

Invasives Make Bad Neighbors

Manage, Prepare, and Prevent the Spread of Invasive
Plants and Pests

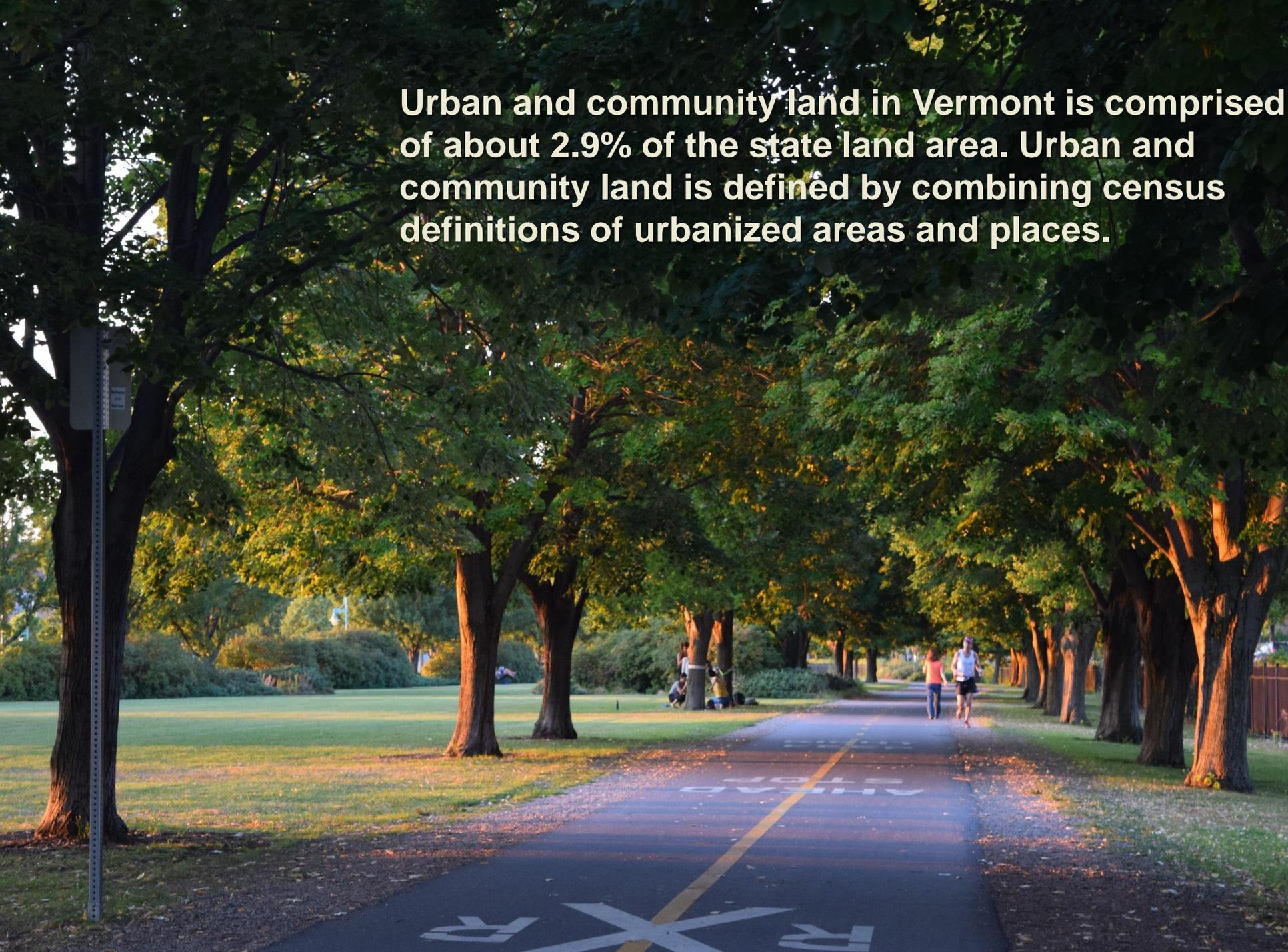
Meredith Whitney, VT UCF

Elizabeth Spinney, VT FPR





Urban and community land in Vermont is comprised of about 2.9% of the state land area. Urban and community land is defined by combining census definitions of urbanized areas and places.



The 11.9 million urban and community trees in Vermont provide an annual value of \$68 billion from services such as filtering air, capturing rainwater, cooling our homes, and increasing our property values.



Benefits of Urban Trees



American Journal of Preventive Medicine

Volume 44, Issue 2, February 2013, Pages 139–145



Research article

The Relationship Between Trees and Human Health: Evidence from the Spread of the Emerald Ash Borer

Geoffrey H. Donovan, PhD^a,  , David T. Butry, PhD^b, Yvonne L. Michael, ScD^c, Jeffrey P. Prestemon, PhD^d, Andrew M. Liebhold, PhD^e, Demetrios Gatzliolis, PhD^a, Megan Y. Mao^a

^a Pacific Northwest Research Station, U.S. Department of Agriculture Forest Service, Pacific Northwest Research Station, Portland, Oregon

^b National Institute of Standards and Technology, Gaithersburg, Maryland

^c Department of Epidemiology and Biostatistics, Drexel University, Philadelphia, Pennsylvania

^d U.S. Department of Agriculture Forest Service, Southern Research Station, Research Triangle Park, North Carolina

^e Northern Research Station, U.S. Department of Agriculture Forest Service, Morgantown, West Virginia

More than 282 arthropods (insects and spiders) depend on North American ash trees for food and shelter. At least 44 species of arthropods feed exclusively on ash.



Toledo, Ohio



2006 (Before EAB)



2009 (After EAB)

◎ Burlington: 1,000 ash trees ROW.

