

HALIFAX

URBAN FOREST MANAGEMENT PLAN



Land Acknowledgement

The Halifax Regional Municipality is located in Mi'kma'ki, the unceded, ancestral, and traditional lands of the Mi'kmaq people. The municipality acknowledges the Peace & Friendship Treaties signed in this Territory and recognizes that we are all Treaty People.

Recognition

The Halifax Regional Municipality recognizes that African Nova Scotians are a distinct people whose histories, legacies, and contributions have enriched the part of Mi'kma'ki known as Nova Scotia for over 400 years.

Acknowledgements

We are grateful to everyone who contributed to shaping the Urban Forest Management Plan. Below is a list of the groups and organizations that have participated in this Plan's development in some form, either through meetings, attending sessions, or providing input. In addition to the groups listed below, we are grateful to the organizations that submitted feedback, or otherwise participated in any phase of engagement through the development of the UFMP.

Targeted Communities

Thank you to the Indigenous community members and organizations who provided their valuable contributions and voices to the Plan. Indigenous knowledge and worldview is necessary for the development of a holistic and interconnected Plan – we thank you for the time you spent with our teams and the ongoing relationships we will carry through the life of this work.

Thank you to those individuals and organizations from the African Nova Scotian/Canadian, francophone and Acadian, and newcomer and immigrant communities who generously gave their time to provide input, feedback, advice, and guidance on the development of the HRM's Urban Forest Management Plan.

HRM Residents, Workers and Visitors

Thank you to the residents, workers and visitors of the HRM. Thousands of people made contributions throughout the planning process. While the following section attempts to list important contributors, it is by no means an exhaustive list and any inadvertent omissions do not reflect a lack of gratitude.

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PLAN AT A GLANCE

This Urban Forest Management Plan (UFMP) details the HRM's **25-year** direction in managing the Municipality's urban forest given the range of pressures it now faces. Developed over two years, the UFMP outlines several objectives, strategies, and actions to inform urban forest management over years ahead. The UFMP's development has been supported by extensive analysis, public engagement, and dialogues with staff, industry professionals, government, and community organizations.

COMMUNITY ENGAGEMENT

PROCESS

- **2 Phases** of engagement
- Community open houses
- Online surveys
- Technical workshops
- Interviews
- Guided tree tour

TARGETED ENGAGEMENT EFFORTS TOWARD REACHING:

1. Indigenous Peoples
2. African Nova Scotians/Canadians
3. Francophones and Acadians
4. People with Disabilities
5. Newcomers and Immigrants

The HRM applied the concept of Etuaptmumk (**two-eyed seeing**), an approach introduced by Elder Albert Marshall of Eskasoni, Unama'ki, Nova Scotia, which blends Indigenous and Western perspectives. The UFMP highlights content where different perspective have been woven together with the "Weaving Winds" motif, inspired by basket weaving and the concept of interconnectedness.

2050 URBAN FOREST VISION

The HRM is a municipality of trees. Through the shared legacy of sustainable management, the HRM's urban forest has been carefully woven into the fabric of our neighbourhoods over the past 25 years. Characterized by a mosaic of native inland and coastal ecosystems as well as large, mature streetscape and park trees, the benefits our urban forest supports meaningful contributions to our health and wellbeing and supports the resilience of our community to the threats imposed by climate change. The protection of our urban forest and its resident biodiversity is central to our management approach and our vision for urban and rural sustainability.

FRAMEWORK

VISION

3 BIG IDEAS

5 OBJECTIVES

17 STRATEGIES

109 ACTIONS

20

Priority actions

6

Quick start actions

3 BIG IDEAS

EQUITY



HRM's urban forest management program is both sustainable and equity-centered in its service delivery

BALANCE



Balance between woodland and biodiversity conservation and the continued growth of the HRM.

COMMUNITY



Community values, education and stewardship capacities are prioritized- people are HRM's most influential urban forest management resource



The HRM has committed to planting a minimum of 1,000 net new trees, per year, to grow the municipality's public tree canopy

Rates of replacement to be determined as the rolling average of tree removals calculated over the previous five years

5 OBJECTIVES

1. PLANNING + PROTECTION
2. PLANTING
3. MAINTENANCE
4. STEWARDSHIP
5. ADMINISTRATION + MONITORING

QUICK START ACTIONS

- **HRM to plant a minimum of 1,000 net new trees per year**
- Achieve a seven-year grid pruning cycle in streets and parks
- Establish an inter-departmental working group
- Collaborate with the HRM, nonprofits, and communities on tree planting and invasive removal
- Define levels of service for planted trees and woodlands
- Explore partnerships to deliver community tree planting and invasive species removal events
- Prepare a financial plan

FACTS ABOUT HRM'S TREES IN 2024

- The HRM's urban core lost **~11.0%** of its canopy cover between 2000 and 2022
- 70% of the HRM's tree canopy is on private property
- **78%** of Halifax is woodland
- Estimated **80,000** planted boulevard trees
- One in three planted boulevard trees inventoried is a **maple**
- **150** planted boulevard tree species and **85** genera
- HRM's 2023 program funding **~\$10 per resident**



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GLOSSARY

TERM	DEFINITION
Associate Plant	A plant that commonly grows alongside (i.e., in association with) another plant species.
Broadleaf	Trees with flat, wide leaves, like maple, oak, and ash. Broadleaf trees
Census	A population count used to gather data about community characteristics.
Coniferous	Trees with needle-like leaves and cones, often evergreen, like pine and spruce. Some coniferous species, like larch, shed their leaves in the fall.
Diameter at Breast Height	A standard method for measuring the diameter of a tree trunk. It is measured at approximately 1.3 metres above the ground.
Dissemination Area	A small geographic area used in census data collection for detailed analysis.
Dominant Plant	A plant that has a superior position in the canopy layer within a woodland as compared to other plants in the woodland. Often, dominant plants are the most abundant plant in a woodland, however this does not need to be the case.
Fuel	A woodland Fuel is any woody material and vegetation that can ignite in a fire. These includes dry grasses, shrubs, leaves, and tree branches.
Genus	A scientific classification of living things ranking above species.
Planted tree	In this Plan, planted trees are considered trees that are intentionally planted by the HRM or the owner of a property.
Prune	The process of selectively removing parts of a tree, such as branches or stems.
Species	The most specific level of living things
Wakanabi-Acadian	The forest region native to eastern Canada and Nova Scotia. The Wakanabi-Acadian is home to a rich diversity of plant species.
Woodland	A natural ecosystem dominated by trees. Also often called a forest.

TABLE OF ACRONYMS

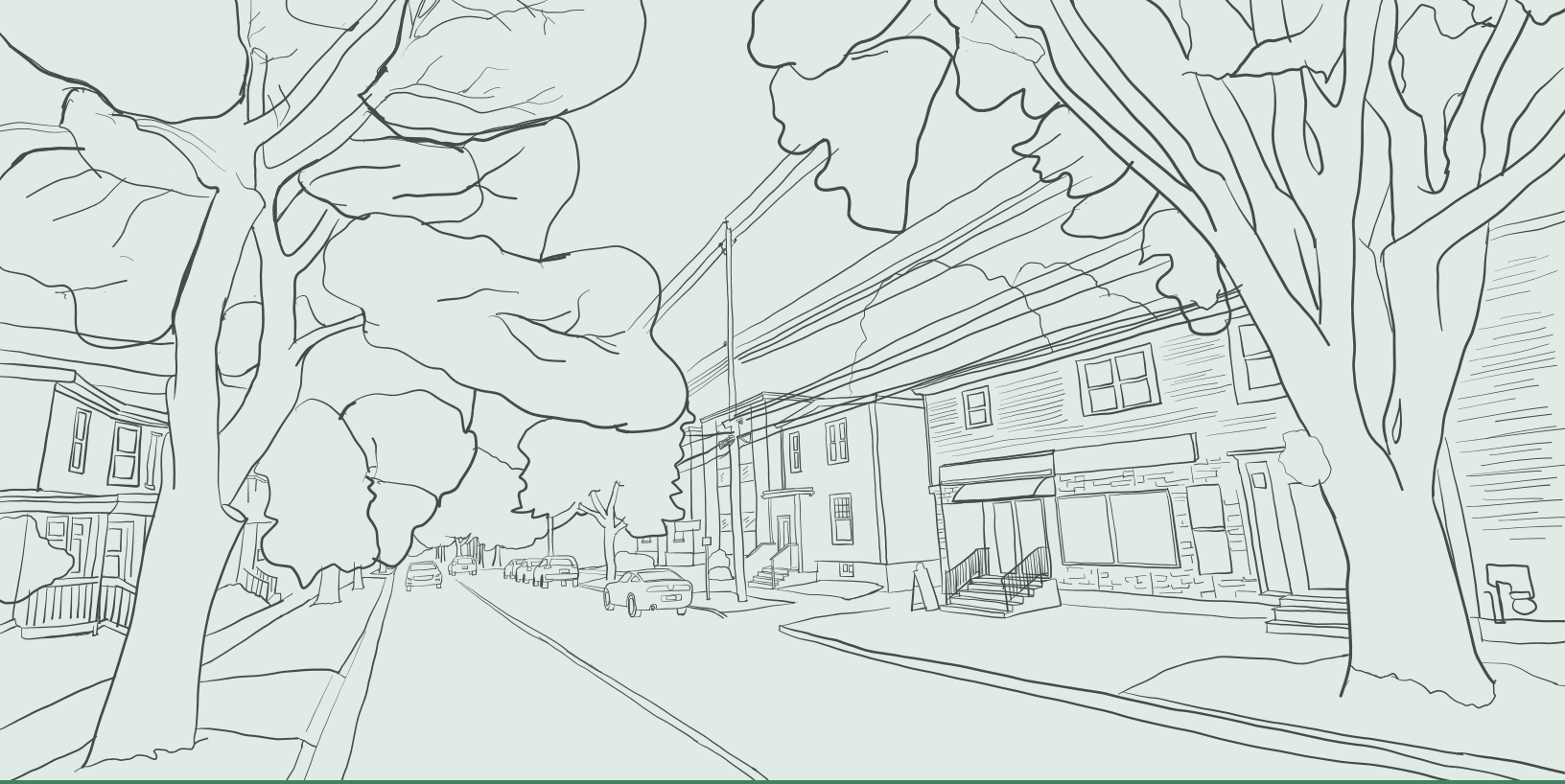
ACRONYMS	DEFINITION
DBH	Diameter at Breast Height
ECMDs	Equity-centered Management Districts
HGNP	Halifax Green Network Plan
HWA	Hemlock Woolly Adelgid
HRM	Halifax Regional Municipality
IMP	Integrated Mobility Plan
NB	New Brunswick
NL	Newfoundland and Labrador
NS	Nova Scotia
SMMD	Succession Monitoring and Management District
TES	Tree Equity Score
UFED	Urban Forest Enhancement District
UFMP	Urban Forest Management Plan

Plan Introduction and Overview

→ *Introduction et aperçu du Plan*

Language is important! French translations reflect the HRM's commitment to the ongoing preservation and support of the Municipality's Acadian and Francophone residents.

1
newt



1.1. INTRODUCTION TO THE PLAN

Residents of the HRM love their trees. From red spruce to white ash, basswood, American elm, and red maple, the HRM is through and through a community of trees. Trees are woven into the very fabric of our community, essential to our urban streetscapes and inseparable from the native Wabanaki-Acadian ecosystems.

This Plan replaces the HRM's 2013 Urban Forest Master Plan as the guiding document to inform the management of the Municipality's trees. The original plan was drafted to inform the management of the urban forest for the period between 2013 and 2023, then establishing that a review would occur beyond that initial decade. There is now a need for an updated plan.

CURRENT CHALLENGES

Much has changed in the HRM over the past decade. Our community has welcomed close to 80,000 new residents- well over ten percent growth in a period of just ten years. This growth has increased demand for new housing and infrastructure. Parks and wilderness have seen increased use, particularly following the COVID-19 pandemic. This growth is anticipated to continue in the years to come. As a result, the HRM's planning and development processes need to be revisited now to ensure growth continues to achieve good balance between the need for housing and services and the preservation of the urban forest and green spaces.

Climate change and extreme weather have become a central management challenge. Hurricane Fiona in 2022 severely impacted trees across the HRM. The Upper Tantallon wildfire in 2023 caused the temporary displacement of more than 16,000 residents and destroyed 200 buildings including 150 homes. At the same time, evolving forest health concerns like hemlock woolly adelgid and emerald ash borer have arrived in Nova Scotia for the first time; these invasive species pose a real threat to trees and native ecosystems in the HRM.



THIS PLAN

This Plan charts a coordinated path forward for the sustainable management of the HRM's urban forest over the coming 25 years. A 25-year horizon allows long-term forest planning. A ten year review period supports flexibility in the Municipality's management approach.

Planning for sustainable urban forest management enables cities to:

- Identify and prioritize current issues in urban forest management through community consultation.
- Build community and urban forest resilience to the varied threats faced by urban nature, through establishment of a long-term vision, and supporting actions with a prescribed monitoring approach.
- Expand access to, and enhance the quality of, urban nature.
- Allocate resources more effectively, while ensuring that tree planting and maintenance efforts prioritize areas with the greatest need.
- Guide strategic planning and policy development influencing urban forest management to create more resilient, biodiverse and inclusive urban environments.

PLAN SCOPE

The HRM's 2013 Urban Forest Master Plan used the urban forest definition put forward by the Canadian Urban Forest Strategy.¹ This Plan continues to use that definition:

Trees, forests, green space and related abiotic, biotic and cultural components in and around cities and communities. It includes trees, forest cover and related components in the [HRM's] rural areas.

Many classes of tree can therefore be found in the urban forest. This includes publicly owned street and park (i.e., planted) trees, privately owned trees, and trees in forested landscapes under a broad range of ownership structures (Figure 1-1).

More than 71 percent of land in the HRM is under private ownership. This amount of private ownership means urban forest management will always be a shared responsibility. The Municipality manages trees on Municipal land such as parks, woodlands and Municipal roadways. On private land, trees are managed in large part by the relevant property owner or land manager.

WHY THE PLAN WAS UPDATED

The Urban Forest Management Plan update was initiated to:

1. Update the 2013 plan, which called for a ten-year review,
2. Respond to the evolving challenges and pressures facing the HRM's urban forest management program,
3. Continue to advance implementation of the 2013 plan, and update the resources needed to meet increasing demand for urban forest services and changing urban forest management context, and
4. Increase diverse perspectives from community members such as Indigenous people, African Nova Scotians/Canadians, Francophones and Acadians, people with disabilities, and newcomers.



Figure 1-1. HRM transect and urban forest types.

Etuaptmumk

Etuaptmumk, known as two-eyed seeing in English, is a guiding principle coined in 2004 by Mi'kmaw Elder Albert Marshall from Eskasoni in Unama'ki. Etuaptmumk emphasizes the co-existence and synergy between Indigenous ways of knowing and alternative worldviews. Elder Marshall describes etuaptmumk as “learning to see from one eye with the strengths of Indigenous ways of knowing and from the other eye with the strengths of Western ways of knowing and to using both of these eyes together”

To honour etuaptmumk, this plan integrates Indigenous knowledge and values throughout. Rather than isolate Indigenous knowledge, the guidance gifted from engagement with local Elders, Knowledge Keepers, and Indigenous community members is found in all components of this plan.

LANGUAGE

Indigenous language is highlighted in different places throughout the plan. The community noted the importance of naming this plan to breathe spirit into the work.

Like this plan, the work in the Urban Forest and with Indigenous People of Mi'kmaki is an ongoing, living relationship. We use the name wetlamultiég... to open this Plan. Our understanding is that this means "we breathe from...". This name serves as a placeholder while this document is being named in community, by community. The name was inspired by dialogue with Grandmother Jane Meader and daughter Paulina Meader of Membertou First Nation. They shared stories of being on the land and the reciprocal relationship

between Mother Earth and the healing of our human relatives. The use of the ellipsis is intentional. We want to communicate that all of the information to follow in the plan will support breathing life into this work.

IMAGERY

Designed by Indigenous graphic designers, you can find Indigenous values and images throughout the plan. You will notice watercolour elements highlight important details within. These elements were inspired by the work of Cheryl Maloney of Indian Brook First Nation, Sipeknekatik district of the Mi'kmaq Nation. During engagements, Elder Ann LaBillois of Ugpi'Ganjig First Nation held a Water Ceremony and received a painting from Cheryl. Elder Ann described how the artwork made her think about life within urban forests and the many connections that exist.

STORYTELLING

The below image was created by pipikwan pêhtâkwan to highlight etuaptmumk in practice.

Observation and personal experience are critical to building understanding from Indigenous perspectives. From this point of view, there are many truths. For many Indigenous People, concepts are cyclical rather than linear. Storytelling is one way we explore knowledge from within.

Read the story below to see how you come to know the imagery in the design illustration. How did you come to know the illustration? What do you see? What does this story make you think about the Urban Forest?

A young girl named maskwi decided it was time to leave her community and explore the world. She grew up in the same community her whole life and had never met anyone else! maskwi wanted to learn about healing and thought she should learn from as many others as possible. Late one night, maskwi packed up her bags and began walking wjipnuk, East. She arrived at the first community around sunrise and was met by a beautiful Grandmother in a bright yellow dress. maskwi visited with the Grandmother, who was building a fire and cooking some food. maskwi asked if there was anything the Grandmother would share to help her learn about healing. The Grandmother told her, “maskwi, take this tobacco and remember how you feel.” Once the fire was out, the Grandmother sent maskwi off with the tobacco. maskwi then began walking kite'snuk, South. She arrived at her next stop around mid-day and was met by a Grandmother wearing a big red hat. The two women greeted one another, and maskwi offered to help the Grandmother with some washing. While they were splashing alongside one another, maskwi asked the Grandmother if there was anything she would share to help maskwi learn about healing. The Grandmother smiled and said, “maskwi, take this cedar and remember your spirit.” Once they finished cleaning, they drained the water, maskwi gathered the gift and began heading tkisnuk, West. The sun was falling, and it was nearing dusk when maskwi arrived. She walked up to a Grandmother resting on a big, black blanket and said hello! The Grandmother invited her to sit beside her while she cleaned some earth off her vegetables. Feeling tired, maskwi took a rest beside the Grandmother and helped brush off the vegetables. maskwi asked the Grandmother if there was anything she would share to help her learn about healing. The Grandmother reached back to grab something and said, “maskwi, take this sage and remember your body.” The two finished cleaning the earth off the food, and maskwi hurried off oqwatnuk, North, before it was too late. Around midnight, maskwi arrived at the last community. It was dark and windy.

There was a Grandmother trying to tie her shelter down with large, white ties. Together, the women pulled the ties tight and secured the home. They moved inside and sat together as the wind whistled around them. Inside, maskwi asked the Grandmother if there was anything she would share to help her learn about healing. The Grandmother picked up a bundle of sweetgrass and braided it together. She said, “maskwi, take this sweetgrass and remember your thoughts.” maskwi thanked her and fell asleep for the night. In the morning, maskwi began walking back to her home with all her new gifts; Her tobacco, her cedar, her sage, and her sweetgrass. She arrived home, and her parents asked, “maskwi, welcome home. What did you learn about healing?” maskwi replied, “I feel that I learned a lot. My spirit is full, but my body is sore from all the walking. I think I need to take a break.” Laughing at herself, she walked into her room, took off her glasses, held the gifts of the Grandmothers and planned her next visit.



THE BENEFITS OF THE URBAN FOREST

Urban forests are essential for creating healthy and livable urban environments. Trees provide many benefits, often called 'ecosystem services' Research has identified many benefits trees provide to urban areas, including:

CLIMATE RESILIENCE

HRM's urban forest helps protect the community from the impacts of climate change. Trees regulate temperatures through shade and evapotranspiration² and reduce storm and flood impacts. They are also important carbon sinks, sequestering and storing atmospheric carbon.^{3,4}

CLEAN AIR AND WATER

Trees purify the air by absorbing pollutants like carbon monoxide, nitrogen dioxide, and particulates.⁵ They also filter rainwater and stormwater runoff, improving water quality before it enters lakes and rivers.^{6,7}

HABITAT AND BIODIVERSITY

Urban forests support a wide range of plant, animal, fungal, and microbial life.⁸ Intact urban forests with diverse habitats sustain greater biodiversity, benefiting both human and animal residents.⁹

IMPROVING HUMAN HEALTH

Trees contribute to physical and mental health by providing spaces for exercise and relaxation. Exposure to greenery reduces stress, improves work performance, boosts creativity, and aids recovery in hospitals.^{10,11,12} Schools with more trees and shrubs visible from classroom windows have been found to achieve higher test scores and graduation rates.¹³ Access to parks or natural areas increases physical activity levels.¹⁴ Canadian doctors are beginning to prescribe time outdoors given known health benefits.

ECONOMIC VALUE

Trees stimulate the local economy by attracting people to commercial districts, resulting in increased spending and longer stays.¹⁵ Areas with abundant tree cover tends to have higher property values.^{16,17}

CONNECTING WITH LAND AND CULTURE

Indigenous participants in the UFMP engagement program expressed the importance of connecting with the land and forest to make them feel they belong. Many newcomers highlighted how they may first connect with the community through connecting with the land, particularly when language might be a barrier to connecting with people. Research shows that forests and trees enrich communities by providing cultural benefits and a sense of identity and pride.¹⁸ Spending time in local green spaces fosters community connection and strengthens social bonds.¹⁹

RESOURCES

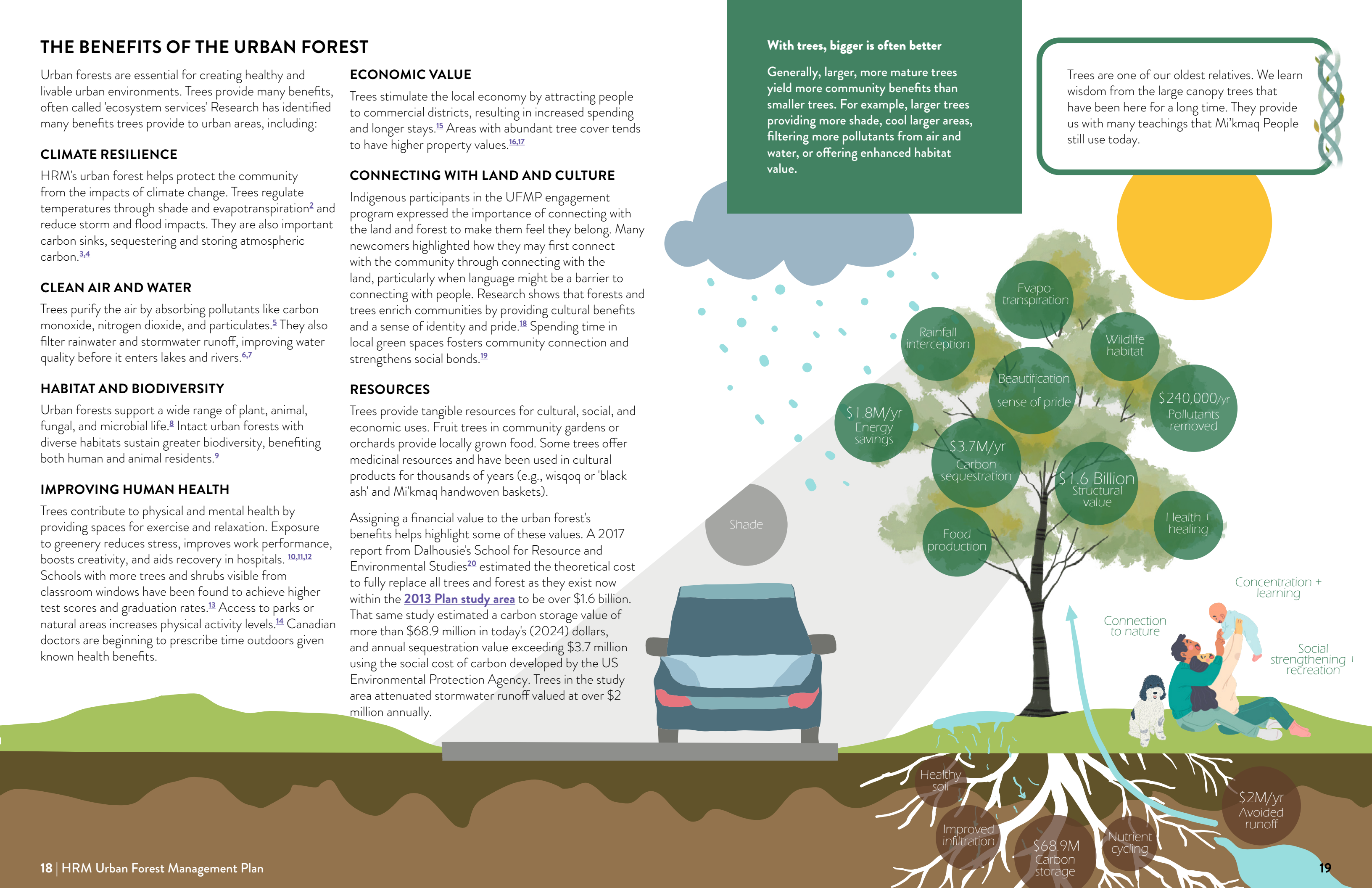
Trees provide tangible resources for cultural, social, and economic uses. Fruit trees in community gardens or orchards provide locally grown food. Some trees offer medicinal resources and have been used in cultural products for thousands of years (e.g., wisqoq or 'black ash' and Mi'kmaq handwoven baskets).

Assigning a financial value to the urban forest's benefits helps highlight some of these values. A 2017 report from Dalhousie's School for Resource and Environmental Studies²⁰ estimated the theoretical cost to fully replace all trees and forest as they exist now within the **2013 Plan study area** to be over \$1.6 billion. That same study estimated a carbon storage value of more than \$68.9 million in today's (2024) dollars, and annual sequestration value exceeding \$3.7 million using the social cost of carbon developed by the US Environmental Protection Agency. Trees in the study area attenuated stormwater runoff valued at over \$2 million annually.

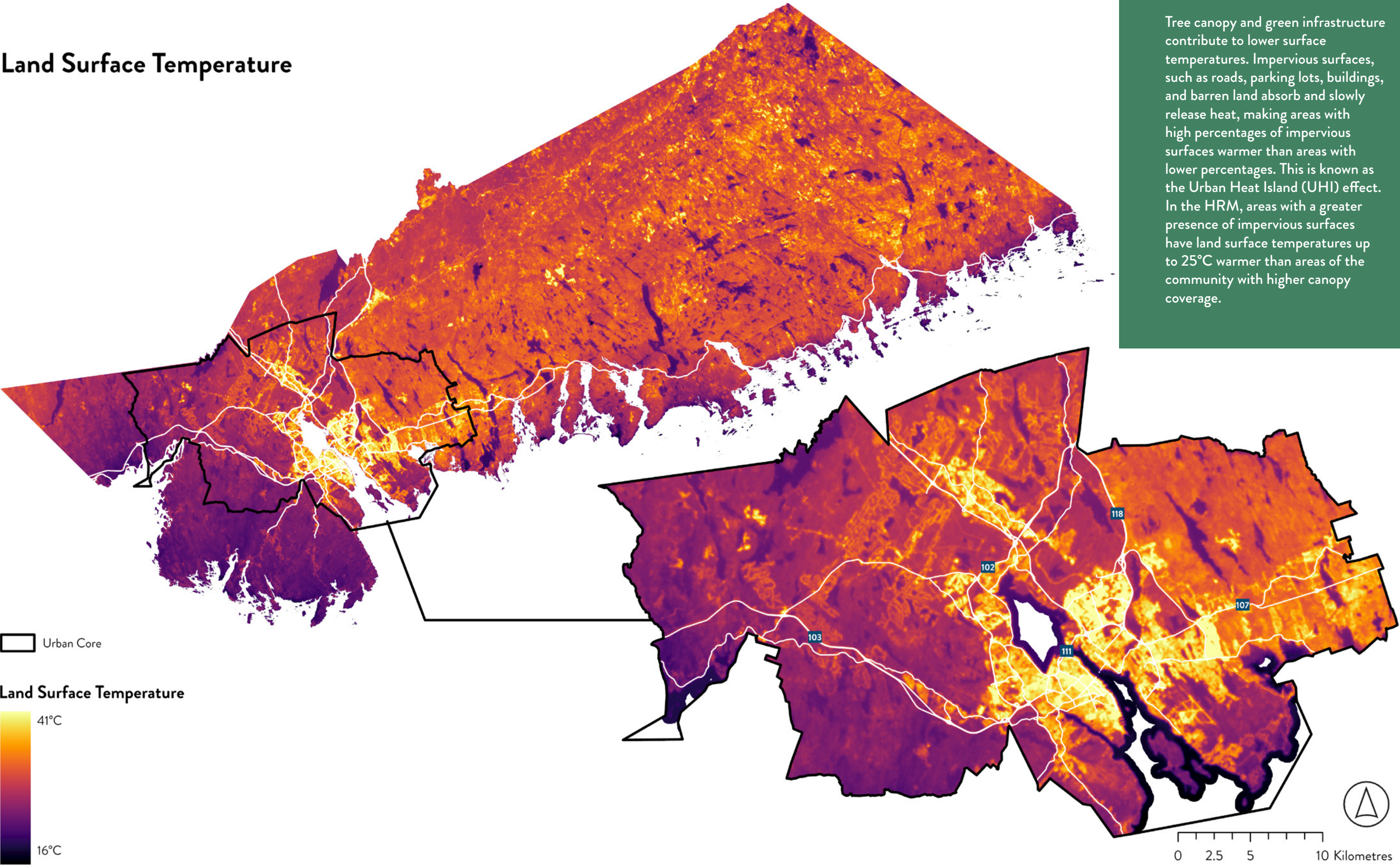
With trees, bigger is often better

Generally, larger, more mature trees yield more community benefits than smaller trees. For example, larger trees providing more shade, cool larger areas, filtering more pollutants from air and water, or offering enhanced habitat value.

Trees are one of our oldest relatives. We learn wisdom from the large canopy trees that have been here for a long time. They provide us with many teachings that Mi'kmaq People still use today.



Land Surface Temperature



HRM's Urban Heat Island

Tree canopy and green infrastructure contribute to lower surface temperatures. Impervious surfaces, such as roads, parking lots, buildings, and barren land absorb and slowly release heat, making areas with high percentages of impervious surfaces warmer than areas with lower percentages. This is known as the Urban Heat Island (UHI) effect. In the HRM, areas with a greater presence of impervious surfaces have land surface temperatures up to 25°C warmer than areas of the community with higher canopy coverage.

HRM's Forest

La forêt de la municipalité





2.1. THE WABANAKI-ACADIAN FOREST

A BRIEF HISTORY

HRM is located within the Wabanaki-Acadian Forest, a transitional ecosystem, wedged between the Northern Hardwood Forests of New England and the Boreal Forests of Quebec. This transitional position results in a mix of coniferous and broadleaf tree species- more than 40 in all. In fact, preserved Wabanaki-Acadian Forest is considered one of the most diverse temperate forest regions in the world.

Red spruce and eastern hemlock are often considered to be the defining tree of the Wabanaki-Acadian Forest and is a major component of its old-growth stands. Here, red spruce is commonly found alongside sugar maple, yellow birch, beech, hemlock (one of the Wabanaki-Acadian's longest-lived species), white pine, balsam fir, and larch. Other common Wabanaki-Acadian species include red maple, white ash, white birch, trembling and large-tooth aspen, and black spruce.

Historical accounts describe the Wabanaki-Acadian as a mixedwood forest of grandeur- a landscape characterized by towering white pines over 45 metres tall and vast stands of beech and other hardwoods.²¹ Studies in the broader Wabanaki-Acadian region have estimated that red spruce once made up one-third of the forest, with balsam fir as a common associate

species. Some red spruce in the Acadian Forest were thought to have commonly been 150 to 250 years old.^{22,23}

Over the thousands of years since the last ice age, the Wabanaki-Acadian Forest and its resident species have adapted to their specific part of North America. Natural processes of disturbance like windstorms, insect outbreaks, and wildfire have shaped its development through a process called succession. These disturbances create 'gaps' that release understorey trees and allow for new growth, promoting forest renewal.

Humans have long inhabited this place. For time immemorial, Indigenous Peoples, the Mi'kmaq, have lived in and cared for the old growth stands of red spruce, white pine, hemlock and ash that have played a strong part in cultural connections to the land. Long before the arrival of Settlers, Indigenous Peoples learned with and from these forest landscapes.

Much has changed in the more than 500 years since the arrival of the first Europeans to the Atlantic coast. More than 400 years of timber harvest, agricultural clearing, shipbuilding, timber-fuelled conflict, and human settlement have permanently changed the landscape.

Forest management practices, such as clear-cutting and high-grading, have contributed to the rise of balsam fir as a significant species. The Wabanaki-Acadian Forest is likely younger today than it ever has been. Before the arrival of Europeans, old growth was thought to cover as much as 50% of the land.²⁴ Today some estimates put that number as low as one percent.²⁵ The forest has also become more fragmented over time, broken up by roads, infrastructure, and urban communities.

In the last century forest stressors have continued to intensify. Humans have disconnected from the natural world, introducing new, invasive pests including beech bark disease, emerald ash borer, hemlock woolly adelgid, and Dutch elm disease. Some of these threats have already taken their toll on both native and introduced tree species, others pose a current and significant threat. Climate change also poses an unprecedented challenge, with trees, people and property increasingly at risk from events such as severe weather and wildfire.

Many species of trees and medicines have been used historically for Indigenous practices. Trees, such as the birch, have been harvested for canoes and baskets since time immemorial and are still practiced today. There are significant teachings around species, such as black and white ash. Where black ash is more commonly used today, it was shared that traditionally, white ash was a significant species ingrained in the Mi'kmaq creation story. Indigenous community members would like to see additional protections for these species, along with a restoration plan.

▼ Point Pleasant Park. August 2007. CR: Peter Duinker.



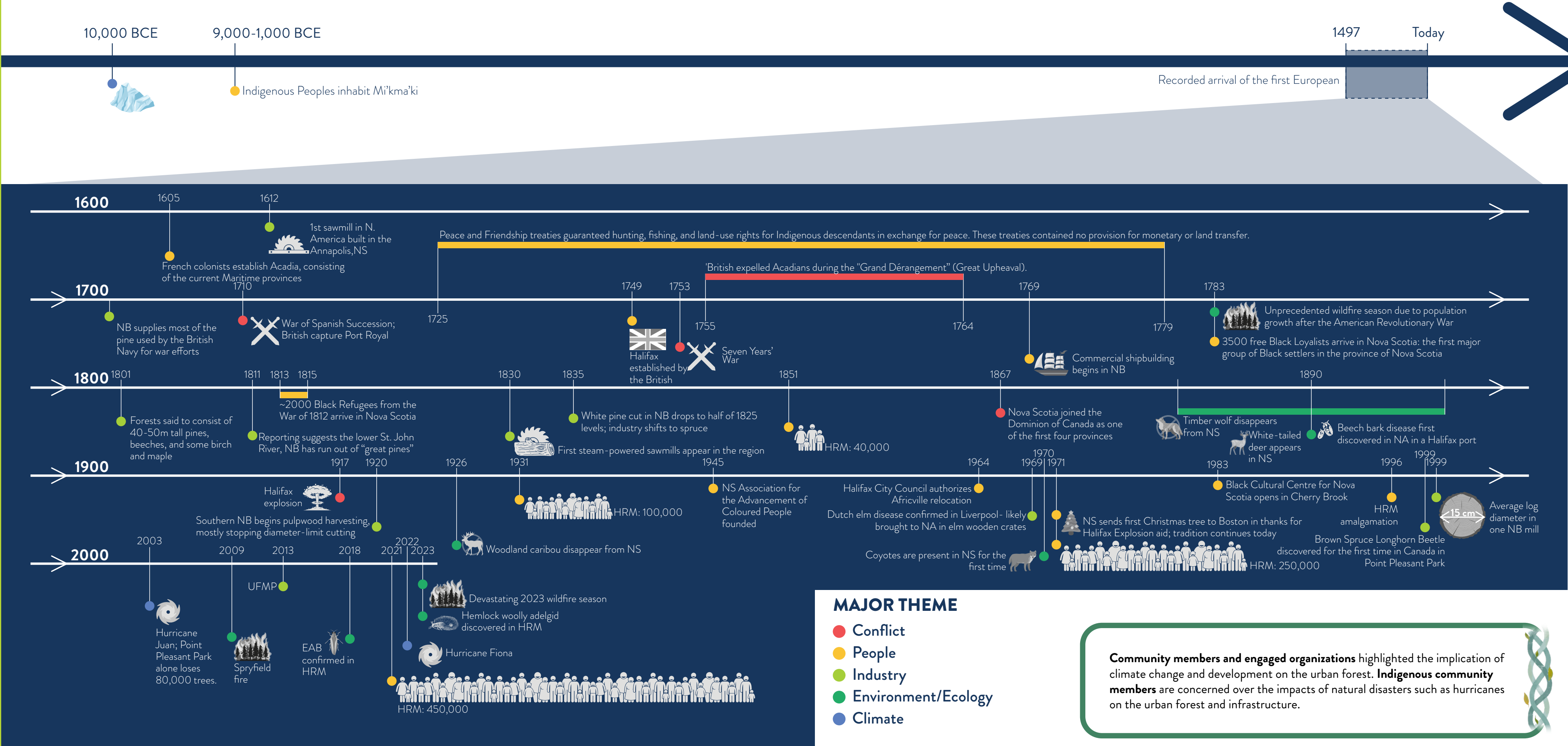
A Timeline

The Wabanaki-Acadian Forest has existed since the retreat of the glaciers following the last ice age. Mi'kmaq Peoples arrived on these lands and cared for the native ecosystems for thousands of years before the arrival of Europeans. In the 500 years since European arrival, the landscape has changed, dramatically.

