



CITY COUNCIL Agenda Item #19-067

Date: February 27, 2019

Consent Discussion

SUBJECT: Emerald Ash Borer Management Plan

SUBMITTING DEPARTMENT: Parks and Trees

RECOMMENDED ACTION: Adopt Emerald Ash Borer Management Plan

STRATEGIC OUTCOME/INITIATIVE: Environmental Stewardship

PRIOR ACTION: At their September 12, 2018 meeting, City Councilors approved the Emerald Ash Borer Management Plan and Budget Proposal as presented by the Tree Board.

EXPENDITURE REQUIRED: \$20,000

SOURCE OF FUNDS: \$12,000 of fund balance and \$8000 set aside for ash borer related work

LEGAL REQUIREMENTS: N/A

BACKGROUND INFORMATION: The Tree Board and Parks and Tree Department created an Ash Borer preparedness plan and proposed setting aside funds in preparation for the huge costs associated with the arrival of the emerald ash borers. An updated survey of ash trees was completed last summer. The preparedness plan has been updated to a Management Plan. City Councilors approved the Emerald Ash Borer Management Plan and Budget Proposal as presented by the Tree Board.

SUPPORTING DOCUMENTS: Ash Borer Management Plan

INTERESTED PARTIES: Parks, Trees, DPW, Residents

CITY MANAGER'S APPROVAL:

A handwritten signature in black ink, appearing to read "W. Johnson".

EMERALD ASH BORER MANAGEMENT PLAN FOR MONTPELIER, VERMONT

SUMMER, 2018 – SUMMER, 2028

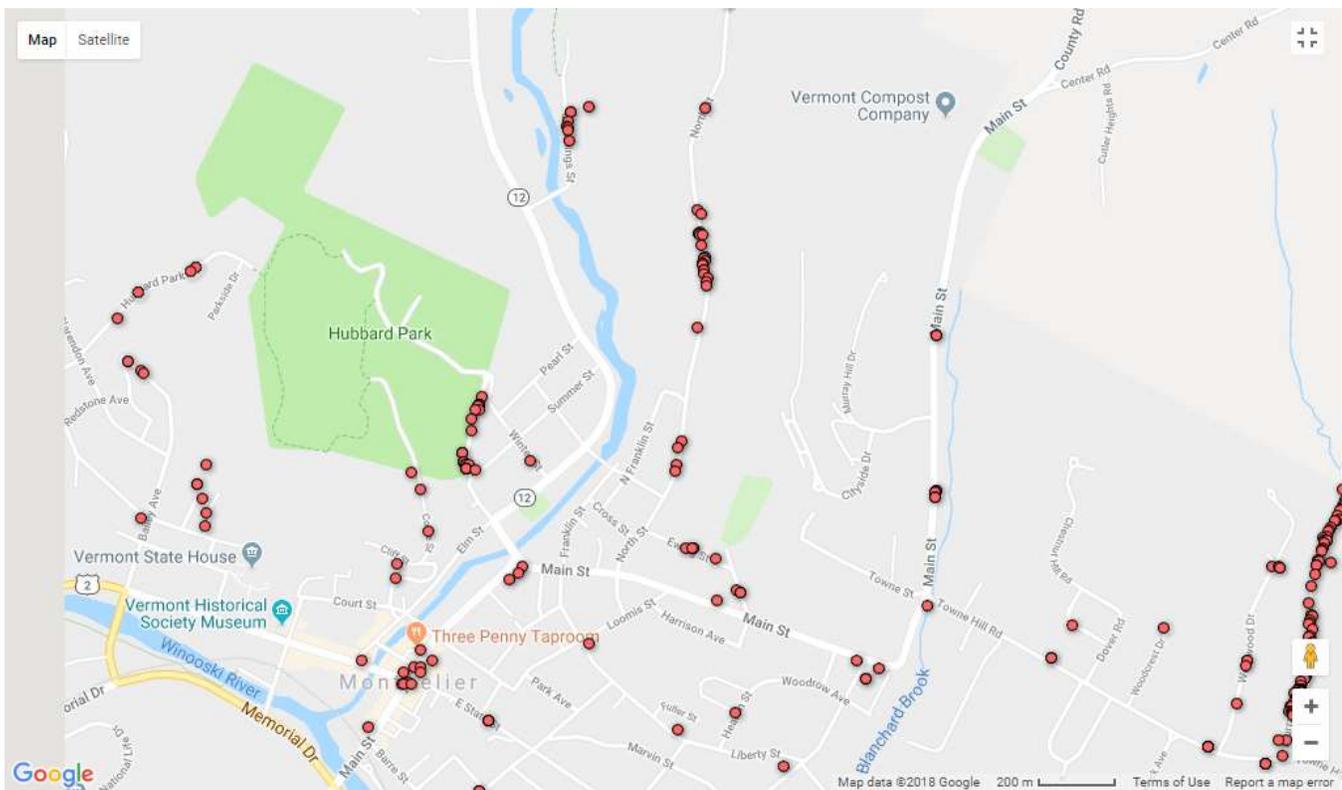


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EAB Management Plan for Montpelier Summer 2018 – Summer 2028

