City of Whitefish

Emerald Ash Borer Course of Action Plan

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Rainbow Treecare

Bozeman Emerald Ash Borer Course of Action Plan

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Whitefish Tree Advisory Committee

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Introduction

Building resilience in Urban Forestry is very important to the City of Whitefish. Preserving mature trees make neighborhoods cooler, safer, and more desirable to live in. Trees play a vital role in urban ecosystems, providing wildlife habitat, water retention, and improving air quality. By maintaining our mature tree canopy, it provides significantly greater benefits to our community than just removal and replacement.

Moving forward, the City of Whitefish Urban Forestry Department is dedicated to preserving as many of our Ash trees as possible while still adding new diversity to our inventory. Species diversity is also important to any plant population for the ecology to thrive. Monocultures harm the greater environment by inviting pests and disease, while also depleting soils and diversification of animal life. With low species diversity, tree populations are especially vulnerable to insects and disease.

The impact of Emerald Ash Borer is not just felt by forestry and natural resources departments. Emerald Ash Borer is an unprecedented ecological event and has been called a “natural disaster in slow motion”. Given that EAB introduction to Whitefish is inevitable, we must approach this threat head on. The loss of our ash trees to Emerald Ash Borer would be devastating not only to our urban canopy, but to the city’s ecology and economic impacts.

The impacts the City of Whitefish must consider are:

1. **Public Safety**
    - When ash trees are at the end of their life or a limb dies, it becomes extremely hazardous to public safety. The grain of the wood in ash trees can cause a tree to fail without warning. Recent windstorms have taken a toll on our older ash trees.
2. **Economic Impact**
    - The Urban Forestry/Parks Department budget will see a significant impact.
    - The cost to remove all the infected “hazardous” ash trees, including removal of wood, staff time, stump grinding and disposal of infected wood, will be high.
    - There will be additional costs for chemicals to biannually treat the trees that are still declared “healthy”.
    - Property values will decrease without mature trees.
3. **Environmental**
    - The benefits that our mature ash trees provide, such as heating/cooling effects, stormwater abatement, air quality and wildlife habitat will be diminished.
4. **Quality of Life**
    - Residents will notice a significant reduction in shade canopy over our trails, sidewalks, and streets, making homes and yards warmer in the summer months. As trees also improve our mental health and social interactions, these benefits will diminish over time.

What is an Emerald Ash Borer (EAB)?

The Emerald Ash Borer (Agrilus planipennis) is a destructive, wood-boring pest that attacks Ash trees. Native to Asia, the Emerald Ash Borer beetle (EAB) was unknown in North America until its discovery in southeast Michigan in 2002. Through the combination of natural spread and human activity, EAB has now been detected in 35 states and has killed millions of trees. It is thought that it probably arrived hidden in wood packing material used to ship consumer goods.

Biology:

The Emerald Ash Borer is deadly to ash trees because the larvae feed right under the bark. Eggs are laid between layers of bark and in bark crevices. Larvae hatch in about one week and bore into the tree where they feed on the inner bark and phloem, creating "S" shaped galleries. Larvae go through the four feeding stages, and then excavate a pupal chamber in the fall, where they will overwinter as prepupae. Pupation occurs in late spring, and adults begin to emerge through "D" shaped exit holes in May and early June. Adults will remain active until the end of summer.

EAB blocks the flow of water and nutrients, thus resulting in tree death. Visual symptoms of an EAB infestation often take a few years to manifest themselves, adding to the challenge of effective management.

