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DNR study shows Fox Valley area trees provide nearly $5 million yearly in benefits

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NORTHEAST Wis. – A recent analysis of street trees and canopy cover in Wisconsin's Fox Valley area show public trees provide $4.89 million in annual benefits. In addition, the canopy analysis revealed the Fox Valley metro area is currently covered by 20 percent tree canopy with the potential of an additional 55 percent of car cover.

The study, completed by the Wisconsin DNR, in cooperation with the communities of Appleton, Greenville, Kaukauna, Kimberly, Little Chute, City of Menasha, Town of Menasha, and Neenah, highlights the significant values that community trees provide Fox Valley area residents including the following:

- $1.40 million per year in summer cooling and winter heating energy savings
- $1.56 million per year in storm water management savings by intercepting approximately 58 million gallons storm water annually
- $1.51 million per year increase in local property values
- $233,336 per year in air quality improvements by mitigating harmful air pollutants
- $186,480 per year in atmospheric carbon dioxide reduction

i-Tree

Tools for Assessing and Managing
Community Forests

i-Tree Project Profile

Wisconsin DNR's Fox Valley Metro Area Analysis Project

[1]

The Wisconsin Department of Natural Resources' [2]Northeast Regional Urban Forestry Coordinators completed the second phase of a regional analysis of street trees and canopy cover in the Fox Valley Metro Area.

The project, which was completed with cooperation from the communities of Appleton, Greenville, Kaukauna, Kimberly, Little Chute, City of Menasha, Town of Menasha and Neenah, showed that public trees provide $4.89 million in annual benefits. In addition, the canopy analysis revealed that the Fox Valley metro area is currently covered by 20% tree canopy with the potential of an additional 55% of canopy cover.

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- **$1.40 million per year in summer cooling and winter heating energy savings.**
- **$1.56 million per year in storm water management savings by intercepting approximately 58 million gallons of storm water annually.**
- **$1.51 million per year increase in local property values.**
- **$233,336 per year in air quality improvement by mitigating harmful air pollutants.**
- **$186,480 per year in atmospheric carbon dioxide reduction.**

Understanding the important environmental and economic value that community trees provide, will allow Wisconsin communities to improve management, advocate for future investment, build partnerships and address threats to ensure that residents receive environmental and economic services well into the future. Simply put, tree benefits increase as trees grow in size. This emphasizes the need for sustainable planning, cooperation and participation by all to ensure that trees reach maturity and continue to enhance community livability.

[1]

Fox Valley Area i-Tree Streets and Canopy Community Fact Sheets

- Fox Valley Area Analysis Fact Sheets[1]
- Appleton Street Tree & Canopy Fact Sheets[3]
- Greenville Street Tree & Canopy Fact Sheets[4]
- Kaukauna Street Tree & Canopy Fact Sheets[5]
- Kimberly Street Tree & Canopy Fact Sheets[6]

- Little Chute Street Tree & Canopy Fact Sheets[7]
- City of Menasha Street Tree & Canopy Fact Sheets[8]
- Town of Menasha Street Tree & Canopy Fact Sheets[9]
- Neenah Street Tree & Canopy Fact Sheets[10]

Green Bay Area i-Tree Streets and Canopy Community Analysis

The first phase of the Wisconsin DNR's regional analysis project focused on community tree benefits in the Green Bay Metro Area including the following:

- **$1.81 million per year in summer cooling and winter heating energy savings.**
- **$1.78 million per year in storm water management savings by intercepting approximately 65 million gallons of storm water annually.**
- **$2.02 million per year increase in local property values.**
- **$296,206 per year in air quality improvement by mitigating harmful air pollutants.**
- **$233,998 per year in atmospheric carbon dioxide reduction.**

- Green Bay Metro Area Regional Analysis Fact Sheets[11]
- Allouez Street Tree & Canopy Fact Sheets[12]
- Ashwaubenon Street Tree & Canopy Fact Sheets[13]
- Bellevue Street Tree & Canopy Fact Sheets[14]
- De Pere Street Tree & Canopy Fact Sheets[15]
- Green Bay Street Tree & Canopy Fact Sheets[16]
- Hobart Street Tree & Canopy Fact Sheets[17]
- Howard Street Tree & Canopy Fact Sheets[18]

Contact Information

The analysis was conducted by Kim Miller from the Wisconsin DNR utilizing the i-Tree Streets & Canopy software.

