Halifax Regional Municipality

Urban Forest Master Plan

July, 2013

HALIFAX
REGIONAL MUNICIPALITY

DALHOUSIE UNIVERSITY
Inspiring Minds

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ACKNOWLEDGEMENTS

The development of the UFMP was made possible by HRM Council and its recognition of the need for a comprehensive plan to ensure the ongoing sustainability of our urban forest. The urban forest planning team expresses its deepest gratitude to the hundreds of HRM citizens who became actively involved in the creation of the UFMP. Valuable feedback during plan development was also provided by a review team comprised of members of the Atlantic Chapter of the International Society of Arboriculture, Atlantic Provinces Association of Landscape Architects, Ecology Action Centre, and Licensed Professional Planners Association of Nova Scotia. Finally, the planning team would like to express its thanks to the Government of Nova Scotia and Natural Resources Canada for providing urban forest canopy research funding through the Atlantic Climate Adaptation Solutions Project.

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EXECUTIVE SUMMARY

The urban forest, simply put, can be defined as every tree within the city. Trees' natural diversity and their interconnectedness with human activities and the built environment make urban forests both complex and dynamic. Urban forests require sustainable management that focuses on the ecological, economic, and social services trees provide, with special attention to the human health and safety dimensions. Trees provide multiple benefits for people in an urban setting—some more apparent than others. We can easily see and feel how they enhance our civic pride, quality of life and sense of wellbeing, but they also provide measurable economic benefits and their natural services are a critical aspect the city's green infrastructure. Some examples of these services include improved air quality, biodiversity, carbon capture and storage, improved energy efficiency, stormwater control, and noise reduction.

Management of the entire urban forest, under both public and private ownership, must draw from a wide array of tools and approaches to satisfy the urban forest values of citizens and foster public engagement and stewardship. A key mechanism in sustainable urban forest management (SUFM) is the municipal urban forest master plan (UFMP), designed to establish policies, procedures, and implementation strategies to guide a municipality towards a sustainable future for its urban forest. HRM has urgently needed a UFMP for some time. This urgency has been accelerated as a result of a series of destructive events, such as the longhorn beetle infestation and Hurricane Juan.

In 2001, HRM Council passed a motion to develop a management plan for urban forests. This initiative was integrated with Council's development of a long-range regional development plan that commenced in the fall of 2001. In 2006, Regional Council adopted Policy E-20 contained in the HRM Regional Municipal Planning Strategy (RMPS). The policy (HRM, 2006) states: "HRM shall prepare an Urban Forest Functional Plan to identify design guidelines and a management strategy to maximize the urban forest". The overall goal of the UFMP is to ensure a sustainable future for our urban forest.

In 2007, HRM and Dalhousie University conducted the first-ever comprehensive study of HRM's urban forest. Tree inventories were developed and analyzed to provide information on tree populations, age distributions, tree-species diversity, tree condition, and economic benefits. The study revealed an impressive overall canopy cover of 43 percent. It also estimated that 709,000 publicly-owned trees line the urban streets of HRM. Of these, 157,000 were directly planted and managed, while the other 552,000 were naturally regenerated trees along HRM roadways. Despite this abundance, the research showed there were still 94,000 vacant and plantable spots for trees on HRM-controlled rights of way. The study also detailed the economic benefits of the urban forest. For example, about 1,478 metric tons (Mg) of pollutants are removed annually by urban trees and shrubs in the serviced area of HRM. This equates to $9.6 million each year in air pollution mitigation benefits. The research also showed that HRM's street trees saved $12.4 million in energy costs each year. The shade provided by urban trees can reduce the total energy required to cool a building. This cooling effect not only reduces energy costs, it also translates into reduced air emissions associated with air conditioning. Our street trees also play an essential role in moderating stormwater and flood damage, water quality, erosion, and stormwater treatment costs. In HRM, it is estimated that street trees provide about $2.1 million in stormwater reduction services annually.

The overall goal of the UFMP is to ensure a sustainable future for our urban forest. The multi-year community engagement process and research initiatives that led to the development of the Plan has resulted in an integrated social, ecological, and economic strategy that strives to incorporate the values of HRM citizens.

The UFMP is a comprehensive document that:

- Provides a detailed overview of the environmental and economic benefits provided by HRM's urban forest.
- Explains the overall design of the Plan and the methods and planning principles used in its development.
- Articulates a UFMP management framework, which includes an inventory of urban forest values, objectives, indicators, and canopy targets linked to specific management and monitoring efforts.

- Offers an in-depth analysis of current urban forest conditions, as well as existing and future challenges, opportunities, and priorities for managing the urban forest at community and neighbourhood scales.
- Outlines a priority-based implementation strategy including actions, probable costs, management structure and timelines.

The UFMP will be implemented in an area extending approximately 15 km outwards from the Halifax Harbour and geographically defined by HRM communities that receive water and wastewater services. Communities receiving these services generally feature the types of compact development and nearby urban centre amenities usually associated with urban living. HRM's urban forest can be seen as a continuous natural resource that spans all public and private properties in the serviced communities of Bedford, Beechville, Lakeside, Timberlea, Dartmouth, Cole Harbour, Eastern Passage, Halifax Peninsula, Halifax Mainland, Sackville, and Spryfield.

In the management of a city's urban forest, the levels of planning range from strategic, city-wide management planning to detailed, street level planning. It is the vision of the HRM UFMP to overcome disconnects between spatial levels of management and gaps between policy and operations. This has been accomplished through the neighbourhood management approach that includes four discrete spatial levels, from broadest to finest: 1) the UFMP Study Area, which essentially includes all municipally serviced areas in HRM, 2) the communities, which follow boundaries of historical pre-amalgamation cities and towns, 3) the neighbourhoods, which exhibit distinctive environmental and settlement patterns, and 4) the neighbourhood divisions, featuring unique land-use subsets within neighbourhoods that warrant special attention in local urban forest management.

The UFMP Study Area was divided into 111 unique urban forest neighbourhoods . The urban forest neighbourhood approach was developed specifically for the UFMP and is embedded throughout the Plan. It came about when planning-team researchers noted significant differences among canopy cover percentages in several communities due to unique historical impacts, land use, and pre-existing conditions such as soil quality, topography, and climate. Consequently, the UFMP implements a novel approach to urban forest planning, driven by the concept of neighbourhood-scale management. The "urban forest neighbourhood" is essentially the functional management unit of the UFMP, and represents the basic level on which SUFM will be implemented.

A rigorous analysis of neighbourhood-scale urban forest conditions, management challenges, and opportunities for improvement was undertaken. The analysis incorporated several sources of data and information. The data were used to calculate a series of neighbourhood- and community-scale indicators, including tree size-class distribution, species distribution, street-tree deficit (number of planting opportunities), area of naturalized forest stands, and proportion of residential properties with a value tree. Using these indicators, and applying the urban forest management principles described in Chapter 4 and the urban forest improvement targets established in Chapter 5, the team developed a schedule of desired management actions described in the UFMP as "treatments" for each neighbourhood. All but one of the treatments deal with decisions related to planting trees. This is based on two general observations: that many more trees are needed in the city to fulfill the plan's aspirations for urban-forest benefits and that planting decisions are by far the most influential decisions associated with improvement of the urban forest.

The guiding and operational management principles of the UFMP are set in perpetuity as part of HRM's long-term vision. The majority of management actions in the Plan will operate annually within five-year implementation periods.

Principles are best designed as statements of basic truths, and are the foundation of a planning process because they give direction and rationality to all subsequent decisions made during a planning process. Principles, goals and objectives developed through public consultation and approved by HRM Council for the Regional Municipal Planning Strategy were incorporated into the UFMP planning process. In accord with the HRM Regional Plan mandate, the UFMP adopted the following guiding principles to steer the development of the UFMP and management of the urban forest. The guiding principles are not arranged hierarchically, as each one influences every element of the UFMP equally.

Guiding Principle 1 – Adaptive Management

The HRM urban forest is a complex natural resource system, and managing a public resource in the face of great future uncertainty requires a management system that fosters continual learning and refinement. This principle is known as "adaptive management". Generally, an effective adaptive management framework performs three tasks: making impact predictions in the form of testable hypotheses, measuring outcomes during and after implementation, and rigorously comparing predictions and measurements.

Guiding Principle 2 – Precaution

The precautionary principle has a simple and straightforward intention: when an action may inflict harm, approach with caution. This simple definition stresses three core elements: potential harm, scientific uncertainty, and precautionary action.

Guiding Principle 3 – Public Participation

Public involvement is fundamental to the long-term success of HRM's urban forest, as it helps the UFMP be responsive to local conditions and challenges by drawing upon a variety of different values and understandings. The public holds vast amounts of local knowledge that can improve the quality and effectiveness of urban forest management decisions and allow future potential conflict to be anticipated, defined, and resolved before it becomes a problem. Finally, public participation encourages a sense of ownership among the citizens.

Guiding Principle 4 – Sustainable Development

Since the urban forest is key to a sustainable Halifax, the UFMP must encompass a wide range of environmental, economic, and social values that have been developed by the research team and refined through community engagement, and it must take a long view of urban forest sustainability for the benefit of future generations.

The preceding guiding principles directed the overall approach to plan development and aligned the UFMP with HRM's Regional Municipal Planning Strategy. The following operational principles are more specific, and provide an operating framework for the UFMP.

Operational Principle 1 – Comprehensive Approach

Accepting that the climate of HRM will change considerably during the Twenty-first Century, and in concert with the long-term view of urban-forest development, building resilience to climate change into the future urban forest is vital to its sustainability.

Operational Principle 2 – Comprehensive Approach

Success in sustaining a healthy urban forest depends on implementing a comprehensive and coordinated suite of actions related to tree and forest protection, maintenance, and enhancement.

Operational Principle 3 – Cooperation and Partnerships

HRM needs the active participation of citizens, businesses, other levels of government, and non-governmental organizations in advancing the sustainability of the urban forest.

Operational Principle 4 – Equity

All HRM citizens deserve to enjoy a fulsome set of urban forest benefits in and near their residences and places of work and recreation.

Operational Principle 5 – Green Infrastructure

The city's total infrastructure includes the land, the built infrastructure, and the green infrastructure dominated by trees. The trees' benefits to the city are proportional to the degree to which they are managed and respected as green infrastructure.

Operational Principle 6 – Integrated Planning

Integrated planning is central to the political structure of urban forest management in HRM, and is vital to the values-based development, implementation, and reporting of the plan over its entire lifetime.

Operational Principle 7 – Invasive Species

Invasive species, both alien and native, compromise the sustainability of the urban forest and demand vigilant attention, as far as is practical, to prevention and control.

Operational Principle 8 – Naturalness

Except where urban conditions are such that adoption of natural traits for the urban forest would compromise sustainability, naturalness enhances ecological integrity of the urban forest.

Operational Principle 9 – Priority-setting

Sustaining the urban forest is best approached by allocating management resources where the highest aggregate benefit will be achieved per unit resource invested.

Operational Principle 10 – Public Understanding

The more HRM citizens know about trees in the city and the values they provide, the more they will engage in stewardship activities and support municipal initiatives associated with sustainable urban forest management (SUFM).

Operational Principle 11 – Sense of Identity

The degree to which HRM residents and visitors identify the city as an attractive place to live, work, play, and visit depends greatly on the quality of the urban forest.

Operational Principle 12 – Space and Location

Urban forest sustainability depends not only on placing trees into hospitable growing locations in or near the built infrastructure, but also on the spatial relationships among the trees themselves. Considering the spatial extent and layout of the UFMP Study Area to which the plan applies, sustainability also depends on attention to urban forest conditions in each neighbourhood.

Operational Principle 13 – Stewardship

Since so much of the land in HRM is privately owned, sustainability of the urban forest depends on individual and corporate landowners taking active care of the trees and tree-growing potential of their properties.

Operational Principle 14 – Time and Timing

A long-term view, with explicit attention to appropriate timings of actions across years and decades, is essential to successful SUFM.

Operational Principle 15 – Urban Forest Values

Citizens of HRM care about their trees in numerous and diverse ways. Urban forest sustainability initiatives should therefore consider a balanced approach to achieving common ground among these diverse environmental, social, and economic values.

The guiding and operational principles of the UFMP are based on issues first identified by citizens during the development of the RMPS and later during the creation of the Draft UFMP. Public engagement meetings conducted in 2010 as well as further research led to the development of a comprehensive set of urban forest values, objectives, indicators of success, and targets that are detailed in the UFMP as VOITs (acronym of values, objectives, indicators, and targets). The following implementation actions have been developed to reflect the UFMP's urban forest inventory research, public engagement programs, guiding principles, operational principles, and VOITs.

A1. Establish an average of 40% canopy cover in HRM parks in the UFMP Study Area.

A2. Apply neighbourhood planting treatments for street trees.

A3. Employ neighbourhood native species treatments.

A4. Utilize neighbourhood species control treatments.

A5. Deploy neighbourhood Acadian old-growth species treatments.

A6. Diversify cultivars of tree species.

A7. Apply neighbourhood treatments to meet canopy targets for neighbourhoods, communities, and the UFMP Study Area.

A8. Employ seven-year pruning cycles for all street trees and establish cooperative pruning programs with utility companies.

A9. Establish an average of 80% canopy cover in HRM–owned riparian buffers.

A10. Educate landowners on the benefits of trees in riparian zones.

A11. Give priority to neighbourhood tree-planting treatments in HRM parks and on school grounds without shade trees.

A12. Give priority to street tree plantings in neighbourhoods lacking privately owned trees.

A13. Educate landowners, realtors, and developers on the benefits of trees.

A14. Conduct regular public surveys.

A15. Establish innovative interpretive programs for the public.

A16. Support citizen-led urban forest stewardship initiatives.

A17. Promote the benefits of the urban forest.

A18. Conduct urban forest research and project monitoring required to ensure the effectiveness of the UFMP adaptive management processes.

A19. Characterize and prioritize target areas for traffic calming for strategic planting in HRM rights of way.

A20. Establish fundraising partnerships with private sector, institutional and non-governmental sector organizations to support urban forest stewardship projects.

A21. Invest in human capital with urban forest staff training and development.

A22. Provide incentives to homeowners to plant trees on their properties.

A23. Use trees to decrease stormwater in highly impervious areas, with priority given to conifers where conditions permit.

A24. Where possible, retain special habitat elements, such as snags, coarse woody debris, and understory vegetation in parks.

A25. Identify and protect urban forest areas that support species at risk.

A26. Research the sale value of urban forest carbon credits.

A27. Encourage citizens to plant food-producing trees on their properties.

A28. Improve urban forest conditions around active transportation networks and use the urban forest to increase active transportation opportunities.

A29. Research best practices and develop amendments to Municipal Planning Strategies and Land Use By-Laws within the UFMP Study Area to improve urban forest canopy retention and replacement provisions.

A30. Research best practices and develop draft Urban Forest Canopy and Riparian Zone By-Laws for public review. Update the Tree By-Law (Respecting Trees on Public Lands: By-Law Number T-600).

A31. Integrate UFMP policies and current upcoming HRM functional plans and land use plans (e.g. HRM By Design-Centre Plan, Open Space Functional Plan, Stormwater Management Functional Plan, Transportation Functional Plan).

A32. Identify urban trees as "green infrastructure" in the HRM Municipal Service Standards "Red Book". Adopt guidelines to maximize the environmental benefits of trees on HRM property.

Two previous drafts of the UFMP have been published for public review. The first draft of the UFMP was peer reviewed during the fall and winter of 2011/12 by a dedicated team of reviewers from the following organizations:

- Atlantic Chapter of the International Society of Arboriculture
- Atlantic Provinces Association of Landscape Architects
- Ecology Action Centre
- Licensed Professional Planners Association of Nova Scotia

The comments and recommendations provided by the reviewers resulted in extensive revisions to the Plan and a second draft was posted on the UFMP website in April, 2012 for public review. The draft included six chapters detailing the rationale for the UFMP as well as supporting research and recommended actions.

However, staff felt that more community input was required and the development of a seventh and final chapter on implementation was delayed.

A second community engagement program took place in 2012. Four public workshops were conducted during May and June, 2012, to determine community priorities for UFMP implementation. At these sessions, three main themes were discussed: trees in the public realm; trees in the private realm; and land use policies & by-laws. More than 100 citizens took part in the workshops and provided feedback through a prioritization exercise and comment sheets. The workshops were attended by local residents and HRM Councillors as well as representatives from the development industry, institutional landowners, environmental groups, HRM advisory committees, utility companies, and government agencies.

Over 490 individuals also took part in an HRM online survey designed to gain better understanding of the public's implementation priorities for the UFMP.

The final chapter of the Plan, Chapter 7, Implementation, outlines a clear and feasible strategy to commence the implementation of the UFMP over a five year period from 2013 to 2018. It includes a description of the UFMP adaptive management process, recommended actions, priorities, priority urban forest neighbourhoods, management structure, timelines and scheduling, and preliminary estimates of probable costs. Future implementation actions will be determined through subsequent five-year UFMP reviews. The actions presented in the Plan represent opportunities identified through the study process. They are a guide to future investment in the sustainability of HRM's urban forest. The initial costs to implement the UFMP are estimated at $1,100,000 annually.

Public engagement activities conducted prior to the development of Chapter 7 of the UFMP provided clear direction from HRM citizens for establishing priorities regarding the resources and program scheduling necessary for an orderly implementation of the Plan. The following public priorities (shown in order of importance) have been incorporated in the implementation strategy.

1. Increase funding, plant more trees on HRM land and improve urban forest maintenance.

- Depending on market prices, HRM plants approximately 1500 street trees at a cost of about $325,000 annually. Unfortunately, a similar number of dead or diseased trees are removed resulting in a current replacement ratio of 1:1. The implementation strategy proposes an annual increase of $325,000 for tree planting in order to meet the urban forest canopy targets outlined in the Plan.
- Many parks have insufficient canopy cover that can be improved through natural regeneration and planting programs. The total area of HRM parks scheduled to be planted and naturalized annually is 33 ha, at an estimated implementation cost of $75,000.
- Tree and utility line conflicts are an ongoing issue in HRM. The utility companies are responsible for pruning trees to reduce potential damage and conflict. However, pruning is often behind schedule, resulting in trees being pruned in response to damage that has already been done. In many instances, urban trees are aggressively pruned or removed because of conflicts with utility lines. The responsible way to manage trees in conflict with infrastructure is to take a proactive approach in a pruning cycle, where arborists from both HRM and the utility companies work cooperatively to apply preventative measures to keep trees safe and healthy.
- Employing a seven-year pruning cycle will initially be experimental. Costing this action is difficult, since future industry prices are variable and hard to predict, and there will undoubtedly be a transitional cost associated with implementing this action. Tree maintenance is currently reactionary, whereby HRM urban foresters respond to public requests in sequence. While the pruning cycle is implemented, it will be necessary to continue the reactionary maintenance for the first several years for safety reasons. Otherwise, potentially hazardous trees would remain unattended for too long. Costs could also be affected if cooperative pruning schedules and practices are adopted by HRM and Nova Scotia Power Incorporated (NSPI). The initial annual cost estimate for implementing a seven-year pruning cycle is $600,000.

2. Adopt new regulations and standards to conserve urban forest canopy cover.

- The Halifax Regional Municipality Charter provides authority to Regional Council to enact by-laws concerning the urban forest. The UFMP will provide a policy and management framework for the further development of by-laws to conserve tree canopy within the serviced areas (municipal water and sanitary sewer services) of the City. The development of these regulations will be a collaborative process involving ongoing public engagement that will require a "made in HRM" approach that considers local urban forest conditions as well as the cultural values of HRM's citizens.
- HRM staff will research best practices from across Canada and the US and develop urban forest canopy conservation regulations for public review.
- Trees require good soil and room for root development in order to grow and eventually form a canopy. The UFMP recognizes that municipal standards for street tree planting could be improved and calls for new planting guidelines to ensure that new street trees will thrive.
- HRM staff will develop new guidelines to maximize the environmental benefits of trees on HRM property.
- Costs associated with the adoption of new standards and regulations are difficult to predict. Initial research and development activities will be assumed by internal staff resources. Future costs will be determined based on the scope of the standards and regulations to be adopted.

3. Promote citizen urban forest stewardship and develop educational programs.

- HRM will develop programs to support citizen-led urban forest stewardship initiatives and establish fundraising partnerships with private sector, institutional and non-governmental sector organizations.
- Additional programs will be developed to provide incentives to homeowners to plant trees on their properties (including food-producing trees).
- The implementation strategy proposes annual funding of $50,000.

Actions corresponding to these priorities will be implemented within the initial five-year timeframe of the Plan. Periodic reviews will be conducted in the future to ensure that the UFMP remains effective. Every one of the UFMP's 111 urban forest neighbourhoods requires work, but knowing when and where to start is a key management decision that will affect the sustainability and success of the Plan. To better understand how priorities could be assigned the planning team looked at the urban forest opportunities and challenges detailed in the Urban Forest Neighbourhood Factsheets contained in Appendix A. When opportunities and challenges aligned then the work of assigning priorities became more straightforward. For example, a neighbourhood challenge could be a lack of street trees but if it was found that there were hundreds of good planting spaces available then immediate action could follow. The decision to initially focus on priority neighbourhoods was also based on a need to adopt a "learning by doing" approach to the implementation of the plan.

The five urban forest neighbourhoods selected for the initial five-year phase of plan implementation are:

1. Colby Village
2. Connaught/Quinpool
3. Eastern Passsage
4. Fairview
5. North End

While these neighbourhoods will initially receive enhanced levels of tree planting and urban forest maintenance other urban forest neighbourhoods will also benefit from the improved urban forestry services recommended in the Plan.

The UFMP is meant to be an ongoing plan and adopted in perpetuity. While the Plan provides a long-term framework for ongoing management, it also contains provisions for five-year reviews and annual monitoring by researchers at Dalhousie University.

LIST OF ABBREVIATIONS:

BLT	Beechville-Lakeside-Timberlea
CBC	Canadian Broadcasting Corporation
CHM	Canopy Height Model
DBH	Diameter at Breast Height
GIS	Geographic Information System
HRM	Halifax Regional Municipality
LIDAR	Light Detection and Ranging
RLUB	Regional Land Use By-Law
RMPS	Regional Municipal Planning Strategy
SFM	Sustainable Forest Management
STRATUM	Street Tree Resource Analysis Tool for Urban Forest
SUFM	Sustainable Urban Forest Management
UFORE	Urban Forest Effect Model
UFMP	Urban Forest Master Plan
VOIT	Values, Objectives, Indicators, Targets

Section one

Introduction

1.1 Values and Benefits of the Urban Forest

The urban forest, simply put, can be defined as every tree within the city (Ordóñez *et al.*, 2010) – from a single maple in a planter, to a row of elms lining a downtown street, to carefully tended pines in residential backyards, to islands of native forest amidst urban development. Their natural diversity and their interconnectedness with human activities and the built environment make urban forests both complex and dynamic (Nowak & Dwyer, 2007). Urban forests require stewardship practices that differ significantly from those appropriate for hinterland forests for several reasons. For one, many trees in the urban forest are managed as individual organisms, whereas hinterland forests are managed primarily as stands. Second, commercial timber production is a key goal in management of many hinterland forests, whereas urban forests rarely focus on commercial products. Finally, because urban forests are characterized by high concentrations of people and built infrastructure, emphasis in sustainable urban forest management must be given to human health and safety, psycho-social benefits, and interactions of trees with engineered works.

Trees are a more than a pleasant window dressing for a city. They provide multiple benefits for people in an urban setting—some more apparent than others. We can easily see and feel how they enhance the aesthetics of our living environment, but they also provide measurable economic benefits by shading infrastructure and decreasing air pollution. In addition, they are a critical aspect of the ecological infrastructure of the city's natural environment (Nowak & Dwyer, 2007; Ordóñez & Duinker, 2013). Many researchers today have identified trees as a critical aspect of urban landscapes that must be managed sustainably. In Halifax we are fortunate to have a rich and extensive urban forest. Below are some examples of a few of the better-known benefits that the urban forest gives our community:

- **Air quality benefits.** Halifax Regional Municipality (HRM) residents periodically experience poor air quality because of the direct and indirect release of airborne pollutants. The majority of the pollutants in Halifax's airshed come from central Canada and the northeastern United States (Government of Nova Scotia, 2012). Urban trees play a large role in reducing airborne pollutants by exchanging gases with the atmosphere and capturing chemical pollutants and particulates that can be harmful to people (Dwyer *et al.*, 1992). The healthier the tree and the greater its foliage, the more it is able to remove airborne pollutants. The results of a 2010 urban forest modelling study conducted in HRM using the Urban Forest Effects (UFORE) model (Nowak & Crane, 2000) indicated that about 1,478 metric tons (Mg) of pollutants are removed annually by urban trees and shrubs in the serviced area of HRM (the UFORE study area Figure 1.4). This equates to $9.6 million each year in air pollution mitigation (Table 1.1).

Table 1.1 The annual amount of carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 µm (PM_{10}), and sulphur dioxide (SO_2) displaced by the urban forest in the UFORE study area (2010)

Pollutant	Amount Removed by the Halifax Urban Forest (Mg/year)
CO	53
NO_2	448
O_3	471
PM_{10}	262
SO_2	244
Total	1,478

- **Biodiversity.** There are many arguments for conserving native biodiversity in urban settings. On the ethical side, an argument can be made for conservation of species at risk in the city. For example, eastern white cedar has been declared a species at risk in Nova Scotia. The Government of Nova Scotia is therefore under obligation to take actions to prevent any further decline of the presence of eastern white cedar, and indeed to improve its prospects. Conservation of the species is important to accomplish in hinterland forests, but many opportunities also exist to increase its abundance in urban settings. This can be achieved through semi-naturalized conditions and in single-tree plantings in parks and private properties.

  The practical grounds for conserving native biodiversity in the city are numerous. Increasing the populations of native trees in the urban setting gives the opportunity for native birds, small mammals, insects, and other native species, to occupy habitat niches in the city. Interaction with nature, across the entire spectrum from casual

encounters to intense study, is also very therapeutic for urban dwellers (Louv, 2011), and what better way to accomplish this than to improve nature in the city.

- **Carbon sequestration benefits.** Trees are constantly capturing and accumulating carbon-based greenhouse gases in their roots, stems, and branches through the processes of carbon sequestration and storage. With this ability, trees can help mitigate the effects of climate change (McPherson *et al.,* 2008). According to the 2010 HRM UFORE study, in total, HRM's street trees are estimated to hold more than 2 million tonnes of carbon, and annually sequester more than 100,000 tonnes. In future carbon credit trading markets, HRM's carbon shares could be highly valued.
- **Economic benefits.** As a compensation for planting and maintenance costs, trees provide measurable financial benefits for homes, businesses, and industries. In a study completed at the University of Washington, consumers were reported to spend an average of 11% more at businesses located in a landscaped business district, compared with a non-landscaped district (Wolf, 2003). Street trees and private trees also add significantly to the overall value of residential properties (Anderson & Cordell, 1988).
- **Energy use benefits.** Cooling buildings in warm weather is a significant cost for building owners and operators in HRM (see figure 1.1). Due to a high proportion of hard and dark surfaces, urban centres are generally a few degrees warmer than neighbouring rural areas – a process known as the urban heat island effect. Shade provided by urban trees can reduce the total energy required to cool a building. In the summer, even a single tree can provide significant direct shade for a home or a small business. In general, urban areas that have a higher canopy cover are far cooler than those with a lower canopy. This cooling effect of the urban forest not only reduces energy costs, it also translates into reduced air emissions associated with air conditioning. Trees can also increase energy savings by acting as windbreaks in the colder seasons and reducing energy usage by 10% (Swistock *et al.,* 2005). Another modelling study using software developed by the USDA Forest Service called STRATUM (Street Tree Resource Analysis Tool for Urban Forest, 2000) indicates that HRM's street trees save $12.4 million in energy costs each year.
- **Health benefits.** There is a positive relationship between the presence urban trees and human health. Their shade mitigates the negative effects of excessive exposure to the sun including sunburn, sunstroke, and skin cancer. They improve the quality of the air we breathe, and their presence has been shown to reduce stress. Hospital patients with views of trees heal significantly faster and with fewer complications than those without such favourable views (Ulrich, 1984).

Figure 1.1 Tree shading effect and energy saving

- **Hydrological benefits.** Urban forests play an essential role in moderating stormwater and flood damage, water quality, erosion, and stormwater treatment costs (Nowak, 2006). Trees act as filters, removing nutrients and contaminants from the ground that may otherwise be collected and treated in our wastewater treatment facilities or may directly enter our streams and oceans, affecting their ecological integrity. Considering that HRM receives about 1,400 mm of precipitation annually (Environment Canada, 2011), trees play a key role in mitigating the effects of water on our urban landscape. It is estimated that for every 5% increase in overall canopy cover, total city run-off is reduced by 2% (Coder, 1996). In HRM, it is estimated that street trees provide about $2.1 million in stormwater reduction services annually, according to the STRATUM model.
- **Noise-reduction benefits.** Urban trees are effective noise buffers, which is a major asset for residential neighbourhoods near highways or industrial areas. For example, a row of conifers can reduce traffic noise by 50% or more (Reethof & McDaniel, 1978).

- **Road benefits.** Trees can make our streets safer. There is a long accepted notion that "Trees have undoubtedly saved many lives and prevented accidents in intangible ways" (Neale, 1949). A tree-lined street gives the illusion that the street is narrower, and generally calms traffic (Wolf & Bratton, 2006). Other studies show that trees reduce drivers' stress, likely calming them and increasing their attention to traffic conditions. They also provide safety barriers between pedestrians and motor vehicles, and they screen out glare from the headlights of oncoming traffic.

  Trees enhance the longevity of our streets. Roads are an expensive feature of our urban landscape, and shading them adequately leads to savings on infrastructure renewal. A road surface that is 20% shaded has its pavement condition improved by 11%. After 30 years, this results in a 60% savings on resurfacing (McPherson *et al.*,1999).

- **Social & psychological benefits.** People like trees around them because they make life more enjoyable and urban conditions more tolerable (Louv, 2011). Urban forests provide an important natural and aesthetic setting for our fast-paced urban lives and are a defining feature of a successful city in the twenty-first century. They have often been described as creating a connection between people and the natural environment (Dwyer *et al.*, 1992). A study was recently done in Halifax on the public's perception of our urban forest (Peckham, 2010). Many of the comments emphasize the social and aesthetic importance of the urban forest:

  "…it's very common that these tree-lined streets are in the residential areas in the city and that has always been one of my favourite parts of the city. It is like you feel like you are walking in a park all the time."

  "I can appreciate the trees, their size and the way they add a sense of serenity and peacefulness to the area."

There are many more benefits than those described here. The personal values associated with trees are as diverse as the people who live, work, and play in HRM's urban forest, and it is clear that most of us care about our treed surroundings. However, in HRM there are a number of significant challenges to the ongoing sustainability of the urban forest. These include the need for renewed efforts to improve our approaches to urban forest planning, climate change, invasive species, infrastructure design, integrated management, maintenance, new regulations and establishing appropriate levels of municipal funding.

1.2 The Need for a Plan

HRM has urgently needed an urban forest management plan for some time. This urgency has accelerated as a result of a series of unforeseen destructive events over the past decade: a longhorn beetle infestation, Hurricane Juan, and a succession of severe storm events have destroyed tens of thousands of trees in the urban forest, and damaged and compromised many of the surviving trees (Figure 1.2). HRM residents have experienced directly what a major loss of urban trees can mean (Steenberg & Duinker, 2010).

In addition, the municipality only has direct control over trees on municipal property—the remaining trees exist on private lands and are therefore outside the public realm. Consequently, management of the entire urban forest, both public and private, must draw from a wide array of tools and approaches to satisfy the urban forest values of citizens and foster public engagement and stewardship.

Figure 1.2 Point Pleasant Park before and after Hurricane Juan

Urban forest management programs and Sustainable Urban Forest Management (SUFM) research have significantly expanded and evolved over the past several decades (Miller, 1998). This has been in response to ever-emerging threats to urban trees, particularly from introduced pests, and to growing recognition of the aesthetic and human health benefits of a treed environment (Ordóñez & Duinker, 2013). Urban forest management is now expanding further in the face of contemporary challenges, such as rapid urban development and climate change, and also to incorporate the much broader spectrum of benefits and values now understood to be associated with the presence of a healthy urban forest (Nowak & Dwyer, 2007).

As described briefly above, the urban forest contributes to our city's sustainability and to the quality of our lives (Gangloff, 1995). The developed character of our urban areas and their complex interaction of social, political, economic, and ecological processes require us to manage our urban forests to ensure that we, and future generations, continue to benefit from them (Clark *et al.*, 1997). A key mechanism in SUFM is the municipal urban forest management plan, or urban forest master plan, designed to establish policies, procedures, and implementation strategies to guide a municipality towards a sustainable future for its urban forest.

Collaboration and interdepartmental cooperation are critical for the management of a city's green infrastructure. The UFMP has implications for, and links to, other HRM plans that have been adopted or are in development. For instance, the Open Space Plan and the Centre Plan are currently underway. They are focused on Peninsular Halifax and areas of Dartmouth inside the Circumferential Highway. Both plans will consider urban forest benefits in our parks, streetscapes and new developments. UFMP policies and implementation strategies will be integrated with these plans. Additionally, a Stormwater Management Functional Plan is in an early stage of development and urban forest benefits associated with stormwater retention and erosion control will also be considered in this plan.

1.3 Plan Origin

In 2001, HRM Regional Council passed a motion proposed by Councillor Linda Mosher to develop a management plan for urban forests. This initiative was integrated with Council's development of a long-range regional development plan that commenced in the fall of 2001. In 2006, Regional Council adopted Policy E-20 contained in the HRM Regional Municipal Planning Strategy (RMPS). The policy states: "HRM shall prepare an Urban Forest Functional Plan to identify design guidelines and a management strategy to maximize the urban forest." (HRM, 2006).

1.4 Scope of the Plan

The overall goal of the UFMP is to **ensure a sustainable future for our urban forest.** The multiyear community engagement process and research initiatives that led to the development of the plan resulted in an integrated social, ecological, and economic strategy that strives to incorporate the values of HRM citizens. The key to the plan's success rests on citizen action and stewardship in all the neighbourhood urban forests and the ongoing support of Regional Council.

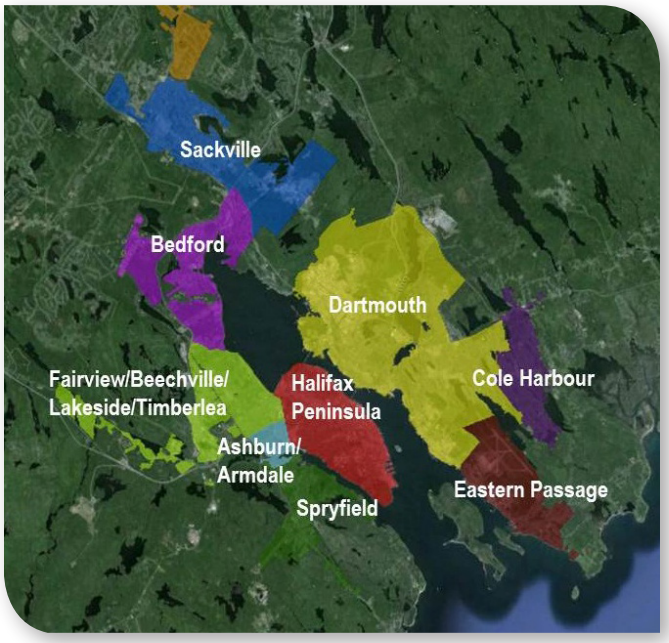


Figure 1.3 HRM communities in the UFMP

Geographic area:

The UFMP will be implemented in an area extending approximately 15 km outwards from the Halifax Harbour and geographically defined by HRM communities that receive water and wastewater services (Figure 1.3). Communities receiving these services generally feature the types of compact development and nearby urban centre amenities usually associated with urban living. HRM's urban forest can be seen as a seamless natural resource that spans all public and private properties in the serviced communities of Bedford, Beechville, Lakeside, Timberlea, Dartmouth, Cole Harbour, Eastern Passage, Halifax Peninsula, Halifax Mainland, Sackville, and Spryfield.

Although the current scope of the UFMP concentrates on urban neighbourhoods, the 2008 UFORE area survey (shown in light grey in Figure 1.4) also included suburban areas of HRM where the municipality had assumed road service responsibilities. The UFORE benefits presented in Chapter 1 include forest cover data collected from these areas that were intended to be used in future suburban forest area plans. The STRATUM model was scoped at the scale of HRM urban polling districts, and was used in the neighbourhood approach to help derive management actions.

Time scale:

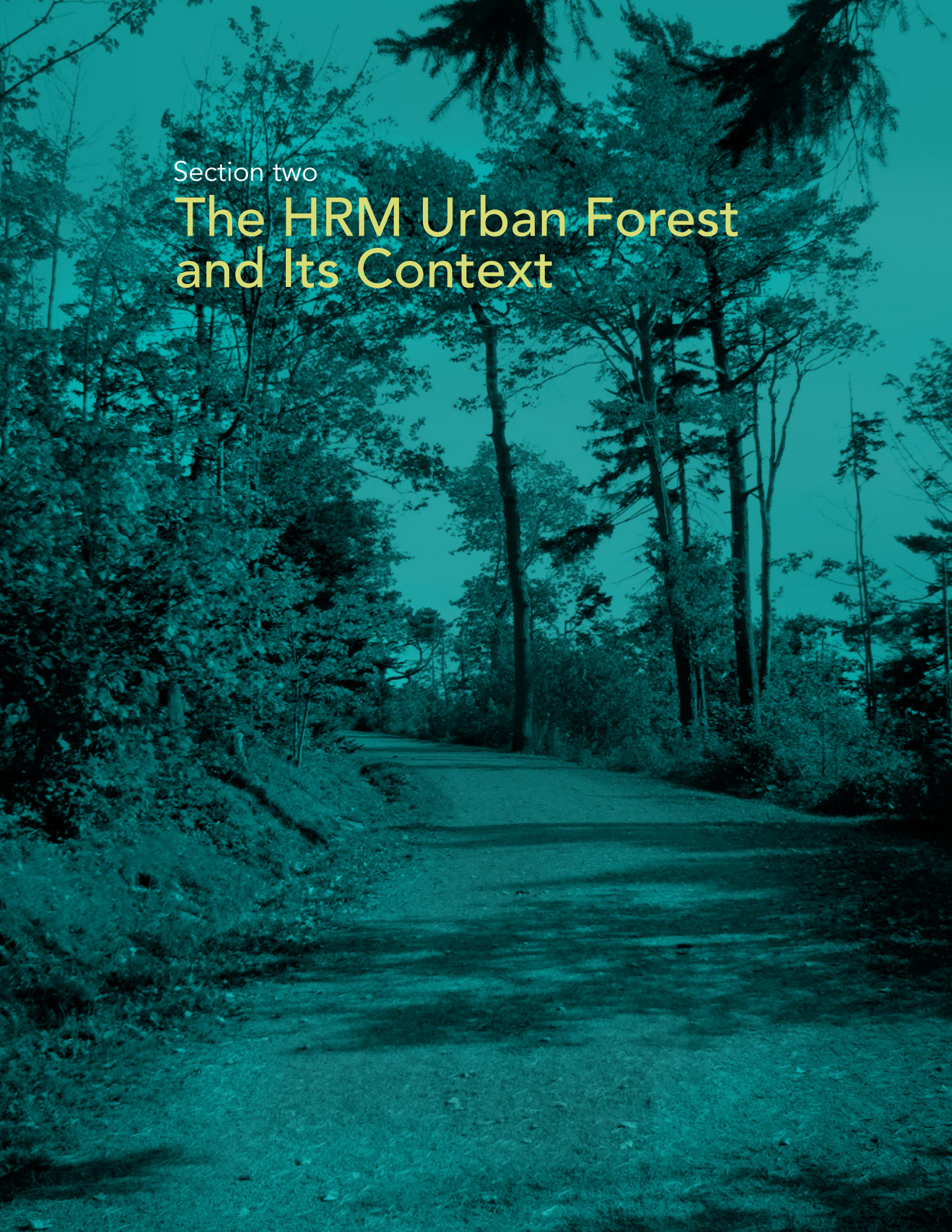
The plan addresses the time scale in two ways. Management actions that are derived from the neighbourhood analysis and the Values, Objectives, Indicators, and Targets (VOIT), operate annually with 5-year and 10-year reviews. Management principles are set in perpetuity as part of HRM's long-term vision. The need for institutional flexibility over time to contend with future uncertainty around climate change, development patterns, and shifting values among the population is incorporated into the UFMP under the overarching principle of adaptive management (see Section 2.1), to ensure that management reflects the ever-changing conditions of the HRM urban forest and values of its citizens.

UFMP research has shown that HRM faces a number of challenges and opportunities in developing a sustainable urban forest that require innovative and neighbourhood-scale approaches.

The HRM Urban Forest Master Plan will:

- Establish the values, objectives, indicators, targets, and management actions necessary for the sustainability of the urban forest.
- Identify urban forest issues and opportunities for their resolution.
- Adopt changes to funding allocations, regulations, policies, by-laws, and processes for managing the urban forest.
- Raise public awareness of the importance of trees to the city and its citizens.

Figure 1.4 2008 UFORE study area



Section two

The HRM Urban Forest and Its Context

2.1 Introduction to the HRM Urban Forest

Most citizens recognize that trees add to their wellbeing and make the city a more pleasant and peaceful place to live. It is likely that if trees disappeared from our city streets, gardens, parks, and forested lands, they would be greatly missed. Unfortunately, trees are disappearing from our urban landscape faster than they are being replaced. For this reason, it is essential to understand what the condition of our urban forest is today, in order to set a comprehensive baseline for future monitoring endeavours. Until recently, HRM has lacked specific information about the trees that contribute so much to our urban wellbeing. Understanding the urban forest's structure, functions, and values supports management decisions that will improve human and environmental health.

In 2007, HRM, in collaboration with Dalhousie University, undertook and issued the first comprehensive study of HRM's urban forest. The urban forest was measured in a total of 191 field plots located throughout the initial UFMP Study Area delineated in the late 1990s. The results were analyzed using the UFORE model (Table 2.1), developed by the United States Department of Agriculture (USDA) Forest Service. The model gave HRM citizens a much better understanding of our urban forest, including quantitative information on tree populations, age distributions, tree-species diversity, tree condition, economic benefits, and costs. This study has provided valuable information for the UFMP development process.

Table 2.1 Selected results from the UFORE study

Background	
Total number of trees	57,800,000
Study area size (ha)	69,300
Total urban forest canopy cover (%)	41
Replacement Value ($)	
Monetary value of all urban trees	10,500,000,000
Monetary value of all trees per hectare	151,000
Carbon Value (Mg)	
Total carbon storage	2,100,000
Carbon removal per year	118,000
Pollution Removed Annually (Mg)	
CO	53
NO_2	448
O_3	471
PM_{10}	262
SO_2	243
Total Pollutants Removed	1,478

The Acadian Forest Region

Nova Scotia is situated in the Acadian Forest Region. It is critical for urban forest managers to understand the context and natural history of our urban forest, both to incorporate native biodiversity values in their management regime and to manage the hinterland stands of Acadian forest still found throughout HRM. These hinterland stands are frequently termed the **peri-urban forest,** and it is abundant throughout the UFMP Study Area, especially in the more rural and suburban neighbourhoods. Peri-urban forests are influenced far more by natural forest ecosystem processes than is the urban forest in denser urban areas. Trees in heavily developed urban areas are typically planted, ornamental species, cultivars, or variants, while trees in the peri-urban forest are typically native species that have naturally regenerated from seed and have a much greater density.

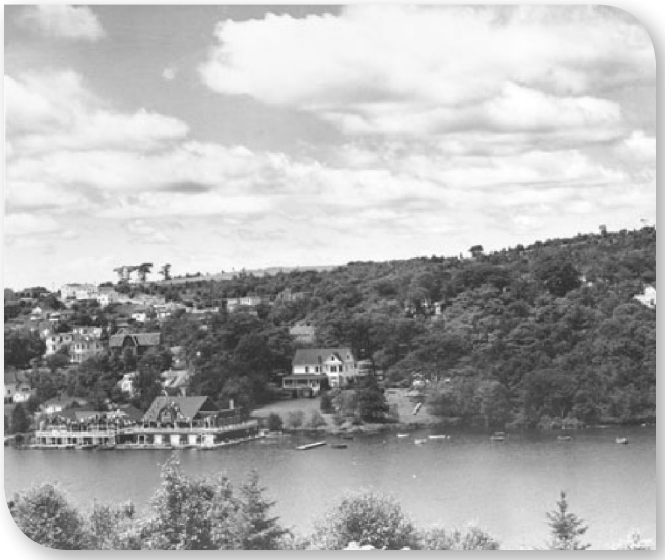


Figure 2.1 Forested region, Lake Banook

The Acadian Forest Region is a unique forest that is in fact listed as critical/endangered by the World Wildlife Fund (Davis *et al.*, 2001). The Region covers the Maritime Provinces of Canada and parts of New England in the United States. It is a transitional forest, composed of a distinctive and diverse mix of trees, with a combination of northerly boreal species, such as black spruce, white spruce, and southerly temperate species, such as sugar maple (Loo & Ives, 2003). Dominant conifers include red spruce, eastern hemlock, balsam fir, and white pine, with scattered stands of black spruce and tamarack in poorly drained lowlands. Dominant broadleaved species include sugar maple, yellow birch, American beech, and red oak.

The aforementioned species (excluding balsam fir and red oak) comprise the six characteristic Acadian old-growth species (Mosseler *et al.*, 2003). However, note that in this plan red oak has been used as a replacement for American beech in the Acadian old-growth species because of the beech bark disease.

The Acadian Forest Region, and especially Nova Scotia, has one of the longest histories of forest exploitation in North America (Loo & Ives, 2003). Because of forest conversion to agriculture, urban development, and unsustainable historical forest practices (such as high-grading), the forests around Halifax are unnaturally young and dominated by early-successional species such as red maple, white and gray birch, poplars, pin cherry, and serviceberry. While many of the forest ecosystems in HRM's urban forest are degraded, the Acadian Forest Region has a moist climate with ample precipitation that provides great conditions for growing trees. Consequently, there are major opportunities to improve the urban and peri-urban forests in HRM with natural forest regeneration, and in doing so, conserving and restoring our native Acadian forests.

Figure 2.2 View of the Public Gardens, 1900

Figure 2.3 HRM's street trees in the past and present

The forests in our public parks

Our public parks are places of refuge from the day to day concerns of urban existence. They play an important role in our quality of life by providing opportunities for play and quiet reflection. Trees are an essential component of our parks. They provide shade on hot summer days and the calming sound of leaves blowing in the wind adds a peaceful sense to any park experience. Trees in parks can flourish because they are free to grow, unimpeded by utility wires, impervious surfaces, road salt, and other urban impacts. Public parks also provide perfect opportunities for restoring natural regeneration cycles and the introduction of native tree species over time. Currently, our parks are faced with serious challenges. Canopy cover in most parks is limited and where canopy cover is good, trees are nearing the end of their productive lives. Public parks offer great promise in the restoration of HRM's urban forest. With 438 parks, consisting of 1369 hectares of land, several thousand new trees could be planted over time to ensure the species and age diversity required for a healthy urban forest.

Our forested streets

The trees that line HRM's streets may possibly be the most influential and beneficial trees within the urban forest, in terms of benefits provided to the public per individual tree. Street trees are also important because, along with trees in parks, they are in the public realm under municipal control. Halifax has long been known as the city of trees because of the large old trees that line many city streets and flourish in the backyards of homes. There are numerous examples of stately old oaks, elms, lindens, maples, and copper beech along city streets, and in parks, that have been growing for the last century. Many of these trees are approaching the ends of their lives, while others are struggling to reach their grandeur. To make the most effective plan to sustain these large old trees, it is essential that the city understand the current population of street trees, and what the specific challenges are (for example, poor age diversity, low species diversity, structural issues). This will provide insight into priority areas in need of management action.

An assessment of HRM's street trees was completed in 2007 to determine the significance of street trees and their structure, function, and values. In collaboration with the USDA Forest Service, street tree inventory data were analyzed using the STRATUM model, which quantified the annual environmental and aesthetic benefits of the public street trees in the HRM polling districts. This included evaluations of stocking, energy conservation, air quality improvement, CO_2 reduction, stormwater control, and property values (Table 2.2 & 2.3). The study also allowed HRM to answer one of the most important questions about the benefit-cost ratio of street trees: do the accrued benefits of street trees outweigh their management costs? The answer was yes, in HRM, the benefits of street trees do outweigh their management cost by a ratio of **eight to one.**

Table 2.2 Selected results from the STRATUM study

Street Tree Facts			
	Planted	Natural	Total
Number of street trees	157,000	552,000	709,000
Trees in conflict with utility lines	15,313	13,607	28,920
Plantable spots	94,000	30,000	124,000
Total Annual Benefits of Street Trees in HRM (x $1,000,000)			
Energy conservation	4.7	7.7	12.4
CO_2 reduction	0.1	0.1	0.3
Air quality improvement	0.8	1.0	1.8
Stormwater control	1.0	1.2	2.2
Property value increase	6.9	21.7	28.6
Total Benefits	**13.4**	**31.8**	**44.2**

Life for urban street trees is tough, generally resulting in short lifespans. Their longevity is compromised by the many urban stresses, such as vehicular traffic, pollution, soil compaction, construction and development. The results are evident on many streets, where entire rows of new plantings and even mature trees have died and need to be replaced. An average street tree can cost several hundred dollars to plant. However, a mature street tree will provide approximately $65 in benefits annually, and in its lifetime it will contribute a total of $6,600 in value through its ecological and aesthetic services alone. The fact that urban trees are the only form of city infrastructure that actually increase in value over time emphasizes that it is worth the effort to replace trees when they die, and to enhance the urban forest.

About 709,000 trees line the city streets of HRM. Of these, 157,000 are directly planted and managed by the city, while the other 552,000 are naturally regenerated trees in the public realm. The current population of street trees comprises about 200 species, both native and introduced.

There is also an abundance of privately owned trees within the urban forest. HRM sees the urban forest as a comprehensive resource that includes trees on public and private property. Detailed discussions of our public and privately-owned urban forest can be found in Chapter 6 as well as in Appendix A.

Table 2.3 Street tree-stocking results from the STRATUM study in the municipal polling districts

	Zone	Planted Sites	Unplanted Sites	Stocking Level (%)
1	Eastern Shore – Musquodoboit Valley	17,144	2,205	92
2	Waverly – Fall River – Beaver Bank	17,435	4,744	76
3	Preston – Lawrencetown – Chezzetcook	9,820	957	93
4	Cole Harbour	2,746	9,571	54
5	Dartmouth Centre	5,160	3,703	58
6	East Dartmouth – The Lakes	3,495	10,694	20
7	Portland – East Woodlawn	2,289	3,454	31
8	Woodside – Eastern Passage	5,326	2,289	69
9	Albro Lake – Harbourview	2,746	5,326	44
10	Clayton Park West	3,287	832	77
11	Halifax North End	5,326	2,830	65
12	Halifax Downtown	1,623	624	72
13	Northwest Arm – South End	4,494	2,413	65
14	Connaught – Quinpool	7,532	2,205	77
15	Fairview – Clayton Park	2,205	2,746	44
16	Rockingham – Wentworth	3,495	2,039	63
17	Purcells Cove – Armdale	5,201	1,207	88
18	Spryfield – Herring Cove	40,779	22,262	94
19	Middle & Upper Sackville – Lucasville	4,286	4,286	85
20	Lower Sackville	12,691	6,450	91
Total	HRM	157,080	90,837	85

2.2 Challenges in Managing the HRM Urban Forest

Enhancing our urban forest so that it represents all the values of HRM citizens will be a challenge, as will managing it sustainably into the future. There are existing financial, legal, and natural barriers preventing improvements to the urban forest, and such challenges may become more severe as our climate, politics, and economy change. Addressing these challenges and forecasting their impacts will be a complex but necessary component of SUFM. Some of the major challenges facing today's urban forest are detailed below.

1. **Aquatic systems and watershed health.** Protecting the health and integrity of urban watersheds constantly intertwines with the management of the urban forest. Perhaps the most critical relationship is the role of forested riverbank (riparian) buffer zones in protecting aquatic systems. Forested riparian buffers regulate flooding, reduce the impacts of sedimentation, erosion, and nutrient loading on watercourses, regulate the temperature of adjacent watercourses, and provide important wildlife habitat.

   Residents and businesses often extend their land uses into riparian areas, leaving them with very low canopy cover. However, landowners with waterfront properties are often unaware of the range of benefits provided by forested strips along stream banks and shorelines. Riparian protection provisions were included in HRM's 2006, RMPS and RLUB to ensure the retention of buffers; however, they are limited to areas of new development and do not apply to existing developments. In 2010, the Province passed legislation granting HRM authority to adopt a riparian protection by-law to preserve watercourse buffers in existing developments. While the UFMP calls for adoption of such a by-law, the regulated retention of trees along waterways, such as lakes, streams, wetlands, and coastal areas, will be a significant challenge. It would strain HRM's current resources, both human and financial, to redress cases of encroachment effectively and in good time. However, neighbourhood-based stewardship organizations could provide assistance by playing an active role in riparian monitoring and public education.

2. **Climate change.** Climate change is a major threat to HRM's urban forest and urban forests around the world, and is a key source of uncertainty in urban forest management. Potential climate change impacts include more frequent and severe storms and hurricanes, drier and hotter growing seasons (a stressor for urban trees), more invasive pests, and warmer winters with a higher occurrence of damaging freeze-thaw cycles (Williamson *et al.*, 2009). Moreover, the warming climate is changing the range of tree species, which is shifting northward (and higher in altitude in some places). This will influence the types of trees that can survive in HRM.

   The two principal concepts related to managing a resource in a changing climate are mitigation and adaptation. Mitigation means reducing the magnitude of climate change through management actions. The most prevalent example of this in urban forest management is the concept of carbon offsetting, whereby the capacity of trees and

Figure 2.4 Development effects on trees

forests to capture and store atmospheric carbon is exploited to reduce the concentrations of climate-forcing atmospheric CO_2. Adaptation refers to management actions that reduce the vulnerability of systems to the changing climate by adapting the system to anticipated future conditions and likely impacts. Adaptation is much more important for reducing the threat of climate change to the urban forest (Ordóñez *et al*, 2010).

3. **Conflicts with infrastructure.** While most citizens understand the importance of trees in the landscape, at times their presence can be perceived as a nuisance. With the increasing frequency and severity of hurricanes and storms expected due to climate change, some people could perceive trees as an unwanted hazard. However, this risk is far outweighed by the benefits of urban trees, if best management practices are followed. Properly managed, city-owned trees are integral elements of our city's infrastructure. Trees do conflict with other types of city infrastructure, but with appropriate management the degree of conflict can be minimized to benefit both traditional infrastructure and the urban forest's "green infrastructure".

   Tree and utility line conflicts are an ongoing issue in HRM. The utility companies are responsible for pruning trees to reduce potential damage and conflict. However, pruning is often behind schedule, resulting in trees being pruned in response to damage that has already been done. In many instances, urban trees are aggressively pruned or removed because of conflicts with utility lines. Cutting too much of a tree's canopy often leaves it weakened and susceptible to pathogens and disease. The responsible way to manage trees in conflict with infrastructure is to take a proactive approach in a pruning cycle, where arborists from both HRM and the utility companies work cooperatively to apply preventative measures to keep trees safe and healthy.

4. **Development.** New development is a major challenge for HRM's urban and peri-urban forests, especially at the urban-rural fringe, where urban expansion is having a profound effect on the trees and their environment. In HRM, many new development areas are clear-cut, graded, and filled before construction occurs, removing all existing trees from the landscape and much of the soil needed for future trees. This practice lessens the value embodied in our urban forest, as it reduces the services that trees provide for homeowners and businesses. What may be more concerning is that it removes trees and the urban forest from the awareness of citizens living and working in these new developments. To be fair, it should be noted that developers are often faced with a "no win" situation when site preparation takes place on rockland. Small patches of native forest stands retained during development are highly vulnerable to disturbance, especially from windstorms, as the newly cut forest edges expose these shallow-rooted forests to the elements. With appropriate site conditions, the preservation of large patches is sometimes possible; but the most successful alternative is for developers to establish a vigorous replanting schedule after development is completed. Although there are HRM land-use policies and by-laws requiring developers to plant street trees, they are not uniform in their requirements and lack specific procedures regarding native tree-stand retention, soil conservation, and street tree planting guidelines. While the UFMP calls for amendments to improve land-use policies and by-laws, some may question HRM's new approach to SUFM. Ongoing consultation and collaboration with development proponents will be required.

5. **Imperviousness.** Impervious surfaces are a major component of urban areas and essentially define the imprint of urban development (Schueler, 1994). By definition, these are surfaces that are impervious to water, and consist of city rooftops and transportation systems. Imperviousness is essentially the most important variable in stormwater management and urban watershed protection, but it is also highly interrelated with the urban forest, as it both influences and is influenced by the urban forest. Impervious surfaces contribute greatly to the heat island effect and act as stormwater collector basins that aggregate road debris, salt, oil, tire particulates, and other pollutants, creating highly polluted runoff that flows into aquatic systems.

   On one hand, it is a considerable challenge to improve the urban forest in these areas due to the scarcity of plantable sites. To ameliorate this, trees need to be accommodated at the planning stage. On the other hand, urban tree canopy in heavily built-up and impervious areas increases stormwater retention (a critical component of stormwater

management), shades surfaces (increasing infrastructure longevity and mitigating off-gassing of volatile organic compounds), and improves the aesthetic qualities and visual carrying capacity of dense urban areas.

Figure 2.5 High amount of impervious surfaces

6. **Invasive species.** Halifax is an international port, and consequently has been a gateway for many invasive alien insects, diseases, and plants. Two well-known examples are the introduction of the beech bark disease, brought in on European Beech trees first planted in the Halifax Public Gardens, which has decimated the native population of American beech in North America (Loo, 2009), and the brown spruce longhorn beetle that attacks our native red spruce and lived undetected in Point Pleasant Park for nearly a decade (Smith & Hurley, 2000). These organisms are a risk to native vegetation and degrade ecosystems, contribute to habitat loss, and of course, are a major threat to the urban forest. Some other examples of invasive alien species and diseases in Nova Scotia include the Dutch Elm Disease, the Chestnut Blight, Purple Loosestrife, the Gypsy Moth, Norway Maple, Scots Pine, and Giant Hogweed. Some threats on the horizon that are emerging in other urban areas include the emerald ash borer and the Asian longhorn beetle.

7. **Lack of knowledge.** Many of HRM's significant individual trees have survived human development, disease, pests, and weather events over decades and even centuries. The conditions under which they continue to thrive may be due to deliberate human intervention or sheer luck, especially during their development, when they do not stand out among others as significant.

   HRM is home to tree specimens which are long-lived, significant, or designated as "landmark" trees. Terms such as "landmark", "historical", "of civic importance", and "significant" are not well defined as related to specific tree specimens in HRM. However, similar terms are often used in reference to cultural landscapes and built heritage, and are reflected in municipal planning strategies and in associated land-use by-laws. Characteristics that might contribute to a prominent or significant tree being deemed for its landmark value are its species, age, location, place in civic culture, and the perception of citizens who have known the tree throughout their lives or throughout their family's history. We currently risk losing some important landmark trees because we lack specific policies and regulatory protection for them.

8. **Ownership.** Managing the urban forest as a continuous resource is part of the vision of the HRM UFMP. However, this does present a challenge due to differences in ownership. HRM's arborists only have management control of trees in the public realm, along road rights of way, and in parks and other HRM properties. Achieving the UFMP's urban forest values and implementing management actions in these areas will be comparatively straightforward. In neighbourhoods with little-to-no municipally controlled land—especially neighbourhoods with low canopy cover and poor urban forest conditions—implementing actions and satisfying values will require engaging the community and fostering public stewardship.

9. **Peri-urban forests and the urban-rural gradient.** Unlike many cities in southern Ontario or in the prairies, the expansion of HRM is not extending into surrounding agricultural areas—it is expanding into the forest. To give some context, in Oakville, Ontario, only 9% of the municipal landmass classified in the urban forest management plan is called continuous forest, in sharp contrast with HRM's 53%. Citizens living in such close proximity to nature are truly fortunate. However, this proximity presents challenges both for the population living near this urban-rural fringe and to the forests

that surround them (Medley & McDonnell, 1995). For the people living adjacent to the forest, the challenges include conflicts with wildlife, wildfire, and blow down from major windstorms. Threats to the forest from its new-found neighbours are potentially more numerous and substantial, and range from major events such as timber harvests and new development, to chronic forms of disturbance such as environmental contamination, illegal dumping, recreational overuse, and introduction of invasive species.

The abundance of continuous, undeveloped hinterland forest in HRM's urban forest has some important implications for SUFM. Managing naturalized forest stands is different from managing individually planted trees in urban areas. Management actions in HRM will be focused more on area-based management in these peri-urban areas, exploiting natural forest-ecosystem processes, such as natural regeneration, and retaining special habitat features, such as snags and coarse woody debris for wildlife.

10. **Redevelopment.** Construction impacts on trees occur primarily in site redevelopment projects in established urban settings, when excavation or other disturbances encroach on a tree's root mass. The design of new developments or redevelopments may not consider established trees as fundamental site constraints or potential landscaping assets, resulting in unnecessary damage to established trees or necessitating complete tree removal. In some cases, the urban environment imposes such tight constraints on redevelopment that it is almost impossible to avoid significant impacts on trees. There may be technical or design solutions in such conditions, but they may be so unreasonably expensive or time-consuming that, on balance, it is more feasible to replace trees after construction. In most cases, however, reasonable solutions or compromises are possible.

    Unfortunately, even reasonable solutions and compromises are sometimes not pursued. Developers, landowners, designers, project managers, construction superintendents, utilities, and contractors have in the past all contributed, directly or indirectly, to eliminating trees or damaging their root masses or habitat zones. The value of mature trees is overshadowed by other considerations, such as site access and convenience during construction. Also overlooked are the importance of proper site assessment and the consideration of trees as fundamental site constraints before building design is undertaken. These failures to consider trees are seldom intentional, but are instead symptoms of the lack of education about the urban forest, and a lack of specific regulatory guidance by the municipality when permitting proposed designs and during construction.

11. **Species and age-class diversity.** Lack of species and age-class diversity is a considerable threat to HRM's urban forest. Many HRM street plantings occurred during the same period in the early Twentieth Century, leading to entire neighbourhoods being dominated by mature, even-aged trees. Many of these trees are nearing the end of their useful and safe lives. However, a lack of management in the intervening decades means that there are not enough younger age-classes to replace the older trees when they die. The painful result is every graceful, mature elm lining a quiet residential street succumbing to old age over a short period, leaving the street treeless, shadeless, and feeling and looking entirely different.

    The skewed species composition of many urban tree plantings is troubling. Previously, street tree plantings of one species, perhaps two or even three, were common. Streets were consequently lined with beautiful over-arching trees that would create attractive tunnels of shade. However, in such situations, there is great risk of losing so much of the benefit of street trees on account of stressors like insects, diseases, and storms. For example, in cities less fortunate than Halifax, the Dutch elm disease has ravaged elm populations, leaving formerly tree-lined streets barren and treeless and in need of new plantings. Another example is the abundance of ash in southern-Ontario municipalities and the contemporary and devastating advancement of the invasive emerald ash borer. In addition to preventing catastrophic loss of trees due to age or disease, a highly diverse urban forest also provides a varied native wildlife habitat, improves biodiversity, and gives a richer sense of place.

Section three

Master Plan Methods

3.1 The Approach to Planning

In the past decade, many cities across Canada have adopted urban forest management plans; however, urban forest management is still an emerging science, and some plans appear to fall short in key areas. Ordóñez and Duinker (2013) recently reviewed urban forest management plans in Canada, and found that several plans followed a technical approach to management that focused on maximizing benefits from the urban forest through regional rather than local canopy-cover targets, and on generalized tree health strategies. In addition, the wider spectrum of urban forest considerations, such as ecological values associated with "nativeness" and "naturalness", social values corresponding to wellbeing and recreation, and economic values such as energy efficiency, were usually excluded or only marginally addressed. In contrast, the HRM UFMP considers the urban forest on a neighbourhood scale, through a new and innovative values-based approach. The result is a more comprehensive approach to SUFM. The basis of the HRM UFMP (Sections 3.5 and 5.1) was created through collaborative development of UFMP "VOITs" (urban forest Values, Objectives, Indicators, and Targets) at a series of community engagement events held during the summer of 2010. Another vital element of urban forest planning is a detailed understanding of the urban forest's current condition—including apparent challenges and opportunities for management—and a historical context of how the forest was shaped. This was done through a rigorous analysis of current conditions, as part of the neighbourhood approach to urban forest management in the UFMP (Section 3.3 and Chapter 6).

Community engagement – 2010

HRM implemented a community engagement program in July-August, 2010, as part of the initial development of the UFMP. The program was structured around the ten principles of community engagement outlined in HRM's (2008) Community Engagement Strategy. The program's primary purposes were information sharing and consultation on the identified urban forest values and VOITs. Community feedback from the consultations was used to inform the draft UFMP. The community engagement consisted of six tools:

1. **Media campaign.** The first step in community engagement was a media campaign in the summer of 2010, including a newsletter and advertisement in *The Coast*, a radio spot on CBC Radio's *Information Morning*, a number of research posters for the open house at Dalhousie University, an HRM press release, and a website hosted by HRM (halifax.ca/RealPropertyPlanning/UFMP/index.html).

2. **Initial scanning focus group.** On July 27, the UFMP team held an initial scanning focus group to gain public opinion on the urban forest values identified for the project. Facilitated by Dr. Peter Duinker at Dalhousie University, individuals from industry, government, and academia were invited to attend. The 29 participants were asked to rank their top three urban forest values to stimulate the discussion. Two of the most frequently identified values were a sense of wellbeing and native species/biodiversity. There were also notable concerns about replacement plans for older trees, the role of historic trees (especially those that are non-native), and the degree and nature of biodiversity HRM should strive for within its urban forest. Also discussed were the legal rights of private landowners and tree-care specialists, and identification of major challenges to the urban forest. A final key area of concern was poor communication with private developers. Participants took the stance that trees must be taken into account prior to new urban development, to increase the age diversity and improve the species diversity within an area.

3. **Urban forest walkabouts.** On August 17, the UFMP team hosted three educational tours, or "walkabouts", in an area of HRM's urban forest around the Dalhousie University campus. Over the two-hour walkabout, citizens were shown a range of challenges facing the urban forest, and some of the benefits it provides. City forester John Simmons, Dalhousie University's Dr. Peter Duinker, and researchers James Steenberg, Jen Ross, and Justin Hack guided the walkabouts and discussed the urban forest.

4. **Open house.** On August 18, the UFMP team hosted a public open house for sharing information and expressing opinions on HRM's urban forest. The format was a poster presentation of urban forest educational material and ongoing UFMP research findings. Twenty participants attend the open house, and engaged in discussion based on the seven

research posters that were presented. As with the focus group, areas of concern included native tree species, biodiversity, and the types of planting plans that will be developed. Other question areas included management of large stands within the UFMP Study Area, concerns about stormwater runoff, and the meaning of some of the research findings.

5. **Native species and biodiversity focus group.** On August 25, a small focus group of four citizens, conducted on an open sign-up basis, engaged in a structured discussion on native species and biodiversity. All the participants considered climate change a significant issue that must be considered in light of native species and biodiversity. Instead of taking a hard stance on native species, it was promoted that the appropriate species be planted for a given area, and that if cultivars/ornamentals are the better option, then they should be planted. Another concern was the need for more shrubs in the city, because in instances where trees will not succeed, shrubs often can.

6. **Sense of wellbeing and environmental education opportunities focus group.** On August 26, a final focus group considered the sense of wellbeing and environmental education opportunities related to the urban forest. Once again, this focus group was based on public signup, and eight participants attended. In general, it was concluded that trees are a major source of a sense of wellbeing within communities, but it may be subconscious for many citizens. An important outcome of the focus group was that in order to ensure that HRM sustains its urban forest, there should be more active volunteer opportunities for citizens to become involved. The concept of a neighbourhood forest stewardship program was brought up so that citizens could directly participate in caring for the urban forest. Various public participation ideas were discussed, as well as school plantings and cooperative efforts between volunteers and HRM staff to improve the care of city trees.

Community engagement – 2012

Following the publication of the Draft UFMP in April, 2012, HRM conducted a community engagement program in May-July, 2012. The program was structured around three themes: management of the urban forest in the public realm, management in the private realm, and by-laws and regulation. The program's primary purposes were to determine the relative priority of the themes and the associated actions to be implemented. The community engagement consisted of three tools:

1. **May Implementation Workshops.** Three workshops were held in May of 2012 at three locations in HRM. The first was on May 16th at Cole Harbour Place, the second on May 17th at Dalhousie University, and the third on May 23rd at C.P. Allen High School. Advertisements for these workshops were posted online, through social media, and in *The Coast*. In total we had over 50 citizens attend these workshops. The three themes noted above guided the discussions. Implementation priorities were discussed for actions within each theme and also between themes. Overall, the public realm was identified as the highest priority, with policy and regulation a close second and the private realm in third. Of course, no theme was unimportant and actions relating to all three themes are included in the UFMP.

2. **June Implementation Workshop.** An additional workshop was held after the public workshops on June 28th at Dalhousie University. Invitations for this workshop were sent to various individuals who have a direct role in shaping the urban forest of HRM. Over 50 people attended this workshop from a wide variety of backgrounds including developers, landscape architects, arborists, real estate agents, NGO employees, NSPI, educational institutions, provincial and federal agencies, business associations, advisory boards, professional planners, tree services, and HRM staff. The discussion format was similar to that of the previous three workshops as were the findings on how to prioritize the actions in the UFMP. Many new implementation ideas were generated and all suggestions were recorded and are available for review.

3. **Online Survey.** An online survey was conducted from June 5th until July 15th. The survey was designed to receive information from the public on the same themes that were discussed at the workshops. The intention was to gain input from a larger proportion of HRM's citizens and it was successful as nearly 500 individuals took part in the survey. The overall findings for the prioritization of actions were similar to those of the workshops.

The survey, consisting of 14 questions, also included space for comments, and some two hundred individuals took this opportunity to voice their opinions and contribute their ideas.

The neighbourhood approach

The neighbourhood approach was developed specifically for the HRM UFMP and is embedded throughout the plan. It came about when UFMP researchers noted significant differences among canopy cover percentages in several communities due to unique historical impacts and pre-existing conditions such as soil quality, topography, and climate. For example, a defining moment in Halifax's North End was the Halifax Explosion in 1917. A review of archival photos from that time clearly showed that the area's urban forest was effectively eliminated by the blast. Further research produced a 1919 map of the devastated area. Aggressive tree replanting in the 1920s, combined with the area's drumlinoid features and good soils, created the urban forest that we see today. These discoveries led researchers to reassess their regional approach to urban forest management and to focus instead on the unique urban forest challenges faced by each urban neighbourhood in HRM. The "urban forest neighbourhood" is essentially the functional management unit of the UFMP, and represents the basic scale on which SUFM will be implemented. The approach first employed a neighbourhood classification effort, whereby more than a hundred unique neighbourhoods were identified in a collaborative approach between HRM staff and the Dalhousie research team. The neighbourhood classification method is outlined in Section 3.3.

Classification and digitization of the neighbourhoods into the working UFMP Geographical Information System (GIS) database was followed by a rigorous analysis of neighbourhood-scale urban forest conditions, management challenges, and opportunities for improvement. The analysis incorporated several sources of data and information, including "UFORE" which stands for "Urban Forest Effects" and refers to a computer-based model that calculates the structure, environmental effects and values of urban forests. The UFORE model, developed by researchers at the United States Department of Agriculture (USDA) Forest Service, is designed to estimate the following indicators, among others: species composition, number of trees, diameter distribution, tree density, tree health, leaf area, leaf and tree biomass, species diversity, hourly amount of pollution removed by the urban forest, hourly volatile organic compound emissions from the urban forest, total carbon stored and net carbon annually sequestered by the urban forest, effects of trees on energy use in buildings, as well as the compensatory value of the forest.

Another research approach involved STRATUM (Street Tree Resource Analysis Tool for Urban Forest), a street tree management and analysis tool for urban forest managers. It uses tree inventory data to quantify the monetary annual value of the following environmental and aesthetic benefits: energy conservation, air quality improvement, CO_2 reduction, stormwater control, and property value increase.

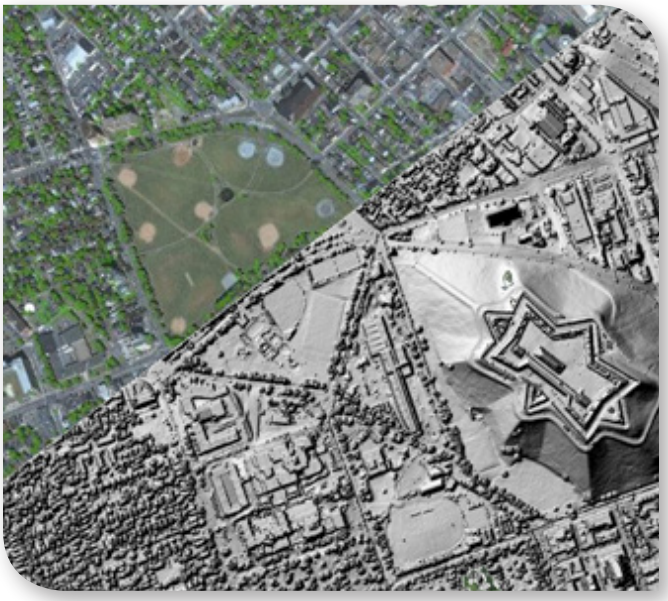


Figure 3.1 Canopy height model (CHM) LiDAR and Quickbird satellite imagery

Quickbird satellite imagery was used to complement additional LiDAR-based canopy height model (CHM) research conducted by HRM and the Nova Scotia Community College Applied Geomatics Research Group (AGRG) (Monette & Hopkinson, 2010). The CHM produced by AGRG was developed with the financial assistance of the Atlantic Canada Adaptation Solutions initiative sponsored by Natural Resources Canada and Nova Scotia Environment. These data were used to calculate a series of neighbourhood- and community-scale indicators (see the data tables in the community profiles of Chapter 6 and the neighbourhood profiles in Appendix A). The indicators cover the following

themes, among others: size-class distribution, species distribution, street tree deficit (number of planting opportunities), area of naturalized forest stands, and proportion of residential properties with a value tree (see Table 6.3). Using these indicators of current condition of the urban forest, and applying the principles described in Chapter 4 and the targets established in Chapter 5, the team developed a schedule of desired treatments for each neighbourhood (see Table 6.3). All but one of the treatments (that exception being a maintenance treatment) deal with decisions related to planting trees: how many to plant, which tree species to plant, which tree species to avoid, and how to arrange the planted trees into naturalized stands vs. street plantings. This emphasis on planting results from two general observations about urban forest management in HRM: first, that many more trees are needed in the city to fulfill the plan's aspirations for urban-forest benefits, and second, that planting decisions are by far the most influential decisions associated with improvement of the urban forest.

3.2 Layout of the Plan

The UFMP is laid out to first provide some background information and context for urban forests in general and the urban forest of HRM. Chapter 3 explains the overall design of the plan and the methods used in its development. Chapter 4 presents the principles required and used to develop the urban forest master plan. Chapter 5 articulates the management framework, which includes the VOITs, management actions, and monitoring measures that will be taken. Chapter 6 summarizes the results of the neighbourhood analysis for the urban forest communities included in the UFMP. The ten urban forest community sections of Chapter 6 present the outcome of an in-depth analysis of current urban forest conditions, as well as existing and future challenges, opportunities, and priorities for managing the urban forest at a community scale. Finally, Chapter 7 describes the resources, timelines, and responsibilities required for the implementations of the UFMP. This chapter was completed after further public consultation had taken place to determine priorities for implementation of the Plan. Further summaries of neighbourhoods contained within the urban forest communities are included in Appendix A – Urban Forest Neighbourhoods Factsheets. These factsheets detail individual urban forest conditions, management actions, and targets required to achieve SUFM at a local scale for each of the 111 neighbourhoods contained in this Plan. The Plan also contains a detailed glossary of terms (Appendix B), a list of abbreviations and additional research material concerning public engagement and climate change research in Appendix C and Appendix D.

Scale is a frequently overlooked element in urban forest management plans (Ordóñez & Duinker, 2013). In the management of a city's urban forest, there are scales or levels of planning that range from strategic, city-wide management planning to detailed, street level planning. To be effective, these planning levels should be integrated to ensure a seamless continuity from regional to local-scale policies and corresponding implementation strategies. It is the vision of the HRM UFMP to overcome disconnects between spatial scales of management and gaps between policy and operations. Different management units, defined on the basis of such factors as land use, history, and biophysical conditions, at different scales require individualized action sets. This has been accomplished through the neighbourhood approach to management that includes four discrete spatial scales, from broadest to finest: 1) the UFMP Study Area, which essentially includes all municipally serviced areas in HRM, 2) the communities, which follow boundaries of historical pre-amalgamation cities and towns, 3) the neighbourhoods, which exhibit distinctive environmental and settlement patterns, and 4) the neighbourhood divisions, featuring unique land-use subsets within neighbourhoods that warrant special attention in local urban forest management.

3.3 Neighbourhood Classification

Critical questions to be addressed in urban forest management plans include: At what scale or scales do management principles operate? At what scale or scales are actions implemented? And most important, at what scale is management of the urban forest most effective in meeting designated targets? Many plans surveyed only address a single scale, which is the entire city and its urban forest, with broad strategic or policy-based principles of management. Other cities surveyed, such as Regina, Victoria, and Saanich, address multiple scales of management, ranging from the city down to the street level (Ordóñez & Duinker, 2013). The HRM UFMP endeavours to focus and expand on the issue of scale, with a novel approach to spatial classification of management units, driven by the concept of the neighbourhood.

The UFMP Study Area was divided into 111 unique neighbourhoods, organized into ten discrete communities. Classification and boundary delineation were collaborative and systematic, driven by four key criteria.

1. **Biophysical conditions.** The classification process incorporated important biophysical properties of the landscape, as these are major drivers of urban forest condition and potential, especially in the extensive areas of undeveloped, peri-urban forest that typifies HRM. Conditions addressed include soils, hydrology, topography, surficial and bedrock geology, and the Provincial Ecological Land Classification. Importantly, the natural history of forest ecosystems in a neighbourhood helped to shape its classification. One example is the iconic white pines of the Armdale area, which were once part of a continuous stand of old-growth white pine prior to development.

2. **Community uptake.** A driving goal behind formation of the neighbourhood approach was to foster the highest possible community engagement and stewardship. HRM residents relate very strongly to the neighbourhood scale and are keenly aware of the environment around their homes and places of work, where they can see the impact of their actions. The neighbourhoods, and subsequently the communities, are often centred around and named after historical HRM neighbourhoods. It is important to note that neighbourhoods were identified and delineated according to the aforementioned criteria, and will often diverge from the traditionally held boundaries of their namesakes.

3. **History.** Halifax and the communities of HRM are steeped in history, ranging from traditional pre-settlement Mi'kmaq heritage to European colonization and the city's military importance in several wars. The neighbourhood classification was also informed by significant historical events whose legacies can be seen in the urban forest today. A prime example of this is the Halifax explosion, and subsequent redevelopment of the North End under the "garden city" influence of Thomas Adams. History also includes recent history, which in the case of the neighbourhood classification is the date of development. The date that a neighbourhood was developed—especially newer residential, suburban neighbourhoods—strongly influences the age structure of the urban forest. A subset of this is the pattern of development, which ranges from "grid-iron" development patterns in the Fairview area, with its tree-lined streets, to low-density "ribbon" (Lörzing, 2000) development in suburban/rural HRM, where often the only trees are found in residual forest patches retained during development.

4. **Land use.** Land use is a major driver of urban forest conditions, and is largely responsible for specific threats to the urban forest and unique challenges in its management. Consequently, land use was a valuable tool in delineating HRM neighbourhoods. To see the extent of the influence of land use on the urban forest, one need only explore the mature tree-lined streets in the South End of Halifax and compare them with the austere streets of the Burnside Industrial Park. A component of land use is ownership, which dictates management control over urban trees. For example, in the Shearwater area nearly all trees are on institutional and industrial lands that are owned privately or by the federal Department of Defence. Consequently, most of the urban forest is outside HRM's jurisdiction.

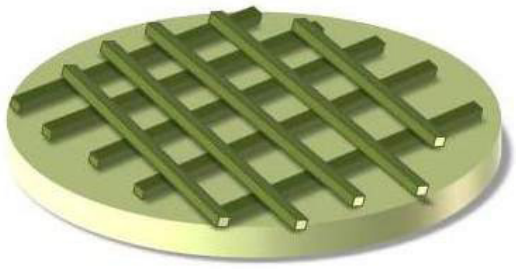
Neighbourhood classification was a two-stage process. First, hard-copy maps were distributed to city planners and other stakeholders with intimate knowledge of particular communities and their development histories and patterns. Participants were encouraged to sketch their knowledge onto the maps in a collaborative and open approach so that their extensive knowledge of history, development, and neighbourhood profiles could be incorporated into the classification process. The second stage was a complex spatial analysis done by the Dalhousie research team. The maps from the first stage were digitized into a GIS database. The database includes the biophysical datasets, the HRM municipal database, and the urban canopy dataset, so that the neighbourhoods could be further refined by the above criteria. The neighbourhoods are the functional unit of the UFMP, and will be pivotal in plan implementation and future monitoring and analysis.

A final component of the neighbourhood classification was identification of finer-scale neighbourhood divisions. A division in a neighbourhood was delineated when there was a major anomaly in canopy cover within a neighbourhood that was both too small to be classified as a separate neighbourhood and was part of the character of the neighbourhood that surrounded it. The most frequent prerequisite for a neighbourhood division was a commercial, institutional, or industrial

area with low canopy cover, such as Mic Mac Mall in Crichton Park or CFB Stadacona in Halifax's North End. However, there were occasions when a division was a residential area within a largely industrial neighbourhood, such as Lewis Drive in the Atlantic Acres Industrial Park.

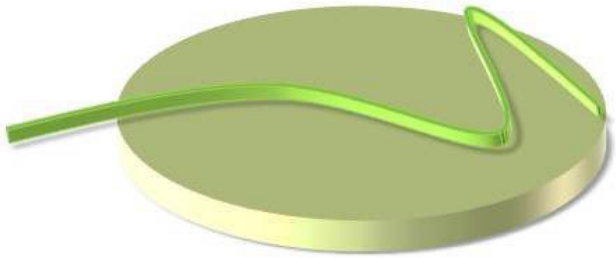
3.4. Landscape Pattern Language

Human beings have an innate ability to navigate. We plan trips and move through our urban landscape on a daily basis. We have a spatial sense that helps us interpret our surroundings. Part of this sense is based in everyday patterns such as squares, lines, and circles. We often interpret our surroundings with maps that help us find our way. The use of patterns is also a helpful way to assist us in thinking about the urban forest landscape. By using these everyday patterns we can create a language to communicate the many forms that the urban forest takes and create maps that express their connections and transitions from one form to another. The UFMP has adapted Han Lörzing's (2000) urban open space pattern language research and applied it to the urban forest. Landscape patterns can be created by singular elements such as the **patchwork**, by linear elements such as the **network**, and **ribbon** and area-based elements such as the **belt** and the **wedge**. In turn, these patterns can be developed into maps that can help us interpret and plan for the urban forest.

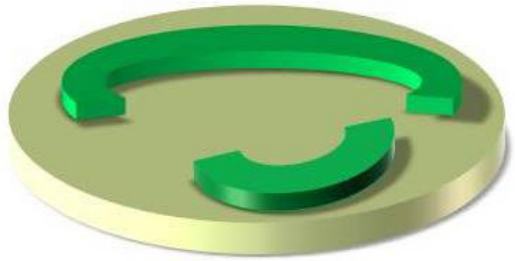


Network. The network pattern is the most abundant and basic pattern in the urban forest. It is a complex lattice of linear elements. Lörzing's original vision of urban open space described the network as created by "recreational links," such as bicycle routes. The application of the pattern concept to the urban forest versus open spaces has yielded a slight divergence from Lörzing's vision of the network. In the urban forest and the UFMP, networks are created by the HRM-controlled street trees that line HRM's road network.

Patchwork. The patchwork pattern consists of a series of discrete, singular "dots" throughout urban areas that are generally comprised of parks. In the UFMP, the patchwork is created by HRM-controlled parks, which provide both open green-space and urban-forest interface with the public, and are of course major opportunities to improve HRM's urban forest.



Ribbon. The ribbon pattern is a linear element that features a continuous forested landscape. Ribbons in HRM are created naturally by tree-lined rivers such as the Sackville River, or treed corridors that were established vicariously due to projects such as the Halifax rail cut. They also include boulevards, greenways, railroads, and substantial rights of way on 100-series highways, all of which provide ample opportunity to accommodate urban trees.



Belt. The belt pattern is an area-based pattern created by large forested areas that confine the expansion of urban development and serve as open space buffers to urban areas. Belts in HRM are created by areas of protected land and parks, such as Shubie Park, Point Pleasant Park or Sir Sandford Fleming Park.

Wedge. The wedge pattern is a large, area-based pattern that has proven to be more successful at containing urban sprawl than the belt pattern. Wedges are large patterns that are found between extending "fingers" of urban development areas that expand radially from the urban core. Wedges of urban forest in HRM are created by large forested areas that are protected from development, such as Long Lake Provincial Park, the Blue Mountain, Birch Cove Lakes Wilderness Area, and the Western Common Wilderness Common Regional Park.

While singular elements in the patchwork provide the most ample and frequent urban forest 'patches' as parks in the city, linear elements in the network and ribbon patterns are critical for enhancing connectivity of the urban forest between patches, and between the greater area-based elements. Patterns incorporate both the built infrastructure and natural landscape features. For example, the network is dictated by the road network of an urban area, where street trees line the public realm of the right of way. Wedges are created by protected natural areas on the fringe of urban areas, controlling urban sprawl.

Combining the linear and spatial elements of the network, patchwork, ribbon, belt, and wedge patterns will result in an integrated, connected, and sustainable urban forest.

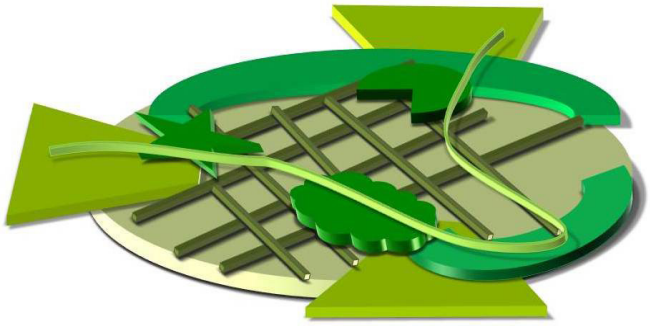


Figure 3.2 Combination of all landscape patterns (Lörzing, 2000)

3.5 Values, Objectives, Indicators, and Targets

To manage HRM's urban forest sustainably, the UFMP study team adapted the Value, Objective, Indicator and Target (VOIT) conceptual framework (Figure 3.3) for sustainable forest management (SFM) that was first developed by the Canadian Standards Association (CSA, 2009) for managing hinterland forests in Canada. A key advantage of the VOIT approach is that it focuses on values (the important things we want to sustain through sustainable urban forest management) rather than on issues (the problems we may identify with the current urban forest).

The planning process using the VOIT framework begins with an identification of appropriate values to plan in regards to. The values for this plan were identified in 2010 through a collaborative, multistage process. HRM and the Dalhousie research team identified a tentative value set based on a thorough review of urban forest literature, other management plans, and the team's professional judgement. The urban forest values and VOITs framework were then discussed and prioritized by citizens in the community engagement process (as detailed in Appendix C). The values were categorized as follows: (a) ecological, including biodiversity, ecosystem condition, water control, carbon uptake, air quality, energy, shade, and microclimate; (b) economic, including employment, materials, property values, and private investment; and (c) social, including aesthetics, sense of wellbeing, knowledge, and traffic calming.

Once the values are known, then planners proceed to develop an objective for each, as well as one or more measurable indicators to represent the value. Finally, targets are set for each indicator, provisionally at first with subsequent refinement as feasibility to meet the targets is tested. During plan implementation, one moves back through the conceptual framework to gauge progress in moving toward sustainability. In so doing, the indicators are monitored and the data are used to determine if the targets are being met. If they are not, the underlying factors are investigated and corrective actions taken - this is the essence of adaptive management. If they are being met, then one assumes that the objectives are also being met and the values therefore being satisfied. The greater the degree of values satisfaction, the greater the achievement of sustainable urban forest management.

While the values, objectives and indicators apply at all levels of consideration - the whole city, the community, and the neighbourhood - the targets are most appropriately set at the finest level, i.e., the neighbourhood. From there, the targets can be summed up for each community to understand broader requirements. This helps recognize the unique features of each neighbourhood (e.g., history, current urban forest conditions, current complement of urban infrastructure, future development possibilities) and also facilitates priority-setting for actions to be taken as part of plan implementation.

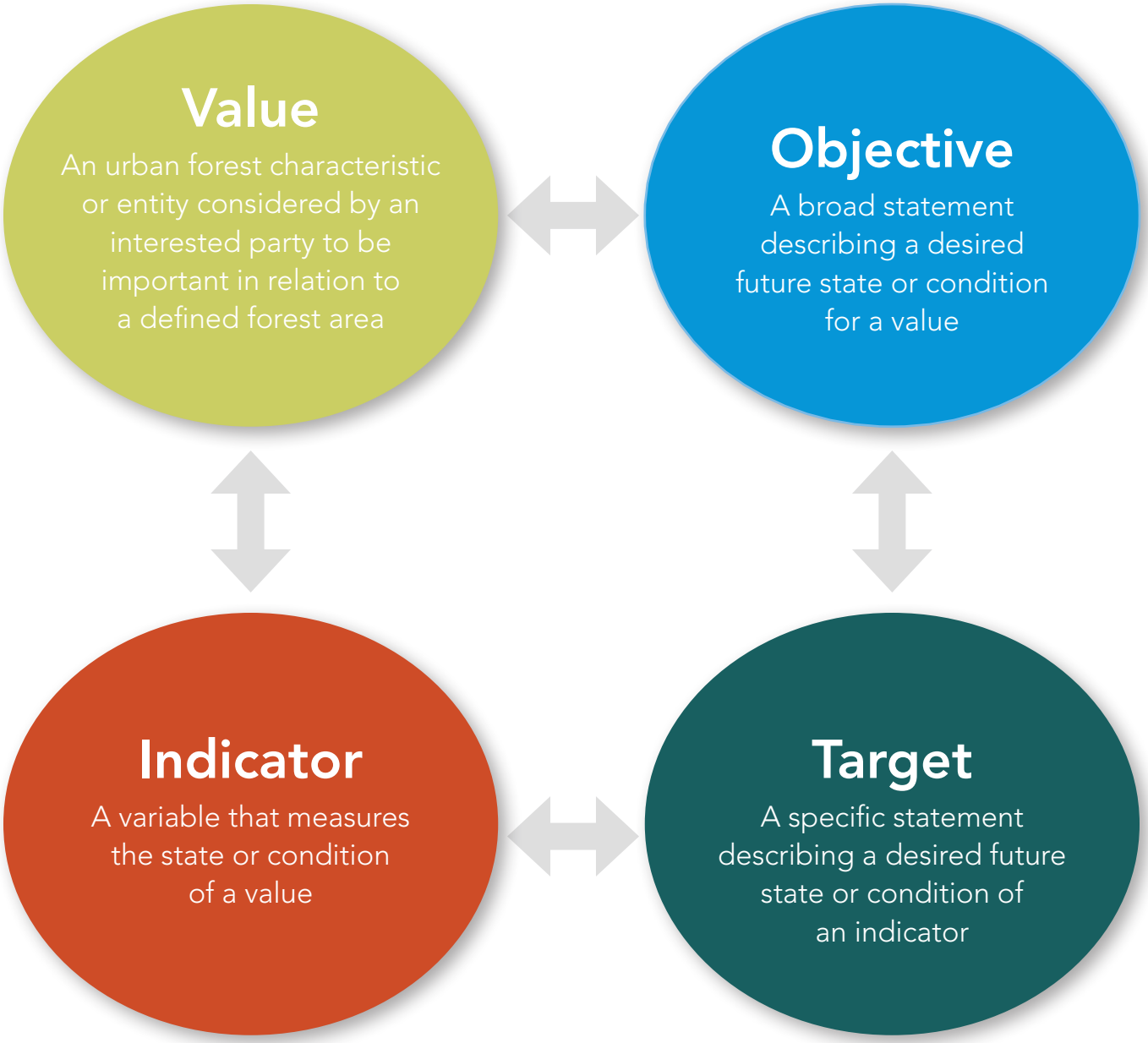
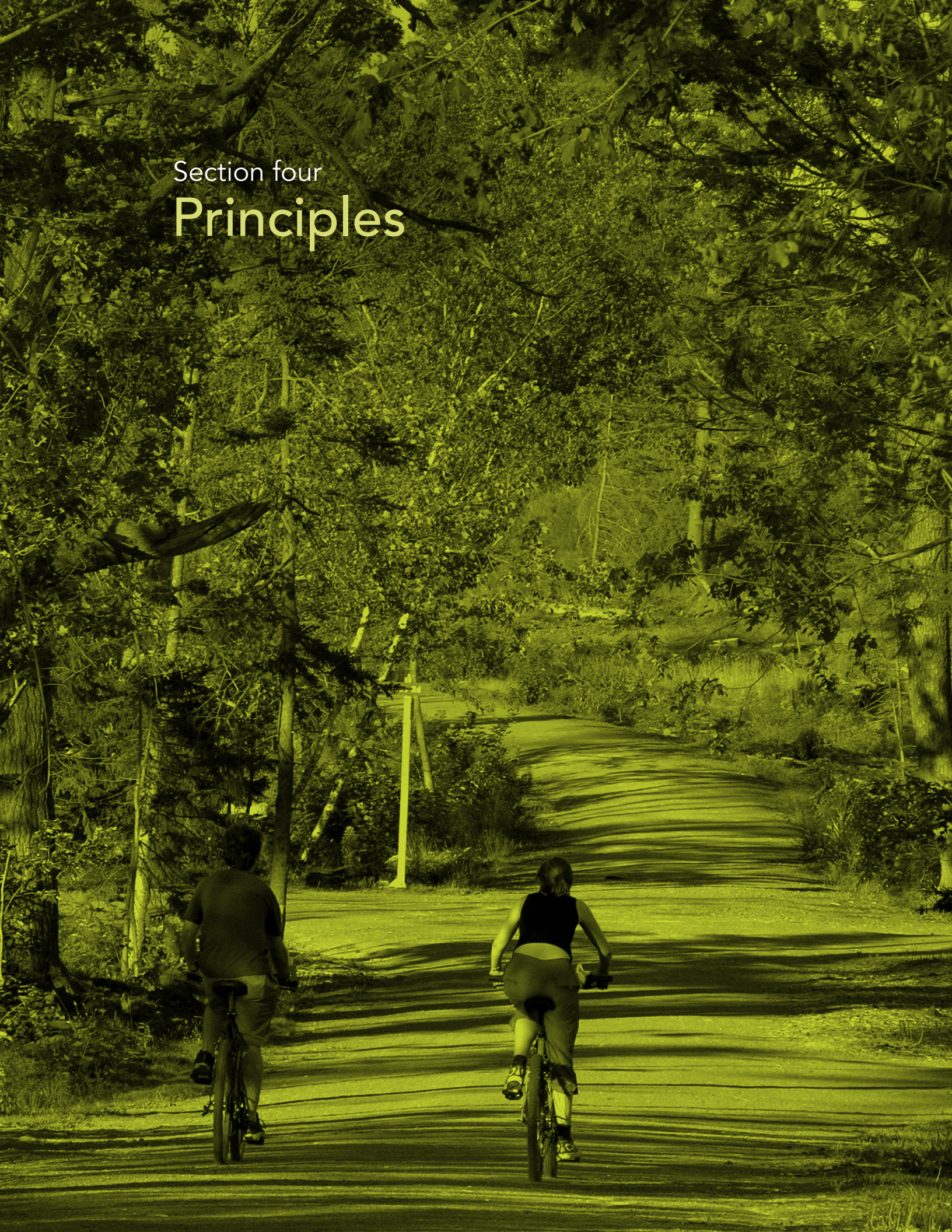


Figure 3.3 The conceptual framework for values, objectives, indicators, and targets



Section four

Principles

4.1 Guiding Principles and Management

Principles are best designed as statements of basic truths (National Round Table on the Environment and Economy, 1996). They are the foundation of a planning process because they give direction and rationality to all subsequent decisions made during a planning process. Principles, goals, and objectives developed through public consultation and approved by HRM Council for the Regional Plan (HRM, 2006), were incorporated into the UFMP planning process (Figure 4.1). Principles are further strengthened when they are adopted as policy by a governing body. In this case, HRM Council adopted Policy E-20 contained in its 2006, Regional Municipal Planning Strategy (RMPS). The policy states: "HRM shall prepare an Urban Forest Functional Plan to identify design guidelines and a management strategy to maximize the urban forest" (HRM, 2006). The purpose of a functional plan is to guide municipal management and signal intent to create a detailed direction for setting budgets for programs, services and facilities consistent with its implementation. A functional plan is also intended to provide guidance in the ongoing management of strategic initiatives, partnerships and demonstration projects useful to seeing the full potential of the plan realized over time.

The terms "functional plan", "management plan" and "master plan" are interchangeable. Throughout North America, "Urban Forest Master Plan" (UFMP) has been generally adopted as the common term to be cited with regard to comprehensive urban forest planning.

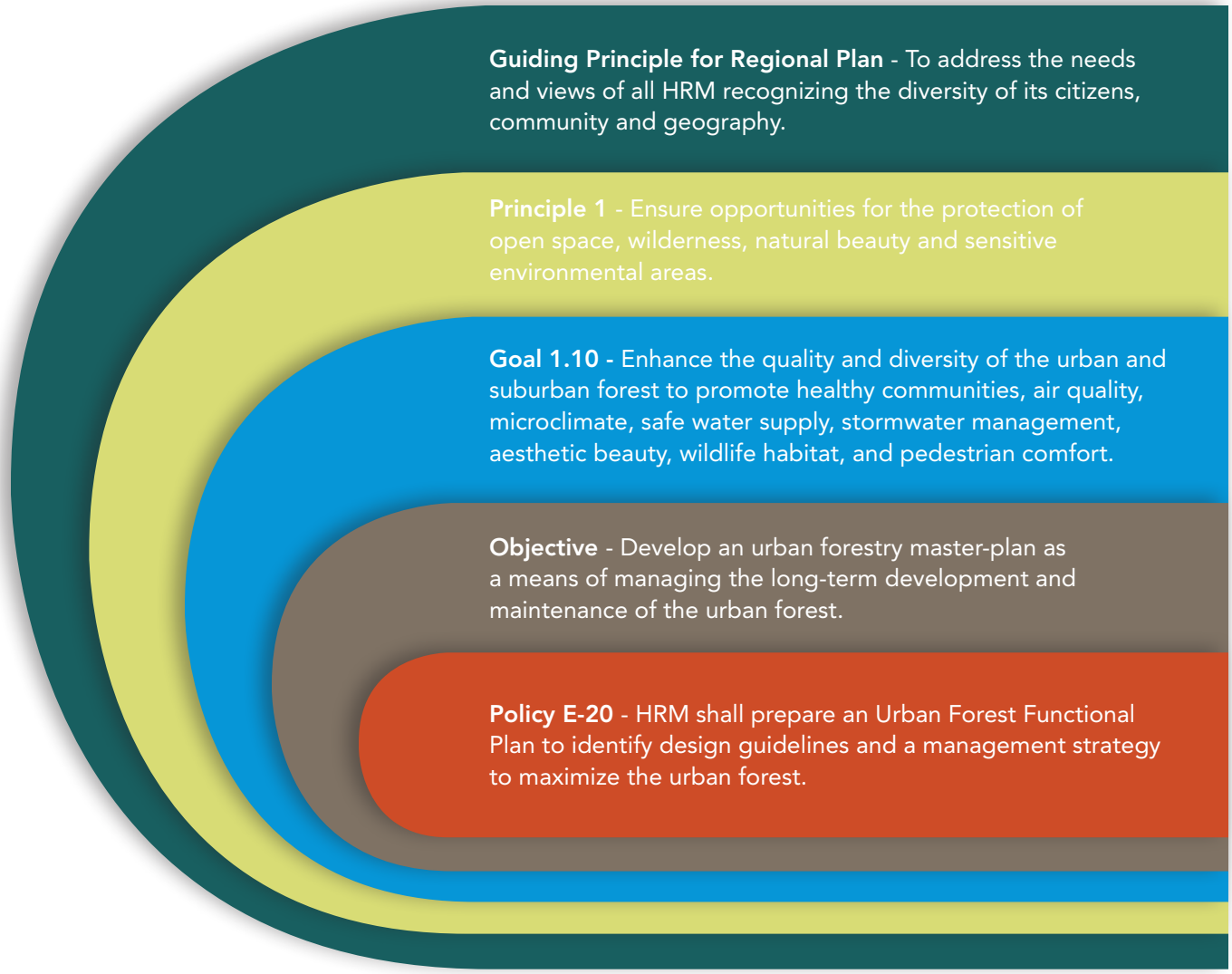


Figure 4.1 RMPS principles, goal, objective, and policy related to UFMP

4.2 Guiding Principles of the UFMP

In accord with the RMPS mandate, the HRM Urban Forest Team adopted the following principles to guide the development of the UFMP and management of the urban forest. They apply directly to the HRM urban forest and highlight concepts of best-management practices. The principles are not arranged hierarchically, as each one influences every element of the UFMP equally.

Guiding Principle 1 – Adaptive Management

The HRM urban forest is a complex natural resource system, where the outcomes of the UFMP will often be highly uncertain— especially when considering the influence of future climate change. Managing a public resource in the face of great future uncertainty requires a management system that fosters continual learning and refinement. This principle is known as "adaptive management." Generally, an effective adaptive management framework performs three tasks: making impact predictions in the form of testable hypotheses, measuring outcomes during and after implementation, and rigorously comparing predictions and measurements." This framework must be applied to every stage of decision-making, from scoping and problem definition to implementation, monitoring, and reassessment. In applying this framework to the HRM urban forest, management will:

- Make explicit statements about how the forest should look many decades from now
- Design actions that will set the forest on the right course
- Implement those actions
- Measure forest conditions over time
- Create new management knowledge by comparing expectations and realities as they unfold

Guiding Principle 2 – Precaution

The precautionary principle has a simple and straightforward intention: when an action may inflict harm, approach with caution (Myers, 2002). This simple definition stresses three core elements: potential harm, scientific uncertainty, and precautionary action.

Guiding Principle 3 – Public Participation

Public involvement is fundamental to the long-term success of HRM's urban forest. It helps the UFMP be responsive to local conditions and challenges by drawing upon a variety of different values and understandings. The public holds vast amounts of local knowledge that can improve the quality and effectiveness of urban forest management decisions. Public involvement also allows potential conflict to be anticipated, defined, and resolved before it becomes a problem.

Public participation also encourages a sense of ownership among the citizens, which can reduce harm to trees through direct vandalism, and can help re-engage people with their local environment and the urban forest (Greenhalgh & Worpole, 1995). Public involvement can both increase citizens' general awareness and appreciation of the urban forest's multiple benefits and engage them in stewardship of the city's trees.

Guiding Principle 4 – Sustainable Development

Since the urban forest is key to a sustainable Halifax, the UFMP must encompass a wide range of environmental, economic, and social values that have been developed by the research team and refined through community engagement, and it must take a long view of urban forest sustainability for the benefit of future generations.

4.3 Operational Principles

The overarching and guiding principles of sustainability, public participation, adaptive management, and precaution that were articulated in Section 4.2 guided the overall thinking for plan development and related the UFMP with HRM's RMPS. The 15 operational principles detailed below are more specific, and functioned as a conceptual backdrop to the development of plan details. Collectively, they represent a mindset or paradigm for SUFM.

The inspiration for identifying topics to be addressed in the principles came from two main sources: the literature on ecosystem management, particularly the seminal papers by Grumbine (1994, 1997), and key themes addressed in UFMPs across Canada (Ordóñez & Duinker, 2013). The approach to operational principles is as follows: First, the topic or theme addressed

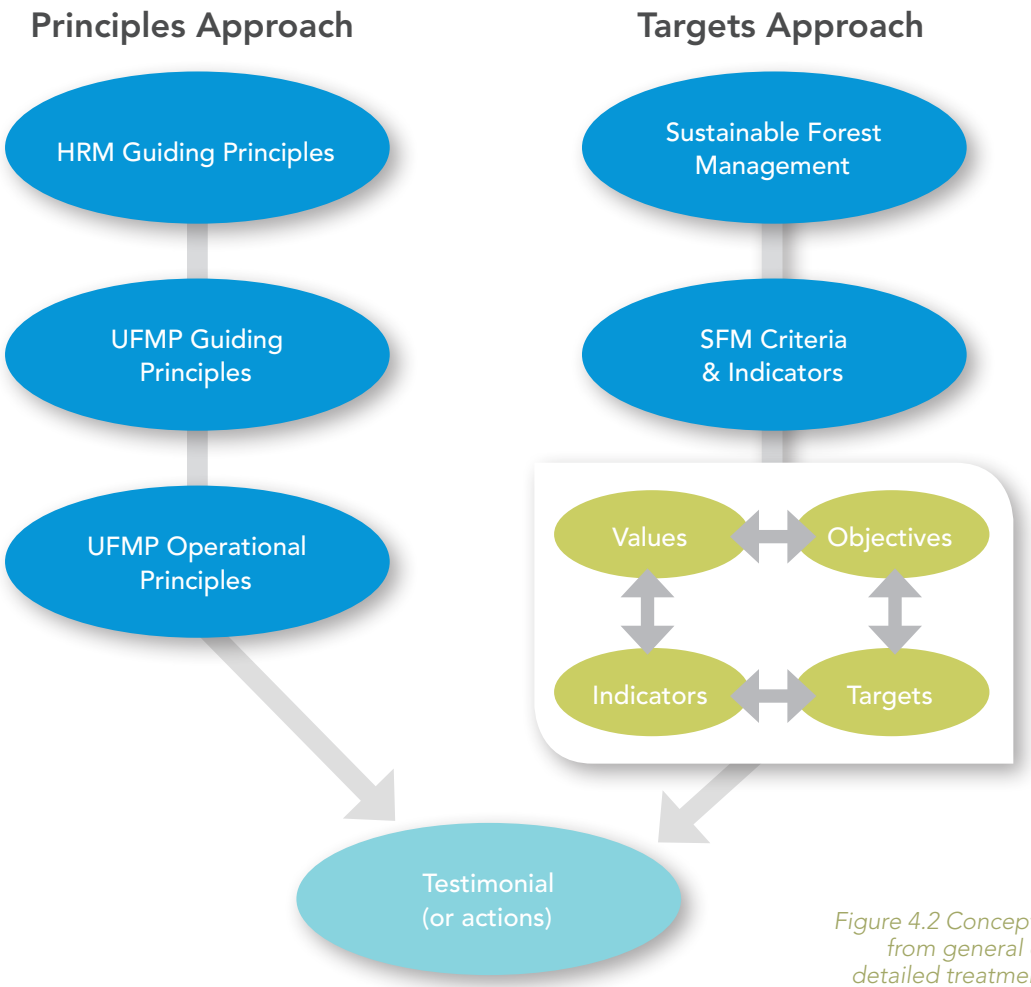


Figure 4.2 Conceptual linkages from general directions to detailed treatment schedules

by the principle is stated, followed by the articulation of the principle, framed as a positive statement. Note that the principles are stated as basic truths, rather than the alternative of recommendations or goal statements. Finally, key elements of the principles are explained and reflected on for their implications for the more detailed elements of the plan, such as target and action design.

Operational Principle 1 – Climate Change

Accepting that the climate of HRM will change considerably during the Twenty-first Century, and in concert with the long-term view of urban-forest development, building resilience to climate change into the future urban forest is vital to its sustainability.

There is presently a debate over whether assisted species migration is a suitable adaptation response to climate change in managing Canada's forests (Ste. Marie *et al.*, 2011). This plan takes the view that careful tree-species selection, including both native and currently alien tree species from the eastern forests of Canada and the USA, is an appropriate response to the potential effects of a changing climate. Intra-specific considerations here include careful selection of genetic material, including cultivars. To provide initial guidance on tree-species selections for the future urban forest in HRM, Rostami (2011) developed a list of appropriate species, and Rostami and Duinker (2011) offered an evaluation framework so urban forest decision makers could apply their own criteria in making appropriate species selections. An abstract and web link to the research is included in Appendix D.

Operational Principle 2 – Comprehensive Approach

Success in sustaining a healthy urban forest depends on implementing a comprehensive and coordinated suite of actions related to tree and forest protection, maintenance, and enhancement.

The span of actions needed to sustain the urban forest is broad. They range from making and/or choosing appropriate growing sites (the right tree in the right place), selecting suitable stock, and maintaining younger trees to ensure survival. Tending older trees prevents structural issues, protects people and vehicles. The UFMP will address this full range of actions, identifying the most promising ones given costs, land ownerships, tree responses, and the provision of urban forest benefits.

Operational Principle 3 – Cooperation and Partnerships

HRM needs the active participation of citizens, businesses, other levels of government, and non-governmental organizations in advancing the sustainability of the urban forest.

The municipality alone cannot sustain the entirety of the HRM urban forest. Not only does the citizenry need to be engaged, but other organizations, other levels of government, and businesses need to be involved. Given HRM's mandate for SUFM and its significant and financial human resources available for this endeavor, it can and should take the lead in forming collaborative and partnership-based relationships with a diversity of other organizations. The plan will commit HRM to a vigorous program of cooperation and partnership in pursuit of SUFM.

Operational Principle 4 – Equity

All HRM citizens deserve to enjoy a fulsome set of urban forest benefits in and near their residences and places of work and recreation.

All citizens can and should benefit significantly from a healthy urban forest in which to live, work, and play. All cities, including HRM, are characterized by a range of neighbourhood wealth. In wealthy neighbourhoods, residents and businesses can contribute more resources to the enterprise of SUFM. In less wealthy neighbourhoods, the city may need to provide relatively more resources and assistance for people to gain an equitable share in a healthy urban forest. The UFMP will call for HRM to distribute attention to sustaining the urban forest according not only to the condition of the urban forest but also to the relative wealth of the city's neighbourhoods.

Operational Principle 5 – Green Infrastructure

The city's total infrastructure includes the land, the built infrastructure, and the green infrastructure dominated by trees. The trees' benefits to the city are proportional to the degree to which they are managed and respected as green infrastructure.

In the same way that built infrastructure allows people to pursue important activities such as living comfortably, travelling safely, working productively, and recreating joyously, so too does the city's green infrastructure of trees contribute to our material well-being. Considering urban trees' basic biophysical roles related to stormwater attenuation, carbon sequestration, shade production, wind amelioration, air purification, and many others, the urban environment becomes greatly enhanced when trees are protected as green infrastructure. Research supporting this plan showed that the monetary value of urban trees' environmental services exceeds the cost of providing those services using trees by eight times. Green infrastructure has the unique characteristics of being only slowly replaceable, and also of increasing in quality and quantity over time with little investment, which are highly advantageous characteristics for infrastructure. When such infrastructure is damaged by human activities, the importance and requirement of replacing the lost green functions as soon as possible should be made clear to all.

Operational Principle 6 – Integrated Planning

Integrated planning is central to the political structure of urban forest management in HRM, and is vital to the values-based development, implementation, and reporting of the plan over its entire lifetime.

Integrated planning is an interdisciplinary approach to planning, whose key function is to ensure participation of every SUFM stakeholder in the planning process so that the diverse values associated with the urban forest can be satisfied, and complex and interrelated arrays of planning problems can be overcome (Rotmans *et al.*, 2000). Integrated planning also recognizes the imperative of incorporating efficient implementation, monitoring, and reporting of projects. In the UFMP, this principle refers to stakeholder and community engagement, as well as to the explicit definition of responsibilities for plan implementation and long-term management.

Operational Principle 7 – Invasive Species

Invasive species, both alien and native, compromise the sustainability of the urban forest and demand vigilant attention, as far as is practical, to prevention and control.

The term "invasive" is applied broadly and interpreted in many different ways. The UFMP relies on the definition provided by the Canadian Food Inspection Agency (CFIA): "Invasive species are plants, animals and micro-organisms that spread when introduced outside of their natural distribution and cause serious and often irreversible damage to Canada's ecosystems, economy, and society. They can be introduced into Canada from other countries or continents, or from one region of Canada to another" (CFIA, 2011). There is a long list of examples of such species in Canada and the United States, many of which have devastated urban trees and forests (see Section 2.2). Limiting the spread of invasive alien species is extremely difficult, as is limiting the damage to existing urban forests. It is therefore necessary to limit the vulnerability of future urban forests to known invasive alien species.

Operational Principle 8 – Naturalness

Except where urban conditions are such that adoption of natural traits for the urban forest would compromise sustainability, naturalness enhances ecological integrity of the urban forest.

Emulating natural patterns and processes has become a dominant theme in management of hinterland forests, both for timber production and for nature protection (Grumbine, 1994, 1997). Those patterns and processes may relate to species selection, tree densities, age-class distribution, or any number of other forest ecosystem processes and attributes. Given the prominence of naturalness-thinking in domains such as food production and forest management, HRM takes the position in the UFMP that, in general, managing to create natural conditions associated with trees in the city is a good thing. In other words, unless there is good evidence to the contrary, it is better to manage the urban forest for naturalness. There are, however, many circumstances under which the naturalness principle is appropriately abrogated:

1. When an invasive alien species of pest or disease makes it difficult or impossible to grow a certain native species of tree to maturity. Examples include American beech and the beech-bark disease, American chestnut and the chestnut blight, or the ash genus and the emerald ash borer.

2. When a species might not be suitable under a changed climate, such as black spruce, balsam fir, or white birch (Steenberg *et al.*, 2011), or a non-native species of tree from neighbouring forest regions may experience a suitable climate in HRM in the future.

3. Where immitigable harsh growing conditions warrant planting of a hardy non-native tree species that can withstand the harsh conditions.

Operational Principle 9 – Priority-setting

Sustaining the urban forest is best approached by allocating management resources where the highest aggregate benefit will be achieved per unit resource invested.

HRM does not have, and is not expected to have, enough money to undertake all desired SUFM actions in the near term. Decisions will therefore be needed immediately on the priorities for action. The UFMP will set out broad directions for such priorities, and the urban forest managers will need to work with their annual municipal resource appropriations, plus any other funds they can access, in setting priorities on an annual basis. This operational principle will be a dominant focus of plan implementation.

Operational Principle 10 – Public Understanding

The more HRM citizens know about trees in the city and the values they provide, the more they will engage in stewardship activities and support municipal initiatives associated with SUFM.

Most of HRM's residents will admit to not knowing much about the trees in the city—what the species are, how the trees grow, or how people might assist in caring for the urban forest (Ordóñez *et al.*, 2011). Since trees are beneficial to human well-being in so many ways, people will turn their increased knowledge into actions to support improvements in the urban forest. The plan will commit HRM, and encourage all relevant organizations, to help citizens enhance their knowledge about all aspects of SUFM.

Operational Principle 11 – Sense of Identity

The degree to which HRM residents and visitors identify the city as an attractive place to live, work, play, and visit depends greatly on the quality of the urban forest.

Some of the world's cities are known as forest cities, where trees are abundant, diverse, in good condition, and aesthetically pleasing. The natural vegetation of HRM's ecosystems is predominantly trees, and we might even be persuaded to see our city not as built infrastructure with trees judiciously placed therein, but rather as a forest with built infrastructure placed throughout. Managing the urban forest therefore becomes a key element in helping HRM residents and visitors identify positively with the city. The UFMP will be driven by the desire to make HRM a highly desirable place to live, work, and visit, where residents are proud of the urban forest and where the urban forest is central to people's appreciation of HRM.

Operational Principle 12 – Space and Location

Urban forest sustainability depends not only on placing trees into hospitable growing locations in or near the built infrastructure, but also on the spatial relationships among the trees themselves. Considering the spatial extent and layout of the UFMP Study Area to which the plan applies, sustainability also depends on attention to urban forest conditions in each neighbourhood.

A tree's ability to deliver the many values and expectations placed on it depends on where it is in relation to many things, including underground growing space, built infrastructure, and neighbouring trees. The UFMP will account for all these spatial relationships. With respect to neighbouring trees, the urban forest landscape patterns under the plan consider the benefits of creating tree corridors and forest stands for people, and continuous-canopy habitats for wildlife.

Urban residents do not generally associate equally with every neighbourhood across cities as large as HRM; they associate primarily with the neighbourhoods in which they live, work, shop, and play. The UFMP is therefore structured spatially to draw people's attention to specific neighbourhoods and the associated urban forest of particular interest to them.

Operational Principle 13 – Stewardship

Since so much of the land in HRM is privately owned, sustainability of the urban forest depends on individual and corporate landowners taking active care of the trees and tree-growing potential of their properties.

Municipal actions on the urban forest will, as expected, focus on trees on land owned by HRM. However, there are many more trees on private, provincial, and federal land. If SUFM is to be achieved in any comprehensive way throughout the UFMP Study Area, those lands also require management. On the premise that people take care of things that are important to them, it is expected that as people gain more understanding of trees and the urban forest, they will be motivated to increase their attention and efforts in stewardship activities. The plan will commit HRM to assisting landowners in their stewardship aspirations and initiatives.

Operational Principle 14 – Time and Timing

A long-term view, with explicit attention to appropriate timings of actions across years and decades, is essential to successful SUFM.

On the premise that people want continuity in satisfaction of the values they associate with trees on or near their properties and in their neighbourhoods, they and urban forest managers need to design ways to deliver on a continuous stream of benefits. The importance of this concept can be highlighted through the comparison of two types of city infrastructure. If a building burns, it can be rebuilt in months, or at most a few years, and full functionality can be quickly restored. If a mature tree dies, full functionality can only be restored after decades of growth of a new tree. Tree species can have considerable variation in their lifespan—short-lived trees may live only a few decades, while long-lived trees may live one or several centuries. This continuity in urban forest benefits can be facilitated by incorporating short-lived, fast-growing species and long-lived, slow-growing species into the urban forest management framework.

Another implication of long-term values satisfaction from trees is the importance of having a diversity of tree ages in a given street, park, or neighbourhood. When a hurricane or disease wipes out every tree

along a street lined with mature trees, it takes decades to return to the full canopy cover and associated benefits provided by mature trees. This interruption in values satisfaction can be prevented by judicious management of the age- and size-class structure of tree populations.

Operational Principle 15 – Urban Forest Values

The citizens of HRM value trees in the city in numerous diverse ways. Urban forest sustainability therefore demands acceptable degrees of satisfaction of and balance among these diverse environmental, social, and economic values.

