Montgomery
Urban Forestry Summary

CHICAGO REGION TREES INITIATIVE
Our Trees.
Our Communities.
Our Future.

The Chicago Region Trees Initiative's (CRTI) goal is that by 2050 the Chicago region will have a healthier urban forest with a diversity of tree species and ages, appropriately distributed across land use types. To achieve that goal, CRTI works with municipalities to help them understand their urban forest and identify strategies that they can use to improve the environmental, economic, and social benefits that trees can provide their residents. This document provides information municipalities need to effectively manage their local forest.

The Importance of Urban Trees

The urban forest includes all trees in an urban setting regardless of who owns or manages them, such as parkway trees, forested natural areas, and the trees on residential property. Trees improve air and water quality, reduce flooding and the urban heat island effect, and reduce energy use by shading buildings. They also provide habitat for wildlife and improve residents' quality of life by reducing crime rates, increasing property value, and boosting social cohesion in neighborhoods.

Understanding the extent of tree canopy is critical for urban planning. The magnitude of benefits that trees provide correlates with the size, structure, and location of their canopy. Canopy maps can be used to quantify the benefits that their trees provide, identify where new plantings would have the greatest impact, and to develop strategies for expanding the canopy.

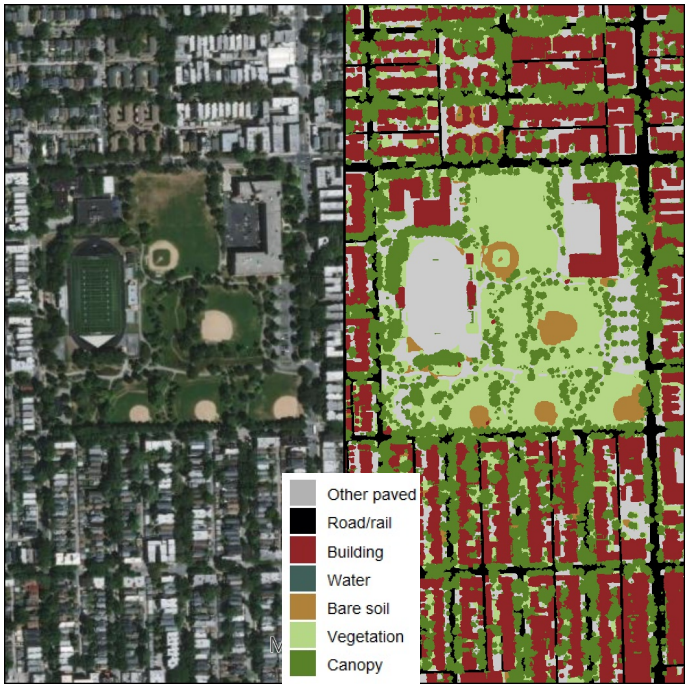

Figure 1: Comparison of imagery and land cover map. Seven types of gray and green infrastructure are in the land cover map.

The Chicago Region Trees Initiative, US Department of Agriculture Forest Service, and the University of Vermont mapped land cover across the seven-county Chicago region in a project funded by the Illinois Department of Natural Resources, the Rice Foundation, and the US Forest Service. This project not only identifies tree canopy, but also other green infrastructure, including grass and shrubs, bare soil and water, and gray infrastructure including buildings, roads and rails, and other paved surfaces like sidewalks and parking lots (Fig. 1). Hereafter, these seven layers will be referred to as "land cover types."

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Land and Canopy Cover in Your Community