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Links

1. http://www.itreetools.org/resources/reports/WDNR_Fox_Valley_reports.pdf
2. http://dnr.wi.gov/topic/UrbanForests/

City of Menasha

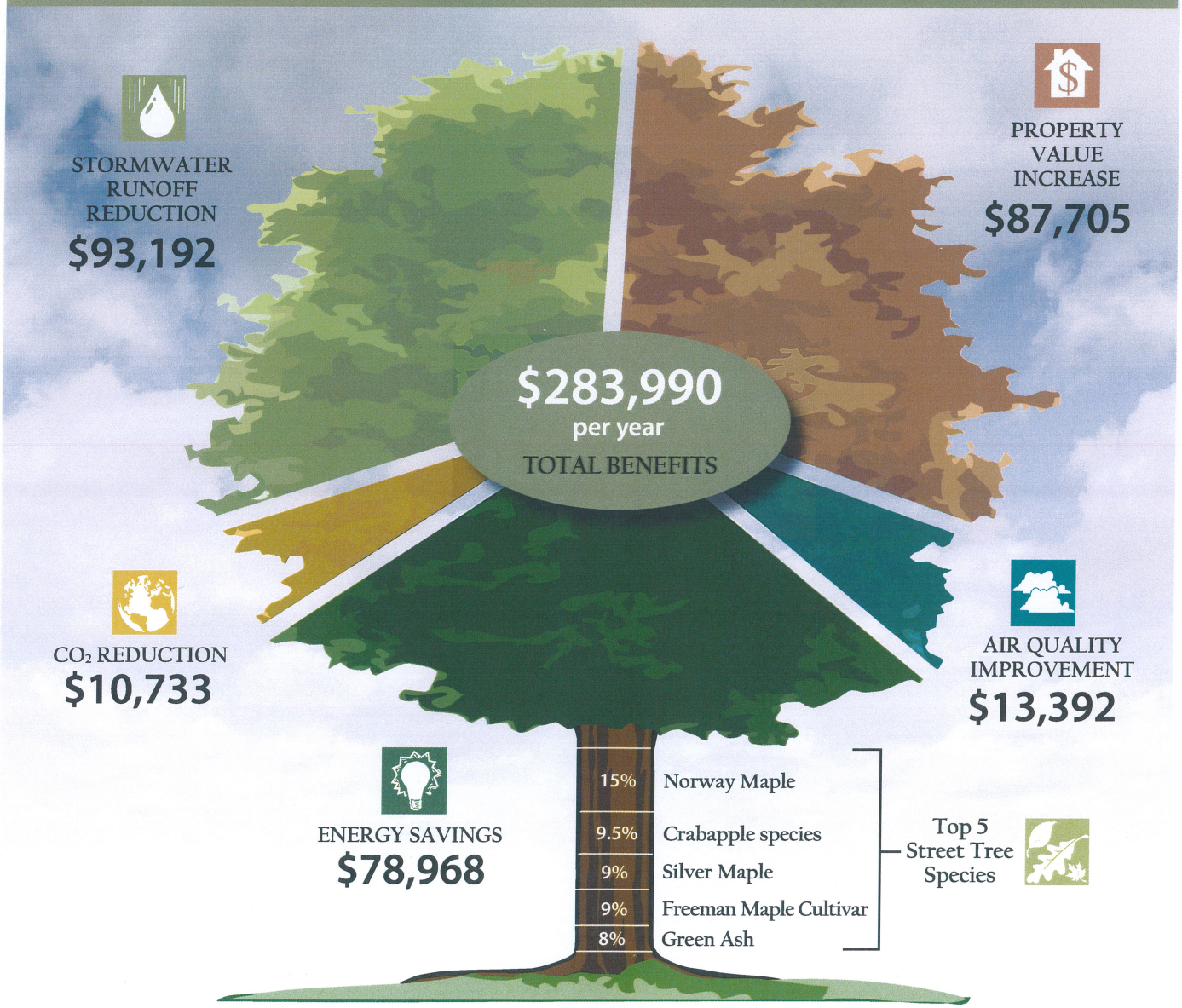
Street Tree Benefits

Menasha street trees provide thousands of dollars of environmental, economic and aesthetic benefits to the community. Over their lifetime, street tree benefits exceed the costs of planting and care, representing a 300 percent return on investment. Tree benefits increase over time highlighting the importance of not only planting trees, but of providing ongoing maintenance and protection. These benefits are a reminder of the worthwhile investment in our community forestry program.

Trees:

- **Reduce stormwater runoff**
- **Lower summer air temperatures**
- **Reduce air pollution**
- **Reduce heating and cooling costs**
- **Reduce atmospheric carbon dioxide (CO_2)**
- **Enhance property values**
- **Provide wildlife habitat**
- **Improve health and wellbeing**
- **Improve learning and concentration**
- **Provide aesthetic benefits**

Annually **Menasha** public street trees provide[1]...



