West Chester University Emerald Ash Borer Management Plan West Chester, Pennsylvania

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Outline

- The Problem with EAB
- Why is this important?
- What I did about it!

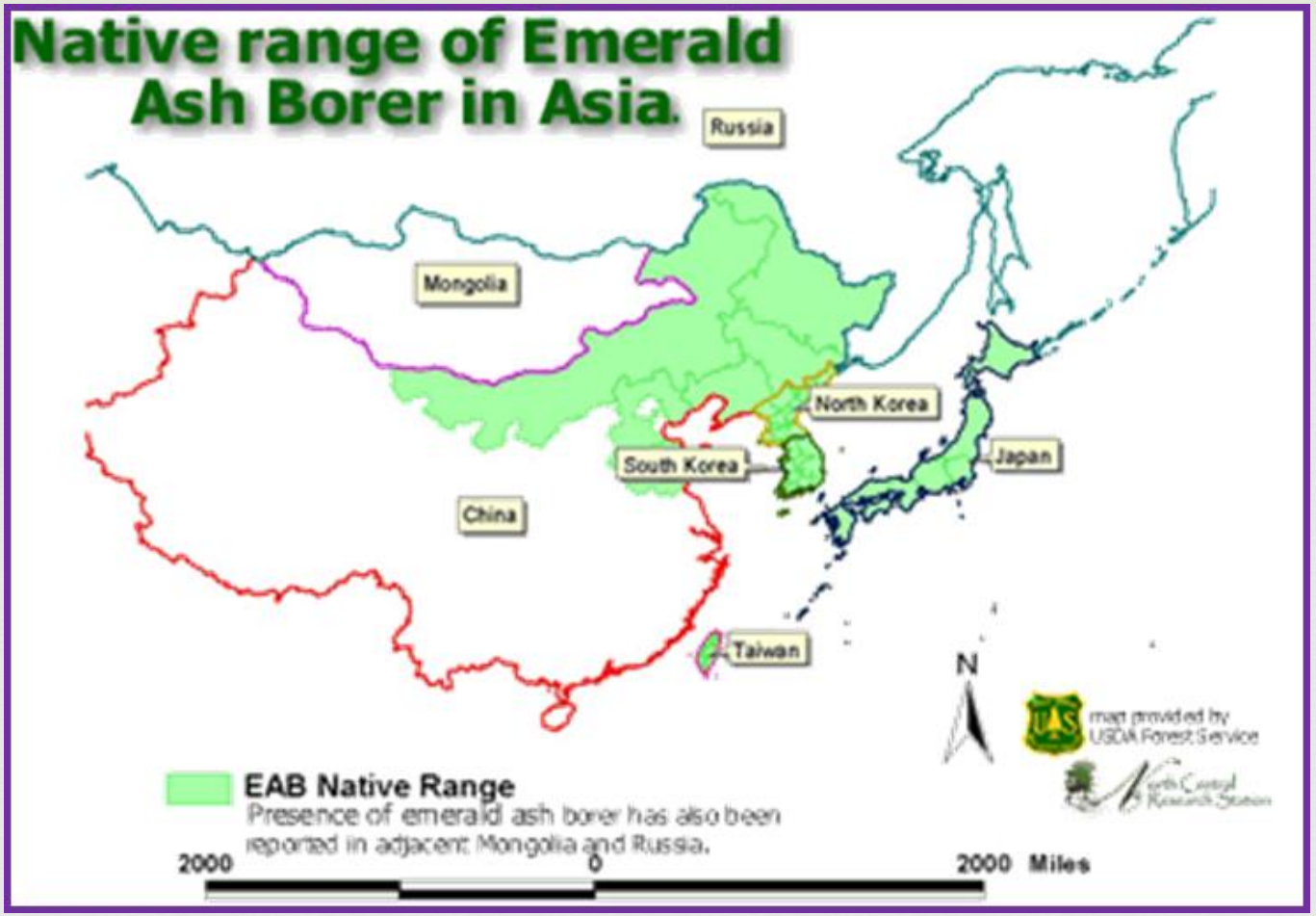
Photo by Kendra McMillin

Photo from Arborjet web site http://www.arborjet.com/

The Problem of EAB

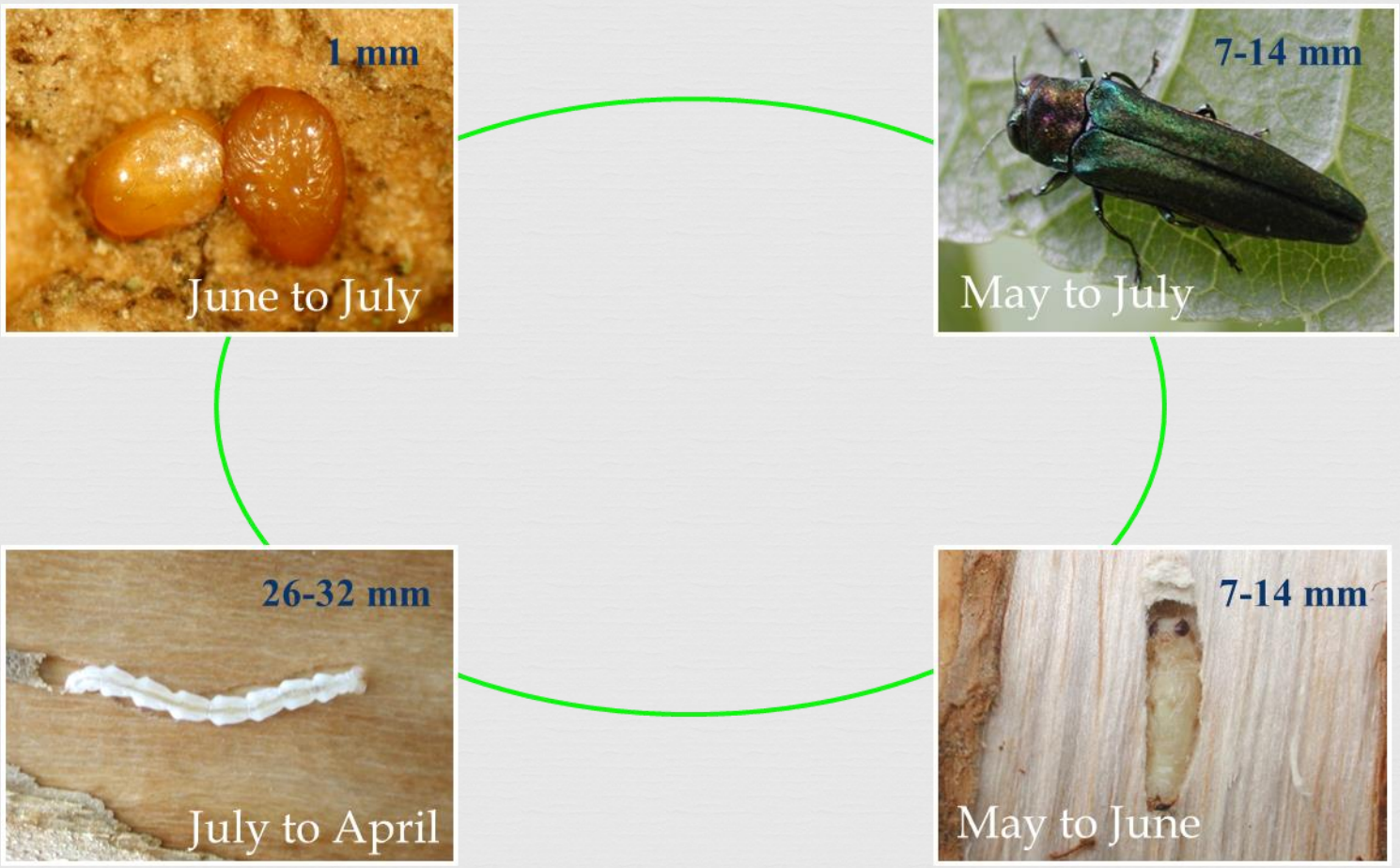
- What would you do if you were responsible for responding to the emerald ash borer in your community?
- What do you need to know to proceed?
- Overall Strategy?
- Your boss wants the plan in 2 months- with a budget!