Larva

S-Shaped Galleries

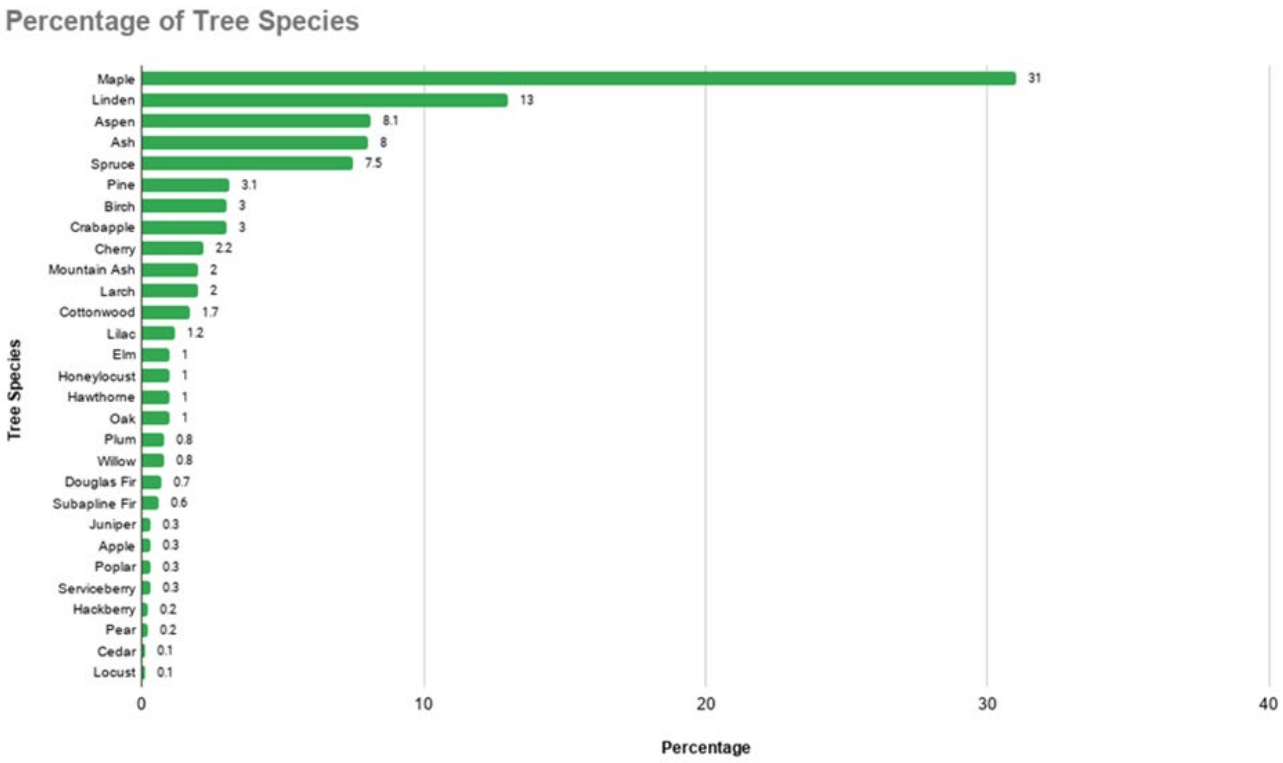
D-Shaped Emergence Hole

Our Urban Forest:

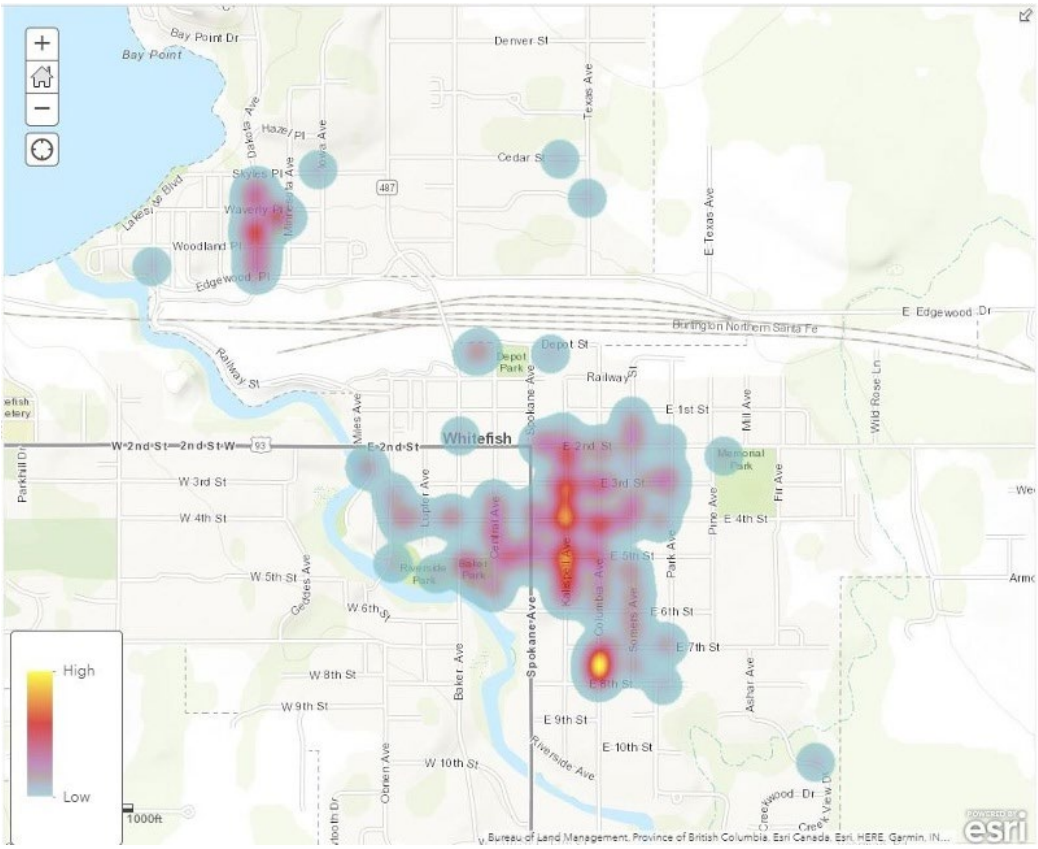
With funding from the DNRC in 2017, the City of Whitefish updated its tree inventory with a web-based database to better manage the urban forest. Using a mobile ArcGIS collector that staff is able to use in the field, the City can now identify, locate and evaluate trees on city streets, parks, public lands and other public rights-of-way and can document each tree's condition, safety risk, and maintenance needs. This interactive and easily accessed inventory allows the City to set priorities for maintenance and pruning, as well as plan for future tree planting and replacement.

