



Plant Pest Update

Emerald Ash Borer & Japanese Beetle

Carrie Larson

Plant Protection Specialist, NDDA

Commissioner's Weed Forum 2013

Doug Goehring, Agriculture Commissioner

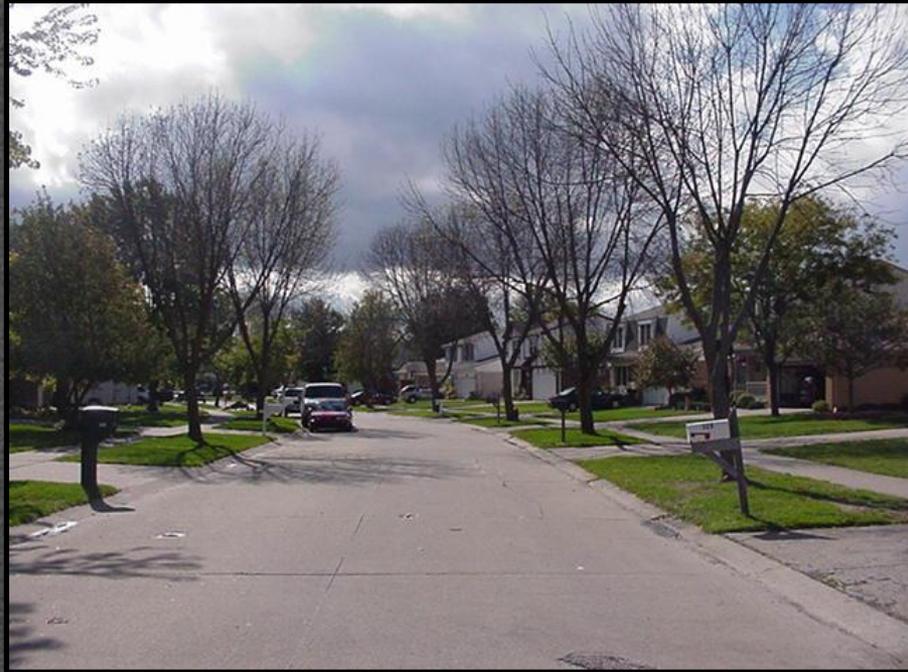
Emerald Ash Borer (EAB)



Agrilus planipennis

- Native to East Asia
- Likely introduced via solid wood packing material
- First detected in Detroit, MI area in 2002
- Established at least 10 years previous

Emerald Ash Borer



- Has killed tens of millions of ash trees in Michigan alone, with tens of millions more lost in IL, IN, KY, NY, OH, PA, VA, WV, WI, MN, IA, KS, MO & Canada.

Emerald Ash Borer



- Cost municipalities, property owners, nursery operators, and forest products industries tens of millions of dollars.

Emerald Ash Borer

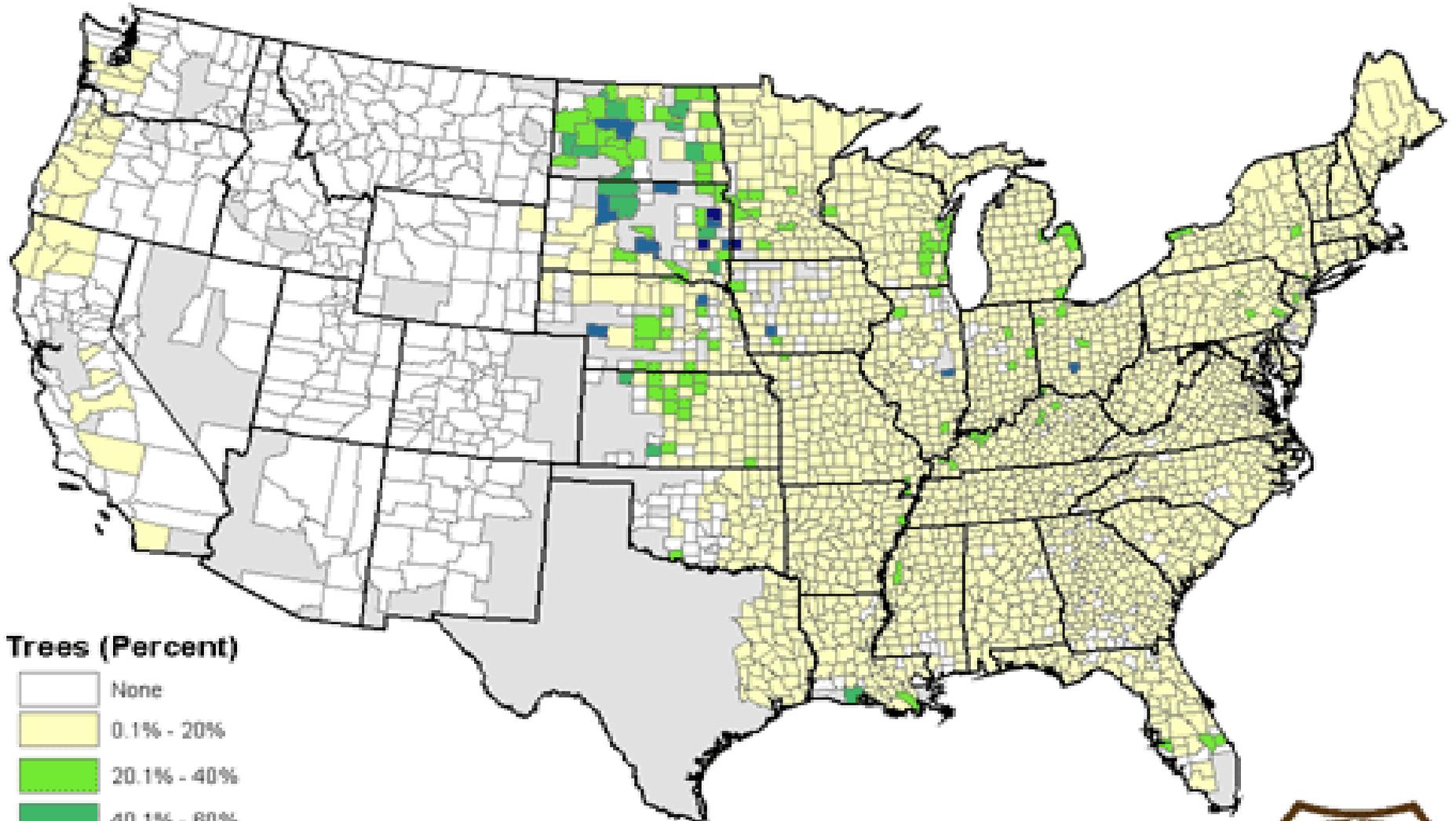
Only attacks ash trees (*Fraxinus* spp.)

