Middlebury College
Emergency Preparedness Plan
for the Invasion of the Emerald Ash Borer

INTRODUCTION

This document outlines an action plan for Middlebury College to follow before and after the arrival of the emerald ash borer (EAB). EAB is a pest introduced from Asia that is currently killing all species of ash trees across the north central and northeast United States. The introduction of EAB into Vermont is expected to have devastating consequences to our ash resource in both forest and urban areas. As an agent of lasting environmental change in the northeast, this insect is on par with Dutch elm disease and chestnut blight of the last century.

Ash at Risk

There are 1,219 ash trees at risk on college land based on our recent inventory on January 21st, 2015. Many of these trees are in areas where their failure could directly affect people, buildings, and infrastructure.

Estimated cost to remove 1,219 ash trees is $253,490, which is based on inventory data and projected costs from past removals.

Estimated cost to replant 175 trees on campus is $99,575.

Estimated value lost from the loss of the 1,219 community ash trees is approximately $133,607 based on accepted industry standards for estimating tree value, including values for environmental benefits such as reducing storm water run-off, mitigating air pollution and reducing heating and air conditioning costs.

The lumber produced by the cuttings will have to be disposed of safely and locally, possibly in Middlebury’s own biomass plant.

This document includes plans for monitoring, disposal, replacement, and budgeting.

Our understanding of forest pest management is constantly expanding as people gain experience dealing with these invasive pests and as new research is conducted. Accordingly, this plan will be updated as needed. Many of the actions accomplished from this plan will have positive, long term benefits for the community. Our citizens will have a greater understanding and appreciation for our forest and urban tree resource, our community will be much better prepared for future invasive pests, and we will have established relationships with people and organizations that will be invaluable in maintaining the many environmental, economic and societal benefits of a healthy urban forest.

A. PURPOSE OF DEVELOPING A FOREST PEST PREPAREDNESS PLAN

1. Plan goals and objectives.

By implementing the provisions in this preparedness and response plan Middlebury College is attempting to:
Minimize the impact of Emerald Ash Borer by:
- Reducing public safety hazards posed by dead or dying trees by removing trees as they become infested.
- Identifying large canopy and high value ash for preventive insecticide treatment.
- Preemptively removing uninfested ash trees in priority order.
- Maintaining all new and existing trees.
- Distributing costs over a manageable time period.

Reduce the risk of introduction and spread of Emerald Ash Borer by:
- Educating and involving Faculty, Staff, and Students, and the larger community
- Serve as an example for other schools and towns
- Facilitating early detection of EAB
- Developing disposal and utilization sites, methods and markets before quarantines are imposed.
- Avoiding pruning or removing ash during the adult EAB flight period (May-July)
- Identifying trees or areas to use for sinks or lethal trap trees once EAB is found

Prevent future catastrophic losses by:
- Avoiding over-planting any tree species
- Designing new planting spaces with tree success in mind

B. FOREST PEST PLANNING TEAM

<table>
<thead>
<tr>
<th>Name</th>
<th>Responsibility</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tim Parsons- Landscape Horticulturist-Facilities Services</td>
<td>Team Leader</td>
<td>Phone: 802-443-5959 Email: <a href="mailto:tparsons@middlebury.edu">tparsons@middlebury.edu</a></td>
</tr>
<tr>
<td>Bill Burger</td>
<td>Public Information Officer</td>
<td>Phone: 201-412-1009 Email: <a href="mailto:bburger@middlebury.edu">bburger@middlebury.edu</a></td>
</tr>
<tr>
<td>Clinton Snyder- Landscape Supervisor-Facilities Services</td>
<td></td>
<td>Phone: 802-443-5059 Email: <a href="mailto:csynder@middlebury.edu">csynder@middlebury.edu</a></td>
</tr>
<tr>
<td>Luther Tenny- Asst. Director, Operations- Facilities Services</td>
<td></td>
<td>Phone: 802-443-5236 Email: <a href="mailto:ltenny@middlebury.edu">ltenny@middlebury.edu</a></td>
</tr>
</tbody>
</table>

C. COMMUNITY TREE RESOURCE ASSESSMENT

1. Latest tree inventory

<table>
<thead>
<tr>
<th>Question</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory</td>
<td>1/21/15</td>
</tr>
<tr>
<td>Inventory Location</td>
<td>Middlebury campus lands</td>
</tr>
<tr>
<td>Tree Species Included in Inventory</td>
<td>We counted all Ash trees on campus, that is, all species of the genus <em>Fraxinus</em></td>
</tr>
<tr>
<td>Conductors of Inventory</td>
<td>Middlebury College INTD1127 2015 class</td>
</tr>
<tr>
<td>Data Collected</td>
<td>We collected data on the location and DBH (diameter at breast height) of every tree, sorting them into four size categories: 0” to 6”, 6” to 12”, 1’ to 2’, and 2’ to 3’.</td>
</tr>
</tbody>
</table>
2. Summary of inventory data

