Winooski Maple and Ash Tree Inventory Report

Prepared for the Town of Winooski by
UVM Rubenstein School Students with the help of the
VT Urban & Community Forestry (UCF) Program

March 2014

Acknowledgements

This project was initiated by the VT Urban & Community Forestry (UCF) Program (specifically Elise Schadler), the Rubenstein School of Environment & Natural Resources (specifically Dr. Kimberly Wallin), and the City of Winooski (specifically Peter Wernsdorfer).

Overview

In the spring of 2014, UVM students in the course FOR 235: Forest Ecosystem Health collected data on ash and maple trees planted within the public right-of-way in Winooski, Vermont. The project was initiated by VT Urban & Community Forestry (UCF) Program, the Rubenstein School of Environment & Natural Resources, and the City of Winooski.

Purpose

The project was conducted over the course of two field days, to assess overall street tree vigor of ash and maple trees while thoroughly checking for signs and symptoms of EAB and ALB. The following report is intended to summarize the results of students' findings and be used by the City of Winooski in a coordinated planning effort to prepare for EAB and ALB.

Project Partners

***UCF*:** The Vermont Urban and Community Forest Program assist municipalities in the care and maintenance of community trees. Currently, the organization is spearheading a number of projects to proactively help Vermont communities prepare for emerald ash borer (EAB) and Asian longhorned beetle (ALB), two non-native invasive forest pests that are major mortality agents of trees.

***UVM Rubenstein School*:** This project was carried out as part of UVM's Forest Ecosystem Health class taught by Dr. Kimberly Wallin. The goal for the class is to cultivate students' understanding of current issues relating to forest health. This project provided students with the opportunity to support this learning while helping the city of Winooski simultaneously.

***City of Winooski*:** The city of Winooski is comprised of approximately 7,300 residents in a 1.4 square mile area. The city was first incorporated in April 1st, 1921. Winooski takes pride in their natural wonders including their waterfalls and lovely river walk path. Both of these sites are enhanced by the urban trees within Winooski.

Context

Invasive forest pests are detrimental non-native species that have the potential to be detrimental to the function of forest ecosystems and can pose threats to specific species of trees and plants. The two species at the focus of this project were Asian longhorned beetle(ALB) and the emerald ash borer (EAB). Invasive species are introduced from other parts of the world, and often do not have any predators in the area(s) in which they are introduced. Without natural enemies they can often proliferate unchecked.

Asian longhorned beetle

The Asian longhorned beetle (*Anoplophora glabripennis*) is an exotic species native to Asia that is considered to be an invasive forest pest because of the impacts it has on a number of tree species. They tend to infest maple, boxelder, horsechestnut, buckeye, willow, and elm tree species (Dodds, et al. 2014). In this project we focused on identifying and inspecting all species of maple that were present along the public right-of-way in the City of Winooski.

Asian longhorned beetles are 0.75-1.50 inches long and are glossy black with white spots They also have long white and black antennas, shown in Figure 1. The male and female beetle look the same, the only difference is that the male is a little bigger (Asian longhorned Beetle, 2013).

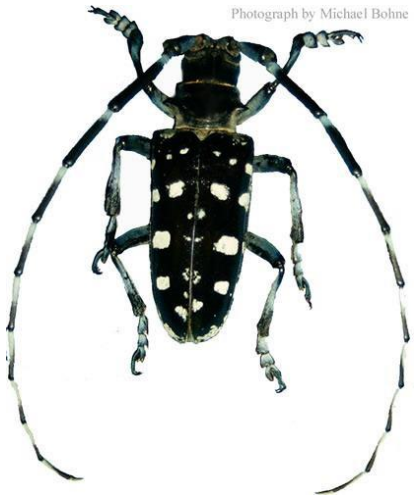

Figure 1: Asian longhorned beetle

ALB was introduced in the US in New York City, Chicago, New Jersey, Massachusetts, Ohio, and Canada (Shatz, et al., 2013) and has spread significantly. Figure 2 shows a map of forest types potentially at risk. The adults can be seen feeding on host trees during the late spring to fall. ALB can significantly disrupt a forest ecosystem if the beetle takes over the majority of the forest (Jiafu, et al. 2009).