- Green ash
- Black ash
- Manchurian ash
- White ash

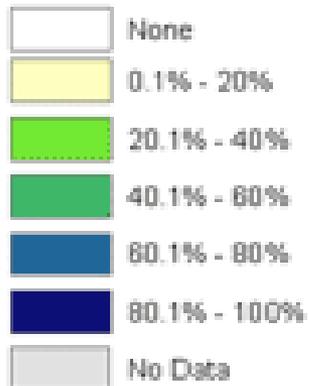


****Including all cultivars**

Emerald Ash Borer Susceptibility - Known Host



Trees (Percent)



Emerald Ash Borer

- Eggs laid on bark



- Immatures feed on cambium under bark
 - Injures trees by destroying phloem
 - Overwinters as larva under the bark

Emerald Ash Borer



- Adults, ~ 1/2" long, emerge in early summer
- Each female lays 60 – 90 eggs
- Usually takes 1 year to complete life cycle
- sometimes 2 years

Emerald Ash Borer

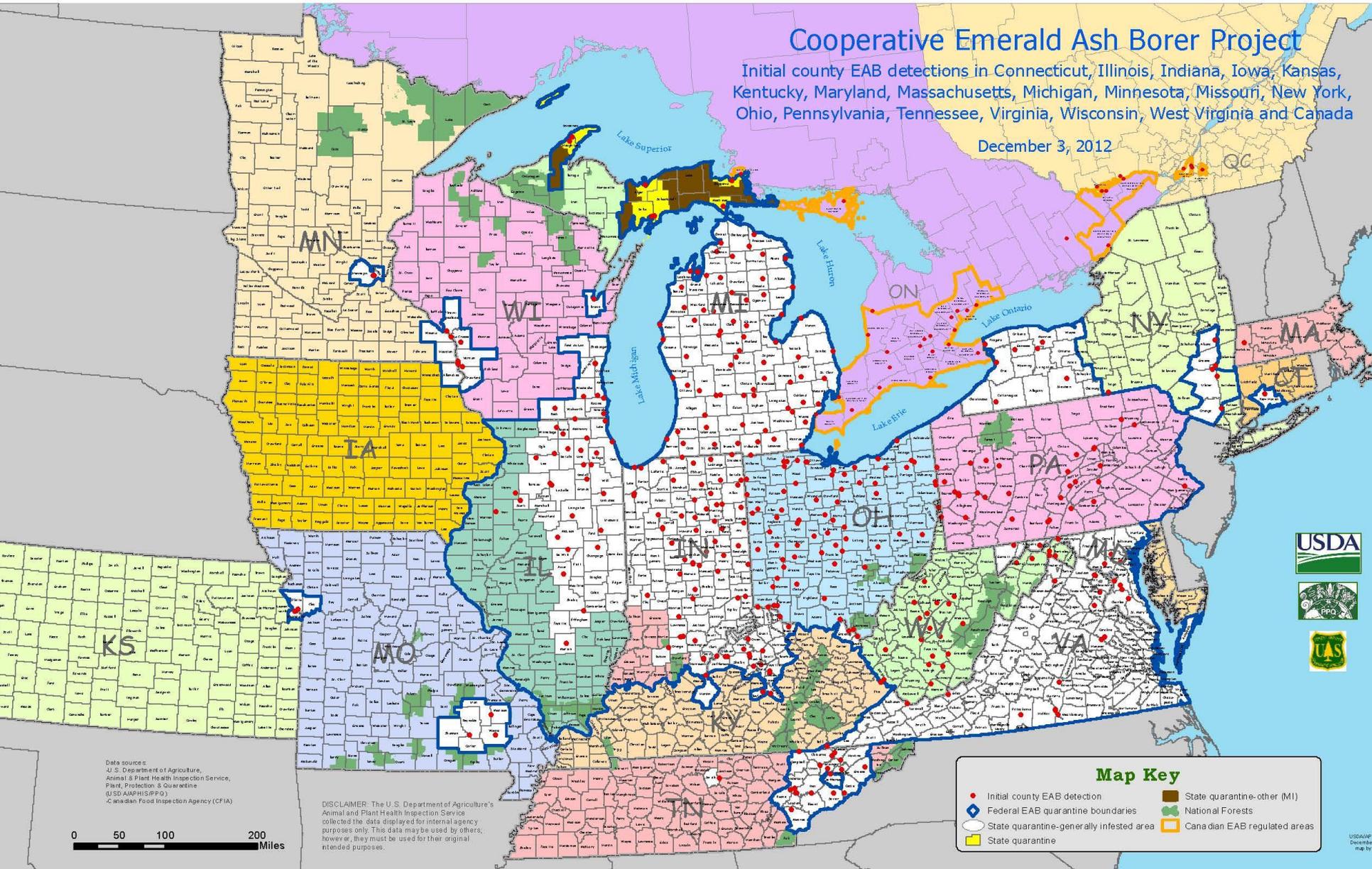
- Infests top 1/3 of tree first
- Subsequent generations progress downward