Administration

EAB Team (responsible for EAB Management Plan development and implementation):

John Snell, Chair, Montpelier Tree Board and First Detector
John Akielaszek, Montpelier Tree Board and First Detector
Geoff Beyer, Tree Warden and Parks Director

With Support From:

Mayor and Montpelier City Council
Office of the City Manager
Montpelier Department of Public Works
Parks Department Staff
Montpelier Tree Board Members and Volunteers
Montpelier Conservation Commission
Montpelier Parks Commission
UVM Extension VT Urban and Community Forestry Program
Vermont Department of Forests, Parks and Recreation

Acknowledgement

The EAB gratefully acknowledges the assistance and support provided by the above referenced entities. Without that support and guidance the formulation of this plan could not have been completed.

Executive Summary

It is 2018 and the emerald ash borer (EAB) has arrived in Montpelier. The Montpelier Tree Board has been anticipating this since 2013 when the EAB Preparedness Plan was first drafted. That plan included steps to take prior to the arrival of EAB and steps that would need to be taken after arrival of EAB within City limits. Now that EAB has been detected approximately 1800 feet from the City Center as a crow or EAB flies, it is highly likely that there are numerous trees already infested by the borer. The time for action is now if we are going to manage the infestation rather than allow the infestation to manage us. This EAB Management Plan, based on 5 years of learning and research, will help achieve the former over the next ten years. The following strategies will be employed with associated recommendations to the City Council for action:

1. The Tree Board and volunteers re-surveyed City streets and roadways to further define how many street ash are in the Right-of-Way and are therefore the responsibility of the City to deal with as they become infested and die (=street ash). Based on previous tree surveys conducted in the past four years that number was expected to be between 150 and 550. The re-survey has been completed. (See page 8 for results of the re-survey).
2. During the re-survey, trained volunteers reported trees that showed symptoms of EAB infestation warranting re-examination by the Tree Warden. That re-examination entailed branch sampling that can be used to detect early EAB infestations. (See page 9 for EAB Monitoring).
3. All trees that are infested will be removed and processed so as to prevent any additional adult EAB from maturing in the dying tree. Approximately 10% of all street ash will be harvested each year according to protocols outlined below (see page 11 for protocols, pages 11-13 for street trees).
4. Given the relative importance of the fifteen ash trees located in the downtown area, the Tree Board makes the following recommendation to the City Council:

“The Tree Board recommends that the City Council approve funding for the treatment of the 15 downtown green ash trees with either Azadirachtin (TreeAzin) and/or Emamectin benzoate (treeage) as part of an overall EAB Management Plan prepared by the Tree Board and the Parks Department. Furthermore, the Tree Board recommends that no neonicotinoid systemic insecticides, such as Dinotefuran or Imidacloprid, ever be used for this purpose.”

Neonicotinoid systemic insecticides have been implicated in bee colony collapse, causing honey bee colonies to cease to function properly and causing the demise of the hive. Honeybees collect pollen from ash trees for food. There is sufficient scientific evidence to warrant the position that no neonicotinoid systemic insecticides should be employed when protecting ash trees from EAB.

The motion to make this recommendation passed unanimously at the June 7, 2018 meeting of the Tree Board. Treatment must begin in 2019 at the latest while the trees show no obvious signs of EAB infestation. The insecticides recommended were researched by the Tree Board and are the same ones recommended for use by the State of Vermont. All downtown trees, including fifteen green ash, will be monitored at least annually to determine tree health status. (See pages 12-13 for chemical control information).

5. The insecticides recommended for use are injected into the trunk of the tree and that treatment must be repeated every two years. The expected annual cost of such treatment is \$1000.00.
6. In the early stages of infestation it is possible to slow the spread of the borer by creating so-called 'trap trees' under what is called the S.L.A.M. strategy (SLOW Ash Mortality). These are a group of 3-6 trees located together that are girdled to weaken the tree. EAB adults have evolved to detect such trees and preferentially choose them for egg-laying. The location of the girdled trees is near an area known to have exhibited an EAB outbreak. The trees are girdled before May and the adults breed and visit the trees in mid-May through June. The girdled trees are harvested before the following May so as to prevent more larvae developing into emerging adults. Trap trees chosen should be easy to fell without complicating factors such as unintended targets (buildings, utilities, etc.). (See page 10 for EAB Monitoring by trapping).
7. The Montpelier Tree Board and the Parks Department will continue to provide timely, accurate information to City residents via the City webpages, articles in the Bridge and Times-Argus, notifications via Front Porch Forum, and information via a Facebook page. We have also created an EAB Information Center located in the City Clerk's Office in City Hall. (See page 16-17 for outreach information).
8. It will be necessary for the City to establish a marshalling area where infested tree material can be brought for processing. The area should not be located contiguous to any known stands of ash given the likelihood that some adult EAB will escape from material brought to the marshalling area. It is recommended that, at least initially, a marshalling area be established adjacent to Gateway Park. The area will need to be fenced and secured. (See page 14 for wood and ash material utilization).