Since the completion of this 2017 grant, our GIS Specialist has integrated the City's asset management system to track maintenance and create work orders to prioritize what needs to be completed. Staff is now able to address existing maintenance needs as well as track and manage new maintenance tasks as they arise. Trees are updated in the inventory when the work is completed.

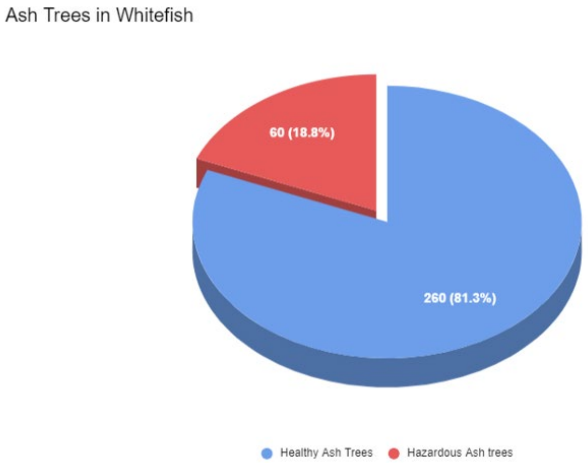
The City of Whitefish currently has 4,000 trees in our inventory, with over 300 ash tree species. Whitefish's ash trees make up 8% of our current inventory, and most fall into our "large urban forest canopy."



Residential areas around downtown, especially along Kalispell Avenue, house a good percentage of our larger ash trees. Ash trees are also found north of the viaduct near City Beach neighborhoods and south of town near Smith Fields.



Of Whitefish's 324 Ash trees, 260 were classified as healthy ash trees. These trees were considered healthy based on average or better scores of certain criteria, such as wood condition, structure, insects, etc. The remaining 60 ash trees were classified as risk trees, meaning certain factors put these trees at higher risk from Emerald Ash Borer. Whitefish is especially vulnerable to EAB with the BNSF railway running through town and from all the visitors traveling with firewood from multiple locations in the United States.



Preparing for EAB:

Using the inventory data that was updated in 2017, staff broke down the ash inventory into two caliper class sizes.

- 10” or larger (mature trees)
- 10” or less (younger trees)

The City then partnered with the Whitefish High School GIS class to determine how many of our ash trees are declared “healthy” or deemed “hazardous.” Ash trees deemed “hazardous” were added to a removal list.

Staff removed eleven unhealthy ash trees in 2020. Twenty new trees were planted, eleven of which replaced the trees staff removed. Nine others were planted near green ash trees that are highly susceptible to EAB. Some of the species planted were oaks, lindens, serviceberry, fruitless crabapple, hawthorn, aspen, and elms. These species are more resilient and create a more diverse urban forest.

All the “healthy” ash trees were added to a list that will be used when we look at which ash trees to start treating, in hopes of preventing EAB from infesting them when the pest presents itself in Whitefish.