Cooperative Emerald Ash Borer Project

Initial county EAB detections in Connecticut, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Tennessee, Virginia, Wisconsin, West Virginia and Canada

December 3, 2012



Data sources:
 U.S. Department of Agriculture,
 Animal & Plant Health Inspection Service,
 Plant, Protection & Quarantine
 (USDA/APHIS/PPQ)
 Canadian Food Inspection Agency (CFIA)

DISCLAIMER: The U.S. Department of Agriculture's
 Animal and Plant Health Inspection Service
 collected the data displayed for internal agency
 purposes only. This data may be used by others;
 however, they must be used for their original
 intended purposes.



Map Key

- Initial county EAB detection
- ◆ Federal EAB quarantine boundaries
- State quarantine-generally infested area
- State quarantine
- State quarantine-other (MI)
- National Forests
- Canadian EAB regulated areas

USDA/APHIS
 December 3, 2012

Emerald Ash Borer

- Spreading by:
 - Naturally ~ ½ mile
 - Nursery Stock
 - Firewood
- Infestations are very difficult to detect
 - we are often 5 to 7 years behind

Emerald Ash Borer

Symptoms:

- Thinning canopy beginning in upper third of tree
- Epicormic shoots or “suckers”
- D-shaped exit holes
- S-shaped tunnels from larval feeding
- Vertical splits in bark
- Activity by woodpeckers

EAB - Symptoms

- Thinning canopy starting in upper 1/3 of tree



- Epicormic shoots or "suckers"

EAB - Symptoms

- D-shaped exit holes



- S-shaped tunnels from larval feeding



EAB - Symptoms

- Vertical splits in bark
- Activity by woodpeckers



Other Culprits

- **Mechanical stress**
- **Environmental stress**
 - Too much water
 - Too little water
 - Winter/ cold injury
 - Soil compaction, etc...

Other Culprits - Diseases

- Ash yellows

Witches brooms – all buds growing, sometimes yellow appearance, usually associated with other damage