Emerald Ash Borer

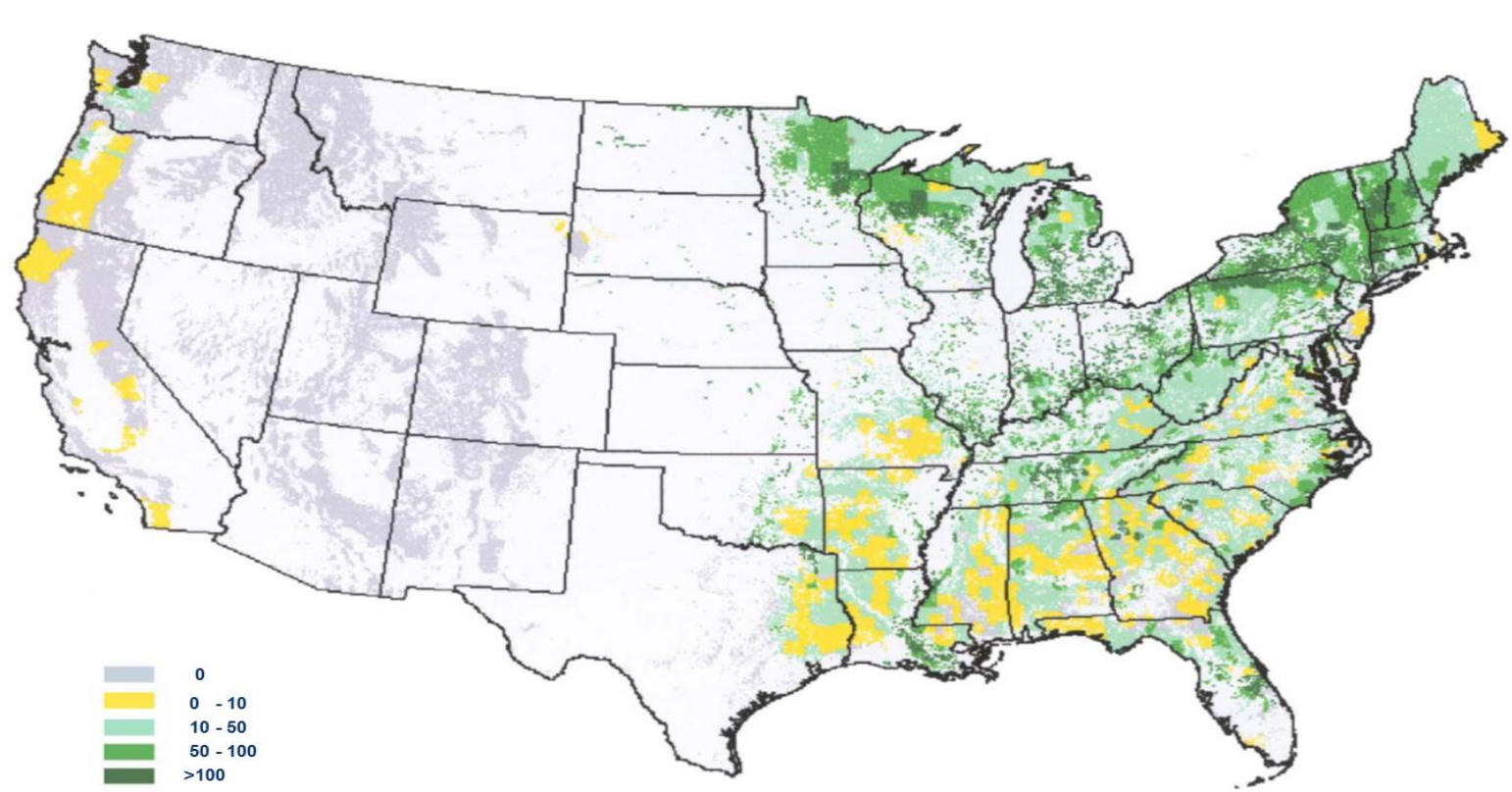


- First discovered in Michigan June 2002
- Attacks only ash (green, white, black, blue, pumpkin) in North America: 16 species of ash

