The Colorado Emerald Ash Borer Management Plan Creation Guide

Considerations and Supplemental Resources to Assist with EAB Management Plan Development

Compiled by the Colorado Emerald Ash Borer Response Team*
Last Update: June 2015

Table of Contents

*The Colorado EAB Response Team is comprised of members from the following agencies/organizations: Boulder County, City of Boulder, Colorado Department of Agriculture, Colorado State Forest Service, Colorado State University Extension, Colorado Tree Coalition, Green Industries of Colorado, University of Colorado and USDA Animal and Plant Health Inspection Service.

Introduction

This guide assists municipalities, green industry professionals, HOAs and others with the creation of EAB management plans. It provides a general framework of suggested plan components found helpful to many communities. Unique situations may necessitate adding more components or omitting some.

This guide consolidates a wide variety of EAB-related resources including examples of state and municipal EAB management plans. These resources are linked to directly throughout this document for your reference.

Before you draft your plan, we recommend you form a stakeholder group to assist. According to [Cornell University Cooperative Extension](#), "This group should consist of people who have the authority to make decisions about your publicly-owned trees, those who will carry out the decisions outlined in your plan and citizens who can help educate, execute and assist with your plan." Smaller cities and towns without an existing urban and community forestry program are encouraged to treat the EAB threat as an opportunity to develop one.

For municipalities that do not already have tree pest control ordinances in place, these sorts of ordinances should be developed before finalizing an EAB management plan to: establish the city's jurisdiction; define "tree pest" and "nuisance tree"; and establish general protocols for dealing with new pest detections and nuisance tree management on both public and private property. Examples of general tree pest ordinances that may help to support EAB efforts appear on p. 30 of the [Minnesota EAB Community Preparedness Manual](#) and in Appendix E (pp. 39-43) of the Illinois Department of Natural Resources' [Emerald Ash Borer Community Readiness Plan](#).

Keep in mind when developing new ordinances that broader "landscape health" ordinances will be more useful to cities than ordinances targeted at specific pests, as they can be applied more quickly and in a wider variety of circumstances. The importance of establishing all-encompassing tree pest policies is articulated well in the Illinois Department of Natural Resources' [Emerald Ash Borer Community Readiness Plan](#): "With the increase in international trade and current mobility of the United States citizenry, the movement of exotic invasive species is inevitable. Therefore, every municipality within the nation should establish procedures to deal with the potential for invasion."

Although the information herein has been compiled from sources believed to be reliable, no warranty is made regarding the accuracy, adequacy, completeness, legality, reliability or usefulness of any information. Any opinions, advice, statements, services, offers or other information or content expressed or made available by third parties, including those accessed via links from within this document, are those of the respective authors and do not necessarily reflect the recommendations of the Colorado EAB Response Team. It is the responsibility of the reader to evaluate the content and usefulness of information contained herein and obtained from linked documents and websites.

Plan Component: Background

It is important to include a brief explanation of what emerald ash borer is and how it threatens the community in your plan, including the scope of the possible infestation expressed as numbers or shown on a map. Find general and Colorado-specific information on EAB in this Emerald Ash Borer FAQs document (Colorado Emerald Ash Borer Response Team).

Detailing the many benefits that urban trees provide is also useful to include to underscore the value of the plan. The i-Tree suite of tools, developed by the USDA Forest Service, can assign a dollar amount to the benefits provided by your urban trees, such as aesthetics, energy savings, pollution reduction and carbon sequestration. For general tree benefits information, view this list of tree benefits and supporting research compiled by Keep Indianapolis Beautiful.

Include the month and year that the plan was created; update it anytime the plan is edited.

Plan Component: Purpose

Determining early on what your EAB management goals are will guide you in the development of your plan. List these goals within your plan to identify expected accomplishments when the plan is adopted, funded and implemented successfully. Common goals include: minimizing costs; spreading costs out over time; minimizing the organization's liability; minimizing public safety hazards; maximizing canopy retention; protecting natural resources; and protecting animal habitat.

