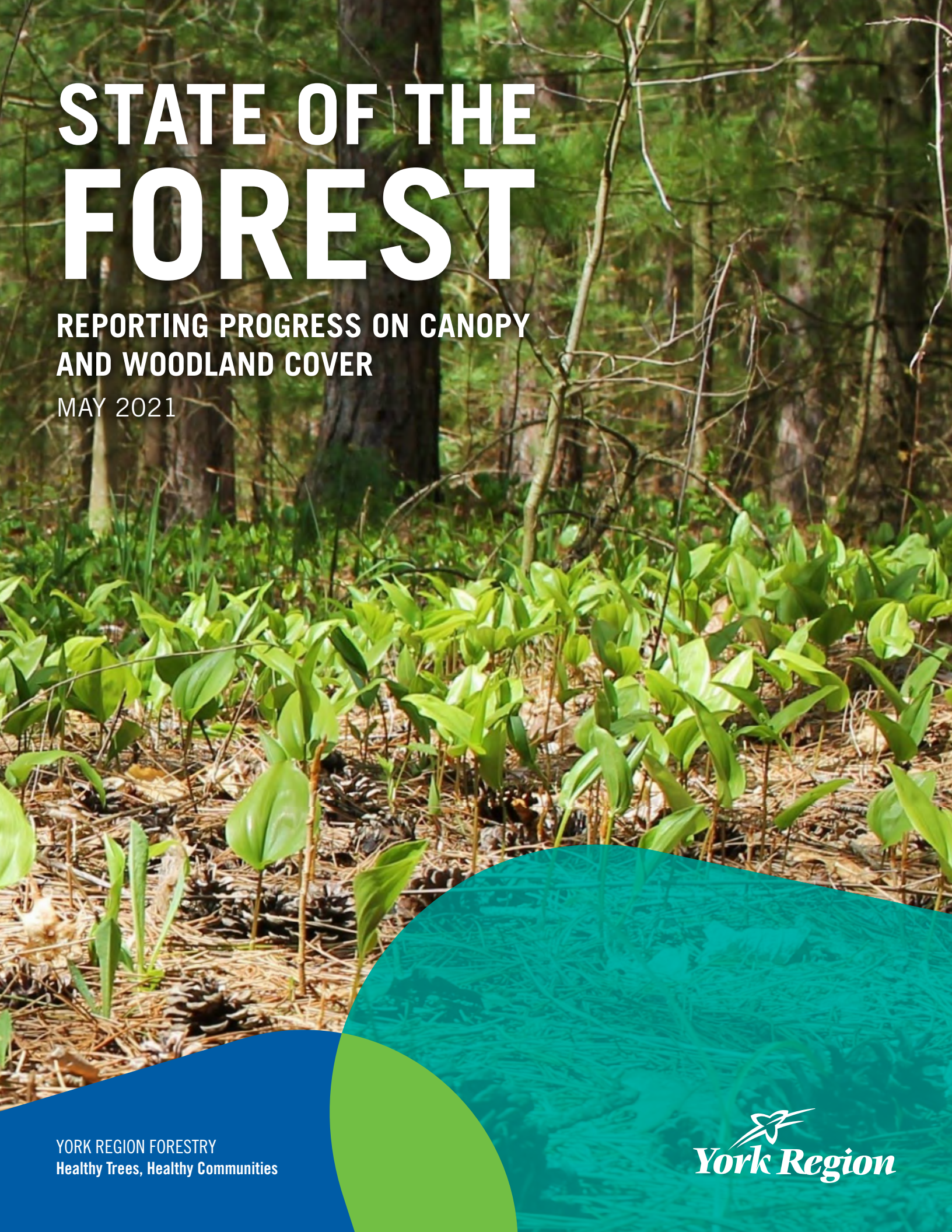


STATE OF THE FOREST

REPORTING PROGRESS ON CANOPY AND WOODLAND COVER

MAY 2021

YORK REGION FORESTRY
Healthy Trees, Healthy Communities

York Region

Forests include **woodlands and trees** in all urban and rural areas

YORK REGION'S TREE COVER IS INCREASING, BENEFITING PEOPLE AND COMMUNITIES

York Region is steadily increasing the benefits residents and communities enjoy from its trees and woodlands, despite challenges from pests, extreme weather, and urbanization.

