Emerald Ash Borer Information Packet

A Novel Solution for a Disastrous Situation

Updated: 2/24/17

Purpose of this report: There is an urgent need for State support to help protect our incredibly valuable community forests from the impending devastation caused by the terrestrial invasive, the Emerald Ash Borer (EAB). This report provides a synopsis of the EAB problem and how a landscape or regional-based management approach is best for the environment and most cost effective. It also provides key facts about tree benefits and attachments that include a one-page "infographic" of the issue, a description of a proposed statewide program to manage the infestation, and numerous references to supplemental information.

The problem: The preservation of our community forests is at a crucial point. Current public tree deaths far outpace tree replacement and the emerald ash borer (EAB) is on track to kill the approximately one billion ash trees in the State. It is already burdening many communities throughout the State, and will eventually overrun every community's ability to respond effectively. The statewide community tree survey conducted by the Minnesota Department of Natural Resources in 2010 found that ash trees comprise approximately 20% of our community forests on average, but many communities have ash tree populations totaling as much as 40%.[1] The loss of these trees will have a profound effect on everyone living in Minnesota. Just as epidemiologists cannot effectively fight a human epidemic city by city, EAB cannot be effectively fought city by city. Unfortunately, that is exactly what is happening throughout the counties where this 'predictable disaster' has been detected to date.[2] Peer-reviewed studies have confirmed that a coordinated, landscaped-based strategy is more cost effective and environmentally sound than a city-by-city approach. In other words, we need a statewide program to help cities manage this infestation.

Minnesota cities will have limited ability to manage the significant new costs from EAB, especially the peak-period costs.[3] Also, cities that do not preserve their healthy trees will

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[1] "Rapid Assessment of Ash and Elm Resources in Minnesota Communities," Minnesota Department of Natural Resources, 1/5/07.
http://files.dnr.state.mn.us/assistance/backyard/treecare/forest_health/ash_elmRapidAssessment/rapidassessment_AshElm.pdf

[2] Refer to the following site for the current status of the infestation in Minnesota: http://gis.mda.state.mn.us/eab/

[3] "The municipal [forestry] budget impact approximately doubled during the peak years (5–8 years post state confirmation) … and was even greater and approximately triple in cost at the peak around year eight." "Effects of emerald ash borer on municipal forestry budgets," Richard J. Hauer, Ward D. Peterson, *Landscape and Urban Planning,* Volume 157, Jan. 2017;
http://www.mnstac.org/uploads/2/0/9/3/20933948/effects_of_emerald_ash_borer_on_municipal_forestry_budgets.pdf

experience an explosive increase in the number of dead trees. Ash trees killed by EAB become brittle very quickly and become a public hazard threatening overhead cables and power lines, vehicles, buildings, and people. The original management strategy for EAB relied upon more than a decade ago was to control the damage by removing trees in order to limit the beetles' food supply. Unfortunately, the strategy was a failure. It wasted public resources to remove and replace healthy trees, destroyed public investments in green infrastructure, and it shifted the burden to property owners as the beetles find and attack private trees. For many years now, scientists have agreed that the most effective strategy is to reduce the number of beetles, not their ubiquitous food supply.[4]

Tree value: In many Minnesota cities and towns, our community forests are some of the most valuable infrastructure providing both economic and environmental benefits. The average community ash tree in the state of Minnesota provides approximately $170 in benefits annually.[5] We need our community forests, and we need to work together to preserve them for generations to come. While the aesthetic value of trees is easily grasped, scientific studies have also quantified their environmental and economic value, as well as their value in reducing health care costs. For example:

- Urban stormwater runoff is a major source of pollution for our water resources, and trees serve as one of the most cost effective mitigation methods for this non-point source pollution as well as stormwater management. An average ash tree will intercept about 1,800 gallons of stormwater annually, which reduces peak flows and flooding during storms.[6]

- The average ash tree will reduce CO_2 by nearly a half a ton every year.[7]

- The evaporation from a single tree can produce the cooling effect of ten room-size air conditioners operating twenty hours a day.[8]

- Trees also reduce health care costs and when EAB kills them, people also die. An analysis by U.S. Forest Service scientists estimated that in 2010, trees in the urban areas of Minnesota removed 4,600 tons of pollutants from the air and that this resulted in $26.7

[4] "Wholescale removal of ash trees to simply reduce ash phloem, however, is not an optimal strategy for EAB management. Mercader et al. (2011a) compared effects of treating merchantable ash trees with TREE-äge™, using those same trees as girdled trap trees, or simply destroying those trees to reduce ash phloem. Their simulations showed ash removal was less effective at slowing EAB population growth than either of the other options and would ultimately accelerate EAB spread." Source: "Developing and integrating tactics to slow ash (Oleaceae) mortality caused by emerald ash borer (Coleoptera: Buprestidae)," Deborah G. McCullough, Rodrigo J. Mercader, Nathan W. Siegert, *The Canadian Entomologist* / Volume 147 / Special Issue 03 / June 2015, pp. 349-358. Downloaded: http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=9694874

[5] Source: National Tree Benefit Calculator: http://www.treebenefits.com/calculator/treeinfor.cfm?zip=55118&city=SAINT%20PAUL&state=MN&climatezone=Midwest

[6] Ibid.

