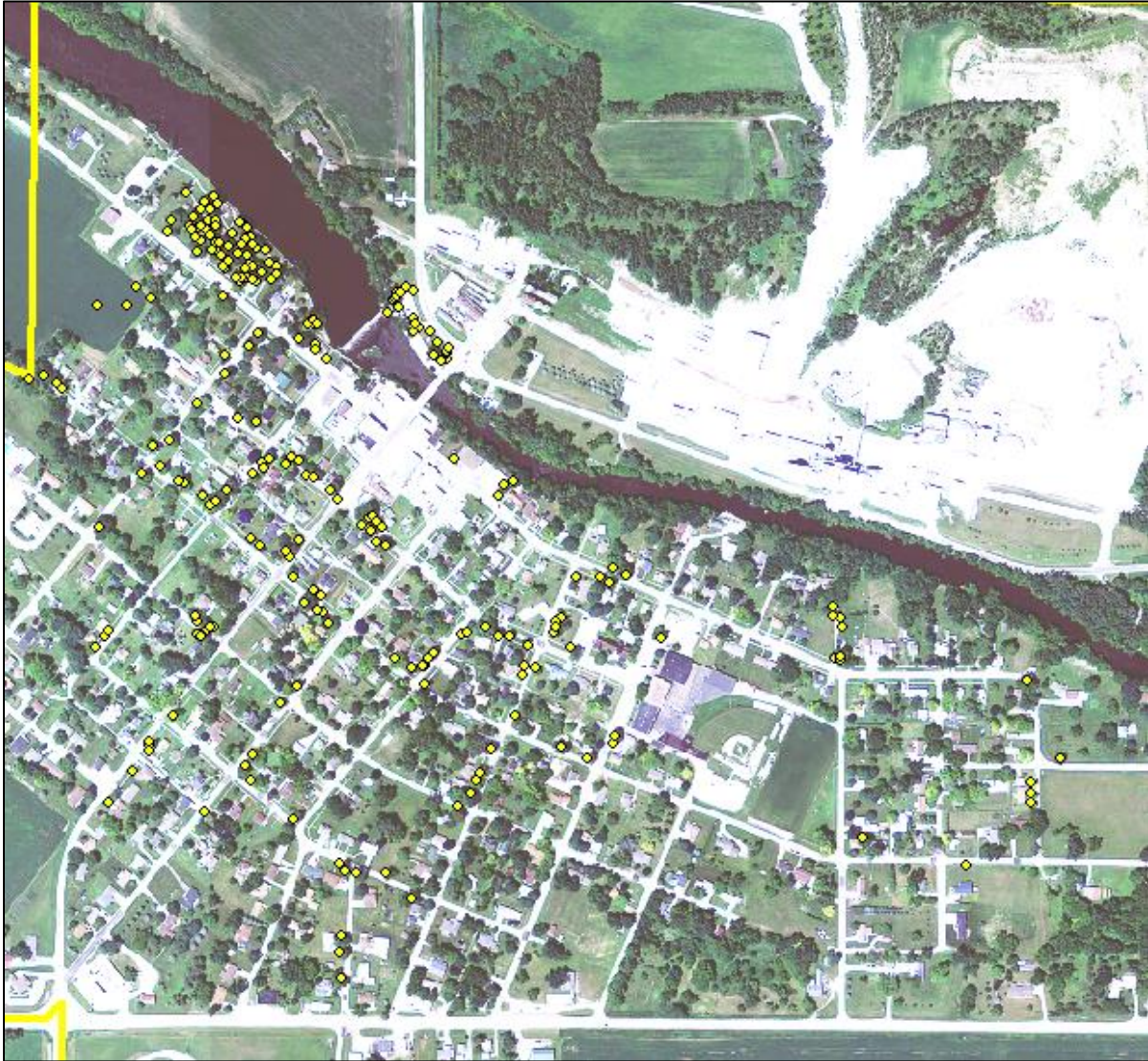


# Alden, IA



2016 Urban Forest Management Plan  
Bureau of Forestry, Iowa DNR



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# Executive Summary

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## Overview

This plan was developed to assist the City of Alden with managing its urban forest, including budgeting and future planning. Trees can provide a multitude of benefits to the community, and sound management allows the community to take full advantage of these benefits. Management is especially important considering the serious threats posed by forest pests such as the emerald ash borer (EAB). EAB is an invasive insect imported from Eastern Asia on wood shipping crates that kills all species of ash trees (this does not include mountain ash). There is a strong possibility that 25% of Alden's urban tree canopy (comprised of 59 Ash trees) will die once EAB becomes established in the community, which doesn't even include privately-owned ash trees. With proper planning and management, the costs of removing dead and dying trees can be extended over years, mitigating public safety issues.

