

The Benefits Of Urban Trees

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Abstract

In order to study and describe the many public benefits of urban trees, this project examined the beneficial contributions made during its lifetime by an individual tree located in Bushnell Park in the city of Hartford that had died and was scheduled for removal. Various benefits were calculated using a tool developed for the purpose. From this information general conclusions can be drawn about the entire urban forest resource. An attempt is also made to show how certain urban tree benefits, particularly carbon sequestration, can be extended even after the tree has died.

Our Goal

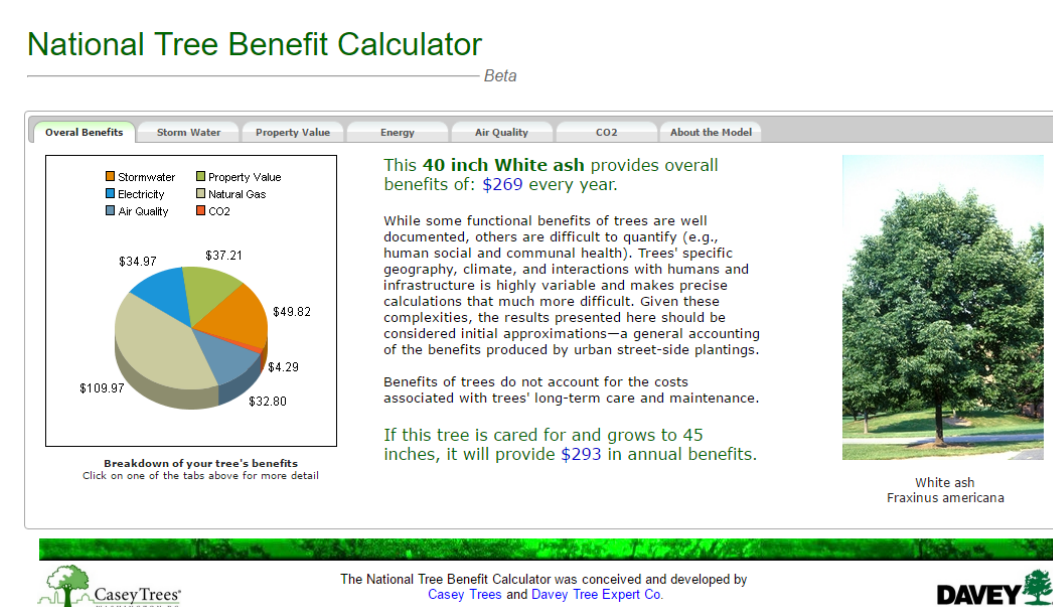
The goal of this project was to show that urban trees provide significant ecological and monetary benefits and show that when it is time to take down diseased and dead trees, instead of dumping the trees we take down we can make them a benefit to the urban community they were taken from.

How we used one tree

In this project, we chose one tree as an example of the possible benefits of urban trees. The tree was a white ash in Bushnell Park near the Soldiers and Sailors Memorial Arch in Hartford. The tree was dead and scheduled for removal. We were able to average the trees diameter once it was cut down. We found that the tree had a diameter of 54 inches at 4.5 feet off the ground. I was able to collect data about white ash benefits using the National Tree Benefit Calculator. I then used the data to predict the benefits our white ash had given in its lifetime.

How we used the National Tree Benefit Calculator

The National Tree Benefit Calculator is an on-line tool that can be used to quantify the benefits provided by urban trees. Based on species, location, and size the calculator can compute estimates of these benefits. I used the National Tree Benefit Calculator to find and quantify the property value, storm water interception, energy and atmospheric carbon reduction benefits of white ash trees. The calculator has specific data like the amount of carbon dioxide the specified tree can sequester in one year and how much energy (in kilowatt hours and therms) the tree saves you in heating/cooling benefits per year. The CO₂ page of the National Tree Benefit Calculator tells you how much the specified tree will reduce atmospheric carbon in one year. Trees reduce atmospheric carbon in two primary ways. They sequester (“lock up”) carbon dioxide in their roots, trunks, stems, and leaves while they grow, and in wood products after they are harvested. Additionally, trees near buildings can reduce heating and cooling demands, thereby reducing emissions associated with power production.