York Region has over 30 million trees, collectively called the Region's forest. These trees grow on public and private lands, including woodlands, trees along streets, in parks, cemeteries, and backyards.

In 2016, York Region published its Forest Management Plan, which laid out a path for protecting and managing the forest within its borders. It included a goal for woodland cover as set out in the Regional Official Plan (2010), added a new goal for canopy cover and provided the roadmap to achieve these goals. The management plan also committed to regularly monitoring and reporting on canopy and woodland cover every five years and forest diversity and benefits every ten years through the State of the Forest reports.

The first State of the Forest report was prepared in 2017 and this 2021 report provides an update on canopy and woodland cover in York Region. The 2026 report will incorporate a five-year update on canopy and woodland cover and a ten-year update on forest diversity and benefits.

York Region has **over 30 million trees,** collectively called the Region's forest.

CANOPY COVER

Area of land across the Region under every tree

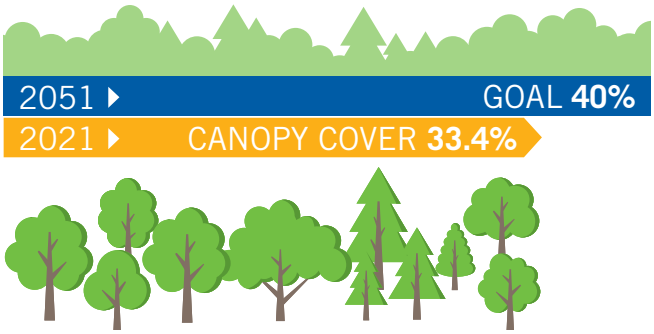
WOODLAND COVER

Area of land across the Region under heavily treed areas that are at least 0.2 hectares in size

Studies carried out for this report show that woodland cover had a net gain of 260 hectares, increasing it to 23.6% in 2021. Woodlands were estimated to cover 41,500 hectares of the Region, making up about two-thirds of the Region's entire canopy cover. Despite a net gain in woodland cover, the Region is unlikely to meet the target of 25% woodland cover by 2031. While the natural expansion of woodland edges and large-scale tree planting outpaced the loss of woodland due to clearing, the net gains achieved are not enough to close the gap by 2031. Even though the rate of increase is less than anticipated, reasonable gains are being made despite the ongoing pressure from different land use needs. With continued planting and protection efforts, the target of 25% woodland cover can reasonably be achieved by 2051.

Canopy cover reached 33.4% in 2021, moving it closer to the goal of 40% by 2051. Canopy cover increases were largely due to the growth and planting of trees in newer residential areas. Many new developments involve the planting of neighbourhood trees. As well, the Region and local municipalities plant and maintain trees along roads and parks, and support partnerships that encourage planting on private property.

Trees outside woodlands now make up about one-third of the total canopy and are expected to be important in achieving the 2051 goal of 40% canopy cover. Their contribution will depend, however, on continued new plantings and good care of existing trees to ensure their long-term health.