## Inventory and Results

In 2015, a tree inventory was conducted by Iowa DNR Forestry staff using a Global Positioning System (GPS) data collector. The inventory included all publicly-owned street trees located between the street and sidewalks, as well as trees in the City Park and river access/dam public area. Below are some key findings of the 233 trees that were inspected for the inventory.

- Alden's trees provide \$47,674 of benefits annually, an average of \$205 a tree
- There are over 30 species of trees
- The top three genera are: Maple 42%, Ash 25%; and Honey Locust 5%
- 77 trees (33% of all inspected) are in need of some type of management

## Recommendations

- Encourage ongoing tree planting using a diverse mix of recommended species. Set a goal of planting 10-15 new trees every 5 years along city streets, parks, and other public spaces to help sustain the urban tree canopy into the future.
- The 77 trees identified as needing some form of maintenance should be scheduled for inspection & management according to priority level:
  - 2 trees were identified as "critical concerns" – which should be inspected and dealt with as soon as possible.
  - 34 trees were identified as needing "immediate" management which implies sometime in the next 1-3 years
  - 41 trees were identified as needing "routine" management which implies sometime in the next 5 yearsNote: Locations are shown in Appendix B Figs. 4 & 5. \*City ownership of the trees recommended for removal should be verified prior to any removal\*
- After that, all trees (young and old) should be inspected on a routine schedule for pruning and management needs- approximately one-third of the trees should be inspected every other year. Prune as needed and remove trees only once they become a hazard or have died.

- 11 of the city's 59 Ash trees should be monitored closely, as they exhibited one or more symptoms that could be related to an EAB infestation (Appendix B Figure 2)
- Monitor all other Ash trees in town regularly for ongoing signs and symptoms of EAB

## Introduction

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This plan was developed to assist Alden with the management, budgeting and future planning of their urban forest. Across the state, forestry budgets continue to decrease with more and more of that money spent on tree removal. With the anticipated arrival of Emerald Ash Borer (EAB), an invasive pest that kills native ash trees, it is time to prepare for the increased costs of tree removal and replacement planting. With proper planning and management of the current canopy in Alden, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

Trees are an important component of Alden's infrastructure and one of the greatest assets to the community. The benefits of trees are immense. Trees provide the community with improved air quality, stormwater runoff interception, energy conservation, and increased property values; research has also shown that trees can lower traffic speeds, reduce crime, improve mental health, and help attract and retain residents. It is essential that these benefits be maintained for the people of Alden and future generations through good urban forestry management.

Good urban forestry management involves setting goals and developing management strategies to achieve these goals. An essential part of developing management strategies is a comprehensive public tree inventory. The inventory supplies information that will be used for maintenance, removal schedules, tree planting and budgeting. Basing actions on this information will help meet Alden's urban forestry goals.

## Inventory

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In 2015, a tree inventory was conducted that included 100% of the city-owned trees on city streets along with the City Park, Veteran's Memorial, and canoe portage/dam area. Information about each tree was recorded using a handheld data collector enabled with a Global Positioning System (GPS) receiver. The data collector gives Geographic Information Systems (GIS) coordinates with an accuracy of 3 meters, which can be used in ArcGIS software as an active GIS data layer. Because the inventory is a digital document, the data can be updated with new information and become a working document.

The program used to collect tree information on the data collectors was written to be compatible with a state-of-the-art software suite called i-Tree. i-Tree was developed by the USDA Forest Service to quantify the structure of community trees and the environmental services that trees provide. The i-Tree suite is a public domain which can be accessed for free.

To quantify the urban forest structure and benefits, specific data is collected for each tree. This data includes: location, land use, species, diameter at 4.5 ft, recommended maintenance, priority of that maintenance, leaf health, and wood condition. Additionally, signs and symptoms associated with EAB were noted for all ash trees. The signs and symptoms noted were canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

## Inventory Results

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The data collected for the 233 city trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management (STRATUM), part of the i-Tree suite. The following are results from the i-Tree STRATUM analysis.

### **Annual Benefits**

#### **Annual Energy Benefits**

Trees conserve energy by shading buildings and blocking winds. Alden's trees reduce energy related costs by approximately \$12,489 annually (Appendix A, Table 1). These savings are both in Electricity (60.2 MWh) and in Natural Gas (8,083.0 Therms).

#### **Annual Stormwater Benefits**

Alden's trees intercept about 713,993 gallons of rainfall or snowmelt a year (Appendix A, Table 2). This interception provides \$19,349 of benefits to the city.