Why we should repurpose urban trees

Many people do not realize that carbon from the atmosphere is sequestered, or tied up, in trees. The carbon is trapped in the wood the tree grows each year. If a tree is removed and sent to a landfill or chipped up, all that carbon is just released back to the atmosphere as decomposition takes place. If the tree is burned the carbon is released even faster. Recovering some or most of the wood from a tree and turning it into long-lasting items like furniture extends the time all that carbon is kept out of the atmosphere. Instead of simply dumping the wood you can make something new from it like a bench which can go back to benefit the community the tree was taken from.

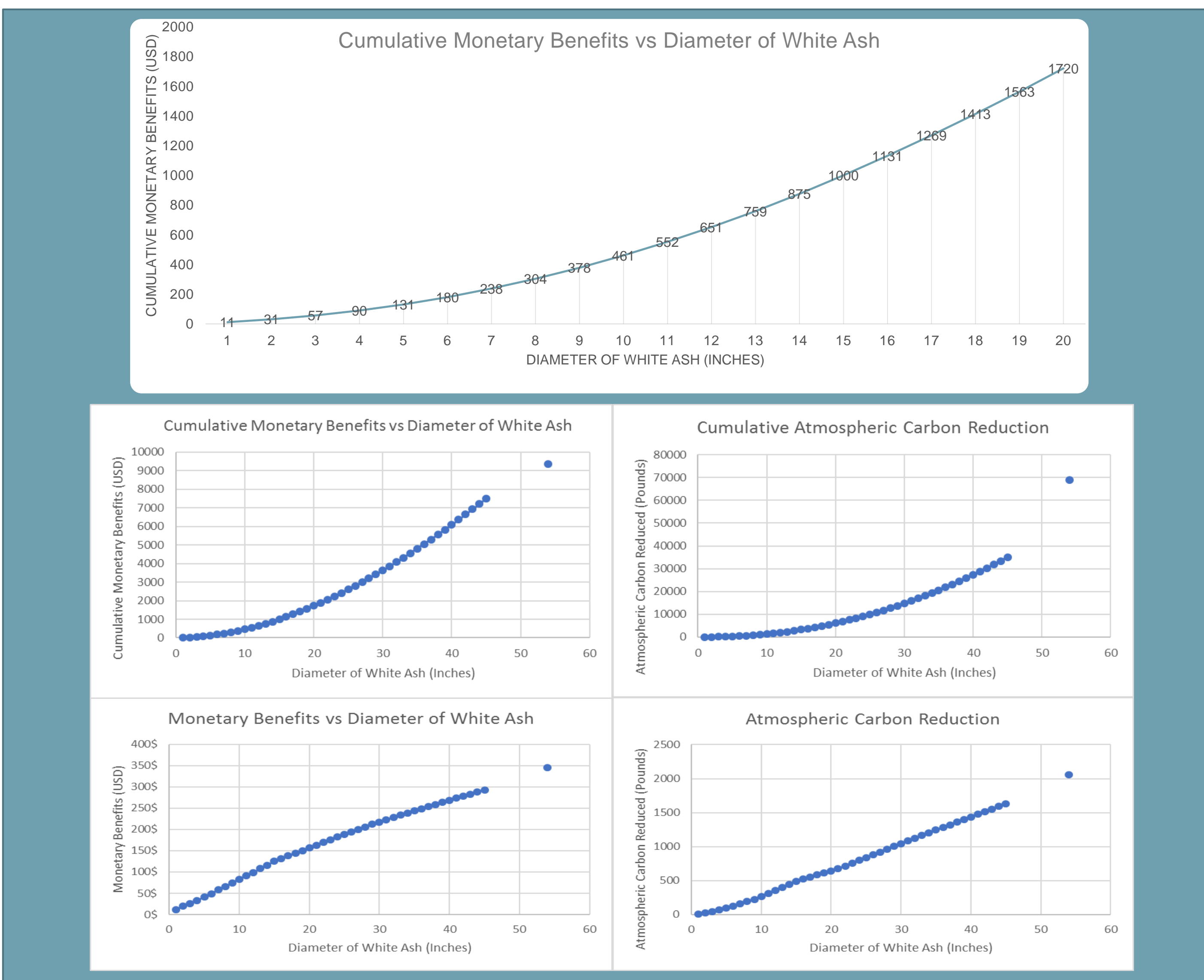
Why the tree was removed

The tree we studied was dead and scheduled for removal. The tree had probably died from a combination of ash diseases and insects like emerald ash borer.