[7] Ibid.

[8] Downloaded 9/4/15: http://www.ncsu.edu/project/treesofstrength/benefits.htm

million in reduced health care costs.[9] Another recent U.S. Forest Service analysis showed that the spread of EAB across 15 states was associated with an additional 15,000 deaths from cardiovascular disease and an additional 6,000 deaths from lower respiratory disease.[10]

The solution: Recent scientific advances have resulted in an integrated pest management approach that includes detection techniques, pest control measures, and the protection of high value, healthy trees. This coordinated strategy could preserve about four times as much of the tree canopy and tree value over twenty years as the outdated approach yet cost half as much.[11] Furthermore, it would help protect untreated private ash trees that are nearby. A statewide management program could incorporate these best management practices and provide incentives for cities to adopt them.

History of State support for community forests: State action can be swift and effective. According to the 2008 Minnesota *Forest Protection Plan*, Minnesota invested "nearly $30 million a year for six years in response and replacement funds" during the initial years of Dutch elm disease. Since then, "State partnership with local governments in this control of invasive species, such as Dutch elm disease, has dwindled to no state appropriation."[12] This State support was a crucial investment that resulted in the green and vibrant community forests that currently grace our cities and towns. EAB is an even greater threat yet there is still no substantive State support to help communities protect their forests from this invasive species.

MnSTAC objectives: For many years now, the Minnesota Shade Tree Advisory Committee (MnSTAC) has worked on this issue with representatives from the League of Minnesota Cities, scientists, local governmental representatives, state agencies, and state legislators.[13] The group's Legislative Committee has collaborated with others to develop and lobby for bills before the Legislature that would help cities manage the infestation. The group's objectives include the following:

- Convince the appropriate state agencies and Governor Dayton to include adequate funding for cities in the state budget.

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[9] The health impacts and their monetary values are based on the changes in NO_2, O_3, $PM_{2.5}$ and SO_2 concentrations using information from the U.S. EPA Environmental Benefits Mapping and Analysis Program model (http://www.epa.gov/air/benmap/).

[10] "Exploring Connections Between Trees and Human Health," *Science Findings*, Pacific Northwest Research Station, U.S. Forest Service, Jan./Feb. 2014, http://www.fs.fed.us/pnw/sciencef/scifi158.pdf

[11] *A Proposal to Create the Minnesota Ash Tree Preservation Program*, Jeffrey M. Hafner and J. Michael Orange, September 2014.

[12] 2008 MN Forest Protection Plan: http://mn.gov/frc/docs/MFRC_ForestProtectionPlan_2008-01-01_Report.pdf

[13] In January 2015, the Minnesota Community Forest Partnership (MCFP) Group was organized. The group includes forestry scientists and experts from the US Forest Service, three State agencies, and the University of Minnesota and Michigan State University; and representatives from the Minnesota Nursery and Landscape Association, Tree Trust, MnSTAC, and private companies. The group developed a bill to establish a new program with funding of $13 million per year in State funds to provide technical assistance, guidance, and matching grants to communities. It also included funding for research regarding pest control, diseases, and other threats that affect community forests. Unfortunately the bill was not approved at the 2015 Legislative session. Before the 2016 Legislative session, members of the MCFP Group reorganized as the Legislative Committee of MnSTAC.

- Continue to lobby for Legislative approval of a state-sponsored program to help cities manage the infestation.
- Request appropriate state departmental Commissioners to hold hearings around the State to discern the levels of community preparedness, listen to the concerns of the citizens and local officials, and to promote the importance of State support for community forests.
- Collaborate with cities and counties to initiate the integrated pest management approach described above at a countywide or region-wide scale.
- Continue to collaborate with forestry scientists and experts, urban foresters, city managers, etc. and serve as an informational clearinghouse for the advancement of EAB management.

The time to act is NOW: EAB continues its deadly march through our State, and delayed action will only increase losses and costs. Swift action is needed, before the infestation exponentially increases in population, and tree deaths explode as seen in other cities. As the pest population increases and a greater number of trees die, the number of management options goes down and the costs and losses go up.