Life Cycle and Biology

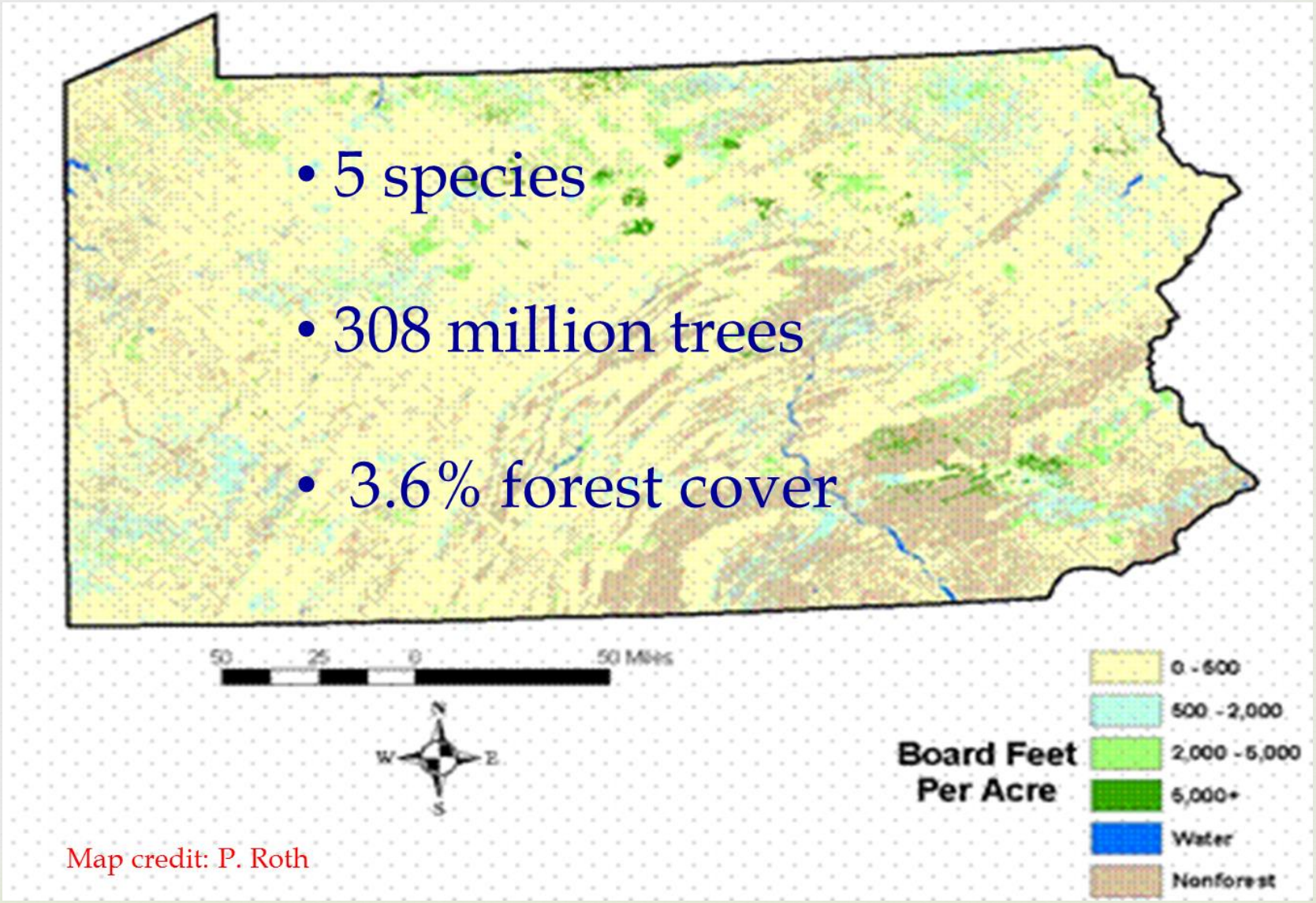


Resources at Risk: All Species of Ash



USDA Forest Service data sources:
County-level estimates of ash densities derived from Forest Inventory and Analysis (FIA) Data.
Forest/non-Forest overlay derived from AVHRR satellite Imagery.

