Emerald Ash Borer Predicted Impacts and Community Outreach in the City of Portland Oregon

By Kelley Deas

The emerald ash borer, or EAB, is an invasive wood boring beetle in the United States. It was originally discovered in Michigan in 2002 and was likely introduced through infested packing materials. EAB infests and kills all native species of ash and some planted varieties if they are not treated. On June 30th, 2022, EAB was discovered in Forest Grove, Oregon marking the first instance of EAB on the West Coast. My area of focus for this project is Portland, Oregon which is about 30 miles east of Forest Grove and has approximately 95,000 ash trees. EAB is one of the most destructive forest pests in the United States and its discovery in Oregon put the native Oregon ash at risk. EAB impacts trees most significantly in its larvae stage, where the larvae feed on the cambium layer of the tree. Over time this feeding cuts off the circulation of nutrients and water to the canopy of the tree. While trees work to compensate by putting out epicormic branches at the base of the tree, 99% of infested trees die because they do not have defensive mechanisms for this species. The adult EAB emerges from the tree between May and September and are small 1/2-inch metallic green beetles. They fly to nearby trees to feed on foliage and lay eggs on the bark before dying 3-4 weeks after emergence. Since the adult

Figure 1. Emerald Ash Borer, David Cappaert, Bugwood.org

EAB is not active for most of the year, signs and symptoms of the species are the best way to identify its presence. Things like woodpecker damage, bark splits, s-shaped galleries, canopy decline, epicormic shoots, and d-shaped boreholes are signs of EAB presence on ash trees.

Scientific Report

The tree canopy in Portland is not equally distributed citywide, so another question was how communities in neighborhoods that already have lower canopy cover be impacted by EAB. These neighborhoods are known as “Priority 1 Neighborhoods” and are based on areas that have less than 25% tree canopy coverage and are often lower income (Metro 2016). The City of Portland Oregon has a Park and Street Tree Inventory that includes information like the tree's location, condition, inventory date, etc. This information was used to create maps in ArcGIS that focused on the location, condition, and size of ash trees citywide to learn about potential impacts on communities from EAB. Per the City of Portland forthcoming EAB Plan, reccomendation for treatment on ash trees that were greater than 6-in diameter breast height (DBH) and in fair or better condition.

	Park Trees	Street Trees	Total Trees
Ash in Poor Condition	56 Ash	695 Ash	751 Ash
Ash Less Than or Equal to 6” DBH (ash in poor condition removed)	132 Ash	758 Ash	890 Ash

Total Trees Not Suitable for Treatment	188 Ash	1,453 Ash	1,641 Ash
Total Ash Trees in Inventory	**837 Ash**	**9,445 Ash**	**10,282 Ash**
Total Trees in Inventory	**25,740 Total Trees**	**227,136 Total Trees**	**252,875 Total Trees**

Table 1. Condition of ash compared to Portland's Citywide Tree Inventory.

Park Trees

Ash trees in parks are not distributed equally citywide, with Gabriel Park and Eastbank Esplanade having the most ash at 79 trees. Both properties do not fall into priority 1 planting areas, but the number of ash trees means it would cost more money to treat or remove impacted trees to reduce tree hazards in public spaces. In terms of the percentage of ash each park contained, Playhaven (Priority 1 Neighborhood) and Eastbank Esplanade had the highest percentage at 50% and 48% respectively. With this higher percentage of ash trees, these parks have lower biodiversity and risk losing more trees than other more diverse properties. Trees that do not meet the parameters for treatment that would eventually be removed or die from EAB impacts were recorded to understand potential tree loss, Cully Park (Priority 1 Neighborhood) and Playhaven Park (Priority 1 Neighborhood) had 19% and 8% of these trees respectively. These trees are not good candidates for treatment and trees that are not treated will eventually be impacted by EAB. Since these trees are smaller, removal and replacement with more diverse species gives new trees time to grow and increase canopy cover.