Other sources of EAB information:

- MnSTAC "A Call to Action"
- "Minnesota is Losing Its Community Forests," Minnesota Community Forest Partnership Group, April 2015
- Emerald ash borer resources from the MN Dept. of Agriculture
- *Model Emerald Ash Borer Management Plan,* Jeffrey M. Hafner and J. Michael Orange, updated September 2014. Available upon request from Jeffrey Hafner, jhafner@rainbowtreecare.com
- http://www.emeraldashborer.info/
- http://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/index.shtml
- http://www.mda.state.mn.us/plants/pestmanagement/~/media/Files/plants/eab/eabtreatmentguide2.ashx
- http://www.emeraldashborer.info/files/multistate_eab_insecticide_fact_sheet.pdf

Attachments:

1. MnSTAC's "infographic" of the EAB issue
2. Frequently Asked Questions About the Need for State Support for Community Forests
3. Two-page summary of "A Proposal to Create the *Minnesota Ash Tree Preservation Program*"

About the Minnesota Shade Tree Advisory Committee (MnSTAC): Since 1974, MnSTAC has been advising the legislative and executive branches on the best ways to preserve, protect, expand, and improve Minnesota's community forests. We also fulfill a federal funding requirement by serving as the state's urban forest council, which accounts for a large percentage of the funding used in our urban and community forestry programming. With the support from our 400 members who represent a broad spectrum of tree-related interests, MnSTAC provides information to local community tree programs throughout the state.

ATTACHMENT 2

Frequently Asked Questions About the Need for State Support for Community Forests

Updated: 7/20/16

Q: Why should the State get involved? It's a local responsibility.

A: The Emerald Ash Borer (EAB) is the most destructive and economically costly forest pest ever to invade North America. The best approach to an EAB infestation is to fight it like a human health epidemic. Just as epidemiologists cannot fight a flu epidemic city by city, EAB cannot be efficiently fought city by city. Peer-reviewed studies have confirmed that a coordinated, landscaped-based strategy is more cost effective that a city-by-city approach. Furthermore, few cities are prepared and no city can easily afford the costs and the liability threats. Ash trees killed by EAB become brittle very quickly and will begin to fall apart and threaten overhead cables and power lines, vehicles, buildings, and people.

Q: Isn't the State doing enough already?

A: Delayed action will increase losses and costs. State action can be swift and effective. Minnesota invested nearly $30 million a year for six years in response and replacement funds during the initial years of Dutch elm disease.[14] EAB is an even greater threat. However, there is no substantive State support currently to help communities protect their forests from this invasive species.

Q: Why not just eliminate the beetles' food supply by removing and replacing all the urban ash trees?

A: This is the original thinking at the start of the infestation more than a decade ago in cities first hit by the infestation, but the strategy was a failure. It wastes public resources to remove and replace healthy trees, destroys public investments in green infrastructure, and impacts human health. An analysis by U.S. Forest Service scientists concluded that, "[T]he spread of EAB across 15 states was associated with an additional 15,000 deaths from cardiovascular disease and an additional 6,000 deaths from lower respiratory disease."[15] Furthermore, other studies show that a removal-only strategy is ineffective at slowing the spread, it may even increase it because the beetles can just fly further to find host trees. We now know that the most effective strategy is to reduce the number of beetles, not their ubiquitous food supply.

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[14] 2008 MN Forest Protection Plan: http://mn.gov/frc/docs/MFRC_ForestProtectionPlan_2008-01-01_Report.pdf

[15] "Exploring Connections Between Trees and Human Health," *Science Findings*, Pacific Northwest Research Station, U.S. Forest Service, Jan./Feb. 2014, http://www.fs.fed.us/pnw/sciencef/scifi158.pdf

Q: If eventually EAB will kill virtually every ash tree, shouldn't we spend the money to replace them now rather than incur the cost of treatments only to replace them later?

A: Trees are the only urban infrastructure that increases in value as they age. Just as with grey infrastructure, green infrastructure investments—including trees—require maintenance to preserve the benefits over the expected lifespan of the investments. However, unlike a sewer line replacement, for example, it can take 30 years before the annual benefit of a new tree matches that of a mature ash tree removed because of EAB.[16]

The best news is that, compared to the old strategy of just removing and replacing the trees, an integrated pest management approach that includes protecting healthy trees with pesticide treatments can preserve about four times as much of the tree canopy and tree value over twenty years, cost half as much, and avoid peak period costs.[17] Treatments not only preserve public trees and dollars, they can also help protect untreated private ash trees that are nearby.[18] As one national expert says. "There is no reason for a landscape ash tree to die from emerald ash borer anymore."[19]

Q: What should the State do?