The timeline on the right is meant to communicate the degree of change that has occurred over a relatively short period of time relative to the Holocene (i.e., the current interglacial period). Technology, population growth and globalization have reshaped tree and forest management.

Major social, political, industrial, and environmental events over the past 500 years are illustrated. Most of these events relate either directly to human influence over the Wabanaki-Acadian Forest, or to the HRM's history (and therefore to the urban forest's history). This timeline is not all-encompassing. It is a sampling of historic events that tell the story of change in the Wabanaki-Acadian Forest, as well as change in the HRM as a community.

The events detailed are assembled from a compilation of sources, however special credit is given to the work of Simpson, J. (2015).³²



OLD GROWTH

Once a hallmark of the Wabanaki-Acadian Forest, old growth forest has become rare. Some estimates put true Old Growth Wabanaki-Acadian forest at as little as one percent of its pre-European range. Through *An Old-Growth Policy for Nova Scotia*, the Province has protected more than 30,000 hectares of Old Growth Wabanaki-Acadian Forest outside of any old growth already subject to protections in Provincial parks and conservation areas. In the HRM, 500 hectares of confirmed old growth crown forest are protected under the Old Growth Forest Policy. Another 43,000 hectares of forested land has been flagged as either prospective old growth (awaiting confirmation) or as a candidate old growth restoration site—some of these stands may be subject to protections under the Province's old growth policy in the future. [Read more about An Old-Growth Policy for Nova Scotia here.](#)

HRM'S FOREST COMMUNITIES

CLIMATE

The Wabanaki-Acadian Forest Region has a climate characterized by warm, humid summers and relatively mild winters. Ample precipitation during the growing season provides excellent conditions for supporting tree growth. Climate change threatens warmer, wetter, wilder conditions. While some impacts may benefit tree growth, others may influence the range of species that grow in the region.²⁶ Changes in abiotic and biotic cycles, as well as freeze-thaw cycles may also threaten and damage trees.

LANDCOVER

HRM's municipal area is nearly 5,500 km², making it one of the largest Canadian communities by area. Its large size supports a significant diversity of land uses and land cover types. [Figure 2-1](#) maps the ecological land classifications in the HRM. More than 4,300 km² of the HRM is woodland, making up nearly three quarters of the Municipality's land base.

[Photo-interpreted Provincial datasets](#) identify that roughly 85% of the HRM's forested lands are "natural", meaning that they have not been treated silviculturally, are not a plantation, and have not been subject to a major disturbance in recent time. Managed forests constitute another 11%, with clear cuts and plantations as the largest classes of managed forest. Smaller elements



FUTURE CLIMATE WILL BE...

WARMER



- Warmer average temperatures
- More hot days above 25°
- Milder winters
- More frequent and longer heat waves
- Longer, warmer growing seasons

WETTER



- Increased quantity and frequency of precipitation, especially in the fall

WILDER



- Potential changes in frequency and intensity of extreme weather events
- More freezing rain, hail
- More high wind gusts

BY 2050, HRM MAY SEE...

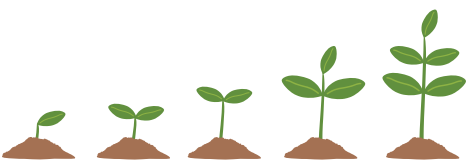
- 4X the days with temperature above 30°C
- 2X the number of summer days
- More days with heavy precipitation (>20mm)
- 10% more rain during rainfall events

WHICH IS LIKELY TO LEAD TO...



EARLIER SPRING

Warmer temperatures will contribute to earlier snow melt and buds to burst sooner.



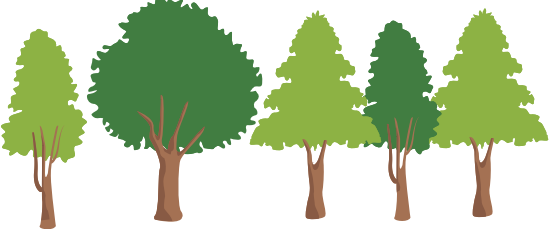
LONGER GROWING SEASON

Earlier spring and a later fall will elongate HRM's growing season.



HEAT WAVES

Possible increases in the frequency and duration of heatwaves may challenge species not well adapted for such conditions, and can also impact fuels and fire behaviour.



MORE FAVOURABLE CLIMATE FOR TEMPERATE SPECIES

Warmer temperatures may challenge the Wabanaki-Acadian's cold-adapted boreal species while at the same time better supporting more southerly, temperate plants.



MORE PESTS AND INVASIVE SPECIES

Climate change is contributing to changes in the life-cycles, abundance and range of forest pests and pathogens.

Ecological Land Classification

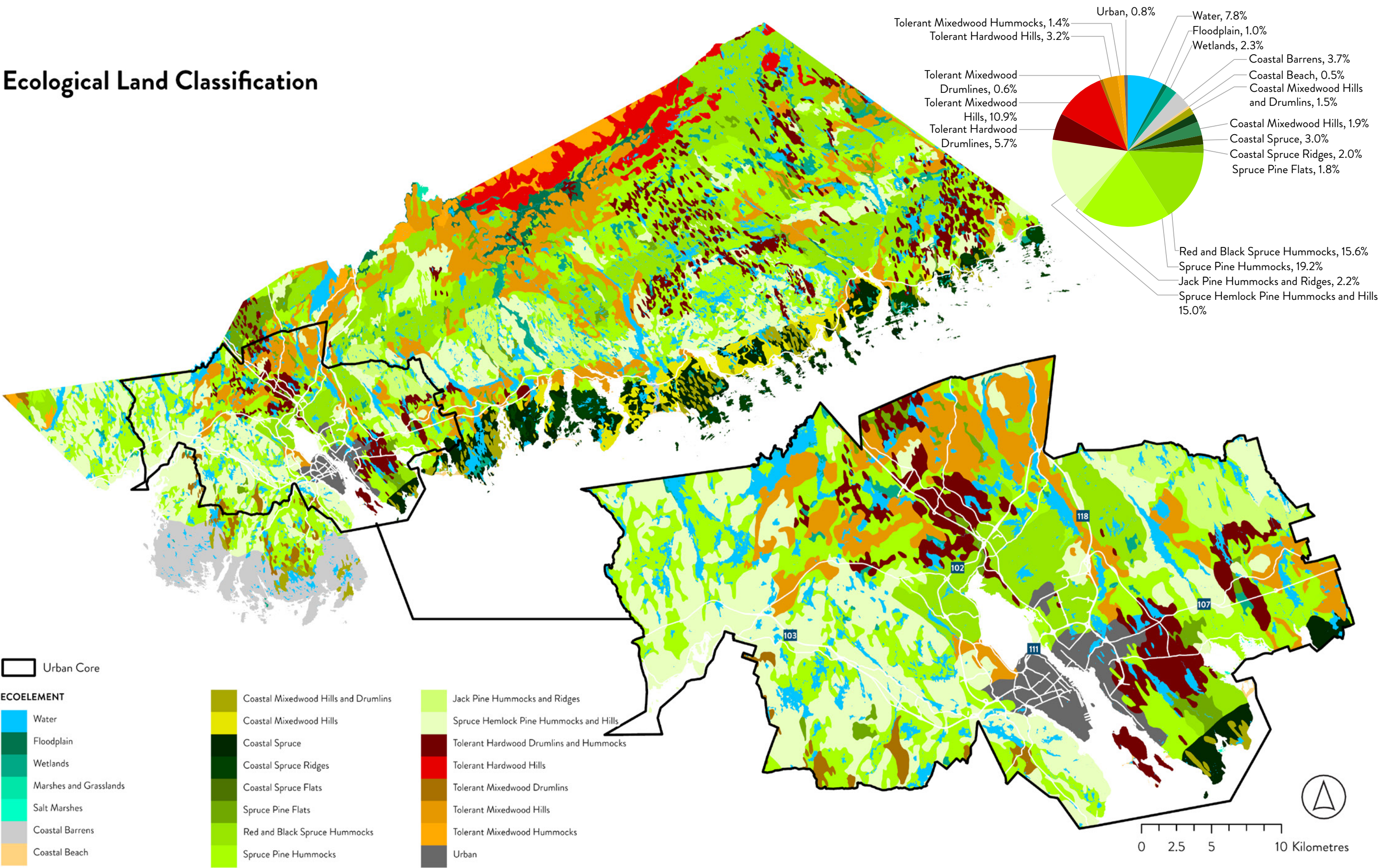


Figure 2-1. Ecological land classification mapping with the HRM illustrates the diversity of terrestrial ecosystems that exist within the Municipality's land base.

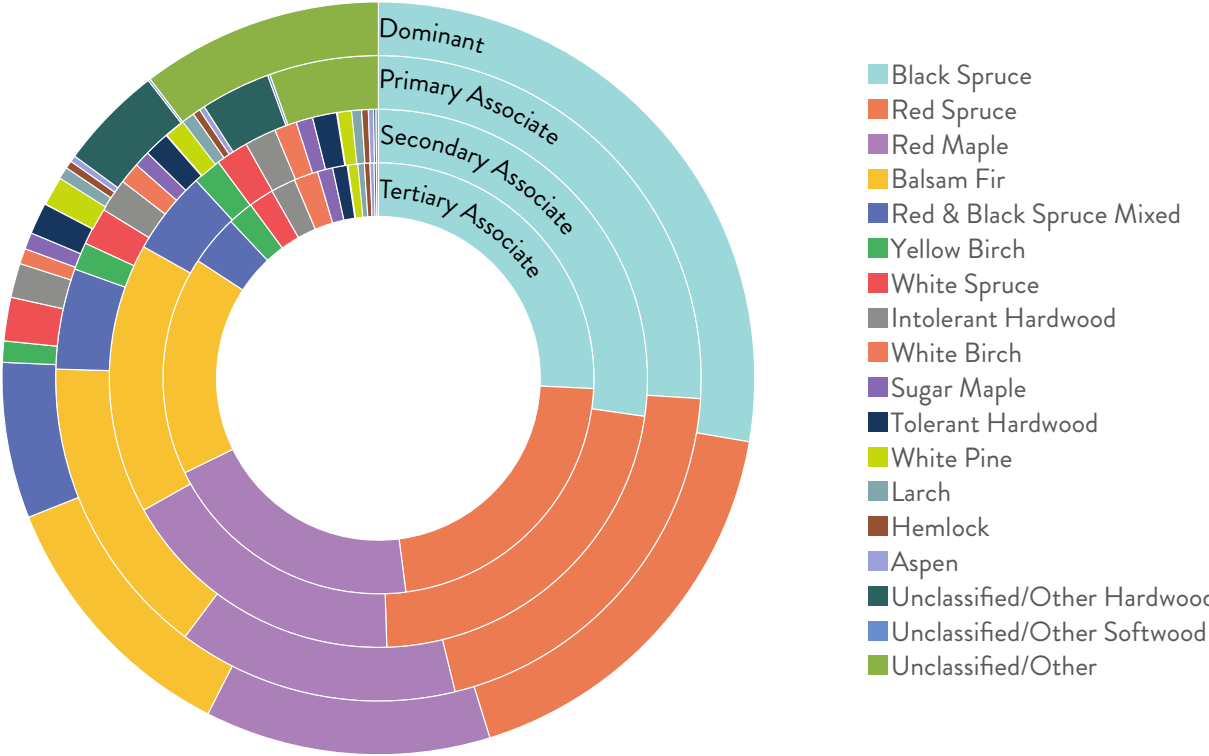


Figure 2-2. Dominant species and associates in the HRM's woodlands.

of managed forest include stands with silvicultural treatments, selective cuts, and Christmas tree farms.

FOREST TYPES

Coniferous communities dominate the HRM's woodlands (Figure 2-1). Provincial datasets identify that more than 60% of the HRM's forests feature black and/or red spruce or balsam fir as dominant species (Figure 2-2). Spruce and spruce-pine hummocks are particularly abundant communities within the municipality. Red maple is the most dominant broadleaf species, and is commonly found in rich, moist soils, often along the banks of streams and swamps.

Character old growth Acadian species including red spruce, eastern hemlock, American beech, yellow birch, and sugar maple can each be found as lead species in isolated instances. However, these species collectively dominate in less than five percent of the woodlands.

Spruce and fir are also common associates in stands dominated by other conifers. Larch is a common associate of black spruce, occurring in eight percent of spruce-dominated stands (Figure 2-2). Larch tends to grow as an associate to black spruce on wet sites and in boggy areas. Balsam fir is a more common associate in stands dominated by spruce.

HRM's native ecosystems are diverse (Figure 2-1) because of the varied site conditions that occur within the Municipality's large land base. Along the HRM's eastern shore, globally rare broom crowberry coastal heathland- a community dominated by huckleberries, blueberry, lambkill, cinnamon fern, alders, and black crowberry - may be found. Elsewhere, towards Elderbank, forests of hemlock, white pine, red oak, and other hardwoods occur, situated atop calcareous bedrock. Outside the reaches of fields, pasture and croplands, remnant floodplain forests of white ash, sugar maple and elm sometimes occur although centuries of land conversion have made these communities particularly rare. On the rolling hills of Musquodoboit late successional (i.e., old) mixed-wood forests might consist of sugar maple, yellow birch and beech on upper slopes and red spruce, balsam fir and hemlock on middle and lower slopes.

This rich diversity of ecosystems supports an abundance of animal life. While much has changed in the centuries since European arrival, the Wabanaki-Acadian remains resilient, and sustains refuge for a broad range of plant and animal species.

DISTURBANCE

Disturbance is a natural process in the Wabanaki-Acadian Forest. While in some stands historically

infrequent, disturbance plays an essential role in renewal and maintaining a healthy ecosystem. Various types of disturbances, such as windthrow, fire, and biotic agents, shape and influence this landscape, supporting biodiversity.

Provincial datasets identify that roughly two percent of the HRM’s woodlands have recently experienced a disturbance event, with windthrow and crown dieback being the most significant. Crown dieback is more a symptom than a form of disturbance itself, however the root causes of crown dieback are often difficult to confirm through remote sensing alone. Smaller areas of burn and secondary woodlands over abandoned fields are also present. The burn area following the 2023 Upper Tantallon wildfire is however not reflected in **Figure 2-1** (the dataset predates the 2023 fire season).

Despite the longstanding role of disturbance within the Wabanaki-Acadian Forest, our relationship with forest disturbance is changing. Long-term changes in precipitation and the frequency and intensity of extreme weather creates new challenges in managing the HRM's more than 4,300 km² of forested lands. A patchwork of ownership structures and interests within the woodlands now more than ever demands a collaborative and integrated approach to supporting the forest through the trials ahead.

FIRE

On May 28, 2023, the Upper Tantallon wildfire began, damaging an estimated 200 properties and forcing the temporary evacuation of over 16,000 people from the HRM's urban core. Schools were closed, 150 homes were lost, and a local state of emergency was declared. This fire was one of many in 2023, with 220 wildfires burning more than 25,000 hectares across Nova Scotia. The largest wildfire on record in the province, outside Shelburne, destroyed 60 homes and impacted over 23,000 hectares. The 2023 fire season was unprecedented in the scale of its impact but not entirely unique, with past events like the 2009 Spryfield fire burning 800 hectares and also triggering evacuations.

Wildfire has always been part of the Wabanaki-Acadian Forest's natural renewal process. However, evidence suggests that the frequency and severity of fire events is increasing, at least in part due to climate change, which brings warmer and often drier conditions.

Nova Scotia’s Forest Datasets

The government of Nova Scotia has been monitoring Nova Scotia’s forest resources for nearly 60 years. Sophisticated field collection programs used in combination with modern remote sensing and GIS technologies allows the Province to capture change in its resources over time. The inventory data enables decision makers to make informed choices on sustainable forest management. Varied analyses are used to define and track forest components and processes, such as volume and growth, and results are reported in a range of reports. The data also supports modeling volumes, biomass and forest carbon. This valuable database is regularly updated and shared with the HRM. These datasets have been drawn on to produce the analyses contained in this section.

While fire behaviour is complex, coniferous fuel types generally support more severe fire behaviour than broadleaf. More than 45% of the HRM's woodlands would be considered a coniferous fuel type (**Figure 2-3**). In the urban core, coniferous fuels are still dominant, but broadleaf and mixed fuels make up a greater share of woodlands. When it comes to building fire resilience communities, local governments have several tools, including:

- Fuel treatments in Municipal woodlands to influence the wildfire behaviour in priority areas,
- Mapping the wildland-urban interface (WUI) and requiring built form and site design to meet fire-resilient standards,
- Developing education and community awareness of wildfire threat, and helping property owners understand how they can maintain fire resilient properties themselves.

Fuel Type

Canadian Fuel Types

You can read more about the Canadian Forest Fire Behaviour Prediction (FBP) System and its associated fuel types [here](#).

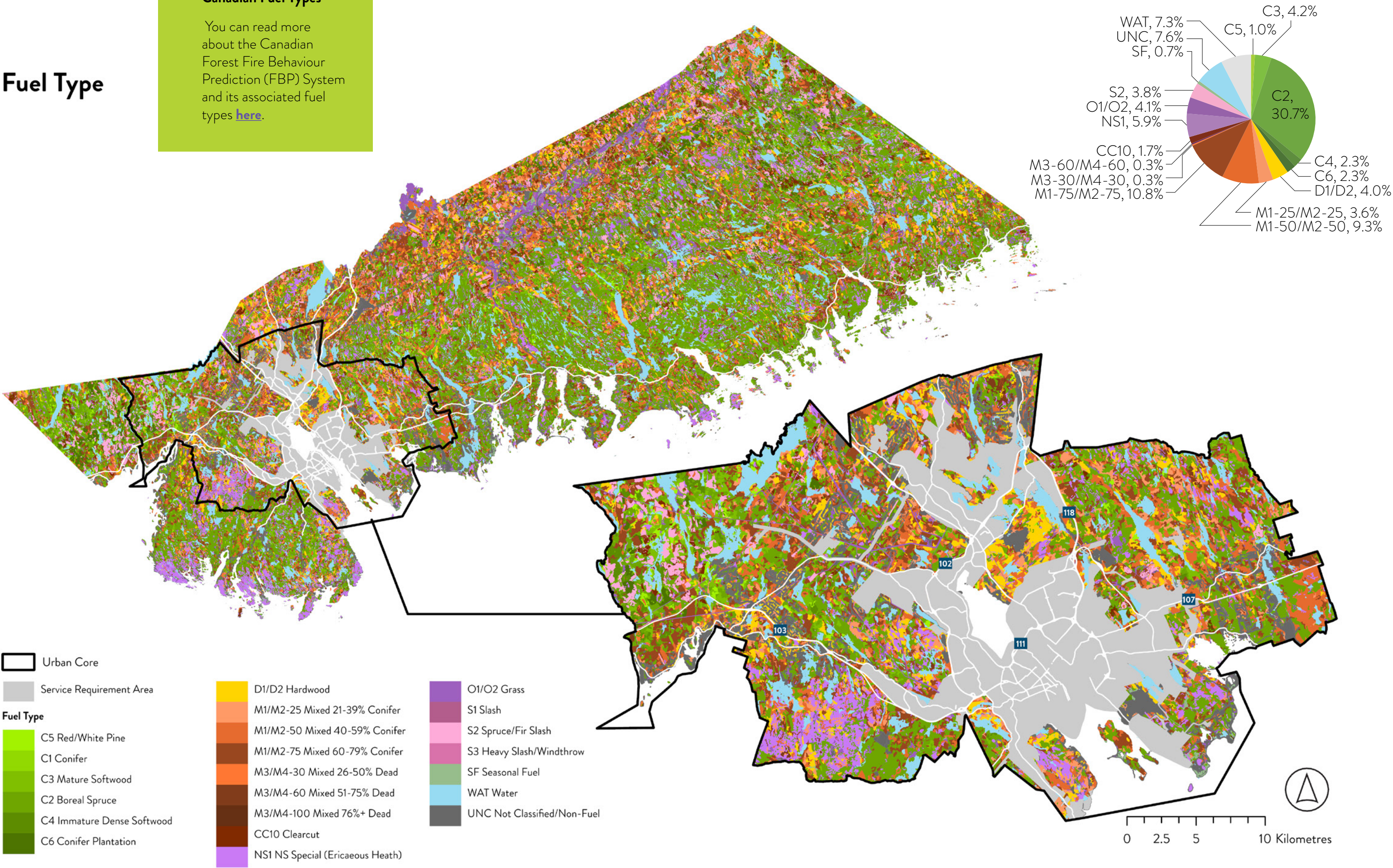
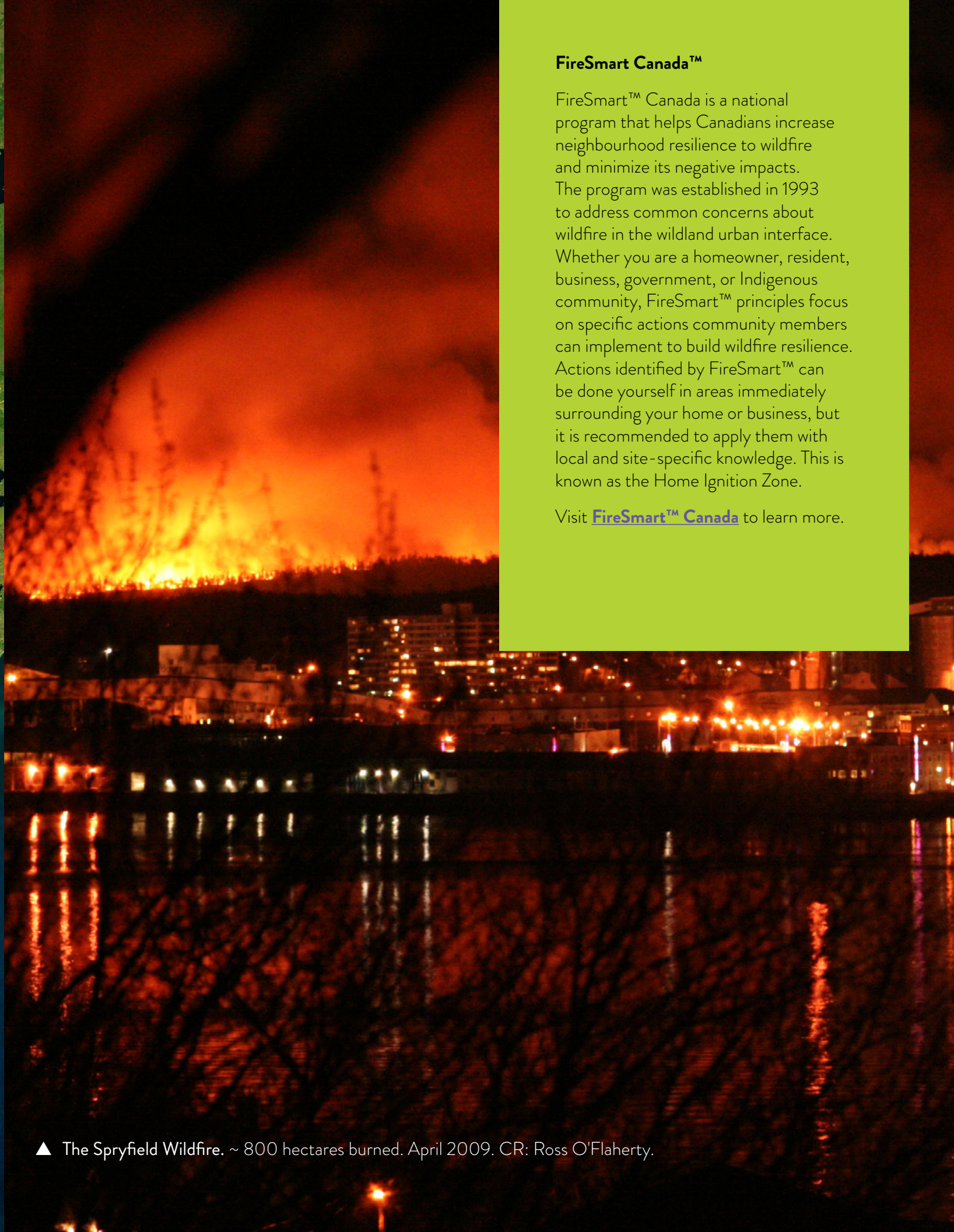


Figure 2-3. Provincial fuel type mapping illustrates differences in forest fuels that exist across the HRM's land base. Forest fuels influence fire behaviour and therefore fire risk. Not all forest fuel types pose the same level of fire risk.



▲ The Shelburne Wildfire. >23,000 hectares burned. June 2023. CR: Shutterstock Imagery.



▲ The Spryfield Wildfire. ~ 800 hectares burned. April 2009. CR: Ross O'Flaherty.

FireSmart Canada™

FireSmart™ Canada is a national program that helps Canadians increase neighbourhood resilience to wildfire and minimize its negative impacts. The program was established in 1993 to address common concerns about wildfire in the wildland urban interface. Whether you are a homeowner, resident, business, government, or Indigenous community, FireSmart™ principles focus on specific actions community members can implement to build wildfire resilience. Actions identified by FireSmart™ can be done yourself in areas immediately surrounding your home or business, but it is recommended to apply them with local and site-specific knowledge. This is known as the Home Ignition Zone.

Visit [FireSmart™ Canada](#) to learn more.



▲ Tree down following Hurricane Juan. September 2003. Credit: Peter Duinker.

WIND

Fire is not the only disturbance in the Wabanaki-Acadian Forest. In much of the Acadian-Wabanaki Forest, wind is a more influential form of disturbance than fire. Strong winds and gusts can bring down limbs, entire trees, and even entire stands in severe cases. Large-scale blowdown, known as windthrow events, create large openings in otherwise continuous forest areas. Like fire, windthrow is a natural disturbance that releases the next generation of trees from the understorey. However, more frequent and severe weather events, including hurricanes, may increase wind's impact on forests and trees.

Hurricane Fiona made landfall in Guysborough on September 24, 2022, as the strongest storm in

Canadian history by barometric pressure. With sustained winds of nearly 170 km/h and peak gusts of almost 180 km/h, the storm caused significant damage. The storm also generated large waves and destructive storm surge. Provincial analyses suggest over 10,000 hectares of forests were impacted by windthrow, including 800 hectares within the HRM. The cleanup cost to the HRM was \$1.6 million, not including provincial or private expenditures.

HRM manages wind-related risks primarily through tree maintenance. A proactive maintenance program can reduce the likelihood of tree failure during storms, but severe storms like Fiona will always result in considerable cleanup costs. Municipally owned parks and woodlands will be closed during extreme weather. Windthrow will

Windthrow Exposure & Instances of Known Windthrow

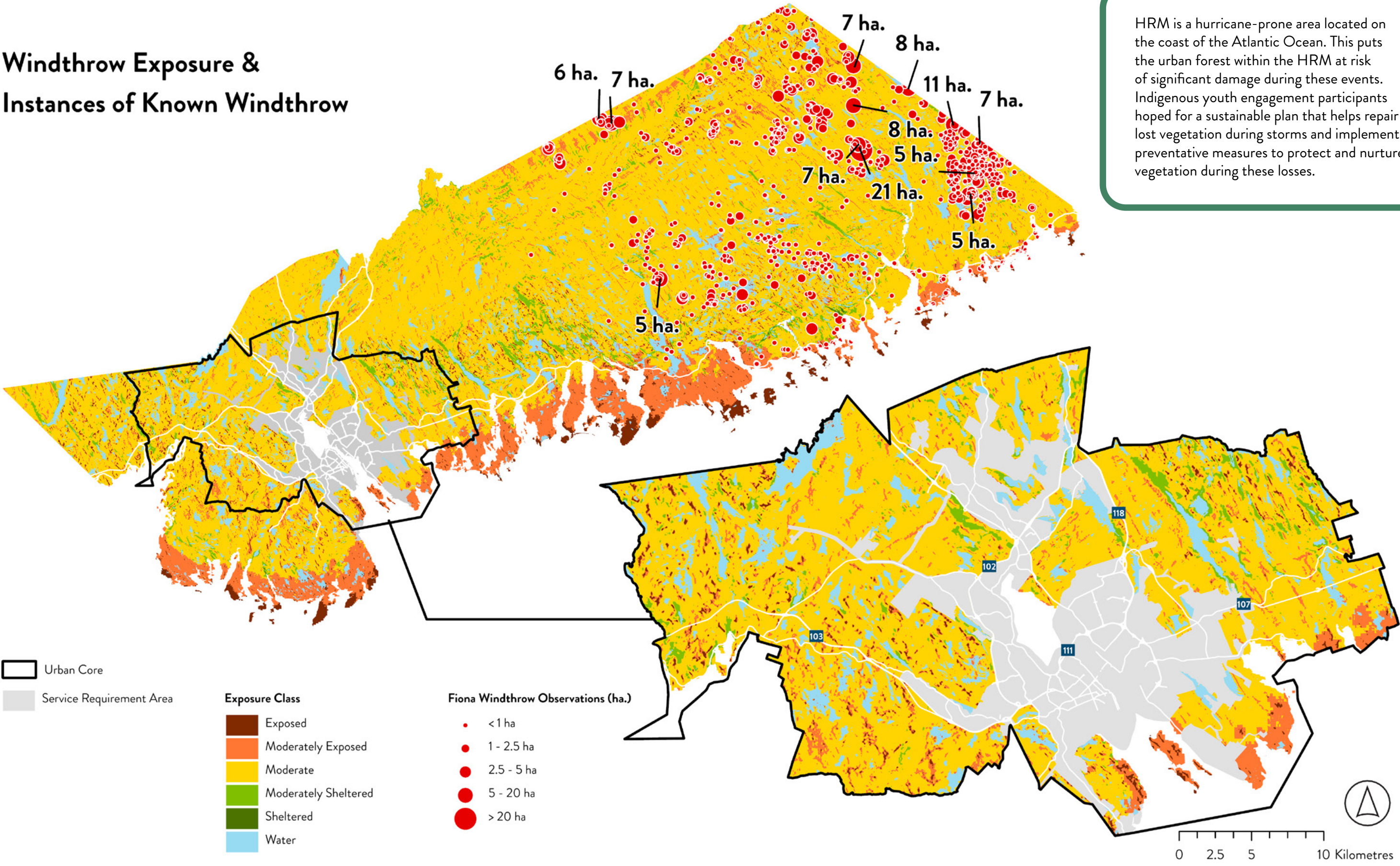


Figure 2-4. Windthrow exposure and instances of known windthrow in the wake of Hurricane Fiona.

continue to drive forest renewal, and the municipality can explore practices to avoid creating new areas with heightened susceptibility to windthrow events.

Figure 2-4 on the following page identifies windthrow risk within Halifax's woodlands given relative exposure, compositional, and soil conditions. Wind risk in urban areas is more complex than can be predicted through these variables alone, and so the analysis shown in Figure 2-4 does not extend into the Municipality's Service Area.

PESTS AND DISEASES

Pests and disease have always been an important agent of change in the Wabanaki-Acadian Forest. Spruce budworm, for example, has long played a role in the renewal of forested communities. However, the last 200 years has altered the role of pests and disease in the HRM's woodlands.

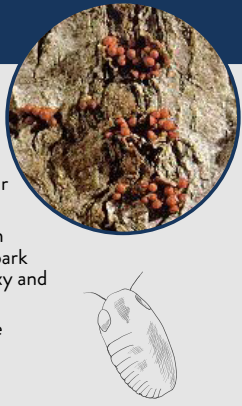
Globalization has allowed new, invasive species to reach our shores, significantly impacting woodland ecosystems. Beech bark disease, beech leaf-mining weevil, brown spruce longhorn beetle, Dutch elm disease, emerald ash borer, and hemlock woolly adelgid have all been introduced within the last 150 years. Even native pests have seen their ecological role shift. Cyclical defoliation by spruce budworm is expected to become more severe under the combined influences of climate change and the legacy of forest industry practices.²⁷

The challenges posed by pests and diseases are likely to worsen with climate change. Trees already stressed by shifting climate conditions are less resilient to secondary pressures, such as pests and diseases. This increased vulnerability can lead to more severe and widespread outbreaks. Additionally, life-cycles and geographic ranges of pests and diseases may shift in response to changing climates, potentially causing issues in areas that were previously unaffected.

In 2022, the HRM developed an Integrated Pest Management (IPM) Strategy in response to the increasing risks of invasive species and pests. The IPM Strategy aims to address gaps in current pest management practices by providing a formalized, holistic, and ecological approach with reduced pesticide use. The Municipality will continue to implement and update its IPM Strategy in response to the ever-changing pest management landscape.

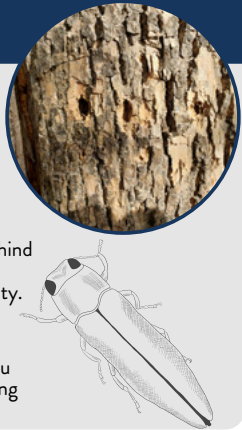
Beech Bark Disease
Cryptococcus fagisuga / *Neonectria faginata*

Type: Insect-fungus complex
Target(s): American beech and European beech
ID: 10 mm long; metallic green body with bronze-coloured wing covers; white tufts of hair on along the sides and rear of the abdomen
Character damage: wilting foliage, undersized leaves, crown thinning, character orange-red beech bark disease cankers and fruiting bodies, waxy and woolly secretions of beech scale insect.
Note(s): Beech bark disease occurs after extensive bark invasion by the beech scale insect.



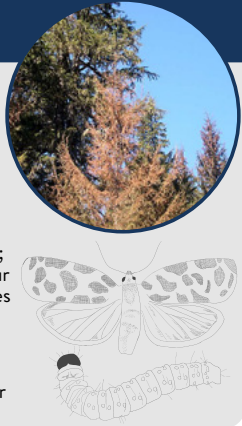
Emerald Ash Borer
Agrilus planipennis

Type: Invasive borer
Target(s): ash - in particular green ash, black ash, and white ash
ID: metallic green color; very short antennae; ~13 mm long and 3 mm wide; larvae creamy-white in color with flattened but segmented bodies
Character damage: 'D' shaped exit holes, larval galleries behind bark, yellowing foliage, waterspouts, foliage feeding, crown thinning, mortality.
Note(s): EAB infestation is typically fatal for ash trees, posing high risk. Most high-risk public ash trees have been removed. If you have an uninfected ash, consider consulting a tree professional for treatment.