#### **Annual Air Quality Benefits**

Air quality is a persistent public health issue in Iowa. The urban forest improves air quality by removing pollutants, lowering air temperature, and reducing energy consumption, which in turn reduces emissions from power plants, and emitting volatile organic matter (ozone). In Alden, it is estimated that trees remove 802.6 lbs of air pollution (ozone (O<sub>3</sub>), particulate matter less than 10 microns (PM<sub>10</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), and sulfur dioxide (SO<sub>2</sub>)) per year with a net value of \$2,271 (Appendix A, Table 3).

#### **Annual Carbon Benefits**

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Alden, trees sequester about 112,591 lbs of carbon a year with an associated value of \$844 (Appendix A, Table 5). In addition, the trees store 3.3 million lbs of carbon, with a yearly benefit of \$24,795 (Appendix A, Table 4).

#### **Annual Aesthetics Benefits**

Social benefits of trees are hard to capture. The analysis does have a calculation for this area that includes: aesthetic value, property values, lowered rates of mental illness and crime, city

livability, and much more. Alden receives an estimated \$12,719 in annual social benefits from trees (Appendix A, Table 6).

### **Financial Summary of all Benefits**

According to the USDA Forest Service i-Tree STRATUM analysis, Alden’s trees provide \$47,674 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 233 trees in Alden provide approximately \$205 annually (Appendix A, Table 7).

### **Forest Structure**

#### **Species Distribution**

Alden has over 30 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genera is as follows:

Maple	93	40%
Ash	59	25%
Honey Locust	11	5%
Oak	<10	4%
Walnut	<10	4%
Linden	<10	3%
Other spp.		<3% ea.

#### **Size Class/Age**

Size class is used as a surrogate predictor of age distribution within the population. Most of Alden’s trees (60%) are larger than 18 inches in diameter (Appendix A, Figure 2). The ideal size class distribution to maintain canopy cover would be flat across the y-axis or skewed slightly left (with more young trees than old trees) to account for unexpected mortality over time. Alden’s current size distribution is skewed heavily to the right, indicating an older than average stand – just 13% of the population is comprised of young trees smaller than 6” diameter. This suggests a need for more planting to balance the population and mitigate storm risks.

#### **Condition: Wood and Foliage**

Both wood condition and leaf condition are good indicators of the overall health of the urban forest. The foliage condition results for Alden indicate that 87% of the trees are in either good or fair health, with only 13% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 85% of Alden’s trees are in either good or fair health for wood condition (appendix A, Figure 4 & Appendix B, Figure 3). Trees with poor, dead or dying wood is about 11% of the population.

#### **Management Needs**

The following outlines the specific management needs of the street and park trees by number of trees and percentage (Appendix B, Figure 3).

<u>Recommended Mgmt.</u>	<u># of Trees</u>
Crown Cleaning	36
Crown Raising	0
Tree Staking	12
Tree Removal	23
Crown Reduction	5

## **Canopy Cover**

The total amount of tree/forest canopy (including both private and public trees) currently in Alden is approximately 0.8%, as measured by remote sensing means. The cumulative tree canopy cover for the 233 trees inventoried in Alden is a little over 7 acres (Appendix A, Figure 5).

## **Land Use and Location**

The majority of Alden’s city-owned trees are in planting strips in single family residential neighborhoods as well as in city parks (Appendix A, Figures 6 & 7).

## **Recommendations**

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### **Risk Management**

Hazardous trees can be a significant threat to both people and property. Trees that are dead or dying, or that have large issues such as trunk cracks longer than 18 inches should be removed. Broken branches and branches that interfere with motorist’s vision of pedestrians, vehicles, traffic signs and signals, etc. should be removed.

#### Hazardous trees

Alden had 2 “critical concern” trees that were identified during the inventory as being public safety concerns. These were reported to city hall upon completion of the inventory for immediate inspection. These trees can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Figure 4).

### **Pruning**

Proper pruning can extend the life and good health of trees, as well as reduce public safety issues. There are three main categories of routine pruning to be addressed: crown cleaning, crown raising, and crown reduction. Crown cleaning removes dead, diseased, and damaged limbs. Crown raising is the removal of lower branches that are 2 inches in diameter or larger for the purpose of providing clearance for pedestrians or vehicles. Crown reduction is removing individual limbs from interference with structures or utility wires. It is recommended that all trees be pruned on a routine schedule every five to seven years.

## Deferred and Routine Management Needs

After addressing hazardous “critical concerns” discussed above, other trees flagged for recommended maintenance should be inspected according to priority level.