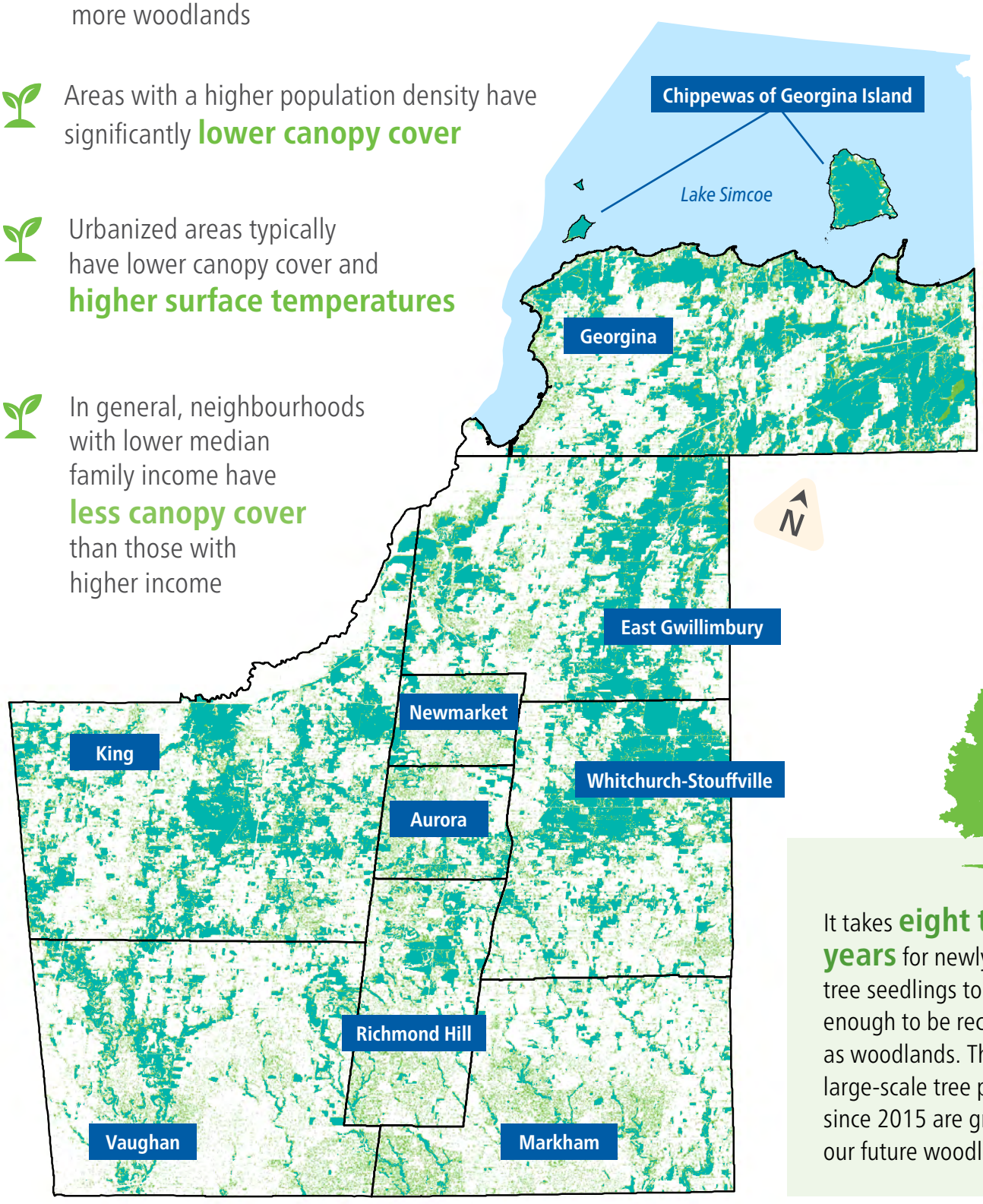


The distribution of canopy cover varies across the Region due to urban and rural landscapes. While it would be impossible to distribute canopy cover evenly across the Region, there is the potential in every municipality to increase the number and size of trees and shrubs.

First Nation/Municipality	Canopy Cover	Recommended Range	Woodland Cover	Recommended Range
Chippewas of Georgina Island First Nation	**88.9%**	★★★★	**78.7%**	★★★★
Aurora	**34.0%**	29% to 35%	**18.4%**	19% to 20%
East Gwillimbury	**37.4%**	39% to 44%	**30.4%**	31% to 33%
Georgina	**44.4%**	46% to 47%	**34.8%**	39% to 40%
King	**34.3%**	36% to 41%	**26.5%**	26% to 28%
Markham	**20.6%**	20% to 35%	**7.5%**	8% to 10%
Newmarket	**28.1%**	25% to 35%	**9.8%**	11% to 13%
Richmond Hill	**29.8%**	26% to 35%	**14.7%**	14% to 15%
Vaughan	**21.9%**	25% to 35%	**12.4%**	14% to 17%
Whitchurch-Stouffville	**38.9%**	40% to 45%	**30.9%**	30% to 32%
York Region	**33.4%**	**40% by 2051**	**23.6%**	**25% by 2051**

THE 2021 CANOPY COVER ASSESSMENT FOUND THAT:

- More rural municipalities have the **most canopy cover**, including more woodlands
- Areas with a higher population density have significantly **lower canopy cover**
- Urbanized areas typically have lower canopy cover and **higher surface temperatures**
- In general, neighbourhoods with lower median family income have **less canopy cover** than those with higher income



Satellite Imagery © 2019 DigitalGlobe, Inc., a Maxar company.

