



## Executive Summary

The economic health of Goshen, as with many communities, is closely related to the ability of its municipal government to supply its residents and visitors with efficient services, safe public spaces, and properly maintained infrastructure. Trees are an integral component of the City's infrastructure and urban environment. When properly maintained, trees return overall benefits and value to the community far in excess of the time and money invested in them for planting, pruning, protection, and removal. They provide shade and act as windbreaks, helping to decrease residential energy consumption. They act as reservoirs, helping to reduce the amount of stormwater that reaches storm drains, rivers, and lakes. They help reduce noise levels, cleanse atmospheric pollutants, produce oxygen and absorb carbon dioxide, stabilize the soil by controlling wind and water erosion, and provide habitat for wildlife. Trees also provide significant economic benefits, including increased real estate values and more attractive settings in which to locate commercial businesses. Their shade and beauty contribute to the community's quality of life and soften the hard appearance of concrete and brick structures and streets. Unlike other components of the City's infrastructure, the tree population, with proper care, will actually grow in value with each passing year.

Managing natural resources, particularly trees in urban areas, is a highly challenging undertaking. Furthermore, providing adequate maintenance for public trees within a budget is a common concern among many communities. To efficiently maintain the City's trees, Goshen's Parks and Recreation Department, Forestry Division and Shade Tree Board have commissioned a study of its public tree population. The study includes an inventory of all street and park trees and an i-Tree Streets analysis used to evaluate current tree conditions and values and establish an effective, professional management program. A truly successful urban forestry program requires a combination of organized leadership, comprehensive information about the tree population, dedicated personnel, effective and efficient maintenance programs, and effective public relations. This Plan was developed to help the City of Goshen face the challenge of managing their public tree resource.



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## Goshen's Public Tree Population

The City of Goshen conducted a public tree inventory of its street and park trees in 2008-2010. Data were collected providing information concerning species composition, size, health, and maintenance recommendations for each public tree. The major inventory trends defined in Goshen's i-Tree Streets analysis and discussed in Goshen's Urban Forest Management Plan include the following.

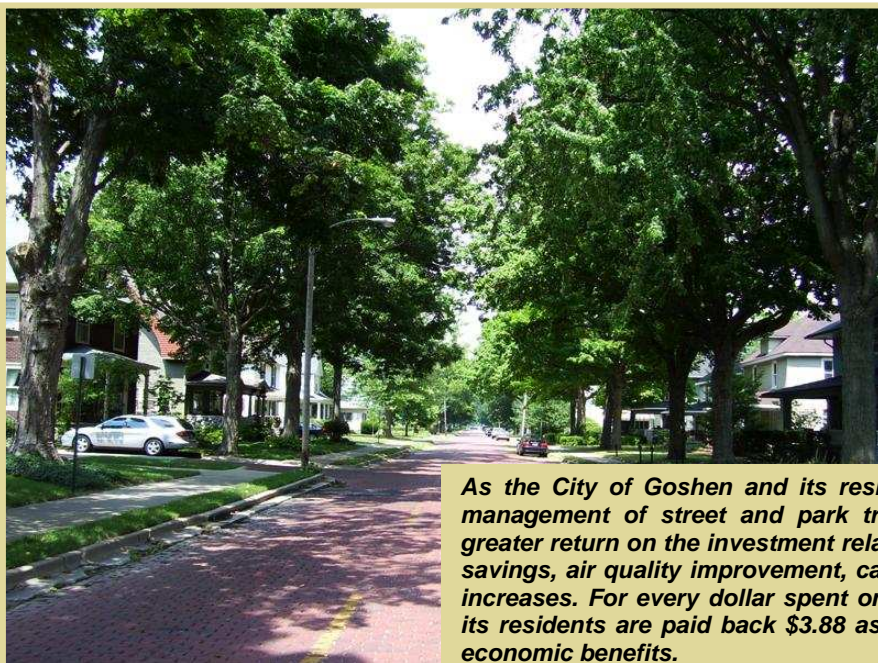
- ✿ There are 12,797 public trees. Among the public trees, 10,464 are street trees, 1,277 are park and public space trees, and 1,056 trees are located on Goshen College's campus. Within these areas there are over 98 distinct species representing 54 genera. The predominant tree species are silver maple (*Acer saccharinum*), sugar maple (*Acer saccharum*), Norway maple (*Acer platanoides*), red maple (*Acer rubrum*), and apple (*Malus* spp.). The genus *Acer* (maple) comprises 50.3% of the tree population.
- ✿ The age structure of Goshen's public trees is approaching an ideal distribution. Goshen's age distribution is 29:22:34:15 (percentages of young: established: maturing: mature trees). An ideal population has a greater percent of young trees with decreasing percentages of established, maturing, and mature populations.
- ✿ The majority of Goshen's public trees are in fair condition (44.9%, 5,747 trees). Trees classified in good condition make up 29.9% (3,822 trees) of the population, while trees in poor condition make up 11.9% (1,525 trees) of the population, and trees that are dead or dying make up 5.7% (731 trees) of the population. There are 972 trees (7.6%) with no recorded condition.
- ✿ Of the inventoried population, there are 1,148 trees (9.0%) listed as a Priority 1 concern and 1,926 trees (15.0%) listed as a Priority 2 concern. Goshen's maintenance task recommendations are listed as: 2,268 trees (17.7%) need a Crown Clean; 769 trees (6.0%) need Removed; 200 trees (1.6%) need a Crown Thin; 76 trees (0.6%) need Vines Removed; 43 trees (0.3%) need a Crown Reduction; and 11 trees (0.1%) need Staked.
- ✿ The tree inventory did not include planting sites for all streets. With only partial planting site information, the inventory suggests there are 1,492 potential planting sites along City streets.
- ✿ Considering the population size of Goshen (32,425: 2009 U.S. Census), the street tree per capita rate is estimated at 1 tree for every 2.8 people.
- ✿ i-Tree Streets estimates the inventoried public tree canopy cover in Goshen to be 219 acres, or 2.0% of the City's total land area (10,712 acres).
- ✿ To replace 11,825 inventoried public trees with trees of similar size, species, and condition would cost approximately \$11.4 million. This represents Goshen's historical public tree investment.