- 34 trees recommended for “immediate” maintenance in the next 1-3 years:
  - 3 need staking or training
  - 18 need crown cleaning
  - 5 need crown reduction
  - 7 need removed
  - 1 needs pest/disease treatment
- 41 trees recommended for “routine” maintenance in the next 5 years:
  - 9 need staking or training
  - 17 need crown cleaning
  - 15 need removed

The locations of these trees are shown in Appendix B Figures 4 & 5.

## Planting

It is recommended to plant 1.2 trees for every tree removed, since survival rates will not be 100%. It is not essential that the new trees be planted in the same location of the trees being removed. However, maintaining the same number of trees helps ensure continuation of the benefits of the existing forest in Alden. If we assume the average useful lifespan of an urban street tree is 100 years, then the annual goal should be to plant approximately 10-15 new trees every 5 years to maintain Alden’s street and parks tree population long-term.

It is important to plant a diverse mix of species in the urban forest to maintain canopy health, since most insects and diseases target a genus (ash) or species (green ash) of trees. Current diversity recommendations advise that a genus (i.e. maple, oak) not make up more than 20% of the urban forest and a single species (i.e. silver maple, sugar maple, white oak, bur oak) not make up more than 10% of the total urban forest. Presently, the forest is heavily planted with maple (40%) (Appendix A, Figure 1). Maples should not be planted until this percentage can be lowered. Also, ash trees have not been recommended since 2002, due to the threat of EAB. Other species to avoid because they are public nuisances include: cottonwood, poplar, boxelder, oriental elms, or others outlined in the city ordinance.

## Continual Monitoring for EAB

Due to the threat of EAB, it is important to continuously check the health of ash trees. It is recommended that ash trees be checked with a visual survey every year for tree decline and for the following signs and symptoms: canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.



# Emerald Ash Borer Recommendations

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The City of Alden has 59 ash trees along its city streets and in city parks as tallied by this inventory, which represents 25% of the tree population (not including private trees). Although the city is not known to have Emerald Ash Borer present, 11 trees that were inventoried had *some* signs or symptoms that are commonly associated with EAB such as: canopy dieback, woodpecker flecking, and/or basal sprouts.

## Monitoring

It is recommended that ash trees be checked with a visual survey every year for tree death and for the following signs and symptoms: canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

## Ash Tree Removals

Nine ash trees were recommended for removal during the 2015 inventory for various reasons. After removing those trees, it is recommended the City begin pre-emptively removing and replacing any ash trees that are categorized as being either in poor health or are dead/dying (leaf health or wood health ratings) (Appendix B, Figure 3). At that point, the City can opt to maintain its residual population of healthy ash trees at or below the 20% threshold for a particular genus until the beetle is discovered in town.

## Treatment of Ash Trees

Chemical treatment for EAB prevention is available on an individual tree-by-tree basis. The City may wish to invest in treatment of certain high quality ash trees that are of exceptional value or importance to the surrounding landscape. Chemical treatment can be effective tool for communities to spread removal costs out over several years while allowing certain trees to continue to provide benefits. Treatment is not recommended if EAB is still more than 15 miles away from the community. For more information on treatment strategies visit <http://www.extension.iastate.edu/psep/EmeraldAshBorer.html>

## Wood Disposal

Wood waste can be disposed of at the City's composting facility via chipping, burning, and/or composting. It's recommended that raw ash materials not be allowed to leave the premises for citizen firewood use in order to prevent spreading the insect to other parts of the city and county.

## EAB Quarantines

The State of Iowa is currently under both a State and Federal quarantine which prohibits the intrastate movement of regulated articles outside the quarantine area. In order to stay ahead of this hard to detect beetle, the USDA is attempting to contain the beetle before it spreads beyond its known positions by regulating articles.

A regulated article under the USDA's quarantine includes any of the following items:

- Emerald Ash Borer
- Firewood of all hardwood species (for example ash, oak, maple and hickory)
- Nursery stock and green lumber of ash
- Any other ash material, whether living, dead, cut or fallen, including logs, stumps, roots, branches, as well as composted and not composted chips of the genus ash (Mountain ash is not included)

In addition, any other article, product or means of conveyance not listed above may be designated as a regulated article if a USDA inspector determines that it presents a risk of spreading EAB.

For more information, please visit [http://www.iowatreepests.com/eab\\_regulations.html](http://www.iowatreepests.com/eab_regulations.html).

### **Canopy Replacement**

As budget permits, all removed trees should be replaced. The new plantings should be a diverse mix excluding species prohibited by City Code.

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