Eastern Spruce Budworm
Choristoneura fumiferana

Type: Native plant feeder
Target(s): balsam fir, white spruce, and sometimes red and black spruce
ID: Small greyish-brown moth with wingspan of 20-25mm; wings have faint wavy lines across and may have pale spot near the centre
Character damage: Defoliation happens at the top of trees; severely affected stands turn rust colour due to the presence of dried out needles
Note(s): Spruce budworms feed on foliage and cones of plants, causing significant mortality and growth loss in mature spruce-fir forests. Timber and non-timber resources are severely affected.



Hemlock Woolly Adelgid
Adelges tsugae

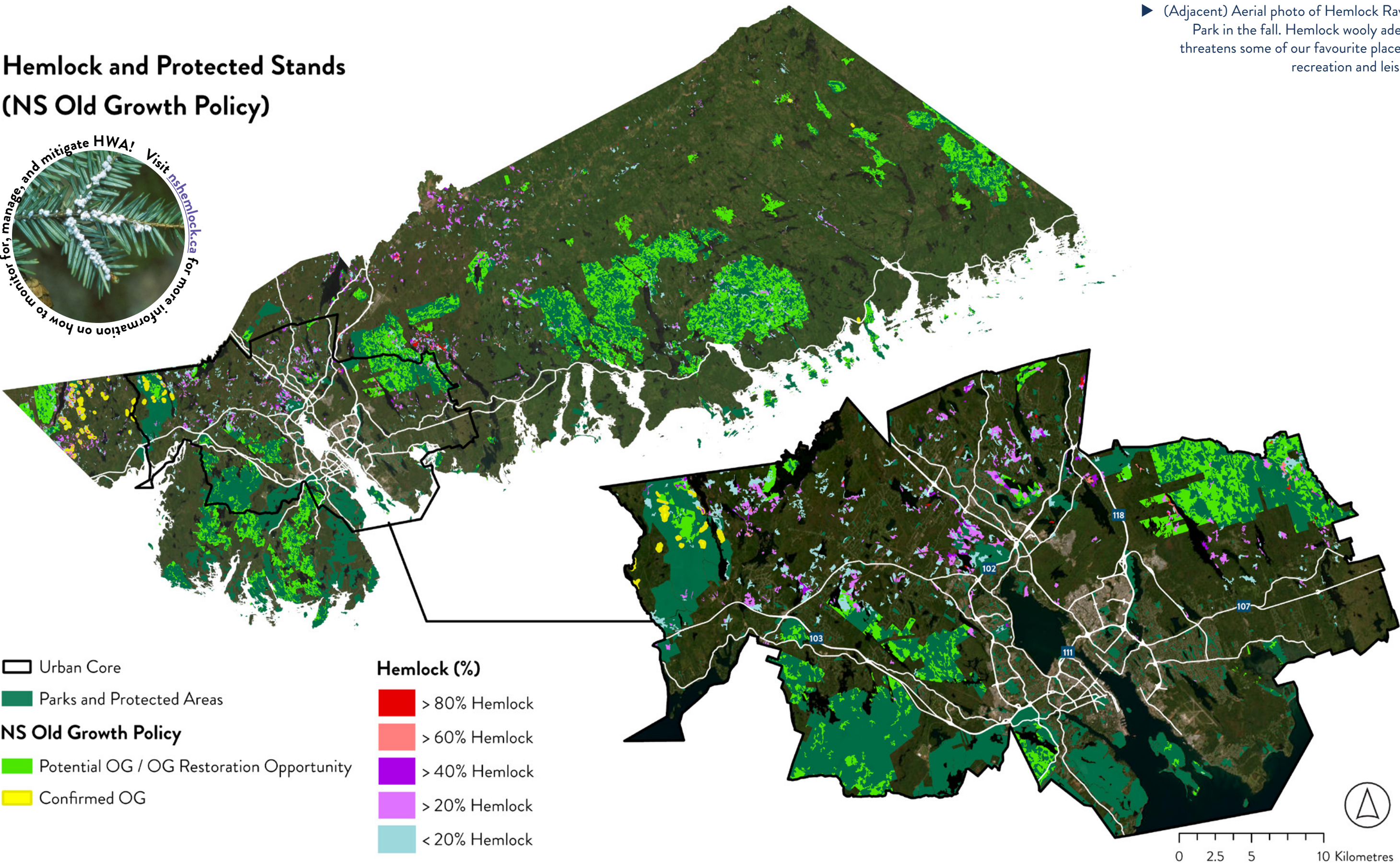
Type: Invasive plant feeder
Target(s): hemlock, some spruce
ID: white "wooly" sacs resembling cotton swab at the base of needles (spring), premature bud and shoot dieback, needle loss, foliage discoloration, dieback, decline.
Character damage: feeds by sucking sap from hemlock and some species of spruce.
Note(s): The absence of a winged generation in North America means HWA spreads primarily through assisted migration (e.g., by humans, animals, or wind) to new areas.



Hemlock and Protected Stands (NS Old Growth Policy)



► (Adjacent) Aerial photo of Hemlock Ravine Park in the fall. Hemlock wooly adelgid threatens some of our favourite places of recreation and leisure.



Hemlock Woolly Adelgid

Hemlock woolly adelgid (HWA) is an invasive, aphid-like insect native to eastern Asia and the Pacific Northwest. HWA was first reported in Canada in the 1920s, and was detected in Southwestern Nova Scotia in 2017.

HWA can cause defoliation, twig dieback and mortality in as few as four years, though it can take up to 20 years. All hemlock sizes and ages are vulnerable. HWA is spread by wind and animals. Long distance dispersal also occurs via infested plant material (e.g., firewood).

HWA is of special concern at this time because of hemlock's role as a keystone Wabanaki-Acadian species. Evidence suggests that as much as 80% of infested hemlock trees die within 3-15 years of infestation. An estimated 11,000 hectares of woodland in the HRM (three percent of woodlands) are 20% or more hemlock. Much of this area is within the HRM's remaining old growth stands. Significant coordination efforts are already underway between all levels of government, academics, and environmental non-governmental organizations to prepare a management plan and protect the HRM's hemlock trees.



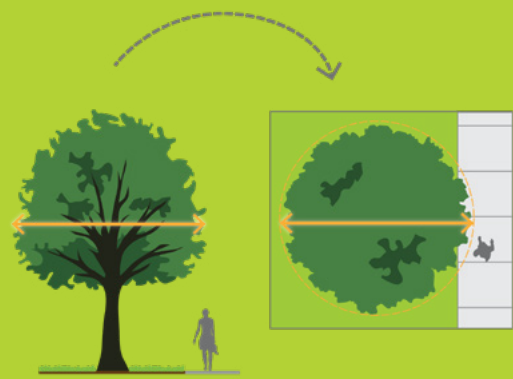
Figure 2-5. HRM woodland mapping by proportion of Hemlock and stands protected under Nova Scotia's Old Growth Forest Policy.



2.2. URBAN FOREST CANOPY COVER

What is Canopy Cover?

Canopy cover refers to the extent of tree canopy covering a defined area. Imagine you are flying above a tree. That tree's canopy cover is the amount of ground obstructed from your top-down view by the tree's leafy crown.



Many jurisdictions track canopy cover over time to monitor change in their urban forest, and to inform administrative planning.

Measures of canopy cover are commonly used to evaluate the extent of an urban forest. Many communities actively track canopy cover over time to monitor change and to inform planning. While canopy cover is a valuable metric in urban forestry, it does not fully capture the health, challenges, or successes of an urban forest management program. It should be considered alongside a full range of other factors including land use, program funding and scope, canopy distribution, tree inventory, as well as varied ecological considerations.

HRM's canopy cover was measured using LiDAR (Light Detection and Ranging), high-resolution imagery, and machine learning methods. Though measurement methods were consistent, input datasets varied between urban and rural areas. In the urban core, LiDAR data from 2019 was combined with imagery from 2017 and 2022. In rural areas, LiDAR data from 2018 was combined with imagery from 2017.

In 2022, the HRM's municipality-wide canopy cover was 58%, covering nearly 3,200 km². Inside the urban core, canopy cover was 65%. This section examines canopy cover in relation to different summary units, land uses, and land ownerships within the HRM:

- **Land use:** Provides insights into the relationship between varied built form and canopy cover.
- **Urban Core:** Provides insights into the urban forest program's operational focus area within the HRM.
- **Land ownership:** Provides insights into the relationship between canopy cover and ownership.
- **2013 Urban Forest Master Plan area:** Supports evaluation of canopy change since prior analyses.
- **Service Requirements Area:** Defined through Schedule B of the HRM's Subdivision By-law, these are areas connected to municipal water and/or sewer that can support urban use and densities.
- **Centre plan area:** Highlights baseline canopy conditions in the HRM's urban heart.

PRIOR CANOPY ASSESSMENT

HRM's 2013 Urban Forest Master Plan study area ([Figure 2-7](#)) was estimated to have 34% canopy cover using 2022 data. A 2016 study²⁸ also estimated canopy cover to have been 34% at that time, which would have been an increase from 25% in 2007 (also reported in the 2016 study).

While this suggests canopy cover grew by nine percent in the decade between 2007 and 2016 and has remained stable since, this observation may not be reliable. A global forest change dataset²⁹ suggests that canopy loss may have exceeded gain since 2001 ([Figure 2-9](#)). Historic trends can be challenging to report with confidence due to the low-resolution of imagery available in 2007 and 2016, because lower-resolution inputs generally yield less accurate canopy cover estimates.

Table 2-1. Canopy summary by land use in the Urban Core and across the HRM (including the urban core). Refer to [Figure 2-8](#) for land use distribution in the HRM.

Use	Urban Core 2022			HRM 2022		
	Land Area (ha)	Canopy Area (ha)	Canopy Cover (%)	Land Area (ha)	Canopy Area (ha)	Canopy Cover (%)
Community Commercial	613	131	21.3	613	131	21.3
Comprehensive Development District (CDD)	308	107	34.8	308	107	34.8
Downtown	73	4	5.0	73	4	5.0
Industrial	4,163	1,169	28.1	6,988	2,558	36.6
Institutional	243	37	15.2	243	37	15.2
Mixed Use	283	67	23.6	347	94	27.1
Protected Area	17,918	13,204	73.7	92,832	61,712	66.5
Rural	32,662	23,959	73.4	374,775	213,397	56.9
Right of Way and Others	5,109	1,840	18.5	9,116	2,560	28.1
Residential						
Interface	18,993	12,722	67.0	39,893	24,175	60.6
Medium Density	295	77	26.0	295	77	26.0
Single Family Density	6,465	2,736	42.3	6,465	2,736	42.3
Parks						
Community	977	555	56.8	1,257	675	53.7
District	475	234	49.3	511	250	48.9
Neighbourhood	198	135	68.0	238	157	66.2
Park	3,520	2,342	66.5	10,504	6,174	58.8
Plaza	2	0.3	13.3	2	0	13.3
Provincial	53	34	63.9	4,772	2,388	50.0
Regional	2,690	2,126	79.0	3,351	2,604	77.7
Totals	95,041	61,478	64.7	552,583	319,834	57.9

Canopy Cover

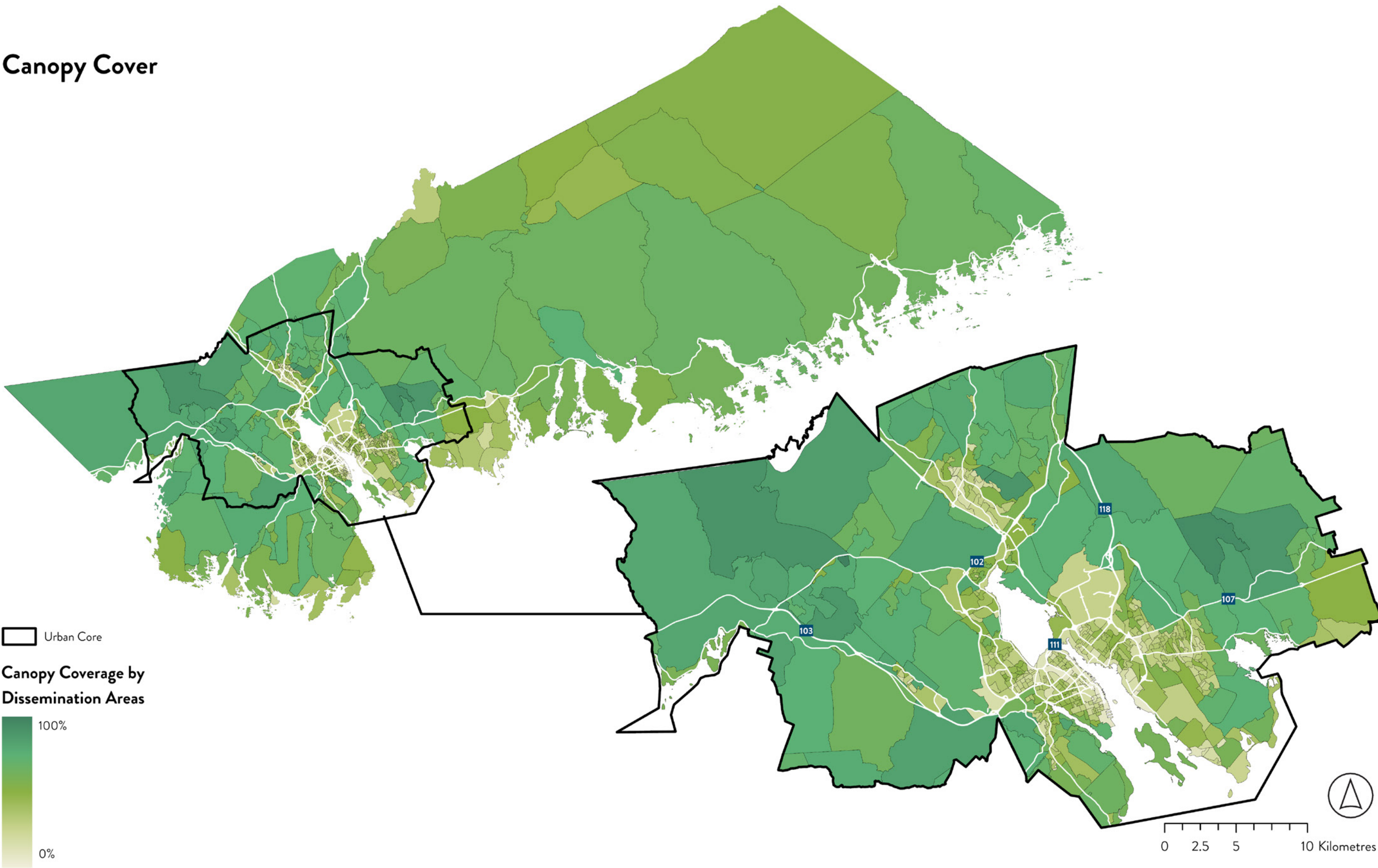


Figure 2-6. HRM canopy cover mapping by Tree Equity Score (TES).

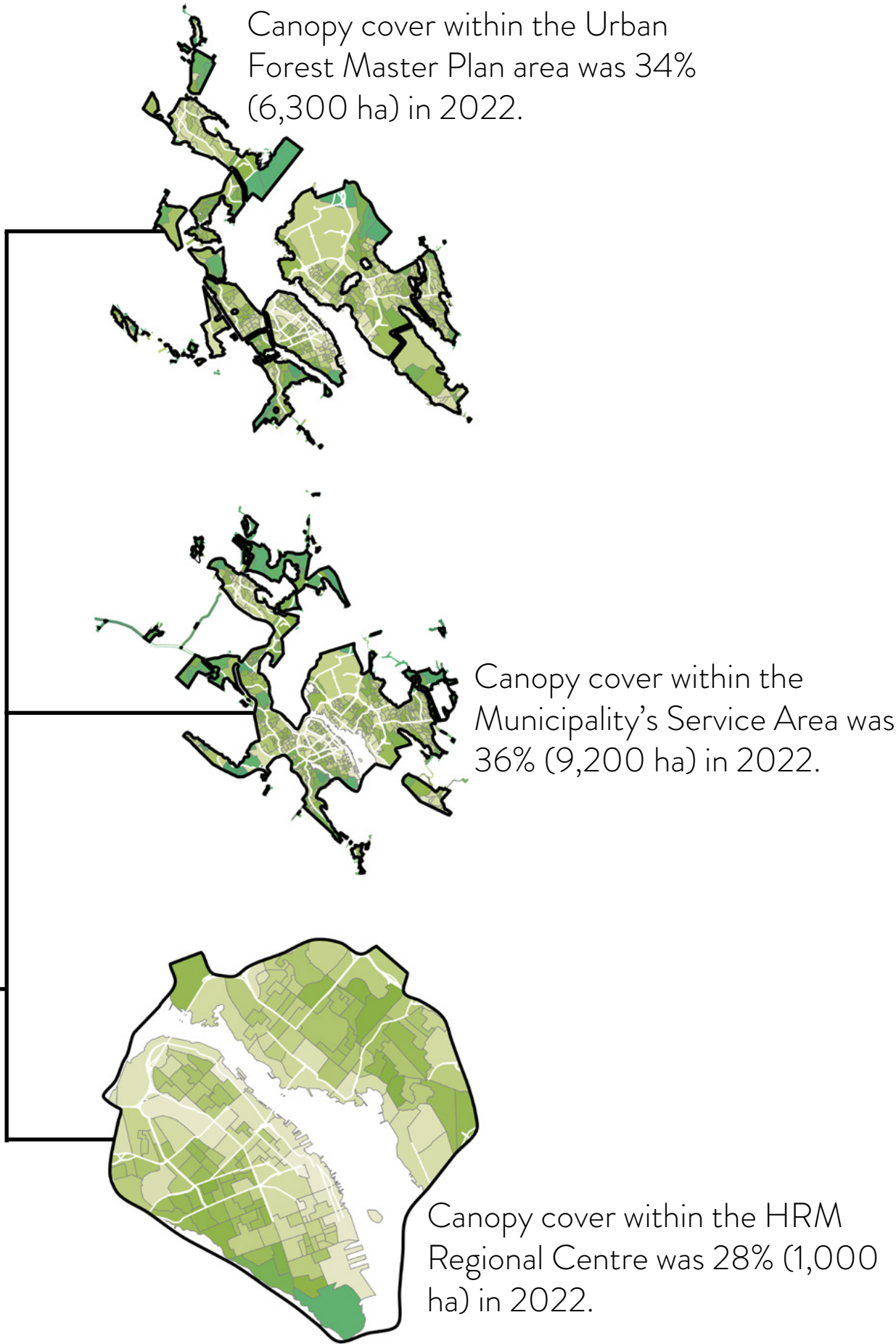


Figure 2-7. Additional canopy cover spatial units in the HRM.

CANOPY BY LAND USE

HRM is a large Regional Municipality with diverse land uses (Table 2-1). Land use is an important summary unit when we think about canopy cover because built form tends to be a primary driver in urban forest composition and canopy extent.

In the HRM, rural land dominates, making up more than two-thirds of Municipality's land base. Other significant land uses include parks, protected areas, and low-density residential areas integrated with forested and rural features (Table 2-1). Within the HRM's urban core, rural uses, protected areas, parks, and low-density residential areas still dominate. However, single-family subdivisions, industrial uses, and rights-of-way are also significant components (Table 2-1).

HRM's downtown area, which is home to the highest density of people and highest intensity of urban uses in the municipality, also has the lowest canopy cover in the HRM (5%, Table 4-1), and is relatively low compared to the downtowns of several of the HRM's peer communities. For instance, downtown canopy cover is over 15% in Winnipeg, MB and in Burlington, ON³⁰, and nearly 12% in Surrey, BC.

Table 2-2. Canopy summary by land ownership in the HRM.

Use	Urban Core 2022				HRM 2022			
	Land Area (ha)	Proportion of Urban Centre Land Area (%)	Canopy Area (ha)	Canopy Cover (%)	Land Area (ha)	Proportion of Jurisdictional Land Area (%)	Canopy Area (ha)	Canopy Coverage (%)
First Nation Reserves	82	0.1	60	73.1	580	0.1	442	76.3
Federal	117	0.1	83	71.2	261	0.0	83	31.9
Government of Nova Scotia	13,361	14.1	10,461	78.3	143,880	26.0	88,363	61.4
Halifax Water	33	0.0	5	16.5	49	0.0	12	23.7
Halifax–Dartmouth Bridge Commission	10	0.0	3	27.8	10	0.0	3	27.8
HRM	10,073	10.6	5,106	50.7	12,621	2.3	6,731	53.3
HRCE	13	0.0	4	32.5	13	0.0	4	32.6
Institutional	10	0.0	6	57.3	11	0.0	6	56.0
Nova Scotia Power	6	0.0	2	28.6	11	0.0	5	48.3
Private	70,427	74.1	45,443	64.5	394,147	71.3	223,851	56.8
Rail	632	0.7	205	32.5	664	0.1	218	32.9
Unopened Road Allowance	276	0.3	100	36.1	354	0.1	116	32.8
Totals	95,041	100.0	61,478	64.7	552,600	100.0	319,834	57.9

CANOPY BY LAND OWNERSHIP

Ownership is an important summary unit when we think about canopy cover because it helps us understand differences in urban forest composition and canopy extent across different land uses within the municipality.

Over 71% of the HRM's land area and 70% of tree canopy cover is on private property (Table 2-4). the HRM owns less than 2.5% of the Municipality's total land area, but 10% of the land area in the urban core where Municipal services are concentrated. Provincial lands make up a significant component of landholdings outside of the urban core (26%, Table 2-4), however the Municipality generally has limited influence over management decisions affecting crown land.

Whether considering just the urban core or all of the HRM, canopy cover on municipal lands exceeds 50%. Future change in the HRM's canopy cover considered at any spatial scale will be moderated in large part by changes in the abundance and size of trees on land uses not owned or managed by the City; namely private and crown land.

Consolidated land use

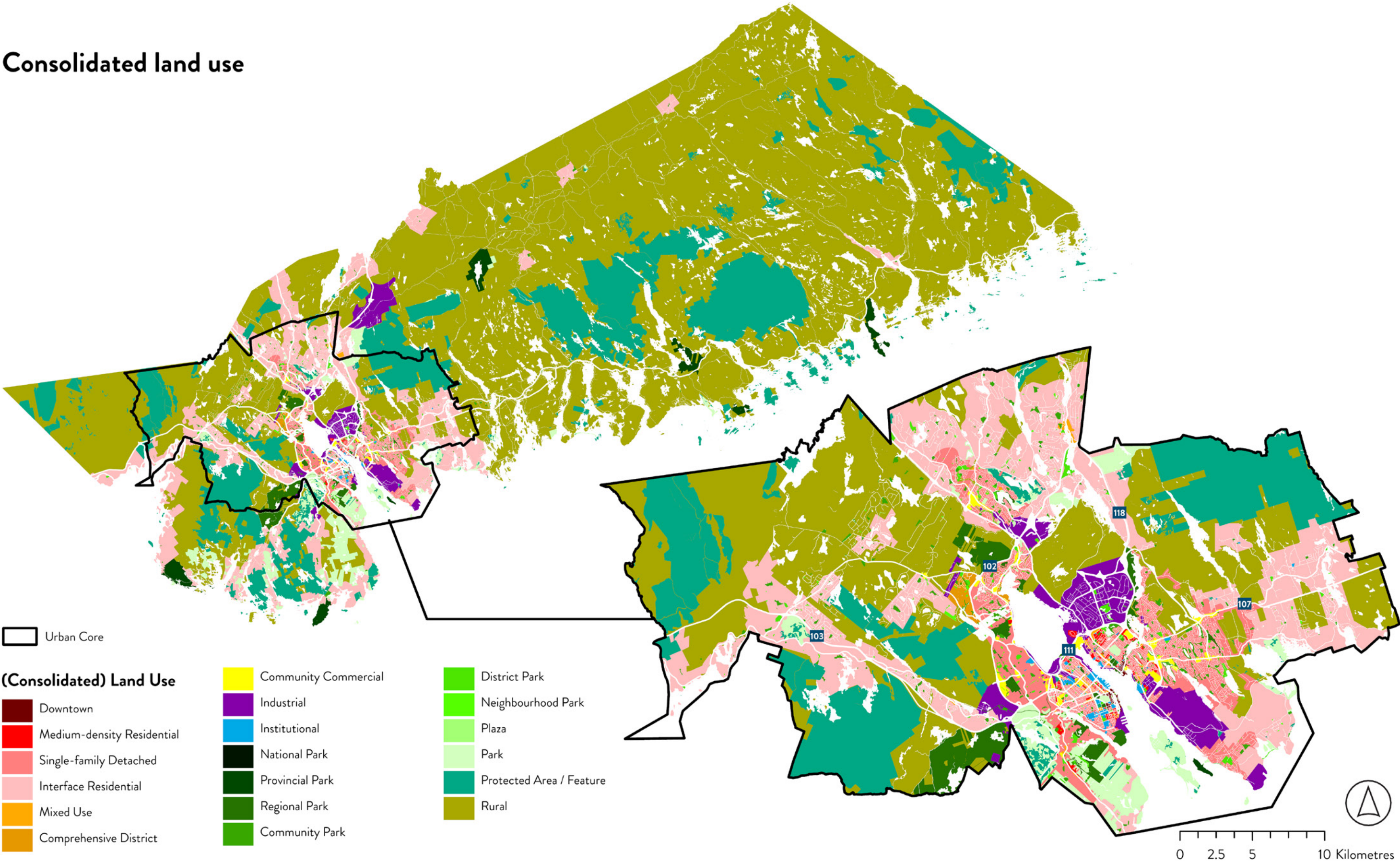


Figure 2-8. HRM consolidated land use mapping. Refer to Table 2-1 for canopy cover area by land use.

CANOPY CHANGE 2001-22

The University of Maryland's Global Land Analysis & Discovery (GLAD) Lab has monitored annual forest cover change using global satellite imagery for over 20 years.³¹ The dataset, with a resolution of 30 m x 30 m, is too coarse to detect individual tree canopies but can identify larger canopy loss/gain events, providing a sense of broad canopy change within the municipality.

GLAD analysis suggests the HRM lost over a fifth of its municipality-wide canopy cover between 2000 and 2022, totalling nearly 100,000 hectares. About 10% of this lost canopy began to regrow over the same period, and the municipality gained over 20,000 hectares of new canopy in previously non-canopied areas (see [Table 2-3](#)). Overall, this dataset suggests canopy cover in the HRM has decreased by nearly 15% over the past twenty years. While some of these losses can be attributed to permanent conversion of forested land to other uses, or to disturbance events (e.g., fire or windthrow), much of the loss observed through GLAD data has been temporary in nature (i.e., has begun the process of regrowth since loss). While GLAD dataset does not support a means for tracking sources of loss, industrial activities, and in particular forest management, it has been and remains a significant driver in canopy cover change within the HRM.

Table 2-3. Municipality-wide canopy change.

Year	Gross Canopy Loss (ha.)	Gross Loss (% Canopy)	Losses Recovered 2001-22 (ha.)	Losses Recovered 2001-22 (% of Gross Loss)	Unrecovered Losses 2001-22 (ha.)	Unrecovered Losses 2001-22 (% of Gross Loss)
2005 - 2005	33,759	11.4	8,824	26.1	24,935	73.9
2006 - 2010	28,933	11.0	792	2.7	28,141	97.3
2011 - 2015	19,364	8.3	251	1.3	19,112	98.7
2016 - 2020	12,023	5.6	392	3.3	11,631	96.7
2021 - 2022	2,677	1.3	252	9.4	2,425	90.6
Loss Totals	96,756	32.6%	10,511	10.9%	86,244	89.1%
Maintained (pre-2000) Canopy Area (ha., % of Municipality-wide canopy maintained new since 2000)			199,864	62.5%		
New (post-2000) Canopy Area (ha., % of Municipality-wide canopy cover new since 2000)			23,205	7.3%		
Totals (ha., % Municipality-wide canopy cover)			319,780	58.5%		

HRM is home to a working landscape. Forestry practices and other industrial activities offer important contributions to our growing community and to the broader Nova Scotian economy. Forest management activities, and in particular harvests, by their nature can significantly reduce canopy cover over relatively large areas. It can then take years, or even decades for forests and canopy cover to return to a pre-harvest state. The regulation of forest operations, agriculture, mines, and quarries is the purview of the Province of Nova Scotia.

In the HRM's urban core, the municipality lost an estimated 11% (7,500 hectares) of its canopy cover between 2000 and 2022 according to the GLAD analysis. Canopy loss in the urban core is more often permanent due to land use conversion. In the urban core, 10,500 hectares has been lost, 500 hectares of that loss has begun to recover, and another 2,500 hectares of new canopy area has been introduced. Major loss events include the development of the Burnside Industrial Park, the Bedford Bypass, woodland lost to the Mineville Road fire (this area should recover with time), new Bedford subdivisions, and Mansion Avenue land clearing.

Canopy Cover Change (2001 - 2022)

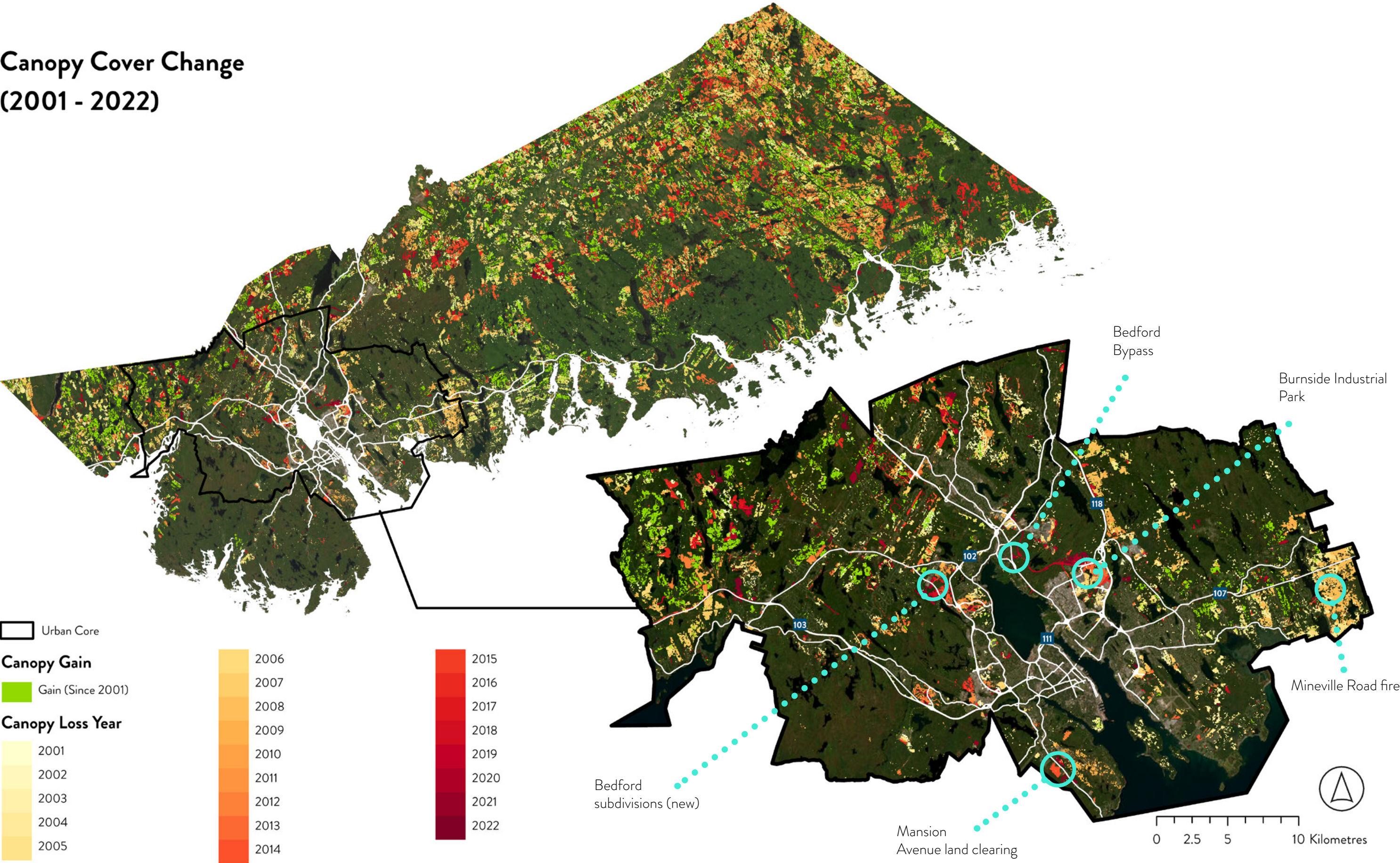


Figure 2-9. HRM canopy loss and gain mapping by year.



2.3. PLANTED TREES

HRM's Urban Forestry Division maintains an inventory of nearly 80,000 planted street trees within the urban core. Most of these trees are intentionally planted along urban boulevards. The tree inventory is about 80% complete as of 2024, with efforts ongoing to finalize the dataset to support operational planning.

SPECIES DIVERSITY

HRM's boulevards are home to approximately 150 tree species and 85 genera. About one in three inventoried trees is a maple, with Norway maple making up 14% and red maple seven percent of the total ([Figure 2-10](#)). Oak, linden, and elm each constitute eight to ten percent of tree genera. In terms of individual species, basswood, white elm, and northern red oak make up four to seven percent alone. All other tree species account for less than three percent individually.

Prioritizing diversity in urban planting supports resilience pest and disease outbreak. Where pests or disease often target a relatively small range of plants, having good diversity in a tree population helps to ensure that large clusters of trees will not be lost in the event of a single outbreak.

HRM's Urban Forestry Division has reduced the planting of maple in recent years to improve urban forest resilience, however the limited availability of

MORE THAN PLANTED TREES

In a way, the land on which the HRM sits wants to grow trees. While most Municipal resources are dedicated to the trees staff have intentionally planted in the HRM's boulevards and within parks, countless more trees are recruited by the landscape every year, without the intention of any human resident. These naturally occurring trees are commonplace in our woodlands and native ecosystems and will often put down roots within our manicured lawns and parks as well if we allow them to. These plants are, when not invasive, every bit as important to the health and vigour of our urban forest broadly as trees we have planted as residents and community members.

This is particularly true in natural settings. While we can influence the composition of our woodlands and natural areas through intentional planting, [the Wabanaki-Acadian](#) is a forest that will readily support new growth, if we allow it to. Recovery after stand-level disturbance, like windthrow, or fire, is often quick in this part of the world. While planting can have its merits given the scale and nature of events we have seen under the influence of climate change, careful consideration should be given to the landscapes propensity to recruit trees without us.



diverse planting stock can hinder the Municipality's capacity to diversify. Planted tree diversification is also a gradual process as the HRM will not replace healthy trees. Maple will therefore persist as a dominant species in the inventory for many years.

STRUCTURAL DIVERSITY

The core elements of structural diversity are the range of tree sizes and age classes present in a planted tree population. In many cases, diameter measurements indicate the maturity of the trees. Currently, half of the HRM's trees have a diameter (dbh) of less than 15 cm, which is indicative of stable urban forest structure.

Diameter distributions that lack smaller-diameter trees can indicate reduced planting in recent years ([Figure 2-10](#)). For example, the HRM has decreased ash planting due to the threat of emerald ash borer (EAB). Similar trends in spruce reflect reduced planting to avoid susceptibility to spruce budworm. The diameter distribution of maple suggests a shift from past over-planting. Increased use of species like oak, walnut, ginkgo, lilac, hackberry, plane tree, and sweetgum are evidence of the HRM's efforts to increase diversity and resilience in the urban forest.

