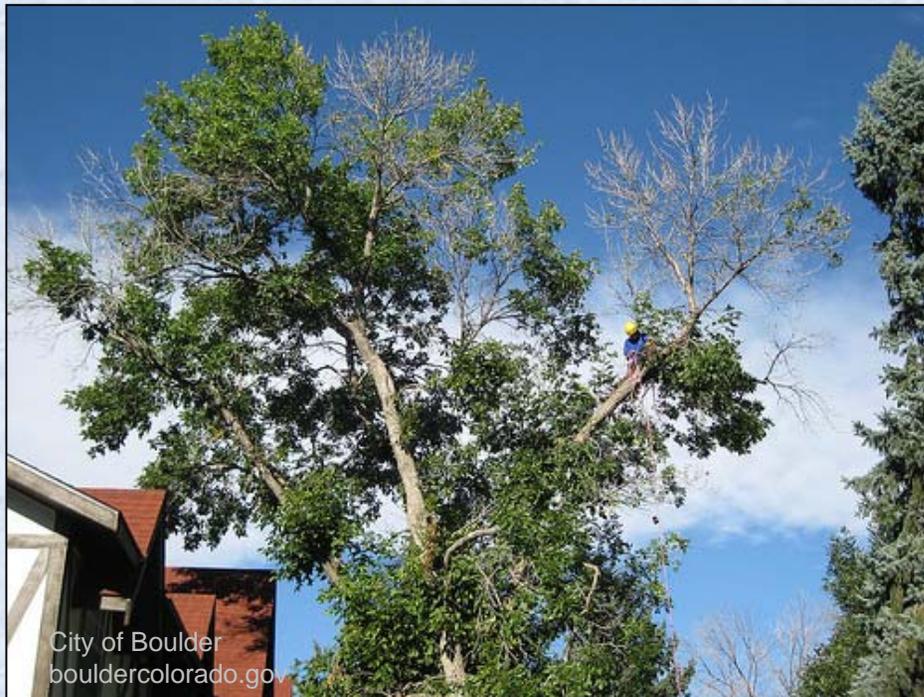
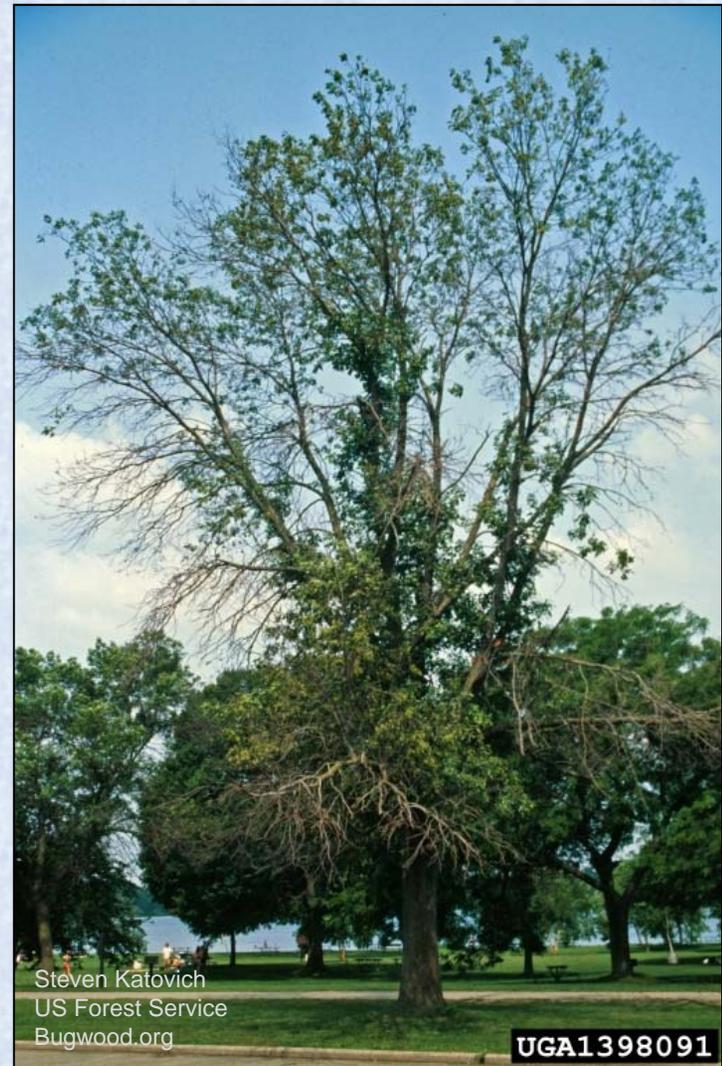