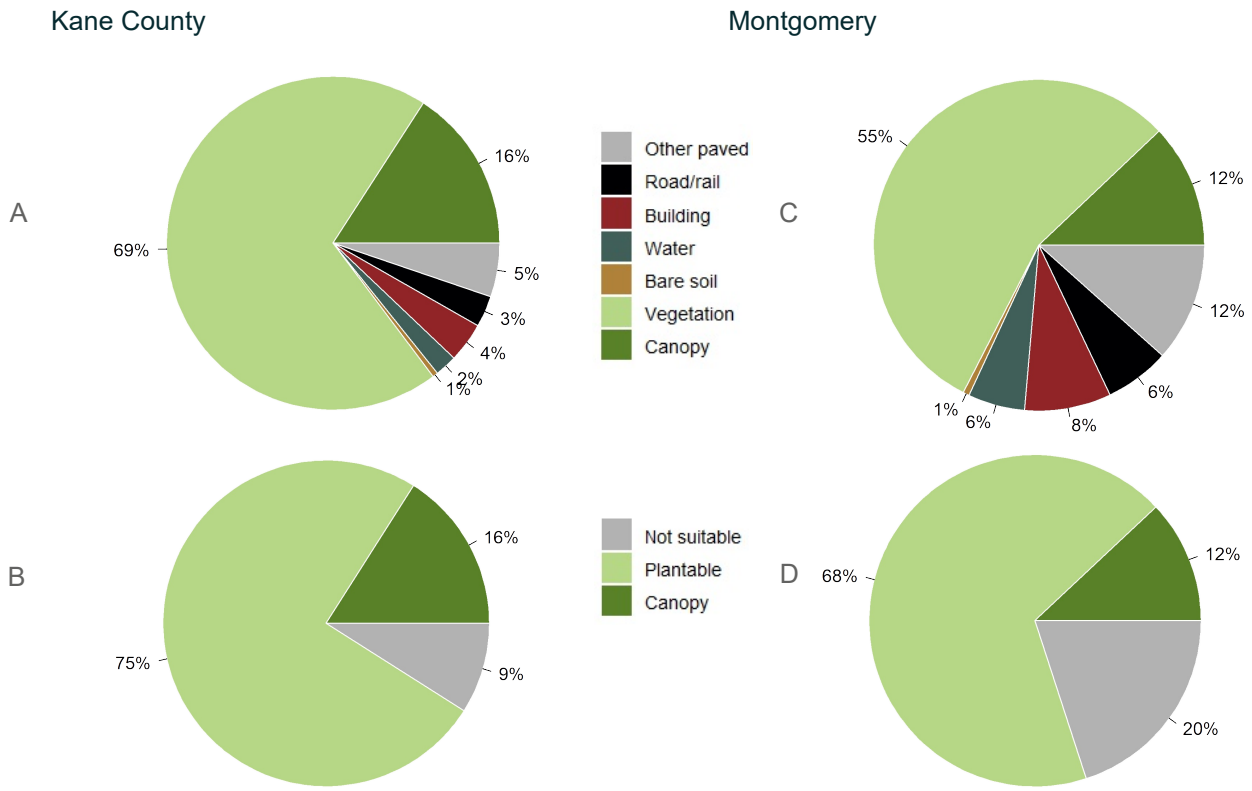

Figure 2: Land cover distribution and plantable space in Kane County (A and B), and in Montgomery (C and D).

Overall, 16% of Kane County is covered by tree canopy (Fig. 2). In all, 75% of the county is plantable, meaning that canopy cover could potentially be raised to 91% if these areas were converted to trees. Spaces where trees could potentially be planted (plantable spaces) can be identified by adding together land cover types that could be converted to canopy: vegetation, bare soil, and other paved surfaces like sidewalks and parking lots.

It is important to note that while these surfaces could theoretically be covered with canopy, it is not necessarily preferable. For example, agricultural fields and baseball diamonds are included as "plantable space," but they may not be considered ideal sites to expand the forest canopy.

Land cover data can also describe canopy at the municipal scale. Montgomery currently has 12% canopy cover and could potentially increase its canopy to 80% (Fig. 2).

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Pecent Land Cover by Land Use

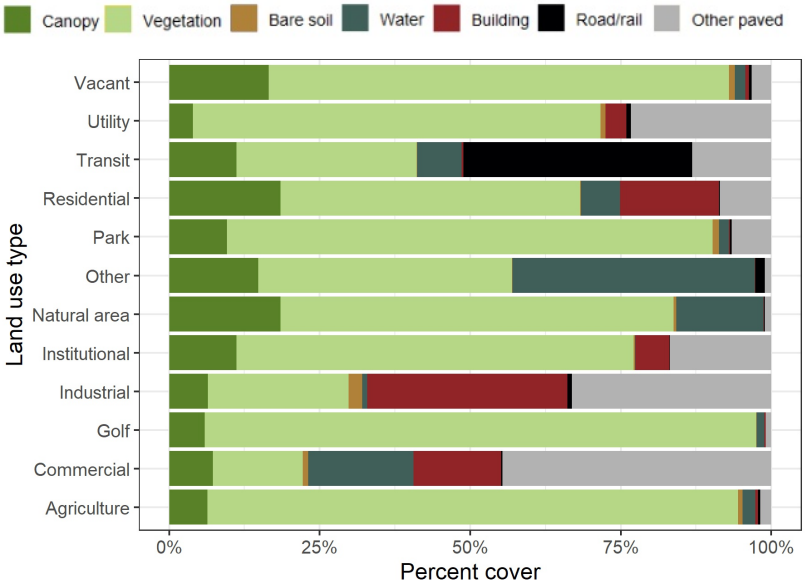

Figure 3: Variations in land cover across land use types.

Canopy cover is not distributed evenly across the region or within municipalities. To better understand how land cover patterns vary, they are compared across land use types like residential, commercial, or park properties. In Montgomery, the highest percentage of canopy is found in natural areas and residential properties (Fig. 3). Agriculture and golf properties have the lowest canopy cover. As one might expect, transit areas have the largest proportion of roads, and industrial, residential, and commercial land use types have an abundance of buildings. See Table 1 on page 5 of this report for a detailed analysis of land cover distribution.

Plantable Space Percentages

By combining turf, bare soil, and other paved surface categories, we can identify which land use types have the most room for growth. In Montgomery, the highest proportions of plantable space are found in utility and golf properties (Fig. 4).

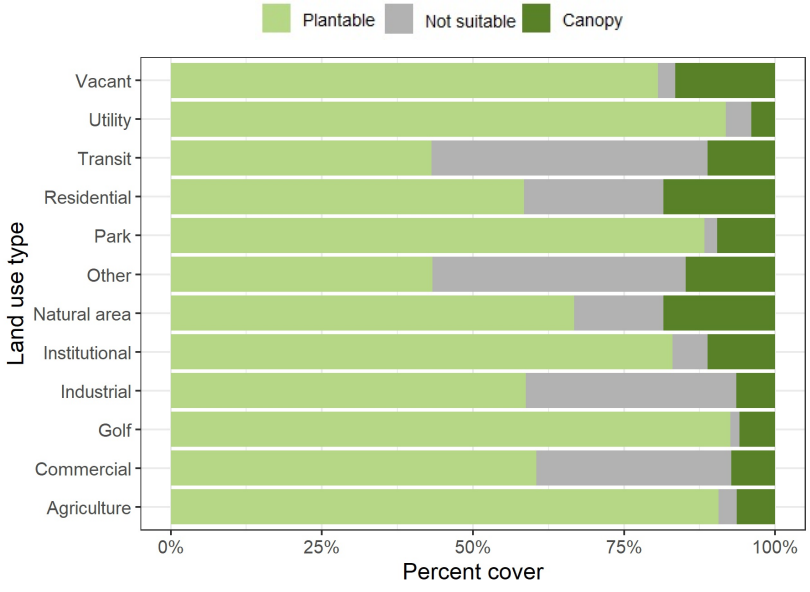

Figure 4: Current canopy and possible planting space across land use types.