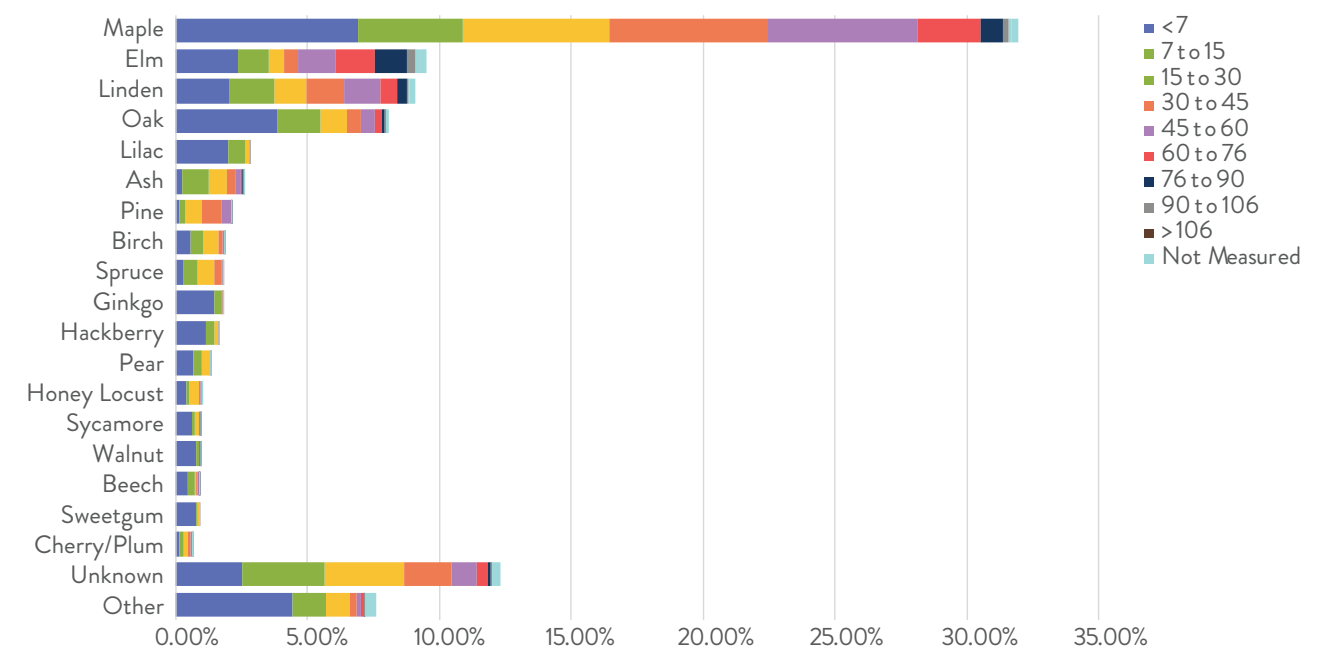


Figure 2-10. HRM top 20 most populous genera by diameter class distribution.

CHARACTER TREES

HRM is home to an estimated 150 species of tree, belonging to 85 genera. From evergreen to vibrant fall foliage, the Municipality's parks and streetscapes are home to a great diversity of plants.

A small selection of our favourite trees are shown adjacent. Look for these as you are out walking around our streetscapes.

Did you know

Planting objectives, site conditions, and constraints should guide the type of tree you are considering planting on your property? Different species of trees have different traits. Some have showy spring flowers, or vibrant fall foliage, others grow well in areas where soils are limited or of poor quality. Some trees are less resilient to constrained growing sites, or will grow too large if the overhead clearance available is limited (e.g., near a power line). Trees require after care in the years following planting. After care responsibilities differ from one tree to the next. Some species require significant aftercare (e.g., watering), while others tend to more readily become established in a new site.

Consider what you want to accomplish in planting your tree, as well as the limitations of the site you are planting within. Consult with a local nursery, arborist, or do your due diligence when selecting planting stock.

WHAT WE HEARD Nova Scotia's ash are of particular cultural importance to Mi'kmaq Peoples.



Black Ash
Fraxinus nigra

Shade intolerant, requires moisture. 7-13 opposite leaflets





White Ash
Fraxinus americana

Fast-growing, slightly tolerant to shade 5-9 opposite leaflets, clearly stalked





Pin Oak
Quercus palustris

Large stature, one of the faster to grow, and one of the first oaks to bloom in the spring. Distinctive, dense growth habit.





Japanese Tree Lilac
Syringa reticulata

Small stature, showy flowers. Salt, drought and shade tolerant (full sun for best flowering).





Ironwood
Ostrya virginiana

Small stature, slow growing. Tolerant to shade and low soil volumes. Slow to establish after being planted, but once it does it makes excellent growth.





Katsura
Cercidiphyllum japonicum

Medium-sized stature, medium-fast growth rate. Impressive colour: purplish in spring, blue-green in summer, red and yellow in autumn.





Kentucky Coffeetree
Gymnocladus dioica

Slow-medium growth rate, large & doubly compound leaf. Very adaptable to drought and city conditions. One of the last trees to leaf out in the spring.





Bur Oak
Quercus macrocarpa

Large stature, slow growing. Very adaptable to various soils/more tolerant of city conditions than most oaks.





Swamp White Oak
Quercus bicolor

Large stature, slow growing, excellent drought resistance.





Red Oak
Quercus rubra

Large stature, one of the faster growing oaks, withstands the polluted air of cities.





Ginkgo (Male)
Ginkgo biloba

Large stature, slow growing. Extremely tolerant to urban conditions, unique fan shaped leaves. No know pests or diseases affect it.





Hackberry
Celtis occidentalis

Medium-large stature, medium-fast growth rate. Performs admirably under adverse conditions, interesting ridged bark.





European Hornbeam
Carpinus betulus

Medium-sized stature, Slow-medium growth rate. Very tolerant to urban conditions, pruning seldom required although withstands heavy pruning.





Basswood
Tilia americana

Large stature, medium growth rate. Very shade tolerant. Has a tendency to produce suckers at its base.





European Beech
Fagus sylvatica

Slow-medium growth rate. Attractive smooth grey bark, dense canopy, resistant to beech bark disease. Tendency to retain leaves into the winter.





American Elm
Ulmus americana

One of Halifax's most common street trees. Very hardy, large, vase shaped. Medium-fast growing. Grows well under a variety of conditions.





Sweetgum
Liquidambar styraciflua

Tolerant to wet conditions, medium-fast growing. Bright fall colour, symmetrical shape.





Silver Linden
Tilia tomentosa

Large stature, medium growth rate. Tolerates heat and drought better than other lindens.





Northern Catalpa
Catalpa speciosa

Large stature, medium-fast growth rate. Tolerant to varying soil conditions, grows in sun or partial shade. Large, heart shaped leaves.





Yellow Birch
Betula alleghaniensis

Large stature, medium growth rate. The largest and most shade tolerant of the eastern birches.





Shagbark Hickory
Carya ovata

Large stature, slow growing. Sweet, edible fruit. Large, deep taproot. Unique bark - long, flat plates which are free at the base or both ends.





Tulip Tree
Liriodendron tulipifera

Large stature, fast growing. Large showy flowers blooming from May-June, suited to a wide climatic range.





Red Maple
Acer rubrum (species and cultivars)

Large stature, medium - fast growing, red fall colour. Very tolerant of soils but prefers slightly acidic.





Honeylocust
Gleditsia triacanthos Inermis

Very tolerant to urban conditions, fast growing, casts a light shade due to small leaflets. Only the thornless variety is planted in the right of way.





White Pine
Pinus strobus

Large stature, one of the fastest growing landscape pines. Thrives in full sunlight, occurs naturally on a variety of sites (dry sandy soil, rocky ridges, sphagnum bogs).





Sycamore Maple
Acer pseudoplatanus

Large stature, medium growth rate. Withstands the full force of salt-laden winds in exposed places Very adaptable to soil types.





Sugar Maple
Acer saccharum

Large stature, slow growing. One of the best larger shade/lawn trees, but tends to suffer in extended periods of heat





Larch
Larix laricina

Large, slender stature, slow-medium growth rate. Grows best in moist, well-drained, acidic soil. Intolerant of shade.





PLANTED TREE DENSITY

Planted tree maintenance programs are typically the largest expense in an urban forest management program. Mapping planted tree density helps illustrate where the HRM's urban forestry resources are predominantly being directed ([Figure 2-11](#)).

[Figure 2-11](#) shows the average number of planted trees per kilometre of public road within each census dissemination area in the urban core. Planted tree density in the HRM ranges from zero in rural dissemination areas to over 250 trees per kilometre in some peninsular neighbourhoods. The lowest densities in the urban core are in sparsely populated, interface areas (less than 10 trees per kilometre of public road). Large commercial and industrial areas also have low densities, between 30 and 50 trees per kilometre of public road. Residential and mixed-use areas generally have higher densities, over 50 trees per kilometre of public road, although this varies by neighbourhood. In peninsular Halifax and Dartmouth, planted tree density is influenced by built form and available planting space in urban streetscapes.



Figure 2-11. HRM planted tree density by DA in the urban core (2023).

SUCCESSION MANAGEMENT

Succession management describes a process of proactively removing and replacing trees that are reaching the end of their life. Succession occurs with or without a formalized approach in place. The benefit of a formalized approach is that the municipality can avoid entire streetscapes or neighbourhoods reaching the end of useful life along a similar trajectory. Today, this is a concern in some of the HRM's older subdivisions where trees were planted at the same time, with only one or two species, and are now aging along a parallel timeline.

Proactive succession management involves gradual removal and replacement of senescing trees, facilitating a more gradual canopy loss and allowing time for replacement trees to grow as older trees are removed. Proactive succession management also ensures future tree age classes are staggered. Converting monocultural neighbourhood palettes to a more diverse species mix also ensures trees have different life expectancies, and builds resilience to pests and disease.

While the current tree inventory does not include age data, it does provide diameter distributions. Diameter class can be used as a coarse proxy for age, although the relationship between size and age is not exact. [Figure 2-3](#) maps the HRM's dissemination areas with concentrations of relatively large trees (over 60 cm dbh). Dissemination areas with particularly high concentrations of large trees have been designated **Succession Monitoring and Management Districts (SMMDs)**. In these districts, the Municipality will need to monitor old trees and begin to consider proactive approaches to managing successional replacement.

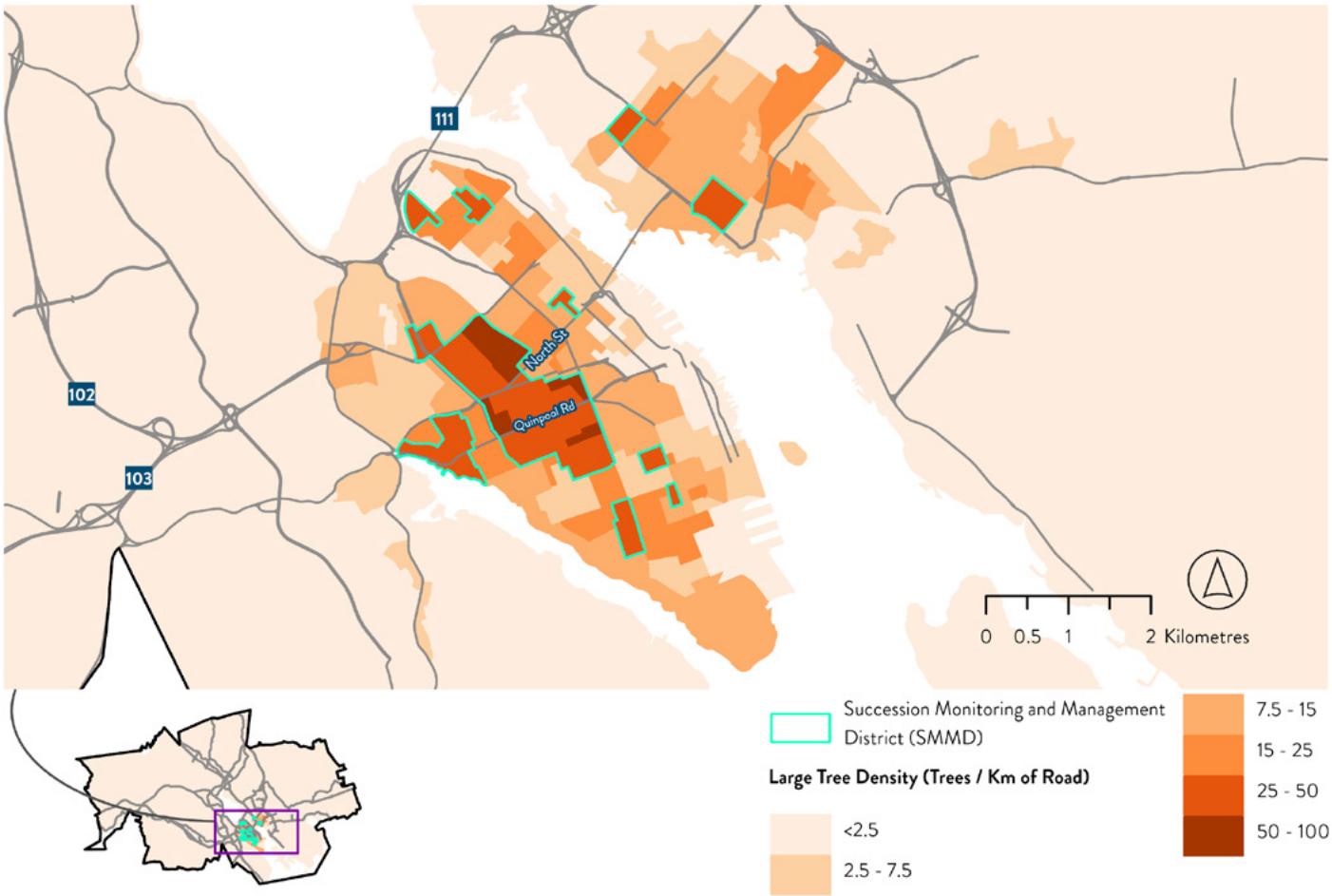


Figure 2-12. HRM large tree density and Succession Monitoring and Management Districts (SMMDs).



TREE EQUITY SCORE CALCULATION

Surface temperatures and a socioeconomic index that includes income, age, race and employment are combined to yield a priority index. Priority index is then combined with tree equity to yield a Tree Equity Score (Figure 2-17).

High priority index values are represented as the HRM's ECMDs (Figure 2-17). Low Tree Equity Score Values are represented as the HRM's UFEDs.

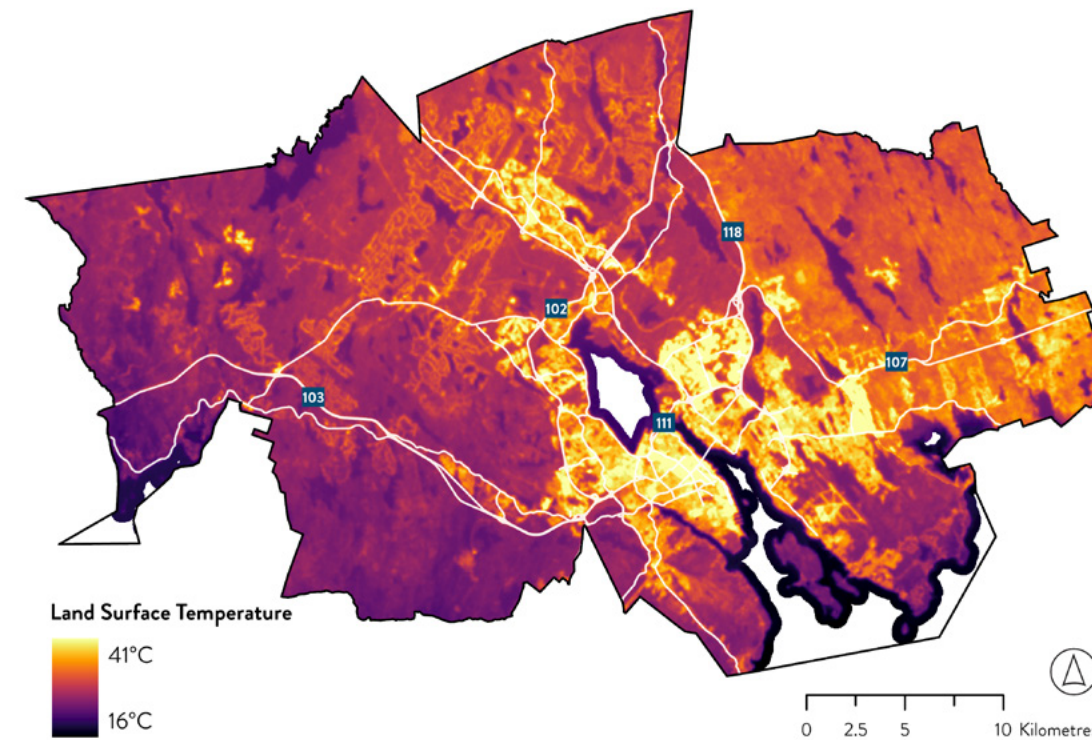


Figure 2-13. Mean surface temperature mapping in the HRM's urban core (July 2020).

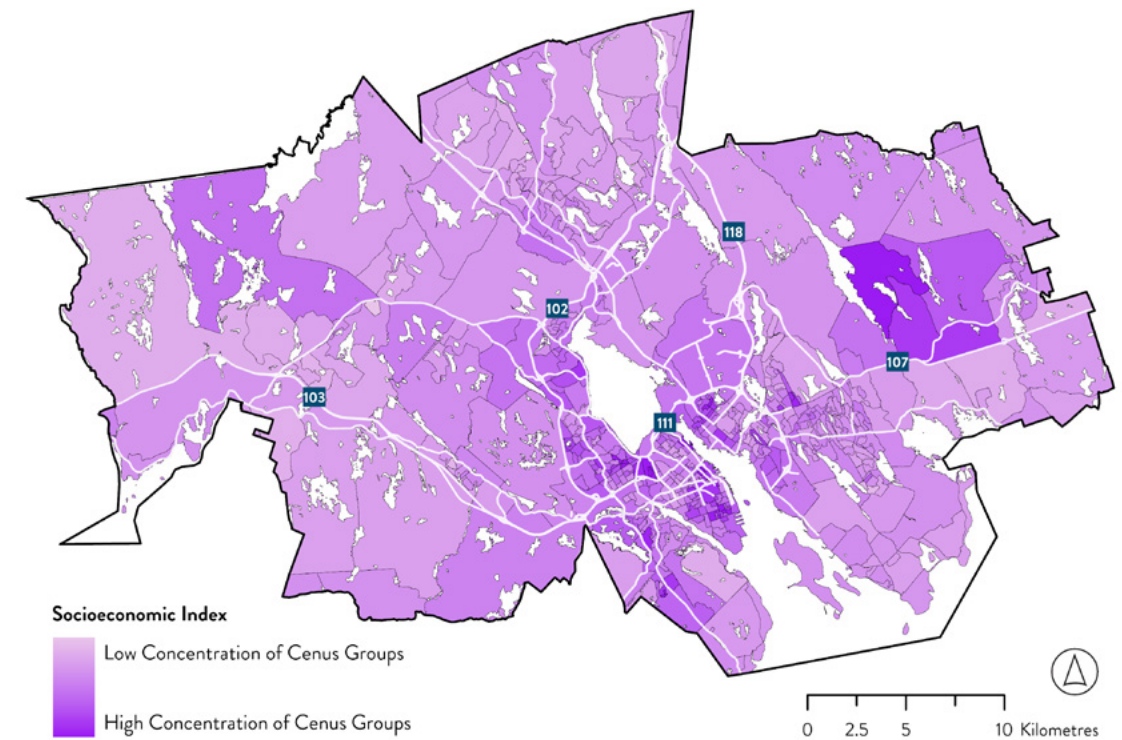


Figure 2-14. Socioeconomic indicators mapping in the HRM's urban core.

2.4. URBAN FOREST EQUITY

Studies have found that trees and tree canopy are often inequitably distributed within urban communities.^{33,34} While specific patterns of inequity vary by local context, education level and income correlate with canopy cover in many urban centres. Tree inequities can often exacerbate uneven climate change impacts across demographic and socioeconomic profiles.^{35,36} Older adults, for example, are often more vulnerable to extreme heat, and lower-income households may not be able to afford cooling systems.

Figure 2-17 contains current canopy equity mapping across census dissemination areas in the HRM using methods adapted from an approach pioneered by American Forests.³⁷ The adapted methods support the calculation of a Tree Equity Score (TES) using census and climatic datasets widely available in Canada (Table 2-4).

TES is an evaluation of how well tree canopy and surface temperature aligns with localized income, employment, race, age, and health factors in a neighbourhood (in this case, census dissemination areas). Tree Equity Score values range from 0 to 100, with lower values corresponding to dissemination areas that have combinations of high land surface temperatures and low canopy cover relative to equity-deserving and vulnerable

African Nova Scotians/Canadians expressed wanting better access to parks, green spaces, walking trails, and sidewalks in rural and suburban African Nova Scotian communities.

populations. Figure 2-13, Figure 2-14, Figure 2-16, and Figure 2-15 on the following page illustrates how TES is calculated. Census indicators (Table 2-4, Figure 2-14) are fused with urban heat mapping (Figure 2-13) to yield a 'priority score' (Figure 2-16), which is then combined with canopy mapping (Figure 2-15) and relevant canopy targets, to produce a final TES layer.

TES in the HRM ranges from 40 to 100, with a mean score of 95. The Municipality's dissemination areas with the lowest tree equity scores (bottom five percent), have TES scores of less than 80 (Figure 2-17).

Canopy Coverage

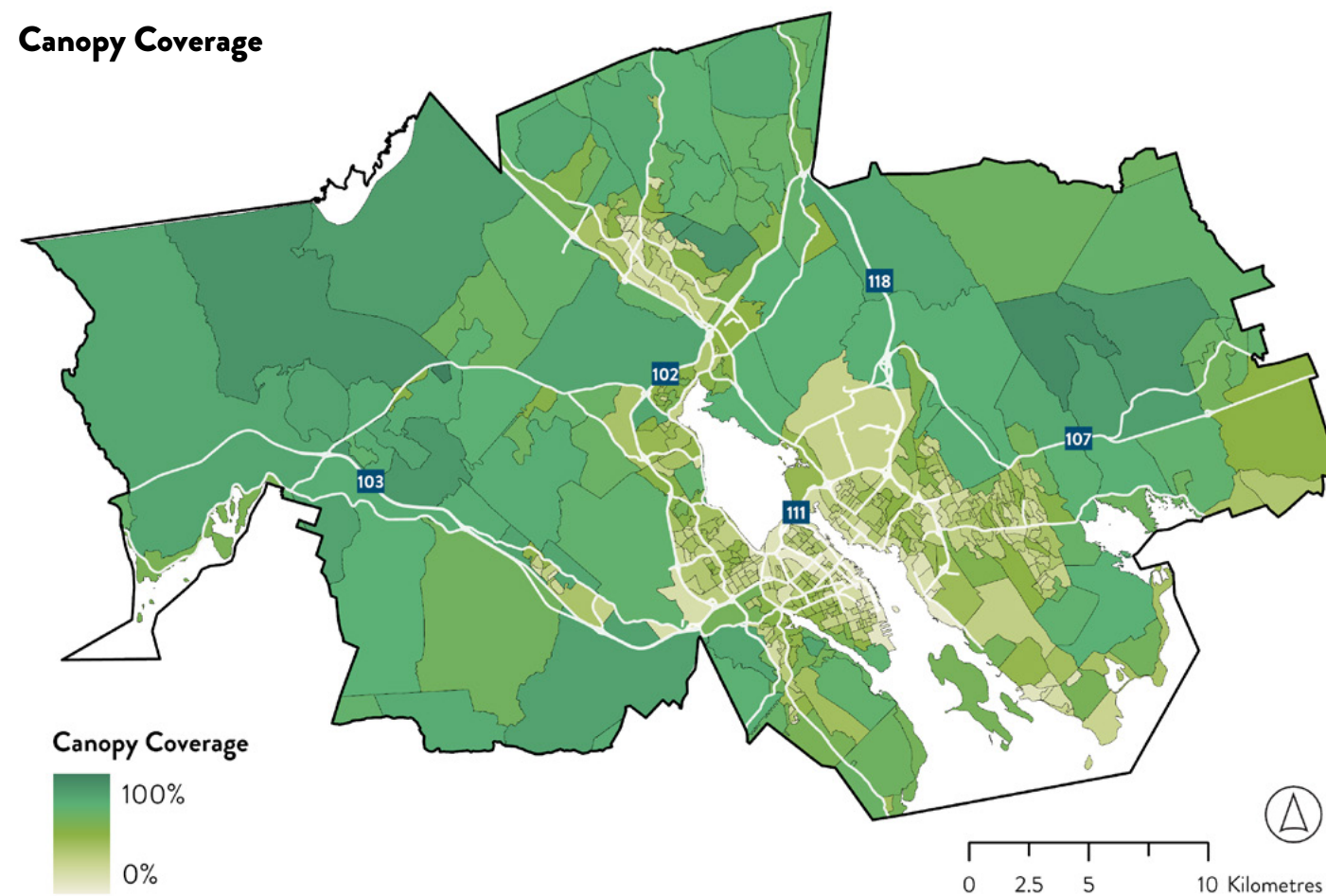


Figure 2-15. Tree canopy mapping in the HRM's urban core.

Priority Index

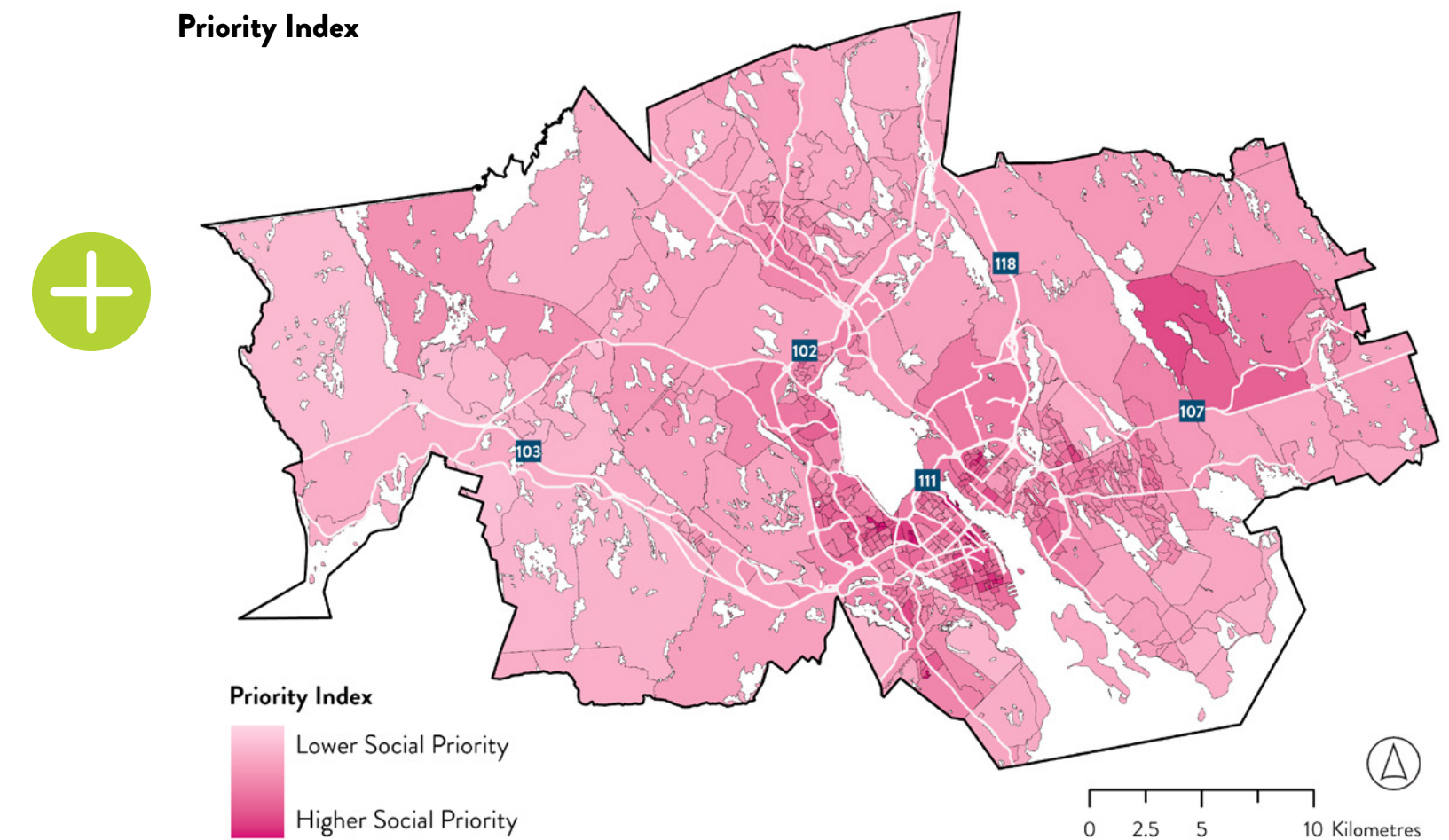


Figure 2-16. Priority index mapping in the HRM's urban core obtained by merging surface temperature and socioeconomic indicators.

Urban Forest Enhancement Districts (UFEDs)

Several areas of the HRM stand out in the Tree Equity Score mapping (Figure 2-17). These areas include:

- Bayer's Lake and Beechville,
- Parts of Glenbourne and Sherwood Heights,
- Parts of Southdale and Russell Lake West,
- Areas of the North End, Halifax peninsula,
- Parts of Mt Uniacke and Upper/Middle Sackville, and
- Parts of Cole Harbour and Westphal.

These are the areas where the HRM should place heightened priority on tree-supportive outcomes on both public and private land. This can be achieved through the regulation of private development, but may also involve incentives, subsidies, and special attention through capital works and construction projects.

Table 2-4. Demographic, economic, and environmental factors used in determining priority canopy areas within the HRM.

Factor	Description of Measurement
Climate	Average surface temperature, as measured from remote sensing data.
Income	Percentage of people living on incomes below 200% of the federally-designated poverty line (< CAD \$40,000)
Age	Seniors (age 65+) and children (0-14) as a proportion of working age adults (15-64).
Race	Percentage of people who belong to visible minority groups, as defined by the Employment Equity Act and, if so, the visible minority group to which the person belongs.
Employment	Percentage of the labour force that do not have a job, but are available and willing.

Two new classes of management district have been established through this plan (Figure 2-17):

Urban Forest Enhancement Districts (UFEDs) and Equity-Centered Management Districts (ECMDs)

UFEDs are geographies where tree canopy is low, despite high concentrations of equity-deserving individuals. To reconcile this issue, the Municipality will prioritize tree planting and protection in such areas, as well as design and construction details on both private and public property that improve the provision of trees.

In contrast, ECMDs are areas characterized by high concentrations of equity-deserving individuals, but are also areas where tree canopy is already fairly high. In ECMDs, tree planting is therefore not necessarily an optimal equity-centered management approach. There may however be other management approaches and interventions that could support equitable outcomes in these areas.

Beyond select districts, the HRM can adopt management and outreach processes that ensure equitable outcomes are considered through management interventions, procurement, community outreach and engagement, and urban forest investment.

Tree Equity Score

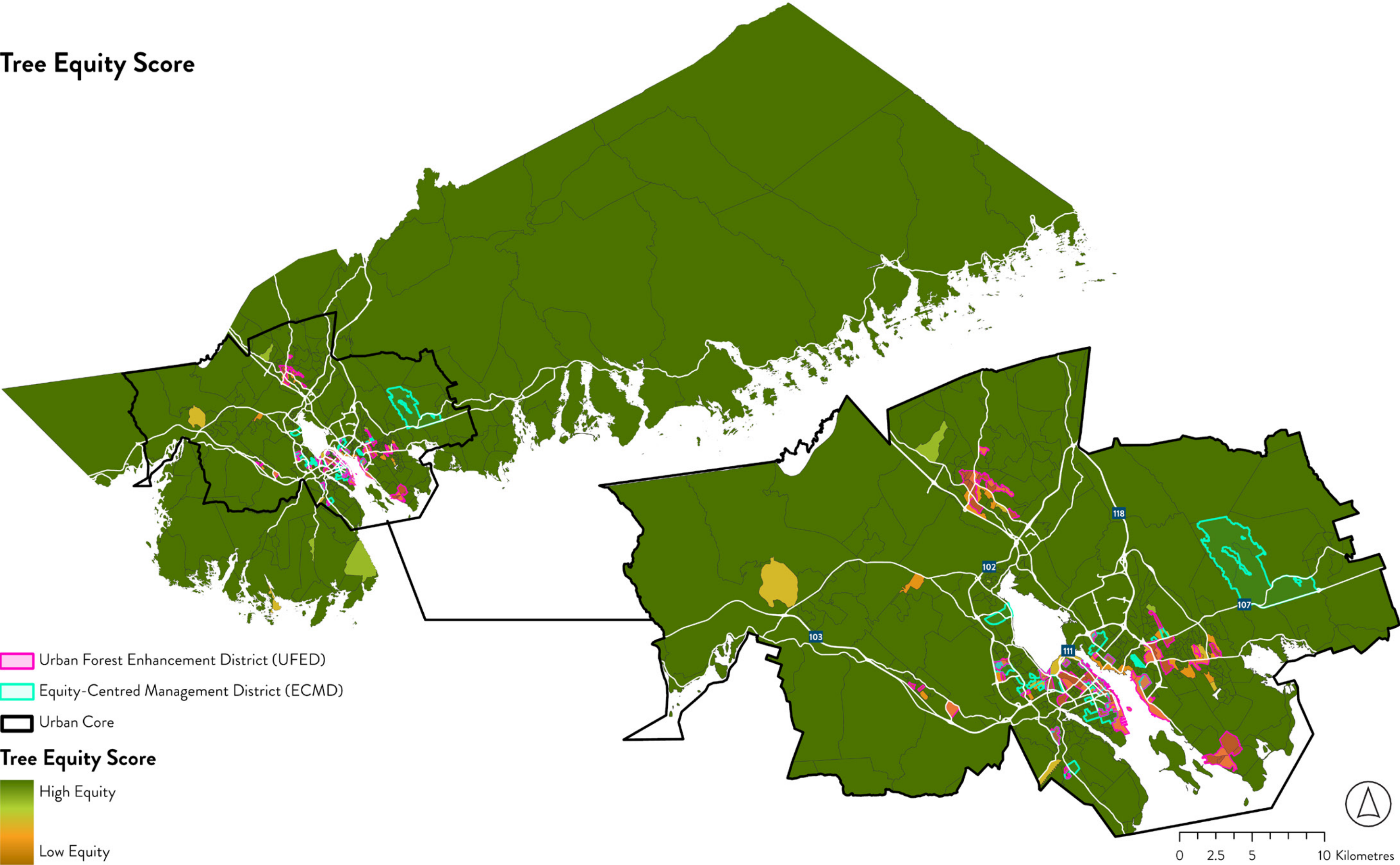


Figure 2-17. HRM's urban core TES mapping, equity-centered management districts (ECMDs) and Urban Forest Enhancement Districts (UFEDs) for illustrative purposes only. Full analysis conducted for the HRM and used in this to guide this plan.

Equity-Centered Management Districts (ECMDs)

Several areas of the HRM stand out in the Prioritization mapping (Figure 2-16), but not necessarily in the Tree Equity Score mapping (Figure 2-17). These areas include:

- Uniacke Square and surrounding residential area,
- Residential areas immediately surrounding South Street,
- Albion Lake and Harbourview neighbourhoods,
- Parts of Fairview and Clayton Park,
- Parts of Spryfield,
- Millview neighbourhood, and
- North and East Preston.

