



EMERALD ASH BORER MANAGEMENT WORKSHEET FOR VERMONT MUNICIPALITIES

Throughout Vermont, ash trees are an important component of our treescape, from our downtowns to our town forests. Ash is a hardy tree that has been planted along streets, in parks and town greens, and naturally occurs along roads. Emerald ash borer (EAB) poses a significant threat to ash trees in Vermont. It is incumbent of Vermont municipalities to prepare for and manage the impacts of the EAB and the loss of ash trees in our communities.

The purpose of this worksheet is to assist municipalities in understanding the impact of EAB on their communities, including the number of trees involved, the costs associated with removal or treatment, and opportunities for replanting to mitigate against the loss of canopy. Vermont communities will bear the costs of removing or treating ash trees within the public-right-of-way and on municipal-owned lands. This worksheet is designed to guide municipalities in planning for EAB by including ways the town can minimize the economic, ecological, and aesthetic impact of ash tree death. Dead and dying ash trees impact not only quality of our urban forests and the benefits they provide, but pose a significant risk to public safety. Municipalities are also an important partner in helping to slow the spread of this destructive insect. We recommend that all Vermont communities plan for EAB.

STEPS TO PLANNING FOR THE EMERALD ASH BORER MANAGEMENT



→ STEP 1: Organize for Action

1. Identify key people.

It is important to identify all of the people in your community who can help develop and implement your EAB management plan, who represent groups to have in the communication loop, and who may be able to assist. Municipalities may already have a resource list as part of their Emergency Operations Plan. Start by checking with your municipal emergency management coordinator, your Regional Planning Commission, or town clerk.



Use the form below to identify key people to support your community's EAB Management Plan.

Key People to Support EAB Management		
Representing Role/Responsibility	Name	Contact Information
Mayor/Town Manager/Selectboard Chair		
Public Information Officer		
Volunteer Forest Pest First Detector(s)		
Tree Warden/Staff Arborist		
Tree Board/Committee member(s)		
Utility Representative		
Solid Waste District Delegate		
Conservation Commission member(s)		
Planning Commission member(s)		
Director of Parks/Recreation Committee member		
Local Emergency Management Coordinator		
Director of Public Works/ Road Foreman or Commissioner		
Local tree service/forestry professionals		
Volunteer partners i.e. Garden Club		
Other:		



Finding Professionals Who Can Help

To find International Society of Arboriculture (ISA) Certified Arborists go to: www.treesaregood.org. To find Vermont licensed foresters go to <https://sos.vermont.gov/opr/find-a-professional/>

2. Host an informational meeting

Invite the stakeholders identified in the table to learn about EAB, why management planning is important, and what the planning process entails. Invite other individuals who you think would be good candidates to serve on your EAB management planning team. Staff from the Urban & Community Forestry Program are available to speak to your community or can connect you with local, trained Forest Pest First Detectors to help. Additional information and resources are available at VTinvasives.org and vtcommunityforestry.org/eab.

3. Form an EAB management planning team.

Identify a team leader and other members to focus on and coordinate EAB management activities. Your town may already have a tree board or committee; if not, consider recruiting subject matter specialists, including volunteer Forest Pest First Detectors, the tree warden, foresters, arborists, Master Gardeners, or nursery professionals. Consider recruiting people who have the relationships and institutional knowledge for getting things done in your town, who can make fiscal and public tree management decisions, and who can help execute the plan, including the local emergency management coordinator. The Public Information Officer, identified in your town’s Emergency Operations Plan, will be able to help with activities such as public awareness events, writing articles, and contributing to the town website.



Use the form below to identify your community’s EAB management planning team.

Identify EAB Management Planning Team		
Name	Responsibility	Contact Information
	Team Leader	
	Public Information Officer	

4. Gather town-specific documents and information.

- Current tree inventory data and management plan for public trees
- Ordinances and policies regarding public trees
- Maps of town/village streets and community-owned areas
- Municipal budget and in-house skills/capacity to manage public trees

5. Develop public outreach strategies.

What communication method(s) will your community use to relay decisions and updates to your residents, elected officials, and local businesses? Developing an outreach and education plan at the beginning of this planning process is key to keeping your community informed with up-to-date information, fostering support for EAB management activities and budgeting, and making sure infested material is properly disposed of and residents don't facilitate the spread of EAB. Communication methods may include: website, Front Porch Forum, social media, local newspaper, public meetings, town clerk's office, and displays.