Research and community engagement conducted in HRM, as well as in other cities, reveals that people hold trees in the city dear to their hearts for a host of reasons (Peckham, 2010; Ordóñez *et al.*, 2011). Generally speaking, people like trees and want them to flourish in the urban environment, and they also associate a diverse and wide-ranging set of values with the urban forest. The UFMP's mission is to satisfy as wide a range of forest values as possible for as wide a range of people as possible. This requires taking a values-based approach to SUFM and designing action sets to sustain these values.

Section five

Management Framework

5.1 Values, Objectives, Indicators, and Targets

The VOITs presented below describe the urban forest values that must be satisfied in the management HRM's urban forest. These values have been extended into objectives, indicators, and targets where possible, so that they can be translated into actions that can be monitored for effectiveness. For several of the urban forest values identified in plan during development, it was not yet possible to identify feasible indicators and translate objectives into targets. These values and objectives are listed and associated with actions, but are not yet part of the monitoring agenda. With time, researchers and planners will develop appropriate indicators and targets so that the full suite of VOITs can be included in the monitoring program. The VOITs are segregated into ecological, social, and economic categories and presented in Tables 5.1, 5.2, and 5.3 respectively.

Table 5.1 Ecological values, objectives, indicators, and targets for the HRM UFMP

	Values	Objectives	Indicators	Targets
Biodiversity	Ecosystem diversity	Increase area of naturalized ecosystems	Percent of area in forest stands	35% of the UFMP Study Area is in forest stands
	Species diversity	Even out age-class diversity of urban trees	Percent of trees planted within the last ten years	Equal or greater than 10%
		Raise representation of native trees in the urban forest	Percent of street trees that are native	50% of all street trees are native
			Genera that comprise more than 10% of all street trees	No genus comprises more than 10% of all street trees
			Acadian old-growth species that represent at least 1% of all street trees	All six Acadian old-growth species represent at least 1% of all street trees
	Genetic diversity	Expand gene pools of native species	Range of cultivars of tree species	Increase number of cultivars per species planted, proportional to the number of trees planted.
Ecosystem Condition	Ecosystem condition	Increase canopy cover	Percent canopy cover	53% canopy cover for the UFMP Study Area
	Tree condition	Improve tree health	Further research needed	Further research needed
	Aquatic system condition	Natural temperatures, sedimentation rates, stable groundwater	Percent canopy cover of riparian zones	100% canopy cover in riparian zones
Water Control	Stormwater control	Increase the amount done by the urban forest	Monetary equivalent of stormwater control service	Target will be based on pending i-Tree analysis (five-year monitoring cycle)
Carbon Uptake	Carbon uptake	Maximize carbon uptake by the urban forest	Net annual carbon sequestration and total carbon storage	Target will be based on pending i-Tree analysis (five-year monitoring cycle)
Air Quality	Particulate control	Increase the amount done by the urban forest	Monetary equivalent of particulate control service	Target will be based on pending i-Tree analysis (five-year monitoring cycle)
	Chemical control	Increase the amount done by the urban forest	Monetary equivalent of chemical control service	Target will be based on pending i-Tree analysis (five-year monitoring cycle)
Energy	Home energy savings	Increase the amount done by the urban forest	Further research needed	Further research needed
Shade	Summer shade/UV control	Increase the amount done by the urban forest	Percentage of HRM parks that are adequately shaded	All HRM parks have a canopy cover of at least 40%
	Asphalt longevity	Increase the amount done by the urban forest	Monetary equivalent of asphalt control service	Target will be based on pending i-Tree analysis (five-year monitoring cycle)
Micro -Climate	Amelioration of adverse winds	Increase the amount done by the urban forest	Further research needed	Further research needed

Table 5.2 Economic values, objectives, indicators, and targets for the HRM UFMP

	Values	Objectives	Indicators	Targets
Employment	Urban forest employment	Increase direct urban forest employment	Further research needed	Further research needed
Materials	Woody materials	Increase the amount of woody materials available from tree removals	Further research needed	Further research needed
	Edibles	Increase the amount of edibles available from the urban forest	Further research needed	Further research needed
Property Values	Property values	Increase property values with value trees on private properties	Proportion of residential with at least one value tree	100% of residential properties with a plantable site have at least one value tree
Private Investment	Private investment	Increase private investment in the urban forest	Further research needed	Further research needed

Table 5.3 Social Values, Objectives, Indicators, and Targets for the HRM UFMP

	Values	Objectives	Indicators	Targets
Aesthetics	Forest appeal to the senses of sight, sound, and smell	Keep appeal positive	Degree of public satisfaction with urban forest aesthetics	80% of survey respondents are satisfied or very satisfied
Sense of Wellbeing	Sense of wellbeing	Increase sense of wellbeing	Degree of public satisfaction with urban forest effects on wellbeing	80% of survey respondents are satisfied or very satisfied
Knowledge	Public awareness	Increase public awareness	Degree of public awareness of urban forest and its benefits	80% of survey respondents articulate five or more benefits
	Scientific knowledge	Increase scientific knowledge	Investment in monitoring and research to create knowledge about the urban forest	Equivalent to 5% of UFMP implementation budget
Traffic Calming	Traffic calming	Increase traffic calming	Speed reductions achieved through strategic tree plantings	100% of chosen locations achieving appropriate speed reductions
Engagement	Citizen engagement	Increase quality and quantity of opportunities for citizen engagement in urban forest management	Degree of public satisfaction with engagement opportunities	80% of survey respondents are satisfied or very satisfied

5.2 Actions

The UFMP action set was designed using the targets developed in the VOIT framework and guided by the operational principles. Values justifying the actions are listed, and relevant operational principles for each action are stated. Actions A1 to A19 were translated directly from targets, many of which pertain to the implementation of neighbourhood treatments, while actions A20 to A28 were developed by the research team in response to less tangible values that, at this time, cannot be feasibly monitored using indicators and/or translated into attainable targets. Actions A29 to A32 are policy-based actions that were justified only by operational principles.

A1. Establish an average of 40% canopy cover in HRM parks in the UFMP Study Area.

- Values addressed: Ecosystem diversity
- Relevant operational principles: Naturalness, climate change, equity

A2. Apply neighbourhood planting treatments for street trees.

- Values addressed: Species diversity
- Relevant operational principles: Comprehensive approach, time and timing, climate change

A3. Employ neighbourhood native species treatments.
- Values addressed: Species diversity
- Relevant operational principles: Naturalness, sense of identity, invasive species, climate change

A4. Utilize neighbourhood species control treatments.
- Values addressed: Species diversity
- Relevant operational principles: Climate change, invasive species

A5. Deploy neighbourhood Acadian old-growth species treatments.
- Values addressed: Species diversity
- Relevant operational principles: Naturalness, sense of identity

A6. Diversify cultivars of tree species.
- Values addressed: Genetic diversity
- Relevant operational principles: Comprehensive approach, invasive species

A7*. Apply neighbourhood treatments to meet canopy targets for neighbourhoods, communities, and the UFMP Study Area
- Values addressed: Ecosystem condition, stormwater control, carbon uptake, particulate control, chemical control, asphalt longevity, amelioration of adverse winds
- Relevant operational principles: Urban forest values, priority-setting. *Action A7 refers to implementation of all neighbourhood treatments, and as such addresses many of the broad and coarse-scaled urban forest values

A8. Employ seven-year pruning cycles for all street trees and establish cooperative pruning programs with utility companies.
- Values addressed: Tree condition
- Relevant operational principles: Comprehensive approach, time and timing

A9. Establish an average of 80% canopy cover in HRM–owned riparian buffers.
- Values addressed: Aquatic system condition
- Relevant operational principles: Space and location, naturalness, integrated planning

A10. Educate landowners on the benefits of trees in riparian zones.
- Values addressed: Aquatic system condition
- Relevant operational principles: Public understanding, stewardship, space and location, naturalness

A11. Give priority to neighbourhood tree-planting treatments in HRM parks and on school grounds without shade trees.
- Values addressed: Summer shade/UV control
- Relevant operational principles: Space and location, equity

A12. Give priority to street tree plantings in neighbourhoods lacking privately owned trees.
- Values addressed: Property values
- Relevant operational principles: Space and location, equity, priority-setting

A13. Educate landowners, realtors, and developers on the benefits of trees.
- Values addressed: Property values
- Relevant operational principles: Public education, stewardship, cooperation and partnerships

A14. Conduct regular public surveys.
- Values addressed: Sense of well-being, forest appeal to the senses of sight, sound, and smell
- Relevant operational principles: Public understanding, stewardship, sense of identity, urban forest values

A15. Establish innovative interpretive programs for the public.
- Values addressed: Public awareness
- Relevant operational principles: Public understanding, stewardship, urban forest values

A16. Support citizen-led urban forest stewardship initiatives.
- Values addressed: Public awareness
- Relevant operational principles: Public understanding, stewardship, urban forest values, integrated planning

A17. Promote the benefits of the urban forest.
- Values addressed: Public awareness
- Relevant operational principles: Public understanding, stewardship, cooperation and partnerships

A18. Conduct urban forest research and project monitoring required to ensure the effectiveness of UFMP adaptive management processes.
- Values addressed: Scientific knowledge
- Relevant operational principles: Coordination and partnerships, priority-setting

A19. Characterize and prioritize target areas for strategic planting in HRM rights of way.
- Values addressed: Traffic calming
- Relevant operational principles: Priority-setting, space, and location

A20. Establish fundraising partnerships with private sector, institutional and non-governmental sector organizations to support urban forest stewardship projects.
- Values addressed: Private investment
- Relevant operational principles: Public understanding, priority-setting

A21. Invest in human capital with urban forest staff training and development.
- Values addressed: Urban forest employment
- Relevant operational principles: Comprehensive approach, urban forest values

A22. Provide incentives to homeowners to plant trees on their properties.
- Values addressed: Home energy savings
- Relevant operational principles: Stewardship

A23. Use trees to decrease stormwater in highly impervious areas, with priority given to conifers where conditions permit.
- Values addressed: Aquatic system condition
- Relevant operational principles: Space and location, priority-setting

A24. Where possible, retain special habitat elements, such as snags, coarse woody debris, and understory vegetation in parks.
- Values addressed: Ecosystem condition
- Relevant operational principles: Naturalness

A25. Identify and protect urban forest areas that support species at risk.
- Values addressed: Ecosystem condition
- Relevant operational principles: Naturalness, priority-setting

A26. Research the sale value of urban forest carbon credits.
- Values addressed: Private investment
- Relevant operational principles: Climate change, cooperation and partnerships

A27. Encourage citizens to plant food-producing trees on their properties.
- Values addressed: Edibles
- Relevant operational principles: Public understanding, stewardship

A28. Improve urban forest conditions around active transportation networks and use the urban forest to increase active transportation opportunities.
- Values addressed: Sense of wellbeing, forest appeal to the senses of sight, sound, and smell
- Relevant operational principles: Sense of identity, space and location, public understanding, priority-setting

A29. Research best practices and develop amendments to Municipal Planning Strategies and Land Use By-laws within the UFMP Study Area to improve urban forest canopy retention and replacement provisions.
- Relevant operational principles: Space and location, green infrastructure, integrated planning, cooperation and partnerships

A30. Research best practices and develop draft Urban Forest Canopy and Riparian Zone By-laws for public review. Update the Tree By-law (Respecting Trees on Public Lands: By-law Number T-600).
- Relevant operational principles: Green infrastructure, integrated planning, cooperation and partnerships

A31. Integrate UFMP policies and current upcoming HRM functional plans and land use plans. (e.g. HRM By Design-Centre Plan, Open Space Functional Plan, Stormwater Management Functional Plan, Transportation Functional Plan).

- Relevant operational principles: Integrated planning, green infrastructure, cooperation and partnerships

A32. Identify urban trees as "green infrastructure" in the HRM Municipal Service Standards "Red Book". Adopt guidelines to maximize the environmental benefits of trees on HRM property.

- Relevant operational principles: Green infrastructure, integrated planning

5.3 Monitoring and Research

This plan describes a vision of sustainable urban forest management in HRM over the short and long terms. Successful implementation demands attention to timelines and allocation of appropriate resources and responsibilities for carrying out the prescribed actions. Also critical is a comprehensive monitoring program to track progress and identify areas where additional efforts or improved directions are needed. Monitoring is essential to understanding the impact and effectiveness of management actions as they are implemented. Monitoring and research are also instrumental components of adaptive management—a guiding principle of the UFMP—so that management actions can be assessed for efficacy and refined for improvement (Duinker & Trevisan, 2003). Partnership approaches, where HRM leads the process but engages the resources of research-oriented organizations and citizens, will be pivotal in undertaking effective and efficient monitoring.

Because future resource availability and future structure and organization of HRM and other stakeholder organizations are uncertain and variable, implementation planning focuses on the short term. Even then, with implementation schedules set for several years or even a decade, they may be invalidated by such events as environmental calamities (e.g., hurricanes) or changed development plans. Notwithstanding such events that may necessitate contingency planning as soon as they occur, UFMP implementation is designed according to annual, five-year, and decadal stages, as shown below.

Annual work planning and implementation. Justification for an annual time step is the annual budget-allocation process of HRM, as well as completion of the annual growth cycle of trees. UFMP implementation requires development of an annual operating plan for city staff. This plan will include technical and maintenance-related elements as well as priority-setting for actions in the neighbourhoods with the most threatened urban forest, planting schedules, pruning and inspection locations, and timelines. Emphasis in monitoring on the annual cycle will be on action implementation.

Year Five. The five-year mark was chosen to reflect a period long enough for significant implementation and forest development to occur, and social and economic action programs to be developed and put in place. This includes the plan's critical public understanding and stewardship components. Five years is also an appropriate cycle for inventory and analysis using, for now, the i-Tree urban forest model suite. Within the five-year period, monitoring associated with most of the indicators (see the VOITs) will be started.

Year Ten. Consistent with forest planning in many provinces and countries, the ten-year stage was chosen to reflect the longest period over which the major assumptions in the plan would likely remain valid (if it is clear through monitoring that the plan assumptions become invalid sooner, then plan review will occur earlier). Thus, after ten years of plan implementation, a major review will be undertaken. Community engagement will ensure that the UFMP is still aligned with HRM citizens' values. By year ten into plan implementation, all the indicators will have become part of the monitoring program. A full review will be undertaken to determine the factors behind any variances between expected and measured values for the indicators. Plan revisions will account for needed changes in targets and actions.

Future Research

Implementing SUFM in HRM's urban forests will require new knowledge generated through research. The urban forest discipline is evolving and expanding, and the world is faced with impending challenges, ranging from global climate change to global recession. Maintaining a rigorous and ongoing research agenda will therefore be a vital component of UFMP implementation. Below are some major areas for future research.

1. **Climate change.** Climate change is a highly uncertain and rapidly changing threat looming on the global horizon. Climate projections are multiple and highly variable. Impacts on trees and the urban forest, adaptation to climate change, and adaptation of cities using urban forests will be at the forefront of the HRM urban forest research agenda.

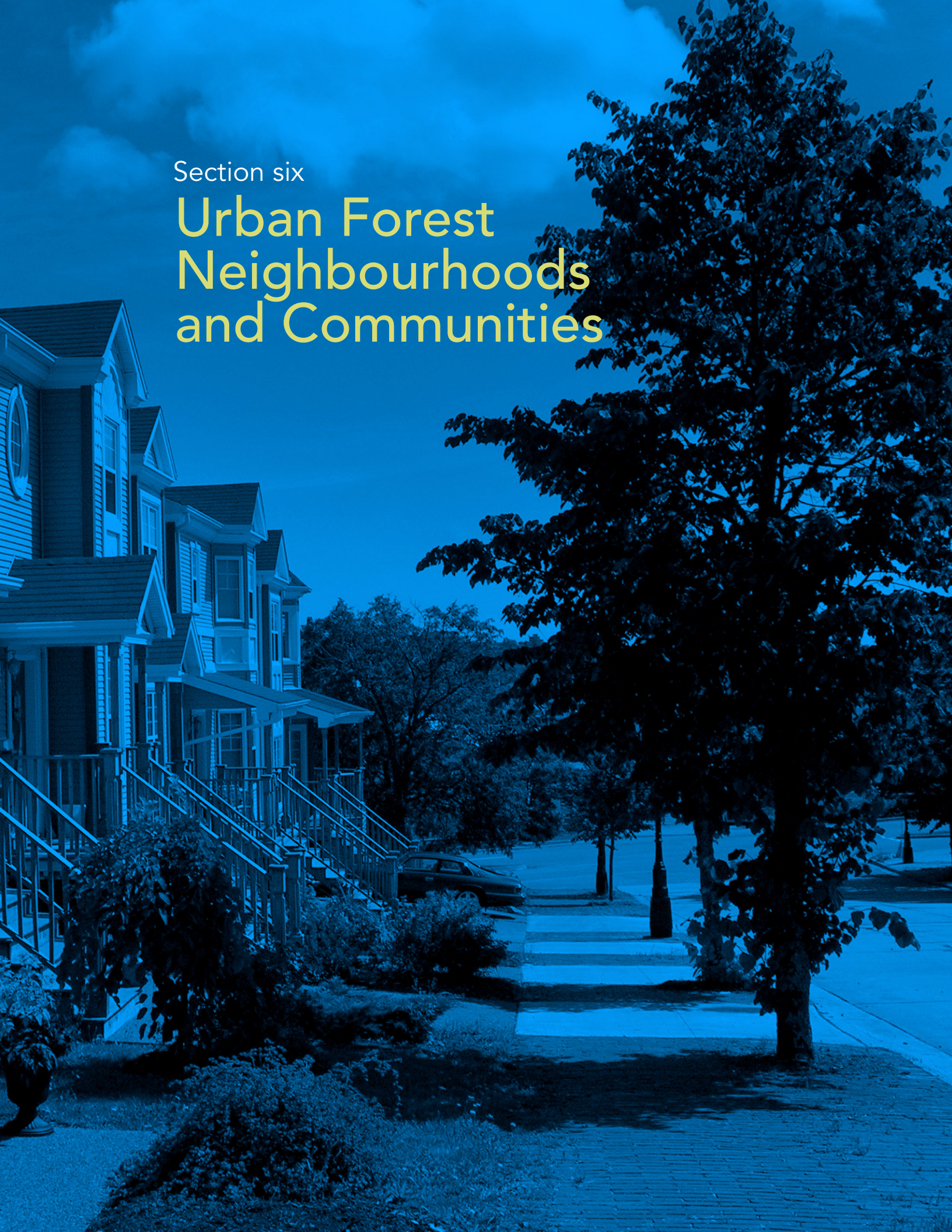
2. **Urban forest values.** Urban forest values are constantly evolving, as are the mechanisms we use to identify and define them. Urban forest values research, with a strong component of public involvement, will be an ongoing component of UFMP implementation. This includes public surveys on knowledge of and satisfaction with the HRM urban forest that are outlined in the action set in Section 5.3.

3. **Urban forest modelling.** The two urban forest models used in developing the UFMP were UFORE and STRATUM (Nowak & Crane, 2000). These two models have now evolved into the i-Tree suite of urban forest models—i-Tree Eco and i-Tree Streets respectively—developed by the USDA Forest Service. The i-Tree software suite is used by forest managers across North America, and has been a driver behind many Canadian urban forest management plans (Ordóñez & Duinker, 2013). Future i-Tree analyses will be part of the HRM urban forest monitoring and research program. This will include updating the urban-tree inventory for use in a new i-Tree analysis to be conducted within five years of plan approval. The spatial stratification, or management units, for the analyses will be the discrete urban forest neighbourhoods classified in the plan.

   A need clearly exists for a Canadian urban forest development model for researchers to use to guide their investigations and for managers to guide their planning initiatives. Such a model needs to have a sophisticated forecasting capability and be parameterized with Canadian climates, tree species, growth rates, and other ecological dimensions of urban forests. Consequently, the development of a locally applicable urban forest model is part of the research agenda for HRM.

4. **Community stewardship.** The increasing ubiquity and availability of social media and spatial tools such as Google Earth offer an expansive and affordable tool for increasing public understanding and stewardship of the urban forest. Moreover, they present opportunities to lighten the financial burden of some urban forest management activities such as inventory and tree care. An example of this is the use of Google Earth by community volunteers in Toronto to inventory tree size, type, and health (Anderson, 2011). The effectiveness of different strategies for using social media and freely available online tools to increase stewardship, especially of private trees, is part of the UFMP research agenda.

5. **Extreme Events.** Hurricane Juan represents an excellent case of an opportunity lost by the municipality and the research community to learn more about the urban forest. For example, precise tree ages could have been easily measured for all blown-down street trees, and the data used to strengthen tree growth rates around the city. The urban-forest specialists, who contributed to the creation of this plan, including city and university staff, will collaborate to put further plans in place to take full advantage of any future extreme events that might significantly affect the urban forest in a matter of mere hours.



Section six

Urban Forest Neighbourhoods and Communities

6.1 UFMP Study Area

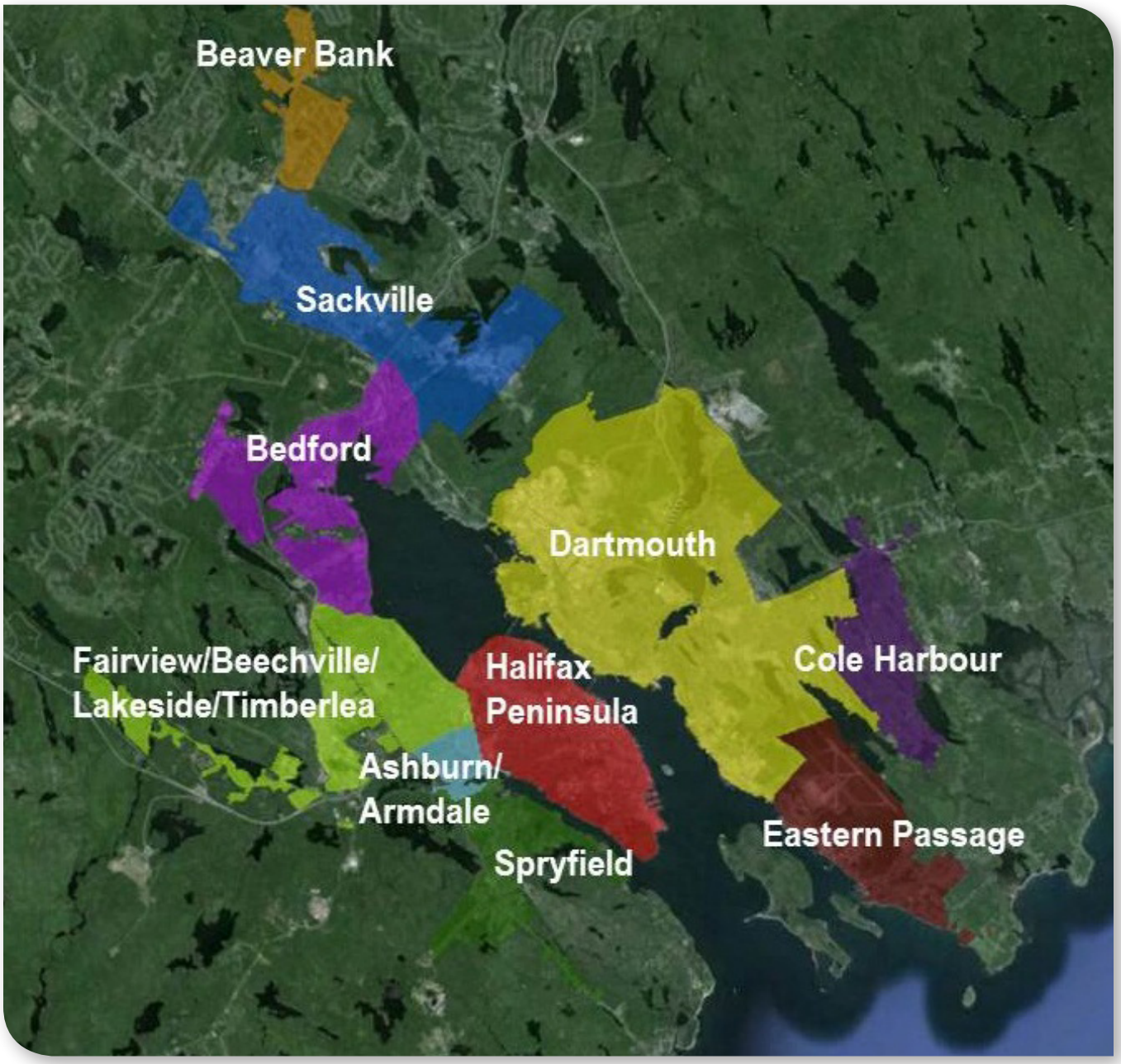


Figure 6.1 The ten communities within the UFMP Study Area

There are ten UFMP Communities. Each community comprises a number of urban forest neighbourhoods. They are established residential areas with accompanying commercial and industrial land uses. The communities receive municipal water and wastewater services. This has resulted in a higher density and intensity of land uses in these areas that has affected the sustainability of the urban forest and has led to the need for this plan. These communities comprise the UFMP Study Area, a 17,539-hectare management unit where the UFMP will be implemented. This chapter describes the communities (Table 6.1), their current conditions, and actions necessary to ensure a sustainable future.

Table 6.1 The ten communities in the UFMP Study Area

Community	Area (ha)	Current Canopy (%)*	Canopy Target (%)
Ashburn/Armdale	254	28	64
Beaver Bank	614	62	70
Bedford	1,710	59	57
Cole Harbour	1,000	27	70
Dartmouth	5,341	54	48
Eastern Passage	1,372	29	45
Fairview/Beechvilee Lakeside Timberlea (BLT)	1,792	26	56
Halifax Peninsula	1,789	19	50
Sackville	2,593	49	48
Spryfield	1,074	46	70
UFMP Study Area	17,539	43	53

**In communities such as Bedford and Dartmouth, current canopy cover appears higher than canopy targets. This is due to the inclusion of existing forest cover data; however, areas of these communities, such as Bedford West and Burnside, that are slated for development will significantly reduce canopy cover in the near future.*

Table 6.2 UFMP treatment summaries

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	26,700
Area of naturalized forest stands to be created on HRM lands per decade	330 ha
Area of naturalized forest stands not to fall below	5,760 ha
Average number of native trees to plant on HRM lands per decade	2,270
Average number of Acadian old-growth species to plant on HRM lands per decade	1,660
Refrain from planting the following genera until 2020	Maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	2,430

Table 6.3 UFMP treatment summaries definition

Treatment	Definition
Average number of trees to plant on HRM lands per decade	Quantitative analysis of the condition of the street trees in the HRM urban core determined that there are some 75 thousand spots that should have a tree and presently do not. The current rate of street tree planting by the city hardly keeps up with current mortalities and removals. The targets for street tree planting were determined in recognition of the need to correct the backlog over a period of 35 years.
Area of naturalized forest stands to be created on HRM lands per decade	The planning team determined that all HRM parks should have a canopy coverage of at least 40%, and that canopy coverage should be made up significantly of naturalized forest stands. Neighbourhood analysis revealed the area of HRM parkland, the current canopy coverage, and the current area of naturalized stands. Most parkland (except forested parkland such as Point Pleasant Park) is way below the general targets, so the specific targets are designed to reach the general target levels over a period of several decades.
Average number of native trees to plant on HRM lands per decade	Considering the harsh growing conditions streetside, it is not feasible at this time to move to native-only planting of street trees. It is possible, given that streetside planting conditions are variable from street to street, to make significant improvements in the proportion of the street tree population that is of native species.
Average number of Acadian old-growth species to plant on HRM lands per decade	The planning team determined that six native tree species would be representative of Acadian old-growth forest composition (American beech is excluded at this time until disease-resistant stock is available): sugar maple, yellow birch, red oak, red spruce, white pine, and eastern hemlock. These species should, according to the principles guiding this plan, dominate plantings, especially in parks and other non-streetside planting spots. Street tree inventory data were used to determine the relative abundances of these six species, and targets set accordingly to correct imbalances.
Refrain from planting the following genera until 2020	Some tree genera, including both native and alien species, are over-represented in the current urban-forest canopy. On the premise that some insect and disease organisms are more genus-specific than species-specific (e.g., emerald ash borer), the plan calls for strong avoidance of some genera in the near term (i.e. no more than 10% of any one genus in the planting stock), allowable exceptions being strongly under-represented Acadian old-growth species.
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	The city desires to treat promptly all HRM-owned trees that are structurally unsound and may represent a present or future hazard. "Normal" tree development and aging (i.e., not accounting for pest outbreaks or serious weather events such as ice storms or hurricanes) has been anticipated by the planning team to generate a certain rate of structural unsoundness in the tree population on HRM land. The targets are set to treat promptly all trees that become structurally unsound. This target is set in order to remove all street trees with structural problems (according to STRATUM) within 35 years.

6.1.1 Ashburn/Armdale

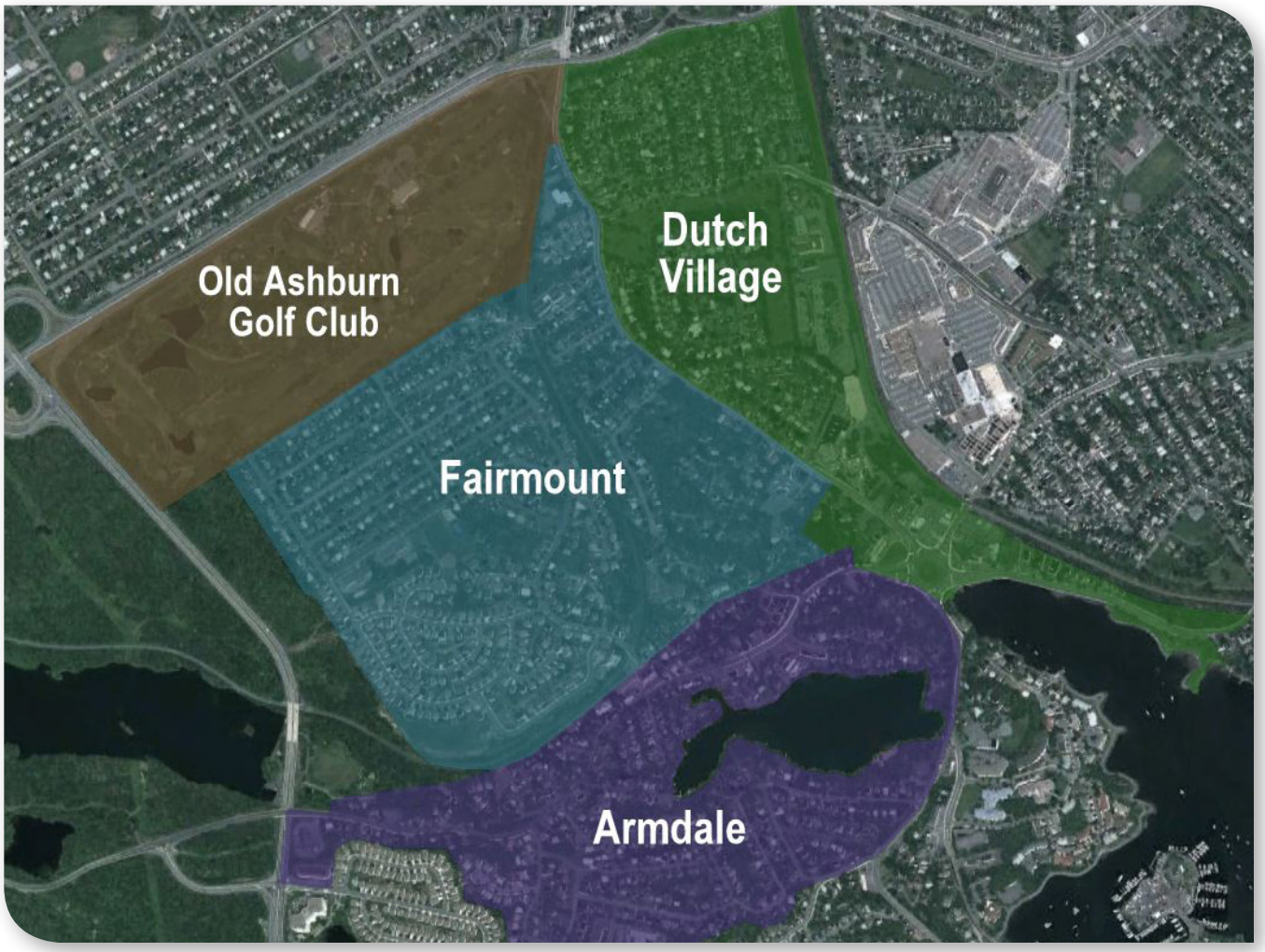


Figure 6.2 The neighbourhoods of Ashburn/Armdale

Background

The Ashburn/Armdale community is located at the head of the Northwest Arm, situated between Fairview and Spryfield and extending north to Highway 102. It includes the established Armdale and newer Fairmont neighbourhoods, as well as the Ashburn Golf Club established by the Halifax Golf and Country Club in 1923. In the 1860s, the name "Armdale" was given to a Northwest Arm estate owned by Sir Charles Tupper. Over time, the surrounding community also became known as Armdale; however, the area was originally known as Dutch Village and dates from 1750 when German settlers established homesteads in the area. The community consists primarily of single-family residential neighbourhoods that were developed after World War II. Notable features of the community are its majestic white pines that tower above the skyline, the golf course, and Chocolate Lake, a popular recreational destination. The nearby Armdale Roundabout, first constructed in 1955, is a major transportation link to and from the Halifax Peninsula (HRM, 2011b). One of the community's major streets, Dutch Village Road, commemorates its early settlers.

A natural history

Ashburn/Armdale lies in the lee of the granite hills of Spryfield and Fairview, at the southern end of the isthmus connecting the Halifax Peninsula to the mainland. Rivers once flowed through this community into the Northwest Arm, but have been lost to

development or converted into sewersheds. Their legacy can be seen in the reservoirs of Chocolate Lake and Long Lake. Much of the rugged terrain in this region would have been dominated by stands of black spruce and white pine, competing with shrub growth such as huckleberry, blueberry, and lambkill that frequent areas with poor, dry soils. However, the historical Armdale community was once a mighty grove of white pine along the waters of the Northwest Arm. The legacy of this natural history can be seen in the many stately white pines that dot the neighbourhoods in this community.

Today's urban forest

Much of the urban forest in Ashburn/Armdale is typical of dense urban areas such as the Halifax Peninsula and Old Dartmouth. Trees here are older, and there are often insufficient younger trees to replace the aging trees as they reach the end of their lifespan. Species diversity is low in some neighbourhoods, which is especially of concern where Norway maple dominates the canopy as it does in the Dutch Village urban forest neighbourhood. Conversely, the native white pine is a prominent tree in the Armdale urban forest neighbourhood. Given its prominence, urban forest management will favour white pine, though not at the cost of species diversity values and targets. The condition of the street tree population in the more highly developed areas of Ashburn/Armdale is comparatively low in relation to other HRM communities. Street tree conflicts with utility lines are also relatively high in this community.

New developments pose risks to the Ashburn/Armdale urban forest, as urban forest management is rarely considered during development. Related to this is the challenge of retaining native canopy at the time of development, as the forests here are found in shallow soils and rockland. These forests, especially their newly exposed edges along clearings, are highly vulnerable to wind damage and often suffer high mortality from exposure alone. The coarse, shallow soils also make it difficult to plant new trees. Canopy cover in the relatively recent Fairmont development is minimal, and more effort should be made to plant trees in the neighbourhood.

The urban forest of tomorrow

In the neighbourhoods of Ashburn/Armdale, outreach and education have played a major role in shaping the urban forest of tomorrow. Local residents are mindful of the many benefits provided to them by the urban forest, and have begun local stewardship initiatives in the different neighbourhoods. Citizen stewardship is in close collaboration with HRM urban forest managers and other identified stakeholders.

New growth of Norway maple has been slowly phased out, and typical introduced urban species, such as elm, linden, and callery pear, have been balanced with native species, including representative Acadian old-growth species. Moreover, white pine is favoured in the traditional Armdale community to keep this characteristic icon of the area's natural history. New tree planting across the neighbourhoods over the years has evened out the urban forest's age distribution. The urban forest's diverse composition and structure reduce its risk to an ever-increasing abundance of forest pests and improves its resilience against climate change. Trees with structural problems are removed promptly in the pruning cycle to minimize any hazards, and harmful pruning techniques by utilities servicing overhead lines are minimized through collaboration and education.

In newer developments, such as in south Fairmont, special attention is given to planting new trees in sufficient substrate, according to the "right tree in the right place" philosophy, as the native soils here are shallow and coarse, being derived from the granitic bedrock. Residents of those areas with low canopy cover and few trees on private properties have been educated on the benefits of the urban forest and of trees on their properties, and informed of best-management practices for maintaining their privately owned trees.

Table 6.4 Ashburn/Armdale treatment summaries

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	500
Area of naturalized forest stands to be created on HRM lands per decade	3 ha
Area of naturalized forest stands not to fall below	13 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	25 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera in all neighbourhoods until 2020	Maple, serviceberry
Refrain from planting the following genera in some neighbourhoods until 2020	Birch
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	20

Table 6.5 Ashburn/Armdale neighbourhoods and canopy targets

Neighbourhood	Area (ha)	Canopy Cover (%)	Canopy Target (%)
Old Ashburn Golf Club	48	28	40
Fairmont	85	28	70
Armdale	62	33	70
Dutch Village	59	24	70
Ashburn/Armdale	254	28	64

Landscape Patterns

In tomorrow's community, a network pattern is formed by all HRM-controlled streets, and a patchwork pattern is similarly created by all HRM parks. Ribbon patterns skirt and bisect the community, created by the railways (including the converted Chain of Lakes Trail) and by Northwest Arm Drive. A wedge pattern can be seen to the west of the community, formed by Long Lake Provincial Park.

Ashburn/Armdale Today

Ashburn/Armdale Tomorrow

Figure 6.3 Ashburn/Armdale: Today and Tomorrow Landscape Patterns

6.1.2 Beaver Bank

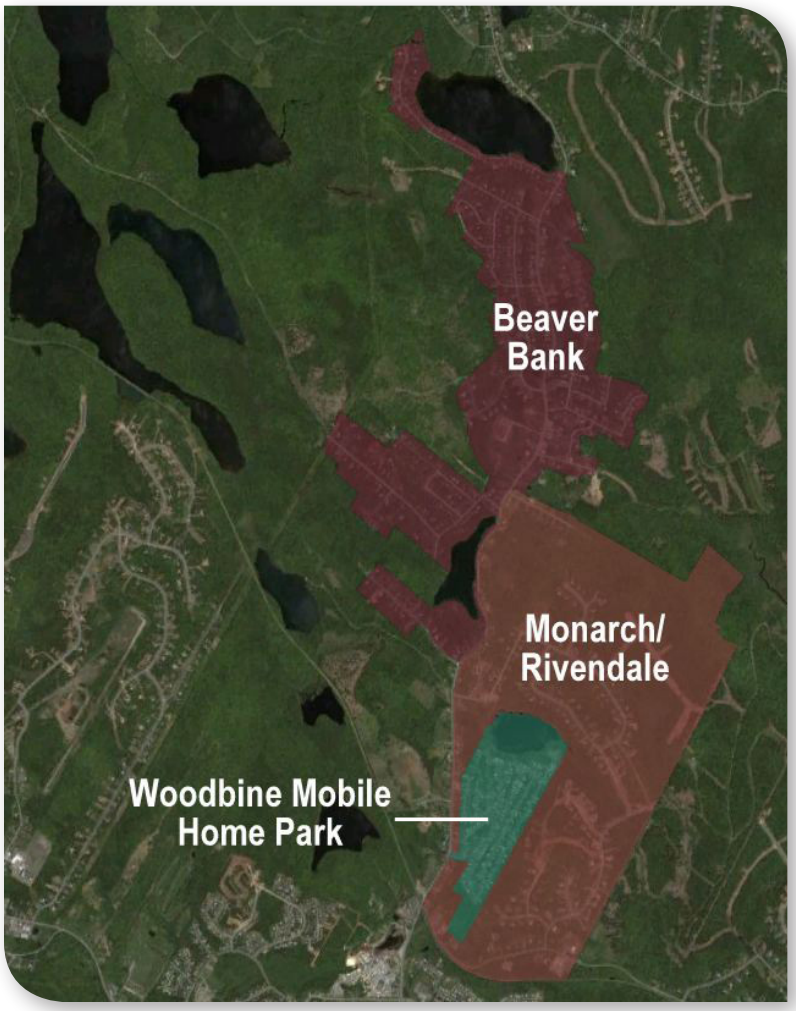


Figure 6.4 The neighbourhoods of Beaver Bank

Background

The Beaver Bank community has a population of 6,000 (2006 Census) and is located due north of Sackville along the Beaver Bank Road. The community dates back to the arrival of Boston loyalists in the late Eighteenth Century. The railway reached Beaver Bank in the 1850s. The subsequent construction of a station and freight shed spurred commercial development in the area. The station continued operations until recently, and still stands today. The area maintained its rural character and continued to develop slowly until the 1960s. With the advent of Nova Scotia's new provincial highways and shorter commuting times to Halifax, the rural setting has slowly changed, and larger properties have been subdivided for residential development. Nevertheless, the community today is still rooted in a beautiful, natural setting, with the motto of the community proclaiming "people together with nature" (Beaver Bank Community Awareness Association, 2009; HRM, 2010a). It is a residential community, consisting primarily of homeowners occupying single-family residences (Government of Nova Scotia, 2011).

A natural history

The likely composition and structure of historical forests in Beaver Bank can be gleaned from both the landscape and the surrounding forests. This region is characterized by drumlin fields, with rolling, tear-shaped hills that are a legacy of the last glaciation. Soils here are derived from meguma slate and greywacke, and are mostly fine-textured loams and sandy clay loam that support productive forest ecosystems typical of richer soils. These hills would have been frequently capped by pure hardwood stands of yellow birch,

sugar maple, and American beech. Mixedwood stands dominated by red spruce would have lined the lower slopes and valleys in this hilly terrain.

Today's urban forest

The native forest that surrounds much of Beaver Bank reflects its long history of forest-sector activity and agriculture. The trees found today between streets in residential buffers are much younger than the pre-settlement forests of long ago. These younger forests have a much higher occurrence of early-successional species such as red maple, poplars, and white and gray birch. Long-lived species such as sugar maple and yellow birch are more characteristic of old, undisturbed forest.

Beaver Bank's street tree population is significantly different from older, more developed communities such as the Halifax Peninsula. It is on average much younger, and frequently comprises native species that have regenerated naturally from the surrounding forests. There are several challenges to managing the peri-urban forest found in communities such as Beaver Bank. These forests are more vulnerable to disturbance, especially along newly created forest edges in developments. They are also vulnerable to a range of other impacts typical of forests surrounding human settlements, such as invasive species, illegal dumping, tree-cutting, and overuse.

Residential development is the primary risk to Beaver Bank's three urban forest neighbourhoods. The relatively high canopy covers in Beaver Bank will most likely decline somewhat in the future, due to a number of new subdivisions both proposed and under construction. Additional tree planting by developers and homeowners could eventually result in the partial restoration of lost canopy. In these neighbourhoods, public outreach programs, homeowner stewardship, and volunteer efforts will be a mainstay of SUFM. In neighbourhoods without HRM-controlled rights of way, such as the Woodbine Mobile Home Park, landowner/tenant initiatives will be required. There are no major commercial or industrial centres in Beaver Bank, and consequently a low proportion of imperviousness. This, coupled with the high number of plantable sites on HRM rights of way and on residential properties, should make improving the urban forest less of a challenge here than in other communities.

The urban forest of tomorrow

Beaver Bank is a model urban forest community that continues to abide by its motto of "people with nature". HRM streets and parks in Beaver Bank have a tree population diverse in species mix and age structure, improving biodiversity and providing resistance and resilience against pests, disease, major disturbances, and climate change. Beaver Bank's rich soils have nurtured the energetic growth of a variety of tree species, including an ever increasing number of native and Acadian old-growth species.

The community has fully integrated urban forest considerations into subdivision permits and development agreements. Native forest buffers, and new trees in parks, along streets, and on residential lots, are attractive features that all residents expect and appreciate. Urban forest management in Beaver Bank peri-urban forest also utilizes natural forest ecosystem processes to meet canopy targets, such as fostering natural regeneration and maintaining healthy levels of snags and coarse woody debris.

Beaver Bank residents are educated on the many benefits of trees for them and their homes. Through citizen involvement at the neighbourhood level, local residents have become active in managing their own urban forest, and local champions collaborate with HRM's team of arborists and landscape architects. Riparian zones around wetlands and streams in the area are fully forested, protecting vital aquatic ecosystems.

Table 6.6 Beaver Bank treatment summaries

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	870
Area of naturalized forest stands to be created on HRM lands per decade	6 ha
Area of naturalized forest stands not to fall below	370 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	20 (sugar maple, red spruce)
Refrain from planting the following genera in all neighbourhoods until 2020	Birch, maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	20

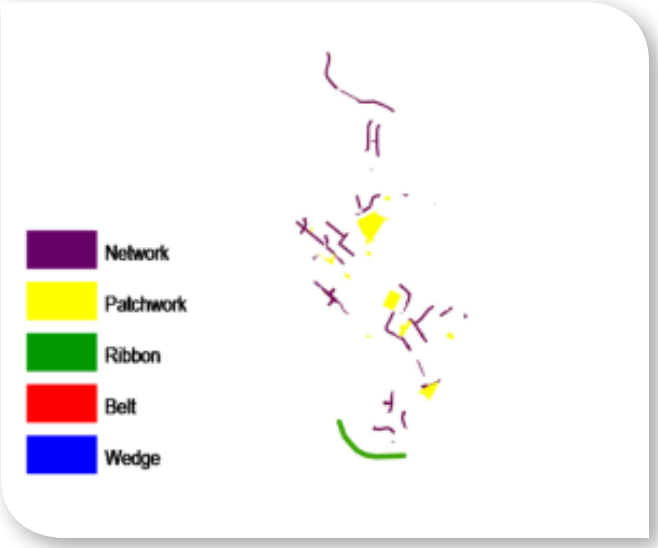
Table 6.7 Beaver Bank neighbourhoods and canopy targets

Neighbourhood	Area (ha)	Canopy Cover (%)	Canopy Target (%)
Woodbine Trailer Park	43	24	70
Monarch/Rivendale	328	69	70
Beaver Bank	243	59	70
Beaver Bank	**614**	**62**	**70**

Landscape Patterns

In Beaver Bank's future urban forest, an ongoing street tree planting program has created a healthy and continuous network pattern throughout the community. As new subdivisions are developed, new street trees are planted to expand the network. Available planting sites in the patchwork pattern of municipal parks have been filled with new trees. Ribbon patterns are created along Wingate Drive and the railway that follows it along the southern boundary of the community.

Beaver Bank Today



Beaver Bank Tomorrow

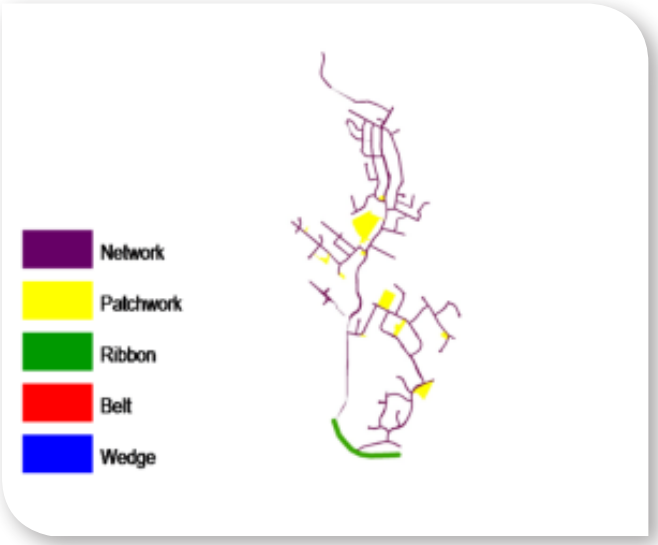


Figure 6.5 Beaver Bank: Today and Tomorrow Landscape Patterns

6.1.3 Bedford

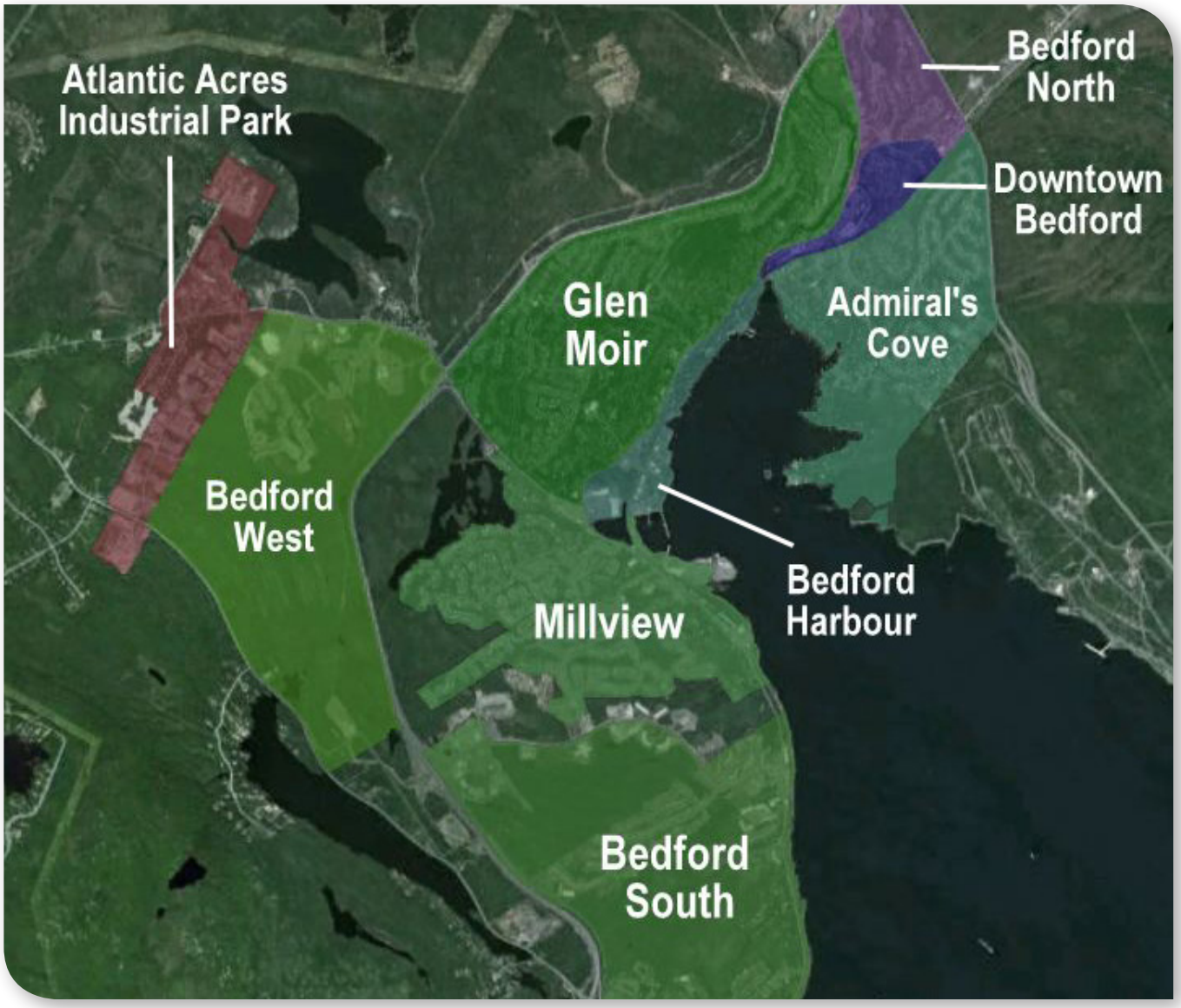


Figure 6.6 The neighbourhoods of Bedford

Background

The Bedford community is situated around the northern shores of the Bedford Basin. Bedford's history dates back to a time when Governor Cornwallis ordered his troops to begin clearing a road from Halifax to the Minas Basin. To protect the newly constructed road, Fort Sackville was constructed at the edge of the Bedford Basin in 1749. The area surrounding the fort eventually developed into a small village that was then known as Sackville. In the late 1700s, commerce developed in Bedford, including several saw mills, to mill the abundance of timber surrounding the community. In 1819, the Acadia Paper Mill opened and supplied paper to the Acadian Recorder, a weekly newspaper of Nineteenth Century Halifax (Trider, 1999; Harvey, 2002; HRM, 2011a).

Further expansion of the community began when the national railway arrived in 1854, and the new community of Bedford was named. By the end of the Nineteenth Century, Bedford sported several hotels and resorts, and was known as one of Nova Scotia's finest resort areas. Today, Bedford exists primarily as a residential community, with a number of commercial centres along the Bedford Highway and others adjacent to the Bedford Basin near the mouth of the Sackville River. As of 2006, Bedford had a population of 16,589 (Government of Nova Scotia, 2011).

A natural history

Urban settlement and a long history of forestry in the Bedford area have had a significant effect on the local ecology. The primeval forest would have looked significantly different from today. Much of Bedford is situated over bedrock, with a high proportion of rockland and exposed bedrock ridges, dotted with many lakes and wetlands. In these ridge terrains, soils are typically dry, shallow, and coarse, and often degraded by a history of repeated wildfire. Typical forests would be dominated by scrubby stands of black spruce, white pine, and pioneer hardwood species such as white birch and red maple, all competing with ericaceous shrubs that are associated with wildfire, such as blueberry, lambkill, and huckleberry.

There are some scattered drumlin hills and areas with deeper soils in ravines and river valleys where old-growth mixed wood stands of red spruce, eastern hemlock, and beech would have been found. Remnants of these woods can still be seen in Hemlock Ravine. The exception to the Bedford area is of course the Sackville River floodplain, where a more biologically diverse plant community would have been found on the rich alluvial soils, with floodplain red maple forests and a rich diversity of flora and fauna.

Today's urban forest

Bedford today has a mix of much younger native hinterland forests, still dominated by spruce, maple, and birch, contrasting with the planted trees on street rights of way and on private lots in more developed areas. The urban forest along the streets of Bedford is quite young, with more than 80% of the trees under ten years of age. Also, most of these trees are native species that have grown naturally from seed—in fact, gray birch, red maple, poplar, and spruce comprise three-quarters of the street tree population. Unlike older, denser urban neighborhoods such as those found on the Halifax Peninsula and in Old Dartmouth, there is no current threat from an even-aged and mature tree population, or an overrepresentation of typical introduced street trees, such as Norway maple, linden, and elm.

New development is the chief threat to Bedford's urban forest. Related to this is the difficulty of retaining native canopy at the time of development, as the forests are dominated by shallow-rooted stands of spruce, most of which are found in shallow soils and rockland. These forests—especially their newly exposed edges along development clearings—are highly vulnerable to wind damage, invasive species, and conflicts with the human population. Wildfire is also a threat in these types of ecosystems, especially after severe windstorms. A current example is Hurricane Juan in 2003 and subsequent urban-wildland interface fires in the hurricane-damaged forests of Porter's Lake and Purcell's Cove.

Adequacy of canopy cover in riparian areas along Bedford's many rivers, lakes, wetlands, and coastal areas is also a concern, as many of the neighborhoods were found to have insufficient riparian canopy cover. Most notable of these is the Sackville River, the main tributary of the Bedford Basin estuary. The river has been heavily affected by ongoing development within its watershed and a chronic loss of riparian zones along its shores, especially in downtown Bedford, where the impervious surfaces of shopping centres and strip malls dominate the landscape. A secondary tributary of the Basin flows through Moirs Mill Pond adjacent to a commercial shopping district at the intersection of the Bedford Highway and Hammonds Plains Road. Both areas have the lowest canopy cover in Bedford, and are comprised almost entirely of impervious surfaces with very few plantable sites. Moreover, these areas happen to lie in major flow accumulation zones, where contaminated stormwater and surface runoff are unable to permeate into the ground and instead flow directly into the Bedford Basin. Prioritizing the urban forest and its improvement in these areas will help ameliorate many of these impacts by improving stormwater retention, not to mention the benefits for business owners and residents from shading infrastructure, cooling the microclimate, and attracting more customers to businesses.

The urban forest of tomorrow

The urban forest of tomorrow in Bedford incorporates the economic, environmental, and social values of the UFMP. Challenges specific to the neighbourhoods of Bedford have been addressed, and opportunities to improve the urban forest have been met. Streets and parks have a tree population diverse in species mix and age structure, improving biodiversity and providing resistance and resilience against pests, disease, major disturbances, and climate change.

The commercial centres along the Bedford Highway have abundant trees in planters and berms throughout parking areas and along their margins, increasing

canopy cover, improving stormwater retention and permeability, and shading cars and infrastructure. There is less contaminated runoff into the Sackville River and Bedford Basin, longer-lasting infrastructure, and a lower energy demand, reducing costs for businesses and the carbon footprint of the community. Customers are attracted to the greener shopping centres, and to the shaded parks that surround them.

Lakes, rivers, and wetlands are buffered by fully forested riparian zones, protecting the aquatic ecosystems and flow of water into the Bedford Basin. The Sackville River in particular is targeted for improvement, by addressing the condition of the urban forest in its riparian zone and creating naturalized areas at its mouth. There is a re-establishment of both the floodplain ecosystems that once characterized it, and thriving fish and bird populations within.

Developers demonstrate appropriate planning and management in order to retain forest canopy and minimize impacts on the urban forest in new developments. Appropriate canopy targets and planting strategies are set in development agreements. New residential developments promote trees on their lots and in street rights of way, and homeowners in newer neighbourhoods such as Bedford South and Bedford West understand and appreciate the benefits of trees on their properties, and participate in community efforts to re-establish forest canopies in their neighbourhoods.

Table 6.8 Bedford treatment summaries

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	1,060
Area of naturalized forest stands to be created on HRM lands per decade	70 ha
Area of naturalized forest stands not to fall below	800 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	45 (sugar maple) 40 (red oak) 3 (eastern hemlock)
Refrain from planting the following genera in all neighbourhoods excluding Bedford South until 2020	Maple, poplar, spruce
Refrain from planting the following genera in Bedford South until 2020	Serviceberry, pine, ash
Average number of trees with structural problems to remove or maintain unless otherwise required for safety reasons	120

Table 6.9 Bedford neighbourhoods and canopy targets

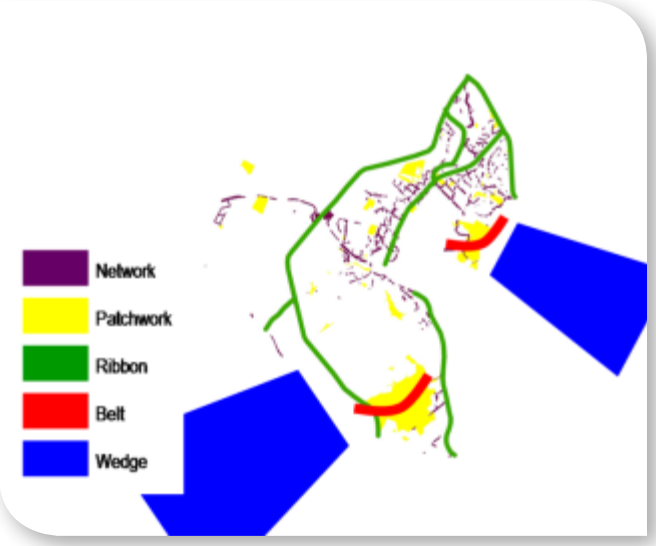
Neighbourhood	Area (ha)	Canopy Cover (%)	Canopy Target (%)
Glen Moir	312	43	70
Bedford West	327	87	20*
Bedford Harbour	42	35	70
Admiral's Cove	208	55	70
Downtown Bedford	32	48	70
Bedford North	64	44	70
Millview	226	35	70
Atlantic Acres Industrial Park	114	15	20
Bedford South	385	85	70
Bedford	**1,710**	**59**	**57**

**Bedford west is undeveloped currently and is subject to development*

Landscape Patterns

In Bedford's future urban forest, a network pattern is formed by all HRM-controlled streets, and a patchwork pattern is similarly created by all HRM parks. Belt patterns in Bedford are created by Hemlock Ravine in the west and Admiral's Cove Park in the east. Ribbon patterns in Bedford are created by the Sackville River, the railway, and 100-series highways. Finally, both Magazine Hill and the Blue Mountain-Birch Cove Lakes Wilderness Area create wedge patterns on either side of Bedford.

Bedford Today



Bedford Tomorrow

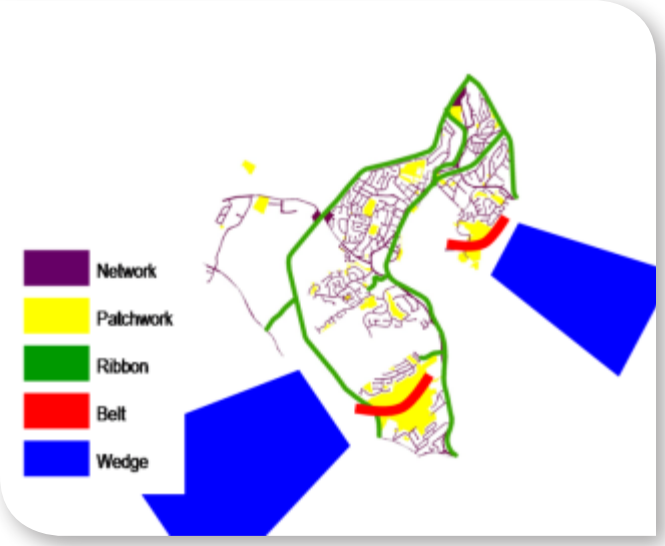


Figure 6.7 Bedford: Today and Tomorrow Landscape Patterns

6.1.4 Cole Harbour

Figure 6.8 The neighbourhoods of Cole Harbour

Background

This community is located east of Dartmouth, near the head of Cole Harbour, its namesake. The place name's origins are uncertain, with some saying it was derived from early land grants referring to the area as "Coal Harbour." Others have surmised that it commemorates an early settler's surname or, variously, that it memorializes Captain Cole, a local historical figure (Nova Scotia Virtual Archives). The first road to Cole Harbour was cut in the 1750s, and by the 1760s land grants were being issued. Up until the 1960s, agriculture was the predominant land use, but in 1955 the Angus L. MacDonald Bridge opened, and suburban developments began soon afterwards. Today, Cole Harbour, with a population nearing 26,000 (2006 Census), is a popular suburban community consisting primarily of single-family homes, with occasional townhouse and apartment complexes. Commercial developments extend along Cole Harbour Road and Main Street. A favourite hiking destination for residents is the Cole Harbour Heritage Park, a 162-hectare provincial park located on the shores of the Cole Harbour Marsh that features a scenic 3-km causeway trail (HRM, 2006a).

A natural history

Like the communities of Sackville and Beaver Bank, Cole Harbour lies on a drumlin field, with rolling hill topography. Soils here are derived from meguma slate and greywacke, and are mostly fine, rich loams that support vigorous forest growth. The historical forests in this terrain would have constituted a matrix pattern of different forest ecosystems. On hilltops, one could

expect pure hardwood stands dominated by yellow birch, sugar maple, and American beech. Surrounding these upland stands on the lower slopes and valleys would have been mixedwood stands dominated by red spruce, with eastern hemlock and some scattered hardwoods. There is also some coastal influence on Cole Harbour's forests, and a higher frequency of white spruce and white pine in open stand conditions. One could also find coastal barrens and saltwater marshes towards the coast of Cole Harbour.

Today's urban forest

Cole Harbour's drumlin topography and its rich, silty soils provide ideal growing conditions for urban forests in established neighbourhoods and new developments. The native tree population is dominated by species typical of young, early-successional forests that have been recently disturbed, such as white birch, white spruce, red maple, poplar, and serviceberry. Introduced species such as Norway maple and Austrian pine are common in residential neighbourhoods.

The four urban forest neighbourhoods in this community are primarily low-density and residential. The natural surroundings are exceptional, with several lakes, rivers, and native Acadian forests; however, homeowners have planted relatively few trees on their properties. In subdivisions such as Brookview and Colby Village, tree canopies are generally isolated to residual buffer strips between properties. The number of HRM street trees is also relatively low.

Cole Harbour's commercial centres along Cole Harbour Road and Main Street present distinct challenges to the growth of healthy trees. Both areas feature extensive paved surfaces. Trees are rare, canopy cover is virtually absent, and there are few plantable sites available in these currently hardscaped neighbourhoods. Collaboration with local business owners here will be essential for improving the urban forest. Another area of concern is the low canopy cover over the riparian corridor of the Forest Hills Commons.

The urban forest of tomorrow

The distinctive, lush forest cover of Cole Harbour's rolling green hills has been restored. The economic, environmental and social values of the UFMP are evident. Challenges specific to urban forest neighbourhoods have been addressed, and sustainability targets have been met. Streets, parks, and residential properties have tree populations diverse in species mix and age structure, improving biodiversity and providing resistance and resilience against pests, disease, major disturbances, and climate change.

Public outreach and education programs have yielded a population fully aware of the rewards of urban trees on their properties. Mature trees grace residential properties in neighbourhoods such as Brookview and Colby Village. In newly developed subdivisions, developers retain appropriate amounts of native canopy in residential buffer strips, while also ensuring that trees are planted on new lots and along streets. Forest buffer strips between lots and in riparian zones are large enough to reduce vulnerability to wind and other forms of disturbance.

Commercial centres along Cole Harbour Road and Main Street have been transformed. HRM's collaboration with local business owners has produced a sustainable future for these areas. Although once grey and barren, they are now filled with greenery and life, as graceful treed areas and long rows of street trees complement the many businesses throughout the neighbourhoods.

Fish have returned to the cool, shaded stream coursing over the Forest Hill Common, and children play under the majestic trees throughout the park.

Table 6.10 Cole Harbour treatment summaries

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	3,740
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	230 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	210 (eastern hemlock, white pine, yellow birch, red oak)
Refrain from planting the following genera in all neighbourhoods until 2020	Birch, spruce, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	380

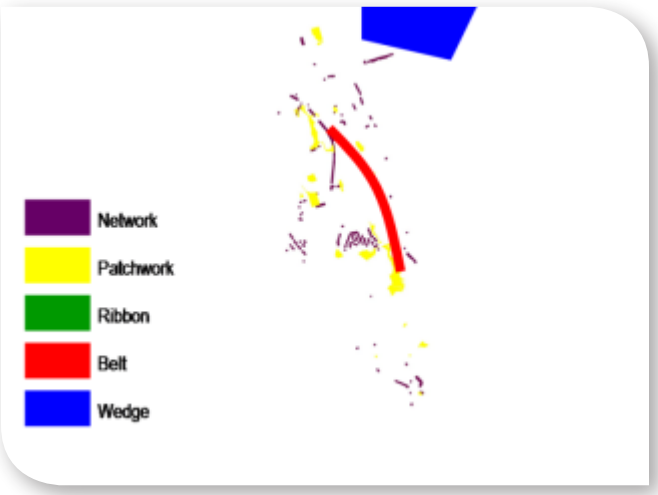
Table 6.11 Cole Harbour neighbourhoods and canopy targets

Neighbourhood	Area (ha)	Canopy Cover (%)	Canopy Target (%)
Colby Village	479	23	70
Forest Hills	470	30	70
Humber Park	27	40	70
Brookview	24	21	70
Cole Harbour	**1,000**	**27**	**70**

Landscape Patterns

In Cole Harbour's future urban forest, an ongoing street tree planting program has created a healthy and continuous network pattern throughout the community. As new subdivisions are developed, new street trees are planted to expand the network. Available planting sites in the patchwork pattern of municipal parks have been filled with new trees. Ribbon patterns are created along Cole Harbour Road and Main Street. A belt pattern is created by the Forest Hills Commons and the stream that connects it to Bissett Lake. Wedge patterns are created to the north by the Lake Major watershed and to the south by the area surrounding the Shearwater Flyer Trail.

Cole Harbour Today



Cole Harbour Tomorrow

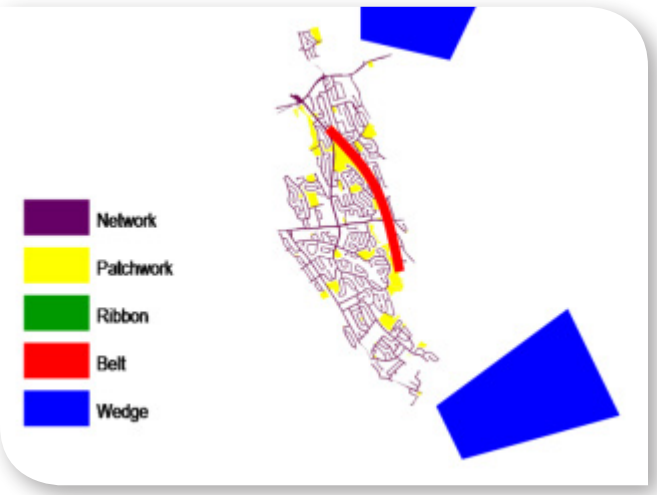


Figure 6.9 Cole Harbour: Today and Tomorrow Landscape Patterns

6.1.5 Dartmouth

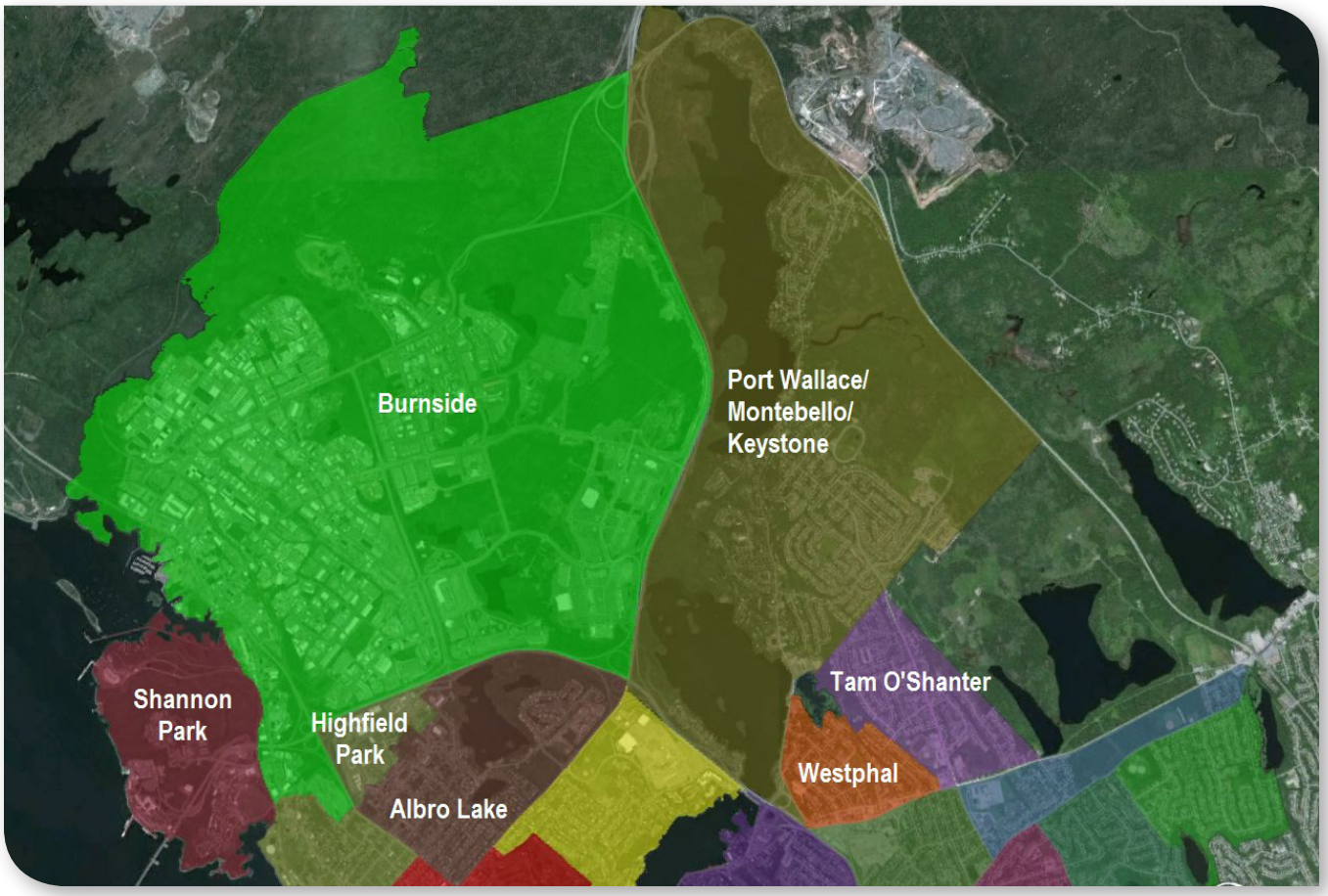


Figure 6.10 The neighbourhoods of northern Dartmouth

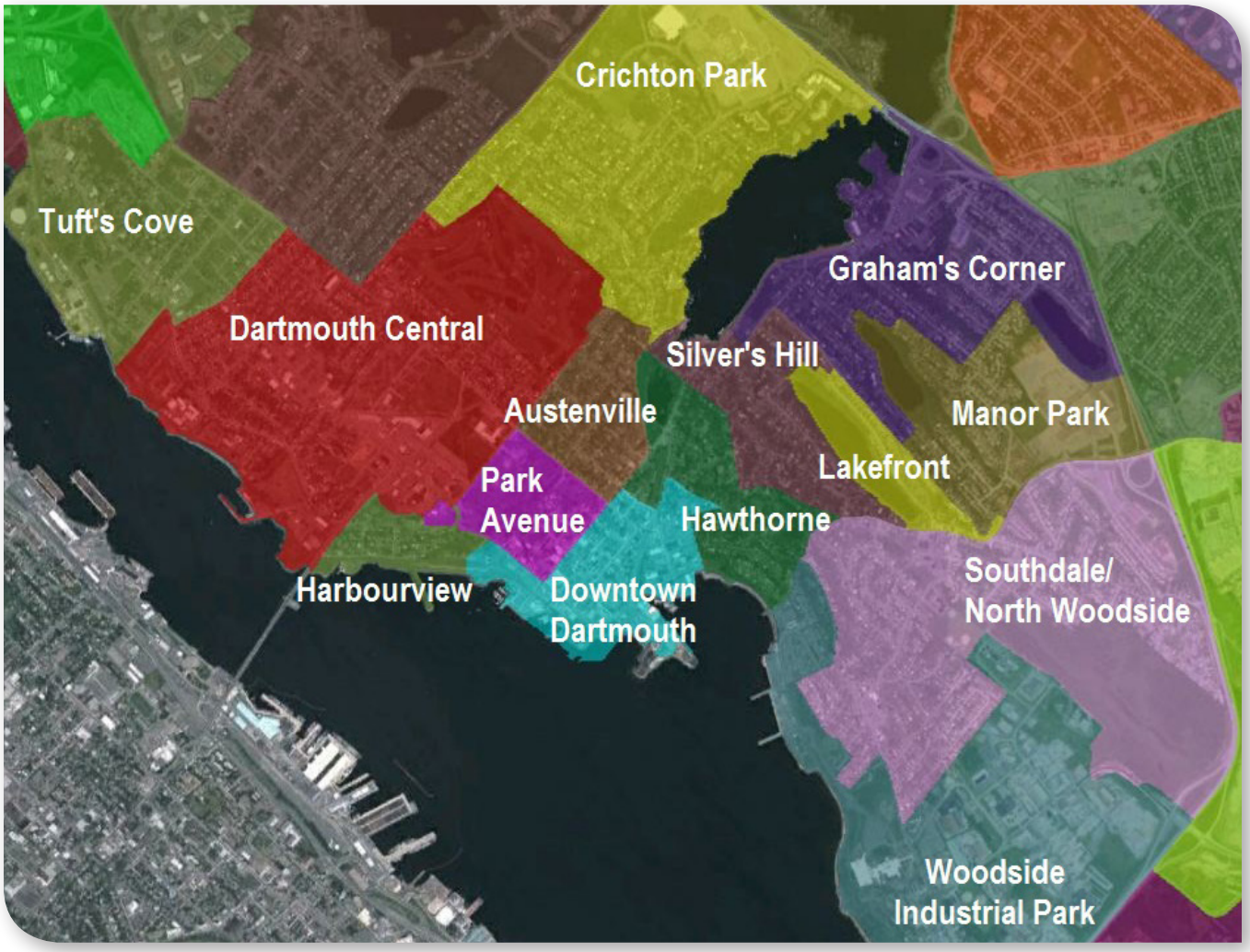


Figure 6.11 The neighbourhoods of central Dartmouth

Background

Dartmouth is known as the "City of Lakes", with 23 lakes dotting the community. The community is recognized as both a residential area surrounded by natural beauty and as an active and growing industrial and commercial centre. The community dates back to 1750, when a shipload of settlers aboard the sailing vessel Alderney arrived in Halifax Harbour. The settlers were granted land on the eastern shore of the harbour directly across the water from Halifax. They cleared the land around Dartmouth Cove and laid out a town plot of just 11 blocks, surrounded by the hinterland forest. The original settlement was small—the 1766 census recorded a population of 39—and centred on the harbour, though some roads were extended to access the ample timber of the surrounding forests. The early 1780s saw the arrival of Loyalists and Nantucket whalers, and Dartmouth began to expand and flourish with the construction of homes, warehouses, and workshops in and around the settlement (Chapman, 2001; HRM, 2009a).

During the late 19th and early 20th centuries, the economy was thriving with industries such as the Starr Manufacturing Company, the Dartmouth Marine Slips, and ultimately the Imperial Oil Refinery. The surrounding Acadian forests were cleared and Dartmouth began to extend north and south. The years following World War II were a brief period of decline in Dartmouth, though this all changed with the opening of the Angus L. MacDonald Bridge in 1955 and the A. Murray MacKay Bridge in 1970 that led to several decades of rapid growth and development (Chapman, 2001; HRM, 2009a).

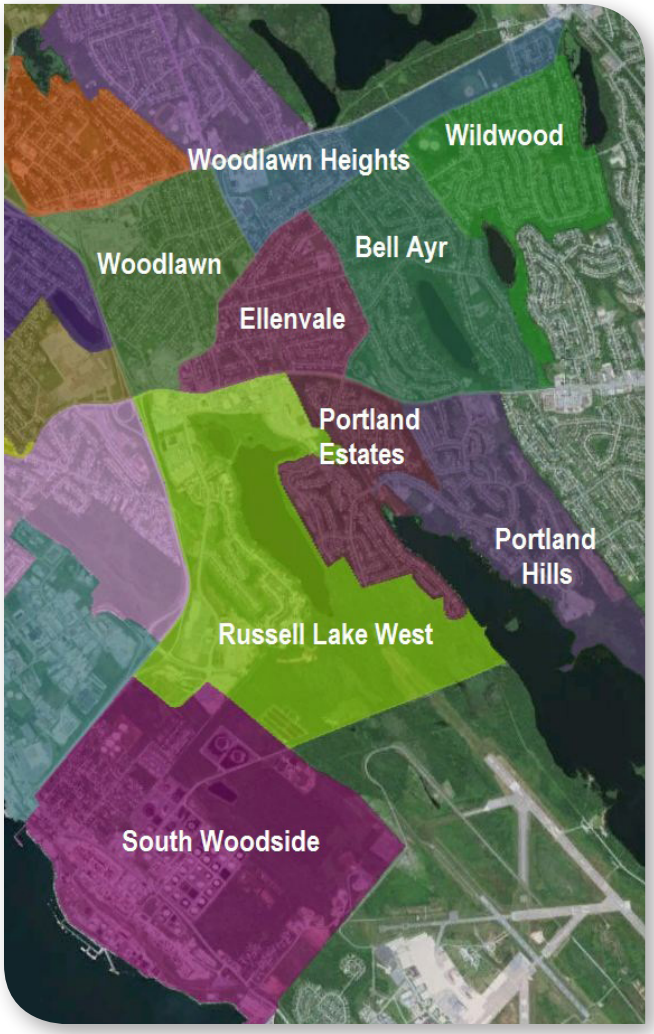


Figure 6.12 The neighbourhoods of southern Dartmouth

With an area of 5,341 hectares, Dartmouth is the largest community in the UFMP Study Area. The population of 68,000 is slightly less than that of the Halifax Peninsula (2006 Census). The attractive community generally features a mix of low-density residential neighbourhoods with single-family homes. However, there are several higher-density areas throughout the community that offer townhouse, apartment building, and condominium units. Dartmouth is also a hub of economic activity that includes a number of shopping malls, commercial centres, and industrial parks.

A natural history

The Dartmouth community extends over diverse landscapes that once contained a variety of forest ecosystems. A major topographical feature is the valley containing the Shubenacadie Canal, Lake Charles, Lake Micmac, and Lake Banook, bordered occasionally by steep hills on either side. To the north, in what has come to be known as Burnside, is a system of rocky ridges, barrens, wetlands, and softwood forests. As the name suggests, this region had frequent forest fires, which explains the many open barrens and the dominance of early-successional species such as white and gray birch.

Central Dartmouth, around Dartmouth Cove, was long used by the Mi'kmaq travelling from the Minas Basin and the Shubenacadie River to their summer encampments on the shores of Halifax Harbour, prior to European colonization. This steep terrain would have been dominated by mixedwood stands of red

spruce, eastern hemlock, yellow birch, and sugar maple surrounding the many lakes and pine-lined harbor shores.

To the south and east of the divide, stretching from Graham's Corner to Cole Harbour, are drumlin fields and scattered hills. This terrain has deeper, richer soils, and would have supported scattered hardwood stands of American beech, sugar maple, and yellow birch, which are typical climax communities on richer upland sites. In the valleys and lowlands, red spruce and eastern hemlock would have dominated the canopy, mixed with black spruce in the poorly drained depressions and wetlands.

Today's urban forest

A cursory look at the overall urban forest canopy of Dartmouth can be misleading. Extending well past the Circumferential Highway are residential neighbourhoods, and industrial and commercial developments, along with residual stands of native Acadian forests that are slated for development in the near future. For the time being, these forest stands give a positive impression of the state of Dartmouth's urban forest. In fact, at its present community scale Dartmouth has a canopy cover of 54%, exceeding the community canopy target of 48%. This condition is likely to only be temporary as new development is planned for rockland areas with shallower soils as is found in Burnside. With grading and servicing requirements typical of today's developments, tree retention is problematic. Past experience has shown that small patches of native forest stands retained during development are highly vulnerable to disturbance, especially from windstorms, as newly cut forest edges expose these shallow-rooted forests to the elements from which they were once sheltered.

The Burnside neighbourhood, which includes the Burnside Industrial Park and Dartmouth Crossing, is a threatened urban forest neighbourhood in HRM. Burnside has a long list of challenges to its urban forest, including poor site conditions, rapid development, an abundance of impervious surfaces, and very few trees on both HRM streets and commercial/industrial properties. Woodside Industrial Park also faces similar challenges in the management of its urban forest.

The remaining Dartmouth neighbourhoods outside the Circumferential Highway are for the most part low-density residential. Residents benefit from being bordered by remnants of forest ecosystems, though they also face a number of challenges associated with their peri-urban forests. A common challenge is the lack of trees on private, residential properties. Neighbourhoods frequently have good canopy cover, but it is generally limited to buffer strips between properties or forest patches bordering the neighbourhood. It appears that in many cases new trees were never planted on building lots that were cleared at the time of development. Opportunities to plant street trees in areas without sidewalks and street curbs are also limited. In these neighbourhoods, public outreach programs, homeowner stewardship, and volunteer efforts will be a mainstay of SUFM. Neighbourhood districts in some sections of Portland Street and Main Street are highly impervious and have little to no canopy cover. There are also a number of difficulties associated with living at the urban/rural fringe. For homeowners, this might include conflicts with wildlife and exposure to forest fire risk.

Inside the circumferential highway are the UFMP neighbourhoods of Old Dartmouth. Here, settlement patterns and land uses are more similar to Halifax Peninsula than other outlying areas of Dartmouth. The first and most obvious similarity is the lower canopy cover, as these neighbourhoods are much more dense and developed. The urban forest, especially street trees, is comprised of introduced species such as Norway maple, linden, and elm that are hardy in harsh urban areas. Species diversity is often low in these neighbourhoods, and there is a skew in the age distribution of the trees, with a dominance of older trees and an insufficient number of young trees to replace them as they mature. Increasing the canopy in these old Dartmouth neighbourhoods will be impeded by the high proportion of surface imperviousness and a lack of plantable sites, both in the dense commercial and downtown areas and along the harbor shore, much of which is composed of fill with poor or no soils.

Dartmouth's residents are proud of its reputation as the City of Lakes. Protecting the integrity of Dartmouth's watersheds and aquatic ecosystems has been a longstanding goal of local citizens. A major tool for protecting the lakes is maintaining forested riparian buffer zones. These forested strips serve as a natural line of defense against stormwater runoff—a major concern in watersheds with a high proportion of imperviousness—and sedimentation. Riparian buffers also provide nutrients for aquatic species and shelter

aquatic habitats. HRM lakefront parks in areas such as Shubie Park, Penhorn Lake, and Big Albro Lake can play an important role in preserving lake water quality if efforts are made to preserve and restore the environmental integrity of their treed riparian zones.

The urban forest of tomorrow

The Dartmouth of tomorrow has a flourishing urban forest, managed in a way that recognizes and improves the thriving industrial and commercial activities that characterize this community. Shopping malls and industrial parks are surrounded by planted trees that shade parking lots and buildings, improving energy efficiency, reducing off-gassing from the asphalt surfaces, increasing stormwater retention, and attracting customers to their businesses. The extensive road networks in Burnside are dotted with trees in HRM rights of way and boulevards. Consideration of climate change influences the selection of species and the location of newly planted trees.

Dartmouth's rapidly developing neighbourhoods recognize the need for trees and an intact urban forest, and explicitly address tree planting and canopy retention in development agreements. Residents have been educated on the benefits they receive from trees on their properties, and have been taught best-management practices on how to plant and manage them. Initiatives to improve the urban forest on residential land not controlled by HRM are spearheaded by neighbourhood champions and environmental groups that educate and help their neighbours.

Old Dartmouth streets and parks have healthy tree populations with high species diversity, particularly for native species, and an even distribution of age classes. Parks and cemeteries in the downtown have significantly increased canopy to provide shade for patrons and help progress towards canopy targets in neighbourhoods where plantable sites are limited. Along the harbour front, trees thrive in rich soil berms and planters. Dartmouth's many lakes are surrounded by forested riparian buffer strips, with healthy aquatic ecosystems that have been both protected and re-established, especially in Lake Banook and Lake Micmac.

Table 6.12 Dartmouth treatment summaries

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	10,400
Area of naturalized forest stands to be created on HRM lands per decade	150 ha
Area of naturalized forest stands not to fall below	2,170 ha
Average number of native trees to plant on HRM lands per decade	280
Average number of Acadian old-growth species to plant on HRM lands per decade	100 (red spruce) 170 (eastern hemlock) 90 (white pine, yellow birch) 80 (sugar maple)
Refrain from planting the following genera in all neighbourhoods until 2020	Maple
Refrain from planting the following genera in some neighbourhoods until 2020	Birch, spruce, linden, elm, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	260

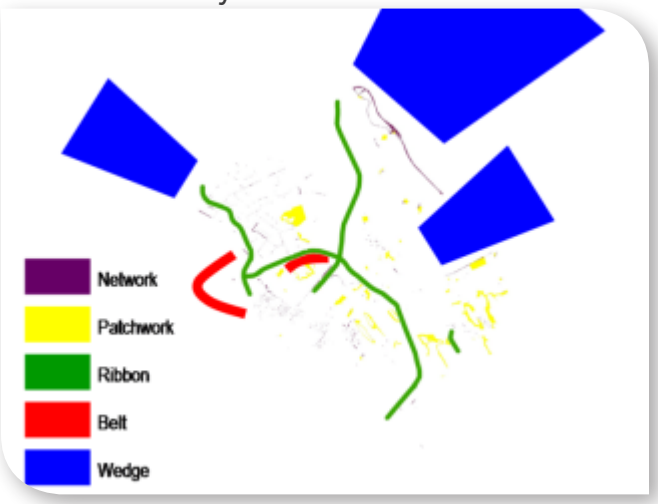
Table 6.13 Dartmouth neighbourhoods and canopy targets

Neighbourhood	Area (ha)	Canopy Cover (%)	Canopy Target (%)
South Woodside	345	36	45
Russell Lake West	251	61	70
Portland Estates	85	25	70
Portland Hills	133	43	70
Bell Ayr	120	23	70
Wildwood	98	35	70
Ellenvale	81	27	70
Woodlawn	114	21	70
Woodlawn Heights	56	45	70
Westphal	77	25	70
Tam O'Shanter	60	28	70
Port Wallace/Montebello/Keystone	650	58	70
Shannon Park	196	55	40
Burnside	1,828	87	20
Tufts Cove	76	25	45
Albro Lake	147	25	70
Highfield Park	43	15	70
Dartmouth Central	184	22	70
Harbourview	15	6	12
Park Avenue	25	24	70
Austenville	29	23	20
Crichton Park	131	23	70
Downtown Dartmouth	36	3	12
Hawthorne	32	23	70
Silver's Hill	39	32	70
Lakefront	11	8	70
Graham's Corner	84	25	70
Manor Park	54	23	70
Woodside Industrial Park	158	6	20
Southdale/North Woodside	183	35	70
Dartmouth	**5,341**	**54**	**48**

Landscape Patterns

In Dartmouth's future urban forest, an ongoing street tree planting program has created a healthy and continuous network pattern throughout the community. As more curbed streets and sidewalks are developed, new street trees are planted to expand the network. Available planting sites in the patchwork pattern of city parks have been filled with new trees. Belt patterns can be found in the lush forests of the Shannon Park neighbourhood and in Albro Lake and Cyril Smith Parks. Ribbon patterns are abundant, created by the tree-lined streets and treed boulevard medians in Burnside, as well as along the Harbour railway corridor and the Circumferential Highway. The large urban forest wedge patterns of Magazine Hill, Lake Lamont, and Topsail Watersheds and Shearwater serve to contain development and provide wildlife corridors to outlying forest communities.

Dartmouth Today



Dartmouth Tomorrow

Figure 6.13 Dartmouth: Today and Tomorrow

6.1.6 Eastern Passage

Figure 6.14 The neighbourhoods of Eastern Passage

Background

Eastern Passage is located southeast of Halifax Harbour, and is named after the channel of water running east of McNabs Island. Most of the land in the area was granted in the 1780s. The fishing industry has been a mainstay of the community; however, major developments such as CFB Shearwater (1918), the Texaco Oil Refinery (1964), and later, Canadian National's Autoport, significantly changed the character and landscape of the community (Virtual Archives, NS). Although the local economy has been challenged by some downturns in the fishing industry and local industries, new subdivisions continue to appear in Eastern Passage. The area's natural features and proximity to the coast have made it an appealing location for new residents. The current expansion of the Eastern Passage Wastewater Treatment Facility will allow for further suburban expansion in the area (HRM, 1992; Trider, 1999; Chapman, 2001).

The community has grown rapidly, from about 1,200 in the mid-1950s to 11,000 today (2006 Census). With a 16% population increase since 1996, Eastern Passage is one of the fastest-growing communities in HRM (Government of Nova Scotia, 2011). Current and projected residential development in Eastern Passage will make it a priority in urban forest management. This will include both working with developers to

ensure adequate canopy retention and tree planting in new developments, and outreach to residents, particularly new homeowners, about the urban forest, its benefits, and best-management practices for trees on their properties.

A natural history

The historical forests would have been dominated by coastal effects on local ecosystems. The community stretches across the Eastern Interior and Eastern Shore ecodistricts, as classified by the provincial ecological land classification. Along the coast and towards Hartlen Point, the influence of the Atlantic Ocean's strong winds, frequent storms, and salt spray favours open and stunted stands of balsam fir, black spruce, and white spruce. The absence of red spruce, a characteristic Acadian species, is a key indicator of a strong coastal influence.

In highly exposed areas, there would have been stands of black spruce and balsam fir in stunted, gnarled patches scattered throughout open barrens, in what is called krummholtz, or tuckamore (similar NL term). Directly on the coast, white spruce tends to dominate the forest. Glacially deposited soils are derived from Cambrian/Ordovician greywacke and slate. Drumlin headlands, salt marshes, and beaches are intermixed with scattered areas of glacially scoured bedrock barrens.

Inland and on higher elevations around the Eastern Passage, there would have been larger mixedwood stands of red spruce, sugar maple, beech on the deeper soils around Shearwater, and early-successional species such as red maple and white birch in thinner soils further south and east.

Today's urban forest

In comparison with other areas of HRM, canopy cover in Eastern Passage's urban forest neighbourhoods is extremely low. While local forest conditions can be attributed to coastal influences and the area's industrial land-use history, they are primarily a result of insufficient urban forest management. In residential neighbourhoods, there are few trees planted on private properties. Residential buffer strips of native forest between streets common in other HRM residential neighbourhoods are used infrequently in Eastern Passage. For new and existing developments in this area, sound urban forest management, enhanced by a vigorous municipal tree-planting effort, is greatly needed.

Almost half the land uses in the area of Eastern Passage are institutional and industrial. Here, we see a predominance of impervious surfaces and open fields, with low-to-nonexistent canopy cover. Land uses include the Shearwater Airport, Autoport, CFB Shearwater, and the former Ultramar Oil Refinery lands. The Autoport's extensive paving presents a significant challenge. There are virtually no trees on this completely impervious site. HRM-controlled lands are confined to road rights of way, limiting opportunities for tree planting on public land. These areas present a major challenge for meeting canopy targets and managing Eastern Passage's urban forest. Collaboration with the Department of National Defence and the area's corporate landowners will be necessary.

The urban forest of tomorrow

The Eastern Passage of tomorrow balances a diverse and healthy urban forest with the green open spaces that are naturally occurring in coastal areas. The residents of neighbourhoods such as Heritage Hills have beautiful treed properties. Public outreach and education programs have yielded a population fully aware of the rewards of urban trees on their properties. In newly developed subdivisions, developers retain appropriate amounts of native canopy in residential buffer strips, while also ensuring that trees are planted on new lots and along streets. Forest buffer strips between lots and in riparian zones are large enough to reduce vulnerability to wind and other forms of disturbance. Riparian zones around wetlands in the area are well established and protect these vital aquatic ecosystems, which in turn buffer watersheds from nearby industrial land uses.

A strong, collaborative effort to manage the urban forest in the Shearwater neighbourhood has been established between HRM, the Department of National Defence, and corporate landowners. In exposed and impervious areas, canopy cover has been increased around infrastructure, in newly created berms and planters, and along riparian buffer strips. The stakeholders have been educated on the benefits of a healthy urban forest for their properties and their community.

Table 6.14 Eastern passage treatment summaries

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	1,460
Area of naturalized forest stands to be created on HRM lands per decade	13 ha
Area of naturalized forest stands not to fall below	340 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	30 (eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera in all neighbourhoods until 2020	Spruce, maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	50

Table 6.15 Eastern passage neighbourhoods and canopy targets

Neighbourhood	Area (ha)	Canopy Cover (%)	Canopy Target (%)
Shearwater	984	33	40
Briarwood	141	33	70
Eastern Passage	178	4	45
Heritage Hills	69	18	70
Eastern Passage	**1,372**	**29**	**45**

Landscape Patterns

In the future urban forest, an ongoing street tree planting program has created a healthy and continuous network pattern throughout the community. As new subdivisions are developed, new street trees are planted to expand the network. Available planting sites in the patchwork pattern of municipal parks have been filled with new trees. A belt pattern can be seen to the south of the community, created by the Hartlen Point Crown land. Ribbon patterns crisscross the Shearwater neighbourhood along railways, connecting into the Shearwater Flyer Trail. Wedge patterns are formed around the trail, and by forested Crown land behind the Shearwater Airport.

Eastern Passage Today

Eastern Passage Tomorrow

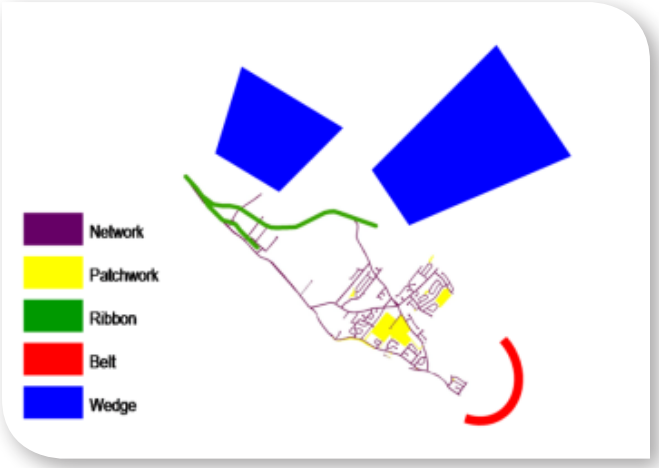


Figure 6.15 Eastern Passage: Today and Tomorrow Landscape Patterns.

6.1.7 Fairview/Beechville-Lakeside-Timberlea (BLT)

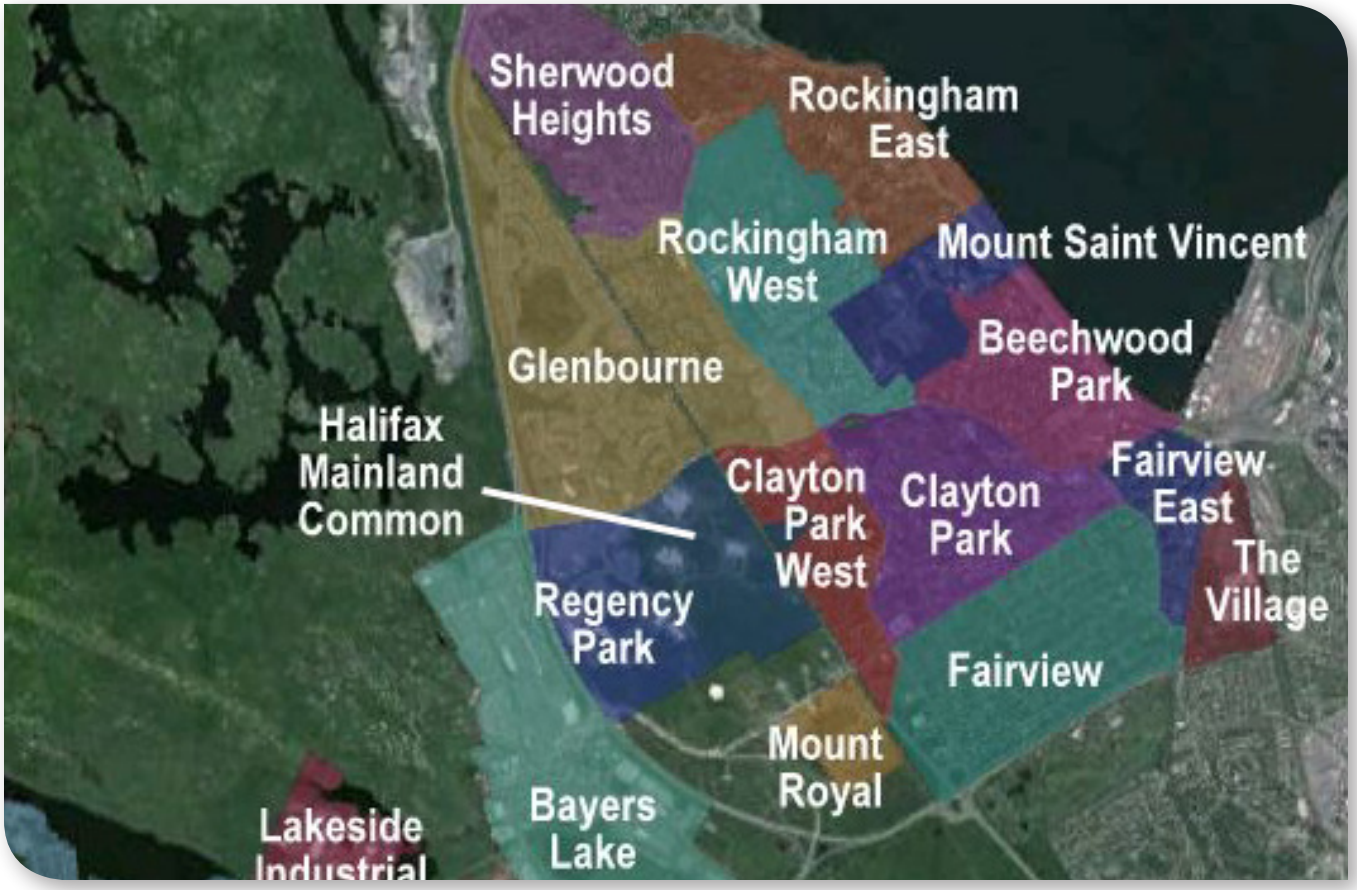


Figure 6.16 The neighbourhoods of Fairview/BLT

Background

The naming of this extensive community was difficult. At just under 1,800 ha, it is comprised of several other well-known areas such as Clayton Park, Rockingham, Glenbourne, and Bayers Lake Industrial Park. However, for the purposes of this Plan the community was named Fairview/Beechville-Lakeside-Timberlea (BLT). The principal consideration in the decision to designate such a large UFMP community was the uniform biophysical nature of the area. Conditions addressed included soils, hydrology, topography, surficial and bedrock geology, and the Provincial Ecological Land Classification. The Fairview/BLT community encompasses the western shore of the Bedford Basin between the Halifax Peninsula and Bedford, and extends inland further west to Highway 103. It contains 21 urban forest neighbourhoods. The name "Fairview" originated from Fairview Cove, located at the southernmost end of the Bedford Basin. Beechville's name is derived from "Beech Hill",
a description of the native beech forest recorded by the African Nova Scotian settlers of the area. "Lakeside" was named due to its proximity to Governor's Lake. "Timberlea" was named for its forestry-based economy (Virtual Archives, Nova Scotia). Until increased subdivision activity took place in the 1960s, Beechville, Lakeside, and Timberlea were distinct and separate settlements. Since that time, further infill developments effectively joined the three settlements into what is now commonly called Beechville-Lakeside-Timberlea, or BLT (HRM, 2009b).

Figure 6.17 The neighbourhoods in Fairview/BLT

The community's settlement history is closely aligned with the construction of roads and railways. Early roads and later railways were constructed along the shores of the Bedford Basin and further inland through Beechville, Lakeside, and Timberlea. From the late 18th to mid-20th centuries, agriculture and forestry were predominant land uses; but, six decades of postwar residential development from the late 1940s to date has dramatically altered the appearance of this community. It now features a mix of detached, semi-detached, and apartment-complex housing. Major subdivision developments began in Fairview in the early1950s, followed by the development of Clayton Park in the 1960s and 70s, and Clayton Park West in the 1990s. Further development has taken place since then in areas such as Glenbourne and Regency Park. Population densities in these newer areas are among the highest in HRM. Parallel developments have also taken place in BLT with the recent construction of subdivisions such as Beechville Estates, Governor's Glen, and Timberlea Village. Residential land uses have been accompanied by major commercial developments such as Bayers Lake Industrial Park and several shopping centres throughout the community. A unique land-use feature in this community is the historic Mt. St. Vincent University campus.

A natural history

Fairview/BLT lines the sheltered shores of the Bedford Basin between the Halifax Peninsula and Bedford. The landscape is dominated by bedrock ridges and rockland, and extends westward towards Highway 103 into the granite hilly topography of the South Mountain batholith, with many lowland lakes and wetlands. Soils in this hectic topography are sandy, well-drained loams over bedrock and glacially deposited granitic till, and are most often shallow, with many exposed bedrock ridges and hilltops.

This rugged terrain would likely have been dominated by open stands of black spruce and white pine, which are typical of forest ecosystems with poor, dry soils. In areas with deeper soils, there could be found larger stands of red spruce, mixed with broadleaved species and eastern hemlock.

Today's urban forest

There is remarkable diversity among the urban and peri-urban forest neighbourhoods found in the Fairview/BLT community. Tree canopy shifts dramatically from the urban/rural fringe character of the BLT neighbourhoods to the established and dense urban settlement areas of Fairview and Clayton Park. On average, Fairview/BLT trees are older, larger ornamental species that have been planted along street rights of way and on residential properties. Here can be found typical urban species like Norway maple, linden, sycamore maple, green ash, and callery pear.

In the older neighbourhoods, age-class diversity is low, which presents a threat to the community's future urban forest. There are often insufficient younger trees to replace the aging trees as they reach the end of their lifespan. Species diversity is also low in many neighbourhoods, and the street tree population is frequently dominated by Norway maples. This is a concern, as Norway maple has proven to be an invasive species in native forests and frequently colonizes semi-naturalized urban areas and vacant land. The condition of the street tree population in the dense, urban areas of Fairview/BLT, such as Rockingham East and Clayton Park, is comparatively low in relation to other HRM communities. This can be attributed to the aging tree population, harsher urban conditions, and ongoing issues related to aggressive tree-pruning practices in utility corridors.

Canopy covers are much lower in recently developed urban forest neighbourhoods such as Glenbourne, Clayton Park West, Bayers Lake Industrial Park, and some BLT neighbourhoods along St. Margarets Bay Road. Patches of urban or peri-urban forests are usually restricted to small stands of native forest that have been retained during development, or native species that have regenerated naturally along street rights of way and around private lots. Dominant species include white and gray birch, red maple, white pine, and black spruce, which are all characteristic of the rugged terrain and poor local site conditions.

BLT's Lakeside Industrial Park, Bayers Lake Industrial Park, and the CN rail corridor along the Bedford Basin have particularly degraded urban forests, with few plantable sites, infrequent trees, and extensive impervious surfaces. In these areas, the lack of forest canopy dramatically increases volumes of stormwater runoff that can contaminate nearby aquatic ecosystems.

Overall, the Fairview/BLT community's topography is the major challenge. Here, the forest has slowly and tenuously evolved over centuries on the rugged terrain of the South Mountain batholith and its shallow, coarse-textured sandy soils. Little is left of the forest when sites are cleared, graded, and filled for development. To be fair, it should be noted that developers are often faced with a "no win" situation when site preparation takes place on rockland. Small patches of native forest stands retained during development are highly vulnerable to disturbance, especially from windstorms, as the newly cut forest edges expose these shallow-rooted forests to the elements. With appropriate site conditions, the preservation of large patches is sometimes possible; but the most successful alternative is for developers to establish a vigorous replanting schedule after development is completed.

The urban forest of tomorrow

Fairview/BLT's urban forest of tomorrow incorporates the economic, environmental and social values of the UFMP. Challenges specific to neighbourhoods have been addressed, and opportunities to improve the urban forest have been met. Streets and parks have a tree population diverse in species mix and age structure, improving biodiversity and providing resistance and resilience against pests, disease, major disturbances, and climate change.

Norway maple has been phased out of the canopy, and typical introduced urban species such as elm, linden, and callery pear are intermixed with native species and representative Acadian old-growth species. New street trees are planted between established trees to ensure the urban forest's resilience to climate change and to reduce vulnerability to introduced insects and diseases. Trees with major structural problems are removed before they become a hazard to residents and infrastructure, and improved tree-pruning practices in utility corridors have reduced tree mortality and structural damage.

Commercial centres and industrial parks across the community have abundant trees in parking areas and along their margins, increasing canopy cover, improving stormwater retention and permeability, and shading cars and infrastructure. There is less contaminated runoff into the area's watershed, longer-lasting infrastructure, and lower energy demand, reducing the costs for local businesses and increasing the amount of carbon stored in the community. Customers are attracted to the shaded and more natural feeling shopping centres, benefiting the local economy.

In BLT, more street trees have been planted along St. Margaret's Bay Road and the number of trees on residential properties has increased through outreach to local residents. Riparian canopy cover has been re-established around Governor Lake and Lovett Lake, and new forest growth now shades long sections of the BLT and Chain of Lakes active transportation corridors.

In new developments, developers are educated on the benefits and management of trees and urban forests. Explicit consideration for the urban forest is included in future subdivision plans and development agreements. Residential buffer strips and large patches of native forest are retained, and trees are planted on new lots and in street rights of way. In newer neighbourhoods, such as Glenbourne and Beechville Estates, residents are educated on the benefits of the urban forest and encouraged to plant trees on their properties by local urban forest volunteers and environmental groups working in cooperation with HRM staff. In older, established neighbourhoods, homeowners and landlords have planted thousands of trees on their properties. The community's freshwater and marine resources are protected by forested riparian zones.

Table 6.16 Fairview/BLT treatment summaries

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	1,800
Area of naturalized forest stands to be created on HRM lands per decade	34 ha
Area of naturalized forest stands not to fall below	360 ha
Average number of native trees to plant on HRM lands per decade	490
Average number of Acadian old-growth species to plant on HRM lands per decade	35 (eastern hemlock, sugar maple) 15 (white pine) 10 (yellow birch)
Refrain from planting the following genera in some neighbourhoods until 2020	Ash, maple, serviceberry, pine
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	160

Table 6.17 Fairview/BLT neighbourhoods and canopy targets

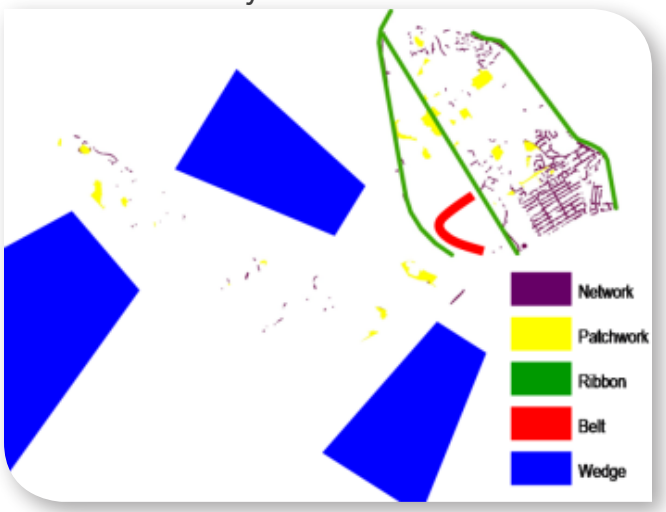
Neighbourhood	Area (ha)	Canopy Cover (%)	Canopy Target (%)
Bayers Lake	202	6	20
Beechville	35	8	20
Lakeside Industrial Park	60	18	20
Lakeside	105	22	45
Timberlea	35	30	70
Maplewood	97	32	70
Forest Hill	104	39	70
Ragged Lake Business Park	9	6	20
Regency Park	61	40	70
Mount Royal	23	3	70
Fairview	134	26	70
The Village	33	15	20
Fairview East	33	21	45
Clayton Park West	58	22	70
Clayton Park	105	26	70
Beechwood Park	75	31	70
Glenbourne	207	23	70
Sherwood Heights	103	39	70
Rockingham West	105	20	70
Mount Saint Vincent	49	60	20*
Rockingham East	94	33	70
Halifax Mainland Common	65	56	40+
Fairview/BLT	1,792	26	56

**Part of Mount Saint Vincet was sold to a developer for new development.*
+There will likely be more recreational development in Halifax Mainland Common

Landscape Patterns

In the future urban forest, an ongoing street tree planting program has created a healthy and continuous network pattern throughout the community. As new subdivisions are developed, new street trees are planted to expand the network. Available planting sites in the patchwork pattern of municipal parks have been filled with new trees. A belt pattern can be found in the Halifax Mainland Common, in the centre of the community. Green ribbon patterns can be found along railways, which include the converted BLT and Chain of Lakes trails, and along Highway 102. There are three wedge patterns around Fairview/BLT, including Long Lake Provincial Park, the Blue Mountain-Birch Cove Lakes Wilderness Area, and the Crown land south of St. Margaret's Bay Road.

Fairview/BLT Today



Fairview/BLT Tomorrow

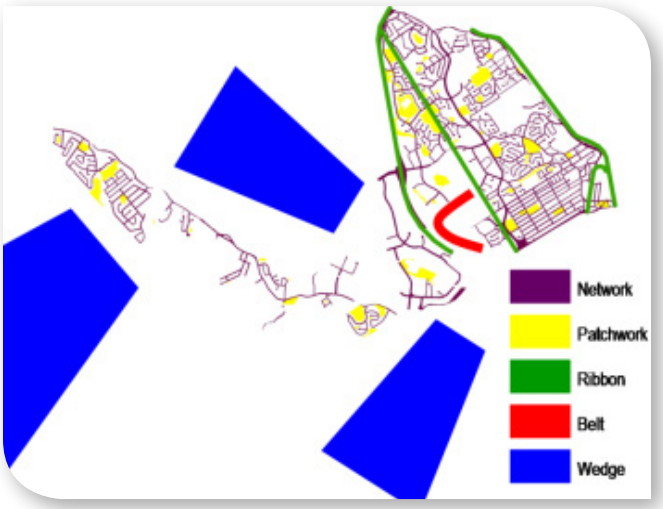


Figure 6.18 Fairview/BLT: Today and Tomorrow Landscape Patterns

6.1.8 Halifax Peninsula

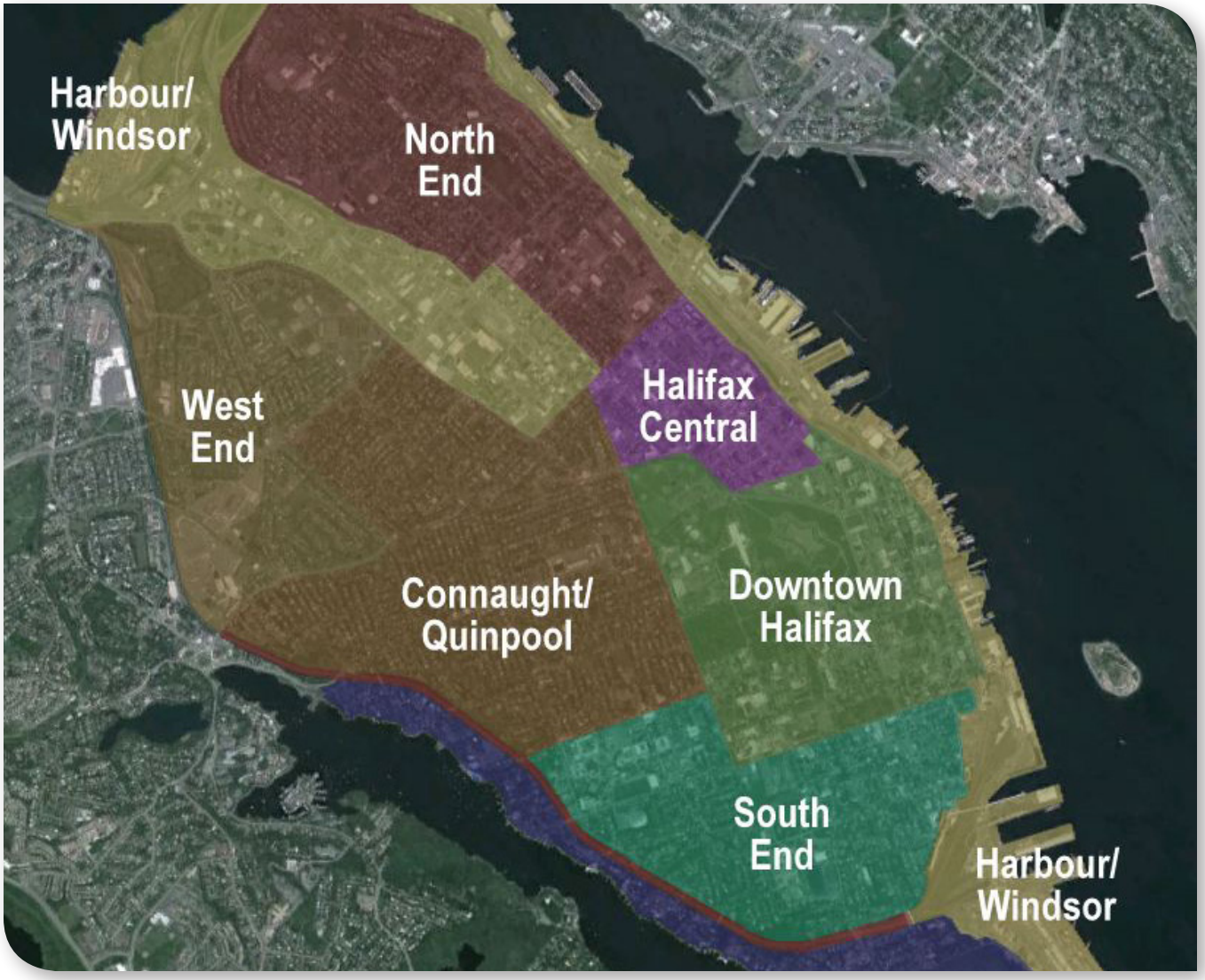


Figure 6.19 The neighbourhoods of the Halifax Peninsula

Background

The Halifax Peninsula is the centre of the urban core of HRM. It is a tear-shaped peninsula connected to the greater Chebucto Peninsula. The shores of the community border Halifax Harbour, which is the second-largest natural harbour in the world. The community of Halifax has a long and rich history as one of Canada's oldest settlements. It dates back to 1749 when a small fleet of British ships sailed into Halifax harbour. The naval officers and settlers aboard had heard tails of rich fishing grounds and France's military strong hold in the new world. The British named the Harbour Chebucto, an anglicised version of the Mi'kmaq Jipugtug, meaning "the big harbour." After a brief encampment at today's Point Pleasant Park, a more sheltered site was chosen with deep shores able to berth ships in the shade of a massive tree-lined drumlin hill, the future site of the Halifax Citadel. The site was cleared of every tree and crude shelters constructed, though many of the early settlers preferred the shelter of their ships over the wild hillside. Such was the original urban forest of Halifax in 1749: a settlement cleared of vegetation, save for the gallows tree, surrounded by a sharp edge of virgin Acadian forest. This surrounding forest would have been both a source of fuel, construction materials, and hunting grounds for early settlers, but also a dark and forbidding place (Raddall, 1948; HRM, 2011b).

Today, more than 250 years later, the forest of the Halifax Peninsula is considerably different. Today's urban forest is mostly populated by descendants of trees imported from Europe. They were planted along streets, in parks, and in residential lots and gardens, along with some hardy loners that today survive amongst the concrete of commercial centres such as Spring Garden Road, Quinpool Road, and the West End Mall. Those who seek them may also come across stands of native vegetation competing with introduced, often invasive, trees like Norway maple in unused or abandoned lots, in fringes of the industrial harbour bordering the northern end of Barrington Street, or along the borders of the rail cut that skirts the Northwest Arm. The only vestige of the Acadian forest that once covered the Peninsula can be found in Point Pleasant Park. Regardless of these challenges, Halifax Peninsula remains a place where trees can flourish. There are still neighbourhoods across the Peninsula with majestic trees shading neighbourhood streets, heritage trees like the copper beech of the public gardens, and a new urban forest regenerating and recovering at Point Pleasant Park through the ongoing support of HRM citizens.

The Halifax Peninsula is a socioeconomically diverse and compact urban area, with a population of 71,915 (2006 Census). Housing densities vary significantly, with the South End at the low end and Downtown Halifax at the high end.