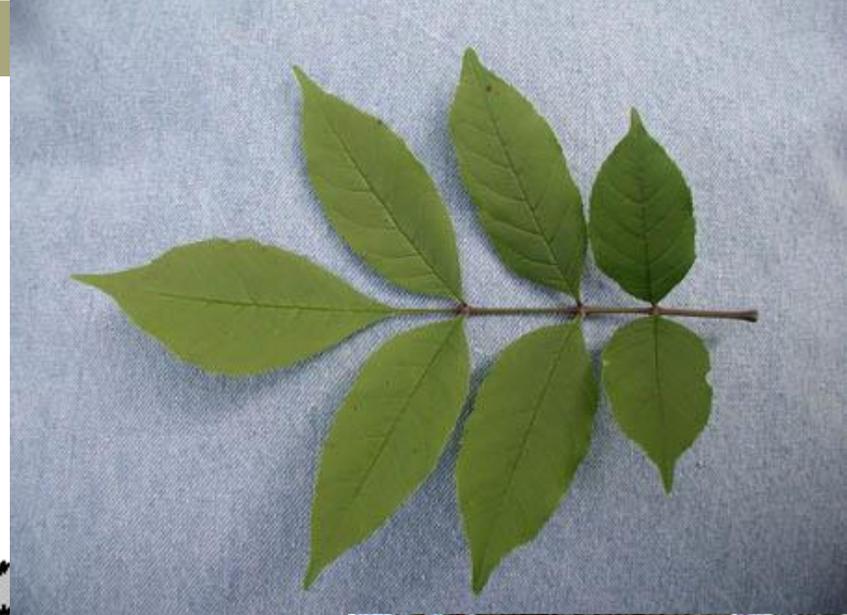
Remove and Replace: **\$500,000**

◎ Johnson: 440 ash trees along back roads

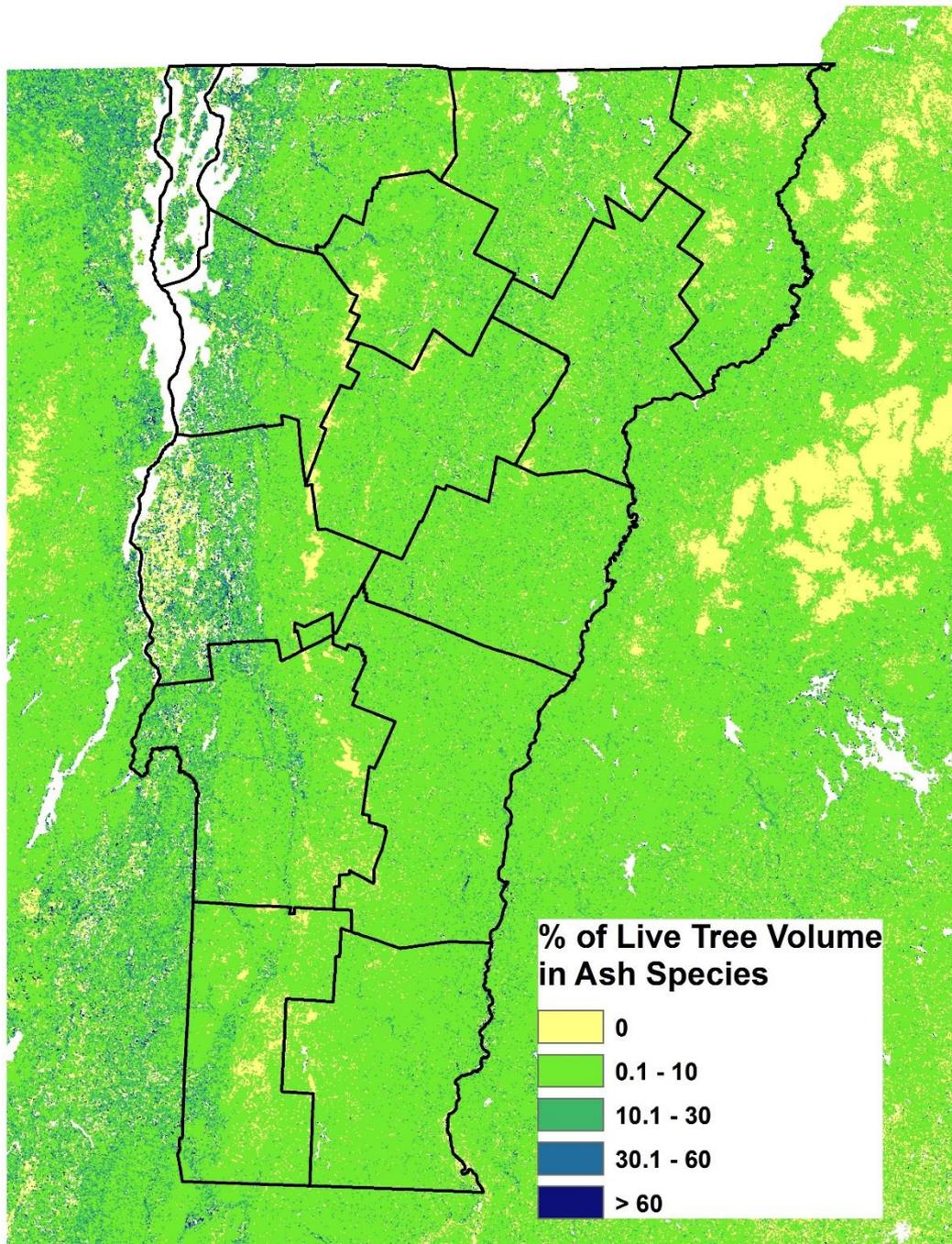
Removal: **\$132,000**