These areas, coined Equity-Centered Management Districts (ECMDs), generally have adequate tree canopy at present. As a result, tree planting may not be needed, but equity considerations should still inform management interventions and approaches. Several of these ECMDs are comprised of lower income, immigrant, refugee, and African Nova Scotian populations, including the two largest African Nova Scotian communities in Nova Scotia, East and North Preston. Uniacke Square, Fairview and Spryfield have a significant immigrant, refugee, and African descended population. Some of these areas may need more support for cleanup after significant storms, while others may need to be a priority for replacement replanting if trees are reaching the end of their life expectancy. In rural areas, equity-centered management might focus on building wildfire resilience or ensuring quality trails infrastructure on public lands meets community needs.



EQUITY AND PLANTED TREES

HRM can measure the extent to which it has contributed to tree equity gaps by mapping areas where tree equity overlaps with areas of low planted tree density (Figure 2-18). In areas with both low tree density and low tree equity, we can assume scarcity of Municipal investment in planted tree planting has directly contributed to lower tree equity. As an organization, the HRM will prioritize the introduction of new planted trees to areas with low tree equity.

In Figure 2-18 below, purple can be viewed as areas of the municipality where tree equity and planted tree density are both high, blue as areas where tree equity is high despite relatively low planted tree density on Municipal lands, vibrant green as areas where tree equity is low despite relatively high planted tree density on Municipal lands (i.e., these are areas where low levels of planting on private land are driving urban forest equity gaps), and muted green as areas where planted tree density on Municipal lands and tree equity are both low (i.e., these are areas where a reduced presence of planted trees on Municipal lands may be contributing to existing urban forest equity gaps).

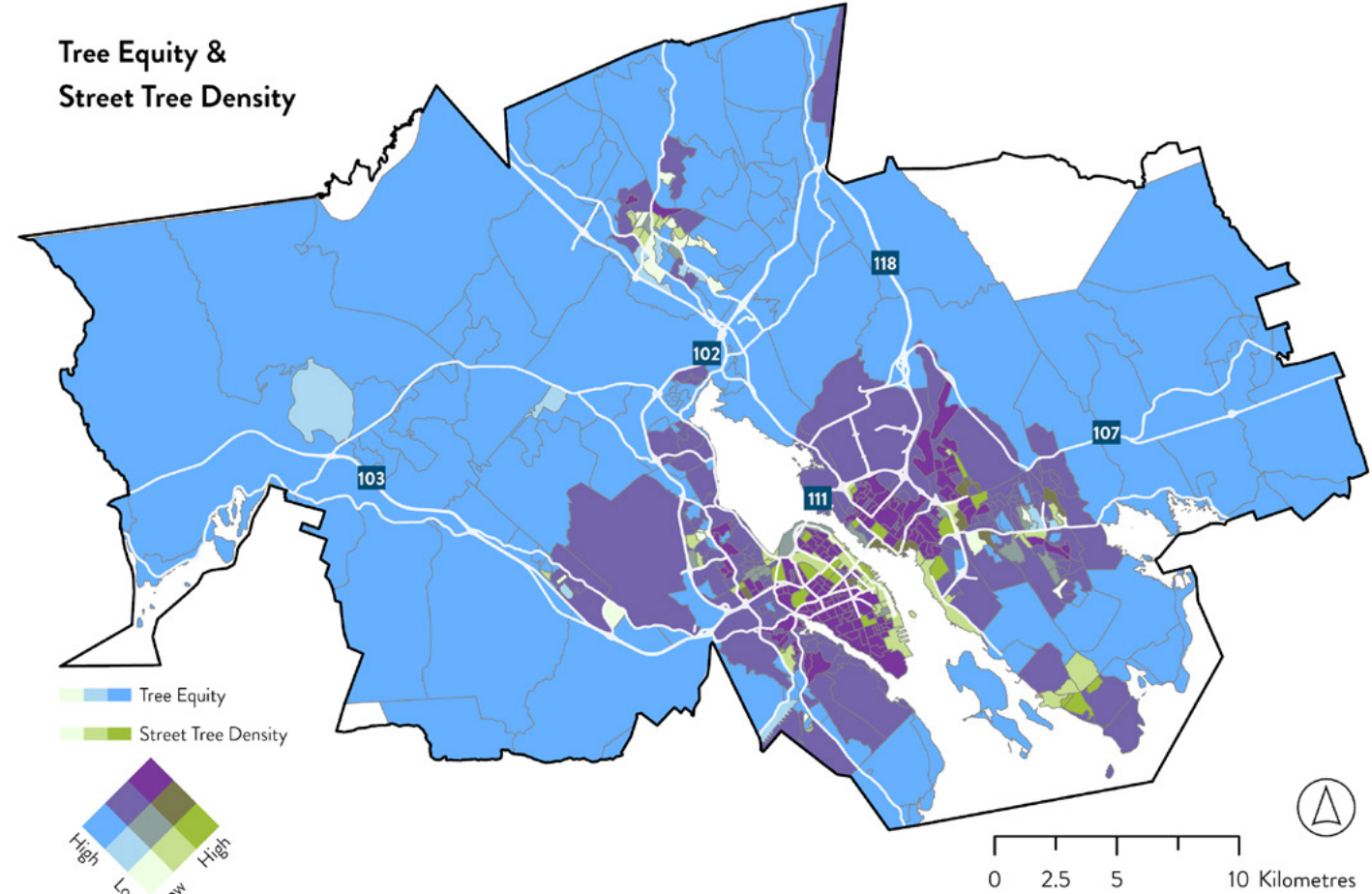


Figure 2-18. Bivariate equity-planted tree density analysis in the HRM's urban core (2023).

Our Program

Notre programme



si'st



3.1. HRM'S URBAN FOREST PROGRAM

The Urban Forestry Department, under the Infrastructure Maintenance & Operations Division of Public Works is primarily responsible for municipal trees in the HRM. This includes planted tree inventory, maintenance, planting, and removal (including stump removal), rural vegetation management, and coordination with other departments and external parties on tree-related matters. However, Urban Forestry is not the only entity involved in managing the HRM's urban forest. This section explores the roles, responsibilities, and interests of various entities and departments holding vested interest.

Public Works influences the urban forest through the HRM's capital design and construction processes, standards documents, and specifications. This includes engineering standards for rights-of-way and the management of trees during construction projects.

OTHER VESTED PARTIES

PARKS AND RECREATION

Parks and Recreation manages planted tree maintenance and planting within the HRM's parks but lacks arboricultural capacity and relies on Urban Forestry for tree care. Currently, the HRM has no formal program for managing the municipality's woodlands, meaning

these assets are presently managed reactively as issues arise.

PLANNING AND DEVELOPMENT

Planning and Development significantly influences the urban forest through the HRM's planning and development processes, policy documents, and by-laws. The unit liaises with Urban Forestry, but tree-related outcomes on private property depend on planning policies and standards.

HALIFAX REGIONAL FIRE AND EMERGENCY

Fire and Emergency is responsible for emergency management and preparedness in the HRM, including storm response and wildfire. The unit collaborates with Urban Forestry on wildfire management initiatives that interface with municipal tree assets.

ENVIRONMENT AND CLIMATE CHANGE

Environment and Climate Change offers subject matter expertise and logistical support to the Urban Forestry team as needed. Some examples of these collaborative efforts include, supporting urban forest initiatives like the annual Tree Giveaway, collaborating on tree planting programs as they relate to naturalization programs, and managing the Invasive Pest Management Strategy which

often overlaps with other urban forest management activities.

FINANCE AND ASSET MANAGEMENT UNIT

Finance and Asset Management influences urban forest management through administering the Municipal approach to asset management, which can encompass green infrastructure, such as trees. Efforts are underway to integrate planted trees into the HRM's planted asset management framework, with opportunities to enhance program resourcing through better planning and accounting processes.

GOVERNMENT OF NOVA SCOTIA

The Province manages trees along provincial highways, forest management on Crown land, and regulates forest practices on private land. It also oversees the *Halifax Regional Municipality Charter*, detailing the HRM's development regulation, taxation, and tree-related liabilities. The Province manages trees in Provincial Parks, Protected Areas, and Wilderness Areas, as well as administers *An Old Growth Forest Policy for Nova Scotia*.

HALIFAX WATER

The Halifax Regional Water Commission, publicly known as Halifax Water, is the municipal water, wastewater and stormwater utility serving the residents of the HRM, pursuant to the *Public Utilities Act*. Given its role in the upkeep and development of water infrastructure, Halifax Water has an important role in accommodating planted trees through their design work and construction activities. In addition, much of the HRM's water is sourced from surface water resources within the HRM's woodland watersheds. As the agency responsible for managing water quality in the HRM, Halifax Water has foresters on staff to support the management of water quality through ecosystem stewardship within critical source-water watersheds.

NONPROFITS AND COMMUNITY ORGANIZATIONS

Organizations like the Nova Scotia Nature Trust, Nature Conservancy of Canada, Ecology Action Centre and Ducks Unlimited influence the HRM's urban forest through conservation practices on their land. Collaborations with nonprofits and community organizations can support community initiatives and investment in the urban forest, enhancing community capacities.



NOVA SCOTIA POWER

Nova Scotia Power manages transmission lines in the HRM and addresses tree-related issues affecting power lines. The utility coordinates with Urban Forestry on clearance, maintenance, and storm cleanup.

PRIVATE RESIDENTS, BUSINESSES, AND LAND MANAGERS

With 71% of the HRM's land privately owned, most trees are under private ownership. While the HRM intervenes in specific circumstances (e.g., clearance pruning, hazard abatement), private property owners are responsible for most of the HRM's tree canopy. Residents and businesses can support the urban forest by practicing good tree care, planting trees, or participating in urban forestry events.

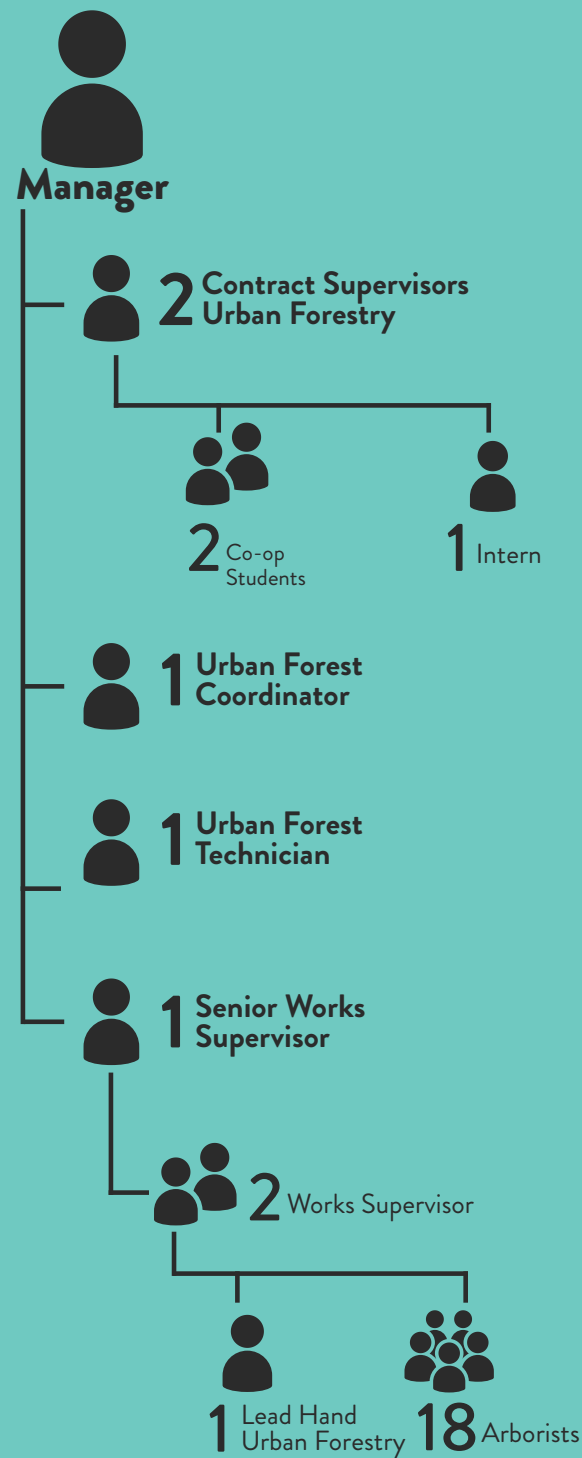


Figure 3-1. Urban Forestry Division organizational chart.

URBAN FORESTRY PROGRAM AT A GLANCE

HRM's Urban Forestry Division is the primary entity responsible for managing the Municipality's trees, consisting of a team of 30 staff (Figure 3-1). These front-line workers in urban forest management:

- Implement the HRM's proactive tree maintenance program,
- Undertake tree inspection,
- Liaise with other departments,
- Lead in storm response, and
- Administer capital contracts.

In 2023/24, Urban Forestry operated on a budget of \$4.2 million (Figure 3-3). Capital funds totalling \$1.7 million supported tree planting, and the annual tree giveaway. Since 2018, the HRM's Urban Forestry's operating budget has been tied to the number of assets under the Division's care. This is an industry best practice but is contingent on adequate base funding to meet service level commitments. As of 2023/24, the HRM's operating funding is approximately \$10 per resident, \$2 less per resident than the average among cities of similar size with populations over 100,000, and \$4 per resident less than leading urban forestry programs (Figure 3-3).

Despite the lower per-resident funding, Urban Forestry has had success in its public tree planting program. Since 2018, the HRM has planted about 5,300 more boulevard trees than have been removed (Figure 3-2), averaging a minimum of 1,000 net new trees per year, though annual numbers have varied (partly

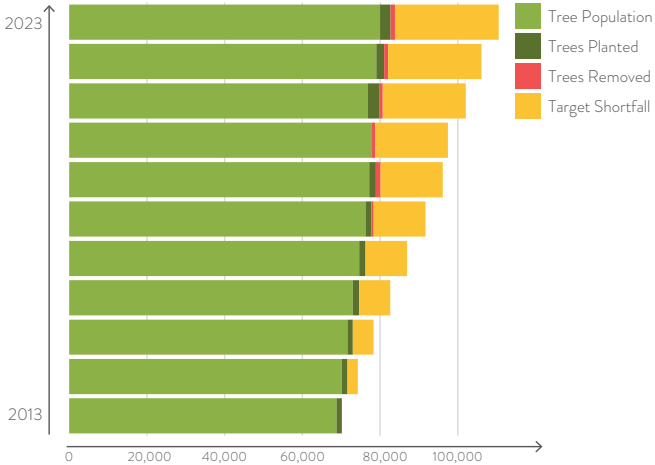


Figure 3-2. Tree inventory, removals, planting, and 2013 UFMP target shortfalls between 2013/14 and 2023/24.

due to COVID-19). These figures exclude new trees planted during development. These achievements are commendable but also highlight the Municipality's struggle to meet its annual planting targets as set out through the preceding 2013 Urban Forest Master Plan (Figure 3-2). Targets identified through the 2013 Urban Forest Master Plan have never been met and the shortfall between real planted numbers and the Municipality's cumulative planting target has grown steadily since 2014 (Figure 3-2).

The growing challenges in planted tree planting and maintenance have been compounded by resource constraints. The Municipality's commitment to a seven-year grid pruning cycle is undermined by insufficient budget, forcing a longer cycle at present. Proactive care for both young (i.e., structural training) and mature (i.e., grid pruning) trees are the hallmark of a sustainable forest management program and are widely recognized to net the best returns for public investment in tree care.

HRM's Parks Department holds responsibility in the management of municipality's woodlands. However, there are currently no formal programs or resources to support proactive management of HRM's large woodland network.

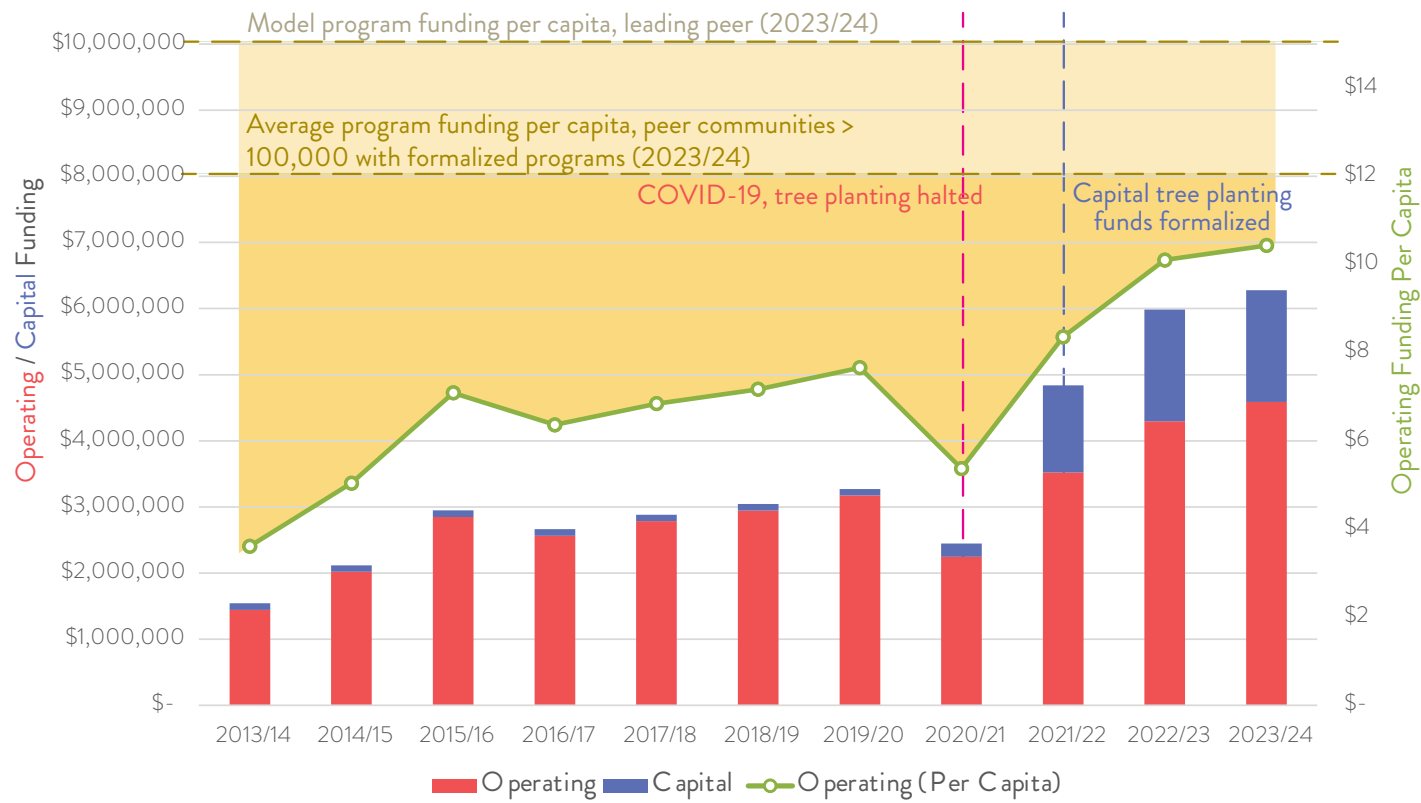


Figure 3-3. Urban Forestry operating and capital budgets by fiscal year.

A Community of Storms

HRM frequently experiences major storms. The cleanup from these events is funded through capital budgets. Storm response can be one of the most significant capital expenditures in a given year, with individual storm cleanups often costing the Municipality hundreds of thousands, occasionally reaching a million or more. For example, tree-related cleanup from Hurricane Fiona in 2022 cost the Municipality an estimated \$1.6 million.

As service demands continue to rise with population change, so too will the need for urban forest management resources to both maintain existing service levels and implement any identified expansions to the Municipality's urban forest program scope.

3.2. HRM URBAN FOREST POLICY

HRM'S URBAN FOREST LEGACY

The Urban Forest Management Plan is not the HRM's first strategic urban forest document. Following council motions in 2001 to develop a management plan for urban forests and research conducted by the HRM and Dalhousie University on the HRM's urban forest in 2007, the HRM developed a comprehensive Urban Forest Master Plan in 2013. At the time of its adoption, the Plan was amongst the first of its kind in Canada, and aimed to address the impacts of rising temperatures, air and water quality concerns, stormwater and flood damage on community wellbeing.

ENGAGEMENT

Community engagement supporting the development of the Urban Forest Master Plan took place from 2010 to 2012. Four public workshops were conducted between May and June of that year. More than 100 citizens took part in the workshops. Nearly 500 individuals also took part in an online survey. It is worth noting the engagement program for this Plan did not include specific scope for consultation with equity-deserving population segments.

PLAN ARCHITECTURE

One of the primary objectives of the Urban Forest Master Plan was to reconcile challenges common to the multiple spatial scales at which an urban forest management program typically operates. The Urban Forest Master Plan sought to resolve this through a neighbourhood management approach that consisted of four spatial levels; i) the UFMP study area (which then excluded rural HRM), ii) communities, which followed boundaries of pre-amalgamation cities and towns, iii) neighbourhoods, which exhibit distinctive environmental and settlement patterns, and iv) neighbourhood divisions, consisting of unique land-use subsets within neighbourhoods. This spatial organization resulted in 111 urban forest neighbourhoods and became the operative unit to which the plan's strategic framework applied.

Fifteen operating principles informed the framework for the Urban Forest Master Plan and 32 broad program actions (often implemented through nuanced neighbourhood-level sub-actions).

IMPLEMENTATION

HRM's Urban Forest Master Plan has faced challenges in its implementation. Still, despite obstacles, the HRM's urban forest management program has matured considerably over the past decade. Current estimates are that a fifth of those actions contained to the Urban Forest Master Plan have been implemented in some capacity. As many as 40% of Urban Forest Master Plan actions may have been implemented since 2013, however with varying degrees of intentionality and limited means to retroactively confirm implementation where progress was often not tracked.

Three central challenges impeded the execution of the 2013 Urban Forest Master Plan more than others: retirements and turnover (i.e., responsibility gaps), over-prescription, and difficulties/gaps in monitoring and evaluating progress in implementation.

The strategic framework put forward by the revised and updated Urban Forest Management Plan attempts to resolve the challenges faced by the Urban Forest Master Plan, though remaining at a broader, strategic level to support operational discretion in implementation. Engagement processes involved in the development of this UFMP employed dedicated streams for reaching equity-deserving population segments (see [4.1. Plan Process](#)).



Halifax Regional Municipality Urban Forest Ma July, 2013



HRM'S 2013 URBAN FOREST MASTER PLAN: AT A GLANCE

Highlights

- Neighbourhood-level strategic units.
- Significant community turnout and support through plan development.
- Fairly novel document and approach amongst peer municipalities at the time.

Challenges

- Retirements, staff turnover, and silos between departments resulted in uncertainties around implementation responsibilities, a scarcity of internal "champions" of the document.
- The neighbourhood spatial scale was too prescriptive/restrictive for practical use in operations capacities.
- Challenges over the past decade (e.g., COVID-19, inflation, housing crisis) have taken centre stage and tightened municipal wallets.
- Limited formalized monitoring following adoption. The status of the Plan faced growing uncertainty over time as a result.

Successes

- Geospatial planted tree inventory.
- Commitment to a seven-year grid pruning cycle.
- Planting 5,300 net new trees

Opportunities

- Increased emphasis on equitable service delivery through the update.
- Increased focus on strategic-level program operations, giving operations greater latitude to make operational decisions and adapt.
- Improved framework for UFMP implementation and monitoring.

OTHER INFLUENTIAL DOCUMENTS

Beyond HalifACT and the IMP, there is a range of legislation, documents, guidelines, standards, and specifications that influence trees and tree protection in the HRM. These are briefly explored following.

THE HALIFAX CHARTER

The *Halifax Regional Municipality Charter* is the primary legislation under which the municipality operates. The *Charter* includes language identifying the HRM's powers respecting trees, as well as the Municipality's powers and capabilities with respect to by-laws and processes that influence trees. The *Charter* does not currently enable the HRM to collect parkland dedications, or cash-in-lieu, through intensification projects or redevelopment. The *Charter* also limits the Municipality's powers with respect to the types of lands that can be requested through redevelopment, as well as the circumstances under which a tree bylaw can be adopted.

LAND USE BY-LAWS

HRM is home to 22 Land Use By-laws, each specific to a plan area within the region. These by-laws identify applicable zoning within different areas of the municipality. Zoning prescribes minimum performance standards which new development must generally satisfy. Where more than 71% of the HRM's land is currently under private ownership, and development is the single greatest moderator of canopy change within urban communities, the requirements through the Municipality's *Land Use By-laws* are amongst the most influential guiding provisions affecting forest change in the HRM.

MUNICIPAL DESIGN GUIDELINES (THE 'RED BOOK')

HRM's *Municipal Design Guidelines* (i.e., the 'Red Book') was developed to provide consistent guidance to the design and construction of public spaces in the HRM. These specifications are to be used as minimum standards in the design of streets, drainage, street trees and lighting, and associated municipal infrastructure. The *Red Book* is a key document in supporting the integration of trees in the municipal right-of-way and contains specifications supporting proven and emerging standards to better support the integration of trees in urbanized environments and streetscapes. The *Red Book* will be periodically updated to reflect best practices, new insights, and municipal experience.

REGIONAL PLAN

HRM's *Regional Plan* establishes long-range, region-wide planning policies outlining where, when, and how future growth and development should take place between now and 2031. A sustainable environment is core to the Plan's vision and guiding principles. The current plan has been in effect since October 18, 2014. In February 2020, Regional Council initiated its review, and an updated Draft Plan was released in June 2023.

The *Regional Plan* presents a key opportunity for the policies and direction put forward through the UFMP to make it into a critical policy document that steers municipal growth at the highest level. Integration of UFMP actions into the *Regional Plan* is critical in assuring trees are represented through the varied development, construction and planning processes that moderate growth within the community.

PUBLIC TREE BY-LAW

HRM's Public Tree *By-law Number T-600* primarily functions to describes the circumstances under which a member of the public may alter or remove a public (i.e., municipally-owned) tree. In brief, no member of the public may alter or remove a municipally-owned tree without the written consent of the HRM, or otherwise having secured a permit to do so from the HRM.

HRM does not currently have a private tree by-law, although the *Halifax Regional Municipality Charter* does enable such within the Municipality's Urban Service Area, or otherwise within Riparian Areas anywhere within the Municipality.

REGIONAL SUBDIVISION BY-LAW

The *Regional Subdivision By-law* details requirements for the subdivision of land within the Municipality and administered by the HRM's Development Officers. The Subdivision By-law sets out various design and process-related requirements that new subdivisions projects within the HRM are required to meet. Many of these processes and design requirements impact trees.



HALIFACT

HalifACT is one of the most ambitious climate action movements in Canada. It is the HRM's response to the climate crisis that will build a more resilient and healthy future in Atlantic Canada while preparing for current and future climate impacts. On June 23, 2020, Halifax Regional Council unanimously adopted *HalifACT* – a transformational plan to achieve a net-zero economy by 2050.

HalifACT contains various actions which have either been reiterated, or further supported through this UFMP. Where the Municipality has earmarked real and significant resources to support *HalifACT*'s implementation, those resources can often also support implementation of this Plan.



INTEGRATED MOBILITY PLAN

HRM's *Integrated Mobility Plan* (IMP) is a strategic initiative designed to create a connected, healthy, affordable, and sustainable transportation network within the HRM. Where trees commonly share space with our transportation infrastructure (e.g., roads, sidewalks, multi-use paths), the IMP is an important guiding document to urban forest management- and the IMP itself recognizes this in several capacities. Projects supporting the continued implementation of the IMP will therefore also influence urban forest management in the HRM.



HALIFAX DIVERSITY AND INCLUSION FRAMEWORK

The Diversity and Inclusion Framework integrates equity into HRM policies services, addressing systemic and barriers. This framework supports the UFMP by ensuring that urban forest management decisions are inclusive and align with values of respect, diversity, and sustainability in community planning.



JUSTFOOD ACTION PLAN

The justFOOD Action Plan seeks to build a resilient and equitable food system in HRM, focusing on food justice, sustainability, and community engagement. The UFMP aligns with this by promoting urban forests as part of a sustainable food system, incorporating food production and waste reduction strategies.

3.3. URBAN FOREST REPORT CARD

HRM's urban forest management program has been evaluated against a sustainability model for urban forests, first introduced by Clark et al. (1997)³⁸ and subsequently updated by Leff (2016).³⁹ The framework was adapted by the Urban Forest Management Plan project team to better facilitate deployment in the HRM. These criteria and performance indicators help measure the program’s status against an idealized state. Each criterion is linked to one of the five objectives and has been assessed through a detailed review of policies, analyses, and staff interviews. The reasoning behind the rankings can be found in [Appendix 1](#).

HRM's urban forest management achieved a scoring of “Fair” in 2024. Key opportunities for improvement include:

- **Tree protection:** Strengthening protections for trees, sensitive ecosystems, soils, and permeability on private property. Also allocating resources for creating and implementing effective protective measures.
- **Woodland health:** Formalizing procedures for the management of the HRM's woodland ecosystems, and earmarking resourcing to support a sustainable management program.
- **Equity:** Improving processes and program outcomes to consider equity outcomes in program service delivery.

Urban Forest Report Card

	2024 program grade (in colour)			
	Poor	Fair	Good	Optimal
OBJECTIVE 1: PLANNING AND PROTECTION				
Awareness of the urban forest as a community resource				
Interdepartmental/municipal agency cooperation in urban forest strategy implementation				
Clear and defensible urban forest canopy cover				
Relative tree canopy cover				
Municipality-wide urban forest management plan				
Municipal green infrastructure asset management				
Municipal-wide biodiversity or green infrastructure strategy				
Municipal urban forestry program capacity				
Urban forest funding to implement a strategy				
Policies/regulations regulating the protection/replacement of private and Municipality trees				
Policies or regulations for conservation of sensitive ecosystems, soils, or permeability on private property through development				
Internal protocols guide Municipality tree or sensitive ecosystem protection				
Standards of tree protection and tree care observed during development or by local arborists and tree care companies				
Cooperation with utilities on protection (and pruning) of Municipality trees				
OBJECTIVE 2: PLANTING				
Municipality planting and replacement program design, planning, and implementation				
Development requirements to plant trees on private land				
Streetscape and servicing specifications and standards for planting trees				
Equity in planting program delivery				
Forest restoration and native species planting				
Selection and procurement of stock in cooperation with nursery industry				
Ecosystem services targeted in tree planting projects and landscaping				

- **Community:** Leveraging community capacities and supporting community education toward improving urban forest outcomes on public and private lands.
- **Monitoring:** Developing modern datasets and data standards to best inform evidence-based decision making.
- **Risk management:** Formalizing the processes and procedures the Municipality undertakes toward managing the risk associated with planted trees.

The Urban Forest Report Card summarizes the assessment of each indicator, serving as a baseline for future comparisons. As the HRM implements its Urban Forest Management Plan, it will be essential to monitor progress and track improvements to guide ongoing efforts to enhance the forest.



OBJECTIVE 3: MAINTENANCE				
Tree inventory				
Knowledge of trees on private property				
Natural areas inventory				
Age diversity (size class distribution)				
Tree risk management				
Publicly owned tree species condition				
Maintenance of intensively managed trees				
OBJECTIVE 4: STEWARDSHIP				
Citizen involvement and neighbourhood action				
Involvement of large private land and institutional land holders (e.g., schools)				
Urban forest research				
Regional collaboration				
OBJECTIVE 5: MANAGEMENT AND MONITORING				
Emergency response planning				
Pest and Disease Management				
Waste biomass utilization				
Tracking of operational carbon footprints and urban forest carbon-cycle balance				
Species diversity				
Species suitability				

The Path Forward

La voie à suivre





4.1. PLAN PROCESS

PHASE

- 1

Identifying key directions

a

Listen and learn

Jan 2024 - May 2024
- 2

Draft plan

a

Strategic planning and program actions

Mar 2024 - Jul 2024

b

Collecting feedback

Jul 2024 - Nov 2024
- 3

Implementation

Dec 2024

Community engagement supporting the development of the UFMP took place over two phases. The first phase of engagement took place in the spring of 2024 and aimed to gather insights into core community values, concerns, and priorities in the management of the HRM's urban forest. Community input informed the development of the urban forest vision, goals, and the actions now contained in the UFMP's Action Plan ([Part 5](#)). The second phase occurred after the draft UFMP was released for public review in the summer of 2024. The goal of the second phase was to ensure the final UFMP reflected community values and priorities.

Engagement activities included online surveys and mapping activities, community open houses, targeted workshops, interviews and focus groups. Tailored engagement programs were delivered to reach underrepresented segments of the HRM's population. Together, these activities helped identify priority concerns and aspirations in managing the Municipality's urban forest and supported the development of the Strategic Framework ([Part 5](#)).

COMMUNITY ENGAGEMENT PROCESS

Phase one of engagement took place in early 2024 and sought to gather insights into core community values, concerns, and priorities for the management of the HRM's urban forest. This input informed the development of the urban forest vision, goals, and the action plan now contained in [Part 5](#) of this document. The second phase occurred after the draft UFMP was released to the public, with the goal being to gather community feedback and ensure the draft reflected community values and priorities.

Targeted engagement opportunities were extended to Indigenous communities, African Nova Scotians/ Canadians, Francophone and Acadian communities, people with disabilities, and newcomers. Unique engagement approaches were prepared for each group to ensure diverse voices could be freely and comfortably expressed. Organizations were also engaged, and included government agencies, non-profit organizations, and industry representatives.



HRM'S URBAN FOREST MANAGEMENT PLAN VISION STATEMENT:

The HRM is a municipality of trees. Through the shared legacy of sustainable management, the HRM's urban forest has been carefully woven into the fabric of our neighbourhoods over the past 25 years. Characterized by a mosaic of native inland and coastal ecosystems as well as large, mature streetscape and park trees, the benefits our urban forest supports meaningful contributions to our health and wellbeing and supports the resilience of our community to the threats imposed by climate change. The protection of our urban forest and its resident biodiversity is central to our management approach and our vision for urban and rural sustainability.

PARTICIPATION BY THE NUMBERS

PUBLIC ENGAGEMENT

ONLINE

- **828 survey responses**
- **93 identified locations**
 - 54 places of value
 - 39 places needing improvements

IN-PERSON

- **3 open houses**
 - ~45 participants

INDIGENOUS COMMUNITIES

Represented by **71** participants from:

- Wasoqopa'q First Nation (Acadia)
- Wijewinen - Mi'kmaw Friendship Centre (multiple programs)
- Diamond Bailey Healing Centre
- Dalhousie Indigenous Student Centre
- Kiknu Indigenous Student Centre (St. FX University)
- Native Council of Nova Scotia
- Sipekne'katik Treaty Truck House
- Aboriginal Youth Outreach Program

FRANCOPHONE & ACADIAN COMMUNITY

Represented by **five** organizations:

- L'Acadie de Chezzetcook
- Alliance Française Halifax
- Conseil scolaire acadien provincial
- Conseil communautaire du Grand Havre

AFRICAN CANADIANS & NOVA SCOTIANS

Represented by **20** participants from:

- Historic African Nova Scotian communities
- Newcomer African-Caribbean Community
- Newcomer Continental African Community
- Rural, Sub-Urban and Urban communities
- Eleven community organizations

PEOPLE WITH DISABILITIES

Represented by **8** participants from:

- The Office of Diversity and Inclusion, HRM
- Walk and Roll Halifax
- Canadian National Institute for the Blind

NEWCOMERS

Represented by **7** participants and the Office of Diversity and Inclusion, HRM:

- Time in the HRM:
- 1-3 months
 - 4-13 months
 - Less than 2 years

ENGAGED ORGANIZATIONS

Represented by **39** participants from:

- Federal, provincial, and municipal governments, such as Nova Scotia Power
- Not-for-profit organizations
- Arboriculture and development industries

COMMUNITY ENGAGEMENT HIGHLIGHTS

VALUES

More than 700 community members responded to survey opportunities. Of those who responded, 97% believed the HRM's urban forest was important. Respondents identified a range of valued benefits supported through the HRM's urban forest, including improving air quality, reducing urban heat, supporting wildlife and biodiversity, and enhancing the overall well-being of residents. The urban forest was recognized by many participants as an important component of a livable and environmentally sustainable municipality.