Current canopy cover and the number of plantable sites available can be affected by housing density. As residential land uses intensify, the capacity for homeowners to plant private trees on their property could be reduced. The Peninsula also has a high proportion of renters and short-term residents, and of course a significant student population. Both tenants and landlords have a role to play in urban forest stewardship. Halifax Peninsula has the highest proportion of people engaging in active transportation in HRM. Urban forest corridors are a key element of the Peninsula's active transport routes (Government of Nova Scotia, 2011).

A natural history

The pre-settlement Halifax Peninsula was a rugged, steep, and stony terrain carpeted with massive red spruce, windswept white pines along the rocky shoreline, and some steep, shaded slopes and ravines studded with graceful hemlocks. The Peninsula has a very uniform geology, with slate, schist, and quartzite from the Cambro-Ordovician period underlying glacial deposits of till veneer. These deposits of glacial till are relatively shallow, giving rise to shallow, rocky, and poor soils on most of the Peninsula, with many areas of exposed bedrock, such as Point Pleasant Park. However, there are several drumlin hills across the Peninsula, such as Citadel Hill and Fort Needham Memorial Park. Drumlins are tear-shaped hills of deep, silty soil deposited at the end of the last Ice Age, and provide excellent growing conditions for urban trees.

Today's urban forest

The Halifax Peninsula represents a comparatively small portion of the overall area of HRM's urban forest. It is a vital element of this dense urban core and population centre. Here, the urban forest is characterized by the features and challenges that are typically associated with urban forests of major North American cities (Ordóñez & Duinker, 2011). A dominant feature of the Halifax Peninsula urban forest is the abundance of Norway maple, as well as linden and elm, which are all introduced European species. This lack of species diversity has left the urban forest vulnerable to Dutch elm disease, and more recently the Asian longhorn beetle. The dominance of Norway maple in Halifax is also a concern as it is an invasive tree species and a threat to remaining native forests in the community.

Another characteristic of the Peninsula's urban forest is an aging tree population. Many of the trees planted in the early-to-mid-Twentieth Century are reaching the end of their lifespan. Today's forest managers have adopted new planting techniques; however, throughout the second half of the twentieth century few saplings were planted amidst these maturing trees. Consequently, there is an older age-bias in the urban forest, and insufficient numbers of younger trees to replace the older ones when they die. The average condition of street trees on the Peninsula is relatively poor compared with suburban communities. This is symptomatic of an aging tree population, harsher urban growing conditions, and conflicts with utility lines.

The last major challenges facing the urban forest of the Halifax Peninsula are redevelopment and impervious surfaces. Redevelopment and densification in many areas of the Peninsula will be encouraged, but there is a pressing need to retain and improve the urban forest

canopy before, during, and after any redevelopment. It is also important to adopt mitigation strategies to avoid an increase in paved surfaces that limit root growth and divert rainwater. Much of the Harbour shore, the Windsor Street commercial corridor, and shopping centres on the Peninsula feature low-to-non-existent canopy cover. These large, impervious areas currently have limited sites where tree planting is possible, and are major challenges for stormwater management. Improving canopy in heavily built-up areas, most of which are identified as commercial or institutional divisions on the Peninsula, would provide very immediate and substantive returns in terms of urban forest benefits, such as improved air quality, stormwater retention, and reduction of urban heat island effects.

The urban forest of tomorrow

Outreach efforts and public education have played a major role in shaping the urban forest of tomorrow. Residents are mindful of the innumerable benefits provided to them by the urban forest, and have begun local stewardship initiatives in their neighbourhoods, led by neighbourhood champions and local environmental organizations. Citizen stewardship is in close collaboration with HRM urban forest managers and other identified stakeholders.

The urban forest of tomorrow has a diverse mix of species, with priority given to local biodiversity values and the changing climate. Common street trees that once dominated the Peninsula's canopy, such as elms, lindens, callery pear, and serviceberry, are less heavily relied on for new plantings, and the species mix has been broadened and evened out. Norway maple is phased out of the street tree population—though not through the removal of existing mature trees. Alternative noninvasive species are encouraged for use on private property. Increased tree planting across the neighbourhoods has been implemented to address the uneven and older age-class distribution of the urban forest. The diverse composition and structure of the urban forest protects it from major weather events and from introduced insects and diseases. Trees with structural problems are removed in a regimented maintenance cycle before they become hazardous, and sustainable pruning techniques are adopted through collaboration with utilities.

SUFM land-use policies and by-laws have created an urban forest renaissance. Impervious areas with low canopy cover have been prioritized for urban forest renewal and improvement. Trees retained and newly planted on redeveloped properties shade infrastructure improve aesthetics, delight local residents, and attract more customers to local businesses. Moreover, increased canopy in these areas helps retain stormwater and buffer wastewater infrastructure in major rain events, helping to minimize overflow into the Harbour.

Table 6.18 Halifax peninsula treatment summaries

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	3,000
Area of naturalized forest stands to be created on HRM lands per decade	13 ha
Average number of native trees to plant on HRM lands per decade	1,500
Average number of Acadian old-growth species to plant on HRM lands per decade	75 (red spruce, eastern hemlock, yellow birch) 65 (white pine) 6 (sugar maple)
Refrain from planting the following genera in all neighbourhoods until 2020	Maple
Refrain from planting the following genera in some neighbourhoods until 2020	Elm, linden, oak, serviceberry, pear
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	1,200

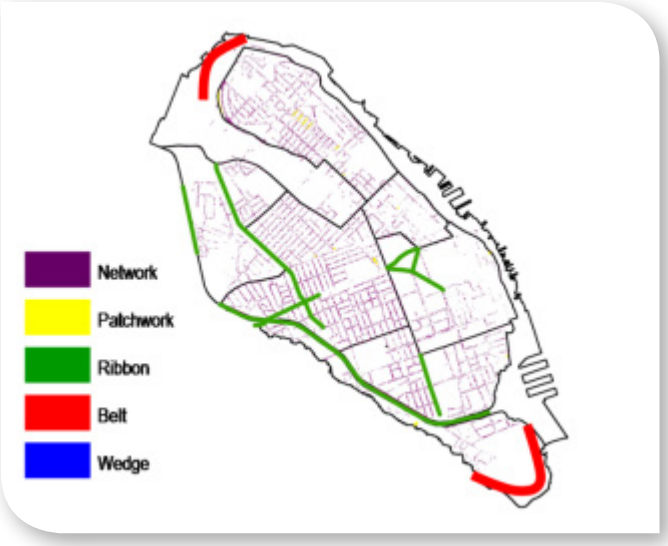
Table 6.19 Halifax Peninsula neighbourhoods and canopy targets

Neighbourhood	Area (ha)	Canopy Cover (%)	Canopy Target (%)
The North End	239	27	70
Halifax Central	72	19	45
Downtown Halifax	208	11	12
The South End	193	27	70
Connaught/Quinpool	307	26	70
Northwest Arm	165	27	70
The West End	194	23	70
Harbour/Windsor	392	4	20
Halifax Peninsula	**1,789**	**19**	**50**

Landscape Patterns

In the urban forest of the future, an ongoing street tree planting program has established a vigorous and continuous network pattern throughout the Peninsula. Available planting sites in the patchwork pattern of city parks have been filled with new trees. Belt patterns of verdant forest areas are apparent where major parks and green spaces border urban areas, including the downtown Harbour shores, Point Pleasant Park and Africville Memorial Park. Ribbon patterns have been strengthened and expanded. Centre boulevards throughout the Peninsula feature long rows of healthy trees, and the rail cut native forest continues to wend its way along the nearby shores of the Northwest Arm.

Halifax Peninsula Today



Halifax Peninsula Tomorrow

Figure 6.20 Halifax: Today and Tomorrow Landscape Patterns

6.1.9 Sackville

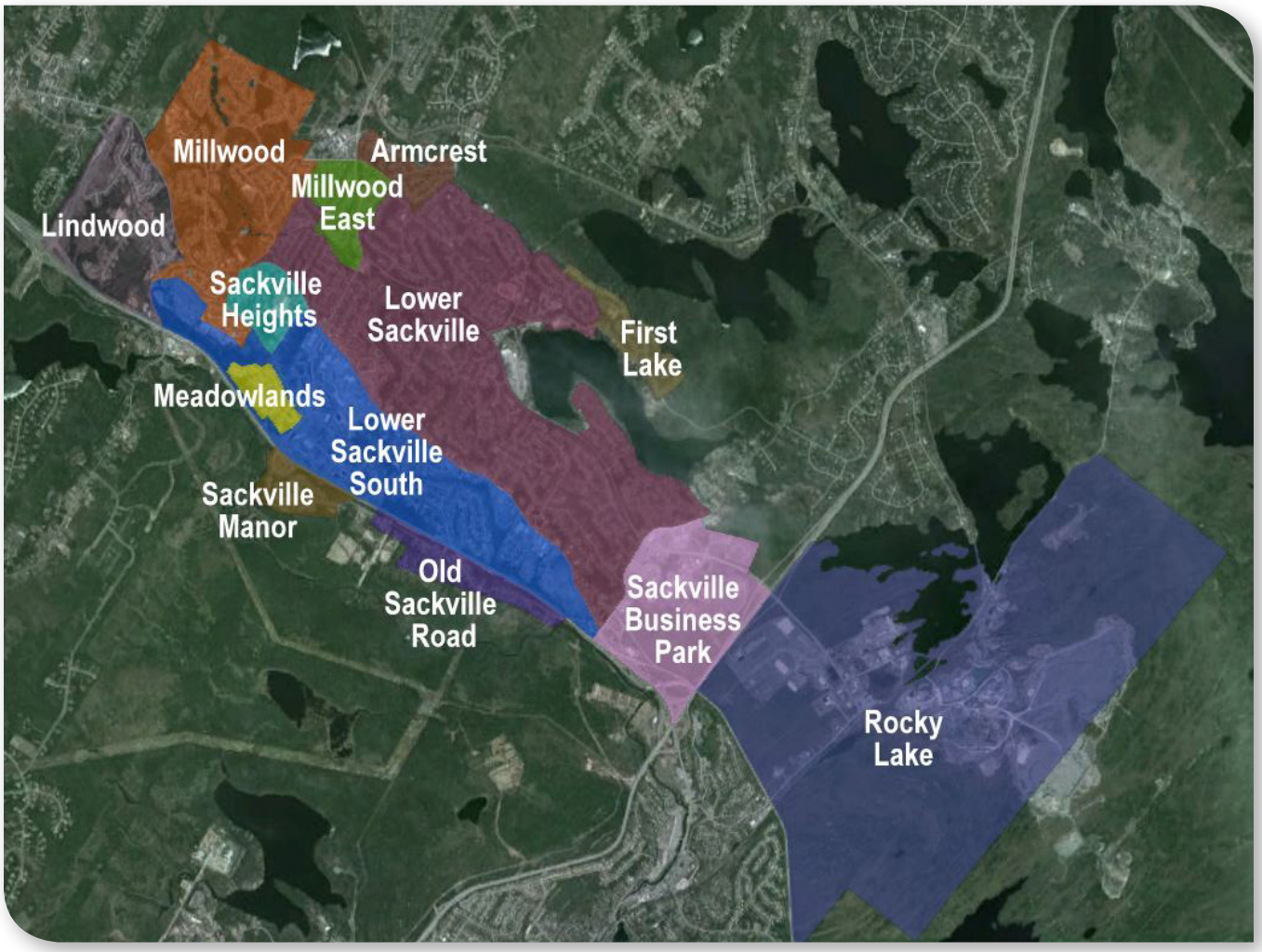


Figure 6.21 The neighbourhoods of Sackville

Background

The current community of Bedford was originally known as Sackville in its earliest days, and its development gradually expanded to the northeast into Lower, Middle, and Upper Sackville. Consequently, the histories of these two communities are intertwined (see Section 4.3). With the development of the railway system in the 1850s, the community began to grow; it was largely rural until the post-war housing boom in the 1950s and 60s (Trider, 1999; Harvey, 2002; HRM, 2010b).

In the 1960s, the Province and the Canadian Mortgage and Housing Corporation formed a partnership to develop a master planned community in Sackville near First Lake. The project enjoyed great success, and the area's population grew rapidly, from 3,000 in the late 1960s to more than 30,000 in 1992. Today, Sackville has a relatively young population, with many first-time home owners. Commercial development along Sackville Drive has seen steady growth since the 1980s, and there have been several recent commercial and industrial developments in the eastern portion of the community near Rocky Lake (Trider, 1999; Harvey, 2002; HRM, 2010). Today, Sackville is a largely residential community, characterized by low-density single-family homes (Government of Nova Scotia, 2011). There is ample room for both public and private trees in the community, and significant opportunities for urban forest improvement.

A natural history

Sackville is quite different from the other major HRM communities included in the UFMP in terms of its development history, but also in terms of its ecology. It is the only community to fall within the Eastern Drumlin ecodistrict, as classified by Nova Scotia's Ecological Land Classification. This region is characterized by drumlin fields, with rolling, tear-shaped hills oriented north-south, indicating the direction of glacial flow. Soils here are derived from meguma slate and greywacke, and are mostly fine-textured loams and sandy clay loam, which provide favourable growing conditions for forests.

These drumlin hills would have been frequently capped by pure hardwood stands of yellow birch, sugar maple, and American beech. Several hundred years ago, an impressive site would have been the continuous stands of smooth-barked old-growth beech trees, which have now been crippled by the introduced beech bark disease and rarely reach maturity. Mixedwood stands dominated by red spruce would have been found in the lower slopes around the hills. The many lakes found around Sackville would have shorelines dotted with wetlands and stands of lowland black spruce, red maple, and tamarack.

The exception to these patterns, both in terms of land use and ecology, are the Sackville Business Park and Rocky Lake neighbourhoods, which include the Rocky Lake quarry, Bedford Industrial Park, and Bedford Common. This southeastern region of Sackville lies on rocky bedrock ridge terrain, with frequent small lakes and wetlands. In this type of landscape, soils are typically dry, shallow, and coarse, and have often been degraded by historical forest fires. In these areas, typical forests would be dominated by stunted stands of black spruce, white pine, and early-successional hardwood species such as white birch and red maple, all competing with ericaceous shrubs such as blueberry and huckleberry that are favoured by fire.

Today's urban forest

Sackville has a potentially bright future for the management of its urban forest. The community is fortunate to have a relatively healthy urban forest today, coupled with many opportunities for improvement, enhanced by the rich silty soils associated with the drumlin hill terrain. Other prospects include abundant curbed streets with ample room for planting in the HRM-controlled rights of way, and several privately owned cemeteries, notably Gate of Heaven Cemetery, which have low canopy cover but abundant open green space for planting new trees. Sackville's street tree population is significantly different from denser urban communities and neighbourhoods such as those on the Halifax Peninsula and Old Dartmouth. Trees are on average much younger and are almost all native species that have regenerated naturally, likely from propagules from the surrounding forests. The rich site conditions are reflected in the street tree population in some neighbourhoods, with abundant eastern hemlock and yellow birch.

While the inventory of Sackville's urban forest is mostly positive, there are still neighbourhoods where few trees can be found on residential properties. Sackville's mobile home neighbourhoods also contain very few trees. New development is an ongoing risk to the continued health of Sackville's urban forest. While neighbourhoods in the older master-planned community of Sackville were designed to retain good tree cover during and after development, some new residential developments have left few trees standing. Reversing this trend by incorporating urban forest principles into development agreements and working with developers and homeowners in new or already-approved developments will be integral to managing Sackville's urban forest. New development practices designed to preserve the urban forest will be especially important to neighbourhoods on the outer edges of the community that currently benefit from their adjacency to native forests. Neighbourhoods in these areas also face challenges from their proximity to hinterland forests, as do the surrounding forest ecosystems. These challenges range from wildfire, storm blowdowns, and wildlife conflicts, as well as invasive forest-associated species and other impacts related to climate change.

Notable exceptions to the urban forest conditions in this community are the Sackville Business Park neighbourhood and industrial and business land uses in the nearby Rocky Lake urban forest neighbourhood. Tree growth in these neighbourhoods is hampered by their bedrock geology, poor soils, and local land uses. Commercial and industrial parks with highly impervious surfaces and very low canopy cover will make urban forest management a challenge in these neighbourhoods, as it will for the commercial strip along Sackville Drive. Collaboration with business owners and

industrial park administrators will be a vital component of renewing local urban forest and meeting canopy targets. There is virtually no tree cover in the Rocky Lake quarry; however, the production of aggregates is vital to our economy, and the quarry is likely to operate for several more decades. In the short term, there are vigorous riparian buffers in place for watercourse protection. In the long term, mitigation strategies could see the return of forests to the area.

The urban forest of tomorrow

Sackville is widely admired for its extensive urban forest, with both the favourable soils and attitude of residents reflected in the urban forest biodiversity and canopy cover. HRM rights of way and open green spaces such as parks and the Gate of Heaven Cemetery have an abundance of trees, shading public play areas and benefiting residents of the entire community by improving air quality and storing carbon, among many other services. In naturalized areas and the peri-urban forests, natural regeneration of native propagules is employed to increase canopy cover and improve the urban forest. The street tree population contains mature trees, which shade streets and sidewalks, and a new diverse pool of street trees, ensuring a healthy age distribution. Climate change is considered in the selection of species planted, and the Little Sackville River is fully protected with a continuous tree-covered riparian corridor.

Public outreach and education programs in Sackville's neighbourhoods have yielded a population fully aware of the rewards of urban trees on their properties. Mature trees grace residential properties, including mobile home parks, apartments, townhouses, and condominiums. In newly developed subdivisions, developers retain appropriate amounts of native canopy in residential buffer strips, while also ensuring that trees are planted on the new lots and along streets. The forest buffer strips, both between streets and in riparian zones, are large enough to reduce vulnerability to wind and other forms of disturbance.

In Rocky Lake and the Sackville Business Park, as well as along Sackville Drive, where soils are generally poorer and impervious surfaces are extensive, care is taken to create plantable sites and increase canopy cover. This has been done largely through collaboration with business owners and business park managers, who have been educated on the benefits of increased stormwater retention, protected riparian zones, shade infrastructure, and consumers' attraction to more-naturalized shopping and industrial centres.

Table 6.20 Sackville treatment summaries

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	1,870
Area of naturalized forest stands to be created on HRM lands per decade	21 ha
Area of naturalized forest stands not to fall below	1,180 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	100 (sugar maple) 60 (red oak)
Refrain from planting the following genera in all neighbourhoods until 2020	Birch, maple, poplar
Refrain from planting the following genera in some neighbourhoods until 2020	Hemlock, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	100

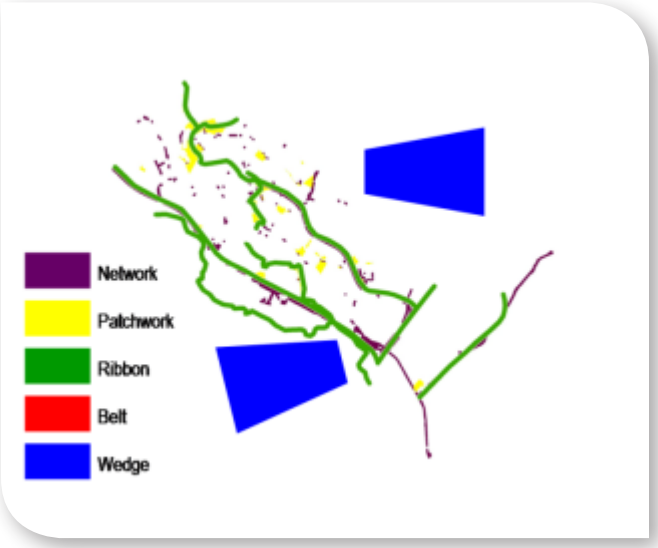
Table 6.21 Sackville neighbourhoods and canopy targets

Neighbourhood	Area (ha)	Canopy Cover (%)	Canopy Target (%)
Lindwood Estates	134	68	70
Milwood	234	29	70
Milwood East	42	31	70
Armcrest	25	16	70
Sackville Manor	32	46	70
Old Sackville Road	45	52	70
Sackville Heights	35	37	70
Meadowlands	21	28	70
Lower Sackville South	286	33	70
Rocky Lake	980	66	20
Sackville Business Park	158	65	20
First Lake	35	32	70
Lower Sackville	566	31	70
Sackville	**2,593**	**49**	**48**

Landscape Patterns

In Sackville's future urban forest, an ongoing street tree planting program has created a healthy and continuous network pattern throughout the community. As new subdivisions are developed, new street trees are planted to expand the network. Available planting sites in the patchwork pattern of municipal parks have been filled with new trees. Ribbon patterns are created along the Little Sackville River and major streets such as Sackville Drive, as well as the 100-series highway corridor. Two large patch urban forest wedge patterns of Crown lands north and south of the community serve to contain development and provide wildlife corridors to outlying forest communities.

Sackville Today



Sackville Tomorrow

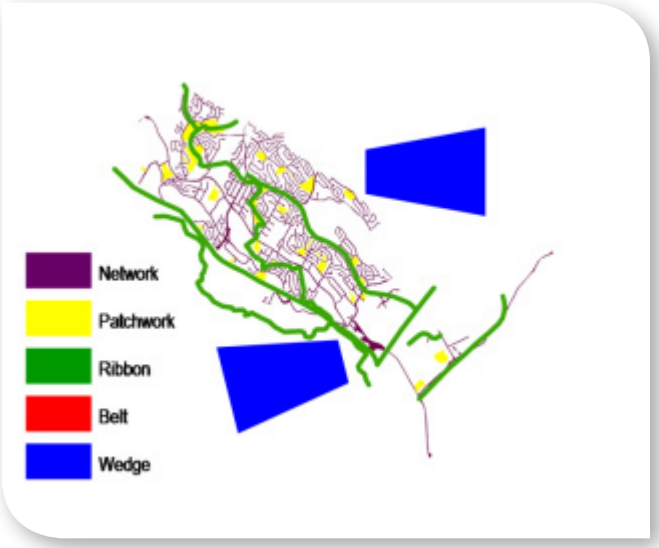


Figure 6.22 Sackville: Today and Tomorrow Landscape Patterns

6.1.10 Spryfield

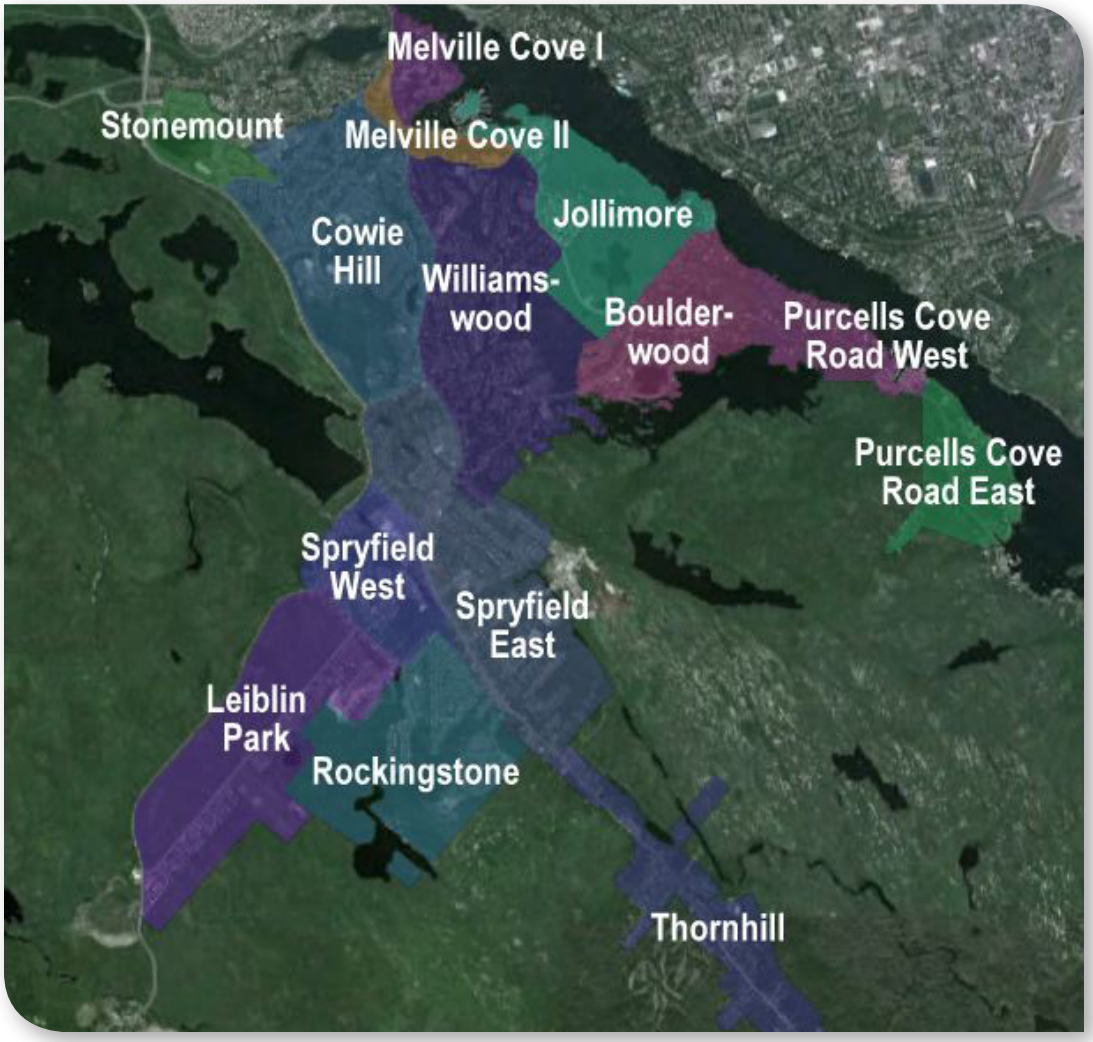


Figure 6.23 The neighbourhoods of Spryfield

Background

In the late Eighteenth Century, the population of Halifax Peninsula was growing and settlers began to look elsewhere for land. In 1766, a large area of land bordering the western shore of the Northwest Arm, then known as Leiblin Manor, was divided into nine 200-hectare lots. In 1769, a noted British army officer, Captain William Spry, purchased three of the lots and cleared the forests for agriculture. Over time, the area became known as Spryfield. Towards the end of the Eighteenth Century, George McIntosh, namesake of the McIntosh Run, acquired all of Spryfield and was highly influential in the clearance of the area's forests for its ongoing development as a farming community (Trider, 1999; Teplitsky *et al.*, 2006; HRM, 2011b).

Another notable event was the development of the Long Lake reservoir in 1848. The reservoir served as a source of drinking water for Halifax until the city's new potable water supply was established at Pockwock Lake in 1980. Although Spryfield continued to exist mainly as a farming community until the end of World War I, the following years saw many residents leaving their farms to look elsewhere for work. After World War II, Spryfield's farmlands became subdivisions featuring new single-family homes for war veterans and their young families, and the community began to grow again. Today, Spryfield is a prosperous and largely residential community of more than 10,000 residents (2006 Census), with a predominance of single-family homes along with town houses, condominiums, and multistory apartment buildings. New developments,

such as Stonemount and Ravenscraig, continue to enhance the community's appeal to new residents (Trider, 1999; Teplitsky *et al.,* 2006; HRM, 2011b).

A natural history

The terrain around the Spryfield community is dominated by granitic bedrock from the South Mountain batholith, with some meguma slates along the Northwest Arm. Some notable evidence of the last glaciation can be seen around Spryfield in the form of glacial erratics - large, isolated boulders strewn across the landscape by melting glaciers. A unique glacial erratic, referred to as "the rocking stone" is a neighbourhood namesake in Spryfield. Soils in the region are thin, coarse sands with many exposed bedrock hilltops and ridges. Historically, forest fires were relatively frequent, despite Nova Scotia's wet climate. A recent and well-known example is the Spryfield fire of spring, 2009. These fires have also helped shape the region's forest ecosystems, giving rise to fire-associated species such as red oak, red pine, and especially jack pine, which are found in pure stands, despite being rare in the province. In fact, jack pine is what is known as a serotinous species, meaning that its reproduction depends on fire. Barrens are another byproduct of this natural history, which are characterized by a dominance of ericaceous shrubs and stunted stands of black spruce, white pine, and balsam fir.

An exception to these ecosystems would have been in western Spryfield around Leiblin Park, where deeper glacial deposits and finer, richer soils in some scattered drumlin hills can be found. Here, one could expect to find old-growth stands of red spruce, white pine, eastern hemlock, and red oak, along with rare pure stands of white pine on drumlin hills that were so sought after by the British colonials to build their ship masts. The landscape is also dotted with many wetlands and low-lying, poorly-drained stands of black spruce.

Today's urban forest

A major risk to Spryfield's urban forest is new development. Here, the forest has slowly and tenuously evolved over centuries on the rugged terrain of the South Mountain batholith and its shallow, coarse-textured sandy soils. Little is left of the forest when sites are cleared, graded, and filled for development. To be fair, it should be noted that developers are often faced with a "no win" situation when site preparation takes place on rocklands. Small patches of native forest stands retained during development are highly vulnerable to disturbance, especially from windstorms, as the newly cut forest edges expose these shallow-rooted forests to the elements. With appropriate site conditions, the preservation of large patches is sometimes possible; the most successful alternative is for developers to establish a vigorous replanting schedule after development is completed

The residents of several Spryfield neighbourhoods benefit from being enclosed by the native forest and its extensive canopy cover. However, the lack of trees on nearby private, residential properties is striking. Neighbourhoods frequently have good canopy cover, but it is generally limited to buffer strips between properties or forest patches bordering the neighbourhood. It appears that in many cases new trees were never planted on building lots that were cleared at the time of development. Opportunities for HRM to plant and maintain street trees on municipal road rights of way in areas without sidewalks and street curbs are also limited. In these neighbourhoods, public outreach programs, homeowner stewardship, and volunteer efforts will be a mainstay of SUFM.

There are other challenges associated with living at the edge or "interface" of urban settlements and forested areas. Residents here are sometimes exposed to conflicts with wildlife and natural forest disturbances, such as wildfire and extreme wind events. The occurrence of wildfire and its influence on forest ecosystems is quite low in Nova Scotia due to the moist maritime climate. However, Spryfield is one of a number of regions in the province where forests are more vulnerable.

The urban forest of tomorrow

Spryfield's urban forest of tomorrow incorporates the economic, environmental, and social values of the UFMP. Challenges specific to neighbourhoods have been addressed, and opportunities to improve the urban forest have been met. Streets and parks have a tree population diverse in species mix and age structure, improving biodiversity and providing resistance and resilience against pests, disease, major disturbances, and climate change.

The commercial centres along Herring Cove Road have abundant trees throughout parking areas and along their margins, increasing canopy cover, improving

stormwater retention and permeability, and shading cars and infrastructure. There is less contaminated runoff into the McIntosh Run, longer-lasting infrastructure, and a lower energy demand, reducing the costs for local businesses and increasing the amount of carbon stored in the community. Customers are attracted to the shaded and more natural-feeling shopping centres, benefiting the local economy.

In new developments, developers are educated on the benefits and management of trees and urban forests. Explicit consideration for the urban forest is included in future subdivision plans and development agreements. Residential buffer strips and large patches of native forest are retained, and trees are planted on new lots and in street rights of way. In newer neighbourhoods, such as Stonemount, residents are educated on the benefits of the urban forest and encouraged to plant trees on their properties by local urban forest volunteers and environmental groups working in cooperation with HRM staff. In older established neighbourhoods, homeowners and landlords have planted thousands of trees on their properties. The McIntosh Run and Spryfield's other lakes, rivers, and wetlands are buffered by lush, forested riparian zones, protecting the aquatic ecosystems they contain.

Table 6.22 Spryfield treatment summaries

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	2,000
Area of naturalized forest stands to be created on HRM lands per decade	22 ha
Area of naturalized forest stands not to fall below	300 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	230 (eastern hemlock, sugar maple, yellow birch) 190 (white pine, red oak) 50 (red spruce)
Refrain from planting the following genera in all neighbourhoods until 2020	Birch, maple
Refrain from planting the following genera in some neighbourhoods until 2020	Poplar, spruce, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	20

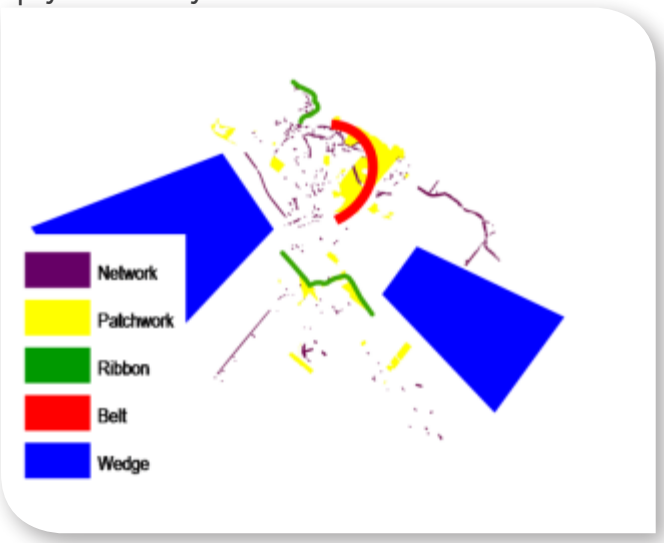
Table 6.23 Spryfield neighbourhoods and canopy targets

Neighbourhood	Area (ha)	Canopy Cover (%)	Canopy Target (%)
Purcells Cove Road East	44	37	70
Purcells Cove Road West	37	43	70
Boulderwood	61	50	70
Jollimore	81	30	70
Stonemount	23	16	70
Melville Cove II	19	26	70
Melville Cove I	16	23	70
Thornhill	92	47	70
Rockingstone	107	60	70
Leiblin Park	132	86	70
Spryfield West	51	47	70
Williamswood	144	33	70
Cowie Hill	132	44	70
Spryfield East	135	35	70
Spryfield	**1,074**	**46**	**70**

Landscape Patterns

In Spryfield's future urban forest, an ongoing street tree planting program has created a healthy and continuous network pattern throughout the community. As more curbed streets and sidewalks are developed, new street trees are planted to expand the network. Available planting sites in the patchwork pattern of city parks have been filled with new trees. Belt patterns can be found in the lush forests of Sir Sanford Fleming and Ravenscraig Drive parks. Ribbon patterns are created by the boulevarded sections of Northwest Arm Drive, along the McIntosh Run, and along the seawall. Wedge patterns are created by the section of Crown land between Purcells Cove Road and Herring Cove Road, and by Long Lake Provincial Park.

Spryfield Today



Spryfield Tomorrow

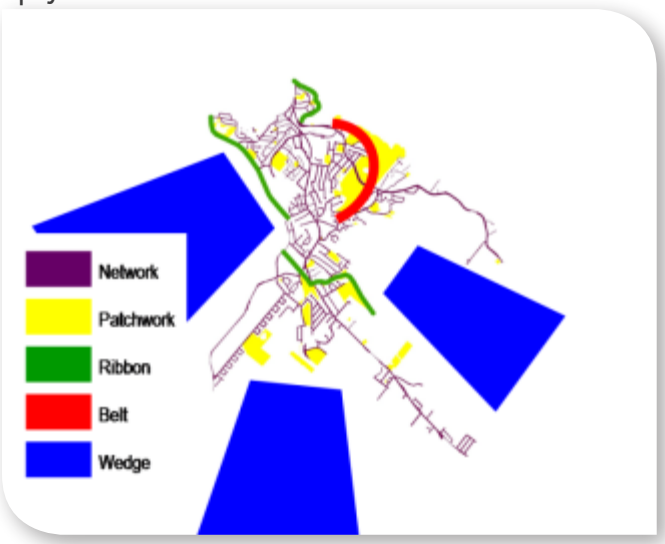


Figure 6.24 Spryfield: Today and Tomorrow Landscape Patterns

6.2 Neighbourhood Prioritization

Establishing priorities is a difficult, but necessary task. Every one of the UFMP's 111 urban forest neighbourhoods requires work, but knowing when and where to start is a key management decision that will affect the sustainability and success of the plan. To better understand how priorities could be assigned the planning team looked at the urban forest opportunities and challenges detailed in the Urban Forest Neighbourhood Factsheets contained in Appendix A. When opportunities and challenges aligned then the work of assigning priorities became more straightforward. For example, a neighbourhood challenge could be a lack of street trees but if it was found that there were hundreds of good planting spaces available then immediate action could follow. The following provides an outline of the methodology used to identify neighbourhood priorities.

- Priorities for tree planting and other urban forest management actions were based on a cumulative analysis of each neighbourhood's urban forest challenges and urban forest opportunities detailed in Appendix A.
- Operational Principles (Section 4.3) such as Principle 4, Equity, and Principle 14, Time and Timing, were also considered.
- Neighbourhood-scale challenges are depicted in the following figure (6.25) on the top of the following page and neighbourhood-scale opportunities figure (6.26) appear on the bottom of the page.
- In both the challenges and opportunities illustrations, red represents an immediate priority, yellow represents a mid-range priority, and green represents a long-range priority.
- Neighbourhoods with matching urban forest challenges and opportunities coloured red are candidates for immediate action and are shown with a triangle. ▲
- Based on the criteria shown above, the following urban forest neighbourhoods should be considered for action in the near-term.
    - Colby Village
    - Connaught/Quinpool
    - Eastern Passsage
    - Fairview
    - North End

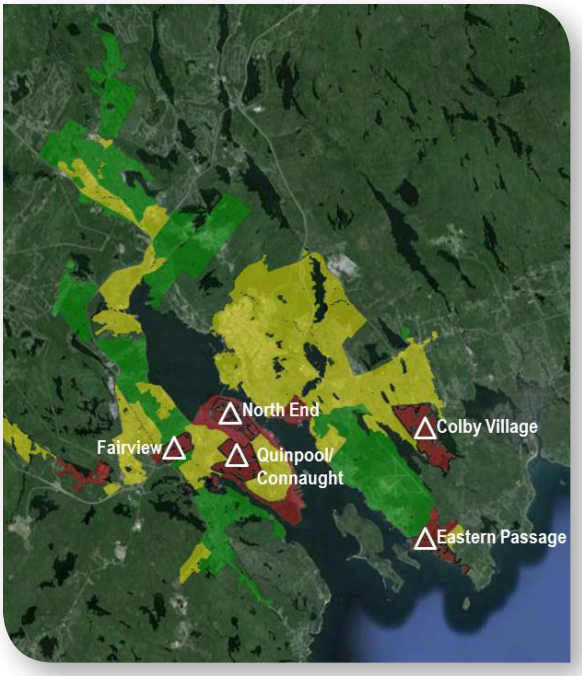


Figure 6.25 UFMP Study Area Challenges

Figure 6.26 UFMP Study Area Opportunities

Section seven

Implementation

7.1 Implementation Strategy

Implementation of the UFMP will be a strategic and ongoing adaptive management process involving continuous monitoring, research, and consistent re-evaluation. The actions required for implementation are based on a range of assessments of HRM's current urban forest challenges and opportunities, forest inventory, and urban forest policy research detailed throughout the Plan. This section outlines a clear and feasible strategy to commence the implementation of the UFMP over a five year period from 2013 to 2018. It sets out a process and identifies actions, priorities, management structure, timelines, and estimates for annual financial and staff resource allocations. Future implementation actions will be determined through subsequent five-year UFMP reviews.

7.2 Adaptive Management Process

The need for institutional flexibility over time to contend with future uncertainty around climate change, development patterns, and shifting values among the population is incorporated into the UFMP under the overarching principle of adaptive management to ensure that management reflects the ever-changing conditions of the HRM urban forest and values of its citizens. Generally, an effective adaptive management framework performs three tasks: making impact predictions in the form of testable hypotheses, measuring outcomes during and after implementation, and rigorously comparing predictions and measurements. This framework will be applied to every stage of decision-making, implementation, monitoring, and reassessment of the UFMP.

7.3 Actions

In the management of a city's urban forest, there are levels of planning that range from strategic, city-wide management planning to detailed, street-level planning. To be effective, these planning levels should be integrated to ensure a seamless continuity from regional to local-scale policies and corresponding implementation strategies. The UFMP has been developed to overcome disconnects between spatial levels of management and gaps between policy and operations. Different management units, defined on the basis of such factors as land use, history, and biophysical conditions, at different scales require individualized action sets. This has been accomplished through the neighbourhood approach to management that includes four discrete spatial levels, from broadest to finest: 1) the UFMP Study Area, which essentially includes all municipally serviced areas in HRM, 2) the communities, which follow boundaries of historical pre-amalgamation cities and towns, 3) the neighbourhoods, which exhibit distinctive environmental and settlement patterns, and 4) the neighbourhood divisions, featuring unique land-use subsets within neighbourhoods that warrant special attention in local urban forest management. The actions required for the implementation of the UFMP are outlined in Section 5.2 and detailed in Table 7.2.

7.4 Priorities

While all UMFP actions are significant, their timing has been prioritized with the assistance of HRM citizens. Four public workshops were conducted during May and June, 2012, to seek community input on how to most effectively implement the actions of the UFMP and how to prioritize these actions (see Section 3.1). At these sessions, three main themes were discussed: 1) trees in the public realm; 2) trees in the private realm; and 3) land use policies and by-laws. More than 100 citizens took part in the workshops and provided feedback through a prioritization exercise and comment sheets. The workshops were attended by local residents and HRM Councillors, as well as representatives from the development industry, institutional landowners, environmental groups, HRM advisory committees, utility companies, and government agencies. Over 490 individuals also took part in an HRM online survey designed to gain better understanding of the public's implementation priorities for the UFMP. Other supporting actions will not be omitted from the UFMP; however the public workshops and online survey provided direction from HRM citizens for establishing priorities regarding the resources and program scheduling necessary for an orderly implementation of the UFMP.

The following public priorities (shown in order of importance) have therefore been incorporated in the implementation strategy.

1. Increase funding, plant more trees on HRM land and improve urban forest maintenance.

2. Adopt new regulations and standards to conserve urban forest canopy cover.

3. Promote citizen urban forest stewardship and develop educational programs.

Actions corresponding to these priorities will be implemented within the initial 5-year timeframe of the Plan.

7.5 Priority Urban Forest Neighbourhoods

Every one of the UFMP's 111 urban forest neighbourhoods requires work, but knowing when and where to start is a key management decision that will affect the sustainability and success of the Plan. To better understand how priorities could be assigned the planning team looked at the urban forest opportunities and challenges detailed in the Urban Forest Neighbourhood Factsheets contained in Appendix A. When opportunities and challenges aligned then the work of assigning priorities became more straightforward. For example, a neighbourhood challenge could be a lack of street trees but if it was found that there were hundreds of good planting spaces available then immediate action could follow. The methodology used to determine priority neighbourhoods is detailed in Section 6.2. The decision to initially focus on priority neighbourhoods was also based on a need to adopt a "learning by doing" approach to the implementation of the Plan. The five urban forest neighbourhoods selected for the initial five-year phase of plan implementation are:

1. Colby Village

2. Connaught/Quinpool

3. Eastern Passsage

4. Fairview

5. North End

7.6 Management Structure, Timelines, and Scheduling

Responsibility for UFMP implementation will be assigned to the Transportation & Public Works Department (TPW). The Department's Superintendent of Parks, Superintendent of Sports Fields, and the HRM Forester will coordinate an interdepartmental UFMP Implementation Committee mandated to guide the integrated management of the urban forest.

The Plan addresses the time scale as follows: management actions are derived from the neighbourhood analysis and the Values, Objectives, Indicators, and Targets (VOIT) and operate annually with five-year and ten-year reviews. Management principles are set in perpetuity as part of HRM's long-term vision. Because future resource availability and future structure and organization of HRM and other stakeholder organizations are uncertain and variable, implementation planning focuses on the short term. UFMP implementation is designed according to annual, five-year, and decadal stages, as shown below.

Annual work planning and implementation. UFMP implementation requires development of an annual operating plan for city staff to include action planning for neighbourhood treatments, maintenance, citizen stewardship, research/monitoring, and standards and regulations. Emphasis will be given to the implementation of action priorities.

Year Five. The five-year mark was chosen to reflect a period long enough for significant implementation and forest development to occur, and social and economic action programs to be developed and put in place. This includes the Plan's critical public understanding and stewardship components. Five years is also an appropriate cycle for tree and canopy inventory and analysis. Within the five-year period, monitoring associated with most of the indicators will be started.

Year Ten. Consistent with forest planning in many provinces and countries, the ten-year stage was chosen to reflect the likely longest period over which the major assumptions in the Plan would remain valid (if it is clear through monitoring that the Plan assumptions become invalid sooner, then plan review will occur earlier). Thus, after ten years of Plan implementation, a major review will be undertaken. Community engagement will ensure that the UFMP is still aligned with HRM citizens'

values. By year ten into Plan implementation, all the indicators will have become part of the monitoring program. A full review will be undertaken to determine the factors behind any variances between expected and measured values for the indicators. Plan revisions will account for needed changes in targets and actions.

7.7 Preliminary Estimates of Probable Costs

As with each one of HRM's other master plans, staff will work strategically with Council through the annual budget process to identify UFMP projects for implementation. All projects will need to be considered, prioritized, and approved by Council when and if opportunities for implementation present themselves. While UFMP implementation will require Council's consideration of supplementary funding, the service levels for street tree planting, park tree planting and maintenance in communities outside the UFMP Study Area will not be affected by the implementation of this Plan.

The probable costs contained in Table 7.1 reflect the priority actions outlined in Section 7.4 to be implemented within the initial five-year timeframe of the Plan. They include Operating budget investments to: improve urban forest maintenance (removal, pruning); increase street tree plantings; increase park tree plantings; develop urban forest citizen stewardship programs; and continue research and monitoring efforts. The development of new regulations and standards to conserve urban forest canopy cover will utilize internal staff resources with no direct financial cost (NDFC); however, future costs for compliance measures are yet to be determined (TBD).

Table 7.1 Preliminary Estimate of Probable Costs

Urban Forest Cost Elements	Current Costs FY 2012/13	Implementation Estimate FY 2013/14	Total (Current +Estimate) FY 2013/14	5 Year Total FY 2013/14 – FY 2017/18
Urban forest maintenance (removal, pruning)	$960,000	$600,000	$1,560,000	$7,800,000
Tree procurement and planting	$325,000	$325,000	$650,000	$3,250,000
Major parks tree maintenance	$53,000		$53,000	$265,000
Greenbelt maintenance	$50,000		$50,000	$250,000
Parks - tree procurement and planting		$75,000	$75,000	$375,000
Citizen Urban Forest Stewardship		$50,000	$50,000	$250,000
Research and Monitoring	$30,000	$2,500	$32,500	$162,500
Research & Development -Urban Forest Canopy and Riparian Zone Conservation By-Laws	NDFC	TBD	TBD	TBD
Amendments to Land-Use Policies and Land-Use By-Laws	NDFC	TBD	TBD	TBD
Amendments to the Tree By-Law (T-300)	NDFC	TBD	TBD	TBD
Municipal Service Standards "Red Book" amendments	NDFC	TBD	TBD	TBD
Total	**$ 1,418,000**	**$ 1,052,500**	**$2,470,500**	**$12,352,500**

7.8. Priority Actions

The following UFMP projects outlined in Table 7.2 are a guide to future investment in the urban forest. The 32 actions contained in the table represent the opportunities and priorities identified through the research process underlying Plan development. The investment will be significant, and a measured and tactical approach over time will be needed.

The table provides an overview of priorities, categorizes specific and supporting actions, indicates starting dates, estimates probable costs, and identifies departments designated to be involved in supporting the actions. As noted previously, an interdepartmental committee to be coordinated by Municipal Operations will work cooperatively to implement the UFMP.

The following action categories summarize implementation priority actions and new costs to be undertaken within the initial five-year timeframe of the Plan.

1. **Neighbourhood Treatment (NT) – Priority 1**
   - Neighbourhood treatments are based on local tree canopy improvement targets identified in the Plan that focus on tree planting in parks and on streets as well as enhanced maintenance of the HRM-owned urban forest.
   - Action A1 refers to canopy cover targets for HRM parks, to be achieved through tree planting and natural regeneration.
   - Actions A3, A4, A5, A6, A7, A9, and A11 are supplementary, and are included in the cost of Action A1.
   - The total area of HRM parks scheduled to be planted and naturalized annually is 33 ha, at an estimated cost of $ 75,000 starting in FY 2013/14.
   - Action A2 refers to urban forest planting targets starting in FY 2013/14 that will require the planting of an additional 1,500 street trees annually at an estimated cost of $325,000.
   - Actions A3, A4, A5, A6, A7, A12, A19, and A23 are supplementary, and are included in the cost of Action A2.

2. **Maintenance (M) – Priority 1**
   - Estimated maintenance costs of $600,000 starting in FY 2013/14 include Action A8 only.
   - Employing a seven-year pruning cycle will initially be experimental. Costing this action is difficult, since future industry prices are variable and hard to predict, and there will undoubtedly be a transitional cost associated with implementing this action. Tree maintenance is currently reactionary, whereby HRM urban foresters respond to public requests in sequence. While the pruning cycle is implemented, it will be necessary to continue the reactionary maintenance for the first several years for safety reasons. Otherwise, potentially hazardous trees would remain unattended for too long. Costs could also be affected if cooperative pruning schedules and practices are adopted by HRM and Nova Scotia Power Incorporated (NSPI).

3. **Citizen Stewardship (CS) – Priority 3**
   - Action A16 is the principal public education action.
   - Actions A10, A13, A15, A20, A27, and A28 are supplementary, and are included in the cost of Action A16.
   - The estimated cost of urban forest education starting in FY 2013/14 is $50,000.

4. **Research and Monitoring (RM) – Required**
   - Action A18 refers to urban forest research and project monitoring required to ensure the effectiveness of UFMP adaptive management processes.
   - Actions A14, A25, and A26 are supplementary, and included in the cost of Action A18.
   - Research and monitoring will be ongoing tasks conducted by Dalhousie University's School for Resource and Environmental Studies (SRES).
   - The cost for monitoring and research starting in FY 2013/14 is estimated at $32,500.

5. Regulation and Standards (RS) – Priority 2

- Actions A29, A31, and A32 refer to land use planning projects regarding amendments to municipal design standards, Municipal Planning Strategy/Land Use By-law amendments, and by-law amendments respecting trees on public property.
- There are no direct financial costs (NDFC) for actions A29, A31, and A32 to be undertaken by HRM staff starting in FY 2013/14. Future compliance costs are shown as to be determined (TBD).
- Action 30 refers to riparian zone and canopy conservation by-law development and amendments to the HRM Tree By-Law (T-300) to be undertaken by HRM staff starting and shown as NDFC in FY 2013/14. Future compliance costs are shown as to be determined (TBD).

Table 7.2 Priority Actions

Priority	Action Category*	Action Number	Action	Priority Supporting Actions	Start	Financial*	Dept.*
1	NT	A1	Establish an average of 40% canopy cover in HRM parks in the UFMP Study Area.		FY 2013/14	$75,000	TPW-MO PI-FD
1	NT	A2	Apply neighbourhood planting treatments for street trees.		FY 2013/14	$325,000	TPW-MO
	NT	A3	Employ neighbourhood native species treatments.	Supports A1 and A2		Included in A1 and A2	TPW-MO
	NT	A4	Utilize neighbourhood species control treatments.	Supports A1 and A2		Included in A1 and A2	TPW-MO
	NT	A5	Deploy neighbourhood Acadian old-growth species treatments.	Supports A1 and A2		Included in A1 and A2	TPW-MO
	NT	A6	Diversify cultivars of tree species.	Supports A1 and A2		Included in A1 and A2	TPW-MO
	NT	A7	Apply neighbourhood treatments to meet canopy targets for neighbourhoods, communities, and the UFMP Study Area.	Supports A1, A2, A8, and A17		Included in A1, A2, A8, and A17.	TPW-MO
1	M	A8	Employ seven-year pruning cycles for all street trees and establish cooperative pruning programs with utility companies.		FY 2013/14	$600,000	TPW-MO
	NT	A9	Establish an average of 80% canopy cover in HRM–owned riparian buffers.	Supports A1		Included in A1	TPW-MO
	CS	A10	Educate landowners on the benefits of trees in riparian zones.	Supports A16		Included in A16	TPW-MO PI-EE

Priority	Action Category*	Action Number	Action	Priority Supporting Actions	Start	Financial*	Dept.*
	NT	A11	Give priority to neighbourhood tree planting treatments in HRM parks and on school grounds without shade trees.	Supports A1 and A2		Included in A1 and A2	TPW-MO PI-FD
	NT	A12	Give priority to street tree plantings in neighbourhoods lacking privately-owned trees.	Supports A2		Included in A2	TPW-MO
	CS	A13	Educate landowners, realtors, and developers on the benefits of trees.	Supports A16		Included in A16	TPW-MO PI-EE
	RM	A14	Conduct regular public surveys.	Supports A18		Included in A18	TPW-MO DAL-SRES
	CS	A15	Establish innovative interpretive programs for the public.	Supports A16		Included in A16	TPW-MO CRS-CRC PI-EE
3	CS	A16	Support citizen-led urban forest stewardship initiatives.		FY 2013-14	$50,000	TPW-MO PI-EE
	CS	A17	Promote benefits of the urban forest.	Supports A16		Included in A16	TPW-MO PI-EE
Required	RM	A18	Conduct urban forest research and project monitoring required to ensure the effectiveness of UFMP adaptive management processes.		FY 2013/14	$32,500	TPW-MO DAL-SRES
	NT	A19	Characterize and prioritize target areas for traffic calming for strategic planting in HRM rights of way.	Supports A2		Included in A2	TPW-MO TPW-TRS
	CS	A20	Establish fundraising partnerships with private sector, institutional and non-governmental sector organizations to support urban forest stewardship projects.	Supports A16		Included in A16	TPW-MO PI-EE DAL-SRES
	M	A21	Invest in human capital with urban forest staff training and development.	Supports A1 and A2		NDFC	TPW-MO
	CS	A22	Provide incentives to homeowners to plant trees on their properties.	Supports A16		Included in A16	TPW-MO PI-EE

Priority	Action Category*	Action Number	Action	Priority Supporting Actions	Start	Financial*	Dept.*
	NT	A23	Use trees to decrease stormwater in highly impervious areas, with priority given to conifers where conditions permit.	Supports A2		Included in A2	TPW-MO
	M	A24	Where possible, retain special habitat elements, such as snags, coarse woody debris, and understory vegetation in parks.	Supports A1		NDFC	TPW-MO
	RM	A25	Identify and protect urban forest areas that support species at risk.	Supports A18		Included in A18	TPW-MO DAL-SRES
	RM	A26	Research the sale value of urban forest carbon credits.	Supports A18		Included in A18	TPW-MO PI-EE DAL-SRES
	CS	A27	Encourage citizens to plant food-producing trees on their properties.	Supports A16		Included in A16	TPW-MO PI-EE
	CS	A28	Improve urban forest conditions around active transportation networks and use the urban forest to increase active transportation opportunities.	Supports A16		Included in A16	TPW-MO PI-P
2	SR	A29	Research best practices and develop amendments to Municipal Planning Strategies and Land Use By-Laws within the UFMP Study Area to improve urban forest canopy retention and replacement provisions.		FY 2013-14	NDFC/ TBD	TPW-MO PI-P PI-RE CRS-DA CRS-MC CAO-LSRM
2	SR	A30	Research best practices and develop draft Urban Forest Canopy and Riparian Zone Conservation By-Laws for public review. Update the Tree By-Law (Respecting Trees on Public Lands: By-Law Number T-600).		FY 2013/14	NDFC/ TBD	TPW-MO CRS-DA CRS-MC PI-P PI-RE CAO-LSRM

Priority	Action Category*	Action Number	Action	Priority Supporting Actions	Start	Financial*	Dept.*
2	SR	A31	Integrate UFMP policies with current and upcoming HRM functional plans and land use plans. (e.g., HRM By Design-Centre Plan, Open Space Functional Plan, Stormwater Management Functional Plan, Transportation Functional Plan).		FY 2013/14	NDFC	TPW-MO PI-P PI-RE CRS-DA CRS-MC CAO-LSRM
2	SR	A32	Identify urban trees as "green infrastructure" in the HRM Municipal Service Standards "Red Book". Adopt guidelines to maximize the environmental benefits of trees on HRM property.		FY 2013-14	NDFC/TBD	TPW-MO TPW-DC CRS-DA CRS-MC PI-I PI-PD PI-RE

*Action Category Abbreviations	
CS	Citizen stewardship
M	Maintenance
NT	Neighbourhood treatments
RM	Research and monitoring
SR	Standards and regulations

*Financial Abbreviations	
NDFC	No direct financial cost
TBD	To be determined

*Department Abbreviations	
CAO-LSRM	Chief Administrative Office - Legal Services and Risk Management
CRS-CRC	Community & Recreation Services - Community Recreation & Culture
CRS-DA	Community & Recreation Services - Development Approvals
CRS-MC	Community & Recreation Services - Municipal Compliance
PI-EE	Planning & Infrastructure - Energy & Environment
PI-FD	Planning & Infrastructure - Facility Development
PI-I	Planning & Infrastructure - Infrastructure
PI-P	Planning & Infrastructure - Planning
PI-RE	Planning & Infrastructure - Real Estate
TPW-MO	Transportation & Public Works - Municipal Operations
TPW-TRS	Transportation & Public Works - Traffic & Right of Way Services
TPW-DC	Transportation & Public Works - Design & Construction
DAL-SRES (external)	Dalhousie University - School for Resource and Environmental Studies

Section eight

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Section nine

Appendices

Appendix A. UFMP Neighbourhood Factsheets

The Urban Forest Neighbourhoods: A Reader's Guide

In this Appendix you will find maps of the10 communities in the UFMP and the 111 neighbourhoods. This Reader's Guide will explain how these communities and neighbourhoods were classified and how the boundaries were delineated. You will also see two graphs for each neighbourhood: one titled Species Mix and the other Tree Size (Indicating Approx. Age). The Species Mix graph shows the species that currently exist in the neighbourhood and what percent each species is of the total number of trees in the neighbourhood. The Tree Size (Indicating Approx. Age) graph shows how large the trees are in the neighbourhood. The size is measured in centimeters as the diameter at breast height (1.3 m above ground level). Several size classes were created and the percent of trees that fit into each class size are shown in the bar graph. The graph shows the distribution of trees by size but in this case tree size is being used as an indicator of tree age.

For each neighbourhood you will also find an introductory paragraph describing the neighbourhood and outlining some of the important biophysical, historical, and land use aspects specific to the area which contributed to the delineation of the neighbourhood boundaries. This is followed by a section describing the challenges and opportunities for the neighbourhood. Each neighbourhood section ends with a table showing the Neighbourhood Indicators, Biophysical Conditions, Socioeconomic Condition, and Neighbourhood Treatments.

The HRM UFMP uses a number of management units defined on the basis of such factors as land use, history, and biophysical conditions. Management actions at different scales require individualized action sets. This has been accomplished through the neighbourhood approach to management that includes four discrete spatial scales, from broadest to finest: 1) the UFMP Study Area, which essentially includes all municipally serviced areas in HRM, 2) the communities, which follow boundaries of historical pre-amalgamation cities and towns, 3) the neighbourhoods, which exhibit distinctive environmental and settlement patterns, and 4) the neighbourhood divisions, featuring unique land-use subsets within neighbourhoods that warrant special attention in local urban forest management. The neighbourhoods will be described here in the Urban Forest Neighbourhoods Factsheets (Appendix A). These factsheets detail individual urban forest conditions, management actions, and targets required to achieve SUFM at a local scale for each of the 111 neighbourhoods contained in the UFMP. The classification and boundary delineation of the neighbourhoods was driven by four key criteria:

1. **Biophysical conditions.** The classification process incorporated important biophysical properties of the landscape, as these are major drivers of urban forest condition and potential, especially in the extensive areas of undeveloped, peri-urban forest that typifies HRM. Conditions addressed include soils, hydrology, topography, surficial and bedrock geology, and the Provincial Ecological Land Classification. Importantly, the natural history of forest ecosystems in a neighbourhood helped to shape its classification. One example is the iconic white pines of the Armdale area, which were once part of a continuous stand of old-growth white pine prior to development.

2. **Community uptake.** A driving goal behind formation of the neighbourhood approach was to foster the highest possible community engagement and stewardship. HRM residents relate very strongly to the neighbourhood scale and are keenly aware of the environment around their homes and places of work, where they can see the impact of their actions. The neighbourhoods, and subsequently the communities, are often centered around and named after historical HRM neighbourhoods. It is important to note that neighbourhoods were primarily identified and delineated according to biophysical conditions, and will often diverge from the traditionally held boundaries of their namesakes.

3. **History.** Halifax and the communities of HRM are steeped in history, ranging from traditional pre-settlement Mi'kmaq heritage to European colonization and the city's military importance in several wars. The neighbourhood classification was also informed by significant historical events whose legacies can be seen in the urban forest today. A prime example of this is the Halifax Explosion, and subsequent redevelopment of the North End under the "garden city" influence of Thomas Adams. History also includes recent history, which in the case of the neighbourhood classification is the date of development. The date that a neighbourhood was developed—especially newer residential, suburban neighbourhoods—strongly influences the age structure of the urban forest. A subset of this is the pattern of development, which ranges from "grid-iron" development patterns in the Fairview area, with its tree-lined streets, to low-density "ribbon" development in suburban HRM, where often the only trees are found in residual forest patches retained during development.

4. **Land use.** Land use is of course a major driver of urban forest conditions, and is largely responsible for specific threats to the urban forest and unique challenges in its management. Consequently, land use was a valuable tool in delineating HRM neighbourhoods. To see the extent of the influence of land use on the urban forest, one need only explore the mature tree-lined streets in the South End of Halifax and compare them with the barren streets of the Burnside Industrial Park. A component of land use is ownership, which dictates management control over urban trees. For example, in the Shearwater area nearly all trees are on institutional and industrial lands that are owned privately or by the federal Department of Defence. Consequently, most of the urban forest is outside HRM's jurisdiction.

Neighbourhood classification was a two-stage process. First, hard-copy maps were distributed to city planners and other stakeholders with intimate knowledge of particular communities and their development histories and patterns. Participants were encouraged to sketch their knowledge onto the maps in a collaborative and open approach

so that their extensive knowledge of history, development, and neighbourhood profiles could be incorporated into the classification process. The second stage was a complex spatial analysis done by the Dalhousie research team. The maps from the first stage were digitized into a GIS database. The database includes the biophysical datasets, the HRM municipal database, and the urban canopy dataset, so that the neighbourhoods could be further refined by the above criteria. The neighbourhoods are the functional unit of the UFMP, and will be pivotal in plan implementation and future monitoring and analysis.

A final component of the neighbourhood classification was identification of finer-scale neighbourhood divisions. A division in a neighbourhood was delineated when there was a major anomaly in canopy cover within a neighbourhood that was both too small to be classified as a separate neighbourhood and was part of the character of the neighbourhood that surrounded it. The most frequent prerequisite for a neighbourhood division was a commercial, institutional, or industrial area with low canopy cover, such as Mic Mac Mall in Crichton Park or CFB Stadacona in Halifax's North End. However, there were occasions when a division was a residential area within a largely industrial neighbourhood, such as Lewis Drive in the Atlantic Acres Industrial Park. In the map presented for each neighbourhood, these divisions are coloured in blue, while parks are shown in light green and the remaining neighbourhood is shown in red. Each of the coloured delineations within a neighbourhood contains a GIS-based estimation of its percentage of canopy cover. Further Dalhousie University research concerning the neighbourhood approach for urban forest management developed for the UFMP was published in the Landscape and Urban Planning journal in 2013 (Steenberg, Duinker, & Charles, 2013).

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A-1 ASHBURN/ARMDALE

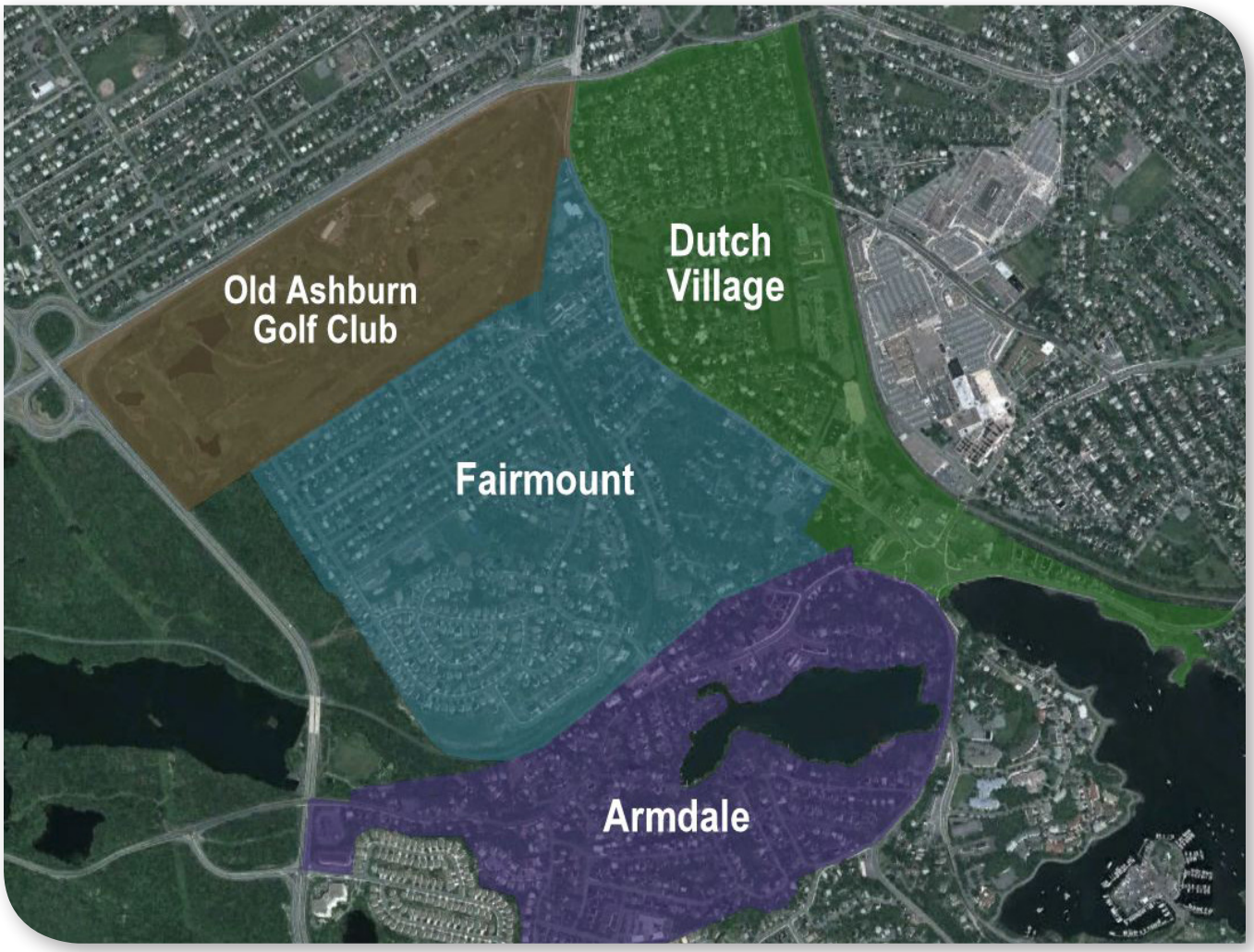
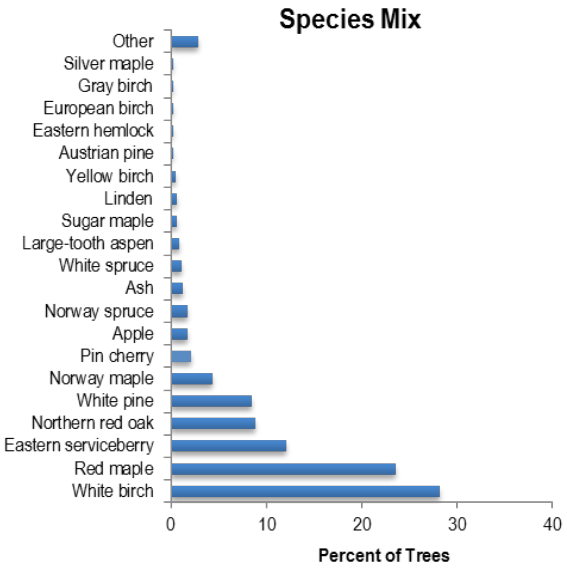


Figure 1

Armdale

The urban forest neighbourhood of Armdale is bisected by St. Margarets Bay Road, while its northern boundary generally follows Crown Drive east from Northwest Arm Drive to the Armdale Roundabout. Herring Cove Road generally forms Armdale's eastern boundary, while a line extending from Fernwood Road to Herbert Road forms it southern boundary. To the west, Armdale's boundary flows around the Stonemount Subdivision and then extends along Northwest Arm Drive. Chocolate Lake is located in the northeast portion of the neighbourhood with a public beach located on its southeastern shore. The neighbourhood contains mostly single-family detached homes with some single family semi-detached homes, as well as apartment and commercial development dispersed throughout the area. Armdale has a canopy cover of 33%, and a relatively healthy urban forest. The White Pine is an iconic feature of the Armdale neighbourhood. The urban forest neighbourhood is dotted with a significant number of stately pine groves on properties along St. Margarets Bay Road and throughout the neighbourhood. Although still in good health, many of these pines are classified as over mature. In some areas there are insufficient younger cohorts to replace them in the years to come. SUFM efforts in this neighbourhood will maintain this iconic natural feature. Additional SUFM focus areas will be to improve Chocolate Lake's riparian buffers and the urban forest ribbon pattern along the Chain of Lakes Trail.



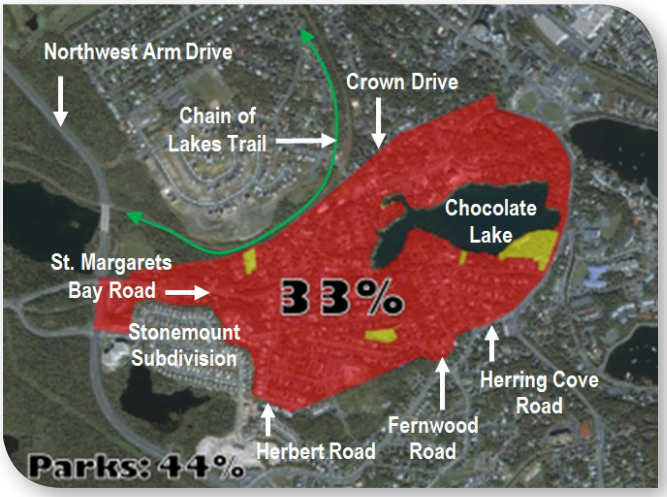
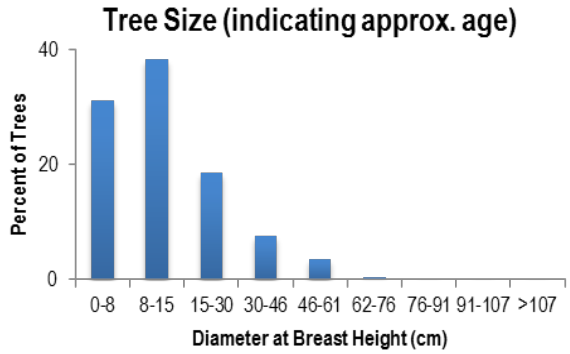


Figure 2



Challenges

- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges. The spruce forest that covers most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- Many of the iconic white pines in Armdale are nearing the end of their lifespan. Planting new pines here will help to ensure the future neighbourhood urban forest character.
- Several riparian areas along Chocolate Lake, particularly where there are lakefront lots, have low canopy cover. Increasing cover here will help to buffer the lake from run-off and pollutants, which is important as it is a popular lake for community recreation.
- There are few trees planted along the streets in the HRM rights of way. This will be an easily attainable opportunity to improve the urban forest of Armdale.

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 33% to 70%.
- There are 358 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential stakeholders will be organized to work with HRM to achieve urban forest targets for their neighbourhoods.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Armdale percent canopy cover	33	≥ 70
Parks percent canopy cover	44	≥ 40
Percent of neighbourhood in forest stands	0	0
Percent of trees within the smallest size class	52	≥ 10
Percent of street trees that are native	78	50
Number of species that comprise more than 5% of all street trees	5 (red/black spruce, black locust, white birch, trembling aspen)	0
Number of genera that comprise more than 10% of all street trees	2 (spruce, maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	358	0
Percent canopy cover of riparian and recharge zones	46	100
Percent of public play areas that are adequately shaded (40% canopy cover)	40	100
Percent of residential properties with at least one value tree	69	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Armdale	62		Bedrock
Park	2		Bedrock

Socioeconomic Conditions

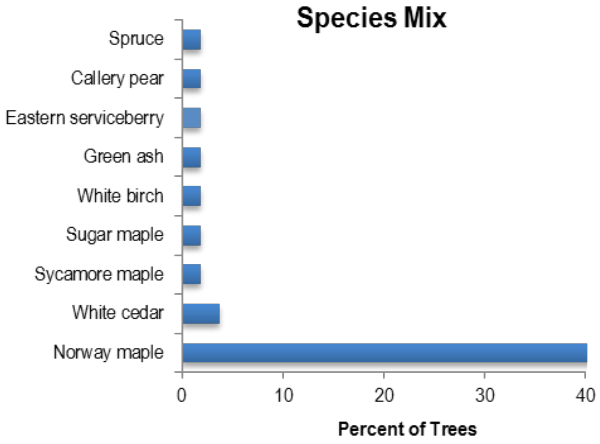
	Land Use	Zoning	Decade of Development
Armdale	Residential	R-1, R-2, R-2P	1930s/1940s
Park	Residential	R-1	1940s/1950s

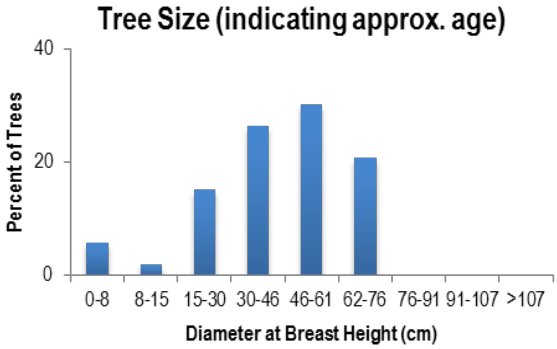
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	145
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	0 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	10 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Birch, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Favour characteristic white pine in the Armdale neighbourhood	

Dutch Village

The urban forest neighbourhood of Dutch Village generally lies between the CN Railway line in the east and Joseph Howe Drive in the west. It extends from Bicentennial Drive in the north to Horseshoe Island Park in the southeast. The area features land uses ranging from commercial and residential to parks and institutional. The area shown in red includes detached single-family homes as well as Mount Olivet Cemetery near its centre. The neighbourhood division shown in blue contains commercial, institutional, multi-family residential, single family residential, and park land uses. It also features the Armdale Roundabout, an important transportation gateway to the Halifax Peninsula. Dutch Village has a canopy cover of 24%. The urban forest here is dominated by the introduced Norway maple, which comprises 40% of the street tree population, while the once prevalent White Pine has declined dramatically. Trees in the neighbourhood are also aging and reaching the end of their life span. This is a threat to the urban forest, as there are currently insufficient numbers of younger trees to replace them in years to come. The neighbourhood division surrounding the Armdale Roundabout has a low canopy cover of 13% that will be improved. The area serves as a major gateway to the city, and provides exceptional views of the Northwest Arm. In order to beautify this area transportation routes entering and leaving the Roundabout will require extensive plantings of street trees to form a continuous urban forest ribbon pattern extending to the urban core.





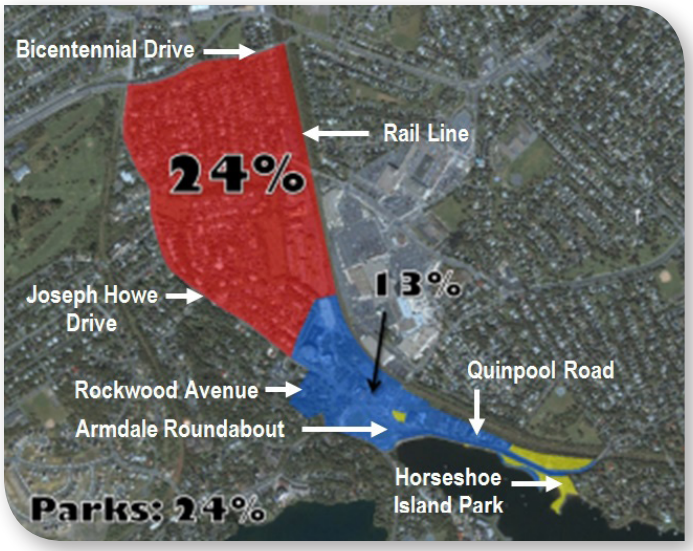


Figure 3

Challenges

- Species diversity in Dutch Village is low, with a substantial overrepresentation of Norway maple in the street tree population.
- The urban forest in Dutch Village is aging, with an uneven distribution of tree sizes. There is disproportionate amount of older, larger trees and not enough young trees to replace old ones in years to come.
- The area's iconic white pines are reaching maturity with few seedlings being planted to replace them.
- The Brentwood Park apartment properties adjacent to the rail line have extensive paved surfaces and limited canopy cover.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 24% to 70%.
- A planned planting program in the neighbourhood division will produce a sustainable age and species distribution of trees and increase overall canopy from 13% to 20%.
- There are 397 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local residents' and commercial landowner groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Dutch Village percent canopy cover	24	≥ 70
Armdale Roundabout percent canopy cover	13	≥ 20
Parks percent canopy cover	12	≥ 40
Percent of neighbourhood in forest stands	5	5
Percent of trees within the smallest size class	52	≥ 10
Percent of street trees that are native	78	50
Number of species that comprise more than 5% of all street trees	5 (red/black spruce, black locust, white birch, trembling aspen)	0
Number of genera that comprise more than 10% of all street trees	2 (spruce, maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	397	0
Percent canopy cover of riparian and recharge zones	0	100
Percent of public play areas that are adequately shaded (40% canopy cover)	33	100
Percent of residential properties with at least one value tree	73	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Dutch Village	59		Bedrock
Armdale Roundabout	14		Bedrock
Park	2		Bedrock

Socioeconomic Conditions

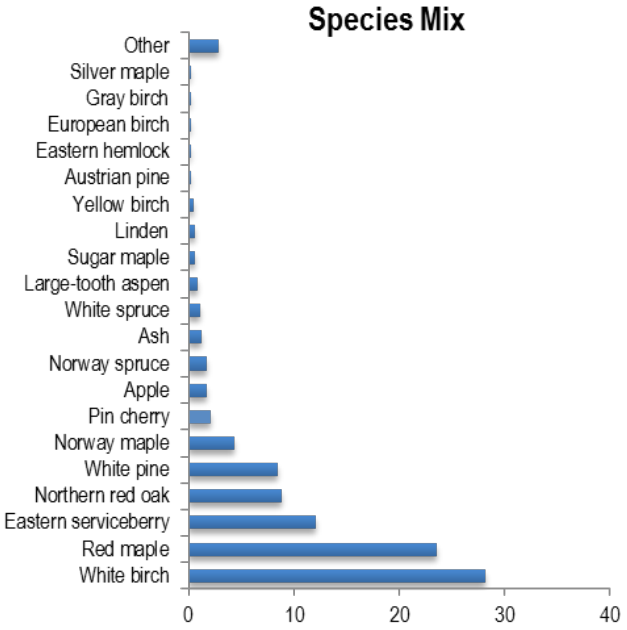
	Land Use	Zoning	Decade of Development
Dutch Village	Residential, cemetery	R-1, R-3, P	1950s
Armdale Roundabout	Commercial, residential	C-2, R-1, R-3	1930s
Park	Park	P	1950s

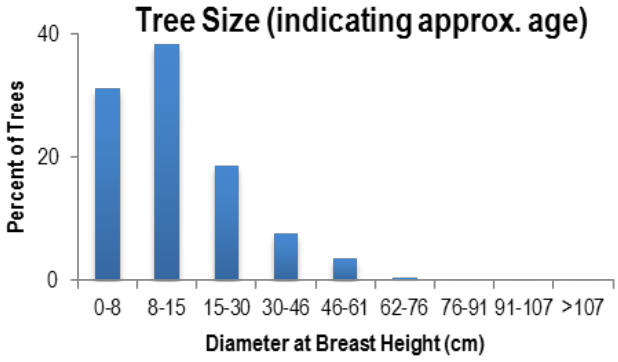
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	160
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	0 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	18
Additional Neighbourhood Treatments	
Maintain and enhance an urban forest ribbon pattern along major transportation routes.	
Encourage residents and commercial landowners to protect mature white pines and plant white pine seedlings.	

Fairmount

Lying south of the Old Ashburn Golf Club, the Fairmont urban forest neighbourhood is bounded by Joseph Howe Drive in the east, Crown Drive in the South and Northwest Arm Drive in the west (Figure 4). The majority of the neighbourhood consists of single-family detached homes with a limited number of institutional and commercial land uses along the west side of Joseph Howe Drive. Fairmount's hilltop location has a canopy cover of 28%, dominated by older, broadleaved species on residential properties; however, the landscape is also dotted with a remnant forest of majestic white pine trees, an iconic feature of this urban forest neighbourhood. The age distribution of trees shows a predominance of young trees; however, very few are white pine. Fairmount Ridge (shown in blue) is a newly developed subdivision in the southern portion of the neighbourhood that has a very low canopy cover at 7%, requiring management attention through neighbourhood outreach and street tree planting. Urban forest renewal here is made additionally challenging with shallow and coarse soils over artificial substrate and bedrock. The Chain of Lakes trail meanders through Fairmont forming a beautiful treed ribbon pattern through the neighbourhood while a wedge pattern containing the expansion of further development, dominates the forested HRM and Halifax Regional Water Commission lands to the west of Fairmount.





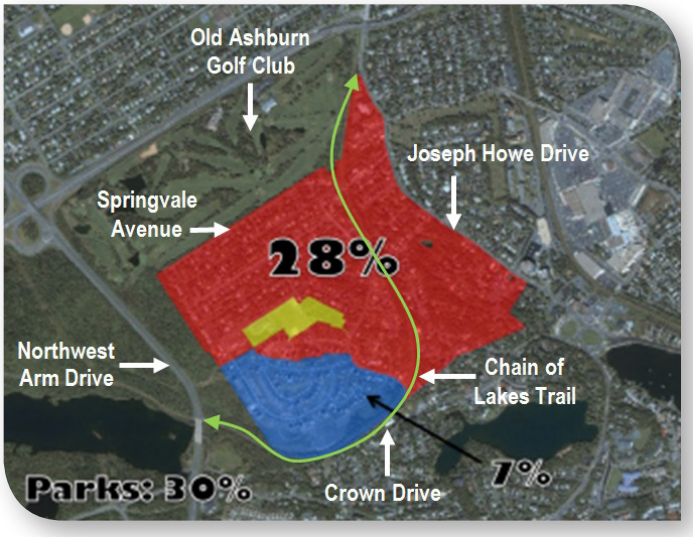


Figure 4

Challenges

- The area's iconic white pines are reaching maturity with few seedlings being planted to replace them.
- There is poor canopy cover and little to no shade in the Fairmount Ridge subdivision.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy to 70%.
- There are 405 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local residents' groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Fairmount percent canopy cover	28	≥ 70
Fairmount Ridge percent canopy cover	7	≥ 70
Parks percent canopy cover	30	≥ 40
Percent of neighbourhood in forest stands	4	4
Percent of trees within the smallest size class	52	≥ 10
Percent of street trees that are native	78	50
Number of species that comprise more than 5% of all street trees	5 (red/black spruce, black locust, white birch, trembling aspen)	0
Number of genera that comprise more than 10% of all street trees	2 (spruce, maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	405	0
Percent canopy cover of riparian and recharge zones	30	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	68	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Fairmount	85		Bedrock
Fairmount Ridge	17		Bedrock
Park	3		Bedrock

Socioeconomic Conditions

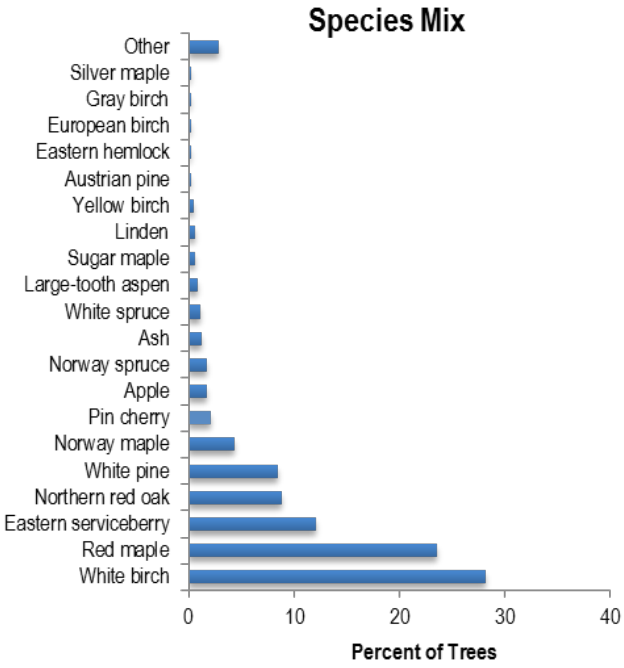
	Land Use	Zoning	Decade of Development
Fairmount	Residential	R-1	1960s
Fairmount Ridge	Residential	RDD	2000s
Park	Residential	R-1	1960s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	160
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	3 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	12 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Birch, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Target Fairmount Ridge rights of way for tree planting and begin outreach to local residents for urban forest improvement	
Maintain and enhance the ribbon pattern along the Chain of Lakes Trail	
Encourage residents to protect mature white pines and plant white pine seedlings	

Old Ashburn Golf Club

The Old Ashburn Golf Club is located southeast of the Bicentennial Drive and Northwest Arm Drive interchange. It is bounded in the east by Joseph Howe Drive and in the south by Springvale Avenue. This 48 hectare private golf course dating from 1922, is a unique urban forest neighbourhood in that it is devoted solely to a recreational land use. The 18 hole course contains tree lined fairways and is bordered on all sides by native forest. The long term stewardship of the club's greenskeepers has produced a healthy urban forest featuring good species diversity and age class distribution with an overall canopy cover of 28%. Surrounding residents benefit from the pastoral viewscape of the open space and urban forest provided by the golf course. Urban forest ribbon patterns are also key elements of this urban forest neighbourhood. The western portion of the golf course forms part of an urban forest ribbon pattern that extends along Northwest Arm Drive to Spryfield. Likewise to the east, the Chain of Lake Trail forms a ribbon pattern that extends throughout Armdale. The canopy cover of Old Ashburn can be increased over time to 40% through additional plantings of native species in forested buffer zones bordering the golf course.



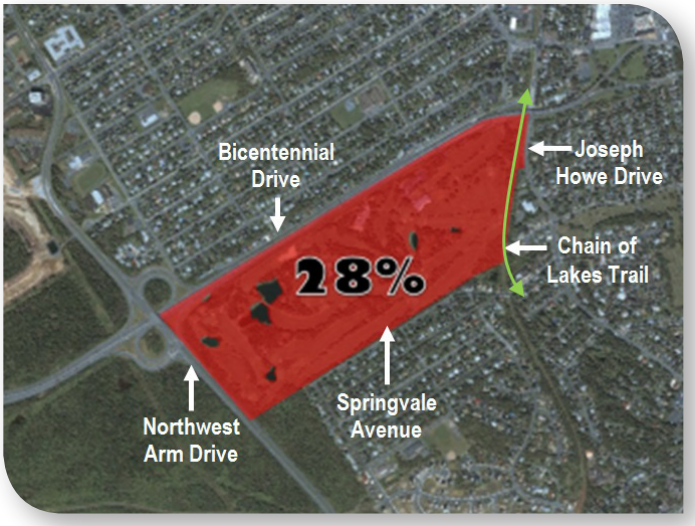
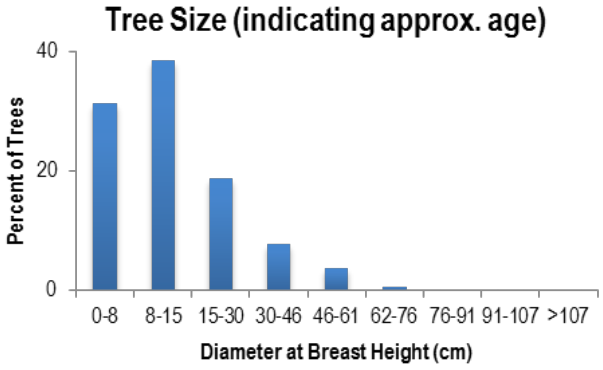


Figure 5



Challenges

- Subdivision development pressures for this prime location are likely to increase in the future.

Opportunities

- There are opportunities for greenskeepers to increase the urban forest canopy from 28% to 40%.
- There are 71 plantable sites for new trees (Joseph Howe Drive, Chain of Lakes Trail) in this neighbourhood.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Old Ashburn Golf Club percent canopy cover	28	≥ 40
Percent of neighbourhood in forest stands	27	27
Percent of trees within the smallest size class	31	≥ 10
Percent of street trees that are native	87	50
Number of species that comprise more than 5% of all street trees	3 (white birch, red maple, eastern serviceberry)	0
Number of genera that comprise more than 10% of all street trees	3 (birch, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	71	0
Percent canopy cover of riparian and recharge zones	33	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	N/A	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Old Ashburn Golf Club	48		Anthropogenic, bedrock

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Old Ashburn Golf Club	Golf course	K	1920s

Neighbourhood Treatments

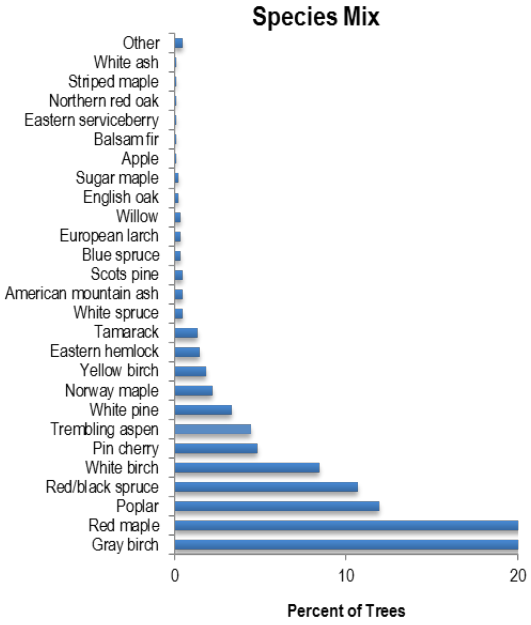
Treatment	Prescription
Average number of trees to plant on HRM lands per decade	30
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	13 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Birch, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0

A-2 BEDFORD

Figure 6

Admiral's Cove

Admiral's Cove is a prominent, low-density residential enclave located on the eastern side of the Bedford community (Figure 7). It is bound in the east by the Bedford Bypass, in the north by the rail line, and in the west by the Bedford Basin. Admiral's Cove Park, a major recreational feature of the neighbourhood's southern tip, is located on the shores of Admirals Cove, which gives the neighbourhood its name. This urban forest neighbourhood contains mostly single-family homes with larger lots, which have more room for trees. There are also some apartment complexes and multi-family dwellings located near the neighbourhood's periphery. Admiral's Cove features an impressive canopy cover of 55% (shown in red). It is blessed not only with a more intact urban forest, but also with much more favourable growing conditions than the rest of Bedford, with areas of well-drained drumlin hills and fine soils. Admiral's Cove Park, a forested park overlooking the Basin, has stands of white pine, red spruce, and red oak. The area's parks have a remarkable overall canopy cover of 92% (shown in light green). Admirals Cove Park forms an urban forest belt pattern at the southern end of the neighbourhood, marking the edge of Bedford and its boundary with the Department of National Defence (DND) Bedford Ammunition Depot and Magazine Hill to the south.



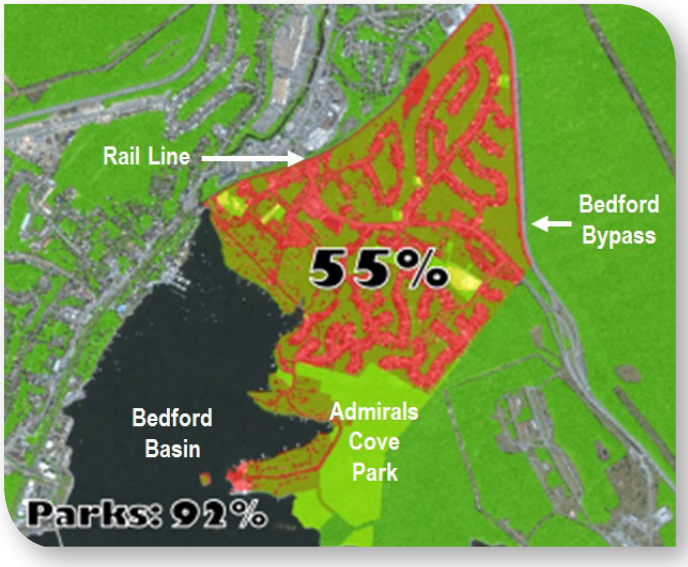
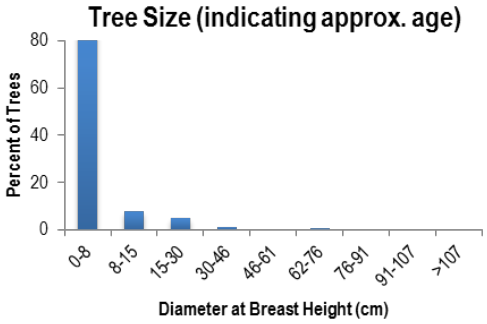


Figure 7



Challenges

- Some areas have few front-yard trees on single- and multi-family residential lots.
- There are relatively few street trees in this neighbourhood.

Opportunities

- Given Admirals Cove's favourable urban forest conditions, future efforts should be targeted towards maintaining and enhancing the neighbourhood's landscape patterns, including the belt created by Admiral's Cove Park.
- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 55% to 70%.
- There are 378 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets for their neighbourhoods.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Admiral's Cove percent canopy cover	55	≥ 70
Parks percent canopy cover	92	≥ 90
Percent of neighbourhood in forest stands	59	59
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	96	50
Number of species that comprise more than 5% of all street trees	6 (gray birch, red maple, poplars, red/black spruce, pin cherry)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, maple, poplar, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, eastern hemlock)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	378	0
Percent canopy cover of riparian and recharge zones	76	100
Percent of public play areas that are adequately shaded (40% canopy cover)	90	100
Percent of residential properties with at least one value tree	88	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Admiral's Cove	208		Till veneer, drumlins, bedrock
Parks	36		Till veneer, drumlins, bedrock

Socioeconomic Conditions

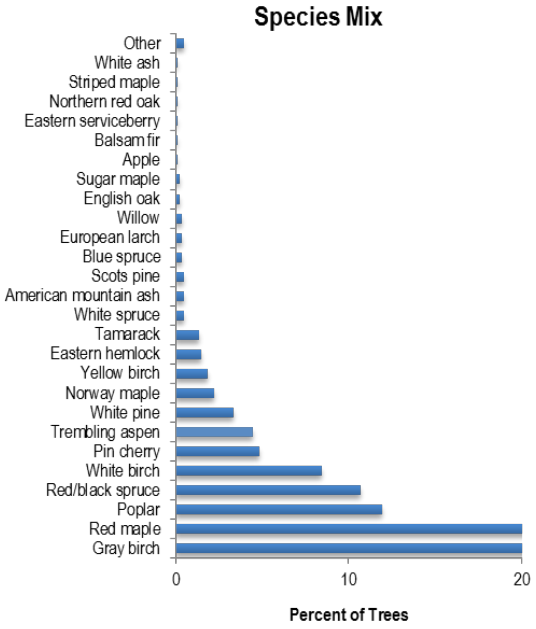
	Land Use	Zoning	Decade of Development
Admiral's Cove	Residential	RSU	1880s/1970s
Parks	Park	RPK, P	1970s

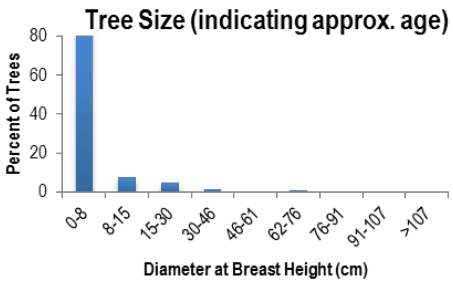
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	150
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	16 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	8 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, poplar, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	15

Atlantic Acres Industrial Park

Atlantic Acres Industrial Park is an industrial/commercial urban forest neighbourhood located in the western portion of the Bedford community, and consists primarily of the Atlantic Acres Industrial Park (Figure 8). Most development is centered around Bluewater Road, although it also extends further north past Hammonds Plains Road on the western shore of Sandy Lake. Since the neighbourhood is primarily industrial, most of the original forest has been cleared, resulting in the lowest canopy cover (shown in red) of all Bedford neighbourhoods. However, while the main urban forest neighbourhood is an industrial park with higher-than-average impervious surfaces on rooftops and parking lots, it is not nearly as impervious as other industrial parks, such as Burnside or Bayers Lake. The relatively greater availability of plantable sites provides major opportunities to improve the urban forest. Key threats include the condition of the forest in riparian areas. Riparian canopy cover in the Industrial Park is low, and the wetland at the river mouth at the southwest corner of Sandy Lake and the larger wetland near the intersection of Hammonds Plains Road and Farmer's Dairy Lane have been partly developed and would benefit from increased canopy cover. The Lewis Drive division (shown in blue) is a 16-ha residential area with a significantly higher canopy cover of 64%. This neighbourhood is far closer than most to the residential canopy target of 70%, due in part to its remoteness. The parks in the neighbourhood are above their canopy target.





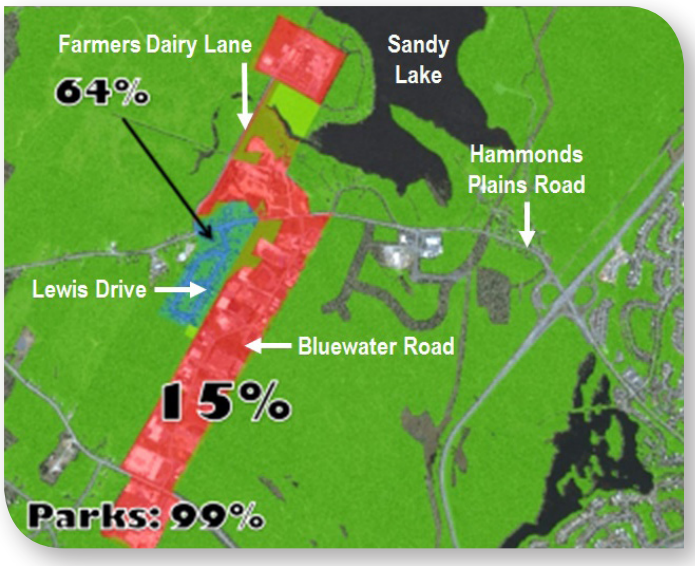


Figure 8

Challenges

- The Atlantic Acres Industrial Park has the lowest canopy cover of all the urban forest neighbourhoods in Bedford.
- There are threats associated with the suburban/forest fringe, such as wildfire, storm blowdowns, and wildlife conflicts.
- Development has affected riparian areas and wetlands in the industrial park.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 15% to 20%.
- There are 117 plantable sites for new street trees in this neighbourhood.
- Riparian zones can be improved to intercept more stormwater.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing commercial and residential stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Atlantic Acres Industrial Park percent canopy cover	15	≥ 20
Lewis Drive percent canopy cover	64	≥ 70
Parks percent canopy cover	99	≥ 90
Percent of neighbourhood in forest stands	24	24
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	96	50
Number of species that comprise more than 5% of all street trees	6 (gray birch, red maple, poplars, red/black spruce, pin cherry)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, maple, poplar, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, eastern hemlock)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	117	0
Percent canopy cover of riparian and recharge zones	43	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	85	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Atlantic Acres Industrial Park	114		Till veneer, drumlin, anthropogenic
Lewis Drive	16		Till veneer
Parks	4		Till veneer, drumlin

Socioeconomic Conditions

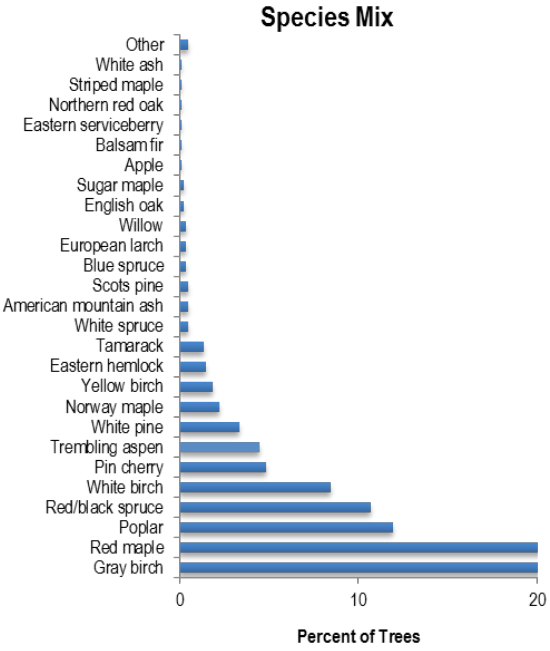
	Land Use	Zoning	Decade of Development
Atlantic Acres Industrial Park	Industrial	ILI, US	1960s
Lewis Drive	Residential	RSU	??
Parks	Park	P	??

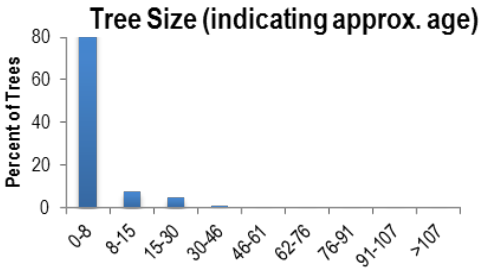
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade.	50
Area of naturalized forest stands to be created on HRM lands per decade.	0 ha
Area of naturalized forest stands not to fall below.	27 ha
Average number of native trees to plant on HRM lands per decade.	0
Average number of Acadian old-growth species to plant on HRM lands per decade.	2 (sugar maple, red oak)
Refrain from planting the following genera until 2020.	Birch, maple, poplar, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons.	4
Additional Neighbourhood Treatments	
Improve canopy cover in riparian areas and protect the wetlands in the neighbourhood from further development.	
Collaborate with Atlantic Acres Industrial Park business owners to improve the urban forest.	

Bedford Harbour

The Bedford Harbour scenic urban forest neighbourhood is situated in central Bedford between the Bedford Highway and the western shore of the Bedford Basin. This mainly infilled shoreline neighbourhood extends north from Moirs Pond to the Sackville River (Figure 41). The area features single- and multi-family residential, commercial, and marine-related land uses, with an overall canopy cover of 35% (shown in red). There are two key challenges in improving Bedford Harbour's urban forest. Foremost is the extensive use of paved parking in the area's shopping centres and small businesses. Second is the poor substrate of the largely infilled Basin shores. Both settings have few sustainable planting sites for new trees. The Bedford Sobeys Plaza (shown in blue) is an infilled and largely impervious commercial division with only 2% canopy cover. As a largely impervious area of stormwater flow accumulation, it would benefit from increased canopy cover. Area parks (shown in light green) have a fairly low canopy cover of 28%. Most of the neighbourhood's canopy is in some of its well-forested residential areas and naturalized stands just north of the plaza and extending along the neighbourhood's rail corridor. The natural forest stands provide canopy benefits to Bedford Harbour that should be maintained. A key urban forest pattern to be retained and improved is the treed railway corridor ribbon running through the neighbourhood.





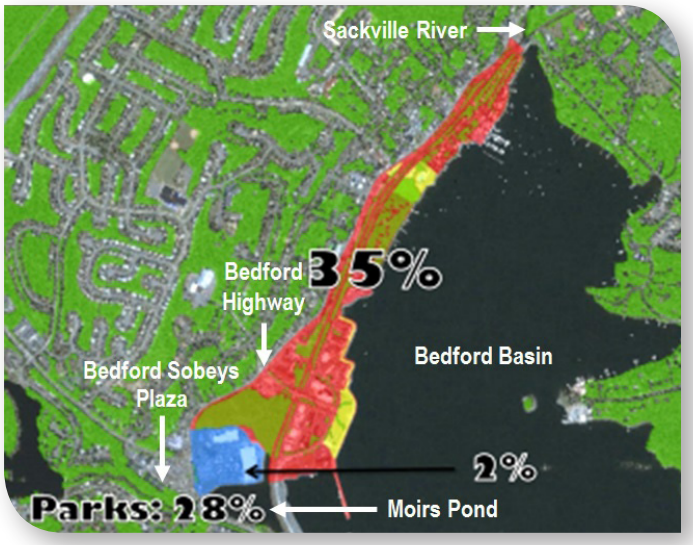


Figure 9

Challenges

- Impervious surfaces and the poor quality of shoreline infill substrate provide few sustainable planting sites for new trees.
- Stormwater retention benefits are compromised by impervious surfaces and a lack of trees on commercial properties.
- Residential properties have few value trees, compared with other Bedford neighbourhoods.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 35% to 70%.
- There are 58 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 28% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets for their neighbourhoods.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Bedford Harbour percent canopy cover	35	≥ 70
Bedford Highway/Hammonds Plains Road percent canopy cover	2	≥ 20
Parks percent canopy cover	28	≥ 40
Percent of neighbourhood in forest stands	23	24
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	96	50
Number of species that comprise more than 5% of all street trees	6 (gray birch, red maple, poplars, red/black spruce, pin cherry)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, maple, poplar, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, eastern hemlock)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	58	0
Percent canopy cover of riparian and recharge zones	7	100
Percent of public play areas that are adequately shaded (40% canopy cover)	67	100
Percent of residential properties with at least one value tree	46	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Bedford Harbour	42		Bedrock
Bedford Highway/Hammonds Plains Road	6		Bedrock
Parks	3		Bedrock

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Bedford Harbour	Multifamily residential, residential	WFCDD, RSU	1960s
Bedford Highway/Hammonds Plains Road	Commercial	CCDD	1970s
Parks	Park	P, WFCDD	1980s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	25
Area of naturalized forest stands to be created on HRM lands per decade	0.5 ha
Area of naturalized forest stands not to fall below	10
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, poplar, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	2
Additional Neighbourhood Treatments	
Create new plantable sites on impervious HRM lands, and encourage commercial and industrial landowners to do the same.	
Collaborate with business owners along the Bedford Highway to improve the urban forest.	
Maintain and enhance the ribbon pattern along the railway.	

Bedford North

The urban forest neighbourhood of Bedford North is a pleasant residential area occupying the northern section of the community and is generally bounded by the Bedford Highway, the Bicentennial Highway, the Bedford Bypass, and Rocky Lake Drive (Figure 10). Most of the residential housing in Bedford North was built in the early 1990s as part of the Oakmount Subdivision. Homes are typically single-family, with some multi-family dwellings. The current urban and peri-urban forests in the neighbourhood are generally healthy, with a 44% canopy cover (shown in red) and 82% park canopy cover (shown in light green). The area also features a large intact forest stand in the northern portion of the neighbourhood that provides an excellent noise buffer against adjacent highways. Trees can be planted on HRM street rights of way to attain canopy goals and improve the urban forest network pattern and on some residential properties and smaller commercial and institutional areas along Rocky Lake Drive and the Bedford Highway with low canopy cover. Urban forest ribbon patterns along the Bicentennial Highway and Bedford Bypass should be maintained for their noise-buffering services to the Bedford North neighbourhood.

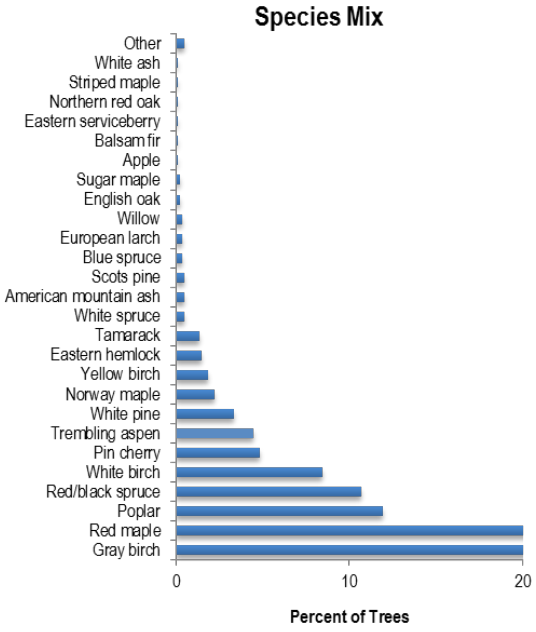
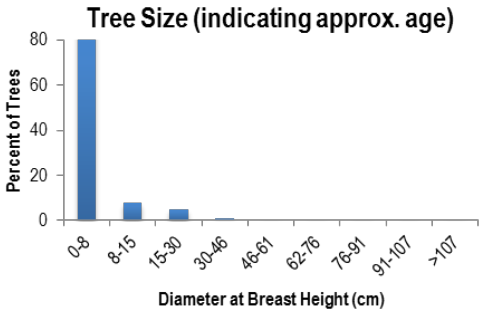


Figure 10



Challenges

- There are few trees on some of the commercial and institutional lots on the Bedford Highway and Rocky Lake Drive.
- There are few street trees along the Bedford Highway in Bedford North.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 44% to 70%.
- There are 168 plantable sites for new street trees in this neighbourhood.
- Maintaining treed buffers will continue to reduce the sound of traffic from nearby highways.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing commercial, institutional, and residential stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Bedford North percent canopy cover	44	≥ 70
Parks percent canopy cover	82	≥ 90
Percent of neighbourhood in forest stands	43	43
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	96	50
Number of species that comprise more than 5% of all street trees	6 (gray birch, red maple, poplars, red/black spruce, pin cherry)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, maple, poplar, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, eastern hemlock)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	168	0
Percent canopy cover of riparian and recharge zones	61	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	84	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Bedford North	64		Till veneer, till blanket, drumlins
Parks	3		Till veneer, till blanket, drumlins

Socioeconomic Conditions

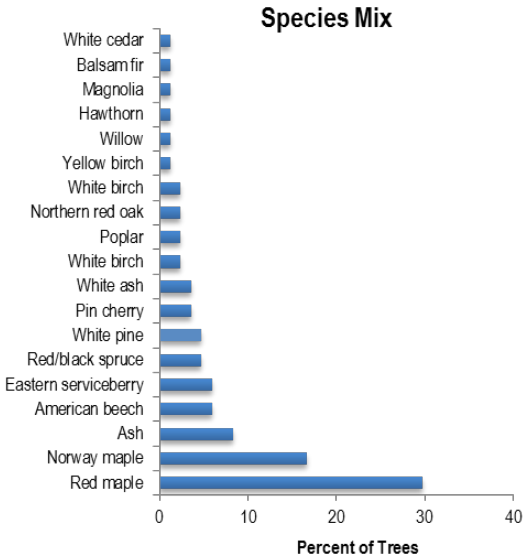
	Land Use	Zoning	Decade of Development
Bedford North	Residential, Institutional	RSU, SU	1990s
Parks	Park	P	1990s

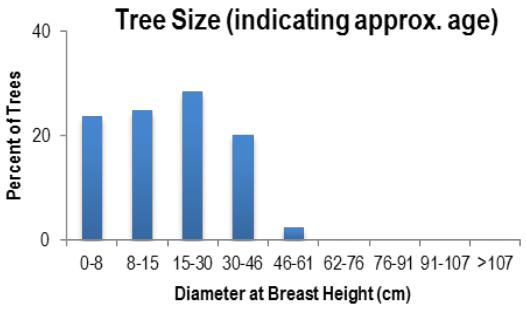
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	70
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	28 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	3 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, poplar, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	6
Additional Neighbourhood Treatments	
Protect and manage naturalized stands between Highways 101 and 102 in the northern section of the neighbourhood.	
Maintain and enhance the ribbons along highways 101 and 102.	

Bedford South

Bedford south is an urban forest neighbourhood with diverse development. It is located in the southern edge of the Bedford community (Figure 11), between the Bedford Highway and Bicentennial Drive, extending south from Larry Uteck Boulevard to Kearney Lake Road. Prince's Lodge (1) is a residential subdivision with multi-family dwellings and apartment buildings located by the Bedford Highway. West of this is the Royale Hemlock subdivision (2), a mixture of single- and multi-family dwellings. Just south of the subdivision is Hemlock Ravine Park, a well-known HRM forest park with several walking trails. The Birch Cove subdivision (3), a mixture of single-family homes, apartment complexes, and commercial buildings, runs along the neighbourhood's southern boundary. Bedford South has an overall canopy cover of 43%. Birch Cove and Prince's Lodge have canopy cover of 30% and 46% respectively. Apartment complexes overlooking the Bedford Highway (4) and Royale Hemlock are newer developments with low canopy cover at 19% and 12% respectively. As there are very few trees on private residential properties, homeowner education and outreach will be essential to managing the urban forest in these divisions. Hemlock Ravine Park forms an important urban forest belt pattern reaching into the centre of these residential developments. Most of the neighbourhood's northern portion is slated for the Bedford South development. Retaining canopy here will be very difficult due to the thin soils and rugged terrain of bedrock ridges. Ribbon patterns of urban forest can be maintained and enhanced along the rail line to the east and Bicentennial Drive to the west.





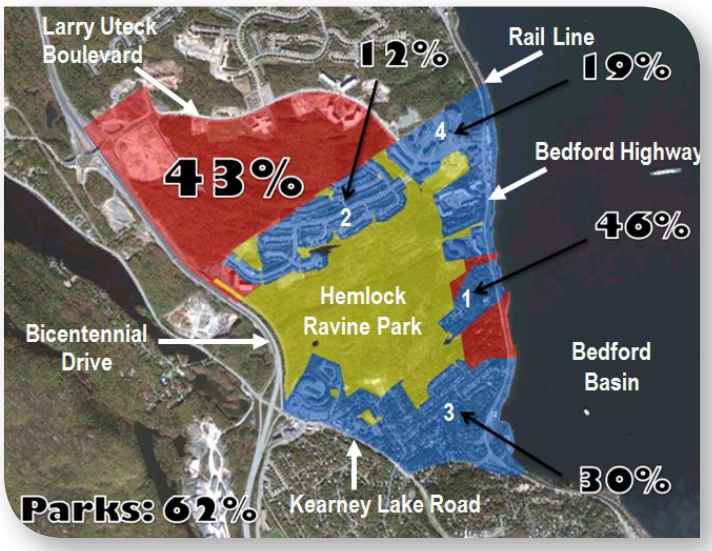


Figure 11

Challenges

- This region is characterized by shallow, poorly drained soils that overlay bedrock, with many exposed bedrock ridges. The spruce forest covering most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- There are 499 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing commercial and residential stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Bedford South percent canopy cover	85	≥ 70
Birch Cove percent canopy cover	30	≥ 70
Prince's Lodge percent canopy cover	46	≥ 70
Bedford Highway percent canopy cover	19	≥ 70
Royal Hemlock percent canopy cover	12	≥ 70
Parks percent canopy cover	62	≥ 90
Percent of neighbourhood in forest stands	58	58
Percent of trees within the smallest size class	24	≥ 10
Percent of street trees that are native	81	50
Number of species that comprise more than 5% of all street trees	7 (red maple, Norway maple, eastern serviceberry, white pine, white ash, white birch)	0
Number of genera that comprise more than 10% of all street trees	4 (Norway maple, serviceberry, white pine, white ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	94	100
Number of plantable sites in HRM rights of way	499	0
Percent canopy cover of riparian and recharge zones	80	100
Percent of public play areas that are adequately shaded (40% canopy cover)	64	100
Percent of residential properties with at least one value tree	52	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Bedford South	385		Bedrock
Birch Cove	63		Bedrock
Prince's Lodge	10		Bedrock
Bedford Highway	39		Bedrock
Royal Hemlock	32		Bedrock
Parks	242		Bedrock

Socioeconomic Conditions

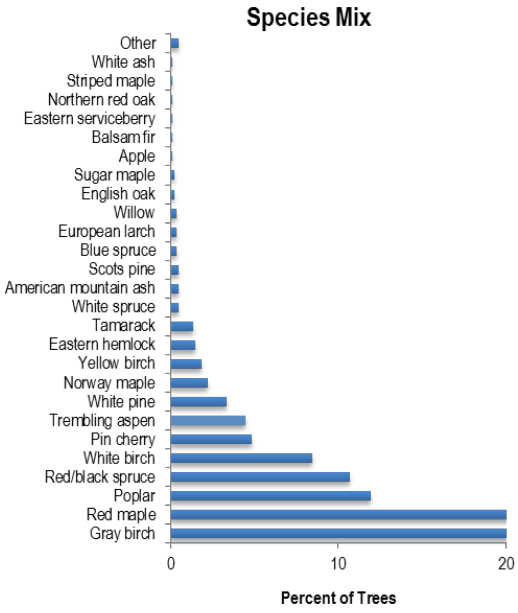
	Land Use	Zoning	Decade of Development
Bedford South	Residential	WCDD, BSCDD	2010s
Birch Cove	Residential, commercial	C-2, R-1	1960s
Prince's Lodge	Residential	R-1	1990s
Bedford Highway	Multi-family residential	R-3, C-2B	2000s
Royal Hemlock	Residential	N/A	1990s
Parks	Park	RPK	1940s

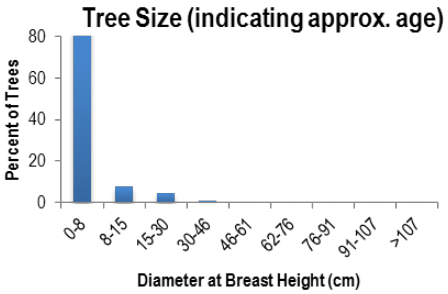
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	200
Area of naturalized forest stands to be created on HRM lands per decade	65 ha
Area of naturalized forest stands not to fall below	223
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	3 (eastern hemlock, sugar maple)
Refrain from planting the following genera until 2020	Maple, serviceberry, pine, ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	21
Additional Neighbourhood Treatments	
Maintain and enhance ribbon patterns along the harbour front railway and along Bicentennial Drive.	

Bedford West

Bedford West is an urban forest neighbourhood located in the western portion of the Bedford community (Figure 12). Most of the area is currently undeveloped and includes lands to the southeast of the Atlantic Acres Industrial Park. The area is enclosed by Hammonds Plains Road, the Bicentennial Highway, and Kearney Lake Road. Existing development is located in the northern portion of the neighbourhood and consists of residential, institutional, commercial, and light industrial land uses bordering Hammonds Plains Road. Here we see stands of younger native forest typical of the Atlantic coast, composed mainly of black and red spruce, red maple, and white birch growing on shallow, poor soils over bedrock ridge terrain. Since much of this area is slated for residential and commercial development, the forest conditions will soon undergo considerable change. Bedford West is almost entirely forested, with 87% canopy cover; however, as development proceeds it will lose most of its native forest canopy cover. This rugged and rocky terrain will require careful planning to retain suitably sized patches of native canopy during and after development to ensure the sustainability of the remnant native forest. Extensive replanting efforts on public and private properties will be required for several decades to re-establish canopy. There is an opportunity to retain and improve a riparian urban forest ribbon pattern along the Kearney Run that flows from Kearney Lake to Paper Mill Lake during and after development of this area.