David Gappaert  
Michigan State Univ.  
Bugwood.org  
UGA9000019



Debbie Miller  
US Forest Service  
Bugwood.org

# Sparse foliage Branch dieback



# Infested firewood



**BUY IT WHERE  
YOU BURN IT.**

[dontmovefirewood.org](http://dontmovefirewood.org)



# EAB Purple Traps

campgrounds

parks

nurseries

rest areas

green waste sites

## Visual Surveys

## Tree Pest Detectors



Kelly Oten  
North Carolina Forest Service  
Bugwood.org

5507072

# Reporting EAB

Nebraska Forest Service: 402-472-2944

Nebraska Dept of Agriculture: 402-471-2394



Brian Sullivan  
USDA APHIS PPQ  
Bugwood.org

# EAB & Look-alikes



University of Illinois

**EAB**



Laurie Stepanek  
Nebraska Forest Service

**Gold dust buprestid**



Pennsylvania Dept of  
Conserv. & Nat. Resources  
bugwood.org

**Dogbane beetle**



Pennsylvania Dept of  
Conserv. & Nat. Resources  
bugwood.org

**Tiger beetle**

**Leafhopper**



Susan Ellis  
bugwood.org



**Not EAB !**



**Not EAB !**

Laurie Stepanek  
Nebraska Forest Service



Nebraska Forest Service

# Decline in Ash Trees: Borers and Bark Beetles

*An Identification Guide*



Sparse foliage



Branch dieback



Woodpecker bark stripping

Declining ash with borers or bark beetles may have sparse foliage, dying branches, broken branches or trunks, and woodpecker activity such as bark stripping and irregular holes in bark.

Many borers and bark beetles contribute to the decline of ash trees in Nebraska. This is a characteristic



Nebraska Forest Service

# Decline in Ash Trees: Diseases and Environmental Stresses

*An Identification Guide*



Sparse foliage



Epicormic shoots



### Symptoms of decline

- Dying branches
- Epicormic shoots (water sprouts, suckers)—shoots sprouting directly from the trunk or major branches