→ STEP 2: Determine the Quantity and Distribution of Public Ash Trees

1. Determine the need for inventorying ash trees.

A tree inventory helps to identify the liabilities of EAB before it arrives. If your community does not have an inventory that was conducted in the past 10 years with data on tree species, diameter, condition, and location, this should be one of your top priorities. You cannot develop a management strategy without first understanding your community's exposure to risk. For the purposes of EAB management planning, an inventory of only ash trees would be sufficient.



Use the form below to determine your ash inventory needs.

Ash Tree Inventory Assessment of Need						
Inventory Area	Inventory Present? (Y/N)	When was inventory conducted?	Who conducted the inventory?	What data was collected (i.e., size, condition)?	Where is the data?	Inventory Needed? (Y/N)
Trees in the ROW in town centers and high-use areas						
Trees in parks, greens, or other town-owned recreational areas						
Trees in the ROW on rural roads						
Trees in natural areas, i.e. town forests that could impact public safety, such as along trails						
Trees on private land that impact town properties or the town ROW, or are a priority for preservation						

2. If you don't have an inventory of your public ash trees, make a plan to conduct one.

It is important to understand the location, number, size, and condition of your community's ash trees for all the areas listed above. If you need to complete an ash tree inventory for all or some of the areas, visit the ash inventory page (vtcommunityforestry.org/ash-inventory) on our website for examples. Vermont Urban & Community Forestry Program staff can offer technical assistance and the tools to get you started.



Determining the Municipal ROW

Most towns don't own the land under the road or alongside of it; the landowner does. The town owns an easement, which is a right to use the land for highway purposes. These easements are a public right-of-way (ROW), usually three rods (49.5 feet) wide, which includes the authority to manage the trees. Knowing the extent of the ROW is important because it tells you who will be responsible for the management of which trees. If a tree is in the town's public ROW, it is the town's responsibility. If the tree is in a state road ROW, it is the state's responsibility. If a tree falls outside the ROW, it is the landowner's. To determine the ROW width of your streets and roads, contact your public works officials, road crews, town planner, or the town clerk. When in doubt, go back to three rods – 49.5', or about 25' from the road center line.

3. Summarize your ash tree inventory data.

Compiling a list of all your community's public ash trees that will need to be managed for EAB is essential in determining your management strategy. Essentially, when public tree managers look at an ash tree, they are encouraged to consider that they face three choices for this tree:

- Cut it down; live trees can be removed proactively.
- Have it treated long-term with a proper insecticide to prevent its loss due to EAB.
- Allow it to succumb to EAB and fall apart in place (appropriate when trees are in areas where people and property are not at significant risk).



Management Options for Forested Areas

In forested areas where the trees will not impact public safety, the management options are much different (i.e., town forests). Refer to the document EAB: Information for Forest Landowners (vtinvasives.org/emerald-ash-borer-resources) for more information.



Use this form to summarize the number, size, and condition of the public ash trees in your community.

Summary of Public Ash Trees in Your Community								
Inventory Area	Total # of Ash Trees	# of Trees by size (DBH)			# of Trees by Condition			
		< 12"	12"-24"	> 24"	Good	Fair	Poor	Dead
Trees in the right-of-way (ROW) in town centers and high-use areas								
Trees in parks, town greens, or other town-owned recreational areas								
Trees in the ROW along rural roads								
Trees in natural areas (i.e. town forests) that could impact public safety, such as when along trails.								
Trees on private land that impact town properties or the town ROW, or are a priority for preservation								



STEP 3: Determine the Timeline for EAB Management in Your Community

1. Has EAB been found in your town?

- If **YES**, you need to act now.
- If **NO**, has it been found in a town within 15 miles?
 - If **YES**, EAB is probably already present in your community.
 - If **NO**, EAB may still be a few years away.