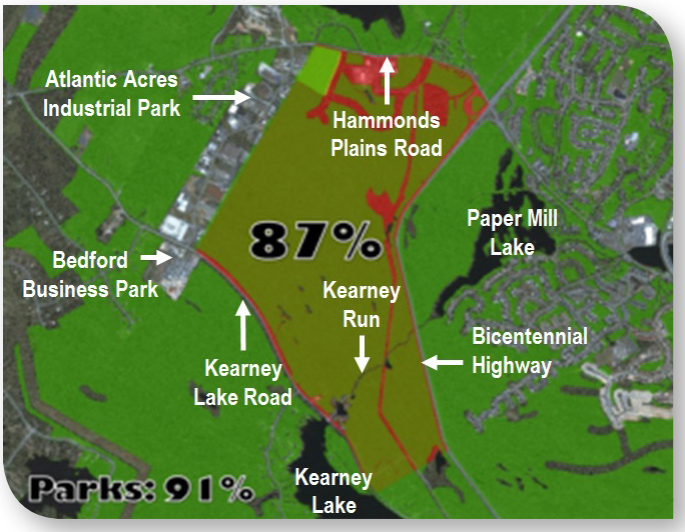


Figure 12

Challenges

- Development will profoundly change the Bedford West forest canopy.
- This region is characterized by shallow, poorly drained soils that overlay bedrock, with many exposed bedrock ridges. The spruce forest covering most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.
- Suburban/forest fringe neighbourhoods include risks from wildfire, storm blowdowns, and wildlife conflicts.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees to attain overall canopy cover of 20%.
- Park tree canopy will attain overall cover of 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Riparian cover along the Kearney Lake run can be maintained and enhanced.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Bedford West percent canopy cover	87	≥ 20
Parks percent canopy cover	91	≥ 40
Percent of neighbourhood in forest stands	87	
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	96	50
Number of species that comprise more than 5% of all street trees	6 (gray birch, red maple, poplars, red/black spruce, pin cherry)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, maple, poplar, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, eastern hemlock)	3 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	170	0
Percent canopy cover of riparian and recharge zones	85	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	89	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Bedford West	327		Bedrock
Parks	7		Bedrock

Socioeconomic Conditions

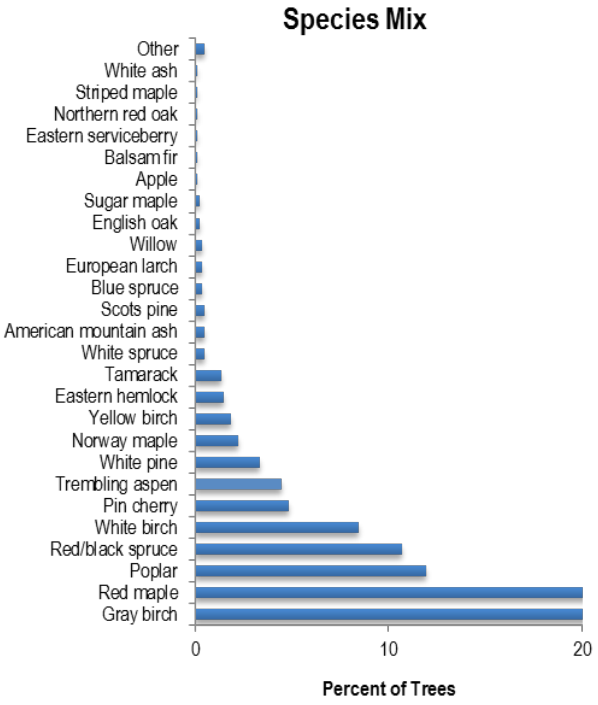
	Land Use	Zoning	Decade of Development
Bedford West	Commercial, institutional	BWCDD, BWBC	2010s
Parks	Institutional	BWBC	2010s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	70
Area of naturalized forest stands to be created on HRM lands per decade	N/A
Area of naturalized forest stands not to fall below	N/A
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	8 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, poplar, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasonse	6
Additional Neighbourhood Treatments	
Designate appropriate targets for the retention of urban canopy and naturalized forest stands.	
Maintain a forested ribbon pattern along the stream connecting Kearny Lake and Paper Mill Lake.	

Downtown Bedford

The urban forest neighbourhood of Downtown Bedford is located in the northeastern portion of the Bedford community. This vibrant neighbourhood features an attractive mix of commercial, institutional, and residential land uses. It is bounded by the Sackville River, Rocky Lake Drive, and the rail line. Downtown Bedford's alluvial and drumlin soils provide favourable growing conditions for the area's urban forest. The neighbourhood's northern portion includes a well-treed single- and multi-family residential area. The southern portion, beside the Bedford Highway, contains a variety of commercial developments including restaurants, office buildings, and retail outlets. Downtown Bedford has a respectable canopy cover of 48% (shown in red). However, the commercial division (shown in blue) along the Bedford Highway is a major challenge to managing this neighbourhood's urban forest, as it represents a third of its area. While Bedford's first-rate development regulations concerning tree planting in commercial areas have made positive inroads, this division is still challenged with a low 14% canopy cover. Moreover, it is partially situated on a floodplain adjacent to the Sackville River, the major tributary of the Bedford Basin. Parking lots and other impervious surfaces in the commercial division have led to limited riparian zone protection for the Sackville River. Urban forest ribbon patterns can be enhanced along the Sackville River and the rail line through natural regeneration and tree planting. Additional plantings in Fish Hatchery Park will provide further riparian protection for the Sackville River.



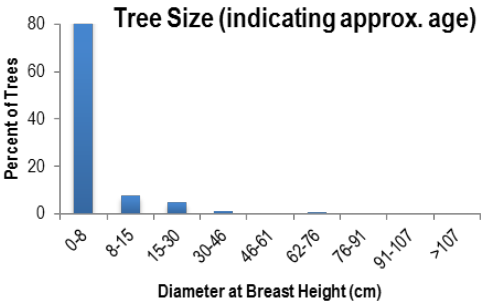


Figure 13

Challenges

- The Bedford Highway commercial division has very low canopy cover.
- The minimal size of the Sackville River riparian buffer is insufficient to capture contaminated runoff from impervious surfaces.

Opportunities

- The Sackville River riparian zone and Fish Hatchery Park will be improved through natural regeneration and further plantings.
- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 48% to 70%.

- There are 54 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Downtown Bedford percent canopy cover	48	≥ 70
Bedford Highway percent canopy cover	14	≥ 20
Parks percent canopy cover	69	≥ 90
Percent of neighbourhood in forest stands	30	30
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	96	50
Number of species that comprise more than 5% of all street trees	6 (gray birch, red maple, poplars, red/black spruce, pin cherry)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, maple, poplar, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, eastern hemlock)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	54	0
Percent canopy cover of riparian and recharge zones	55	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	79	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Downtown Bedford	32		Drumlin, till veneer
Bedford Highway	11		Alluvial
Parks	1		Alluvial

Socioeconomic Conditions

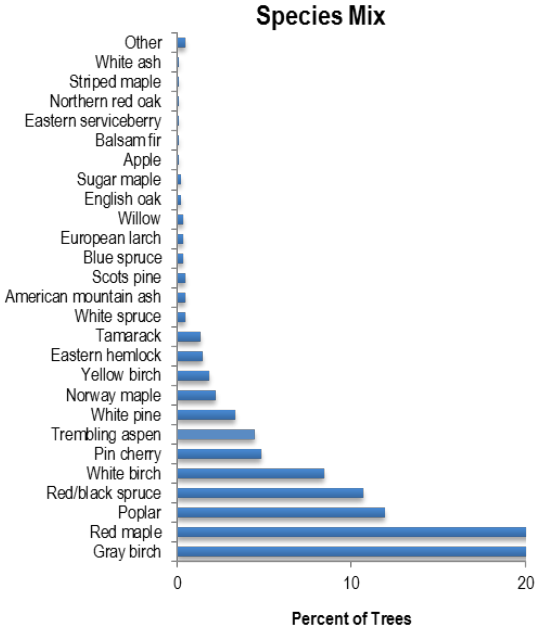
	Land Use	Zoning	Decade of Development
Downtown Bedford	Multi-family residential	RTU	1940s
Bedford Highway	Commercial	CSC, CHWY-CGB	1950s
Parks	Park	P	1940s

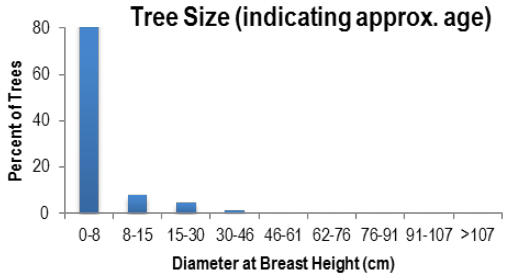
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	20
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	10 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, poplar, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	2
Additional Neighbourhood Treatments	
Increase canopy cover in riparian areas and naturalize Fish Hatchery Park at the mouth of the Sackville River.	
Maintain and enhance the urban forest ribbon pattern along the railway.	

Glen Moir

Glen Moir is an attractive, low-density, residential suburban neighbourhood overlooking the scenic shores of the Bedford Basin (Figure 14). This urban forest neighbourhood is bounded by the Bedford and Bicentennial highways and Hammonds Plains Road. Compared with other Bedford neighbourhoods, Glen Moir's canopy cover appears low; however, unlike other neighbourhoods it is fully developed with no native forest remaining. Overall, the area has a healthy and intact urban forest (shown in red), with a canopy cover of 43%. There are some exceptions, with few trees in areas such as Central Bedford, the Hammond Centre, parks, and newer subdivisions adjacent to the Bicentennial Highway. The Central Bedford division (shown in blue) has a canopy cover of just 2%, with a high degree of imperviousness. Stormwater runoff poses a potential risk to the Sackville River, which would benefit significantly from the stormwater protection benefits of an increased riparian canopy cover. At 12% coverage, the Hammond Centre (shown in blue) also has an insufficient canopy. There is a wide variety of canopy cover among Glen Moir's parks (shown in light green). Although the Bedford Barrens parkland is fully forested, other parks have few trees, resulting in 14% canopy cover for the neighbourhood's park. Opportunities exist to establish a forest ribbon pattern along the Sackville River.





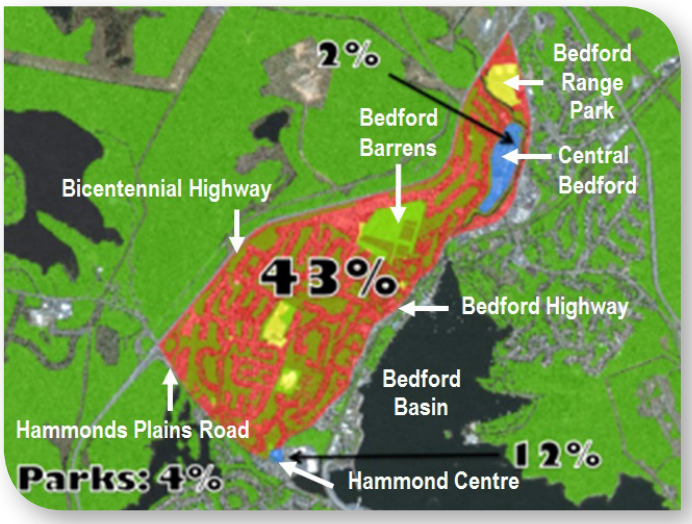


Figure 14

Challenges

- There are impervious surfaces and few plantable sites throughout the Central Bedford and Hammond Centre divisions.
- There is low riparian canopy cover and high stormwater runoff into the Sackville River.
- The canopy cover in parks is low, with few parks adequately shaded.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 43% to 70%.
- There are 758 plantable sites for new street trees in this neighbourhood.
- Canopy in parks can be increased from 14% to 40%, in Central Bedford from 2% to 20%, and in Hammond Centre from 12% to 20%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Riparian cover along the Sackville River can be restored.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Glen Moir percent canopy cover	43	≥ 70
Central Bedford percent canopy cover	2	≥ 20
Hammond Centre percent canopy cover	12	≥ 20
Parks percent canopy cover	14	≥ 40
Percent of neighbourhood in forest stands	39	41
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	96	50
Number of species that comprise more than 5% of all street trees	6 (gray birch, red maple, poplars, red/black spruce, pin cherry)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, maple, poplar, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, eastern hemlock)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	758	0
Percent canopy cover of riparian and recharge zones	52	100
Percent of public play areas that are adequately shaded (40% canopy cover)	54	100
Percent of residential properties with at least one value tree	83	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Glen Moir	312		Bedrock
Central Bedford	10		Alluvial
Hammond Centre	1		Bedrock
Parks	26		Bedrock

Socioeconomic Conditions

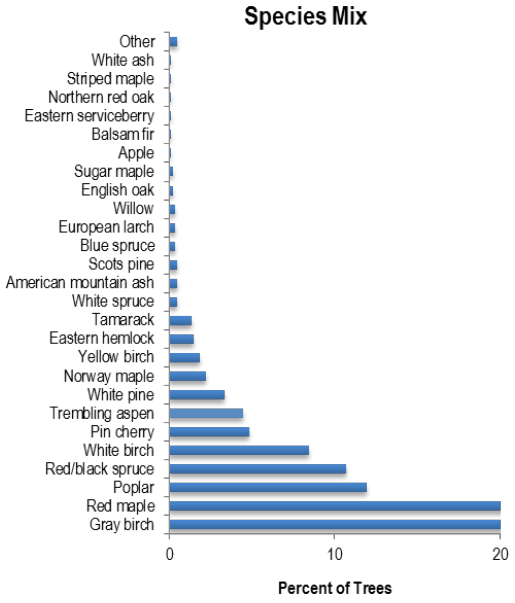
	Land Use	Zoning	Decade of Development
Glen Moir	Residential, multifamily residential	RSU, RCDD	1890s/1950s
Central Bedford	Commercial	CSC	1960s
Hammond Centre	Commercial	CSC	1990s
Parks	Multifamily residential, wetland	FW, RCDD	1950s

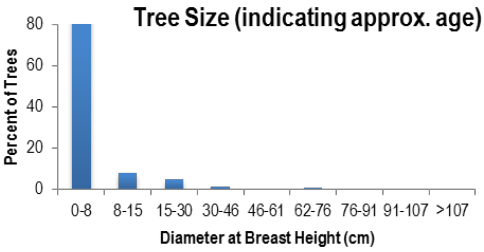
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	300
Area of naturalized forest stands to be created on HRM lands per decade	2 ha
Area of naturalized forest stands not to fall below	122 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	15 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, poplar, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	45
Additional Neighbourhood Treatments	
Collaborate with business owners in Hammonds Centre and Central Bedford to improve the urban forest.	
Develop a ribbon pattern along the Sackville River and improve canopy cover in this riparian zone.	

Millview

The Millview urban forest neighbourhood covers an extensive area of residential development located in the southern portion of the Bedford community, overlooking the shores of Bedford Basin. It is bound in the north by Paper Mill Lake and Hammonds Plains Road, and in the east by Bedford Basin (Figure 15). Development of the neighbourhood dates from the late 1990s to the present day. Millview contains a mixture of single- and multi-family dwellings, with a variety of lot sizes typically set in peri-urban forest surroundings. The area's 35% canopy cover (shown in red) is low compared with other Bedford residential neighbourhoods. Millview's newer single- and multi-family residential developments have very few street or front-yard trees. Most of the neighbourhood's canopy cover is found in forested buffer strips between and behind residential lots. The buffer strips are dominated by shallow-rooted spruces that grow on the area's thinly soiled bedrock. These remnant areas are highly vulnerable to wind damage. With a canopy cover of just 2%, The Village Centre urban forest division (shown in blue) is part of the major commercial district spanning several neighbourhoods at the intersection of the Bedford Highway and Hammonds Plains Road. This highly impervious area is subject to stormwater flow accumulation during severe weather events and poses risks to nearby aquatic systems. Another challenge to improving the urban forest in this neighbourhood is the harbour front, much of which is human-engineered shoreline with poor substrates. A native forest shoreline ribbon pattern is evident along the rail line. Efforts should be made to maintain and improve this remaining area of intact shoreline growth.





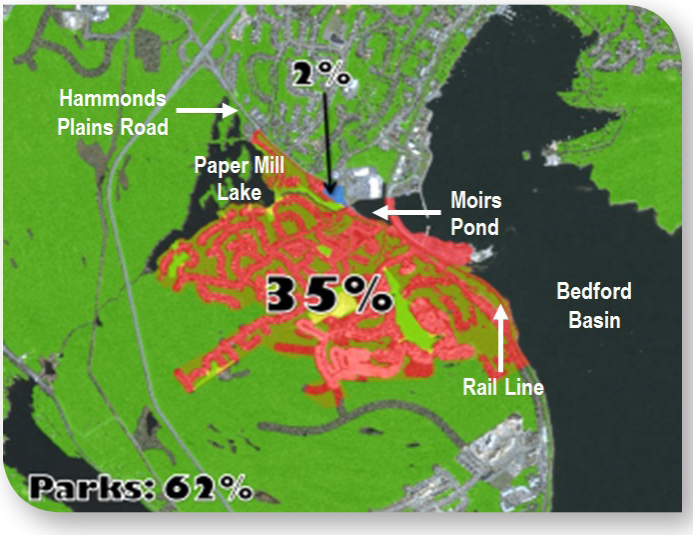


Figure 15

Challenges

- This region is characterized by shallow, poorly drained soils that overlay bedrock, with many exposed bedrock ridges. The spruce forest covering most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.
- There is limited canopy cover and associated stormwater retention capacity in the riparian zones of Paper Mill Lake, Moirs Pond, and the Bedford Basin.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 35% to 70%.
- There are 428 plantable sites for new street trees in this neighbourhood.
- Riparian zones can be improved to intercept more stormwater.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing commercial and residential stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Millview percent canopy cover	35	≥ 70
Village Centre percent canopy cover	2	≥ 20
Parks percent canopy cover	62	≥ 90
Percent of neighbourhood in forest stands	35	37
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	96	50
Number of species that comprise more than 5% of all street trees	6 (gray birch, red maple, poplars, red/black spruce, pin cherry)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, maple, poplar, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, eastern hemlock)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	428	0
Percent canopy cover of riparian and recharge zones	56	100
Percent of public play areas that are adequately shaded (40% canopy cover)	67	100
Percent of residential properties with at least one value tree	75	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Millview	226		Bedrock
Village Centre	1		Bedrock
Parks	16		Bedrock

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Millview	Residential, multi-family residential	BSCDD, RSU, RCDD	1950s/1980s/1990s
Village Centre	Multi-family residential	RSU	1980s
Parks	Park	P	1940s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	170
Area of naturalized forest stands to be created on HRM lands per decade	5 ha
Area of naturalized forest stands not to fall below	79 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	9 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, poplar, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	15
Additional Neighbourhood Treatments	
Create plantable sites in the Village Centre and along the harbour front.	
Develop a ribbon pattern along the railway following the harbour front.	

A-3 BEAVER BANK

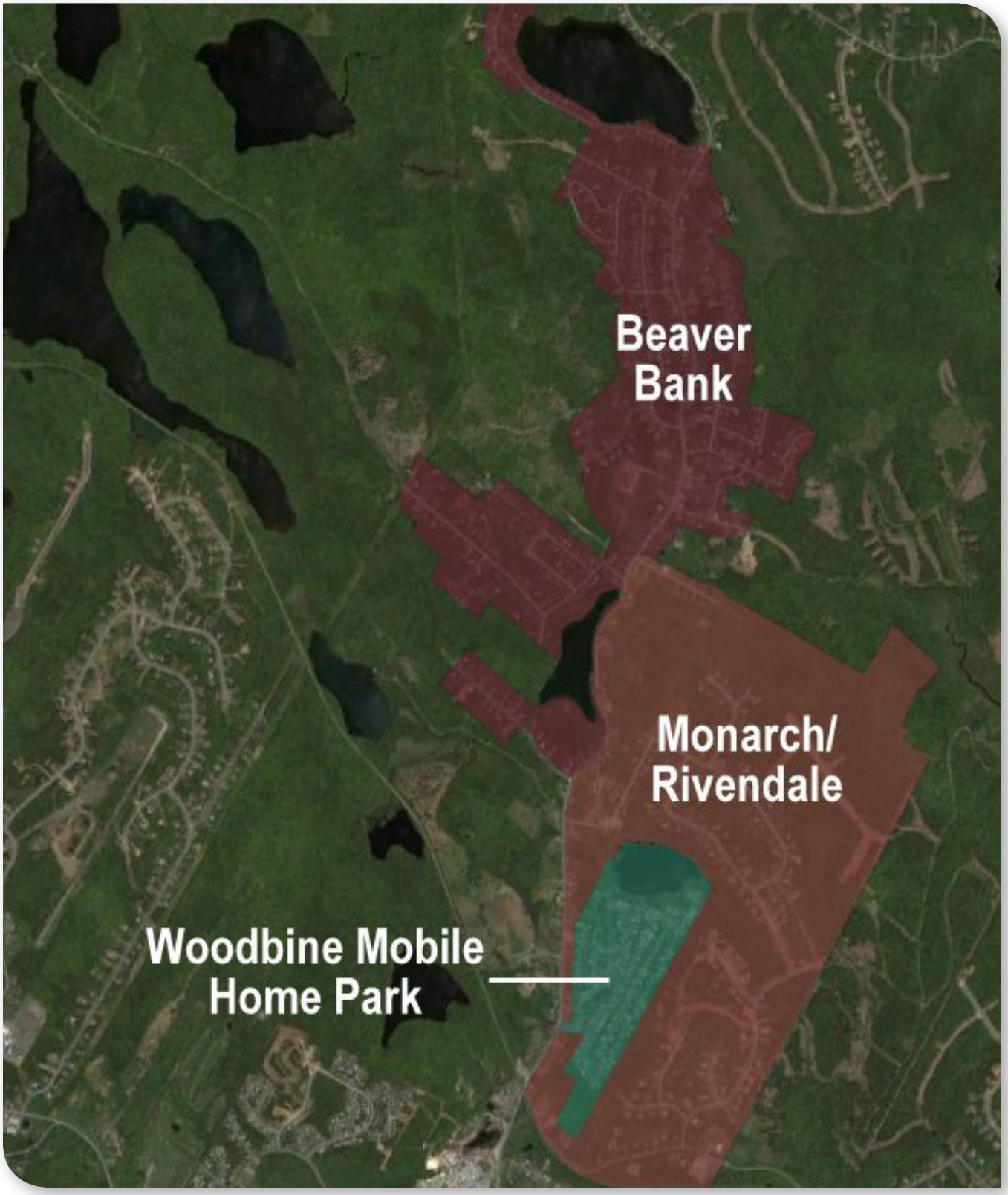
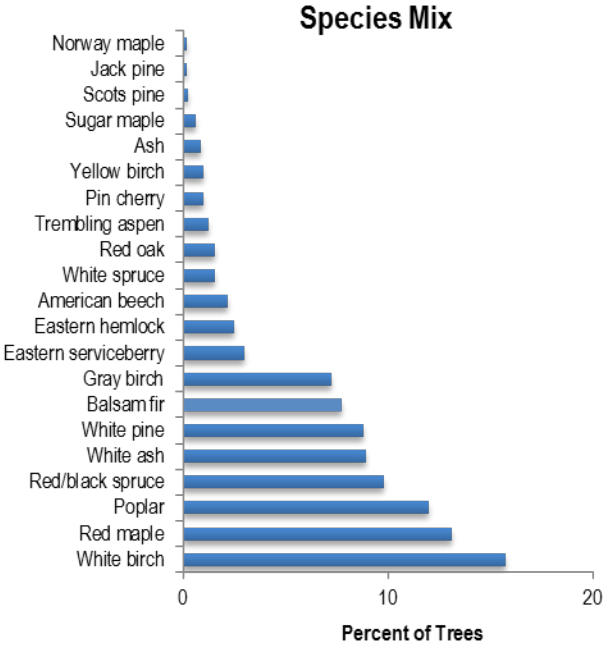
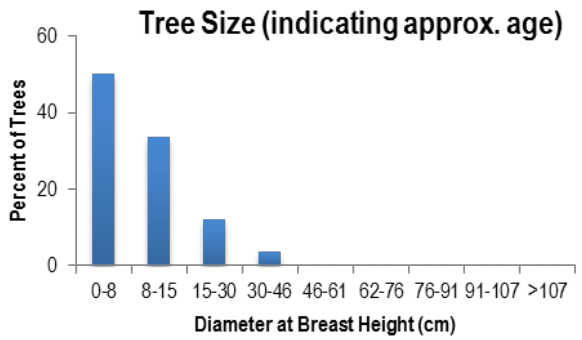


Figure 16

Beaver Bank

The Beaver Bank urban forest neighbourhood, namesake of the community, extends from Barrett Lake in the south to Tucker Lake in the north. The area features a ribbon development pattern with subdivisions spreading to the east and west of Beaver Bank Road (Figure 17). The neighbourhood is primarily rural residential, consisting of single-family homes with larger lot sizes than typical suburban subdivisions. Beaver Bank has a higher canopy cover of 59%, with shaded, well-forested parks and riparian areas on drumlin terrain, and a high proportion of residential lots with at least one value tree. The neighbourhood's surrounding hinterland forest, lakes, and wetlands give the impression of a wildnerness community. However, most of the surrounding forestland, that could have acted as urban forest wedge patterns, is slated for residential development as part of Carriagewood Estates and Lost Creek Village to the east and Golden Birches to the southwest. The key challenge here will be to retain adequate canopy levels, both through careful development practices and by encouraging residents in new developments to plant trees.





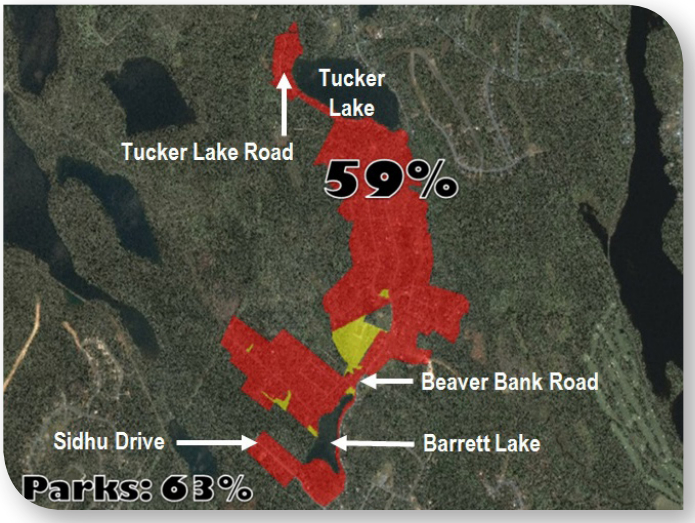


Figure 17

Challenges

- Much of the intact canopy of this neighbourhood is at risk from new development, which would substantially lower the canopy cover of this neighbourhood.
- There are risks associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts, and invasive species.

Opportunities

- Maintaining or planting new trees on residential properties, both newly developed and existing, will be an integral component of maintaining and increasing the benefits that residents receive from their urban forest.
- There are 733 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Beaver Bank percent canopy cover	59	≥ 70
Parks percent canopy cover	63	≥ 90
Percent of neighbourhood in forest stands	58	62
Percent of trees within the smallest size class	50	≥ 10
Percent of street trees that are native	99	50
Species that comprise more than 5% all street trees	5 (white birch, red maple, poplar, red spruce, black spruce)	0
Genera that comprise more than 10% of all street trees	2 (birch, maple)	0
Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, eastern hemlock, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	733	0
Percent canopy cover of riparian and recharge zones	83	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	75	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Beaver Bank	243		Drumlin
Parks	13		Drumlin

Socioeconomic Conditions

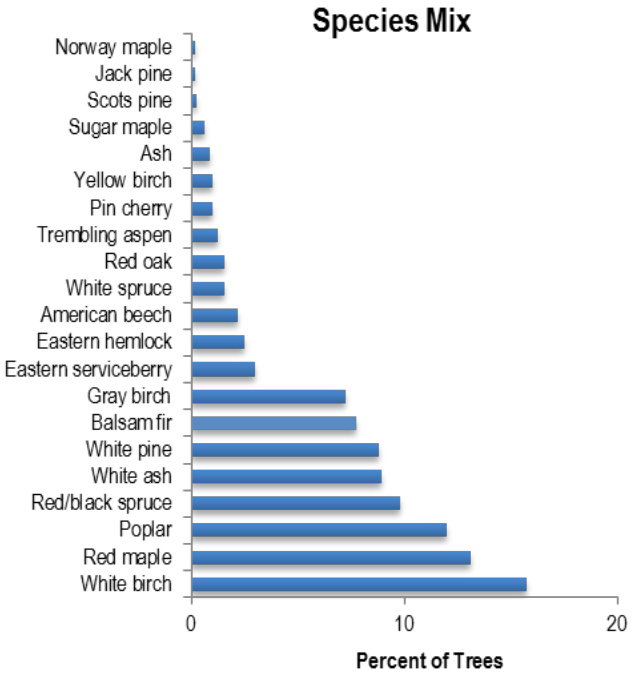
	Land Use	Zoning	Decade of Development
Beaver Bank	Residential	R-1, R-6	1970s
Parks	Institutional	P-2	1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	300
Area of naturalized forest stands to be created on HRM lands per decade	4 ha
Area of naturalized forest stands not to fall below	140 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	9 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	9
Additional Neighbourhood Treatments	
Maintain an urban forest wedge pattern of surrounding forest in the east of the neighbourhood, where no development is scheduled.	

Monarch/Rivendale

The Monarch/Rivendale urban forest neighbourhood lies west of the Beaver Bank Road and extends from Windgate Drive in the south to Galloway Drive in the north (Figure 18). Monarch/Rivendale is a residential neighbourhood of single-family homes with larger lot sizes than suburban neighbourhoods. The streets are spread out with relatively large stands of hinterland forests between them. Monarch/Rivendale is in considerably good standing with its urban forest, being only 1% off of its 70% canopy target and having relatively well forested parks, riparian areas, and residential properties. Furthermore, a full two thirds of the neighbourhood has continuous forest cover growing in drumlin and alluvial soils. However, this situation will likely not remain as new developments are planned for the area. As such, the canopy cover will certainly decline, and the proportion of residential properties with trees will drop as new lots are cleared for construction. The key challenge in Monarch/Rivendale will therefore be to retain adequate canopy levels, both through careful development practices and by encouraging residents in new developments to plant trees.



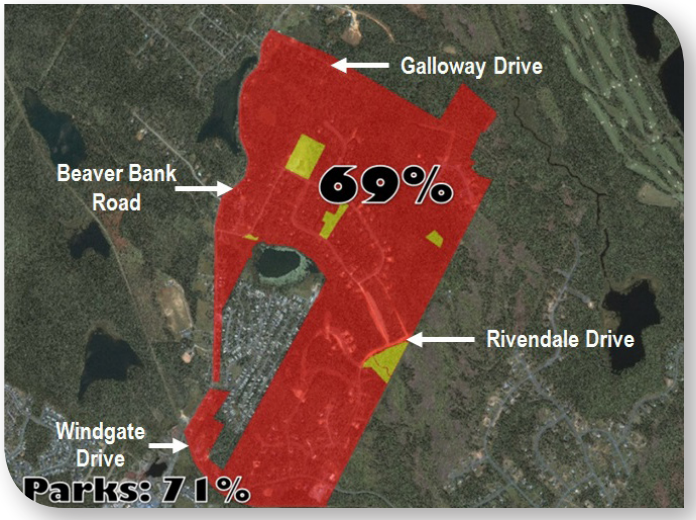
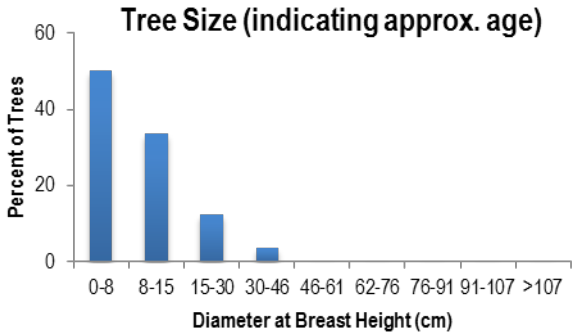


Figure 18



Challenges

- As new development takes place, the intact canopy of this neighbourhood will be reduced.
- There are risks associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts, and invasive species.

Opportunities

- There are 674 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Monarch/Rivendale percent canopy cover	69	≥ 70
Parks percent canopy cover	71	≥ 90
Percent of neighbourhood in forest stands	69	71
Percent of trees within the smallest size class	50	≥ 10
Percent of street trees that are native	99	50
Species that comprise more than 5% all street trees	5 (white birch, red maple, poplar, red spruce, black spruce)	0
Genera that comprise more than 10% of all street trees	2 (birch, maple)	0
Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, eastern hemlock, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	674	0
Percent canopy cover of riparian and recharge zones	80	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	78	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Monarch/Rivendale	328		Drumlin, Alluvial
Parks	10		Drumlin

Socioeconomic Conditions

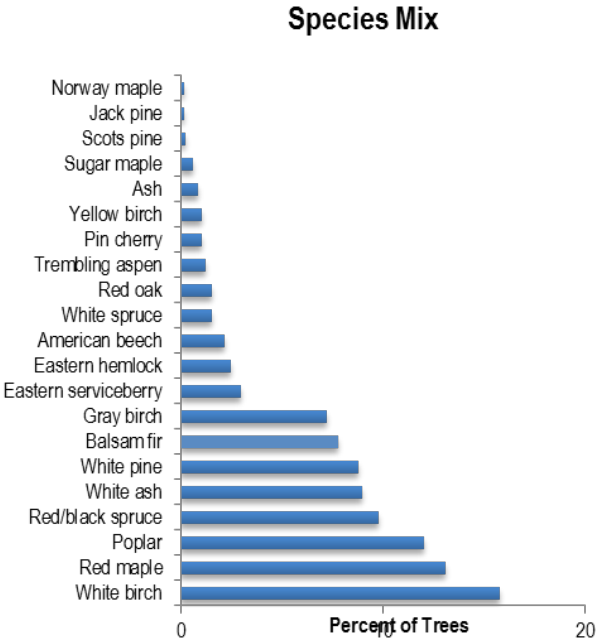
	Land Use	Zoning	Decade of Development
Monarch/Rivendale	Residential	CDD, MU-1, R-3, R-1	1990s/2000s
Parks	Park	CDD, MU-1	1990s

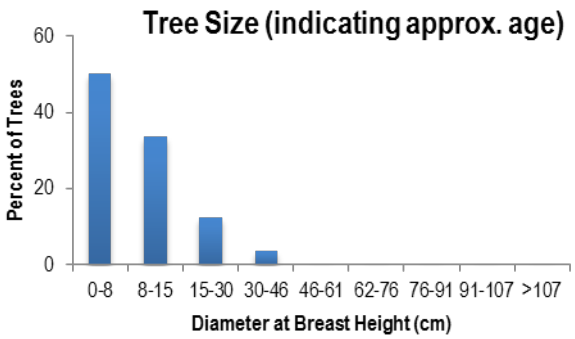
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	270
Area of naturalized forest stands to be created on HRM lands per decade	2 ha
Area of naturalized forest stands not to fall below	226 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	8 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	8

Woodbine Mobile Home Park

The Woodbine Mobile Home Park urban forest neighbourhood is located between Beaver Bank Road in the east and the Rivendale Subdivision to the west. It extends north from Windgate Drive to Duck Lake (Figure 19). The privately held mobile home park is the largest community of its kind in Atlantic Canada and is home to over 600 families. Duck Lake, at the northern boundary of the neighbourhood, is surrounded by a well forested riparian buffer and Woodbine's attractive residential landscape features a wide array of compact lots and homes with an overall urban forest canopy cover of 24%. Several residential lots contain trees but many more could be planted throughout this urban forest neighbourhood. There are also many opportunities for street trees however the road system is privately owned. This neighbourhood lies on drumlin terrain with rich, deep soils that are beneficial for growing trees. Stewardship efforts by the property owner and local residents could dramatically improve Woodbine's urban forest canopy.





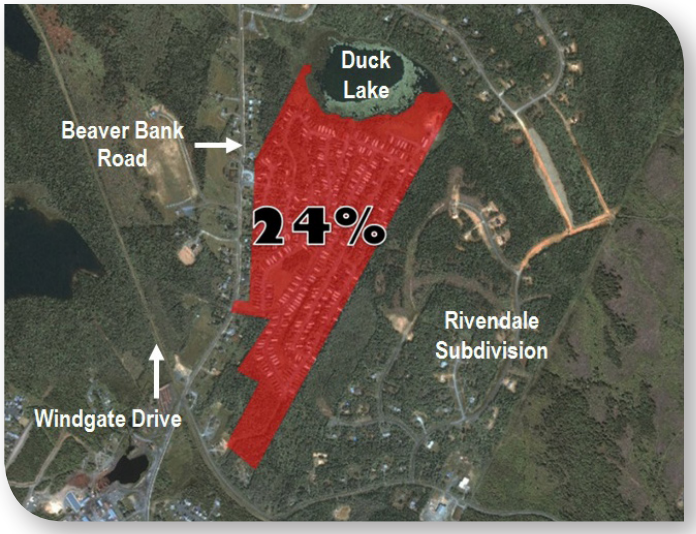


Figure 19

Challenges

- HRM can plant trees on public property but road rights of way and properties in Woodbine Mobile Home Park are privately owned.
- There are few street trees throughout the Woodbine Mobile Home Park.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 24%-70%.
- Mobile home park administrators and local residents can form an urban forest stewardship group to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Woodbine Trailer Park percent canopy cover	24	≥ 70
Percent of neighbourhood in forest stands	19	19
Percent of trees within the smallest size class	50	≥ 10
Percent of street trees that are native	99	50
Species that comprise more than 5% all street trees	5 (white birch, red maple, poplar, red spruce, black spruce)	0
Genera that comprise more than 10% of all street trees	2 (birch, maple)	0
Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, eastern hemlock, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites along private roadways	265	0
Percent canopy cover of riparian and recharge zones	61	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	50	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Woodbine Trailer Park	43		Drumlin, till veneer

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Woodbine Trailer Park	Residential	R-3A	1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant along private roadways per decade	265
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	8 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	3 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	3
Additional Neighbourhood Treatments	
Cooperate with mobile home park administrators and park residents regarding the urban forest and opportunities for improvement.	

A-4 COLE HARBOUR

Figure 20

Brookview

The urban forest neighbourhood of Brookview is a small residential area developed in the 1980s and 1990s. Generally located near the intersection of Cole Harbour Road and Bissett Road it extends south to the Halifax Regional Water Commission depot at 213 Bissett Road. The northern portion of the neighbourhood features single-family detached dwellings, while homes on Patrick Lane and Brookview Drive are semi-detached. The urban forest neighbourhood has a relatively low canopy cover of 21%, with an even lower cover of 12% in its parks. Here, there are very few trees found on residential properties, especially in newer areas of the neighbourhood. Brookview's rich drumlinoid soil will provide an ideal opportunity for homeowners to establish a beautiful urban forest in this area. New street trees will also be planted along road rights of way.

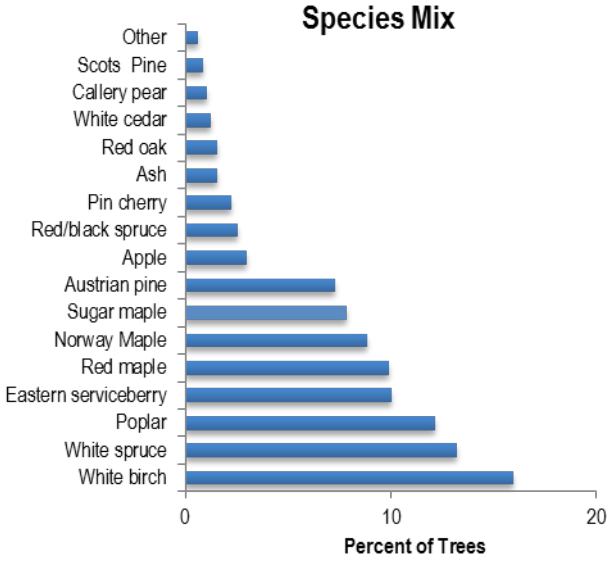
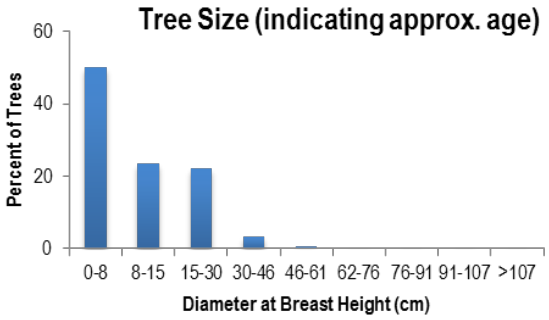


Figure 21



Challenges

- There are few trees on residential lots.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 21% to 70%.
- Canopy cover in parks will be increased from 12% to 40%.
- There are 221 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local residents will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Brookview percent canopy cover	21	≥ 70
Parks percent canopy cover	12	≥ 40
Percent of neighbourhood in forest stands	19	19
Percent of trees within the smallest size class	50	≥ 10
Percent of street trees that are native	78	50
Number of species that comprise more than 5% of all street trees	6 (white birch, white spruce, poplar, eastern serviceberry, Norway maple, sugar maple)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, spruce, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	221	0
Percent canopy cover of riparian and recharge zones	53	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	38	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Brookview	24		Drumlin
Parks	1		Drumlin

Socioeconomic Conditions

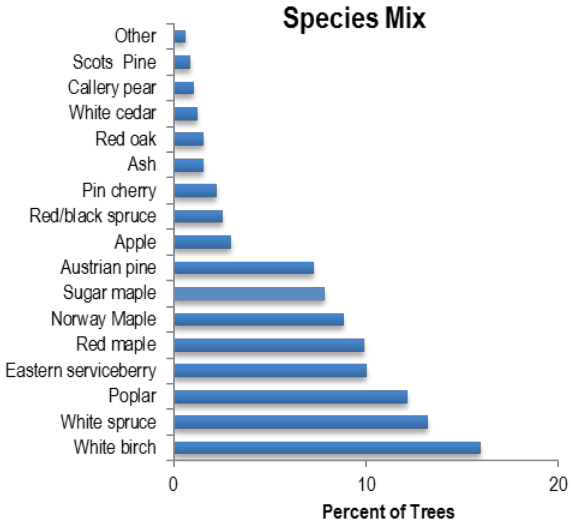
	Land Use	Zoning	Decade of Development
Brookview	Residential	R-2, R-1	1990s
Parks	Residential	R-2, R-1	1990s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	90
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	5 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	5 (eastern hemlock, white pine, yellow birch, red oak)
Refrain from planting the following genera until 2020	Birch, spruce, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	10
Additional Neighbourhood Treatments	
Maintain and enhance the urban forest ribbon pattern riparian zone along Brookview's western boundary.	

Colby Village

The urban forest neighbourhood of Colby Village lies between Morris Lake and Bissett Lake and extends southeast from Cole Harbour Road to Beaver Crescent (Figure 22). The area was first developed in the 1970s and features a range of attractive single family and multi-family residences as well as a number of schools and parks. A commercial division (shown in blue) along Cole Harbour Road provides a range of services and products to local residents. This urban forest neighbourhood features compact lots with many forested buffer strips retained during development but it has a relatively poor canopy cover of 23% due to a low number of street trees. The limited amount of riparian canopy cover protecting the eastern shore of Bissett Lake and its water quality is also a concern to be addressed. The area's parks generally have a good canopy cover of 43% that will be maintained. Additionally, the species mix and age class diversity in this neighbourhood is robust and new trees planted in Colby Village will flourish due to the area's fertile drumlinoid soil. Although commercial properties along Cole Harbour Road generally have few, if any trees, the appearance of this area will be dramatically improved when more plantings take place.



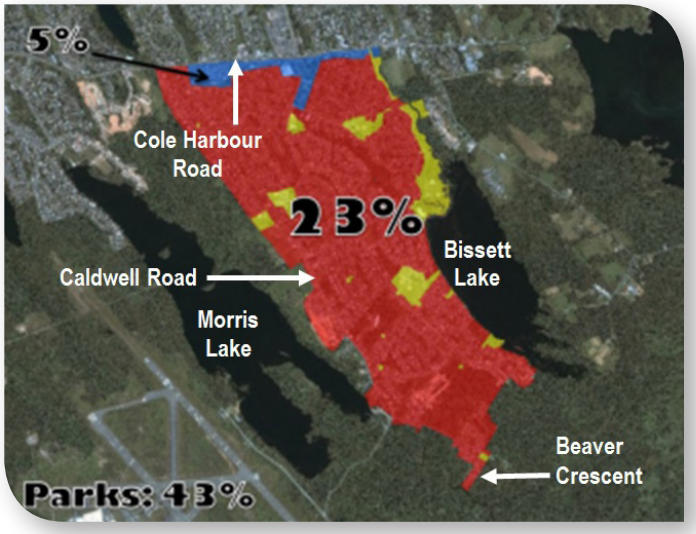
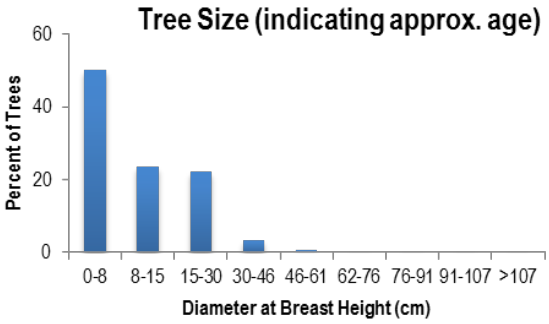


Figure 22



Challenges

- There is relatively low canopy cover in the riparian zone of Bissett Lake, which is at risk from run-off and sedimentation.
- The Cole Harbour Road commercial division has low canopy cover and extensive paving.
- There are few street trees planted along HRM rights of way.

Opportunities

- The area features excellent soils and a good age distribution and species diversity of existing trees.
- A planned planting program will increase overall canopy from 23% to 70%.
- There are 4441 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential and business stakeholders will be organized to work with HRM to achieve urban forest targets for Colby Village.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Colby Village percent canopy cover	23	≥ 70
Cole Harbour Road percent canopy cover	5	≥ 20
Parks percent canopy cover	43	≥ 40
Percent of neighbourhood in forest stands	19	19
Percent of trees within the smallest size class	50	≥ 10
Percent of street trees that are native	78	50
Number of species that comprise more than 5% of all street trees	6 (white birch, white spruce, poplar, eastern serviceberry, Norway maple, sugar maple)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, spruce, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	4,441	0
Percent canopy cover of riparian and recharge zones	67	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	49	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Colby Village	479		Drumlin
Cole Harbour Road	21		Drumlin
Parks	59		Drumlin

Socioeconomic Conditions

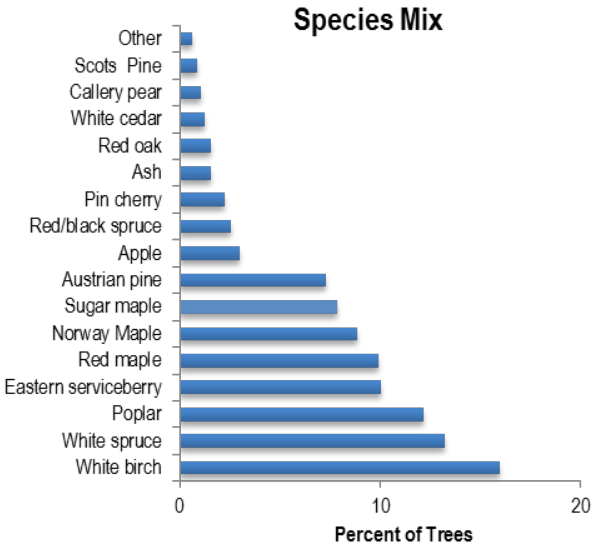
	Land Use	Zoning	Decade of Development
Colby Village	Residential	R-1	1970s
Cole Harbour Road	Commercial	C-2, CDD	1970s
Parks	Park, institutional	P-2, P-1	1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	1,800
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	91 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	100 (eastern hemlock, white pine, yellow birch, red oak)
Refrain from planting the following genera until 2020	Birch, spruce, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	180
Additional Neighbourhood Treatments	
Collaborate with local business owners to improve tree canopy along the Cole Harbour Road.	
Encourage waterfront property owners to improve Bissett Lake's riparian canopy.	

Forest Hills

Forest Hills is a 470 hectare urban forest neighbourhood stretching north from Cole Harbour Road to Main Street. In the west it borders Settle Lake and Cranberry Lake, and Broom Road and Smith Avenue in the east (Figure 23). The tree lined Forest Hills Parkway forms a beautiful ribbon of greenery as it passes through the centre of this urban forest neighbourhood. The area is primarily residential, with a pleasant mix of single-family and multi-family homes. Although there are many green spaces, parks, and walking trails in this neighbourhood, Forest Hills has a canopy cover of just 30%, with much of the canopy found in residential buffer strips between streets. While it has a relatively high number of trees on residential properties compared to other similar neighbourhoods the low number of street trees is a contributing factor to its limited canopy cover. The commercial strip along Highway #7 (shown in blue) has a minimal 9% canopy cover, and an abundance of paved surfaces. It will be a major challenge to improving the urban forest of Forest Hills. The riparian buffers of the Forest Hills Commons form an environmentally significant urban forest ribbon pattern that meanders through Forest Hills but it too will require work to reinstate adequate canopy cover.



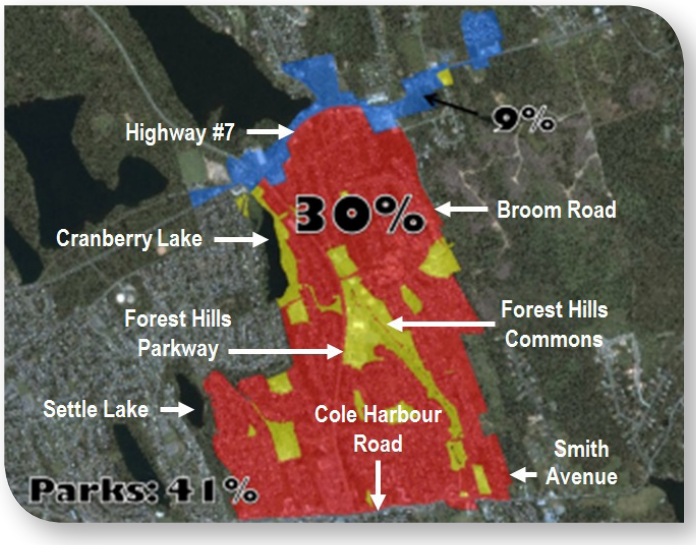
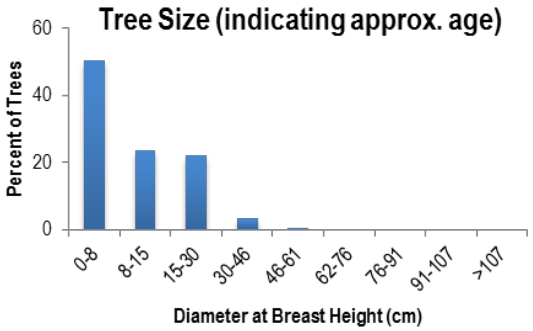


Figure 23



Challenges

- There are few street trees planted along HRM rights of way. There is low canopy cover in the riparian buffer strip of the stream running through the Forest Hills Commons.
- The Main Street commercial division has very low canopy cover. The high degree of imperviousness and lack of plantable sites will make it a considerable challenge to improving the urban forest of Forest Hills.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 30% to 70%.
- There are 4360 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Groups of local residents and business owners will be organized to work with HRM to achieve urban forest targets for Forest Hills.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Forest Hills percent canopy cover	30	≥ 70
Main Street percent canopy cover	9	≥ 20
Parks percent canopy cover	41	≥ 40
Percent of neighbourhood in forest stands	26	26
Percent of trees within the smallest size class	50	≥ 10
Percent of street trees that are native	78	50
Number of species that comprise more than 5% of all street trees	6 (white birch, white spruce, poplar, eastern serviceberry, Norway maple, sugar maple)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, spruce, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	4,360	0
Percent canopy cover of riparian and recharge zones	16	100
Percent of public play areas that are adequately shaded (40% canopy cover)	67	100
Percent of residential properties with at least one value tree	72	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Forest Hills	470		Drumlin
Main Street	50		Drumlin
Parks	65		Drumlin

Socioeconomic Conditions

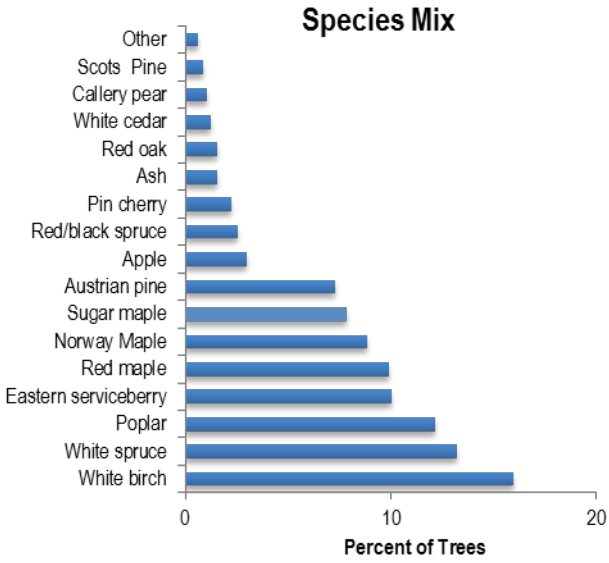
	Land Use	Zoning	Decade of Development
Forest Hills	Residential, park	R-1, PUD, R-1A	1970s
Main Street	Commercial, cemetery	C-4, P-2	1970s
Parks	Park, institutional	P-2, P-1	1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	1,750
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	122 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	95 (eastern hemlock, white pine, yellow birch, red oak)
Refrain from planting the following genera until 2020	Birch, spruce, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	180
Additional Neighbourhood Treatments	
Collaborate with local business owners to improve tree canopy along Highway # 7.	
Reinstate an urban forest ribbon pattern along the streambanks of the Forest Hills Commons.	

Humber Park

The urban forest neighbourhood of Humber Park is located just north of Main Street and extends north from Badger Avenue to Serpentine Avenue. The area features a range of attractive single-family homes separated by treed buffer strips. Humber Park has a comparatively high canopy cover of 40%, with many front yard trees planted on residential properties. Undeveloped parkland surrounding Humber Park Elementary has an excellent canopy cover of 63%, however there are no trees adjacent to the school. The number of street trees along HRM rights of way is also low. Given the current conditions of the urban forest in Humber Park, future management will focus on planting street trees and cooperative efforts with local residents to promote tree planting on the school grounds and residential properties.



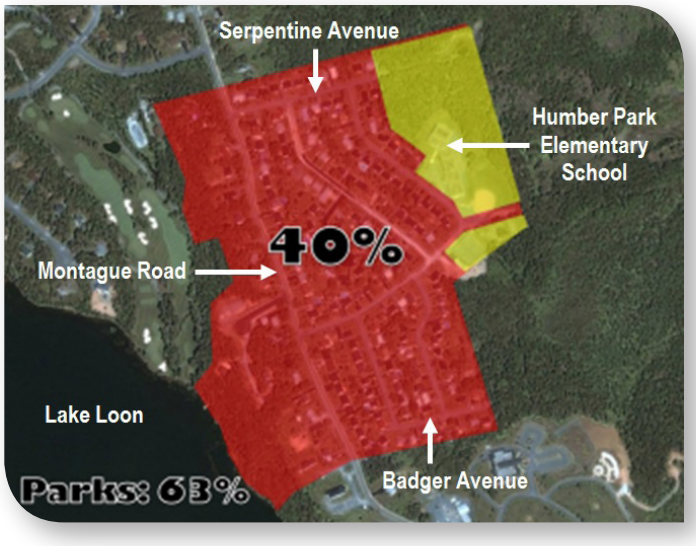
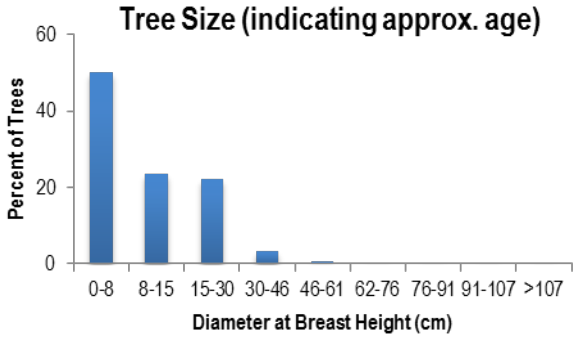


Figure 24



Challenges

- There are few trees planted along the streets in the HRM rights of way.
- There are no shade trees on the grounds of the Humber Park Elementary School.

Opportunities

- There are 255 plantable sites for new street trees in Humber Park.
- Local residents will be organized to work with HRM to achieve urban forest targets.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Humber Park percent canopy cover	40	≥ 70
Parks percent canopy cover	63	≥ 40
Percent of neighbourhood in forest stands	42	42
Percent of trees within the smallest size class	50	≥ 10
Percent of street trees that are native	78	50
Number of species that comprise more than 5% of all street trees	6 (white birch, white spruce, poplar, eastern serviceberry, Norway maple, sugar maple)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, spruce, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	255	0
Percent canopy cover of riparian and recharge zones	100	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	89	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Humber Park	27		Drumlin
Parks	4		Drumlin

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Humber Park	Residential	R-1	1960s
Parks	Park	P-2	1960s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	100
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	11 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	6 (eastern hemlock, white pine, yellow birch, red oak)
Refrain from planting the following genera until 2020	Birch, spruce, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	10

A-5 DARTMOUTH

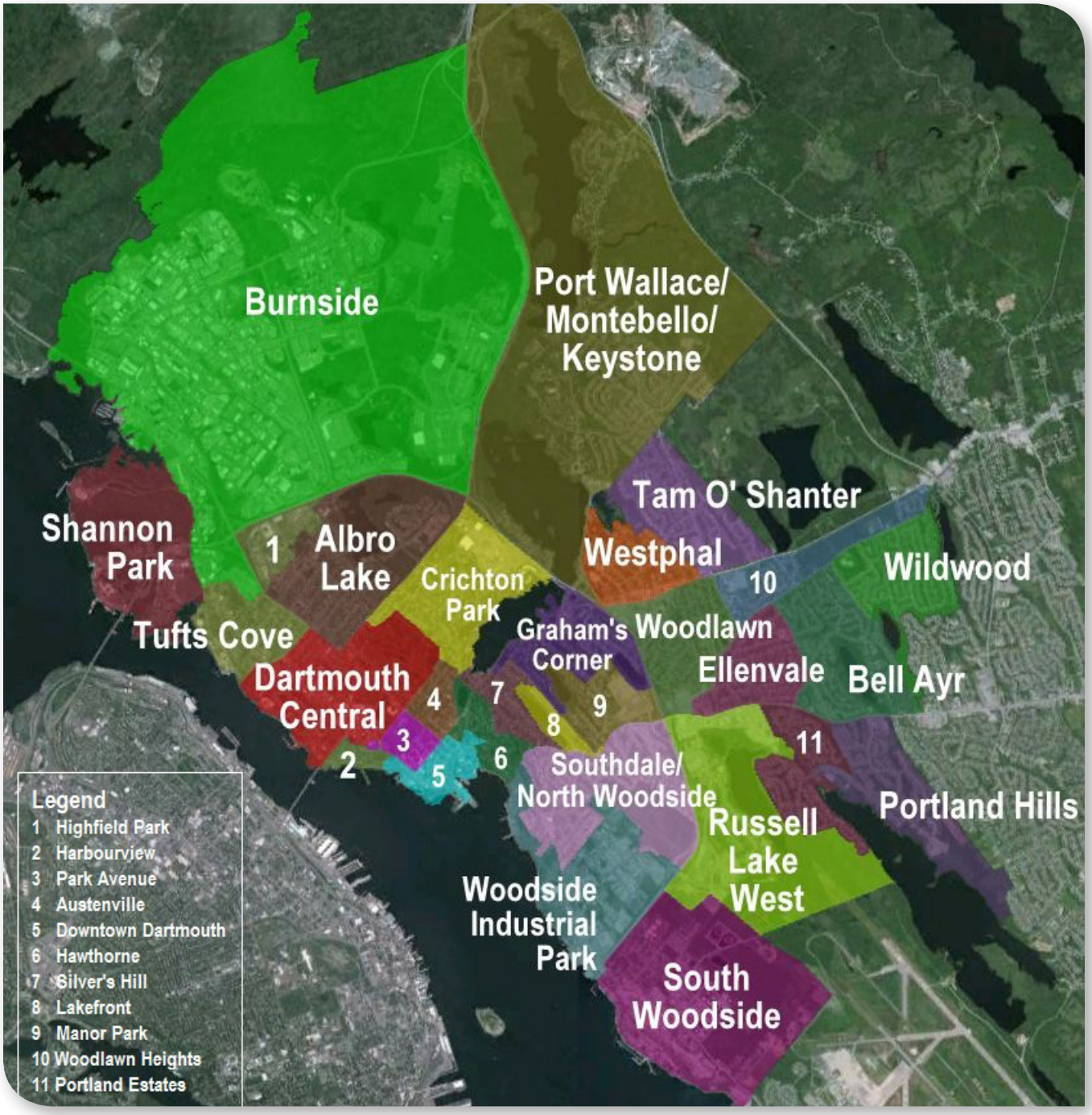
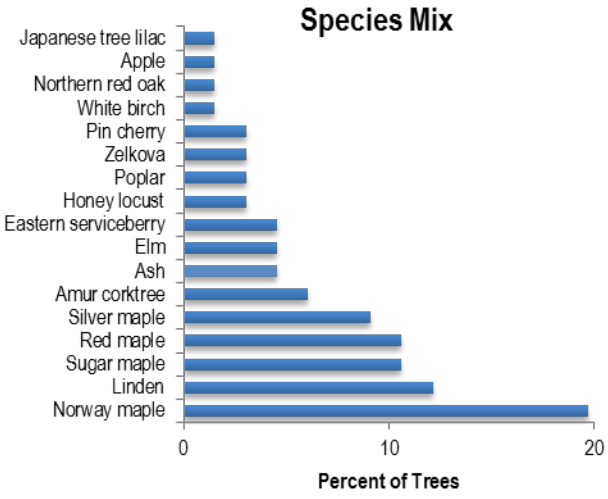
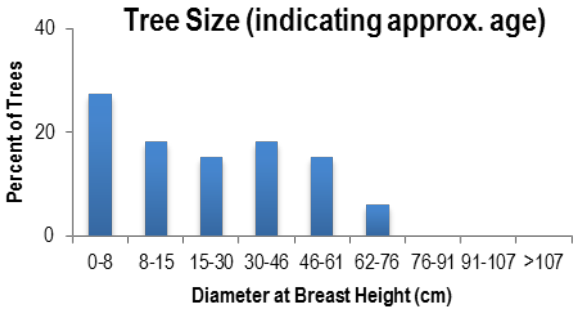


Figure 25

Albro Lake

Albro Lake is a residential urban forest neighbourhood located in north Dartmouth, south and east of the Circumferential Highway, and bounded by Woodland Avenue and Victoria Road (Figure 26). Albro Lake has 25% canopy cover, which is among the highest in the Old Dartmouth neighbourhoods. There is a predominance of introduced urban species, such as Norway maple and linden, and an older tree population; however, age-class diversity in the street tree population is far better than in the Halifax Peninsula. The many multi-family complexes in the southwestern corner of the neighbourhood, where canopy cover is especially low, will be priority areas for improving the urban forest. The Albro Lake waterbody, Little Albro Lake, and Martin Lake are within the well-canopied Cyril Smith and Albro Lake parks. An urban forest ribbon pattern will be maintained and improved along the Circumferential Highway right of way.





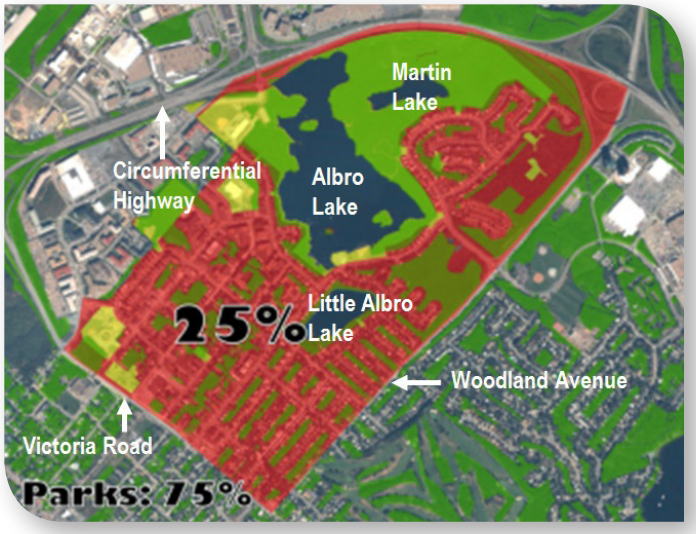


Figure 26

Challenges

- There is an over-representation of Norway maple and linden in the street tree population.
- Several larger multi-family residential properties have few trees. Planting new trees in these areas will be an integral component of maintaining and increasing the benefits to residents from their urban forest.
- The canopy cover in the riparian zone around Little Albro Lake is poor, and lakefront properties with few trees threaten the integrity of the lake and its shoreline.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 25% to 70%.
- There are 465 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Albro Lake percent canopy cover	25	≥ 70
Parks percent canopy cover	75	≥ 90
Percent of neighbourhood in forest stands	0	5
Percent of trees within the smallest size class	27	≥ 10
Percent of street trees that are native	32	50
Number of species that comprise more than 5% of all street trees	4 (Norway maple, linden, sugar maple, red maple)	0
Number of genera that comprise more than 10% of all street trees	2 (maple, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (sugar maple, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	465	0
Percent canopy cover of riparian and recharge zones	66	100
Percent of public play areas that are adequately shaded (40% canopy cover)	39	100
Percent of residential properties with at least one value tree	65	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Albro Lake	147		Till veneer, hummocky till, drumlins
Parks	44		Till veneer, hummocky till, drumlins

Socioeconomic Conditions

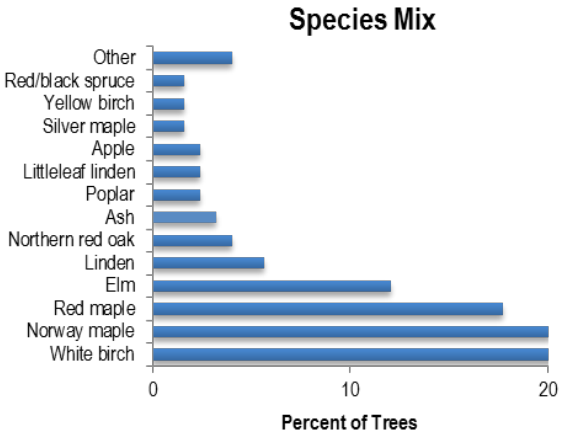
	Land Use	Zoning	Decade of Development
Albro Lake	Residential	R-1, R-1M, R-3	1960s – 1970s
Parks	Park	P	1960s – 1970s

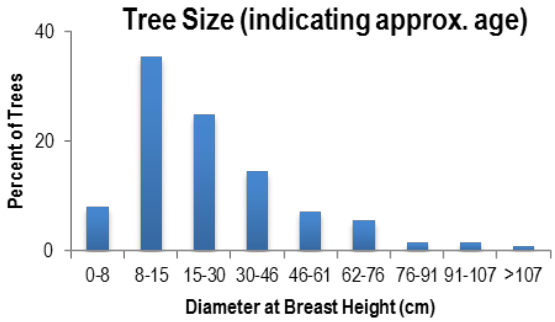
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	185
Area of naturalized forest stands to be created on HRM lands per decade	7 ha
Area of naturalized forest stands not to fall below	N/A
Average number of native trees to plant on HRM lands per decade	25
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (red spruce, eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	2
Additional Neighbourhood Treatments	
Improve the canopy cover around Little Albro Lake through collaboration with lakefront homeowners.	

Austenville

Austenville is a small, quiet residential urban forest neighbourhood in Old Dartmouth (Figure 27). Its steep hills rise quickly from the shores of Sullivans Pond and Lake Banook to the fairways of Brightwood golf course in the west. The area is bounded by Thistle Street, Mayflower Street, Crichton Avenue, Ochterloney Street, and Victoria Road. With the exception of some commercial land uses along Ochterloney Street, the area's long-term and predominant land use has been single-family residential. It is surprising, therefore, that the neighbourhood has only 23% canopy cover. There is an over-representation of both typical introduced urban species, including Norway maple, elm, and linden, and some native species, including white birch and red maple. Austenville's trees are also aging, without enough younger age classes for replacement. The clearest challenge in the neighbourhood is the limited number of trees on residential properties. The key focus for urban forest management in Austenville—apart from the prescribed neighbourhood treatments—will be to communicate with homeowners about opportunities and strategies to improve their neighbourhood's urban forest by planting trees on their properties. Another area for improvement is the Pine Street Park (shown in light green) that currently has 0% canopy cover. Additional plantings of street trees in Austenville will help strengthen the area's urban forest network pattern.





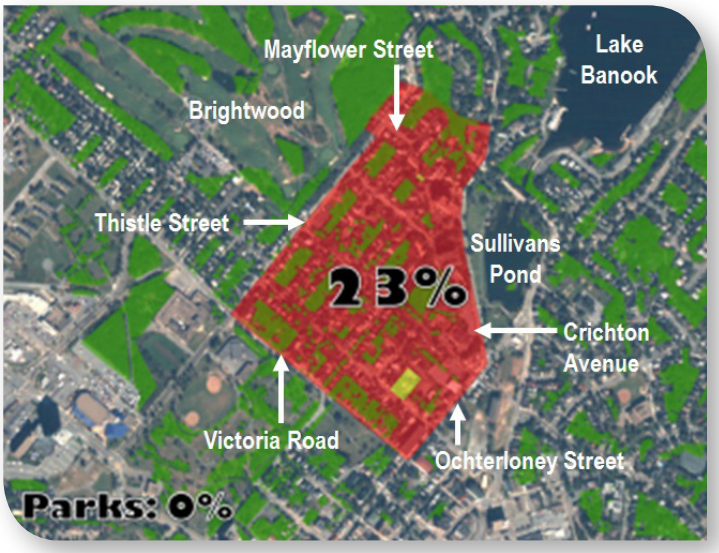


Figure 27

Challenges

- There are few trees on private residential lots.
- There is an over-representation of some introduced and native species in the street tree population.
- Austenville's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees, and not enough young trees to replace them.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 23% to 70%.
- There are 153 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 0% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Austenville percent canopy cover	23	≥ 20
Parks percent canopy cover	0	≥ 40
Percent of neighbourhood in forest stands	9	0
Percent of trees within the smallest size class	8	≥ 10
Percent of street trees that are native	48	50
Number of species that comprise more than 5% of all street trees	6 (white birch, Norway maple, red maple, elm, linden)	0
Number of genera that comprise more than 10% of all street trees	4 (maple, birch, elm, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	91	100
Number of plantable sites in HRM rights of way	220	0
Percent canopy cover of riparian and recharge zones	28	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	32	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Austenville	29		Till veneer
Parks	0.3		Till veneer

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Austenville	Commercial	DN, DB	1940s
Parks	Commercial	DN	1940s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	90
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	N/A
Average number of native trees to plant on HRM lands per decade	2
Average number of Acadian old-growth species to plant on HRM lands per decade	3 (red spruce, eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Maple, birch, elm, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	10

Bell Ayr

Bell Ayr is a residential neighbourhood located between Portland Street and Mt. Edward Road (Figure 28). The neighbourhood has 23% canopy cover, which is fairly typical of Dartmouth's residential neighbourhoods outside the Circumferential Highway, and has room for improvement. The best opportunities for urban forest improvement are HRM rights of way, where there are few trees and an over-representation of the invasive Norway maple, and HRM parks, many of which have poor canopy cover and no shade for recreation. The Bell Lake riparian zone, most of which is found within Bell Lake Park, has 56% canopy cover. Urban forest improvements in Bell Ayr will be directed towards this riparian area, the patchwork pattern created by the many parks in this neighbourhood, and the network pattern along streets, which is currently underdeveloped.

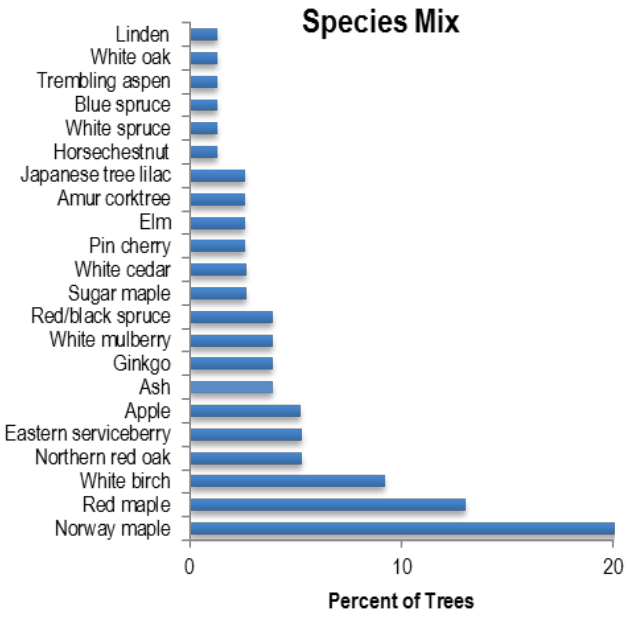
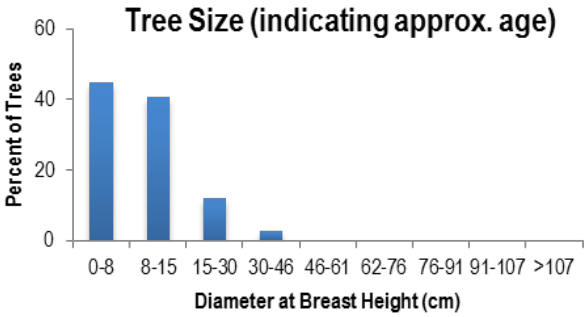


Figure 28



Challenges

- There are few trees on private residential lots.
- There is an over-representation of Norway maple in the street tree population.
- There is somewhat low canopy cover in the riparian zone of Bell Lake, which is at risk for being polluted by runoff and sedimentation.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 23% to 70%.
- There are 1,357 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 56% to 90%.
- Land-use policies and land-use by-laws will be amended to ensure that there is no loss of canopy cover due to new development.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Bell Ayr percent canopy cover	23	≥ 70
Parks percent canopy cover	56	≥ 90
Percent of neighbourhood in forest stands	27	33
Percent of trees within the smallest size class	45	≥ 10
Percent of street trees that are native	47	50
Number of species that comprise more than 5% of all street trees	3 (Norway maple, red maple, white birch)	0
Number of genera that comprise more than 10% of all street trees	1 (maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red oak, red spruce, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	1,357	0
Percent canopy cover of riparian and recharge zones	56	100
Percent of public play areas that are adequately shaded (40% canopy cover)	43	100
Percent of residential properties with at least one value tree	60	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Bell Ayr	120		Drumlin, till veneer
Parks	20		Drumlin, till veneer

Socioeconomic Conditions

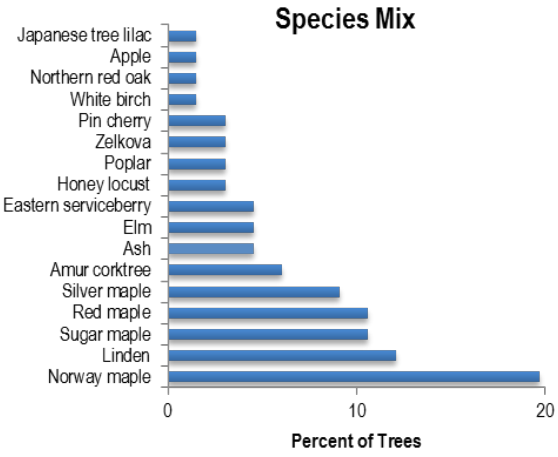
	Land Use	Zoning	Decade of Development
Bell Ayr	Residential	R-1, R-2	1960s
Parks	Park, Residential	P, R-1	1960s

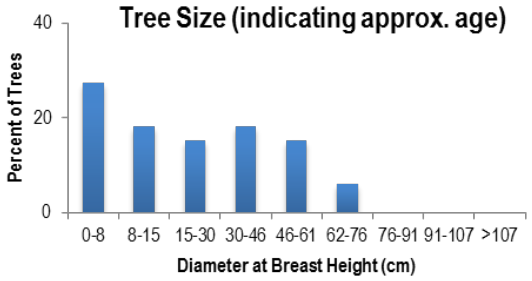
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	540
Area of naturalized forest stands to be created on HRM lands per decade	68,000 m2
Area of naturalized forest stands not to fall below	32 ha
Average number of native trees to plant on HRM lands per decade	12
Average number of Acadian old-growth species to plant on HRM lands per decade	6 (eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Target riparian areas along Bell Lake and HRM parks for improving canopy cover.	

Burnside

The urban forest neighbourhood designated as Burnside in the UFMP is one of the largest neighbourhoods in the HRM at 1,828 ha (Figure 29), and has some considerable challenges and pressures to its urban forest. It is bounded by Highway 118, Highway 111, and the Bedford Basin shore. Burnside has sharp divisions in its urban forest, between the developed industrial and business areas, with little-to-no canopy cover, and the undeveloped areas, with continuous, unbroken canopy. Two-thirds of this neighbourhood is within the Burnside Industrial Park/Dartmouth Crossing division, which has 47% canopy cover. Most of this canopy is in residual patches of hinterland forest on undeveloped lots and in parks, with the exception of a few planted street and private trees. The Phase 12-3 Development division is a newly approved, 16-hectare development near the north-eastern corner of the neighbourhood. The division currently has a canopy cover of 99%, and is slated for development with a post development canopy target of 20%. The best opportunity for Burnside will be to establish an urban forest network pattern along HRM road rights of way.





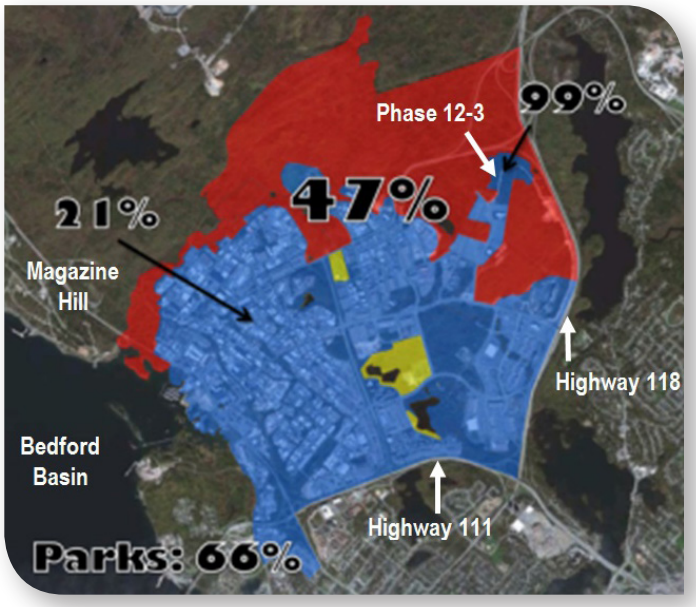


Figure 29

Challenges

- Burnside has high levels of impervious surfaces and few plantable sites for new trees.
- Much of the neighbourhood's intact canopy is at risk from new development, which would substantially lower the neighbourhood's canopy cover. In the areas slated for development, maintaining intact forest canopy will be a challenge as land is cleared, graded, and filled.
- This region is characterized by shallow, poorly drained soils overlying bedrock, with many exposed bedrock ridges. The spruce forest covering most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.
- There are few trees planted along streets in the HRM rights of way. The rights of way provide a good opportunity to improve the Burnside urban forest.

Opportunities

- There are ample opportunities to create ribbon patterns along the boulevarded streets of Burnside.
- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy to 20%.
- There are 2,035 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 66% to 90%.
- Planting new trees on commercial properties, both newly developed and existing, will be an integral component of maintaining and increasing the benefits to residents from their urban forest.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local business groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Burnside percent canopy cover	47 (pre development)	≥ 20 (post development)
Burnside Industrial Park/Dartmouth Crossing percent canopy cover	21 (pre development)	≥ 20 (post development)
Phase 12-3 Development percent canopy cover	100 (pre development)	≥ 20 (post development)
Parks percent canopy cover	66	≥ 90
Percent of neighbourhood in forest stands	46	47
Percent of trees within the smallest size class	27	≥ 10
Percent of street trees that are native	32	50
Number of species that comprise more than 5% of all street trees	4 (Norway maple, linden, sugar maple, red maple)	0
Number of genera that comprise more than 10% of all street trees	2 (maple, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (sugar maple, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	2,035	0
Percent canopy cover of riparian and recharge zones	85	100
Percent of public play areas that are adequately shaded (40% canopy cover)	67	100
Percent of residential properties with at least one value tree	15	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Burnside	1,828		Hummocky till, till veneer, till blanket
Burnside Industrial Park/Dartmouth Crossing	1,127		Anthropogenic
Phase 12-3 Development	19		Till blanket
Parks	37		Hummocky till

Socioeconomic Conditions

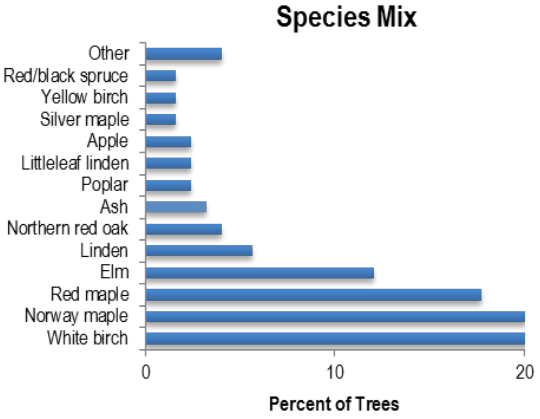
	Land Use	Zoning	Decade of Development
Burnside	Industrial	I-2	1970s/2000s
Burnside Industrial Park/Dartmouth Crossing	Industrial	I-2	2010s (projected)
Phase 12-3 Development	Industrial	I-2	2010s
Parks	Park	I-2	1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	815
Area of naturalized forest stands to be created on HRM lands per decade	9 ha
Area of naturalized forest stands not to fall below	840
Average number of native trees to plant on HRM lands per decade	120
Average number of Acadian old-growth species to plant on HRM lands per decade	15 (red spruce, eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	10
Additional Neighbourhood Treatments	
Collaborate with the Greater Burnside Business Association and Eco-Efficiency Centre to improve the urban forest.	
Develop urban forest ribbon patterns along the boulevarded streets in Burnside.	

Crichton Park

Crichton Park is a beautiful urban forest neighbourhood bounded by the Brightwood Golf and Country Club, Woodland Avenue, the Circumferential Highway, and Lake Banook (Figure 30). It is principally a residential neighbourhood featuring single-family housing, with a mix of townhouses and apartment complexes in the vicinity of Mic Mac Mall, the area's only commercial land use. Crichton Park's urban forest canopy cover (shown in red) is 23%. There is an over-representation of both typical introduced urban species, including Norway maple, elm, and linden, and some native species, including white birch and red maple. Crichton Park also has an older street tree population, with insufficient numbers of younger trees to replace them. Townhouse and apartment developments near the northwestern shore of Lake Banook provide fine examples of good riparian area protection, urban forest retention, and management. Mic Mac Mall poses a key challenge to improving Crichton Park's urban forest. This commercial division (shown in blue) has a low 11% canopy cover and abundant impervious surfaces, with few spots to plant additional trees. Apart from Birch Cove Park and Brookdale Crescent Park (shown in light green), riparian protection for the western shore of Lake Banook should be improved by planting more trees on residential properties between the parks. Although Maybank Park (shown in light green) features some areas of naturalized forest, more plantings around the park's sport fields would provide shade for players and spectators. There is an opportunity to develop a forested ribbon pattern along the Circumferential Highway and Woodland Avenue rights of way, and along the boulevard sections of Micmac Boulevard.



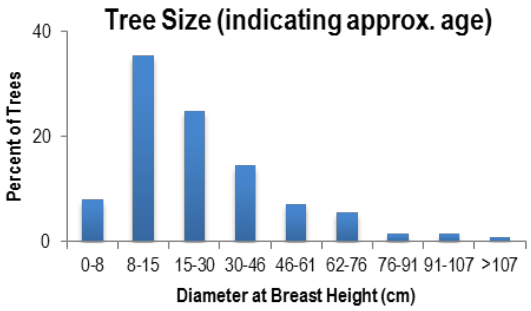


Figure 30

Challenges

- The Mic Mac Mall commercial division has very low canopy cover. The high degree of imperviousness and lack of plantable sites make it a considerable challenge to improving the Crichton Park urban forest.
- There is an over-representation of some introduced and some native species in the street tree population.
- Crichton Park's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees, and not enough young trees to replace them.
- There are areas of limited canopy cover in the Lake Banook riparian zone. Lakefront properties with few trees pose runoff and sedimentation risks to lake water quality.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 23% to 70%.
- There are 850 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 58% to 90%.
- Mic Mac Mall canopy can be increased from 11% to 20%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets for their neighbourhoods.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Crichton Park percent canopy cover	23	≥ 70
Mic Mac Mall percent canopy cover	11	≥ 20
Parks percent canopy cover	58	≥ 90
Percent of neighbourhood in forest stands	28	33
Percent of trees within the smallest size class	8	≥ 10
Percent of street trees that are native	48	50
Number of species that comprise more than 5% of all street trees	6 (white birch, Norway maple, red maple, elm, linden)	0
Number of genera that comprise more than 10% of all street trees	4 (maple, birch, elm, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	91	100
Number of plantable sites in HRM rights of way	850	0
Percent canopy cover of riparian and recharge zones	60	100
Percent of public play areas that are adequately shaded (40% canopy cover)	83	100
Percent of residential properties with at least one value tree	69	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Crichton Park	131		
Mic Mac Mall	36		
Parks	21		

Socioeconomic Conditions

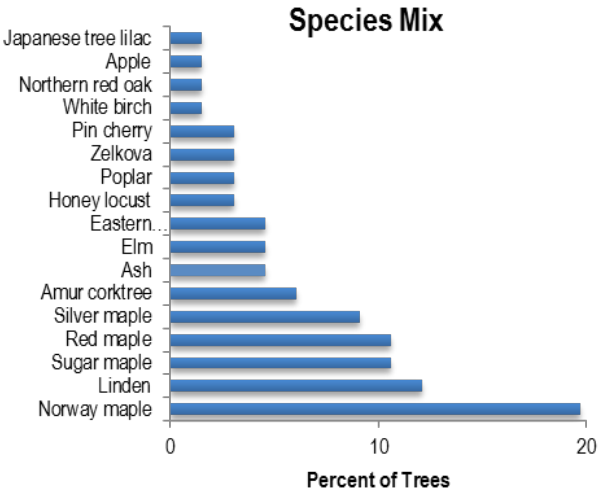
	Land Use	Zoning	Decade of Development
Crichton Park	Residential	R-1	1950s
Mic Mac Mall	Commercial, Multi-family Residential	C-3, R-3	1960s
Parks	Park	P	1950s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	340
Area of naturalized forest stands to be created on HRM lands per decade	7 ha
Area of naturalized forest stands not to fall below	36 ha
Average number of native trees to plant on HRM lands per decade	8
Average number of Acadian old-growth species to plant on HRM lands per decade	10 (red spruce, eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Maple, birch, elm, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	40
Additional Neighbourhood Treatments	
Increase canopy cover in the Lake Banook riparian zone.	
Collaborate with Ivanhoe Cambridge Ltd., owners and managers of the Mic Mac Mall, to improve the urban forest.	

Dartmouth Central

The Dartmouth Central urban forest neighbourhood (Figure 31) is generally bounded by Halifax Harbour, Albro Lake Road, the Brightwood Golf and Country Club, and Thistle Street. The area features commercial, multi-family residential, single-family residential, institutional, and recreational land uses. Although there is an overall canopy cover of 22%, the character of the urban forest varies greatly throughout the neighbourhood. To the northeast, Brightwood's forested golf course contributes significantly to the area's canopy, as do most of the neighbourhood's residential properties. In contrast, the Wyse Road commercial division (shown in blue) is heavily developed. Here, trees are scarce, providing the division with only a 2% canopy cover. This division has a predominance of impervious surfaces with few plantable sites, and will be a key challenge to improving Dartmouth Central's urban forest. The harbour shoreline has poor canopy cover, but it could be developed as an urban forest ribbon pattern. Largely infilled, its impervious surfaces and impoverished substrate will require creative approaches to plantings. The area's parks, including Mount Herman Cemetery, have a relatively low 28% canopy cover, but they contain abundant plantable sites. Future redevelopment is likely in this area. Careful consideration should be given to preserving and enhancing the urban forest when these developments take place.



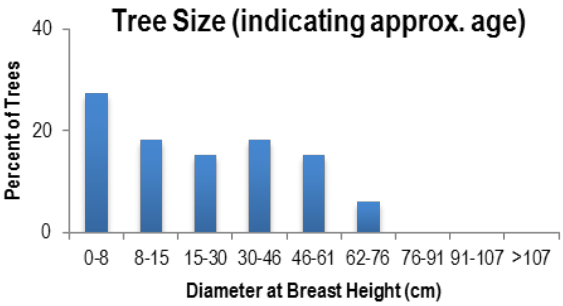


Figure 31

Challenges

- There is an over-representation of Norway maple and linden in the street tree population.
- The Wyse Road commercial division has very low canopy cover. The high degree of imperviousness and lack of plantable sites will make it a considerable challenge to improving Dartmouth Central's urban forest.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 22% to 70%.
- There are 440 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 28% to 40%.
- Wyse Road canopy can be increased from 2% to 20%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Dartmouth Central percent canopy cover	22	≥ 70
Wyse Road percent canopy cover	2	≥ 20
Parks percent canopy cover	28	≥ 40
Percent of neighbourhood in forest stands	12	2
Percent of trees within the smallest size class	27	≥ 10
Percent of street trees that are native	32	50
Number of species that comprise more than 5% of all street trees	4 (Norway maple, linden, sugar maple, red maple)	0
Number of genera that comprise more than 10% of all street trees	2 (maple, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (sugar maple, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	440	0
Percent canopy cover of riparian and recharge zones	45	100
Percent of public play areas that are adequately shaded (40% canopy cover)	40	100
Percent of residential properties with at least one value tree	68	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Dartmouth Central	184		
Wyse Road	24		
Parks	12		

Socioeconomic Conditions

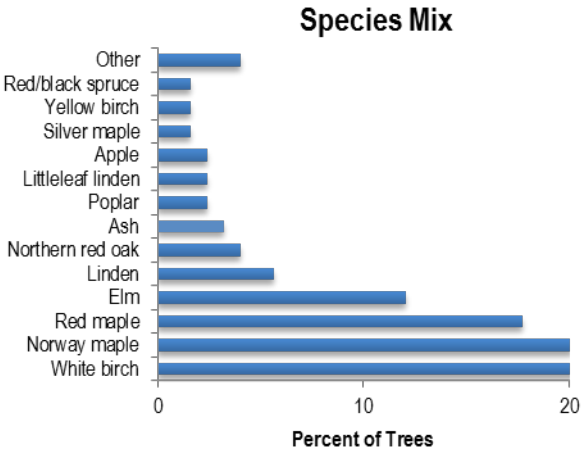
	Land Use	Zoning	Decade of Development
Dartmouth Central	Residential, Golf Course	P, R-1, R-2	1950s
Wyse Road	Commercial	C2-R4, C-2	1960s
Parks	Park, Institutional	P, S	1700s/1950s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	175
Area of naturalized forest stands to be created on HRM lands per decade	3 ha
Area of naturalized forest stands not to fall below	22 ha
Average number of native trees to plant on HRM lands per decade	25
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (red spruce, eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	2
Additional Neighbourhood Treatments	
The Dartmouth Common Master Plan (adopted in 2011) provides guidance for urban forest treatments on Common lands.	
Establish collaborative urban forest rehabilitation efforts with Wyse Road commercial division stakeholders.	
Develop a Halifax Harbour shoreline urban forest ribbon pattern.	

Downtown Dartmouth

The street network of Downtown Dartmouth's urban forest neighbourhood (Figure 32) was first laid out in 1755. Over the past 256 years, this area has seen many changes in fortune, but today the area is experiencing a vibrant transformation with development of new condominiums, apartment complexes, and commercial ventures. These exciting changes also bring new opportunities to restore the neighbourhood's urban forest. With only 3% canopy cover, there is much work to be done. There is a lack of species diversity and an insufficient proportion of young trees in the street tree population. Much of the Downtown is highly impervious. The shoreline has been extensively infilled, leaving few natural opportunities for tree growth. This will make planting new trees a challenge, although Ferry Terminal Park demonstrates that it is possible to utilize berm planting to establish well-treed open space in this harsh environment. The Kings Wharf development will need to incorporate berms, planters, or other landscaping strategies to develop a good tree canopy for the site. The partial urban forest ribbon pattern currently existing along parkland bordering the Halifax harbour shoreline and the boulevards of Alderney drive will be strengthened through additional plantings.



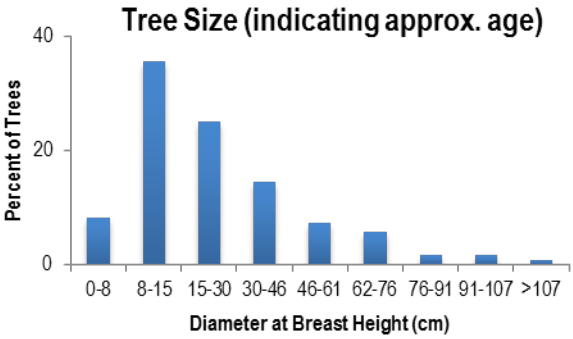


Figure 32

Challenges

- There is a high proportion of imperviousness in the neighbourhood. Moreover, much of it lies on artificially created substrate beyond the harbour's natural shoreline, where planting trees will be challenging.
- There is low species diversity in the street tree population.
- Downtown Dartmouth's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees and not enough young trees to replace them.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 3% to 12%.
- There are 285 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 3% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Downtown Dartmouth percent canopy cover	3	≥ 12
Parks percent canopy cover	3	≥ 40
Percent of neighbourhood in forest stands	0	0.5
Percent of trees within the smallest size class	8	≥ 10
Percent of street trees that are native	48	50
Number of species that comprise more than 5% of all street trees	6 (white birch, Norway maple, red maple, elm, linden)	0
Number of genera that comprise more than 10% of all street trees	4 (maple, birch, elm, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	91	100
Number of plantable sites in HRM rights of way	285	0
Percent canopy cover of riparian and recharge zones	0	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	16	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Downtown Dartmouth	36		Till veneer, anthropogenic
Parks	8		Till veneer, anthropogenic

Socioeconomic Conditions

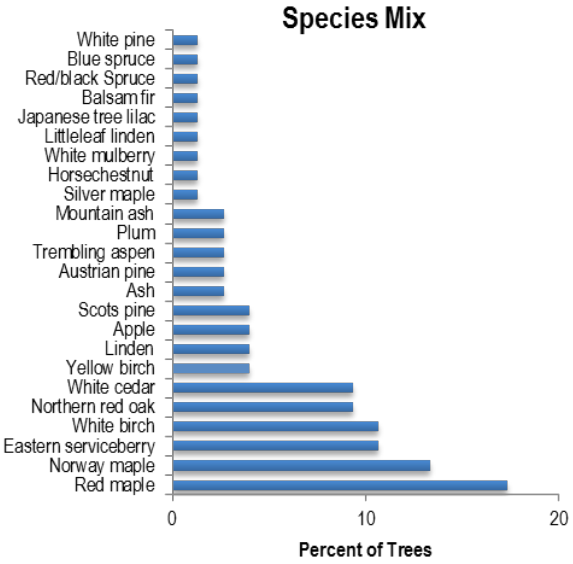
	Land Use	Zoning	Decade of Development
Downtown Dartmouth	Residential, Commercial	DB, M	1750s
Parks	Industrial	W	1750s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	120
Area of naturalized forest stands to be created on HRM lands per decade	0.5 ha
Area of naturalized forest stands not to fall below	N/A
Average number of native trees to plant on HRM lands per decade	3
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (red spruce, eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Maple, birch, elm, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	15
Additional Neighbourhood Treatments	
Enhance the urban Alderney Drive and Ferry Terminal Park urban forest ribbon pattern.	
Collaborate with Fares Real Estate Inc., the developers of Kings Wharf, to improve the urban forest.	

Ellenvale

Ellenvale is a residential neighbourhood enclosed by Portland Street to the south, Woodlawn Road to the west, and Spring Avenue to the east (Figure 33). Ellenvale has 27% canopy cover (shown in red), and 17% canopy cover in HRM parks (shown in light green). Most of Ellenvale's trees are in buffer strips between the rear boundaries of residential properties; however, there are few trees on the private properties or in the HRM rights of way. The street tree population is aging, with an overabundance of large, mature trees, especially maples, which is a future concern. A dominant natural feature is the Ellenvale Run, a stream that bisects the neighbourhood from north to south. It has very poor canopy cover, and has been built over in some sections. Improving the integrity of the Ellenvale Run—a current Clean Nova Scotia restoration initiative—will require improving the urban forest conditions within its riparian buffer zone; collaboration between HRM and Clean Nova Scotia will be vital. Moreover, a forested riparian ribbon pattern can be developed along the stream through the entire neighbourhood.



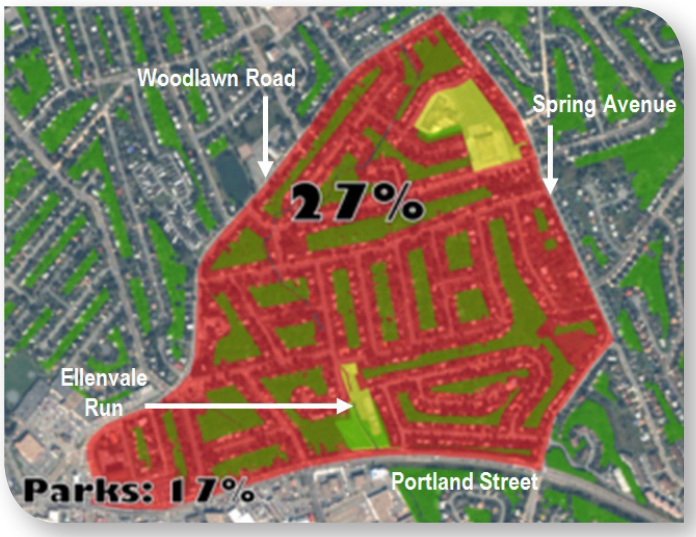
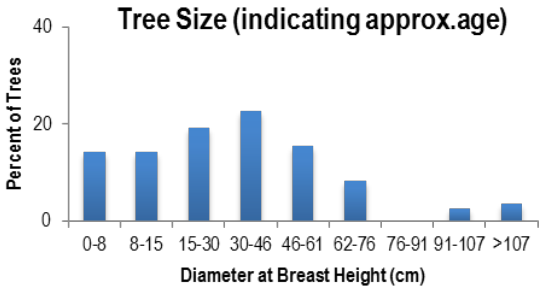


Figure 33



Challenges

- Ellenvale Run, the stream that bisects the Ellenvale neighbourhood, has poor canopy cover.
- Ellenvale's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees, and not enough young trees to replace them.
- There is an over-representation of maples in the street tree population, including the invasive Norway maple.
- There are few trees on private residential lots.
- The canopy cover in neighbourhood parks is low, with none adequately shaded.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 27% to 70%.
- There are 1,355 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 17% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Ellenvale percent canopy cover	27	≥ 70
Parks percent canopy cover	17	≥ 40
Percent of neighbourhood in forest stands	22	23
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	67	50
Number of species that comprise more than 5% of all street trees	6 (red maple, Norway maple, eastern serviceberry, white birch, red oak, white cedar)	0
Number of genera that comprise more than 10% of all street trees	3 (maple, serviceberry, birch)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	(red oak, yellow birch, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	1,355	0
Percent canopy cover of riparian and recharge zones	43	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	72	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Ellenvale	81		Till veneer, drumlins
Parks	4		Till veneer

Socioeconomic Conditions

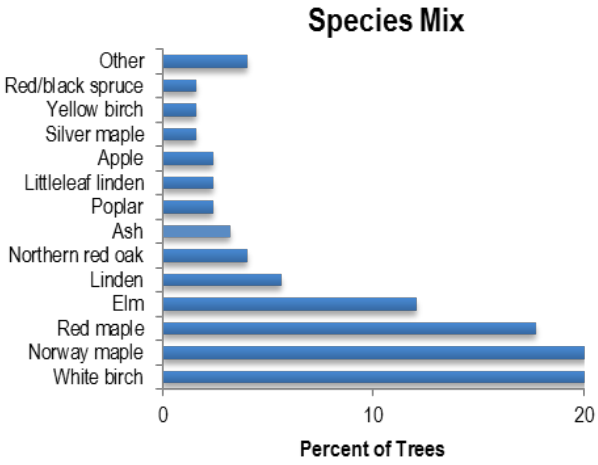
	Land Use	Zoning	Decade of Development
Ellenvale	Residential	R-2, R-1, H	1950s
Parks	Residential	R-2, R-1	1950s

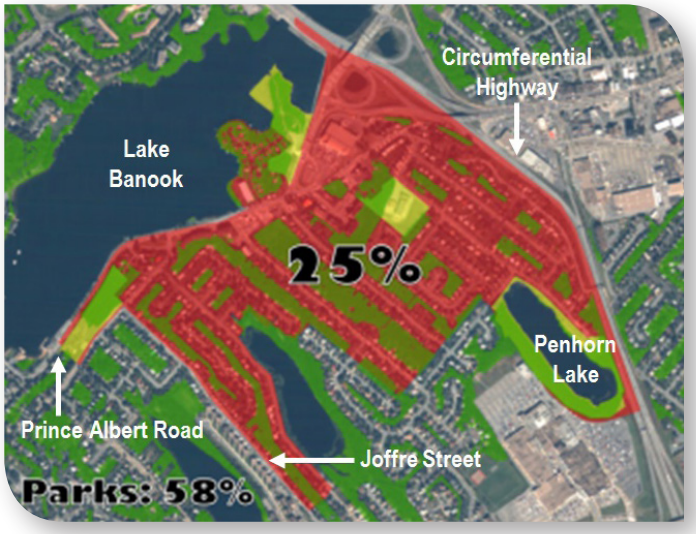
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	540
Area of naturalized forest stands to be created on HRM lands per decade	9,200 m2
Area of naturalized forest stands not to fall below	18 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	3 (red spruce, eastern hemlock, sugar maple)
Refrain from planting the following genera until 2020	Maple, serviceberry, birch
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	2
Additional Neighbourhood Treatments	
Target riparian areas along the Ellenvale Run for improving canopy cover and developing an urban forest ribbon pattern.	

Graham's Corner

The Graham's Corner urban forest neighbourhood extends east from Lake Banook (Figure 34). The area features park, commercial, institutional, and residential land uses, with 25% canopy cover (shown in red). There is a lack of species diversity in the neighbourhood, and an insufficient proportion of young trees in the street tree population. There is also a noticeable divide in the number of trees on residential properties between the west and east sides of the neighbourhood. In the east, canopy cover is much lower as there are far fewer trees around homes. Canopy cover is also low in the highly impervious northern corner of the neighbourhood around the Atlantic Superstore and the Circumferential Highway. Riparian canopy cover is also fairly low along the northeastern shore of Lake Banook and the eastern shore of Penhorn Lake.





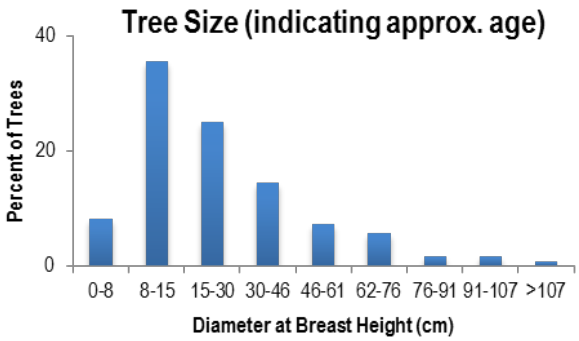


Figure 34

Challenges

- There are few trees on private residential lots.
- There is poor canopy cover in the riparian zones of Lake Banook and Penhorn Lake, which are at risk for being affected by runoff and sedimentation.
- There is low species diversity in the street tree population.
- Graham's Corner's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees and not enough young trees to replace them.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 25% to 70%.
- There are 687 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 58% to 90%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Graham's Corner percent canopy cover	25	≥ 70
Parks percent canopy cover	58	≥ 90
Percent of neighbourhood in forest stands	28	32
Percent of trees within the smallest size class	8	≥ 10
Percent of street trees that are native	48	50
Number of species that comprise more than 5% of all street trees	6 (white birch, Norway maple, red maple, elm, linden)	0
Number of genera that comprise more than 10% of all street trees	4 (maple, birch, elm, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	91	100
Number of plantable sites in HRM rights of way	687	0
Percent canopy cover of riparian and recharge zones	47	100
Percent of public play areas that are adequately shaded (40% canopy cover)	75	100
Percent of residential properties with at least one value tree	67	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Graham's Corner	84		
Parks	10		

Socioeconomic Conditions

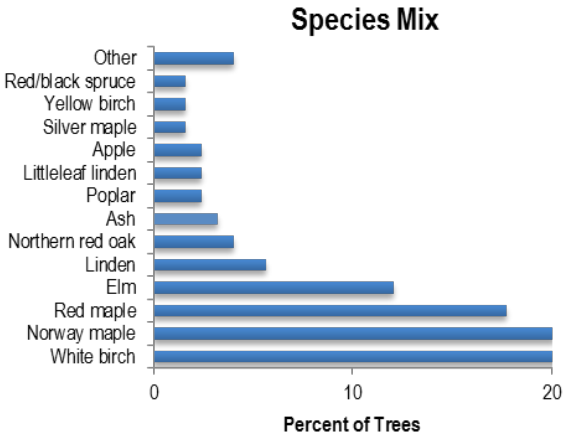
	Land Use	Zoning	Decade of Development
Graham's Corner	Residential	R-2, R-1, H	1960s/1970s
Parks	Park	P	1960s/1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	275
Area of naturalized forest stands to be created on HRM lands per decade	3 ha
Area of naturalized forest stands not to fall below	24 ha
Average number of native trees to plant on HRM lands per decade	6
Average number of Acadian old-growth species to plant on HRM lands per decade	10 (red spruce, eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Maple, birch, elm, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	35
Additional Neighbourhood Treatments	
Increase canopy cover around Lake Banook and Penhorn Lake, especially in Penhorn Lake Park and Graham's Grove Park.	

Harbourview

The Harbourview urban forest neighbourhood is an iconic and historic downtown Dartmouth residential neighbourhood that overlooks Halifax Harbour (Figure 35). It is bounded by Nantucket Avenue, Alderney Drive, and Geary Street. One of the neighbourhood's key features is the historic St. Paul's Cemetery. It is part of the Dartmouth Common and also contains a protected viewplane of the Harbour. Given the age and well-established nature of the area, it is striking that it only has 6% canopy cover. However, the land use of the shoreline area is predominantly industrial, with CN Rail being the majority landowner. The shoreline area has no canopy cover. Throughout Harbourview, there is an over-representation of both typical introduced urban species, including Norway maple, elm, and linden, and some native species, including white birch and red maple. Harbourview's trees are also aging, without enough younger age classes. Planting trees will be a challenge in this neighbourhood, as it consists of a steep slope facing the harbour and CN's industrial shoreline land uses. However, there are opportunities to develop treed ribbon patterns along roadway boulevards and strengthen Harbourview's street tree network pattern. Additional plantings can also improve canopy in the area's parks.



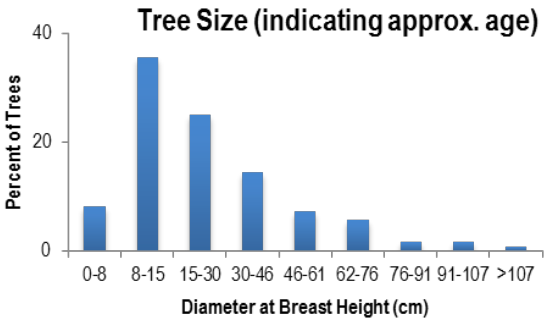


Figure 36

Challenges

- There is a high proportion of imperviousness in the neighbourhood. Moreover, much of it lies on artificially created substrate beyond the harbour's natural shoreline, where planting trees will be exceedingly difficult.
- There is an over-representation of some introduced and some native species in the street tree population.
- Harbourview's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees, and not enough young trees to replace them.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 6% to 12%.
- There are 150 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 16% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Harbourview percent canopy cover	6	≥ 12
Parks percent canopy cover	16	≥ 40
Percent of neighbourhood in forest stands	0	0
Percent of trees within the smallest size class	8	≥ 10
Percent of street trees that are native	48	50
Number of species that comprise more than 5% of all street trees	6 (white birch, Norway maple, red maple, elm, linden)	0
Number of genera that comprise more than 10% of all street trees	4 (maple, birch, elm, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	91	100
Number of plantable sites in HRM rights of way	150	0
Percent canopy cover of riparian and recharge zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	31	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Harbourview	15		Till veneer, anthropogenic
Parks	1		Till veneer, anthropogenic

Socioeconomic Conditions

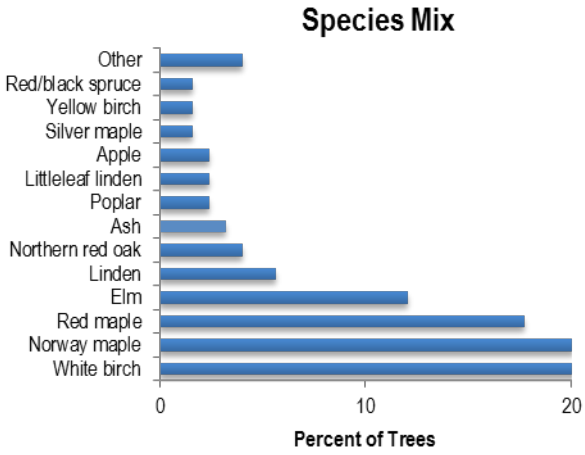
	Land Use	Zoning	Decade of Development
Harbourview	Residential, Industrial, Commercial	DN, W	1840s
Parks	Park	PK	1840s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	60
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	N/A
Average number of native trees to plant on HRM lands per decade	1
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (red spruce, eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Maple, birch, linden, elm
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	7
Additional Neighbourhood Treatments	
Develop urban forest ribbon patterns along Shore Road and the boulevards of Windmill Road and Alderney Drive.	

Hawthorne

The Hawthorne urban forest neighbourhood extends from Dartmouth Cove north to Sullivans Pond. This older neighbourhood features a pleasant mix of single-family residential, park, and multi-family residential land uses (Figure 36). Its 23% canopy cover (shown in red) is relatively low considering the many opportunities in the area for trees to grow. There is a lack of species diversity in the neighbourhood, and an insufficient proportion of young trees in the street tree population. Hawthorne has abundant open green space, notably in Sullivans Pond Park and other parks (shown in light green), where increasing the urban forest canopy would be comparatively easy. In fact, the riparian canopy cover around Sullivans Pond is very low at 13%. The patchwork urban forest pattern can be enhanced through more plantings in parks, and the urban forest network pattern can be improved through street tree plantings. Finally, a urban forest ribbon pattern of trees can be established along the Dartmouth Cove trail.



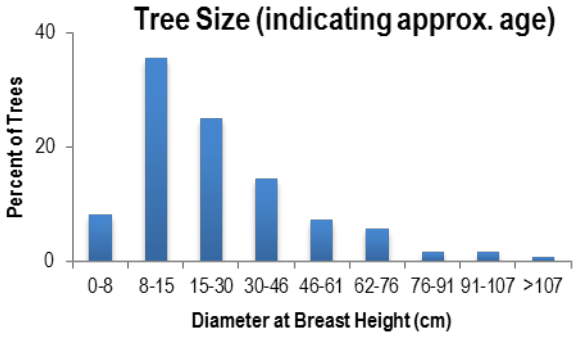


Figure 36

Challenges

- There is poor canopy cover in the Sullivans Pond riparian zone.
- There is low species diversity in the street tree population.
- Hawthorne's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees and not enough young trees to replace them.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 23% to 70%.
- There are 234 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 9% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Hawthorne percent canopy cover	23	≥ 70
Parks percent canopy cover	9	≥ 40
Percent of neighbourhood in forest stands	17	20
Percent of trees within the smallest size class	8	≥ 10
Percent of street trees that are native	48	50
Number of species that comprise more than 5% of all street trees	6 (white birch, Norway maple, red maple, elm, linden)	0
Number of genera that comprise more than 10% of all street trees	4 (maple, birch, elm, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	91	100
Number of plantable sites in HRM rights of way	234	0
Percent canopy cover of riparian and recharge zones	13	100
Percent of public play areas that are adequately shaded (40% canopy cover)	20	100
Percent of residential properties with at least one value tree	65	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Hawthorne	32		
Parks	6		

Socioeconomic Conditions

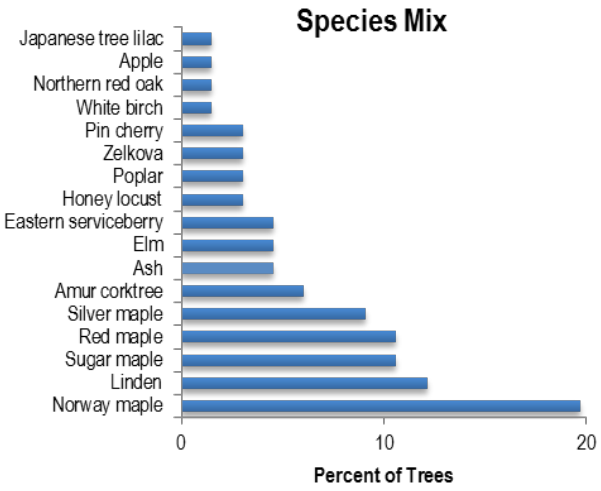
	Land Use	Zoning	Decade of Development
Hawthorne	Residential	DN	1950s
Parks	Park, Institutional	PK	1950s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	95
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Area of naturalized forest stands not to fall below	5 ha
Average number of native trees to plant on HRM lands per decade	2
Average number of Acadian old-growth species to plant on HRM lands per decade	3 (red spruce, eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Maple, birch, elm, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	12
Additional Neighbourhood Treatments	
Enhance the following urban forest patterns through additional plantings: patchwork, network, ribbon.	

Highfield Park

The Highfield Park urban forest neighbourhood is located in Dartmouth's north end, just south of the Circumferential Highway and east of Victoria Road (Figure 37). This high-density area features a number of mid-rise apartment complexes and commercial land uses with an abundance of impervious surfaces, few plantable sites for street trees, and a low canopy cover of just 15%. There is also a greater dominance of introduced urban species such as Norway maple and linden than in other Dartmouth neighbourhoods. The neighbourhood's canopy cover can be considerably improved, but it will require significant collaboration with local commercial and residential property owners. The introduction of tree-lined streets and an overall urban landscape dominated by trees rather than asphalt will dramatically improve Highfield Park's character and aesthetics. An urban forest ribbon pattern of native vegetation along Victoria Road and the Circumferential Highway will be maintained and enhanced through additional plantings and natural regeneration.



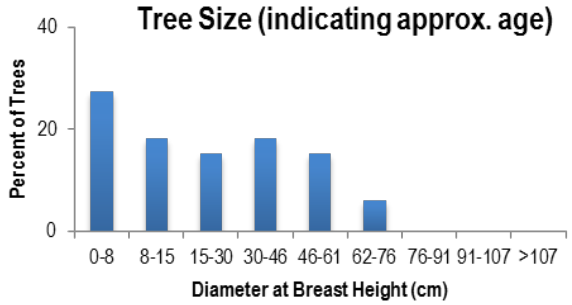


Figure 37

Challenges

- There is an over-representation of Norway maple and linden in the street tree population.
- The multi-family residential properties have few trees planted on their properties.
- There is a high proportion of imperviousness in the neighbourhood.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 15% to 70%.
- There are 145 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Highfield Park percent canopy cover	15	≥ 70
Percent of neighbourhood in forest stands	0	0
Percent of trees within the smallest size class	27	≥ 10
Percent of street trees that are native	32	50
Number of species that comprise more than 5% of all street trees	4 (Norway maple, linden, sugar maple, red maple)	0
Number of genera that comprise more than 10% of all street trees	2 (maple, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (sugar maple, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	145	0
Percent canopy cover of riparian and recharge zones	38	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	45	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Highfield Park	43		Till veneer

Socioeconomic Conditions

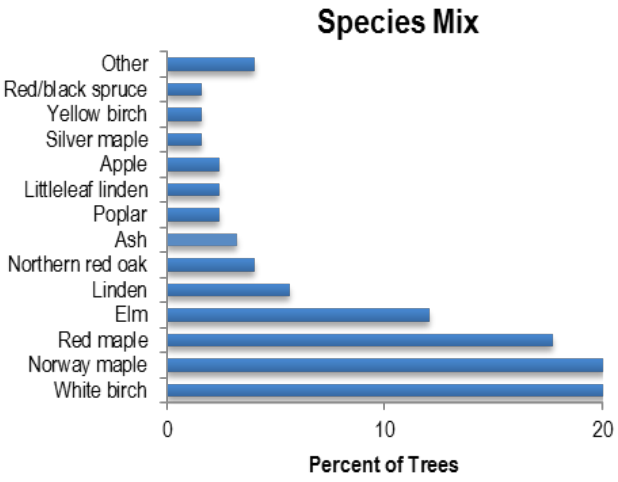
	Land Use	Zoning	Decade of Development
Highfield Park	Multi-family Residential, Commercial	R-3, C-2	1980s

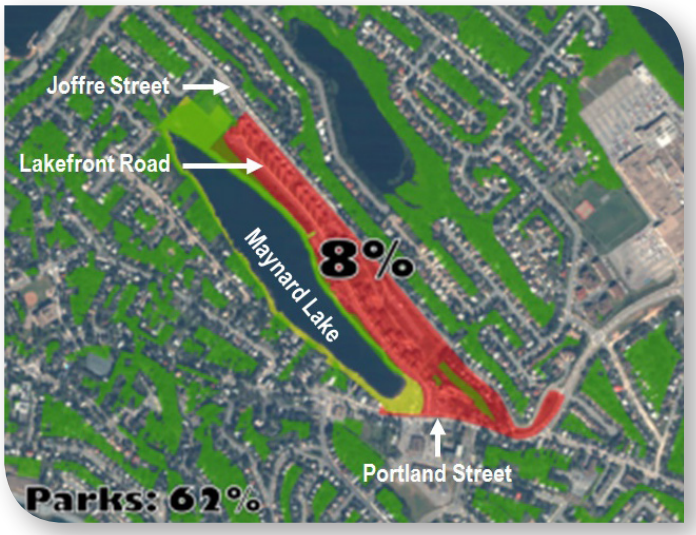
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	60
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	N/A
Average number of native trees to plant on HRM lands per decade	8
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (red spruce, eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	1
Additional Neighbourhood Treatments	
Maintain and enhance the urban forest ribbon pattern along Victoria Road and the Circumferential Highway.	