Street Trees

Ash trees along streets are also not distributed equally citywide, with South Portland and Richmond having the most ash trees at 525 and 402 respectively. In terms of the percentage of ash each neighborhood contained, Colins View has the highest percentage of ash, but the dataset contained only 96 trees which was a low number for a whole neighborhood. The top 5 neighborhoods that contained the highest percentage of ash fell into the west side of Portland; an area known to have dense canopy cover. According to Jeff Ramsey, GIS Coordinator with the City of Portland Urban Forestry, these trees either fell into natural areas that were not included in the inventory, were on private property, or in areas that were not safe for volunteers to collect data. Trees that do not meet the parameters for treatment that would eventually be removed or die from EAB impacts were recorded to understand potential tree loss, Sunderland (Priority 1 Neighborhood) and Collins View had 7% and 5% respectively.

Business Report

The City of Portland Urban Forestry is responsible for monitoring and maintaining public trees in the city of Portland which include parks, natural areas, and street trees. According to the "About Urban Forestry" webpage, Portland's Urban Forestry program works to implement the City of Portland's Urban Forest Management Plan, work with community collaboration and tree stewardship, develop tree policies and programs, monitor, and assess the urban forest, and issue permits for tree work or removal. This organization has three main work groups: Tree Maintenance Operations, Permitting and Regulations, and Science, Outreach, and Planting. I worked in the Science, Outreach, and Planning workgroup and focused on getting information out to the public. I created quad-fold pamphlets that showed identification and impacts from this species along with reporting information. Multiple trainings were led online and in-person for the

City of Portland Staff, The City of Portland Teen Nature Team, and the public throughout this internship.

This was an unpaid internship that required ArcGIS software and printing access, so low upfront cost to the organization. While my internship was low cost, the cost to manage EAB in the future is more significant depending on the route Portland decides to take. According to the forthcoming EAB plan, the cost to treat trees that are at least 6 inches DBH and remove the rest would be approximately $2,904,500. While park trees are relatively straightforward with management, the responsibility of street trees falls to the adjacent homeowner after 3 years from initial planting, so this cost is more uncertain and depends on the homeowner. If the City of Portland took over management for the treatment or removal of ash street trees under the same parameters (at least 6 inches DBH) it would cost approximately $30.2 million.

The science and business of this research is all meant to provide information or a foundation for additional work. 480 hours over an internship is not enough time to do outreach and build relationships with neighborhoods throughout Portland, but it is enough time to start building materials. In terms of value, I provided materials that can be used in the future to inform communities with the quad-fold EAB guide and recorded PowerPoint training. I also provided materials that can be used in the future, such as a pop-up arboretum sign for ash trees and a decision guide for ash trees. I created maps based on the forthcoming City of Portland EAB guide and helped organize data with the tentative parameters for treatment and removal. Since this plan has not been approved as of the completion of the internship, the maps are meant to inform decision-makers on the location, condition, and size of ash.

In terms of my learning, there were various trainings that I was able to attend to broaden my knowledge of EAB and other invasive species work being done. I attended training led by

Oregon State University (OSU) in person at Cathedral Park in Portland, OR, and online through OSU via the Oregon Pest Detector course. The two trainings I was able to attend in Forest Grove with the Oregon Department of Forestry and the Oregon Department of Agriculture helped me understand the scope of response from various organizations statewide. The City of Portland Urban Forestry sent me to Oregon's Urban Forestry Conference; this opportunity helped me connect with professionals in the field from the public and private sectors. I am thankful for the opportunity to develop this internship project in conjunction with OSU and the City of Portland and appreciate the support given by both groups to complete it.

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Kelley Deas Biography

Kelley was born in Woodland Hills California and spent the beginning of her life in Santa Clarita, California before moving to Corvallis, Oregon for college in 2014. She discovered a passion for Environmental Sciences and the outdoors quickly in the beautiful Pacific Northwest. In 2017, after 3.5 years she received her undergraduate and moved back to Southern California, but realized the PNW was home and moved back just a few months later. After graduation she worked as a server and a pre-school teacher but received an opportunity to work as an intern in transportation demand management at South Metro Area Regional Transit (SMART) in Wilsonville, Oregon and got a second job as a Seasonal Park Ranger with Portland Parks and Recreation. She continued to be a full-time Park Ranger with the City of Portland and once COVID hit, decided to return to school to pursue her professional science master's degree in environmental sciences. She now works as a Park Ranger Supervisor with the City of Portland and completed her internship with Urban Forestry with the City of Portland. She hopes to

continue working with invasive species past graduation and to continue to connect with the beautiful outdoor spaces in the PNW.