Trees Reduce Stormwater Runoff and Improve Water Quality

Trees reduce peak stormwater runoff and associated pollutants entering local water bodies. Trees reduce stormwater volumes by intercepting a portion of rainfall, which evaporates and never reaches the ground. Tree roots also increase rainfall infiltration and storage in the soil. And tree canopies reduce soil erosion by diminishing the impact of raindrops on barren surfaces.

Street trees in Menasha intercept 3,438,580 gallons of water annually for a savings of $93,192.

Trees Reduce Atmospheric Carbon Dioxide

Trees reduce atmospheric carbon by capturing and storing CO2 as they grow. By reducing demand for heating and cooling, trees indirectly reduce CO2 by avoiding power plant emissions associated with energy production.

Street trees in Menasha capture 429 tons of atmospheric CO2 per year. Annual savings including indirect costs are $10,733. Street trees also store approximately 5,287 tons of atmospheric CO2 for a total savings of $79,304.

Trees Improve Air Quality

Trees improve air quality by trapping particulates, absorbing gaseous pollutants, and releasing oxygen. By cooling urban heat islands and shading parked cars, trees indirectly reduce ozone levels. The Environmental Protection Agency recognizes tree planting as an ozone reduction measure in state implementation plans.

Street trees in Menasha remove 276 lbs. of particulate matter, 549 lbs. of ozone, 25 lbs. of sulfur dioxide and 93 lbs. of nitrogen oxides annually. Total annual savings including indirect cost are $13,392.

Trees Save Energy

Trees reduce the demand for energy to heat and cool buildings by providing shade, lowering summertime temperatures, and reducing windspeeds. Secondary benefits are reduced water consumption and pollutants emissions by local power plants.

Street trees in Menasha save approximately 375 MWH of electricity and 51,543 Therms of natural gas annually for a savings of $78,968.

Trees Improve Property Values and Beautify Our Communities

Trees are the single strongest positive influence on scenic quality in our community! They increase the attractiveness of retail business areas. Studies found shoppers are willing to pay up to 11% more for goods and services in a well-landscaped business district. Trees increase property values. People will pay 3-7% more for properties with many trees. Trees foster safer and more sociable neighborhoods. Views of trees ease mental fatigue and stress, help concentration, reduce sickness, and provide settings for recreation and relaxation. Trees also help reduce noise, provide a refuge for wildlife, and help connect residents with their natural environment.

Street trees in Menasha increase property values annually by $87,705.

Diversity Improves Urban Forest Resilience

A diverse palette of trees helps guard against catastrophic loss to insects and diseases or environmental stresses. A general guideline for urban forest diversity is no more than 5% of any one species, 10% of any one genus.

Ash and maple trees are over-represented on Menasha's streets. This jeopardizes $216,818 of the city's urban forest's benefits from pests such as emerald ash borer (EAB) and Asian longhorned beetle (ALB). Enlist the public to help increase Menasha's urban forest resilience by planting less common trees on their own property.

[1] Analysis was conducted using iTree Streets. iTree Streets is a street tree management and analysis tool for urban forest managers that uses tree inventory data to quantify the dollar value of annual environmental and aesthetic benefits. The iTree Suite is a free state-of-the-art, peer-reviewed software suite from the USDA Forest Service. www.itreetool.org.

Tree graphic concept courtesy of City of New York Department of Parks & Recreation.

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City of Menasha

Urban Tree Canopy (UTC) Analysis

What is the Urban Forest and Urban Tree Canopy?

The **Urban Forest** consists of all public and private trees and shrubs in our community. This includes trees in yards, parks, open spaces, along streets and other land where trees are present. One way to understand the value of urban forests is by envisioning the layer of leaves, branches and tree stems when viewed from above. This layer is called **Urban Tree Canopy (UTC)**.

Why is Urban Tree Canopy important?

While we may not think of city trees as a typical "forest," these trees provide valuable services and benefits.

Trees in our community:

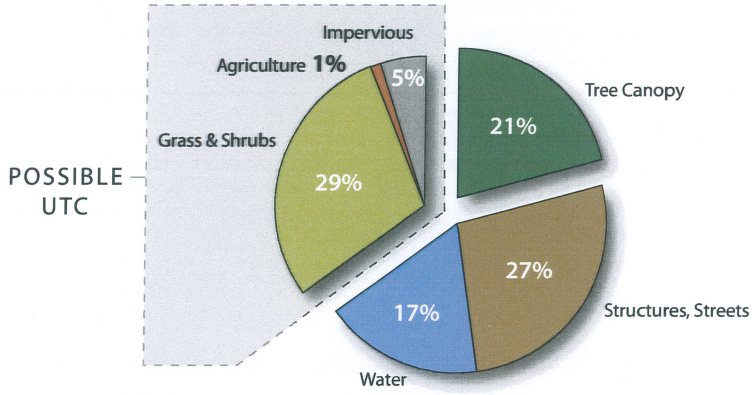
- **Reduce storm water runoff**
- **Lower summer air temperatures**
- **Reduce air pollution**
- **Reduce heating and cooling costs**
- **Enhance property values**
- **Provide wildlife habitat**
- **Improve health and wellbeing**
- **Improve learning and concentration**
- **Provide aesthetic benefits**

UTC benefits can be quantified. A single large tree can provide approximately $76 in average annual net benefits, $3,000 in benefits over a 40-year period. An increase in UTC brings an associated increase in benefits.