“Save the best, replace the rest.”

Whitefish Urban Forestry Quick Stats:

The City has removed 111 trees in the last 5 years.

In FY19/20, City staff pruned 844 trees.

In FY19/20, City staff removed 72 trees.

Staff Members:

Maria Butts- Parks Department Director

Jen Sybrant- Urban Forestry/Landscape Foreman

Philip Hodge- Arborist

2 Seasonal Staff

Monitoring and Detection:

Detecting the presence and monitoring the severity of the EAB infestation is an essential part of this plan. City staff will monitor for symptoms and signs of new infestations, including branch dieback in the upper crown, excessive epicormic branching on the tree trunk, and vertical bark splits. Woodpecker damage is sometimes a sign as well.

Epicormic Branching

Bark Splits

Dieback

Woodpecker Damage

Photos courtesy of USDA Forest Service.

Treatment Plan for EAB:

Once EAB arrives, the infested trees will be immediately removed. Mature trees not yet showing signs of infestation will be treated to delay their removal. Some of the existing, younger ash trees will also be evaluated and deemed worth saving. Trees will be applied with a preventative herbicide biannually to repel EAB. To determine whether ash trees are younger or mature, they were divided into two class sizes of 10" diameters or less for younger trees, or 10" diameters or more for mature trees.

Systemic Chemical Injections

Trunk injections of emamectin benzoate (EB) are the safest and most effective way to treat ash trees and will be used during heavy periods of infestation. A trunk injection of EB is the only method of protecting ash trees for two years, and in some recent studies, EB was effective for three years. Emamectin benzoate has shown to provide the highest level of control in side-by-side studies. This treatment option could be used through all stages of the EAB infestation and most likely will be the cost-effective approach considering it can be applied once every three years during low infestation periods. (EAB Management Plan for Bozeman, 2016)

After determining what ash trees will be treated, staff will:

- Flag the trees to raise awareness for citizens and promote education.
- Treat with a systemic injection of emamectin benzoate every 2 years.
- Update the inventory.

Biological Control Methods

The USDA has tested and developed protocols for the introduction of three biological control insects to help slow the population increase of EAB (EAB Management Plan for Boulder County, 2015). Oobius agrili, Spathius agrili, and Tetrastichus plannipennisi are insects known to exist in EAB's native range and parasitize either the EAB eggs or larvae. These insects vary a bit in their efficacy but complete multiple lifecycles in one year's time, helping to reduce EAB either during the egg or larval phase of development. Although biological control can reduce EAB densities, these biological control agents have not been effective in significantly reducing EAB populations below damaging levels. (EAB Management Plan for Bozeman, 2016)

Budgeting:

The city has evaluated the costs of removing trees in house versus hiring a contractor to remove trees. The cost to remove a mature ash tree "in house" is around $700, whereas the cost to contract a mature ash tree removal is estimated to be $1,000-$2,000. In FY18, the Parks and Recreation Department was able purchase a bucket truck, chipper, and proper PPE at the cost of $140k. This bucket truck will not only offset the extra expense of hiring a contractor to remove ash trees but will be used for the maintenance and removal of other trees in the urban forest.

In estimating the cost to treat ash trees with emamectin benzoate, there are many factors to consider. The goal would be to treat the 245 ash trees with DBH greater than 10 inches, but the rate of application depends on the level of infestation. For example, since EAB has not arrived yet, a low or medium use rate would be appropriate and would cost the City $3,875-$10,967 (see table 5, page 11). Once the trees are under attack, a higher application rate would be needed and would cost the City $21,935-$31,777 to adequately treat all trees greater than ten inches. Staff time to treat the number of trees would be an additional cost and may present a loss in productivity in the heart of the working season for the department.

The anticipated cost of removing the entire ash inventory is estimated to be $453,000. The cost to replace a tree, including a 2" caliper tree, planting materials, and staff time, is $450. The anticipated cost to replace all ash trees would be $136,000. Therefore, the total cost of removal and replacement if all ash trees in the City of Whitefish would be approximately $589,000.