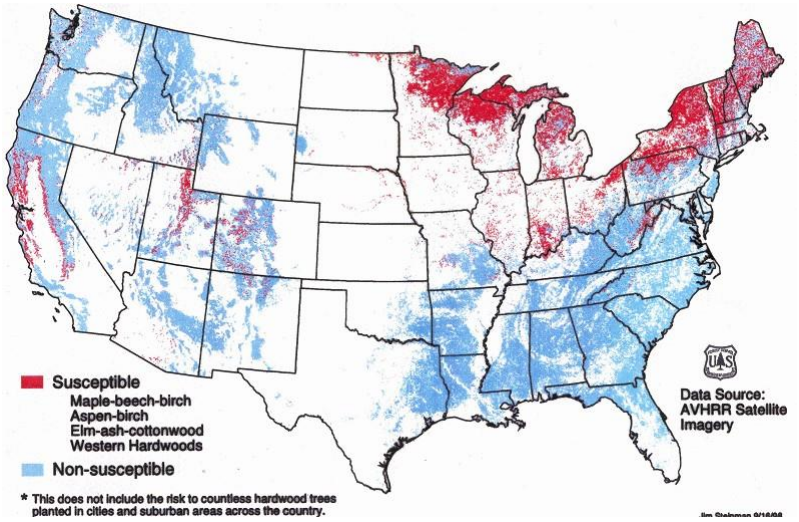

Figure 2: Forest types potentially at risk to Asian longhorned beetle

ALB infestations have caused the death of millions of trees; eradication efforts in places like New Jersey have been successful when the beetles have been detected early enough and where on-the-ground coordinated efforts have occurred (USDA, 2001). ALB has yet to be detected in Vermont. Research projects have been developed in order to understand how to manage ALB. These projects include learning their general biology and the impacts they have on trees (USDA, 2001). In order to prevent further spread, any tree that is infested is removed and either chipped or burned (Jiafu, et al. 2009).

The female ALB will chew through the bark straight down to the cambium or phloem, so they can lay their eggs (Dodds, 2014). One egg will be laid on the niche or site, which will create a visible scar on the surface on the tree (Shatz, et al. 2013). The scar tends to be oval or round and 0.5 inches in diameter (USDA, 2001). Asian longhorned beetle undergoes complete metamorphosis: egg, larvae, pupa, adult. The larvae overwinter and eventually go into their pupa state.

If a tree is suspected to be infested with the ALB, do not draw conclusions until an expert is able to inspect the tree. Do not use, dispose, or move any of the wood of the host species from the area. Finally,it is recommended to not plant trees that are Asian longhorned beetle host trees in areas that are at risk (Jiafu, et al., 2009). For more information on the signs, symptoms, impacts, and preparing for ALB, visit www.vtinvasives.org.

Emerald ash borer

The emerald ash borer (*Agrilus planipennis*) is an invasive beetle native to Asia that feeds on all species of ash trees. It was first detected in Michigan in 2002, has since spread throughout most of the northeastern and Midwestern U.S., and is now found in over 20 US states. The beetle will infest all species of ash trees and most infested trees will die within two to four years of infestation (McCullough, 2004). Adult EAB are 3/8 to 5/8 inch long with green elytra and a

copper abdomen, shown in Figure 3 below.

Figure 3: Emerald ash borer adult

Adult EAB leave distinct D-shaped exit holes in the bark when they emerge from under the bark of ash trees in June. Other signs of infection include canopy dieback, yellowing, and browning of leaves. Perhaps the most visible sign of EAB infestation is evidence of woodpecker flecking, commonly referred to as blonding. Most destruction of the tree is done by the larvae, which feed on the tree's conductive tissue that is used to transfer nutrients and water from roots to leaves. Emerald ash borers can fly over ½ mile from their emergence tree, but many infestations begin when infected ash firewood or nursery trees are moved into uninfected areas (Cappaert, 2005). EAB is now considered to be one of the most destructive invasive forest pests in North America. Figure 4 shows the current distribution of EAB; though yet to be discovered in Vermont, the insect has been found in all surrounding states and provinces. For more information visit www.vtinvasives.org.