It takes **eight to ten years** for newly planted tree seedlings to grow large enough to be recognized as woodlands. That means large-scale tree plantings since 2015 are growing into our future woodlands.

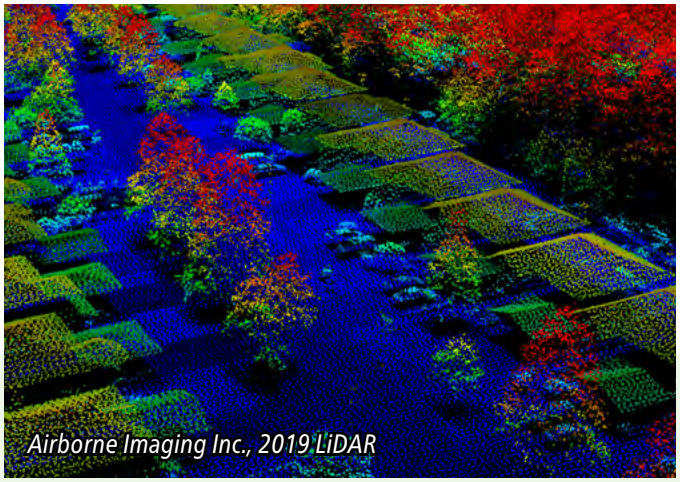
ADVANCED MEASURING TOOLS GIVE A BETTER ESTIMATE OF CANOPY AND WOODLAND SIZE

For this report, canopy cover estimates were updated using sophisticated methods that included high-resolution multi-spectral satellite imagery and LiDAR, which stands for Light Detection and Ranging.

Multi-spectral satellite imagery captures different wavelengths of light to identify vegetation, bare ground, water and built structures like roads and buildings. Images are corrected for viewing angles, topography, and earth curvature to give what is called orthoimagery.

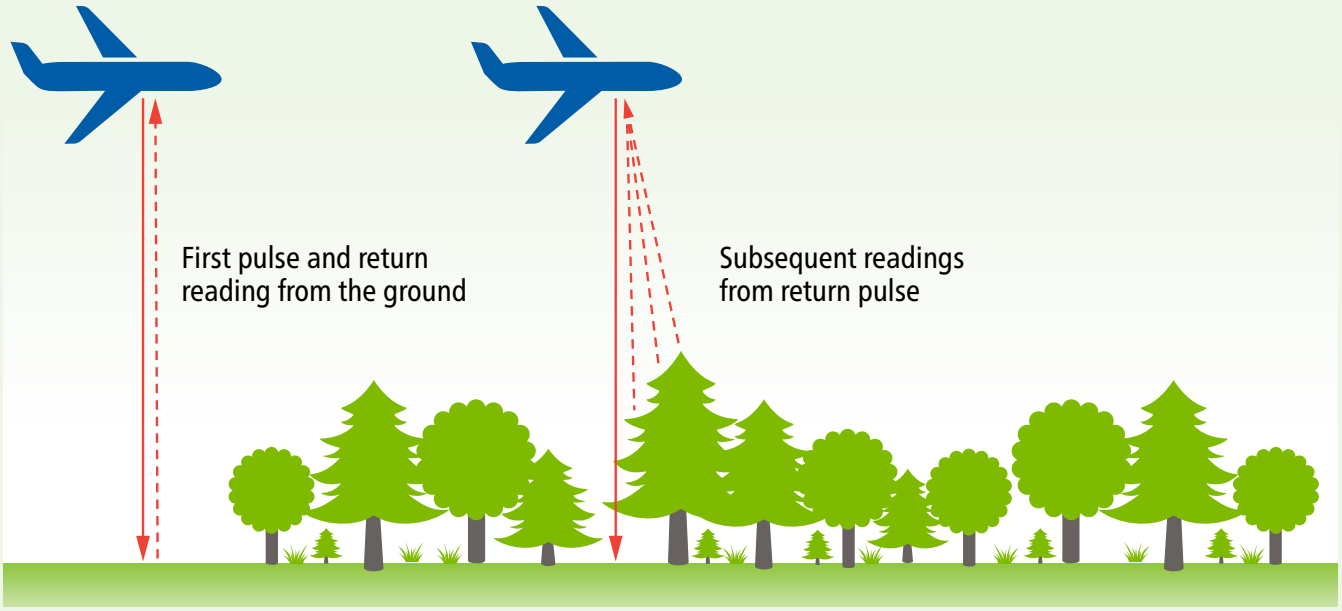
To generate LiDAR data, a pulsed laser beam is projected from an aircraft to measure the constantly changing distance to the earth, producing a three-dimensional image of the surface. LiDAR data is then combined with orthoimagery and other information to produce a detailed image of the earth's surface that identifies canopy cover provided by trees and shrubs.

