Dealing with the Risks Posed by Ash Trees Killed by the Emerald Ash Borers

An introduction to the problem

Ash Trees throughout the state are dying due to emerald ash borer, and will continue to do so for the next several years. The resulting dead and dying ash trees along public roads and in public spaces are a significant challenge to municipalities, as they represent an increased risk due to the potential for damage and injury from failing trees.

This paper seeks to present a brief introduction to this problem. It uses numbers from two of Connecticut's communities – Hartford and Sprague – to illustrate the extent of this problem. Hartford's population from the 2010 census is 124,775 people, with approximately 200 miles of town-owned roads. In Sprague, the population in 2010 was 2,984 people and it has about 26 miles of road. Yet, in many ways, the problems are similar.

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Emerald Ash Borer and Connecticut's Cities and Towns

Background: the emerald ash borer (EAB) is an exotic beetle that attacks ash trees. It was first found in North America in 2002, in the Detroit area. In 2012, it was found in Connecticut.

There are no natural controls on EAB in North America. Unless steps are taken, this insect will be inevitably fatal to ash trees throughout the continent. In certain parts of the US and Canada, ash trees are a predominant tree and so the loss of these trees is of great concern.

In Connecticut, ash trees make up on average 2-3% of the population of trees. Locally, this number may be higher. It does approach 20% in parts of the state (see attached map). In spite of this low number, ash trees are ecologically and economically valuable within the state.

However, the purpose of this paper is to point out that, in urban areas, dead and dying ash trees have a high potential of becoming a significant public hazard. As they die, ash trees tend to lose branches and fall apart. These falling limbs could injure people and damage property, including cars and electric wires. Whole tree failure, where the tree topples over, is also of concern with EAB-infested ash trees. In a city or town with a street tree population of between 10,000 and 20,000 trees, this can mean anywhere from 200 to 600 street trees, or more, at risk of failure. This number of trees might be matched by a similar number of ash trees in parks and on other public properties.

For municipalities, the need to remove this many trees will seriously impact the budget. To give one example, in Sprague, 546 ash trees have been counted along town roads.[1] If all these trees were to be removed, the cost would total an estimated $312,700. This is without including stump-grinding or replanting costs.

EAB has already been found in about half of the state's municipalities. Within just a few years, it is expected to be found in all cities and towns in the state. It is typical, 5 to 10 years after the discovery of EAB in a community, for all untreated ash trees in that community to be dead.

In fact, given that the insect will often be in an area for 2-3 years before it is discovered, EAB may already be in all of the state's municipalities. It is time for all communities in Connecticut to be making plans regarding ash trees and the emerald ash borer.

Options for Municipalities Regarding EAB:

Insecticides can be effective in controlling EAB[2]. Depending upon insecticide, application can be through direct injection into the trunk of a tree, by injection into the soil around a tree or by painting the treatment onto the tree's bark. Costs will vary by insecticide and method of treatment. Generally, the aggregate costs for treatment (cost over time) are comparable with or less than the costs associated with removal of the tree. It is recommended that treatments continue over a ten year period. Over this time frame all nearby, untreated ash trees will succumb to the insect, causing the local EAB population to crash. Introduced bio-controls[3] should mitigate the effects of EAB as the population of ash trees returns to an area. If all goes well, once all untreated trees have died, treatments will no longer be required for the surviving ash trees.

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[1] This report is attached. State roads are excluded from this estimate. As indicated in the report, Sprague has approximately 26 miles of town-maintained roads. This indicates a high percentage of ash trees along these roads.

[2] At present, there are four insecticides being used to control EAB in Connecticut: imidacloprid, dinotefuran, clothianidin and emamectin benzoate. Each of these insecticides are systemic insecticides.

[3] The Connecticut Agricultural Experiment Station is leading this effort by releasing parasitic wasps in the state.

Using insecticides to retain ash trees allows these trees to continue to provide benefits for the surrounding community and allows for there to be a seed source for reestablishing the ash population.