Monitoring for EAB

Early detection is critical to slowing EAB. Identify areas in your town that are a high risk for EAB introduction. These include nurseries, campgrounds, recreational lakes, cottage communities, sawmills, firewood producers, pallet operations, and other wood utilization firms. Because many “detections” are false positives, protect confidentiality. If a municipal staff member or resident thinks they have an invasive pest, he/she can report it online at VTinvasives.org using the “Report it” function on the homepage.

2. Determine the likely timeline for the arrival of EAB in your town.

EAB will spread throughout Vermont. In fact, it is expected that the number of trees in a community that are infested with EAB will double every year until most, if not all, ash trees are infested. Also, for a community that is adjacent to an infested town but in which EAB has not yet been found, it is very likely that EAB is in fact

already there, infesting 1% - 2% of the ash population. The following chart will help to determine where your community stands with regards to the extent of an EAB infestation. The chart assumes that in a heavy infestation, all infested trees will die within three years of becoming infested. By the end of 12 years, all untreated ash trees within a community are anticipated to be dead.



Use the chart below to determine the number of infested ash trees.

Number of Ash Tree Infested in Your Community Based on Years into Infestation							
Years into infestation	Percent of Ash Trees Infested with EAB	Street trees in densely settled/high use areas		Trees in parks or town greens		Trees in the ROW along rural roads	
		# of trees	# impacted*	# of trees	# impacted*	# of trees	# impacted*
1**	Not noticeable, < 1%						
2	1%						
3	2%						
4	4%						
5	8%						
6	16%						
7	32%						
8	64%						
9	100%						

** Multiply the percentage of trees infested by the number of ash trees for each area.
 ** Year 1 is the first positive identification of an EAB infested tree in your community.*

STEP 4: Evaluate Your Community's Public Policies

1. Determine if your town has the authority needed to respond to EAB effectively and efficiently.

It is important to have regulations in place to ensure the ability to effectively prepare and respond to an EAB infestation (e.g. ability to order the removal of infected tree(s) on private property that may affect the public ROW). The Vermont Tree Warden Statutes were revised in November 2020 and provide guidance specific to this municipally appointed role ([Review complete definitions and statutes](#)).

Tree wardens have control over all shade trees within a town and therefore are authorized to remove any trees that are infested with or infected by a tree pest or that constitute a public hazard without public notice or hearing requirements (24 V.S.A. § 2511). The cost of the control measure will be the responsibility of the municipality.

If a shade tree is being removed **that is not infested with EAB or is not a hazard**, the tree warden will need to follow the requirements outlined in 24 V.S.A. § 2509. The tree warden must post public notice of the intent to

cut or remove a shade tree with a minimum of 15 days prior to cutting or removing the tree. Only if the cutting or removal is appealed, the legislative body of the municipality shall hold a public hearing. To prepare for EAB, protect public safety, and maintain community forest health, your town may want to consider developing a municipal tree ordinance or policy to further define its local authority.



Tree Wardens and Tree Ordinances

A tree warden is an appointed individual in town responsible for making determinations about the trees on public property. You can learn more about Vermont tree wardens and updated statutes on the tree wardens page (vtcommunityforestry.org/resources/vermont-tree-wardens-0) on our website. We also have resources available to help you develop a tree ordinance or policy, including examples from VT cities and towns. You can find them on the public policies page on our website (<https://vtcommunityforestry.org/resources/public-policy>).

 **STEP 5: Determine if there are Trees to Preserve**

1. Develop a list of priority trees for preservation.

Determine if there are large, structurally sound and/or valuable trees in culturally or economically important locations, such as on the town green, along your downtown streets, or on school grounds. These may be trees that you would like to preserve. Insecticide treatment should begin before an ash tree is infested with EAB and is a long-term commitment, with applications occurring every 1-3 years, based on the insecticide. However, recent economic analyses have shown that treating high-value, large landscape ash trees with effective systemic insecticides can be significantly less expensive than removing the tree and will maintain the many benefits that the tree provides. ***It is important to determine if insecticide treatments will be an accepted option in your community. The only way to preserve ash trees is by using insecticides and it is likely that protective treatments with an insecticide will be needed for the rest of the tree’s life.***



Pollinator Alert

There are limited pesticide options to effectively treat ash trees. There are significant public concerns about using neonicotinoid insecticides, which are those that contain the active ingredients: imidacloprid, dinotefuran, and clothianidin. To mitigate the risk to pollinators, other products should be used. Foliar sprays are also not recommended. Review the resource [Options for Protecting Ash Trees from Emerald Ash Borer with Insecticide Treatments](#) for the Vermont Urban & Community Forestry Program’s recommendations pertaining to treatment options.