Previous estimates of canopy cover relied on a variety of methods used at different points in time, and satellite imagery was not available for the entire Region. Because the combination of LiDAR and Region-wide orthoimagery improved the accuracy of canopy mapping, for this report visual inspections were carried out in some areas to determine how much of the apparent increase in canopy from earlier studies was due to more precise measurement techniques and how much reflected actual canopy growth.



Airborne Imaging Inc., 2019 LiDAR

HOW LIDAR WORKS



Woodland cover across the Region has **increased** by **260 hectares** - that's about **363 soccer fields**

The analysis showed that just over half of the increase resulted from better measuring techniques while the remaining increase was from actual canopy growth. Canopy cover grew to 33.4% in 2021, and the previous canopy cover estimate of 31% was underestimated.

Unlike canopy cover, woodlands are identified from digital orthophotographs based on size and tree density. Past assessments calculated woodland cover using the total area but using land area (excludes water bodies) is a more accurate reflection of woodland cover. From satellite imagery and LiDAR, the land area for the Region is derived, therefore, with this report, the land area is used to estimate the 2021 woodland cover and correct the 2017 woodland cover from 23.2% to 23.6%.

The techniques used for this report have created a solid baseline, and the Region plans to use them again to measure canopy and woodland cover in 2026 to ensure consistency and accuracy in measuring progress.

WITH GROWTH AND URBANIZATION, INVESTING IN TREES IS MORE ESSENTIAL THAN EVER

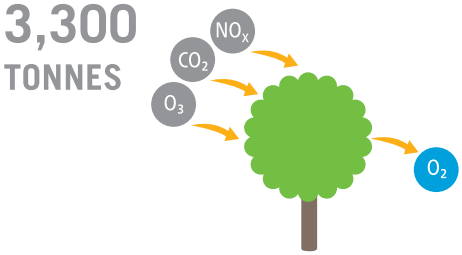
Forests provide a wide variety of public health, economic, social, and environmental services that help make York Region a better place to live. These services are becoming more essential as growth and urbanization continue, bringing more people and more intense development.

Attempting to provide these same services with built or manufactured infrastructure would be extremely costly and in some cases impossible. In addition, the huge intrinsic value that nature provides to residents cannot be quantified or replaced.

Examples of services that trees and forests provide:

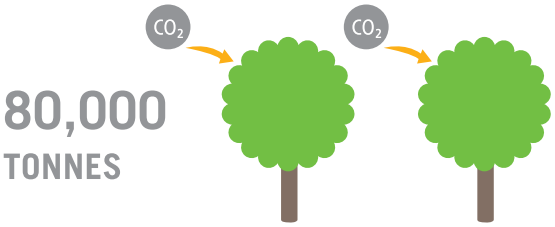
REDUCING ENERGY USE

The shade provided by trees around homes and buildings reduces the need for conventional air conditioning, saving York Region property owners an estimated $8 million a year in energy costs. In winter, trees planted as windbreaks can lower home heating bills.



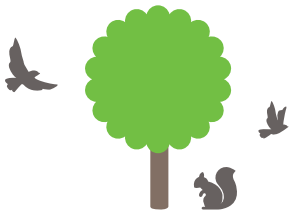
IMPROVING AIR QUALITY

Air pollutants reduce respiratory health and air quality. Each year, the Region's trees and shrubs "breathe in" about 3,300 tonnes of air pollutants such as ozone, sulfur dioxide and nitrogen dioxide through their leaves, trap or convert the harmful chemicals, and breathe out pure oxygen in return.