VISION

Survey respondents were invited to contribute to the vision statement for the HRM's urban forest management through to 2050. More than 700 written contributions to the shaping of the vision statement were received through the community survey, and countless more through in-person discussions, workshop, and engagement with targeted community groups. The vision statement for this Plan is a synthesis of that feedback.

CONCERNS

Open house participants, survey respondents, and engaged organizations expressed concerns about the impacts of development and climate change on the urban forest. Development activities, particularly those supported by clear-cutting, were viewed as a significant threat. In response to these threats, survey respondents identified their top three objectives for urban forest management over the next ten years as addressing

climate change impacts, integrating urban forest policies into regional and community planning processes, and protecting, maintaining, and enhancing the urban forest.

PRIORITIES

PLANNING AND PROTECTION

"I'd like to see the preservation of the urban forest be not just in balance but a precondition to development."

Urban Forest Management Priorities: Climate change, greater consideration for trees through planning and development processes, and tree protection were identified as the highest priorities for urban forest management over the next decade (phase one survey).

Tree Protection: Increasing tree protection during construction was supported by 86% of respondents, and tree protection was emphasized 23 times when respondents were asked about the need to balance urban forest protection with growth (phase two survey).

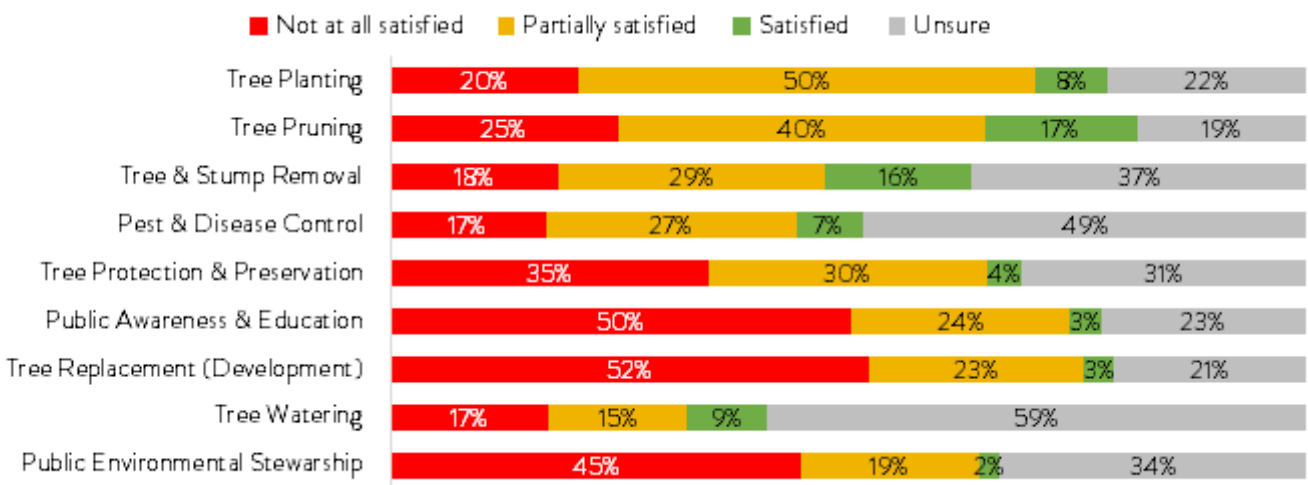


Figure 4-1. Respondent's satisfaction with current levels of service by service type

MAINTENANCE

"[I would like to see] increase[d] support to maintaining trees that are planted, especially in the first year of them being planted."

A Management Priority: Improving tree maintenance and enhancement was identified as the third most important urban forest management objective, along with tree protection (phase one survey).

Pruning Satisfaction Levels: 25% of respondents were not at all satisfied with tree pruning in the HRM, and 17% for tree watering (phase one survey). Some suggested that increased funding for maintenance, and improved maintenance of establishing trees would help improve public perception of the HRM’s maintenance service levels.

Proactive Maintenance: Phase two survey respondents encouraged proactive tree and park maintenance. Some respondents emphasized the need to ensure clearance requirements were met, particularly along bike paths.

Several other respondents preferred that tree pruning be balanced with tree health outcomes.

PLANTING

"[the HRM should] oversee or inspect tree planting in new subdivisions and where homeowners are required to plant species on their properties."

Native Species Selection: Engagement participants advocated for the use of native, pollinator and bird-friendly species.

Improved Growing Conditions: Participants in the phase one technical workshop suggested the Municipality take bold actions to enhance boulevard growing conditions, such as burying utilities and requiring sustainable right-of-way standards to support tree inclusion in design. Argyle Street was used as an example.



▲ February 2024 phase one stakeholder workshop.

STEWARDSHIP

"[The Municipality should] inform residents about the trees in their neighbourhood (and/or the city) and how they can participate in caring for them. Take school children on tree walks to explain what's growing near their school. Invite people living in a particular neighbourhood on a tree walk to help them gain an understanding and appreciation of the urban forest."

Emphasis on Community: Reflecting on the quick-start actions presented through the earlier draft of the UFMP, many engagement participants expressed a desire for enhanced positioning of public education and community stewardship actions as priorities within the Plan’s strategic framework, including commitments to partnerships with NGOs, educators of all age groups, and more effectively using social media to increase awareness of the HRM’s urban forest program (phase two survey).

Barriers to Participation: Participants identified the most significant barriers to participating in urban forest stewardship as cost, utilities, and limitations associated with ownership (phase one survey). Tree planting subsidies, tax credits, and educational materials around tree selection were often suggested as methods to reduce barriers to tree planting and maintenance on private property (phase one survey).

ADMINISTRATION AND MONITORING

Successful Management Indicators: When asked what would best demonstrate successful urban forest management, 67% of respondents agreed that increased tree protection and retention would be key (phase one survey). Other important indicators included increased tree canopy cover (62%), and equitable access to canopy cover (57%). These considerations have been incorporated into the UFMP’s core monitoring framework.

INDIGENOUS ENGAGEMENT

Engagement methodologies rooted in Indigenous knowledge systems, including keeoukaywin (The Vising Way) and etuaptmumk (Two-Eyed Seeing), were used to better meet the needs of Indigenous nations. The practices emphasize rationality, respect, and the integration of Indigenous and Western ways of seeing and knowing to create more comprehensive and inclusive solutions. Engagement activities included direct outreach to Indigenous communities, facilitated visits, and interviews to gather diverse perspectives.

Indigenous communities highlighted the following priorities for the Urban Forest Management Plan. One priority was to **include Indigenous language in the plan**. Equally important was **supporting the sharing of Indigenous ecological knowledge**. Participants described this as involving the co-creation of an education plan to bridge Indigenous perspectives into the Urban Forest Management Plan. They also indicated it should embody etuaptmumk and Indigenous pedagogy, such as land-based learning, into broad education and engagement approaches. **Collaboration and partnerships** between the HRM and Indigenous communities were also highlighted as an important way to support urban forest outreach and management with Indigenous communities. This includes clarifying and strengthening internal collaborations within the HRM and streamlining dialogues and processes to improve efficiency for Indigenous organizations.

Indigenous communities also expressed a need for the **protection of culturally significant species**, especially birch, black ash, and white ash. These species hold cultural importance for Indigenous communities and need to be preserved through urban forest planning. Similarly, participants expressed a desire to **plant food forests** and support community food sovereignty, especially in areas where houseless community members reside or where access for Indigenous communities is limited. Participants also suggested introducing a greater variety of food and creating more opportunities for vertical farming and pollinator programs. **Creating urban spaces for ceremony and healing** was also prioritized as Indigenous communities need dedicated space to practice their cultural traditions and activities.

Participants also wanted the HRM to ensure **malleability and responsiveness** in its implementation of the Urban Forest Management Plan so it can evolve with

community needs and priorities. This would need to be supported by ongoing engagement with Indigenous communities to ensure continued alignment with their priorities. Additionally, **enhancing protection and restoration post-disaster** was important to Indigenous participants, especially in disaster-prone areas. Youth expressed a strong desire for a sustainable plan to protect and restore vegetation lost during storms and to **achieve a resilient and adaptive urban forest for future generations**.

AFRICAN NOVA SCOTIANS/ CANADIANS ENGAGEMENT

Engagement with African Nova Scotians/Canadians involved detailed in-person and online interviews and focus groups with community development specialists, heads of development organizations, educators, social workers, and recreation specialists. The engagement aimed to provide a historical and socio-political analysis of African Nova Scotian development challenges, highlighting seven key race and culture-specific themes to be considered by the Urban Forest Management Plan.

African Nova Scotian/Canadian participants aspired for robust and inclusive policies and programs that ensured diversity and equity, the protection of their community against commercial development and the preservation of their historical and cultural connections to the land.

Protecting urban forests from development was seen as critical to successful urban forest management, emphasizing the ecological and social benefits trees provide. Participants expressed support for **programs that grow the urban forest** and highlighted the **importance of planting fruit trees** and a food forest.

Participants suggested that **more knowledge and information** could empower African Nova Scotian/Canadian to take care of trees, expressing their interest in **volunteering** in the HRM's urban forest initiatives. They also noted the need for **community involvement and partnership with the HRM in decision-making processes** and emphasized that low African Nova Scotian/Canadian participation in urban forest management activities was predominantly due to a lack of access to information, not disinterest.

African Nova Scotian/Canadian participants also shared culture-specific considerations and concerns, emphasizing the need to incorporate their viewpoints

"I think they need to talk more about how Black people interact with the environment, because the truth is that black people out here especially, we have a history with this place. We hunt, we hunted out here. We did everything out here."

"Our absence and erasure from historical narrative of settlements keeps us from connecting to the land and the trees on it."



"Meaningfully supporting relationships with Indigenous communities can be challenging without an Indigenous Framework to support direct interactions with the First Nations within the Halifax Regional Municipality. Some engaged communities have identified their approaches to engagement, which the HRM should meaningfully reflect on and incorporate into their own engagement processes."

into the Urban Forest Management Plan due to their historical and ongoing experiences of systemic economic neglect, social exclusion, and racial marginalization. A key concern revolved around their historical exclusion from civic affairs resulting in their lack of awareness of the 2013 HRM Urban Forest Master Plan. Despite this, participants expressed a high interest in learning about urban forest management and suggested **culture-specific public information channels**.

Participants emphasized the importance of building trust through transparent and inclusive engagement processes. Addressing issues of loss and trust through reparatory justice was highlighted as a critical aspect of successful urban forest outcomes for African Nova Scotian/Canadians. Participants discussed the need to acknowledge past harms and create pathways for healing and rebuilding trust between the HRM and African Nova Scotian and Canadian communities to support these efforts.

Participants felt that urban forest management should also consider **economic development opportunities** such as job creation in the tree care and maintenance industry, as well as income generation through sustainable timber harvesting. Participants noted the need for better access to green space, tools, funding and infrastructure to connect urban forest management with other emerging issues such as food security.

FRANCOPHONE AND ACADIAN ENGAGEMENT

Engagement with francophone and Acadian organizations was conducted through French-language interviews, with results translated into English to support accessibility.

Participants envisioned an accessible urban forest with mature trees and **greenery along active transportation routes**. They strongly supported the **protection of mature trees and forests** near schools, and advocated for improved access to natural areas by means other than driving. Participants had concerns around trees causing power outages during storms and suggested **enhanced tree care practices** like pruning and utility underground as potential solutions.

Participants also expressed they have been involved in urban forest activities such as tree planting or tree giveaway events and had interest in **more educational initiatives** such as 'urban forest walkabouts' about native

species, wildlife habitat maintenance, and invasive species removal.

Participants shared important cultural considerations, such as the role forests played historically in providing shelter for Acadians during the “Grand Dérangement” (Great Upheaval) and witnessing their ties with the Mi’kmaq People. They emphasized the importance for the Acadian community of **seeing the Mi’kmaq culture well represented in the plan**. Participants also noted that **French-language signage in parks** could increase access to the HRM’s greenspaces by making them more welcoming.

PEOPLE WITH DISABILITIES

Engagement with people with disabilities involved varying formats adapted to meet individual needs. The engagement highlighted diverse lived experiences. Individuals were given the opportunity to self-identify a disability; some of these included visual and hearing impairments, wheelchair reliance, autism spectrum disorders, and service dog use.

A key consideration was the importance of **accessible design principles**. Participants stressed that urban forest resources such as documents and online platforms must be usable by all community members. Barriers such as **poor color contrast, inadequate font size, and lack of alternative text for images** were identified as significant challenges. **Simplified, plain language** was also highlighted as essential to access to information regarding the urban forest.

Some cited concerns around **sidewalk safety**, noting issues like uneven pavement caused by roots, overhanging branches blocking paths, and dense tree placement limiting mobility. At night, **tree canopies can obstruct sidewalk lights**, casting shadows at intersections and reducing visibility. This creates a safety concerns, especially for those with partial sight. Current street lighting is deemed insufficient by the community, and **suggested ground-level lighting** and ongoing consultation with the Canadian National Institute for the Blind to ensure comprehensive solutions.

Participants called for **multi-sensory connections to the urban forest**, suggesting experiences that incorporate sound, touch, and smell while ensuring sensory inclusivity. Additionally, participants urged action on protecting nature, emphasizing the need to **preserve Halifax’s historic trees** and prioritize restoration efforts to **maintain ecological and cultural heritage**.

"I couldn't talk to the people, but I could always talk to the trees in the park."

"Why do I walk past this patch of grass every day, to go to a grocery store and buy cilantro when it could just grow there?"



NEWCOMERS AND IMMIGRANTS

The engagement with newcomers involved various formats of interviews. Newcomers to Halifax highlighted the importance of **fostering connections to the land**, emphasizing that **building relationship with greenspaces helped them feel at home** despite language barriers. Parks and community gardens played **pivotal roles in forming initial friendships**.

Participants express a strong interest in **food sovereignty and community gardens**, advocating for spaces to grow traditional herbs and food not widely available in Halifax. They envisioned grass lawns to be repurposed for **growing edible plants**.

Newcomer participants expressed a strong interest in **education about native plants** and the integration of Mi’kmaq knowledge. Newcomers sought opportunities to learn about Indigenous plant practices, including traditional uses, growing techniques, and cultural stories. Programs fostering knowledge-sharing between newcomers and Mi’kmaq communities were viewed as valuable. Participants however noted language barriers would need to be addressed through translated materials.

Safety in parks is a significant concern, particularly for female and female-presenting participants. Parks with large canopy cover were generally considered as unsafe during lower light times and when parks are less populated. In community gardens, **experiences of racism and intimidation** were experienced, where individuals were bullied or harassed to leave. Newcomers **did not feel welcome** to participate in community garden space and have been **bullied or harassed into leaving**.

Newcomers noted that racism is not exclusive between dominant society and newcomers, but sometimes between other cultural groups. Creating inclusive spaces in the urban forest will require the awareness of these nuances.



4.2. RECAP: THE MAJOR CONCERNS

HRM's first urban forest plan was developed in 2013 out of a sense of urgency to respond to a series of destructive events including Hurricane Juan, several severe storms, and growing concerns around the introduction of invasive species. In the decade since, more hurricanes have reached the HRM's shoreline, wildfires have been felt, and new pests of concern have arrived in the community. Threats to the urban forest are increasing and, while the HRM's urban forestry program has made significant strides since 2013, more must be done to support the health of the urban forest for the enjoyment of future generations.

CLIMATE CHANGE AND EXTREME WEATHER

Climate projections for the HRM suggest we will see wetter, wilder weather in years to come. Extreme weather events like Hurricanes Juan (2003), Dorian (2019), and Fiona (2022) will become more common. Conditions like those that supported the 2023 Upper Tantallon wildfire may not be isolated occurrences. The relationship between our trees and climate is complex. What is certain is that climate change brings with it new challenges to urban forest management the likes and magnitude of which, the community has not experienced before.

PESTS AND PATHOGENS

HRM is an international port. The City has historically served as a gateway for the arrival of new invasive pests to the Province, and in some cases to Canada or North America. As trans-Atlantic shipping is likely to continue, so to will the threat of uninvited, invasive pests or disease. Now, emerald ash borer and hemlock woolly adelgid threaten the HRM's ash and hemlock trees. These are species of concern that have left destruction in their wake in the parts of North America that have been dealing with them over the past decade. It is not just invasive pests that are an ongoing concern, however. Under the influence of climate change the life-cycles, range, or behaviour of even native plants may deviate from what we have observed from them historically, and potentially problematically.

An Ageing Tree Population

Many of the HRM's trees lining streets and parks were planted in the early 20th century. These mature trees are a defining feature of the HRM's identity and contribute significantly to the urban tree canopy. However, as these trees near the end of their safe life expectancy, their loss could have a significant impact, especially in neighbourhoods where early 20th-century plantings dominate.

In some cases, proactive measures can delay the replacement of large, aging trees in urban landscapes. Targeted pruning, soil aeration, and, in certain cases, the installation of supportive cables can help reduce stress and extend the lifespan of older trees. While effective, applying these measures to all aging trees under the HRM's care is not feasible due to resource limitations.

To address this challenge, multiple approaches are needed. Many parks currently have low canopy cover, presenting an opportunity for proactive planting. Establishing young trees in these areas now will ensure that there are successors ready to replace aging trees in the future. Along streetscapes, a planned, phased approach to successional replacement is essential. By replacing trees in blocks as they reach the end of their lives, the municipality can spread the financial costs and minimize the visual and ecological impact of canopy loss over time.

Limited Program Resources

HRM's Urban Forestry program operates within the constraints typical of municipal departments, with most resources allocated to maintaining planted trees. The current maintenance plan targets a seven-year grid pruning cycle, but funding limitations prevent full achievement of this goal. Additionally, the HRM lacks dedicated funding for managing its woodland areas, despite the need for invasive species control, restoration,

new tree planting, recreation management, trails upkeep, risk management, and fuels reduction in woodlands.

URBAN DEVELOPMENT

With nearly 275 years of urban history, the HRM has experienced numerous growth periods, the most recent spurred by the COVID-19 pandemic. Between 2016 and 2021, the municipality's population grew by nine percent, necessitating the development of thousands of new homes, commercial facilities, industries, and public services—primarily concentrated in the Urban Core.

Urban development can often result in tree removals and increase impervious surfaces, which can negatively impact the urban forest canopy and exacerbate stormwater runoff and urban heat. While some tree losses are inevitable, a balance must be struck to ensure that urban forest preservation accompanies growth. Trees and development are not mutually exclusive; both are integral to creating a complete, sustainable community.

Addressing the Challenges

The challenges facing HRM's urban forest require a diverse set of solutions. The Urban Forest Management Plan provides a vision and strategic framework to maintain and expand the tree canopy while adapting to the pressures of urban growth, climate change, and resource limitations.



▲ Tree down following Hurricane Juan. September 2003. CR: Peter Duinker.



4.3. STRATEGIC FRAMEWORK



The Strategic Framework for the HRM's Urban Forest Management Plan implements the 2050 urban forest community vision, which has been further distilled into three big ideas.

The Strategic Framework is applied through Five Objectives, which form the broad foundations of the HRM's Urban Forest Management Plan. Seventeen strategies further implement these five objectives, and 114 actions provide the detailed program actions the HRM will undertake toward achievement of the Municipality's 2050 urban forest vision.

Key components of the strategic framework:

- **Vision:** The vision shapes the objectives and strategies, ensuring the Plan is focused and impactful.
- **Three Big Ideas:** These ideas further refine the vision and provide more structure to the objectives and strategies.
- **Five Core Objectives:** These objectives guide the overall direction of the Urban Forest Management Plan.

Detailed implementation approach:

- **17 Strategies:** These strategies provide specific details on how each objective will be achieved.
- **108 Program Actions:** Grouped under the strategies, program actions detail the specific steps the Municipality will take in urban forest management from 2025 to 2050.
 - **20 Priority Actions** : These actions will have a significant impact on the success of the Municipality's program and implementation of this UFMP.
 - **Six Quick Start Actions** : These are actions the Municipality will implement in the early years of the Plan's life.
 - **82 Medium- to Long-Term Actions:** These are longer-term actions to support the achievement of the vision and core objectives

4.4. THREE BIG IDEAS

The broad aspirations for the Urban Forest Management Plan have been captured through this Plan's vision statement and three big ideas. Grounded in community priorities and values, more than 800 survey submissions and countless more discussions with engagement participants have refined the vision statement, which is further distilled through three big ideas, to be the guiding principals behind the Urban Forest Management Plan's Objectives, Strategies, and implementing actions.

THE VISION

The HRM is a municipality of trees. Through the shared legacy of sustainable management, the HRM's urban forest has been carefully woven into the fabric of our neighbourhoods over the past 25 years. Characterized by a mosaic of native inland and coastal ecosystems as well as large, mature streetscape and park trees, the benefits our urban forest supports meaningful contributions to our health and wellbeing and supports the resilience of our community to the threats imposed by climate change. The protection of our urban forest and its resident biodiversity is central to our management approach and our vision for urban and rural sustainability.

3 BIG IDEAS

EQUITY

HRM's urban forest management program is both sustainable and equity-centered in its service delivery.

BALANCE

Balance between woodland and biodiversity conservation and the continued growth of HRM.

COMMUNITY

Community values, education and stewardship capacities are prioritized- people are HRM's most influential urban forest management resource.

4.5. TARGET-SETTING AND MONITORING

To ensure success through UFMP implementation, the HRM will monitor progress, and remain flexible in the face of evolving community priorities and challenges.

CANOPY COVER TARGET

Community engagement highlighted a desire amongst participants for the HRM to adopt a formal canopy cover target to guide future development. Canopy cover is an effective metric for tracking large-scale changes in the extent and distribution of a community’s urban forest. Consequently, many Canadian municipalities incorporate canopy cover targets into their urban forest management plans to measure progress toward long-term goals. These targets are particularly valuable because they can be easily integrated into planning policies and development processes, aiding in informed decision-making.

While canopy cover is a useful metric, it does not provide a comprehensive assessment of urban forest health or management outcomes. It fails to account for key aspects such as species diversity, tree age distribution, forest health, and ecosystem services. To gain a complete understanding of an urban forest’s status and to evaluate the success of management efforts, it is essential to pair canopy cover monitoring with other performance indicators.

Leading urban forest organizations, such as American Forests, recommend that municipalities establish canopy cover targets based on local ecological conditions, population density, and land use constraints. Developing an informed canopy cover target for the HRM will require an understanding of tree protection policies, rates of replacement, historical rates of loss, projected rates of loss, and knowledge of future land use changes and development. Making assumptions about canopy change in the HRM is presently challenging due to several factors:

- Canopy cover datasets of a fine geospatial scale have only recently been acquired, meaning there is a limited historical record to understand how canopy cover has changed within the HRM (although coarse estimates exist, see section 2.2),
- Private tree protection is currently negotiated through the development process, with limited formalized processes supporting private tree

protection outside riparian setbacks, there is variability in tree retention through one development process to the next,

- Regional development will be informed by the Regional Plan, which is currently under review, and its direction will influence the rate, location and pattern of growth within the HRM over years to come,
- Development form and density are dictated by twenty-two Land Use By-laws that make it challenging to set targets at the regional level, and
- Recent legislative shifts to expedite the development approvals process create uncertainty in the relationship between municipal regulation, powers, and provincial initiatives and priorities.

As a result, the HRM’s Urban Forest Management Plan is not proposing the Municipality adopt a canopy cover target at this time. Nonetheless, the Municipality has committed to five actions through the action plan (Part 5. Action Plan) that will support the establishment of an informed canopy cover target through future review of the UFMP:

1. HRM will plant a minimum of 1,000 ("ball and burlap") net new trees per year until at least the first review of the UFMP (Figure 4-2),
2. HRM will revisit the possibility of establishing a canopy cover target at the second (10-year) review of the UFMP, once the Regional Plan Update has been completed and the HRM is equipped with a decades' worth of change monitoring to support modelling efforts,
3. HRM will review its net new planting target at each five-year review and ensure committed rates of tree planting are being achieved, and contributing to desired urban forest outcomes,
4. HRM will continue to support reforestation and community planting events in addition to planting a minimum of 1,000 net new trees, per year, and
5. HRM will formalize planting opportunities mapping to support informed canopy modelling through a future review.

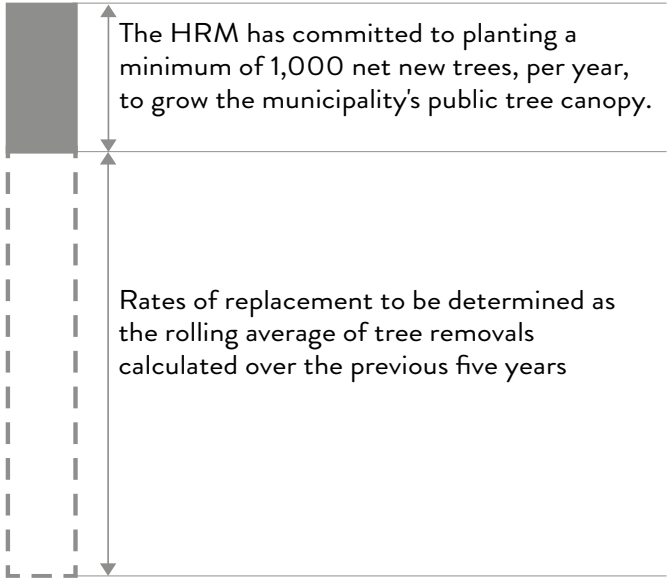


Figure 4-2. The HRM is committing to plant a minimum of 1,000 net new trees every year on top of replacement trees

MONITORING APPROACH

Monitoring is essential for the successful implementation of any strategic initiative. Urban forest management programs informed by current, high-quality datasets best support adaptive planning efforts. In addition to monitoring canopy cover, tracking several other indicators will provide information to evaluate successes and failures in implementation, allowing staff to plan, respond, and adjust to changes for better implementation outcomes. Table 4-1 identifies the core monitoring framework to track successes and gaps in the implementation of this plan.

Table 4-1. Core monitoring framework to support the tracking of the UFMPs' implementation.

Indicator	Method	Assessment (iterative)	Baseline (2023)	Target (2050)
1. Canopy Coverage	LiDAR + Orthoimagery	Five years	65% in urban core; 58% in the HRM	No net loss until five-year review
2. Net basal area (m ² /ha) loss through capital projects	Survey	Five years	Unknown	To be established at five-year review
3. Proportion of communities where a recent (< five years old) FireSmart™ Risk Assessment has been completed			Unknown	None
4. Net new trees planted annually	Inventory	Annual	Roughly 1,000 net new "ball and burlap" trees per year in the HRM's parks and streetscapes	A minimum of 1,000 net new "ball and burlap" trees per year in the HRM's parks and streetscapes
5. Net new trees planting in Urban Forest Enhancement Districts (UFEDs)	Inventory, Spatial Data	Annual	26%	40%
6. Average tree dbh (diameter at breast height) at removal	Inventory	Ongoing	Unknown	To be established at five-year review
7. Grid pruning cycle	Inventory	Ongoing	More than nine years	Seven years
8. Risk management procedures	Risk Management Procedures	Ongoing	Not formalized	Formalized and achieved on an annual basis
9. Woodland condition ratings	Inventory	Ongoing	Unknown	To be established at five-year review
10. Annual volunteer hours		Annual	Unknown	To be established at five-year review (2030)
11. Resident satisfaction with municipal outreach and education programming	Survey	Annual	58%	80%
12. Annual research funding	Capital Budget	Annual	\$50,000	\$50,000

Indicator	Method	Assessment (iterative)	Baseline (2023)	Target (2050)
13. Dialogues with Indigenous Committee	Varied	Annual	Ad hoc	Annual ongoing meetings
14. Program funding per capita	Operating and Capital Budgets	Annual	\$10 per capita	\$15 per capita (inflation adjusted)
15. Frequency of working group meetings	Calendars	Ongoing	No working group	Twice annually
16. Planted tree condition ratings	Inventory	Ongoing	Unknown	To be established at five-year review (2030)
17. Public reporting on UFMP implementation	State of the Urban Forest Reporting	Five years	None	5 years, repeating



▲ CR: Natalie Bell.

► Sample of the HRM's high-resolution tree canopy layer. The canopy layer will be regularly re-measured to support ongoing program monitoring .



Action Plan

Plan d'action



na'n



The UFMP action plan is organized around five objectives that address the essential components of urban forest management necessary to fulfill the plan’s overarching vision. Each objective is supported by a set of strategies designed to guide action and ensure measurable progress.

Progress toward achieving each strategy can be tracked using identified indicators and targets at the strategic level. This framework provides a clear and transparent means of evaluating the UFMP’s implementation. For detailed information on the monitoring approach, see section [4.3](#).

To operationalize the strategies, the UFMP outlines 110 actions that detail specific steps needed to implement each strategy effectively. When an action contributes to or aligns with another municipal initiative (e.g., HalifACT, IMP), it is marked with an accompanying badge to indicate its dual role in supporting broader municipal goals.

Occasionally, the cover of another strategic plan approved by the HRM is presented alongside an action in this Plan. This indicates that the action in this plan is supportive or is restated through one or more actions or initiatives identified through the plan indicated. In some cases, an action in this plan supports more than one plan, and so more than one cover is presented.

1. Planning and Protection

Objective: **HRM achieves sustainable balance between continued growth and the protection of the municipality’s natural areas and features.**

Planning and protection are essential to sustainable urban forest management. Planning involves the processes, regulations, provisions, and standards the HRM uses to include trees in new developments, whereas protection focuses on retaining existing trees during development. Planning approvals often include tree protection requirements or conditions.

HRM’s rapid growth presents a challenge in balancing development with the conservation of natural areas and features. Although development and tree protection can coexist, some development sites will inevitably require tree removal. The key is using planning tools to determine when the removal of trees to facilitate development is acceptable and to ensure trees are replanted on-site or elsewhere after construction.

Climate change and its full range of impacts can also present a source of tree loss. Coordinated planning can ensure tree management and development processes are supporting healthy trees and resilient urban environments so that the impacts of climate change are mitigated to the degree possible.

Actions and strategies in this section aim to support the HRM in achieving a balance between urban growth and conserving or enhancing natural areas and features. Strategies encompassing tree protection measures, planning tools, design-phase integration, and building climate resilience are each covered.

The strategies to achieve this objective:

- Ensure policies promote canopy cover in the Urban Core.
- Prioritize urban forests in the planning and design phase of projects.
- Build resilience to climate change impacts including wildfire threat and extreme weather.

Strategy 1.1: Ensure policies promote canopy cover in the Urban Core.

HRM's has two forms of policy at its disposal with respect to the municipality's trees: tree protection, and design-based intervention.

Tree protection focuses on preserving existing trees and woodlands on a site. Mature trees support significant canopy area and significantly more community benefits than smaller trees. It is in the community's interest to balance new development with the protection of mature trees and forested lands. In the HRM, public trees are protected by the Public Tree By-law, which requires permits for any activities by private entities that involve the removal of public trees. Private tree protection is typically negotiated during the development process, often as part of park dedication in greenfield developments, but this can vary by site.

Design-based policy interventions ensure the availability of suitable planting space and soils following development and are as important as tree protection. The HRM's varied development applications and permitting processes must consistently achieve a balance between supporting growth and leaving suitable areas for planted trees and green infrastructure.

Actions under [Strategy 1.1](#) aim to further tree protection requirements within the Municipality, as well as to better integrate trees into urban sites through enhanced specifications, site design criteria, and standards.

A CASE STUDY IN RIPARIAN PROTECTION


The City of Toronto's Ravine and Natural Feature Protection By-law requires a permit for various activities that would impact trees in the City's ravines and natural areas. The structure of the by-law provides regulations more tailored to woodland and ravine protection than a private tree by-law, and applies to features mapped through attached schedules.




INDICATOR(S):
Canopy Coverage


BASELINE (2023):
65% in urban core; 58% in the HRM



TARGET (2030):
No net loss until five-year review



- 

1.1 A Consider adopting a By-law to manage removal of trees on private property within the serviced areas of HRM, prioritizing riparian areas and focusing on larger properties with development potential.
- 1.1 B** Consider updates to contract language which would require hold-backs for tree protection where private contractors are working around public trees.
- 

1.1 C Periodically review the Municipality's Public Tree By-law to ensure design remains aligned with the needs of the HRM.
- 1.1 D** Formalize internal procedures for the retention, removal, and replacement (if necessary) of trees in municipal capital projects considering when: (i) Urban Forestry review/ sign off is required, and (ii) construction work requires arborist supervision.
- 1.1 E** Review the Municipality's engineering standards to promote tree and soil retention as a first priority for stormwater management.

- 

1.1 F  Develop new policies that will foster the acquisition and stewardship of forested environmental lands by the HRM, the Province and NGOs.
- 

1.1 G  Consider the planning policies and financial tools required to allow the Municipality to acquire new and improve existing parkland as part of urban infill and redevelopment projects.
- 

1.1 H When amending Community Plans and Land Use By-laws, update site design and built form requirements to ensure site design both requires adequate tree planting with new development, and will support the long-term growth of newly planted landscape trees.

- 1.1 I** Where the details of a Streets and Services permit trigger a Construction Management Plan, require tree planting in any rehabilitated street right-of-way to meet the requirements of the Municipal Design Guidelines.
- 1.1 J** Consider opportunities to use incentive or bonus zoning to encourage the voluntary retention of quality private trees through the development process.

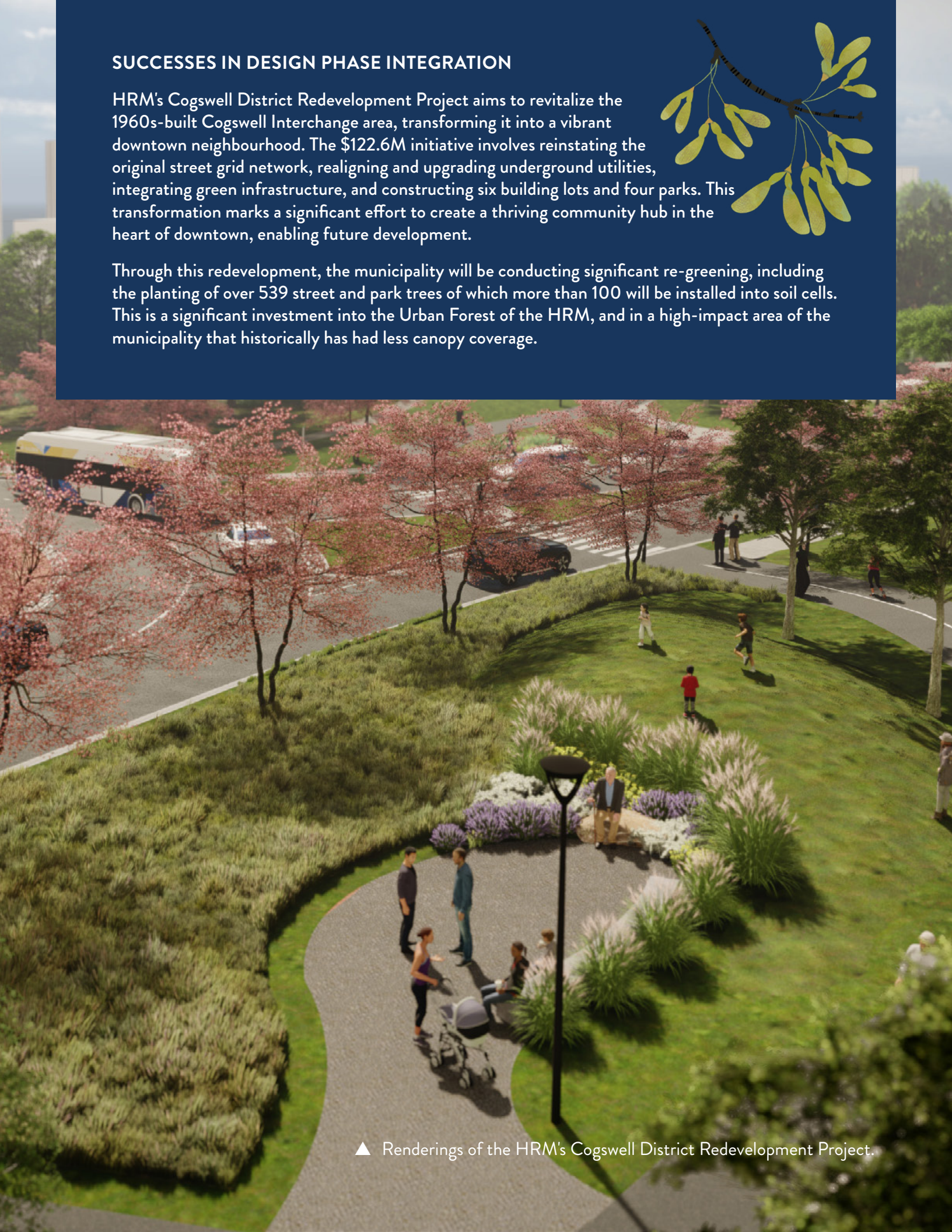


▲ CR: Natalie Bell.

