

Goshen, Indiana Improves Ecosystem Resilience with Tree Canopy Inventory and Assessment

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Project Summary

As temperatures and pests change, urban ecosystems will need to adjust and will become ever more important for public health and quality of life. In 2012, the City of Goshen completed an urban tree canopy inventory and assessment in order to understand what trees are in the community and how they will be impacted by environmental changes. The City collaborated with local, state, and national programs to fund and execute the projects, including tree planting. The resulting data are now used to inform tree plantings across the city, and support climate change adaptation strategies on public and private lands.



Tree canopy over South 6th Street, Goshen, IN Aaron Sawatsky-Kingsley

How did they do it?

Action	Applicable Resources
<p>Convene relevant partners and raise necessary funds.</p> <ul style="list-style-type: none">• The City secured grants from the Indiana Department of Natural Resources Community and Urban Forestry office and the Great Lakes Restoration Initiative.	<ul style="list-style-type: none">• The <u>Great Lakes Restoration Initiative</u> <https://www.glri.us/> accelerates efforts to protect and restore the Great Lakes.

Collect necessary information to uncover critical data and create plans

- The City conducted a public tree inventory, which entailed going tree-by-tree, street-by-street, collecting information on all trees on public property.
- The Goshen Parks and Recreation Division of Forestry team collaborated with the City's engineering department to use remote sensing equipment and geographic information system land cover data to determine the distribution of tree cover.
- [The Sustainable Urban Forest: A Step-by-Step Approach](http://www.fao.org/sustainable-forest-management/toolbox/tools/tool-detail/en/c/472218/) [<http://www.fao.org/sustainable-forest-management/toolbox/tools/tool-detail/en/c/472218/>](http://www.fao.org/sustainable-forest-management/toolbox/tools/tool-detail/en/c/472218/) is a guide designed to help municipalities assess the state of their urban forest, identify management concerns, and chart a path forward toward long-term sustainability.

Action

Applicable Resources

Measure, maintain, protect, and expand jurisdiction's tree canopy

- The Goshen Forestry team began working with Davey Resource Group, a land-management consulting firm, to analyze the initial inventory data and perform the canopy assessment.
- The City adjusted their planting plans to incorporate more species of trees that will thrive as historical species struggle or decline when temperatures rise and other conditions change in northern Indiana.
- [Indiana's Future Forests: A Report from the Indiana Climate Change Impacts Assessment](https://ag.purdue.edu/indianaclimate/forest-ecosystems-report/) [<https://ag.purdue.edu/indianaclimate/forest-ecosystems-report/>](https://ag.purdue.edu/indianaclimate/forest-ecosystems-report/) examines the direct and indirect impacts that climate change is expected to have on Indiana's forests.

Background

In 2008, the Goshen Parks Department superintendent called for an inventory to be completed of all trees on public land in the city. With support from city departments, local institutions, state funders, and technical experts, Goshen was able to uncover critical tree data and create plans for managing canopy coverage and diversity. The data also contributed towards Goshen's efforts to improve resilience to flooding and other climate impacts.

Why do a Tree Canopy Assessment?

Urban trees provide many economic, environmental, and social benefits: they reduce the urban heat island effect, improve water quality, reduce stormwater flooding, enhance property values, provide wildlife habitat, absorb carbon dioxide and more. The overall amount and diversity of canopy determines the benefits achieved. Inventories allow for important data, such as species and age diversity of trees, to be unearthed. Assessments analyze inventory data and help communities measure, monitor, and improve canopy cover. In particular, understanding what tree planting trends have been and need to become in coming years can help communities prepare for

the effects of climate change. Completing these projects is one of the more beneficial and affordable ways communities can boost neighborhood quality and address environmental equity issues.

Implementation

The city-wide public tree inventory entailed going tree by tree, street by street, collecting information on all trees on public property. The Goshen Parks and Recreation Division of Forestry team collaborated with the City's engineering department to use remote sensing equipment and geographic information system land cover data, both of which are accessible and affordable to cities, to determine the distribution of tree cover. The Forestry team began working with Davey Resource Group, a land management consulting firm, to analyze the initial inventory data and perform the canopy assessment. Goshen plans to update these data in 2020, and hopes to complete inventories/assessments every five years thereafter.

Timeline

The inventory began in 2008 and was completed in 2011, and the assessment was completed in 2012.

Funding

The total combined cost for the inventory and assessment was \$20,000 and was largely supported by grants with a 50% match from City of Goshen's Forestry Division. The initial grants for the tree inventory were from the Indiana Department of Natural Resources Community and Urban Forestry office. The inventory results were leveraged for additional grants to complete an assessment and plant trees. These subsequent grants continued to come through the Department of Natural Resources but originated from the Great Lakes Restoration Initiative, a project of the U.S. Department of Agriculture that only applies to communities in the Great Lakes watershed basin. Goshen paired these Department of Agriculture grants with other state grants through the Indiana Department of Natural Resources to facilitate planting projects alongside the canopy assessment.