Ash Trees



1 in 12 trees in
Vermont are ash



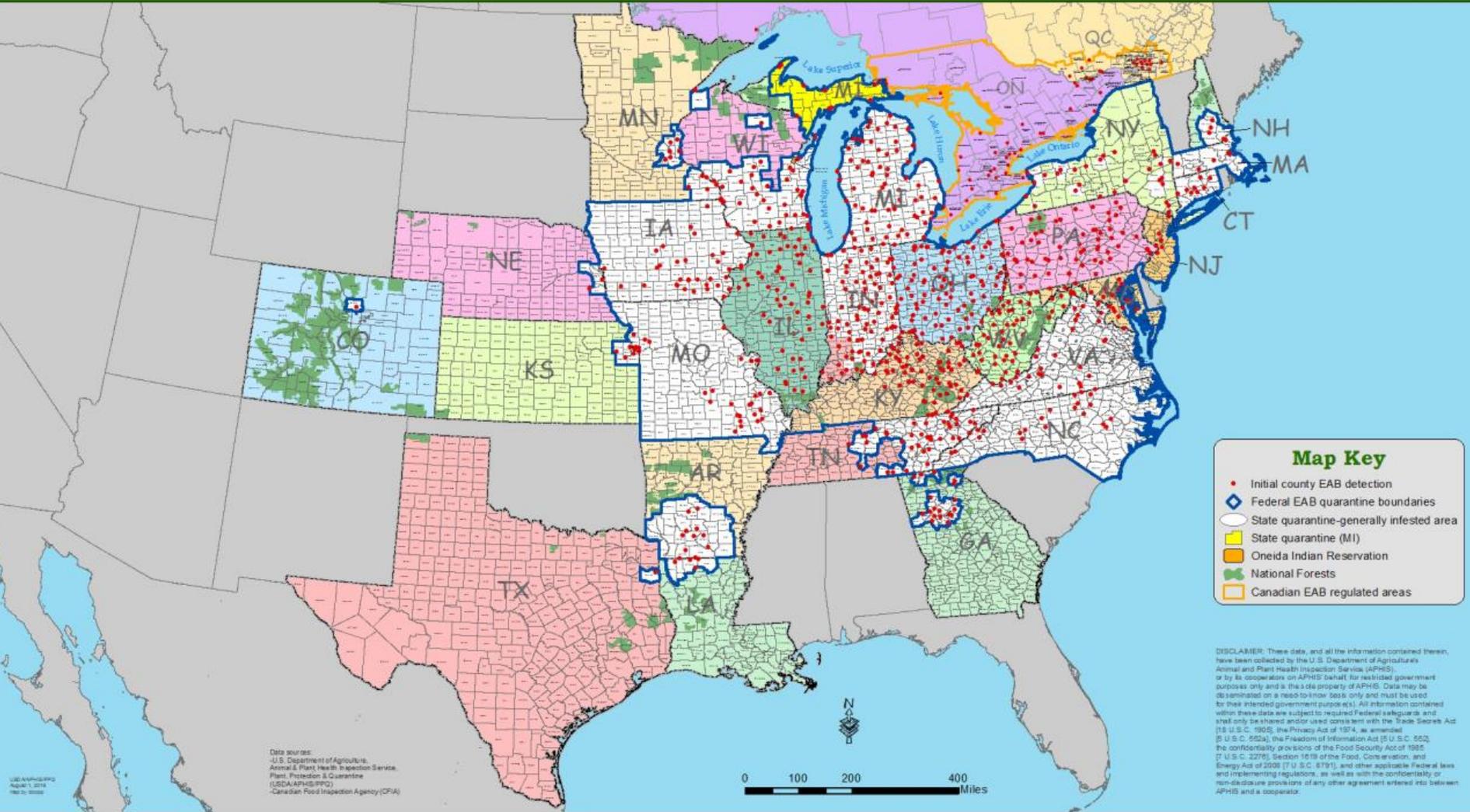


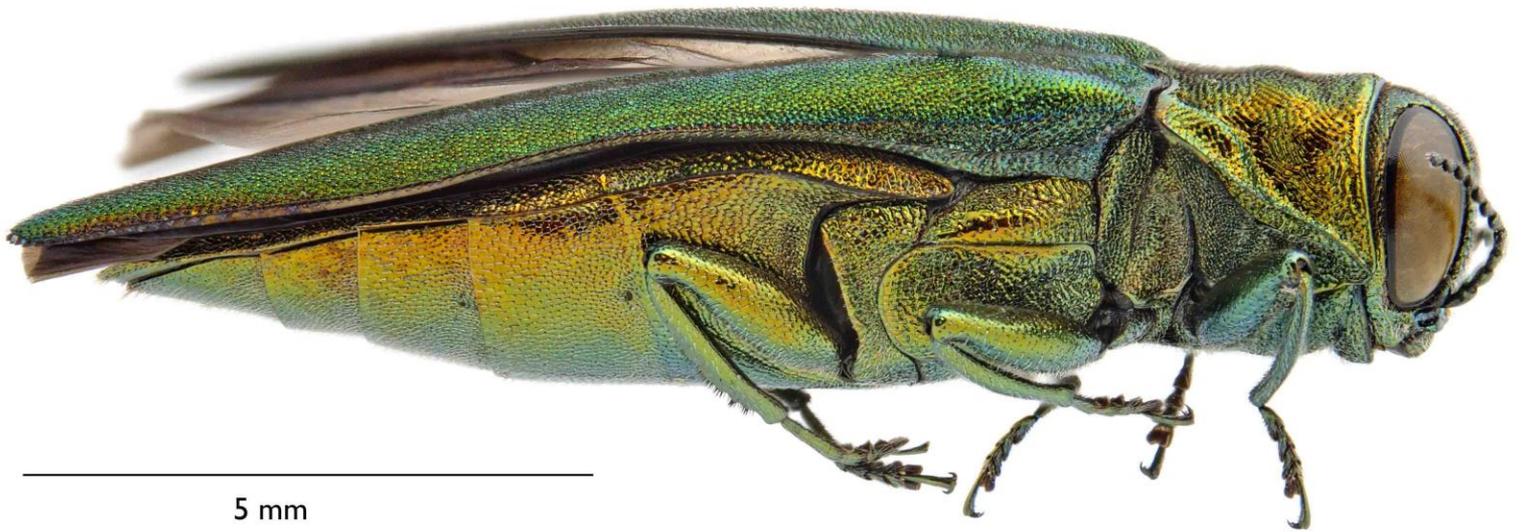
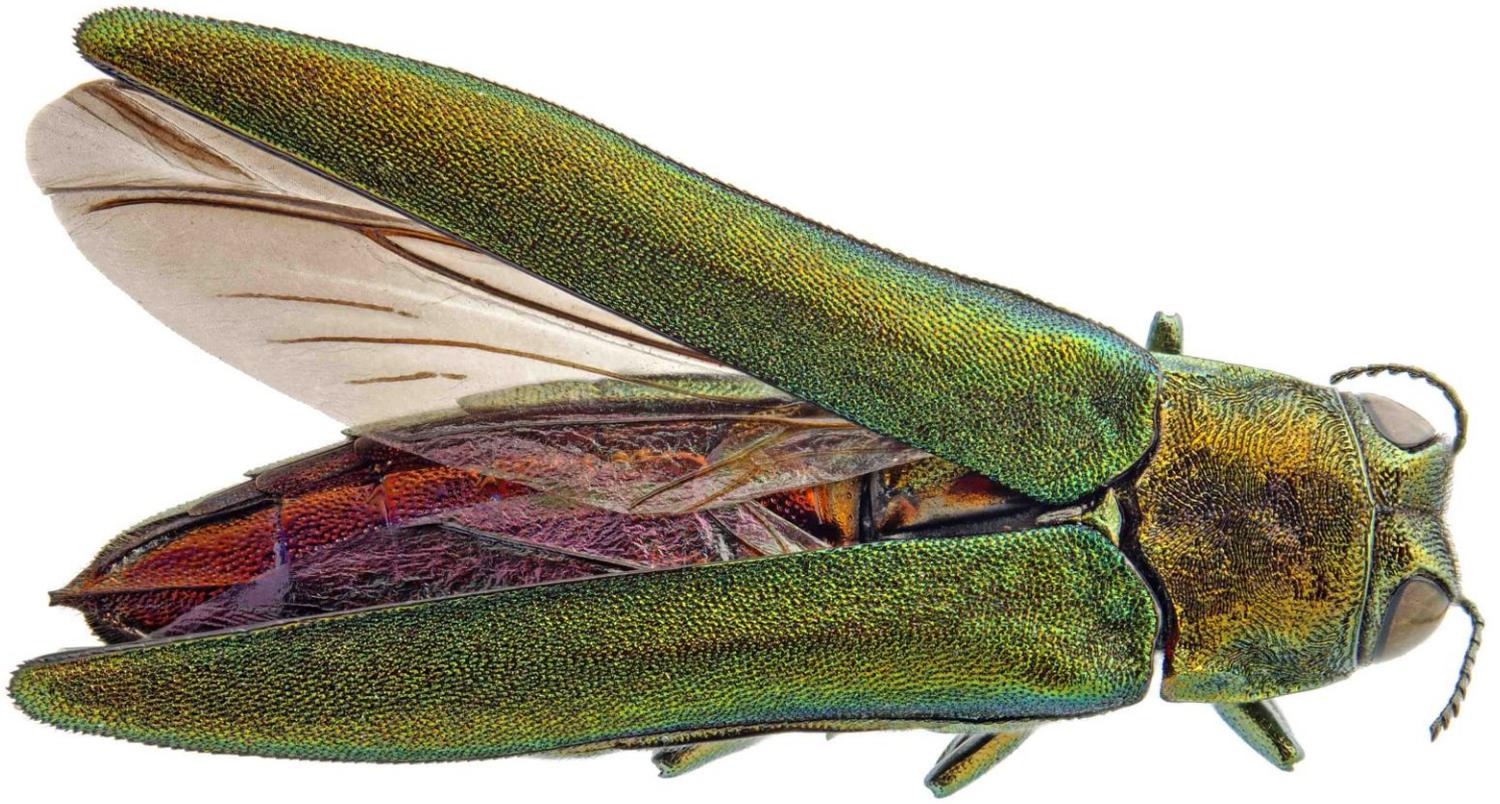