Plan Component: Inventory

Knowing the number, size and location of ash trees in your jurisdiction is critical to developing an actionable EAB management plan. According to Cornell University Cooperative Extension's Plan Development Workbook, the three different levels at which a tree inventory can be conducted to prepare for or respond to EAB are:

100%: "Every tree is identified, measured and evaluated for condition. Great for every community, if you have the time and the funds."
Ash Only: "Only ash trees are counted (should include size, condition and proximity to buildings and human-use areas). Should be considered a must if you don't have the time/funds for the 100% inventory." Other information to collect might include location description (park, ROW, etc.), ownership category designation and risk priority level.
Representative Samples: "A percentage of your streets/public areas are surveyed and that number is used [to calculate a community-wide] estimate [...] Consider only as a first step or if you already have EAB and no inventory. Consider conducting a more thorough one as time and funds permit."

This article from the Journal of Arboriculture describes how to perform a sample-based survey which is less resource-intensive and still statistically accurate: A Statistical Method for the Accurate and Rapid Sampling of Street Tree Populations. Inventories can be collected with the

help of the free CO-TreeView tool, an online tool for mapping Colorado's urban forests. Charts and maps based off of existing inventory shapefiles can also be created.

Plan Component: Detection

Detecting EAB early – while difficult to do – is recommended to enable proactive measures and budgetary planning. Possible detection methods include visual inspections/surveys, branch sampling and peeling, trap trees, rearing cages and attractant traps. The EAB Quick Guide, produced by a collaboration of federal, state and university partners, lists the visible signs of EAB infestation to search for.

In 2015, the Colorado EAB Response Team began development of an EAB detection options guide. The completed guide will be made available at eabcolorado.com.

Plan Component: Management Strategy

Each community or organizational EAB management strategy will be dictated by existing best management practices (BMPs), available resources, local quarantines/restrictions and other unique factors. Management tactics generally include some combination of monitoring, preemptive removals, infestation tracking/analysis, reactive removals, trap trees and chemical treatments (see the Insecticide Options for Protecting Ash Trees from Emerald Ash Borer report). The organization's goals as outlined in the Purpose section of the EAB management plan and each goal's relative importance will help guide the overall strategy and specific tactics used as well as the share of resources devoted to each one.

When it comes to prioritizing trees to treat or remove, it helps to first identify subjective criteria such as "poses public safety hazard," "is historic tree" or "important entryway to community." You can then convert these subjective criteria into objective, measurable criteria such as "50 feet or closer to a playground," "on Colorado Register of Historic Properties" or "adjacent to Roadname Road." These objective criteria are more valuable than subjective criteria because they can be applied during inventories and within GIS analyses to objectively identify the highest-priority trees. Other potential considerations include maintenance needs, placement or current condition.

As you formulate your management strategy, consider the timing of branch, tree and stump removals. Page 250 of the Minnesota EAB Community Preparedness Manual recommends that pruning and removal of infested trees take place between the start of September and the end of April. Here's why: "By postponing pruning until the fall, you can help reduce the risk of EAB spreading. If the tree is left intact during the EAB Active Period, it can provide habitat for EAB adults to lay eggs. But since the adults won't emerge until the following year, if this tree or branch is cut and properly disposed of during the EAB Dormant Period, any EAB that may exist in the ash material will be destroyed when the wood is destroyed." Moving infested material during the EAB active period risks the release and spread of adults into new areas.

Research on a management strategy called "SLAM" has explored the relative merits of a variety of management strategies which may help you prioritize your options. Experimental SLow-Ash-Mortality techniques, which include removing infested trees before the beetles emerge and treating a percentage of randomly selected trees each year, show promise in reducing the rate of EAB spread. According to slameab.info, this is accomplished by "destroying EAB life stages before adults can disperse and reproduce, concentrating and eliminating adult beetles and their progeny, and reducing the amount of food (ash phloem) available for the development of large numbers of EAB offspring."