A: The State should establish a new program with funding of $13 million per year to provide technical assistance, guidance, and matching grants to communities.

[16] McPherson, E.G., Simpson, J.R., Peper, P.J., Maco, S., Gardner, S., Cozad, S., et al., 2005. City of Minneapolis, Minnesota Municipal Tree Resource Analysis. Center for Urban Forest Research, USDA Forest Service, Pacific Southwest Research Station. http://www.treesearch.fs.fed.us/pubs/45984

[17] "The municipal [forestry] budget impact approximately doubled during the peak years (5–8 years post state confirmation) … and was even greater and approximately triple in cost at the peak around year eight." "Effects of emerald ash borer on municipal forestry budgets," Richard J. Hauer, Ward D. Peterson, *Landscape and Urban Planning,* Volume 157, Jan. 2017

[18] *A Proposal to Create the Minnesota Ash Tree Preservation Program*, Jeffrey M. Hafner and J. Michael Orange, September 2014.

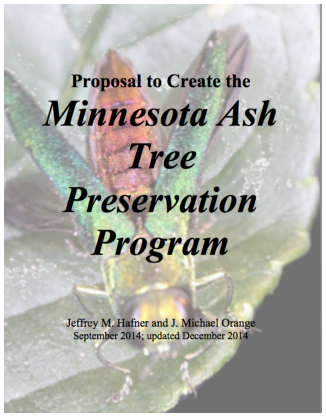
[19] "Emerald ash borer treatments costing less, working better," *Minneapolis StarTribune*, 8/8/13: http://www.startribune.com/local/south/218936301.html

ATTACHMENT 3

Summary
"Proposal to Create the Minnesota Ash Tree Preservation Program"

Jeffrey M. Hafner and J. Michael Orange
August 2016 (full report available upon request)[20]

Introduction: In the spring of 2013, Dr. Robert Haight, an economist at the St. Paul office of the U.S. Forest Service, and three other scientists published a seminal report regarding the management of the invasive species, the emerald ash borer (EAB), which threatens every one of the billion ash trees in Minnesota. Their peer-reviewed analysis, known as the Kovacs Study,[21] concluded that a regional or landscape-based management and funding strategy would more effectively control the infestation in urban forests than an inconsistent, city-by-city response, or no response. Early in 2014, Jeffrey M. Hafner and J. Michael Orange worked with Dr. Haight to take the Kovacs Study conclusions a step further. They prepared a cost-benefit analysis of a statewide EAB management program they called the Minnesota Ash Tree Preservation (ATP) Program. The ATP Program they propose would include state-funded loans and grants for public entities that manage urban forests to enable them to develop and implement landscape-based EAB management plans for public ash trees.



Synopsis of the report: The proposal has three parts. The first part examines the approximately 880,000 public ash trees that are in the urbanized areas of the seven-county Twin Cities region because reliable data was available. The cost-benefit analysis covers a 20-year study period and includes two primary scenarios—a Base Case that relies exclusively on removal and replacement of all ash trees, and a second scenario called the Ash Tree Preservation (ATP) Plan. The ATP Plan includes pesticide treatments using trunk-injected emamectin benzoate to inoculate high-quality ash trees located on public property. The second part of the analysis uses the regional results to generate statewide estimates for the two scenarios. In order to provide a sense of scale of the potential costs and benefits of the proposed state-funded ATP Program, the third part of the analysis includes reasonable assumptions about city participation rates (75% of cities with populations 3,000 or larger), state matching grant rates (approximately 50% of total EAB management costs), and program administrative costs.

The Base Case assumes that new trees will replace all public ash trees in the urban forests of participating cities throughout the State. The ATP Plan scenario assumes participating cities will preserve their healthy public ash trees (approximately 570,000 trees statewide), and they will plant new trees for low-quality ash trees as they succumb to EAB. The following summarizes the findings:

Minnesota ATP Program costs: 20-year total ($246 million), average annual ($12.3 million).
Average annual benefits: The following estimates list the average annual benefits over the 20-year study period provided by the trees in the ATP Program compared to the trees in the Base Case scenario:

- **Overall economic value of preserved ash trees and new replacement trees:** $177 million more.
- **Increased property value:** $28 million more.

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[20] Jeffrey M. Hafner is the Director of Municipal Consulting for Rainbow Treecare. J. Michael Orange is the Principal of ORANGE Environmental, LLC. Dr. Robert Haight, research economist with the US Forest Service, vetted this analysis. To receive a copy of the full report, contact Michael Orange: orange_michael@msn.com or 952-905-1448.