Cooperative Emerald Ash Borer Project

Initial county EAB detections in North America

August 1, 2016



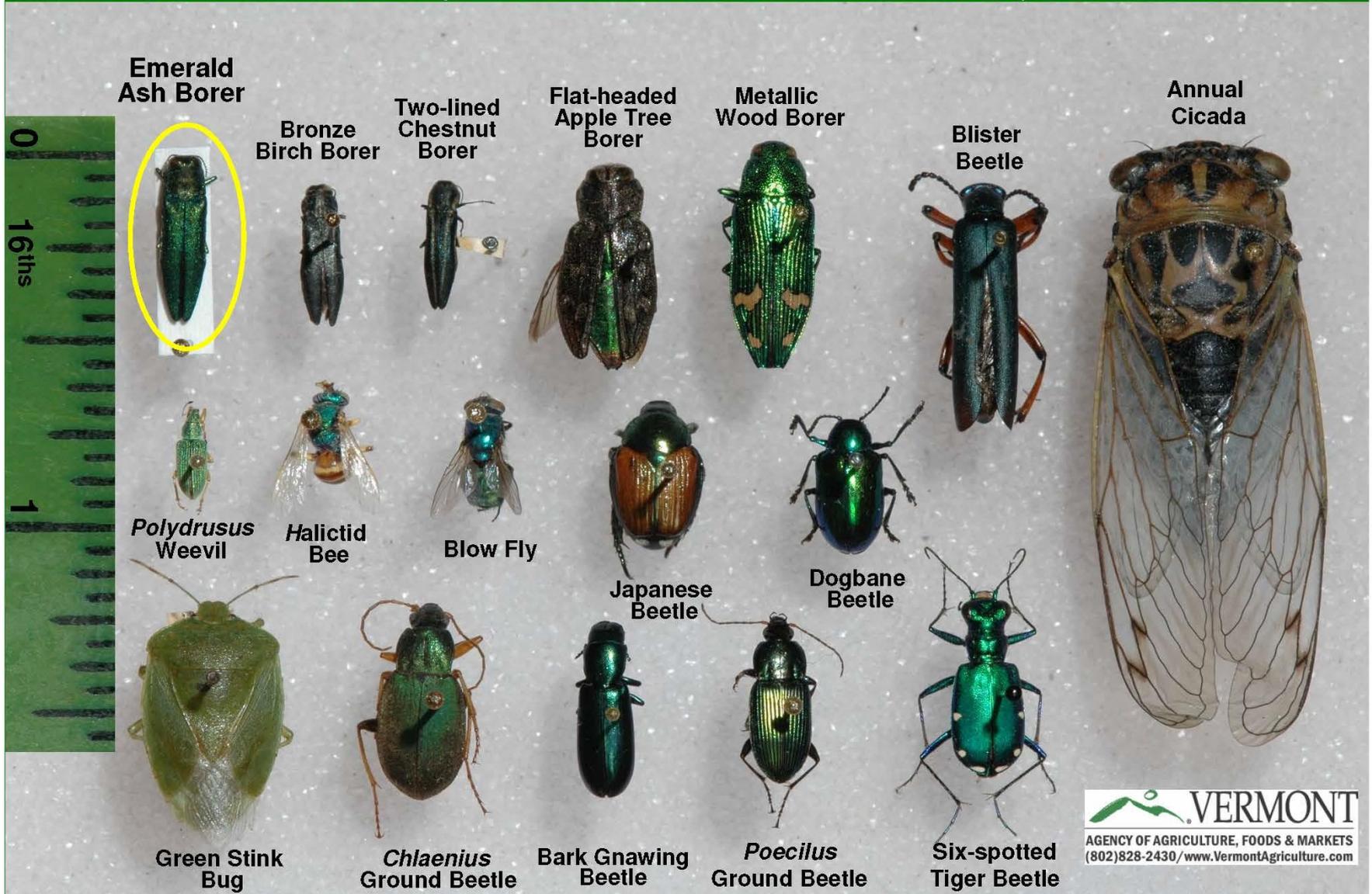


5 mm

Photo by
Kent Loeffler,
Cornell University

Insects in Vermont that may be confused with Emerald Ash Borer

Adapted from Jeff Hahn, University of Minnesota Extension and Val Cervenka Minnesota Dept. of Natural Resources





June/July
Oviposition



Summer/Fall
Larval growth



1-Year Life Cycle

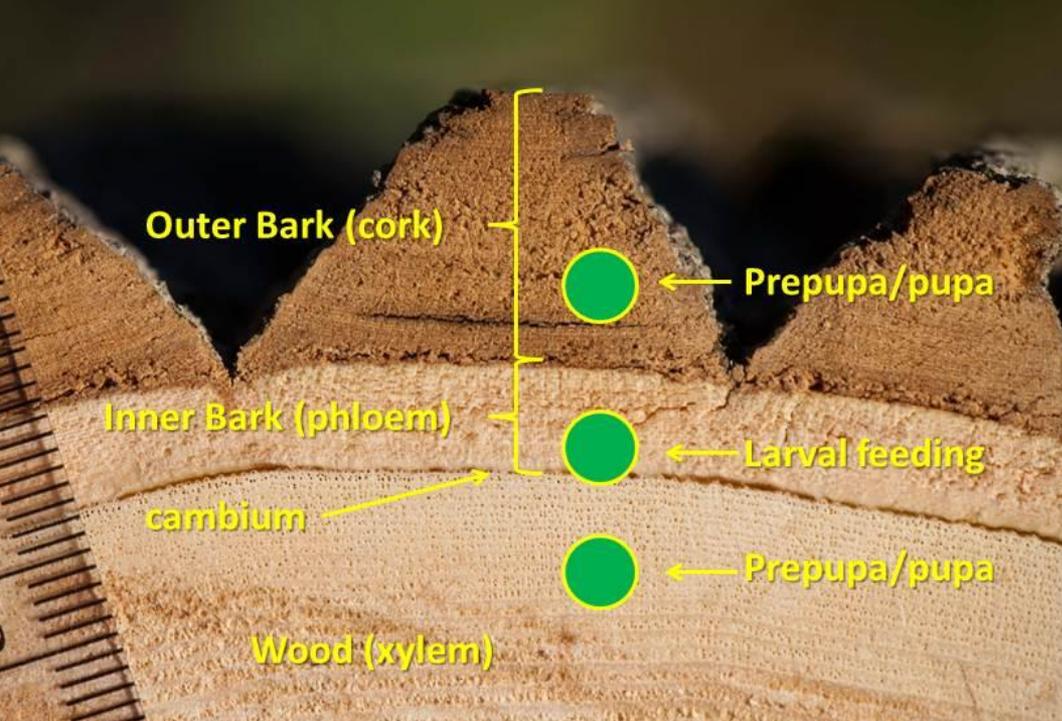
May/June
Adult Emergence
Ovary maturation