Lakefront

The Lakefront urban forest neighbourhood is centred on the scenic shores of Maynard Lake (Figure 38). The area features several low-rise apartment units originally developed for military families in the early 1960s. The apartment grounds are attractively landscaped but have very few trees. Challenges for the site include a number of impervious surfaces. It has a canopy cover (shown in red) of only 8%, one of the lowest for all residential neighbourhoods. Almost all of Lakefront's urban forest is located in the riparian zone parkland (shown in light green, 62% canopy) surrounding the lake and a small native patch in the southern tip of the neighbourhood. Like Silver's Hill, Lakefront is situated on a drumlin. The rich soils present an excellent opportunity for trees to thrive in this area.





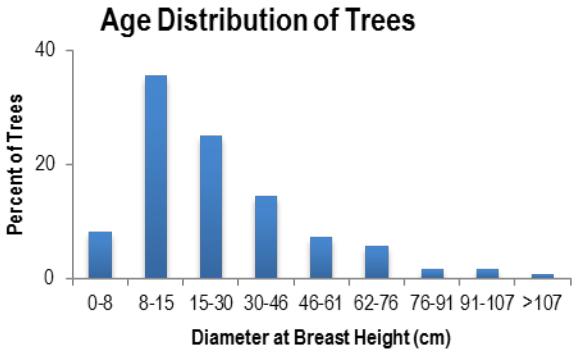


Figure 38

Challenges

- There are few trees on the apartment grounds.
- There is low species diversity in the street tree population.
- Lakefront's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees and not enough young trees to replace them.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 8% to 70%.
- There are 88 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 62% to 90%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups of apartment residents and property owners will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Lakefront percent canopy cover	8	≥ 70
Parks percent canopy cover	62	≥ 90
Percent of neighbourhood in forest stands	11	11
Percent of trees within the smallest size class	8	≥ 10
Percent of street trees that are native	48	50
Number of species that comprise more than 5% of all street trees	6 (white birch, Norway maple, red maple, elm, linden)	0
Number of genera that comprise more than 10% of all street trees	4 (maple, birch, elm, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	91	100
Number of plantable sites in HRM rights of way	88	0
Percent canopy cover of riparian and recharge zones	58	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	29	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Lakefront	11		Drumlins
Parks	3		Drumlins

Socioeconomic Conditions

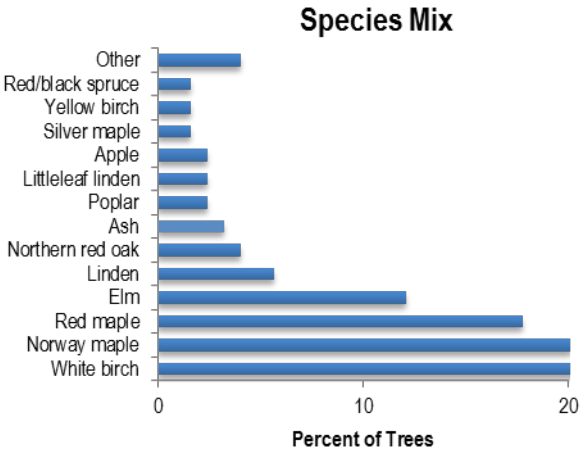
	Land Use	Zoning	Decade of Development
Lakefront	Residential	R-4, R-2	1960s
Parks	Park	P	1960s

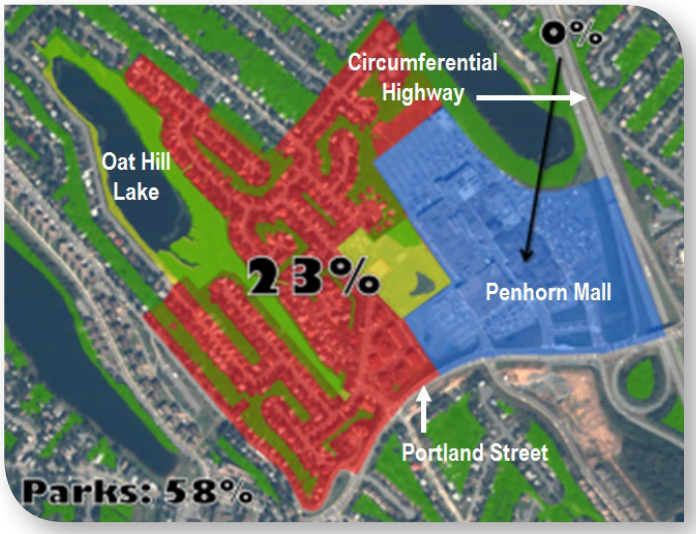
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	35
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	1 ha
Average number of native trees to plant on HRM lands per decade	1
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (red spruce, eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Maple, birch, elm, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	5
Additional Neighbourhood Treatments	
Collaborate with apartment residents and owners to improve the urban forest.	

Manor Park

Manor Park is a relatively new and attractive urban forest neighbourhood developed throughout the 1980s that lies west of the Circumferential Highway and north of Portland Street (Figure 39). The area's urban forest canopy presents a stark division between residential and commercial land uses. The residential area (shown in red) has 23% canopy cover, and Penhorn Mall (shown in blue) has 0% canopy. The anticipated redevelopment of this property presents an excellent opportunity to re-establish an urban forest. Planning activities should focus on coordinating efforts with developers to establish 20% canopy for commercial properties and 70% canopy for residential development. Oat Hill Lake Park is a major feature of Manor Park that exhibits a well-treed riparian zone. Parks in this neighbourhood (shown in light green) have 58% canopy cover, but there is room for improvement. An underlying concern for Manor Park is that the urban forest has somewhat low species diversity and a lack of younger cohorts.





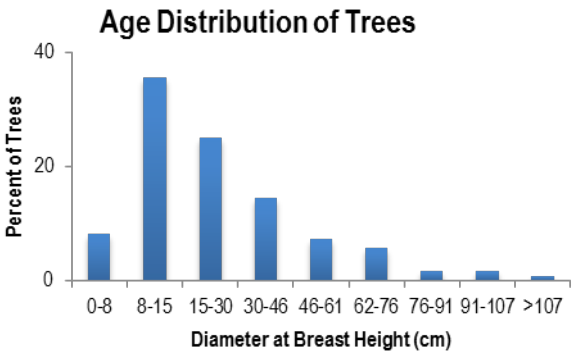


Figure 39

Challenges

- The Penhorn Mall commercial division has very low canopy cover. The high degree of imperviousness and lack of plantable sites make it a considerable challenge to improving Manor Park's urban forest.
- There is low species diversity in the street tree population.
- Manor Park's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees and not enough young trees to replace them.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 23% to 70% in residential areas and a canopy increase from 0% to 20% in commercial divisions.
- There are 287 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 58% to 90%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Manor Park percent canopy cover	23	≥ 70
Penhorn Mall percent canopy cover	0	≥ 20
Parks percent canopy cover	58	≥ 90
Percent of neighbourhood in forest stands	19	23
Percent of trees within the smallest size class	8	≥ 10
Percent of street trees that are native	48	50
Number of species that comprise more than 5% of all street trees	6 (white birch, Norway maple, red maple, elm, linden)	0
Number of genera that comprise more than 10% of all street trees	4 (maple, birch, elm, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	91	100
Number of plantable sites in HRM rights of way	287	0
Percent canopy cover of riparian and recharge zones	70	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	78	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Manor Park	54		Drumlins
Penhorn Mall	20		Drumlins
Parks	7		Drumlins

Socioeconomic Conditions

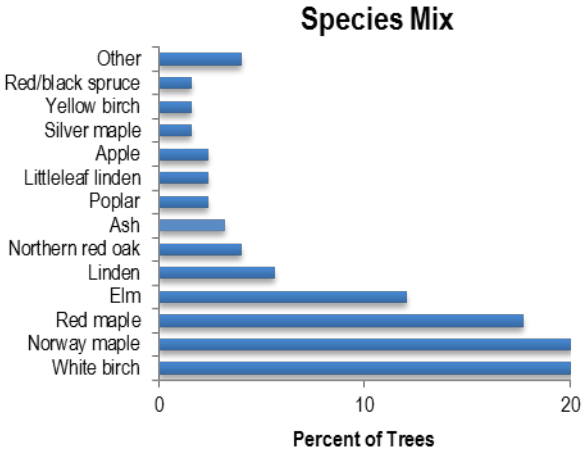
	Land Use	Zoning	Decade of Development
Manor Park	Residential	R-1	1980s
Penhorn Mall	Commercial	C-3	1980s
Parks	Park, Residential	P, R-1	1980s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	115
Area of naturalized forest stands to be created on HRM lands per decade	2 ha
Area of naturalized forest stands not to fall below	1 ha
Average number of native trees to plant on HRM lands per decade	3
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (red spruce, eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Maple, birch, elm, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	15
Additional Neighbourhood Treatments	
Ensure that Penhorn Mall redevelopment planning includes measures to re-establish canopy cover.	

Park Avenue

Park Avenue is a historic and attractive downtown Dartmouth urban forest neighbourhood bounded by Thistle Street, Victoria Road, Ochterloney Street, and Alderney Drive (Figure 40). Land uses are predominantly single-family residential, with a mix of commercial, multi-family residential, and institutional uses on the neighbourhood's perimeter streets. The area's namesake, Park Avenue, bisects the neighbourhood. More than half the area is taken up by the Dartmouth Common. This beautiful park is a dominant feature of Dartmouth's history and a treasured community asset.The park's urban forest canopy (shown in light green) is 29%, and the neighbourhood's canopy (shown in red) is 24%. Both percentages are low and can be improved. Urban forest improvements to the Dartmouth Common are included in the 2010 Dartmouth Common Master Plan. There is an over-representation of both typical introduced urban species, including Norway maple, elm, and linden, and some native species, including white birch and red maple. The trees in Park Avenue are also aging, without enough younger age classes to replace them. The network pattern can be strengthened with street tree plantings, and the patchwork pattern can be improved through additional plantings in the Dartmouth Common.



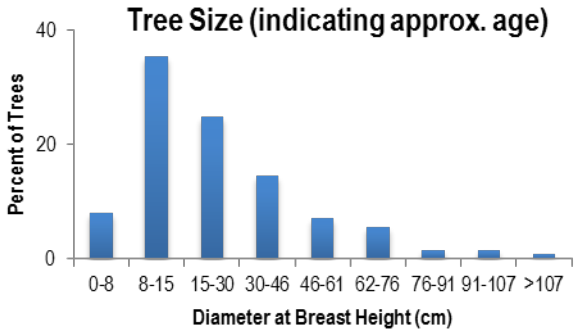


Figure 40

Challenges

- There is an imbalance in the species distribution of Park Avenue, with an over-representation of some species.
- The urban forest in Park Avenue is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees, and not enough young trees to replace them.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 24% to 70%.
- There are 153 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 29% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Park Avenue percent canopy cover	24	≥ 70
Parks percent canopy cover	29	≥ 40
Percent of neighbourhood in forest stands	4	10
Percent of trees within the smallest size class	8	≥ 10
Percent of street trees that are native	48	50
Number of species that comprise more than 5% of all street trees	6 (white birch, Norway maple, red maple, elm, linden)	0
Number of genera that comprise more than 10% of all street trees	4 (maple, birch, elm, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	91	100
Number of plantable sites in HRM rights of way	153	0
Percent canopy cover of riparian and recharge zones	38	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	45	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Park Avenue	25		Till veneer
Parks	12		Till veneer

Socioeconomic Conditions

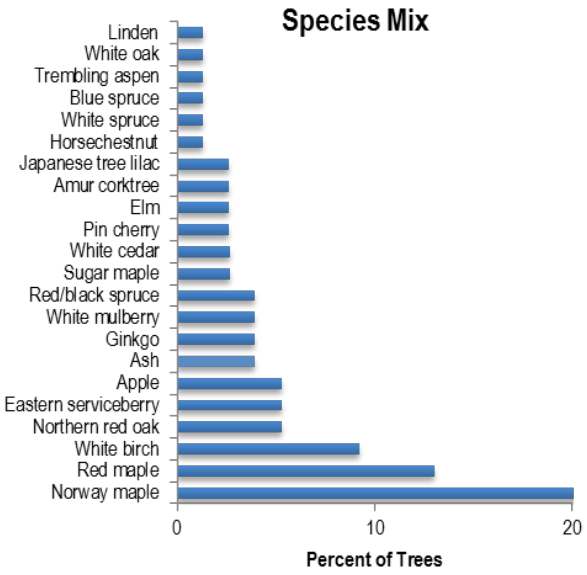
	Land Use	Zoning	Decade of Development
Park Avenue	Residential, Multi-family Residential, Cemetery	DN, DB, PK	1750
Parks	Park, Cemetery	PK	1750

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	60
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Area of naturalized forest stands not to fall below	0.5 ha
Average number of native trees to plant on HRM lands per decade	1
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (red spruce, eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Maple, birch, elm, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	8
Additional Neighbourhood Treatments	
Increase canopy cover in cemeteries	
Within the Dartmouth Common, refer to the strategy outlined in the 2010 Dartmouth Common Master Plan to guide management.	

Portland Estates

Portland Estates is a residential neighbourhood located between Russell Lake and Morris Lake in Dartmouth. It is bounded in the north by Portland Street, in the south by undeveloped land that is currently zoned as residential, and in the east by the Portland Hills neighbourhood (Figure 41). The neighbourhood benefits from urban forest patches around the shores of Russell Lake and Morris Lake, but the canopy cover of 25% (shown in red) is relatively lower than other suburban neighbourhoods in Dartmouth. Parks in the area have a low 24% canopy cover (shown in light green), because there are no large tracts of raw hinterland forest in this neighbourhood, unlike many others in outer Dartmouth. There are several residential buffer strips of forest behind the residential lots, in between streets. There are few trees on the residential lots and in the HRM rights of way, where it is possible to develop a network pattern of street trees. A ribbon forest pattern could also be developed to follow the stream running through parkland between Portland Street and Morris Lake. There is an opportunity to further promote connectivity in this neighbourhood by developing an additional ribbon pattern of street trees along Portland Estates Boulevard.



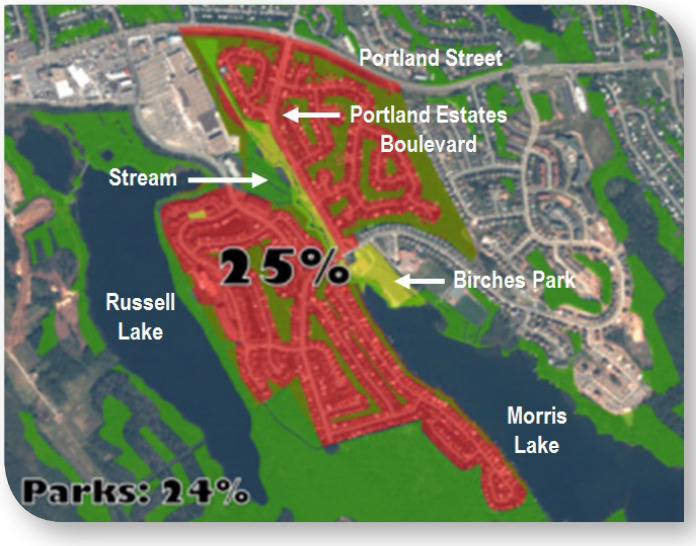
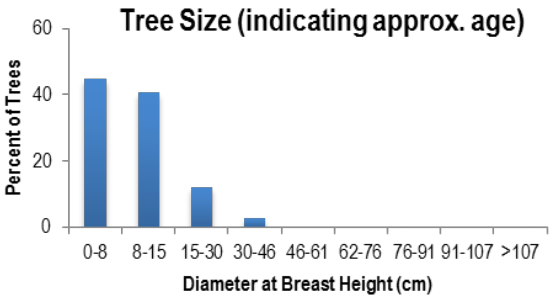


Figure 41



Challenges

- There are few trees on private residential lots.
- There are stresses associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts, environmental contamination, illegal dumping, tree-cutting, and invasive species.
- There are few trees planted along the streets in the HRM rights of way.
- There is an over-representation of Norway maple in the street tree population.
- There is poor canopy cover in the park riparian zones of Russell Lake, Morris Lake, and the stream in the Birches Park, which are at risk from runoff and sedimentation.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 25% to 40%.
- There are 1,022 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 24% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Portland Estates percent canopy cover	25	≥ 70
Parks percent canopy cover	24	≥ 40
Percent of neighbourhood in forest stands	28	29
Percent of trees within the smallest size class	45	≥ 10
Percent of street trees that are native	44	50
Number of species that comprise more than 5% of all street trees	3 (Norway maple, red maple, white birch)	0
Number of genera that comprise more than 10% of all street trees	1 (maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red oak, red spruce, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	1,022	0
Percent canopy cover of riparian and recharge zones	58	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	58	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Portland Estates	85	18	Drumlin, till veneer
Parks	6		Till veneer

Socioeconomic Conditions

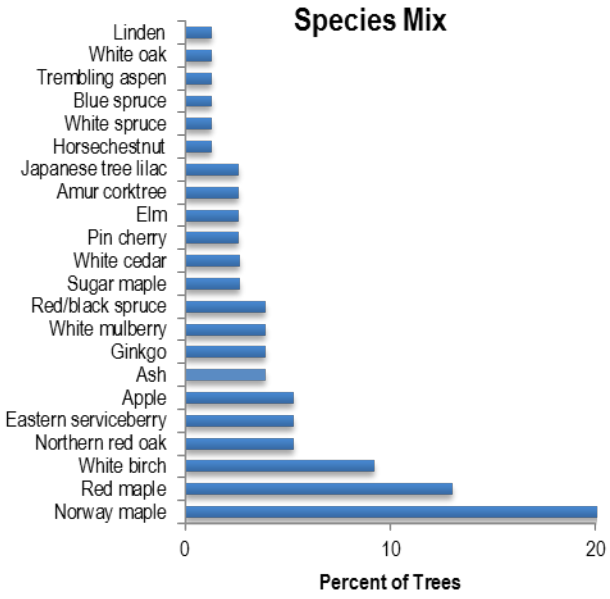
	Land Use	Zoning	Decade of Development
Portland Estates	Residential	H, CDD	1980s/1990s
Parks	Residential	H, CDD	1980s/1990s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	410
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Area of naturalized forest stands not to fall below	24 ha
Average number of native trees to plant on HRM lands per decade	10
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Target riparian areas along Morris Lake and the stream in the Birches Park for improving canopy cover.	
Develop an urban forest ribbon along the stream in the Birches Park and Portland Estates Boulevard.	

Portland Hills

Portland Hills is a residential neighbourhood located on the east side of Morris Lake and south of Portland Street. Portland Hills (Figure 42) has 43% canopy cover (shown in red)—most of it in a forested section in the southern portion of the neighbourhood. This area could potentially form a forest belt pattern along the east side of Morris Lake; however, it is slated for development in the near future. Area parks (shown in green) have overall canopies of 36%, close to the 40% canopy target for the neighbourhood. The existing residential portion of Portland Hills has very few street trees or trees on residential lots; many of those are problem species such as Norway maple. Most of the area's canopy is in small forest patches between lots. The riparian area along Morris Lake is fairly well forested, and forms a strong forest ribbon pattern along the western boundary of Portland Hills.



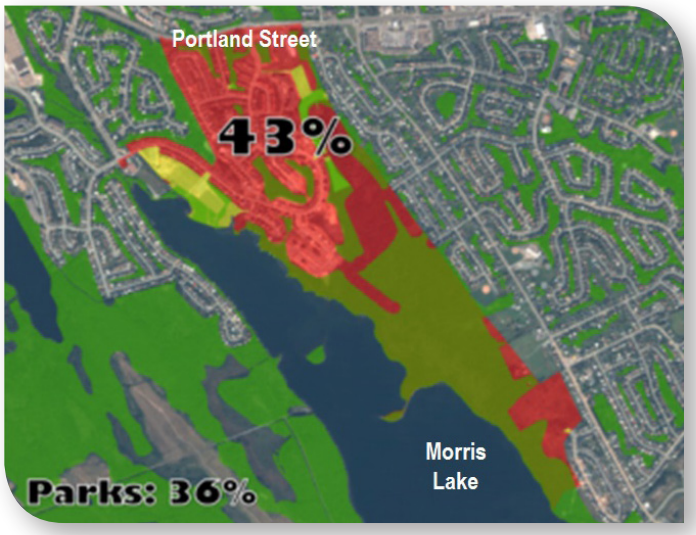
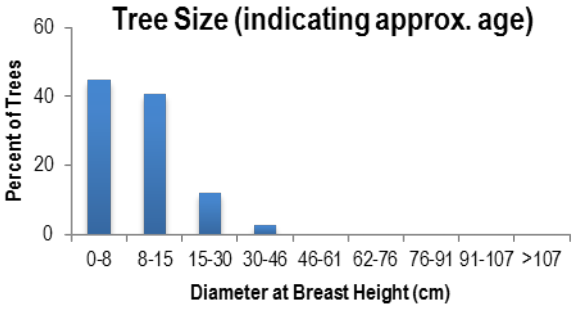


Figure 42



Challenges

- As parts of the neighbourhood are slated for development, maintaining intact forest canopy will be a challenge as land is cleared, graded, and filled.
- There is an over-representation of Norway maple in the street tree population.
- There are few trees on private residential lots.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 43% to 70%.
- There are 727 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 36% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Portland Hills percent canopy cover	43	≥ 70
Parks percent canopy cover	36	≥ 40
Percent of neighbourhood in forest stands	45	45
Percent of trees within the smallest size class	45	≥ 10
Percent of street trees that are native	47	50
Number of species that comprise more than 5% of all street trees	3 (Norway maple, red maple, white birch)	0
Number of genera that comprise more than 10% of all street trees	1 (maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red oak, red spruce, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	727	0
Percent canopy cover of riparian and recharge zones	72	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	42	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Portland Hills	133		Drumlin, till veneer
Parks	10		Drumlin, till veneer

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Portland Hills	Residential, Commercial	CDD	1990s/2000s
Parks	Residential	CDD	1990s/2000s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	290
Area of naturalized forest stands to be created on HRM lands per decade	0 m2
Area of naturalized forest stands not to fall below	60 ha
Average number of native trees to plant on HRM lands per decade	10
Average number of Acadian old-growth species to plant on HRM lands per decade	3 (eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0

Port Wallace/Montebello/Keystone

Port Wallace/Montebello/Keystone is the second-largest urban forest neighbourhood in Dartmouth, and is essentially three smaller communities surrounded by forest, parkland, and lakes (Figure 43). The relatively high 58% canopy cover is largely due to the native forests in the neighbourhood's eastern corner; however, much of the corner is slated for new Keystone developments. The canopy cover in Port Wallace/Montebello/Keystone is therefore likely to decline. Maintaining some canopy and planting adequate numbers of new trees during development will be important for maintaining the benefits to local residents from the urban forest. Lake Charles and Lake Micmac both have two distinct sides: Shubie Park (shown in light green) extends the entire length of the neighbourhood and provides a continuous forest ecosystem along the western shores of both lakes; their eastern shores are dotted with lakefront properties and have poor canopy cover. Shubie Park forms a major belt pattern between this residential neighbourhood and Burnside, while the wedge pattern of the Lake Lamont watershed can be seen to the southeast.

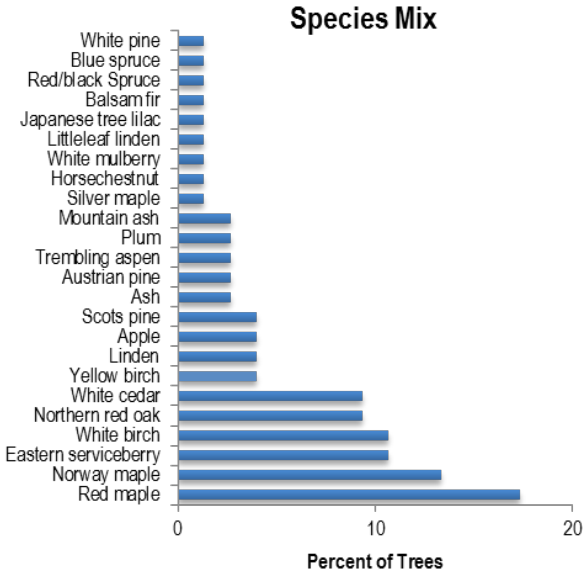
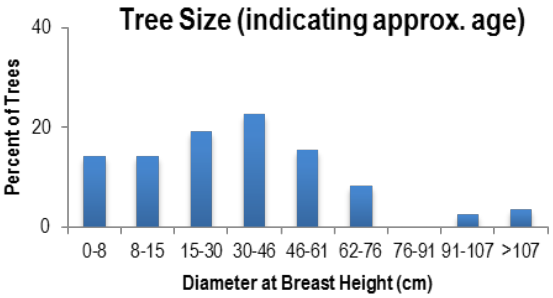


Figure 43



Challenges

- As parts of the neighbourhood are slated for development, maintaining intact forest canopy will be a challenge as land is cleared, graded, and filled.
- Lakefront properties with few trees threaten the integrity of Lake Charles, Lake Micmac, and their eastern shorelines and riparian zones.
- There are threats associated with the suburban/forest fringe, both to the residents from wildfire, storm blowdowns, and wildlife conflicts, and to the peri-urban forest from environmental contamination, illegal dumping and tree-cutting, and invasive species.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 58% to 70%.
- There are 6,025 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 47% to 90%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Port Wallace/Montebello/Keystone percent canopy cover	58	≥ 70
Waverly Road percent canopy cover	2	≥ 20
Parks percent canopy cover	47	≥ 90
Percent of neighbourhood in forest stands	82	94
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	67	50
Number of species that comprise more than 5% of all street trees	6 (red maple, Norway maple, eastern serviceberry, white birch, red oak, white cedar)	0
Number of genera that comprise more than 10% of all street trees	3 (maple, serviceberry, birch)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	(red oak, yellow birch, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	6,025	0
Percent canopy cover of riparian and recharge zones	76	100
Percent of public play areas that are adequately shaded (40% canopy cover)	60	100
Percent of residential properties with at least one value tree	59	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Port Wallace/Montebello/Keystone	650		Till veneer, hummocky till, drumlins
Waverly Road	4		Anthropogenic
Parks	188		Hummocky till

Socioeconomic Conditions

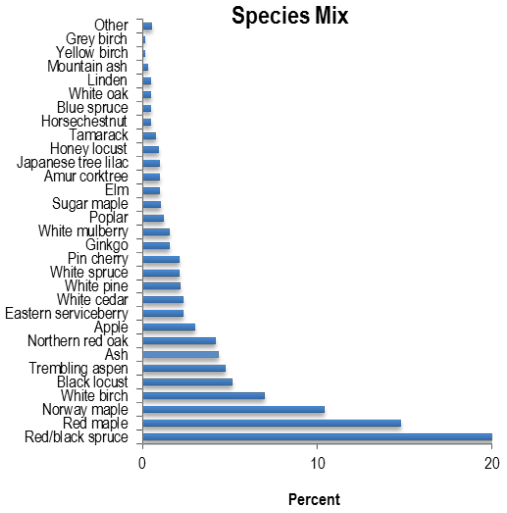
	Land Use	Zoning	Decade of Development
Port Wallace/Montebello/Keystone	Residential, Commercial, Park	R-1, (C,?)RPK	1960s/1980s
Waverly Road	Industrial	I-1	1980s/1990s
Parks	Park, Residential	RPK, R-1	1980s/1990s

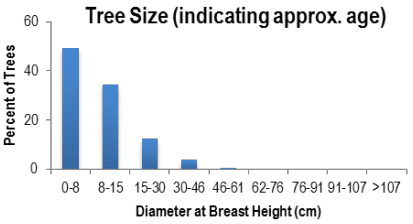
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	2,400
Area of naturalized forest stands to be created on HRM lands per decade	80 ha
Area of naturalized forest stands not to fall below	530 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	13
Refrain from planting the following genera until 2020	Maple, serviceberry, birch
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	7
Additional Neighbourhood Treatments	
Maintain the urban forest belt pattern created by Shubie Park.	

Russell Lake West

This newly developed urban forest neighbourhood is bounded by the Circumferential Highway, Portland Street, Russell Lake, Morris Lake, and CFB Shearwater (Figure 44). It largely features residential land uses bordering the western shore of Russell Lake. The residential area has been carefully planned, with design standards that seek to preserve the ecological integrity of the local watershed. Russell Lake West (shown in red) has 61% canopy cover, a deceptively high figure in light of the new residential developments in the neighbourhood. This housing, built in the 2000s, is typical of many new suburban developments in HRM, with remnant forest stands filling the gaps between relatively treeless residential lots and street rights of way. Significant urban forest challenges exist in the Portland Street and Mount Hope Avenue commercial land-use divisions (shown in blue), which feature minimal canopy cover (Portland Street 1%, Mount Hope Avenue 5%). The widespread use of paved surfaces in the commercial land uses typical of these divisions has resulted in few plantable sites. Fortunately, there is continuous canopy cover throughout the riparian zone of Russell Lake, Russell Lake Park, and undeveloped lands south of Russell Lake. In fact, the canopy cover of the parks, riparian zones, and undeveloped lands in the neighbourhood (shown in green) is a remarkable 73%. Most of the neighbourhood lies on drumlin hills, which provide better growing conditions for urban trees and are less prone to natural disturbances from wind events than other substrates. The Russell Lake parkland and riparian area belt pattern is a dominant feature of the neighbourhood. Further to the south is a potential wedge pattern extending west from Morris Lake. A strong network pattern of urban trees could also be established throughout the street rights of way in both the commercial divisions and the residential areas.





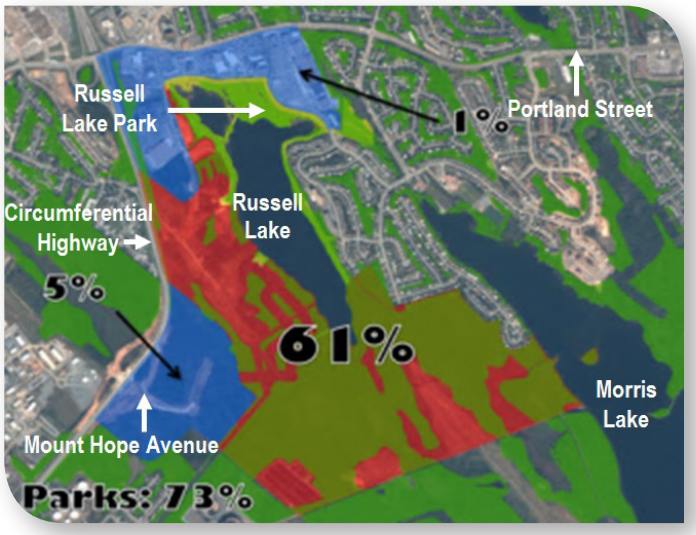


Figure 44

Challenges

- There are stresses associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts, environmental contamination, illegal dumping, tree-cutting, and invasive species.
- There are few trees on private residential lots.
- The Portland Street and Mount Hope Avenue commercial divisions have very low canopy cover. The high degree of imperviousness and a lack of plantable sites constitute a considerable challenge to improving these two urban forest areas of Russell Lake West.
- Much of the neighbourhood's undeveloped intact canopy is at risk from new development.

Opportunities

- A planned planting program could produce a sustainable age and species distribution of trees and increase overall canopy from 61% to 70%.
- There are 887 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 73% to 90%.
- Portland Street division's canopy cover can be increased from 1% to 20%.
- Mount Hope Avenue division's canopy cover can be increased from 5% to 20%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Russell Lake West percent canopy cover	61	≥ 70
Portland Street percent canopy cover	1	≥ 20
Mount Hope Avenue percent canopy cover	5	≥ 20
Parks percent canopy cover	73	≥ 90
Percent of neighbourhood in forest stands	45	46
Percent of trees within the smallest size class	49	≥ 10
Percent of street trees that are native	67	50
Number of species that comprise more than 5% of all street trees	5 (red spruce, red maple, Norway maple, white birch, black locust)	0
Number of genera that comprise more than 10% of all street trees	2 (maple, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, red oak, white pine, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	887	0
Percent canopy cover of riparian and recharge zones	69	100
Percent of public play areas that are adequately shaded (40% canopy cover)	67	100
Percent of residential properties with at least one value tree	52	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Russell Lake West	251	3	Drumlin
Portland Street	42	23	Till veneer, drumlin
Mount Hope Avenue	37	23	Anthropogenic
Parks	17	1	Lacustrine, drumlin

Socioeconomic Conditions

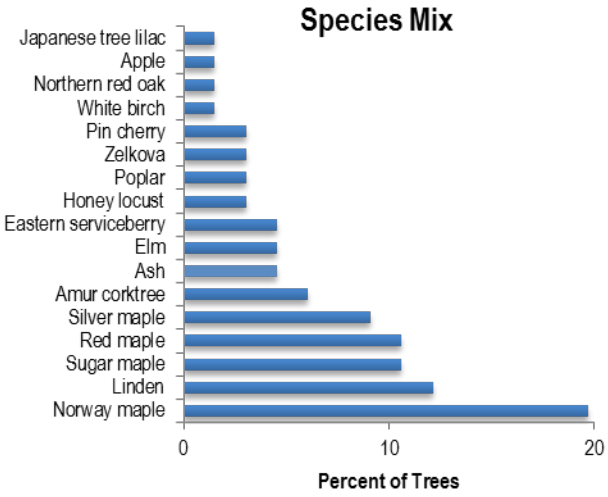
	Land Use	Zoning	Decade of Development
Russell Lake West	Residential	CDD	2000s
Portland Street	Commercial	C-3, CDD	2000s
Mount Hope Avenue	Commercial, Industrial	I-2, CDD	2000s
Parks	Residential	H, CDD	2000s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	350
Area of naturalized forest stands to be created on HRM lands per decade	3 ha
Area of naturalized forest stands not to fall below	110 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	8 (eastern hemlock)
1 (yellow birch)	
Refrain from planting the following genera until 2020	Maple, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	4
Additional Neighbourhood Treatments	
Collaborate with business owners and developers in Portland street and Mount Hope commercial divisions to improve the urban forest.	
Work with corporate and institutional interests to develop an urban forest wedge pattern extending west from Morris Lake.	

Shannon Park

Shannon Park (Figure 45) is an interesting and diverse urban forest neighbourhood on the shores of the Bedford Basin. It is primarily owned by the Department of National Defence and has a high 55% canopy cover. However, within this area, the former military housing community of Shannon Park, the now privately owned Wallace Heights area, the Bedford Institute of Oceanography (BIO), and Wright's Cove, all have very low canopy cover. The forests surrounding these locales are primarily stands of red maple and aspen. Since most of this neighbourhood is administered by federal agencies, improving the urban forest will require collaborative urban forest management efforts.



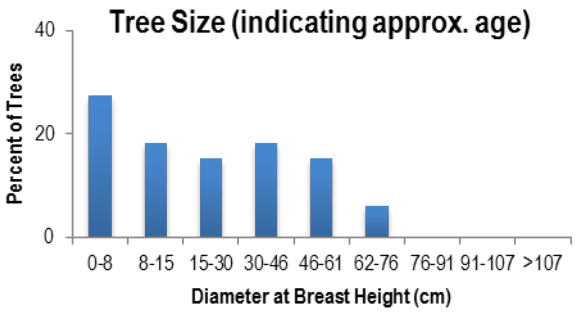


Figure 45

Challenges

- The key challenge in this neighbourhood will be increasing the number of trees in Shannon Park, Wallace Heights, Wright's Cove, and BIO. There is no immediate threat to the hardwood stands surrounding these developments.

Opportunities

- Collaboration with the Federal Government on improving the urban forest and its benefits will be vitally important for Shannon Park.
- There are 264 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Shannon Park percent canopy cover	55	≥ 40
Percent of neighbourhood in forest stands	52	52
Percent of trees within the smallest size class	27	≥ 10
Percent of street trees that are native	32	50
Number of species that comprise more than 5% of all street trees	4 (Norway maple, linden, sugar maple, red maple)	0
Number of genera that comprise more than 10% of all street trees	2 (maple, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (sugar maple, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	264	0
Percent canopy cover of riparian and recharge zones	86	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	79	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Shannon Park	196		Hummocky till, till veneer, anthropogenic, bedrock

Socioeconomic Conditions

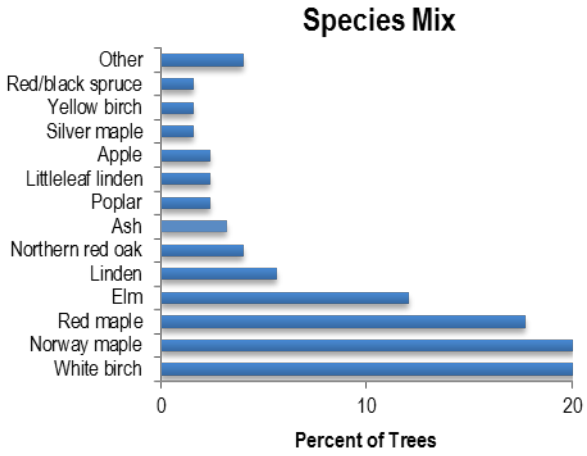
	Land Use	Zoning	Decade of Development
Shannon Park	Institutional, Multi-family Residential	H, I-2, I-3	1950s

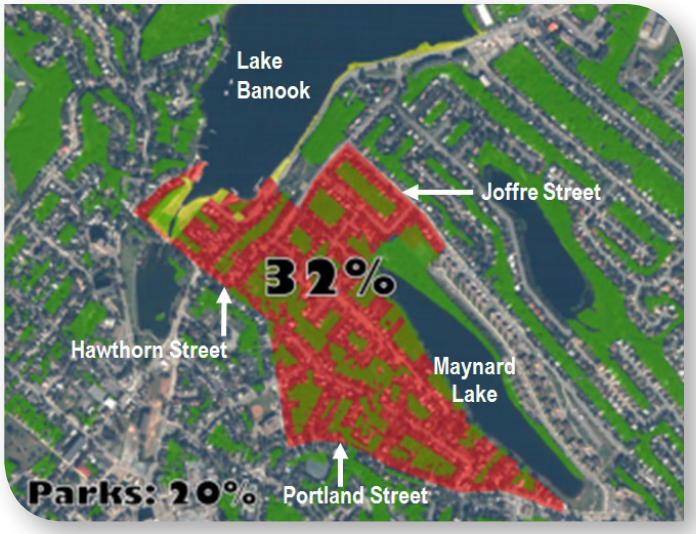
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	100
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	100 ha
Average number of native trees to plant on HRM lands per decade	15
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (red spruce, eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	1
Additional Neighbourhood Treatments	
Collaborate with federal agencies to improve the urban forest.	

Silver's Hill

Located just east of Lake Banook, the Silver's Hill urban forest neighbourhood (shown in red) boasts a rich canopy cover of 32% (Figure 46). The steep, tear shaped hill is actually a drumlin formed as the last ice age ended. Its deep, rich soils provide a perfect medium for growing trees. This well-situated urban forest neighbourhood is mostly residential, with some commercial land uses along the eastern portion of Portland Street near Maynard Lake. Silver's Hill has one of the higher canopy covers in Old Dartmouth, but like many other neighbourhoods, there is a lack of species diversity and an insufficient proportion of young trees in the street tree population. The neighbourhood's parks (shown in light green) have 20% canopy cover, which will be increased significantly to provide riparian protection for Lake Banook.





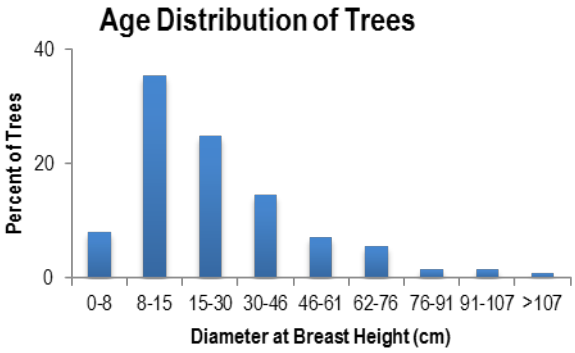


Figure 46

Challenges

- There is poor canopy cover along the eastern side of Lake Banook, which is at risk of being polluted by runoff and sedimentation.
- There is low species diversity in the street tree population.
- Silver's Hill's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees and not enough young trees to replace them.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 32% to 70%.
- There are 268 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 20% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Silver's Hill percent canopy cover	32	≥ 70
Parks percent canopy cover	20	≥ 40
Percent of neighbourhood in forest stands	26	26
Percent of trees within the smallest size class	8	≥ 10
Percent of street trees that are native	48	50
Number of species that comprise more than 5% of all street trees	6 (white birch, Norway maple, red maple, elm, linden)	0
Number of genera that comprise more than 10% of all street trees	4 (maple, birch, elm, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	91	100
Number of plantable sites in HRM rights of way	268	0
Percent canopy cover of riparian and recharge zones	38	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	74	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Silver's Hill	39		Drumlins
Parks	2		Drumlins

Socioeconomic Conditions

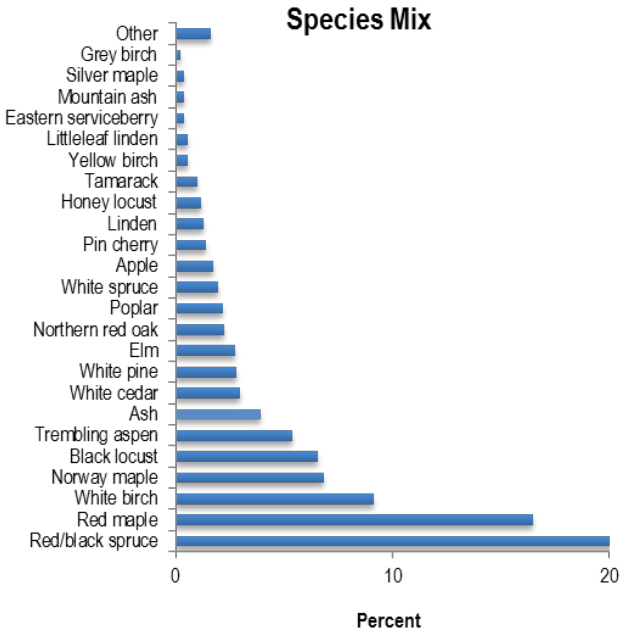
	Land Use	Zoning	Decade of Development
Silver's Hill	Residential, Commercial	R-1, DN	1950s/1960s
Parks	Park	P, PK	1950s/1960s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	110
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	10 ha
Average number of native trees to plant on HRM lands per decade	2
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (red spruce, eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Maple, birch, elm, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	15

Southdale/North Woodside

The urban forest neighbourhood of Southdale/North Woodside is situated on the rich soils of an undulating drumlin field. The area south of Portland Street is located to the west of the Circumferential Highway and just north of the Woodside Industrial Park. Land use for the area is primarily residential, with areas of development ranging from the 1960s to the present day (Figure 47). Southdale/North Woodside has 35% canopy cover (shown in red). The parks, (shown in light green) with a 19% canopy cover, have extensive sport fields and play areas with little-to-no shade, and could easily benefit from some newly planted trees. A significant portion of Southdale/North Woodside's canopy is in the remnant stand of black spruce, balsam fir, and red maple in the eastern side of the neighbourhood. However, as this area has been proposed for development as the Woodside Knowledge Park, canopy cover in this neighbourhood is likely to decline. There is a large wetland system running through this area, so planning for a forested riparian buffer will be vital.



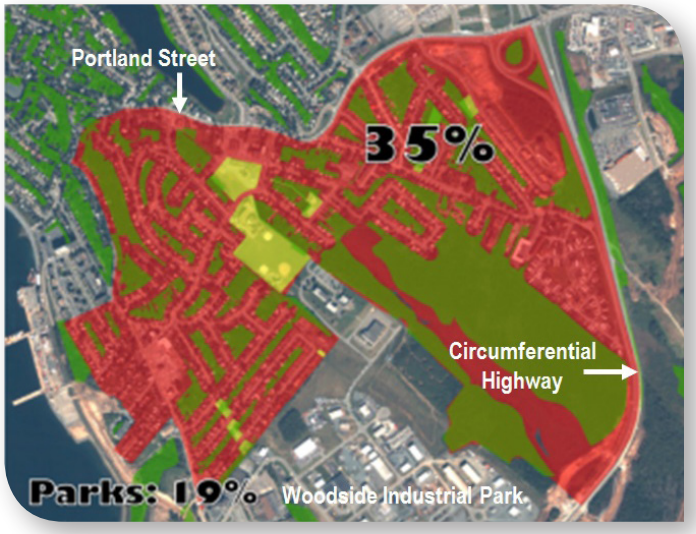
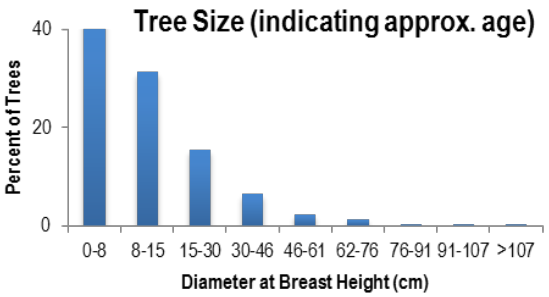


Figure 47



Challenges

- As the native forest in the eastern corner of the neighbourhood is slated for development, maintaining intact forest canopy will be a challenge as land is cleared, graded, and filled. Moreover, this area has an extensive wetland system that will need appropriate forested riparian buffers.
- There are few trees on private residential lots.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 35% to 70%.
- There are 1,112 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 19% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Southdale/North Woodside percent canopy cover	35	≥ 70
Parks percent canopy cover	19	≥ 40
Percent of neighbourhood in forest stands	32	33
Percent of trees within the smallest size class	42	≥ 10
Percent of street trees that are native	73	50
Number of species that comprise more than 5% of all street trees	6 (red spruce, black spruce, red maple, Norway maple, white birch)	0
Number of genera that comprise more than 10% of all street trees	2 (maple, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, red oak, white pine, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	95	100
Number of plantable sites in HRM rights of way	1,112	0
Percent canopy cover of riparian and recharge zones	87	100
Percent of public play areas that are adequately shaded (40% canopy cover)	38	100
Percent of residential properties with at least one value tree	70	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Southdale/North Woodside	183		Drumlins
Parks	8		Drumlins

Socioeconomic Conditions

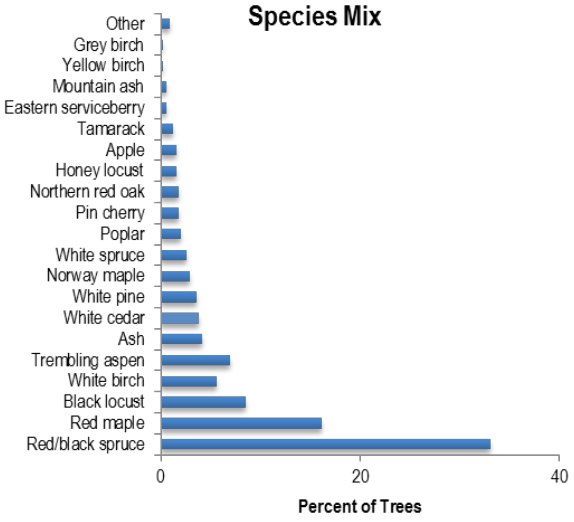
	Land Use	Zoning	Decade of Development
Southdale/North Woodside	Residential, Multi-family Residential, Industrial	R-2, H, I-2, CDD	1960s
Parks	Park, Residential, Industrial	P, R-2, S	1960s

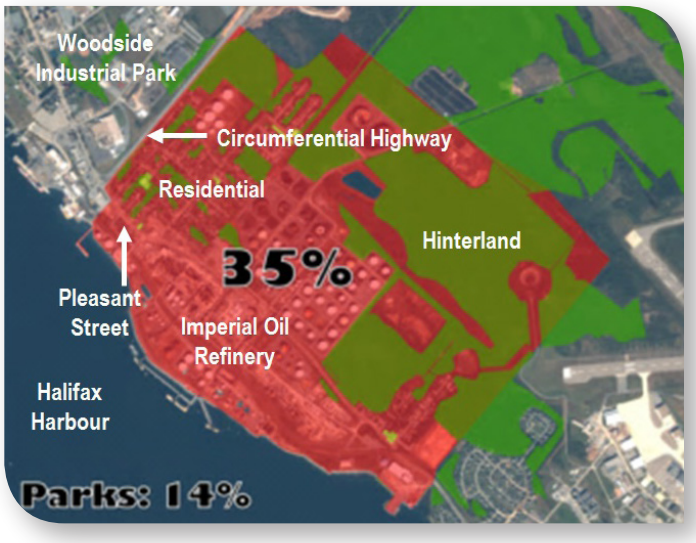
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	450
Area of naturalized forest stands to be created on HRM lands per decade	2 ha
Area of naturalized forest stands not to fall below	58 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	20 (eastern hemlock, yellow birch)
Refrain from planting the following genera until 2020	Maple, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	45
Additional Neighbourhood Treatments	
Ensure that ecologically sustainable patches of native forest and wetland riparian areas are retained in Woodside Knowledge Park.	

South Woodside

The South Woodside urban forest neighbourhood borders the shore of Halifax Harbour and extends northwest from CFB Shearwater to the Circumferential Highway (Figure 48). The overall canopy cover (shown in red) for South Woodside is 35%. The neighbourhood's urban forest has two distinct features. South Woodside is characterized by its industrial and residential land uses. It is home to the lands of the Imperial Oil Refinery that occupy about 70% of the area. Residential properties in South Woodside account for the remaining 30%. The urban forest of the residential area north of Pleasant Street comprises trees along public rights of way and on private residential properties. Canopy cover in the residential area's parks (shown in green) is low at 14%. There are no trees on the central operations of the refinery located south of Pleasant Street and south-east of the residential area. Fortunately, Imperial Oil's landholdings also include a hinterland forest on its undeveloped lands in the eastern sector of the neighbourhood. This forested area accounts for most of the neighbourhood's canopy cover. It is mostly a mix of native species typical of this region, including red spruce, black spruce, and white birch. Ideally, this forested area should be maintained along with CFB Shearwater's bordering hinterland forest that extends to Morris Lake. The lands form a wedge pattern providing connectivity from Morris Lake to South Woodside.





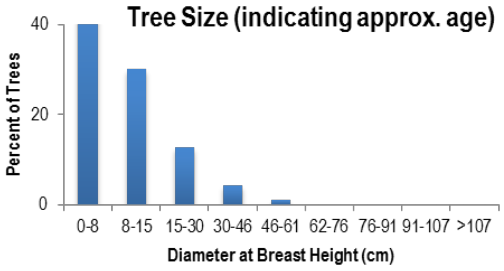


Figure 48

Challenges

- There are stresses associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts, environmental contamination, illegal dumping, tree-cutting, and invasive species.
- The canopy cover in neighbourhood parks is low, with none adequately shaded.
- There is poor canopy cover in the riparian zone of the neighbourhood's wetlands and streams, which are at risk for being affected by runoff and sedimentation, especially considering the industrial land use and wetland area in South Woodside.
- There are threats and opportunities for the urban forest around the Imperial Oil refinery. While there are environmental concerns for the water, soil, and forests associated with this land use, there is also the potential for the urban forest to buffer and ameliorate many of these impacts.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 35% to 40%.
- There are 613 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 14% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
South Woodside percent canopy cover	36	≥ 45
Parks percent canopy cover	14	≥ 40
Percent of neighbourhood in forest stands	35	36
Percent of trees within the smallest size class	52	≥ 10
Percent of street trees that are native	78	50
Number of species that comprise more than 5% of all street trees	5 (red/black spruce, black locust, white birch, trembling aspen)	0
Number of genera that comprise more than 10% of all street trees	2 (spruce, maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	613	0
Percent canopy cover of riparian and recharge zones	57	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	77	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
South Woodside	345	11	Anthropogenic, drumlin
Parks	1	7	Drumlin

Socioeconomic Conditions

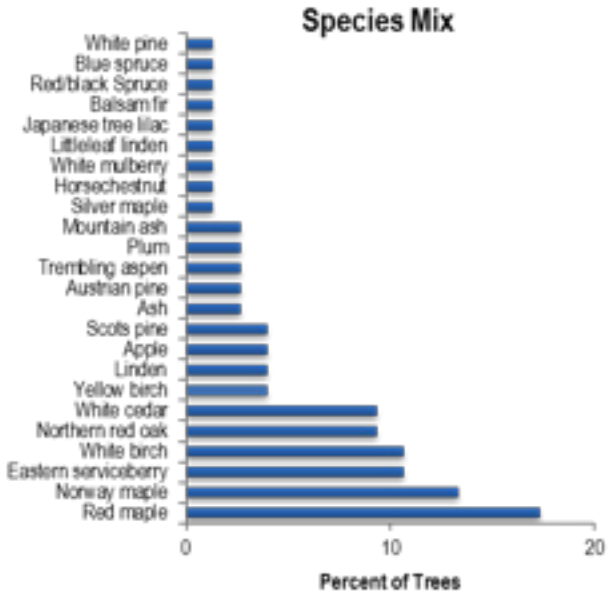
	Land Use	Zoning	Decade of Development
South Woodside	Industrial, Residential	I-2, I-3, R-2	1920s/1950s
Parks	Residential	R-2, P	1950s

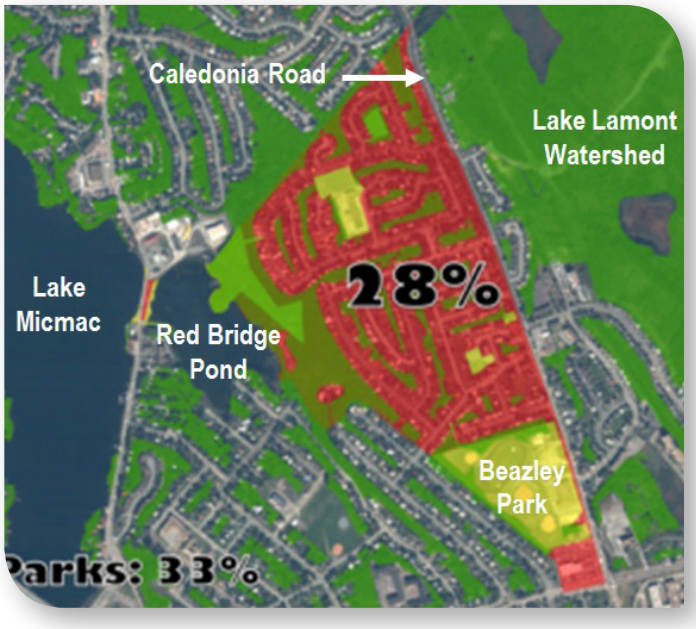
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	250
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Area of naturalized forest stands not to fall below	120 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	13 (eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Spruce, maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	8
Additional Neighbourhood Treatments	
Establish collaborative urban forest efforts with Imperial Oil.	
Collaborate with CFB Shearwater and Imperial Oil to preserve the urban forest wedge pattern between Morris Lake and South Woodside.	

Tam O'Shanter

Tam O'Shanter is a smaller residential urban forest neighbourhood west of the Lake Lamont Watershed and east of Red Bridge Pond (Figure 49). The canopy cover is 28%, with 33% cover in parks. There is considerable variability in park canopy cover between the fully forested Red Bridge Pond Park and Beazley Park, a large sport field complex with an adjacent community centre and school. Beazley Park will require extensive tree planting in order to restore an adequate canopy in this area. Attention will also be given to the aging street tree population and its overabundance of large, mature trees, especially maples, with few younger trees to replace them. The forested areas adjacent to Red Bridge Pond and the Kuhn Marsh will also require ongoing management efforts to ensure continuing riparian protection.





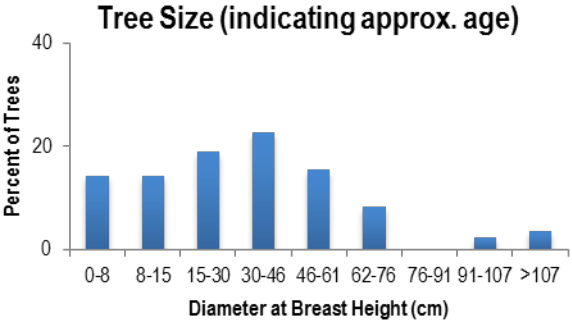


Figure 49

Challenges

- Canopy cover in Beazley Park is very low, and public play areas there are inadequately shaded.
- Tam O'Shanter's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees, and not enough young trees to replace them.
- There is an over-representation of maples in the street tree population, including the invasive Norway maple.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 28% to 70%.
- There are 891 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 33% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Tam O'Shanter percent canopy cover	28	≥ 70
Parks percent canopy cover	33	≥ 40
Percent of neighbourhood in forest stands	29	31
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	67	50
Number of species that comprise more than 5% of all street trees	6 (red maple, Norway maple, eastern serviceberry, white birch, red oak, white cedar)	0
Number of genera that comprise more than 10% of all street trees	3 (maple, serviceberry, birch)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	(red oak, yellow birch, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	891	0
Percent canopy cover of riparian and recharge zones	77	100
Percent of public play areas that are adequately shaded (40% canopy cover)	33	100
Percent of residential properties with at least one value tree	68	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Tam O'Shanter	124		Till veneer, drumlins, bedrock
Parks	15.5		Till veneer, drumlins, bedrock

Socioeconomic Conditions

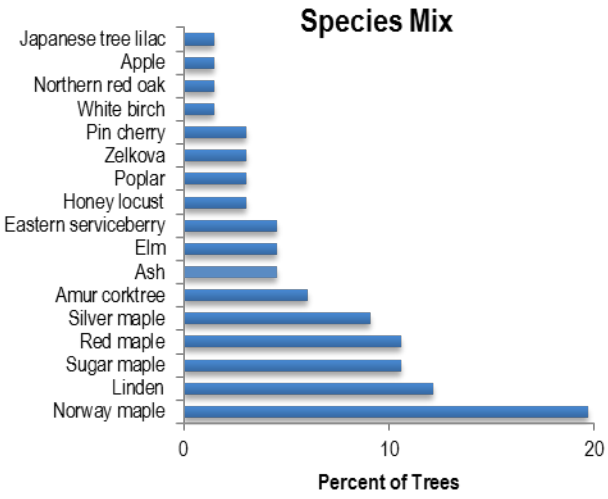
	Land Use	Zoning	Decade of Development
Tam O'Shanter	Residential	R-1	1960s/1970s
	Residential, Multi-family	R-2	1960s/1970s
Parks	Park, Institutional	P, S	1960s/1970s

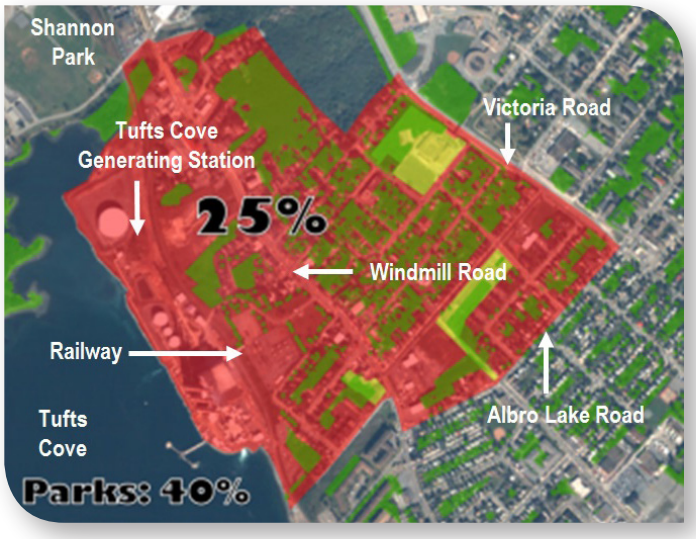
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	350
Area of naturalized forest stands to be created on HRM lands per decade	10 ha
Area of naturalized forest stands not to fall below	17 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (red spruce, eastern hemlock, sugar maple)
Refrain from planting the following genera until 2020	Maple, serviceberry, birch
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	1

Tufts Cove

This historic urban forest neighbourhood is located on the shore of Tufts Cove, just south of Shannon Park and is bisected by Windmill Road (Figure 50). It extends south to Albro Lake Road and east to Victoria Road and contains a mix of industrial, commercial and residential land uses. Canopy cover is 25%, with an overabundance of Norway maple and linden. The main challenge to improving Tufts Cove's urban forest is its industrial and mostly impervious harbourfront occupied by the Tufts Cove Generating Station owned by Nova Scotia Power Incorporated (NSPI). Although there are few opportunities to plant trees on NSPI property, there is an urban forest ribbon pattern formed east of the railway providing a welcome visual buffer to nearby residential property owners that could be improved. Further to the east, along Windmill Road and Victoria Road there are additional opportunities to plant more street trees to establish urban forest ribbon patterns. Residential areas in Tufts Cove will also benefit from additional street tree planting to improve the area's urban forest network pattern.





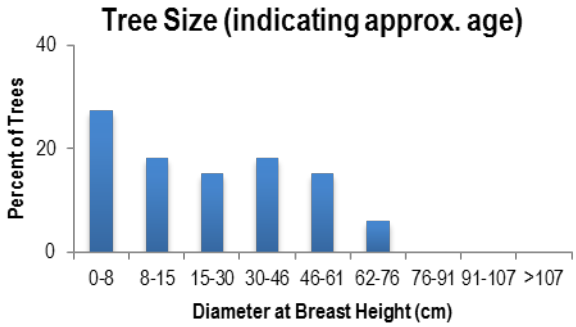


Figure 50

Challenges

- There is a high proportion of imperviousness in the neighbourhood. Moreover, much of it lies on artificially created substrate beyond the harbour's natural shoreline, where planting trees will be exceedingly difficult.
- There are major areas of flow accumulation around harbour areas, which would benefit greatly from additional stormwater retention provided by the urban forest canopy in Tufts Cove.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 25% to 45%.
- There are 184 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Tufts Cove percent canopy cover	25	≥ 45
Parks percent canopy cover	40	≥ 40
Percent of neighbourhood in forest stands	0	0
Percent of trees within the smallest size class	27	≥ 10
Percent of street trees that are native	32	50
Number of species that comprise more than 5% of all street trees	4 (Norway maple, linden, sugar maple, red maple)	0
Number of genera that comprise more than 10% of all street trees	2 (maple, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (sugar maple, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	184	0
Percent canopy cover of riparian and recharge zones	10	100
Percent of public play areas that are adequately shaded (40% canopy cover)	67	100
Percent of residential properties with at least one value tree	74	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Tufts Cove	76		
Parks	4		

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Tufts Cove	Residential, Industrial, Commercial	R-2, I-2, C-2	1940s
Parks	Institutional	S	1950s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	75
Area of naturalized forest stands to be created on HRM lands per decade	0
Area of naturalized forest stands not to fall below	0
Average number of native trees to plant on HRM lands per decade	10
Average number of Acadian old-growth species to plant on HRM lands per decade	2
Refrain from planting the following genera until 2020	Maple, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	2 (red spruce, eastern hemlock, white pine, yellow birch)
Additional Neighbourhood Treatments	
Create new plantable sites on impervious HRM lands, and encourage commercial and industrial landowners to do the same.	
Develop an urban forest ribbon pattern along the railway that runs along the harbour.	

Westphal

Westphal is a residential urban forest neighbourhood of attractive hills and vales bordering Lake Micmac to the east and Main Street to the south (Figure 51). The area has 25% canopy cover (shown in red). Most of Westphal's urban forest canopy is in residential buffer strips between houses. There are fewer trees on residential properties. The neighbourhood's street tree population is aging, with an overabundance of older trees, which is a concern as there are few younger trees to replace them as they expire. Canopy cover is particularly low along Main Street. In area parks (shown in light green), the low canopy cover of 16% is also a concern. A key issue in Westphal is the condition of the riparian zone along Lake Micmac. Riparian canopy cover along the lake shorelines bordered by both residential lots and the Circumferential Highway is low at 36%. Improving the urban forest here will help to protect lakewater quality. There is also some steeper terrain leading up to Raymoore Drive on Tam O'Shanter Ridge, with thinner, glacially deposited soils, where maintaining forest cover will be both important for slope stabilization and challenging due to the terrain.

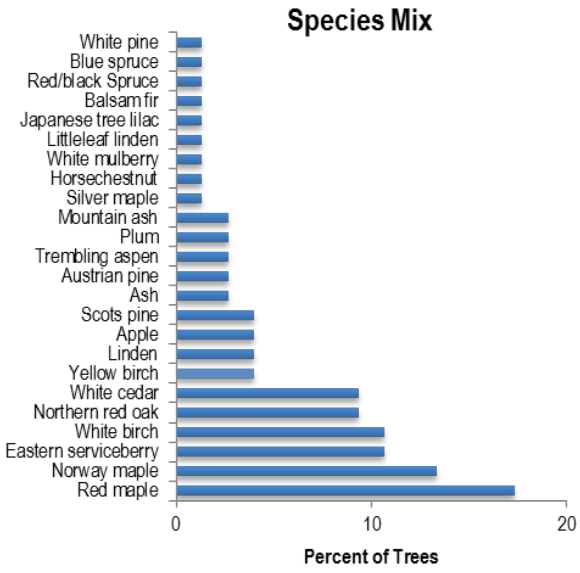
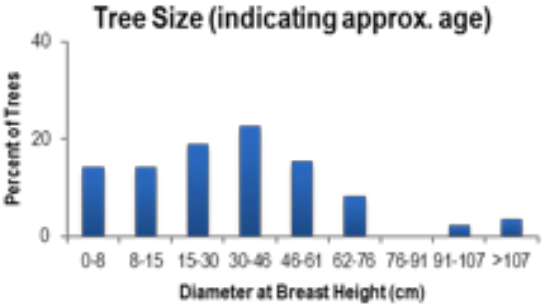


Figure 51



Challenges

- The riparian areas of Lake Micmac and Red Bridge Pond have poor canopy cover, and in many places few opportunities for improvement due to the Circumferential Highway.
- Westphal's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees, and not enough young trees to replace them.
- There is an over-representation of maples in the street tree population, including the invasive Norway maple.
- The steep topography and rugged terrain will make managing the urban forest in parts of Westphal difficult.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 25% to 70%.
- There are 1,207 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 16% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Westphal percent canopy cover	25	≥ 70
Parks percent canopy cover	16	≥ 40
Percent of neighbourhood in forest stands	19	21
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	67	50
Number of species that comprise more than 5% of all street trees	6 (red maple, Norway maple, eastern serviceberry, white birch, red oak, white cedar)	0
Number of genera that comprise more than 10% of all street trees	3 (maple, serviceberry, birch)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	(red oak, yellow birch, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	1,207	0
Percent canopy cover of riparian and recharge zones	36	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	70	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Westphal	77		
Parks	5		

Socioeconomic Conditions

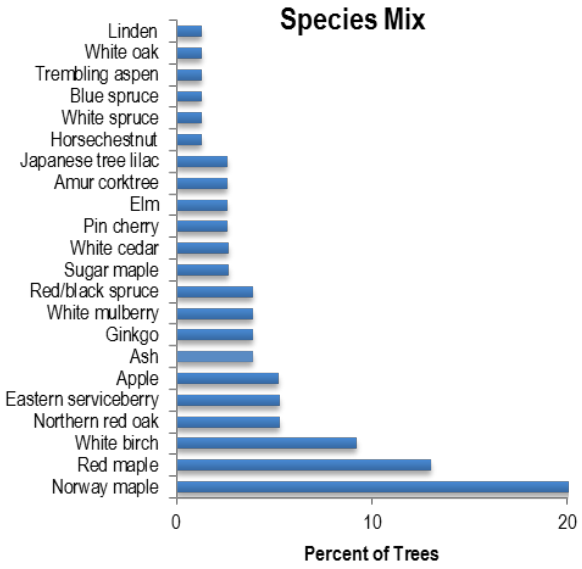
	Land Use	Zoning	Decade of Development
Westphal	Residential, Commercial	R-1, C-2	1960s
Parks	Park, Residential	P, R-1	1960s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	480
Area of naturalized forest stands to be created on HRM lands per decade	10,000 m2
Area of naturalized forest stands not to fall below	15 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	3 (red spruce, eastern hemlock, sugar maple)
Refrain from planting the following genera until 2020	Maple, serviceberry, birch
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	2
Additional Neighbourhood Treatments	
Improve canopy cover in the riparian zones of Lake Micmac and Red Bridge Pond.	

Wildwood

Wildwood is a residential neighbourhood located on the south side of Mt. Edward Road, just west of the Bell Ayr neighbourhood (Figure 52). Wildwood has several forested sections, well-forested parks, shorelines on two lakes, and an overall 35% canopy cover. As in many of Dartmouth's residential neighbourhoods, most trees are found in residential buffer strips between the backyards of residential properties; however, there are few trees on the private properties or in the HRM rights of way. There are two dominant features in the urban forest of this neighbourhood. The first is Settle Lake Park, which comprises the southern boundary of Wildwood, and is almost fully forested. The second is the naturalized stand around the Halifax Water Commission (HWC) reservoirs in the northwestern corner of the neighbourhood. The reservoir forest is not controlled by HRM, and collaboration with HWC will be initiated to conserve this area and keep it forested. Lakefront lots with poor canopy cover dot the shoreline on the western side of Cranberry Lake, and pose a threat to the lake's water quality. North of Mt. Edward Road, a wedge pattern is formed by HWC forested lands surrounding Topsail Lake.



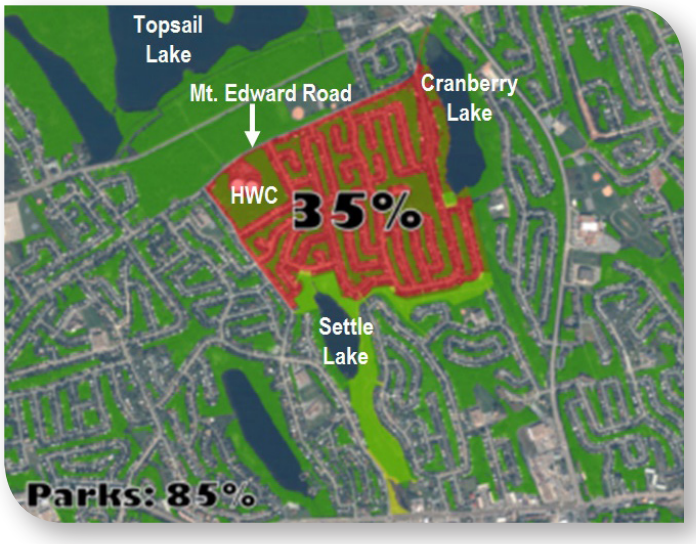
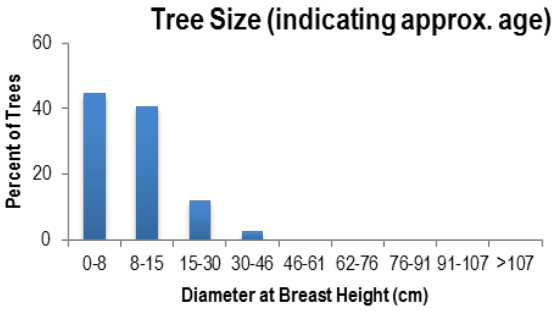


Figure 52



Challenges

- There are few trees on private residential lots.
- There are few trees planted along streets in the HRM rights of way. This provides a good opportunity to improve Wildwood's urban forest.
- There is poor canopy cover in the riparian zone of Cranberry Lake, which is at risk of being degraded by runoff and sedimentation. Several lakefront properties with few trees pose risks to the integrity of Cranberry Lake and its shoreline.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall
- canopy from 35% to 70%.
- There are 984 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 85% to 90%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Wildwood percent canopy cover	35	≥ 70
Parks percent canopy cover	85	≥ 90
Percent of neighbourhood in forest stands	34	35
Percent of trees within the smallest size class	45	≥ 10
Percent of street trees that are native	47	50
Number of species that comprise more than 5% of all street trees	3 (Norway maple, red maple, white birch)	0
Number of genera that comprise more than 10% of all street trees	1 (maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red oak, red spruce, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	984	0
Percent canopy cover of riparian and recharge zones	53	100
Percent of public play areas that are adequately shaded (40% canopy cover)	67	100
Percent of residential properties with at least one value tree	82	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Wildwood	98		Drumlins, till veneer
Parks	17		Drumlins, till veneer

Socioeconomic Conditions

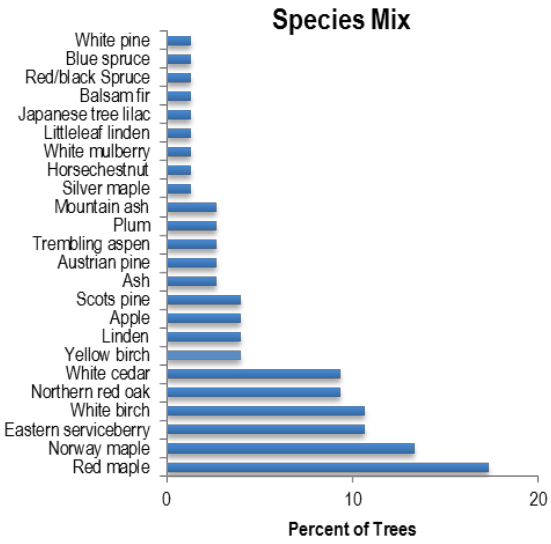
	Land Use	Zoning	Decade of Development
Wildwood	Residential, Institutional	R-1, C	1960s
Parks	Park	P, P-1	1960s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	400
Area of naturalized forest stands to be created on HRM lands per decade	8,500 m2
Area of naturalized forest stands not to fall below	33 ha
Average number of native trees to plant on HRM lands per decade	9
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Target riparian areas along Cranberry Lake, and to a lesser degree Settle Lake, for improving canopy cover and maintaining an urban forest ribbon pattern.	
Collaborate with Halifax Water Commission to conserve the forested stand surrounding the water reservoirs on Mt. Edward Road.	

Woodlawn

Woodlawn is a pleasant residential neighbourhood with two distinct commercial areas, located south of Main Street and east of the Circumferential Highway (Figure 53). The area is similar to nearby suburban neighbourhoods developed in the postwar boom years of the 1960s that were soon annexed to become part of the rapidly expanding City of Dartmouth. The 21% canopy cover (shown in red) is largely found in buffer strips between the backyards of residential properties; there are few trees on the private properties or in the HRM rights of way. Woodlawn's street tree population is aging, with an overabundance of large, mature maples, which is a future concern. Woodlawn has two major commercial divisions, Tacoma Plaza and the newer Athorpe Drive, that have a canopy cover of 1% and under 0% respectively. These areas have an abundance of impervious surfaces and very few plantable sites, and will present a challenge for improving the urban forest. Neighbourhood parks have a low canopy cover of just 4% (shown in light green). A strong network pattern can be established by planting street trees in commercial and residential areas.



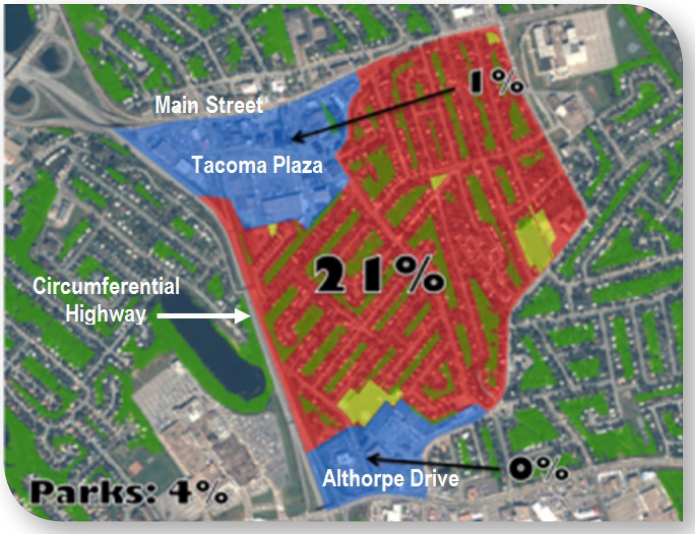
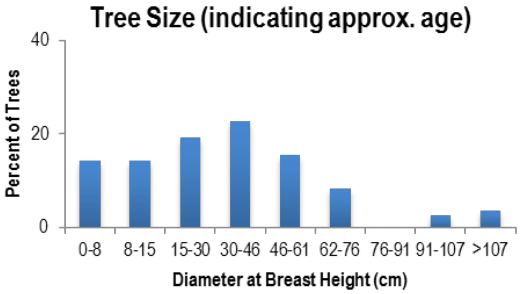


Figure 53



Challenges

- The Tacoma Plaza and Athorpe Drive shopping centres have very low canopy cover. The high degree of imperviousness and lack of plantable sites make these commercial divisions a considerable challenge to improving Woodlawn's urban forest.
- Woodlawn's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees, and not enough young trees to replace them.
- There is an over-representation of maples in the street tree population, including the invasive Norway maple.
- There are few trees on private residential lots.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 21% to 70%.
- There are 1,888 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 4% to 40%.
- Tacoma Plaza division canopy cover can be increased from 1% to 20%.
- Althorpe Avenue division canopy cover can be increased from 0% to 20%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Woodlawn percent canopy cover	21	≥ 70
Tacoma Plaza percent canopy cover	1	≥ 20
Athorpe Drive percent canopy cover	0	≥ 20
Parks percent canopy cover	4	≥ 40
Percent of neighbourhood in forest stands	9	10
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	67	50
Number of species that comprise more than 5% of all street trees	6 (red maple, Norway maple, eastern serviceberry, white birch, red oak, white cedar)	0
Number of genera that comprise more than 10% of all street trees	3 (maple, serviceberry, birch)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	(red oak, yellow birch, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	1,888	0
Percent canopy cover of riparian and recharge zones	7	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	73	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Woodlawn	114		Till veneer, drumlin
Tacoma Plaza	20		Anthropogenic
Athorpe Drive	10		Till veneer, drumlin
Parks	3		Till veneer

Socioeconomic Conditions

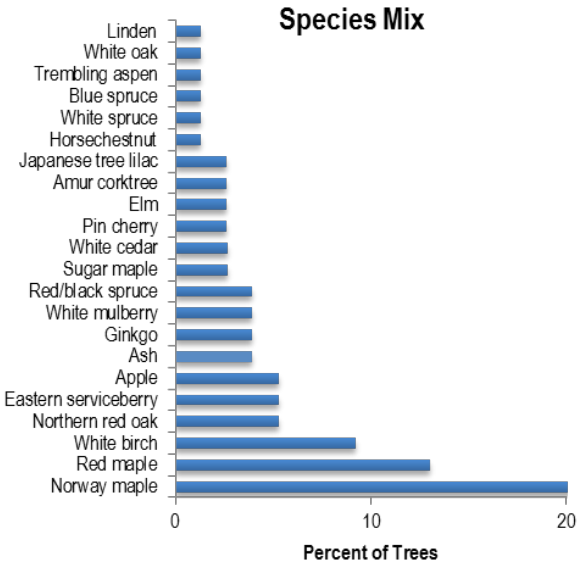
	Land Use	Zoning	Decade of Development
Woodlawn	Residential	R-1	1960s
Tacoma Plaza	Commercial	C-2	1950s/1970s
Athorpe Drive	Commercial	C-3	1950s/1970s
Parks	Park	P	1960s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	750
Area of naturalized forest stands to be created on HRM lands per decade	10,000 m2
Area of naturalized forest stands not to fall below	10 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (red spruce, eastern hemlock, sugar maple)
Refrain from planting the following genera until 2020	Maple, serviceberry, birch
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	2
Additional Neighbourhood Treatments	
Collaborate with business owners and administrators in the Tacoma Plaza and Athorpe Drive commercial divisions to improve canopy cover.	

Woodlawn Heights

The Woodlawn Heights neighbourhood is an elongated, residential urban forest neighbourhood bounded by Main Street, Cranberry Lake, Mt. Edward Road, and Woodlawn Road. Compared with other Dartmouth neighbourhoods, it has a high canopy cover at 45% (Figure 54). Its canopy strength lies within the beautiful native forest in the undeveloped centre of the neighbourhood. Residential areas to the east and west of the neighbourhood's forest centre have relatively few trees. Most trees are in patches between the backyards of residential properties. The neighbourhood's institutional division (shown in blue) comprises the Akerley Campus of the Nova Scotia Community College (NSCC) and Prince Andrew High School. Both school grounds feature high levels of impervious surfaces and few trees, and have a minimal 10% canopy cover. Cooperative efforts with the schools can significantly improve canopy cover. Parks (shown in light green) have a fairly good canopy cover of 36%. An emerging riparian ribbon pattern along the Ellenvale Run can be enhanced with new tree planting, and increased planting of street trees can improve the neighbourhood's network pattern. To the north, the Halifax Water Commission's lands around Lake Lamont provide a strong urban forest wedge pattern and enhance the area's natural attractiveness.



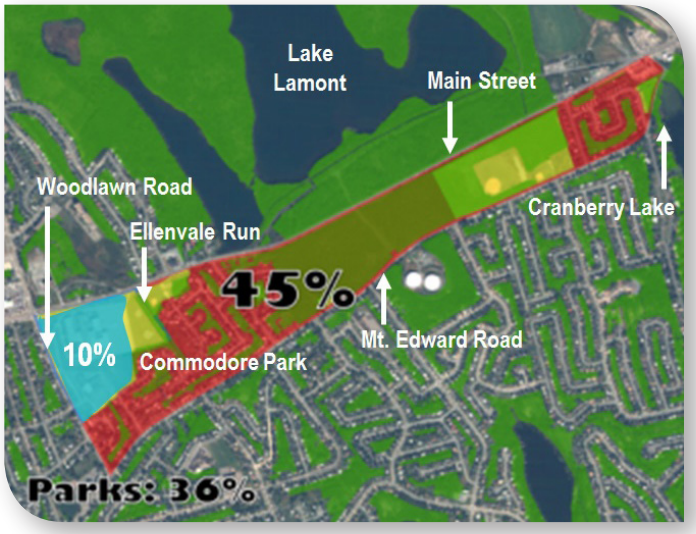
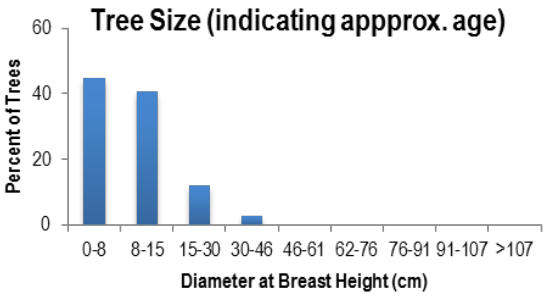


Figure 54



Challenges

- There are few trees on private residential lots
- There is an over-representation of Norway maple in the street tree population.
- The Akerley Campus and Prince Andrew High School institutional division has a high level of imperviousness and low canopy.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 45% to 70%.
- There are 571 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 36% to 40%.
- The institutional division canopy can be increased from 10% to 20%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Woodlawn Heights percent canopy cover	45	≥ 70
Institutional division canopy cover	10	≥ 20
Parks percent canopy cover	36	≥ 40
Percent of neighbourhood in forest stands	56	60
Percent of trees within the smallest size class	45	≥ 10
Percent of street trees that are native	47	50
Number of species that comprise more than 5% of all street trees	3 (Norway maple, red maple, white birch)	0
Number of genera that comprise more than 10% of all street trees	1 (maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red oak, red spruce, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	571	0
Percent canopy cover of riparian and recharge zones	71	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	68	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Woodlawn Heights	56		Till veneer, drumlins
Parks	26		Till veneer, drumlins

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Woodlawn Heights	Residential, Park	R-1, C	1960s/1970s
Parks	Institutional	S, C	1960s/1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	230
Area of naturalized forest stands to be created on HRM lands per decade	22,000 m2
Area of naturalized forest stands not to fall below	30 ha
Average number of native trees to plant on HRM lands per decade	5
Average number of Acadian old-growth species to plant on HRM lands per decade	3 (eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Collaborate with NSCC, Akerley Campus, and Prince Andrew High School to achieve canopy targets.	

Woodside Park

The defining land-use feature of the Woodside Park urban forest neighbourhood is primarily light industrial, with an additional range of marine industrial, commercial, park, residential, and institutional land uses. It generally extends north from the intersection of Pleasant Street and the Circumferential Highway along the harbour shoreline to encompass marine-related land uses, and then inland to the northeast (Figure 55). Delineating this neighbourhood was challenging, but the uniform coastal topography and predominance of industrial land uses provided guidance. This area has several challenges associated with its urban forest. It has a canopy cover (shown in red) of just 6%. The neighbourhood has abundant impervious surfaces, comprised of asphalt roads, parking lots, and warehouse rooftops. Most of the canopy is in undeveloped patches of native forest east of Mount Hope Avenue, which explains the area's species mix dominance by native spruces and younger age distribution. Additionally, the coastal lands west of Pleasant Street feature steep slopes and infilled shorelines with limited substrate and extensive impervious surfaces. Improving the urban forest will take time, but ongoing collaboration with businesses owners could dramatically improve the neighbourhood's visual appeal. Opportunities exist to establish a coastal urban forest ribbon pattern along the shoreline. Additional street trees will establish a more prominent urban forest network pattern, and the canopy cover in parks (shown in light green, 21% canopy) will be improved to strengthen the patchwork pattern.

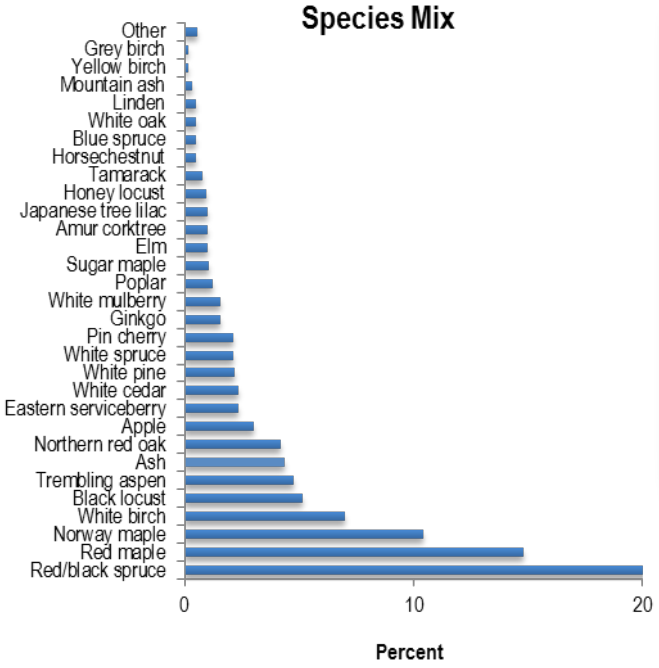
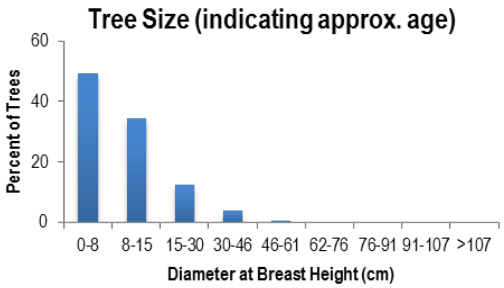


Figure 55



Challenges

- There is a high proportion of imperviousness in the neighbourhood. Moreover, much of it lies on artificially created substrate beyond the harbour's natural shoreline, where planting trees will be exceedingly difficult.
- As new development is a continuous reality in industrial parks, planning should ensure appropriate retention of native forest stand, creation of plantable sites, and planting of new trees on all new developments.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 6% to 20%.
- There are 582 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 21% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place
- Local institutional and business groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Woodside Park percent canopy cover	6	≥ 20
Parks percent canopy cover	21	≥ 40
Percent of neighbourhood in forest stands	7	9
Percent of trees within the smallest size class	49	≥ 10
Percent of street trees that are native	67	50
Number of species that comprise more than 5% of all street trees	5 (red spruce, red maple, Norway maple, white birch, black locust)	0
Number of genera that comprise more than 10% of all street trees	2 (maple, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, red oak, white pine, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	582	0
Percent canopy cover of riparian and recharge zones	56	100
Percent of public play areas that are adequately shaded (40% canopy cover)	33	100
Percent of residential properties with at least one value tree	65	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Woodside Park	158		Anthropogenic, drumlins
Parks	14		Anthropogenic, drumlins

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Woodside Park	Industrial, Institutional	I-1, S	1930s/1980s
Parks	Park, Industrial	P, I-1	1970s

Neighbourhood Treatments

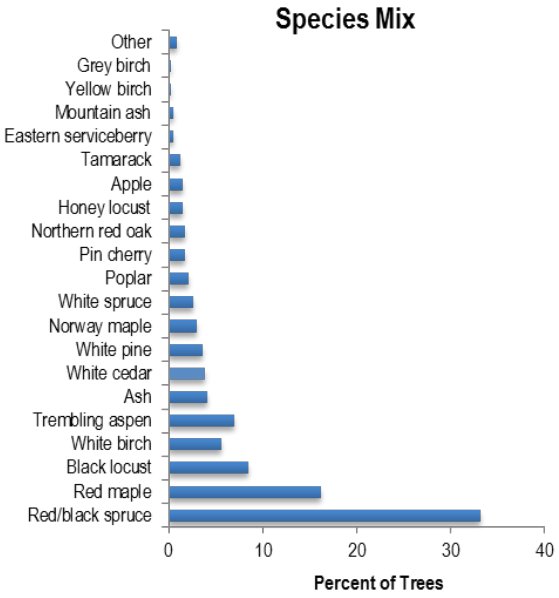
Treatment	Prescription
Average number of trees to plant on HRM lands per decade	230
Area of naturalized forest stands to be created on HRM lands per decade	3 ha
Area of naturalized forest stands not to fall below	70
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	12 (eastern hemlock)
9 (yellow birch)	
Refrain from planting the following genera until 2020	Maple, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	7
Additional Neighbourhood Treatments	
Collaborate with institutional and business groups to achieve canopy targets.	

A-6 EASTERN PASSAGE

Figure 56

Briarwood

The Briarwood urban forest neighbourhood is bordered by Janice Ann Drive in the west and Cow Bay Road in the south and east (Figure 57). Caldwell Road bisects the area. This suburban neighbourhood contains a range of single family detached and semi-detached homes built on compact lots, as well as two mobile home parks with higher residential densities. Briarwood has a low canopy cover of 17%. While some residents have planted trees, overall, there are few residential properties with good-size trees in Briarwood. Areas of the urban forest shown in blue are neighbourhood divisions for the Greenridge Mobile Home Park in the north, and Birch Hill Estates in the southeast with canopy covers of 1% and 0%, respectively. Since these divisions lack HRM-controlled rights of way, meeting canopy targets here will require cooperative efforts with park administrators and residents. In newer subdivisions street trees have been planted by developers however, in older areas of Briarwood and especially along Caldwell Road, the number of street trees is inadequate.



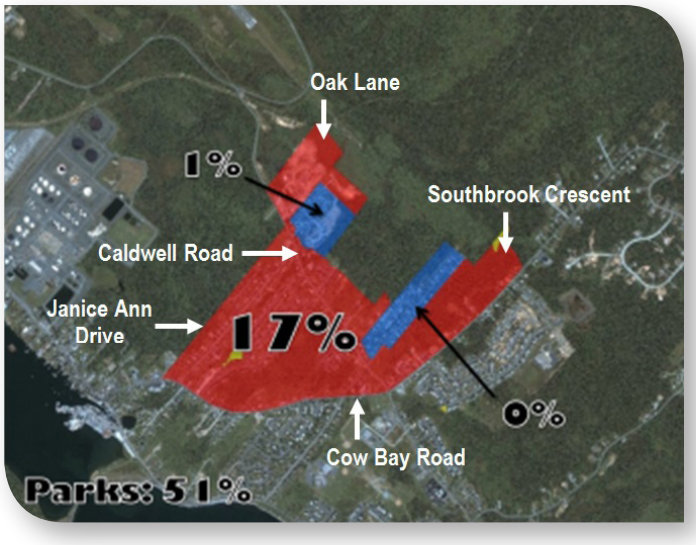
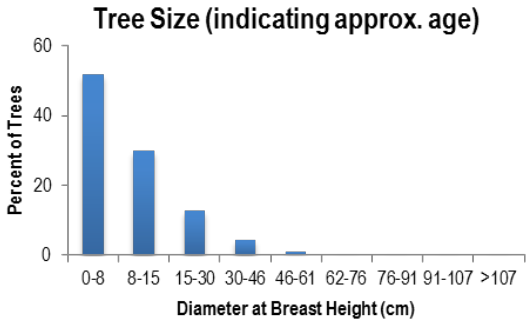


Figure 57



Challenges

- There are a small number of trees planted on residential properties and along HRM rights of way.
- Briarwood's mobile home parks feature very few trees. New development is slated for the remaining forested land in the neighbourhood. This is further complicated by the low-lying wetlands found in this area.
- Planting new trees on residential lots and retaining forest in riparian buffer zones will be important aspects in future urban forest management in Briarwood.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 17% to 70%.
- There are 703 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local residents' groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Briarwood percent canopy cover	17	≥ 70
Greenridge Mobile Home Park percent canopy cover	1	≥ 70
Birch Hill Estates percent canopy cover	0	≥ 70
Parks percent canopy cover	51	≥ 90
Percent of neighbourhood in forest stands	14	14
Percent of trees within the smallest size class	52	≥ 10
Percent of street trees that are native	78	50
Number of species that comprise more than 5% of all street trees	5 (red/black spruce, black locust, white birch, trembling aspen)	0
Number of genera that comprise more than 10% of all street trees	2 (spruce, maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	703	0
Percent canopy cover of riparian and recharge zones	16	100
Percent of public play areas that are adequately shaded (40% canopy cover)	67	100
Percent of residential properties with at least one value tree	9	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Briarwood	141		Till veneer, hummocky till, drumlins
Greenridge Mobile Home Park	9		Hummocky till
Birch Hill Estates	12		Till veneer
Parks	1		Till veneer

Socioeconomic Conditions

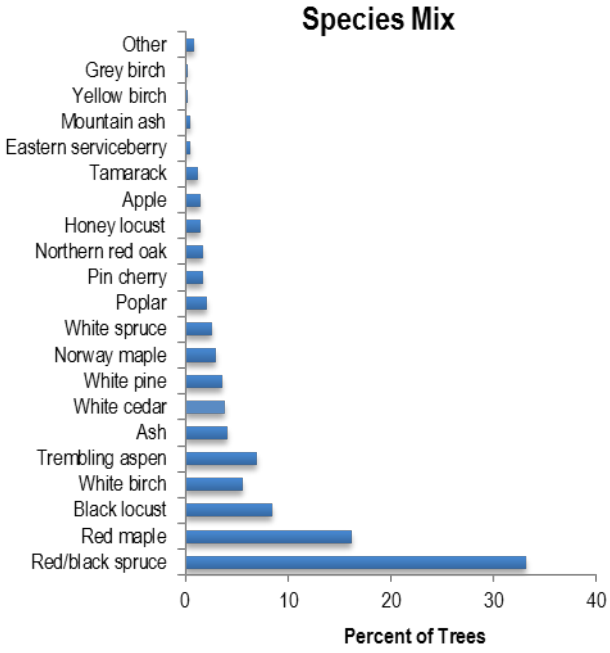
	Land Use	Zoning	Decade of Development
Briarwood	Multi-family residential, residential	R-2, R-1	1970s/2000s
Greenridge Mobile Home Park	Residential	R-1	1970s
Birch Hill Estates	Residential	R-1	1980s
Parks	Wetland	FP	1980s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	280
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	20 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	6 (eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Spruce, maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	10
Additional Neighbourhood Treatments	
Collaborate with the administrators of Greenridge and Birch Hill Estates mobile home parks to improve tree canopy.	

Eastern Passage

This urban forest neighbourhood's namesake is a narrow channel that runs between the mainland and Lawlors Island. It is bound in the south and west by the waters of the Eastern Passage, in the east by Caldwell Road, and in the north by Cow Bay Road. The neighbourhood consists mostly of residential development with a predominance of detached and semi-detached homes, with a range of institutional land uses adjacent to the Eastern Passage Commons. Although there are several parks and green areas in this neighbourhood, Eastern Passage has a strikingly low canopy cover of 4%. Most of this canopy is found in treed residential buffer strips and undeveloped patches of native forests and wetlands around the Eastern Passage Commons. The Eastern Passage Commons is a recreation hub for sports and other recreational activities however this area is also challenged with an extremely low canopy cover of just 5%. The low canopy cover of Eastern Passage is understandable given the area's harsh coastal microclimate but prior to subdivision development native trees such as red and black spruce and red maple thrived in this environment. Careful selection of hardy tree species along with local urban forest stewardship efforts will lead to the restoration of canopy cover in Eastern Passage.



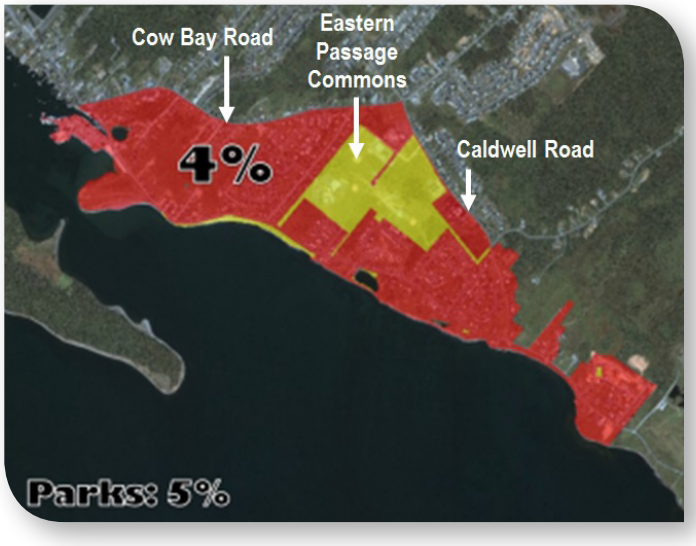
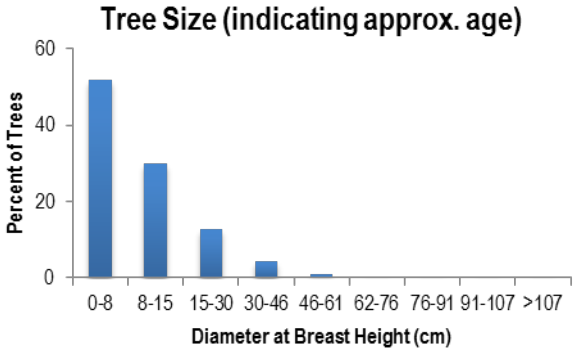


Figure 58



Challenges

- The harsh coastal microclimate can stunt and cause excessive wind damage to non-native tree species.
- There are a small number of trees planted on residential properties and along HRM rights of way. There is poor canopy cover and little to no shade in the Eastern Passage Commons.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 4% to 45%.
- There are 856 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local residents' groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Eastern Passage percent canopy cover	4	≥ 45
Parks percent canopy cover	5	≥ 40
Percent of neighbourhood in forest stands	3	14
Percent of trees within the smallest size class	52	≥ 10
Percent of street trees that are native	78	50
Number of species that comprise more than 5% of all street trees	5 (red/black spruce, black locust, white birch, trembling aspen)	0
Number of genera that comprise more than 10% of all street trees	2 (spruce, maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	856	0
Percent canopy cover of riparian and recharge zones	10	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	3	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Eastern Passage	178		Till veneer, hummocky till, drumlins
Parks	31		Anthropogenic, drumlins

Socioeconomic Conditions

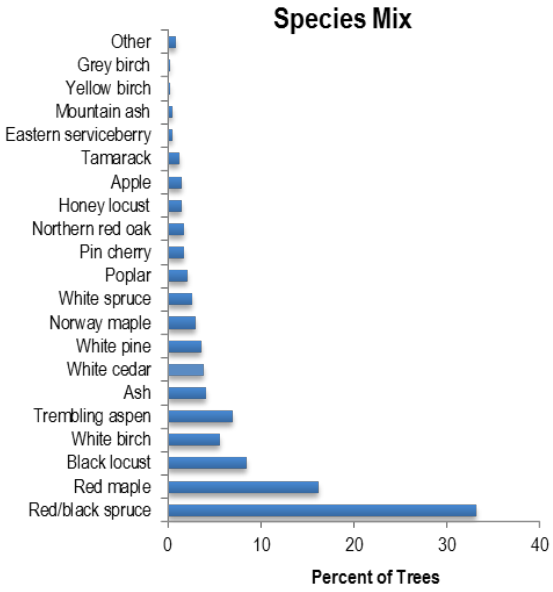
	Land Use	Zoning	Decade of Development
Eastern Passage	Multi-family residential, residential, commercial	R-2, R-1, C-2	1880s/1970s
Parks	Park	P-2	1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	340
Area of naturalized forest stands to be created on HRM lands per decade	11 ha
Area of naturalized forest stands not to fall below	5 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	7 (eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Spruce, maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	11
Additional Neighbourhood Treatments	
Target the Eastern Passage Commons for increasing the neighbourhood canopy, shading public play areas, and creating naturalized stands.	

Heritage Hills

Heritage Hills is a relatively new urban forest neighbourhood bounded in the west by Cow Bay Road, in the south by Caldwell Road, and in the north by Atikian Drive. Subdivision development started in the 1990s and has continued since then. This residential area features compact lots with a mix of detached and semi-detached single family dwellings. Prior to development this area would have been dominated by stands of red maple, black spruce and red spruce but now there are few trees in Heritage Hills. The area's 18% overall canopy cover and its park canopy cover of 3% at Eastern Passage Education Centre are both extremely low. Although street trees have been planted in newer sections of the subdivision, older areas of the urban forest neighbourhood have no street trees. Moreover, the neighbourhood lacks the treed residential buffer strips between streets that are typical of similar suburban residential neighbourhoods. A significant portion of the canopy in Heritage Hills is found in an HRM forest stand in a low-lying southern section of the neighbourhood, east of Caldwell Road. Considering the potential of further subdivision development to the east of the neighbourhood, additional forest stands should be retained. The low canopy cover of Heritage Hills is understandable given the area's harsh coastal microclimate but careful selection of hardy tree species along with local urban forest stewardship efforts will lead to the restoration of Heritage Hills' canopy cover.



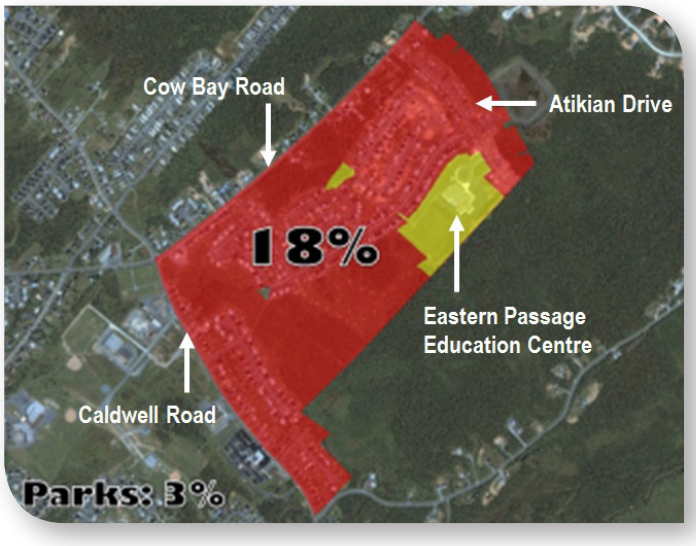
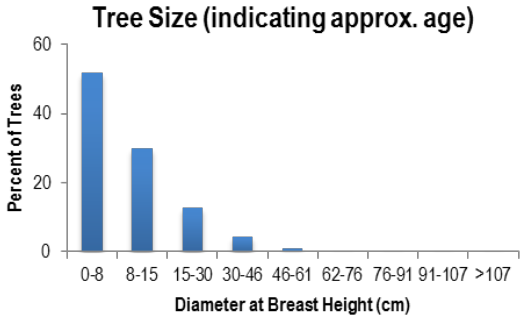


Figure 59



Challenges

- The harsh coastal microclimate can stunt and cause excessive wind damage to non-native tree species.
- There are a small number of trees planted on residential properties and along HRM rights of way.
- There is poor canopy cover and little to no shade on land adjacent to the Eastern Passage Education Centre.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 18% to 70%.
- There are 375 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local residents' groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Heritage Hills percent canopy cover	18	≥ 70
Parks percent canopy cover	3	≥ 40
Percent of neighbourhood in forest stands	15	17
Percent of trees within the smallest size class	52	≥ 10
Percent of street trees that are native	78	50
Number of species that comprise more than 5% of all street trees	5 (red/black spruce, black locust, white birch, trembling aspen)	0
Number of genera that comprise more than 10% of all street trees	2 (spruce, maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	375	0
Percent canopy cover of riparian and recharge zones	50	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	6	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Heritage Hills	69		Hummocky till, till veneer, lacustrine
Parks	6		Hummocky till

Socioeconomic Conditions

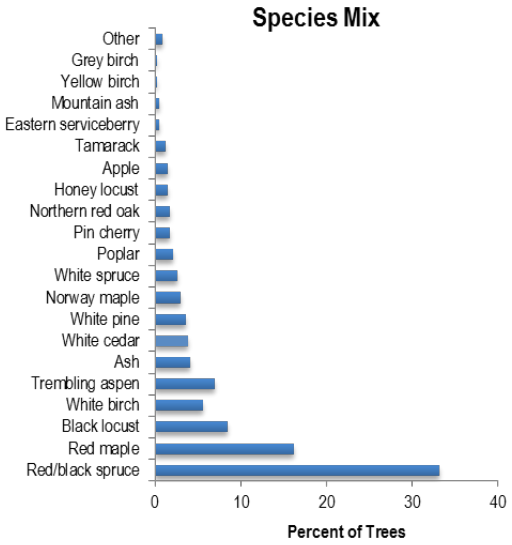
	Land Use	Zoning	Decade of Development
Heritage Hills	Industrial, multi-family residential, commercial	CDD, R-2	1990s
Parks	Industrial	CDD	1990s

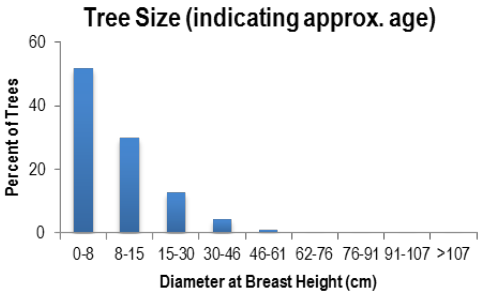
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	150
Area of naturalized forest stands to be created on HRM lands per decade	2 ha
Area of naturalized forest stands not to fall below	10 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	3 (eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Spruce, maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	5
Additional Neighbourhood Treatments	
Protect and extend the HRM forest stand in the southern section of the neighbourhood.	

Shearwater

The Shearwater urban forest neighbourhood contains a mix of industrial, commercial, institutional and residential land uses. The area overlooks McNabs Island to the southwest and is generally bounded by Morris Lake, Caldwell Road, Janice Ann Drive, and Main Road (Figure 60). Canadian Forces Base (CFB) Shearwater is a dominant feature. Its airstrip, accessory buildings, and housing occupy a large portion of the land in this 984 hectare area. The nearby shores of Halifax Harbour contain several marine industrial and institutional land uses. Surprisingly, this urban forest neighbourhood still has a canopy cover of 33%. Most of it can be found in undeveloped tracts of hinterland forest dominated by stands of red maple, balsam fir, and spruce, with several poorly drained stands of black spruce and tamarack located southeast of the airstrip. The remaining institutional and residential lands in this urban forest neighbourhood have limited canopy cover and are shown in Figure 68 in light blue. Shearwater West (1) is Department of National Defence (DND) housing with a canopy cover of only 12%. Shearwater Central (2) and Shearwater East (3) are privately owned residential divisions with a canopy cover of 23% and 12%, respectively. About half of the overall urban forest neighbourhood is Department of National Defence (DND) property, with the rest being privately owned. Improving the urban forest neighbourhood will require HRM's collaboration with DND, and private landowners. Maintaining and improving the urban forest ribbon pattern along the Shearwater Flyer Trail will also increase urban forest connectivity in the neighbourhood while planting trees along Main Road and other HRM rights of way will establish a green treed corridor between Dartmouth and Eastern Passage.





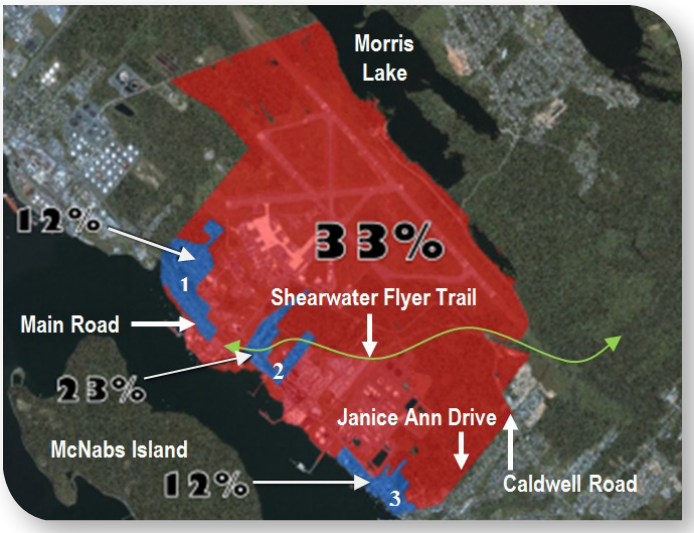


Figure 60

Challenges

- Increasing canopy cover in Shearwater will be difficult given the extensive industrial and institutional grounds, including the CFB Shearwater, the former Ultramar Oil Refinery, and the Auto Port.
- There is a high degree of imperviousness throughout the neighbourhood.
- Many harbourfront properties have been infilled with artificial substrate and are highly impervious.
- There are few trees on private residential lots.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 33% to 40%.
- There are 1725 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing institutional, corporate, and residential stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Shearwater percent canopy cover	33	≥ 40
(1) Shearwater West division percent canopy cover	12	≥ 40
(2) Shearwater Central division percent canopy cover	23	≥ 70
(3) Shearwater East division percent canopy cover	12	≥ 20
Percent of neighbourhood in forest stands	32	32
Percent of trees within the smallest size class	52	≥ 10
Percent of street trees that are native	78	50
Number of species that comprise more than 5% of all street trees	5 (red/black spruce, black locust, white birch, trembling aspen)	0
Number of genera that comprise more than 10% of all street trees	2 (spruce, maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	1,725	0
Percent canopy cover of riparian and recharge zones	60	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	54	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Shearwater	984		Drumlins, anthropogenic, till veneer
Shearwater West	33		Drumlins
Shearwater Central	21		Drumlins
Shearwater East	18		Till veneer

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Shearwater	Institutional, industrial	US, I-2, I-1, D-1	1910
Shearwater West	Institutional	D-1	1940s
Shearwater Central	Multi-family residential, commercial	R-2, C-5	1950s
Shearwater East	Commercial	C-2	1950s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	690
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	315 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	15 (eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Spruce, maple
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	22
Additional Neighbourhood Treatments	
Establish an urban forest ribbon pattern along Main Road and the Shearwater Flyer Trail.	

A-7 FAIRVIEW/BEECHVILLE, LAKESIDE, TIMBERLEA (BLT)

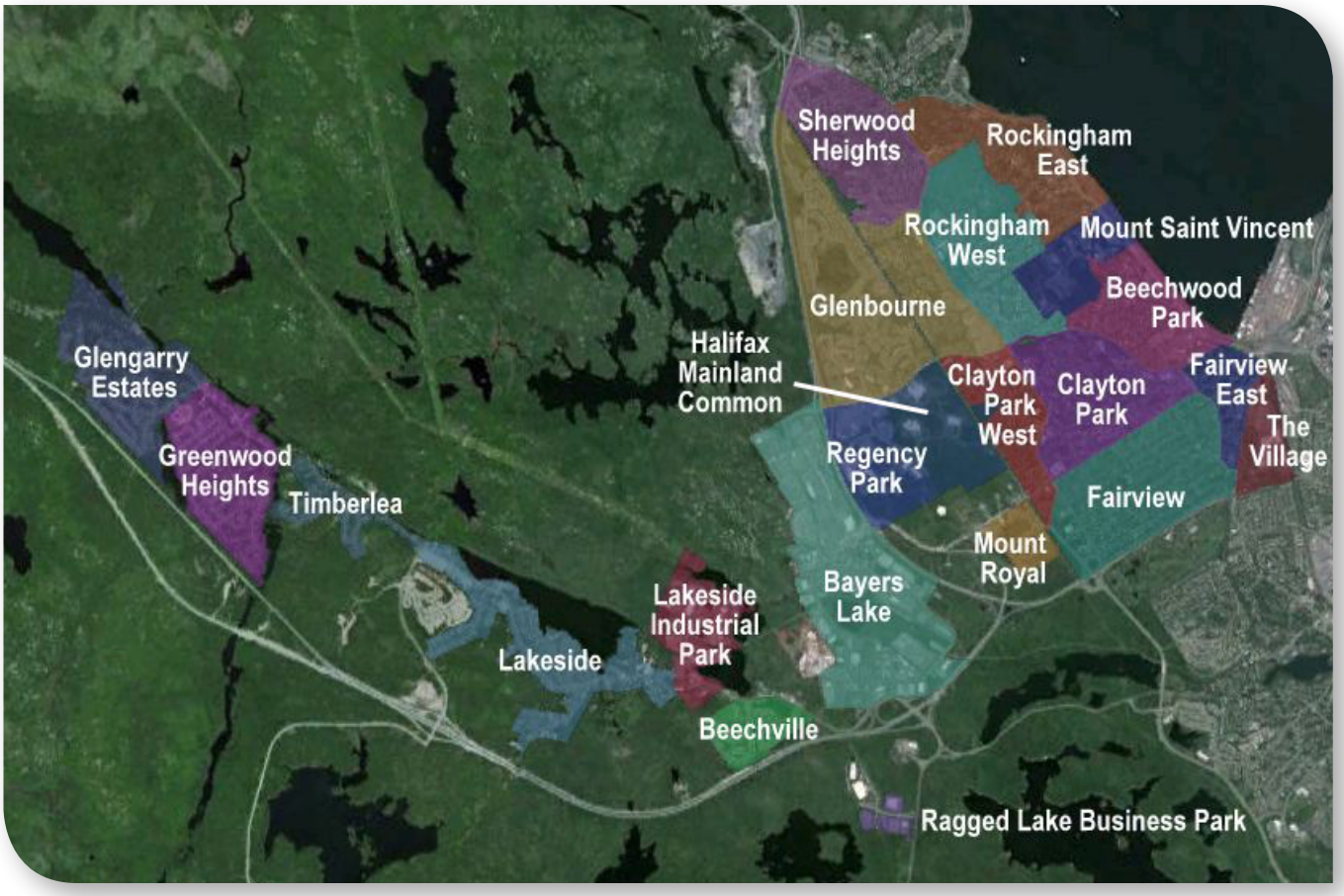
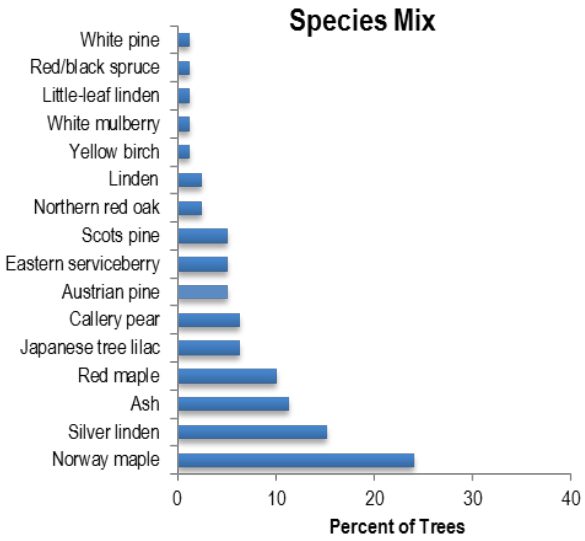
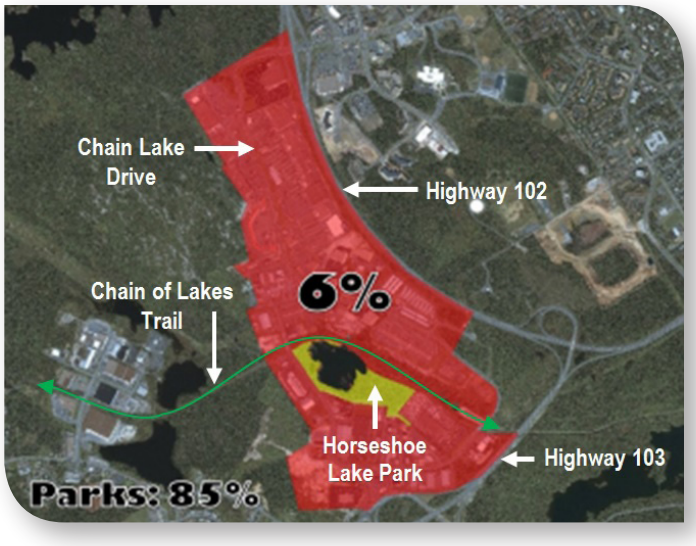


Figure 61

Bayers Lake

The urban forest neighbourhood of Bayers Lake is home to the Bayers Lake Business Park, one of Atlantic Canada's major destinations for shopping and business services. It is bound in the east by Highway 102 and by Highway 103 in the south (Figure 62). Chain Lake Drive, the area's major thoroughfare, generally bisects the neighbourhood. Prior to the business park's development in the mid-1980s, native forests dominated the landscape. This area has seen rapid growth since then and presently has a canopy cover (shown in red) of just 6%. Unfortunately, the high levels of impervious surfaces accompanied by the underlying poor, shallow soils and bedrock terrain of the park will be a significant challenge to managing and improving the urban forest. Bayers Lake's retail and other service-oriented land uses have required extensive paving for vehicle parking. Although there are opportunities to plant street trees on public property, the area's private properties rarely contain plantable sites. Fortunately, there are opportunities to maintain and improve the connectivity of the urban forest with the significant urban forest wedge pattern shaped by the Blue Mountain – Birch Cove Lakes Regional Park in the north and the ribbon pattern formed by the treed Chain of Lakes Trail active transportation corridor in the south. Urban forest ribbon patterns can also be developed with street tree planting along HRM's road right of ways in the park.