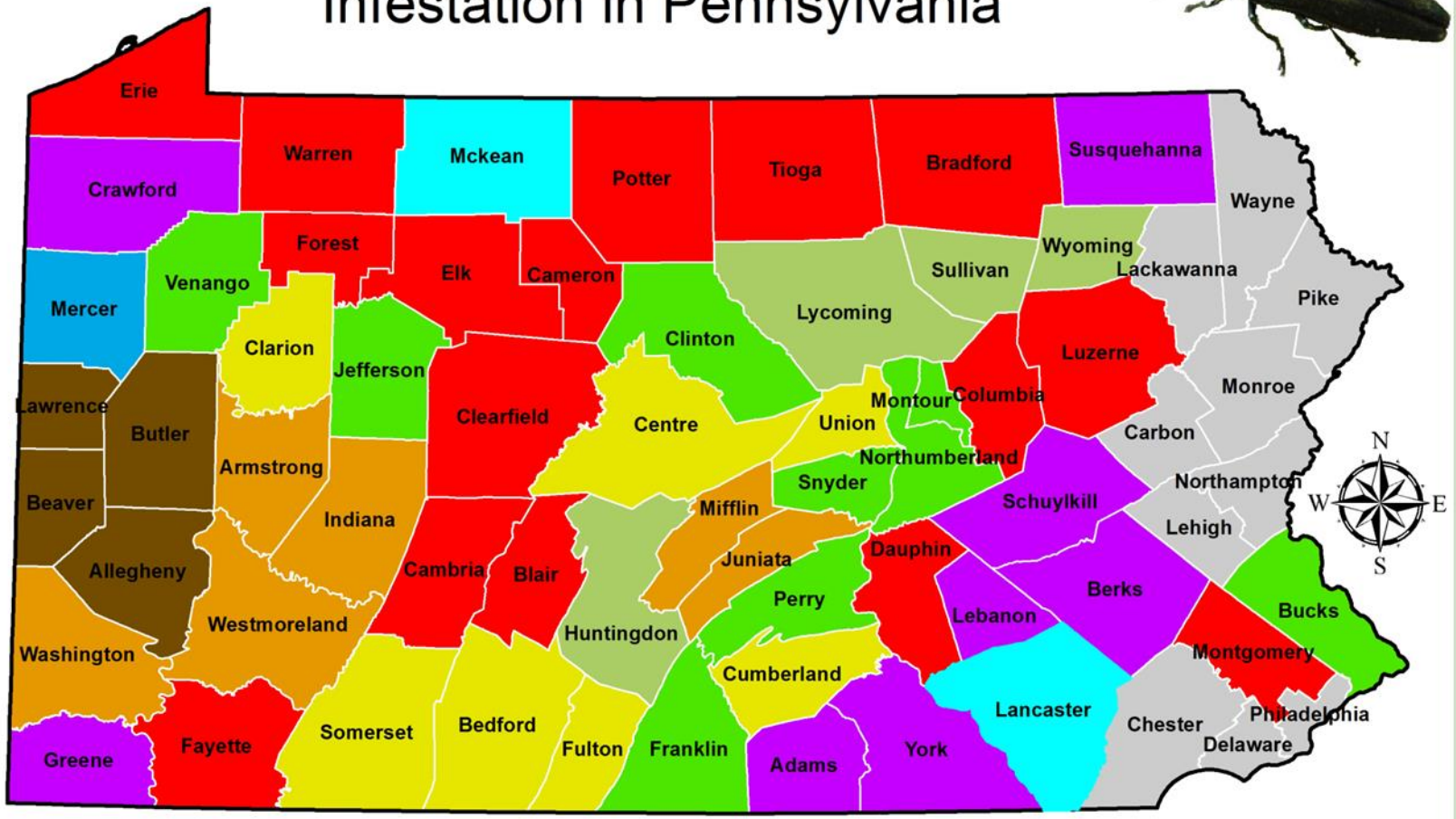
Resources at Risk: Pennsylvania



Map credit: P. Roth

Emerald Ash Borer

Infestation in Pennsylvania



NONE 2008 2010 2012 2014

2007 2009 2011 2013 2015

pennsylvania
DEPARTMENT OF CONSERVATION
AND NATURAL RESOURCES

By May 18, 2015

WCU
WEST CHESTER
UNIVERSITY

Emerald Ash Borer Management Plan
West Chester, Pennsylvania

April 16, 2015

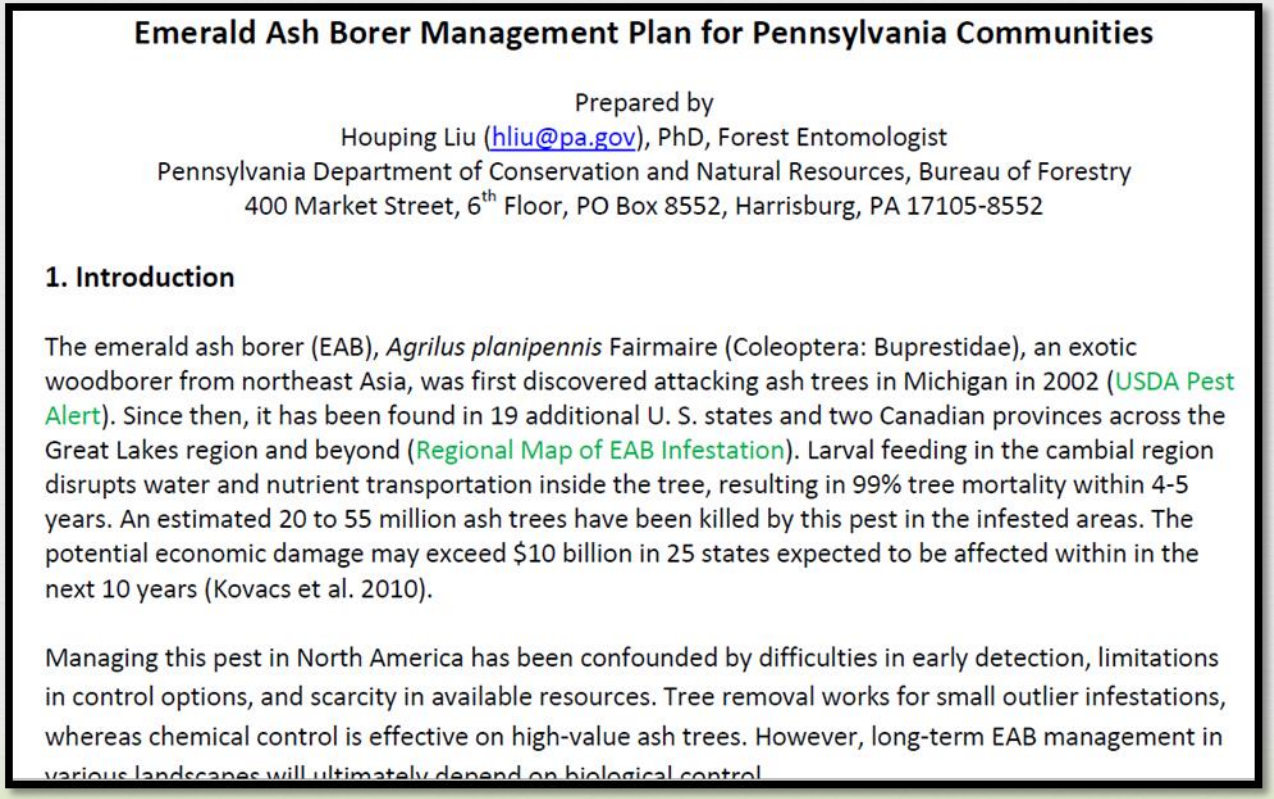
Prepared by Kendra McMillin (WCU Undergraduate Biology 2014)
and Dr. Gerard Hertel (WCU Department of Biology)
[modified from model plan prepared by PADCNR, Bureau of Forestry]

How are we helping them!

- Using information from Mid-Western
- Houping Liu (Pa- DCNR)–

Template : Management Options

Web site: http://www.dcnr.state.pa.us/forestry/insectsdisease/eab/index.htm



Emerald Ash Borer Management Plan for Pennsylvania Communities

Prepared by
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1. Introduction

The emerald ash borer (EAB), *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae), an exotic woodborer from northeast Asia, was first discovered attacking ash trees in Michigan in 2002 (USDA Pest Alert). Since then, it has been found in 19 additional U. S. states and two Canadian provinces across the Great Lakes region and beyond (Regional Map of EAB Infestation). Larval feeding in the cambial region disrupts water and nutrient transportation inside the tree, resulting in 99% tree mortality within 4-5 years. An estimated 20 to 55 million ash trees have been killed by this pest in the infested areas. The potential economic damage may exceed $10 billion in 25 states expected to be affected within in the next 10 years (Kovacs et al. 2010).

Managing this pest in North America has been confounded by difficulties in early detection, limitations in control options, and scarcity in available resources. Tree removal works for small outlier infestations, whereas chemical control is effective on high-value ash trees. However, long-term EAB management in various landscapes will ultimately depend on biological control

Administration

- Examples of your City's EAB task force:
  - Team Leader (Mayor)
  - Program Manager (City Forester)
  - Communications/Public Relations (City Spokesperson)
  - Business Relations/ Fiscal Planning
  - Monitoring/Ground Operations (Forestry Manager)
  - Tree Removal/Material Disposal (Arborties/Saw Mills)
  - Replanting/Canopy Replacement (Reforestation Advisor)

Issues with Policies and Implementing Plan

- Updated West Chester University's Tree Care and Policies - West Chester University's Tree Care and Policies: https://www.wcupa.edu/_INFORMATION/AFA/Facilities/Grounds/Policies/policyTreeCare.asp
- Formed Tree Campus USA Committee
- Leader is administrated by the University's President, Grounds Management, and overseen by the WCU Tree Campus USA Committee and Executive Director Facilities Management
- The EAB Manager reports to WCU Tree Campus USA Committee and Executive Director Facilities Management on this plan