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Land Cover Area by Land Use

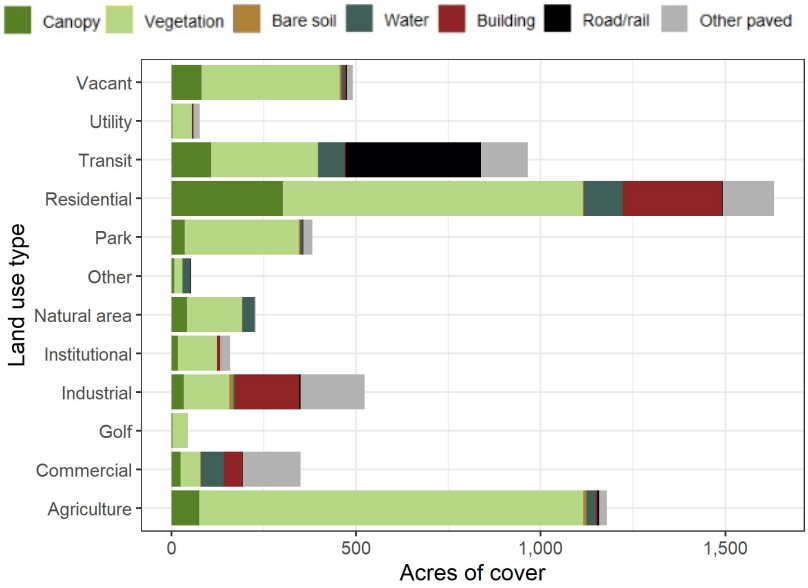

Figure 5: Acres of land cover types across land uses.

While utility and golf courses have a high proportion of plantable space, these land use types make up a relatively small area in Montgomery (Fig. 5). Most of the land is residential, followed by agriculture.

Plantable Space Area

Residential and agriculture land use types could have the greatest impact in expanding the canopy (Fig. 6). However, each of these land use types require different strategies to increase canopy. Agricultural properties could host more trees along roads and waterways, and these trees could reduce erosion and fertilizer runoff. Residential property owners could be encouraged to plant more through tree giveaways, ordinances that encourage preservation, or stormwater tax breaks for properties that have more canopy.

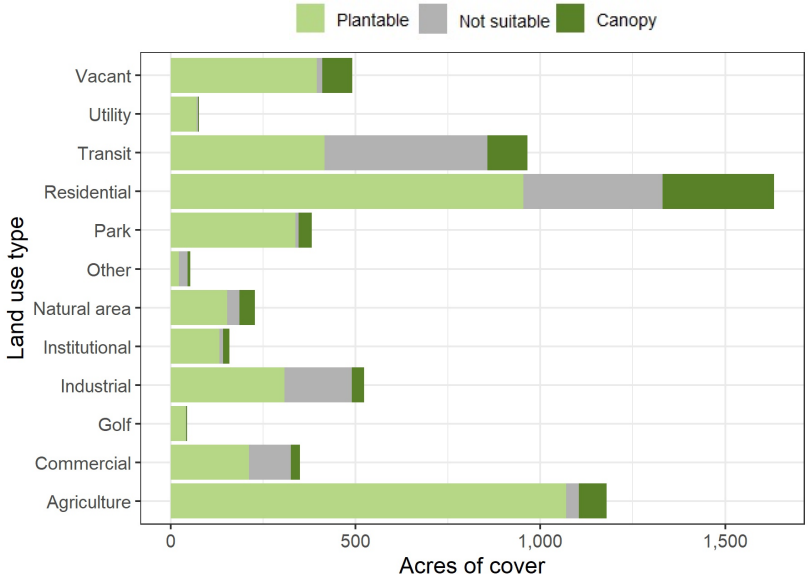

Figure 6: Acres of plantable space, canopy, and not suitable land cover types across land uses.

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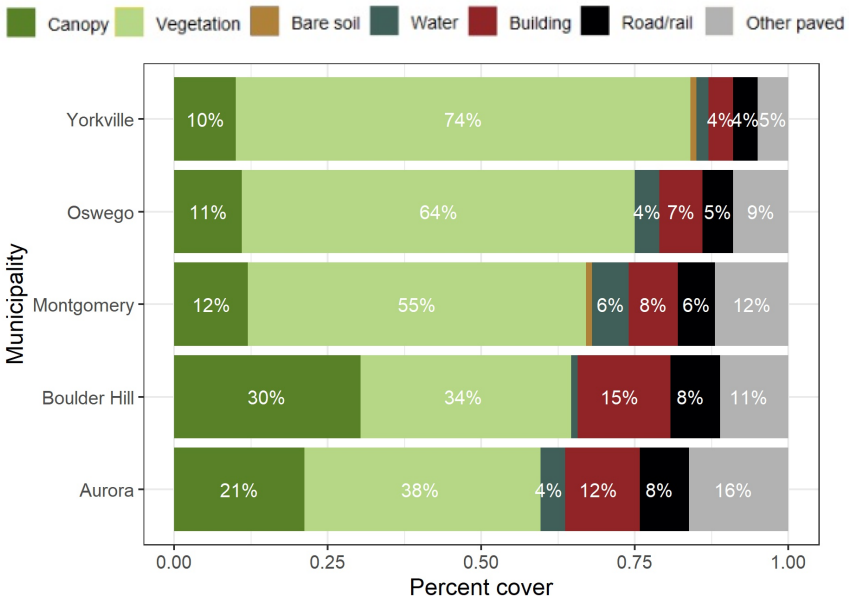
Land Cover Across Land Use Types

Table 1: Summary of land cover across land use types.