Winter
Pre-pupae



Early spring
Pupation









Bark splitting



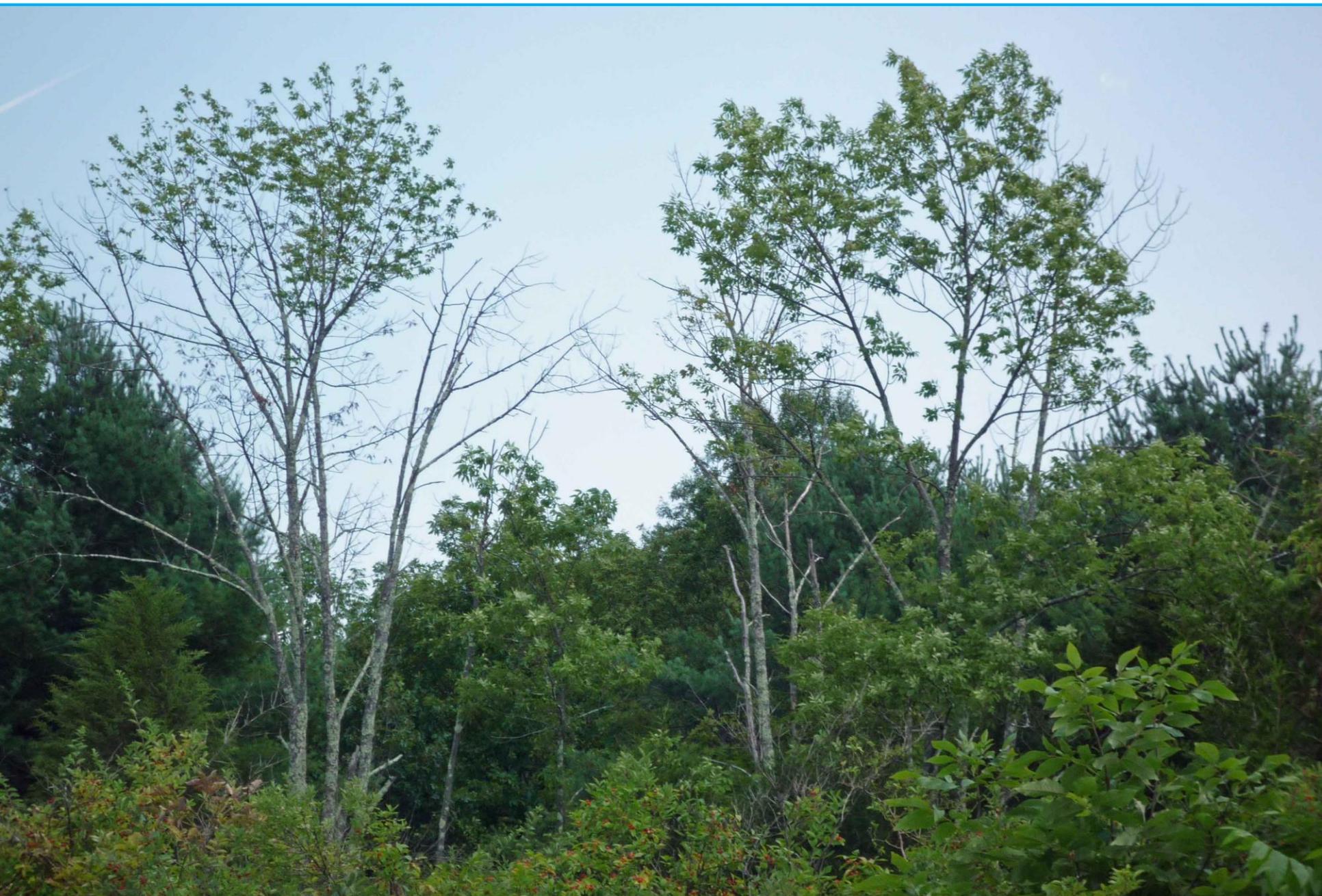
Woodpecker Flecking



Epicormic, or water sprouts



Canopy Thinning





Questions?

Creating a Pest Preparedness Plan



**Emerald Ash Borer Preparedness Plan
for Bakersfield, Vermont**



**Bakersfield Conservation Commission
May, 2014**

Why Plan Ahead at a Municipal Level:



Who Writes the Plan?



Ask Yourself These Questions:

- Are your ash trees identified?
- Who owns them?
- Whose responsibility is it to treat or remove potentially risky ash trees?