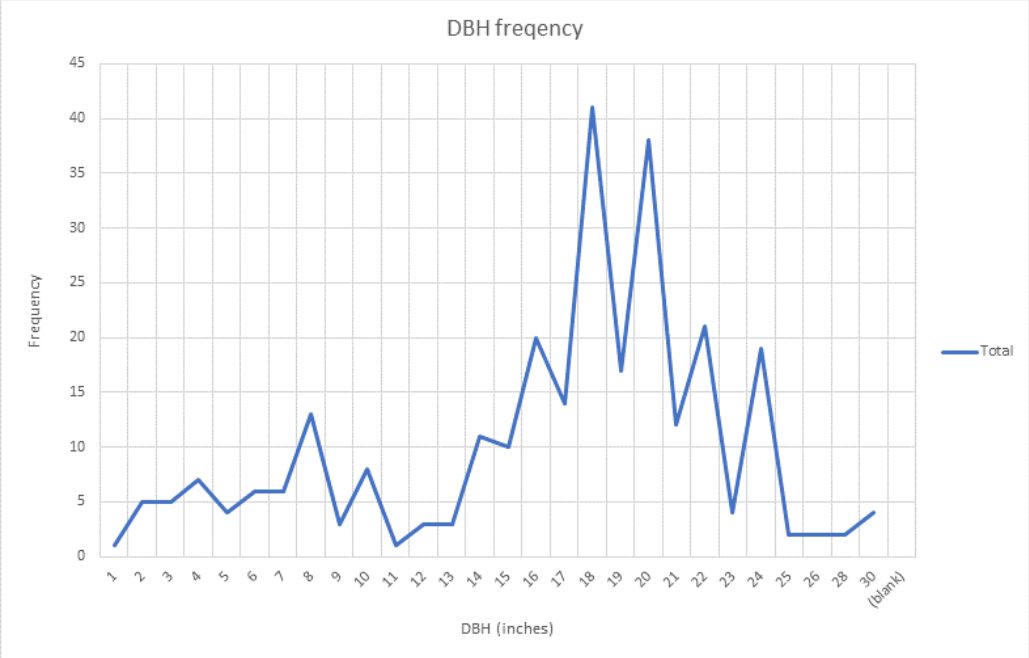


Table 1: Green Ash Tree Data	
DBH in inches	# Green Ash per group
<4	11
4-6	19
7-9	24
10-12	14
13-15	24
16-18	79
19-21	70
22-24	47
25-27	5
28-30	6
Grand Total	**299**

Table 2: Application Rates (mL/tree)				
DBH	low	medium	medium high	high
<4	0	0	0	0
4-6	15	25	50	0
7-9	20	4	80	0
10-12	30	55	110	165
13-15	35	70	140	210
16-18	42	85	170	225
19-21	50	100	200	300
22-24		115	230	345
25-27		130	260	390
28-30		145	290	435
(ArborMectin Injected Insecticide Rate Table)				

Cost Estimates to Treat with Emamectin Benzoate

Table 3: Total Application (mL x total # trees)				
DBH	low	medium	medium high	high
<4	0	0	0	0
4-6	285	475	950	0
7-9	480	96	1920	0
10-12	420	770	1540	2310
13-15	840	1680	3360	5040
16-18	3318	6715	13430	17775
19-21	3500	7000	14000	21000
22-24	0	5405	10810	16215
25-27	0	650	1300	1950
28-30	0	870	1740	2610
Total	**8843**	**23661**	**49050**	**66900**

Table 4: Total Cost (mL x $.475)				
DBH	low	medium	medium high	high
<4	$0.00	$0.00	$0.00	$0.00
4-6	$135.38	$225.63	$451.25	$0.00
7-9	$228.00	$45.60	$912.00	$0.00
10-12	$199.50	$365.75	$731.50	$1,097.25
13-15	$399.00	$798.00	$1,596.00	$2,394.00
16-18	$1,576.05	$3,189.63	$6,379.25	$8,443.13
19-21	$1,662.50	$3,325.00	$6,650.00	$9,975.00
22-24	$0.00	$2,567.38	$5,134.75	$7,702.13
25-27	$0.00	$308.75	$617.50	$926.25
28-30	$0.00	$413.25	$826.50	$1,239.75
Total	$4,200.43	$11,238.98	$23,298.75	$31,777.50