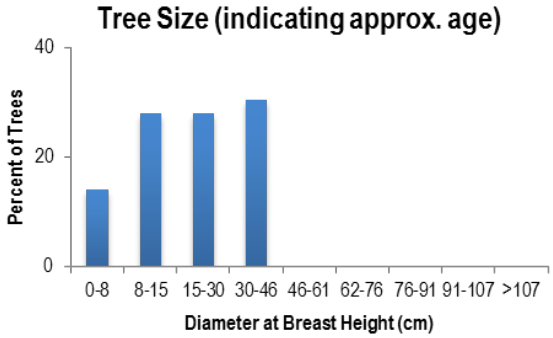


Figure 62

Challenges

- Bayers Lake has high levels of imperviousness and a limited number of plantable sites.
- Remaining areas of intact canopy will be reduced by new development activities.
- This region is characterized by shallow, poorly-drained soils that overly bedrock, with many exposed bedrock ridges. The area's spruce forest is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 6% to 20%.
- There are 322 plantable sites for new street trees in this neighbourhood.
- Riparian zone protection for Horseshoe Lake will be increased from 44% canopy cover to 100% canopy cover.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- HRM will collaborate with the Bayers Lake Business Association to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Bayers Lake percent canopy cover	6	≥ 20
Parks percent canopy cover	85	≥ 90
Percent of neighbourhood in forest stands	9	9
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	33	50
Number of species that comprise more than 5% of all street trees	4 (ash, eastern serviceberry, callery pear, northern red oak)	0
Number of genera that comprise more than 10% of all street trees	1 (ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	322	0
Percent canopy cover of riparian zones	44	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	N/A	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Bayers Lake	202		Anthropogenic, bedrock
Parks	8		Bedrock

Socioeconomic Conditions

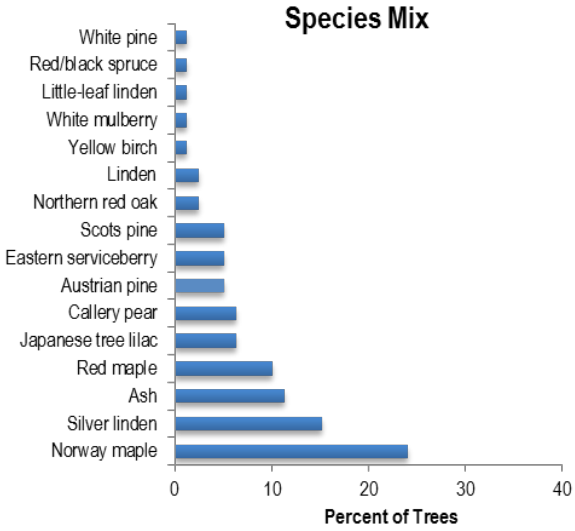
	Land Use	Zoning	Decade of Development
Bayers Lake	Industrial	I-3	1980s
Parks	Park	I-3	1980s

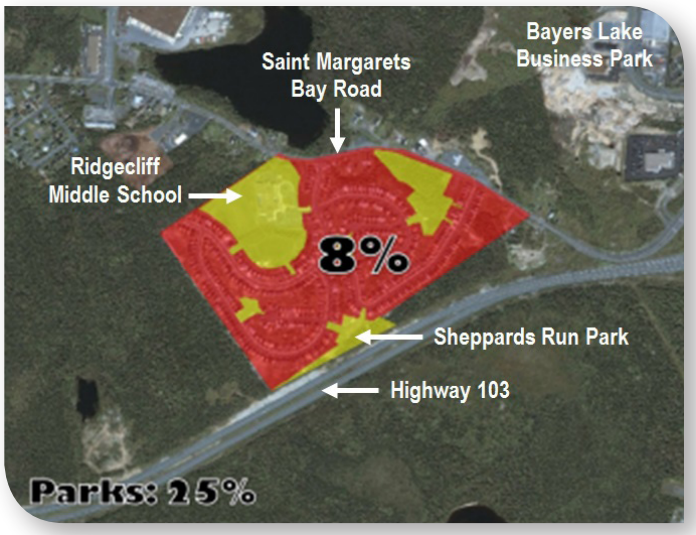
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	130
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	18 ha
Average number of native trees to plant on HRM lands per decade	75
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Maintain and enhance the urban forest ribbon pattern created by the Chain of Lakes Trail.	
Maintain recreational opportunities in Bayers Lake Business Park with trail access to the Blue Mountain – Birch Cove Lakes Regional Park.	
Collaborate with the Bayers Lake Business Association regarding urban forest improvement opportunities.	

Beechville

The urban forest neighbourhood of Beechville, situated southwest of the Bayers Lake Business Park, is bound in the north by St. Margarets Bay Road and Highway 103 to the south (Figure 63). This historic area has grown rapidly with the development of Beechville Estates residential subdivision's many new detached and semi-detached homes over the past decade. The growth of this attractive neighbourhood was accompanied by the construction of Ridgecliffe Middle School and several parks (shown in light green). Prior to development, extensive grade alterations to the area's rockland topography were required and all trees were removed from the site. Although some trees have been replaced, the urban forest neighbourhood's canopy cover of just 8% (shown in red) indicates that many more trees are required on public and private properties to achieve Beechville's urban forest canopy cover target of 20%. While the neighbourhood is surrounded by native Acadian stands of red and black spruce, balsam fir, and red maple, private residential properties and HRM rights of way have few trees, with most being found in residential buffer strips behind homes. The canopy cover in public parks is also low at 25% and can be improved. An urban forest ribbon pattern formed by a treed buffer strip along the southern border of the neighbourhood adjacent to Highway 103 provides sound attenuation benefits to local residents and should also be enhanced.





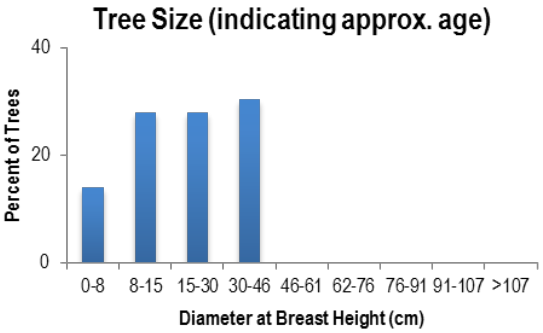


Figure 63

Challenges

- There are few trees planted on private residential lots and along HRM rights of way.
- Beechville is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges. The spruce forest that covers undeveloped areas of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.
- There are stresses associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts, environmental contamination, illegal dumping, tree-cutting, and invasive species.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 6% to 20%.
- There are 558 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- HRM will collaborate with local residents' groups to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Beechville percent canopy cover	8	≥ 20
Parks percent canopy cover	25	≥ 40
Percent of neighbourhood in forest stands	10	13
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	33	50
Number of species that comprise more than 5% of all street trees	4 (ash, eastern serviceberry, callery pear, northern red oak)	0
Number of genera that comprise more than 10% of all street trees	1 (ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	N/A	N/A
Number of plantable sites in HRM rights of way	558	N/A
Percent canopy cover of riparian zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	40	100
Percent of residential properties with at least one value tree	16	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Beechville	35		Bedrock
Parks	7		Bedrock

Socioeconomic Conditions

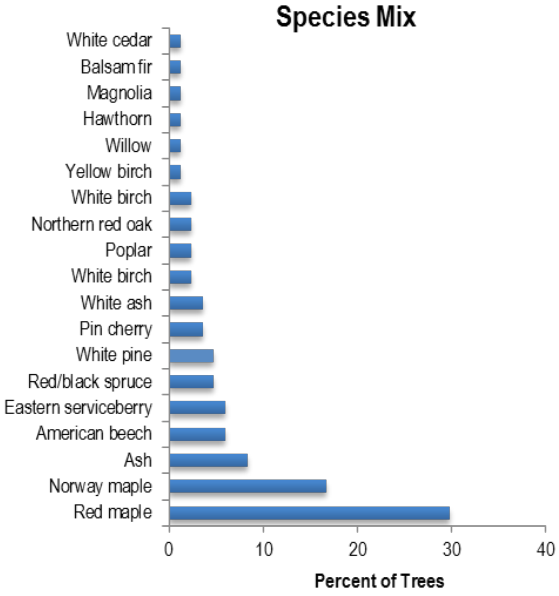
	Land Use	Zoning	Decade of Development
Beechville	Residential	CDD	2000s
Parks	Commercial	CDD, R-1	2000s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	130
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Area of naturalized forest stands not to fall below	4 ha
Average number of native trees to plant on HRM lands per decade	75
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	N/A
Additional Neighbourhood Treatments	
Maintain and enhance the urban forest ribbon pattern along Highway 103 and collaborate with the Nova Scotia Department of Transportation and Infrastructure Renewal.	

Beechwood Park

Beechwood Park is a residential urban forest neighbourhood situated just west of the shores of Fairview Cove. The neighbourhood generally extends from its northern bounds of Mount Saint Vincent University, Bayview Road and Briarwood Crescent to Main Avenue in the south and Lacewood Drive in the southwest (Figure 64). It is a relatively well-forested neighbourhood, with a canopy cover of 31% (shown in red), characterized by detached single-family homes enclosed by a healthy growth of native and introduced tree species. The neighbourhood division (shown in blue) in the southeastern portion of the neighbourhood has a much lower canopy cover of 17% and features a range of institutional and commercial land uses and multi-family dwellings. Although this area exhibits an abundance of impervious surfaces its many treeless open spaces provide good opportunities for tree planting to increase local canopy cover. The Canadian National Railway corridor runs between the Bedford Highway and Fairview Cove. Although presently devoid of trees, there are opportunities to form an urban forest ribbon pattern in this area.



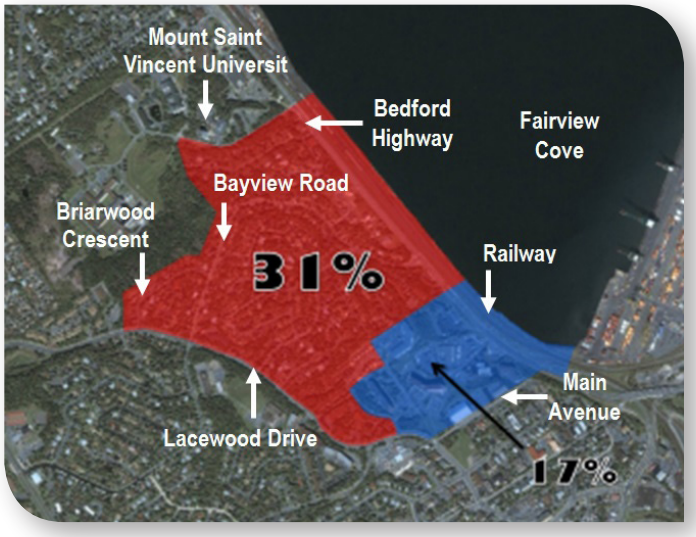
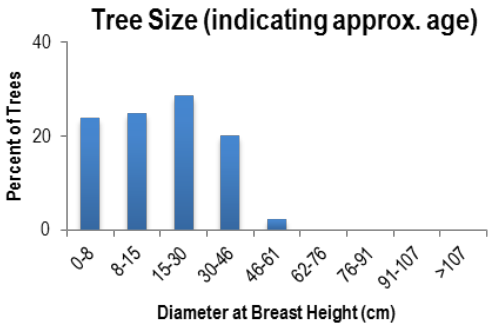


Figure 64



Challenges

- There are no trees along the east side of the Bedford Highway or alongside the railway corridor.
- There is no riparian protection for Fairview Cove.
- There are high levels of imperviousness and a limited number of trees in the neighbourhood division.
- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy in the single family residential area of Beechwood Park from 31% to 70% and increase canopy cover in the neighbourhood division from 17% to 45%.
- There are 217 plantable sites for new street trees in Beechwood Park.
- There are opportunities to establish an urban forest ribbon pattern along the Bedford Highway.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential, institutional and commercial stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Beechwood Park percent canopy cover	31	≥ 70
Neighbourhood divsion percent canopy cover	17	≥ 45
Percent of neighbourhood in forest stands	14	14
Percent of trees within the smallest size class	24	≥ 10
Percent of street trees that are native	81	50
Number of species that comprise more than 5% of all street trees	7 (red maple, Norway maple, eastern serviceberry, white pine, white ash, white birch)	0
Number of genera that comprise more than 10% of all street trees	4 (Norway maple, serviceberry, white pine, white ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	94	100
Number of plantable sites in HRM rights of way	217	0
Percent canopy cover of riparian zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	83	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Beechwood Park	75		Bedrock
Apartment Towers	18		Bedrock

Socioeconomic Conditions

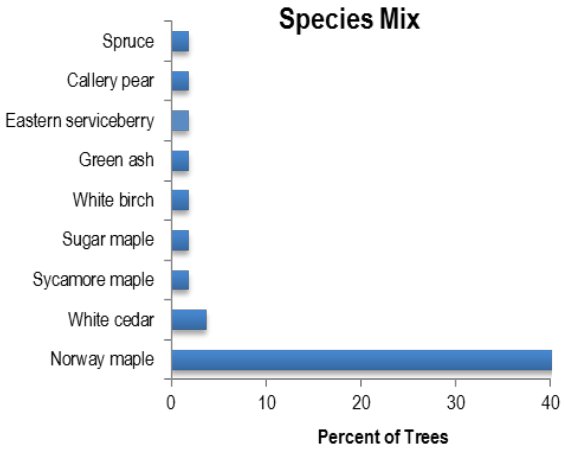
	Land Use	Zoning	Decade of Development
Beechwood Park	Residential	R-1	1970s/1980s
Apartment Towers	Multi-family residential, commercial	R-4, CDZN	1990s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	90
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	11 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (eastern hemlock, sugar maple)
Refrain from planting the following genera until 2020	Norway maple, serviceberry, white pine, white ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	9
Additional Neighbourhood Treatments	
Develop an urban forest ribbon pattern along the Bedford Highway.	

Clayton Park

This urban forest neighbourhood is a venerable residential subdivision developed in the 1960s and named in honour of the Clayton family, the original owners of the tract of land that became known as Clayton Park. The subdivision is generally bounded by Lacewood Drive extending from the north to the southeast, Main Avenue in the south, and Dunbrack Street in the west (Figure 65). Clayton Park consists mainly of detached single family homes, with various semi-detached residences and multi-family residential dwellings located in areas adjacent to Dunbrack Street and along Main Avenue. This high density urban forest neighbourhood has a canopy cover of 26% (shown in red), however there is very low species diversity and the neighbourhood is dominated by the invasive Norway maple. There is also an older bias in the age-class distribution of the street tree population, with inadequate numbers of younger trees to replace the older ones as they mature. Northcliffe Centre, at the northwest corner of the neighbourhood, is the site of a former community centre with a forested park surrounding it. The small wetland found within the park has relatively poor canopy cover in its riparian zones. Any potential sale of this land will include conditions for HRM's retention of the parkland and its valuable canopy cover. Dunbrack Street was originally designed as a parkway with beautifully landscaped medians and boulevards: however, this 1980s era roadway is in need of renewal. Tree planting along Dunbrack Street's boulevards will restore its beauty and form a continuous urban forest ribbon pattern providing much needed shade and connectivity throughout the neighbourhood.



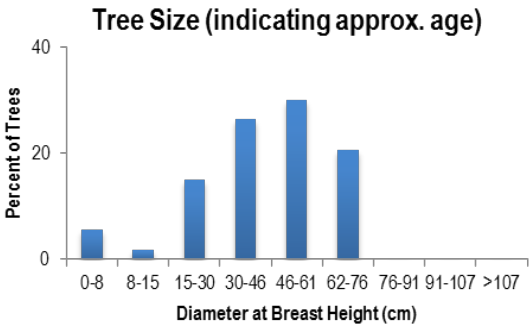


Figure 65

Challenges

- Species diversity in Clayton Park is low. There is an overrepresentation of Norway maple and lack of native species in the street tree population.
- The urban forest in Clayton Park is aging, with an uneven distribution of tree sizes. There is disproportionate amount of older, larger trees and not enough young trees to replace old ones in years to come.
- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges. The spruce forest that covers some areas of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 26% to 70%.
- There are 630 plantable sites for new street trees in Clayton Park.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential and institutional stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Clayton Park percent canopy cover	26	≥ 70
Parks percent canopy cover	53	≥ 40
Percent of neighbourhood in forest stands	18	18
Percent of trees within the smallest size class	6	≥ 10
Percent of street trees that are native	11	50
Number of species that comprise more than 5% of all street trees	1 (Norway maple)	0
Number of genera that comprise more than 10% of all street trees	1 (maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	85	100
Number of plantable sites in HRM rights of way	630	0
Percent canopy cover of riparian zones	58	100
Percent of public play areas that are adequately shaded (40% canopy cover)	86	100
Percent of residential properties with at least one value tree	81	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Clayton Park	105		Bedrock
Parks	13		Bedrock

Socioeconomic Conditions

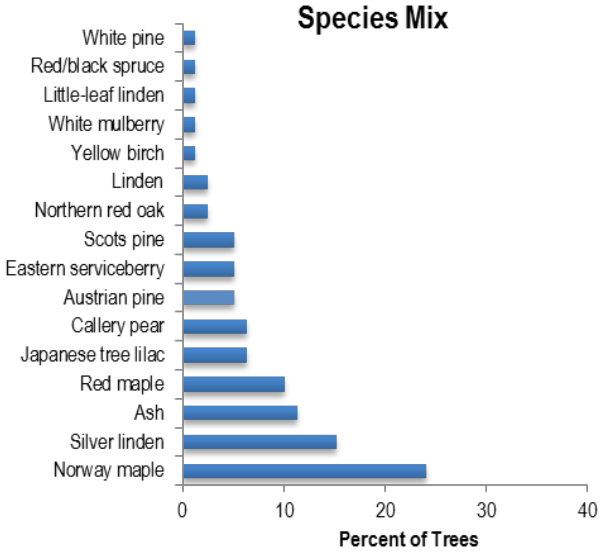
	Land Use	Zoning	Decade of Development
Clayton Park	Residential, multi-family residential	R-1, R-4, CDZN, T	1960s
Parks	Park, institutional	P	1960s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	250
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	12 ha
Average number of native trees to plant on HRM lands per decade	75
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	28
Additional Neighbourhood Treatments	
Develop an urban forest ribbon pattern along Dunbrack Street.	

Clayton Park West

The urban forest neighbourhood of Clayton Park West is bound in the north by Lacewood Drive, in the east by Dunbrack Street, and the Mainland North Linear Parkway in the west (Figure 66). The area was developed between 1986 and 2003 and borders the extensive parkland and recreational amenities of the Mainland Common. It features an attractive range of detached and semi-detached single family homes as well as townhouses, apartment complexes, and a shopping centre. Although the urban forest neighbourhood has one of the highest population densities in HRM, it has a canopy cover of 22% (shown in red). There are two neighbourhood divisions in Clayton Park West (shown in blue). Birkdale Crescent, in the south, has a canopy cover of 17%, and to the north, the Clayton Park Shopping Centre has 0% canopy cover. Both divisions require improved tree planting efforts. The area's linear parkway and common form impressive urban forest ribbon and belt patterns that provide a continuous green western boundary for the residents of Clayton Park West.



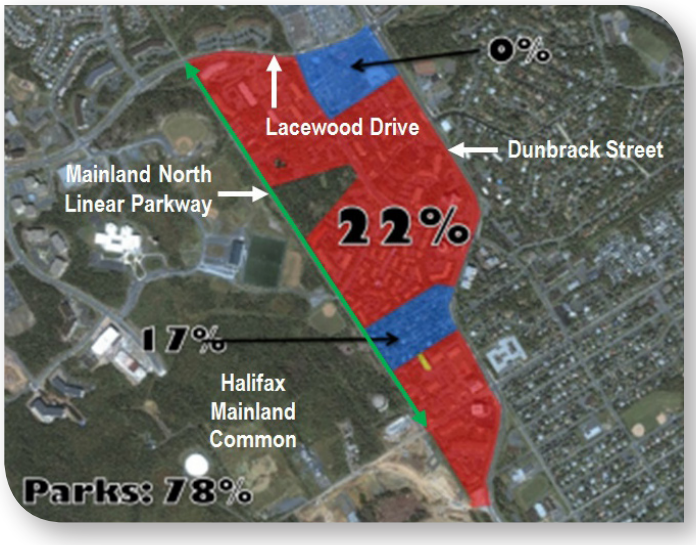
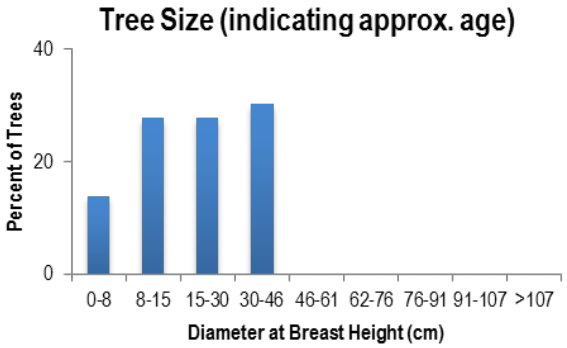


Figure 66



Challenges

- There is an overrepresentation of Norway maple and lack of native species in the street tree population.
- The Clayton Park Shopping Centre commercial division has no canopy cover. Paved surfaces dominate the site and there are few areas suitable for trees.
- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges. The spruce forest that covers some areas of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 22% to 70%.
- There are 131 plantable sites for new street trees in Clayton Park West.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential and commercial stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Clayton Park West percent canopy cover	22	≥ 70
Birkdale Crescent percent canopy cover	17	≥ 70
Clayton Park Shopping Centre	0	≥ 20
Parks percent canopy cover	78	≥ 40
Percent of neighbourhood in forest stands	11	11
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	33	50
Number of species that comprise more than 5% of all street trees	4 (ash, eastern serviceberry, callery pear, northern red oak)	0
Number of genera that comprise more than 10% of all street trees	1 (ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	131	0
Percent canopy cover of riparian zones	52	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	71	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Clayton Park West	58		Bedrock
Birkdale Crescent	4		Bedrock
Clayton Park Shopping Centre	5		Anthropogenic
Parks	1		Bedrock

Socioeconomic Conditions

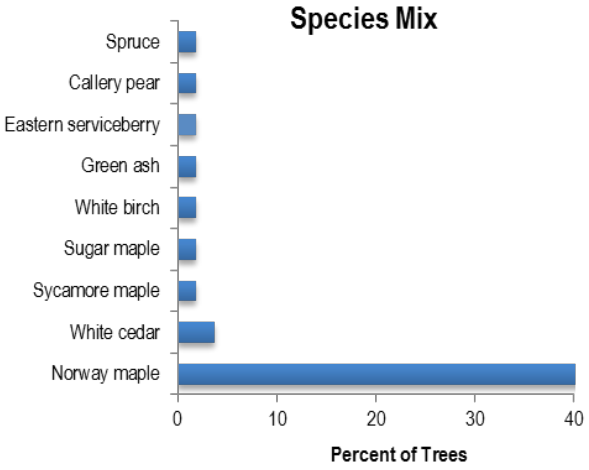
	Land Use	Zoning	Decade of Development
Clayton Park West	Multi-family residential	R-4	1980s – 2000s
Birkdale Crescent	Residential	R-1	1980s
Clayton Park Shopping Centre	Commercial	C-2	1980s
Parks	Multi-family residential	R-4	1980s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	50
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	6 ha
Average number of native trees to plant on HRM lands per decade	30
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Maintain and enhance the urban forest ribbon pattern along the Mainland North Linear Parkway.	
Develop an urban forest ribbon pattern along Dunbrack Street.	

Dutch Village North

The Dutch Village North urban forest neighbourhood is bounded by the Fairview Overpass in the north, Bicentennial Highway in the south, the railway in the east and Joseph Howe Drive in the west. This diverse area features a small enclave of residential properties in the south and several centrally located commercial properties that extend northwards to the Fairview Overpass. Overall, Dutch Village North has a low canopy cover of 15% (shown in red). The Village at Bayers Road and Atlantic Superstore, are key commercial properties that include extensive paved areas that present challenges to improving the urban forest, with very few plantable sites. In contrast to this are the residential areas located to the south and southwest featuring a high proportion of attractive residential properties with value trees and tree-lined streets. Urban forest improvements to Dutch Village North will include additional tree plantings to form network and ribbon patterns along residential streets and the railway corridor. The mature treed landscape of Bi-Hi Park provides an iconic gateway to the City along Bicentennial Drive and its current canopy of 20% will be improved upon.



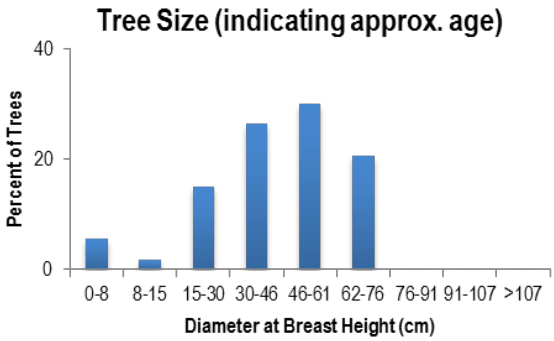


Figure 67

Challenges

- The commercial majority of the Village has very low canopy cover. The high degree of imperviousness and lack of plantable sites on commercial properties will make it a considerable challenge to improving the urban forest.
- Species diversity in the Village is low. There is an overrepresentation of Norway maple and lack of native species in the street tree population.
- The urban forest in the Village is aging, with an uneven distribution of tree sizes. There is disproportionate amount of older, larger trees and not enough young trees to replace old ones in years to come.
- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges.
- The spruce forest that covers most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 15% to 20%.
- There are 200 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
The Village percent canopy cover	15	≥ 20
Parks percent canopy cover	20	≥ 40
Percent of neighbourhood in forest stands	0	0
Percent of trees within the smallest size class	6	≥ 10
Percent of street trees that are native	11	50
Number of species that comprise more than 5% of all street trees	1 (Norway maple)	0
Number of genera that comprise more than 10% of all street trees	1 (maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	85	100
Number of plantable sites in HRM rights of way	200	0
Percent canopy cover of riparian zones	0	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	86	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
The Village	33		Anthropogenic, bedrock
Parks	2		Anthropogenic, bedrock

Socioeconomic Conditions

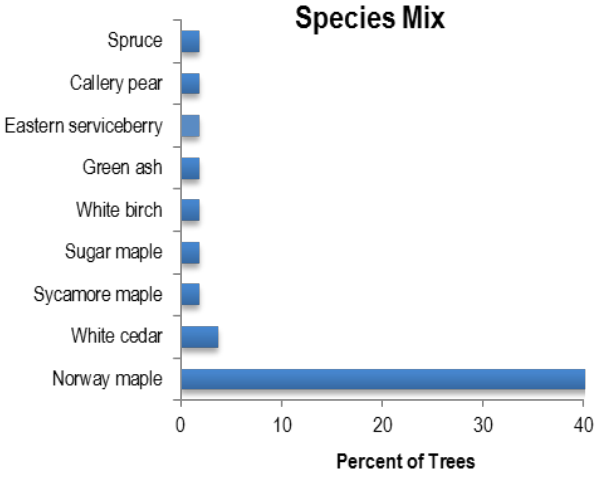
	Land Use	Zoning	Decade of Development
The Village	Commercial, residential	C-2, CDZN	1950s/1980s
Parks	Park	P	1950s

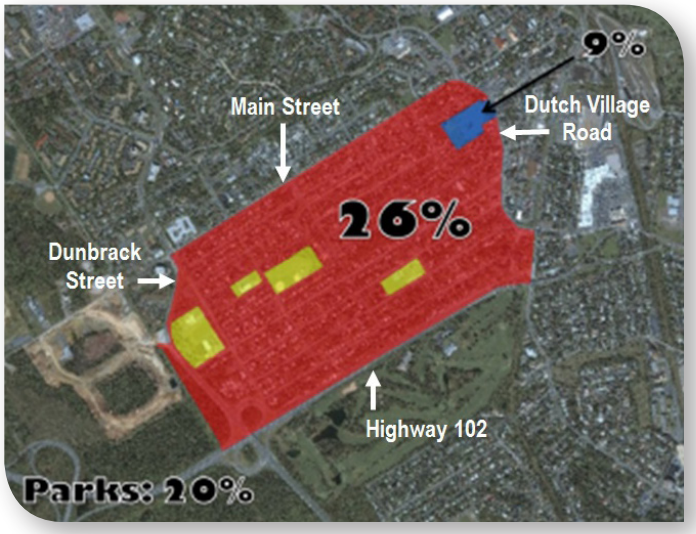
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	80
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	0 ha
Average number of native trees to plant on HRM lands per decade	25
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	9
Additional Neighbourhood Treatments	
Maintain and enhance the ribbon pattern along the railway and develop one along the Chain of Lakes Trail, along Joseph Howe Drive.	

Fairview

The Fairview urban forest neighbourhood lies south of Main Avenue between Dutch Village Road in the east and Dunbrack Street in the west. Its southern boundary is formed by Highway 102. This residential area features a range of compact single-family homes as well as a number of multi-family dwellings. Partially situated on a plateau, it overlooks its nearby namesake, Fairview Cove. The area has a long history, dating back to early settlements along Dutch Village Road that slowly expanded westward over the past two hundred years. Today, Fairview has a canopy cover of 26% (shown in red), though the tree population has a low species diversity – dominated by Norway maple – and is aging, without adequate numbers of younger trees to replace older ones in the future. There are several parks in the neighbourhood (shown in light green) where canopy cover will be improved. There are also few trees planted along streets such as Dutch Village Road, a situation that will be remedied in the future. The former site of Halifax West High School (shown in blue) has a low canopy cover of 9%. The property is scheduled for redevelopment however HRM has retained ownership of a fair portion of the property for parkland and will utilize this area to improve canopy cover.





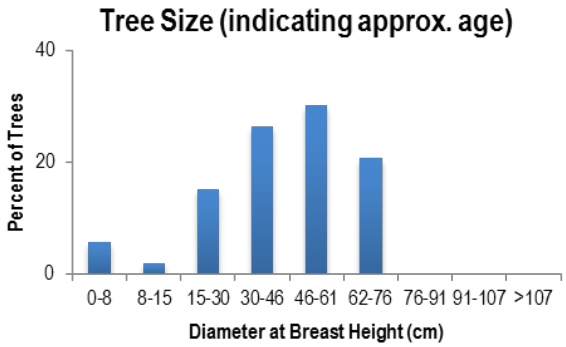


Figure 68

Challenges

- Species diversity in Fairview is low. There is an overrepresentation of Norway maple and lack of native species in the street tree population.
- The urban forest in Fairview is aging and dominated by mature trees with insufficient numbers of young trees to replace the older cohort in the future.
- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges.
- Street trees are noticeably absent throughout Fairview, especially along Dutch Village Road.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 26% to 70%.
- There are 1,167 plantable sites for new street trees in Fairview.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential and commercial stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Fairview percent canopy cover	26	≥ 70
Vacant Lot percent canopy cover	9	≥ 20
Parks percent canopy cover	20	≥ 40
Percent of neighbourhood in forest stands	4	5
Percent of trees within the smallest size class	6	≥ 10
Percent of street trees that are native	11	50
Number of species that comprise more than 5% of all street trees	1 (Norway maple)	0
Number of genera that comprise more than 10% of all street trees	1 (maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	85	100
Number of plantable sites in HRM rights of way	1,167	0
Percent canopy cover of riparian zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	79	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Fairview	134		Bedrock
Vacant Lot	3		Bedrock
Parks	8		Bedrock

Socioeconomic Conditions

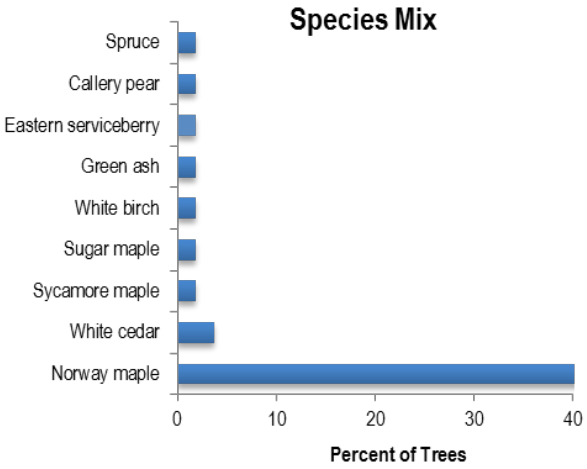
	Land Use	Zoning	Decade of Development
Fairview	Residential	R-2, R-1	1950s
Vacant Lot	Vacant	CDZN	1960s
Parks	Park, institutional	R-2, R-1	1960s

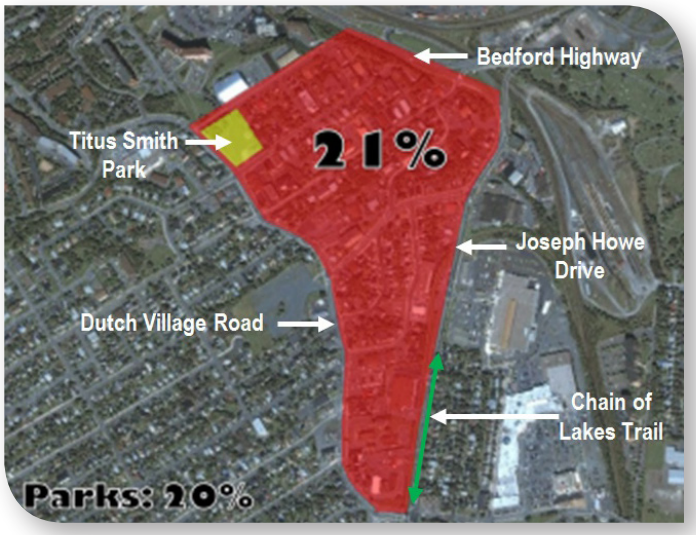
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	470
Area of naturalized forest stands to be created on HRM lands per decade	2 ha
Area of naturalized forest stands not to fall below	5 ha
Average number of native trees to plant on HRM lands per decade	135
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	52
Additional Neighbourhood Treatments	
Develop an urban forest ribbon pattern along Dutch Village Road.	
Collaborate with Dutch Village Road businesses regarding urban forest improvement opportunities.	
Improve the urban forest network pattern throughout Fairview.	

Fairview East

The Fairview East neighbourhood lies by the Bedford Highway and extends its narrow band of urban forest one kilometre southward between Dutch Village Road and Joseph Howe Drive to the intersection of the two roadways (Figure 69). The area features a range of land uses including commercial outlets along Dutch Village Road and Joseph Howe Drive, and a mix of multi-family residential complexes, apartment buildings and single-family homes in central and northern sections of the neighbourhood. Fairview East has a canopy cover of 21% (shown in red). Although this urban forest neighbourhood is extensively paved, with a high degree of imperviousness, there are opportunities to double its present canopy cover through street tree planting and cooperative efforts with local businesses and apartment building owners. Titus Smith Park, in the northwest corner of Fairview East, also presents significant tree planting opportunities. Further south, adjacent to Joseph Howe Drive, is the starting point for the Chain of Lakes Trail. The ribbon pattern formed by the trail's substantial right of way corridor provides outstanding opportunities for tree planting on both sides of the trail. Additional planting opportunities exist north of the trail, along the western side of Joseph Howe Drive, extending to the Bedford Highway.





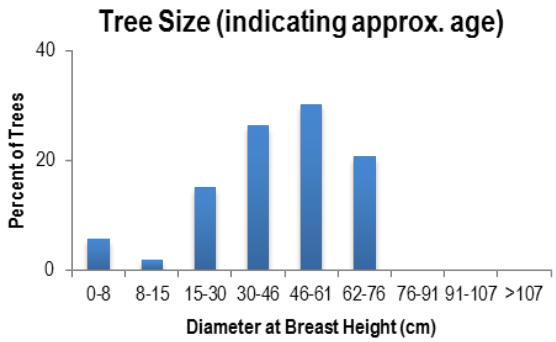


Figure 69

Challenges

- In Fairview East there is no canopy cover along Dutch Village Road and Joseph Howe Drive. This challenge is accompanied by a high degree of imperviousness and a lack of plantable sites on commercial properties.
- Species diversity is low. There is an overrepresentation of Norway maple and lack of native species in the street tree population.
- The urban forest in Fairview East is aging and dominated by mature trees with insufficient numbers of young trees to replace the older cohort in the future.
- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 21% to 45%.
- There are 226 plantable sites for new street trees in Fairview East.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential and commercial stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Fairview East percent canopy cover	21	≥ 45
Parks percent canopy cover	20	≥ 40
Percent of neighbourhood in forest stands	0	0
Percent of trees within the smallest size class	6	≥ 10
Percent of street trees that are native	11	50
Number of species that comprise more than 5% of all street trees	1 (Norway maple)	0
Number of genera that comprise more than 10% of all street trees	1 (maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	85	100
Number of plantable sites in HRM rights of way	226	0
Percent canopy cover of riparian zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	73	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Fairview East	33		Bedrock
Parks	1		Bedrock

Socioeconomic Conditions

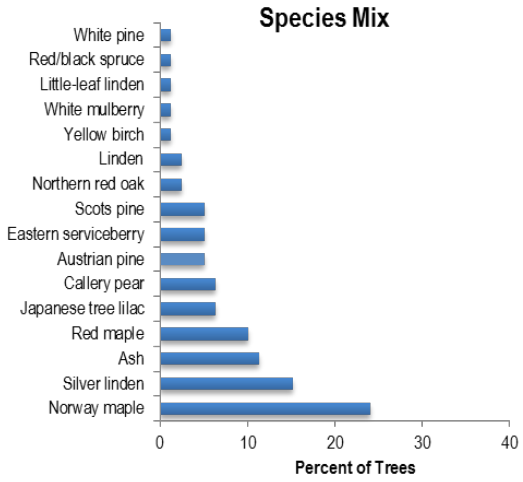
	Land Use	Zoning	Decade of Development
Fairview East	Residential, multi-family residential, commercial	C-2A, R-2P, R-2AM, R-2	1940s
Parks	Park	P	1940s

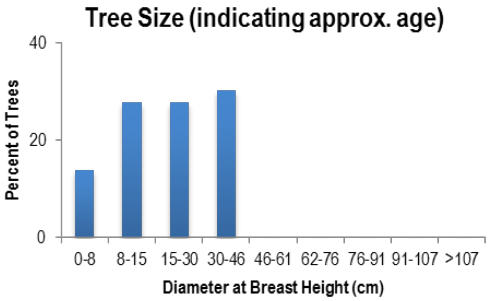
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	90
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	0 ha
Average number of native trees to plant on HRM lands per decade	25
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	10
Additional Neighbourhood Treatments	
Develop an urban forest ribbon pattern along the Chain of Lakes Trail.	
Plant new street trees along Dutch Village Road and Joseph Howe Drive.	

Glenbourne

The urban forest neighbourhood of Glenbourne is bounded by the Mainland North Linear Parkway and Dunbrack Street in the east. Highway 102 forms its western boundary, while its southern extent is marked by Lacewood Drive (Figure 70). Spanning over 200 hectares, this recently developed locale features an impressive array of land uses. Sections of the neighbourhood shown in red are primarily detached and semi-detached single-family residential districts (Figure 70). It is evident when the development of Glenbourne took place in the 1990s great care was given to planting new trees along streets and front yards throughout these areas of the subdivision. Native forest was also retained in parks, riparian zones, and treed buffer strips. Although these areas of Glenbourne presently have a relatively low canopy cover of 23%, further growth of existing trees, as well as additional plantings by residents and HRM will increase overall canopy cover to 70% in the future. Areas shown in blue require special attention due to their extremely low levels of canopy cover (Figure 70). These multi-family and commercial urban forest neighbourhood divisions along Lacewood Drive and Parkland Drive contain a variety of apartment complexes and retail outlets with extensive paved surfaces for tenant and customer parking. Although these divisions currently present a hostile environment for the growth of trees, collaborative efforts between HRM and property owners will increase local canopy cover to 45% in the future. Belcher's Marsh is a dominant natural feature in the neighbourhood but its riparian zone canopy cover of 27% provides insufficient environmental protection. Over time, the marsh's original 100% canopy cover will be restored. There is an urban forest ribbon pattern formed by Mainland North Linear Parkway that will benefit from new tree planting to re-establish a shaded, treed corridor for local residents to enjoy.





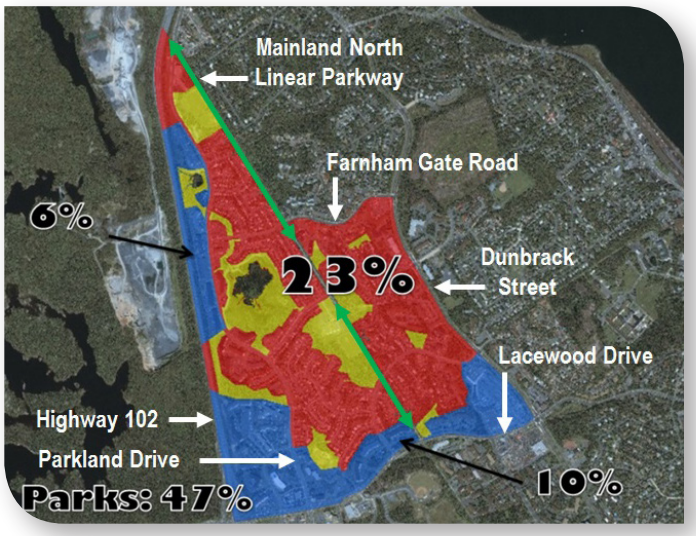


Figure 70

Challenges

- There is poor canopy cover in the riparian zone of Belcher's Marsh.
- There is an overrepresentation of Norway maple and lack of native species in the street tree population.
- Belcher's Marsh has an insufficient level of riparian canopy cover.
- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges. The spruce forest that covers most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy in single family residential areas from 23% to 70%.
- There are 400 plantable sites for new street trees in Glenbourne.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential and commercial stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Glenbourne percent canopy cover	23	≥ 70
Parkland Drive percent canopy cover	6	≥ 45
Lacewood Drive percent canopy cover	10	≥ 45
Parks percent canopy cover	47	≥ 90
Percent of neighbourhood in forest stands	20	27
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	33	50
Number of species that comprise more than 5% of all street trees	4 (ash, eastern serviceberry, callery pear, northern red oak)	0
Number of genera that comprise more than 10% of all street trees	1 (ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	400	0
Percent canopy cover of riparian zones	27	100
Percent of public play areas that are adequately shaded (40% canopy cover)	80	100
Percent of residential properties with at least one value tree	74	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Glenbourne	207		Bedrock
Parkland Drive	47		Bedrock
Lacewood Drive	14		Bedrock
Parks	34		Bedrock

Socioeconomic Conditions

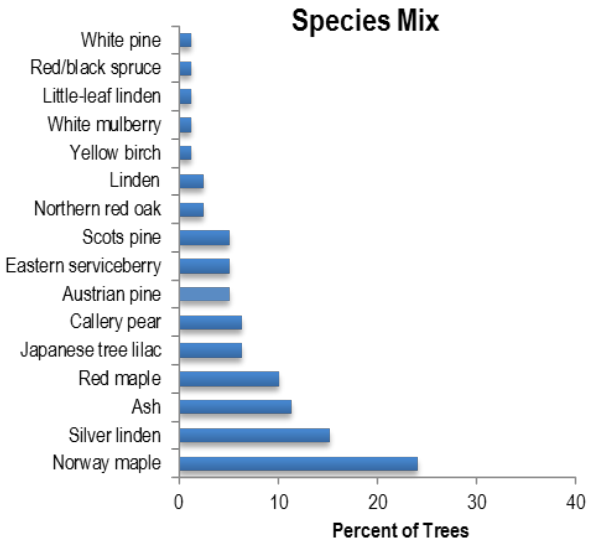
	Land Use	Zoning	Decade of Development
Glenbourne	Residential	N/A	1990s
Parkland Drive	Multi-family residential	N/A	1990s
Lacewood Drive	Multi-family residential	N/A	1980s
Parks	Park	N/A	1990s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	160
Area of naturalized forest stands to be created on HRM lands per decade	14 ha
Area of naturalized forest stands not to fall below	41 ha
Average number of native trees to plant on HRM lands per decade	90
Average number of Acadian old-growth species to plant on HRM lands per decade	6 (eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Maintain and enhance the urban forest ribbon pattern along the Mainland North Linear Parkway.	
Collaborate with landowners and business groups in the Lacewood Drive and Parkland Drive divisions to achieve canopy targets.	
Target the riparian zone of Belcher's Marsh for urban forest improvement.	

Glengarry Estates

The urban forest neighbourhood of Glengarry Estates lies at the fringe of the peri-urban forest and extends north from James Street to Frasers Lake. It is generally bounded in the east by St. Margarets Bay Road and Highway 103 to the west. This well treed residential area features a range of attractive detached and semi-detached homes mainly built in the 1990s. Glengarry Estates has good canopy cover at 39% (shown in red), and 72% in parks (shown in light green). Although Glengarry Estates residents can take pride in their healthy urban forest, there are still many opportunities for improvement on private residential properties, in parks, and HRM rights of way. The Beechville-Lakeside-Timberlea (BLT) Trail forms an urban forest ribbon pattern along the northern boundary of the neighbourhood, and Highway 103 creates another ribbon pattern along the southern boundary. Both provide forest connectivity functions and act as treed sound buffers for local residents as well. Riparian protection in Glengarry Estates is substantial at 59% canopy cover however there are opportunities to improve this vital protection for local lakes.



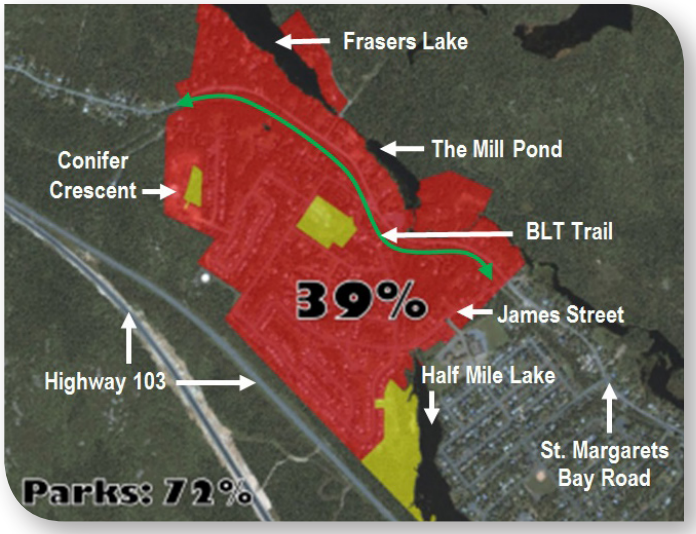
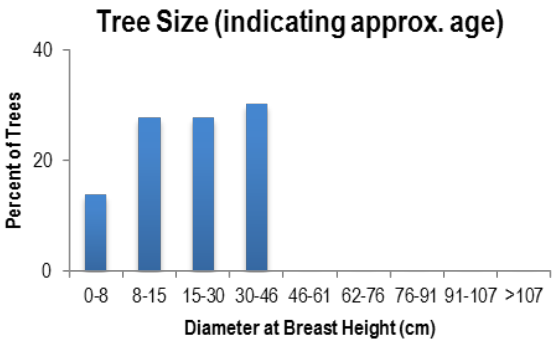


Figure 71



Challenges

- There are stresses associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts, environmental contamination, illegal dumping, tree-cutting, and invasive species.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 39% to 70%.
- There are 160 plantable sites for new street trees in Glengarry Estates.
- Riparian canopy cover will be improved from 59% to 100%.
- Park canopy cover will be increased from 72% to 90%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential and commercial stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Glengarry Estates percent canopy cover	39	≥ 70
Parks percent canopy cover	72	≥ 90
Percent of neighbourhood in forest stands	37	38
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	33	50
Number of species that comprise more than 5% of all street trees	4 (ash, eastern serviceberry, callery pear, northern red oak)	0
Number of genera that comprise more than 10% of all street trees	1 (ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	190	N/A
Percent canopy cover of riparian zones	59	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	51	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Glengarry Estates	104		Silty till plain
Park	8		Silty till plain

Socioeconomic Conditions

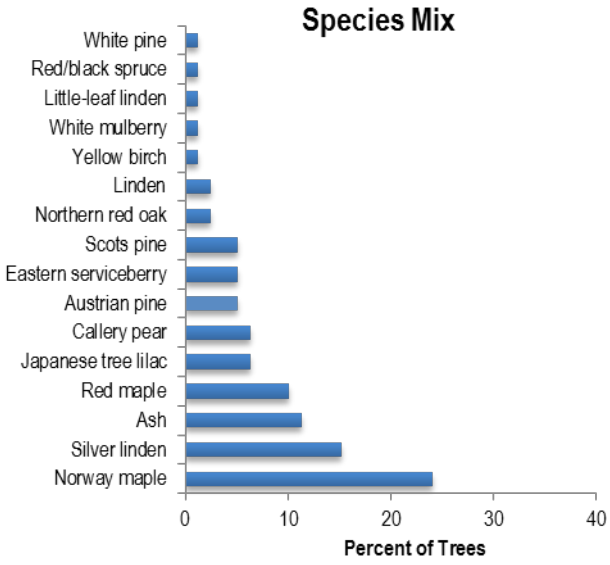
	Land Use	Zoning	Decade of Development
Glengarry Estates	Residential	R-1, CDD	1970s/1990s
Park	Park, institutional	CDD, P-2	1990s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	160
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Area of naturalized forest stands not to fall below	39 ha
Average number of native trees to plant on HRM lands per decade	90
Average number of Acadian old-growth species to plant on HRM lands per decade	6 (eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	N/A
Additional Neighbourhood Treatments	
Maintain and enhance the urban forest ribbon patterns along the Beechville-Lakeside-Timberlea Trail and Highway 103.	

Greenwood Heights

The Greenwood Heights urban forest neighbourhood is generally bounded by St. Margarets Bay Road in the north, Nine Mile River to the east, Highway 103 in the south, and Half Mile Lake to the west. This attractive and relatively well treed area has a canopy cover of 32% and features a range of detached and semi-detached single-family homes built from the 1970s to the 1990s. There are comparatively few value trees on residential properties and street trees are noticeably absent along HRM rights of way. As well, waterfront properties with riparian zones along the east side of Half Mile Lake have low canopy cover. Future street tree planting, local stewardship efforts and riparian canopy improvements will address these issues. The urban forest ribbon patterns formed by the BLT Trail in the north and Highway 103 in the south will also be improved to create a continuous corridor of trees throughout this area.



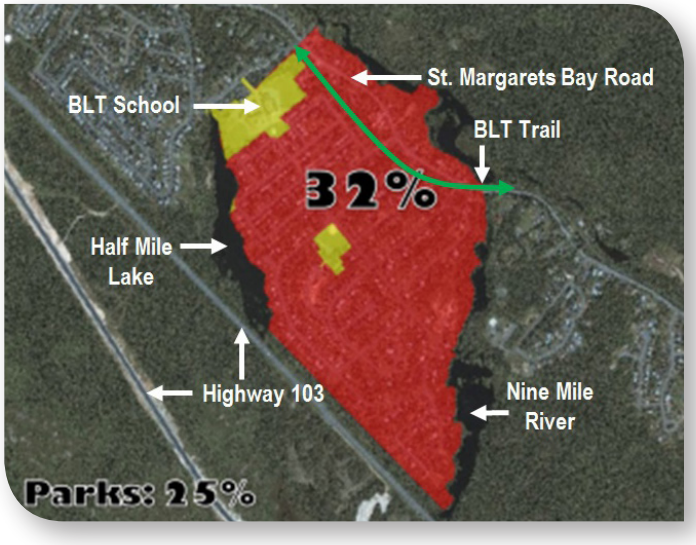
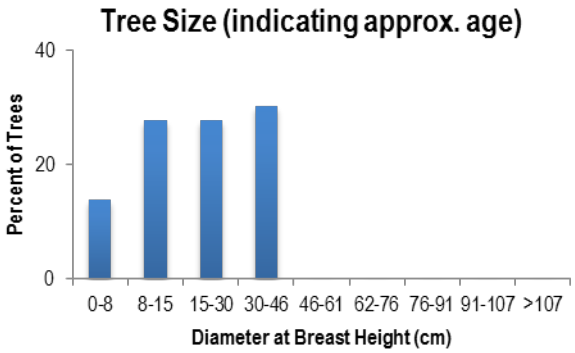


Figure 72



Challenges

- The eastern shoreline of Half Mile Lake has limited riparian canopy cover.
- There are few street trees along HRM rights of way.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 32% to 70%.
- There are 250 plantable sites for new street trees in Greenwood Heights.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Greenwood Heights percent canopy cover	32	≥ 70
Parks percent canopy cover	25	≥ 40
Percent of neighbourhood in forest stands	26	27
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	33	50
Number of species that comprise more than 5% of all street trees	4 (ash, eastern serviceberry, callery pear, northern red oak)	0
Number of genera that comprise more than 10% of all street trees	1 (ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	250	N/A
Percent canopy cover of riparian zones	66	100
Percent of public play areas that are adequately shaded (40% canopy cover)	33	100
Percent of residential properties with at least one value tree	55	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Greenwood Heights	97		Silty till plain
Parks	7		Silty till plain

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Greenwood Heights	Residential	R-2, R-1	1970s
Parks	Institutional	P-2, P-1	1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	160
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Area of naturalized forest stands not to fall below	25 ha
Average number of native trees to plant on HRM lands per decade	90
Average number of Acadian old-growth species to plant on HRM lands per decade	6 (eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	N/A
Additional Neighbourhood Treatments	
Maintain and enhance the ribbon patterns along the Beechville-Lakeside-Timberlea Trail and along Highway 103.	

Halifax Mainland Common

HRM's Halifax Mainland Common urban forest neighbourhood is bounded by in the north by Lacewood Drive, Regency Park Drive to the west, and the Mainland North Linear Parkway to the east. It is generally bounded in the south by properties owned by the Halifax Regional Water Commission (Figure 73). In HRM's 2008 Mainland Common Master Plan, a northern portion of the Common (shown in red) was designated as Active Recreation Reserve. The recent development of sports fields and recreation facilities has reduced canopy cover to 28% in this area; however, this will be increased to 40% in the future. Remaining parts of the Common's intact Acadian stands of red and black spruce, red maple, white birch, and balsam fir have been designated as Passive Recreation Reserve, and their canopy cover is intended to be preserved. These forest stands form urban forest belt patterns that link with the urban forest ribbon pattern of the linear parkway. Together, these patterns provide an unbroken band of urban forest for local residents to enjoy. The management of this valued and publicly owned urban forest will be guided by the conservation strategies outlined in the 2008 Mainland Common Master Plan.

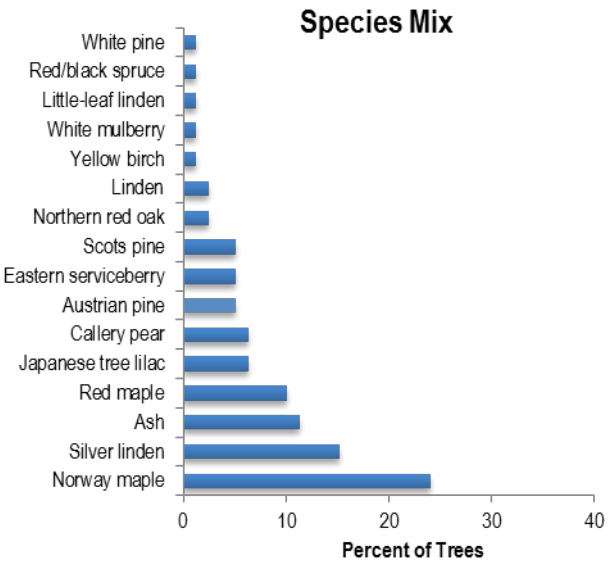
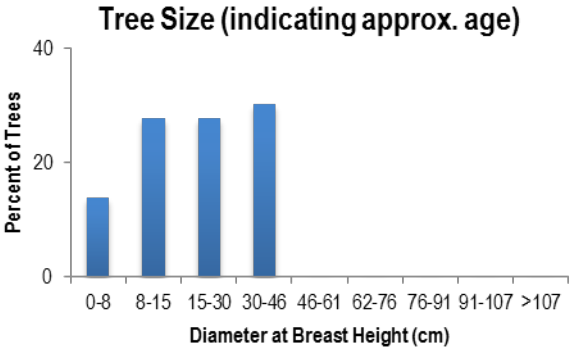


Figure 73



Challenges

- Recent sports field and recreation facility development has reduced canopy cover in the Active Recreation Reserve to 28%.
- There are few street trees along Thomas Radall Drive.
- There is an overrepresentation of Norway maple and lack of native species in the street tree population.
- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges. The spruce forest that covers most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- The Halifax Mainland Common Master Plan, adopted by Council in 2008, presents comprehensive approaches to the maintenance and preservation of the Common's urban forest.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Halifax Mainland Common North percent canopy cover	28	≥ 40
Regency Park Passive Recreation Reserve percent canopy cover	81	≥ 90
Willet Passive Recreation Reserve percent canopy cover	97	≥ 90
Percent of neighbourhood in forest stands	52	54
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	33	50
Number of species that comprise more than 5% of all street trees	4 (ash, eastern serviceberry, callery pear, northern red oak)	0
Number of genera that comprise more than 10% of all street trees	1 (ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	600	0
Percent canopy cover of riparian zones	54	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	N/A	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Halifax Mainland Common	69		Bedrock

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Halifax Mainland Common	Park and Institutional	N/A	1990s/2010s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	5
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Area of naturalized forest stands not to fall below	34 ha
Average number of native trees to plant on HRM lands per decade	3
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Refer to the management principles of the Mainland Common Master Plan of 2008 to guide urban forest management.	
Maintain and enhance urban forest belt and ribbons patterns.	

Lakeside

The Lakeside urban forest neighbourhood is generally bounded in the north by Governor Lake, in the south by Highway 103, in the east by Lakeside Industrial Park, and in the west by the Timberlea Village Parkway (Figure 74). St. Margarets Bay Road bisects this predominantly residential area. Lakeside is a diverse and pleasant urban forest neighbourhood with commercial, institutional, single and multi-family residential land uses. Its 22% canopy cover (shown in red) is low and likely to change as the Brunello Estates development takes place. Riparian canopy cover is also minimal along residential properties bordering Governor Lake. Evaluations of current canopy cover and opportunities for tree planting indicate that Lakeside's future canopy cover will be increased to 45% with HRM's cooperative efforts among local residents, developers, and business owners. Governor Lake's riparian buffers will also be protected and the future health of this vital natural and recreational resource will be preserved.

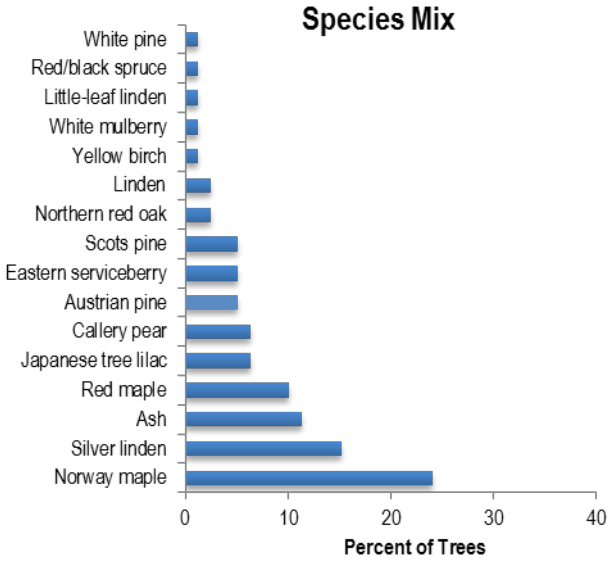
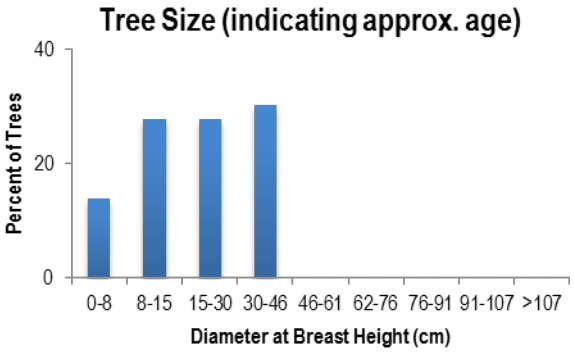


Figure 74



Challenges

- There is limited canopy cover in the riparian zone of Governor Lake that could lead to harmful run-off and sedimentation impacts.
- There are stresses associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts, environmental contamination, illegal dumping, tree-cutting, and invasive species.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 22% to 45%.
- Riparian protection activities will be developed for local homeowners.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local stakeholder groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Lakeside percent canopy cover	22	≥ 45
Parks percent canopy cover	23	≥ 40
Percent of neighbourhood in forest stands	15	15
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	33	50
Number of species that comprise more than 5% of all street trees	4 (ash, eastern serviceberry, callery pear, northern red oak)	0
Number of genera that comprise more than 10% of all street trees	1 (ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	900	N/A
Percent canopy cover of riparian zones	25	100
Percent of public play areas that are adequately shaded (40% canopy cover)	40	100
Percent of residential properties with at least one value tree	45	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Lakeside	105	R-1, R-3, C-2	Silty till plain
Parks	1	P-2	Silty till plain

Socioeconomic Conditions

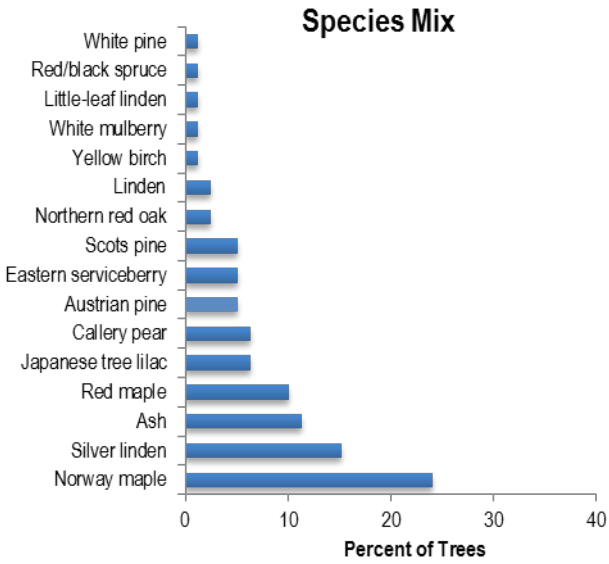
	Land Use	Zoning	Decade of Development
Lakeside	Residential, Multi-family residential, commercial		1970s
Parks	Park		1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	160
Area of naturalized forest stands to be created on HRM lands per decade.	0 ha
Area of naturalized forest stands not to fall below.	16 ha
Average number of native trees to plant on HRM lands per decade	90
Average number of Acadian old-growth species to plant on HRM lands per decade	6 (eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	N/A
Additional Neighbourhood Treatments	
Target riparian areas along Governor Lake for improving canopy cover.	

Lakeside Industrial Park

The Lakeside Industrial Park urban forest neighbourhood is generally bounded by the Black Duck Ponds in the north, Lovett Lake in the east, and Governor Lake in the west (Figure 75). Lakeside Park Drive, the neighbourhood's main road, extends north from St. Margarets Bay Road and ends at Duck Pond Road. Land uses in this area are primarily light industrial and commercial. The urban forest neighbourhood has a canopy cover of 18% (shown in red). While this is near the UFMPs 20% industrial neighbourhood canopy target, most of Lakeside's canopy is only found along the Beechville-Lakeside-Timberlea (BLT) and Chain of Lakes Trails, as well as in surrounding spruce forests. Street trees are noticeably absent in Lakeside Industrial Park, yet there are many planting opportunities. Limited riparian canopy cover adjacent to Lovett Lake and the Black Duck Ponds is also a concern. Future street tree planting and riparian canopy improvements will address these issues. The urban forest ribbon pattern formed by the BLT and Chain of Lakes Trails will also be improved to create a continuous corridor of trees throughout this area.



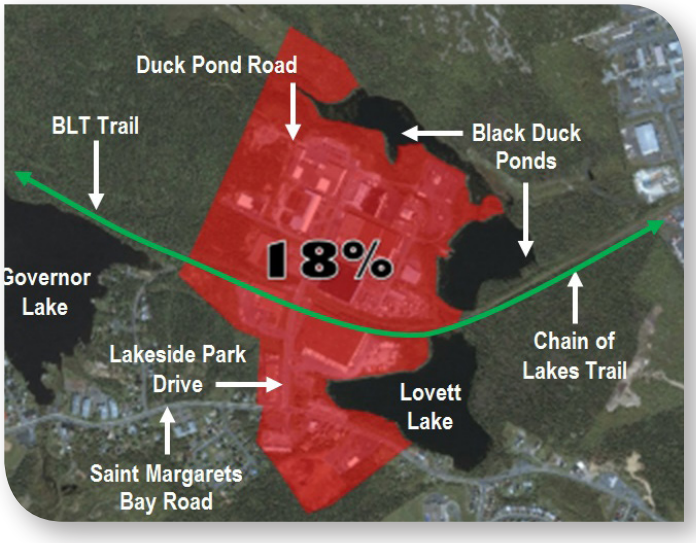
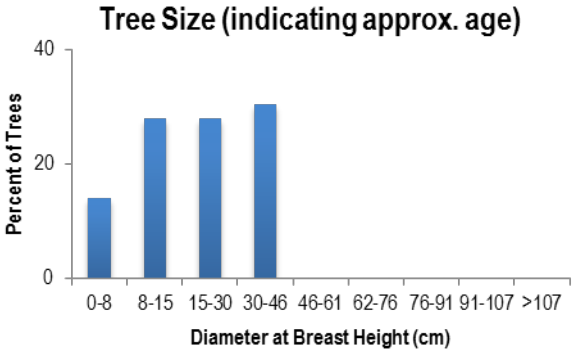


Figure 75



Challenges

- There are few street trees in the Lakeside Industrial Park.
- Riparian canopy cover for the Black Duck Ponds and Lovett Lake is low.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 18% to 20%.
- There are 597 plantable sites for new street trees in Lakeside Industrial Park.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing commercial stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Lakeside Industrial Park percent canopy cover	18	≥ 20
Percent of neighbourhood in forest stands	16	16
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	33	50
Number of species that comprise more than 5% of all street trees	4 (ash, eastern serviceberry, callery pear, northern red oak)	0
Number of genera that comprise more than 10% of all street trees	1 (ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	N/A	N/A
Number of plantable sites in HRM rights of way	597	N/A
Percent canopy cover of riparian zones	27	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	10	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Lakeside Industrial Park	60		Anthropogenic, bedrock

Socioeconomic Conditions

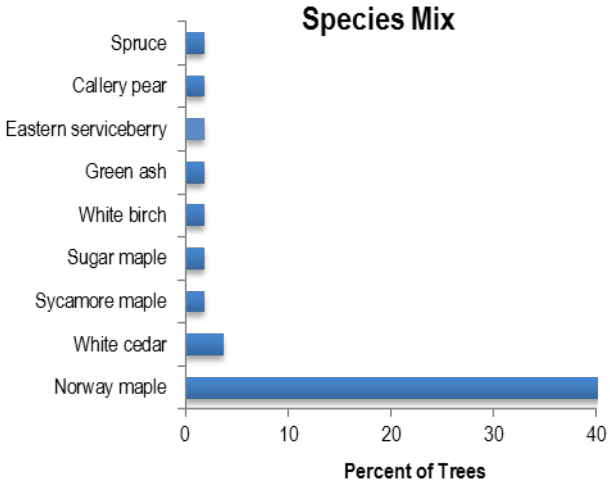
	Land Use	Zoning	Decade of Development
Lakeside Industrial Park	Industrial	CDZN, R-1	1970s

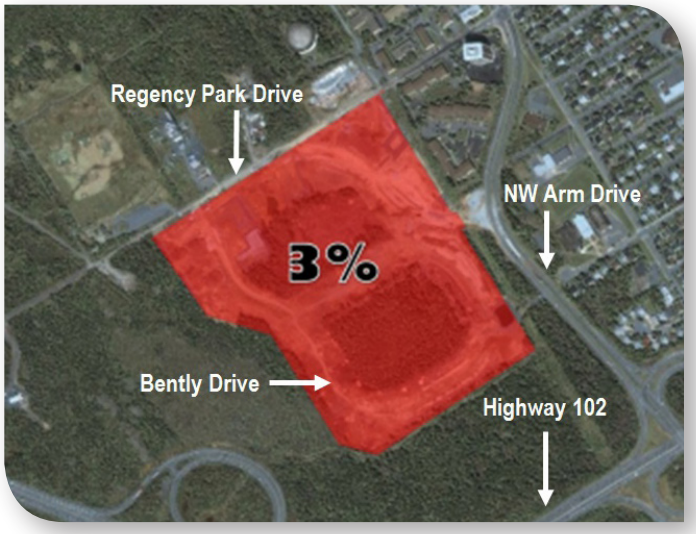
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	130
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	10 ha
Average number of native trees to plant on HRM lands per decade	75
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	N/A
Additional Neighbourhood Treatments	
Maintain and enhance the urban forest ribbon pattern along the Beechville-Lakeside-Timberlea and Chain of LakesTrails.	
Target Lovett Lake and Black Duck Ponds for improving riparian canopy cover.	
Collaborate with business owners in the Lakeside Industrial Park regarding urban forest improvement opportunities.	

Mount Royal

The Mount Royal urban forest neighbourhood is bounded by Regency Park Drive in the north, NW Arm Drive in the east, and Highway 102 in the south. Bently Drive, the subdivision's main road, encircles the development. This newly developed area primarily features a mix of detached and semi-detached single-family homes as well as townhouses, multi-family condominiums, apartment buildings, and commercial properties. The former spruce forest that dominated Mount Royal was largely removed during development leaving an extremely low canopy cover of 3%. Although developers have planted some trees along HRM rights of way there is a lack of native species and low species diversity, with the invasive Norway maple dominating the small urban forest. Moreover, the remaining native trees in this area have grown on shallow soils over bedrock and many will likely succumb to wind or exposure. Much effort will be required to attain the urban forest canopy cover target of 70% for Mount Royal. In the meantime, there are many urban forest stewardship opportunities for homeowners and property managers of the area's commercial and multi-family developments to plant new trees.





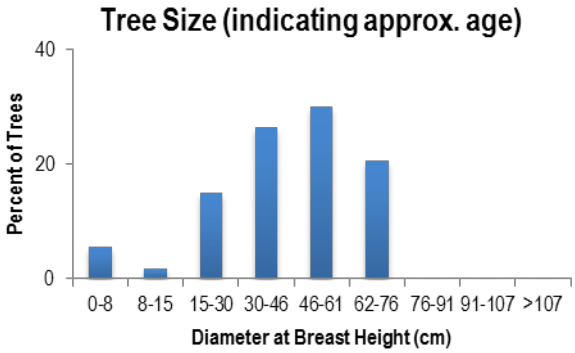


Figure 76

Challenges

- Species diversity in Mount Royal is low. There is an overrepresentation of Norway maple and lack of native species in the street tree population.
- Low numbers of replacement trees have been planted on residential and commercial properties.
- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges. The remaining native forest is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 3% to 70%.
- There are 127 plantable sites for new street trees in Mount Royal.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential and commercial stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Mount Royal percent canopy cover	3	≥ 70
Percent of neighbourhood in forest stands	0	0
Percent of trees within the smallest size class	6	≥ 10
Percent of street trees that are native	11	50
Number of species that comprise more than 5% of all street trees	1 (Norway maple)	0
Number of genera that comprise more than 10% of all street trees	1 (maple)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, white pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	85	100
Number of plantable sites in HRM rights of way	127	0
Percent canopy cover of riparian zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	12	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Mount Royal	23		Bedrock

Socioeconomic Conditions

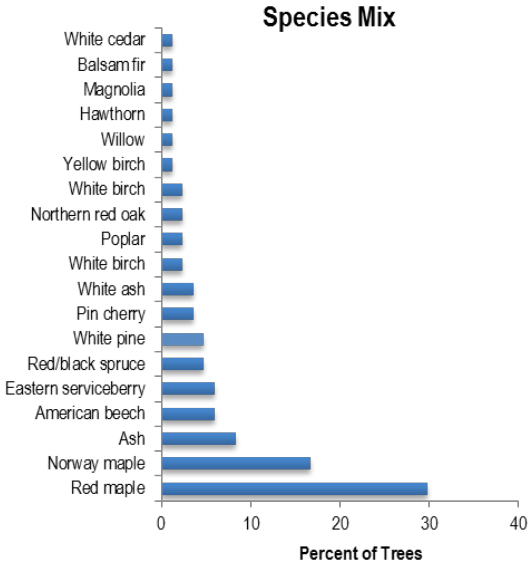
	Land Use	Zoning	Decade of Development
Mount Royal	Residential	N/A	2010s

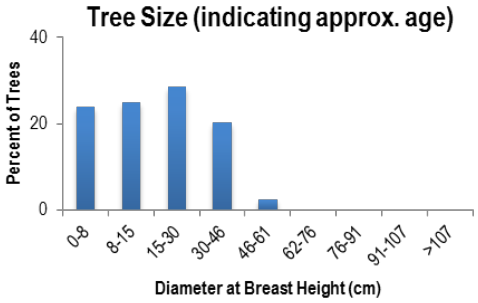
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	50
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	0 ha
Average number of native trees to plant on HRM lands per decade	15
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	6

Mount Saint Vincent

The urban forest neighbourhood of Mount Saint Vincent lies between the Bedford Highway in the east and Chartwell Lane in the west. It is generally bounded in the north by Melody Drive and Canary Crescent and in the south by Seton Drive and Briarwood Crescent (Figure 77). From its origin in the 1870s until recently, this stunning urban forest neighbourhood overlooking the Bedford Basin was devoted to institutional land uses related to Mount Saint Vincent University (MSVU) and the Sisters of Charity Motherhouse. However, in the past few years about half of the property has been sold. First, to Shannex Ltd., for the development of Caritas House, a Sisters of Charity retirement home, and more recently in 2011, to Southwest Properties for a proposed mixed-use development. Current canopy cover throughout the urban forest neighbourhood is relatively good with a MSVU canopy of 44%; Shannex Ltd. at 60%; and a 58% canopy for Southwest Properties. Although further development will take place in the future, special attention should be given to tree planting as well as preserving intact patches of native forest and riparian zones throughout the Mount Saint Vincent urban forest to attain an overall canopy cover target of 50%. Cooperative planning efforts among landowners will ensure the ongoing sustainability and connectivity of the urban forest in this area. The HRM road right of way along the Bedford Highway will also be improved to form an urban forest ribbon pattern to complement access roads to the Mount Saint Vincent urban forest.





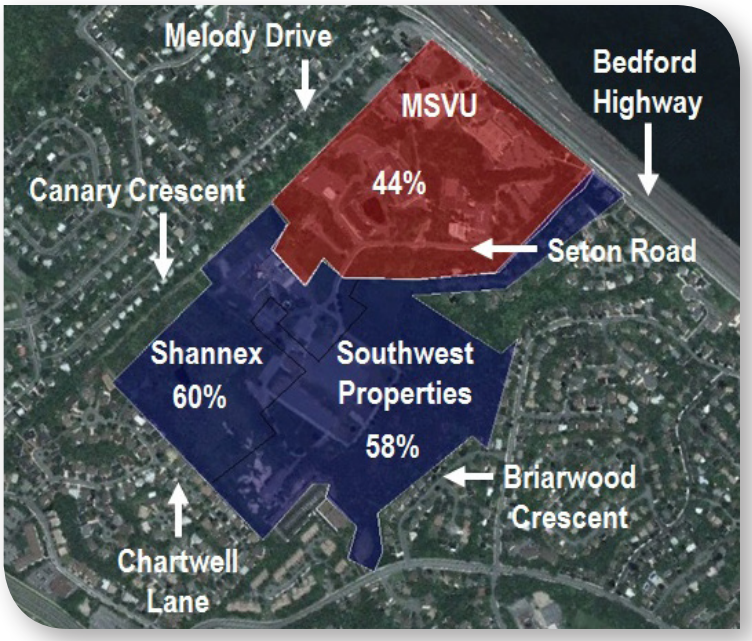


Figure 77

Challenges

- Species diversity is low, with an over representation of Norway and Red maples.
- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges. The native forest that covers most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- A planned planting and retention program will produce a sustainable age and species distribution of trees and maintain overall canopy at 50%.
- There are 43 plantable sites for new street trees along the Bedford Highway.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential and commercial stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Mount Saint Vincent percent canopy cover	44	≥ 50
Shannex Ltd. percent canopy cover	60	≥ 50
Southwest Properties percent canopy cover	58	≥ 50
Percent of neighbourhood in forest stands	58	47
Percent of trees within the smallest size class	24	≥ 10
Percent of street trees that are native	81	50
Number of species that comprise more than 5% of all street trees	7 (red maple, Norway maple, eastern serviceberry, white pine, white ash, white birch)	0
Number of genera that comprise more than 10% of all street trees	4 (Norway maple, serviceberry, white pine, white ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	94	100
Number of plantable sites in HRM rights of way	43	0
Percent canopy cover of riparian zones	39	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of properties with at least one value tree	31	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Mount Saint Vincent	49	P, I-2, U-2	Bedrock

Socioeconomic Conditions

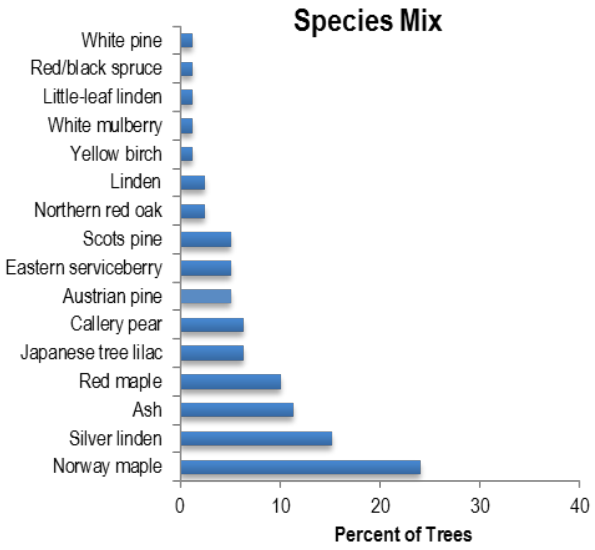
	Land Use	Zoning	Decade of Development
Mount Saint Vincent	Institutional		1870s/ 1960s/2010s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	15
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	23 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (eastern hemlock, sugar maple)
Refrain from planting the following genera until 2020	Norway maple, serviceberry, white pine, white ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	2
Additional Neighbourhood Treatments	
Collaborate with Mount Saint Vincent University regarding urban forest improvement opportunities.	
Develop a ribbon pattern, where possible, along the railway on the shore of the Bedford Basin.	

Timberlea

The urban forest neighbourhood of Timberlea extends northwest along St. Margarets Bay Road from the Timberlea Village Parkway to the Nine Mile River (Figure 78). Just north of St. Margarets Bay Road lies the popular Beechville-Lakeside-Timberlea Trail that forms an urban forest ribbon pattern across the neighbourhood. Timberlea is an attractive residential settlement featuring single-family detached homes built between the 1960s and 80s. Its name, "Timberlea" reflects the importance that forestry and lumbering once had in the area. This urban forest neighbourhood has a canopy cover of 30% (shown in red), and in relation to nearby neighbourhoods, has a fairly intact urban forest. Homeowners have the best opportunity to contribute to Timberlea's canopy cover by planting trees on their properties. While there is little-to-no room to plant trees along many HRM-controlled rights of way in Timberlea, there are several tree planting opportunities along the grass medians on the south side of St. Margarets Bay Road. The planned development of Brunello Estates will affect the peri-urban forest surrounding the southern edge of Timberlea however, the new subdivision's designers have included significant forested buffers in their development plans to separate Brunello Estates from existing residential development.



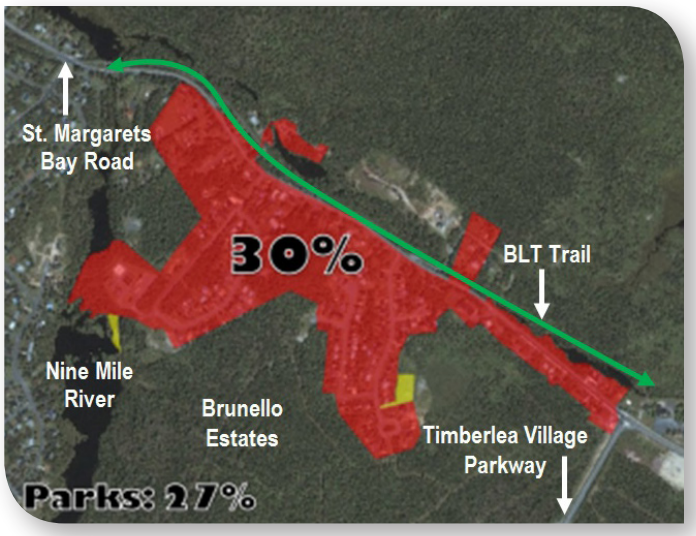
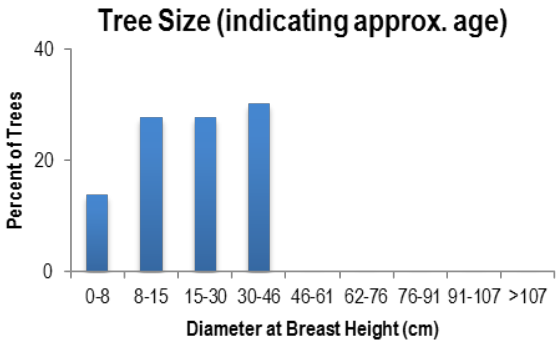


Figure 78



Challenges

- There are limited numbers of value trees on residential properties.
- There are few street trees along HRM rights of way.
- There are stresses associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts, environmental contamination, illegal dumping, tree-cutting, and invasive species.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 30% to 70%.
- There are 200 plantable sites for new street trees along St. Margarets Bay Road.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators – Actual and Targets

Indicator	Actual	Target
Timberlea percent canopy cover	30	≥ 70
Parks percent canopy cover	27	≥ 40
Percent of neighbourhood in forest stands	23	23
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	33	50
Number of species that comprise more than 5% of all street trees	4 (ash, eastern serviceberry, callery pear, northern red oak)	0
Number of genera that comprise more than 10% of all street trees	1 (ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	200	N/A
Percent canopy cover of riparian zones	36	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	52	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Timberlea	35		Silty till plain
Parks	1		Silty till plain

Socioeconomic Conditions

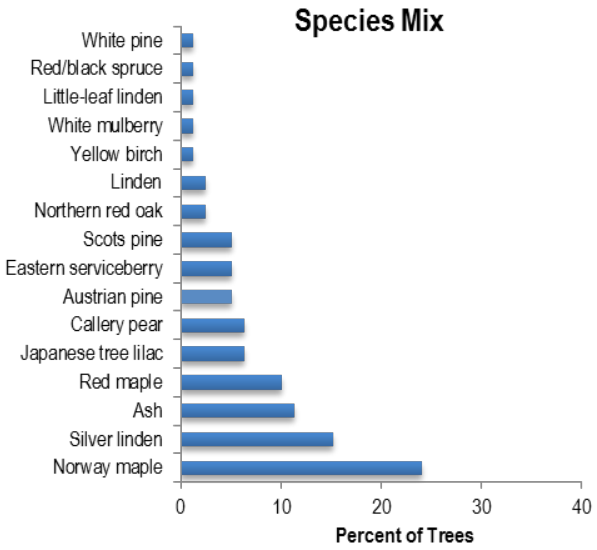
	Land Use	Zoning	Decade of Development
Timberlea	Residential	R-1	1960s/1980s
Parks	Park	P-4	1980s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	160
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	8 ha
Average number of native trees to plant on HRM lands per decade	90
Average number of Acadian old-growth species to plant on HRM lands per decade	6 (eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	N/A
Additional Neighbourhood Treatments	
Maintain and enhance the ribbon pattern along the Beechville-Lakeside-Timberlea Trail.	

Ragged Lake Business Park

Ragged Lake Business Park urban forest neighbourhood is situated on Ragged Lake Boulevard and lies approximately one kilometre south of the intersection of St. Margarets Bay Road and Prospect Road. The park was first developed by the City of Halifax Industrial Commission in the 1980s. Although it has expanded slowly since that time it is likely to grow in the future. Further growth of the park will be governed by the HRM Business Parks Functional Plan - Part II Bayers Lake and Ragged Lake, as well as the Western Common Wilderness Common Master Plan adopted by HRM Council in 2010. Both plans include complementary policies concerning the retention of Acadian forest ecosystems, riparian canopy cover and the environmentally sustainable development of the park.



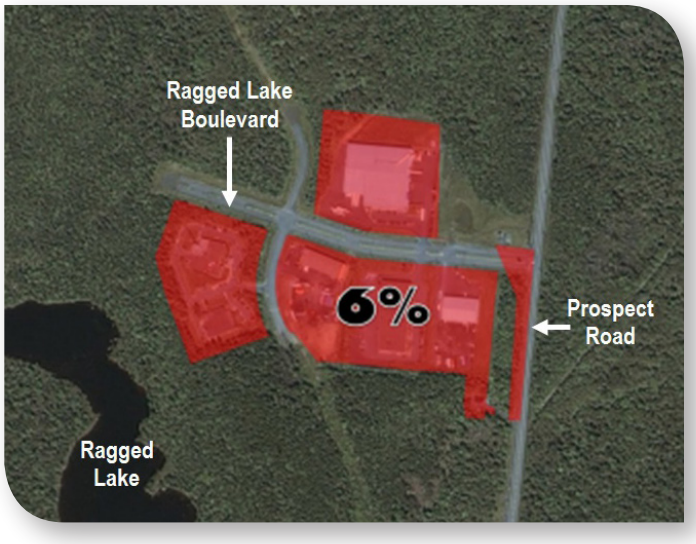
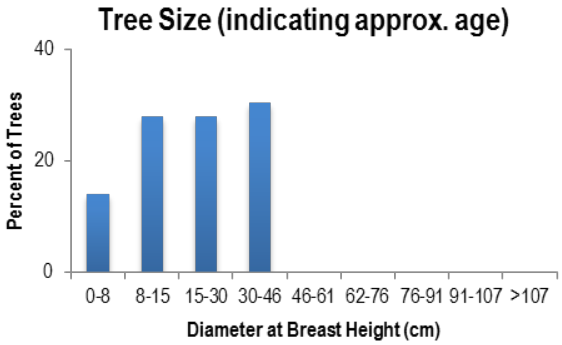


Figure 79



Challenges

- Current canopy cover is low with most properties featuring limited tree planting and extensive paving.
- There are no street trees in Ragged Lake Business Park.

Opportunities

- The current canopy cover of Ragged Lake Business Park can be increased from 6% to 20%.
- There are 480 plantable sites for new street trees.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing business park stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Ragged Lake Business Park percent canopy cover	6	≥ 20
Percent of neighbourhood in forest stands	0	0
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	33	50
Number of species that comprise more than 5% of all street trees	4 (ash, eastern serviceberry, callery pear, northern red oak)	0
Number of genera that comprise more than 10% of all street trees	1 (ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	N/A	N/A
Number of plantable sites in HRM rights of way	480	N/A
Percent canopy cover of riparian zones	0	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	N/A	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Ragged Lake Business Park	9		Anthropogenic, till blanket

Socioeconomic Conditions

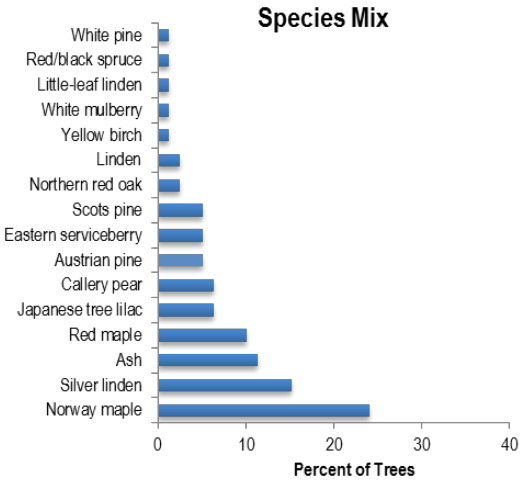
	Land Use	Zoning	Decade of Development
Ragged Lake Business Park	Industrial	I-3	1990s

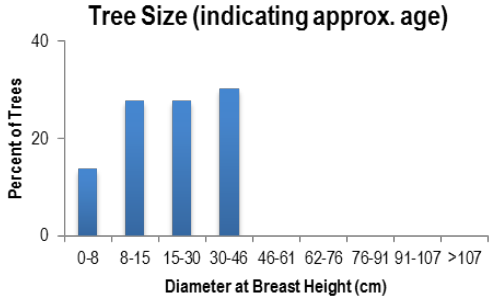
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	130
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	10 ha
Average number of native trees to plant on HRM lands per decade	75
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	N/A
Additional Neighbourhood Treatments	
Collaborate with business owners in the Ragged Lake Business Park regarding urban forest improvement opportunities.	

Regency Park

The urban forest neighbourhood of Regency Park is generally bounded by Lacewood Drive in the north, Regency Park Drive in the east, and Highway 102 in the west (Figure 80). The area features a mix of commercial and multi-family residential land uses and has a current canopy cover of 40%. Recent developments in the south and east sectors of Regency Park contain several apartment complexes. The properties are largely paved and contain no immediate canopy cover, however they are currently surrounded by remnant native stands of red and black spruce, red maple, and balsam fir. On Lacewood Drive, the mostly paved Home Depot urban forest commercial division (shown in blue) has a canopy cover of only 2%. Further developments planned for the undeveloped southern sections of Regency Park will undoubtedly result in additional canopy losses to the area's fragile spruce forests inhabiting the thin soils of the area's bedrock terrain. In this urban forest neighbourhood commercial and residential landowners will have the best opportunities to contribute to the restoration of Regency Park's canopy cover and achieve its target of 70% by planting trees on their properties. The urban forest ribbon pattern formed along the Highway 102 treed buffer strip will be maintained and improved as it is an important feature for the neighbourhood that provides sound attenuation services from highway traffic noise. Likewise, the Solutions Drive Park forms an urban ribbon pattern for active transportation. Tree planting and stand naturalization in this park will increase its canopy cover from 11% to 40% in the future.





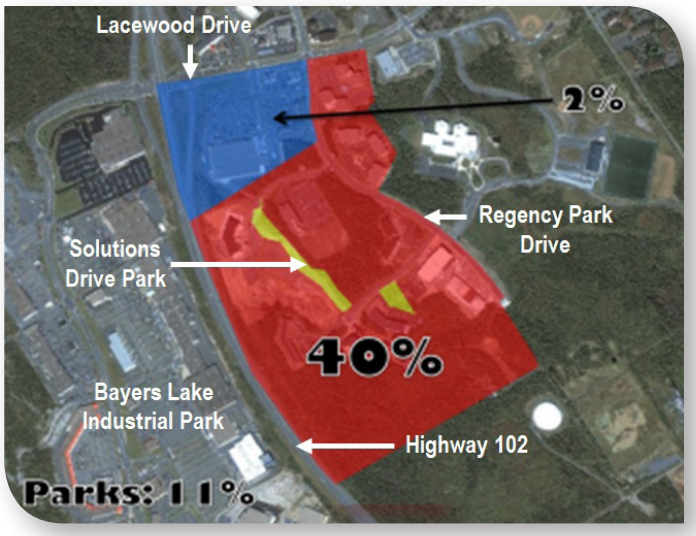


Figure 80

Challenges

- The current canopy of this neighbourhood will be substantially lowered as development continues.
- The Home Depot commercial division has very low canopy cover and is extensively paved.
- There is an overrepresentation of Norway maple and lack of native species in the street tree population.
- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges. The spruce forest that covers most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 40% to 70%.
- There are 58 plantable sites for new street trees.
- Park tree canopy will be increased from 11% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential stakeholders will be organized to work with HRM to achieve urban forest targets for their neighbourhoods.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Regency Park percent canopy cover	40	≥ 70
Home Depot percent canopy cover	2	≥ 20
Parks percent canopy cover	11	≥ 40
Percent of neighbourhood in forest stands	32	32
Percent of trees within the smallest size class	14	≥ 10
Percent of street trees that are native	33	50
Number of species that comprise more than 5% of all street trees	4 (ash, eastern serviceberry, callery pear, northern red oak)	0
Number of genera that comprise more than 10% of all street trees	1 (ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	3 (red spruce, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	58	0
Percent canopy cover of riparian zones	7	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	53	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Regency Park	61		Bedrock
Home Depot	11		Anthropogenic, bedrock
Parks	1		Bedrock

Socioeconomic Conditions

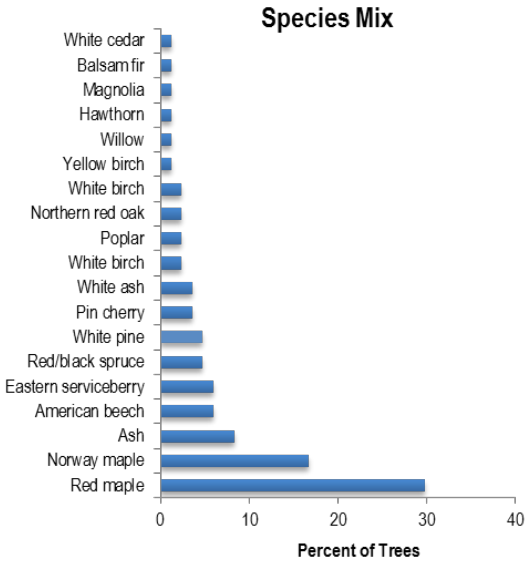
	Land Use	Zoning	Decade of Development
Regency Park	Multi-family residential	N/A	1990s
Home Depot	Commercial	N/A	1990s
Parks	Multi-family residential	N/A	1990s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	25
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	20 ha
Average number of native trees to plant on HRM lands per decade	13
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (eastern hemlock, white pine, sugar maple)
Refrain from planting the following genera until 2020	Ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Maintain and enhance the urban forest ribbon pattern along Highway 102.	
Collaborate with Home Depot management regarding urban forest improvement opportunities.	

Rockingham East

The historic urban forest neighbourhood of Rockingham East is located on the western shore of the Bedford Basin near Fairview Cove and generally extends north along the Bedford Highway from Melody Drive in the south to Kearney Lake Road in the north. This settlement dates from the late 1700s and was named after the 2nd Marquis of Rockingham. Today, this primarily residential urban forest neighbourhood consists of a pleasant variety of detached single-family homes. Overall, Rockingham East has a canopy cover of 33% (shown in red). However, commercial and multi-family residential properties along the Bedford Highway feature extensive paving with few trees. The rail line property along the Bedford Basin shoreline also lacks trees resulting in virtually no riparian canopy protection for the marine ecosystem in this area. Regardless of these challenges, the neighbourhood has a high proportion of residential properties with value trees and many small, forested strips between homes. Promoting awareness and private stewardship of trees will be the main focus of the urban forest management in Rockingham East. However, HRM can also improve local canopy cover. Public parks in this area have a low canopy cover at 12%, but tree planting will increase this to 40%. The railway lining the shore of the Bedford Basin is a highly impervious area with little-to-no soils for planting trees, though there is an opportunity to develop an urban forest ribbon pattern on HRM road rights of way along the Bedford Highway.



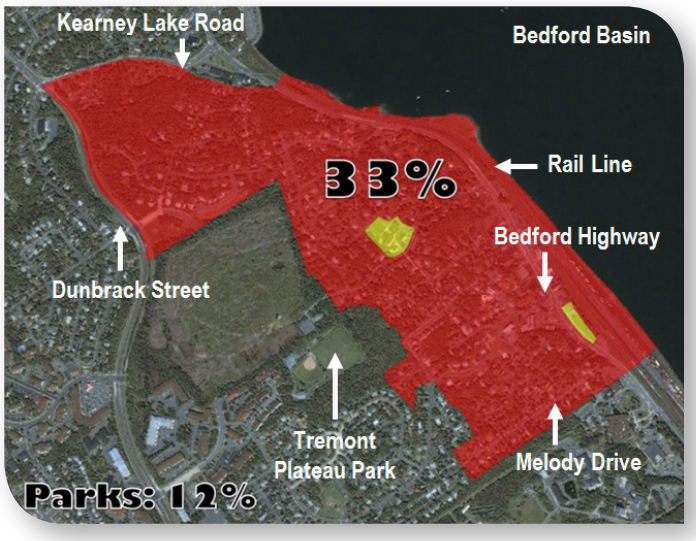
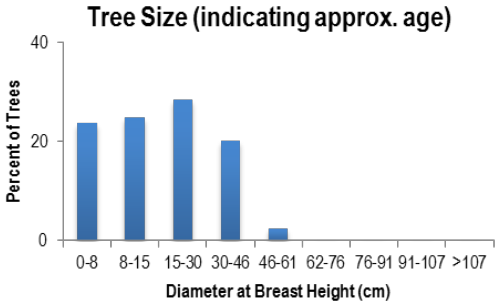


Figure 81



Challenges

- The harbour front and railway are highly impervious surfaces, with little soil to sustain urban trees.
- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 33% to 70%.
- There are 314 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 12% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential and commercial stakeholders will be organized to work with HRM to achieve urban forest targets for their neighbourhoods.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Rockingham East percent canopy cover	33	≥ 70
Parks percent canopy cover	12	≥ 40
Percent of neighbourhood in forest stands	29	29
Percent of trees within the smallest size class	24	≥ 10
Percent of street trees that are native	81	50
Number of species that comprise more than 5% of all street trees	7 (red maple, Norway maple, eastern serviceberry, white pine, white ash, white birch)	0
Number of genera that comprise more than 10% of all street trees	4 (Norway maple, serviceberry, white pine, white ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	94	100
Number of plantable sites in HRM rights of way	314	0
Percent canopy cover of riparian zones	44	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	87	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Rockingham East	94		Bedrock
Park	1		Bedrock

Socioeconomic Conditions

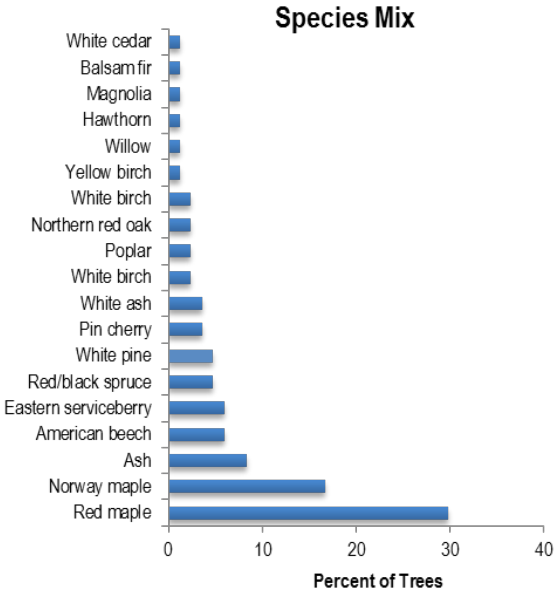
	Land Use	Zoning	Decade of Development
Rockingham East	Residential, commercial	R-1, R-2, I-1, C-2A	1950s/1960s
Park	Residential	R-1	1960s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	125
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	27 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (eastern hemlock, sugar maple)
Refrain from planting the following genera until 2020	Norway maple, serviceberry, white pine, white ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	13
Additional Neighbourhood Treatments	
Develop an urban forest ribbon pattern on HRM road rights of way along the Bedford Highway.	

Rockingham West

The urban forest neighbourhood of Rockingham West extends east of Dunbrack Street from Lacewood Drive in the south to Chelmsford Place in the north. Its eastern bounds are shown in Figure 82. Most of this attractive neighbourhood is comprised of detached single-family residences in an area (shown in red) with a canopy cover of 29%. Although the tree age distribution in this neighbourhood is acceptable, the species diversity is fairly low with the majority of trees from the maple family. Along Dunbrack Street there is a multi-family residential neighbourhood division (shown in blue), and while these units are relatively well treed, and many are surrounded by naturalized stands, there is still an abundance of impervious surfaces and opportunities for improving the urban forest. The other neighbourhood division is the Tremont Plateau, which has been cleared of trees except for the perimeter and has a canopy cover of 21% (shown in blue). This area is slated for development. Its current treed perimeter provides an effective visual and sound buffer and should be retained. The parks of Rockingham West have good canopy cover that will be improved from 57% to 90%.



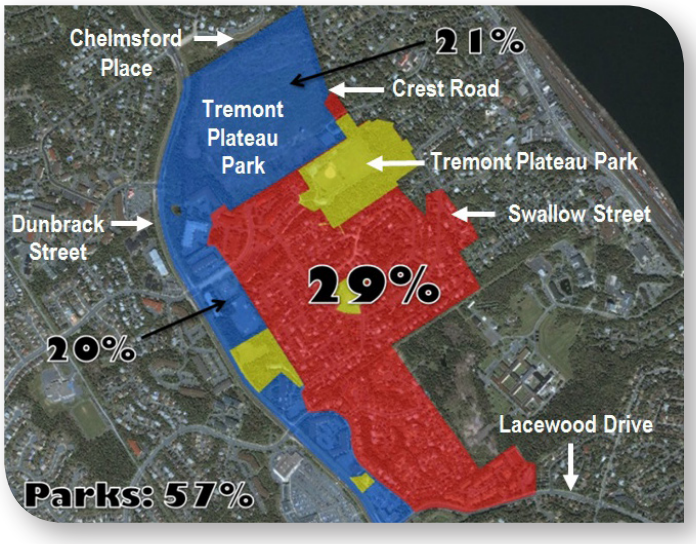
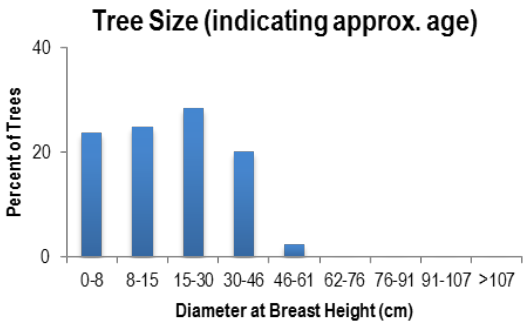


Figure 82



Challenges

- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges.
- The spruce forest that covers most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- The multi-family residential properties have few trees planted on them.
- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 29% to 70%.
- There are 279 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Rockingham West percent canopy cover	29	≥ 70
Dunbrack Street percent canopy cover	20	≥ 45
Tremont Plateau	21	≥ 20
Parks percent canopy cover	57	≥ 90
Percent of neighbourhood in forest stands	27	31
Percent of trees within the smallest size class	24	≥ 10
Percent of street trees that are native	81	50
Number of species that comprise more than 5% of all street trees	7 (red maple, Norway maple, eastern serviceberry, white pine, white ash, white birch)	0
Number of genera that comprise more than 10% of all street trees	4 (Norway maple, serviceberry, white pine, white ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	94	100
Number of plantable sites in HRM rights of way	279	0
Percent canopy cover of riparian zones	83	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	81	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Rockingham West	105		Bedrock
Dunbrack Street	15		Bedrock
Tremont Plateau	24		Bedrock
Parks	12		Bedrock

Socioeconomic Conditions

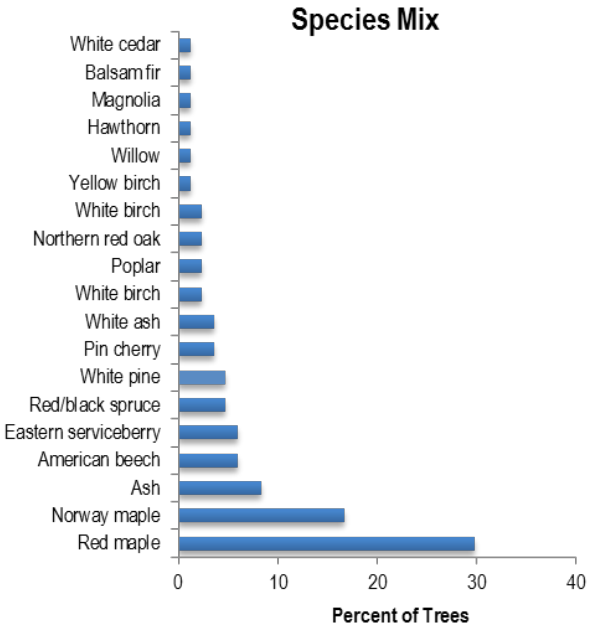
	Land Use	Zoning	Decade of Development
Rockingham West	Residential	R-1, R-2	1950s/1960s
Dunbrack Street	Multi-family residential	N/A	1980s
Tremont Plateau	Industrial	I-2	1980s
Parks	Park	P	1980s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	110
Area of naturalized forest stands to be created on HRM lands per decade	4 ha
Area of naturalized forest stands not to fall below	28 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (eastern hemlock, sugar maple)
Refrain from planting the following genera until 2020	Norway maple, serviceberry, white pine, white ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	12

Sherwood Heights

The urban forest neighbourhood of Sherwood Heights is bounded by Highway 102, Kearney Lake Road, Dunbrack Street, Farnham Gate Road, and the Mainland North Linear Parkway. This well treed neighbourhood's canopy cover of 39% (shown in red) and its even age distribution of trees is one of the best of all residential neighbourhoods in the UFMP Study Area. This is equally true for the neighbourhood's parks (Rockingham Ridge, Wedgewood, and Remington Court) where the canopy cover is at 95%. The neighbourhood also has one of the highest proportions of residential properties with value trees within the HRM. Promoting awareness and private stewardship will be a mainstay of urban forest management in Sherwood Heights. The neighbourhood provides a fine example of the benefits of citizen-led urban forest stewardship. Urban forest ribbon and network patterns in Sherwood Park will be improved through additional plantings along the Mainland North Linear Park corridor and HRM road rights of way in Sherwood Heights.



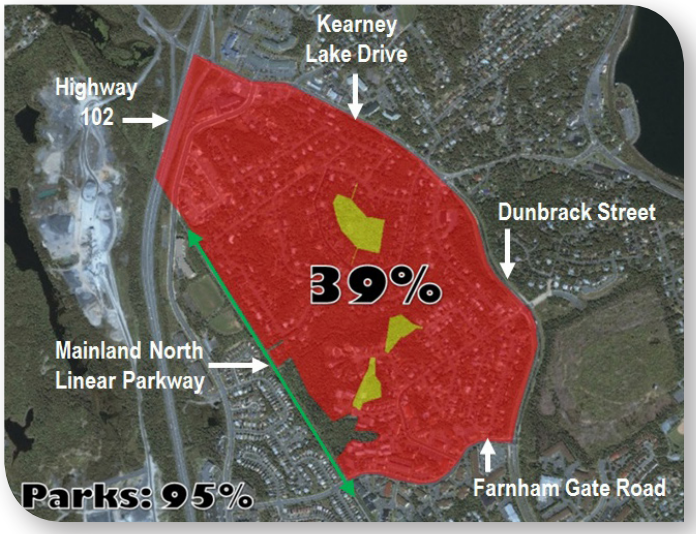
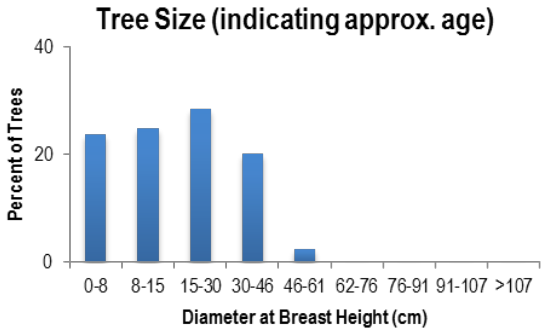


Figure 83



Challenges

- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges.
- The spruce forest that covers most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 39% to 70%.
- There are 354 plantable sites for new street trees in this neighbourhood.
- Educating and promoting awareness of the urban forest to help maintain the canopy cover and health of the trees in this area would be an integral part of the urban forest management of Sherwood Heights.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Sherwood Heights percent canopy cover	39	≥ 70
Parks percent canopy cover	95	≥ 90
Percent of neighbourhood in forest stands	37	37
Percent of trees within the smallest size class	24	≥ 10
Percent of street trees that are native	81	50
Number of species that comprise more than 5% of all street trees	7 (red maple, Norway maple, eastern serviceberry, white pine, white ash, white birch)	0
Number of genera that comprise more than 10% of all street trees	4 (Norway maple, serviceberry, white pine, white ash)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	4 (red spruce, white pine, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	94	100
Number of plantable sites in HRM rights of way	354	0
Percent canopy cover of riparian zones	95	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	93	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Sherwood Heights	103		Bedrock
Parks	3		Bedrock

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Sherwood Heights	Residential	R-1	1960s
Parks	Park	P, R-1	1960s

Neighbourhood Treatments

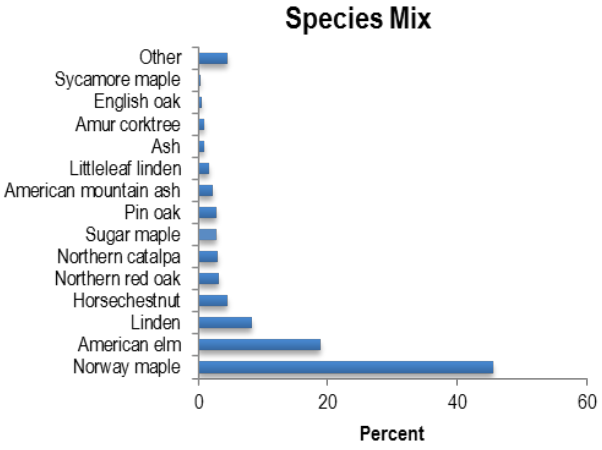
Treatment	Prescription
Average number of trees to plant on HRM lands per decade	140
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	39 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (eastern hemlock, sugar maple)
Refrain from planting the following genera until 2020	Norway maple, serviceberry, white pine, white ash
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	15
Additional Neighbourhood Treatments	
Maintain and enhance the ribbon pattern created by Linear Park.	

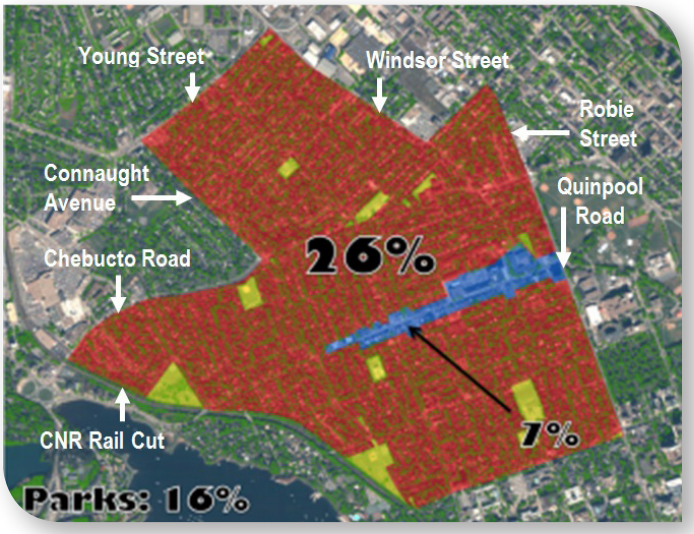
A-8 HALIFAX PENNINSULA

Figure 84

Connaught/Quinpool

The Connaught/Quinpool neighbourhood is bounded by the CNR Rail Cut, Chebucto Road, Connaught Avenue, Young Street, Windsor Street, Robie Street, and Coburg Road (Figure 85). Tree-lined boulevards such as Connaught Avenue and quiet canopied residential streets are key features of this mature and attractive neighbourhood. Another defining feature is the thriving Quinpool Road commercial district. The area features high levels of impervious surfaces such as roads, buildings, and sidewalks, and has relatively few street trees. Connaught/Quinpool is the largest residential area on the Halifax Peninsula. Given that residential areas have the highest canopy targets, this neighbourhood will be critical for improving the urban forest of the entire Halifax Peninsula and a major demand on HRM management resources. The canopy cover of Connaught/Quinpool (shown in red) is 26%–not low compared with other Peninsula neighbourhoods, but low considering the high number of plantable sites on residential properties and HRM street rights of way. The Quinpool Road division (shown in blue) that encompasses the road's commercial district has just 7% canopy cover, and presents a particularly difficult challenge due to the lack of plantable sites and a high degree of imperviousness. Parks in the area (shown in green) also have a relatively low 16% canopy cover. A dominant landscape pattern in the neighbourhood is the urban forest ribbon, found along the boulevards of Connaught Avenue and the native stands of trees bordering the railway cut that runs along the neighbourhood's western boundary. New commercial and residential developments will likely be taking place in this neighbourhood. Careful planning will be required to retain and improve its urban forest.





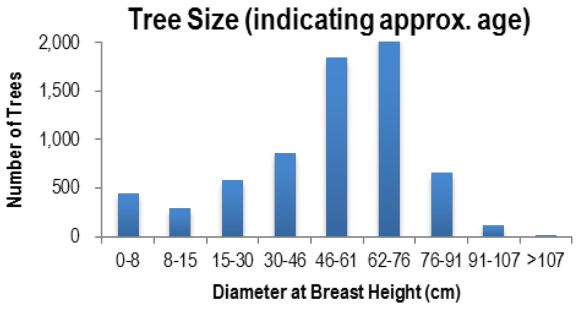


Figure 85

Challenges

- The trees of Connaught/Quinpool are aging without enough young trees to replace them as they reach the end of their lifespan.
- Connaught/Quinpool's species diversity is low, and streets are dominated by Norway maple, elm, and linden, making the neighbourhood vulnerable to pests and diseases.
- Connaught/Quinpool has a higher proportion of trees with structural problems compared with other Peninsula neighbourhoods.
- The Quinpool Road commercial division has very low canopy cover. The high degree of imperviousness and lack of plantable sites make this location a considerable challenge.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 26% to 70%.
- There are 2,363 plantable sites for new street trees in this neighbourhood.

- Tree canopy at local parks can be increased from 16% to 40%.
- Cooperative programs with Quinpool Road commercial landowners could increase the division's canopy cover from 7% to 20%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Connaught/Quinpool percent canopy cover	26	≥ 70
Quinpool Road percent canopy cover	7	≥ 20
Parks percent canopy cover	16	≥ 40
Percent of neighbourhood in forest stands	0	0.9
Percent of trees within the smallest size class	6	≥ 10
Percent of street trees that are native	27	50
Number of species that comprise more than 5% of all street trees	3 (Norway maple, American elm, silver linden)	0
Number of genera that comprise more than 10% of all street trees	3 (Maple, elm, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (Red oak, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	79	100
Number of plantable sites in HRM rights of way	2,363	0
Percent canopy cover of riparian and recharge zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	31	100
Percent of residential properties with at least one value tree	63	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Connaught/Quinpool	307	60	Till veneer
Quinpool Road	13	56	Till veneer
Parks	13	13	Till veneer

Socioeconomic Conditions

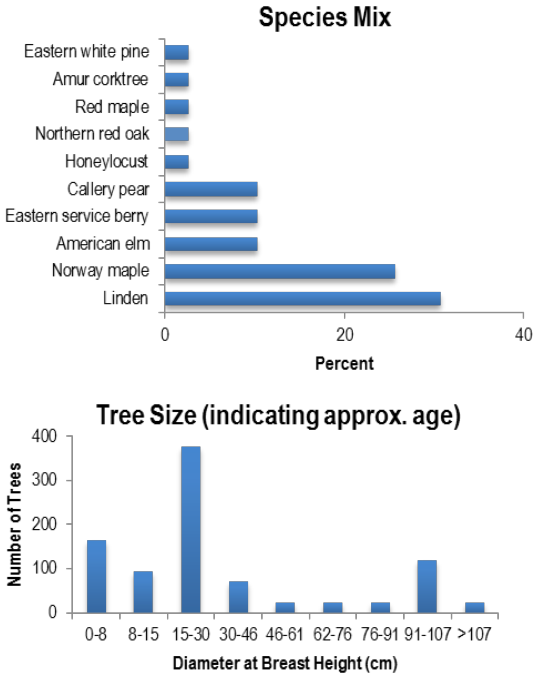
	Land Use	Zoning	Decade of Development
Connaught/Quinpool	Residential	R-2, R-1	1930s
Quinpool Road	Commercial	C-2C	1940s
Parks	Park, Institutional	P	1950s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	950
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Average number of native trees to plant on HRM lands per decade	640
Average number of Acadian old-growth species to plant on HRM lands per decade	28 (red spruce, eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple, elm, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	600
Additional Neighbourhood Treatments	
Establish collaborative tree-planting efforts with Quinpool Road merchants.	

Downtown Halifax

The Downtown Halifax neighbourhood bounded by Robie Street, Cogswell Street, Lower Water Street, and South Street is the centre of HRM's urban core (Figure 86). The landscape features a rich mix of contemporary office towers, apartment complexes, residential housing, and Nineteenth and early Twentieth-Century commercial, institutional, and government heritage buildings. Stands of heritage trees are prominent on the Grand Parade (1), Province House (2), Old Burial Ground (3), Victoria Park (4), Public Gardens (5), and Camp Hill Cemetery (6) sites. Street trees are also well established in a number of areas along University Avenue, Bedford Row, and South Park Street. In addition, thousands of trees are flourishing throughout the remaining residential properties in the southern areas of Downtown Halifax. To the northwest lies the Halifax Citadel National Historic Site and the Halifax Common. The neighbourhood's defining landmark, the Halifax Citadel, overlooks the harbour from the crest of the Peninsula's largest drumlin. Since the fort's construction in the Eighteenth Century, trees have been cleared from its embankments for defensive purposes. Today, the Citadel is managed by Parks Canada, and although there are trees around the perimeter of the site, it's grounds are still largely kept clear of trees to maintain its historical integrity. The nearby sports fields and green spaces of the North and Central Commons have a long tradition of recreational use by Halifax residents. Rows of stately street trees line the outer perimeters of these parks. As a typical urban core, the area shown in red features high levels of impervious surfaces such as roads, office buildings, and sidewalks; it has 14% canopy cover. The cover would be lower without the neighbourhood's heritage tree stands and remaining urban forest in residential areas near South Street. The Citadel and institutional area divisions (shown in blue) have canopy covers ranging from 7% to 15%. Parks and cemeteries (shown in green) have overall 14% canopy cover. Although Downtown Halifax features relatively few plantable sites for street trees, opportunities exist to develop urban forest stands in the neighbourhood's patchwork of parks, cemeteries, and institutional divisions, and to strengthen treed ribbon pattern corridors along Robie Street, Summer Street, and the perimeters of Halifax's Common and Citadel. New developments are being encouraged in this neighbourhood, but careful planning will be required to retain and improve its urban forest.