- Ash decline

- Ash anthracnose



Other Culprits - Insects

- Red headed ash borer



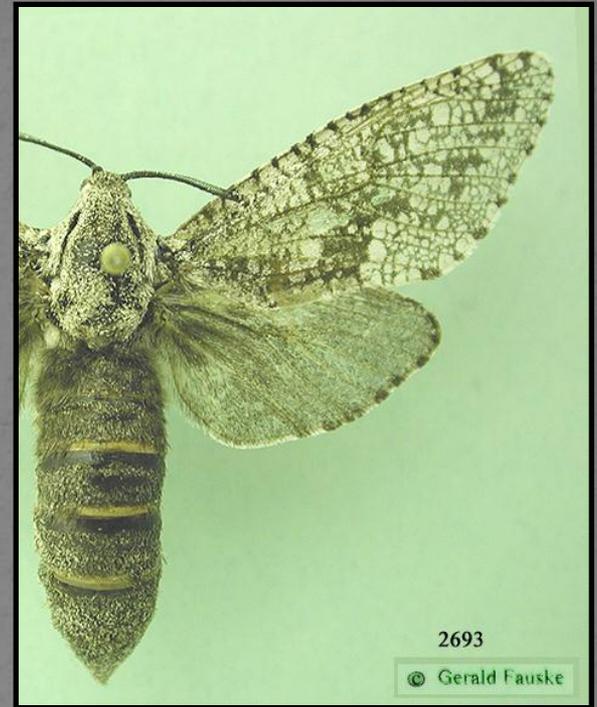
Other Culprits - Insects

- Ash/ lilac borer



Other Culprits - Insects

- Carpenter worms



Other Culprits - Insects

- Bark beetles



Other Culprits - Insects

- Buprestids



Emerald Ash Borer

Sample submission

- Need larvae or adult to confirm
- Send to NDSU Plant Diagnostic Lab
(701)-231-7854

Emerald Ash Borer

What's being done?

- Research conducted at universities to understand the beetle's life cycle and find ways to detect new infestations, control EAB adults and larvae, and contain the infestation.
- Quarantines are in place to prevent infested ash firewood, logs, or nursery trees from being transported and starting new infestations.

More information can be found
at www.nd.gov/ndda
or www.emeraldashborer.info

National EAB Survey

Purple Prism Trap

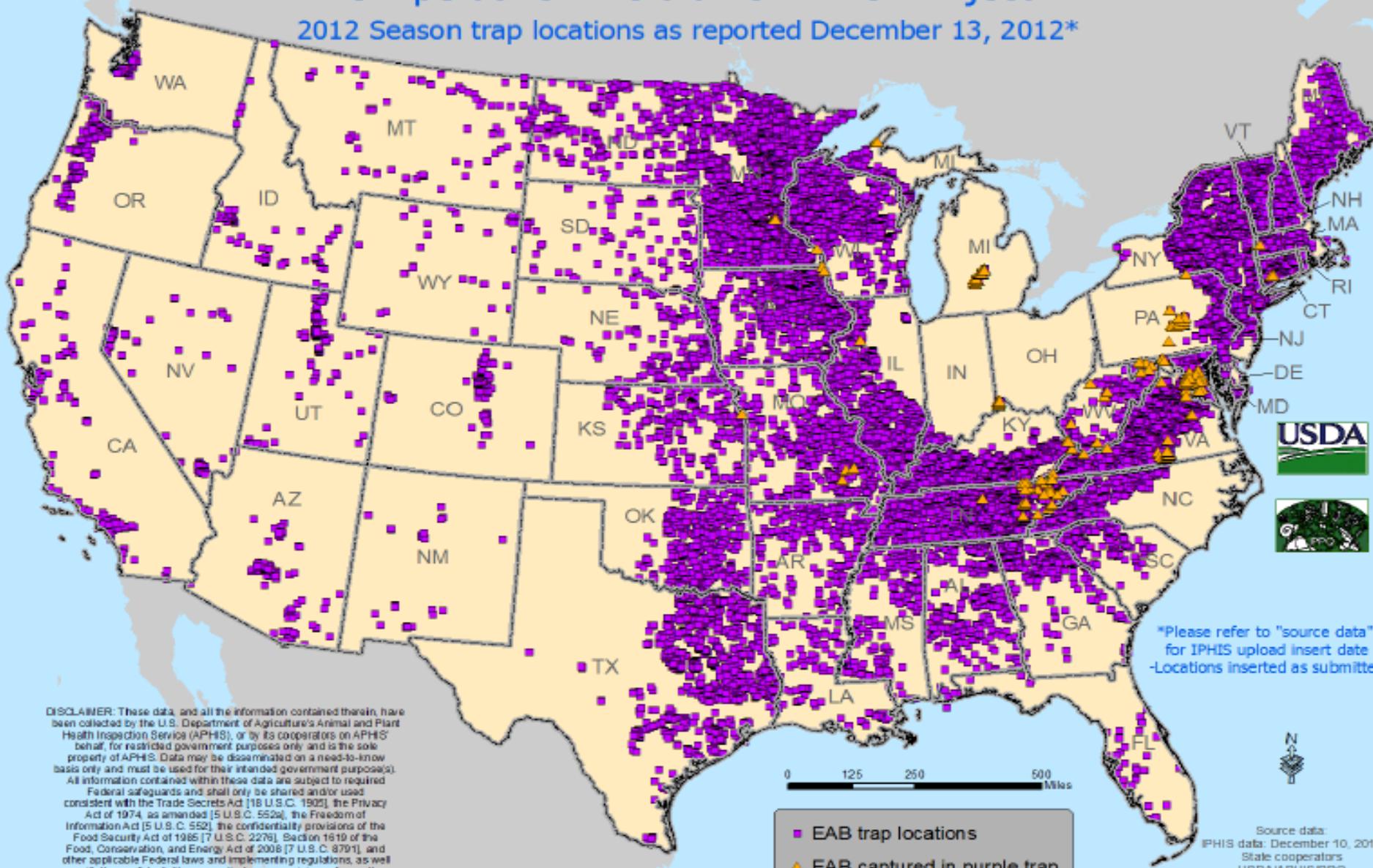
- Manuka oil and Z-3-hexenol lures contains ash bark volatiles attractive to adult EAB males and females
- Sunny side of tree more effective
- Placement high in tree more effective
- Tanglefoot to capture adults