9. A portable sawmill should be available for processing ash for lumber. The ash tree wood is only affected about one inch deep from the outer bark so most of the wood can be utilized. Lumber can be stockpiled in the marshalling area until it is sold or used by the City (see page 15).
10. The slash created as a by-product should be further chipped to a small size so as to decrease the likelihood of survival of any EAB larvae contained in the wood. The chips could be sold to a heating plant supplier or used as mulch (see page 15).
11. Downed ash trees, harvested at the right time of year, can also be processed for firewood. The City should consider providing such firewood to low income residents at little or no cost or selling it to offset costs associated with EAB (see page 15).
12. City residents will begin to notice dying ash trees, most likely in a couple of years. If no action is taken to slow the spread, it is estimated that 99% of the ash trees in the City will be dead in 8-10 years. The Tree Board estimated, and previously reported to the City Council, that there may be as many as 2700 ash trees on private property throughout the City. Because ash trees become brittle when dead, and are prone to splintering, residents will be faced with many hazard trees in the near future. City ordinances require that residents remove hazard trees; in fact, ordinances require removal of visibly infested trees. Approximately one-third of all landowners have more than one ash tree on their property. Some of these landowners will not have the financial ability to deal with the removal of these trees. It is recommended that the City establish and manage a revolving loan fund whereby eligible residents can obtain funding for tree removal and pay back the loan over time. The City would seed the fund with an amount deemed sufficient for the affected residents. (See pages 11-12 for revolving fund information).
13. There are an estimated 600 ash trees along the trails of Hubbard Park (this includes ash located along the Statehouse Trail which is not technically part of Hubbard Park but owned by the State of Vermont). There are an estimated 170 ash actually within 10 feet of a trail in Hubbard Park (or which overhang a trail). It will be necessary for Parks Department staff to remove a certain percentage of ash trees along trails to prevent dead/dying ash from becoming hazard trees. In addition, there may be some select ash trees in Hubbard Park that should be treated with insecticides, similar to the downtown ash. These would include the large green ash located adjacent to the Old Shelter and the Parks Director has suggested that there are other trees that would be good candidates. The ash trees along trails in other City parks such as Blanchard and North Branch should be enumerated. (See pages 11-13 for park trees).

14. During the ten year span of this EAB Management Plan the Tree Board highly recommends that additional tree planting locations in the downtown area be identified and/or created so as to begin to plan for the possible demise of the fifteen green ash. If additional trees are planted and are successful, the loss of the legacy green ash (if treatments are discontinued) would be unfortunate but not as devastating as if no replacements had been established. The treatment of the fifteen green ash over the course of a minimum of ten years provides the time for the replacement trees to become well established. (See page 16 for replacement ratio and species).
15. The City of Montpelier, the Vermont Department of Buildings and General Services, and the Vermont Department of Forests, Parks, and Recreation will collaborate on a plan to ameliorate the visual impact of the loss of ash trees in the forest behind the Statehouse. This area has a higher than average concentration of ash trees and the loss of the associated canopy is predicted to have a detrimental impact on the aesthetics, especially during fall months (currently underway, Summer 2018).

Authority

The City of Montpelier has sufficient authority embedded in City ordinances to address the infestation of ash trees by EAB.

Montpelier Ordinance 13-312. Public Tree Care.

The City shall have the right to plant, prune, maintain and remove trees, plants and shrubs within the lines of all streets, alleys, avenues, lanes, squares and public grounds, as may be necessary to insure public safety or to preserve or enhance the symmetry and beauty of such public grounds.

The City Tree Warden may remove or cause to be removed any tree or part thereof which is in an unsafe condition or which by reason of its nature presents a hazard to the general public, is injurious to sewers, electric power lines, water lines or other public improvements, or is affected with any injurious fungus, insect or other pests.
(emphasis added)

Montpelier Ordinance 13-316 Dead or Diseased Tree Removal on Private Property

The City shall have the right to cause the removal of any dead or diseased tree on private property within the city, when such tree constitutes a hazard to life and property, or harbor insects or disease which constitutes a potential threat to other trees within the city. The City Tree Board will notify in writing the owners of such trees. Removal shall be done by said owners at their own expense within sixty days after the date of service of notice. In the event of failure of owners to comply with such provisions, the City shall have the authority to remove such trees and charge the cost of removal on the owner's property tax notice.