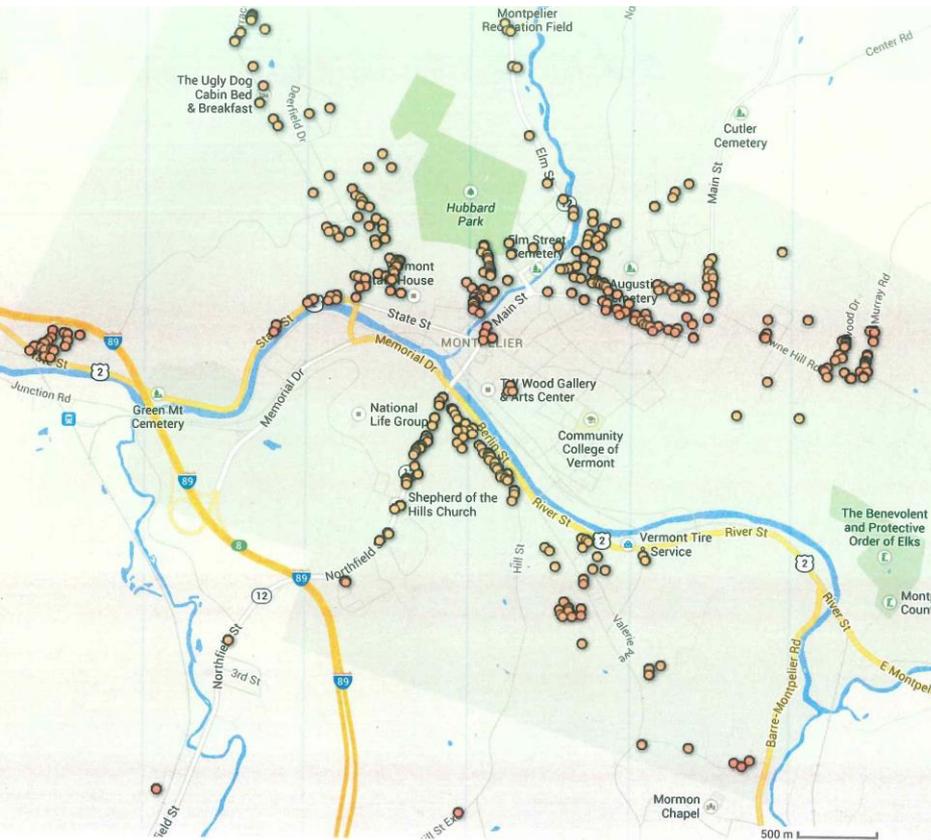


Inventory

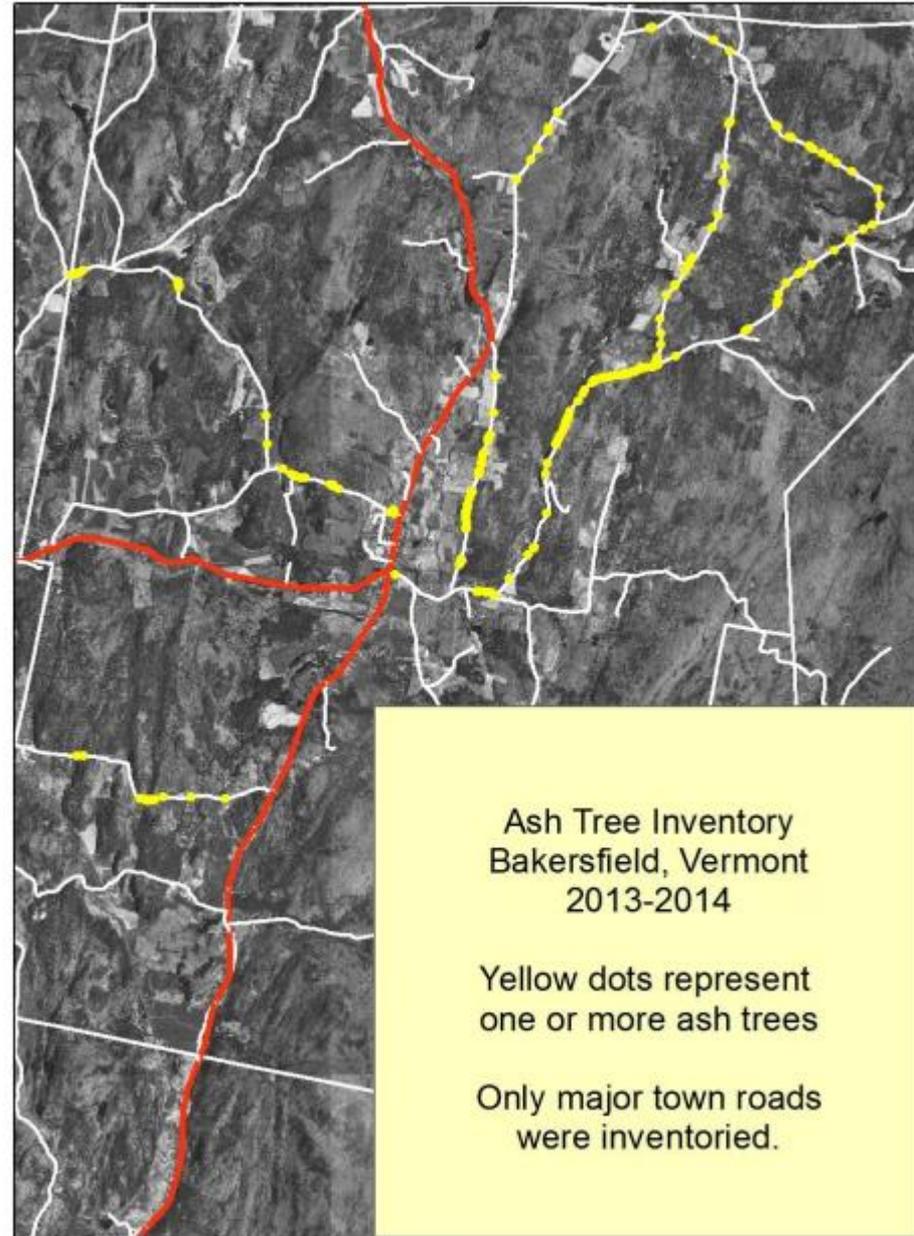
An inventory will tell you:

- How many trees you have
- Condition of trees
- Identify any candidates to preserve using insecticides
- How to direct your management activities





Montpelier



**Ash Tree Inventory
Bakersfield, Vermont
2013-2014**

Yellow dots represent
one or more ash trees

Only major town roads
were inventoried.

Management Options

- **Do nothing**
 - Liability issues
- **Remove all ash before they become infested**
 - Loss of valuable canopy
- **Remove ash as they become infested**
 - Expensive reactive management – potential exposure to liability
 - More dangerous (and expensive) to remove dead trees than live ones
- **Treat with insecticides**
 - Retain canopy
 - Many management options available with more time

Emerald Ash Borer Cost Calculator

PURDUE
UNIVERSITY

Welcome to the Emerald Ash Borer Cost Calculator 3.0

The calculator has been redesigned to help you and your community understand why it is more economical to protect ash trees than to replace them. This version is driven by an EAB [invasion wave model](#) that assumes it takes 8 years from the time EAB is detected in your city until all the untreated ash can no longer be saved with a [pesticide application](#). In this new version you can:

- [Stage](#) your response to an EAB invasion based on the percentage of ash trees that have lost more than 30% of their canopy.
- Evaluate management plans that reduce the frequency of ash treatment after the initial wave of EAB has passed through your forest.
- Compare the annual and cumulative costs and the size of the remaining forest over a 25 year period for ANY management strategy that includes a mixture of tree removal, replacement, and insecticide treatment.
- Generate and share electronic and printed reports of projected costs of up to 3 management strategies at a time.

To run the calculator you will need:

- An inventory of the number and size of ash trees
- An estimate of costs for removing and treating trees based on the size of each tree.
- An estimate of costs for replacing each ash tree that is removed.

Find out how saving trees can be more cost effective by:

- Using the DEMO forest (1600 ash trees) to compare the costs of replacing ash trees as they die, proactive ash removal, and saving larger trees (DBH > 12").

eabindiana.info

Emerald Ash Borer Cost Calculator

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[Instructions](#)

[Forests](#)

[Input](#)

[Comparisons](#)

[About EAB Calculator](#)

[Contact Us](#)

[Tutorials](#)



[Tree Size Class Distribution](#)

[Costs and Infestation Stage](#)

[Management Plans](#)

Welcome **mark whitmore** ([logout](#))

Active Forest: **demo 2**

Tree Size Class Distribution

Please use your street tree inventory data to enter the number of ash trees of each size class in your forest in the table below. Size span should be entered the diameter of the trunk at breast height (DBH), or at 4.5 feet above the soil line. Use the default values for tree size range or change the size class to correspond with the summary statistics you have on hand.