A SLAM-based research project conducted by Purdue University experimented with the use of girdled ash trees, systemic insecticide and harvest/removal of severely infested ash. For more information on the SLAM technique and the findings of the study, see Evaluation of potential strategies to SLow Ash Mortality (SLAM) caused by emerald ash borer (Agrilus planipennis): SLAM in an urban forest (McCullough, et al. 2012).

Plan Component: Budget

Management priorities and tactics from the Management Strategy section should be used to prioritize spending. For communities and organizations with limited funds, the management activities performed will likely shift in prominence from year to year.

For example, a community forester may focus most available resources on detection activities and preemptive removals prior to the local detection of EAB. After confirming local infestation, spending may shift more to support chemical treatments and removals. Depending on available funds, these treatments and removals may apply only to very high priority trees (as identified through objective criteria), or may follow SLAM techniques.

While proactive replacements and/or underplantings are ideal to preserve and restore canopy, budgetary constraints may postpone planting efforts until detection, removal and treatment expenses have begun to subside. However, it is important to remember that because trees increase in value over time, it costs less money overall to plant smaller trees now than it does to plant larger ones later.

Budgeting Tool: Cost Calculators

There are several free tools available online that calculate the costs of a variety of removal, replacement and insecticide treatment scenarios based on user inputs. Purdue University has developed such a tool, Emerald Ash Borer Cost Calculator 2.0. Note that the assumptions inherent to this Illinois-based tool are different than the real-life circumstances encountered by Colorado foresters because of differing variables such as growth rate, average infestation-to-mortality time, tree distribution and treatment cost.

The University of Wisconsin-Stevens Point has developed a similar tool, EAB-PLANS. EAB-PLANS (available at the bottom of this page) is a downloadable Excel spreadsheet pre-

populated with formulas and charts, allowing the user to add their own inputs and view the costs and projected results of various management scenarios. Again, outcomes may vary greatly depending on the assumptions built into the cost calculator model and may not accurately reflect local conditions. EAB-PLANS users should note that many of the pre-populated (but editable) values built into the workbook, especially the default values for the "removal cost," "expected [treatment] success," "species ratings" and "replanting rates," may differ widely from actual local values. For more information on customizing the EAB-PLANS tool for local use, view this archived webinar presented by Natural Path Urban Forestry Consultants' Mark Duntemann (discussion about using cost calculators starts near the 25-minute mark).

Stevens Point professor Richard Hauer, Ph.D also offers tips for using the EAB-PLANS tool in the "Emerald Cash Borer" webinar, archived here. Hauer is co-author of Economic Analysis of Emerald Ash Borer Management Options, a study published in the Journal of Economic Entomology in 2012. His webinar touches on several interesting topics related to EAB management, including a comparison of treatment options costs/results, a formula for calculating the costs of keeping a tree (including time) and a few highlights of the results of the SLAM research study (which showed great results from treating only 10-20% of trees).

The USDA Forest Service also offered a webinar on this topic, titled Emerald Ash Borer: Status, Management Options and Cost Calculators which explores the features and usage of EAB-PLANS and Emerald Ash Borer Cost Calculator 2.0.

Budgeting Tool: Cost Sharing

Whether you are a municipality, HOA or member of the green industry, you may want to consider creating some kind of cost-sharing or discount program that distributes the cost of tree removal, planting and/or treatment among multiple parties or provides discounted trees or other materials.

Budgeting Tool: Volunteers and Interns

Volunteers can assist with inventories, tree planting and other tasks. You can post your volunteer opportunities on sites like www.idealist.org or www.volunteermatch.org or in city newsletters. You can also work with local teachers or professors to get students involved, giving them an opportunity to learn about urban forestry while helping your organization to reduce labor costs. "Adopt a tree" programs that put property owners in charge of trees adjacent to their properties are also useful, providing for the successful establishment of new trees.