Ash Tree Re-Survey

The Montpelier Tree Board conducted a survey of ash trees located along City streets in 2013 and identified approximately 550 ash trees ("TB Survey"). Using the Google Fusion Tables and Mapping function, the ash trees were located using a Geaddress feature (that is, trees were geographically located (in an approximate fashion) using the nearest address of a residence). During that survey no attempt was made to determine if any particular ash tree was a street tree or not; that determination is problematic because characterization as a street tree is only made based on whether or not the tree is located in the City right-of-way which varies from street to street and can also vary in different parts of the same street.

Parks Department personnel conducted a street tree inventory of all trees in the City in 2016 and located approximately 150 street ash trees ("City Street Tree Inventory"). Because some questions have arisen regarding the accuracy of some of the data collected during that inventory, and discrepancies in the street tree inventory when compared to the TB Survey, the decision has been made to re-survey those areas of the City containing the most ash as per the TB Survey.

The re-survey was completed by August, 2018 by Tree Board members and volunteers and indicated that there are approximately 450 street ash trees. Suspect trees were examined for any indication of EAB infestation but none was found; that work is currently continuing. (See work schedule, Appendix A).

Evaluation of Ash Tree Condition – Prioritizing Trees For Removal

During the 2018 re-survey ash tree conditions were noted as this information will be essential for identifying those trees that will be removed during the first year (see mechanical control section below). In addition, the re-survey data can also be used to identify those trees that will be good candidates as trap trees (see EAB monitoring below) and also identify re-planting locations that can be used to replace the ash with other tree species (see Re-Planting section below). Annually thereafter, the inventoried trees will need to be re-examined for removal, selecting trap tree candidates, and establishing replanting locations.

Mapping

Using Google Fusion tables, ash distribution maps have been created for the TB Survey and the ash located during the City Street Tree Inventory. An updated street ash distribution map will be created at least annually reflecting the current ash tree distribution.

EAB Monitoring: By Signs and Symptoms of Infestation

A limited survey of the ash trees identified during the City Tree Inventory that were characterized as being in either poor or dying condition has been conducted during the Spring, 2018, before EAB was found within City limits. The rationale for surveying this reduced population of ash street trees (n = 17) is that it has been reported in the literature that EAB preferentially seeks out ash trees in poor condition for infestation. During the pre-leaf-out survey no obvious signs of EAB infestation (epicormic shoots, woodpecker damage) were observed. A second survey of these trees was conducted during June, 2018 to observe the canopy of each tree.

During the 2018 re-survey of ash trees, survey staff were trained to identify signs of EAB infestation and trees exhibiting any unusually characteristics were noted for possible follow-up assessment. The follow-up assessments involved branch sampling to detect EAB larvae. In future years tree removal to enable a more thorough examination for signs of EAB, or girdling to utilize the poor condition ash tree as a trap tree, with subsequent removal and examination may be employed as monitoring tactics. Due to their typical structure, white ash are not as amenable to branch sampling from the ground as green ash so additional equipment (truck with bucket) would be required to sample white ash in this manner.

The initial re-survey has prioritized trees for removal. Approximately 10% of all ash trees will be removed each year (45 trees) but the exact percentage (higher or lower) may depend upon the number of hazard trees identified. It is understood that all the untreated ash trees (99%) will eventually be killed during the time span covered by this management plan and therefore if less than 10% of the street ash are removed, a larger percentage will have to be removed sometime down the road.

Re-surveys in subsequent years will prioritize the trees scheduled for removal in the following twelve months, identify trees for branch sampling, or to be used as trap trees. Furthermore, when we can identify select trees for removal prior to infestation, costs are likely to be less than waiting until they are infested.

EAB Monitoring: Green Sticky Prism Traps

Green sticky prism traps have been found to be effective in EAB surveys when those traps contain kairomone and pheromone lures. The City will purchase a least ten such traps and the baited lures to be used with them and deploy those traps throughout the City as an early detection system for EAB activity. Traps will be deployed in accordance with manufacturer instructions and recommendations from the literature, generally in place prior to the flight period of the EAB. When properly placed, these traps have been

very effective at detecting low populations of EAB in areas where the EAB infestation's effects on trees are not yet apparent. The traps are checked for EAB (generally males) every few weeks throughout the year (until November). The results of this monitoring can be used for further trapping of EAB by using trap trees as described below.

EAB Monitoring: By Trapping With Approved Protocols.

Trapping by girdling ash trees may be incorporated into this EAB Management Plan based on the concepts contained in the following paper:

Katovich, S. SLAM A Strategy to SLow A.sh M.ortality In Emerald Ash Borer Outlier Sites, U.S. Forest Service, St. Paul, Minnesota, February, 2009.

The SLAM strategy works best for areas of recent infestation so it would be appropriate for use for the initial two-three years of the span of time covered by the EAB Management Plan. Essentially a group of ash trees are girdled in the vicinity of a known infestation. Adult EAB are drawn to weakened trees and would be expected to deposit eggs in these trees preferentially. By removing and processing these trees prior to the following May (when adults emerge from the trees) a portion of the next generation of EAB is eliminated. It is recommended that the SLAM strategy be employed wherever new outbreaks of EAB are identified, at least for the first three years of the management plan.