Size Span (inches)	Number of Trees
<input type="text" value="1"/> - <input type="text" value="3"/>	<input type="text" value="200"/>
<input type="text" value="3"/> - <input type="text" value="6"/>	<input type="text" value="500"/>
<input type="text" value="6"/> - <input type="text" value="12"/>	<input type="text" value="900"/>
<input type="text" value="12"/> - <input type="text" value="18"/>	<input type="text" value="300"/>
<input type="text" value="18"/> - <input type="text" value="24"/>	<input type="text" value="75"/>
<input type="text" value="24"/> - <input type="text" value=""/>	<input type="text" value="25"/>

[Save Changes](#)

[Add Span](#)

Changes Saved

[View Plan Comparisons Now](#) or [Customize Costs and Infestation Stage](#)

Emerald Ash Borer Cost Calculator

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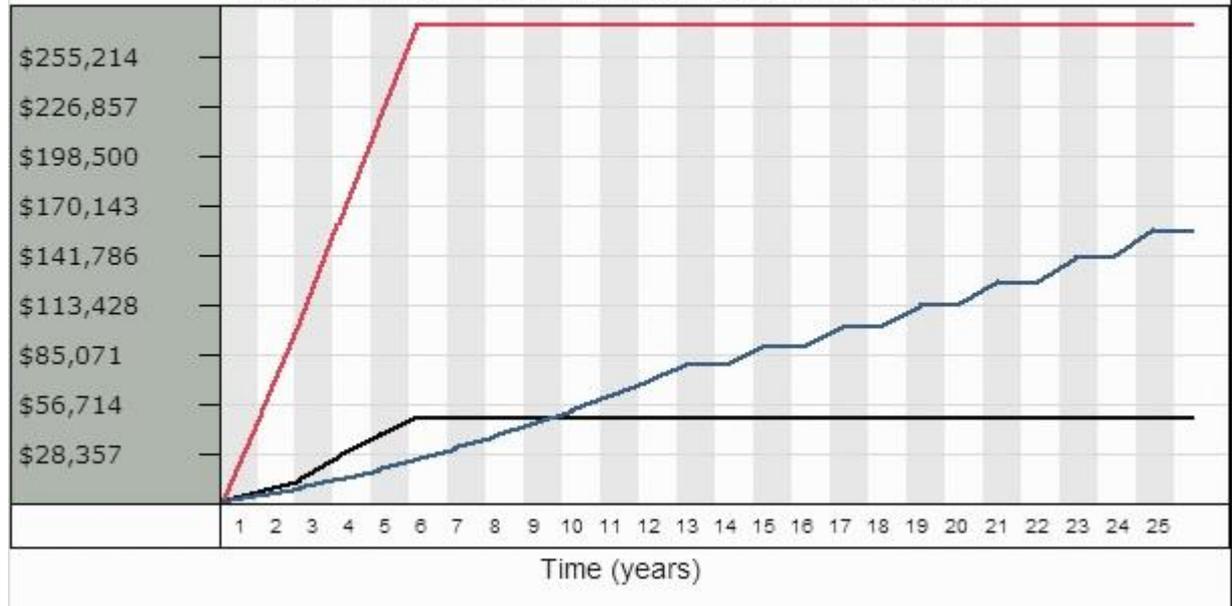
Active Forest: **Demo**

Print

Option 1	Option 2	Option 3
Remove All	Remove All	Remove All
Replace All	Replace All	Replace All
Treat All	Treat All	Treat All
Remove Unsafe Ash	Remove Unsafe Ash	Remove Unsafe Ash
Replace Unsafe Ash	Replace Unsafe Ash	Replace Unsafe Ash
Replace >12	Replace >12	Replace >12
Replace <12	Replace <12	Replace <12
Replace <24	Replace <24	Replace <24
Save 50%	Save 50%	Save 50%
Treat 30% More to Buy Time	Treat 30% More to Buy Time	Treat 30% More to Buy Time
URBAN SLAM	URBAN SLAM	URBAN SLAM

The EAB Cost Calculator

Cumulative Cost Comparison in Today's Dollars Over Time With a 0% Discount Rate



Year	Remove All		Replace All		Treat All	
	Cost This Year	Total Cost	Cost This Year	Total Cost	Cost This Year	Total Cost
1	\$8,599	\$8,599	\$52,070	\$52,070	\$3,210	\$3,210
2	\$8,599	\$17,198	\$52,070	\$104,140	\$3,776	\$6,986
3	\$8,599	\$25,797	\$52,070	\$156,210	\$4,343	\$11,329
4	\$8,599	\$34,396	\$52,070	\$208,280	\$4,909	\$16,239
5	\$8,599	\$42,995	\$52,070	\$260,350	\$5,476	\$21,715

The Vermont Planning Process

- 1. Educate yourself about invasive forest pests
- 2. Learn about developing a Forest Pest Preparedness Plan
- 3. Form a local forest pest planning and response team
- 4. Brief decision makers
- 5. Develop a timeline
- 6. Assess your community's level of preparedness and prioritize action steps
- 7. Formalize plan
- 8. Implement your preparedness plan

[http://vtcommunityforestry.org/
community-planning/tree-pests](http://vtcommunityforestry.org/community-planning/tree-pests)

Vermont Forest Pest Planning: Overview

Until the 1960s, Vermont's succumbed to the Dutch Elm longhorned beetle (ALB) and blow to Vermont's woodlands connected by a tight life line. Pests make up nearly two-thirds of Vermont's urban and commercial millions of dollars of environmental damage.



Photo by Lee Krohn

The impact of the

This document was adopted from the Wisconsin Emerald Ash Borer Program

What will happen if Emerald Ash Borer is found in my community?

Quick facts for town officials

The emerald ash borer (EAB) is a major threat to untreated ash trees start dying within a few years by humans, EAB can appear anywhere at any time states and is expected to spread into Vermont agencies, so its spread is monitored and its actions.

EAB infestations in Vermont will be subject to in place by state and federal agencies to regulate material—firewood, and ash nursery stock, log follow county boundaries and federal quarantine material may be moved within the quarantine unless it meets standards as published in the circumstances, early or isolated infestations may as establishing trap trees in an attempt to define levels of EAB larvae to slow the insect spread. areas begin to coalesce into a larger area, quarantine change somewhat and there will be more employment landscape.

What will happen when EAB is found in my community?



DDA1241013

1. The municipality will be required to take action to control the spread of EAB.
2. You will be required to take action to control the spread of EAB.

Vermont Forest Pest Planning: Is your community prepared?

Three highly invasive forest pests—the emerald ash borer (EAB), Asian longhorned beetle (ALB) and hemlock woolly adelgid (HWA), threaten Vermont's woodlands, urban forests and the goods and services these provide. Maples, ash, hemlocks and other host species that could be attacked by these pests make up nearly two-thirds of the trees in Vermont. While the hemlock woolly adelgid was detected in Windham County in 2007, the other two pests have yet to arrive in Vermont.