Management Tools

Tool 1: Tree Removal

Tool 2: Chemical Control

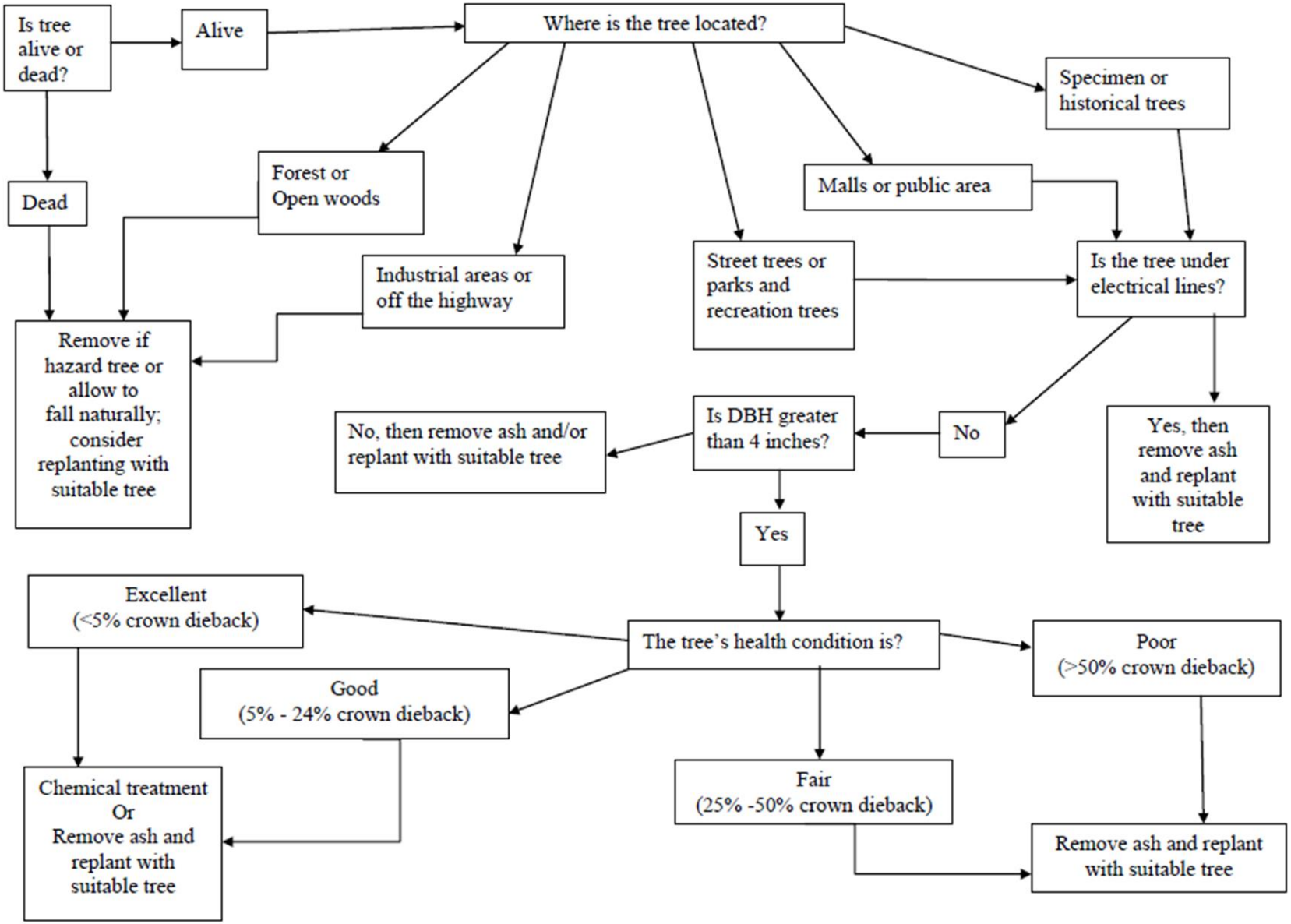
Method
Soil Treatment
Trunk Injection
Bark Spray
Cover Spray

- Used as trunk injection
- 99% control for current year
- Effective for 3 – 4 years
- Price tag ~ $559/L (40 g a.i)

Items Needed For Assessing Ash Trees

- 1. DBH tape English
- 2. Something to collect the data with (mobile device, clipboard, pencil, etc.)
- 3. Map of boundaries
- 4. Blue marker to numbered the trees
- 6. Binocular
- 7. Field guide book for identifying trees
- 8. Gloves, sunscreen, bug spray, and hat
- 9. Safety Vest!
- Most of these items can be purchase at Forestry Suppliers, Inc. http://www.forestry-suppliers.com/ or the local hardware store.

Ash Tree Assessment Flowchart



- 1st ash assessment was completed in June 2012
- New geo-thermal wells were installed below ground
- 2nd ash assessment was completed in June 2014

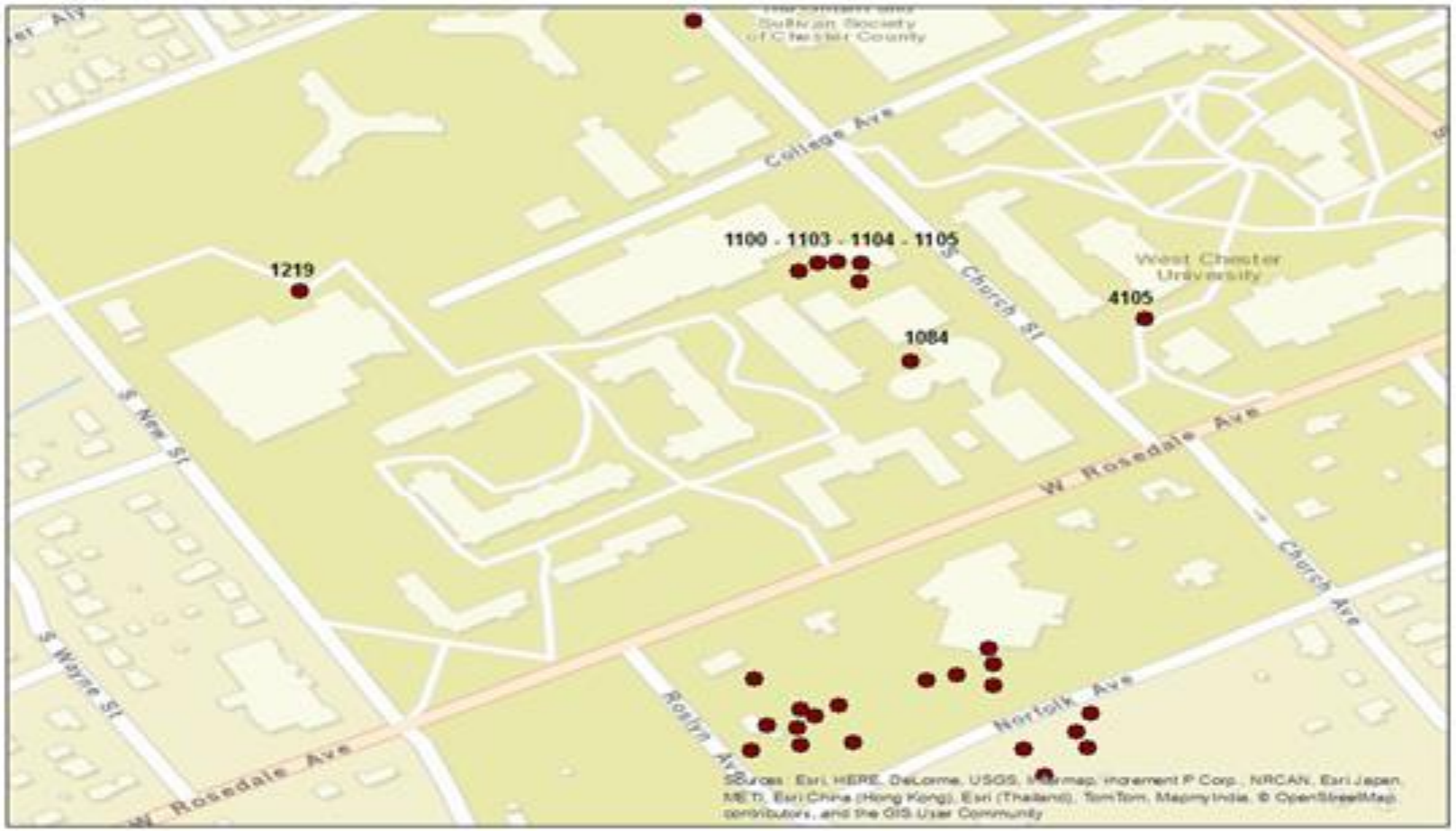
Table 1. Diameter and condition of the street ash trees on campus in 2012