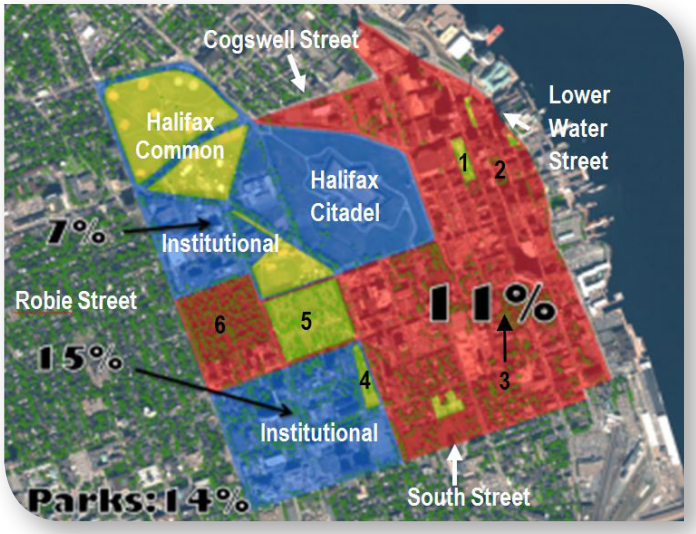


Figure 86

Challenges

- The Downtown Halifax canopy cover is not far from the canopy targets for downtown land uses. There is a considerable amount of impervious surfaces, so any increase will be a challenge.
- Downtown Halifax's parks and cemeteries have a fair amount of open green space with low canopy cover; they have much less impervious area compared with the rest of the neighbourhood.
- There is a low proportion of residential properties with value trees. The lot size in the neighbourhood is small and there are more high-density residential areas, resulting in fewer opportunities to plant trees.
- The downtown has low species diversity, and as with much of the Halifax Peninsula there is an over-representation of linden, elm, and Norway maple.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees.
- There are 352 plantable sites for new street trees in this neighbourhood.
- Tree canopy on parks and school grounds can be increased from 14% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Downtown Halifax percent canopy cover	11	≥ 12
North Common percent canopy cover	7	≥ 20
Dalhousie/IWK percent canopy cover	15	≥ 20
Parks percent canopy cover	14	≥ 40
Percent of neighbourhood in forest stands	0	5
Percent of trees within the smallest size class	18	≥ 10
Percent of street trees that are native	28	50
Number of species that comprise more than 5% of all street trees	5 (Silver linden, Norway maple, American elm, eastern serviceberry, callery pear)	0
Number of genera that comprise more than 10% of all street trees	5 (Linden, maple, elm, serviceberry, pear)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (White pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	90	100
Number of plantable sites in HRM rights of way	352	0
Percent canopy cover of riparian and recharge zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	10	100
Percent of residential properties with at least one value tree	41	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Downtown Halifax	208	75	Till veneer, drumlin
North Common	67	34	Till veneer, drumlin
Dalhousie/IWK	28	70	Till veneer
Parks	30	75	Till veneer

Socioeconomic Conditions

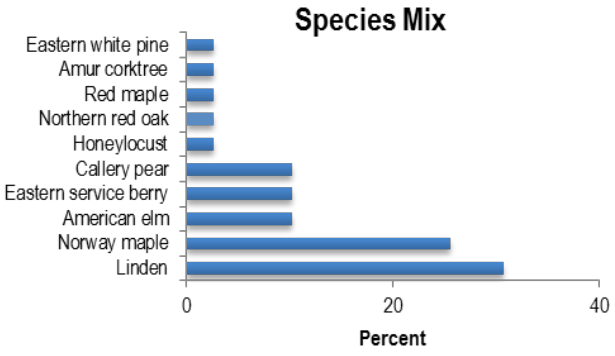
	Land Use	Zoning	Decade of Development
Downtown Halifax	Park, Institutional, Commercial	P, C-2	1810s
North Common	Park, Institutional	P, RPK	1820s
Dalhousie/IWK	Institutional	P, U-2	1900s
Parks	Park	P	

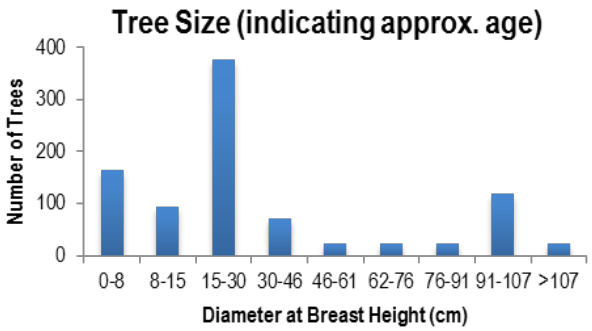
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	140
Area of naturalized forest stands to be created on HRM lands per decade	2 ha
Average number of native trees to plant on HRM lands per decade	80
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Linden, maple, elm, serviceberry, pear
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	40
Additional Neighbourhood Treatments	
Target the North Common, Central Common, and Wanderer's Grounds in particular for planting and creation of naturalized stands.	
Collaborate with Dalhousie University's Office of Sustainability on the Campus Natural Environment Master Plan and the Campus Tree Plan to increase canopy cover on the Carlton and Sexton campuses.	
Establish collaborative tree planting efforts with representatives of other Institutional divisions (shown in blue in Figure 86).	

Halifax Central

Halifax Central is bounded by Robie Street, North Street, HMC Dockyard, and Cogswell Street (Figure 87). The area is characterized by a rich mix of commercial, residential, and institutional land uses. The historic Gottingen Street commercial district (shown in blue) is emerging from a period of decline with the recent completion of several new mixed residential/commercial developments. Agricola Street is also experiencing a revival of commercial activity. Meanwhile, new businesses are opening and residential properties are being renovated throughout the neighbourhood. Further developments will soon be under construction in this thriving area and more are likely in the future. Halifax Central has the structural characteristics of a densely populated "downtown" neighbourhood, including extensive paved surfaces, greater frequency of commercial properties, mid-rise apartment buildings, townhouses, condominiums, and larger residential building footprints in relation to lot size. These features have formed a neighbourhood with relatively few plantable sites. Halifax Central's overall canopy cover (shown in red) is 19%. The main commercial division (shown in blue) has 4% canopy cover, and parks and school grounds (shown in green) have 14% canopy cover. A belt pattern of urban forest adjacent to the Dockyard provides neighbourhood residents with a welcome vista of green space. Halifax Central is changing, but its urban forest can be retained and improved through careful planning.





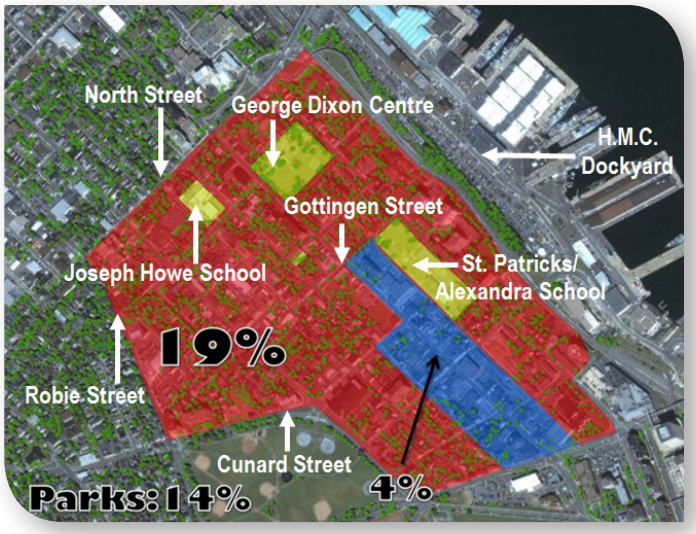


Figure 87

Challenges

- The Halifax Central neighbourhood has low canopy cover, with a high proportion of impervious surfaces and few plantable sites. This is especially true for the Gottingen Street division, where canopy coverage is 4%.
- Halifax Central has the lowest proportion of residential properties with value trees on the Peninsula; however, the lot sizes in the neighbourhood are smaller, with fewer opportunities to plant trees.
- As with much of the Halifax Peninsula, there is an over-representation of linden, elm, and Norway maple.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees.
- There are 168 plantable sites for new street trees in this neighbourhood.
- Tree canopy in parks and on school grounds can be increased from 14% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Cooperative programs with institutional and commercial landowners could dramatically increase their share of the neighbourhood's canopy cover.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Halifax Central percent canopy cover	19	≥ 45
Gottingen Street percent canopy cover	4	≥ 20
Parks percent canopy cover	14	≥ 40
Percent of neighbourhood in forest stands	0	0
Percent of trees within the smallest size class	18	≥ 10
Percent of street trees that are native	28	50
Number of species that comprise more than 5% of all street trees	5 (Silver linden, Norway maple, American elm, eastern serviceberry, callery pear)	0
Number of genera that comprise more than 10% of all street trees	5 (Linden, maple, elm, serviceberry, pear)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (White pine, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	90	100
Number of plantable sites in HRM rights of way	168	0
Percent canopy cover of riparian and recharge zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	20	100
Percent of residential properties with at least one value tree	43	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Halifax Central	72	68	Till veneer
Gottingen Street	7	87	Till veneer
Parks	5	34	Till veneer

Socioeconomic Conditions

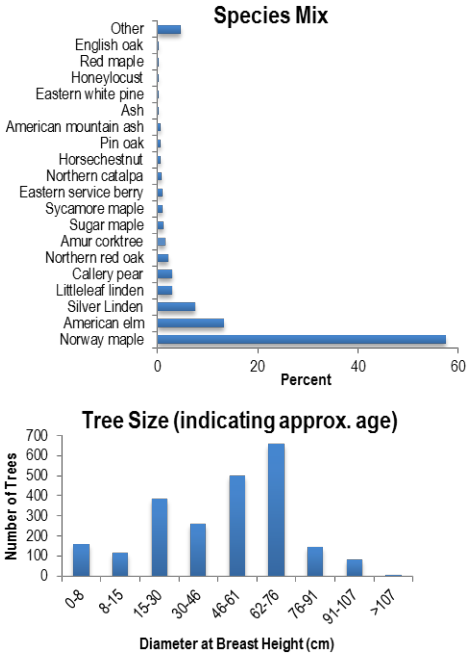
	Land Use	Zoning	Decade of Development
Halifax Central	Residential, commercial, multi-family residential	R-2, R-3, C-2	1850s
Gottingen Street	Commercial	C-2	1930s
Parks	Park, institutional	P	1950s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	70
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Average number of native trees to plant on HRM lands per decade	40
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Linden, maple, elm, serviceberry, pear
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	15
Additional Neighbourhood Treatments	
Establish collaborative tree planting efforts with representatives of the Gottingen commercial division (shown in blue in Figure 2).	

Harbour/Windsor

The Harbour/Windsor urban forest neighbourhood borders the coast of Halifax Harbour from the Halterm Container Pier, past Africville Memorial Park, to the Fairview Container Pier, and then extends inland to an area bounded by Robie Street, North Street, and Windsor Street (Figure 88). Harbour area land uses include a number of marine activities related to national defence and shipping. Recreational, institutional, residential, and commercial land uses extend throughout the downtown core. Inland areas of the Windsor corridor contain a mix of land uses associated with light industry, commercial, institutional, and residential activities. Several areas in the downtown core and the Windsor corridor are likely to be redeveloped in the near future. Key areas of downtown harbour lands are owned by the Waterfront Development Corporation, a crown corporation charged with waterfront development. Coastal areas in major port cities such as Halifax feature intensive land uses usually regarded as unsuited to growing trees. While this neighbourhood cointains a high level of impervious surfaces that present significant challenges for planting and growing trees, it also presents many opportunities for redevelopment and the creation of a new urban forest. The industrial and commercial Harbour/Windsor neighbourhood (shown in red) has the poorest urban forest conditions on the Halifax Peninsula, with a meagre 4% canopy cover. It features an aging tree population, a lack of diversity, and difficult growing conditions. The urban forest divisions in this neighbourhood (shown in blue) are unique residential and parkland areas that have canopy coverage ranging from 17% to 27%. In some areas, naturalized stands have survived and thrived due to benign neglect. Yet there is potential to protect and manage these areas as patches and belts of urban forest. The Barrington Street natural stand has 24% canopy cover and can be seen as a belt landscape pattern. Africville Memorial Park, Seaview Lookoff Park, and naturalized stands along Highway 111 near the McKay Bridge also offer good belt pattern opportunities. Another opportunity in the neighbourhood would be to establish a network pattern of street trees along street rights of way that bisect the Windsor Street area. Although the neighbourhood's physical characteristics present many challenges to the establishment of an urban forest, there are more than 1,000 plantable sites for street trees in the area. New institutional, industrial, residential, and commercial developments are likely in this neighbourhood, but careful planning will be required to retain, improve, and in some cases restore its urban forest.



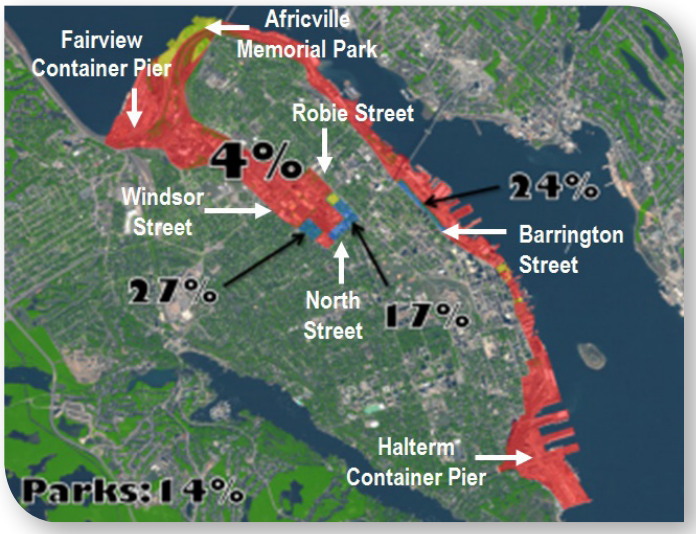


Figure 88

Challenges

- The Harbour/Windsor neighbourhood has by far the lowest canopy cover on the Halifax Peninsula, and is among the lowest within the entire UFMP study area.
- There is a high proportion of imperviousness in the neighbourhood. Moreover, much of it lies on artificially created substrate beyond the harbour's natural shoreline, where planting trees will be exceedingly difficult.
- As with much of the Halifax Peninsula, there is an over-representation of linden, elm, and Norway maple.
- There are major areas of flow accumulation around the container terminals and harbour areas, which would benefit greatly from additional stormwater retention provided by the urban forest canopy.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 4% to 20%.
- There are 1,092 plantable sites for new street trees in this neighbourhood.
- Park tree canopy will be increased from 14% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Harbour/Windsor percent canopy cover	4	≥ 20
Windsor Terrace	27	≥ 70
Fern Lane	17	≥ 20
Barrington-Dockyard Hill	24	≥ 40
Parks	14	≥ 40
Percent of neighbourhood in forest stands	2.4	4
Percent of trees within the smallest size class	7	≥ 10
Percent of street trees that are native	19	50
Number of species that comprise more than 5% of all street trees	3 (Norway maple, American elm, silver linden)	0
Number of genera that comprise more than 10% of all street trees	3 (Maple, elm, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (Red oak, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	90	100
Number of plantable sites in HRM rights of way	1,092	0
Percent canopy cover of riparian and recharge zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	43	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Harbour/Windsor	392	43*	Anthropogenic, till veneer
Windsor Terrace	4	63	Till veneer
Fern Lane	9	65	Till veneer
Barrington-Dockyard Hill	4	37	Till veneer
Parks	18	15	Till veneer, anthropogenic

**More than likely an underestimate due to a lack of available data.*

Socioeconomic Conditions

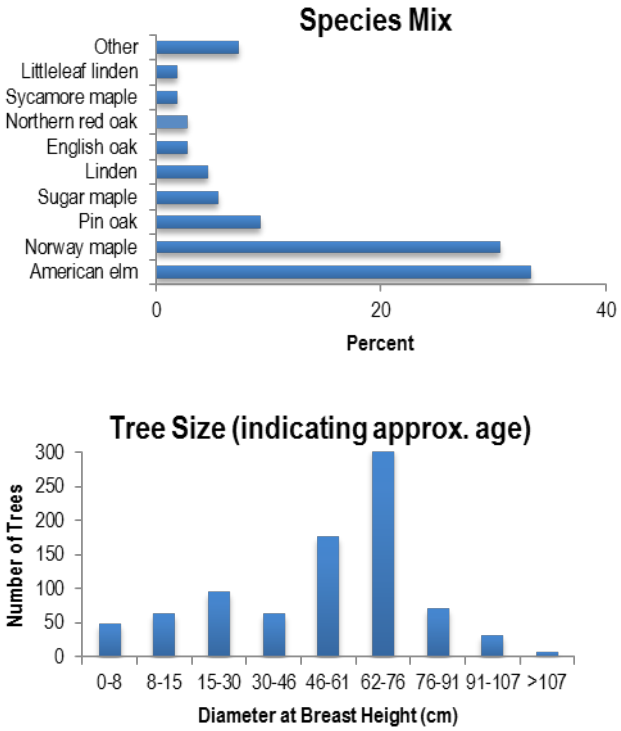
	Land Use	Zoning	Decade of Development
Harbour/Windsor	Industrial, Commercial	C-5, C-3, C-2	1900s
Windsor Terrace	Residential	C-2	1950s
Fern Lane	Commercial	C-2	1950s
Barrington-Dockyard Hill	Park	P	1960s
Parks	Park	P	1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	440
Area of naturalized forest stands to be created on HRM lands per decade	24,000 m2
Average number of native trees to plant on HRM lands per decade	290
Average number of Acadian old-growth species to plant on HRM lands per decade	9 (red spruce, eastern hemlock, yellow birch), 7 (white pine)
Refrain from planting the following genera until 2020	
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	Maple, elm, linden
Average number of trees to plant on HRM lands per decade	90
Additional Neighbourhood Treatments	
Protect and manage naturalized stands on the Barrington-Dockyard Hill division and on either side of Highway 111.	
Increase the canopy cover around Halifax Ports and along the Harbour, as these are major areas of flow accumulation and would greatly benefit from stormwater retention.	

Northwest Arm

This graceful urban forest neighbourhood extends north from Point Pleasant Park to Quinpool Road. It contains a mixture of residential areas and parks between the CNR Rail Cut and the eastern shore of the Northwest Arm (Figure 89). Today, most residences are single-family homes situated on sizeable lots; however, in the past the landscape featured a number of large estates. Over time, the estates were sold and subdivided, but much of the urban forest was retained. Point Pleasant Park, one of Canada's oldest urban parks and the largest park on the Halifax Peninsula, is located at the southern tip of the neighbourhood. The park was devastated by Hurricane Juan in 2003, losing a large proportion of its trees. Comprehensive restoration efforts are now underway in the park. Certainly the dominant urban forest feature in the Northwest Arm neighbourhood is Point Pleasant Park (shown in blue), an area classified separately from the remainder of the neighbourhood. The Park has a separate Comprehensive Plan that was developed in response to the destruction by Hurricane Juan. The park's 26% canopy cover is likely to change rapidly in the coming years, since much of the canopy is now comprised of younger planted saplings and areas of natural regeneration. The remainder of the neighbourhood's urban forest (shown in red), with a canopy cover of 27%, is typical of low-density residential areas, and is quite similar to the South End's. The trees are younger than the South End's because this neighbourhood was developed later, but the street tree population is still disproportionately old, with a lack of species diversity. A dominant landscape pattern in the neighbourhood is the urban forest ribbon, formed by the native stands of trees bordering the railway cut that runs along its eastern boundary. The Point Pleasant Park landscape forms a belt pattern along the southern reaches of the neighbourhood.



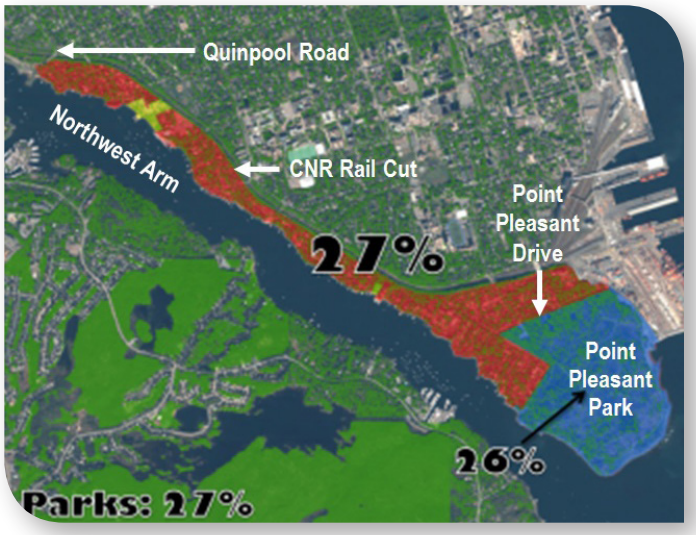


Figure 89

Challenges

- The Northwest Arm's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees, and not enough young trees to replace them.
- The Northwest Arm's species diversity is low, with mature elm- and maple-lined streets being a dominant feature. Low age and species diversity make the urban forest more susceptible to various forms of disturbance.
- The Northwest Arm has a large amount of street trees with structural problems that requires maintenance or replacement.
- Point Pleasant Park will require special attention in light of the damage caused by Hurricane Juan, invasive species, and forest pests such as the brown spruce longhorn beetle.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 27% to 70%.
- There are 466 plantable sites for new street trees in this neighbourhood.
- Tree canopy at Point Pleasant Park can be increased from 26% to 90%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Northwest Arm percent canopy cover	27	≥ 70
Point Pleasant Park percent canopy cover	26*	≥ 90
Parks percent canopy cover	27	≥ 40
Percent of neighbourhood in forest stands	12*	46
Percent of trees within the smallest size class	6	≥ 10
Percent of street trees that are native	42	50
Number of species that comprise more than 5% of all street trees	3 (American elm, Norway maple, pin oak)	0
Number of genera that comprise more than 10% of all street trees	3 (Maple, elm, oak)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (Sugar maple, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	75	100
Number of plantable sites in HRM rights of way	466	0
Percent canopy cover of riparian and recharge zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	33	100
Percent of residential properties with at least one value tree	73	100

**The canopy in Point Pleasant Park is likely underestimated, as many are only seedlings and not captured within the GIS.*

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Northwest Arm	165	32	Till veneer, bedrock
Point Pleasant Park	76	7	Bedrock, hummocky till
Parks	3	14	Till veneer

Socioeconomic Conditions

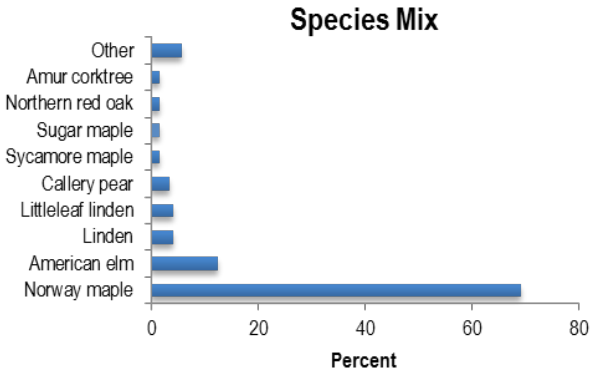
	Land Use	Zoning	Decade of Development
Northwest Arm	Residential	R-1	1930s
Point Pleasant Park	Park	RPK	1860s
Parks	Park	P	1930s

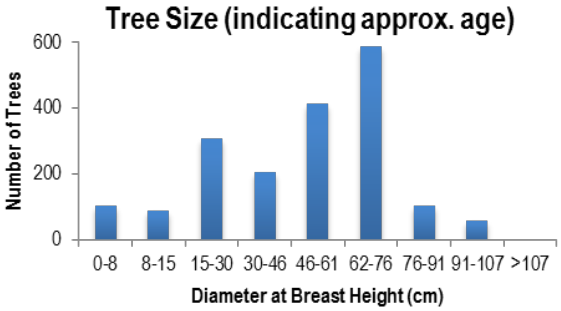
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	190
Area of naturalized forest stands to be created on HRM lands per decade	2 ha
Average number of native trees to plant on HRM lands per decade	30
Average number of Acadian old-growth species to plant on HRM lands per decade	4 (red spruce, eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple, elm, oak
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	90
Additional Neighbourhood Treatments	
Within Point Pleasant Park, refer to the targets and generic actions prescribed in the Comprehensive Plan of 2008 to guide management.	

North End

The North End urban forest neighbourhood (Figure 90) is bounded by Robie Street, Africville Memorial Park, Barrington Street, North Street, and Agricola Street. Throughout the Nineteenth and early Twentieth centuries, this neighbourhood was generally known as Richmond. It was a prosperous and attractive working-class district of Halifax until its destruction in the 1917 Halifax Explosion. The explosion devastated this and other areas of Halifax, killing 1,600 people and injuring 9,000 others. The pressure wave from the blast levelled most of the neighourhood's urban forest. The subsequent restoration of this neighbourhood was led by Thomas Adams, a prominent town planner and early advocate of the "Garden City" movement, which favoured the inclusion of parks, trees, and open space in the design of new communities. Today's urban forest in the neighbourhood can be traced back to Adams' planning wisdom and insistence that intensive tree planting be part of the area's overall redevelopment. As new developments take place in this neighbourhood, special care should be taken to maintain this vision. Adams' influence is best seen in the treed boulevards of the Hydrostone district west of Fort Needham Memorial Park. It is also visible in the neighbourhood's numerous parks and the evenly aged, older canopy provided by street trees throughout the area. The North End has 27% overall canopy cover (shown in red). The area's parks (shown in green) have 22% canopy cover. Institutional and commercial divisions (shown in blue) have lower canopy cover; they include Stadacona (1) and Mulgrave Park (2) with 9% canopy cover, and the Nova Scotia Community College (3), Oland Brewery (4), and Novalea Centre (5) with 2% canopy cover. A belt pattern of urban forest around the northern curve of the neighbourhood is shaped by Africville Memorial Park and adjacent green spaces.





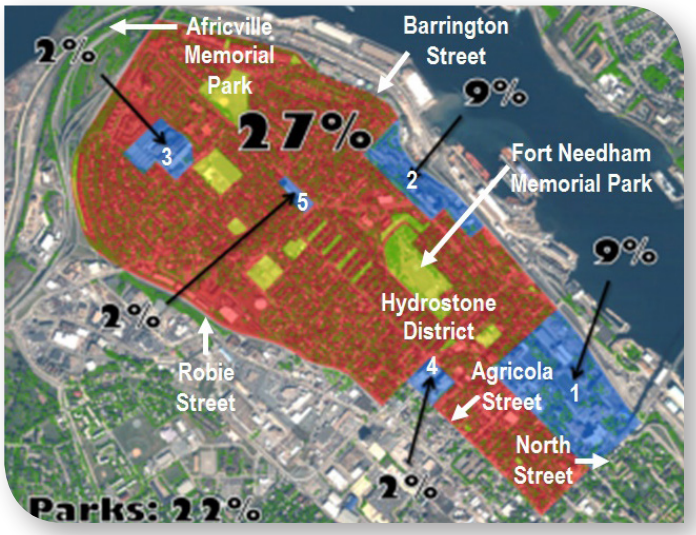


Figure 90

Challenges

- The North End's urban forest is aging, with an uneven distribution of tree sizes and a high proportion of older, larger trees.
- The North End's species diversity is low, with Norway maple and its cultivars constituting 65% of the population. Moreover, the representation of native species, particularly of Acadian old-growth species, is minimal.
- The institutional and commercial neighbourhood divisions (shown in blue in Figure 90) have marginal canopy cover. High levels of imperviousness and a lack of plantable sites are considerable challenges to improving canopy cover in these areas.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees.
- Cooperative programs with institutional and commercial landowners could dramatically increase their share of the neighbourhood's canopy cover.
- There are 998 plantable sites for new street trees in this neighbourhood.
- Tree canopy in parks can be increased from 22% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
North End percent canopy cover	27	≥ 70
Stadacona percent canopy cover	9	≥ 20
Mulgrave Park percent canopy cover	9	≥ 20
Novalea Centre percent canopy cover	2	≥ 20
Nova Scotia Community College percent canopy cover	2	≥ 20
Oland Brewery percent canopy cover	2	≥ 20
Parks percent canopy cover	22	≥ 40
Percent of neighbourhood in forest stands	0.7	2.7
Percent of trees within the smallest size class	6	≥ 10
Percent of street trees that are native	15	50
Number of species that comprise more than 5% of all street trees	2 (Norway maple, American elm)	0
Number of genera that comprise more than 10% of all street trees	2 (Maple, elm)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (Sugar maple, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	94	100
Number of plantable sites in HRM rights of way	998	0
Percent canopy cover of riparian and recharge zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	33	100
Percent of residential properties with at least one value tree	67	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
The North End	239	54	Till veneer, drumlins
Stadacona	21	64	Till veneer
Mulgrave Park	8	64	Till veneer
Novalea Centre	1	96	Till veneer
Nova Scotia Community College	5	58	Till veneer
Oland Brewery	2	100	Till veneer
Parks	16	19	Till veneer, drumlins

Socioeconomic Conditions

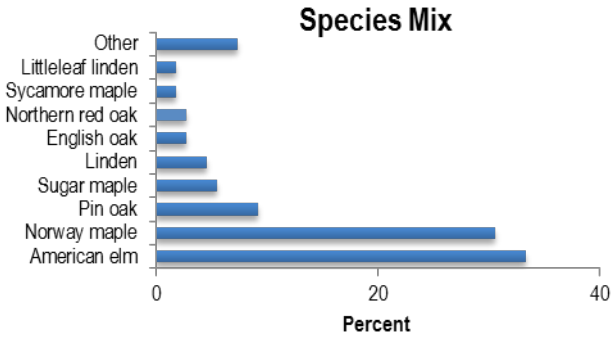
	Land Use	Zoning	Decade of Development
The North End	Residential	R-2, R-1, C-2	1920s
Stadacona	Institutional	CFB	
Mulgrave Park	Multi-family residential	R-3, C-2	1960s
Nova Scotia Community College	Institutional	R-2	1970s
Oland Brewery	Commercial	C-3	1930s
Novalea Centre	Commercial	C-2A	1960s
Parks	Park	P	1920s

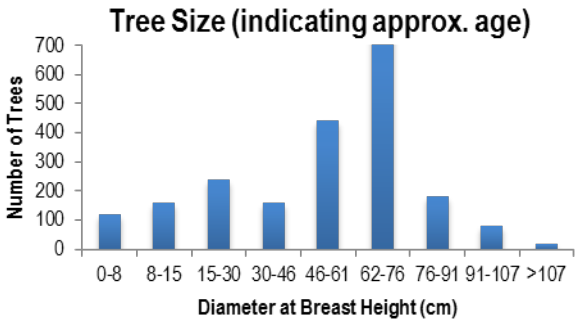
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	400
Area of naturalized forest stands to be created on HRM lands per decade	3 ha
Average number of native trees to plant on HRM lands per decade	260
Average number of Acadian old-growth species to plant on HRM lands per decade	8 (red spruce, eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple, elm
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	45
Additional Neighbourhood Treatments	
Target the rich drumlinoid soils of the Fort Needham Memorial Park area for plantings of naturalized stands and native Acadian species.	
Establish collaborative tree-planting efforts with representatives of the institutional and commercial divisions.	

The South End

The South End neighbourhood is bounded by the CNR Rail Cut, Coburg Road, South Street, and Halifax Port Authority lands (Figure 91). A defining feature of the area is its attractive single-family homes and tree-lined streets. One of the most appealing streets is Young Avenue, named after William Young, an early benefactor of Point Pleasant Park who advocated for the Park's creation. The avenue leads to the park's main gateway and provides a fine example of Nineteenth-Century urban design principles adopted to ensure a formal and appealing streetscape. The neighbourhood is also home to Saint Mary's University and Dalhousie University. The South End's large residential lots and boulevards provide ample opportunities for both private and public trees. The neighbourhood has 27% canopy cover (shown in red). There is a large amount of institutional area in the South End, with Dalhousie's main Studley Campus and Saint Mary's University both classified as neighbourhood divisions (shown in blue). Their canopy cover is 16% and 14% respectively. The universities could be useful collaborators by contributing to urban forest research and improving their own canopy with campus tree plans. A dominant landscape pattern in the neighbourhood is the urban forest ribbon, found along Robie Street and the native stands of trees bordering the railway cut that runs along the neighbourhood's southern and western boundaries. The long stretches of wide boulevard streets in the South End, such as Young Avenue and University Avenue, provide ample opportunity for creating future ribbons. New institutional and residential developments are taking place in this neighbourhood. Careful planning will be required to retain and improve its urban forest.





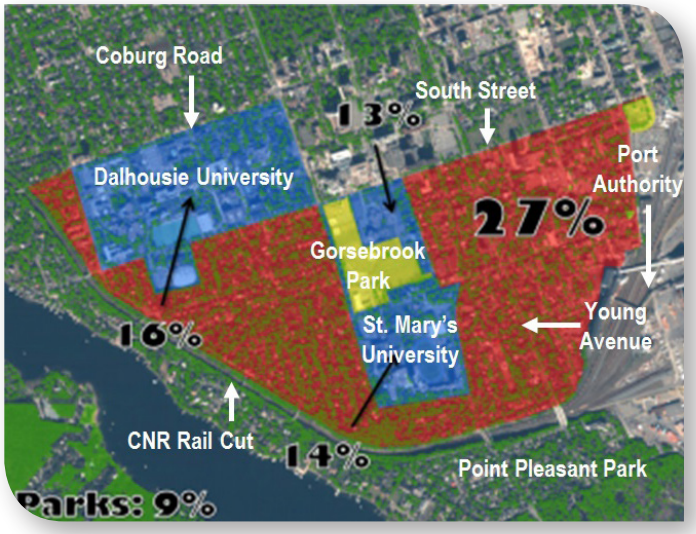


Figure 91

Challenges

- The South End's urban forest has an aging street tree population, with insufficient younger trees to replace the older ones in the years to come.
- The South End's species diversity is low, with mature elm- and maple-lined streets being a dominant feature. This makes the neighbourhood vulnerable to pests and diseases.
- The South End has a much higher proportion of trees with structural problems compared with other neighbourhoods.
- Dalhousie University and Saint Mary's University campuses have low canopy cover.
- Gorsebrook Park has particularly low canopy cover.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees.
- There are 1,162 plantable sites for new street trees in this neighbourhood.
- Tree canopy at Gorsebrook Park can be increased from 9% to 20%.
- Tree canopies at the Dalhousie and St. Mary's campuses can be increased to 20%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
South End percent canopy cover	27	≥ 70
Dalhousie percent canopy cover	16	≥ 20
Gorsebrook percent canopy cover	13	≥ 20
Saint Mary's percent canopy cover	14	≥ 20
Parks percent canopy cover	9	≥ 40
Percent of neighbourhood in forest stands	0.9	2.8
Percent of trees within the smallest size class	6	≥ 10
Percent of street trees that are native	42	50
Number of species that comprise more than 5% of all street trees	3 (American elm, Norway maple, pin oak)	0
Number of genera that comprise more than 10% of all street trees	3 (Maple, elm, oak)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (Sugar maple, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	75	100
Number of plantable sites in HRM rights of way	1,162	0
Percent canopy cover of riparian and recharge zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	25	100
Percent of residential properties with at least one value tree	71	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
South End	193	54	Till veneer, drumlin
Dalhousie	38	64	Till veneer
Gorsebrook	15	35	Till veneer
Saint Mary's	15	54	Till veneer
Parks	9	20	Till veneer

Socioeconomic Conditions

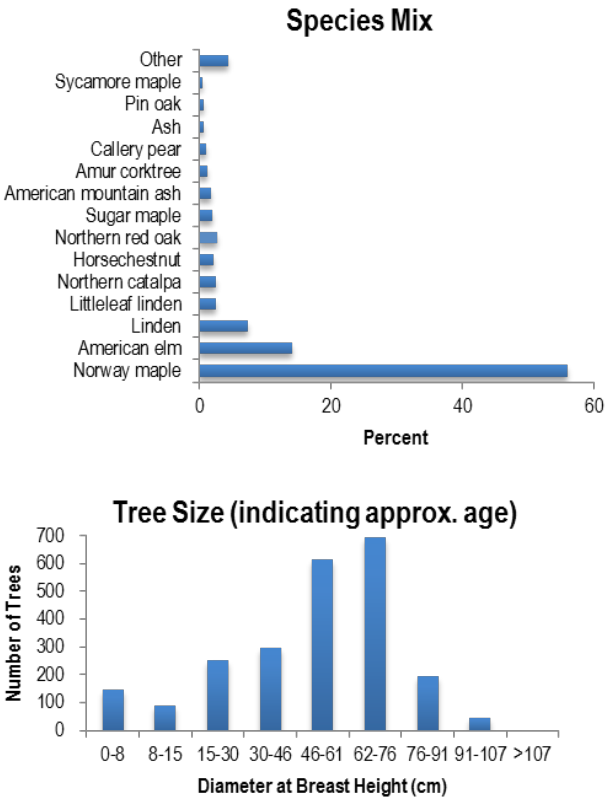
	Land Use	Zoning	Decade of Development
South End	Residential	R-1, R-2A, R-3	
Dalhousie	Institutional	U-2, U-1	1900s
Gorsebrook	Park, Residential	P, R-2A	1930s
Saint Mary's	Institutional	U-2, U-1	
Parks	Park	P	1930s

Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	465
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Average number of native trees to plant on HRM lands per decade	70
Average number of Acadian old-growth species to plant on HRM lands per decade	9 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Maple, elm, oak
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	220
Additional Neighbourhood Treatments	
Collaborate with Dalhousie University's Office of Sustainability on the Campus Natural Environment Master Plan and the Campus Tree Plan to increase canopy cover on the Studley Campus.	
Collaborate with Saint Mary's University's Sustainability Committee on developing a campus tree plan.	

The West End

This prosperous urban forest neighbourhood is bounded by the CNR line, Kempt Road, Windsor Street, Young Street, Connaught Avenue, and Chebucto Road (Figure 92). During Halifax's early development, the West End consisted primarily of small farms and county estates. As Halifax grew, the neighbourhood was gradually established as a residential area. Rapid development took place during the post-war housing boom, and effectively transformed the area into an urban community. The residential areas of the West End now contain mainly single-family homes and a few multi-family housing complexes. The West End Mall (1) and Halifax Shopping Centre (2) are significant commercial areas with high levels of impervious surface, which present a significant challenge to incorporating new trees. The West End is a younger residential neighbourhood, but still suffers from an aging tree population due to insufficient planting over the past 50 years. More than half the street tree population is Norway maple, which is an invasive species in parks and naturalized stands. The West End's (shown in red) canopy cover is 23%, which is lower than most Peninsula neighbourhoods. The park canopy cover (shown in green) is also low at 15%. The commercial division (shown in blue) that contains the West End Mall and Halifax Shopping Centre is a barren landscape with a canopy cover of only 3%. Tree-stand plantings in the Fairview Cemetery and the area's parks could establish a strong patchwork pattern of urban forest in the area. A ribbon pattern of native urban forest skirts the neighbourhood along northern sections of the railway corridor. New residential and commercial developments are likely in this neighbourhood, but careful planning will be required to retain, improve, and in some cases restore its urban forest.



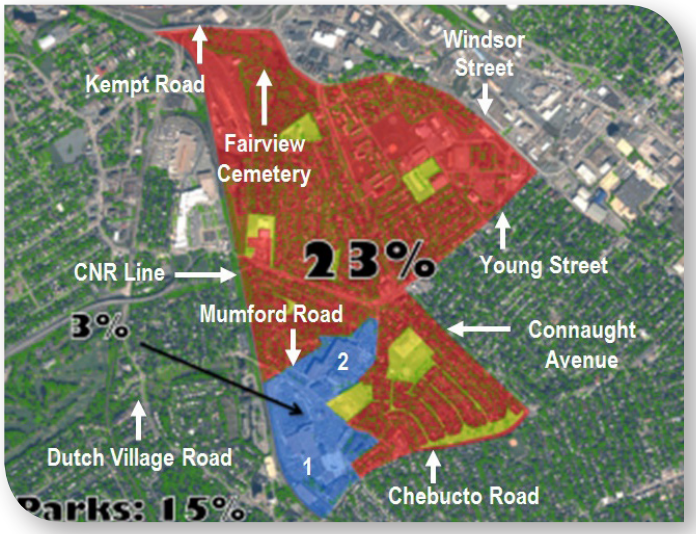


Figure 92

Challenges

- There are major gaps in the West End's canopy. This is in part due to built-up, impervious areas such as the West End Mall and the Halifax Shopping Centre. Species diversity is very low, with a particularly high representation of Norway maple.
- The West End's urban forest is aging, with an uneven distribution of tree sizes. There is a disproportionate amount of older, larger trees and not enough young trees to replace them.
- Despite the high number of parks in the neighbourhood, none are adequately shaded.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees and increase overall canopy from 23% to 70%.
- There are 884 plantable sites for new street trees in this neighbourhood.
- Canopy covers for West End Mall and Halifax Shopping Centre can be increased from 3% to 20%.
- Park tree canopy will be increased from 15% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
The West End percent canopy cover	23	≥ 70
West End Mall/Halifax Shopping Centre percent canopy cover	3	≥ 20
Parks percent canopy cover	15	≥ 40
Percent of neighbourhood in forest stands	0	1.3
Percent of trees within the smallest size class	6	≥ 10
Percent of street trees that are native	21	50
Number of species that comprise more than 5% of all street trees	3 (Norway maple, American elm, silver linden)	0
Number of genera that comprise more than 10% of all street trees	3 (Maple, elm, linden)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (Red oak, sugar maple)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	86	100
Number of plantable sites in HRM rights of way	884	0
Percent canopy cover of riparian and recharge zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	79	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
The West End	194	42	Till veneer, bedrock
West End Mall/Halifax Shopping Centre	26	88	Anthropogenic
Parks	15	24	Till veneer

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
The West End	Residential, Multi-family residential	R-1, R-2, P	1950s
West End Mall/Halifax Shopping Centre	Commercial	C-2, C-3	1960s
Parks	Park, Institutional	P	1950s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	350
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Average number of native trees to plant on HRM lands per decade	275
Average number of Acadian old-growth species to plant on HRM lands per decade	9 (red spruce, eastern hemlock, white pine, yellow birch)
Refrain from planting the following genera until 2020	Maple, elm, linden
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	130
Additional Neighbourhood Treatments	
Communicate with corporate owners of the West End Mall and Halifax Shopping Centre about the urban forest and opportunities for improvement.	
Target the Fairview Lawn Cemetery and Saunders Park for urban-forest improvements.	

A-9 SACKVILLE

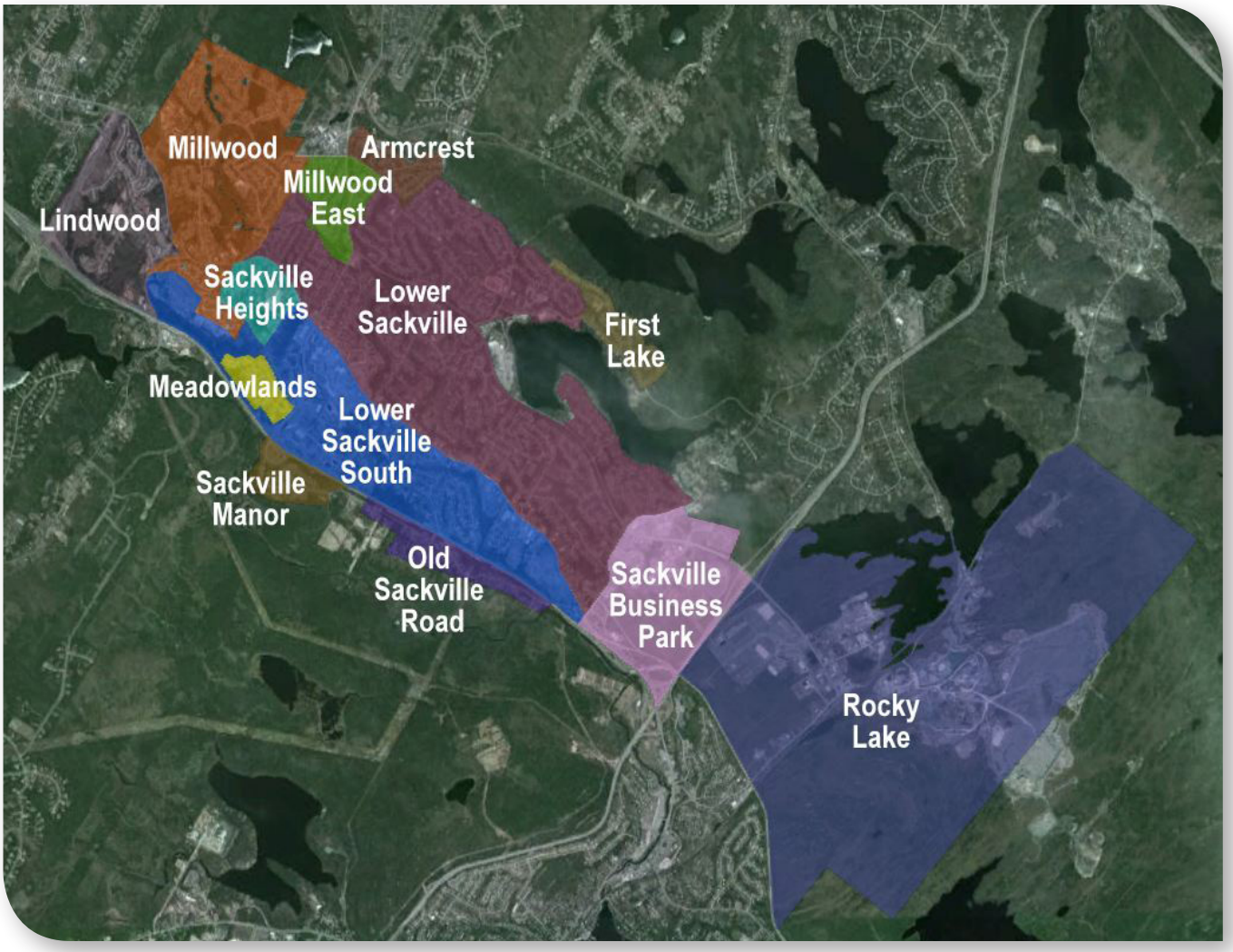
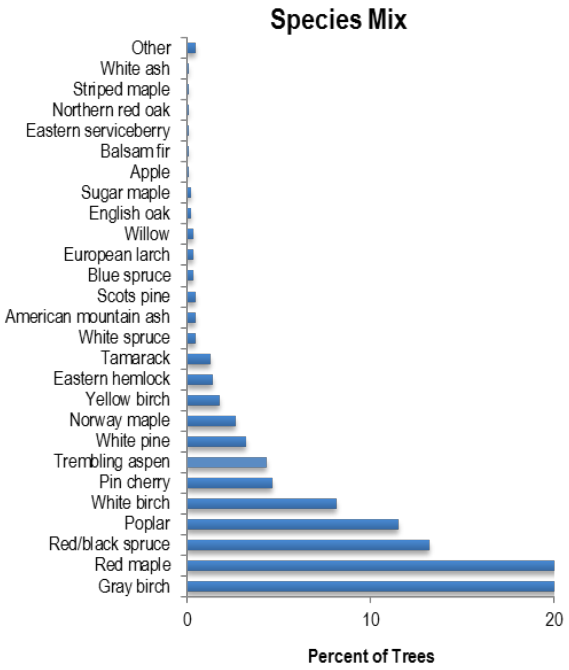


Figure 93

Armcrest

The urban forest neighbourhood of Armcrest is a pleasant residential neighbourhood located in the north western portion of the Sackville community, just north of Stokil Drive (Figure 94). It is characterized by single-family houses on smaller lots, with some apartment complexes in the west. There are few street trees along HRM rights of way and on residential properties. Although there are no parks in the neighbourhood, visual relief is provided to the north and northeast by a large patch of neighbouring Crown land that forms an urban forest wedge pattern to provide connectivity to the peri-urban forest. Most of the area's 16% canopy cover is contained in forested buffer strips between residential streets. Although Armcrest has the lowest canopy cover in Sackville, its rich, drumlinoid soil presents a perfect opportunity for the fast growth of healthy trees. Cooperative tree planting efforts by local residents could dramatically improve the urban forest in this neighbourhood.



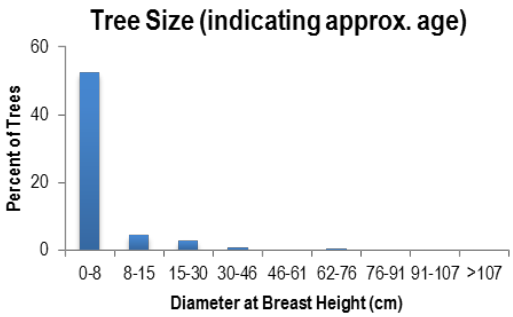


Figure 94

Challenges

- There are few trees on existing residential lots.
- There are a limited number of plantable sites on HRM-controlled rights of way.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 16%-70%.
- There are 62 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Armcrest percent canopy cover	16	≥ 70
Percent of neighbourhood in forest stands	12	12
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	95	50
Species that comprise more than 5% all street trees	7 (gray birch, red maple, red spruce, black spruce, poplar, white birch, pin cherry)	0
Genera that comprise more than 10% of all street trees	5 (birch, maple, spruce, poplar)	0
Acadian old-growth species that represent at least 1% of all street trees	2 (red spruce, eastern hemlock, white pine, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	62	0
Percent canopy cover of riparian and recharge zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	36	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Armcrest	25		Drumlins

Socioeconomic Conditions

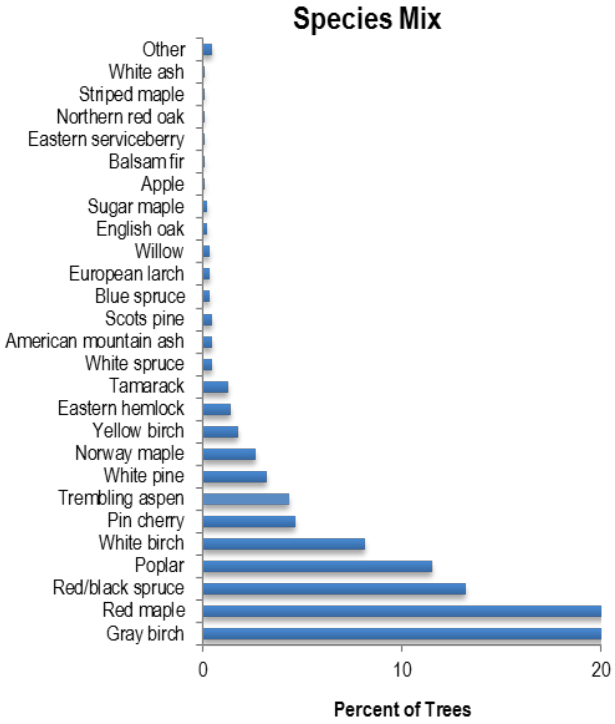
	Land Use	Zoning	Decade of Development
Armcrest	Commercial, residential	CDD, R-6, R-1	1990s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	25
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	3 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, spruce, poplar
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	3

First Lake

First Lake is an attractive urban forest neighbourhood located between First Lake and Second Lake. The neighbourhood features single-family homes built in the 1980s. It is enclosed to the north and east by the Acadian forest of the Second Lake Regional Park. First Lake has a canopy cover of 32%, typical of a fully developed residential neighbourhood, but it has the potential to develop a full canopy. This urban forest neighbourhood sits atop a drumlin with rich soils that are perfect for tree growth. Although some property owners have planted trees in their front yards there are many more opportunities for local residents to improve their neighbourhood's urban forest. HRM can help support this effort through public education as well as more street tree plantings and improving canopy cover in the area's parks. First Lake is fortunate to be encircled by a regional park. This urban forest wedge pattern limits further development and provides connectivity to the hinterland forest.



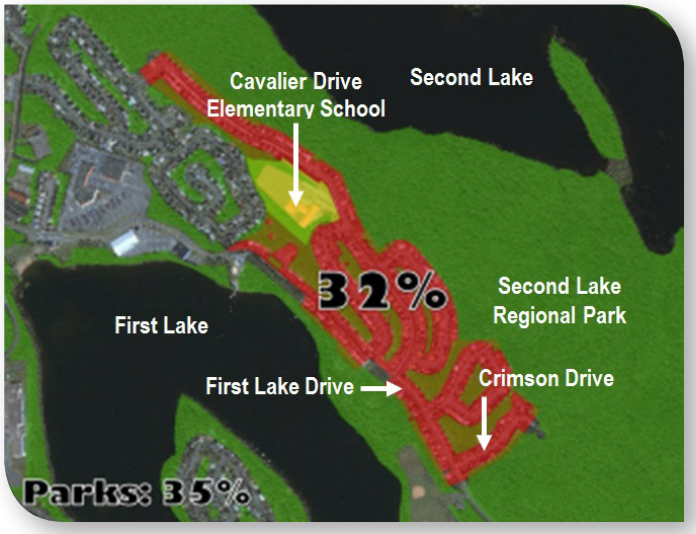
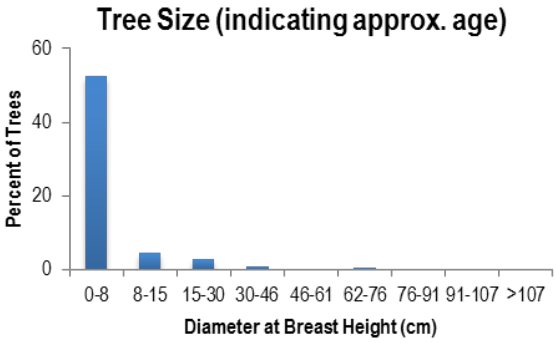


Figure 95



Challenges

- There are a limited number of plantable sites on HRM-controlled rights of way.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 32%-70%.
- There are 77 plantable sites for new street trees in this neighbourhood.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
First Lake percent canopy cover	32	≥ 70
Parks percent canopy cover	35	≥ 40
Percent of neighbourhood in forest stands	29	29
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	95	50
Species that comprise more than 5% all street trees	7 (gray birch, red maple, red spruce, black spruce, poplar, white birch, pin cherry)	0
Genera that comprise more than 10% of all street trees	5 (birch, maple, spruce, poplar)	0
Acadian old-growth species that represent at least 1% of all street trees	2 (red spruce, eastern hemlock, white pine, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	77	0
Percent canopy cover of riparian and recharge zones	100	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	72	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
First Lake	35		Drumlins
Parks	3		Drumlins

Socioeconomic Conditions

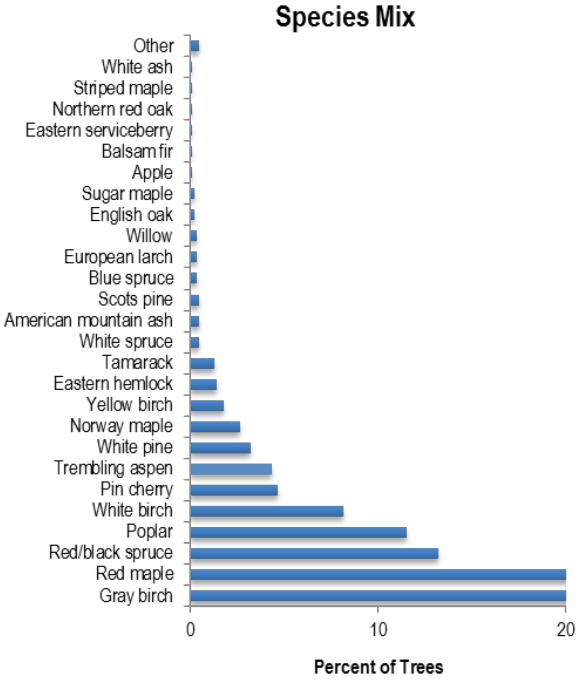
	Land Use	Zoning	Decade of Development
First Lake	Residential	R-1	1970s
Parks	Institutional	P-2	1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	30
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	10 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, spruce, poplar
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	3

Lindwood

This urban forest neighbourhood's namesake is the former Lindwood Farms established by the Oland family in the late 1800s. Situated between Highway 101 and Sackville Drive, it extends northwest from Lucasville Road to Margeson Drive (Figure 96). Lindwood features large lots with homes set well back from neighbourhood streets. Sackville Heights Elementary School is located in the eastern portion of the neighbourhood. Although the school ground provides ample open space, there are few trees on site. Lindwood currently has a high canopy cover of 68% but developments slated for the near future will reduce this amount. Trees are rare on existing residential properties and the number of plantable sites for street trees is limited. However, Lindwood's rich drumlinoid soil could provide an ideal opportunity for homeowners to establish a beautiful urban forest in this neighbourhood. Special attention should be paid to maintaining the existing forest buffer along Highway 101. This green ribbon provides a visual break for local residents and sound attenuation benefits from highway traffic.



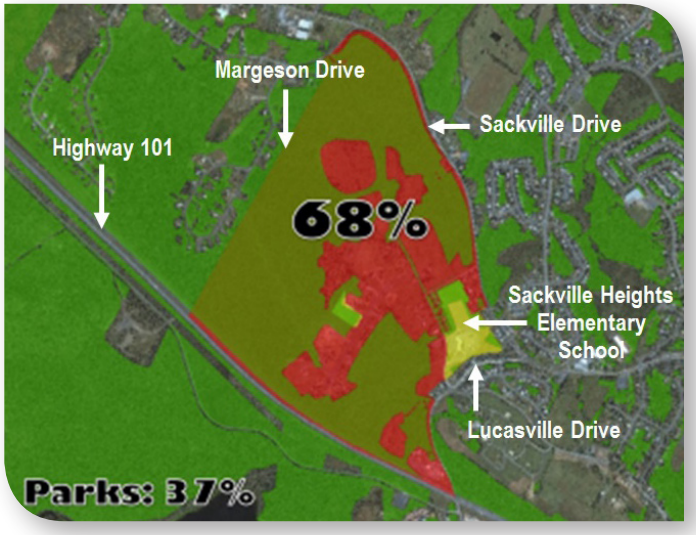
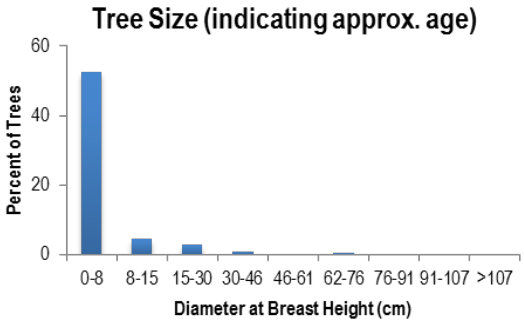


Figure 96



Challenges

- Parts of the neighbourhood are slated for development, so maintaining intact forest canopy will be a challenge as land is cleared, graded, and filled.
- There are few trees on private residential lots.
- There are few opportunities for planting trees in HRM-controlled rights of way.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 68%-70%.
- There are 78 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Lindwood percent canopy cover	68	≥ 70
Parks percent canopy cover	37	≥ 40
Percent of neighbourhood in forest stands	66	66
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	95	50
Species that comprise more than 5% all street trees	7 (gray birch, red maple, red spruce, black spruce, poplar, white birch, pin cherry)	0
Genera that comprise more than 10% of all street trees	5 (birch, maple, spruce, poplar)	0
Acadian old-growth species that represent at least 1% of all street trees	2 (red spruce, eastern hemlock, white pine, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	78	0
Percent canopy cover of riparian and recharge zones	94	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	61	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Lindwood Estates	134		Drumlins
Parks	6		Drumlins

Socioeconomic Conditions

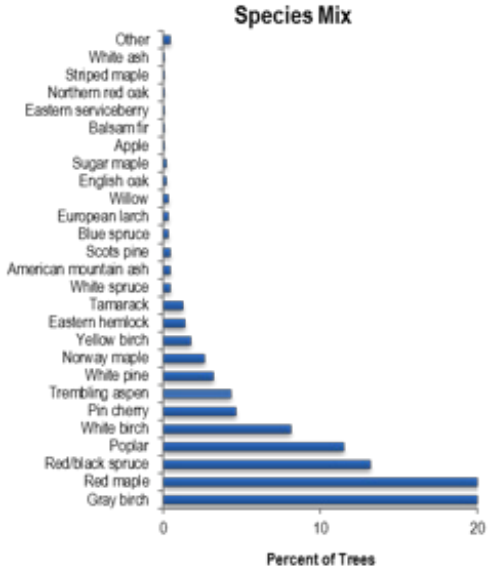
	Land Use	Zoning	Decade of Development
Lindwood	Commercial, residential	CDD, R-6	1960s/1990s
Parks	Residential	R-6	1960s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	30
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	88 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, spruce, poplar
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	3
Additional Neighbourhood Treatments	
Maintain and enhance the ribbon pattern along Highway 101 and collaborate with the Nova Scotia Department of Transportation and Infrastructure Renewal.	

Lower Sackville

The urban forest neighbourhood of Lower Sackville lies between Sackville Drive and Second Lake Regional Park. It generally extends northwest from Cobequid Road to the Beaver Bank Cross Road (Figure 97). The neighbourhood features a wide range of land uses. Commercial development dominates the Sackville Drive landscape while the remainder of this area consists of a pleasant mix of single and multi-family homes, mobile homes, parks, and schools. Considering that Lower Sackville is at the centre of the Sackville community, the urban forest is in relatively good condition with a canopy cover of 31%. Nonetheless, there are some areas where canopy cover could be improved. Schools in this neighbourhood are not adequately shaded. Although Pleasant Hill Cemetery is a private facility, it too could benefit from improved canopy cover. The key challenge is the commercial division (shown in blue) along Sackville Drive, where canopy cover is low at 14%, with extensive impervious surfaces and few currently plantable sites. Another concern is the forested riparian zone of the Little Sackville River that meanders through the neighbourhood. Although it is generally well forested, there are riparian areas with low canopy adjacent to Sackville Drive, where the river is most vulnerable to stormwater runoff. Connectivity is also an important feature of Lower Sackville. The urban forest ribbon pattern provided by the treed riparian zone of the Little Sackville River is an essential element of Lower Sackville's beauty and environmental health. Regardless of the challenges facing the Lower Sackville urban forest neighbourhood, there are significant opportunities for improvement. Its deep, rich drumlin soils provide ideal conditions for the growth of new trees and planting opportunities exist throughout the area's parks, commercial areas, cemeteries, streets, and front yards.



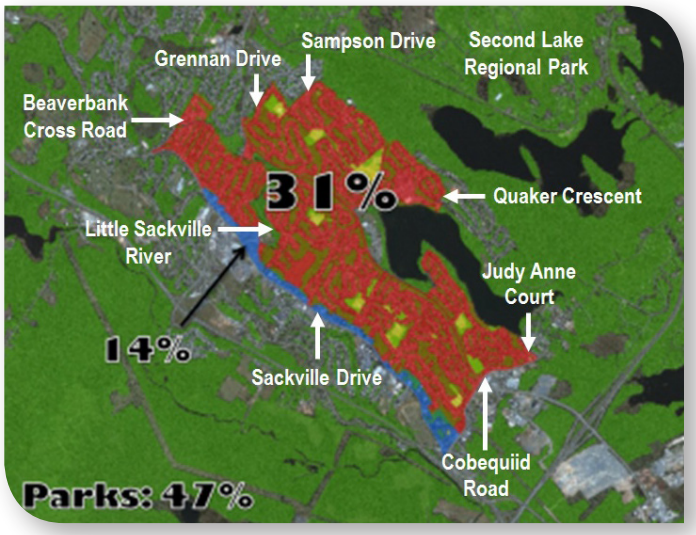
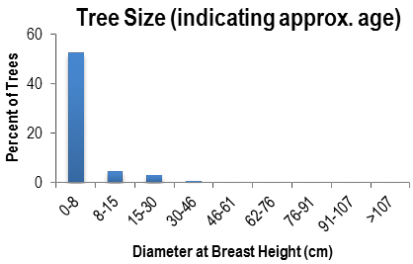


Figure 97



Challenges

- The Sackville Drive commercial division has low canopy cover, extensive impervious surfaces, and a current lack of plantable sites.
- The Little Sackville River has limited riparian protection in areas adjacent to Sackville Drive.
- Park, cemetery, and street tree canopy cover is generally low.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 32%-70%.
- Canopy cover in the commercial division of Sackville Drive can be increased from 14%-20%.
- There are 1,225 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Lower Sackville percent canopy cover	31	≥ 70
Sackville Drive percent canopy cover	14	≥ 20
Parks percent canopy cover	47	≥ 40
Percent of neighbourhood in forest stands	26	26
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	95	50
Species that comprise more than 5% all street trees	7 (gray birch, red maple, red spruce, black spruce, poplar, white birch, pin cherry)	0
Genera that comprise more than 10% of all street trees	5 (birch, maple, spruce, poplar)	0
Acadian old-growth species that represent at least 1% of all street trees	2 (red spruce, eastern hemlock, white pine, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	1,225	0
Percent canopy cover of riparian and recharge zones	56	100
Percent of public play areas that are adequately shaded (40% canopy cover)	78	100
Percent of residential properties with at least one value tree	72	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Lower Sackville	566		Drumlins, anthropogenic
Sackville Drive	40		Drumlins, anthropogenic
Parks	29		Drumlins

Socioeconomic Conditions

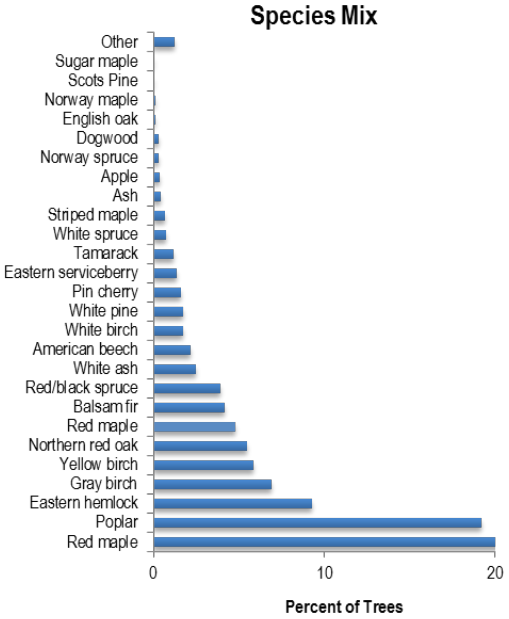
	Land Use	Zoning	Decade of Development
Lower Sackville	Residential, multi-family residential	R-1	1960s/1970s
Sackville Drive	Commercial	PC, PR, LS	1970s
Parks	Park	P-2	1960s/1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	490
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	147 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	28 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, spruce, poplar
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	50
Additional Neighbourhood Treatments	
Collaborate with Sackville Drive business owners to improve the urban forest.	
Maintain and enhance the Little Sackville River riparian corridor.	
Collaborate with Pleasant Hill Cemetery administrators to improve the urban forest.	

Lower Sackville South

Lower Sackville South is an urban forest neighbourhood lying in the historic heartland of the Sackville Community between Sackville Drive and Highway 101. It generally extends northwest from Cobequid Road to Lucasville Road and includes a unique blend of residential, commercial and institutional land uses. South-central portions of the neighbourhood contain a moderate density of single and multi-family housing. Lower density residential development occurs in the urban forest neighbourhood's north western sections. Although the area has an overall canopy cover of 33%, its commercial and institutional divisions have dramatically lower canopy coverage. The 10% canopy cover associated with commercial land uses along Sackville Drive (shown in blue) presents a major challenge to the urban forest in this neighbourhood. Near Cobequid Road, the Gate of Heaven Cemetery's low canopy cover of 20% (shown in blue) is also a concern. The area's impressive canopy cover of 66% in parkland (shown in light green) along the Little Sackville River and the Sackville Linear Park protects water quality and provides a ribbon pattern of urban forest connectivity throughout Lower Sackville South. Although there are areas along the Little Sackville River where riparian canopy cover is low, further tree planting could dramatically improve protection for this valued watercourse. The area's rich, drumlinoid soil presents a perfect opportunity for the fast growth of healthy trees. Cooperative tree planting efforts by local residents, as well as commercial and institutional landowners could significantly improve the urban forest in this neighbourhood. Finally, there are a remarkable1,387 plantable sites for street trees in Lower Sackville South.



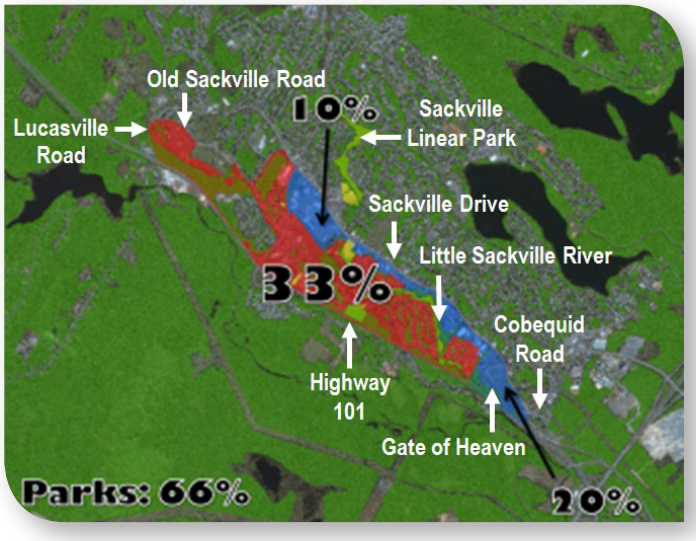
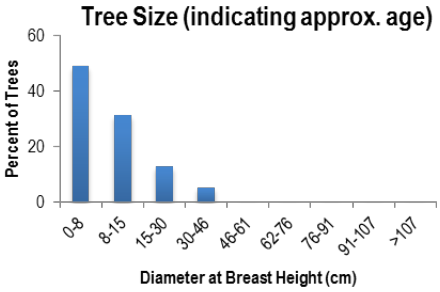


Figure 98



Challenges

- The Sackville Drive commercial division has low canopy cover and extensive paving with few opportunities for tree planting.
- Some riparian zone areas of the Little Sackville River have low canopy cover.
- Canopy cover in the Gate of Heaven Cemetery is low.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 33%-70%.
- There are 1,387 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Lower Sackville South percent canopy cover	33	≥ 70
Sackville Drive percent canopy cover	10	≥ 20
Gate of Heaven Cemetery percent canopy cover	20	≥ 40
Parks percent canopy cover	66	≥ 90
Percent of neighbourhood in forest stands	33	39
Percent of trees within the smallest size class	49	≥ 10
Percent of street trees that are native	97	50
Species that comprise more than 5% all street trees	4 (red maple, poplar, eastern hemlock, gray birch)	0
Genera that comprise more than 10% of all street trees	4 (maple, poplar, hemlock, birch)	0
Acadian old-growth species that represent at least 1% of all street trees	5 (red spruce, eastern hemlock, white pine, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	1,387	0
Percent canopy cover of riparian and recharge zones	64	100
Percent of public play areas that are adequately shaded (40% canopy cover)	36	100
Percent of residential properties with at least one value tree	71	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Lower Sackville South	286		Drumlins, anthropogenic, alluvial
Sackville Drive	53		Drumlins, anthropogenic, alluvial
Gate of Heaven Cemetery	18		Drumlins
Parks	24		Drumlins, alluvial

Socioeconomic Conditions

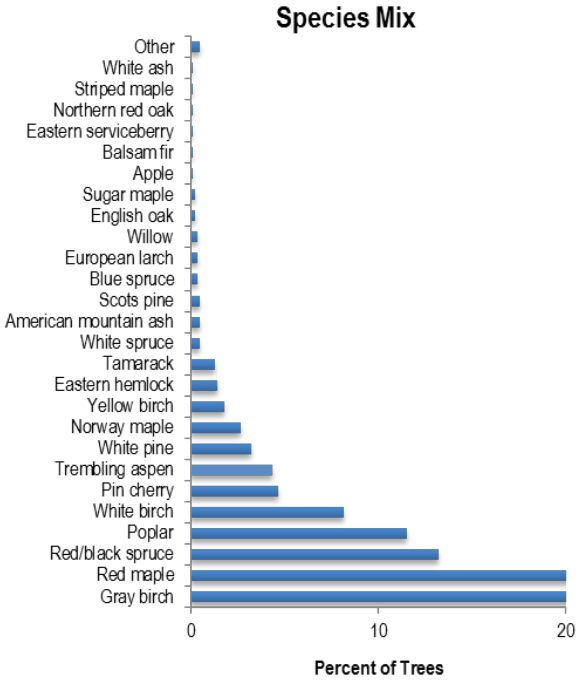
	Land Use	Zoning	Decade of Development
Lower Sackville South	Residential, commercial, park	R-1, R-2, LS	1950s
Sackville Drive	Commercial, residential	PC, DC-3, PR	1960s
Gate of Heaven Cemetery	Cemetery	CP	1960s
Parks	Wetland, park	P-3	1960s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	550
Area of naturalized forest stands to be created on HRM lands per decade	6 ha
Area of naturalized forest stands not to fall below	94 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	36 (sugar maple)
Refrain from planting the following genera until 2020	Maple, poplar, hemlock, birch
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Maintain and enhance the ribbon pattern along the Little Sackville River and improve riparian canopy cover in commercial areas.	
Pool resources with Sackville Drive business owners to improve the urban forest.	
Cooperate with the administrators of the Gate of Heaven Cemetery and Oakridge Memorial Gardens to improve the urban forest.	

Meadowlands

Meadowlands is an attractive urban forest neighbourhood secluded between Highway 101 and Old Sackville Road. It extends northwest from the Beaver Bank Connector to a recently developed subdivision on Evangeline Court (Figure 99). Located on the plateau of one of Sackville's iconic drumlins, the area's single-family homes, first developed in the 1980s, occupy a former farm meadow once cleared of trees for crops and grazing livestock. Although it is evident that some homeowners have planted trees, Meadowlands has a relatively low canopy cover of 28%. There are few trees in HRM rights of way and on residential properties however, a recent subdivision on Evangeline Court features a good number of streets trees. Most of the current canopy is contained in a ribbon of forest along Highway 101 and in Meadowlands Park. This urban forest ribbon pattern is a key feature of the neighbourhood that should be maintained. Although Meadowlands has a fairly low canopy cover, its rich drumlinoid soil presents a perfect opportunity for the fast growth of healthy trees. Cooperative tree planting efforts by local residents could dramatically improve the urban forest in this neighbourhood.



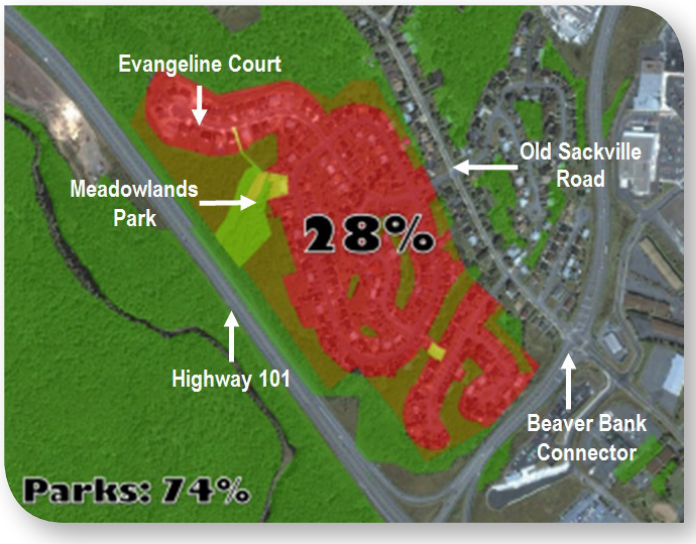
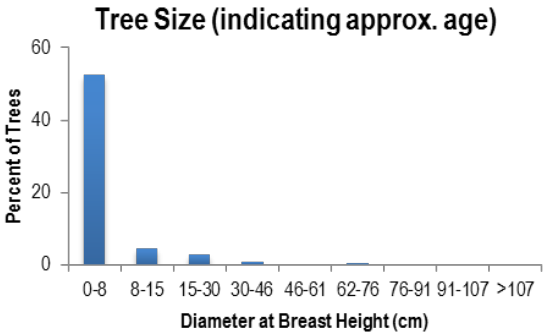


Figure 99



Challenges

- There are few opportunities for planting street trees.
- There are a low number of trees on residential lots.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 28%-70%.
- There are 42 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Meadowlands percent canopy cover	28	≥ 70
Parks percent canopy cover	74	≥ 90
Percent of neighbourhood in forest stands	25	25
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	95	50
Species that comprise more than 5% all street trees	7 (gray birch, red maple, red spruce, black spruce, poplar, white birch, pin cherry)	0
Genera that comprise more than 10% of all street trees	5 (birch, maple, spruce, poplar)	0
Acadian old-growth species that represent at least 1% of all street trees	2 (red spruce, eastern hemlock, white pine, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	42	0
Percent canopy cover of riparian and recharge zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	61	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Meadowlands	21		Drumlins
Parks	1		Drumlins

Socioeconomic Conditions

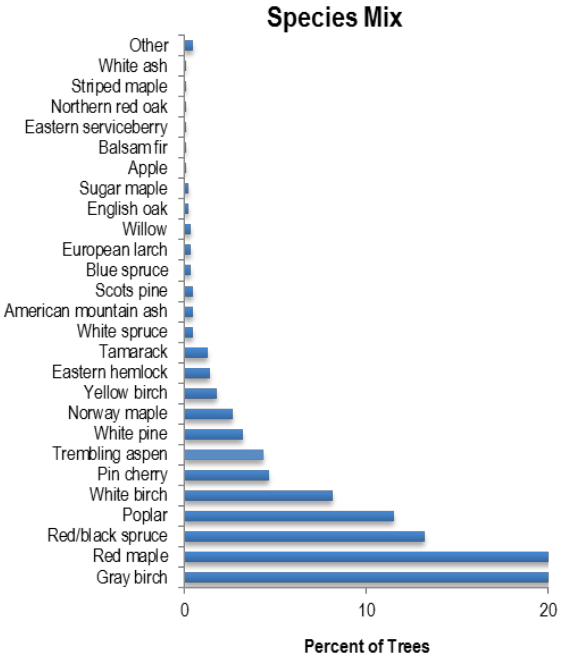
	Land Use	Zoning	Decade of Development
Meadowlands	Residential, multi-family residential	R-1, R-2	1990s
Parks	Residential	R-1	1990s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	15
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	5 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, spruce, poplar
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	2
Additional Neighbourhood Treatments	
Maintain and enhance the ribbon pattern along Highway 101 and collaborate with the Nova Scotia Department of Transportation and Infrastructure Renewal.	

Millwood

The urban forest neighbourhood of Millwood is located, for the most part, north of Sackville Drive and centered on Millwood Drive (Figure 100). The area features a mix of single-family and multi-family homes with compact lot sizes. To the west is the new Twin Brooks subdivision, being developed on the fairways of the former Sackville Golf Club. Millwood has a canopy cover of 29% (shown in red). Most of this canopy is comprised of treed buffer strips between properties. On front lawns and in HRM rights of way there are few trees to be seen; however, good canopy cover (54%) has been retained in the Millwood Common and Jackladder Park. The parks' canopy cover (shown in light green) provides a green ribbon of riparian protection to the Little Sackville River that meanders through the centre of Millwood. Although Millwood Elementary School and Millwood High School are surrounded by green space, very little of it is treed. With the advantage of Millwood's rich drumlinoid soil, cooperative tree planting efforts with developers, local residents, and school officials could dramatically improve the urban forest in this neighbourhood.



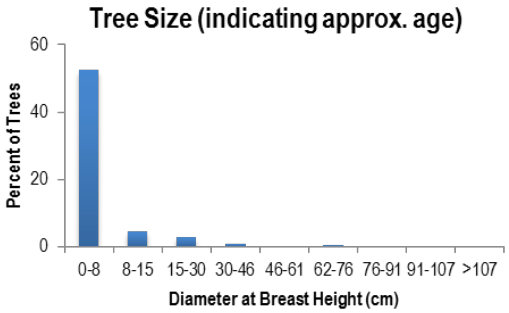


Figure 100

Challenges

- There are few trees on existing and recently developed residential lots.
- Millwood's school grounds largely feature paved parking lots and sports fields. Tree plantings appear minimal.
- Suburban/forest fringe neighbourhoods include risks from wildfire, storm blowdowns, and wildlife conflicts.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 29%-70%.
- There are 365 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Millwood percent canopy cover	29	≥ 70
Parks percent canopy cover	54	≥ 90
Percent of neighbourhood in forest stands	30	36
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	95	50
Species that comprise more than 5% all street trees	7 (gray birch, red maple, red spruce, black spruce, poplar, white birch, pin cherry)	0
Genera that comprise more than 10% of all street trees	5 (birch, maple, spruce, poplar)	0
Acadian old-growth species that represent at least 1% of all street trees	2 (red spruce, eastern hemlock, white pine, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	365	0
Percent canopy cover of riparian and recharge zones	70	100
Percent of public play areas that are adequately shaded (40% canopy cover)	38	100
Percent of residential properties with at least one value tree	56	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Millwood	234		Drumlins
Parks	39		Alluvial

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Millwood	Residential	R-6, R-1	1960s/1980s
Parks	Wetland, park	P-3, P-2	1960s/1980s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	150
Area of naturalized forest stands to be created on HRM lands per decade	14 ha
Area of naturalized forest stands not to fall below	70 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	8 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, spruce, poplar
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	15
Additional Neighbourhood Treatments	
Maintain and enhance the urban forest ribbon pattern along the Little Sackville River riparian buffer zone.	

Millwood East

Millwood East is a residential urban forest neighbourhood located near the center of the Sackville community. It is generally bounded in the north by Millwood and Stokil Drives, in the east by Beaver Bank Road, and in the south by the Little Sackville River (Figure 101). There are two distinct settlement patterns in the neighbourhood. In the west, compact mobile home lots are predominant. The eastern portion of the neighbourhood is mostly single-family homes on larger lots. Millwood East has a canopy cover of 31% (shown in red). Most of this canopy is comprised of residential buffer strips between homes, though there are several good examples of residential properties dotted with white pine or maples. Unfortunately, Millwood East presents few opportunities for planting more street trees as its mobile home developments account for a significant portion of this urban forest neighbourhood and have no HRM-controlled rights of way. With the advantage of Millwood East's rich, drumlinoid soil, cooperative tree planting efforts by local residents could dramatically improve the urban forest in this neighbourhood. Although there are no parks here, the Little Sackville River riparian corridor presents an excellent opportunity to enhance and maintain an urban forest ribbon pattern across the southern edge of Millwood East.

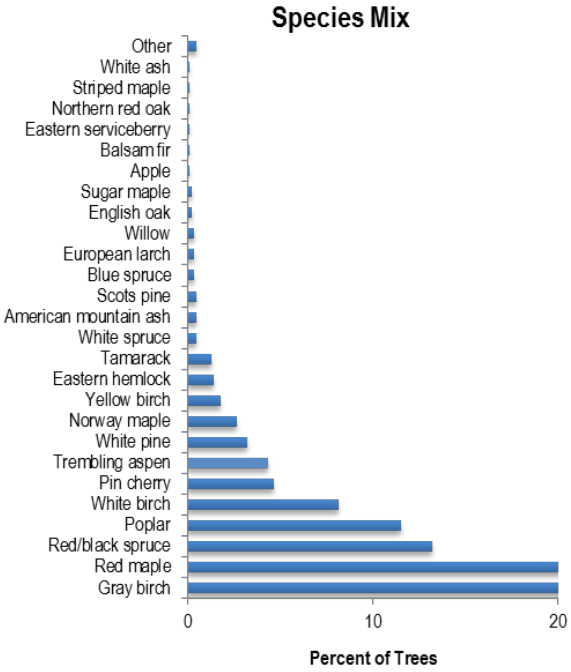
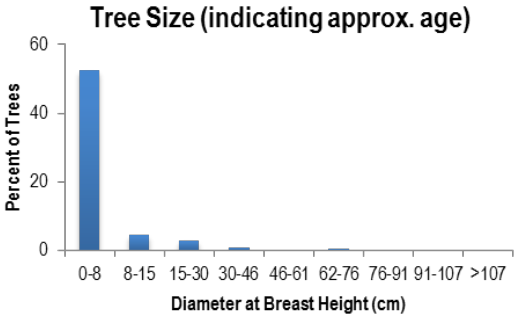


Figure 101



Challenges

- There are few trees on existing residential lots.
- There are a limited number of plantable sites on HRM-controlled rights of way.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 31%-70%.
- There are 97 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Millwood East percent canopy cover	31	≥ 70
Percent of neighbourhood in forest stands	26	26
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	95	50
Species that comprise more than 5% all street trees	7 (gray birch, red maple, red spruce, black spruce, poplar, white birch, pin cherry)	0
Genera that comprise more than 10% of all street trees	5 (birch, maple, spruce, poplar)	0
Acadian old-growth species that represent at least 1% of all street trees	2 (red spruce, eastern hemlock, white pine, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	97	0
Percent canopy cover of riparian and recharge zones	81	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	70	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Millwood East	42		Drumlins, alluvial

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Millwood East	Residential	R-1	1960s/1990s/2000s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	150
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	11 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, spruce, poplar
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	4
Additional Neighbourhood Treatments	
Maintain and enhance the urban forest ribbon pattern along the Little Sackville River.	

Old Sackville Road

This small, pastoral urban forest neighbourhood is located just south of Highway 101, along Walkers Service Road and the Old Sackville Road (Figure 102). The area features a variety of residential dwellings, with compact mobile home developments in the southeast, medium-density suburban housing near the centre, and lower-density rural style housing in the northwest. Old Sackville Road is a fairly well-forested neighbourhood, with a canopy cover of 52%. The homes here, for the most part, are surrounded by forest and individual value trees. The only visible challenge to this neighbourhood's urban forest is an industrial site in the southwestern corner off of Walker's Service Road. The relative isolation of the neighbourhood is enhanced by an urban forest ribbon pattern extending along Highway 101 and an urban forest wedge pattern created by federal Crown land owned by the Department of National Defence (DND) to the south of the neighbourhood.

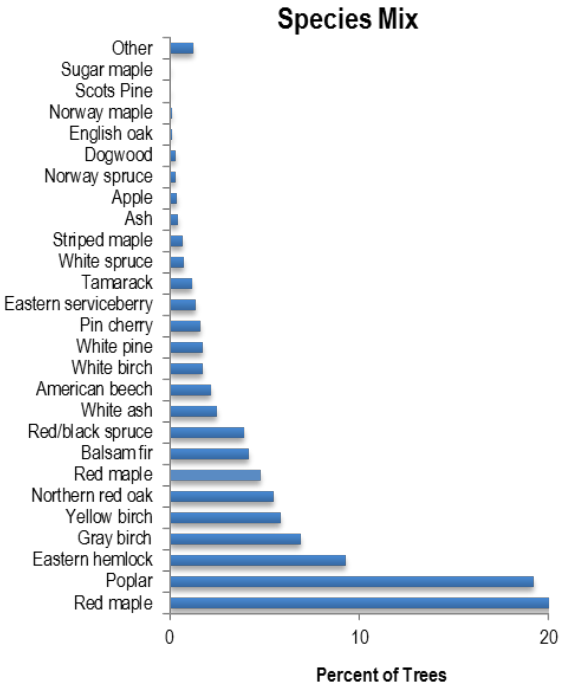
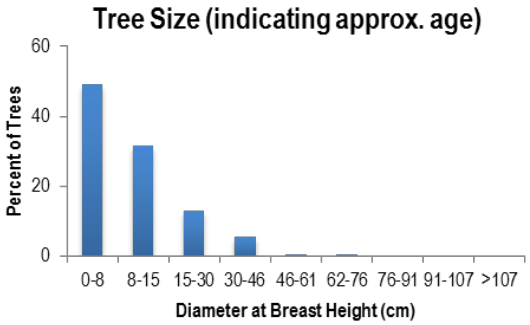


Figure 102



Challenges

- There are stresses associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts,
- environmental contamination, illegal dumping, tree-cutting, and invasive species.
- There are few trees on existing mobile home lots.
- There are a limited number of HRM-controlled rights of way.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 52%-70%.
- There are 274 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Old Sackville Road percent canopy cover	52	≥ 70
Percent of neighbourhood in forest stands	48	48
Percent of trees within the smallest size class	49	≥ 10
Percent of street trees that are native	97	50
Species that comprise more than 5% all street trees	4 (red maple, poplar, eastern hemlock, gray birch)	0
Genera that comprise more than 10% of all street trees	4 (maple, poplar, hemlock, birch)	0
Acadian old-growth species that represent at least 1% of all street trees	5 (red spruce, eastern hemlock, white pine, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	274	0
Percent canopy cover of riparian and recharge zones	45	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	83	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Old Sackville Road	45		Drumlins

Socioeconomic Conditions

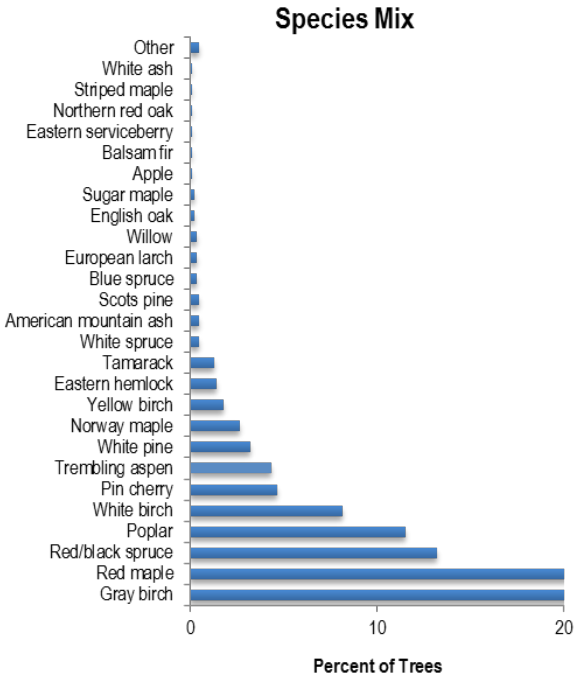
	Land Use	Zoning	Decade of Development
Old Sackville Road	Residential	R-6, R-1	1890s

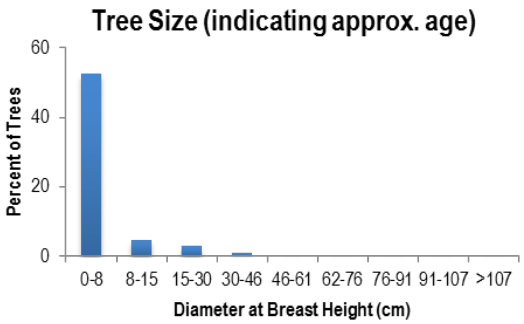
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	110
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	22 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	7 (sugar maple)
Refrain from planting the following genera until 2020	Maple, poplar, hemlock, birch
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Maintain and enhance the ribbon pattern along Highway 101 through collaboration with the Nova Scotia Department of Transportation and Infrastructure Renewal.	

Rocky Lake

Rocky Lake is a 980 hectare urban forest neighbourhood in an area dominated by industrial and commercial land uses. It is bound in the west by the Veteran's Memorial Highway, in the southwest by the Bedford Bypass, and in the north by Rocky Lake (Figure 103). The Bedford Industrial Park and the Bedford Commons occupy much of the western section, but the largest development is the Rocky Lake Quarry. This urban forest neighbourhood is a study in contrasts. Although it has an overall canopy cover of 66%, its industrial and commercial areas have virtually no canopy cover. While the remaining areas of the peri-urban forest feature extensive stands of trees, this is likely to change as commercial and industrial land uses expand into the hinterland forest. Given the nature of these land uses it is probable that canopy cover would eventually approach 0%, however, it is possible that a canopy cover of 20%, could be retained through cooperative planning and planting efforts with local landowners. Unfortunately, Rocky Lake lies just outside the Sackville drumlin fields. There are no rich, deep soils as much of the landscape here is ridge topography, with exposed bedrock dotting the red maple, white birch, and black spruce forests.





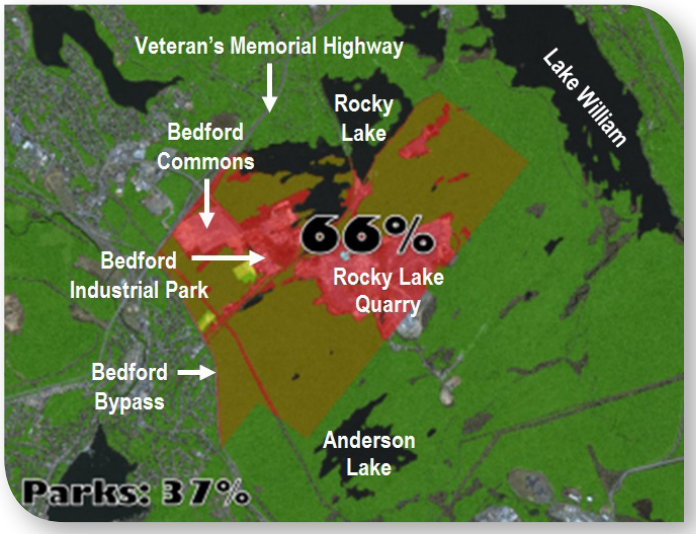


Figure 103

Challenges

- This region is characterized by shallow, poorly-drained soils that overlay bedrock, with many exposed bedrock ridges.
- Parts of the neighbourhood are slated for development, so maintaining forest canopy targets will be an ongoing challenge.
- Extensive forested riparian buffers will be vital to maintaining the trophic status of the area's lakes.

Opportunities

- A canopy cover of 20%, can be retained through cooperative planning and planting efforts with local landowners.
- There are 269 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Rocky Lake percent canopy cover	66	≥ 20
Parks percent canopy cover	37	≥ 40
Percent of neighbourhood in forest stands	65	65
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	95	50
Species that comprise more than 5% all street trees	7 (gray birch, red maple, red spruce, black spruce, poplar, white birch, pin cherry)	0
Genera that comprise more than 10% of all street trees	5 (birch, maple, spruce, poplar)	0
Acadian old-growth species that represent at least 1% of all street trees	2 (red spruce, eastern hemlock, white pine, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	269	0
Percent canopy cover of riparian and recharge zones	65	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	76	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Rocky Lake	980		Bedrock, anthropogenic, till veneer
Parks	9		Bedrock, till veneer

Socioeconomic Conditions

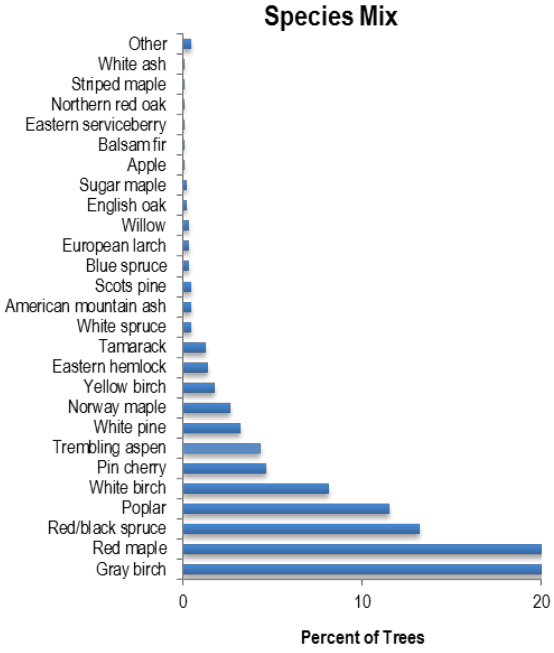
	Land Use	Zoning	Decade of Development
Rocky Lake	Industrial, residential	I-3, UR, ILI, IHI	1950s/2010s
Parks	Institutional	SI	1960s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	110
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	637 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	6 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, spruce, poplar
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	11
Additional Neighbourhood Treatments	
Collaborate with business owners in the Bedford Industrial Park and Bedford Commons regarding urban forest improvement opportunities.	

Sackville Business Park

The Sackville Business Park urban forest neighbourhood extends north from the junction of Highways 101 and 102, running as far west as Cobequid Road and just beyond Glendale Avenue in the north (Figure 104). The Park was developed in 1981 and today is home to more than 25 companies generally housed in large multi-unit buildings surrounded by paved surfaces. The Sackville Business Park has contrasting conditions in its urban forest. The business park is a neighbourhood division (shown in blue) with an inadequate canopy cover of 18%. The remaining area of peri-urban forest lands consists of stands of native Acadian forest and chiefly accounts for the neighbourhood's 65% canopy cover. Much of the neighbourhood's remaining urban forest is slated for future development, so appropriate management measures should be taken prior to development to achieve the area's 20% post-development canopy cover target. The Sackville Memorial Park (shown in light green) pond has no canopy cover. Special attention should be given to creating riparian protection for this area's only remaining water feature. The area's rich, drumlinoid soil presents a perfect opportunity for the fast growth of healthy trees. Cooperative tree planting efforts by business park landowners could significantly improve the urban forest in this neighbourhood.



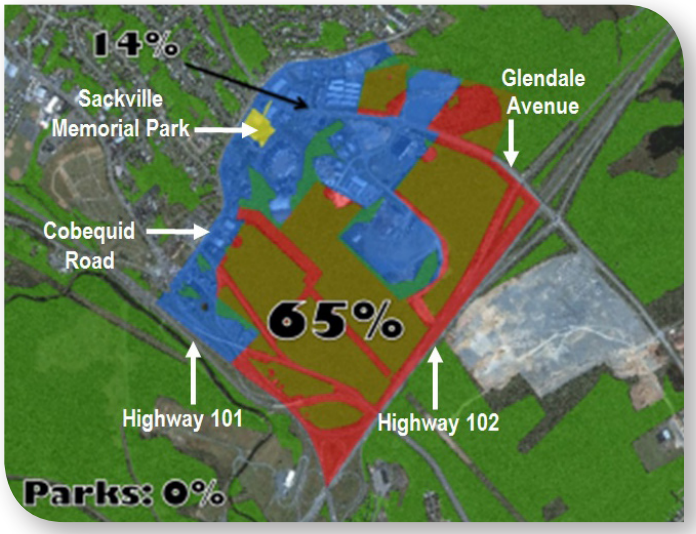
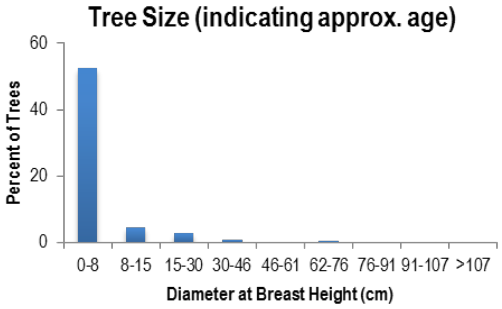


Figure 104



Challenges

- Parts of the neighbourhood are slated for development, so maintaining intact forest canopy will be a challenge as land is cleared, graded, and filled.
- The Sackville Business Park commercial division has very low canopy cover. The high degree of imperviousness and lack of plantable sites will make it a considerable challenge to improving the urban forest of the neighbourhood.
- There are few trees planted along the streets in the HRM rights of way.

Opportunities

- A post-development canopy cover of 20%, can be retained through cooperative planning and planting efforts with local landowners.
- There are 250 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Sackville Business Park percent canopy cover	65	≥ 20
Business Park percent canopy cover	14	≥
Parks percent canopy cover	0	≥ 40
Percent of neighbourhood in forest stands	43	43
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	95	50
Species that comprise more than 5% all street trees	7 (gray birch, red maple, red spruce, black spruce, poplar, white birch, pin cherry)	0
Genera that comprise more than 10% of all street trees	5 (birch, maple, spruce, poplar)	0
Acadian old-growth species that represent at least 1% of all street trees	2 (red spruce, eastern hemlock, white pine, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	250	0
Percent canopy cover of riparian and recharge zones	2	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	56	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Sackville Business Park	158		Till veneer, anthropogenic, drumlins
Business Park	64		Till veneer, anthropogenic, drumlins
Parks	1		Till veneer, drumlins

Socioeconomic Conditions

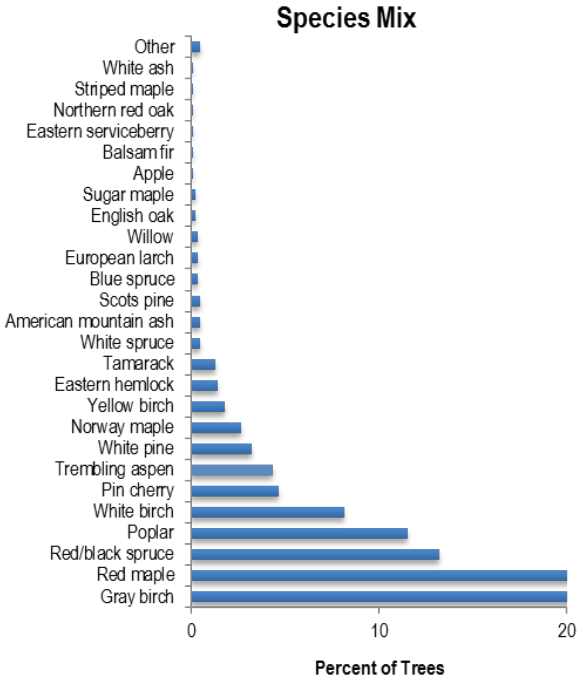
	Land Use	Zoning	Decade of Development
Sackville Business Park	Commercial	BP, BP-1	1980s
Business Park	Commercial, institutional	BP	1980s
Parks	Park	P-2	1980s

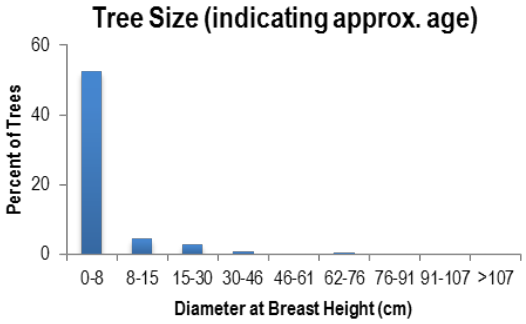
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	100
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	68 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	6 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, spruce, poplar
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	10
Additional Neighbourhood Treatments	
Collaborate with business owners in the Sackville Business Park regarding urban forest improvement opportunities.	

Sackville Heights

Sackville Heights is an established urban forest residential neighbourhood that lies near the centre of the Sackville community. The area still reflects the rural heritage and charm of a bygone era. It is bound in the north by Sackville Drive and in the south by the Old Sackville Road (Figure 105). The western reaches of this neighbourhood consist of moderate sized lots with a mix of multi and single-family housing, while the eastern portion's large lot settlement pattern features a lower housing density. With a 37% canopy cover, Sackville Heights is a comparatively well forested neighbourhood; however, the junior high school grounds have few trees and limited canopy. A key feature in the neighbourhood's canopy that merits preservation is a small native forest stand south of Sackville Heights Junior High. The areas' rich drumlinoid soil presents a perfect opportunity for the fast growth of healthy trees. Cooperative tree planting efforts by local residents and school groups could dramatically improve the urban forest in this neighbourhood.





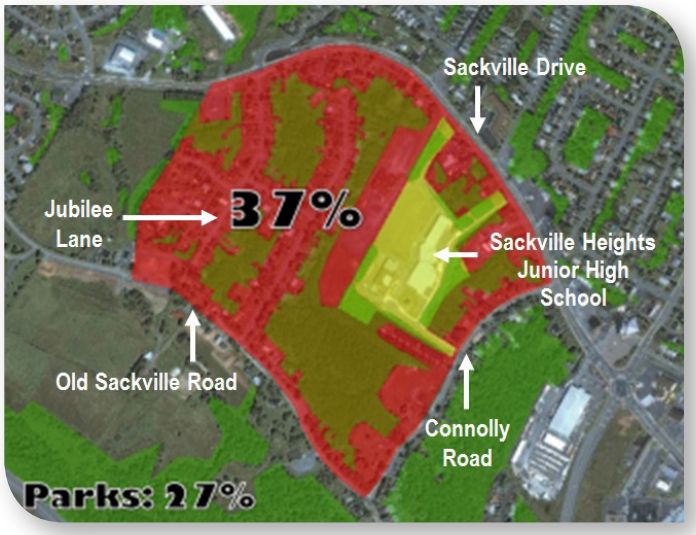


Figure 105

Challenges

- The canopy cover in neighbourhood school grounds and parks is low, with none that are adequately shaded.
- A vulnerable forest stand south of Sackville Heights Junior High contains most of the neighbourhood's canopy cover.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 37%-70%.
- There are 55 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Sackville Heights percent canopy cover	37	≥ 70
Parks percent canopy cover	27	≥ 40
Percent of neighbourhood in forest stands	35	36
Percent of trees within the smallest size class	86	≥ 10
Percent of street trees that are native	95	50
Species that comprise more than 5% all street trees	7 (gray birch, red maple, red spruce, black spruce, poplar, white birch, pin cherry)	0
Genera that comprise more than 10% of all street trees	5 (birch, maple, spruce, poplar)	0
Acadian old-growth species that represent at least 1% of all street trees	2 (red spruce, eastern hemlock, white pine, yellow birch)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	98	100
Number of plantable sites in HRM rights of way	55	0
Percent canopy cover of riparian and recharge zones	18	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	61	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Sackville Heights	35		Drumlins
Parks	4		Drumlins

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Sackville Heights	Multi-family residential	R-2	1950s/1960s
Parks	Park	P-2	1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	20
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Area of naturalized forest stands not to fall below	12 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	1 (sugar maple, red oak)
Refrain from planting the following genera until 2020	Birch, maple, spruce, poplar
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	2

Sackville Manor

The Sackville Manor urban forest neighbourhood is bordered by Highway 101 in the north and the Sackville River in the southwest (Figure 106). The privately owned development features a few hundred mobile homes on compact lots. Although the area has a canopy cover of 46%, nearly all of this is found in the adjacent hinterland forest and treed buffer strip along Highway 101. There are very few trees on lots, and no HRM-controlled rights of way, or parks within the neighbourhood. As such, discussions with HRM, the property owner, and residents about the benefits of the urban forest and ways to improve it will be the best possible urban forest management opportunity for this neighbourhood.

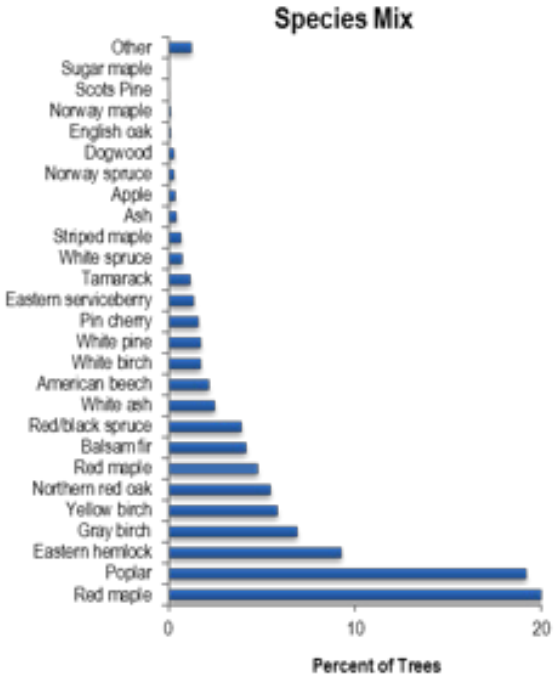
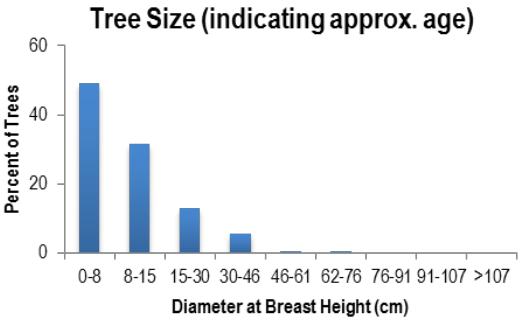


Figure 106



Challenges

- There are few trees on existing mobile home lots.
- There are a limited number of HRM-controlled rights of way.
- There are stresses associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts, environmental contamination, illegal dumping, tree-cutting, and invasive species.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 46%-70%.
- Local groups will be organized to meet with HRM to discuss urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Sackville Manor percent canopy cover	46	≥ 70
Percent of neighbourhood in forest stands	45	45
Percent of trees within the smallest size class	49	≥ 10
Percent of street trees that are native	97	50
Species that comprise more than 5% all street trees	4 (red maple, poplar, eastern hemlock, gray birch)	0
Genera that comprise more than 10% of all street trees	4 (maple, poplar, hemlock, birch)	0
Acadian old-growth species that represent at least 1% of all street trees	5 (red spruce, eastern hemlock, white pine, yellow birch, red oak)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites along private roadways	232	0
Percent canopy cover of riparian and recharge zones	99	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	50	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Sackville Manor	32		Drumlins

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Sackville Manor	Residential	R-6, R-1	1950s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant along private roadways per decade	90
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	14 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	6 (sugar maple)
Refrain from planting the following genera until 2020	Maple, poplar, hemlock, birch
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Maintain and enhance the ribbon pattern along Highway 101 and collaborate with the Nova Scotia Department of Transportation and Infrastructure Renewal.	

A-10 SPRYFIELD

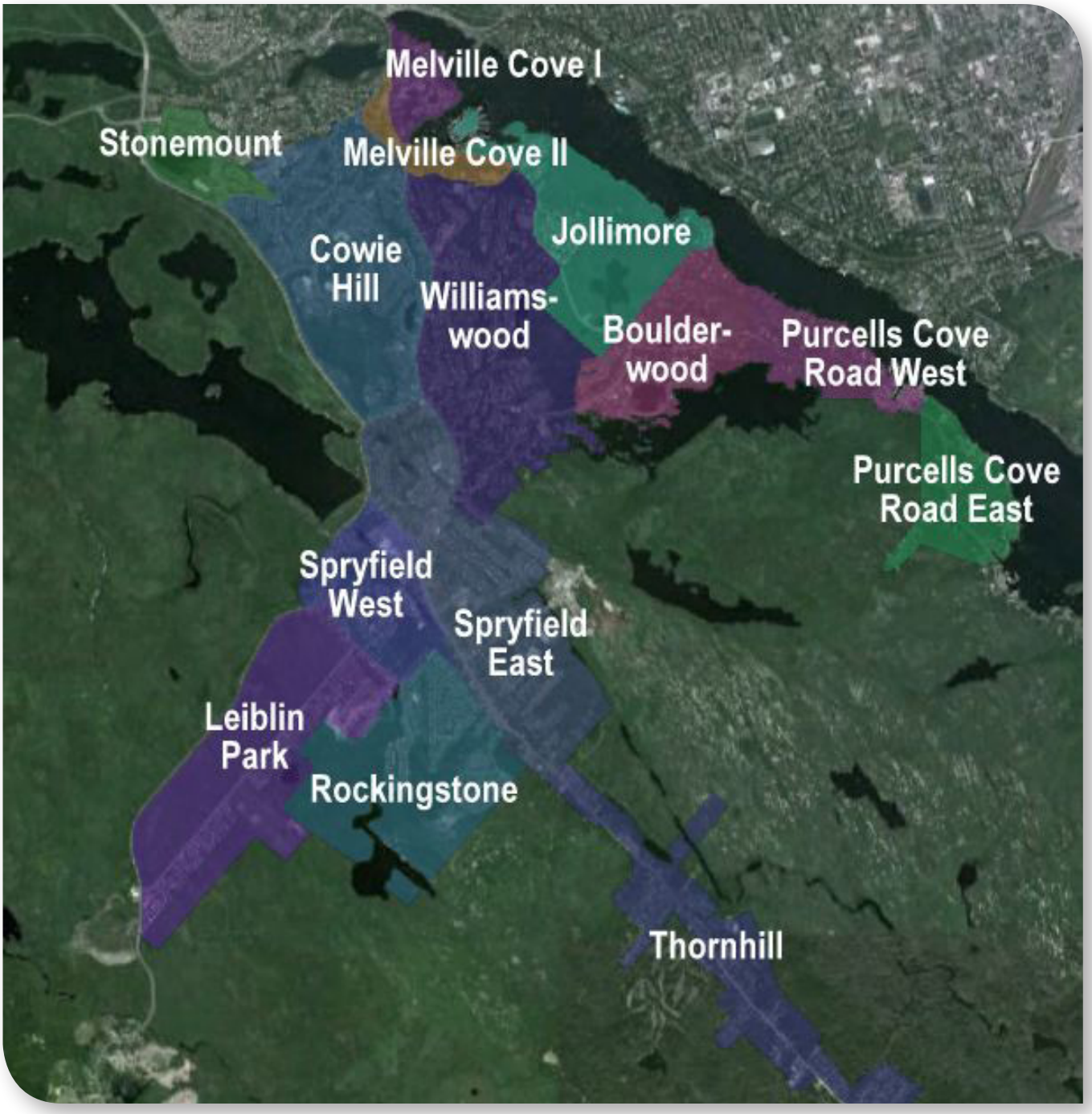
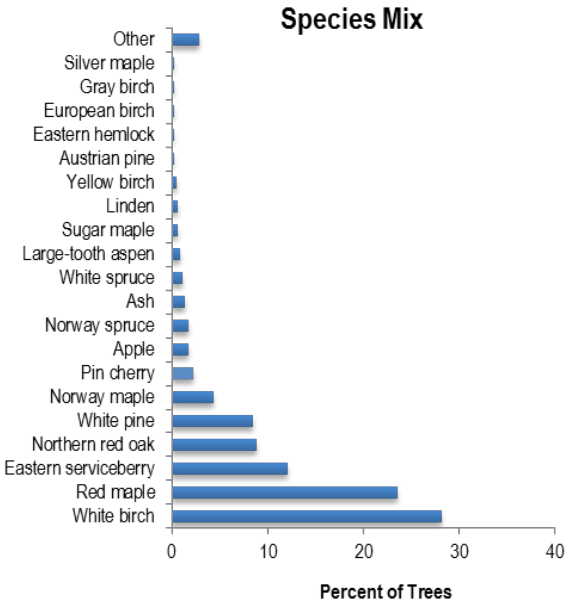


Figure 107

Boulderwood

The Boulderwood urban forest has one of the highest canopy covers among Spryfield's residential neighbourhoods, at 50% (shown in red), with canopy cover in parks (shown in light green) at 69% (Figure 108). This is an impressive figure, as this neighbourhood is somewhat denser than other neighbourhoods along Purcells Cove Road; however, there is still room on private residential properties and in HRM-controlled rights of way to plant more trees. The Williams Lake shoreline is a significant feature of this neighbourhood, and is a key opportunity for improving the Boulderwood urban forest, as the riparian areas in the lake's complex shoreline and the many wetlands along its shores have poor canopy cover. The impressive canopy of Sir Sandford Fleming Park provides a strong urban forest belt pattern for the neighbourhood.



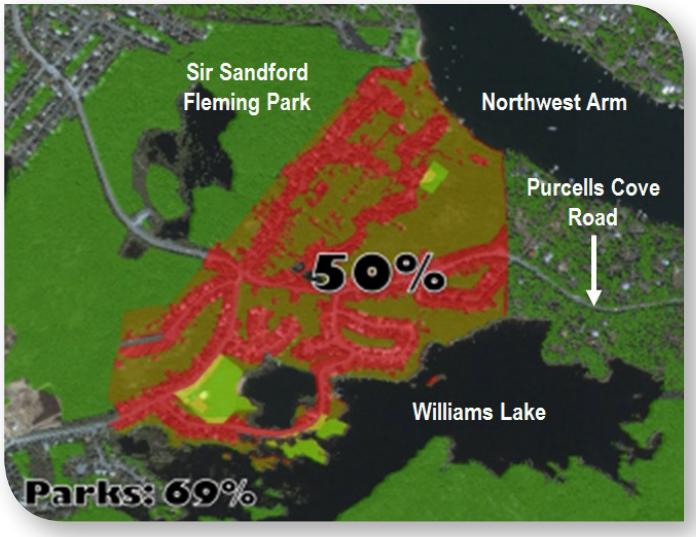
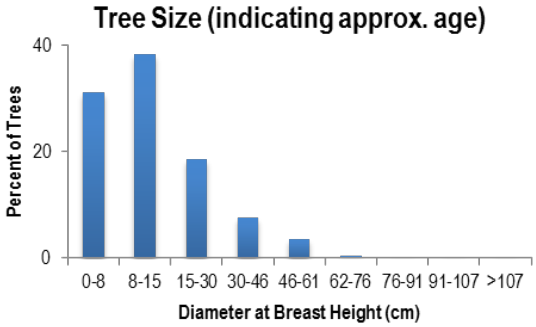


Figure 108



Challenges

- Riparian areas along the northern shore of Williams Lake are generally developed for residential land uses. The edges of the lake's many contiguous wetlands are also largely developed.
- This region is characterized by shallow, poorly drained soils overlying bedrock, with many exposed bedrock ridges. The spruce forest covering most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- There are 211 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential stakeholders will be organized to work with HRM to achieve urban forest targets.
- Williams Lake will benefit from increased canopy cover.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Boulderwood percent canopy cover	50	≥ 70
Parks percent canopy cover	69	≥ 90
Percent of neighbourhood in forest stands	13	14
Percent of trees within the smallest size class	31	≥ 10
Percent of street trees that are native	87	50
Number of species that comprise more than 5% of all street trees	3 (white birch, red maple, eastern serviceberry)	0
Number of genera that comprise more than 10% of all street trees	3 (birch, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	211	0
Percent canopy cover of riparian and recharge zones	56	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	80	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Boulderwood	61		Bedrock
Parks	3		Bedrock

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Boulderwood	Residential	R-1	1860s/1990s
Parks	Residential	P	

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	85
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Area of naturalized forest stands not to fall below	8 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	6 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Birch, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Increase canopy cover in the Williams Lake riparian zones.	

Cowie Hill

The Cowie Hill urban forest neighbourhood generally features a mix of single- and multi-family residential dwellings. It extends south from Osborne Street to Old Sambro Road and is bounded in the west by Northwest Arm Drive and in the east by Herring Cove Road (Figure 109). Robert Cowie, the neighbourhood's namesake, was granted the land by Governor Cornwallis in 1752. A key division is the Cowie Hill townhouse condominium development dating from the early 1970s (shown in blue). The canopy cover here is particularly low at just 11%, with few trees on residential lots and on HRM rights of way. However, there are some good localized examples of tree-lined streets that have flourished. The townhouse division is serviced with underground utility lines and provides an ideal environment for the growth of exceptional trees. Older single-family residential properties in the north end of Cowie Hill generally have good backyard canopy coverage; however, there are few front-yard trees and limited numbers of street trees. Although the Cowie Hill urban forest neighbourhood has a commendable overall canopy cover of 44%, it owes much of this to a currently undeveloped forest stand at its southern edge. The neighbourhood benefits from Long Lake Provincial Park, located along its western boundary and forming a strong urban forest wedge pattern connecting the neighbourhood to the hinterland forest.