***North Dakota hung 393 traps in 2012**

Cooperative Emerald Ash Borer Project

2012 Season trap locations as reported December 13, 2012*



DISCLAIMER: These data, and all the information contained therein, have been collected by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), or by its cooperators on APHIS' behalf, for restricted government purposes only and is the sole property of APHIS. Data may be disseminated on a need-to-know basis only and must be used for their intended government purpose(s). All information contained within these data are subject to required Federal safeguards and shall only be shared and/or used consistent with the Trade Secrets Act [18 U.S.C. 1905], the Privacy Act of 1974, as amended [5 U.S.C. 552a], the Freedom of Information Act [5 U.S.C. 552], the confidentiality provisions of the Food Security Act of 1985 [7 U.S.C. 2276], Section 1619 of the Food, Conservation, and Energy Act of 2008 [7 U.S.C. 8791], and other applicable Federal laws and implementing regulations, as well as with the confidentiality or non-disclosure provisions of any other agreement entered into between APHIS and a cooperator.

*Please refer to "source data" for IPHIS upload insert date
-Locations inserted as submitted

- EAB trap locations
- ▲ EAB captured in purple trap

Source data:
IPHIS data: December 10, 2012
State cooperators
USDA/APHIS/PPQ
December 10, 2012
Map author: dlopp

National EAB Survey - 2013

- Purple prism traps will be used again in 2013
- North Dakota was assigned 526 locations to trap by the USDA Forest Service and their Forest Health Technology Enterprise Team.



If EAB detected in North Dakota

- APHIS quarantine authority
 - Interstate quarantine authority
 - If state doesn't implement intrastate quarantine then APHIS may quarantine entire state
- State quarantine authority
 - Intrastate quarantine authority

If EAB detected in North Dakota

- Quarantine would immediately be placed
- Boundary to be determined after consultation
- Delimiting survey initiated (APHIS, NDDA, NDFS)
- Notification of citizens by various media
- Investigation to attempt to determine origin
- Trace forward inspections of any host material that left area

Possible Control Tactics

- Prompt removal & disposal of infested trees prior to adult emergence.
- Selective use of Insecticides:
 - **Emamectin benzoate (Tree-age)** - early studies have shown 2 years of near 100% control. In 2012 cost was \$5.87 per inch. This treatment is recommended for larger diameter trees.
 - **Imidacloprid** – This is applied as a soil drench and cost is \$1.01 per inch in 2012. This treatment is recommended for smaller diameter trees and must be applied annually.
 - **Safari (Dinotefuran)** – This is applied as a soil drench and cost is \$2.99 per inch in 2012.

*** APHIS Guidelines ***

- Management action (i.e. tree removal) would only be considered when infestation is:
 - Small & isolated
 - (e.g. Single clearly identifiable regulatory incident where point of introduction clearly identified)
 - Detected early (i.e. < 2 years old)
 - Deemed eradicable by an EAB Management Team (or strategically important for slowing the spread).

Possible Control Tactics

- Phloem reduction – Removing large trees may be most effective.
- Regulatory component – quarantines would still be used to prevent/reduce spread.
- Public outreach
- Biological Control?



Biological Control?

- Foreign searches: China, Mongolia, Japan, Korea, Russia (Haack et al 2002)
- Three lead horses.
 - *Spathius agrili* (Hymenoptera: Braconidae)
 - *Tetrastichus planipennisi* Yang (Hymenoptera: Eulophidae)
 - *Oobius agrili* Zhang and Huang (Hymenoptera: Encyrtidae)

Community Preparedness Planning

- “Since control options to eradicate or prevent spread are not effective at this time, it is recommended that communities take action to prepare for an infestation of emerald ash borer.”

Emerald Ash Borer

We are so concerned because:

- We have a lot to lose
- Hard to find and diagnose
- Firewood movement
- Funding down

Don't Move Firewood. Use Local Sources.

More information can be
found at

www.agdepartment.com or
www.emeraldashborer.info

***Emerald Ash Borer
University***



An amazing
resumé Mr Borer.
When can you
start?