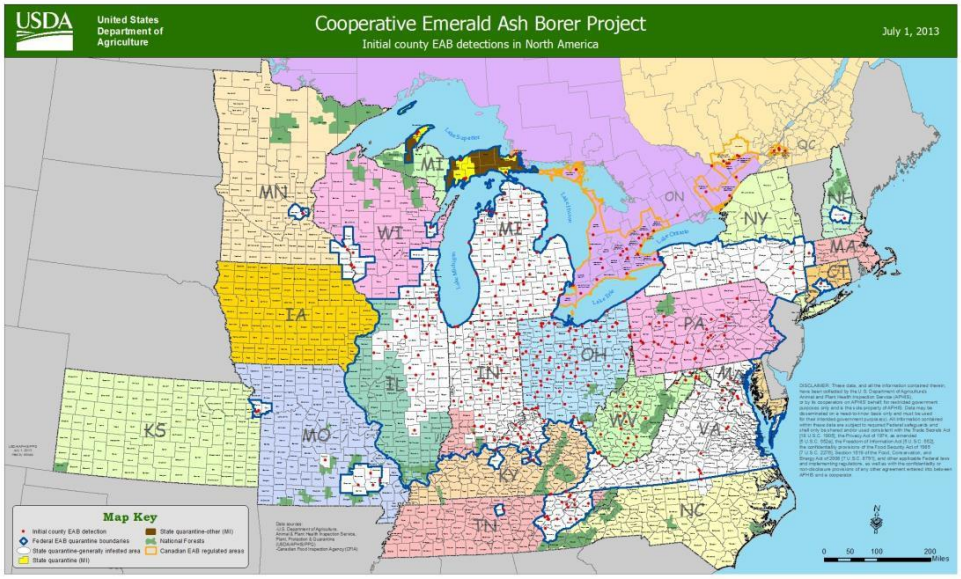

Figure 4: Current range of EAB.

Methodology

The Winooski ash and maple inventory was conducted by students in the Forest Ecosystem Health class taught by Dr. Kimberly Wallin through the Rubenstein School of Environment & Natural Resources. Based on a public tree inventory conducted by an employee with Winooski's Public Works Department, trees belong to maple and ash species were re-inventoried with a specific focus on checking for signs and symptoms of EAB and ALB. Elise Schadler with the Vermont Urban &Community Forestry Program coordinated the project.

Conducting this inventory required the class to be broken into small teams of three students each. Upon reaching the inventory site, Dr. Kimberly Wallin and Elise Schadler discussed the procedure and what to assess for on the ash and maple trees. The teams were then given a safety briefing and wore orange safety vests due to the busy urban environment and traffic patterns in Winooski.

Each team was tasked with locating trees and assessing the diameter, and overall health (good, fair, poor, dead) of each tree. Ash trees were assessed for the presence of: woodpecker holes and flecking, bark cracks, D-shaped exit holes, S-shaped galleries, and epicormic shoots, which could indicate the presence of EAB. Maple trees were assessed for the presence of: egg lay sites, dime-sized exit holes, frass, oozing sap, and bark cracks, which could indicate the presence of ALB.

To conduct the assessment, each team was given: a map identifying trees to be inventoried in specific neighborhoods and sections of Winooski, an inventory data collection sheet, and a diameter (dbh) tape for measuring the diameters of the trees.

Inventory Results

Data was collected on a total of 189 trees within the public right-of-way of the City of Winooski. Figure 5 shows the species of the trees surveyed. Norway and red maple accounted for the majority of the sample trees; both species are potential hosts for ALB.