FIGHTING CLIMATE CHANGE

Trees in York Region store, or sequester, roughly 80,000 tonnes of carbon each year by absorbing carbon dioxide. This is equivalent to taking 62,000 vehicles off the road.



SHELTERING WILDLIFE

Trees and shrubs provide critical habitat for a wide range of wildlife, including birds, pollinators and other insects.

REDUCING EXTREME HEAT IN BUILT-UP AREAS

Hard surfaces such as roads and buildings collect the sun's heat, then radiate it out again. This "urban heat island effect" raises local temperatures and is especially hard on children, seniors and the chronically ill. Numerous studies show that canopy cover reduces temperatures and the heat island effect.

ADDING TO PROPERTY VALUE

Canadian surveys have shown that having mature trees around a house can increase its value by up to 15% by providing privacy and adding character to a neighbourhood. Trees and shrubs also advance the Region's goal of creating Complete Communities by encouraging active transportation and enhancing natural heritage.

IMPROVING MENTAL AND PHYSICAL HEALTH

Research has verified that simply spending time near trees improves physical, emotional, mental, and social wellbeing. Woodlands and urban trees create an appealing environment that encourages walking, running, cycling and other outdoor exercise. Trees block UV rays, which helps prevent skin cancer, and their shade makes exercising more comfortable.

ABSORBING STORMWATER AND IMPROVING WATER QUALITY

If unchecked, the runoff from storms can flood basements and low-lying areas, carry away valuable topsoil, erode stream banks and overburden storm sewers. The Region's trees and shrubs absorb millions of cubic metres of stormwater each year through their roots, countering these threats. They also reduce suspended solids in streams and rivers, making water cleaner and clearer.

LIDAR GIVES FIRST DETAILED LOOK AT TREE HEIGHTS ACROSS THE REGION

Using LiDAR for the 2021 assessment allowed the varying height of the canopy across the Region to be measured for the first time. Height was found to range from 2 metres to 36 metres (or about 6 to 120 feet) with half of the canopy measuring at a height below average.

This supplements earlier conclusions based on trunk diameter that the trees in the Region's forest are generally younger. Over the past 20 years, the Region and its partners have planted trees along streets and in residential areas, often after land was developed. In areas with little canopy cover, even a small tree significantly improves the local environment.

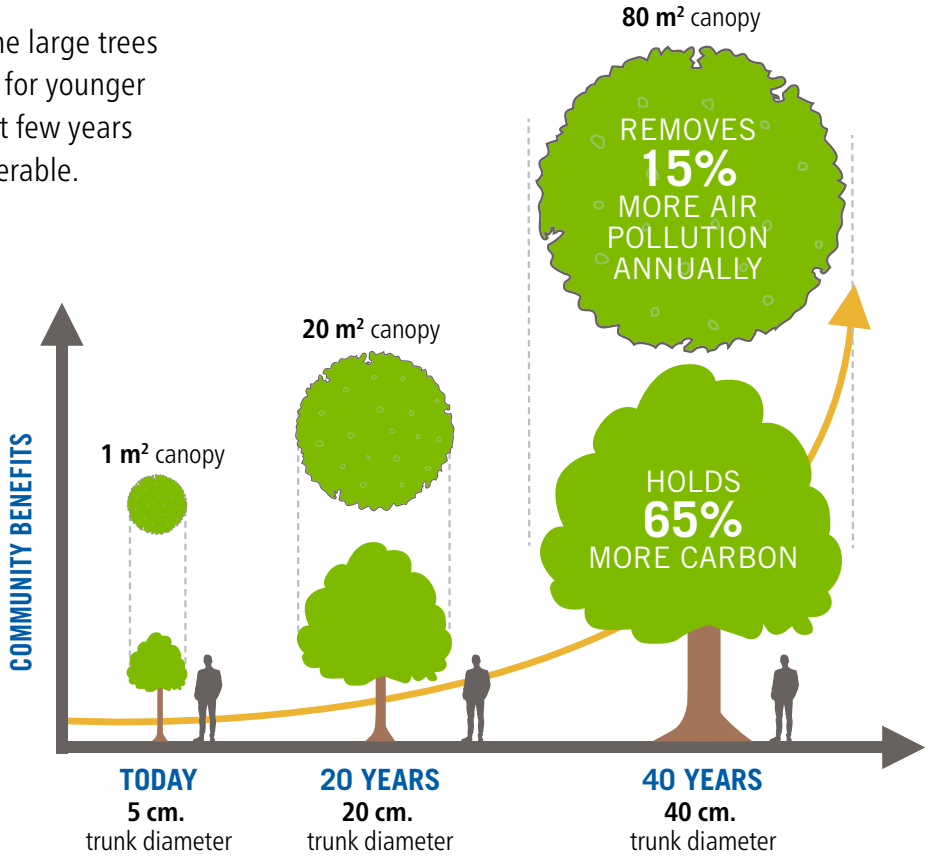
Larger trees, however, provide exponentially more canopy cover and associated services than smaller ones. One large healthy tree can store about 65 times more carbon and remove 15 times more air pollution annually than one small tree. It also provides far more shade and shelter.