Table 5: Total Cost to treat 10"-30"				
DBH	low	medium	medium high	high
10-12	$199.50	$365.75	$731.50	$1,097.25
13-15	$399.00	$798.00	$1,596.00	$2,394.00
16-18	$1,576.05	$3,189.63	$6,379.25	$8,443.13
19-21	$1,662.50	$3,325.00	$6,650.00	$9,975.00
22-24	$0.00	$2,567.38	$5,134.75	$7,702.13
25-27	$0.00	$308.75	$617.50	$926.25
28-30	$0.00	$413.25	$826.50	$1,239.75
Total	$3,837.05	$10,967.75	$21,935.50	$31,777.50

Quarantine Wood:

Quarantine wood from removed, infested ash trees will be dealt with in a coordinated manner. Trunks containing EAB larvae carry the risk of spreading the bug, so a single spot will be chosen to limit further dispersal of EAB. When the City removes an infested tree, an area in the Public Works yard will be designated for storing this material. Branches and smaller-caliper brush are chipped and should be aged before considered safe for repurposing or disposing of normally. The City will consider opening this yard for homeowners and tree services to dispose of infested logs as well.

Species Diversity/Replanting:

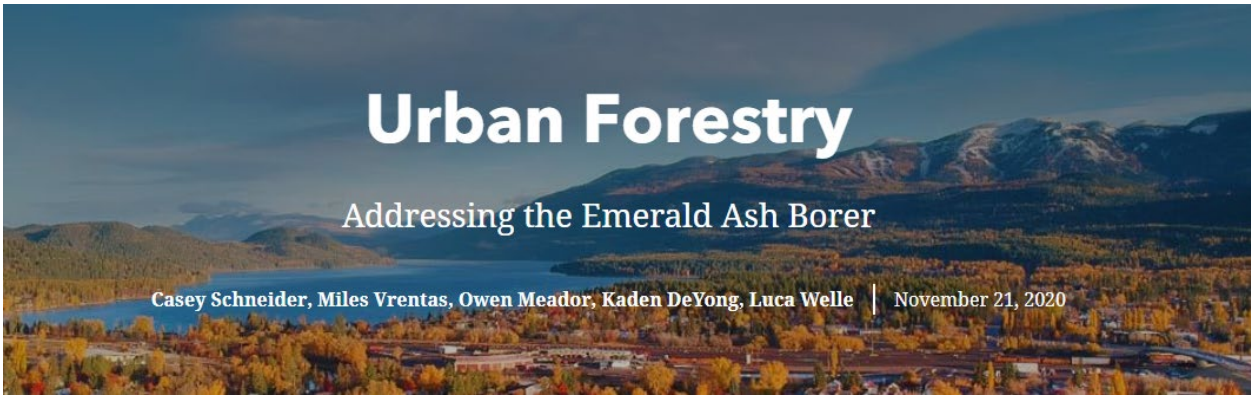
In FY'19/'20 City staff removed (11) "hazardous" Green Ash trees. Staff then replaced these green ash trees with a variety of trees that require less water, have stronger pest resiliency, and provide diversity to our inventory. These newly planted trees will also provide a more resilient landscape that will be more adaptive to climate change.

- Brandon Elm (2)
- Accolade Elm (1)
- Spring Snow Crabapple (6)
- Littleleaf Linden (1)
- Thunderchild Crabapple (1)
- Toba Hawthorn (1)
- Spring Flurry Serviceberry (1)
- Bur Oak (1)

Public Education:

Education is a major factor in the fight against the Emerald Ash Borer. We hope that this plan will serve as a tool to educate the public on how EAB may impact our community, the cities around us, and the pro-active steps the City of Whitefish will take before its arrival.

- The City worked closely with the Whitefish High School GIS class for data analysis and the creation of a Story Map (Urban Forestry: Addressing the Emerald Ash Borer). The Story Map will be shared on the City's website and social media.
- EAB information is periodically added to the City's quarterly newsletter that is distributed to all residents with a City water bill.
- This Course of Action Plan will be added to our City website and social media accounts.
- Educational messages focusing on not moving out-of-state firewood to Montana will be emphasized.



Moving Forward:

As the City awaits the arrival of EAB, there are many things that will be done in preparation:

- Staff will keep City Council up to date on anticipated costs EAB could have on the budget.
- The City will continue to provide EAB updates on our City website and social media pages.
- Staff will re-evaluate after the first 2 years of treating to see if the ash tree is still in "healthy" status.
- This plan will be updated as needed.
- Educate the community and visitors as much as possible.
- Staff is always available to answer any questions residents may have regarding the trees in our Urban Forest, by calling (406) 863-2470.