The trees were tallied as follows:

<table>
<thead>
<tr>
<th>Location</th>
<th>No. Trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest between Atwater Dining and Weybridge Street</td>
<td>523</td>
</tr>
<tr>
<td>Ridgeline</td>
<td>263</td>
</tr>
<tr>
<td>The Rest of Campus</td>
<td>433</td>
</tr>
</tbody>
</table>

TOTAL: 1219

Size ranges for the trees are as follows:

<table>
<thead>
<tr>
<th>DBH Class</th>
<th># Trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6&quot;</td>
<td>487</td>
</tr>
<tr>
<td>6-12&quot;</td>
<td>438</td>
</tr>
<tr>
<td>1-2’</td>
<td>232</td>
</tr>
<tr>
<td>2-3’</td>
<td>62</td>
</tr>
</tbody>
</table>

D. VISUAL INFORMATION AND PRIORITY TREES

   Full campus map:
Problem Area 1 map (Atwater Dining)
Problem Area 2 map (Ridgeline)
EAB Problem Area: Ridgeline and Ross

Priority Trees map:
E. MONITOR FOREST PESTS

1. Pest detection efforts
If you are going to monitor, then where will you focus your efforts?

- By Atwater Dining and the Atwater Commons House, as this area is densely packed with ash trees and people often walk through these woods.
- Along Ridgeline and behind Ross Dining, as these are dense stands near pedestrian walkways and roadways.
- Ash trees near Twilight Hall and in other public parks, as these are high traffic areas with many potential targets.

Who can help survey?

- Facilities should do an annual monitoring of ash trees on campus and continuously survey when conducting grounds maintenance.
- Students in introductory biology and environmental science courses could conduct surveys as a part of a lab period in the spring. This would provide bi-annual monitoring by a large number of people.
- Volunteers should also be gathered to monitor ash trees on an annual basis between May and June, solicited from student groups on campus (Sunday Night Group, Campus Sustainability Coordinators) or local environmental nonprofits (Middlebury Land Trust, ACoRN).

What time of year will you conduct the surveying?

- May and June, after the insects emerge from the trees and begin to feed on leaves.

2. Action plan for monitoring

- Show EAB powerpoint to Middlebury College employees (by April 2015)
- Find volunteers to survey/monitor trees and show them the EAB powerpoint (by end of academic year)
- Volunteers will monitor ash stands in May or June and look for signs of the following:
  - Crown dieback, epicormic sprouting, bark splitting, high woodpecker activity, exit holes, and the insect itself.
- Involve students in monitoring, educate them on EAB symptoms (by 2016)
- Have classes looking for signs of EAB during spring semester (by the end of the next academic year)

3. Who to contact if signs of invasive pests are detected

Within the college, suspected sightings of EAB should be reported to Facilities Services at 802-443-5472.

If a college staff member or resident thinks he or she has an invasive pest, and visit http://www.vtinvasives.org/tree-pests/report-it for pest identification information and contact information for state and federal staff.
F. PLAN FOR TREE PROTECTION AND REMOVAL

1. Plan for preserving municipal trees using pesticides

<table>
<thead>
<tr>
<th>Question</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the town wants to preserve high value trees with pesticides then who will conduct the insecticide applications?</td>
<td>Tim Parsons, Middlebury College Landscape Horticulturalist, or Jeremy Gardener at Bartlett Tree Experts</td>
</tr>
<tr>
<td>Which pesticide will be used?</td>
<td>Imidacloprid</td>
</tr>
<tr>
<td>Is it safe?</td>
<td>We currently inject our campus elm trees with this insecticide. For more information, see this website: <a href="http://npic.orst.edu/factsheets/imidagen.html">http://npic.orst.edu/factsheets/imidagen.html</a></td>
</tr>
</tbody>
</table>

2. Plan for removing trees through a prioritized process

<table>
<thead>
<tr>
<th>Question</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe the process for prioritizing and designating trees for removal.</td>
<td>We will prioritize by risk, tree size, and proximity to targets.</td>
</tr>
<tr>
<td>Who will conduct the removals (college employees or tree care companies)?</td>
<td>Either college employees or contractors could remove the trees. Large jobs would likely be handled by outside groups.</td>
</tr>
</tbody>
</table>

G. DETERMINE HOW INFESTED WOOD WILL BE DISPOSED OF OR UTILIZED

A key aspect of reducing the spread of forest pests is properly disposing of or utilizing the wood, brush and stump grindings generated by the removal of infested trees.