The most effective way of developing the large trees the Region needs is to protect and care for younger trees as they grow, especially in the first few years after planting when they are most vulnerable.

Results from the Region's 2020 Street Tree Health Assessment reinforced the importance of actions such as mulching and watering to reduce stress from transplanting and drought. This attention is especially important for trees outside woodlands, which tend to face more stressful growing conditions.

Since larger trees provide far more services, investing in their survival in the early years provides excellent returns. Continuing to plant and encourage new trees every year also remains important, so that when the largest and oldest trees eventually die, trees of the right size are always in place to succeed them.

The use of LiDAR for future five-year reports on the state of the forest, combined with field measurement every ten years, will help improve management decisions by providing valuable insight into how the forest is maturing.



Human life could not **exist** if there were **no trees**.

A MIX OF SPECIES PROVIDES BETTER PROTECTION FROM THREATS

Greater species diversity is important to the health of a forest because it reduces vulnerability to threats like invasive pests and diseases and climate change. It also supports a greater range of ecological processes and provides food and habitat for more birds, pollinators and other wildlife.

When the mix includes native species, the benefits are even greater. While a central goal of forestry programs is continuing to encourage native species, the challenges posed by some planting locations, especially in highly urbanized areas, coupled with a changing climate, support the use of select non-native species.

The 2017 State of the Forest Report showed that forests in York Region contained approximately 50 different native tree species and were dominated by maple, cedar and ash. The 10-year assessment being carried out for 2026 State of the Forest report, using the i-Tree Eco tool developed by the United States Department of Agriculture Forest Service, will show how tree species composition is changing.

One important shift has been in the prevalence of ash, which has been declining in the Region because of the invasive emerald ash borer. The 2026 State of the Forest report will also provide an update on the impact of this and other invasive species.

EMERALD ASH BORER (EAB)

FOREST MANAGEMENT PLAN: THE REGION'S ROADMAP TO A HEALTHY FOREST

The 77 actions in the 2016 York Region Forest Management Plan are the roadmap to achieving the goals of 40% canopy cover and 25% woodland cover by 2051.

In the four years since the plan was adopted, 45 of the 63 short and medium term actions have been completed or are being delivered on an ongoing basis, and work on the 14 long term actions are planned for future implementation.

Actions aim to leverage opportunities to grow the forest by engaging private landowners and communicating the value of trees to all residents, while addressing challenges like the impacts of invasive species. Since 2016, the Region has:

$10 MILLION

Secured **$10 million** in funding from the federal Disaster Mitigation and Adaptation Fund for land securement and tree planting

Planted **over 350,000 trees** and shrubs through the Region's Greening Strategy and on heavily travelled roads as part of the Viva bus rapidways program

Developed and adopted ***It's in our Nature: Management Plan for the York Regional Forest 2019 – 2038***

Secured an **additional 64.5 hectares** to link natural areas in the Greenlands System, bringing the **total to 1,376 hectares** of environmentally significant land protected through its land securement program since 2001

Worked with partners to counter **invasive species** such as dog-strangling vine, and taking part in ongoing forums to **share knowledge** about other known and **emerging threats**

Shown leadership in innovation in forestry practices, as evidenced by research findings presented at a total of **35 science and technology gatherings** from 2018 to 2020

Developed a communication strategy to **increase public awareness** of the benefits of trees and forests