	CANOPY		VEGETATION		BARE SOIL		WATER		BUILDINGS		ROADS/RAIL		OTHER PAVED	
LAND USE	ACRES	PERCENT	ACRES	PERCENT	ACRES	PERCENT	ACRES	PERCENT	ACRES	PERCENT	ACRES	PERCENT	ACRES	PERCENT
Agriculture	75.4	6.4%	1,039.4	88.1%	8.7	0.7%	24.7	2.1%	5.5	0.5%	4.8	0.4%	21.4	1.8%
Commercial	25.5	7.3%	52.4	14.9%	3.1	0.9%	61.2	17.5%	50.9	14.5%	0.7	0.2%	156.5	44.7%
Golf	2.6	5.9%	40.8	91.7%	0.0	0.0%	0.6	1.3%	0.1	0.2%	0.0	0.0%	0.4	0.9%
Industrial	33.8	6.5%	122.3	23.4%	11.9	2.3%	4.2	0.8%	174.0	33.2%	4.1	0.8%	173.3	33.1%
Institutional	17.8	11.2%	105.1	65.9%	0.4	0.2%	0.1	0.1%	9.1	5.7%	0.1	0.0%	26.9	16.9%
Natural area	42.2	18.5%	149.0	65.3%	1.0	0.5%	33.1	14.5%	0.2	0.1%	0.4	0.2%	2.4	1.1%
Other	7.9	14.8%	22.5	42.1%	0.0	0.1%	21.5	40.3%	0.0	0.1%	0.8	1.6%	0.6	1.1%
Park	36.6	9.6%	308.5	80.7%	4.0	1.0%	6.4	1.7%	0.7	0.2%	1.1	0.3%	25.2	6.6%
Residential	302.4	18.5%	812.3	49.8%	2.3	0.1%	105.5	6.5%	267.9	16.4%	2.9	0.2%	139.3	8.5%
Transit	107.7	11.2%	289.1	30.0%	0.8	0.1%	71.2	7.4%	2.9	0.3%	366.5	38.0%	126.7	13.1%
Utility	3.0	3.9%	52.2	67.7%	0.6	0.8%	0.0	0.0%	2.7	3.5%	0.6	0.7%	18.0	23.3%
Vacant	81.2	16.5%	375.2	76.4%	4.8	1.0%	8.6	1.7%	3.0	0.6%	2.4	0.5%	15.9	3.2%

Land Cover in Surrounding Communities



Montgomery has similar canopy cover and gray infrastructure to its neighbors (Fig. 7).

Figure 7: Comparison of land cover of Montgomery and its neighbors.

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Canopy change from 2010 to 2017

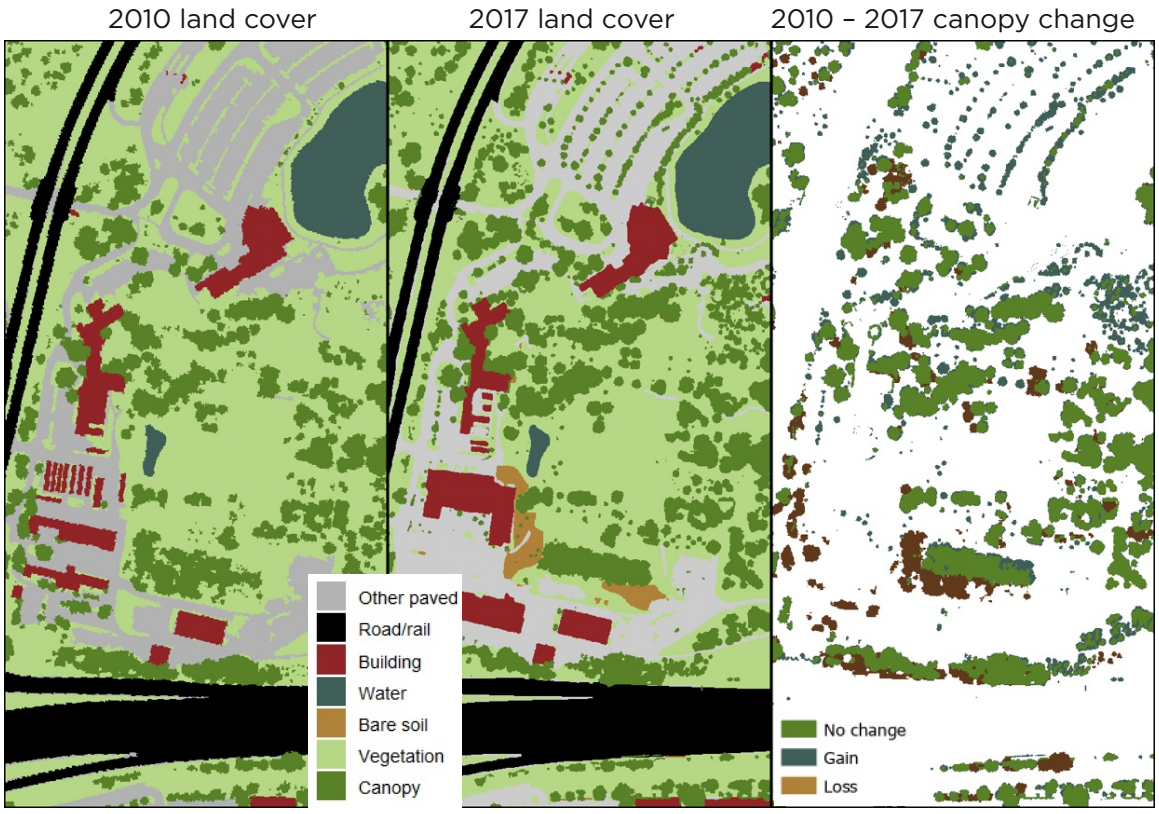

Figure 8: Example of land cover and canopy change at the Morton Arboretum.

The Chicago region has changed a lot from 2010 to 2017, including new development, tree plantings, and growth of existing trees. Examples of this can be seen at the Morton Arboretum (Fig 8).