It should be noted that there is no guarantee that treated trees will not succumb to EAB following the cessation of treatment. EAB itself may be more resilient than expected, or the bio-controls less effective. Also, 3 of the 4 insecticides used to control EAB are neonicotinoids. This is an additional consideration to be made in the context of recent concerns regarding this class of insecticides[4].

Treatments can be used as a tactic to control the rate of ash tree mortality. By staggering the need to remove trees, a community may improve its control over the budgetary burdens imposed by the insect.

Removal: The removal of ash trees can be an appealing option, as it eliminates any ongoing concerns regarding the trees removed. However, it also eliminates the benefits provided by those trees. Where appropriate, replacement of removed trees should be considered.

The condition of individual trees may also be a factor. In general, trees already in poor condition are better candidates for removal while vigorous trees are better candidates for retention and treatment with insecticides.

As previously mentioned, treatment and removal are often similar in terms of relative costs. These costs can vary greatly, however, for individual trees. For both removal and treatment, costs will differ depending upon the size of the tree. Removal costs are also highly influenced by such factors as location, adjacent hazards and the ease by which the wood can be removed.

Comparisons of estimated costs for removal and treatment are included in the attached reports from the Town of Sprague and the City of Hartford.

Utilization: This is less developed as an option. Ash wood is generally considered valuable and, when harvested as part of forestry practices, is of market interest for lumber, chips and firewood. However, sawmills tend to be less interested in street trees and most park trees, due to the uneven quality of the wood from these trees and the risk of embedded objects. More recently, interest in the use of urban wood has risen, due to the increased use of portable band-saw mills. The University of Connecticut[5] has been in the forefront in exploring the possibilities. The large extent of the potential urban wood resource, particularly in the wake of the EAB infestation, is a key incentive behind this exploration.

DEEP foresters have shown that the sale of ash logs to a logger can help offset the cost of tree removals in certain settings. In individual state parks, significant savings have been achieved by selling ash logs as timber rather than contracting for the removal of the trees. However, the success of these efforts has depended upon trees that are in good condition and in a favorable location for the logger to harvest.

Allow the Trees to Fall Apart in Place: This approach is very reasonable in wooded settings and other situations where the falling limbs and trees are not apt to do harm to people or property. In fact, under those circumstances, leaving these trees in place can provide benefits, in terms of wildlife benefit and other contributions to the ecosystem. The typical setting for this approach is unmanaged woodlands.