Budgeting Tool: Funding Solicitation

Adding a funding solicitation or grant application component to your management plan can help you address the costs of preparing for and responding to EAB. For statistics to help you demonstrate the need for additional funding, consider using cost information derived from EAB cost calculators or your own calculations. You can also generate tree benefits monetary values information specific to your community by utilizing the iTree suite of tools mentioned earlier in

this guide. For current information about possible funding sources, visit the [Colorado State Forest Service's Grants and Funding Assistance page,](#) [Colorado State University's Natural Resources Grants and Assistance Database](#) and the [Colorado Tree Coalition grants page](#).

Plan Component: Communication

Start by identifying your target audience(s), which may include colleagues, employees, volunteers, superiors/decision-makers, customers and members of the general public. You can then determine your intended message(s) and identify potential media such as presentations, events and newsletters. See pages 7 and 8 in the [Results of the 2015 EAB Community Update Survey report](#) for information on common outreach tactics being used in Colorado and their perceived return on investment.

You should also include a protocol for interacting with local media. Even before emerald ash borer is confirmed in your area, you may receive media requests due to the regular EAB-related news releases put out by the Colorado Emerald Ash Borer Response Team (visit the [eabcolorado.com homepage](#) and click "EAB NEWS" to view releases). Please contact the Colorado EAB Response Team at the email address listed under "CONTACT US" on [eabcolorado.com](#) before speaking with local media for recommended talking points.

To assist private property owners in your community with preparing for and actively responding to EAB, the Colorado Department of Agriculture recommends providing information on chemical protection and alternative management strategies. As such, you may want to budget for the printing and distribution of the [Managing Emerald Ash Borer Decision Guide](#), the [Insecticide Options for Protecting Ash Trees from Emerald Ash Borer](#) report and similar documents into your plan.

To prevent and slow the spread of EAB to and within your community, it is also recommended that you incorporate the "Burn it where you Buy It" message into your communications plan. The message to not bring wood back home after vacationing can help prevent the spread of EAB, especially during peak travel times such as Memorial Day and Labor Day weekends. Visit the [Don't Move Firewood website](#) for free, downloadable outreach materials templates focused on discouraging wood transport. Resources include handout sheets, banners, brochures and postcards. Municipalities in which firewood sales are common may want to consider putting a firewood vendor permit system into place or checking in with local firewood vendors.

You may also want to include tree replacement and planting information in your communications. The [Front Range Tree Recommendation List](#) can be distributed to colleagues, contractors, customers and homeowners to help your partners in EAB response in your community choose site-appropriate tree planting species that contribute to tree diversity. An ash/shade tree replacement guide is also in development and will be available soon.

There are a wealth of EAB-related educational materials, signage, invasive pest costumes and other items available for download at the [Colorado Department of Agriculture's EAB page](#) and

check-out from the Colorado Department of Agriculture. Contact the CAPS State Survey Coordinator at 303-869-9070 for more information on checking out items.

Plan Component: Collection Yard Development & Wood Utilization

Communities are encouraged to proactively develop disposal locations and wood utilization methods in accordance with their established best management practices and with the Colorado Department of Agriculture quarantine and other restrictions. The Colorado Emerald Ash Borer Response Team is working with the United States Forest Service's Dr. Mike Eckhoff to explore wood utilization options statewide, but individual communities are encouraged to begin thinking about utilization options. These options include but are not limited to:

- Whole-tree architecture,
- Lumber,
- Veneer,
- Furniture,
- Cabinetry,
- Millwork,
- Flooring,
- Biomass (firewood, chips, etc.),
- Pallets,
- Sporting goods (baseball bats, hockey sticks),
- Specialty products, and
- Engineered wood products.

For more information on production considerations, wood quality concerns and market opportunities, see Part Three in the Wood Utilization Options for Urban Trees Infested by Invasive Species report for more information (Bradshaw, et al. 2012).