In Montgomery, canopy has increased from 11% to 12% gains in most land use types (Fig. 9).

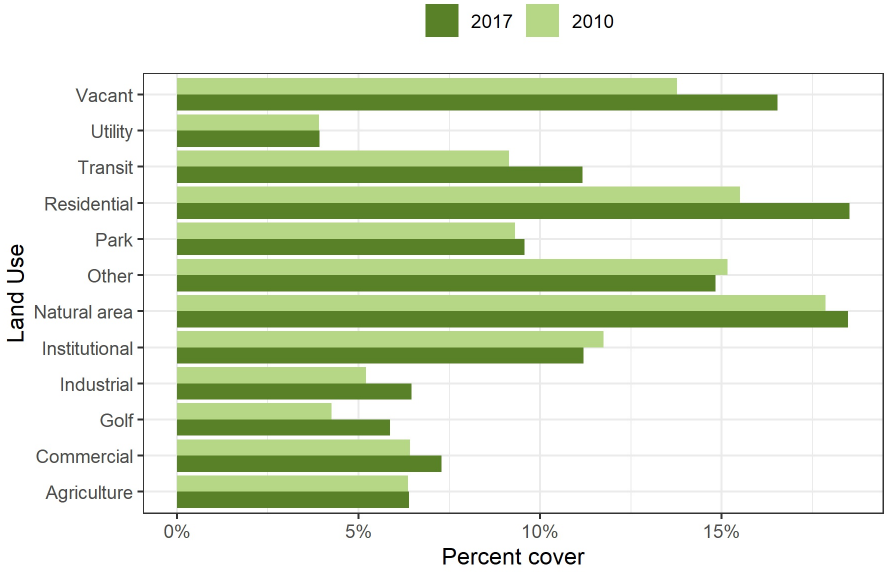

Figure 9: Canopy change across land use types in Montgomery.

Know What You Have

While understanding canopy is an important component of urban forestry, canopy does not show the whole picture. It cannot identify tree species, health, or vulnerability to pests, diseases, or climate change. A tree inventory is needed to better understand and manage the urban forest (Fig. 10).

Types of tree inventories vary. The most complete inventories gather data on every tree in the study area and each tree's species, size, any health issues it may have, and its specific location. This type of inventory provides the most complete data for planning and monitoring the urban forest's health and growth over time. Many communities have conducted such inventories on public property.

Complete inventories are invaluable for urban forest management but are expensive and time consuming to conduct. They may not be practical for very large areas. Sample inventories (that only gather information on a subset of trees) are much easier to conduct but can only be used to estimate species and size diversity, and tree abundance. The Morton Arboretum and the USDA Forest Service conducted a sample inventory of 1,600 plots across the seven-county region and determined species composition at the county scale (Fig. 11).

The figures on pages 8 and 9 of this document are based on a 2013 inventory of Montgomery's municipal trees. CRTI will update those figures if a new inventory is provided.

Figure 10: Measuring a tree for an inventory.

Figure 11: You can learn more about the tree census here: https://mortonarb.org/science/tree-census/

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Your Community's Species Diversity

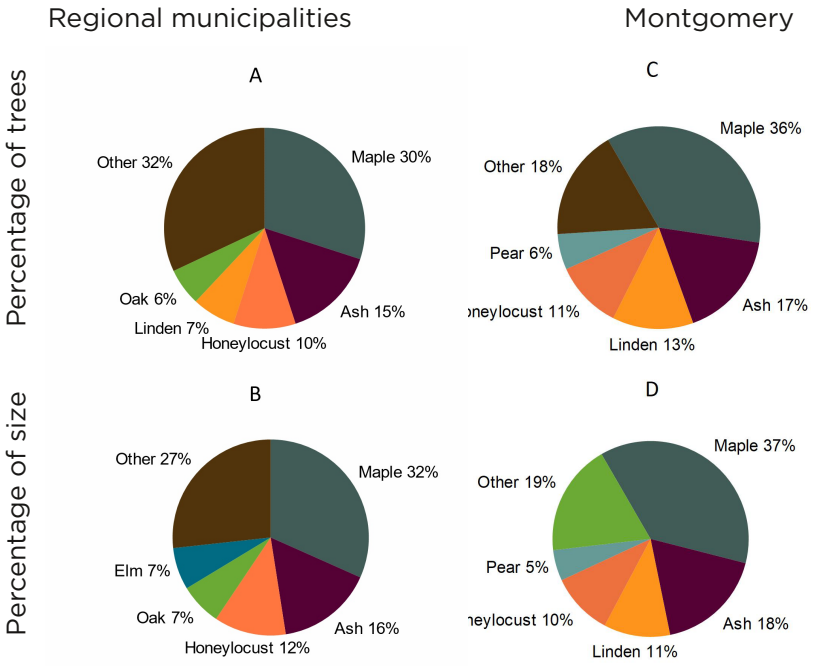

Figure 12: Most abundanct genera across the region (A and B) and in Montgomery (C and D). For both areas, composition is shown by the number of trees (A and C) and by the percentage of size (B and D).

Inventories allow us to look at diversity in two ways: by the abundance of individual trees, and the proportion of the entire canopy that these trees make up. To determine the second figure, the diameter of the trees is used as a correlate for canopy abundance, as those values are closely related. Both measures are important. Number of individual stems is useful when calculating the number of trees that might be affected by a given pest or disease. The abundance of canopy will show how the entire forest might change. That is, losing five small apple trees would have a much smaller impact on the ecosystem services that a forest offers than losing five mature oaks. Figure 12 shows the most abundant genera in Montgomery and across 55 other municipalities.

Many municipalities have very low species diversity. They rely heavily on a few species, like Freeman maples, white ash, and honey locust. Maples, on average, comprise 30% of municipal plantings. Ashes are slightly less abundant, and while losing millions of them was devastating, losing maples would be much worse.