Use the form below to identify priority public ash trees for preservation.

Priority Ash Trees for Preservation		
Tree Location	Diameter	Description

2. Determine the plan for preserving priority ash trees using insecticides.

Determine the treatment costs for individual trees. Factors in determining the cost include extent of infestation, type of insecticide used, frequency of treatment (annually vs. biennially), and the size of the tree. It is recommended that treatment begin before the tree shows any signs of EAB infestation. However, systemic insecticides have been effective on lightly infested trees. But if the tree has suffered more than 1/3 to 1/2 canopy loss, it is probably too late to treat.



Pesticide Certification for Municipal Employees.

To treat any public ash trees, municipal employees need to be a certified - applicator in Vermont category 3a - Ornamental & Shade Tree pest control or the municipality needs to hire a company that employs at least one person certified in Vermont Category 3A. Specialized equipment is often required, especially for systemic trunk injection treatments. To learn more about pesticide application, review these [frequently asked questions](#).

Additional questions to consider:

- What product and application method is best suited for your municipality?
- How will you review environmental impact, ensure public safety, and notify the public?
- Since insecticide treatment will likely need to occur annually or biennially for remainder of the life of the tree(s), how will the treatment be funded in the future?
- Who will conduct the insecticide applications (town employees or contractors)?
- If municipal employees will be doing the work, what training, certification, and equipment do they have and what additional training, certification, and equipment are needed to safely complete the task?
- Insecticides can also be used to control rate of removal. In other words, the need to remove trees can be postponed by treating individual trees for a limited period. Would this be an option for your municipality?
- When will you begin to treat?

3. Develop a list of trees that are worth saving and that the municipality can afford to preserve.

Given the considerations above, develop a list of high priority trees to preserve and that your town can commit to treating over time. Estimate the costs of treatment on a per year basis for each tree to be treated.

**Treatment Costs**

Current estimates for treatment range from \$3-\$13 per inch of DBH depending on product and application method. Confirm approximate costs with a local arborist before making your calculations.



Use the form below to estimate the costs of treatment for each tree to be treated.

High Priority Trees for Preservation			
Tree Location	Diameter	Treatment (product, application method, and frequency of application)	Estimated Cost

 **STEP 6: Determine a Plan for Removals**

1. Plan for removals through a prioritized process.

EAB kills trees within a few years (3-5) of initial infestation. After being killed, trees deteriorate quickly. If left in place, they may become hazardous and allow more rapid spread of the pests they harbor. Using the information gathered in Step 2 and including any decision you made regarding trees you would like to preserve with insecticide, determine the number and sizes of the ash trees you will need to remove.

2. Develop a plan for staggering the removals.

Use the timeline you created in Step 3 to develop a plan for staggering removals. Strategically staggering removals can spread the costs out over several years. Keep in mind that if a decision has been made not to treat a tree, it can be removed prior to infestation. There is no need to wait for a tree to die to remove it, especially if it is poor condition and will be a risk to public safety. This acknowledgement should help with

planning the removal of those trees.



Ash Trees in the Forest

In forested situations, where trees will not become a hazard to public safety, there are good reasons to leave ash trees in place. Dead trees provide important wildlife benefits, and some trees might turn out to show resistance or tolerance to EAB (termed “lingering ash”), which can benefit the species genome and can assist with hybrid and crossbreeding initiatives.

3. Determine what removing individual trees will cost.

Local estimates are preferred. However, an estimate derived by the [USDA Forest Service for the Northeast region](#) suggested \$18.33 per inch DBH as a guide for removal costs plus \$6.50 per inch DBH for removal and grinding of the stump. This estimate works well for street and shade trees in developed areas. You will most likely be able to reduce the cost along rural roads. Because of the increased risks involved with removing standing dead trees, the cost of removing an ash tree that has already succumbed to EAB may be double or even triple the cost of removing a live ash tree.