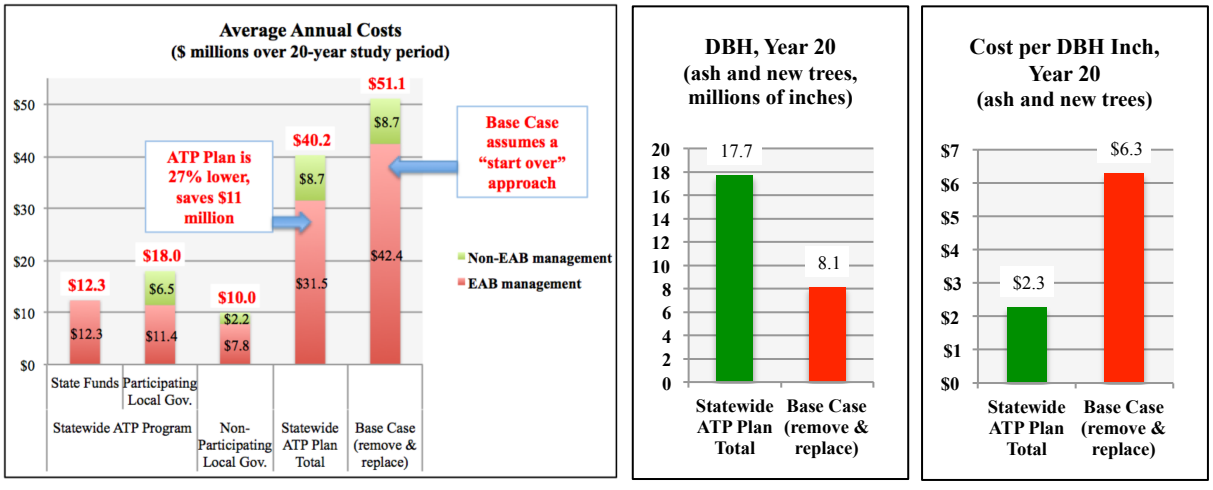
[21] Kovacs, Kent. F.; Haight, Robert G.; Mercader, Rodrigo J.; McCullough, Deborah G.; "A bioeconomic analysis of an emerald ash borer invasion of an urban forest with multiple jurisdictions." *Resource Energy Econ*. (2013), http://dx.doi.org/10.1016/j.reseneeco.2013.04.008

- **Increased stormwater interception:** 1.8 billion additional gallons.
- **Household offsets of energy consumption:** The additional energy conservation from the trees in the ATP Plan scenario is equivalent to the average annual energy consumption of 17,500 Minnesota households.
- **CO_2 reduction:** The additional CO_2 reduction from the trees in the ATP Plan scenario is equivalent to the average annual CO_2 emissions from 2,100 Minnesota households.
- **Reduced heath care costs:** $800,000 more in reduced costs.

Cost-Benefit comparison: The following figures compare the average annual benefits for every dollar of cost for the ATP Program over the 20-year study period:

- **Increased property value:** $4
- **Stormwater interception:** .....140 gal., $5
- **Energy conservation:** $4
- **Air quality improvement:** $0.70
- **CO_2 reduction:** .....33 lbs., $0.50
- **Overall economic value:** $14

Charts: The below-left chart compares the average annual costs for the statewide management of public ash trees in urban forests. The first two bars on the left show that State funds ($12.3 million) plus local matching funds ($11.4 million) would be needed to manage the infestation for the cities that participate in the proposed ATP Program. Local governments would spend an additional $6.5 million on other urban forest expenses. The 25% of cities that are assumed to not participate in the ATP Program (the third bar) would spend about $10 million on their urban forests (including EAB management). The fourth bar shows the total amounts for these three bars—$40.2 million annually for statewide urban forest management in the ATP Program (which also includes the costs for the non-participating cities). The rightmost bar is the Base Case scenario ($51.1 million), which assumes a "start-over" approach for the pubic ash trees. The chart shows that the public costs (local and state) for the ATP Program are 27% lower and save about $11 million annually compared to the Base Case (which is 100% local). The middle chart illustrates tree canopy as indicated by trunk size or DBH (diameter at breast height)[22] for all trees in Year 20. The ATP Plan would result in more than twice as much tree canopy compared to the Base Case. The final chart combines costs and tree canopy and shows that the Base Case costs almost three times as much as the ATP Plan on a per-inch basis.



[22] DBH is used here as a surrogate for tree canopy.