This illustrates how critical it is to actively increase species diversity where possible. Most pests and diseases (like emerald ash borer and Dutch elm disease) only attack a specific species or genus of plants. By diversifying species, we can ensure that the regional forest is resilient to these attacks. CRTI recommends that municipalities strive to have no more than 15% of a single family, 10% of a genus, and 5% of a species in their plantings. These guidelines should be met not only across the whole municipality, but at smaller scales like individual blocks.

Montgomery is overly reliant on maples and ash, and should try to increase diversity by introducing under-represented species.

Tree Size Class Distribution

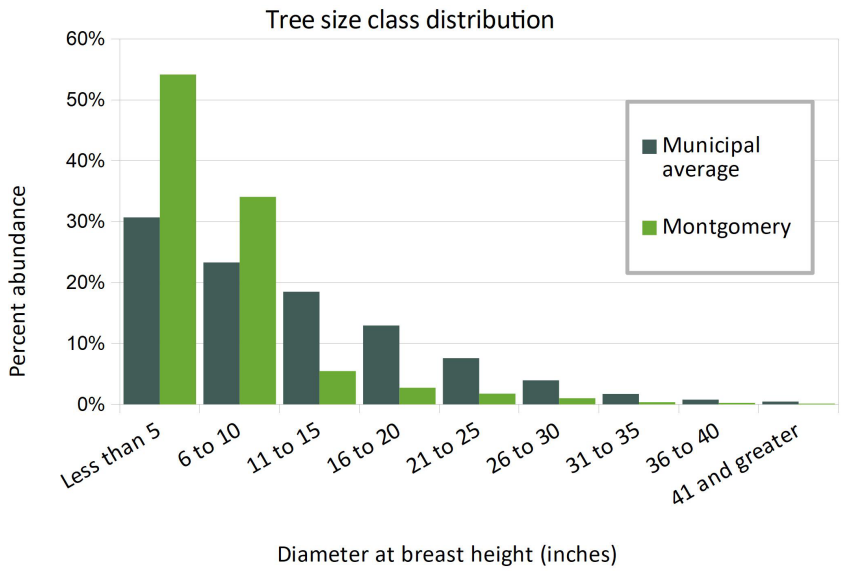

Figure 13: Distribution of tree sizes in Montgomery and across all municipal inventories.

Age and size diversity are other important types of diversity to consider beyond species. A sustainable forest has a variety of ages and sizes of trees. We want our urban forest to have a range of sizes and ages so that it doesn't grow, age, and eventually die at the same time.

It is important to foster sustainable age diversity. This can be done by planting trees over several years, planting trees with different growth habits (some grow quickly and have shorter lifespans than others), and by under-planting aging trees so that something is ready to replace them when they die.

Across all municipalities, there are a decreasing number of trees in larger size classes (Fig. 13). This is ideal, as there is room for some trees to die between each size class with plenty remaining to grow into the next age and size class. Montgomery has a lot of trees in the smallest size classes, which could indicate that the forest will expand in the coming years.

It is also important to look at smaller areas, like individual blocks or properties. Planning for size class diversity on these scales is important to local ecosystem services including reducing energy use, managing stormwater, and retaining soil.

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The Unique Benefits of Your Community

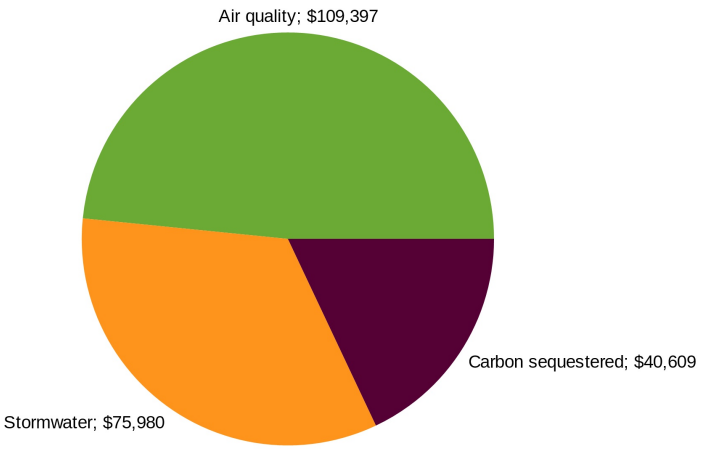

Figure 14: Trees offer myriad benefits, including intercepting stormwater, improving air quality and removing carbon from the atmosphere.

Urban trees are extremely valuable. Research has provided data to help quantify the values that trees provide, far beyond the aesthetics that are readily recognized. For example, urban trees:

1. Save energy by reducing surface temperatures and shading buildings.
2. Store carbon dioxide and remove pollutants from the air.
3. Intercept stormwater and help reduce flooding.
4. Increase property values and make our communities more pleasant.
5. Improve health.

The i-Tree suite of tools was developed by the USDA Forest Service. They allow users to calculate tree benefits at a variety of scales—from an individual tree to entire tree inventories, and even landscape scale assessments of canopy and hydrology. For more information on i-Tree tools and methodology, visit iTreetools.org.

Figure 14 shows the benefits that all the trees (including trees public and private property) in Montgomery offer. These values were calculated with i-Tree Landscape using a 2010 land cover layer. Each year, Montgomery's trees provide the municipality with $226,000 worth of benefits. These trees also store a lot of carbon, which is valued at an additional $1,531,000.