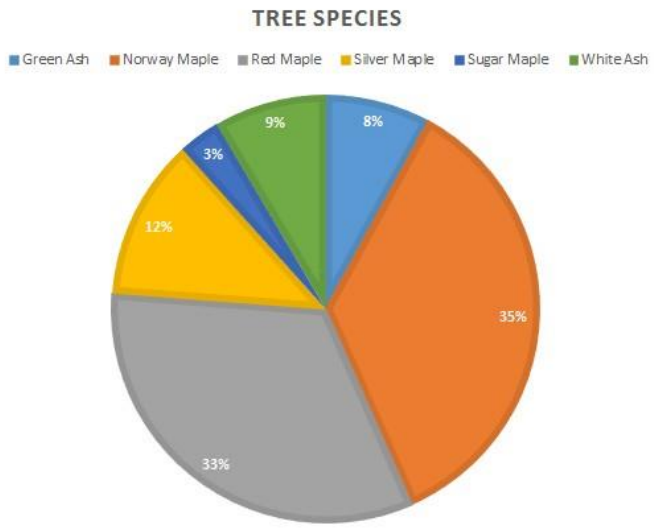

Figure 5: Species of trees surveyed.

Figure 6 shows the diameter distribution of the trees inventoried. The majority of trees surveyed were < 12' DBH, indicating a fairly young street tree population of both ash and maple trees in Winooski.

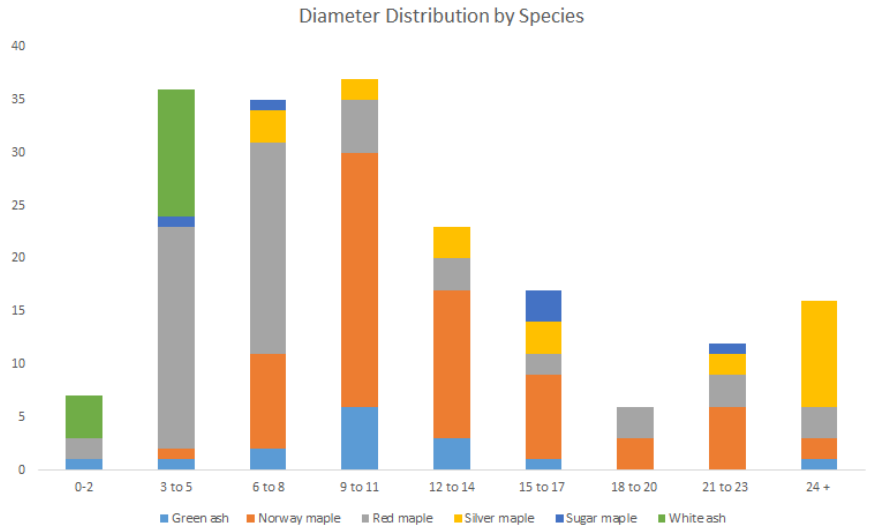

Figure 6: Diameter distribution by species.

The majority of the trees surveyed were in “good” health (157 out of 189 trees sampled) with increasingly smaller amounts in the categories of “fair”, “poor”, and “dead”, as seen in Figure 7 and Table 1. We found only two dead trees and both were red maple. Only eight trees were designated as in “poor” condition, six of which were Norway maples and two which were red maples. These are trees at greater risk of attack from ALB because of their lower overall vigor.