EAB Monitoring: By Reportings From Homeowners

The Montpelier Tree Board and the Parks Department have provided up-to-date information to Montpelier residents regarding EAB and what homeowners can do now that the borer is within City limits. Information has been distributed (in paper form) at locations around the City as well as on the Montpelier Tree Board webpage (thanks to the invaluable assistance of Ms. Jamie Granfield in the office of the City Manager). Additional information has been provided through publication in the local City newspaper, The Bridge, and letters to the editor, penned by Tree Board volunteers. A Facebook page has been established as an additional venue for distributing information on a timely basis. It is hoped that homeowners will become educated regarding EAB and ask questions and/or report possible infestations to City and UVM Urban and Community Forestry personnel. Infestations should be reported to www.VTInvasives.org using the directions at that website. Secondly, infestations should be also reported to the Montpelier Tree Warden as those infestations may form the basis for subsequent action such as the SLAM strategy described earlier.

Management Tools: Mechanical Control – Street and Park Trees

The City will remove, or contract with a tree removal company, to remove approximately 10% of the ash street tree population each year. This number will approximate 45 trees each year. For obvious reasons the Department of Public Works and all local utilities will need to be involved in the removal of street trees.

The following tree conditions will warrant inclusion on the removal list for each year:

Trees that pose a hazard to people, property and utilities (i.e. have targets if they fall).

Trees that exhibit signs of EAB infestation including canopy impairment.

Trees that were girdled in the previous year to serve as trap trees

Other trees not in these categories but otherwise in dying or poor condition with priority given to heavily travelled roadways.

The timing of removal in any particular year will be as follows:

Hazard Trees: As Soon As Possible After Identification

Trees With EAB Damage: Mandatorily before May to eliminate adults and larvae

Girdled Trees: Mandatorily before May to eliminate adults and larvae

Lethal Girdled Trees: Can be left in place until determined to be possible hazard tree

Other Trees: During the course of the summer/fall

Infested ash trees are dangerous because parts of the tree become brittle. Arborists should avoid climbing these trees and use extreme caution when removing same. A dead ash tree can shatter during limb removal and cause injury or death to workers.

Management Tools: Trees On Private Property – Revolving Loan Fund

As would be expected, the treatment or removal of ash trees on private property throughout the City is the responsibility of the landowner. As part of the Preparedness Plan for the City of Montpelier, a survey of 97 randomly chosen residences was conducted and the ash trees on those parcels measured and enumerated. Based upon a statistical extrapolation of the data collected, it is estimated that approximately 46% of the parcels in the City have at least one ash tree and there are an estimated total of 2700 ash on private property.

If this estimate proves to be accurate, there will be a considerable financial burden to be borne by residents when those trees must be removed. For low income residents, with

an income threshold to be established by the City Council, it is recommended that a City revolving loan fund be established to help those residents deal with their ash and pay back the fund over time as part of their real estate tax assessment. This might help avoid a situation where a hazard ash was not removed in a timely manner and caused injury or damage to property as a result (dead ash trees become very brittle and hazardous). It may also avoid some litigious battles whereby the City requires a tree to be removed and the homeowner will not or cannot comply due to financial considerations. Information for homeowners can be found here:

www.montpelier-vt.org/DocumentCenter/View/5200/Homeowners-Guide-to-the-Emerald-Ash-Borer

Chemical Control: Downtown City Trees, Street Trees and Park Trees

The City of Montpelier will follow the State of Vermont recommendations regarding the use of systemic insecticides to treat street trees. Those recommendations can be found here:

www.montpelier-vt.org/DocumentCenter/View/5267/Emerald-Ash-Borer-Treatment

Treatment of the ash trees does not guarantee long-term survival of those trees because once treatment starts it cannot end without the tree succumbing to EAB. At a minimum, treatment provides time for the City and homeowners to plant replacement trees and for those trees to develop and contribute to the cityscape. Treatment also serves to allow the City and homeowners a degree of control over the number of trees that need to be removed and when those trees will be removed.

Downtown Ash Trees

Perhaps the most noticed ash trees in the City, several of these green ash were planted in the Bicentennial Year of 1976 and have grown large and provide major benefits to the City ecologically and aesthetically. These green ash have been survivors in a very difficult environment for trees to grow and thrive. They will certainly not survive EAB without assistance. This management plan incorporates the use of the State recommended systemic insecticides Emamectin benzoate, commonly called Treeäge and/or azadirachtin, commonly called TreeAzin. Both of these systemic insecticides are applied via trunk injection which limits any exposure to humans and animals. In addition, when applied with recommended precautions, these insecticides pose the least amount of risk to non-target insects such as honeybees.