Temperature and Trees

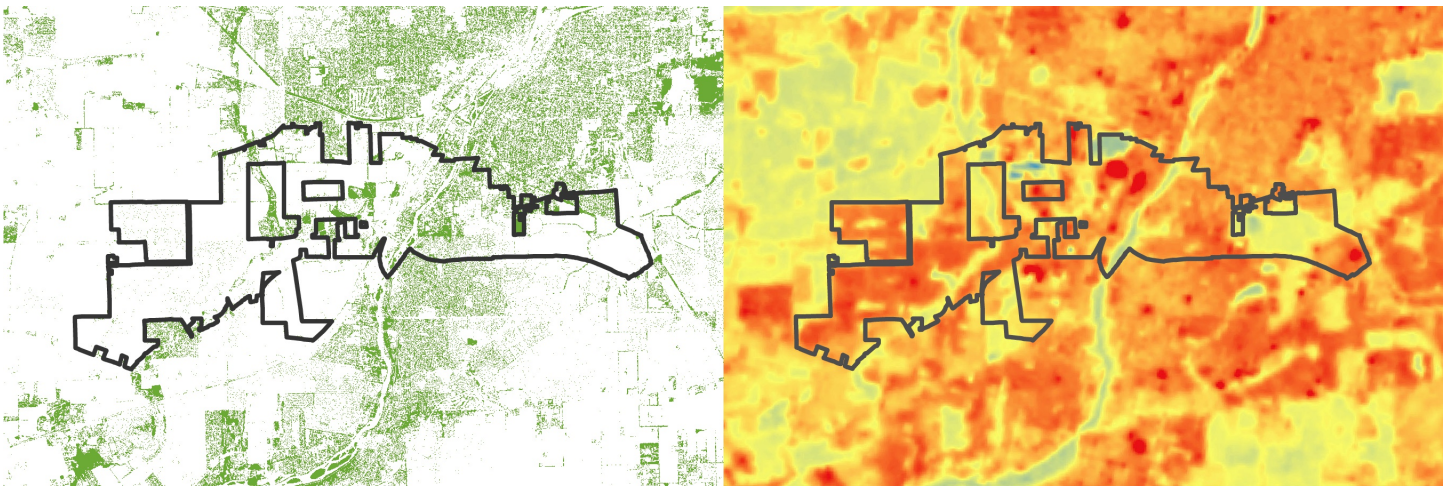

Figure 15: The image on the left shows tree canopy and on the right shows surface temperature. Surface temperature was calculated using a LandSat8 image from July 2017. Areas that have higher tree canopy tend to have lower temperatures.

Cities tend to be hotter than rural areas because buildings and pavement absorb the sun's energy and release it as heat—known as the urban heat island effect. High urban temperatures increase the use of energy within buildings. It can also cause health issues, and extreme heat can even cause death. Trees help lower urban temperatures by shading built surfaces and through evaporative cooling. Urban areas that have more tree canopy tend to have lower surface temperatures (Figure 15). Planting more trees in parking lots and around buildings can be especially helpful in reducing urban temperatures and making cities more comfortable.

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Oak Ecosystems – Our Natural Heritage

Oaks are a keystone species in our region's ecology. They provide habitat and food for countless animals, and they influence which plants grow around them. However, conversion of natural areas to agriculture and development has removed many of the oaks from our region. Only 17% of oak ecosystems remain region wide.

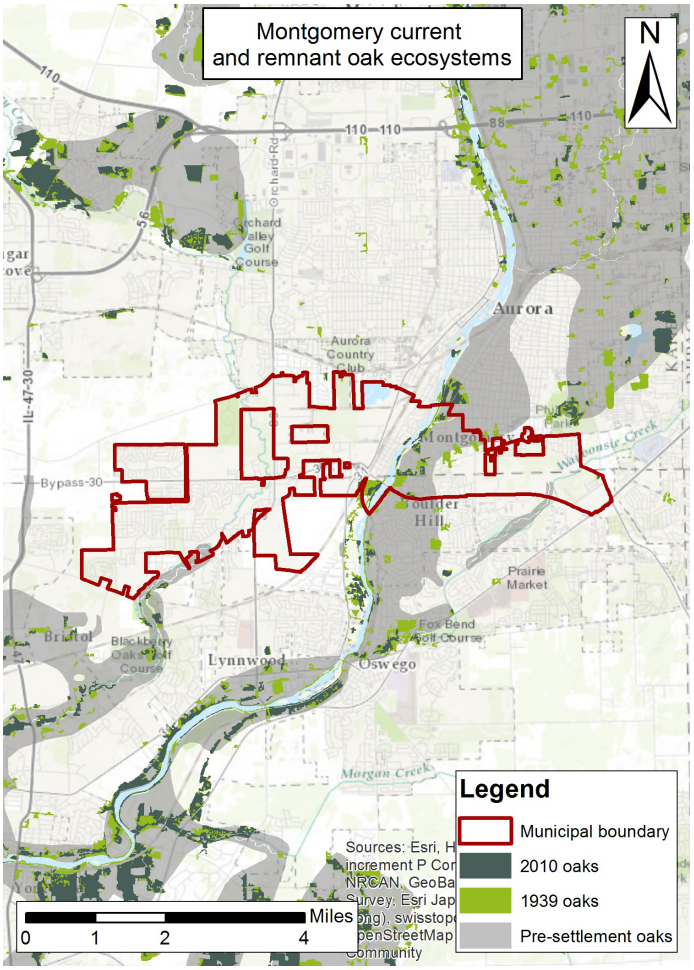

Figure 16: Oak ecosystems were abundant prior to Euro-American settlement. This map shows which of these ecosystems still remained in 1939 and 2010.

Restoring oak ecosystems is a major focus of CRTI. Its efforts include improving oak management in natural areas and encouraging their use in municipal plantings. Many municipalities avoid oaks because some foresters believe that they do poorly as street trees. CRTI strives to dispel these stereotypes and teach foresters how oaks can be used effectively in urban areas. The expanded use of oaks can help increase species diversity and continue the legacy of oaks in our region. For more information, see Chicago Wilderness's Oak Ecosystem Recovery Plan.