How much Urban Tree Canopy does Menasha have?

UTC analysis for Menasha shows[1]:

- **An existing tree canopy of 21% (968 acres)**
- **Trees could potentially cover an additional 35% (1,622 acres) of the city's land surface. These "Possible UTC" areas include grass, agriculture land, and impervious surfaces (e.g., parking lots, paved playgrounds & ROW).**
- **The remaining 44% (2,019 acres) of the city 's area is buildings, streets, water and other permanent features and is generally unsuited to UTC improvement.**



Many factors determine where best to plant urban trees. UTC analysis shows where additional trees will have the greatest positive impact.

UTC analysis for the FOX VALLEY METROPOLITAN AREA shows[2]:

- **An overall tree canopy of 20%.**
- **Possible UTC is 55%. The remaining land area of buildings, streets, water and other permanent features is 25%.**

[1] Analysis was conducted using iTree Canopy. iTree Canopy offers a quick and easy way to produce a statistically valid estimate of land cover types (e.g., tree cover) using aerial images available in Google Maps. The iTree Suite is a free state-of-the-art, peer-reviewed software suite from the USDA Forest Service. www.itreetool.org

[2] Appleton, Greenville, Kaukauna, Kimberly, Little Chute, City of Menasha, Town of Menasha, Neenah

Why should Menasha set goals for UTC?

As urban development expands, it is increasingly important to balance growth with environmental wellbeing. To maximize UTC benefits, communities should set goals to protect, maintain and enhance their entire urban forest. Careful planning and goal setting are necessary to retain as much mature tree canopy as possible in areas with development pressure and to expand and sustain canopy in already urbanized areas. UTC goals can emphasize environmental quality (stormwater, air quality, carbon offsets), livability and economic vitality.

Though many communities have adopted land use strategies to mitigate sprawl, few have developed land cover strategies like UTC to mitigate urbanization effects.

Additional Resources

Urban Tree Canopy Assessment, Northern Research Station, USDA Forest Service, **http://nrs.fs.fed.us/urban/utc/**

Watershed Forestry Resource Guide, Urban Tree Canopy, **http://www.forestsforwatersheds.org/urban-tree-canopy/**

Urban Natural Resources Institute, **http://www.unri.org/webcasts/archive/march-2011a/**

Society of Municipal Arborists, Urban Forestry BMPs, **http://www.urban-forestry.com/sma-urban-forestry-bmps**

How to Set UTC Goals

Effective UTC goal setting requires involvement and commitment by municipal leaders and staff, local business community, neighborhood groups and citizens. The process generally includes four steps:

- **Assess Current UTC**
  - Can use iTree Canopy Analysis or GIS to arrive at UTC baseline.
- **Assess Possible UTC**
  - Identify opportunities on both public and private land.
- **Adopt Goals Based on Assessments**
  - If possible, institutionalize goals in appropriate ordinances, policies, or community master plan.
- **Develop Implementation Plan**
  - Identify strategies to meet goals based on available resources, political climate and stakeholder needs. Produce timeline and identify parties responsible for each strategy.

Potential Strategies to Implement UTC Goals

- **Plant New Trees**
  - Identify and prioritize planting sites community-wide.
  - Assess species diversity needs.
  - Identify how trees will be maintained.
- **Protect & Maintain Existing Trees**
  - Adopt tree protection ordinance and conservation easements.
  - Produce a tree management plan.
  - Ensure proper pruning in utility corridors.
- **Minimize & Restore UTC Lost to Age, Mortality & Land Conversion**
  - Specify strategies within Comprehensive Land Use Plan (e.g. Smart Growth).
  - Adopt subdivision, zoning, and landscaping ordinances.
  - Identify impact from EAB and potential management strategies.
- **Promote Public Education & Awareness**
  - Promote tree benefits (e.g., community website, newsletter, water bill insert)
  - Promote proper tree planting (e.g., Arbor Day, workshops)
  - Develop or participate in campaigns (e.g., First Downs for Trees, Taking Root in Oshkosh)

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