EAB is an insect that was introduced to the U.S. from Asia in 2002 and attacks all species of ash native to North America. It has led to the death of millions of ash trees from Michigan to New York. There are more than 100 million ash trees in Vermont's woodlands, downtowns and roadsides. Unless treated with insecticides, most trees infested by EAB will die within 2 to 4 years. Experience in Michigan and other states has shown that once EAB is detected in an area, more detections follow quickly and loss of ash trees increases rapidly over a few short years. If we can slow the spread of EAB and ash mortality, we can buy time for research to provide us with more options for managing EAB.

The following resources will help you work through the process of planning for a pest infestation:

- **Vermont Forest Pest Planning Worksheet**—assists in assessing your community's level of preparedness and prioritizing action steps.
- **Vermont Forest Pest Planning: Community Resource Toolbox**—provides links and background information on all aspects of preparedness and response.
- **Vermont Forest Pest Planning: Communications Toolkit**—contains example press releases, and other educational materials for educating your community.

A Forest Pest Preparedness & Response Plan is a document that outlines a municipality's objectives and the approaches it will use to meet anticipated costs, public concerns, and environmental impacts; explore opportunities for wood disposal; and initiate steps to mitigate impact.

We expect EAB to arrive in Vermont within a few years. If there are ash trees in your community we expect most, if not all, will die when EAB shows up. Prepared or unprepared, your community will have to deal with a large number of hazardous trees within a short time frame. A proactive response plan will be invaluable in addressing the threat by allowing you to:

- Modify budgets to accommodate increased tree-related costs and spread the costs/losses over a longer period of time.
- Provide/arrange for debris disposal space.
- Inform citizens about forest pests & dealing with private trees
- Determine public policy for designating trees to be preserved and replacing trees that are lost.
- Ease costs by: forming partnerships, brokering group or volume prices, prearranging contracts, and seeking grants.

It's better to look ahead and prepare than look back with regret.



[EMERALD ASH BORER PREPAREDNESS PLAN]

The *Agrilus planipennis*, commonly known as the Emerald Ash Borer or EAB, is an exotic beetle that was discovered in southeastern Michigan in 2002 and feeds exclusively on trees in the genus *Fraxinus*. Native to Asia and Eastern Russia, this tiny green beetle has killed 150-200 million ash trees in 22 states and 2 provinces, causing devastation rivaling that of Dutch Elm Disease and Chestnut Blight. This insect will inevitably destroy most, if not all, ash trees left untreated by insecticides and will pose significant human health and safety risks. Though not yet discovered in Vermont, EAB infestations have been confirmed north, south, east and west of us in Concord, NH, Dalton, MA, Albany, NY, and just 30 miles north of the Vermont border in Quebec, so it's not a matter of if EAB reaches Vermont, but when. Williston is an area of particular risk as 43% of publically owned trees are ash. Publically owned trees include those on municipal properties (community parks, library, etc.) as well as within the right-of-way (ROW) along town roads. The purpose of this document is to describe the scope of the threat to public property and to provide recommendations to mitigate the impacts of EAB.

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VERMONT FOREST PEST PLANNING WORKSHEET

This planning worksheet will help your community identify the policies, resources, and actions needed to respond to invasive forest pests such as the Emerald Ash Borer (EAB). By preparing for forest pests, your community can minimize the impact of forest pests and reduce the risk of spreading them. We recommend that all Vermont communities plan for EAB. Some will want to plan for HWA and other pests as well.

You may not have answers for all questions posed in this worksheet because of unique situations in your community. Instructions and background information are provided in black text, while questions and considerations for your community to fill in are in red. In numerous cases you are referred to a Community Resource Toolbox. This online toolbox is available at <http://vtcommunityforestry.org/community-planning/tree-pests> and provides background information, links and other supporting resources.

This planning worksheet will guide you through the following **checklist** for developing your plan for action:

Action	Lead person	Date to complete
<input type="checkbox"/> A. Identify key stakeholders and develop a resource list		
<input type="checkbox"/> B. Convene an initial pest planning informational meeting.		
<input type="checkbox"/> C. Form a pest planning team.		
<input type="checkbox"/> D. Gather town documents & information.		
<input type="checkbox"/> E. Assess your community tree resource.		
<input type="checkbox"/> F. Define the purpose of developing a community preparedness plan.		
<input type="checkbox"/> G. Identify priority trees.		
<input type="checkbox"/> H. Monitor forest pests.		
<input type="checkbox"/> I. Plan for tree protection and removal.		
<input type="checkbox"/> J. Determine how infested wood will be disposed of & utilized.		
<input type="checkbox"/> K. Plan recovery efforts.		
<input type="checkbox"/> L. Evaluate your community's public policies.		
<input type="checkbox"/> M. Estimate costs.		
<input type="checkbox"/> N. Develop a plan for educating and communicating with community members.		
<input type="checkbox"/> O. Summarize your policies, resources and next steps.		
<input type="checkbox"/> P. Preparedness Plan Outline		
<input type="checkbox"/> Q. Definitions		

Don't Forget to Plan for Removal

- Who will remove the trees?
- Where will they go?
- What will you do with the wood?



Learn More
vtinvasives.org



Follow us on Twitter, Facebook,
and Instagram @ VTinvasives

The screenshot shows the Vermont Invasives website homepage. At the top, there is a navigation bar with links for 'INTRO TO INVASIVES', 'GET INVOLVED', 'NEWS & EVENTS', and 'ABOUT US', along with social media icons for Twitter, Facebook, and Instagram. Below the navigation bar is the 'VERMONT INVASIVES' logo. To the right of the logo, there is a link to 'Learn about invasive species:' and two buttons: 'on Land' and 'in Water'. The main content area features a large banner image of a forest with a lake. The banner text reads: 'Don't bring firewood into Vermont: It's the law.' followed by 'Invasive species Pose A Serious Threat To Vermont Communities. Become part of the solution: Learn, Get Involved, Make a Difference.' Below the banner, there are three columns of content. The first column, 'QUICK LINKS', includes 'Gallery of Aquatic Invaders', 'Gallery of Forest Pests', and 'Gallery of Terrestrial Plants'. The second column, 'NEWS', features two articles: 'Femme fatale' emerald ash borer decoy lures, kills males' (dated September 6, 2016) and 'Gypsy moths Are Reappearing in New England' (dated July 11, 2016). The third column, 'FEATURED STORY', has a large image of a mountain landscape with the text 'Welcome to Vermont! Please leave your firewood at home.' and a 'LEARN MORE' button. At the bottom of the page, there is a footer with a 'REPORT IT!' button, navigation links for 'Get Involved', 'About', 'Intro to Invasives', and 'News & Events', and logos for 'VERMONT DEPARTMENT OF FORESTS, PARKS & RECREATION' and 'UNIVERSITY OF VERMONT EXTENSION'. A note at the bottom right states: 'This website was supported by an Innovations and Collaborations Grant from the Vermont Community Foundation.'



Meredith Whitney
Forest Pest Outreach Coordinator
UVM Extension
Meredith.Whitney@uvm.edu