Prior to Euro-American colonization, oaks made up over 60% of the region's canopy. Now, they only make up 6.5% of municipal plantings. Increasing the use of oaks in municipal areas could make more resilient forests, improve habitat for wildlife, and restore the region's natural history.

Montgomery had forests in the pre-settlement era, but they have mostly been destroyed (Fig. 16). It is imperative to protect the remaining forests.

Find the Oak Ecoysystem Recovery Plan at chicagorti.org/OakRecovery.

Woody Invasive Species

Woody invasive species like European buckthorn and bush honeysuckles make up over one in three trees in the region. These shrubs were introduced as ornamental specimens, but they have escaped cultivation. Birds eat the berries produced by buckthorn and honeysuckle and disperse the seeds into natural areas. Both genera are extremely disruptive to native plants and animals. They create dense thickets and prevent other species from growing around them (Fig. 17). In natural areas, they are one of the leading contributors to reduced oak regeneration.

It is imperative to remove buckthorn from all land uses, as the seeds can easily travel to natural areas. It is difficult to dictate plantings on private property but educating residents can encourage them to remove it of their own accord. This could include signage explaining invasive removal on public property, or expansion of programs like Conservation@Home.

Woody invasives are becoming more problematic region-wide according to 2010 and 2020 inventories (Fig. 18). For more information on how to manage woody invasive species, see: https://chicagorti.org/program/stop-invasives/.

Figure 17: A buckthorn thicket. Notice the lack of understory vegetation and dense shade. Photo credit: Brett Jelinek.

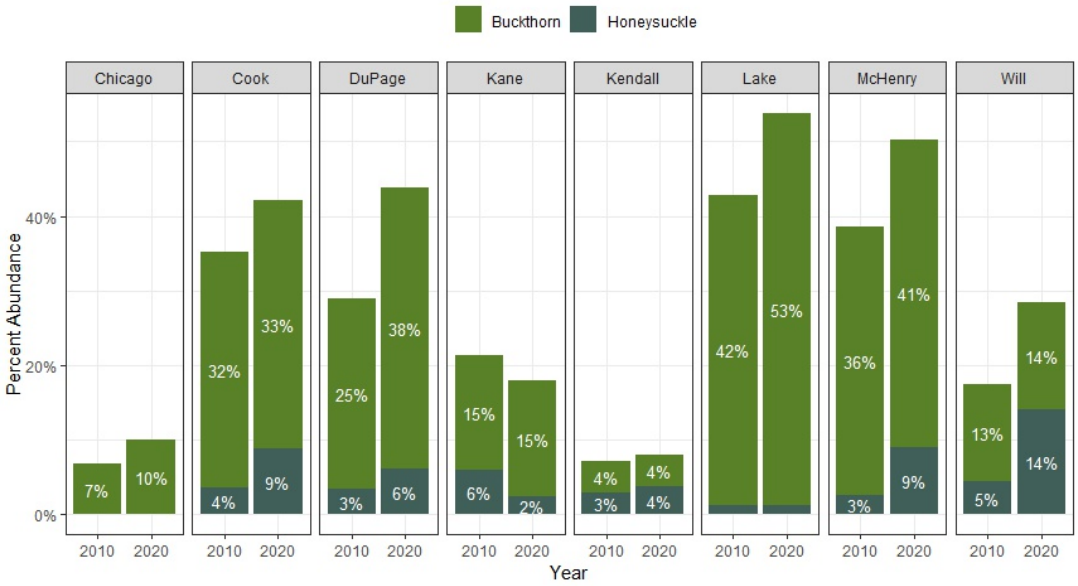

Figure 18: Woody invasive abundance across all counties in 2010 and 2020.

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Important Considerations for Management of the Urban Forest

A healthy urban forest can provide a wide range of benefits that have significant impacts on quality of life. Understanding what you have is an important first step. Next is to manage the urban forest effectively. There are several key ingredients in a well-managed urban forest and these are resources and organizations that can help you achieve that goal.

1. Preservation and Protection Ordinances: Ordinances are the community's policy and guiding document for the care, protection and preservation of the urban forest. The Chicago Region Trees Initiative has staff who will work with you to help you at no cost and templates to get you started.

2. Tree Inventory: A tree inventory is a mechanism to inform what trees you have, where they are located, how many there are, and their condition. This is a critical tool in managing the urban forest—especially in improving species diversity and reducing the risk of catastrophic loss. Visit the CRTI website to learn about funding opportunities https://chicagorti.org/programs.

3. Urban Forest Management Plan: An urban forest management plan is a strategy document that guides communities in allocating manpower and funding to manage the urban forest. It is important to develop a plan that outlines where your community is now and a framework to improve level of care, species selection, proper practices, and qualifications, as skills and resources are developed. A template has been developed to help you get started and to identify areas where your community can begin to improve practices. https://chicagorti.org/program/tree-ordinance-templates.

4. ISA Certified Arborist: Your community would greatly benefit from having an International Society of Arboriculture certified arborist on staff. It is not a hard process and could improve the professionalism of your team. The Illinois Arborists Association has several training opportunities to train your staff and build skills and knowledge in urban forestry. Note: If you are not ready for staff to assume this role, be sure to use certified arborists to conduct the urban forestry work. A list is available on the IAA website.

5. Resident Engagement: 70% of our trees are located on private property. Communities can connect their residents to information and resources that will help them improve the health of the urban forest on their properties. The CRTI website has several resources for individual citizens.

Important links:

Chicago Region Trees Initiative: chicagoRTI.org

Illinois Arborist Association: illinoisarborist.org

Illinois DNR Urban Forestry: www2.illinois.gov/dnr/conservation/Forestry/UrbanForestry

Openlands TreeKeepers: openlands.org/what-we-do/trees/treekeepers