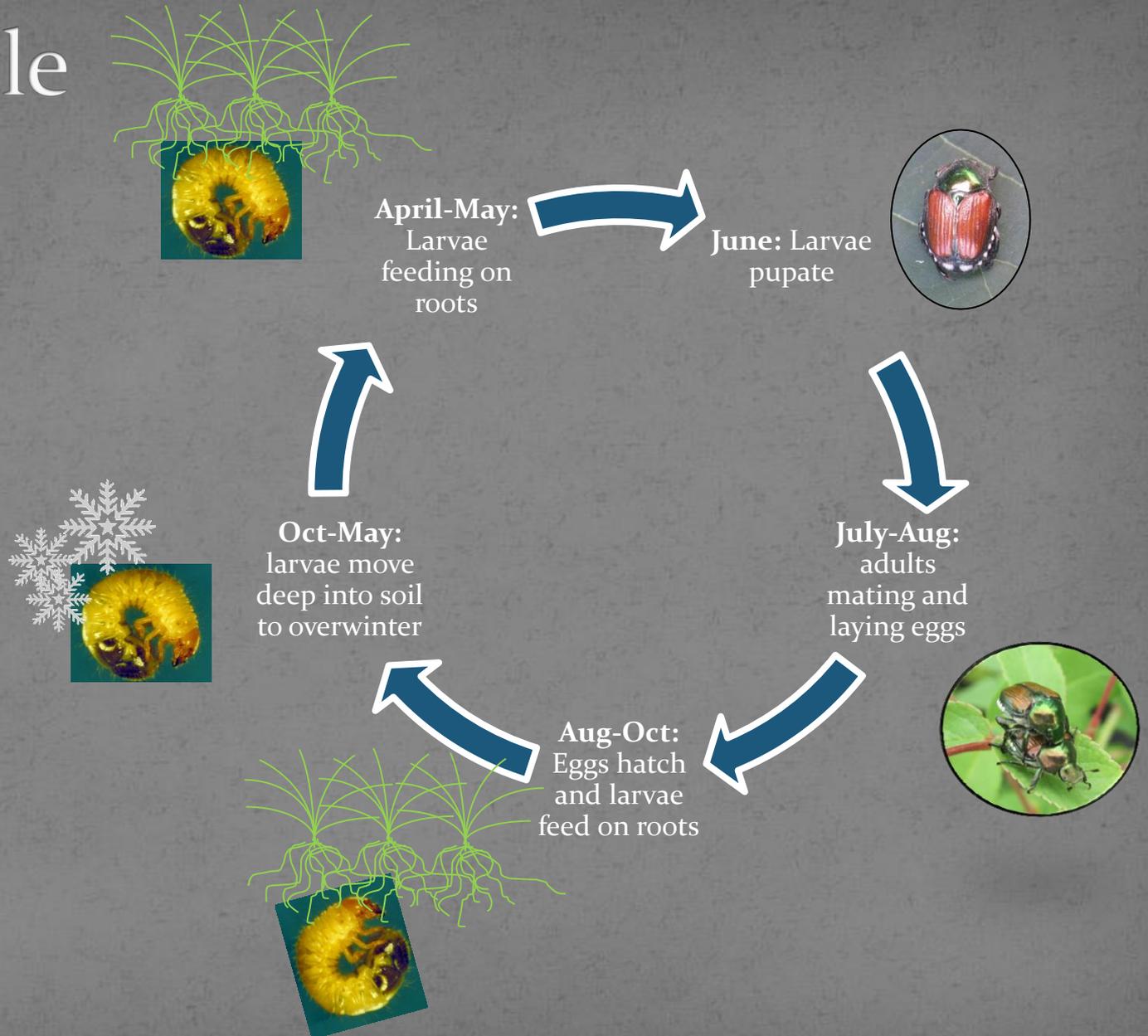
<http://home.golden.net/~samu>

Japanese Beetle - History

- Native to Japan → not a major pest there
- First found in US in 1916 in New Jersey
- Canada-1939
- No beetles detected in North Dakota since 2001
- August 2012, Japanese beetles discovered on incoming nursery stock