1. Wood disposal sites

Site 1 – Location: The A. Johnson Co.  
995 South 116th Road Bristol, VT 05443  
Contact Name: Chris Breen  
Phone: (802) 453-4884

Site 2 – Location: Middlebury College Biomass Plant
H. PLAN RECOVERY EFFORTS

1. Intention
Replace 175 key ash trees with ornamentally significant native trees that are appropriate for our climate and offer a similar durability and longevity.

2. Total Cost Estimate
175 trees X $569 = $99,575

3. Replacements
Here is a list of native species that are appropriate the climate, offer similar durability and longevity to Ash, and are as commercially available as the Ash once was.

- Oaks (Quercus rubra, Q. bicolor, Q. macrocarpa, Q. palustris)
- Maples (Acer rubrum, A. saccharinimum, A. saccharum, A. x freemanii)
- Elm (Ulmus americana 'Princeton' or other DED resistant varieties)
- Hickories and Walnuts (Carya ovata, Juglans nigra)
- Hackberry (Celtis occidentalis)
- Birches (Betula nigra, Betula alleghaniensis)
- Tulip Tree (Liriodendron tulipifera)
- Tamarack (Larix laricina)
- Others (Ostrya virginica, Carpinus caroliniana, Nyssa sylvatica, Platanus occidentalis, Tilia americana, Populus deltoides)

4. Replacement costs broken down by size
In general, pricing for these trees would run as follows for wholesale / retail. (Tim Parsons has the ability to purchase trees at a wholesale rate through our nursery)

- 10 Gallon container ($88-$98 / $179- $199)
- 1.75" Caliper ($158 / $439)
- 2" Cal. ($198 / $569)
- 2.5" Cal. ($250 / $695)
- 3" Cal. ($325 / $995)
- 3.5" Cal. ($400 / $1195)
- 4" Cal. ($475 / $1395)

5. Park Design
In the area between Atwater Dining and Atwater Commons House, there are so many ash trees that we will need to cut them all down. In that empty space, we’ve designed a proposal for a park.

Possible Elements:
- Park tables and benches
- Adirondack chairs
- Fire pit
- Swing set
- Small field for pick-up games

Cost:

**Site work and lawn establishment:** $15,000

**Cost to plant one 2” tree:** $569

**Cost of planting 50 trees (50 X $569):** $28,450

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**Total cost for the park ($15,00 + $28,450):** $43,450*

*Does not include cost of tree removal or extras like benches, fire pits, swing set, etc

Design:

- to Atwater Commons House
I. ESTIMATE COSTS

1. Estimate costs and resources needed (funds, materials and labor) for each forest pest response action.

Removals: $253,490.00
Replacement trees: $99,575.00
Park at Weybridge: $43,450.00
Injections: $9,768.00

__________________________________
Total: $406,283.00

J. DEVELOP A PLAN FOR EDUCATING & COMMUNICATING WITH COMMUNITY MEMBERS

1. What communication method(s) will your community use to relay decisions and updates to your residents, elected officials and local businesses?

<table>
<thead>
<tr>
<th>Communication Method</th>
<th>Target audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Go link: go/EAB</td>
<td>Students, faculty and staff</td>
</tr>
<tr>
<td>College newspaper</td>
<td>Students and faculty</td>
</tr>
<tr>
<td>College website</td>
<td>Students, parents and faculty</td>
</tr>
<tr>
<td>MiddBeat</td>
<td>Students</td>
</tr>
</tbody>
</table>

Thank you for joining us in this effort against Emerald Ash Borer at Middlebury College. This important, advance planning will help minimize the invasion’s impact.

Contributors:
Matt Barr, Annie Beliveau, Drew Buchser, Jessica Chen, Anton Connolly, Courtney Devoid, Jacob Epstein, Robbie Faselt, Becca Hicks, Peter Howe, Austin Kahn, Jen Koide, Jess Parker, Matt Reala, Joao Rocha, Hannah Root, Alex Smith, Henry Thomson, Heather Tourgee, Karina Toy, Claire Treesh, Caroline Trowbridge, Linda Waller, Simon Willig, students in INTD 1127, Trees and the Urban Forest.

Tim Parsons, Middlebury College Landscape Horticulturist

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