# Emerald Ash Borer



**Bell-shaped segments**

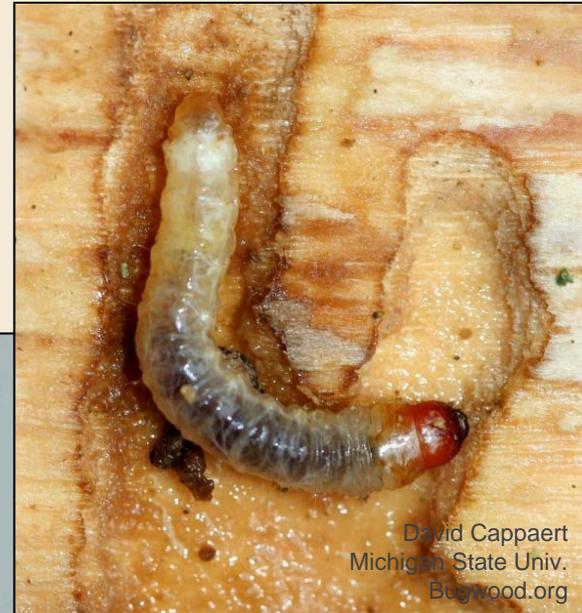
**Zig-zag tunnels**

**Just below bark**



**D-shaped  
1/8 inch**

# Lilac Borer



**Cylindrical with  
amber head**

**Tunnels extend  
deep into wood**

# Lilac Borer

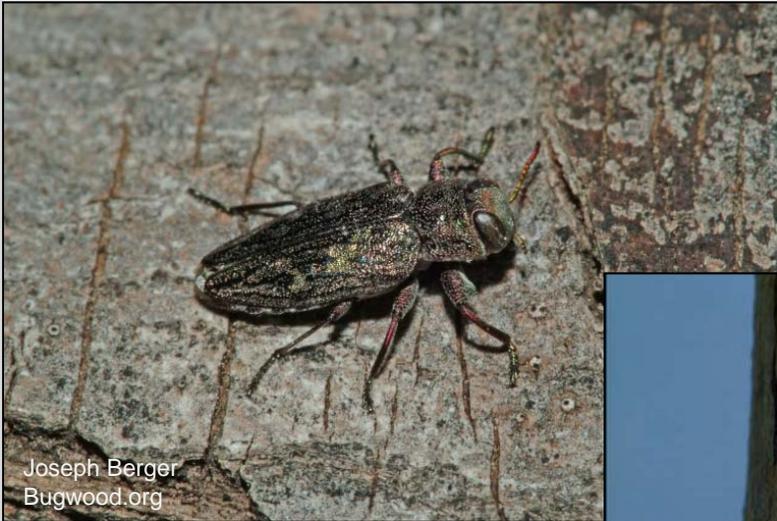


**Round**  
**3/16 - 1/4 inch**



**Pupal skin in exit hole**

# Chrysobothris Borers



Flatheaded apple tree  
borer & related species



James Solomon  
US Forest Service  
Bugwood.org



MH Shour  
Iowa State Univ Extn.

# Chrysobothris Borers



**Irregular winding tunnels  
at surface of wood**

**Pupates in wood**



**Oval  
3/16 inch**

# Carpenterworm



Gerald Lenhard  
Louisiana State Univ.  
Bugwood.org



Elizabeth Beers  
Washington State Univ.  
Bugwood.org



James Solomon  
US Forest Service  
Bugwood.org

UGA3057042

Large, up to 3  
inches long

Pinkish red to  
creamy white

# Carpenterworm



L Stepanek  
NFS

Round  
1/2 inch



Laurie Stepanek  
Nebraska Forest Service



Les Solomon  
Forest Service  
wood.org

UGA3057031

# Roundheaded Borers aka: Longhorned Beetles



Laure Stepanek  
Nebraska Forest Service



Auburn Univ.  
Bugwood.org



Steven Katovich  
US Forest Service  
Bugwood.org



bugwood.org  
Pennsylvania Dept of Conserv. & Nat. Res

**Cylindrical**

redheaded ash borer  
banded ash borer  
ash and privet borer

# Roundheaded Borers aka: Longhorned Beetles



Tunnel deep  
in wood

Firewood



Round  
1/8 inch +



# Ash Bark Beetles



Narrow horizontal and narrower vertical tunnels

# Poor Sites and Drought

- ✓ Ash naturally grow near streams
- ✓ Ash in landscapes/windbreaks often in hot, dry sites
- ✓ Proper watering and mulching can help alleviate stress



Laurie Stepanek  
Nebraska Forest Service

**drought**

# Poor Sites and Drought



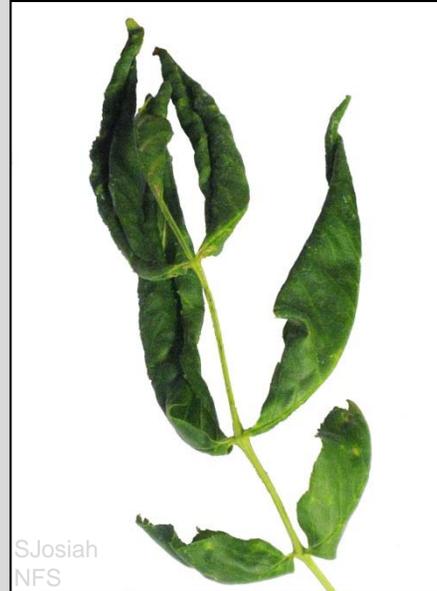
**Concrete**



**Rock  
Weed barrier**

# Herbicide Injury

- ✓ Symptoms:
  - twisted, cupped, curled, stunted leaves
  - defoliation
  - branch dieback
  - tree death