The insecticides will, most likely, need to be applied every two years for the extent of the ten-year span covered by this EAB Management Plan. If TreeAzin is used, annual applications may be required when EAB populations in the area are high. At the end of

the 10 year period, a re-assessment of the downtown green ash can be made relative to their removal or continued treatment, an assessment of the success or failure of the treatment provided, and an assessment of the replanting efforts made in the interim.

All 15 green ash in the downtown area would be treated. The treatment cost is based upon the diameter of the tree at 54" above ground surface (DBH). Calculation made using the current treatment cost of \$12/inch of diameter, and based on recent measurements of DBH indicate that a treatment would cost approximately \$2000.00 and, because the treatment is made every two years, the annual cost is approximately \$1000.00. The City may be able to negotiate lower costs from local arborists certified to apply these insecticides. On the other hand, as tree diameters increase over time, and the cost of labor increases, future treatment costs can also increase. The fifteen trees include two large ash on private property (City Center and Capitol Theatre) that provide excellent environmental benefits to City residents and thus warrant protection, at least initially, by the City with approval of the property owners.

Street Trees and Park Trees

The Tree Warden may choose to recommend for treatment other ash trees not located in the downtown area. These may include some trees in Hubbard Park, for example, such as the large green ash located adjacent to the Old Shelter in the Park. Legacy park trees typically have larger DBH measurements, therefore are more costly to treat.

Because of the costs involved, the City may partner with local residential communities so as to preserve some of the cityscape provided by these street ash trees. Also to lower costs, the City may choose to have personnel trained and certified in the application of the aforementioned insecticides. This would effectively increase the City's options in terms of how many trees to treat and, because treatments are made during a short period in the Spring, there would be no major impact on the availability of this staff during other times of the year. It is important to note that treatment of some trees throughout the City may serve to slow the spread of EAB because adults feeding on treated ash leaves will either die outright or exhibit a reduction in their reproductive ability. This delaying tactic will give homeowners in those residential communities additional time to obtain the resources necessary to remove their ash as they become infested. The partnerships should best be established with the involvement of the City Councilor(s) representing the residents of the districts where the communities are located.

Biological Control: Parasitoid Wasps

If and when biological controls are available to the City the EAB team will evaluate their use and make a recommendation to the City Council upon making a finding that they will not impact non-target species to any significant degree. Asian and native parasitoid wasps are currently employed at infested sites around the country and the success of these introductions is being evaluated. Woodpecker predation on EAB larvae is probably the most important natural biological control for EAB and it has been suggested that providing suet may induce woodpeckers to remain at selected sites throughout the year.

Wood and Ash Material Utilization – Quarantine and Transportation

On woodlots, timber sales can reduce EAB spread when some ash are left to attract dispersing beetles. If all ash are removed then the actual spread of the beetle is probably enhanced as they search for ash to infest. The combination of harvest and girdling remaining ash provide revenue to the landowner (from lumber or firewood) and also help slow the spread when the girdled trees are removed. Girdled trees can also be treated with Emamectin benzoate and become lethal trap trees left in place to kill more adults.

EAB was originally first discovered in Vermont in Orange County. Because of the proximity of the location where EAB was discovered, State and Federal officials placed Montpelier and surrounding towns located approximately 15 miles from the discovery into an 'infestation zone' designation. Officials recommended that ash not be transported out of the zone and that visibly infested ash not be moved at all. Montpelier was identified as being in the 'high risk' portion of the infestation zone. This proved to be correct as the discovery of an EAB infestation within the Montpelier City limits came shortly thereafter. The transportation of infested ash tree material is not restricted within the infestation area which now encompasses all of Montpelier. It is essential for the City to establish a marshalling area where ash can be stockpiled and processed (see below). The marshalling area will need to be secured by fencing. It is recommended that the vacant land adjacent to Gateway Park be utilized in this manner. This has the added benefit of eventually providing an educational display at the Park to explain what the marshalling area is being used for and why.

If a marshalling area is not established in a timely manner, and EAB infested trees left unprocessed where they are found, the spread of EAB will be enhanced and the loss of all untreated ash trees in the Montpelier area will likely occur within an eight - ten year period.

Processing Ash with EAB – Processing for Lumber and Firewood

It is important to remember that EAB only affects the area of the tree right beneath the bark. Most of the wood of an ash that is infested but still alive can be used in various ways. To process the ash for lumber (as it is an excellent straight-grained wood used in flooring, etc.), only the bark and the first inch of wood beneath the bark must be removed. Trees can also be processed for firewood and that firewood utilized within the infestation area. Because it is unlikely that the resulting firewood can be kiln-dried in the marshalling area, it is recommended that any such firewood be cut into smaller chunks than normal (6-8 inches). This is necessary because it is believed that any EAB larvae will continue to develop in the firewood until it is relatively dry. Smaller chunks would limit the amount of phloem available for consumption by the larvae as the wood dries at a residence. It will also dry faster. It is further recommended that any such firewood be utilized completely in the winter prior to the adult emergence period in the following Spring, thus further limiting the spread of EAB. Finally, trees can also be chipped and utilized in a heating plant as fuel. Chipping will essentially deprive the larvae of phloem and they will perish.