Life cycle



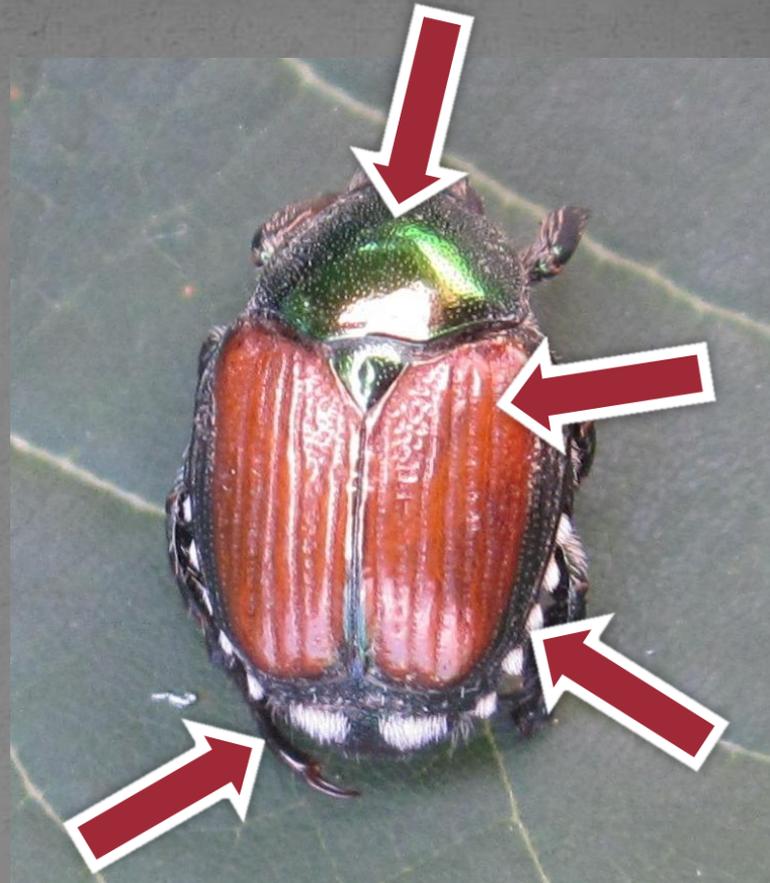
Damage

- Adults feed on foliage of over 300 plant species
 - Including soybean, corn, roses, elm and crabapple
- Larvae feed on roots of grasses



Adult Identification

- 3/8 inch long
- Metallic green
- Bronze wing coverings
- White tufts of hairs along sides and at the tip of the abdomen



Look-Alikes



Sturgis McKeever, Georgia Southern University, Bugwood.org



Pennsylvania Department of Conservation and Natural Resources - Forestry Archive, Bugwood.org