# Herbicide Injury



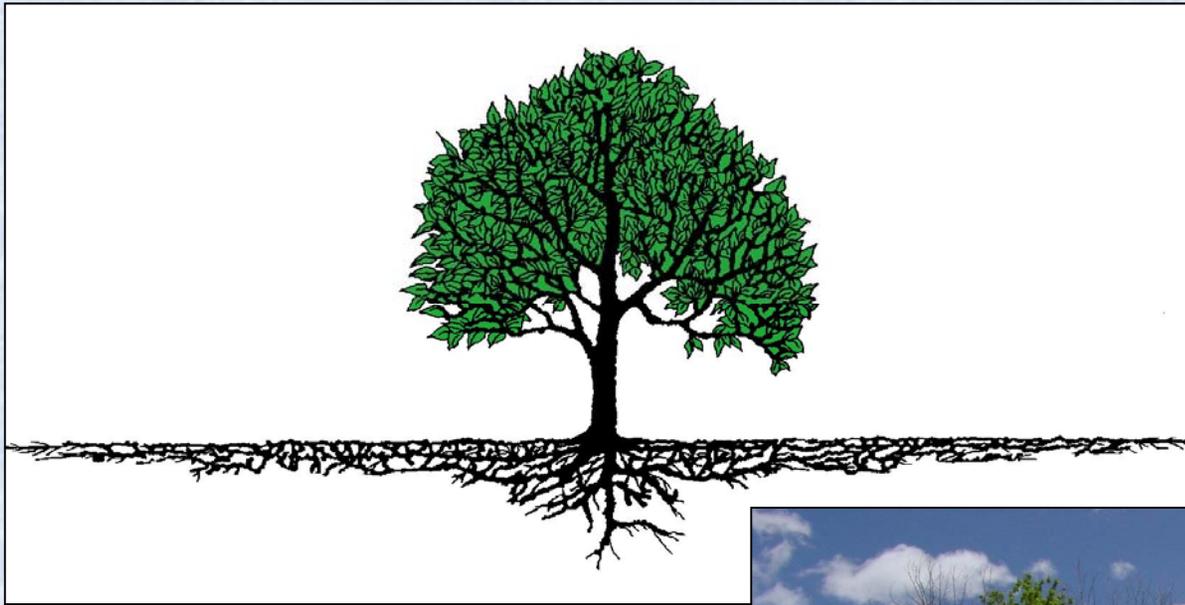
Steven Ramaekers  
Nebraska Tree Works, Inc.

Look for the source!



Steven Ramaekers  
Nebraska Tree Works, Inc.

fencelines  
driveways, sidewalks  
utility boxes and poles  
buildings



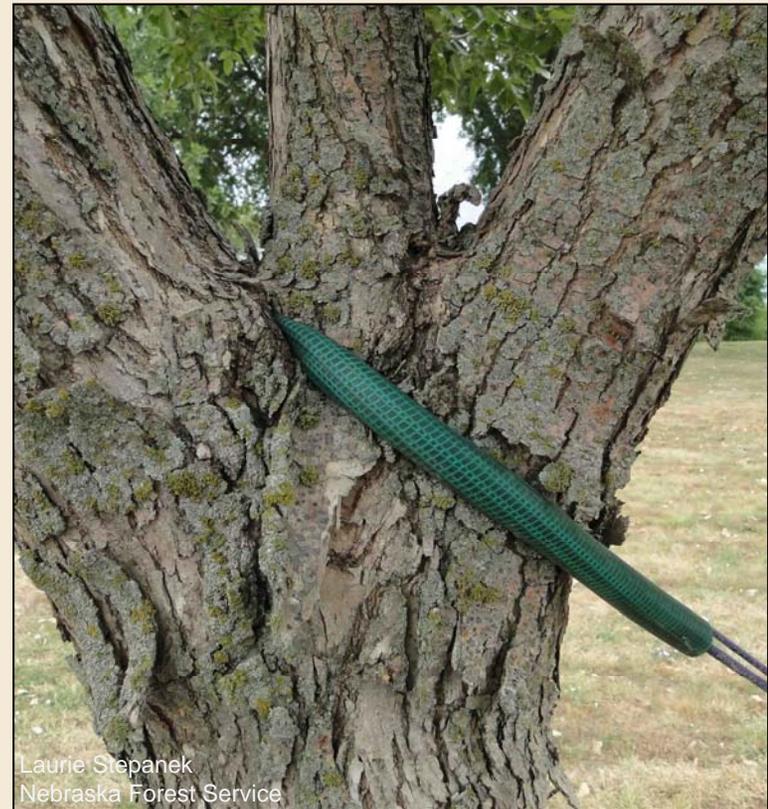
**Some roots extend  
2-3x height of tree**