Results

We found that the white ash removed was 129 years old. It had started growing at about the time the Arch was constructed. It had a diameter of 54 inches 4.5 feet above the ground. The tree was about 80 feet tall and had a crown spread of 40 to 50 feet. By the time the tree was 45 inches in diameter it was reducing atmospheric carbon by 1629 pounds each year. According to my projections, when the tree had grown to a diameter 54 inches it was reducing atmospheric carbon by about 2055.8 pounds every year. Per my projections, which were based on white ash trees with diameters from 1 to 45 inches, during the tree’s lifespan it reduced atmospheric carbon my more than 69077 pounds of carbon. We found out that the tree had provided the community with approximately \$9377.61 in monetary benefits. By the time the tree was 54 inches in diameter it was giving the surrounding community approximately \$345.81 per year in the form of storm water, air quality, property value, energy and carbon reduction benefits. A White Ash with a diameter of 45 inches diverts 7234 gallons of water per year, saves nearby buildings either 272 kilowatt hours or 82 therms of energy, reduces atmospheric carbon by 1629 pounds per year, increases property value by \$40, and gives off \$293 per year in overall benefits.



Discussion

Based on my results it is extremely important to have trees in urban areas. The trees in Bushnell Park alone provide the surrounding community with thousands of dollars every year. While urban trees have considerable benefits large and dead trees cause a considerable amount of damage. In urban areas, dead trees can cause unsafe situations. They are more likely to fall on buildings, roads, cars, trails, and electrical lines than trees in suburban areas. So once an urban tree dies or becomes large enough to be considered a danger it should be removed. However, many people think it is a waste of city money to remove trees. Based on my results that point is irrelevant because trees produce far more money in benefits than it costs to remove them. I found that by the time our White Ash had grown to a diameter of 20 inches it had produced enough benefits to pay for its own removal costs and the costs of planting a new tree in its place. Knowing this is it definitely worth it to remove and replace dead urban trees. Once the trees are removed it is beneficial to use the wood for benches or other products. A lot of times when trees are removed they are chipped up and sent to landfills. Many people do not realize that carbon from the atmosphere is sequestered, or tied up, in trees. The carbon is trapped in the wood the tree grows each year. If a tree is removed and sent to a landfill or chipped up, all that carbon is just released back to the atmosphere as decomposition takes place. If the tree is burned the carbon is released even faster. Recovering some or most of the wood from a tree and turning it into long-lasting items like furniture serves to extend the time that all that carbon is kept out of the atmosphere. Instead of simply dumping the wood you can make something new from it like a bench which can go back to benefit the community the tree was taken from. Following that principle, we made the bench on display out of three logs taken from the limbs of the White Ash.

Extending Urban Tree Benefits

While urban trees produce significant ecological and monetary benefits during their lifetime we also set out to show that instead of dumping the trees we take down we can make them a benefit to the urban community they were taken from. Wood from urban trees can be recovered and used to make attractive and durable items like furniture. This serves to continue to hold the carbon trapped by the tree during its life and to continue its aesthetic value. Most of the wood from our ash tree was collected by a company called “City Bench” to be used in projects they create.

With the help of the UConn Forest Crew we saved three logs taken from limbs of the tree. These were sawn into lumber materials from which we assembled a rustic bench, on display here. The bench is an example of the type of item that can be made from wood recovered from urban trees that need to be taken down. Benches like this can be placed in the park or in city buildings for people to enjoy. Making benches and other products with this wood can provide job opportunities.



Conclusions

Urban trees provide numerous benefits during their lifetime. The White Ash tree taken down produced nearly \$10000 in benefits during its lifetime. The trees in Bushnell Park alone provide the surrounding community with thousands of dollars in benefits every year. While urban trees have considerable benefits large and dead trees cause a considerable amount of damage. Urban trees are more likely to fall on buildings, roads, cars, trails, and electrical lines than trees in suburban areas. So once an urban tree dies or becomes large enough to be considered a danger it should be removed. Once a tree has been taken down it should be replaced right away. By replacing the tree the land it was on is still being used to give valuable benefits to the surrounding community. Furthermore, once a tree is taken down it can be made into useful items, extending the values the tree is providing. We need to appreciate how many benefits urban trees give and help them do their best work.

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Heather Dionne was an important part of the project’s completion. She worked with the City of Hartford Arborists to let us know dates of the tree’s removal and important information about the tree

Lastly, I would like to thank Laura Cisneros and the entire team of NRCA facilitators as well as the University of Connecticut for hosting and providing resources for NRCA.

RESOURCES

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