Questions to consider:

- Will the municipality preemptively remove ash trees in poor condition, that are hazardous, or that are growing in undesirable locations before they are infested with EAB? If so, identify priority areas or trees.
- If you are waiting until EAB is confirmed in your town, how will you approach tree removal (i.e., by location, condition)?
- Who will conduct the removals (municipal employees, tree care companies, loggers, or a combination)?
- If municipal employees will be doing the work, what training and equipment do they have and need (i.e., chainsaw training, ground operations) to safely complete the task?
- What role will the utilities companies play? If the trees are within 10 feet of energized conductors, tree removal must be done by a professional trained to work safely in the special hazards involved in such work.
- Is the tree warden involved? According to the VT Tree Warden Statutes, they are the only person authorized to approve removal of shade trees, unless a town tree ordinance dictates otherwise. A public hearing process is not necessary if the trees are infested or hazardous but is necessary otherwise.
- How will the public be notified of the plan for removals?

4. Consider private property trees.

The decision to treat, remove, or retain private trees rests with the property owner, unless a private tree poses a threat to public safety or public property. A municipality should consider how to manage the risk posed by trees on private property that threaten public property or a public right-of-way.

You may want to explore options for residents who wish to save right-of-way trees through insecticide treatment. Some towns in other states have incentivized treatment with a cost-share program. For example,

residents are reimbursed 50% of the treatment costs up to \$50 per ash tree if they agree to treat the tree with the preferred method.

 **STEP 7: Determine how Infested Wood will be Disposed of or Utilized**

1. Stay informed on the State’s Slow the Spread Recommendations

Paramount to reducing the spread of EAB is properly disposing of or utilizing the wood, brush, and stump grindings generated by the removal of infested trees. Based on the slow the spread recommendations put forth by the State of Vermont, provisions for the movement, storage, and disposal of infested woody material are available at: vtinvasives.org/land/emerald-ash-borer-vermont. Collaborating with adjacent towns on establishment of wood disposal areas, sharing chipping equipment or a portable mill, and utilization of ash materials will save staff time and resources.

2. Locate at least one wood disposal site in your town or nearby.

The purpose of a debris disposal yard is to help prevent infested wood from being transported out of a quarantined area. They can be used as staging sites for wood processing, such as chipping, grinding, and debarking, and related marketing activities. The yards also serve as temporary or emergency storage sites when trees are removed. A disposal yard will allow municipalities, tree service and logging companies, utilities, and individuals to drop off cut material for processing and disposal in a manner that will prevent human-facilitated spread of EAB. Disposal sites or wood recycling centers may also accept various species, not just ash, and can make wood disposal more efficient and economical. Locate at least one wood disposal site in your town or nearby.



Facilities Collecting Yard Waste

In support of the Universal Recycling Law, the Department of Environment Conservation manages an [online and interactive materials management map](#). The map indicates recycling and drop off facilities and whether a facility accepts yard waste.



Use the form below to list potential wood disposal sites in your community or nearby.

Potential Wood Disposal Site Options

3. Develop a communication strategy to let residents and businesses know where they can drop off material.

It will be important to communicate where the wood disposal site is and the rules around accepting wood, as well as hours of operation. Outline a plan to get the message out to residents, businesses, and utilities. Refer

to the communication strategies developed in Step 1.

4. Consider how to best utilize the wood to minimize environmental impact, offset disposal costs, or even create a value-added product.

What wood utilization options and local markets for infested wood exist in your town, county, or region? The following are typical options for the wood generated by removing ash trees. Decisions should be made considering the quantity of wood that will be generated, and over what timeframe. Data from Step 5 can be used to help guide that understanding.

Typical Wood Use Options:

- Chipped and ground for mulch.
- Usable timber made into lumber for use in town (e.g. – work with a local sawmill).
- Merchantable logs sold (e.g. – work with a local forest products harvester or forester).
- Firewood only as last resort, as firewood can help spread the insect.

Explore the [wood utilization](http://vtcommunityforestry.org/wood-utilization) page (vtcommunityforestry.org/wood-utilization) on our website.