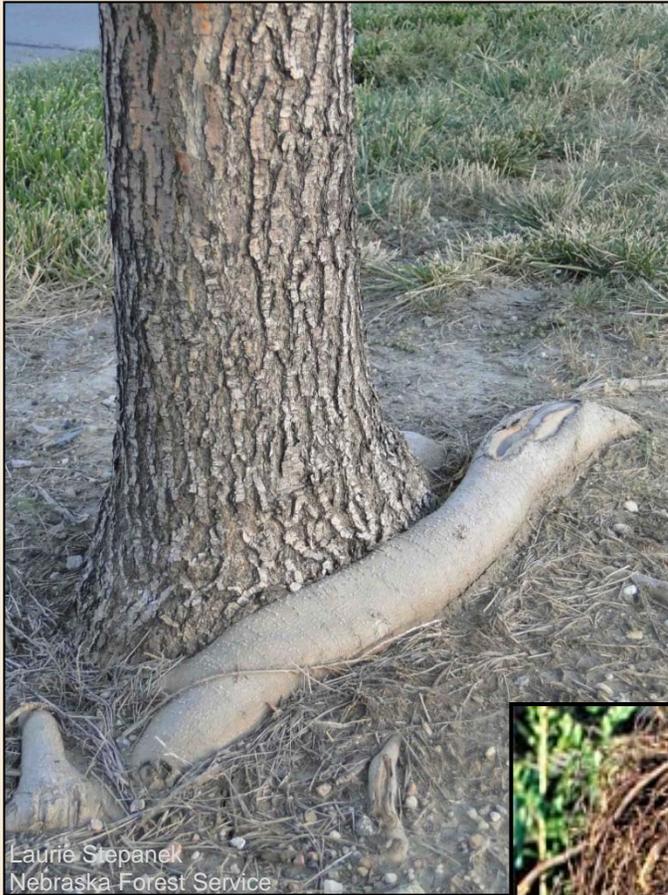
Laurie Stepanek  
Nebraska Forest Service

# Girdling Injury

- ✓ Girdling restricts flow of water, nutrients, sugars



# Girdling Injury



**girdling roots**

# Girdling Injury



# Girdling Injury



“mower blight”

Laurie Stepanek  
Nebraska Forest Service

# Vascular Diseases

✓ Not easy to diagnose

slow growth

sparse foliage

wilting

yellowing

scorching

defoliation

branch dieback

tree death



Iowa State University

**verticillium wilt**

## ash yellows



Joseph O'Brien, US Forest Service,  
Bugwood.org

UGA5042035

# Decays and Cankers



white  
mottled  
heart rot



# Decays and Cankers



**sulfur mushroom**

# Decays and Cankers



hollow stems

pruning cuts



# Minor Ash Pests



Mark Harrell  
Nebraska Forest Service

**ash  
anthracnose**



Iowa State Univ

**ash rust**



Laurie Stepanek  
Nebraska Forest Service

**ash flower gall**

# Minor Ash Pests

ash leaf curl aphid



Whitney Cranshaw  
Colorado State Univ  
Bugwood.org



Whitney Cranshaw  
Colorado State Univ  
Bugwood.org

ash plant bug



Whitney Cranshaw  
Colorado State Univ  
Bugwood.org



University of Nebraska Entomology

# Questions?

**Laurie Stepanek**  
**Nebraska Forest Service**