To get ahead of the coming large amount of ash that will need to be processed in coming years, we have the following recommendations:

- (1) The City should purchase a portable sawmill for ash lumber processing. Furthermore, after this purchase, the City should contract with a skilled sawmill operator to provide as-needed lumber processing. In addition, after the operation is established, the operator should also provide training to vocational youth in the area in the safe processing of trees into lumber. The contract may specify that the sawmill operator be paid, at least in part, through the sale of wood products from the ash processed.
- (2) The City should also purchase equipment that can process the sawmill waste into boiler fuel. A portable heavy-duty chipper may be suitable for this purpose. Chips can be stockpiled at the marshalling area.
- (3) The City should establish a program through which ash trees not deemed suitable for lumber are processed into firewood. A volunteer core of residents skilled in chainsaw use could process the firewood which could then be provided to low income residents at reduced cost (or free). Any publicity from such a program would be of great benefit to the City and its image as a progressive, caring community.

Any rules and policies regarding the operation of the marshalling yard should be clearly indicated on signage attached to the fencing of the yard. Because it is anticipated that local arborist companies will need to bring ash to the yard, hours of operation will need to be established. It is recommended that the Montpelier DPW be given the task of controlling access to the yard. The DPW could charge a fee for use by arborists.

Replacing Lost Ash Trees Through Replanting

The Tree Board recommends that ash trees be replaced with other species on a 2:1 basis. This will be especially important in neighborhoods where ash are predominant and their loss will have a profound effect on the tree canopy in those locations. If, after the end of the 10-year period covered by this Plan it is decided to cease treatment of the fifteen downtown green ash, their replacements should be in place and healthy so that some of the eco-benefits of the ash can be replaced. It is further recommended that if the 2:1 replacements are not successfully in place after the end of the 10-year period, treatments be continued until they are. In order to accomplish the replacement of downtown green ash, it will be necessary to create additional planting wells in the downtown City sidewalks. This will need to be done within the first three years of this EAB Management Plan so as to enable planting of the replacement trees early in the 10 year cycle.

The Tree Board has noted that the current City ordinances dealing with tree plantings are now outdated and will need to be revised, preferably by the end of 2018. For example, the ordinance specifies the planting of green ash among the favored species listed. The species in the revised list will be trees that can be successful in the harsh downtown environment and preferably are bee-friendly. The Tree Board will attempt to adhere to the following rule when planting trees in order to promote diversity (when looking at new plantings overall):

- Not to exceed 10% of any one species;
- Not to exceed 20% of any one genera;
- Not to exceed 30% of any one family of trees.

Outreach and Education

The overall goal in outreach is to educate the public on EAB damage and ash tree health. This can be accomplished through public informational meetings, presentations to the Montpelier City Council (which are re-broadcast), publication of articles in The Bridge and Times-Argus, creation and maintenance of a Facebook page, providing information using the Tree Board website as a document portal, providing information via the Tree

Warden webpage, and providing updated information via the Montpelier Front Porch Forum. It would be convenient if a City blog could be established for the sole purpose of responding to questions/concerns about EAB raised by City residents. An EAB Information Center has been established in the City Clerk's Office in City Hall.

The following are excellent sources of EAB information:

<https://vtinvasives.org>

<https://vtcommunityforestry.org>

Citizen Involvement

The Tree Board and Parks Department has trained volunteers to be able to identify ash trees, determine the relative health of ash trees, and spot the signs of EAB infestation. Initially, this effort was to achieve the goal of a more refined inventory of City-wide street ash trees. However, in the future, these and other trained volunteers will form the core of an overall EAB monitoring program as assessments will be made each year as to what infestations have been discovered in parts of the City and what trees will be removed, girdled or treated in subsequent years. Identifying infested ash takes a certain amount of situational awareness that we hope to infuse into our citizenry. It will take a community effort to keep the EAB onslaught manageable in terms of personnel and budgetary realities.

The Tree Board has always involved volunteers in tree planting efforts undertaken either in the downtown area or around the City neighborhoods. This practice will continue and it is envisioned that the Tree Board will provide guidance to homeowners around the City as those residents plant trees to replace the ash on their parcels.

Cost/Benefit Analysis: Eco-Benefits and Landscape Tree Value Appraisal , Woodlots

Trees provide numerous eco-benefits. Some of these include combating climate change by removing CO₂, cleaning the air by absorbing odors and pollutant gases (especially important in downtown areas), cooling the streets, preventing water pollution, and more. See the link: www.treepeople.org/tree-benefits for more information.