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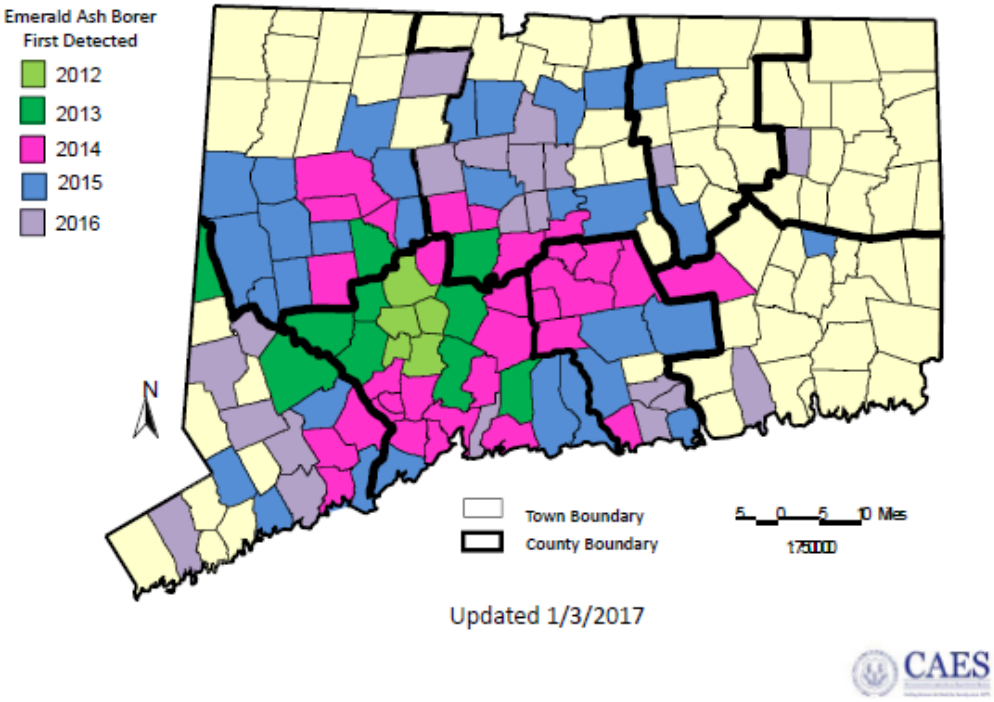
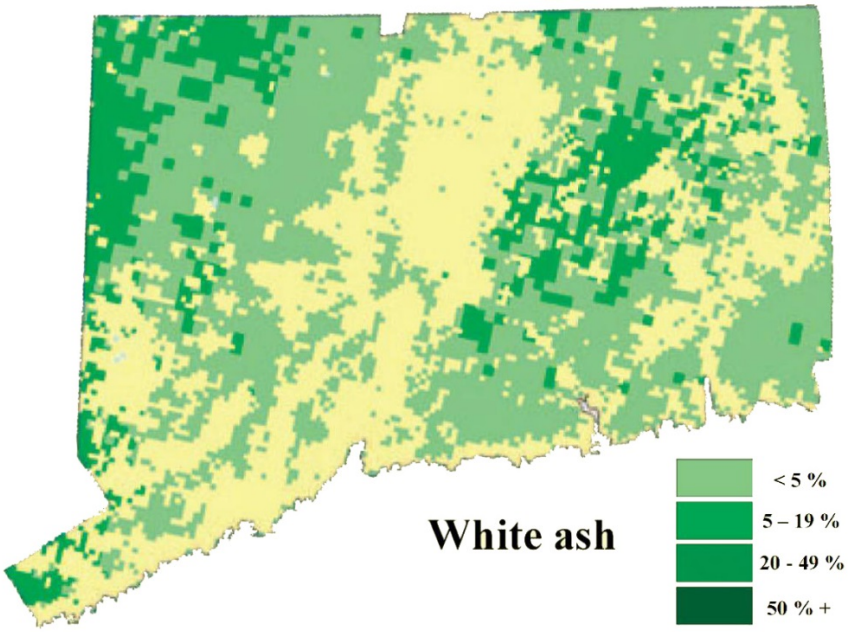
[4] As ash trees are wind-pollinated, many researchers consider that the impact of these treatments on insect pollinators will be minimal.

[5] This is largely through the work of Tom Worthley, Extension Forester with the University of Connecticut.

Maps indicating the known location of the emerald ash borer and the concentration of ash trees on forestlands in Connecticut



Towns in which the emerald ash borer has been discovered by year of discovery



Concentration of white ash by percentage of basal area in forestlands within Connecticut
(source – "The Forests of Connecticut", USDA Forest Service Northern Research Station Bulletin NE-160)

Ash Tree Survey Report
Town of Sprague, CT

A complete ash tree survey was conducted in the Town of Sprague, Connecticut by the Town Tree Warden at the request of Chris Donnelly, Forester for CT DEEP. The survey was done between July 10 and October 7, 2016 and encompassed 53 town roads for a total of 26 miles. Sprague is a small rural community in Southeastern Connecticut 13 square miles in area. All ash trees within the Town's Right-of Way (ROW) on each town road and ash trees located within 2 to 4 feet outside the ROW boundaries that have major stems or significant crowns over the town roads were included and measured for the survey. Additionally, common access areas at Sayles School, the River Park, Baltic Reservoir, ball fields, soccer fields and the access road to the Sprague Preserve were included in the survey.

Each ash tree within the ROW and on town property was posted with a lime green colored Emerald Ash Borer placard provided by the Connecticut Agricultural Experimentation Station (CAES) listing web sites for notification of dying ash trees. All ash trees surveyed on private property out of the ROWs were flagged with red or lime green tape. The placard and tape postings signified ash trees that were surveyed and were also intended to make residents more aware of the significant number of ash trees in town.