## Goshen's i-Tree Streets Analysis

The City's public trees mitigate stormwater runoff, conserve and reduce energy consumption, improve air quality, reduce carbon dioxide levels, increase property values, and provide other benefits associated with aesthetics and quality of life. Goshen's public trees are providing the community substantial benefits such as:

- 🌳 The interception of 19,816,067 gallons of stormwater is valued at \$537,053 per year, for an average benefit of \$41.97 per tree.
- 🌳 Reduction of energy and natural gas use due to shading and climate effects equal to 2,048.7 Megawatt-hours and 277,663.0 therms valued at \$249,261 per year, for an average benefit of \$19.48 per tree.
- 🌳 Net air quality improvements from the removal and avoidance of 12.4 tons of air pollutants are valued at \$69,190 per year, for an average benefit of \$5.41 per tree.
- 🌳 Reduction of atmospheric carbon dioxide (CO<sub>2</sub>) by a net of 4,000.9 tons is valued at \$60,014 per year, for an average benefit of \$4.69 per tree.
- 🌳 Increased property values, aesthetics, and other less tangible improvements are valued at \$206,958 per year, for an average of \$16.17 per tree.
- 🌳 The total annual benefit received from the City's public trees is \$1,122,476. The average benefit per tree is \$87.71 per year and the per capita benefit \$34.62 per year.
- 🌳 When the City's annual tree-related expenditures of \$289,245 per year are considered, the net benefit (benefits minus costs) returned to the City is \$833,231 annually. The City currently receives 2.3 times more benefit per tree compared to annual management costs per tree.
- 🌳 The City of Goshen receives \$3.88 in benefits for every \$1 spent on its municipal forestry program.



*As the City of Goshen and its residents invest time and money into the management of street and park trees, Goshen's public trees provide a greater return on the investment related to stormwater management, energy savings, air quality improvement, carbon sequestration, and property value increases. For every dollar spent on public tree maintenance, the City and its residents are paid back \$3.88 associated with these environmental and economic benefits.*



## Urban Forestry Management Recommendations

Based on the structural data analysis, this report recommends best management practices and provides long-term planning strategies that will improve maintenance efficiency, tree health, and population stability. A ten-year *Urban Forestry Management Program* is explained and outlined in Chapter 4 and includes estimated budgets for each recommended activity. The following recommendations will enhance the management of Goshen's public trees:

- 🌳 Perform all recommended Removals, Crown Cleans, and other Priority 1 and 2 concerns as soon as possible beginning in 2012 and have completed by 2017.
- 🌳 Implement a seven-year cyclical *Routine Pruning Program* for all established, maturing, and mature trees beginning no later than 2017.
- 🌳 Implement a three-year cyclical *Young Tree Training Program* for all young trees beginning no later than 2017.
- 🌳 Implement a well-planned *Tree Planting Program* that focuses on species diversity and population sustainability. Replace all recommended removals and fill all recorded planting sites by 2028.
- 🌳 Inventory all planting sites along streets, revisit trees with omitted inventory data, and continuously update the inventory as tree maintenances are complete, and do a complete re-inventory of City streets, parks, and public spaces in 2022.
- 🌳 Develop an Emergency Response System to organize protocol for when trees fail, large limbs fail, or severe storm events impact Goshen's public trees.
- 🌳 Implement an expanded public relations campaign to gain increased resident interest and City support for the urban forestry program.
- 🌳 Review and/or revise the City's tree ordinance to accommodate recent and needed changes in the urban forestry program.
- 🌳 Create educational programs to highlight the findings of this Management Plan and to prepare citizens, City officials, and budget administrators for inevitable removals and the need for continual maintenance and planting.
- 🌳 Strengthen the network of City Departments, Shade Tree Board, City organizations, and City residents. Work towards the common goal of a safe, healthy, diverse, more functional, and sustainable public tree resource.
- 🌳 Continue exploring ways to fund the urban forestry program. Promote the 50/50 program as a tax incentive to citizens and consider developing a Tree Bank to help fund tree maintenances and plantings.