Besides eco-benefits which cannot be meaningfully expressed in dollars (think about sitting in the shade of a tree on a hot day; what is that worth?), trees have tangible landscape value that can be measured.

The fifteen downtown green ash trees have been valued conservatively at over \$8,500. Unlike most assets, the value of downtown trees increases over time if those trees are maintained and protected from unnecessary damage. As a tree gets larger the eco-benefits also increase.

In the City of Montpelier there are small woodlots with stands of ash that may have significant harvest potential. It is recommended that homeowners with such stands contact the regional State forester or other professional to assess the stand and provide advice while the ash may still be marketable. The revenue from the sale of ash could possibly offset other costs such as those incurred with the removal of non-marketable trees and re-planting.

Homeowners with small woodlots should check the following link:

www.montpelier-vt.org/DocumentCenter/View/5321/Emerald-Ash-Borer-Information-for-Forest-Landowners

Fiscal Planning : Estimated Annual Budget – Initial Year (* = Mission Critical)

*Treatment of Fifteen Ash with Systemic Insecticide \$2,000 every two years	\$ 1,000.00
*Treatment of Additional Legacy Ash (Hubbard Park)	\$ 1,000.00
*Green Stick Prism Traps / Lures for 4 year use	\$ 2,000.00
*Remove 10% of street ash (estimate for contracted tree removal for trees City staff cannot handle)	\$10,000.00
*Full-time Parks staff person dedicated for at least half-time EAB - ash management (salary and benefits)	\$50,000.00
*New tree wells (5 each year for 3 years) @\$3,000/well	\$15,000.00
*New downtown trees (7 each year for 3 years) \$300/tree	\$ 2,100.00
Revolving Loan Fund for Low Income Residents (Initial seed)	\$25,000.00
*Bucket Truck (used) suitable for tree removal activities	\$45,000.00
*Marshalling area including, fencing/security	\$10,000.00
Portable Sawmill, chipper, stump grinder, etc.	\$60,000.00
Contract w/ Sawmill Operator (subsidized by lumber sales)	\$10,000.00

Initial Year Estimate	\$231,100.00

(Note: This estimate does not include costs associated with updating the nursery area for growing trees as needed for ash replacement (inc. watering system) as well as the cost of trees for neighborhood plantings).

Fiscal Planning: Estimated Annual Budget – Subsequent Years

*Treatment of Fifteen Ash with Systemic Insecticide \$2,000 every two years	\$ 1,000.00
*Treatment of Additional Legacy Ash (Hubbard Park)	\$ 1,000.00
*Remove 10% of street ash (estimate for contracted tree removal for trees City staff cannot handle)	\$10,000.00
*Full-time Parks staff person dedicated for at least half-time EAB - ash management (salary and benefits)	\$50,000.00
*New tree wells (5 each year for 3 years) @\$3,000/well	\$15,000.00
*New downtown trees (7 each year for 3 years) \$300/tree	\$ 2,100.00
Contract w/ Sawmill Operator (subsidized by lumber sales)	\$10,000.00

Subsequent Years Estimate	\$89,100.00

(Note: Estimate does not include costs associated with replacing neighborhood ash trees; however, after three years costs associated with new tree wells and new downtown trees can be re-directed for neighborhood plantings.)

APPENDIX A: ANNUAL ACTIVITIES FOR EAB MANAGEMENT

JANUARY

FEBRUARY

Set up the annual plan for surveying ash trees in all city neighborhoods

Train volunteers in EAB tree symptoms identification

Arrange for treatment of downtown ash and other legacy ash Park and street trees

MARCH

Prepare report for previous year's EAB management activities and submit to City Council and post

Remove any trees girdled as trap trees in previous year unless treated with Emamectin benzoate (lethal trap trees)

APRIL

Set out one-half of green traps throughout the city especially near suspected infested areas previously ID

Based on known infestation areas, choose trap trees and girdle same

Remove any ROW infested trees identified in previous year; move ash material to marshalling area and process to kill EAB

Re-examine Montpelier ROW ash and flag poor condition ash for removal, noting areas of possible infestation

MAY

Update ash inventory with new information (tree condition, trees removed, etc.)

Set out remaining green traps in new areas of possible infestation

Check green traps deployed in April

Verify that downtown ash trees have been treated with Emamectin benzoate (every two years)

JUNE

Check all green traps

APPENDIX A: ANNUAL ACTIVITIES FOR EAB MANAGEMENT

JULY

Check all green traps

Hold a public informational meeting for Montpelier residents to provide an update on infestation and receive information from residents

AUGUST

Check all green traps

SEPTEMBER

Conduct branch sampling of suspect trees or trees in areas where green traps have captured adult EAB

OCTOBER

NOVEMBER

Cut infested trees and process, chip or generate firewood

Move all downed ash material to marshalling area for processing

Distribute firewood to low income residents

DECEMBER

Cut infested trees and process, chip or generate firewood