The following guidelines/conditions were used to conduct the survey and total costs:

- No trees smaller than 6 inches DBH were counted
- 11.2 miles of CT State roads were not included (responsibility of CT DOT)
- Due to extensive poison ivy, bittersweet and other vines, about one half of the tree measurements were actually caliper measurement for DBH
- Some ash tree DBHs were estimated from the roadway due to extreme bank pitch and excessive brush and vine growth around stands of trees
- During the period of the survey about 20 ash trees were removed by Eversource contractors as part of the Enhanced Tree Trimming program
- Several of the surveyed ash trees have been posted for removal due to declining health or safety concerns
- Cost for removal pricing guide was provided by the town's contracted tree company
- Cost for pesticide treatment uses an imidacloprid product applied as a ground drench or bark spray. The $3 per DBH includes material and labor and was provided by a licensed arborist
- Total cost of removal includes an allowance for grinding 40 stumps closest to roadways with an average 20 inch DBH at $3 per DBH
- Total cost of removal includes replacement of about one half of the removed trees at $200 per tree
- 106 hours were used to conduct the ash tree survey and report

As provided in the enclosed spread sheet, the total cost of removing 546 ash trees is estimated to be $312,700. Adding stump grinding and replanting about half of the removed trees brings the total cost to $365,100. The total estimated cost of pesticide treatment of all ash trees for one year is $29,377. Additional annual applications over 10 years to protect the ash trees until the main wave of EAB passes results in a total cost of pesticide treatment to $297,770.

Submitted:
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Tree Warden
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Town of Sprague Worksheet - Ash Trees

DBH	TOTAL ASH TREES BY DBH	COST PER TREE TO CUT	TOTAL COST TO CUT BY DBH CLASS	COST PER TREE TO TREAT PER YEAR	TOTAL COST TO TREAT BY DBH CLASS/YEAR	TOTAL COST TO TREAT DBH - 10 yrs.
6	3	$175	$525	$18	$54	$540
7	3	$175	$525	$21	$63	$630
8	9	$175	$1,575	$24	$216	$2,160
9	18	$175	$3,150	$27	$486	$4,860
10	25	$175	$4,375	$30	$750	$7,500
11	20	$175	$3,500	$33	$660	$6,600
12	57	$375	$21,375	$36	$2,052	$20,520
13	49	$375	$18,375	$39	$1,911	$19,110
14	50	$375	$18,750	$42	$2,100	$21,000
15	34	$375	$12,750	$45	$1,530	$15,300
16	47	$375	$17,625	$48	$2,256	$22,560
17	18	$375	$6,750	$51	$918	$9,180
18	31	$375	$11,625	$54	$1,674	$16,740
19	8	$500	$4,000	$57	$456	$4,560
20	35	$600	$21,000	$60	$2,100	$21,000
21	12	$600	$7,200	$63	$756	$7,560
22	14	$600	$8,400	$66	$924	$9,240
23	8	$600	$4,800	$69	$552	$5,520
24	19	$600	$11,400	$72	$1,368	$13,680
25	7	$900	$6,300	$75	$525	$5,250
26	13	$1,200	$15,600	$78	$1,014	$10,140
27	6	$1,200	$7,200	$81	$486	$4,860
28	8	$1,200	$9,600	$84	$672	$6,720
29	1	$1,200	$1,200	$87	$87	$870
30	10	$1,200	$12,000	$90	$900	$9,000
31	1	$1,400	$1,400	$93	$93	$930
32	3	$1,650	$4,950	$96	$288	$2,880
33	3	$1,650	$4,950	$99	$297	$2,970
34	6	$1,650	$9,900	$102	$612	$6,120
35	2	$1,650	$3,300	$105	$210	$2,100
36	4	$1,650	$6,600	$108	$432	$4,320
37						
38	3	$2,100	$6,300	$114	$442	$4,420
39						
40	8	$2,100	$16,800	$120	$960	$9,600
41						