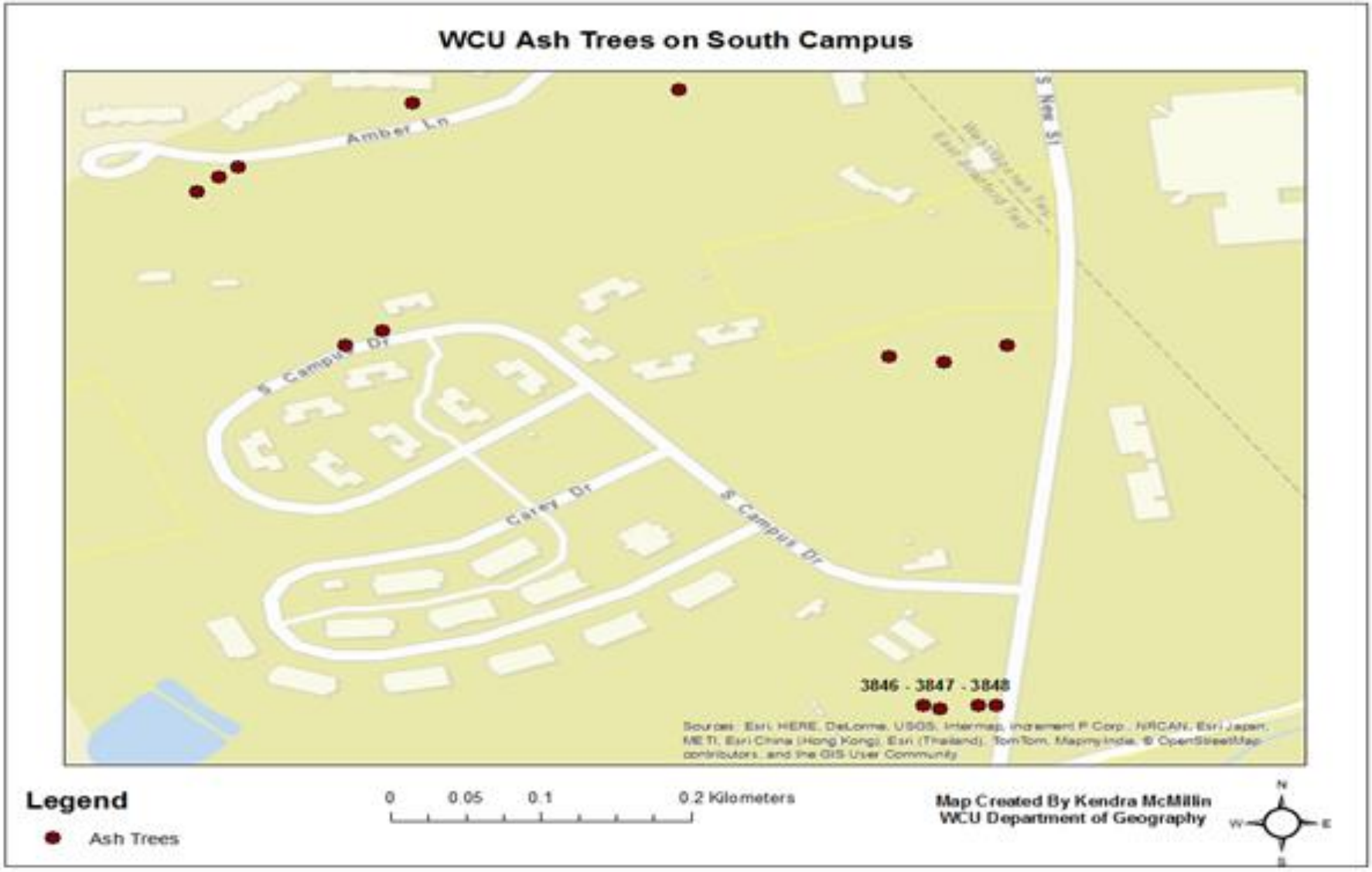
Tree Conditions	Diameter class (inches)					*Total*
	<10	10-25	26-35	36-50	>50	
Excellent	3	3	0	0	0	*6*
Good	6	7	6	1	0	*20*
Fair	0	4	4	0	1	*9*
Poor	1	5	2	2	1	*11*
Dead	0	0	0	0	0	*0*
Total	*10*	*19*	*12*	*3*	*2*	*46*

Table 2. Diameter and condition of the street ash trees on campus in 2014

Tree Conditions	Diameter class (inches)					*Total*
	<10	10-25	26-35	36-50	>50	
Excellent	3	2	0	0	0	*5*
Good	4	6	3	1	0	*14*
Fair	0	0	0	0	1	*1*
Poor	1	0	2	1	1	*5*
Dead	0	0	0	0	0	*0*
Total	*8*	*8*	*5*	*2*	*2*	*25*