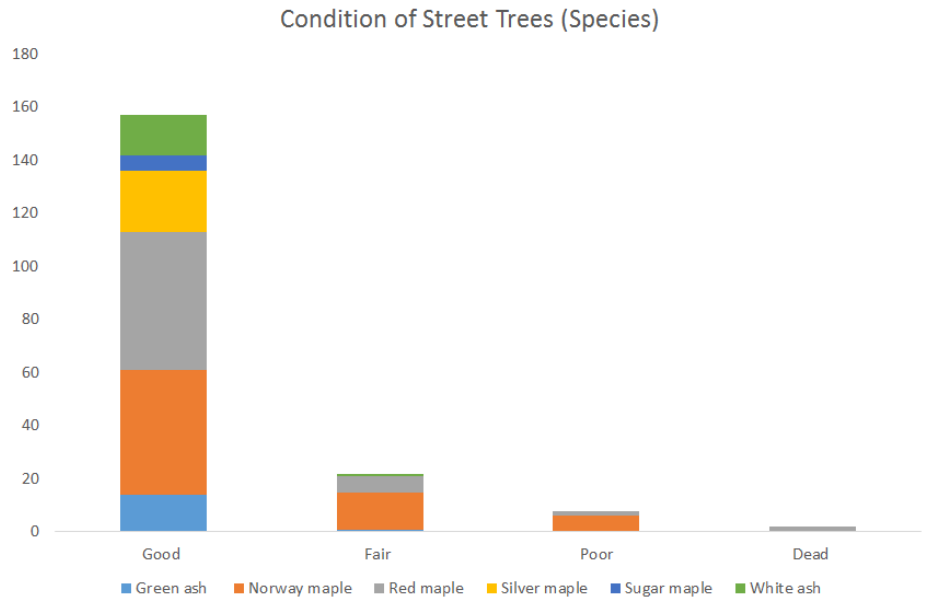

Figure 7: Condition of Winooski ash and maple street trees.

Table 1: Condition of Winooski street trees surveyed with total count and percent total.

	Count	% of total	Good	Fair	Poor	Dead
Green ash	15	8	14	1	0	0
Norway maple	67	35	47	14	6	0
Red maple	62	33	52	6	2	2
Silver maple	23	12	23	0	0	0
Sugar maple	6	3	6	0	0	0
White ash	16	8	15	1	0	0
Percent of total			83	12	4	1
Total	189					

Conclusion

Overall the results of the surveys indicated that the maple and ash street trees in Winooski were in generally good health. Additionally, no significant signs of EAB or ALB were present at the time of the survey. However we suggest routine surveys, especially of the trees reported in fair or poor health, to continue to ensure the health of the Winooski public trees, and to monitor for signs of EAB and ALB.

Further, we suggest that the City of Winooski continue to work with the VT Urban & Community Forestry Program to plan and prepare for the arrival of EAB and ALB. The Forest Pest First Detectors Program trains citizens to be on the look-out and to organize events in order to educate residents on the threats, signs, and preparation for these invasive forest pests. The website www.vtinvasives.org provides a wealth of resources and information about these pests and efforts made throughout nationwide and statewide to prepare for EAB and ALB. A vibrant and active urban forestry program that involves municipal staff as well as residents and active volunteers is an important first step to preparing for any threat to a city's trees.

Citations

Asian Longhorned Beetle, Coordinated by The University of Vermont. 2013. Asian Longhorned Beetle. Retrieved from http://www.uvm.edu/albeetle/index.html.

Cappaert, David; McCullough, Deborah G.; Poland, Therese M.; Siegert, Nathan W. 2005. Emerald ash borer in North America: a research and regulatory challenge. American Entomologist. 51(3): 152-165.

Dodds, K., Hull-Sanders, H., Siegert, N., Bohne, M. 2014. Colonization of Three Maple Species by Asian Longhorned Beetle, Anoplophora glabripennis, in Two Mixed-Hardwood Forest Stands. Insects (2075-4450). 5:105-119.

Jiafu, H., Angeli, S., Schuetz, S., Youqing, L., Hajek, A. 2009. Ecology and management of exotic and endemic Asian longhorned beetle Anoplophora glabripennis. Agricultural & Forest Entomology. 11:359-375.

McCullough, Deborah G.; Katovich, Steven A. 2004. Emerald Ash Borer. NA-PR-02-04. Newtown Square, PA: U.S. Dept. of Agriculture, Forest Service, Northeastern Area, State & Private Forestry.

Shatz, A., Rogan, J., Sangermano, F., Ogneva-Himmelberger, Y., Chen, H. 2013. Characterizing the potential distribution of the invasive Asian longhorned beetle (Anoplophora glabripennis) in Worcester County, Massachusetts. Applied Geography. 45:259-268.

USDA. 2001. Wanted: The Asian Longhorned Beetle. USDA-APHIS Program Aid. 1655:1-16