42	3	$2,100	$6,300	$126	$378	$3,780
43						
44						
45						
46	3	$2,700	$8,100	$138	$414	$4,140
47	1	$2,700	$2,700	$141	$141	$1,410
48	2	$2,700	$5,400	$144	$288	$2,880
49						
50	1	$3,200	$3,200	$150	$150	$1,500
51						
52						
53						
54	1	$3,200	$3,200	$162	$162	$1,620
	546		$312,700		$29,377	$293,770
Stumpage	$3/dbh	40 x 20dbh	$2,400			
			$315,100			
Replant	250x$200		$50,000			
Totals			$365,100			$293,770

City of Hartford
Emerald Ash Borer Response Cost Estimates
Estimates based upon approximately 200 street trees and 600 park trees (800 total trees)

	Scenario 1 No treatment - removal of all ash trees & planting by contractors	Scenario 2 Treatment of half of the trees, removal of other half & planting by contractors	Scenario 3 Treatment of half of the trees by DPW or YSC* - removal of the rest & planting by contractors	Scenario 4 Trunk injection of half of the trees by contractors
year 1				
Removal	$190,000	$95,000	$95,000	$95,000
Treatment		$40,000	$30,000	$80,000
Replanting	$160,000	$80,000	$80,000	$80,000
	$350,000	$215,000	$205,000	$255,000
Year 2				
Removal	$190,000	$95,000	$95,000	$95,000
Treatment		$27,000	$20,000	
Replanting	$160,000	$80,000	$80,000	$80,000
	$350,000	$202,000	$195,000	$175,000
Year 3				
Removal	$190,000	$95,000	$95,000	$95,000
Treatment		$27,000	$20,000	$40,000
Replanting	$160,000	$80,000	$80,000	$80,000
	$350,000	$202,000	$195,000	$215,000
Three year total	$1,050,000	$619,000	$595,000	$645,000

Note: Scenarios 1-3 assume soil injection of imidacloprid. This treatment will need to continue annually for a total of up to 10 years at the rate indicated in years 2 and 3. Scenario 4 assumes trunk injection with emamectin benzoate. It should be repeated every other year. If trees to be treated are split into two groups and treated in alternate years, annual cost will be $20,000 per year.

* DPW is the Hartford Department of Public Works; YSC is the Youth Service Crew, also known as the Green Crew, from KNOX, Inc., a Hartford based non-profit.
Either group could work under the supervision of the Hartford City Forester, a licensed arborist. In this case, this in-house approach would lead to significant savings. Not all communities would have this option available to them.

Notes Regarding EAB numbers from the City of Hartford and the Town of Sprague

- **While the numbers (cost totals, individual expenses connected with removal and treatment) may seem different, looked at closely, they are reasonably similar.**
    - **For example, per tree removal cost in Hartford is about $712.50 per tree. In Sprague, it averages about $572.70 per tree. Two factors likely contribute to this $140 difference – first, Sprague's survey is much more detailed as to tree size and, second, removal and wood disposal would be expected to cost more in a crowded urban environment.**
    - **The Hartford estimates for treatment range more widely because they are including a variety of options, including use of two different (and differently priced) treatment systems and also treatment through in-house personnel and the use of contractors. The basic costs used, though, are very similar – essentially $3 to treat a tree per diameter inch, plus material costs. This assumes soil injection of imidacloprid.**
- **The context of the decision making between Sprague and Harford is apt to be very different, however. As Sprague is rural, with a great deal of forests alongside most of its roads, tree removal and the consequence of tree removal is apt to be seen as a simpler solution than it would be in Hartford. In Hartford, removing trees can complex due to obstacles to removal. Also, the individual trees along roads will often be seen as of greater importance to the residents of Hartford, due to the fact there are fewer trees on properties adjoining the roadways in the city.**
- **Removing trees for the sake of the timber value associated with these tree along roadsides is a specialized skill. Not all loggers are willing to become engaged in harvesting roadside trees. This has a significant impact of the merchantability of these trees, and the ability to offset removal costs.**
- **Another point in common for these two communities is the need for there to be a response now, before the situation progresses to where damage and injury is much more likely.**