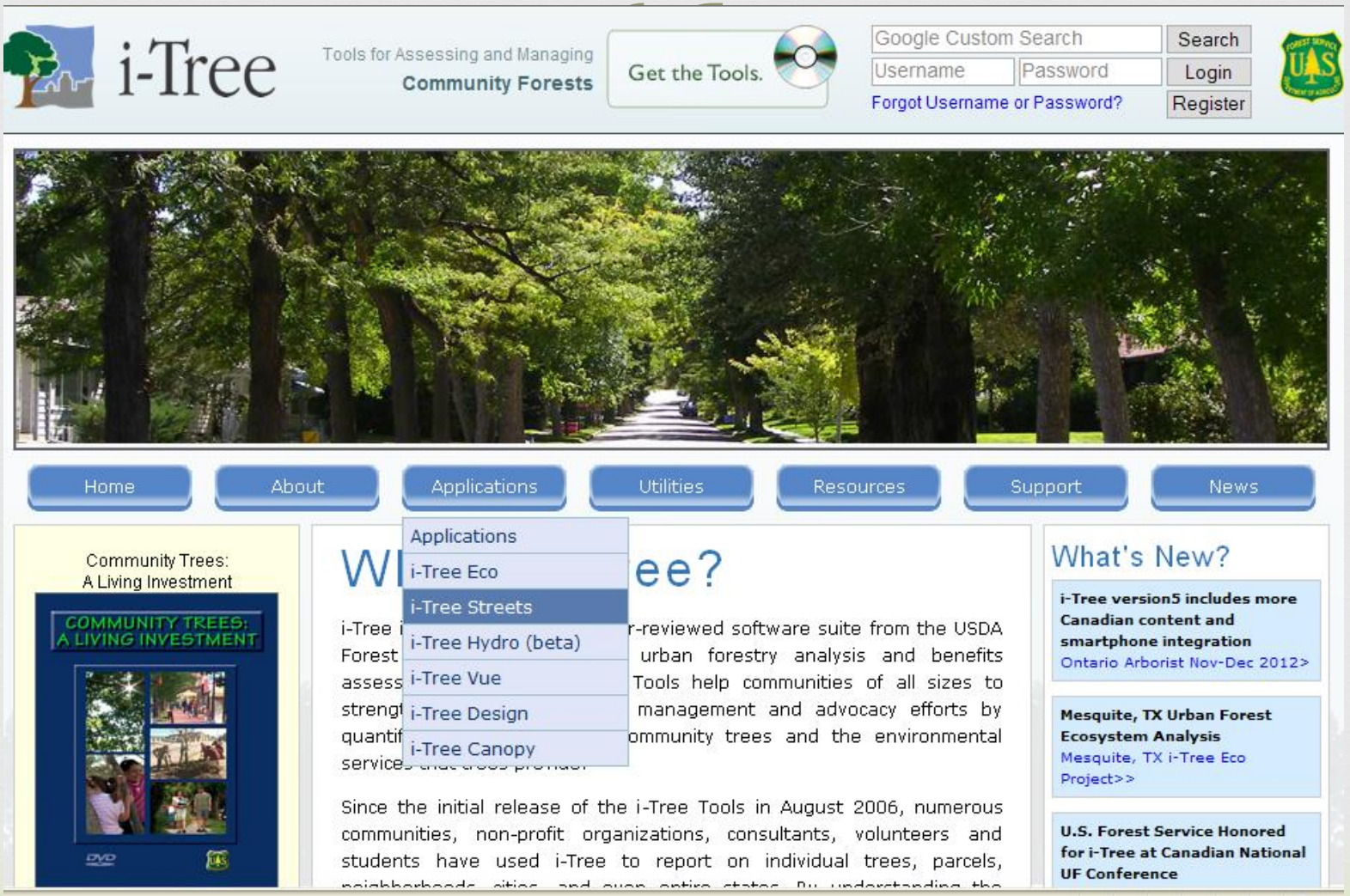
WCU Ash Trees on North Campus




WCU Ash Trees on South Campus
Amber Ln
S Campus Dr
Carey Dr
S Campus Dr
S New St
3846 - 3847 - 3848
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Legend
Ash Trees
0 0.05 0.1 0.2 Kilometers
Map Created By Kendra McMillin
WCU Department of Geography
N
W
E
S

i – Tree Tools: Streets

http://www.itreetools.org/street/index.php



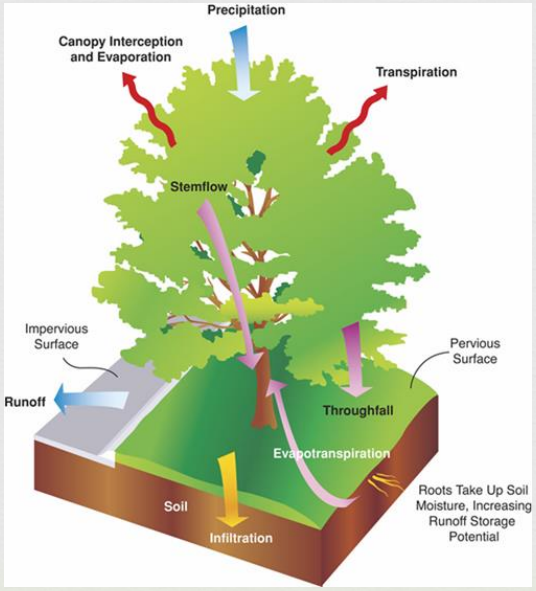
i – Tree Streets

- Quantifies Net Benefits Provided by Trees

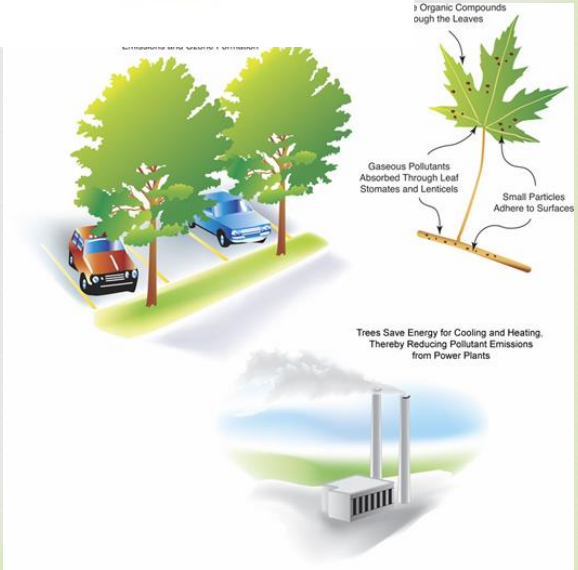
Conserve Energy

Reduce Atmospheric CO_2

Reduce Storm Water Runoff



Improve Air Quality



Benefits of WCU's Ash Street Trees

- 25 Ash Trees offer
- Ecosystem Services = $65,896 per year
- 2015 Landscape Trees Appraisal = $10,118

Treatment Cost Worksheet

B3 | 4

	TREE-AGE INSECTICIDE USE RATE TABLE (see Label)					COST PER TREE (mls x 559/1000)				ENTER NUMBER OF TREES (for each DBH)				COSTS BASED ON DCNR SUGGESTED RATES				
Tree DBH (inches)	Low ml/tree	Med ml/tree	Med-High ml/tree	High ml/tree	DCNR Suggested ml/tree	Low Cost/tree	Med Cost/tree	Med-High Cost/tree	High Cost/tree	# Street Trees	# Park Trees	# Other Trees	# Other Trees	Street Trees Cost	Park Trees Cost	Other Trees Cost	Other Trees Cost	Stree Tree DBH Tota
4	15	25	50	X	med	$ 8.39	$ 13.98	$ 27.95	X					$ -	$ -	$ -	$ -	0
5	15	25	50	X	med	$ 8.39	$ 13.98	$ 27.95	X	1				$ 13.98	$ -	$ -	$ -	5
6	15	25	50	X	med	$ 8.39	$ 13.98	$ 27.95	X					$ -	$ -	$ -	$ -	0
7	20	40	80	X	med	$ 11.18	$ 22.36	$ 44.72	X					$ -	$ -	$ -	$ -	0
8	20	40	80	X	med	$ 11.18	$ 22.36	$ 44.72	X	1				$ 22.36	$ -	$ -	$ -	8
9	20	40	80	X	med	$ 11.18	$ 22.36	$ 44.72	X					$ -	$ -	$ -	$ -	0
10	30	55	110	165	med-high	$ 16.77	$ 30.75	$ 61.49	$ 92.24					$ -	$ -	$ -	$ -	0
11	30	55	110	165	med-high	$ 16.77	$ 30.75	$ 61.49	$ 92.24	1				$ 61.49	$ -	$ -	$ -	11
12	30	55	110	165	med-high	$ 16.77	$ 30.75	$ 61.49	$ 92.24					$ -	$ -	$ -	$ -	0
13	35	70	140	210	med-high	$ 19.57	$ 39.13	$ 78.26	$ 117.39					$ -	$ -	$ -	$ -	0
14	35	70	140	210	med-high	$ 19.57	$ 39.13	$ 78.26	$ 117.39	1				$ 78.26	$ -	$ -	$ -	14
15	35	70	140	210	med-high	$ 19.57	$ 39.13	$ 78.26	$ 117.39					$ -	$ -	$ -	$ -	0
16	40	75	150	225	med-high	$ 22.36	$ 41.93	$ 83.85	$ 125.78					$ -	$ -	$ -	$ -	0
17	40	75	150	225	med-high	$ 22.36	$ 41.93	$ 83.85	$ 125.78	1				$ 83.85	$ -	$ -	$ -	17
18	40	75	150	225	med-high	$ 22.36	$ 41.93	$ 83.85	$ 125.78					$ -	$ -	$ -	$ -	0
19	50	100	200	300	med-high	$ 27.95	$ 55.90	$ 111.80	$ 167.70					$ -	$ -	$ -	$ -	0
20	50	100	200	300	med-high	$ 27.95	$ 55.90	$ 111.80	$ 167.70	1				$ 111.80	$ -	$ -	$ -	20
21	50	100	200	300	med-high	$ 27.95	$ 55.90	$ 111.80	$ 167.70					$ -	$ -	$ -	$ -	0
22	X	115	230	345	med-high	X	$ 64.29	$ 128.57	$ 192.86					$ -	$ -	$ -	$ -	0
23	X	115	230	345	med-high	X	$ 64.29	$ 128.57	$ 192.86	1				$ 128.57	$ -	$ -	$ -	23