SUCCESSES IN DESIGN PHASE INTEGRATION

HRM's Cogswell District Redevelopment Project aims to revitalize the 1960s-built Cogswell Interchange area, transforming it into a vibrant downtown neighbourhood. The \$122.6M initiative involves reinstating the original street grid network, realigning and upgrading underground utilities, integrating green infrastructure, and constructing six building lots and four parks. This transformation marks a significant effort to create a thriving community hub in the heart of downtown, enabling future development.

Through this redevelopment, the municipality will be conducting significant re-greening, including the planting of over 539 street and park trees of which more than 100 will be installed into soil cells. This is a significant investment into the Urban Forest of the HRM, and in a high-impact area of the municipality that historically has had less canopy coverage.



▲ Renderings of the HRM's Cogswell District Redevelopment Project.

Strategy 1.2: **Prioritize urban forests in the planning and design phase of projects.**


The best outcomes for planted trees are achieved when trees are considered early in the project planning and design process. At this stage, opportunities for alternative approaches, tree-sensitive design, and bolstered protection measures are generally still feasible. Beyond the design stage, once detailed design has been completed or work has been brought to tender, the opportunities for positive tree outcomes in the event of an unforeseen conflict are significantly reduced. Adjustments to approach are often prohibitively expensive and can also compromise critical project timelines and put budgets at risk. The actions under [Strategy 1.2](#) seek to improve the consideration for trees during the design phase, through improved design-phase information, discretion in planning approvals, and enhanced consideration through capital projects.

INDICATOR(S):
Net basal area (m²/ha) loss through capital projects

BASELINE (2023):
Unknown

TARGET (2030):
To be established at five-year review



1.2 A  Consider amending plans and Land Use By-laws to introduce flexible development regulations that would incentivize protecting mature tree stands and/or forested areas on lands proposed for development.



1.2 B Consider requiring arborist reports or tree protection plans in all cases where it would support decision-making as part of development processes.

1.2 C Update procedures related to data acquisition and migration to the asset registry such that that tree removal and replacement through capital projects is more accurately accounted.

1.2 D Work with utility providers to establish preferred and minimum planting setbacks from infrastructure, and to identify acceptable solutions (e.g., utility sleeves, root barriers, vertical setbacks) to facilitate reduced setbacks.



1.2 E Explore opportunities for tree planting and green infrastructure integration in surface parking lots through facility design.



1.2 F Prioritize tree retention and strong tree planting standards for capital projects planned within the Municipality's UFEDs ([Figure 2-17](#)).



1.2 G Prioritize tree retention in the design and development of new active transportation infrastructure.

Strategy 1.3: **Build resilience to climate change impacts including wildfire threat and extreme weather.**

HRM’s urban forest is increasingly vulnerable to the impacts of climate change. Challenges such as extreme weather events, heightened wildfire risk, and the spread of pests and diseases are expected to intensify in the years ahead, placing significant stress on both woodland and street tree populations.

To address these threats, the actions outlined under [Strategy 1.3](#) focus on enhancing the resilience of the urban forest . This strategy emphasizes proactive measures to adapt to climate change and ensure the long-term safety, health and functionality of the urban forest.



INDICATOR(S):
Proportion of communities where a recent (< five years old) FireSmart™ Risk Assessment has been completed

BASELINE (2023):
Unknown

TARGET (2050):
None

- 

1.3 A  Identify and map the wildland-urban interface (WUI) and high fire risk areas.
- 

1.3 B  Formalize wildfire risk mapping to inform wildfire within the wildland-urban interface.
- 

1.3 C  Through the review of the Regional Plan, consider wildfire risk mapping in settlement patterns and develop planning policy to support risk mitigation.
- 

1.3 D Develop standards for transfer agreements that apply FireSmart principles and invasive species removal measures prior to those lands being conveyed to the municipality.
- 1.3 E** Work with local nurseries to identify fire susceptible and fire resilient landscaping plants at the point of sale.
- 1.3 F** Develop internal and external (i.e., contractor) expertise related to fuels and wildfire management in woodlands.
- 1.3 G** Record tree loss during extreme weather events in the Municipality's tree inventory to better inform future emergency preparedness.



2. **Planting**

Objective: **Tree planting is sufficient to offset canopy cover losses and increase canopy cover within the HRM's Service Area Boundary.**

This Plan commits the HRM to planting a minimum 25,000 net new ball and burlap trees over the coming 25 years. This is in addition to continuing to support such initiatives as the HRM's free tree giveaway and identifying opportunities for community planting events.

However, sustainable rates of tree planting are more involved than simply getting more trees in the ground. Perhaps more important, the strategies under the planting objective also ensure the HRM is planting trees where trees are most needed, and to ensure that the tree planting standards and specifications are supporting trees growing to maturity. The municipality's Equity-Centered Management and Urban Forest Enhancement Districts ([Figure 2-17](#)) are intended to bridge existing equity gaps in the design of the urban forest management program, alongside other actions toward the same ends.

The strategies to achieve this objective are to:

- Plant more trees.
- Bridge gaps in access to the urban forest and its benefits.
- Ensure planting standards are supporting long-term tree growth.

Strategy 2.1: **Plant more trees.**

This Plan comes with a commitment for the Municipality to plant a minimum of 25,000 net new trees over the next 25 years. Rates of net new tree planting will be reviewed with each revisit of the UFMP. While Urban Forestry has achieved net new planting rates in the past five years, these rates have not met the commitments of the 2013 Urban Forest Master Plan or targeted specific neighbourhoods identified in that document for planting. The actions under **Strategy 2.1** support increasing rates of tree planting on both private and public property.

- 

2.1 A Continue to support the Municipality's tree giveaway program, growing it if and when demand exceeds program capacity.
- 

2.1 B Explore opportunities to work with institutional land owners toward planting programming on institutional lands.
- 2.1 C**  Plant a minimum of 1,000 net new trees per year in the HRM's parks and streetscapes.
- 

2.1 D  Create a spatial layer to document where opportunities for tree planting and reforestation exist on municipal property and consider identifying areas with high need for shade such as along sports fields and playground equipment.
- 2.1 E** Continue to explore opportunities to support tree planting initiatives through grant funding.
- 2.1 F** Prioritize use of native planting stock in planted plantings interfacing with natural areas (e.g., parks, interface subdivisions) to support native biodiversity, including birds.
- 2.1 G** Develop a planting plan for lands within the Centre Plan's Downtown designation with the objective of a net increase in canopy cover over the lifetime of the UFMP.
- 2.1 H** Prioritize new tree planting along multi-use paths (MUPs) and active transportation corridors.

INDICATOR(S):
Net new trees planted annually

BASELINE (2023):
Roughly 1,000 net new "ball and burlap" trees per year in the HRM's parks and streetscapes

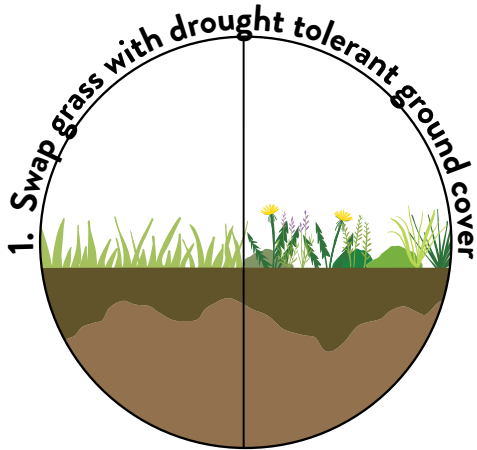
TARGET (2050):
A minimum of 1,000 net new "ball and burlap" trees per year in the HRM's parks and streetscapes

- 2.1 I** Explore opportunities to partner with the Province and other organizations toward developing a plant nursery as a local source of container, bare root, and/or caliper planting stock.
- 2.1 J** Encourage local suppliers to consider production of native plant species as identified in the HRM Natural Areas restoration guidelines

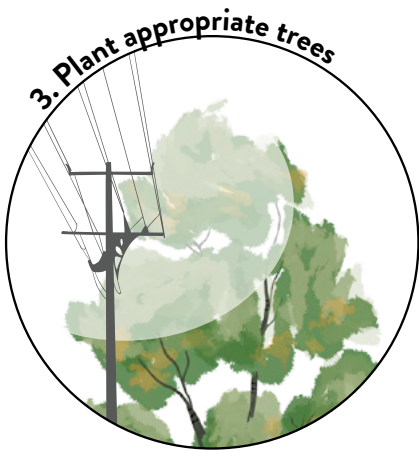
▼ 'Ball and burlap' planting stock ready for installation, peninsular Halifax.



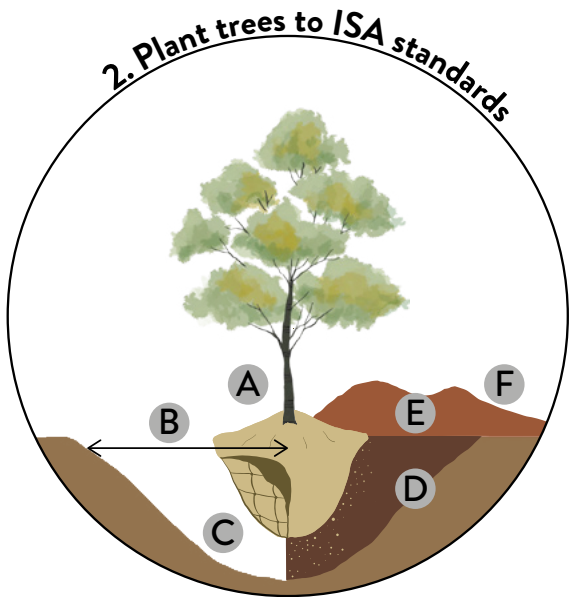
How can you contribute?



Grass removes moisture from the ground, reducing the supply to other organisms, including trees. Opting for a non-invasive alternative to grass preserves soil health around trees.



Selecting suitable trees ensure the proper growth of trees while also maintaining the safety of the surroundings. Small to medium trees can be planted close to powerlines.



- A. Visible trunk flare above ground

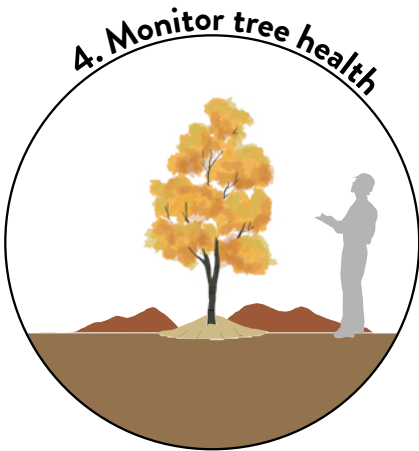
B. Planting hole should be 2-3x the size of the root ball

C. Remove burlap or wire baskets from the top and sides of the root ball to prevent constriction of roots

D. Fill in the hole and apply gentle pressure (with your foot) to the surface of the now covered root ball

E. Mulch with 2-3 inches of coarse wood chips; make sure to not pile up against the trunk

F. Avoid fertilization unless required by soil test



- A. Watch for foliage and stem damage.

B. Contact International Society of Arboriculture (ISA) certified arborist if you notice issues.

C. Report tree health concerns to HRM's online services: halifax.ca/home/online-services/trees



Tree pruning can help promote good structure and avoid structural problems from developing as tree ages. There are various pruning techniques to achieve desired purposes that can be found in the ISA guideline.

Strategy 2.2: Bridge gaps in access to the urban forest and its benefits.

Despite ample urban forest resources in the HRM, not all residents benefit equally from trees and green spaces. As the HRM continues to grow, equity must play a larger role in the delivery of urban forest services.

The Plan has identified several urban forest enhancement districts (UFEDs) and several more equity-centered management districts (ECMDs) (Figure 2-17). Urban Forest Enhancement Districts (UFEDs) are areas where tree canopy is low, despite high concentrations of equity-deserving individuals. This contrasts ECMDs, which are areas characterized by high concentrations of equity-deserving individuals, but are also areas where tree canopy is already fairly high. In ECMDs, tree planting is not necessarily the optimal equity-centered management approach, however there may be other approaches and interventions that could support equitable outcomes in such areas.

Outside of UFEDs and ECMDs, there are several initiatives that the HRM can initiate to enhance consideration for equity in urban forest management. The actions under Strategy 2.2 aim to improve access to urban forest benefits and services.

- 2.2 A Leverage the Municipality's Social Value Procurement and Supplier Code of Conduct to prioritize proposals and vendors that help bridge discrepancies in access and enjoyment of urban forest benefits, as well as those that work to bridge broader social inequities.
- 2.2 B Prioritize the retention of existing trees on public and private property within the HRM's UFEDs. (Figure 2-17).
- 2.2 C Allow advanced registration for residents living within an UFED interested in the HRM's annual tree giveaway. Undertake targeted advertisement of the tree giveaway to UFEDs. Reduce barriers to tree giveaway participation- such as enabling drop-off for residents with mobility challenges.

INDICATOR(S):
Net new trees planting in Urban Forest Enhancement Districts (UFEDs)

BASELINE (2023): Average canopy cover of 26% across UFEDs

TARGET (2050): Average canopy cover of 40% across UFEDs

- 2.2 D Consider ECMDs in urban forest operations and management (Figure 2-17), including but not limited to:
 - Prioritizing ECMDs with poor access to trails and parks in the development of trails on existing parkland,
 - Considering ECMDs through storm response and cleanup activities,
 - Prioritizing wildfire resilience programming and activities within interface ECMDs, and
 - Prioritizing succession management activities within ECMDs that are also located within a Succession Monitoring and Management Districts.
- 2.2 E Update ECMDs and UFEDs as is warranted through future UFMP review periods (Figure 2-17)

Strategy 2.3: Ensure planting standards are supporting long-term tree growth.

The Municipality can require tree planting standards that support planted tree longevity by ensuring planting standards meet best practices in tree planting. This can include use of emerging technologies like soil cells to improve soil volumes in tight urban areas, ensuring setbacks to buildings and utilities will not lend to future conflicts with nearby trees, and ensuring urban design thoughtfully integrates trees into street sections, plazas, and parks.

As the HRM’s population density increases in urban areas, heavy foot traffic can cause soil compaction and compromise the health of existing trees, leading to calls for hardscaping such areas. Surface treatments that accommodate foot traffic while maintaining existing tree roots and permeable surfaces may need to be explored in order to protect mature trees in heavy foot traffic areas.

The actions under Strategy 2.3 outline the steps the Municipality will take to ensure that new trees on public land are planted in conditions that support their full life-cycles and overall health.

Soil cell installation along Argyle street.



INDICATOR(S):
Average tree dbh (diameter at breast height) at removal

BASELINE (2023):
Unknown

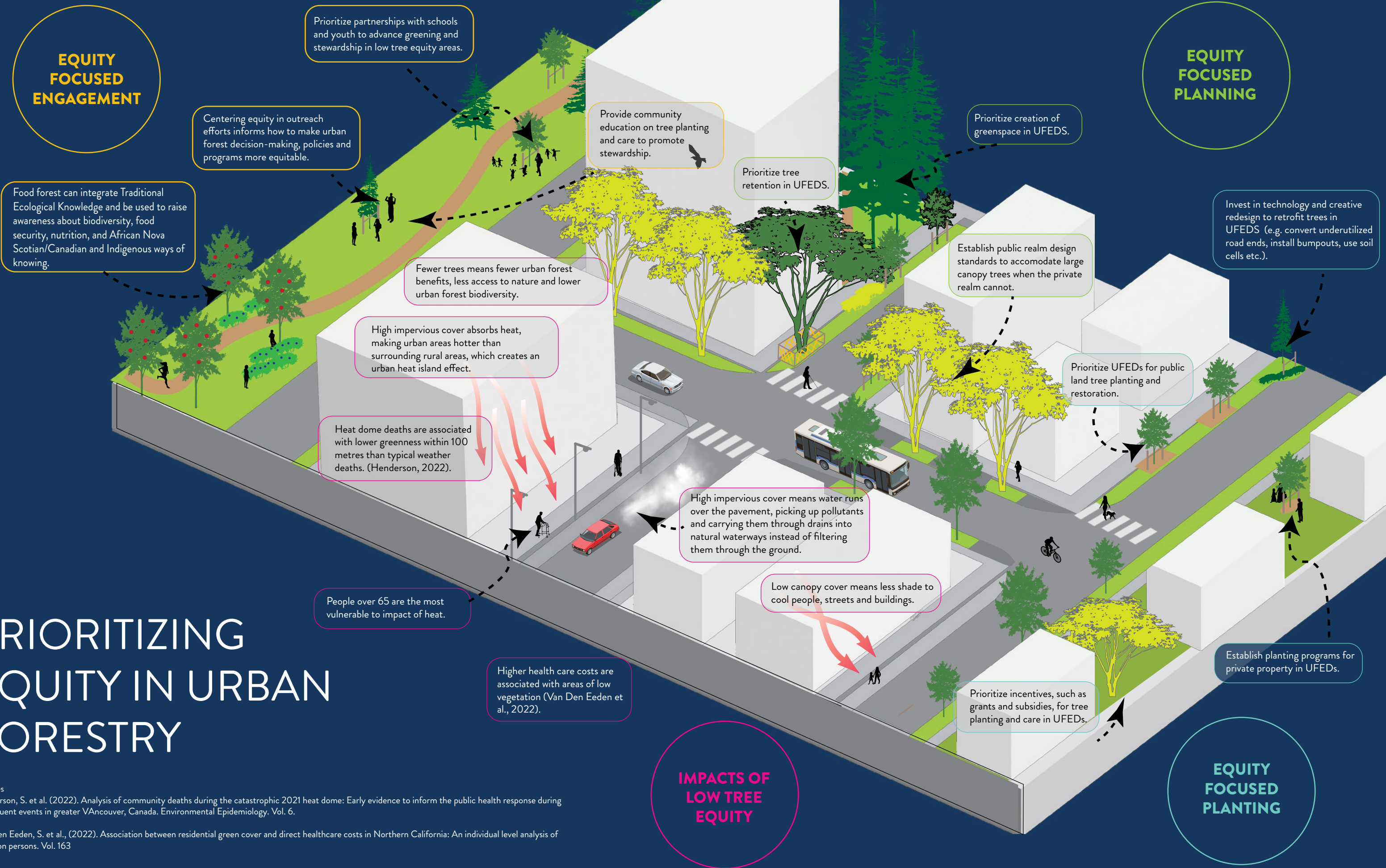
TARGET (2030):
To be established at five-year review

- 2.3 A Continue to explore new surface treatments and design solutions that may reduce pedestrian-tree conflicts in high-traffic areas.
- 2.3 B Ensure all new trees entering the inventory are reviewed by Urban Forestry to confirm that stock and establishment standards are met before being added to the registry.
- 2.3 C Establish standards for tree planting in plazas and open spaces that are aligned with the specifications detailed through the Red Book (e.g., soil volumes).
- 2.3 D Consider future climate hardiness informed by climate projections for the Halifax Region to inform stock selection for planted trees.
- 2.3 E Work with local researchers to evaluate the effectiveness of and recommend updates to new municipal design guidelines requiring soil cells and confirm whether they provide measurable advantages to tree growth over the use of structural soils.
- 2.3 F Undertake feasibility pilots of new climate-forward species and cultivars in open-grown parks settings.

PRIORITIZING EQUITY IN URBAN FORESTRY

Sources
Henderson, S. et al. (2022). Analysis of community deaths during the catastrophic 2021 heat dome: Early evidence to inform the public health response during subsequent events in greater Vancouver, Canada. Environmental Epidemiology. Vol. 6.

Van Den Eeden, S. et al., (2022). Association between residential green cover and direct healthcare costs in Northern California: An individual level analysis of 5 million persons. Vol. 163





3. Maintenance

Objective: **HRM's tree assets are managed in accordance with best practices and planned service levels are achieved.**

Few aspects of urban forest management are as important as proper maintenance. Maintenance is a sweeping objective and encompass most activities we undertake to improve the health or longevity of trees and woodlands in the HRM.

Modern urban forest management programs that subscribe to industry best practices undertake periodic, proactive tree care for each planted tree under a community's care. This is often a relatively small resource investment as compared to the costs of reactive maintenance and is widely acknowledged to extend tree life-cycles, and reduce premature mortality. For example, proactive pruning can resolve structural issues in trees before they become severe and are more likely to result in failure or otherwise require the removal of the tree.

Within the HRM's municipal woodlands, the focus of maintenance shifts from the individual tree to the entire forest ecosystem. Despite owning over 5,000 hectares of woodland, the HRM currently lacks a program to guide and administer proactive forest management. Activities that could be a part of woodland management program do occur and include invasive species removal, risk management, trails development and maintenance, and tree planting. Such initiatives are however currently ad hoc and are not informed by any coordinated management approach. These initiatives are generally targeted in their scope, implemented across varied departments with varied intents and responsibilities, and not subject to any form of a prioritization scheme.

The strategies to achieve this objective are to:

- Enhance planted tree care practices.
- Formalize a risk management process.
- Formalize the management of the HRM's woodland areas.

Strategy 3.1: Enhance planted tree care practices.

Planted tree care practices are the keystone to all modern urban forest management programs. Tree pruning, a foundational tree care activity, is a practice where certain parts of a tree, typically branches, buds and roots are removed to improve the tree structure, appearance, or to direct new, healthy growth. Pruning can also help to control the size of a tree and provide clearance for foot traffic, vehicles, or overhead utilities. The HRM currently targets a seven-year grid pruning cycle. Current resourcing levels are only sufficient to achieve roughly a nine-year cycle. Other common tree care elements include watering and young tree 'training', and integrated pest management. The HRM's existing Integrated Pest Management Strategy and tree watering programs are considered to be sufficient. The actions under [Strategy 3.1](#) covers these critical program elements.

INDICATOR(S):
Grid pruning cycle

BASELINE (2023):
More than nine years

TARGET (2050):
Seven years

▼ Tree worker in a bucket truck.



- 3.1 A** Achieve a seven-year grid pruning cycle for all planted trees in both streets and parks.
- 3.1 B** Establish a three-year cyclical maintenance program for all newly planted trees for the first 10 years of their life, and integrate this work into the HRM's cyclical pruning program.
- 3.1 C** Implement, expand, and improve the HRM's Integrated Pest Management Strategy to ensure invasive species of concern such as hemlock woolly adelgid and emerald ash borer are monitored, treated, and controlled.
- 3.1 D** Formalize a process for increased monitoring and gradual replacement of planted trees within Succession Monitoring and Management Districts (SMMDs) ([Figure 2-12](#)). Update SMMDs as is warranted through future UFMP review periods.
- 3.1 E** Work with utility providers toward the establishment of best practices/terms for clearance pruning around utility assets.
- 3.1 F** Implement an internal training program for parks labourers working in proximity to municipal trees.

Strategy 3.2: Formalize a risk management process.

Risk management is an asset management convention through which an asset manager commits to measures which mitigate risk associated with an acceptable level. Risk management commonly involves formal monitoring requirements, formalized risk thresholds, and specific treatments given different risk exposures and tolerance.

Where trees exist amongst people and property in our neighbourhoods and can fail, there is an inherent risk in their presence. The Municipality has a social obligation to ensure that the risk associated with its trees and forested parks is appropriately managed. Note that tree risk management does not imply the elimination of tree-related risks, but rather that the risk associated with trees is managed at an acceptable level. Differing from many of its peer communities, the HRM currently has no formalized tree risk management process in place. The actions under [Strategy 3.2](#) detail the procedural changes the Municipality will undertake to formalize its urban forestry risk management processes over the coming 25 years.

INDICATOR(S):

Risk management procedures

BASELINE (2023):

Not formalized

TARGET (2050):

Formalized and achieved on an annual basis

3.2 A Formalize operational procedures for risk inspection frequency, mitigation priority, mitigation time frames, qualifications, and documentation.

3.2 B In consultation with the municipality's legal team, formalize a risk management policy encompassing all urban forest asset classes (e.g., planted trees and forested parks).



▲ A tree down in the wake of Hurricane Juan. September 2003.
CR: Peter Duinker.

Strategy 3.3: Formalize the management of the HRM's woodland areas.

HRM is home to well over 5,000 ha of woodland area. Canopy cover in the HRM's (municipal, provincial, and federal) parks network makes up almost one tenth ([Table 2-1](#)) of the Municipality's canopy cover in the urban core. Beyond canopy cover, woodlands foster countless more social, cultural, and ecologic values, and represent biodiversity hotspots within the HRM's urban neighbourhoods.

The Municipality's forested parks face numerous threats including climate change, invasive species, wildfire, urban encroachment, and fragmentation. The HRM has no reason to expect the pressures to subside in the years ahead. At present, the Municipality has no coordinated approach in place to guide the management of its woodlands. The HRM must work to ensure that coordinated direction and resourcing is available to support these features and their sustainable management. Without woodlands, the HRM would not be as nice a place to live. The actions under [Strategy 3.3](#) sets out a path for the HRM to establish a sustainable woodlands management program.

3.3 A Formalize priorities and objectives in managing the Municipality's naturalized parks as a system, considering both ecologic and human uses.

3.3 B Coordinate with the province and private landowners to ensure fuel management activities on municipal land is supplemented, where possible and justified, by fuels management activities on abutting private or crown land, and vice versa.

3.3 C In cooperation with community and trails organizations, develop technical standards for forest trail construction and maintenance to ensure low impact to forest ecosystems.

3.3 D Establish an assessment framework supporting the evaluation of woodland health and function relative to long-term objectives in its management.

3.3 E Prepare an invasive species management strategy.

INDICATOR(S):

Woodland condition ratings

BASELINE (2023):

Unknown

TARGET (2030):

To be established at five-year review

3.3 F Undertake woodland assessments on a regular cycle to understand current conditions within a woodland of interest, and to inform short-term management interventions.

3.3 G Undertake woodland management activities, supported by current data on woodland condition, and informed by long-term objectives in woodland management.

3.3 H Explore opportunities for partnership with First Nations, African Nova Scotians/Canadians, other equity-deserving communities, other nature-based NGOs, and the Province to support community-led sustainable forest management on crown or municipal forested lands.



4. Stewardship

Objective: **Leverage partnerships and the community in urban forest management.**

More than 71% of the HRM's land base is under private ownership. Given this, the HRM's single greatest resource in managing its urban forest is its people. Community members are the residents, assorted property holders and managers that have outsized influence on the maintenance and administration of trees within the Municipality.

Stewards are members of the HRM's public that are engaged and knowledgeable on urban forest issues. These are individuals that are invested in the urban forest, supporting important messaging, and often directly enhancing program capacities through their own time and resources.

The strategies to achieve this objective are to:

- Develop community capacities.
- Support community outreach and education.
- Support research partnerships and opportunities.
- Explore opportunities for the integration of Indigenous Knowledge and culturally sensitive management practices in urban forest management practices.

Collaboration is a two-way process that will require the HRM to reach out to and involve community members. Indigenous and African Nova Scotian/Canadian engagement participants highlighted the importance of the HRM reaching out to and involving their communities in the work to implement this Plan and ensuring the municipality remains responsive to evolving community priorities. By doing so, the HRM can contribute to strengthening community connections and addressing historical wrongs that compromised those relationships.

- African Nova Scotian/Canadian workshop participant

Strategy 4.1: **Develop community capacities.**

For the HRM, the development of community capacities to support urban forest management is critical to garnering broad support for the program, and for meaningfully supporting implementation of this Plan as well. The actions under [Strategy 4.1](#) focus on programming efforts that provide outlets for community members and urban forest stewards to support the Municipality's program, contribute to management, and enhance urban forest outcomes on private and public lands.

INDICATOR(S):
Annual volunteer hours

BASELINE (2023):
Unknown

TARGET (2050):
To be established at five-year review (2030)

A CASE STUDY IN HARNESSING THE POWER OF COMMUNITY

The City of Mississauga's **Garlic Mustard Task Force (GMTF)** utilizes community stewards to reduce the spread of Garlic Mustard in the City's parks and natural areas. The program has only recently been formalized, but has run since 2018. Volunteers are trained by City staff to ensure they understand what Garlic Mustard looks like and how to remove it, as well as to review procedures for working safely outdoors. Volunteers are provided with the necessary supplies and work independently at an (approved) park of their choosing throughout the summer. Volunteers track their own hours, and report on the amount of garlic mustard removed through a volunteer management system.

In 2021, the GMTF was supported by 18 volunteers across 10 parks. Volunteers dedicated nearly 200 hours and removed 260 garbage bags of Garlic Mustard. The City invested approximately 40 hours of staff time into program administration and training. In 2022, the number of volunteers enrolled in the GMTF more than doubled, as did volunteer hours.

- **4.1 A**  Explore opportunities to work with other HRM business units, non-profit organizers, and community members to deliver community tree planting and invasive removal events.

**4.1 B** Make urban forestry data, including tree canopy mapping and inventory datasets, publicly available and explore ways to use this information to educate and build awareness.

**4.1 C**  Leverage and support the existing community programs and resources toward developing a community network with interest in the management of the HRM's woodlands.

4.1 D Continue to support volunteer tree planting requests under the Naturalization program.

4.1 E Formalize responsibilities for regular engagement with community members and organizations, as the responsibilities of a specific staff member(s).

4.1 F Leverage community capacities to support volunteer invasive species removal events.

Strategy 4.2: **Support community outreach and education.**

Community members have expressed a desire for more outreach and education on the urban forest and its management. While the Urban Forestry Division has had success in delivering periodic community outreach and education events in the past, programming has been inconsistent, supported only as existing staff capacities can absorb it outside of their regular duties and responsibilities. Consequently, UFMP engagement revealed gaps in residents' knowledge of urban forest management, as well as in the nuances of the HRM's urban forest management program and challenges it faces.

Enhanced outreach efforts and educational programming would develop the public as an urban forestry human resource, expanding the reach of program messaging and offerings, and potentially supporting new stewards. Enhanced communication would foster better dialogue between the HRM's Urban Forestry division and all residents and community members, ultimately generating greater community support for the implementation of the UFMP. [Strategy 4.2](#) includes actions that support improved Urban Forestry outreach and educational programming.

- 

4.2 A Explore partnerships with the Halifax Regional Centre for Education toward reaching youth in education and fostering urban forest education and interest amongst student demographics.
- 

4.2 B Formalize the Naturalization programming which is inclusive of urban forest education opportunities and stewardship activities.
- 4.2 C**  Ensure that outreach to communities integrate culturally sensitive communication methods.
- 4.2 D** Utilize door hangers to notify affected residents of planned maintenance on nearby boulevard trees and include brief educational material on the merits of (proactive) tree pruning.

INDICATOR(S):
Resident satisfaction with municipal outreach and education programming

BASELINE (2023): 58%

TARGET (2050): 80%

- 4.2 E** Leverage marketing materials and the program website to publish news, updates, and educational materials related to the urban forest and the UFMP.
- 4.2 F** Enhance work with Marketing and Public Affairs to communicate key initiatives, messaging, benefits of and challenges impacting urban forest management in the HRM.
- 4.2 G** Set up a publicly accessible digital dashboard to provide ongoing updates on trees planted, removed, conditions, and program design/fiscal health.
- 4.2 H** Produce a quarterly (email) newsletter on the latest Urban Forestry developments and progress in UFMP implementation.

Strategy 4.3: **Support research partnerships and opportunities.**

There is hardly an urban forest research legacy as impactful as the one the HRM fostered with researchers at Dalhousie University for more than 20 years. In fact, the HRM's 2013 Urban Forest Master Plan, cutting edge in its time, was the product of this very relationship. The 2013 Urban Forest Master Plan was written by accomplished researchers like Dalhousie's Dr. Peter Duinker, as well as varying alumni that have since gone on to work as staff at the HRM, with the Province, and across the country. The Urban Forest Master Plan was just the tip of the proverbial iceberg, countless studies, reports of findings, scientific articles, and broad urban forest advancements owe their origins to this relationship. The actions under [Strategy 4.3](#) are shaped to pay respects to this legacy, and to continue to support and develop the crucial knowledge exchange that has benefited the program and wider profession over decades past.

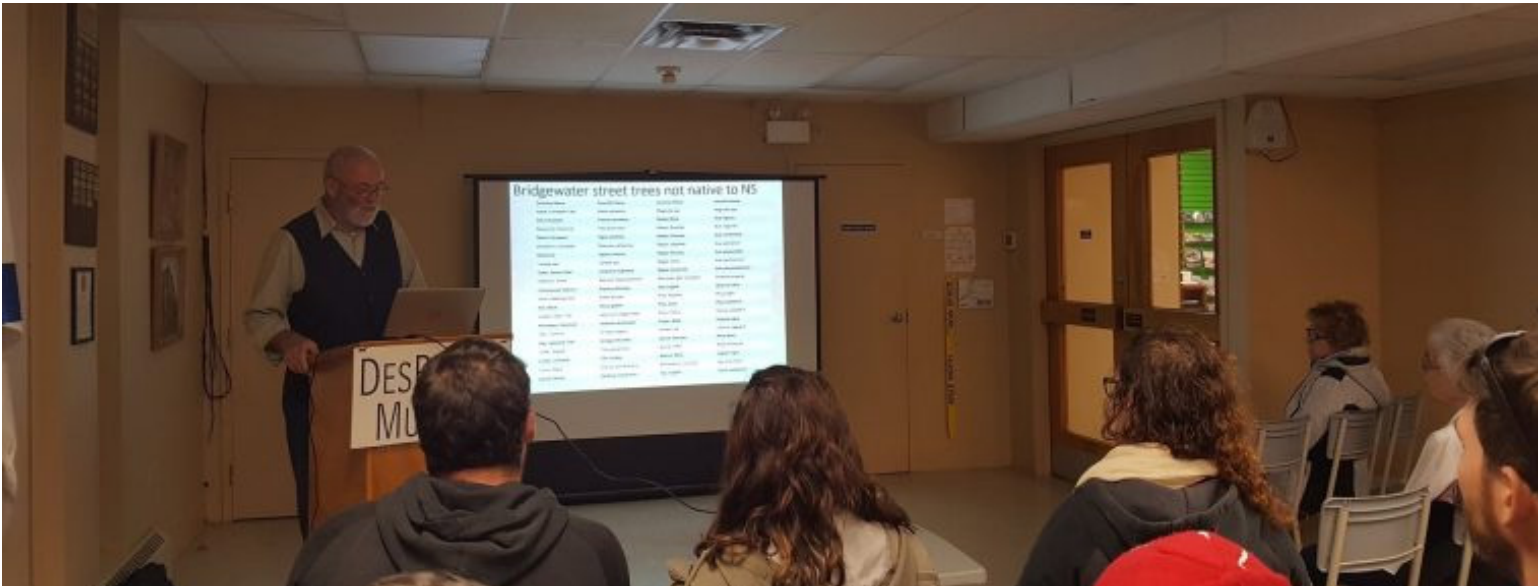
INDICATOR(S):
Annual research funding

BASELINE (2023): \$50,000

TARGET (2050): \$50,000 (inflation adjusted)

- 4.3 A** Continue to capitalize on opportunities for internship and cooperative placements.
- 

4.3 B Support opportunities for partnerships with academia toward building climate resilience in the Municipality's forested landscapes.
- 4.3 C**  Support opportunities to support research partnerships with academia.
- 4.3 D** Work with local institutions toward the establishment of an urban forest research chair



▲ Dalhousie University's Dr. Peter Duinker speaking to community members on the value of their trees.