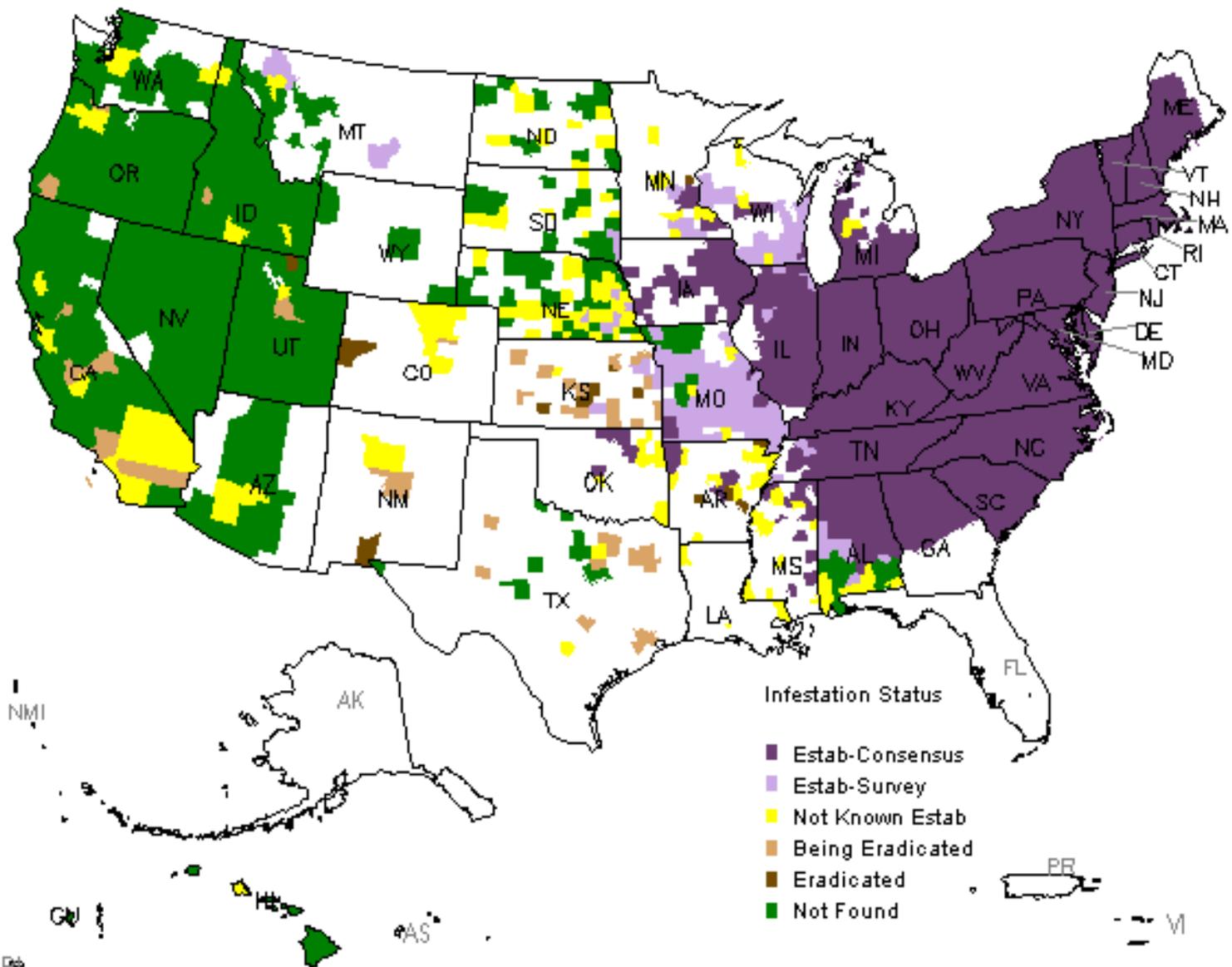


A. Steven Munson, USDA Forest Service, Bugwood.org

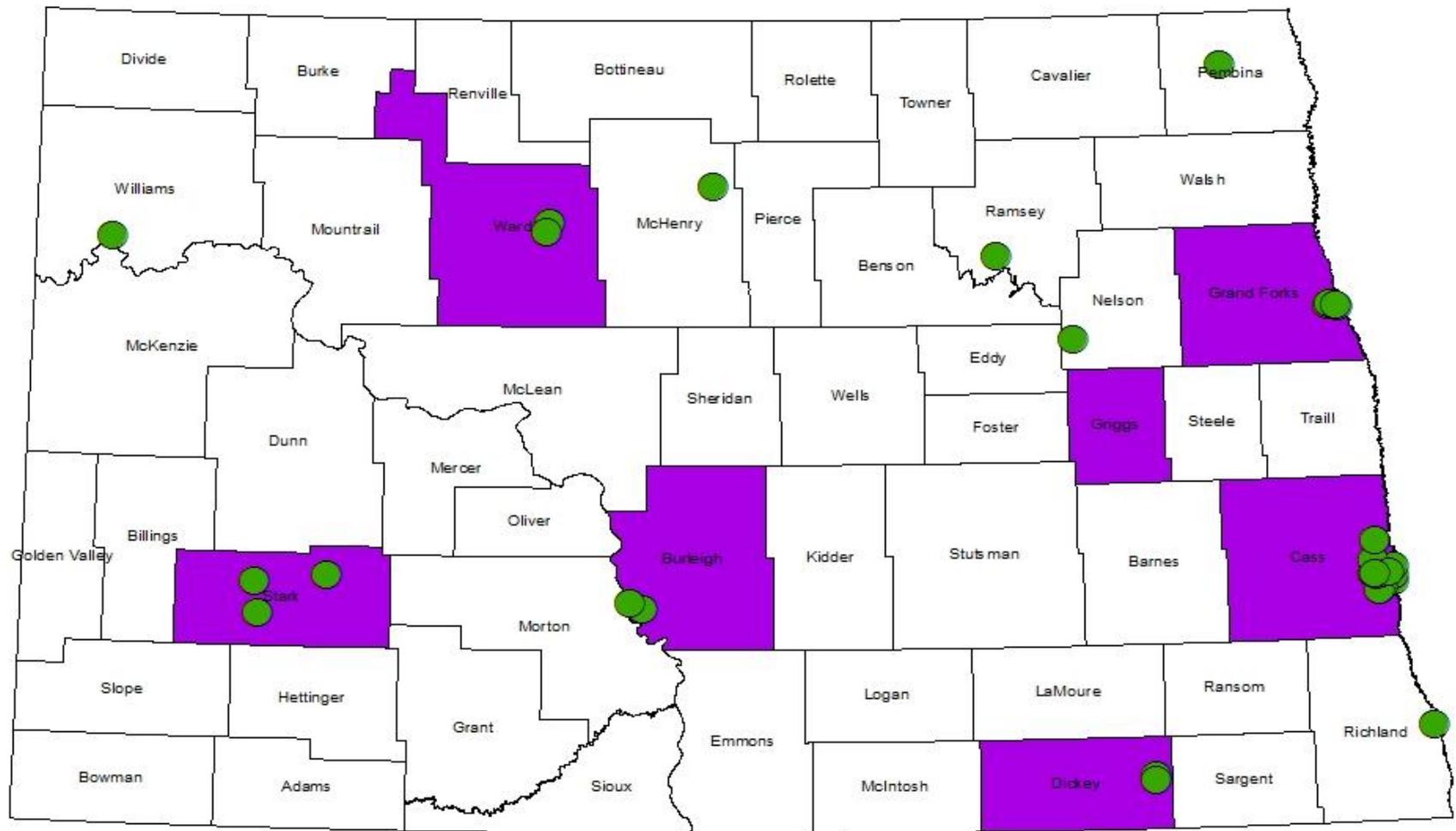


Susan Ellis, Bugwood.org

Map of current spread



2012 Japanese Beetle Trapping



 Japanese Beetle trap locations

 Counties with a Japanese beetle positive detection

Survey 2013 Plan

- Trap approximately half the nurseries in the state that sell woody plant material
- Trap various parks and golf courses



Questions?