http://www.dcnr.state.pa.us/forestry/insectsdisease/eab/index.htm

Proposed ash trees for chemical treatment on campus

- Total of 4 treatments over 10 years
- Total cost for 1 year chemical treatment = $4,720

Year	No. trees	Total DBH (inch) *	Unit price ($) *	*Cost ($)*
2015	10	107	8	***$1,128***
2016	0	0	0	***0***
2017	0	0	0	***0***
2018	10	108	8.2	***$1,162***
2019	0	0	0	***0***
2020	0	0	0	***0***
2021	10	109	8.4	***$1,197***
2022	0	0	0	***0***
2023	0	0	0	***0***
2024	10	110	8.6	***$1,233***
Total	***10***			***$4,720***

- Total cost includes 1% annual increase assumed to the total diameters of the ash trees and 2% increase for cost of chemical treatment

Recovery Plan (Replanting Trees)

Table 6. Cost of Replanting in West Chester for 10 years (2015-2024)

Year	No. trees	Average DBH (inch)	Unit price ($) *	*Cost ($)*
2015	4	2-3	670	***2,680***
2016	4	2-3	683	***2,732***
2017	4	2-3	697	***2,788***
2018	4	2-3	711	***2,844***
2019	4	2-3	725	***2,900***
2020	4	2-3	740	***2,960***
2021	4	2-3	755	***3,020***
2022	4	2-3	770	***3,080***
2023	2	2-3	785	***1,570***
2024	2	2-3	801	***1,602***
Total	***36***			***$26,176***

- Total 36 trees will be replanted with non-host species
- Total cost $26,176 over 10 years

Fiscal Planning

Year	Chemical treatment ($)	Replanting ($)	*Total ($)*
2015	***1,128***	2,680	***3,808***
2016	***0***	2,732	***2,732***
2017	***0***	2,788	***2,788***
2018	***1,162***	2,844	***4,006***
2019	***0***	2,900	***2,900***
2020	***0***	2,960	***2,960***
2021	***1,197***	3,202	***4,217***
2022	***0***	3,080	***3,080***
2023	***0***	1,570	***1,570***
2024	***1,233***	1,602	***2,835***
Total	***$4,720***	***$26,176***	***$30,896***

Community Outreach

How to Identify an Ash Tree for Emerald Ash Borer

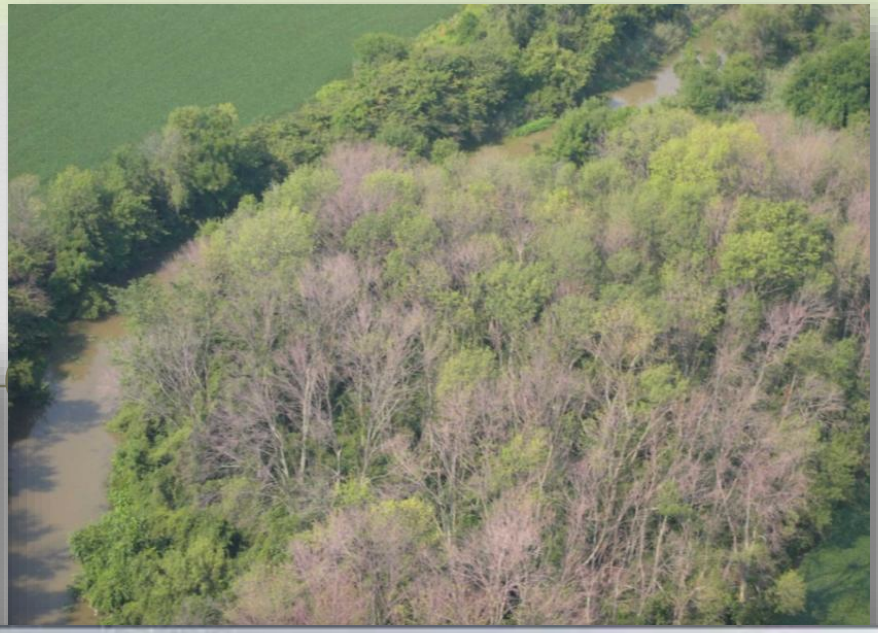
By Kendra McMillin

Are you in an Emerald Ash Borer (EAB) quarantine area? Ash trees on your property may be at risk from this destructive pest because EAB only kills ash tree species. The EAB adults feed on the foliage, while the EAB larvae under the bark feed on their vascular system, killing them within 3 to 4 years. Losing important trees in your community can be visually and emotionally devastating. Being proactive is the key to fighting against EAB! The purpose of this tutorial is to guide you through the process of (1) identifying ash trees *Fraxinus spp.* and (2) detecting symptoms and signs of EAB *Agrilus planipennis*.

STEP I: Identify an Ash Tree

Guided tours in the Robert B. Gordon Natural Area for Environmental Studies at WCU's South Campus

Basic Facts



- If EAB is not successfully managed, it could cause the extinction of ash trees in North America

Contact Information

- DCNR website: http://www.dcnr.state.pa.us/forestry/insectsdisease/eab/index.htm
- Pennsylvania Urban & Community Forestry Council website: http://www.pacommunityforests.com/
- Kendra McMillin
  - PA Urban & Community Forestry Council
  - km731995@wcupa.edu
  - 610-909-2888