Outcomes and Conclusions

The inventory and assessment determined that Goshen's tree canopy covered 22% of municipal land in 2012. Both the age and species diversity were limited. Goshen is known as "The Maple City" and through the inventory found that 50% of their public trees were in fact maple. This data point is useful because if a future pest like the destructive Asian Long-horned Beetle were to target maple trees, the aftermath would greatly impact Goshen. With the inventory information, Goshen was able to adjust their planting plans to incorporate more species of trees that will thrive as historical species struggle or decline when temperatures rise and other conditions change in northern Indiana. New species were selected by identifying adaptable trees from climate zones immediately south of Goshen, including species such as Sweetgum, Blackgum, and Northern Pecan. The new plans also ensured that large

swaths of trees are not maturing at the same time, resulting in even-aged growth with the potential for future major losses in canopy over a short period of time.

The data proved how valuable trees are as a city asset and the Forestry team leveraged inventory findings to obtain a \$100,000 USDA tree planting grant. The City has since collaborated with a local nonprofit, Trees for Goshen, to plant trees across the city. The next step is to marry the assessment outcomes with the inventory information to devise long term projects that drive a new canopy goal: 45% community-wide tree cover by 2045. Since this goal cannot be achieved solely on public land, Trees for Goshen launched a pilot project to engage with private landowners. Working with local college interns, the project inventoried an entire neighborhood, including public and private trees. Project participants will create an urban forest management plan for that neighborhood and future neighborhoods as the project continues. The City intends to prioritize canopy growth in lower-income neighborhoods.

American Forests, a national conservation organization, recommends that cities work to develop personalized urban canopy targets that consider development densities, land use patterns, ordinances, and climate. [The Sustainable Urban Forest: A Step-by-Step Approach](http://www.fao.org/sustainable-forest-management/toolbox/tools/tool-detail/en/c/472218/) [<http://www.fao.org/sustainable-forest-management/toolbox/tools/tool-detail/en/c/472218/>](http://www.fao.org/sustainable-forest-management/toolbox/tools/tool-detail/en/c/472218/) is an online toolkit from the U.S. Forest Service and the Davey Institute that can help managers assess their canopy and set targets. To learn more about how rising temperatures and changing precipitation will affect Indiana's trees, read the [Indiana's Future Forests](https://ag.purdue.edu/indianacclimate/forest-ecosystems-report/) [<https://ag.purdue.edu/indianacclimate/forest-ecosystems-report/>](https://ag.purdue.edu/indianacclimate/forest-ecosystems-report/) report from the Indiana Climate Change Impacts Assessment.

Challenges

The tree canopy inventory and assessment project manager expressed that there were not many difficult barriers in this process, particularly due to the fact that the Parks Department superintendent was an early champion for the project. However, building knowledge, skills and relationships were the biggest challenges. There were some constituents that were initially skeptical of forestry work in general, but once the inventory and assessment data were made available, the doubt dissipated.

Aaron Sawatsky-Kingsley, the project manager and forester for the City of Goshen, gave this advice:

"The most important lesson from working on the inventory, canopy assessment, and planting projects has been how critical data collection is. The information we collected has been leveraged in so many ways and the experience of collecting it is essential. It was the best way for me to begin to know my urban forest."

Questions for discussion

These questions are designed to inspire readers—especially those wanting to learn broadly about climate change solutions—to think critically about the case study on this page and encourage deeper, more meaningful conversations. A list of ERIT case studies that include discussion questions can be found on the Resilient Communities Case Studies <<https://eri.iu.edu/who-we-work-with/educators/resilient-communities-case-studies.html>> page.

1. Describe a situation in which it would be a good idea to introduce tree species to an urban landscape that are different from historically native species.
2. What are the challenges of putting a price tag on the benefits of urban trees? Why do you think it might still be important to do so?
3. Data collection is an important first step in setting goals. Why might it be important to update data and assessments regularly?

Project resources

- Indiana's Future Forests: A Report from the Indiana Climate Change Impacts Assessment <<https://ag.purdue.edu/indianacclimate/forest-ecosystems-report/>>

For more information about Goshen's tree canopy inventory and assessment, contact:

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Adaptation Strategies

Learn how your community can prepare its parks, trees, and forests.

<[../strategies/parks-trees-and-forests.html](https://www.goshencity.com/strategies/parks-trees-and-forests.html)>

Tools

See what tools are available to help your community prepare its parks, trees, and forests.

[<../tools/index.html>](https://tools.eri.iu.edu/index.html)

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See the funding opportunities available to support your resilience strategies.

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