Communities are also encouraged to proactively seek out potential locations for local collection yards to accommodate the rapid increase in surplus wood that will accompany peak EAB infestation. Collection yards must meet the regulatory requirements of the Colorado Department of Agriculture. See page 5 of the DOA's Emerald Ash Borer Preparedness Plan for more information.

The Colorado Wood Utilization and Marketing Program (CoWood) website hosts the Colorado Forest Products™ Program, which is an online directory for locally sourced wood products and businesses that create those products. It may be worth engaging some of these listed local businesses when exploring wood utilization options or encouraging others to join the program to increase their visibility.

Plan Component: Canopy Restoration/Species Diversification

To build and maintain sustainable urban forests in your area, include a re-planting component in your EAB management plan that encourages a mix of species, sizes and ages (Colorado Department of Agriculture). Consider the 20-10-5 rule: in any community, plant no more than 20 percent of trees from the same family, no more than 10 percent of trees from the same genus, and no more than 5 percent of trees of the same species. For a list of tree species recommended in Colorado, including suitability ratings and notes, view the Front Range Tree Recommendation List (created by ASLA Colorado, Colorado Nursery and Greenhouse Association, the Colorado Tree Coalition and Colorado State University Extension).

As time and funding allows, you may also want to consider planting new tree species in the shadow of ash. If smaller trees are under-planted prior to the infestation of an area, they will have a head start on becoming large, healthy and well-established, making them a more cost-effective replacement than larger, more expensive replacements planted later on.

Plan Component: Implementation Contacts List

Assigning specific EAB plan-related duties to groups or individuals helps ensure that your EAB plan is implemented successfully and with minimal duplication. List all involved parties (including recommended tree removal contractors and compliant disposal sites) within the plan along with a short description of their role and contact information. The recommended internal media contact(s) also should be named.

City foresters should consider directing local home and property owners to one or more of the following resources to help them locate a certified and/or licensed tree care professional. Please note that if property owners would like to hire someone to apply pesticide treatments, the applicator must be licensed by the Colorado Department of Agriculture as a Commercial Pesticide Applicator.

The EAB response team does not endorse any service providers accessible via the following links; is recommended that EAB management plan writers also refrain from endorsing specific service providers to reduce their own liability by including a disclaimer with any contact lists, links or referrals provided within an EAB management plan.

Possible Contact Lists / Links to Include in Your Plan:

- List of Companies who have signed Colorado Department of Agriculture Emerald Ash Borer Compliance Agreements
- International Society of Arboriculture "Find an Arborist" and "Verify a Credential" search tools
- The Tree Care Industry Association's "Why Choose an Accredited Tree Care Company?" brochure
- The American Society of Consulting Arborists' guide to finding a Consulting Arborist

EAB Management Plan Examples: State-Level

- [WI EAB Strategic Plan](#)
  [WI EAB Municipal Readiness Checklist](#)
- [MI EAB Community Preparedness Plan](#)
- [IL EAB Readiness Plan](#)
- [NY EAB Community Preparedness Plan Development Workbook](#)

EAB Management Plan Examples: Colorado Municipality-Level

The EAB management plans linked to below – listed from smallest to largest population – show how Colorado communities large and small are planning for EAB's arrival:

- [Edgewater](#)
- [Westminster](#)
- [Lafayette](#)
- [Thornton](#)
- [Lakewood](#)
- [Fort Collins](#)

EAB Management Plan Examples: Private Sector (Commercial Arborists, Pesticide Applicators, etc.)

In the green industry, EAB "management plans" often take the form of online or printed informational guides for property owners, who usually make EAB management decisions for their own trees. The [Managing Emerald Ash Borer Decision Guide](#) is a public resource that green industry professionals can modify or give directly to clients. The guide was developed by Purdue University and the Indiana Department of Natural Resources and is recommended by the Colorado Department of Agriculture and Colorado State University Extension.