Strategy 4.4: **Explore opportunities for the integration of Indigenous Knowledge and culturally sensitive management practices in urban forest management practices.**

For centuries, Relations have inhabited and cared for lands and ecosystems on which the HRM now sits. Their approach to forest management was inherently sustainable, rooted in a profound respect for the land and natural resources. Differing from early European settlers who viewed forests as commodities to be exploited, the Mi'kmaq have always considered the land and its gifts as sacred and strove for a harmonious coexistence. These enduring values and practices hold significant value for how we manage the urban forest in modern times. Recognizing the importance of Indigenous peoples and their cultural heritage, the HRM endeavours to honour their traditions, values, and stewardship which continue to this day. The actions under [Strategy 4.4](#) are to further explore and support opportunities to integrate Indigenous knowledge and practices into urban forest management.

A CASE STUDY IN INDIGENOUS PARTNERSHIP

After years of planning and collaboration between the Village of Pemberton, Lil'wat Nation and the Province of British Columbia, the Spelkúmtn Community Forest (SCF) management plan was finally unveiled spring of 2022. The SCF consists of a nearly 18,000 hectares of forested land and is a partnership between the Village of Pemberton and Lil'wat Nation designed to promote reconciliation, increase community benefits from local resources and amplify local voices in regards to the management of the surrounding forest.


The SCF management plan aims to protect and maintain water quality; protect, restore and enhance wildlife and fish habitat; protect at-risk species; protect and enhance recreation values and uses; and to protect the function and productivity of forest soils, amongst other values.

INDICATOR(S):

Dialogues with Indigenous Committee

BASELINE (2023): Ad hoc

TARGET (2050): Annual ongoing meetings

4.4 A  Work with First Nations and the Native Council of Nova Scotia to identify opportunities to integrate Traditional Knowledge into woodland management, and to support ongoing knowledge exchange.



4.4 B Identify urban sites for the establishment of medicine gardens to support healing while reclaiming and celebrating Indigenous culture.



4.4 C In consultation with Indigenous communities- explore opportunities to utilize placemaking and dedications to celebrate Indigenous language and culture.



4.4 D Work with First Nations communities to identify high priority forested stands within the community.



4.4 E HRM's Office of Diversity & Inclusion facilitate regular (e.g., annual) meetings with First Nations to review UFMP implementation progress, challenges and emerging opportunities for cooperation and partnership in urban forest management.

Indigenous community members in the HRM need accessible, safe locations for ceremonies and healing gardens, similar to the Halifax Public Gardens.



5. Administration and Monitoring

Objective: **Develop program resourcing, governance, and monitoring that support gradual implementation of the UFMP.**

The strategies under administration and monitoring capture a broad range of program actions targeting administration and vehicles for proper monitoring of this Plan's implementation. One of the shortcomings of the preceding Urban Forest Master Plan was that progress in implementation was not adequately monitored across many program areas, and resources often did not match new and enhanced elements areas. Such gaps will continue to create challenges in the full implementation of this Plan if not meaningfully resolved.

Objective five captures actions that support the Municipality in achieving the varied strategies and actions found under the preceding four objectives. Put simply, objective five's strategies and actions are generally enabling, rooted in process and supportive of the applied actions elsewhere in the UFMP.

While enabling in nature, the strategies under part five are no less crucial to the implementation of this Plan. Levels of resourcing and robust monitoring measures must be in place to support the actioning of this Plan, or implementation will not be successful.

The strategies to achieve this objective are to:

- Enhance program resources.
- Practice effective program governance.
- Strengthen natural asset management practices.
- Prioritize reporting and program monitoring.

The evolving needs of **Indigenous people within the HRM** require a flexible plan that aligns with community priorities and fosters meaningful engagement. By continuously developing parts of the Urban Forest Management Plan, Indigenous communities can introduce new voices and initiatives, such as land-back projects, species reclamation, and youth engagement programs, ensuring ongoing collaboration and mutual benefit.

Strategy 5.1: Enhance program resources.


Securing adequate resources is essential for the success of an urban forest management program. Currently, the 30-member Urban Forestry Division is responsible for managing an estimated 80,000 municipality-owned trees, responding to service requests, and supporting emergency cleanups post-storm events. As of 2023/24, the HRM’s program funding is approximately \$10 per resident, falling below the average among municipalities of similar sizes.

Moreover, the Urban Forestry team faces increasing demand for tree services, driven by expanding tree planting initiatives and the escalating impacts of climate change and future development. Strategy 5.1 aims to create sustainability in urban forest programming by assessing the resources required for UFMP implementation and exploring opportunities to secure these resources effectively.

INDICATOR(S):
Program funding per capita

BASELINE (2023):
\$10 per capita

TARGET (2050):
\$15 per capita (inflation adjusted)

- 

5.1 A

🚧

Develop new staff capacities within Urban Forestry as required to support increased service levels identified through this plan.
- 5.1 B

👤

Create an Education Officer position to support urban forest outreach and education programming, as well as coordinating partnerships with nonprofits, School Districts, Indigenous and African Nova Scotian/ Canadian groups, research institutions and other interested parties.
- 5.1 C

📋

Define levels of service for all asset classes (i.e., planted trees, park trees, forested areas), and resource requirements to support operational maintenance.
- 5.1 D

👤

Establish a FireSmart Coordinator role to support FireSmart programming on private lands and to support community education.
- 5.1 E

📝

Update the service agreement between Parks and Urban Forestry to reflect changes to levels of service that would result from adoption of the UFMP.
- 5.1 F

👤

Establish formal woodland management capacity, both staff and fiscal, to support monitoring, contract administration, outreach, and management activities with the Municipality’s treed and woodland parks.

Strategy 5.2: Practice effective program governance.

Urban forest program governance encompasses the policies, rules, practices, and structures that guide the management and protection of the urban forest. Effective governance is an important ingredient in an accomplished urban forest management program, influencing staff capacity and competency, partnerships, and community support.

Key components of effective governance include integrated planning processes, interdepartmental and inter-agency partnerships, and adequate resourcing. Strategy 5.2 includes a range of actions to support varied governance supports.

▼ Halifax Christmas Tree, Grand Parade.



INDICATOR(S):
Frequency of working group meetings

BASELINE:
No working group

TARGET (2050):
Twice annually

- 5.2 A

👤

Continue to support staff professional development and peer networking.
- 5.2 B

🌐

Continue to participate in national programs, networks, and events.
- 5.2 C

👥

Undertake periodic community surveys to understand changing public perspectives, including those of targeted communities, on urban forest management and associated strategic priorities.
- 5.2 D

👤

Establish an inter-departmental working group with terms of reference identifying staff and departmental leads in implementation. The working group will meet quarterly to share progress, opportunities, challenges, experiences, and concerns.
- 5.2 E

📋

Prepare a financial plan to formalize resource requirements and assign strategic (i.e., departmental) leads for each action item shortly following plan adoption.
- 5.2 F

🌳

Explore opportunities for the establishment of a stormwater (canopy) credit adjusted by the percentage of canopy cover on a property.

Strategy 5.3: Strengthen natural asset management practices.

Asset management is a methodology used to evaluate the value and needs of physical assets throughout their life-cycle. Municipalities are more and more adopting asset management principles to plan and budget for necessary investments in the maintenance, renewal, and replacement of public assets. This approach is valuable for budgeting and forecasting asset replacements.

At present, most municipal deployments of asset management frameworks focus on built infrastructure. However, there is increasing uptake of some natural asset classes (i.e., planted trees) into these systems. By utilizing asset management techniques for the management of the HRM's green infrastructure, the municipality can establish the required levels of service to optimize returns (i.e., maximize benefits and minimize risks) and allocate adequate resources accordingly. Asset management inputs like an up-to-date tree inventory can also support important municipal processes like succession management, proactive tree maintenance, storm response, and informed species selection.

While the HRM does have some natural asset management practices in place, there is a need for a formalized municipality-wide process. This Plan aims to provide guidance for formalizing asset management processes for both urban managed trees and natural areas. [Strategy 5.3](#) includes data acquisition and process-oriented actions which position the Municipality to readily integrate green infrastructure into an asset management framework.

- 5.3 A Develop inventory standards to support a condition assessment of the HRM's woodland areas under Municipal ownership.
- 5.3 B Maintain and expand the tree inventory to include urban park trees, condition ratings and year planted. Archive retired tree assets to track removals and guide regular maintenance and emergency management through time.
- 5.3 C Formalize standards and thresholds for monitoring, management, and replacement of assets with SMMDs ([Figure 2-12](#)), as well as a timeline for SMMD delineation.

INDICATOR(S):
Planted tree condition ratings

BASELINE (2023): Unknown

TARGET (2030): To be established at five-year review (2030)

- 5.3 D Scale Urban Forestry operating budgets with changes to levels of service and the number of assets under Urban Forestry's care.
- 5.3 E Link the Municipality's inventory of urban forest assets to CityWorks.
- 5.3 F Formalize levels of service for the management of Municipal woodland areas

SUCCESS IN ASSET MANAGEMENT

In 2023, the HRM contracted the Natural Asset Initiative (NAI, formally the Municipal Natural Assets Initiative) to conduct a pilot project within the Nine Mile River watershed. The watershed spans from the southern portion of Blue Mountain-Birch Cove reserve to Shad Bay. The project will evaluate the benefits that natural assets provide for stormwater management as well as four co-benefits, recreation, carbon storage and sequestration, physical and mental health, and cultural values.

Strategy 5.4: Prioritize reporting and program monitoring.

Program reporting and monitoring allows for an iterative approach to decision-making that allows for flexibility and adjustment in response to changing conditions, uncertainties, and new information. Given the dynamic nature of the urban forest, and the escalating uncertainties brought on by climate change and future development, the success of the UFMP implementation will depend on how well the HRM's processes to actively track these changes, and to bring forward formal reporting identifying their impacts on continued Plan implementation.

Various methods can be deployed to track change in the HRM's urban forest. For example, canopy cover can be tracked to understand changes in canopy extent over time. Woodland health monitoring is crucial for early detection of evolving forest health concerns, and can support prompt intervention to prevent irreversible damage. [Strategy 5.1](#) aims to establish monitoring and reporting mechanisms that support informed decision-making.

- 5.4 A Continue to monitor planting site technologies (e.g., soil cells, permeable pavement etc.) to understand their full life-cycle cost implications and measure the outcomes for the trees planted into them.
- 5.4 B Continue to update Municipal Design Guidelines to account for new technologies and best management practices.
- 5.4 C Produce a state of the urban forest report on a five-year interval to report on key program metrics and explore urban forest change since the preceding assessment.
- 5.4 D Review the Action Plan in the Urban Forest Management Plan every 5 years.

INDICATOR(S):
Public reporting on UFMP implementation

BASELINE (2023):
None

TARGET (2050):
5 years, repeating

- 5.4 E Procure new LiDAR and four-band (Near Infrared or NIR as the 4th band), high-resolution imagery on a five-year repeating interval. Prepare a new canopy layer with the datasets procured to inform the monitoring of canopy change within the HRM.
- 5.4 F Utilize four-band imagery to monitor canopy decline amongst conifers (e.g., HWA monitoring).
- 5.4 G Utilize the UFMP monitoring framework ([Table 4-1](#)) to inform ongoing monitoring and adaptive management interventions through UFMP review periods.

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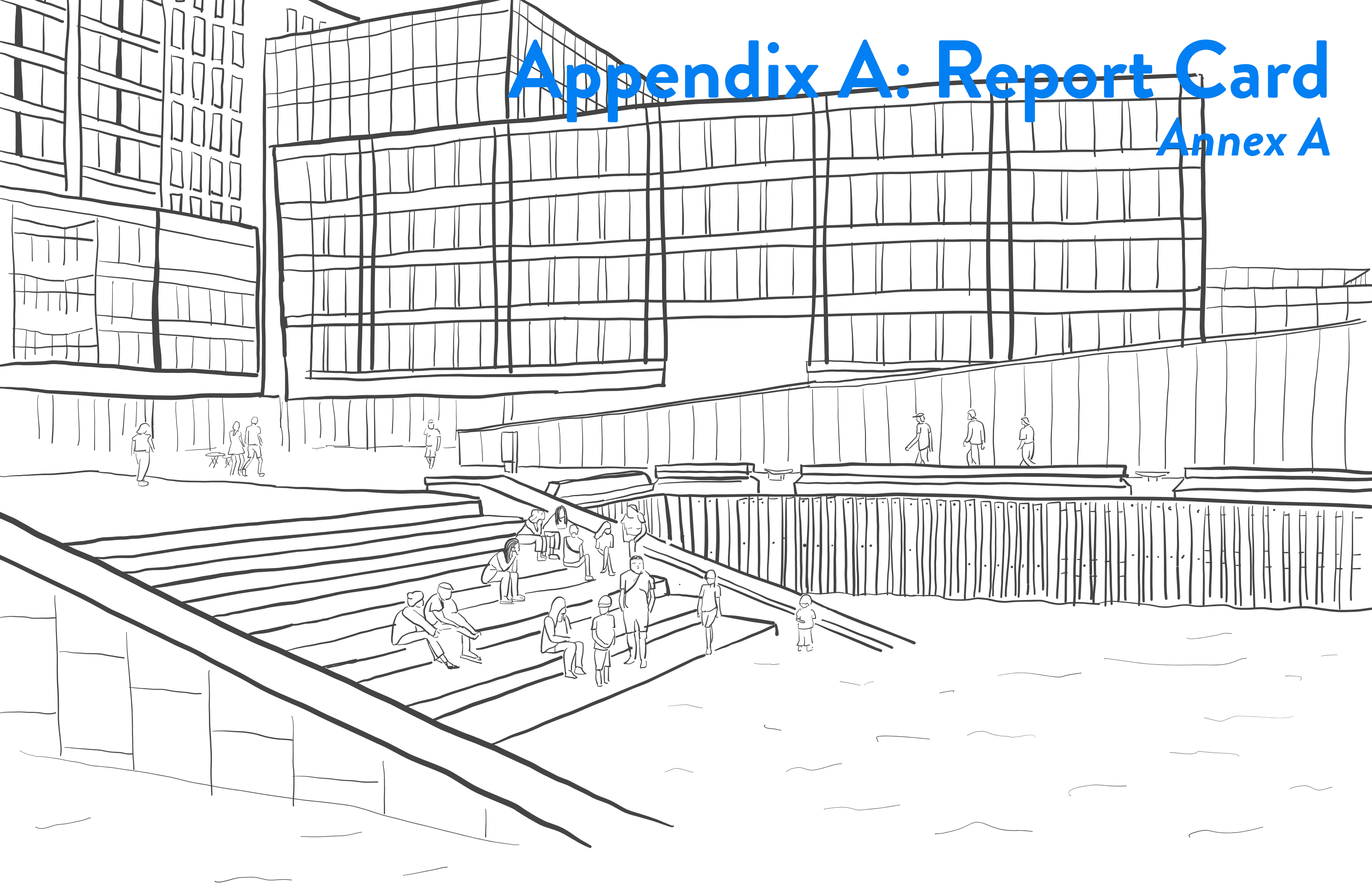
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Appendix A: Report Card

Annex A



Appendix 1. Sustainable Urban Forest Management Criteria and Indicators

Assessment Criteria	Objective	Indicator for Community Forestry Performance			
		Poor	Fair	Good	Optimal
PLANNING AND PROTECTION					
Awareness of the urban forest as a community resource	The urban forest is recognized as vital to the community’s environmental, social, and economic well-being.	General ambivalence or negative attitudes about trees, which are perceived as neutral at best or as the source of problems. Actions harmful to trees may be taken deliberately.	Trees are widely acknowledged as providing environmental, social, and economic services but are not widely integrated in corporate strategies and policies.	Trees are widely acknowledged as providing environmental, social, and economic services and urban forest objectives are integrated into other corporate strategies and policies.	Urban forest recognized as vital to the community’s environmental, social, and economic well-being. Widespread public and political support and advocacy for trees, resulting in strong policies and plans that advance the viability and sustainability of the entire urban forest.
Interdepartmental and Municipal agency cooperation on urban forest strategy implementation	Ensure all relevant municipal departments and agencies cooperate to advance goals related to urban forest issues and opportunities.	Little cooperation and conflicting among departments and/or agencies often leading to poor outcomes for trees.	Common goals but limited cooperation among departments and/or agencies and mixed outcomes for trees.	Municipal departments, affected agencies and urban forest managers recognize potential conflicts and reach out to each other on an informal but regular basis.	Formal interdepartmental working agreements or protocols for all projects that could impact municipal trees.
Clear and defensible urban forest canopy assessment and goals	Urban forest policy and practice is driven by comprehensive goals municipality-wide and at the neighbourhood or land use scale informed by accurate, high-resolution assessments of existing and potential canopy cover.	No assessment or goals.	Low-resolution and/or point-based sampling of canopy cover using aerial photographs or satellite imagery – and limited or no goal setting.	Complete, detailed, and spatially explicit, high-resolution Urban Tree Canopy (UTC) assessment based on enhanced data (such as LiDAR) – accompanied by comprehensive set of goals by land use and other parameters.	The City has a complete, detailed, and spatially explicit high-resolution Urban Tree Canopy (UTC) assessment accompanied by a comprehensive set of goals, all utilized effectively to drive urban forest policy and practice municipality-wide and at neighbourhood or smaller management level.
Relative tree canopy cover	Achieve desired degree of tree cover, based on potential or according to goals set for entire municipality and for each neighbourhood or land use.	The existing canopy cover for entire municipality is <50% of the desired canopy.	The existing canopy is 50%-75% of desired	The existing canopy is >75%-100% of desired.	The existing canopy is >75%-100% of desired - at the individual neighbourhood level as well as overall municipality
Municipality-wide urban forest management plan	Develop and implement a comprehensive urban forest management plan for public and private property.	No plan.	Existing plan limited in scope and implementation	Recent comprehensive plan developed and implemented for publicly owned forest resources, including trees managed intensively (or individually) and those managed extensively, as a population (e.g., trees in natural areas)	Strategic, multi-tiered plan with built-in mechanisms developed and implemented for public and private resources

Assessment Criteria	Objective	Indicator for Community Forestry Performance			
		Poor	Fair	Good	Optimal
Municipal green infrastructure asset management	Integrate green infrastructure assets into the municipal asset management system to support valuing and accounting for natural assets in the City's financial planning to build climate resilient infrastructure.	No recognition of value of natural or human-made elements that provide ecological and hydrological functions (green infrastructure)	Local government recognizes the value of green infrastructure but does not yet have information to include them in an asset management system.	Green infrastructure assets have been partially or fully inventoried and some assets are included in an asset management system, with the intent to ultimately capture all assets in the consolidated financial statements of the municipality.	Green infrastructure assets are inventoried and included in an asset management system and on the consolidated financial statement of the municipality.
Municipal-wide biodiversity or green network strategy	Acquire and restore publicly-owned natural areas in pursuit of meeting municipal-wide biodiversity and connectivity goals.	No or very limited planning and stewardship of natural areas.	Area specific management plans focused on management, restoration, and protection of natural areas.	Municipal-wide urban forest, parks or natural areas strategy guiding management, restoration, and protection of the existing natural areas network.	Biodiversity strategy or equivalent in effect to support management, restoration, and acquisition of natural areas network throughout the municipality.
Municipal urban forestry program capacity	Maintain sufficient well-trained personnel and equipment – whether in-house or through contracted or volunteer services – to implement municipality-wide urban forest management plan	Team severely limited by lack of personnel and/or access to adequate equipment. Unable to perform adequate maintenance, let alone implement new goals.	Team limited by lack of staff and/ or access to adequate equipment to implement new goals.	Team able to implement many of the goals and objectives of the urban forest management plan.	Team able to implement all of the goals and objectives of the urban forest management plan.
Urban forest funding to implement a strategy	Maintain adequate funding to implement the urban forest strategy.	Little or no dedicated funding.	Dedicated funding but insufficient to implement the urban forest strategy or maintain new assets as they are added to the inventory.	Dedicated funding sufficient to partially implement the urban forest strategy and maintain new assets as they are added to the inventory.	Sustained funding to fully implement the urban forest strategy and maintain new assets as they are added to the inventory.
Policy or regulations regulating the protection and replacement of private and City trees	Secure the benefits derived from trees on public and private land by enforcement of municipality-wide policies and practices including tree protection.	No or very limited tree protection policy.	Policies in place to protect public trees and employ industry best management practice.	Policies in place to protect public and private trees with enforcement but lack integration with other municipal policy to enable effective tree retention.	Urban forest strategy and integrated municipal-wide policies that guide the protection of trees on public and private land, and ensure they are consistently applied and enforced.
Policy or regulations for conservation of sensitive ecosystems, soils, or permeability on private property through development	Secure the benefits derived from environmentally sensitive areas by enforcement of municipality-wide policies in pursuit of meeting biodiversity and connectivity goals	No or very limited natural areas protection policy.	Policies in place to protect privately-owned natural areas without enforcement.	Development Permit Areas in place to protect privately-owned natural areas with enforcement but lack integration with other municipal policy to enable effective tree retention.	Biodiversity strategy or equivalent and integrated municipal-wide policies that guide privately-owned natural area protection and ensure they are consistently applied.
Internal protocols guide City tree or sensitive ecosystem protection	Ensure all relevant municipal departments follow consistent tree or ecosystem protection protocols for capital design and construction activities.	No protocols guiding City tree or ecosystem protection for capital design and construction activities.	Informal and inconsistent processes followed for City tree or ecosystem protection for capital design and construction activities.	Established protocols for City tree or ecosystem protection for capital design and construction activities but outcomes are inconsistent or sometimes unachievable.	Established protocols for City tree or ecosystem protection for capital design and construction activities are consistently followed and outcomes are successful.

Assessment Criteria	Objective	Indicator for Community Forestry Performance			
		Poor	Fair	Good	Optimal
Standards of tree protection and tree care observed during development or by local arborists and tree care companies	Consulting arborists and tree care companies understand city-wide urban forest goals and objectives and adhere to high professional standards.	Limited understanding or support for tree protection requirements.	General understanding or support for tree protection requirements but large variation in the quality of information and services provided.	General understanding or support for tree protection requirements and generally consistent quality of information and services provided.	Advocacy for tree protection requirements, engagement with City staff on improving processes and standards, and generally consistent quality of information and services provided to high professional standards.
Cooperation with utilities on protection (and pruning) of City trees	All 3rd party utilities employ best management practices and cooperate with the City to advance goals and objectives related to urban forest issues and opportunities.	Utilities take actions impacting urban forest with no municipal coordination or consideration of the urban forest resource.	Utilities inconsistently employ best management practices, rarely recognizing potential municipal conflicts or reaching out to urban forest managers and vice versa.	Utilities employ best management practices, recognize potential municipal conflicts, and reach out to urban forest managers on an ad hoc basis – and vice versa.	Utilities employ best management practices, recognize potential municipal conflicts, and consistently reach out to urban forest managers and vice versa.
PLANT / GROW					
City tree planting and replacement program design, planning and implementation	Comprehensive and effective tree selection, planting and establishment program that is driven by canopy cover goals and other considerations according to the UFS.	Tree replacement and establishment is ad hoc.	Some tree planting and replacement occurs, but with limited overall municipality-wide planning and insufficient to meet replacement requirements.	Tree replacement and establishment is directed by needs derived from an opportunities assessment and species selection is guided by site conditions, tree health and climate adaptation considerations.	Tree planting and replacement is guided by strategic priorities and is planned out to make progress towards targets set for canopy cover, diversity, tree health and climate adaptation within the timeframe of the strategy.
Development requirements to plant trees on private land	Ensure that new trees are required in landscaping for new development or, where space is lacking, there is an equivalent contribution to tree planting in the public realm.	Landscaping requirements do not address trees on private land.	Developments are generally required to plant trees but the outcomes are often in conflict with public trees and other infrastructure due to space limitations and not connected to meeting canopy cover targets.	Developments are required to plant trees or, where space is not adequate according to soil volume available, provide cash-in-lieu for equivalent tree planting on public land. The requirement is not connected to meeting canopy cover targets.	Developments are required to provide a minimum density of trees per unit measure or, where space is not adequate according to soil volume available, provide adequate cash-in-lieu for equivalent tree planting on public land. Planting density is determined based on meeting a municipal-wide canopy cover target.
Streetscape and servicing specifications and standards for planting trees	Ensure all publicly owned trees are planted into conditions that meet requirements for survival and maximize current and future tree benefits.	No or very few specifications and standards for growing sites.	Specifications and standards for growing sites exist but are inadequate to meet urban forest goals.	Specifications and standards exist and are adequate to meet urban forest goals but are not always achieved.	All trees planted are in sites with adequate soil quality and quantity, and with sufficient growing space to achieve their genetic potential and life expectancy, and thus provide maximum ecosystem services.
Equity in planting program delivery	Ensure that the benefits of urban forests are made available to all, especially to those in greatest need of tree benefits.	Tree planting and outreach are not determined equitably by canopy cover or need for benefits.	Planting and outreach includes attention to low canopy neighbourhoods or areas.	Planting and outreach targets neighbourhoods with low canopy and a high need for tree benefits.	Equitable planting and outreach at the neighbourhood level are guided by strong citizen engagement in identified low-canopy/high-need areas.

Assessment Criteria	Objective	Indicator for Community Forestry Performance			
		Poor	Fair	Good	Optimal
Forest restoration and native species planting	Encourage the appreciation of climate suitable native vegetation by the community and ensure native species are widely planted to enhance native biodiversity and connectivity	Voluntary use of climate suitable native species on publicly and privately-owned lands.	The use of climate suitable native species is encouraged on a site-appropriate basis in public and private land development projects.	Policies require the use of climate suitable native species and management of invasive species on a site-appropriate basis in public and private land development projects but are not integrated across all policy or guided by a connectivity analysis.	Policies require the use of climate suitable native species and management of invasive species on a site-appropriate basis in public and private land development projects and through tree bylaw.
Selection and procurement of stock in cooperation with nursery industry	Diversity targets and climate adaptation/mitigation objectives guide tree species selection and nurseries proactively grow stock based on municipal requirements.	Species selection is not guided by diversity targets or climate adaptation/mitigation objectives.	Species selection is guided by diversity and climate adaptation/mitigation but required stock is rarely available from nurseries and acceptable substitutes reduce diversity.	Species selection is guided by targets for diversity and climate adaptation/mitigation and required stock or acceptable substitutes are usually available from nurseries.	Species selection is guided by targets for diversity and climate adaptation/mitigation and required stock is secured ahead of the planned planting year from contract or in-house nurseries.
Ecosystem services targeted in tree planting projects and landscaping	Incorporate ecosystem services objectives into public and private tree planting projects to improve urban tree health and resilience, carbon sequestration, stormwater management and cooling	Ecosystem services not considered in planting projects or intentionally designed into vegetated landscapes	Ecosystem services, such as stormwater interception, occasionally incorporated into City or private land planting projects and landscape designs.	Guidelines in place for planting projects and landscape designs on public and private land to deliver specific ecosystem services.	Ecosystem services targets are defined for the urban forest and policy requires planting project and land-scape designs on public and private land to contribute to meeting targets.
MAINTENANCE AND MONITORING					
Tree inventory	A current and comprehensive inventory of intensively managed trees to guide management, including data such as age distribution, species mix, tree condition and risk assessment.	No inventory.	Partial inventory of publicly-owned trees in GIS.	Complete inventory of planted trees and intensively managed park trees in GIS but inconsistently updated.	The municipal tree inventory is complete, is GIS-based, supported by mapping, and is continuously updated to record growth, work history and tree condition.
Knowledge of trees on private property	Understand the extent, location, and general condition of privately-owned trees	No information about privately owned trees.	Aerial, point-based or low-resolution assessment of tree canopy on private property, capturing broad extent.	Detailed Urban Tree Canopy analysis of the urban forest on private land, including extent and location, integrated into a municipality-wide GIS system.	The City has an i-Tree Eco analysis of private trees as well as detailed Urban Tree Canopy analysis of the entire urban forest integrated into a municipality-wide GIS system.
Natural areas inventory	A current and comprehensive inventory of sensitive and modified natural ecosystems and their quality mapped to Provincial standards to provide standardized ecological information to support decision-making.	No inventory of natural areas.	Natural areas inventoried in GIS but not recently updated and attribute information not to a standard that can support decision-making.	Natural areas inventoried in GIS and with standard and complete attribute information to support decision-making but not updated in the last 5 years.	Natural areas inventoried in GIS and with standard and complete attribute information to support decision-making and updated in the last 5 years.

Assessment Criteria	Objective	Indicator for Community Forestry Performance			
		Poor	Fair	Good	Optimal
Age diversity (size class distribution)	Provide for ideal uneven age distribution of all “intensively” (or individually) managed trees – municipality-wide as well as at neighbourhood level	Even-age distribution, or highly skewed toward a single age class (maturity stage) across entire population	Some uneven distribution, but most of the tree population falls into a single age class	Total tree population across municipality approaches an ideal age distribution of 40% juvenile, 30% semi-mature, 20% mature, and 10% senescent	Total population approaches that ideal distribution municipality-wide as well as at the neighbourhood level
Publicly owned tree species condition	Current and detailed understanding of condition and risk potential of all publicly owned trees that are managed intensively (or individually)	Condition of urban forest is unknown	Sample-based tree inventory indicating tree condition and risk level	Complete tree inventory that includes detailed tree condition ratings	Complete tree inventory that is GIS-based and includes detailed tree condition as well as risk ratings
Maintenance of intensively managed trees	Maintain all publicly owned intensively managed trees for optimal health and condition in order to extend longevity and maximize current and future benefits	Intensively managed trees are maintained on a re-quest/reactive basis.	Intensively managed trees are maintained on a request/reactive basis. Limited systematic (block) pruning and/or immature trees are structurally pruned.	All intensively managed trees are systematically maintained on a cycle determined by work-load and resource limitations. All immature trees are structurally pruned.	All mature intensively managed trees are maintained on an optimal pruning cycle. All immature trees are structurally pruned.
Tree risk management	Comprehensive tree risk management program fully implemented, according to ANSI A300 (Part 9) “Tree Risk Assessment” standards, and supporting industry best management practices	No coordinated tree risk assessment or risk management program. Response is on a reactive basis only.	Some areas within the city are prioritized for risk assessment and management. Little annual budget is available to develop a more proactive inspection program.	Priority areas of the City are inspected on a regular schedule and operational standards and budgets are in place for responding to and managing tree risks within an appropriate timeframe.	A comprehensive risk management program is in place, with all public lands inspected on defined schedules and operational standards and budgets in place for responding to and managing tree risks within an appropriate timeframe.
STEWARDSHIP					
Citizen involvement and neighbourhood action	Citizens and groups participate and collaborate at the neighbourhood level with the municipality and/or its partnering NGOs in urban forest management activities to advance municipality-wide plans	Little or no citizen involvement or neighbourhood action.	Community groups are active and willing to partner in urban forest management, but involvement and opportunities are ad hoc.	Several active neighbourhood groups engaged across the community, with actions coordinated or led by municipality and/or its partnering NGOs.	Proactive outreach and coordination efforts by the City and NGO partners result in widespread citizen involvement and collaboration among active neighbourhood groups engaged in urban forest management
Involvement of large private land and institutional land holders (e.g., schools)	Large private landholders to embrace and advance city-wide urban forest goals and objectives by implementing specific resource management plans	Large private landholders are generally uninformed about urban forest issues and opportunities.	Landholders manage their tree resource but are not engaged in meeting municipality-wide urban forest goals.	Landholders develop comprehensive tree management plans (including funding strategies) that advance municipality-wide urban forest goals.	As described in “Good” rating, plus active community engagement and access to the property’s forest resource.
Urban forest research	Research is active and ongoing towards improving our understanding of the urban forest resource, the benefits it produces, and the impacts of planning, policy, design and management initiatives.	No urban forest research.	Isolated academic re-search occurs in the municipality’s urban forest.	The municipality supports and has input on academic research occurring in its urban forest and knowledge transfer occurs.	The urban forest is a living laboratory – in collaboration with public, private, NGO and academic institutions – integrating research and innovation into managing urban forest health, distribution, and abundance.

Assessment Criteria	Objective	Indicator for Community Forestry Performance			
		Poor	Fair	Good	Optimal
Regional collaboration	There is cooperation and interaction on urban forest plans among neighbouring municipalities within the region, and/or within regional agencies.	Municipalities have no interaction with each other or the broader region for planning or coordination on urban forestry.	Some neighbouring municipalities and regional agencies share similar policies and plans related to trees and urban forest.	Some urban forest planning and cooperation across municipalities and regional agencies.	Widespread regional cooperation resulting in development and implementation of regional urban forest strategy.
MANAGEMENT					
Emergency response planning	A response plan guides call-out procedures, resources available and the clean-up response for extreme weather and earthquake.	Response plan not documented or not current.	Response plan is documented and includes call-out procedures, roles and responsibilities but lacks details to prioritize hazards and clean-up.	Response plan includes call-out procedure, roles and responsibilities, and criteria for prioritizing tree hazards and removing debris is in place.	A comprehensive response plan is in place and a response drill occurs annually.
Pest and Disease Management	An Integrated Pest Management (IPM) Plan guides treatment responses to existing and potential pest, disease and invasive species threats to the urban forest.	No integrated pest management plan and no pest management.	No integrated pest management plan and reactive pest management.	An integrated pest management plan is in place and implemented.	A comprehensive pest management program is in place, with detection, communication, rapid response and IPM practiced.
Waste biomass utilization	A closed system diverts all urban wood and green waste through reuse and recycling	Wood waste from the urban forest is not utilized.	Wood waste from the urban forest is utilized as mulch or biofuel.	Wood waste from the urban forest is utilized as mulch or biofuel and sometimes high value pieces are milled and stored for later use or sold on to local value-added industries.	Low value wood waste from the urban forest is utilized as mulch or biofuel and all high value pieces are milled and stored for later use or sold on to local value-added industries.
Tracking of operational carbon footprints and urban forest carbon-cycle balance	Organization will actively track their operational carbon footprints and their community-wide urban forest carbon-cycle balance and work with community partners to minimize greenhouse gas emissions (GHG) emissions while maximizing carbon sequestration and avoided GHG emissions.	Basic CO2/GHG accounting not considered for urban forestry operations	Basic CO2/GHG accounting and carbon cycle assessment and climate action plan undertaken for urban forestry operations and for the entire community with general goals and objectives to minimize community emissions	Basic CO2/GHG accounting and carbon cycle assessment and climate action plan undertaken with specific goals and objectives for urban forestry and formal policies in place to encourage use of trees and green infrastructure for carbon sequestration and energy conservation in buildings	Basic CO2/GHG accounting and carbon cycle assessment and climate action plan undertaken for urban forestry operations and for the entire community with specific goals and objectives for urban forestry and formal policies in place to encourage use of trees and green infrastructure for carbon sequestration and energy conservation in buildings, and to maximize urban wood and woody biomass utilization.
Species diversity	Establish a genetically diverse population across the municipality as well as at the neighbourhood scale	Five or fewer species dominate the entire tree population across municipality	No single species represents more than 10% of the total tree population; no genus more than 20%, and no family more than 30%	No single species represents more than 5% of total tree population; no genus more than 10%; and no family more than 15%	At least as diverse as “Good” rating (5/10/15) municipality-wide and at least as diverse as “fair” (10/20/30) at the neighbourhood level
Species suitability	Establish a tree population suited to the urban environment and adapted to the overall region	Fewer than 50% of all trees are from species considered suitable for the area	>50%-75% of trees are from species suitable for the area	More than 75% of trees are suitable for the area	Virtually all trees are suitable for the area

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