 **STEP 8: Determine Your Community’s Replanting Efforts**

1. Identify which areas are important for replanting.

The removal of ash trees within the community, even if only 2-3% of the total number of trees in the developed area, will leave a gap in the town’s urban tree canopy. The town should decide how it will replace these trees, identify priority areas for tree replacement, and estimate costs. Depending on the size and who plants the trees, costs can range from \$150 - \$600 per tree. At the time of replanting, there is also an opportunity to improve site conditions, such as increasing soil volume, or amending or aerating urban soils. This should be noted as well and included in the cost.

 *Use the form below to identify priority areas for replanting.*

Priority Areas for Replanting		
Area (streets, neighborhoods, parks)	Estimated number of trees	Estimated Costs

2. Fill vacant planting spaces with a diversity of species.

Replacing the ash trees should be guided by a consideration of species that are appropriate for replanting, priority planting sites, and the long-term vision for the town’s urban forest. Discussion regarding these planting plans might include consideration of the planting costs, benefits lost due to the tree removals, potential benefits from the new trees to be planted, and the extent of public interest in these decisions. It is also important to select the right species for the right site and strive for species diversity.

Questions to Consider:

- What species are over-represented in your urban forest and thus should be avoided in replanting efforts?
- By whom and when will these vacant spaces be planted?
- Does your community require new developments to provide and plant street trees within the public right-of-way as part of its subdivision site planning and permitting process? If so, how and what criteria are used to review and inspect landscape design plans?



Tree Selection Resources

There are many tools available to help you select the right trees. Go to the [tree selection and planting page \(vtcommunityforestry.org/resources/tree-selection\)](https://vtcommunityforestry.org/resources/tree-selection) on our website.



STEP 9: Create Your EAB Management Plan

1. Estimate total costs and resources needed.

Review this worksheet and calculate the costs associated with your plans for treatment, removal, and replanting. The total will demonstrate the direct impact EAB will have on your municipal budget and staff. A comprehensive cost estimate will help you make choices on whether you need to adjust your plans to treat or remove trees, whether to spread the costs over time or deal with them all at once, and what kind of training, equipment, supplies and contracts you'll need. Be realistic when considering the capacity and the resources needed to implement this plan in your community.



Tool to Assist in Estimating Costs

Purdue University has developed a [EAB Cost Calculator](https://int.entm.purdue.edu/ext/treecomputer/) that can be used to help estimate the costs of management. Learn more: int.entm.purdue.edu/ext/treecomputer/

2. How will the town fund the implementation of the plan?

Identify any financial constraints that may hamper plan implementation. What additional financial resources are available to assist? Describe the plan for securing any additional funding and overcoming any barriers identified.



Financial Support

We offer an annual grant program, Caring for Canopy, that supports the development of

municipal EAB management plans. Visit the [Caring for Canopy Grant](#) page on our website for more information.

3. Develop your EAB management plan.

Based on the information gathered in this worksheet, develop your EAB management plan. The outline below can be used as a framework. You can also view a number of Vermont EAB plans and case studies about towns that have gone through the planning process on our website at vtcommunityforestry.org/EABplans_casestudies. Feel free to use any of the listed plans as a template as you begin to develop your EAB plan. Your plan should include the:

- Current condition**, documenting the number of public ash trees and costs associated with removing and/or treating these trees.
- Course of action** that should be taken over the next few years to address the needs resulting from the presence of EAB and the identified resources and limitations.
- Expected results** stemming from these actions, both during implementation and at the end of the period of time outlined.
- Individuals or organizations responsible** for each action identified in the report.
- Specific timelines** for all actions to be taken.

4. Please share your plan with us.

To help us better understand management efforts and to assist other communities in Vermont, please share your plan with us.

For technical assistance and to submit your EAB plan:

ELISE SCHADLER

Vermont Urban & Community Forestry Program
VT Dept. of Forests, Parks & Recreation
111 West Street
Essex Junction, VT 05452
elise.schadler@vermont.gov
802.522.6015

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Learn more about EAB management at vtcommunityforestry.org/eab



Vermont Urban & Community Forestry Program

Vermont Department of Forests, Parks and Recreation in partnership with the University of Vermont Extension