Developed **best practices** for tree planting along rural roads, based on a review of existing practices

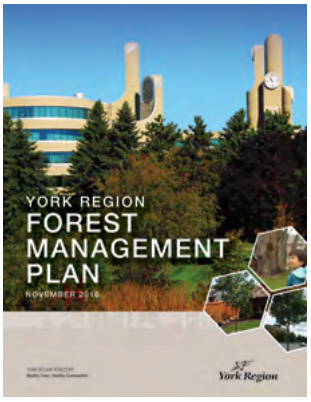
Created a **planting prioritization tool** to analyze planting opportunities across the Region

Public engagement and education are key to creating a sense of forest stewardship across the Region. Recent outreach efforts include:

Hosting or co-hosting over **400 events** between 2018 and 2020 involving more than **15,000 participants**, who learned about the importance of the natural environment and the benefits of trees

Delivering an **outdoor education pilot project**, targeting the Region's rapidly growing seniors' cohort, to highlight the York Regional Forest and explain the **benefits of connecting with nature**

CONTINUING TO GROW: THE JOURNEY AHEAD



Gathering in-depth data and using it to work toward the goals of the York Region Forest Management Plan is an important aspect of adaptive management -- that is, management that is flexible to respond to changing needs and conditions.

A key example is the next important step in realizing the plan: working in partnership with local municipality and conservation authorities to undertake forest studies across the Region. These studies will be completed between 2021 and 2025 and results will be included in the 2026 State of the Forest report, along with updated canopy and woodland cover metrics. These results will be used to review and update the overall plan to ensure its strategies and actions remain effective.

As it continues to implement the forest management plan, York Region will:

- **Promote and support stewardship** and planting programs on private land, such as *Grow Your Legacy* and residential tree-planting programs
- **Work with partners** to leverage the prioritized planting tool to target planting to areas that will most benefit
- **Deliver the Nature's Classroom** program to engage and increase public awareness of the York Regional Forest and the natural environment
- **Continue to use** the *Green Infrastructure Asset Management Plan* to drive better stewardship and care of the Region's existing trees and woodlands
- **Identify and work towards** securing land for conservation and planting in partnership with local organizations and municipalities
- **Work with partners** to research and monitor the forest to protect and enhance forest health
- **Participate in programs** that communicate the value of trees and support tree-planting initiatives, such as *Adopt-A-Stream* and planting on school grounds
- **Plant 400,000 trees and shrubs** and establish 100 additional hectares of woodland by 2027 with funding from Infrastructure Canada's *Disaster Mitigation and Adaptation Fund*
- **Enhance and rehabilitate** natural areas with local municipalities and conservation authorities through the *Greening Action Partnership*

Canada's federal government has committed to using nature-based solutions to fight climate change, including planting **two billion trees** over the next **10 years**. The Region looks to this and other federal initiatives to provide additional funding for its tree-planting initiatives.

MAKING HEADWAY DESPITE A RANGE OF THREATS REQUIRES CONTINUED COMMITMENT

Guided by the Regional Official Plan and York Region Forest Management Plan, the Region has made good progress on the goal of increasing tree cover. While woodland cover is growing more slowly than anticipated, reasonable gains are being made as the Region balances tree-planting and stewardship efforts with the need for land for development, agriculture and other uses. Progress on all fronts is being made despite threats posed by invasive species and weather that is both less predictable and more extreme.

These threats are not just continuing, they are increasing. If left unchecked, they could easily push the Region and its communities off their current path to success. Reaching the Region's goals for canopy and woodland cover, which are key to the Region remaining welcoming and livable as it grows and urbanizes, will require continued vigilance and commitment.

It will also call for recognition that as living infrastructure, trees and woodlands are a long-term investment in the Region's future. Rows of saplings planted 8-10 years ago to reclaim and rebuild woodlands are now starting to show the diversity and complexity of thriving woodlands. Street trees in their fifth growing season are beginning to soften the hardscaping around them, providing shade, shelter and visual interest.

This is a reminder that while the impacts of today's work to expand the canopy and enhance its health will take decades to fully mature, the ultimate result will be an invaluable legacy to the people of York Region.

YORK REGION FORESTRY

Healthy Trees, Healthy Communities

York Region