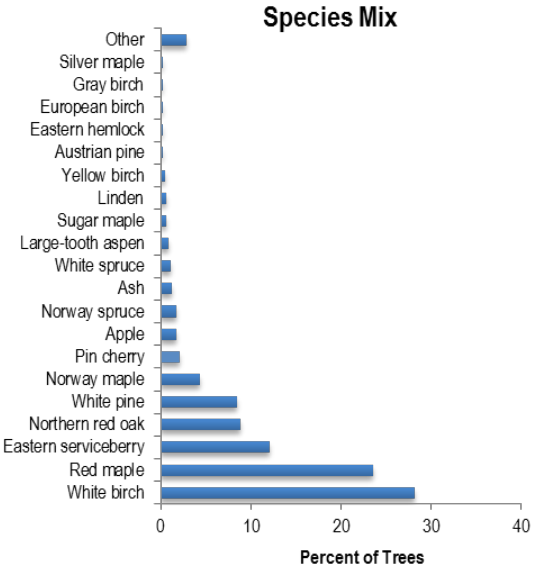
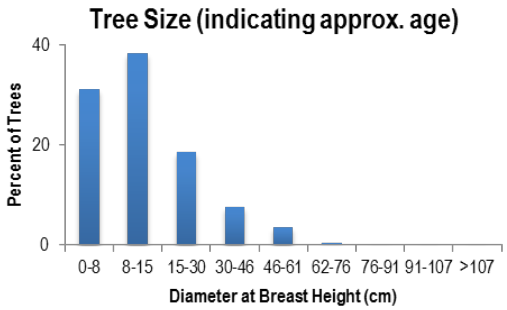


Figure 109



Challenges

- This region is characterized by shallow, poorly drained soils overlying bedrock, with many exposed bedrock ridges. The spruce forest covering most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.
- The townhouse division has a low canopy cover.
- As parts of the neighbourhood are slated for development, maintaining intact forest canopy will be a challenge as land is cleared, graded, and filled.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 44% to 70%.
- There are 492 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Cowie Hill percent canopy cover	44	≥ 70
Hilltop percent canopy cover	11	≥ 40
Parks percent canopy cover	34	≥ 40
Percent of neighbourhood in forest stands	19	20
Percent of trees within the smallest size class	31	≥ 10
Percent of street trees that are native	87	50
Number of species that comprise more than 5% of all street trees	3 (white birch, red maple, eastern serviceberry)	0
Number of genera that comprise more than 10% of all street trees	3 (birch, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	492	0
Percent canopy cover of riparian and recharge zones	49	100
Percent of public play areas that are adequately shaded (40% canopy cover)	43	100
Percent of residential properties with at least one value tree	74	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Cowie Hill percent canopy cover	132		Bedrock
Hilltop percent canopy cover	25		Bedrock
Parks percent canopy cover	9		Bedrock

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Cowie Hill percent canopy cover	Residential	RDD, R-2, R-2P	1940s
Hilltop percent canopy cover	Multi-family residential	R-4	1960s
Parks percent canopy cover	Residential, park	R-1, P	1960s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	200
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Area of naturalized forest stands not to fall below	25 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	15 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Birch, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Collaborate with Cowie Hill condominium corporations regarding urban forest improvement opportunities.	

Jollimore

Located between Purcells Cove Road and the western shore of the Northwest Arm, Jollimore is a beautiful, mostly single-family residential urban forest neighbourhood nestled beside the iconic Sir Sandford Fleming Park (Figure 110). The park occupies more than half the neighbourhood and has an impressive canopy cover of 69% (shown in light green). The Park has an extensively forested shoreline that provides riparian protection along the Northwest Arm. Jollimore's residential properties also have a remarkable canopy cover of 50% (shown in red). Melville Island, the current location of the Armdale Yacht Club, has a storied history as the site of a former military prison. This area is now largely paved and features few trees. The park forms a major urban forest belt pattern, and its western edges could provide connectivity with Williams Lake and the urban forest wedge pattern formed by the Purcells Cove Backlands to the south.

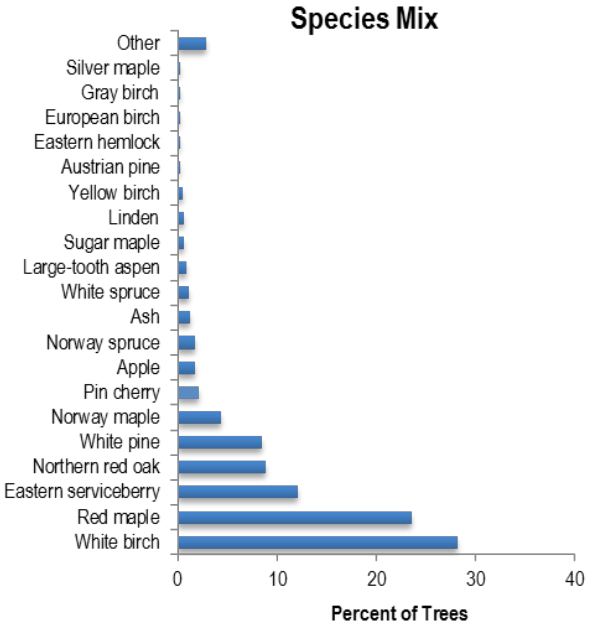
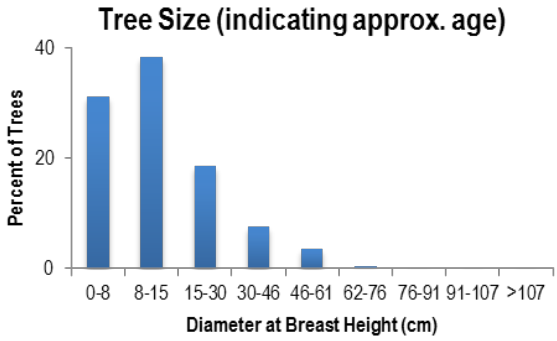


Figure 110



Challenges

- Melville Island has very low canopy cover. The high degree of imperviousness and lack of plantable sites pose considerable challenges to improving the island's canopy cover.
- This region is characterized by shallow, poorly drained soils overlying bedrock, with many exposed bedrock ridges. The spruce forest covering most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development. Wildfire also poses a potential risk.

Opportunities

- There is an opportunity to improve urban forest connectivity between Sir Sandford Fleming Park, Williams Lake, and the Purcells Cove Backlands urban forest wedge pattern.
- There are 180 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing neighbourhood stakeholders and the yacht club will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Jollimore percent canopy cover	30	≥ 70
Parks percent canopy cover	77	≥ 90
Percent of neighbourhood in forest stands	50	57
Percent of trees within the smallest size class	31	≥ 10
Percent of street trees that are native	87	50
Number of species that comprise more than 5% of all street trees	3 (white birch, red maple, eastern serviceberry)	0
Number of genera that comprise more than 10% of all street trees	3 (birch, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	180	0
Percent canopy cover of riparian and recharge zones	70	100
Percent of public play areas that are adequately shaded (40% canopy cover)	75	100
Percent of residential properties with at least one value tree	74	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Jollimore	81		Bedrock
Parks	52		Bedrock

Socioeconomic Conditions

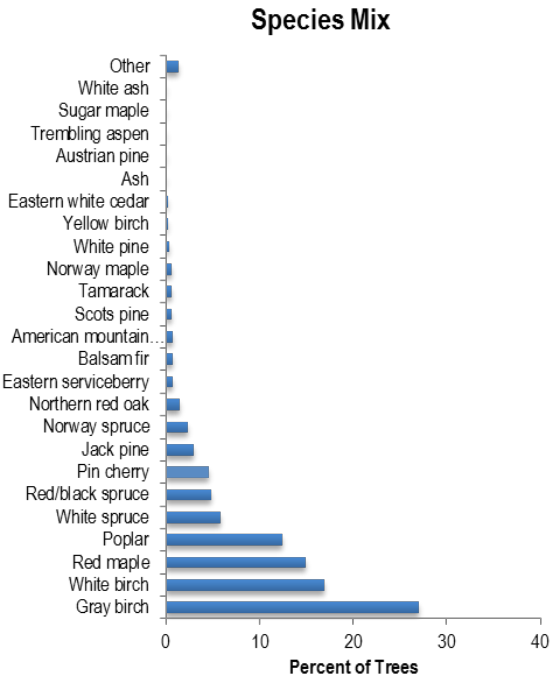
	Land Use	Zoning	Decade of Development
Jollimore	Residential	R-1, RDD	1860s/1950s
Parks	Park	P	1910s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	70
Area of naturalized forest stands to be created on HRM lands per decade	7 ha
Area of naturalized forest stands not to fall below	41 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	5 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Birch, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Increase urban forest connectivity between Sir Sandford Fleming Park and Williams Lake.	
Increase canopy cover and riparian areas in and around the Armdale Yacht Club.	

Leiblin Park

The Leiblin Park urban forest neighbourhood contains a unique, linear, single-family residential development (shown in blue) dating from the 1950s that extends along the eastern side of Lieblin Drive (Figure 111). Kidston Estates (shown in blue) is a new single-family residential subdivision located in the northeast corner of the neighbourhood. The area's overall 86% canopy cover is dominated by large patches of undeveloped native forest (shown in dark green) west and southeast of Lieblin Drive. Although the area's native forest provides exceptional benefits, Lieblin Park's streets and residential properties are largely devoid of trees and have a total canopy cover of just 13%. The low canopy cover of Graves Oakley Memorial Park (shown in light green) is also a concern. The aesthetic quality of Lieblin Park has been compromised by its low number of trees, but significant improvements can be achieved through a comprehensive effort to re-forest its streets, parks, and residential properties.



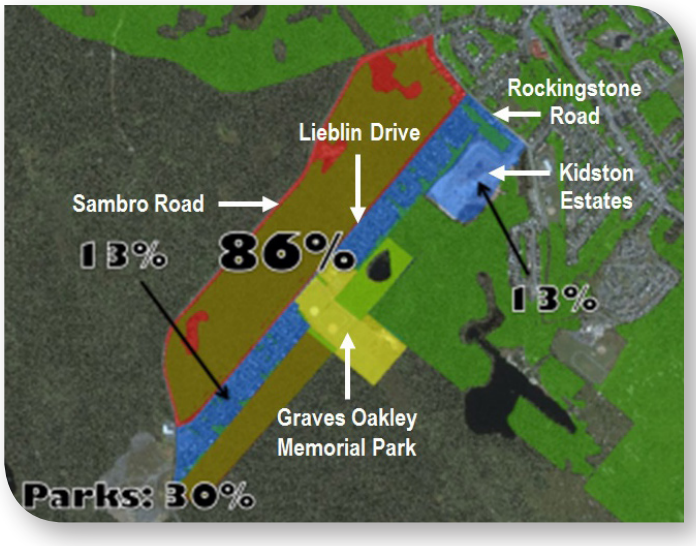
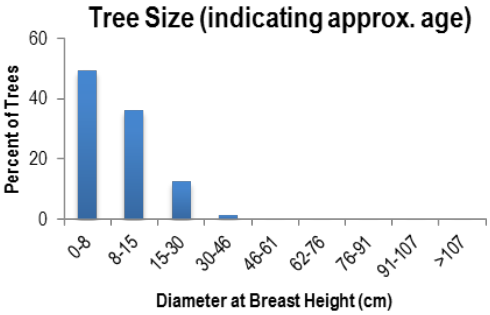


Figure 111



Challenges

- There are few trees on private residential lots.
- New development could significantly reduce this area's canopy cover.
- There are stresses associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts, environmental contamination, illegal dumping, tree-cutting, and invasive species.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy in parks from 30% to 40%.
- There are 1,000 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Leiblin Park percent canopy cover	86	≥ 70
Leiblin Drive percent canopy cover	13	≥ 70
Grindstone Drive percent canopy cover	13	≥ 70
Parks percent canopy cover	30	≥ 40
Percent of neighbourhood in forest stands	54	56
Percent of trees within the smallest size class	50	≥ 10
Percent of street trees that are native	95	50
Number of species that comprise more than 5% of all street trees	6 (gray birch, white birch, red maple, poplars, red spruce, black spruce)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, maple, poplar, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	1 (red spruce)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	1,000	0
Percent canopy cover of riparian and recharge zones	68	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	36	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Leiblin Park	132		Till veneer, drumlins
Leiblin Drive	24		Till veneer, drumlins
Grindstone Drive	11		Till veneer
Parks	16		Anthropogenic, till veneer

Socioeconomic Conditions

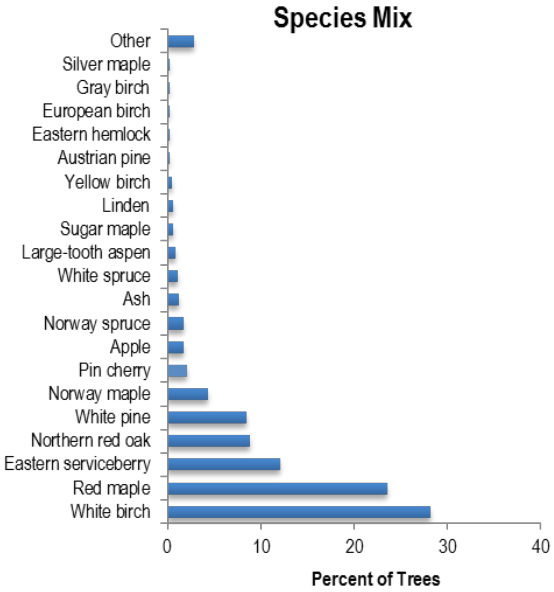
	Land Use	Zoning	Decade of Development
Leiblin Park	Park	RPK, H	1950s
Leiblin Drive	Residential	R-2	1950s
Grindstone Drive	Residential	R-1	2000s
Parks	Park	P	1980s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	400
Area of naturalized forest stands to be created on HRM lands per decade	2 ha
Area of naturalized forest stands not to fall below	71 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	60 (eastern hemlock, white pine, sugar maple, yellow birch, red oak)
Refrain from planting the following genera until 2020	Birch, maple, poplar, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	7

Melville Cove I

This attractive urban forest neighbourhood, with its distinctive tall white pines, is located on the western shores of the Northwest Arm (Figure 112). It extends south from the Armdale Roundabout along Herring Cove Road and Purcells Cove Road to Melville Cove. Despite an impressive number of mature white pines, the 26% canopy cover in Melville Cove I is fairly low for a residential urban forest neighbourhood. This is likely due to it being a high-density residential neighbourhood with multi-family residential complexes, which is also why the neighbourhood has a small proportion of area in forest stands. Park canopy cover is similarly low at 22%, with inadequate shade in all parks. Much of the shoreline park is composed of infill material. Poor substrate and exposure to high winds present challenges to successful tree planting in this area; however, careful planting and maintenance could establish an urban forest ribbon pattern along the shore.



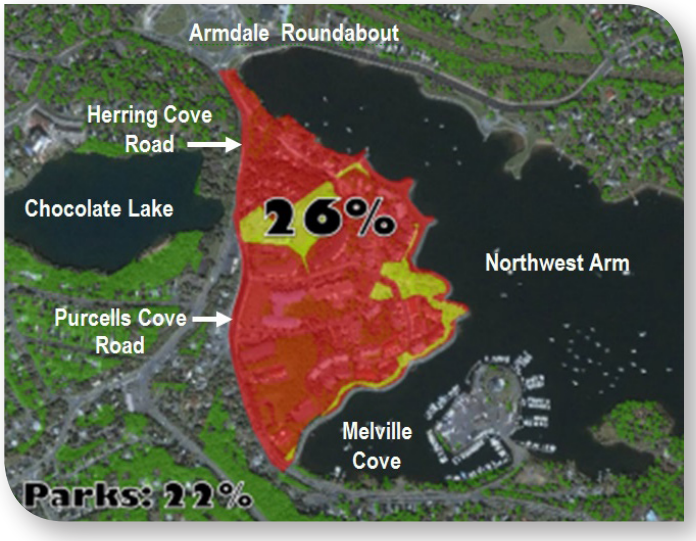
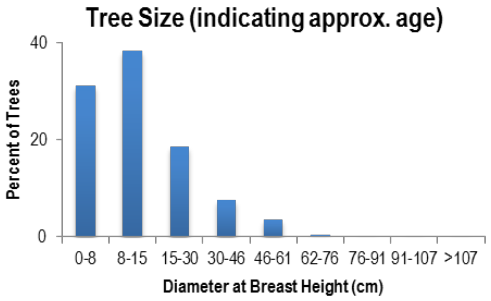


Figure 112



Challenges

- Some multi-family residential properties have too few trees.
- The neighbourhood's stately white pines are approaching the end of their lifespan.
- The anthropogenic shoreline features poor substrate and is exposed to high winds.

Opportunities

- A planned planting program can reintroduce white pines, produce a sustainable age and species distribution of trees, and increase overall canopy from 26% to 70%.
- There are 83 plantable sites for new street trees in this neighbourhood.
- Tree canopy in parks and along shorelines can be increased from 22% to 40%.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Melville Cove I percent canopy cover	26	≥ 70
Parks percent canopy cover	22	≥ 40
Percent of neighbourhood in forest stands	4	4
Percent of trees within the smallest size class	31	≥ 10
Percent of street trees that are native	87	50
Number of species that comprise more than 5% of all street trees	3 (white birch, red maple, eastern serviceberry)	0
Number of genera that comprise more than 10% of all street trees	3 (birch, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	83	0
Percent canopy cover of riparian and recharge zones	12	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	49	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Melville Cove I	19		Bedrock
Parks	2		Bedrock

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Melville Cove I	Residential	RDD, R-2	1890s/1990s
Parks	Park, residential	P, RDD	1930s/1990s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	35
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	1 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Birch, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Establish a program to enhance white pine replacement.	

Melville Cove II

This unique residential urban forest neighbourhood is on a steep slope overlooking Melville Cove, between Purcells Cove Road and Herring Cove Road (Figure 113). At 32% canopy cover (shown in red), the Melville Cove II urban forest is fairly well established, especially in the small wooded area in the centre of the neighbourhood. Several commercial properties on Purcells Cove Road and Herring Cove Road lack trees. These sites are extensively paved and would benefit from planting of street trees. The steep slope and thin soils over bedrock in this neighbourhood make the existing forest more vulnerable to disturbance and increase the importance of preventing soil erosion and stormwater runoff entering the Northwest Arm. Maintaining canopy here is critical.

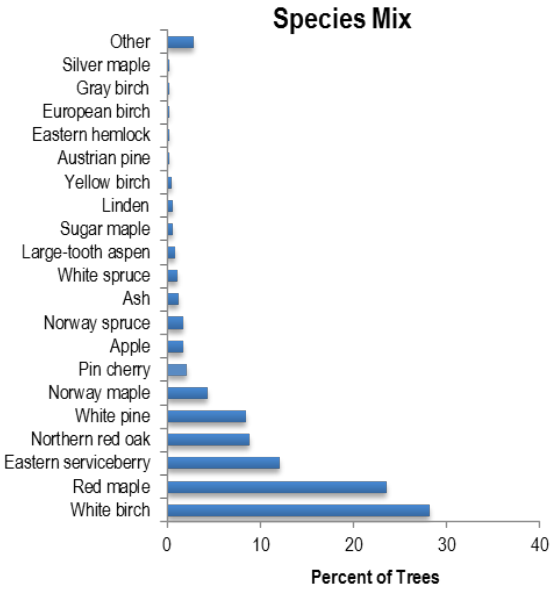
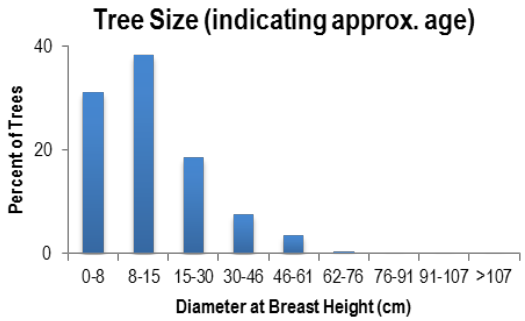


Figure 113



Challenges

- This neighbourhood has very steep slopes, making forests here more vulnerable to disturbance and soils vulnerable to erosion.
- The commercial strips in the northwest corner of the neighbourhood have low canopy cover and a high proportion of imperviousness.
- This region is characterized by shallow, poorly drained soils overlying bedrock, with many exposed bedrock ridges. The spruce forest covering most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 32% to 70%.
- There are 96 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Melville Cove II percent canopy cover	23	≥ 70
Parks percent canopy cover	32	≥ 40
Percent of neighbourhood in forest stands	0	0
Percent of trees within the smallest size class	31	≥ 10
Percent of street trees that are native	87	50
Number of species that comprise more than 5% of all street trees	3 (white birch, red maple, eastern serviceberry)	0
Number of genera that comprise more than 10% of all street trees	3 (birch, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	96	0
Percent canopy cover of riparian and recharge zones	N/A	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	72	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Melville Cove II	16		Bedrock
Parks	1		Bedrock

Socioeconomic Conditions

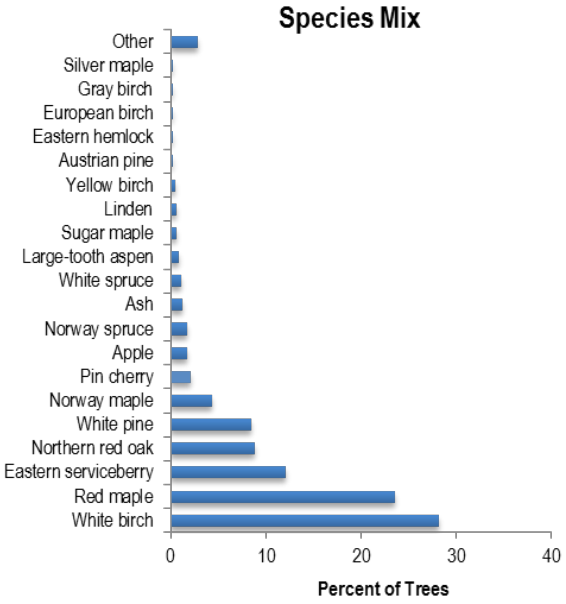
	Land Use	Zoning	Decade of Development
Melville Cove II	Residential	R-1, R-2	1940s
Parks	Residential	R-1	1990s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	40
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	N/A
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	3 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Birch, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0

Purcells Cove Road East

Samuel Purcell, this historic neighbourhood's namesake, first settled in the area in the early 19th century. Nature's regenerative powers are evident here as the area was extensively quarried in the mid-to-late 19th century. Bisected by Purcells Cove Road, the urban forest neighbourhood is situated on the western shore of the Northwest Arm and is bordered further west by a large swath of Crown land known as the Purcells Cove Backlands (Figure 114). The neighbourhood features a pleasant mix of single-family homes in a ribbon development pattern along Purcells Cove Road. The canopy cover (shown in red) on private residential lots appears low in this neighbourhood, at 37%. However, this percentage only reflects canopy on private lots. Overall, the urban neighbourhood canopy in this area is much higher. The region's steep and rugged bedrock terrain is composed of bedrock barrens and softwood forests found on coarse and shallow soils, characterized by species acclimated to the poor site conditions and exposure, such as black spruce, white pine, jack pine, and red maple. Street trees in the neighbourhood are rarely planted, and consist of early-successional trees and shrubs along forest edges that thrive in the abundance of light. The lone park (shown in light green) in Purcells Cove Road East has a low canopy cover of 7%. Riparian canopy cover is also low compared with other Spryfield neighbourhoods. The provincially owned Purcells Cove Backlands provide a valued break from further development in this area and should be preserved as an urban forest wedge pattern. Riparian cover along the shores of the Northwest Arm is limited; an urban forest ribbon pattern could be developed with additional plantings and natural regeneration.



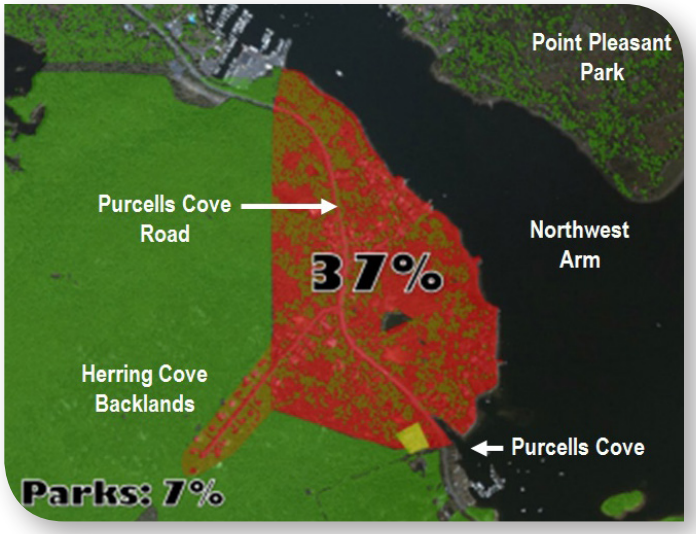
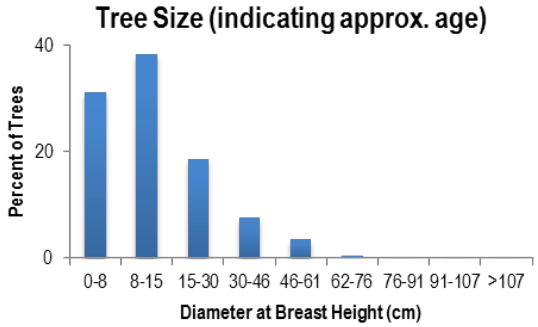


Figure 114



Challenges

- Infill development could reduce the urban forest canopy of this area.
- This region is characterized by shallow, poorly drained soils overlying bedrock, with many exposed bedrock ridges. The spruce forest covering most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development. Wildfire also poses a risk.

Opportunities

- There are 107 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Purcells Cove Road East percent canopy cover	37	≥ 70
Parks percent canopy cover	7	≥ 40
Percent of neighbourhood in forest stands	18	18
Percent of trees within the smallest size class	31	≥ 10
Percent of street trees that are native	87	50
Number of species that comprise more than 5% of all street trees	3 (white birch, red maple, eastern serviceberry)	0
Number of genera that comprise more than 10% of all street trees	3 (birch, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	107	0
Percent canopy cover of riparian and recharge zones	37	100
Percent of public play areas that are adequately shaded (40% canopy cover)	0	100
Percent of residential properties with at least one value tree	82	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Purcells Cove Road East	44		Bedrock
Parks	1		Bedrock

Socioeconomic Conditions

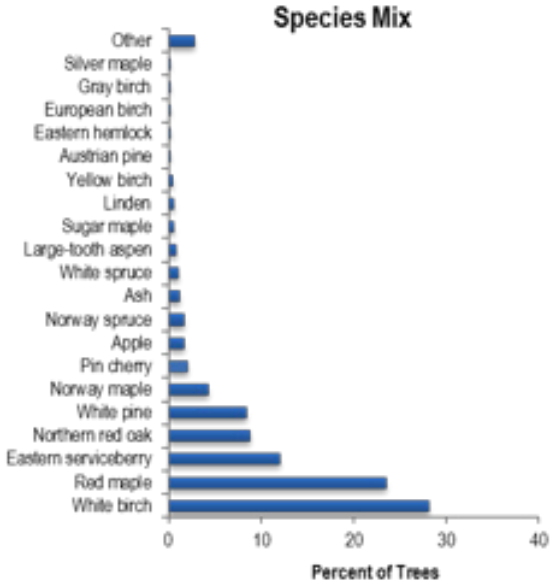
	Land Use	Zoning	Decade of Development
Purcells Cove Road East	Residential	H, UR	1960s
Parks	Residential	UR	1980s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	40
Area of naturalized forest stands to be created on HRM lands per decade	0
Area of naturalized forest stands not to fall below	8
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	3 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Birch, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0

Purcells Cove Road West

Bisected by Purcells Cove Road, this urban forest neighbourhood is situated on the western shore of the Northwest Arm and bordered further to the west by Williams Lake. A large band of Crown land known as the Purcells Cove Backlands extends in a southwesterly direction from the southern shores of Williams Lake (Figure 115). The neighbourhood features an attractive mix of single-family homes in suburban developments along both sides of Purcells Cove Road. The 43% canopy cover is notable, with a good number of well-treed residential properties. Although not a separate neighbourhood division, the Royal Nova Scotia Yacht Squadron (RNSYS) is mostly impervious, with few trees, and would benefit from increased riparian canopy cover. The neighbourhood's rocky terrain has black spruce, white pine, jack pine, and red maple forests growing in thin, granitic soils with scattered bedrock barrens. Vegetation bordering native forest edges along the Purcells Cove Road right of way is comprised of early-successional trees and shrubs that thrive in the abundance of light. The Crown-owned portions of the Purcells Cove Backlands form an urban forest wedge pattern that provides a buffer to development, and connectivity to large patches of native forest to the southwest.



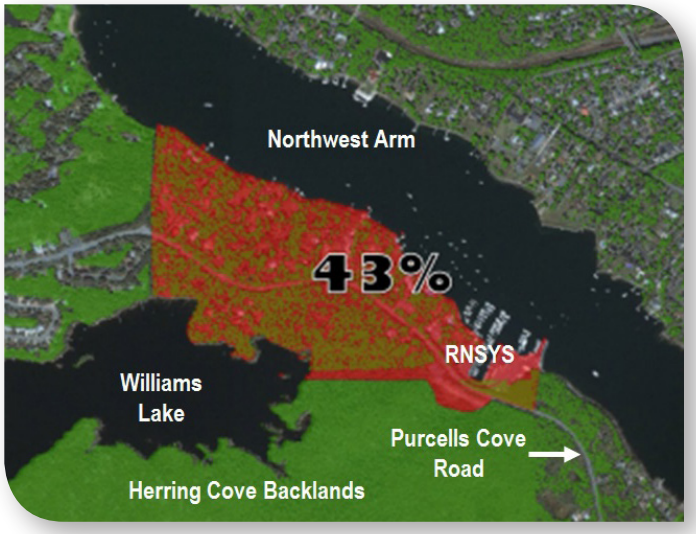
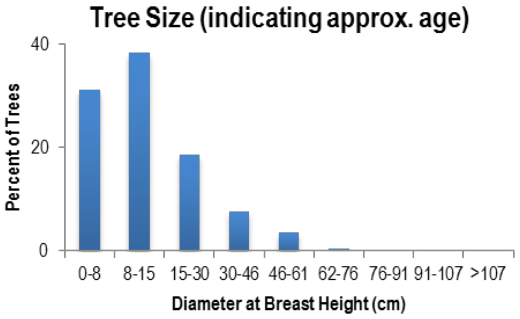


Figure 115



Challenges

- Infill development could reduce the urban forest canopy of this area.
- This region is characterized by shallow, poorly drained soils overlying bedrock, with many exposed bedrock ridges. The spruce forest covering most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development. Wildfire also poses a risk.

Opportunities

- There are 68 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing residential stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Purcells Cove Road West percent canopy cover	43	≥ 70
Percent of neighbourhood in forest stands	20	20
Percent of trees within the smallest size class	31	≥ 10
Percent of street trees that are native	87	50
Number of species that comprise more than 5% of all street trees	3 (white birch, red maple, eastern serviceberry)	0
Number of genera that comprise more than 10% of all street trees	3 (birch, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	68	0
Percent canopy cover of riparian and recharge zones	62	100
Percent of public play areas that are adequately shaded (40% canopy cover)	N/A	100
Percent of residential properties with at least one value tree	78	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Purcells Cove Road West	37		Bedrock

Socioeconomic Conditions

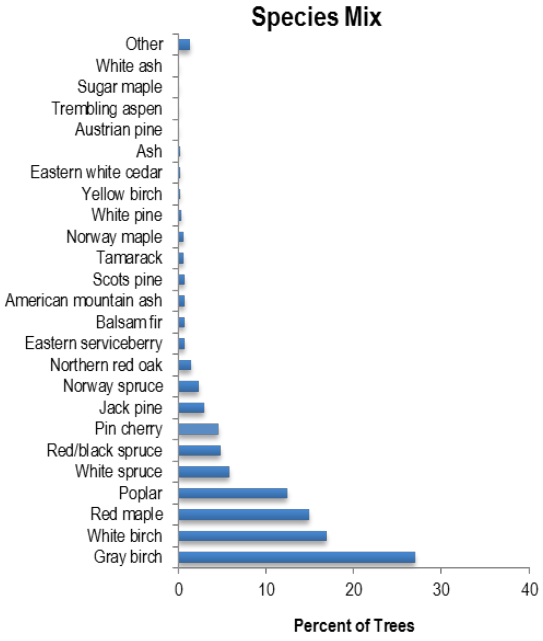
	Land Use	Zoning	Decade of Development
Purcells Cove Road West	Residential	H, UR, R-1	1850s/1980s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	30
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	7 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	2 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Birch, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Increase canopy cover and riparian areas in and around the Royal Nova Scotia Yacht Squadron.	

Rockingstone

Rockingstone is a residential urban forest neighbourhood with a mix of single-family homes in the north and multi-family residential complexes in the south (Figure 116). Its namesake is the Rocking Stone, a famed glacial erratic boulder located near Kidston Lake. The 60% canopy cover (shown in red) in Rockingstone is deceptive, as there are in fact three distinct patterns in the urban forest. The undeveloped hinterland forest in the southwest corner of the neighbourhood near Kidston Lake is responsible for most of the canopy. The second pattern is the residential area in the northern portion of the neighbourhood bounded by Adwell Avenue and Thornhill Drive with somewhat better canopy cover, mainly along property boundaries. Finally, residential properties adjacent to Lavender Walk have inadequate canopy cover, with few value trees on residential properties and a limited number of street trees. The low canopy cover of 27% in parks (shown in light green) and adjacent schools (Elizabeth Sutherland and Rockingstone Heights) are additional concerns to be addressed.



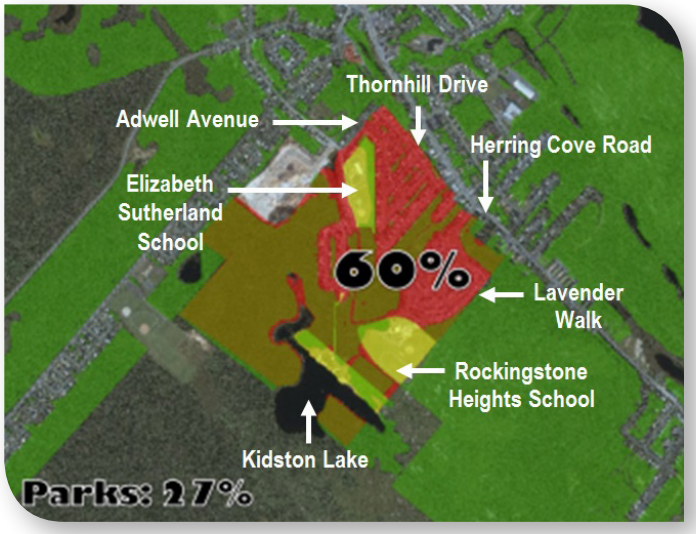
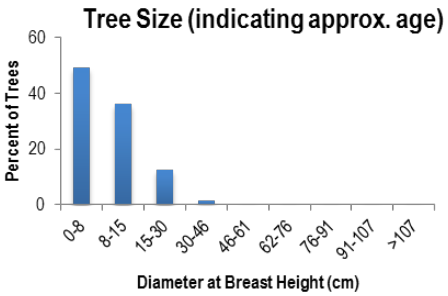


Figure 116



Challenges

- There are few trees in the vicinity of Lavender Walk, Rockingstone Heights School, and Elizabeth Sutherland School.
- Much of the neighbourhood's intact canopy is at risk from new development, which would substantially lower the canopy cover.
- This region is characterized by shallow, poorly drained soils overlying bedrock, with many exposed bedrock ridges. The spruce forest covering most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy in parks from 27% to 40%.
- There are 736 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Rockingstone percent canopy cover	60	≥ 70
Parks percent canopy cover	27	≥ 40
Percent of neighbourhood in forest stands	50	52
Percent of trees within the smallest size class	50	≥ 10
Percent of street trees that are native	95	50
Number of species that comprise more than 5% of all street trees	6 (gray birch, white birch, red maple, poplars, red spruce, black spruce)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, maple, poplar, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	1 (red spruce)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	736	0
Percent canopy cover of riparian and recharge zones	68	100
Percent of public play areas that are adequately shaded (40% canopy cover)	33	100
Percent of residential properties with at least one value tree	55	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Rockingstone	107		Bedrock, till veneer, drumlins
Parks	15		Anthropogenic, bedrock, drumlins

Socioeconomic Conditions

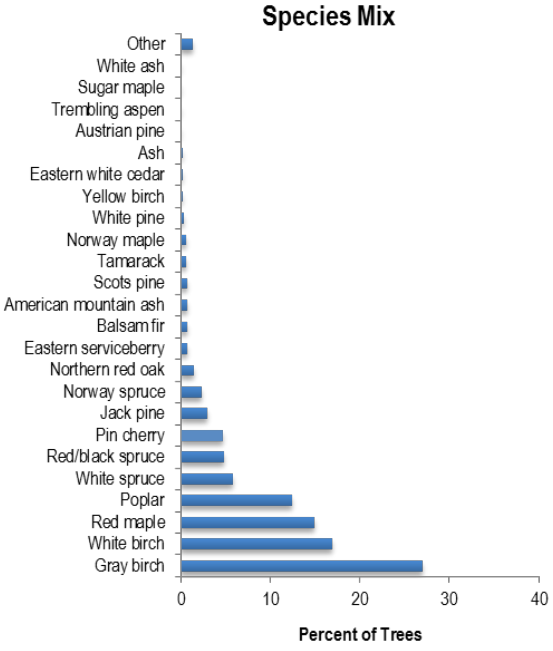
	Land Use	Zoning	Decade of Development
Rockingstone	Residential, multi-family residential	H, R-3, R-2, R-1	1960s/1990s
Parks	Park	P	

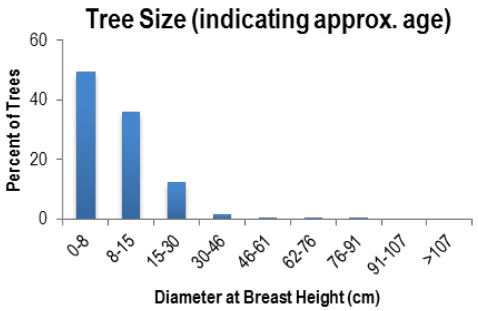
Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	300
Area of naturalized forest stands to be created on HRM lands per decade	2 ha
Area of naturalized forest stands not to fall below	54 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	45 (eastern hemlock, white pine, sugar maple, yellow birch, red oak)
Refrain from planting the following genera until 2020	Birch, maple, poplar, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	5

Spryfield East

The Spryfield East urban forest neighbourhood extends southeast from Old Sambro Road to McIntosh Street (Figure 117). Land uses are highly diverse, with single-family and multi-family residential areas, commercial divisions, parks, and schools. Spryfield East has a canopy cover of 37%, much of which is located in adjacent hinterland forest and in McIntosh Run Park. There are a limited number of trees on residential properties, especially in high-density sections. The commercial division on Herring Cove Road (shown in blue) features extensive pavement, presenting few opportunities to plant trees on private lots or on HRM rights of way. Increasing canopy cover beyond the current 5% in this division will be a challenge. In 2009, the area was exposed to a nearby wildfire that alerted many to the risks associated with living on the urban-wildland fringe. Vulnerability to fire and other forms of disturbance can be minimized through proper management of this peri-urban forest. The hinterland forest surrounding Colpit Lake currently forms a strong urban forest wedge pattern; however, future development could significantly diminish the environmental benefits of this area. Careful planning to establish extensive riparian protection for Colpit Lake and McIntosh Run will be critical to maintaining the ecological integrity of these local watercourses and the native forest.





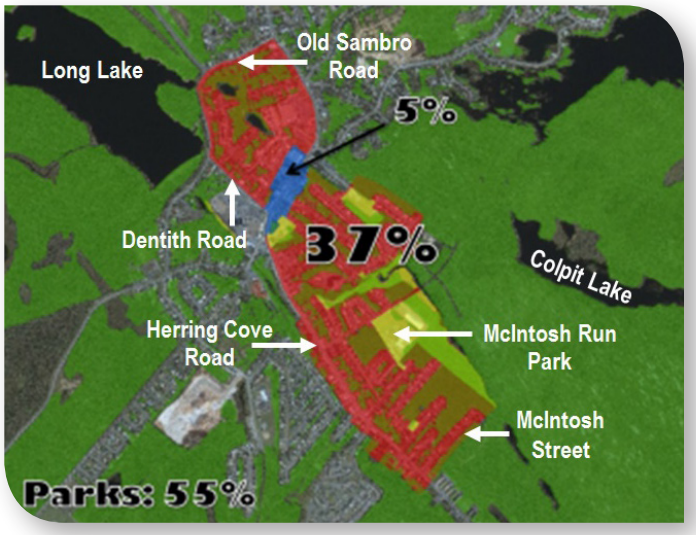


Figure 117

Challenges

- There are stresses associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts, environmental contamination, illegal dumping, tree-cutting, and invasive species.
- Spryfield East's commercial division has very low canopy cover. The high degree of imperviousness and lack of plantable sites will make it a considerable challenge to improve the urban forest in this division.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 37% to 70%.
- There are 185 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Spryfield East percent canopy cover	37	≥ 70
Herring Cove Road percent canopy cover	5	≥ 20
Parks percent canopy cover	55	≥ 40
Percent of neighbourhood in forest stands	16	16
Percent of trees within the smallest size class	50	≥ 10
Percent of street trees that are native	95	50
Number of species that comprise more than 5% of all street trees	6 (gray birch, white birch, red maple, poplars, red spruce, black spruce)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, maple, poplar, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	1 (red spruce)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	185	0
Percent canopy cover of riparian and recharge zones	63	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	69	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Spryfield East	135		Bedrock
Herring Cove Road	5		Bedrock
Parks	18		Bedrock

Socioeconomic Conditions

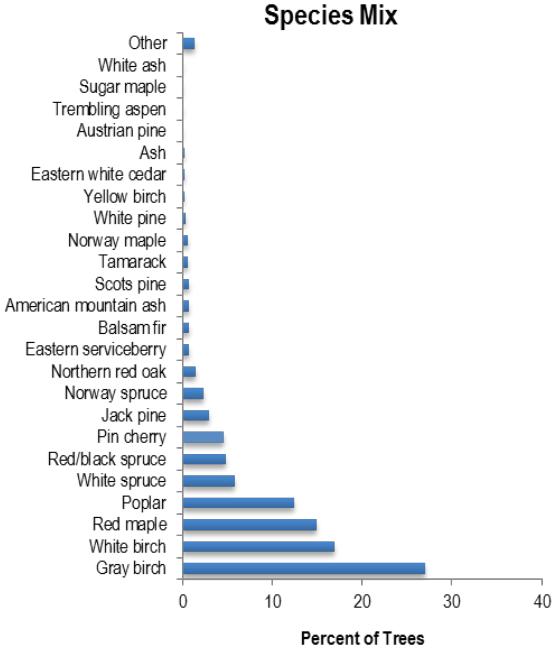
	Land Use	Zoning	Decade of Development
Spryfield East	Residential, multi-family residential	RDD, R-2P, R-4	1950s/1970s
Herring Cove Road	Commercial	C-2A	1970s
Parks	Park, residential	P, RDD	1970s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	75
Area of naturalized forest stands to be created on HRM lands per decade	0 ha
Area of naturalized forest stands not to fall below	22 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	5 (eastern hemlock, white pine, sugar maple, yellow birch, red oak)
Refrain from planting the following genera until 2020	Birch, maple, poplar, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Begin collaboration with business owners along Herring Cove Road on the urban forest and opportunities for improvement.	

Spryfield West

The Spryfield West urban forest neighbourhood is located due south of Long Lake Provincial Park (Figure 118). The McIntosh Run, Spryfield's iconic watercourse, meanders through this attractive and well-established neighbourhood. Most residents live in single-family homes, although there are some multi-family residences along Old Sambro Road and Herring Cove Road. Spryfield West has an overall canopy cover of 47% (shown in red), and a park canopy cover of 68% (shown in light green) most of which is located in McIntosh park. Although the McIntosh Run has some areas of adequate riparian cover, others require improvement. The South Centre Mall (shown in blue) has 0% canopy cover. This commercial division borders the McIntosh Run; stormwater runoff is a significant concern that could be mitigated by tree-planting. The McIntosh Run presents a good opportunity for the establishment of an urban forest ribbon pattern of riparian protection along the watercourse. The urban forest wedge pattern of Long Lake Provincial Park ensures the continuing presence of native forest cover to the north of the neighbourhood.



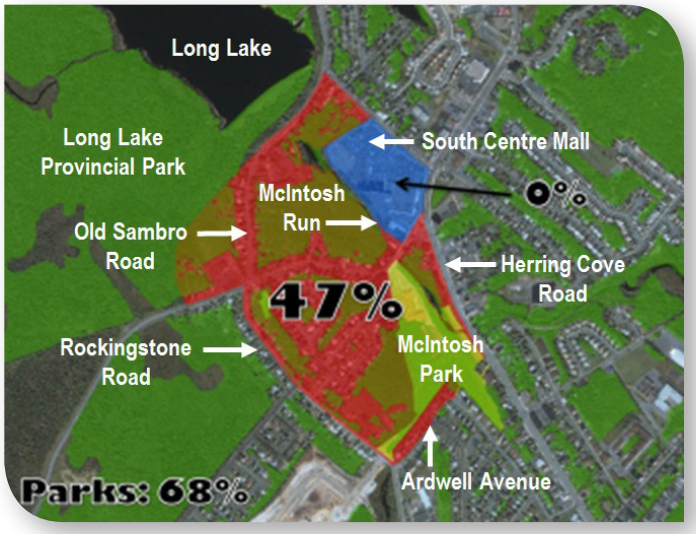
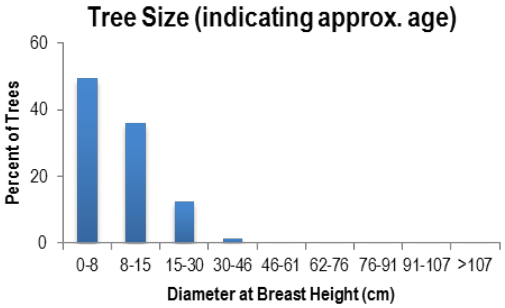


Figure 118



Challenges

- The South Centre Mall commercial division has no canopy cover, a high degree of imperviousness, and a lack of plantable sites.
- McIntosh Run is a key ecological and hydrological feature in southern mainland Halifax that is at risk from contaminated stormwater runoff and areas of poor riparian cover.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase South Centre Mall's canopy in from 0% to 20%.
- There are 455 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local resident and corporate groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Spryfield West percent canopy cover	47	≥ 70
Spryfield Mall percent canopy cover	0	≥ 20
Parks percent canopy cover	68	≥ 90
Percent of neighbourhood in forest stands	23	25
Percent of trees within the smallest size class	50	≥ 10
Percent of street trees that are native	95	50
Number of species that comprise more than 5% of all street trees	6 (gray birch, white birch, red maple, poplars, red spruce, black spruce)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, maple, poplar, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	1 (red spruce)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	455	0
Percent canopy cover of riparian and recharge zones	55	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	74	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Spryfield West	51		Drumlins, till veneer, bedrock
Spryfield Mall	6		Bedrock
Parks	7		Till veneer, bedrock

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Spryfield West	Residential, multi-family residential	R-2, R-1	1940s
Spryfield Mall	Commercial	C-2	1950s
Parks	Park	P	1980s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	180
Area of naturalized forest stands to be created on HRM lands per decade	2 ha
Area of naturalized forest stands not to fall below	12 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	25 (eastern hemlock, white pine, sugar maple, yellow birch, red oak)
Refrain from planting the following genera until 2020	Birch, maple, poplar, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	3
Additional Neighbourhood Treatments	
Develop an urban forest ribbon pattern by increasing the riparian canopy cover of the McIntosh Run.	
Cooperate with business owners and administrators in the South Centre Mall on the urban forest and opportunities for improvement.	

Stonemount

The relatively new single- and multi-family residential development of Stonemount is located in the upper northwest corner of the Spryfield urban forest community. It is generally bounded by St. Margarets Bay Road in the north, North West Arm Drive to the west, and Osborne Street to the south (Figure 119). This neighbourhood contains one of the more challenged urban forests in Spryfield, with a canopy cover of just 16% (shown in red). There are also many impervious areas surrounding the apartment complexes overlooking Hail Pond Park. The park itself is a redeeming feature of the neighbourhood's urban forest, with a canopy cover of 71% (shown in light green). The Hail Pond riparian area is therefore well forested compared with many other neighbourhoods' waterbodies in Spryfield. Although residential areas of this urban forest neighbourhood currently face challenges, there are many newly planted trees in HRM rights of ways and on residential properties, many of which are too young to be captured in the canopy cover calculations. It is likely that time and ongoing maintenance will restore some of the neighbourhood's urban forest. Although soils here are thin and coarse, offering poor growing conditions for urban trees, planting and maintenance techniques can be enhanced to ensure healthy growth. The key emphasis for urban forest improvement in Stonemount should be on improving the urban forest network pattern of street trees and encouraging local residents and apartment complex owners to plant additional trees on their properties.

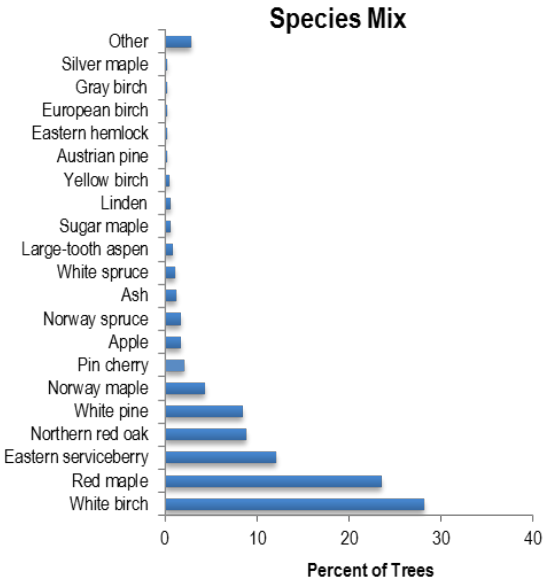
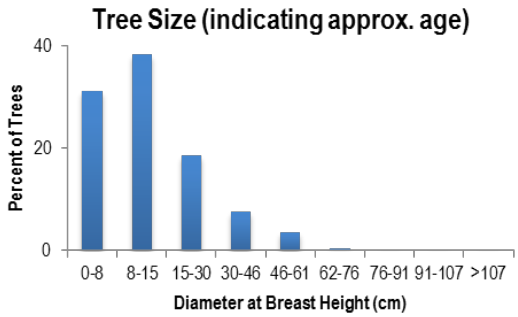


Figure 119



Challenges

- There are few trees on residential lots.
- This region is characterized by shallow, poorly drained soils overlying bedrock, with many exposed bedrock ridges. The spruce forest covering most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development. Wildfire also poses a risk.

Opportunities

- There are 108 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups representing neighbourhood stakeholders will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Stonemount percent canopy cover	16	≥ 70
Parks percent canopy cover	71	≥ 90
Percent of neighbourhood in forest stands	16	17
Percent of trees within the smallest size class	31	≥ 10
Percent of street trees that are native	87	50
Number of species that comprise more than 5% of all street trees	3 (white birch, red maple, eastern serviceberry)	0
Number of genera that comprise more than 10% of all street trees	3 (birch, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	108	0
Percent canopy cover of riparian and recharge zones	27	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	51	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Stonemount	23		Bedrock
Parks	5		Bedrock

Socioeconomic Conditions

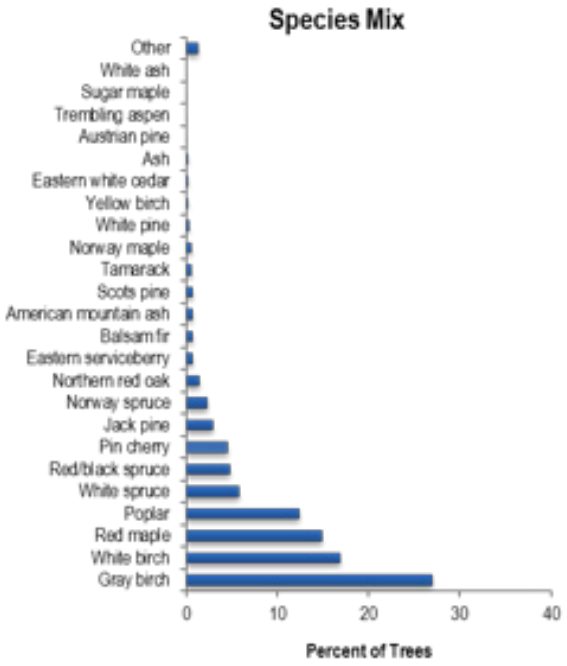
	Land Use	Zoning	Decade of Development
Stonemount	Residential	RDD	2000s
Parks	Residential	RDD	2000s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	45
Area of naturalized forest stands to be created on HRM lands per decade	1 ha
Area of naturalized forest stands not to fall below	4 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	3 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Birch, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0

Thornhill

The Thornhill urban forest neighbourhood is surrounded by beautiful and verdant forests. It stretches along both sides of Herring Cove Road to the most southeasterly extent of the Spryfield community (Figure 120). The area features a mix of single- and multi-family residential land uses, and its 47% canopy cover (shown in red) consists almost entirely of native stands of spruce and pioneer hardwoods bordering properties in the area. Heavily forested parkland (shown in light green) southeast of Roach's Pond has 75% canopy cover; however, the parkland's sports field and playground near Herring Cove Road have no canopy cover. Despite abundant hinterland forest to the west and east of this neighbourhood, residential properties generally contain few trees. With the exception of Herring Cove Road, there are ample planting opportunities on HRM-controlled rights of way, and cooperative efforts with local residents could improve canopy cover on private properties. Thornhill's close proximity to forested lands should also be considered with regard to wildfire risks.



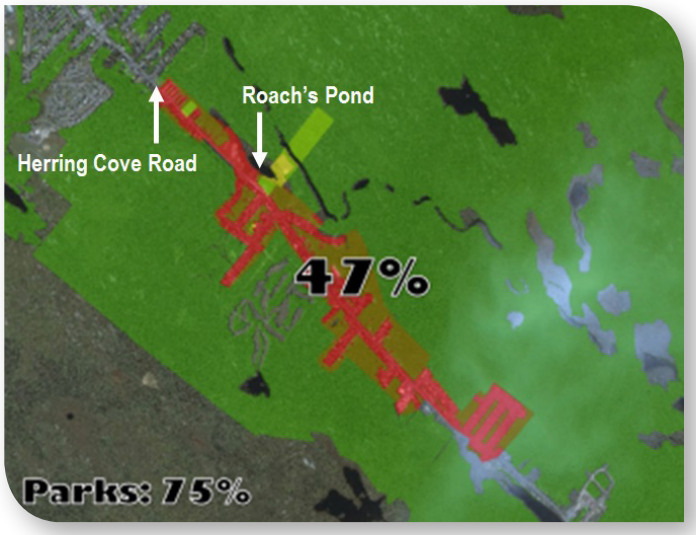
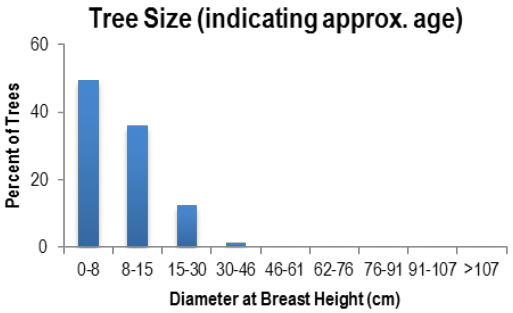


Figure 120



Challenges

- There are few opportunities for planting street trees on most of Herring Cove Road.
- Many residential properties have front yards without trees.
- There are stresses associated with the suburban/forest fringe such as wildfire, storm blowdowns, wildlife conflicts, environmental contamination, illegal dumping, tree-cutting, and invasive species.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 47% to 70%.
- There are 913 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Thornhill percent canopy cover	47	≥ 70
Parks percent canopy cover	75	≥ 90
Percent of neighbourhood in forest stands	24	26
Percent of trees within the smallest size class	50	≥ 10
Percent of street trees that are native	95	50
Number of species that comprise more than 5% of all street trees	6 (gray birch, white birch, red maple, poplars, red spruce, black spruce)	0
Number of genera that comprise more than 10% of all street trees	4 (birch, maple, poplar, spruce)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	1 (red spruce)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	99	100
Number of plantable sites in HRM rights of way	913	0
Percent canopy cover of riparian and recharge zones	49	100
Percent of public play areas that are adequately shaded (40% canopy cover)	100	100
Percent of residential properties with at least one value tree	77	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Thornhill	92		Till veneer, bedrock, drumlins
Parks	7		Bedrock

Socioeconomic Conditions

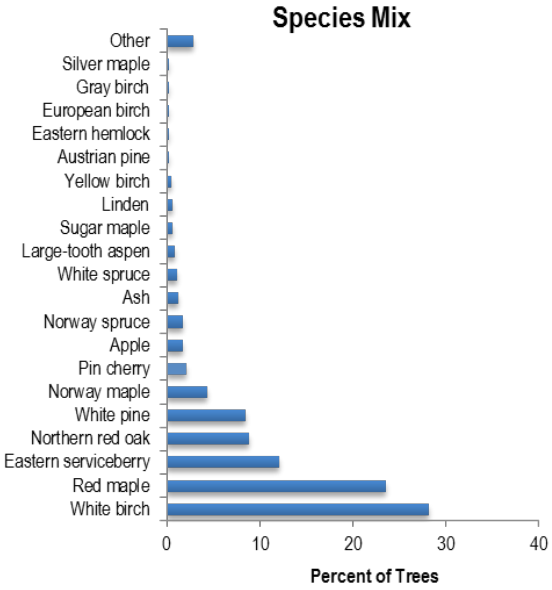
	Land Use	Zoning	Decade of Development
Thornhill	Residential	R-2	1960s
Parks	Park	P	1990s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	365
Area of naturalized forest stands to be created on HRM lands per decade	2 ha
Area of naturalized forest stands not to fall below	22 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	50 (eastern hemlock, white pine, sugar maple, yellow birch, red oak)
Refrain from planting the following genera until 2020	Birch, maple, poplar, spruce
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	6
Additional Neighbourhood Treatments	
Educate residents about best practices for improving the urban forest on their properties in ways that do not increase vulnerability to forest fire.	

Williamswood

The Williamswood urban forest neighbourhood is located west of Herring Cove Road and extends south from Melville Avenue to St. Michaels Avenue in the east and Birchview Drive in the west (Figure 121). This attractive neighbourhood is largely comprised of single-family homes with a limited number of institutional and multi-family residential land uses in its northern sectors. The area has a relatively high canopy cover of 33% (shown in red). Residential properties have good tree cover, but the street layout has left very few plantable sites in HRM-controlled rights of way. Meeting canopy targets in Williamswood will largely depend on the stewardship efforts of local residents. Williamswood benefits from an urban forest belt pattern provided by the native trees of Ravenscraig Drive Park and an urban forest wedge pattern of currently undeveloped lands south of Williams Lake.



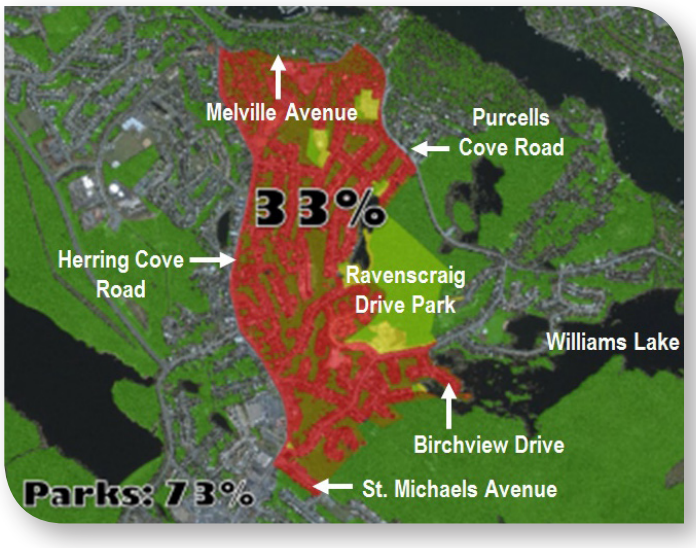
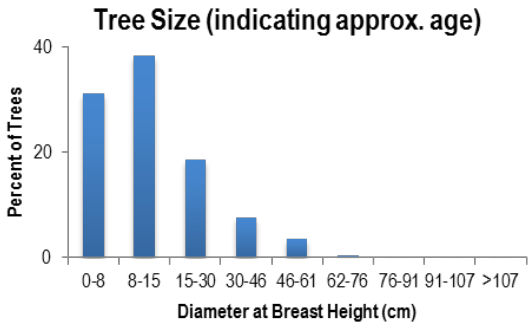


Figure 121



Challenges

- This region is characterized by shallow, poorly drained soils overlying bedrock, with many exposed bedrock ridges. The spruce forest covering most of this neighbourhood is easily disturbed by wind and storms when new forest edges are created during development.
- There are few opportunities for planting trees in HRM-controlled rights of way.
- Some waterfront lots and parkland on Williams Lake and Whimsical Lake have low levels of riparian canopy cover.

Opportunities

- A planned planting program will produce a sustainable age and species distribution of trees, and increase overall canopy from 33% to 70%.
- There are 348 plantable sites for new street trees in this neighbourhood.
- Land use policies and land use by-laws will be amended to ensure that there are improvements to canopy cover when new developments take place.
- Local groups will be organized to work with HRM to achieve urban forest targets.

Neighbourhood Indicators - Actual and Targets

Indicator	Actual	Target
Williamswood percent canopy cover	33	≥ 70
Parks percent canopy cover	73	≥ 90
Percent of neighbourhood in forest stands	12	16
Percent of trees within the smallest size class	31	≥ 10
Percent of street trees that are native	87	50
Number of species that comprise more than 5% of all street trees	3 (white birch, red maple, eastern serviceberry)	0
Number of genera that comprise more than 10% of all street trees	3 (birch, maple, serviceberry)	0
Number of Acadian old-growth species that represent at least 1% of all street trees	2 (red oak, white pine)	6 (red spruce, hemlock, white pine, sugar maple, yellow birch, red oak)
Percent of street trees with no structural problems	100	100
Number of plantable sites in HRM rights of way	348	0
Percent canopy cover of riparian and recharge zones	40	100
Percent of public play areas that are adequately shaded (40% canopy cover)	50	100
Percent of residential properties with at least one value tree	83	100

Biophysical Conditions

	Area (ha)	Impervious (%)	Surficial Geology
Williamswood	144		Bedrock
Parks	23		Bedrock

Socioeconomic Conditions

	Land Use	Zoning	Decade of Development
Williamswood	Residential	R-1, R-2, RDD	1950s/2000s
Parks	Park	P	1960s/2000s

Neighbourhood Treatments

Treatment	Prescription
Average number of trees to plant on HRM lands per decade	140
Area of naturalized forest stands to be created on HRM lands per decade	4 ha
Area of naturalized forest stands not to fall below	17 ha
Average number of native trees to plant on HRM lands per decade	0
Average number of Acadian old-growth species to plant on HRM lands per decade	10 (red spruce, eastern hemlock, sugar maple, yellow birch)
Refrain from planting the following genera until 2020	Birch, maple, serviceberry
Average number of trees with structural problems to remove or maintain, unless otherwise required for safety reasons	0
Additional Neighbourhood Treatments	
Maintain and enhance the urban forest belt pattern created by Ravenscraig Drive Park.	
Improve riparian protection for Whimsical Lake at Mabou Avenue Park.	

Appendix B. Glossary of Terms

Term	Definition	Source
Adaptation	Adjustment in natural or human systems in response to actual or expected climate stimuli and their effects, which moderates harm or exploits beneficial opportunities. There are various types of adaptation, including anticipatory, autonomous, and planned adaptation.	*NRTEE (2011)*
Acadian native tree species	Closely related to the Great Lakes-St Lawrence Forest Region, this region is confined to Nova Scotia, Prince Edward Island and a large portion of New Brunswick. Red spruce, balsam fir, yellow birch and sugar maple are commonly found. Black spruce, white and grey birch, red oak, white elm, black ash, beech, red maple, trembling aspen and balsam poplar are also widely distributed.	*The Canadian Encyclopaedia (2012)*
Adaptive management	A dynamic planning or modelling process that recognizes that the future cannot be predicted perfectly. In response to these imperfect predictions, planning and management strategies are modified frequently as better information becomes available. It applies scientific principles and methods to improve management activities incrementally, as decision-makers learn from experience and new scientific findings, and adapt to changing social expectations and demands. Adaptive management is based on the adage "expect the unexpected". It is a continuous process requiring constant monitoring and analysis of the results of past actions, which are then feedback into current decisions.	*Dictionary of Natural Resource Management (1996)*
Age-class diversity	The relative distribution of different age groups of a population. High age-class diversity means that there is an adequate representation of all tree ages.	*Steenberg (2011)*
Arborist	A professional who possesses the technical competence through experience and related training to provide for or supervise the management of trees and other woody plants in the residential, commercial and public landscape.	*Casey Trees (2007)*
Bedrock	The solid rock underlying unconsolidated surface materials (such as soil).	*Merriam Webster (2012)*
Biodiversity	The total diversity of all organisms and ecosystems at various spatial scales (from genes to entire biomes).	*NRTEE (2011)*
By-law	A rule adopted by an organization chiefly for the government of its members and the regulation of its affairs.	*Merriam Webster (2012)*

Term	Definition	Source
Canopy cover	The proportion of land area occupied by tree crowns when visualized from above. It is the two-dimension horizontal extent of the combined canopies of all trees on a given land area.	*Oakville UFMP (2008)*
Carbon sequestration	Amount of atmospheric carbon removed annually by trees.	*Oakville UFMP (2008)*
Carbon storage	Carbon currently held within tree tissue (roots, stems, and branches).	*Oakville UFMP (2008)*
Climate	Climate in a narrow sense is usually defined as the average weather or, more rigorously, as the statistical description of mean values and variability of variables such as surface temperature, precipitation, and wind over a period of time ranging from months to thousands or millions of years. Climate in a wider sense describes the state of the climate system.	*NRTEE (2011)*
Climate change	Climate change is a significant and persistent change in an area's average climate conditions or their extremes.	*NRTEE (2011)*
Community	An interacting population of various kind of individuals (as species) in a common location.	*Merriam Webster (2012)*
Coniferous	Woody plant which produces seeds in cones. Most coniferous trees are termed "evergreen" since they keep their needles for two or more years after which the needles die and drop off the plant.	*Casey Trees (2007)*
Cultivar	A tree variety with noticeable differences from the species, but these differences can only be retained through vegetative propagation such as cuttings or grafting.	*Casey Trees (2007)*
DBH	Diameter at Breast Height (approximately 1.3 meters from the ground).	*Oakville UFMP (2008)*
Deciduous	A woody plant which has leaves for one growing season, sheds those leaves, then grows new ones in the next growing season.	*Casey Trees (2007)*
Density	The quantity of structures or buildings per unit area.	*King County, Washington Comprehensive Plan (2004)*
Development	An area that is developed as a tract of land with built structures.	*King County, Washington Comprehensive Plan (2004)*

Term	Definition	Source
Early successional species	Species that pioneer in or benefit from disturbances. If a plant species, it usually requires full sun to succeed. Over time, these species are later replaced by others.	*The Longleaf Alliance (2012)*
Ecosystem	The interactive system formed from all living organisms and their physical and chemical environment within a given area. Ecosystems cover a hierarchy of spatial scales.	*NRTEE (2011)*
Environment	The prevailing conditions which reflect the combined influence of climate, soil, topography and biology (other plants and animals) present in an area.	*Casey Trees (2007)*
Erosion	The wearing away of the land surface by water, wind, ice or other geologic agents, and by such processes as gravitational creep.	*Casey Trees (2007)*
Fertility	The quality that enables a soil to provide nutrients, in adequate amounts and in proper balance, for the growth of specified plants. Light, moisture, temperature, tilth and other growth factors are favourable.	*Casey Trees (2007)*
Floodplain	The area of land adjacent to lakes, rivers, and streams that are subject to periodic flooding. Floodplains are designated based on the predicted frequency of flooding for a particular area. For example, a 100 year flood plain is a land area that has a one percent chance of experiencing flooding in any given year.	*King County, Washington Comprehensive Plan (2004)*
Forestry	The forestry and logging sector, including timber production, harvesting, reforestation and gathering of forest products.	*NRTEE (2011)*
Functional plan	Functional plans are detailed plans for facilities and services and action plans and programs for other governmental activities. Some functional plans are operational or programmatic, which means they guide daily management decisions. Others include specific details of facility design and location and must be consistent with the comprehensive plan and development regulations.	*King County, Washington Comprehensive Plan (2004)*
GIS	A collection of computer hardware, software, and geographic data for capturing, storing, updating, manipulating, analyzing and displaying all forms of geographically referenced information.	*Casey Trees (2007)*

Term	Definition	Source
Green infrastructure	An interconnected network of waterways, wetlands, woodlands, greenways, parks, forests, and other open spaces that support native species, maintain natural ecological processes, sustain air and water resources and contribute to health and quality of life. Includes parks, parkways, riparian buffers, residential landscaping, street trees, rain gardens, green roofs, and window boxes.	*Casey Trees (2007)*
High-grading	The practice of selecting only the most healthy or valuable individuals in harvesting a natural resource (as timber or fish).	*Merriam Webster (2012)*
Habitat	The locality or natural home in which a particular plant, animal, or group of closely associated organisms lives.	*NRTEE (2011)*
Impervious surface	A hard surface (such as a parking lot or rooftop) that prevents infiltration of water into the ground, causing water to run off the surface.	*Casey Trees (2007)*
Infrastructure	The physical foundation of a society, community or enterprise. Infrastructure comprises assets, installations or systems used to provide goods or services.	*NRTEE (2011)*
Invasive	Species that grow and spread rapidly, establishing over large areas, and displacing native species.	*Casey Trees (2007)*
Inventory	Gathering of accurate information on the health and diversity of the community forest which can include: listing and description of trees and planting sites. Used for planning.	*Casey Trees (2007)*
LiDAR	LiDAR (Light Detection And Ranging, also LADAR) is an optical remote sensing technology that can measure the distance to, or other properties of a target by illuminating the target with light, often using pulses from a laser.	*Wikipedia (2012)*
Mitigation	In the context of climate change, mitigation is an intervention intended to reduce adverse human influence on the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhance greenhouse gas sinks.	*NRTEE (2011)*
Native	A species that naturally occurs in a particular region, ecosystem and habitat. Species native to North America are generally recognized as those occurring on the continent prior to European settlement.	*Casey Trees (2007)*
Neighbourhood	The people living near one another.	*Merriam Webster (2012)*

Term	Definition	Source
Non-native/alien/ introduced	A species that due to direct or indirect human activity occurs in locations beyond its known historical or potential natural range. Refers to species from another continent, region, ecosystem, or habitat.	*Casey Trees (2007)*
Open space	Land set aside for public or private use that is not built upon.	*Casey Trees (2007)*
Prescription	A written direction for a therapeutic or corrective agent.	*Merriam Webster (2012)*
Propagules	Any of various structures that can give rise to a new individual organism, especially parts of a plant that serve as means of vegetative reproduction, such as corms, tubers, offsets, or runners. Seeds and spores are also propagules.	*Dictionary.com (2012)*
Pruning	Removing branches (or occasionally roots) from a tree or other plant using approved practices, to achieve a specified objective (e.g., visual appearance, clearance for pedestrians, strength of the tree in maturity, etc.).	*Casey Trees (2007)*
Public realm	The land base that is controlled by the government. In the context of the urban forest, this usually refers to the municipal government.	*None*
Restore	To return land and water resources from a distributed or totally altered condition to an approximation of their condition prior to disturbance or alteration.	*King County, Washington Comprehensive Plan (2004)*
Right of way	A strip of land, usually along transportation corridors, that is owned/controlled by the municipal government.	*None*
Riparian buffer	A vegetated zone adjacent to a stream, wetland, or shoreline where development is restricted or controlled to minimize the effects of development.	*Casey Trees (2007)*
Riparian zone	Vegetated ecosystems along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high water table and may be subject to periodic flooding.	*Casey Trees (2007)*
Run-off (stormwater)	Water from rain, melted snow, or irrigation that flows over the land surface. Precipitation that falls on impervious surfaces (such as roofs and roads). Because it is not absorbed by soil and vegetation, it flows into storm drains.	*Casey Trees (2007)*
Scale	A graduated range of values forming a standard system for measuring or grading something.	*Dictionary.com (2012)*

Term	Definition	Source
Snag	A standing dead tree.	*Cline et al. (1991)*
Stocking	% of available places for planting that have trees already planted in them.	*UFORE (1990)*
Stormwater retention	The retention of rainfall during a storm event. In the context of the urban forest, this refers to the retention provided by tree canopies.	*None*
STRATUM	The STRATUM model was developed by the US Department of Agriculture (USDA) Forest Service to estimate the composition, environmental impacts, and value of street trees.	*Casey Trees (2007)*
Subdivision	A land that has been divided into legal lots, or is the process of dividing land into lots.	*King County, Washington Comprehensive Plan (2004)*
SUFM	Sustainable urban forest management (SUFM) is the management of the urban forest to maximize benefits to people without compromising the health and condition of the forest.	*Casey Trees (2007)*
Sustainable development	Sustainable development can be defined as the process of developing land, cities, businesses and communities so that our current needs are met without compromising the ability of future generations to meet their own needs.	*Environment Canada (2009)*
Trophic status	The level in the food chain at which an organism sustains itself.	*Dictionary of Natural Resource Management (1996)*
UFORE	The Urban Forest Effects (UFORE) model was developed by the US Department of Agriculture (USDA) Forest Service to estimate the composition, environmental impacts, and value of the urban forest.	*Casey Trees (2007)*
Uncertainty	An expression of the degree to which a value (e.g., the future state of the climate system) is unknown. Uncertainty can result from lack of information or from disagreement about what is known or even knowable. It may have many types of sources, from quantifiable errors in the data to ambiguously defined concepts or terminology, or uncertain projections of human behaviour.	*NRTEE (2011)*

Term	Definition	Source
Urban centre	These are centres of concentrated employment and housing located within the urban growth area. Urban centres are to be serviced by high-capacity transit and are to contain a wide variety of land uses, including retail, recreational, cultural and public facilities, parks and open spaces.	*King County, Washington Comprehensive Plan (2004)*
Urban forest	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 surrounding rural areas (peri-urban forests) (Canadian Urban Forest Strategy 2004-2006).	*Oakville UFMP (2008)*
Urban Forestry	See SUFM	*Casey Trees (2007)*
Urban heat island	A phenomenon where temperatures in urban areas are several degrees higher than in the surrounding rural areas due to the relative concentration of paved and dark coloured surfaces in cities that absorb heat.	*NRTEE (2011)*
Utility	An entity that delivers a public service such as electricity or communication (e.g. utility line).	*Casey Trees (2007)*
Value tree	A fully grown mature tree that adds value to the price of a residential property.	*Steenberg and Duinker (2010)*
Vulnerability	Vulnerability to climate change is the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability to climate change is a function of the character, magnitude, and rate of climate change variation to which a system is exposed, its sensitivity and its adaptive capacity.	*NRTEE (2011)*
Watershed	The topographic boundary within which water drains into a particular river, stream, wetland, or body of water.	*Casey Trees (2007)*
Wetland	Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.	*King County, Washington Comprehensive Plan (2004)*
Zoning	Regulations or requirements that govern the use, placement, spacing, and size of land and buildings within a specific area.	*Casey Trees (2007)*

Appendix C. Community Engagement on the HRM Urban Forest Master Plan

Community Engagement Report: Summer 2010

1. Introduction

During summer 2010, as part of the activities associated with development of HRM's Urban Forest Master Plan (UFMP), several community engagement events were held. The primary purpose of the events was information-sharing and consultation. Feedback from the consultations will be used to inform preparation of the draft UFMP. General issues with the urban forest have been the primary focus area, although topics such as biodiversity, environmental education opportunities, and the contribution of urban trees to a sense of well-being were also discussed.

In summary, community engagement activities for the UFMP included two advertisements in The Coast, three focus groups, three urban forest walkabouts, and an open house. All activities were designed and led by us. Over the course of the summer, the UFMP team also had an urban forest information line and email address that acted as the primary means for contact with the public. We experienced high interest from a select group of people who participated in most of our events and received positive feedback following each event. Overall, we judge the public interest in the UFMP to have been satisfactory. However, participation was low at some events, likely due to summer vacations.

2. The Community Engagement Activities

2.1 Media Campaign. The first step in our community engagement program was a media campaign that included a newsletter (see Appendix 1) and advertisement in The Coast, a radio spot on CBC Radio 1, a number of research posters for the open house, a press release, and a website. Generally, all of our advertisements were well received and resulted in increased public interest in the UFMP. Following the first newsletter, we were contacted by a number of individuals interested in learning more about the UFMP and had participants in every event throughout the summer referencing it. On August 17, Peter Duinker was interviewed on CBC Radio 1, which resulted in a number of people attending the urban forest walkabouts and open house. Finally, the research posters created for the open house were well received and sparked interesting conversation within the crowd. Overall the media campaign was successful and we got coverage from CBC Radio, The Coast, the DAL Gazette, and the Halifax Gazette. During fall 2010, we will develop four questions for the Halifax Metro- Quarterly questionnaire and will advertise in the Naturally Green newsletter.

2.2 Initial Scanning Focus Group. On July 27, the UFMP team held an initial scanning focus group to gain public opinion on the UFMP's framework for values, objectives, indicators and targets (VOIT). The meeting was facilitated by Peter Duinker, and 29 individuals from industry, government and academia attended. We were very pleased with the attendance at this session and had a balanced representation of professional sectors. Discussion centred around the values outlined in VOIT and participants were asked to identify their top three values prior to the focus group. Based on participant responses, we discovered that two most-common values were (a) sense of wellbeing, and (b) native biodiversity. Sense of wellbeing was a focal area of discussion over the two-hour event. Participants commented that trees contribute to a sense of wellbeing in a number of ways ranging from psychological factors to providing a sense of place. Overall it was thought that street trees contribute disproportionately highly to citizens' sense of wellbeing. On the matter of biodiversity and the role of native species in HRM's urban forest, most participants supported planting native species. Some individuals held strong views about planting only native stock. Within this discussion, there were concerns about replacement plans for older trees, the role of historic trees (especially those that are non-native), and the biodiversity qualities HRM should strive for within its urban forest. There was also discussion about the legal rights of private landowners and the municipality, and the identification of major barriers to development of a healthy urban forest. One area of major concern was the communication disconnect with land developers. Participants took the stance that trees must be taken into account prior to the development of subdivisions, as this will increase the age and species diversity of trees within an area. The UFMP team gained a lot of useful feedback from participants. The focus group highlighted the primary values of public concern and provided direction for the development of subsequent focus groups. Feedback from participants was satisfactory and will be considered when creating the UFMP.

2.3 Urban Forest Walkabouts. On August 17, the UFMP team hosted three guided tours of a small section of HRM's urban forest near Dalhousie University. During the walkabouts, citizens engaged in an active learning session focused on the urban forest. Over the two-hour walkabout, citizens were shown a range of challenges faced by the urban forest, and some of the benefits it provides. HRM Urban Forester John Simmons joined Dalhousie University's Peter Duinker and his research team to guide the walkabouts and discuss issues prompted by the specific elements of the urban forest visited by the groups. Discussion was wide-ranging (see Appendix 3) and touched on concerns about the spacing between street trees, the effect of installing lights on trees, the role of species diversity, previous urban forest management practices, and regulations and guidelines for arborists. Overall, the walkabouts provided a range of information to participants and provoked interest in forming a volunteer program associated with the urban forest.

2.4 Open House. On August 18, the UFMP team hosted an open house in room 5001 of the Rowe building on the Dalhousie campus. The open house was designed as a meeting for sharing information and expressing opinions on HRM's urban forest and was open to all members of the public. Twenty participants attended the open house where

they actively engaged in discussion based a series of posters prepared by the team. The posters included two maps of the UFMP study area, two posters outlining the major challenges facing HRM's urban forest, and one poster each discussing the benefits of the urban forest, the VOIT framework, and the results from the Stratum and UFORE analyses of HRM urban forest. During the open house, Peter Duinker gave a presentation on the UFMP and HRM's urban forest which spurred a lot of discussion similar to that of the July focus group (see Community Engagement Reports: Summer 2012). Again, one area of concern was native tree species, biodiversity, and what types of planting plans will be developed. Other question areas included the management of large stands within the UF study area, issues with stormwater runoff, and the meaning of the Stratum and UFORE results. Although there was a small turnout to the open house, it was well received and considered a success.

2.5 Focus Group on Native Species and Biodiversity. Four citizens joined our focus group on August 25 (see Community Engagement Reports: Summer 2012). All four considered climate change to be a significant issue that must be considered in light of strong desires for native species and biodiversity. Instead of taking a hard line for native species, the group felt strongly that the right species/cultivars should be planted in each site to ensure tree health and survival. Careful choice of non-native species is permissible. Another concern was the need for more shrubbery in the city. Participants held the view that in instances where trees will not succeed, shrubs often can. One participant introduced the concept of adjustive management, "which reflects both the uncertainty and the likely evolution of the moral values humans attribute to biodiversity" (Maris & Béchet, 2009). Participants felt that HRM should consider adopting an adjustive management scheme within the UFMP. By greening the city, we will be doing more for carbon sequestration, which is a growing concern for the public.

2.6 Focus Group on Sense of Well-Being and Environmental Education Opportunities. We held our final focus group on August 26 to address issues related to sense of wellbeing and environmental education. Eight participants attended. In general, it was concluded that trees are a major source of the sense of wellbeing within communities, but it may be subconscious to many citizens. To ensure that HRM sustains its urban forest, there should be more active volunteer opportunities for citizens to become involved. The concept of a neighbourhood forest stewards program was brought up, where citizens could directly participate with and care for the urban forest. It is important to get champions of the urban forest in HRM because we need citizens to gain a sense of ownership over the city trees in order to promote sustainability. Various ideas on further public participation were discussed along with school plantings and volunteer-led training for city workers to decrease maltreatment of city trees.

3. Main Themes Arising from the Consultations.

Here we present a list of some of the main themes – 25 in all – we heard about from participants at our various events. The order of themes below is more or less random and does not indicate any sense of relative priority.

3.1 Definition of Urban Forest. A common question throughout the public engagement sessions was centred on the definition of urban forest. As will be outlined in the UFMP, our definition of the urban forest includes all of the public and private trees in the HRM urban core. This includes trees in parks, such as Point Pleasant, trees between the sidewalks and roads, and trees in citizens' yards.

3.2 Sense of Wellbeing and Sense of Place. One of the overarching themes of the engagement sessions was the importance of trees on citizen's sense of well-being and place. Citizens discussed the importance of trees in providing shade, comfortable areas to walk, a visual way to connect to nature and the seasons, and a physical reminder of place. Participants believe that the psychological benefits of urban trees are the most important although it may be at a subconscious level for many citizens.

3.3 Education. The public feels that education about the importance of the urban forest needs to be increased across the spectrum. In schools, children need to be educated on the benefits of trees and take part in planting and caring for them. Tree-nursery owners need to be educated on the importance of growing native and city- resilient species, and should promote planting of more trees on private property. Land developers need to be educated on how to protect and sustain tree populations while undertaking development operations. Finally, participants discussed the importance of educating the general public and increasing awareness and stewardship of HRM's urban forest.

3.4 Tree replacement policy, density. There was confusion about how HRM deals with tree replacement when a sick or dead tree needs to be removed. Questions included: What species should be replanted? How far apart from each other should new trees be planted? Who is responsible for replacing and caring for street trees? If an historical tree is removed that is not a native species, should it be replaced by a tree of native species or the species that was previously there to retain the historical importance? What type of age diversity will be considered? The UFMP needs to address all these kinds of questions.

3.5 Biodiversity. The role and importance of biodiversity within the urban forest was discussed in a number of ways. Participants considered the role of native vs. non-native species in terms of both a diverse and resilient urban forest. Participants concluded that although native species are preferred, HRM needs to plant species suited to the conditions of each site so as to maintain or increase the sustainability of the urban forest. Other topics discussed in connection with biodiversity were varying the gene pool of species bought from nurseries, how we can incorporate

more shrubs in the urban forest, and the concept of species richness and evenness throughout the urban forest as well as in specific stands.

3.6 Riparian Setbacks. Trees are essential to the maintenance of healthy riparian habitat in Nova Scotia. It is important to protect sufficient trees when developing in riparian habitats.

3.7 By-laws. Participants discussed various ways that HRM might be able to control or direct people's behaviours around the city to conserve trees. A strong tree by-law was considered essential for securing a sustainable urban forest. Issues to be included in bylaw revisions include possible permissions for landowners to cut down living trees on their properties, and the rights of landowners to direct sunshine on their properties (i.e., freedom from tree shade).

3.8 Tree Maintenance. HRM is responsible for maintaining trees on lands it owns (e.g., city parks, boulevards, tree lawns next to streets). It is not the responsibility of citizens to take action to correct problem situations with trees that HRM owns. HRM should be called to take action. The responsibility to maintain a tree falls to whomever owns the land where the tree is growing. This includes homeowners.

3.9 Funding. Participants recognized that funding for HRM's urban-forest program is too low. Given the current budget allocation and the high cost of planting appropriate trees in public places such as along streets, HRM is losing more of its municipally owned trees each year than it is replacing. This highlights the importance of citizens taking action into their own hands by planting more trees on their own properties.

3.10 Greenways and Forest Patches. For many people, green belts and forest patches, where tree cover is high, are the core of the urban forest. These areas are important to manage well for wildlife habitat, biodiversity conservation, recreation, and many other benefits of tree canopy cover.

3.11 Citizen Engagement. Citizens can become involved with the urban forest in many ways. It is important for HRM to encourage this and provide avenues for doing so in both active and passive approaches. Participants were in support of increasing urban forest education through hands-on-learning, such as tree planting programs and urban forest walkabouts, and through passive learning by posting tree information placards, and increasing the availability of information on the benefits and challenges of the urban forest.

3.12 Trees as Green Infrastructure. Given the many ways in which urban trees physically improve the environment – air-quality improvement, storm-water control, temperature and wind amelioration, to name a few – it behoves city planners and developers to view trees as green infrastructure and use them more often to provide services that would, in the absence of trees, either not be provided or would require expensive engineering works to provide.

3.13 Links to the Provincial Government. The Government of Nova Scotia owns considerable amounts of land in HRM, even in the urban core. To sustain the entire HRM urban forest, it is important to cooperate with the Government of Nova Scotia, particularly in relation to parks and protected areas in the urban core (e.g., Long Lake Provincial Park).

3.14 Ecological Services. The urban forest provides many ecological services to the city and its citizens. These include, among other things, slowing down and retaining stormwater, providing shade, and sequestering carbon from the air. It is important for the UFMP to address these issues and ensure that the urban forest plays as strong a role as it can in continuing to provide ecological services consistently across the urban core. It is also important for citizens to become aware of and understand these ecological services.

3.15 Industrial and Commercial Zones. Industrial and commercial zones – e.g. Bayers Lake Commercial Park, Burnside Industrial Park, Dartmouth Crossing - are major problem areas in relation to HRM's urban forest. Vast areas of land have been cleared of all the trees and built up with buildings, roads and parking lots, all impervious hard surfaces. Strategically placed trees in these built-up areas could provide huge benefits economically, environmentally and socially.

3.16 Metal Hardware in Trees. Many people, including citizens but also people working for businesses and the city itself, see trees as handy posts from which to hang things. In yards, clotheslines and treehouses often result in metal fasteners becoming embedded in the wood. In the streets, trees often are used as anchors for utility poles and as carriers for street signs. In some places in the city – e.g., the Grand Parade - trees are used to support decorative lighting equipment. While such uses of trees may not affect their health, they certainly reduce the utility of the wood once a sick or dead tree needs to be removed. Whereas a tree devoid of metal objects inside it can be used for lumber, firewood or chips, a city tree that may have metal objects embedded in the wood has no use whatsoever and usually needs to be dumped somewhere.

3.17 Fire. Forest fire is an increasing concern of HRM citizens in HRM, especially after the Porters Lake fire of 2007 and the Spryfield fire of 2009. This concern is based on the greenways and forest patches within and surrounding HRM, as they can bring fire close to subdivisions. The UFMP needs to have special considerations for the managment of these and other fire-prone lands in HRM.

3.18 Clearcutting Prior to Development. A major problem with development of forest land at the periphery of the urban core is that developers often clearcut the land and then replant trees sparsely around the new buildings and roadways. Much stronger consideration is needed on retention of forest green belts and patches in new developments.

3.19 The Underground Environment. Trees depend on the soil for nutrients and anchorage. Urban environments present many challenges for trees to be able to develop sufficient rooting systems for a long and healthy life. In areas disturbed by development, we now know how to build tree-friendly planting environments. While these are expensive, they are essential for confident tree establishment. The UFMP must address the need for improving tree- rooting habitats in

disturbed sites.Underground placement of utility infrastructure such as pipes and cables can be a major challenge to the urban forest. Care and intelligent design and installation, with recognition of the dynamics of tree-root development, can reduce conflicts for both trees and built infrastructure.

3.20 Long-term Planning. Trees have life spans ranging from a few years (young trees frequently die due to the harsh growing conditions in urban settings) up to a century or two. People need to consider the long-term future when decisions are made about where to put which trees in the urban environment. For example, one would want to guard against a situation where all the trees on a street are old, with no young ones already underway to form the new canopy once the old trees succumb and die. A balanced age-class structure, on a fine spatial scale, is important for urban-canopy continuity over the long term. That is why the UFMP will take a long- term view to managing the urban forest.

3.21 Wildlife. Wild animals in the city are, depending on the species, at times welcome and at times shunned. For example, coyotes and racoons are generally unwelcome, but diverse songbirds bring positive reactions from urban citizens. Most of the welcome birds and other small animals are only present because of the urban forest. Judicious management of all aspects of the urban forest can foster the positive aspects of urban wildlife while minimizing the negative side of nuisance wildlife.

3.22 Heritage Trees. Heritage trees are particularly important individuals by virtue primarily of their age and often also because of their large size. Participants at our consultations said that heritage trees provide a sense of place for HRM citizens. Whether of native or non-native species, the UFMP must address the conservation of heritage trees and indeed make provisions for new heritage trees to flourish across the urban landscape.

3.23 Climate Change. Most people accept that the globe's climate is changing. In HRM, this probably means a significant warming trend over the 21st century. The UFMP must consider the diverse effects of climate change on the urban forest, both on the extant trees and those to be planted during the next decades. This may mean that native species may not always be the best choice for urban plantings, depending on their resilience and adaptability.

3.24 Invasive Alien Species. Invasive alien species are those from other areas that become established in NS and spread to the detriment of native species. In HRM's urban forest, the Norway maple is a prime example among tree species of an invasive alien species. The UFMP will need to address the invasiveness of any non-native tree species planted. It must also address the issue of non-tree invasive alien species, of which there are several categories: diseases brought to NS unwittingly on non-native plant materials (e.g., the beech bark disease); ornamental species brought to NS for landscape beautification (e.g., Japanese knotweed); and species brought here by accident as a result of trade in manufactured goods (e.g., the brown spruce long-hornedbeetle). Travelling citizens and trading businesses must be compelled to be vigilant against importation of alien species to NS except under highly regulated circumstances.

3.25 Safety. Some participants brought up the issue of safety in connection with the urban forest. Safety relates to urban trees in several ways. First, it is well known by now that urban trees help reduce crime. Second, urban trees (and shrubs) need to be managed in such a way as to help people feel safe walking at night. This may mean simple things like keeping the tree crowns up from the trunk by several metres. Finally, people are rightly concerned about branches or entire trees falling onto themselves or their properties, especially during windy conditions. We just need to recall how Hurricane Juan was responsible for tree damage to many buildings in HRM, and even some cars were crushed by toppled trees. The UFMP will need to address all aspects of safety in relation to trees in the city.

4. Conclusions

In the public engagement program we have implemented so far in relation to the HRM UFMP, we attempted to meet the requirements of HRM's Community Engagement Strategy by following the ten principles of community engagement. During summer 2010, the UFMP team has hosted seven successful community engagement events. Feedback from participants has been positive and a number of citizens have requested updates on the UFMP during its development. In all of the events, the social value of the urban forest was discussed most frequently. This can be attributed to citizens" assessment of the importance of trees and the urban forest with their sense of wellbeing.

Considering our plans as developed in spring 2010, several community engagement initiatives are still needed. These include advertising in the Naturally Green Newsletter, developing a second information item for The Coast (on the progression of the plan and community engagement events of the summer), questions in HRM's metro- quarterly, street interception surveys, an open house, and potentially a workshop. We know of a cadre of citizens following the development of the UFMP who are interested in participating in more events.

Based on our conversations with participants, it is clear that some Haligonians at least have a strong interest in protecting and sustaining their urban forest. There is potential to develop a volunteer-based neighbourhood forest-stewardship program that could be fostered in the UFMP. HRM needs to increase the number of urban forest public participation programs within the region to ensure citizens are informed about and conscious of the urban forest.

Appendix D.
Tree Species Selection Under a Changing Climate

Tree species selection for the Halifax urban forest under a changing climate

Rostami, Maliheh (2011)

A tree-species selection study was carried out by Rostami in 2011 that suggested a list of tree species to be planted in Halifax's Urban forest by the year 2100. This study used the results of a climate envelope research that has predicted tree-species migration as a result of climate change, combined with other selection criteria for tree plantations in urban settings, and has suggested a list of trees species that are suitable for plantation. The suggested tree species are trees that are native to Nova Scotia, New Brunswick, and the eastern seaboard of United States. The trees were selected from these areas based on the continuity of the climate in these regions.

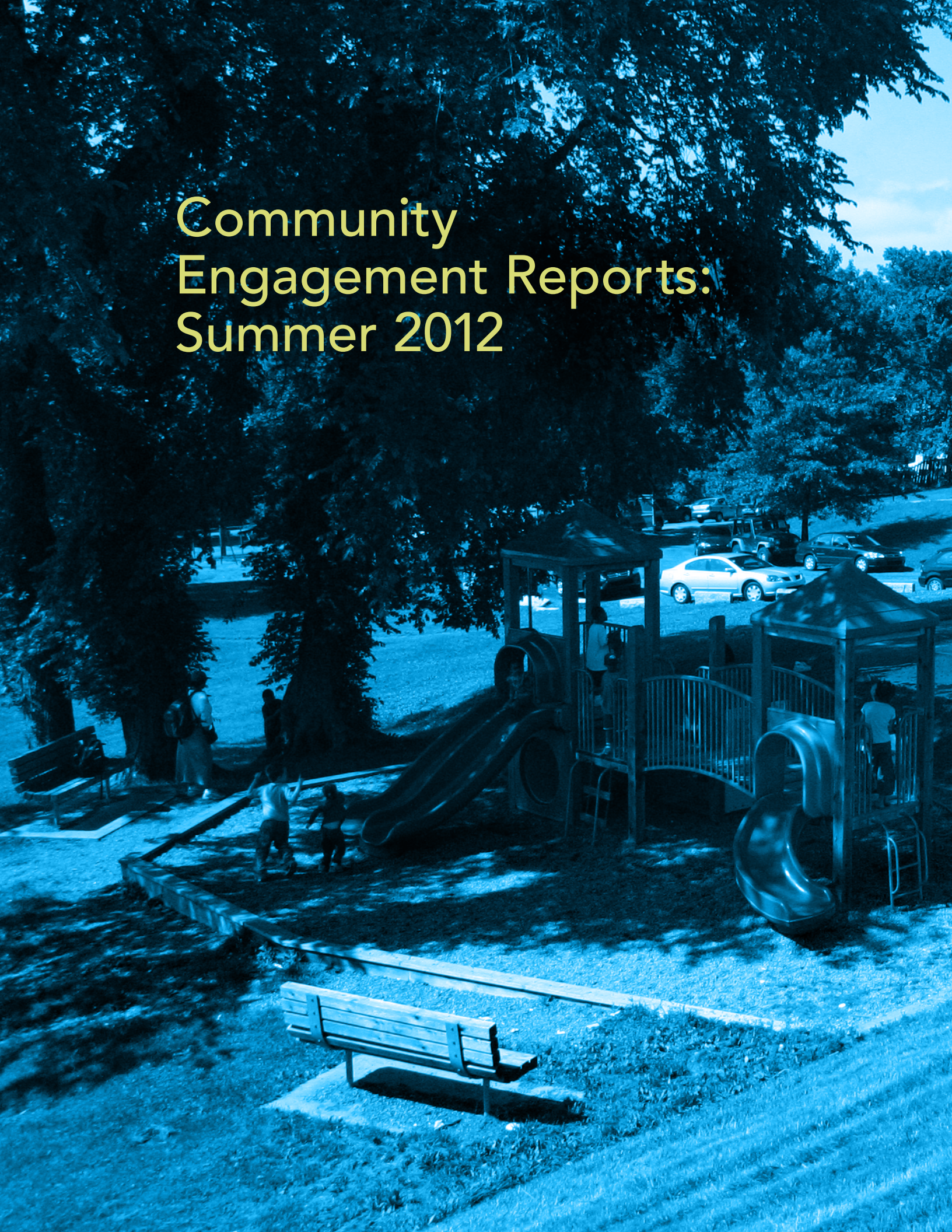
As part of the research Rostami and Duinker (2011) have developed a tree species database that has studied 95 characteristics of 57 tree species. This database is a comprehensive source of tree species characteristic and can be used by any individual working with and studying trees. The abstract to this research and also the link to the tree species database can be found below:

http://dalspace.library.dal.ca/bitstream/handle/10222/14211/Rostami,%20Maliheh,%20MES,%20ENVI,%20August%202011.pdf?sequence=1

Abstract

Tree selection is critical to ensuring that urban forests are diverse, healthy, and adapted to the urban environment. Climate is one of the main controllers of plant distribution around the world, so tree species are expected to redistribute as a result of climate change. This research aimed to identify which eastern North American tree species should be most suited for planting in urban areas in Halifax given impending climate change. A database was developed for 57 tree species and 95 tree characteristics to enable analysis of tree species native to eastern North America. The results of previous climate envelope research and the database were used to identify the tree species most suitable for planting in Halifax. Of the 57 tree species examined, 16 were identified as most suited for the Halifax urban forest of the 21st century.

Community Engagement Reports: Summer 2012



Community Consultations on the Implementation of the Urban Forest Master Plan: Summary Report – June 2012

Introduction and Background

Halifax Regional Municipality and the School for Resource and Environmental Studies at Dalhousie University held three consultations between May 16th – 23rd, 2012 to seek community input on how to most effectively implement the actions of the Urban Forest Master Plan (UFMP) and how to prioritize these actions. These sessions were held at the following locations: Cole Harbour Place, Cole Harbour; Dalhousie Campus, Halifax; C.P. Allen High School, Bedford.

At these sessions there were three main themes discussed: trees in the public realm, trees in the private realm, and land use policies & by-laws. More than 50 people attended these sessions and provided feedback through a prioritization exercise and comment sheets. Comments made during the discussions were recorded by note-takers. The edited comments have been reproduced at the end of this document.

The following is a general summary of the suggestions that emerged, as well as issues that could be considered and addressed throughout the implementation of the UFMP.

Theme 1: Trees in the Public Realm

There was a general consensus at the public meetings that HRM could and should improve its urban forest by planting more street trees, park trees, and by reclaiming vacant land. There was also a general feeling that new trees being planted should be ones that are native to the region and that species should be selected in order to increase diversity within each neighbourhood and in the urban forest as a whole. It was suggested that such plantings on public lands would give HRM the best return on their investment and the most immediate results. Upon reviewing the many benefits trees provide us and learning that there are over 90,000 plantable spots on HRM streets members of the public called for more trees to be planted. When they were informed that the current rate of planting is approximately equal to the rate of loss from natural causes they called for an increase in the rate of planting so the urban forest will grow in size instead of remaining constant or possibly diminishing over time.

While there was general agreement that more trees could be planted in municipal parks the members of the public made it clear that they do value open space in parks and do not want that completely eliminated. This fits well with the goal for parks in the UFMP of achieving 40% canopy cover.

Another major issue discussed about trees in the public realm was pruning and maintenance. Many people were concerned by the pruning done by NSPI around the power lines. They felt the pruning was not done with tree health in mind and caused unnecessary damage to the trees. To fix this problem people suggested that HRM work closely with NSPI to come to an agreement on how to appropriately prune the trees. Many people also suggested a switch to underground power lines or the more durable Hendrix cables.

Switching to a proactive 7-year pruning cycle was discussed; each tree would be visited, assessed, and pruned if needed once every 7 years. Currently the pruning of street trees is done on a reactive basis; when a specific tree or branch becomes an issue it is pruned. Compared to the current method of pruning, a 7-year cycle would require a significant increase in the proportion of the budget being attributed to tree maintenance. However, it would reduce the costs associated with problem trees such as damage from falling limbs. As such, many agreed that a switch to proactive pruning would be for the better with the stipulation that HRM tests the program in a few neighbourhoods first. There was also a concern that with so many empty plantable spots HRM might plant more trees than it can properly maintain. Thus the budget for maintenance and pruning should increase in conjunction with the budget for tree planting.

Theme 2: Trees in the Private Realm

Since the majority of land within the boundaries of the UFMP is privately owned, the importance of trees in the private realm was clearly recognized at the public meetings. Two general themes that came up repeatedly during discussions were education and partnerships: education on the values, benefits, and importance of the urban forest partnerships with groups, organizations, institutions, associations, corporations, and businesses to help them manage the urban forest

on their lands and use their networks to promote urban forest values to the general public. Partnerships with Non-Governmental Organizations (NGOs) were identified as a great starting point since they would require little convincing and are experienced at reaching out to the public. Partnerships with NGOs could be used to produce informational booklets or pamphlets, run educational workshops, and create volunteer groups.

Large corporations looking to 'green' their images were identified as targets for possible sponsors of an urban forest outreach program. Also members of the public felt that large corporations that were also large property owners should be targeted for outreach programs directing them to plant more trees on their properties.

Partnerships with tree nurseries and garden centers could be especially fruitful as the companies could be encouraged to stock more native trees, and can influence what species of tree people buy. It was suggested that a copy of the UFMP be given to these companies so that customers could look up their neighbourhood in the appendix and see what species of tree they should be planting.

One idea that kept coming up was that of a tree/seedling giveaway. This idea took many forms but in general it referred to a campaign that would be led by HRM to provide seedlings/whips to citizens at a low cost (or possibly free). Corporate sponsors could play a role and existing nurseries and garden centers could function as the delivery method. By registering with their address online citizens could receive several trees and a combination suited specifically for their neighbourhood.

The creation of an Urban Forest Trust or Foundation was discussed and generally accepted as a good idea. This organization would be a separate entity from HRM and would be allowed to accept both private and public fund donations. A trust or foundation was seen as preferable to an advisory committee as the feeling was that there are already too many advisory committees in HRM. Also advisory committees are most useful when drafting plans whereas a trust or foundation would be better at implementing the plan we have already created.

There was considerable interest in the possible formation of a network of Urban Forest Neighbourhood Associations (UFNAs) to get the public more involved and foster stewardship. The volunteer groups would be formed based on the neighbourhood boundaries set out in the UFMP. Existing neighbourhood associations could be used to aid in the creation of UFNAs and once a few UNFAs are created they could be used to help nearby neighbourhoods to form their own.

As previously mentioned education was a frequently reoccurring theme in each of the meetings. When asked who should be the target of an education program people identified three main groups: home/property owners, businesses, and children. Businesses and homeowners were identified since they own land on which trees can be planted and children because values are more easily instilled in youth and will be carried by them into the future.

People at the meetings felt very strongly that partnerships with development agencies, construction firms, and real estate agencies were crucial to the preservation and continued growth of HRMs urban forest. Real estate agencies can be used to educate new homeowners on the benefits of trees, possibly including some informative pamphlets or booklets in the packages they give out. Developers need to be worked with closely as they take the native forest land and shape it into the urban forest we enjoy today.

Theme 3: Land Use Regulations and By-laws

The possibility of a by-law (permitting system) was discussed at the public meetings. The UFMP can recommend further research into developing regulations concerning trees on private property that could then be presented to Council. From the discussions it was clear that people wanted a by-law that would not annoy people with a lengthy process and fees, especially if a resident only wanted to cut down a single tree in their backyard. A possible solution to this was the suggestion of a 10 tree threshold over the time span of 1 year; if more than 10 trees are to be cut down on a certain sized property then a permit would be necessary. There was also general consensus that if a tree by-law were to be created it would have to be one that was easily enforceable.

Other forms of regulation that were discussed included changes to development agreements to preserve more existing trees during development or include provisions for replacement after development and/or nearby. Replacement could be done with a diameter

replacement policy, where the diameter at breast height of the tree(s) to be removed is/are measured and the total diameter of the younger and smaller trees to be replanted must add up to the original tree(s) diameter(s).

The possibility of a designation system for specific trees was also discussed. These trees would likely be denoted as "Landmark Trees" and could be individual trees or entire copses. Designations would be made based on factors such as age, size, cultural associations, and history. These designations would likely not provide any permanent or legal protection for the trees but would be more of a celebration of nature.

A final reoccurring theme was a changing of the Municipal Planning Standards, or a so-called 'greening' of the red book. Changes discussed were those to make room for large trees to grow and even thrive in an urban setting.

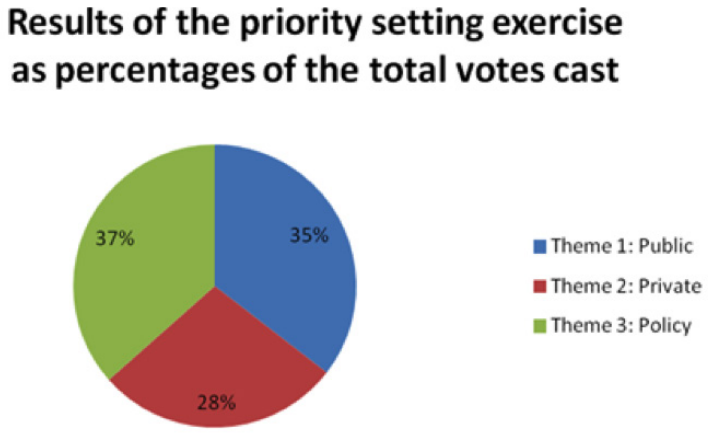
Results of the Priority Setting Exercise

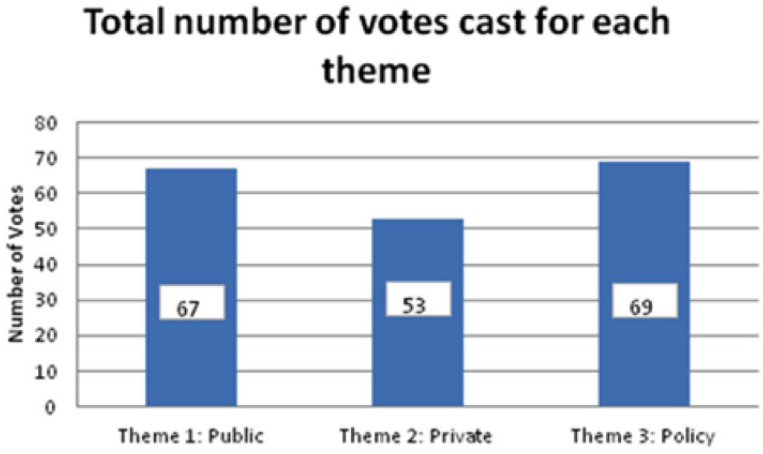
At the end of each workshop the participants were asked to take part in a priority setting exercise. The simple exercise required each participant to place four dots into any of the three themes discussed; management of the urban forest on public land, on private land, and land use policies. Each dot represented a vote for the relative importance of moving forward immediately with the UFMP actions based on that theme. The votes were all tallied and presented below in a histogram and pie chart with the totals and percentages of the total respectively. For reference the three themes shown in these graphs are as follows:

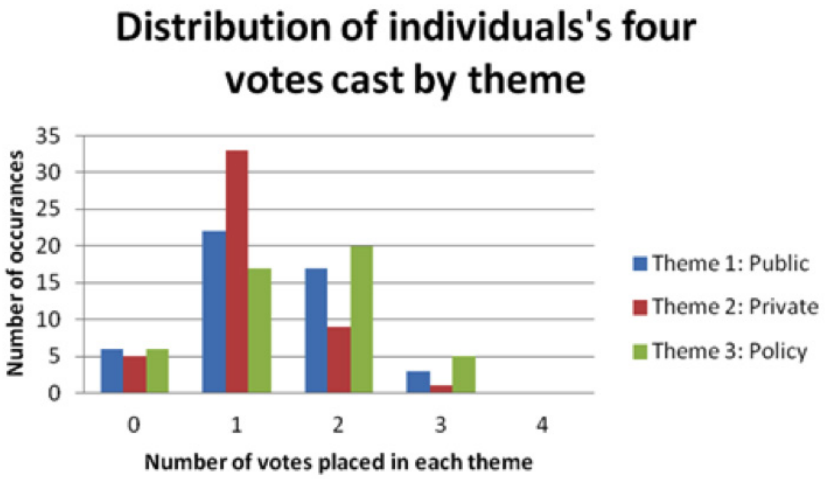
Urban forest management in the public realm – city streets, parks and greenways.

Urban forest management in the private realm – residential, commercial and industrial properties.

Land use policies and regulation in relation to urban forest management.







Themes 1 and 3 had slightly more votes than theme 2, but overall the distribution of votes was fairly even across all three themes. Next we looked at how each person distributed their votes; for each category they could place 0, 1, 2, 3, or all 4 of their votes. For each theme the frequency of each of these voting possibilities were tallied and are shown below.

Looking at this graph we can see that a comparatively higher number of individuals placed only a single vote into theme 2 than in themes 1 & 3. Also we can see that comparatively fewer individuals placed 2 or 3 votes into theme 2 than in themes 1 & 3. From this we can determine that more individuals felt strongly that themes 1 & 3 are very important than did for theme 2. However, no individuals placed all their votes into one theme and the number of times each theme received no votes is almost equal between all three themes. Therefore, these results suggest that we cannot disregard theme 2 but should place a higher importance on themes 1 & 3.

Supplementary Information

The following notes were taken during the workshop discussions.

Theme One Discussions: Public Realm

Cole Harbour Workshop

- Trees on city lands are a real public good, and dollar for dollar that is the best investment that helps improve the city. For every dollar we spend in HRM we get a $7.5 benefit back.
- The biggest loss of trees in Halifax right of ways is from vandalism.
- In parks you can get a lot more canopy and benefits for your dollar.
- Most big cities have been looking at replanting city-owned vacant land.
- All real estate agents should be carrying tree brochures when they show properties to their clients.

Dalhousie Workshop

- Tree maintenance is an important issue (right now it is reactive).
- Have a legacy of trees. So what can we do? There are about 90,000 plantable spots in the city. Many big trees in the city are facing the end of their life.
- I believe there is a big problem with NS power. Should they plant new trees to replace the ones that died from their bad pruning?
- I think NS power should install underground power lines. Or they can have coated wires.
- NS power always wants to cut down trees and they should be in this discussion since they are the big violators.
- Do we want more native trees? Do we want smaller trees?
- I think we should be planting native.
- It is hard to introduce new trees due to vandalism.
- We need a neighborhood watch for trees.
- Grassroots organizations will have more public ownership which will include protection.
- What will the province do as a partner for trees in parks?
- UFMP should be integrated with other levels of government.
- The UFMP should be expanded to include unserviced areas adjacent to the UFMP study area.
- The Shubenacadie Canal Commission has a partnership and outreach program.
- Have the plan be more malleable. Quicker than

20 years and under $3 million so it won't scare the HRM.
- Compare the amount of money currently spent on planting and pruning to other public services when presenting the UFMP to the government and public.
- Tree maintenance will likely be more expensive than tree planting (how can government keep up with this?).
- How many trees will likely die in the next few years? Reflect on that number if possible.
- Right now we are at a 1:1 ratio in our planting: however, there would be more trees dying in the future with the budget remaining constant. This will have a bad implication.
- Need to hire contractors or volunteers to engage in these activities. At least in planting.
- Do you need a permit to plant trees in parks?
- When we were in Moncton the city came and planted a tree on our private land when we requested it at no cost.
- Put benches around trees to reduce crime (more eyes on trees)
- Maybe have a small cost paid by homeowners for street trees in front of their properties so that people don't see it as HRM's tree.
- Planting too many trees at once could be an issue for maintenance/pruning.
- We have 90,000 plantable spots but we don't want to plant them all at once.
- The cities resources would be better spent on maintenance and planting than trying to create a by-law.
- Concern about by-laws – that they take too long to produce noticeable effects.
- Partnership with NSPI must include detailed instructions on how they should prune trees under power lines.
- Improvements to the power lines such as Hendrix cables would be acceptable even at high costs (for example Hendrix cables or underground cables).
- We should create education programs that will foster attachment and stewardship to the urban forest as a whole, to each person's neighbourhood and to individual trees.
- We need more coniferous trees – broader diversity of species.

Bedford Workshop

- Start with park trees. There is a lot of planting going on in streets which have left trees in those locations in bad shape. There are lots of street trees in poor condition.
- Take care of those street trees that we currently have.
- Focus on planting more diverse and healthy trees in parks.
- There needs to be changes to the municipal standards for site preparation prior to street tree planting.
- I think that the cost of planting street trees would be far less than the cost shown in the UFMP discussion paper.
- When building new subdivisions why do the developers have to clear-cut the whole area? Why can't they just cut out the trees that need to come down and leave the rest?
- My understanding is that trees are saved in pockets to keep them alive and some trees can survive on their own. Choosing the right group of trees to keep in buffers and those to plant on street trees is important.
- It is extremely difficult to maintain the health of native trees in buffer strips in small lot subdivisions. They generally die within a few years.
- We should educate the public of the benefits that trees provide in the public realm.
- I do not recommend a pruning cycle. I don't think that trees need pruning you can spend a whole amount of money on pruning trees that will blow down eventually.
- But pruning can keep the trees healthy and therefore they will be less vulnerable to blow downs.
- I don't think that pruning keeps the trees healthy. However I think trees should be pruned for risk management.
- I think that troubled trees should be immediately replaced. Maintaining a tree can make it become a risk in the future. It can be weak inside. Plant new trees.
- HRM should increase the budget for planting trees by raising taxes.
- Why are we planting trees in the first place? The answer depends on why HRM wants trees.
- Stormwater retention benefits.
- Tree shade limits asphalt deterioration.
- Improve air quality.
- The UFMP neighbourhood approach helps answer this too.
- Trees should be seen as green infrastructure.
- Cost/benefit analysis of the urban forest is complex and inter-related.
- Everything is local.
- The UFMP neighbourhood approach is great.
- Spinoffs should be seen.
- HRM should work with private industry like they did

for solar panels, compost bins, and the green roof programs. The city should be active.
- Small trees provide benefits as well.
- HRM needs more staff to plant more trees, and should partner with volunteer groups.
- Union cooperation would be important/necessary.
- Could there be a voluntary work program with local correctional facilities to plant trees?
- Insurance for volunteer groups could be a problem.
- Why is planting a priority in the short term? We need a balanced approach with equal amount of maintenance and planting. We want to avoid the New York City story (poorly managed trees injuring people).
- The economic benefits of planting a street tree are not the same as parks trees. Trees in parks have unique values.
- Open spaces are beneficial. What do we want from our parks?
- Agreement with the value of naturalness for parks proposed in the UFMP.
- Our urban forest is being threatened by development.
- There is nothing better than planned urban forest maintenance. It can be done by HRM staff or outside contractors.
- In some cases if the developers had done things right from the beginning, HRM wouldn't have to use HRM staff or hire contractors to correct past mistakes.
- HRM should offer incentives to developers wishing to retain canopy cover.
- Plant now, plant often.
- In cities with alleyways there are more opportunities for tree growth.
- Tree canopy is taken for granted.
- The UFMP has been a 10-year process with still nothing to approve yet at council.
- When NSPI prunes trees poorly people get angry and phone HRM to complain.
- Let's Have NSPI work in tandem with the city to prune intelligently!

Theme Two Discussions: Private Realm

Cole Harbour Workshop

- There is a group called Awesome Halifax that a couple of business owners chip in a few dollars and in the end of each month they do something cool with the money. They planted 200 trees for $1000 last month. So if we show people that if we plant trees ourselves, it would be really cheap to plant a lot of trees.
- What about some NGO and organizations that can help?
- Reach out to Clean Nova Scotia, this is under their mandate.
- It would be great if NGOs had a day which families could get together and get information on how to plant and prune trees.
- Tree Workshops teaching people about proper planting and pruning held in places like public libraries or business such as Home Depot are also useful.
- I think providing a list of species to plant would be useful (it is already in the appendix).
- People cherish puppies why don't we teach them to cherish little trees, whips.
- I think building campaigns up to Earth Day could be an example of community participation.
- We should have a "tree giveaway" program or provide trees for citizens at a low cost.
- Look for sponsors that want to green their image to fund this program. Car companies, TD, BMO, and Manulife financial, all these money institutes are going to go green. We should target them.
- Getting trees in front of properties is a big issue. We need to educate people on why trees are important. We need to get them to like having a tree in front of their house or in their property.
- Can an urban forest advisory committee be something worth thinking and investing?
- There are too many advisory committees right now.
- Advisory committees are more useful when you want to develop a plan they don't make implementation. So we need an implementation group.
- Toronto established an organization that helps fund a lot of the tree plantations.
- Trust and foundations would be more useful than advisory committee.
- These trusts should be dedicated to trees. They could give money to plant trees or provide the trees themselves to people or HRM.
- I think that HRM has previously partnered with clean Nova Scotia. But I'm not sure if it was for tree plantations.
- There is a foundation called evergreen foundation they could be ones to target.
- There are trusts in the UK that are both privately and publicly funded that manage the urban forest.
- Create a 'Seedling/whip giveaway' program or create a similar program where they can purchase the trees for a very low cost. Sell the trees through existing garden/nursery stores. Sell them in a 5 tree bundle where we control the species they will plant

for their neighbourhood. Register online. Tie this in to a 'holiday' like earth day or arbour day. Try and get a corporate sponsor that wants to green their image so the trees can be free.
- For public outreach target Neighbourhood Associations already in existence.
- Work with NGO's for a public outreach program, create planting/pruning workshops.
- Instead of an Urban Forest Advisory Committee HRM should create a standalone foundation/trust to which companies can give money.
- Have real estate agents include a tree planting and pruning guide in new houses.

Dalhousie Workshop
- So when you did the survey, where did you see the gap in canopy targets? Were they from residential, commercial, or HRM land?
- There is a street tree backlog on HRM land, but there are lots of opportunities on private land.
- Is there a place that could help someone with a sick tree?
- Do you think a compost bin method (subsidized by HRM) is a good method to increase trees on private property?
- People will spend $100 on annual that would die after a year. So I think it is mostly education. Direct people to buy very cheap trees ($0.75) that are low maintenance and stay for a much longer period of time.
- You can say to people that based on the tax that each neighbourhood has paid these are the number of subsidized trees available for plantation.
- I think I need better education on the trees on my property? What disease they have? What could be done? What trees to plant? Do you think an organization can help?
- I think organizations such as energy efficiency have done huge work. I think some work along those lines could work.
- Educating high school students would be a good way to target people.
- Urban forestry outreach program currently does this but we need more resources. We need education on diversity of age and species.
- I believe the diversity of species on private lands is more than HRM lands.
- Is there an invasive species list? Do nurseries have this list? Why are nurseries aloud to bring and sell these species?
- I think the educational aspect of nurseries is very weak and they are not being involved.
- Should we partner with nurseries or educate them only?
- Landscape associations can be good to target and ask for their help. We can even have some standards for them.
- Well educated graduate students could be a good group to target (this has been successful on the theme of water which can be incorporated for trees)
- There is not enough soil for our trees, it is all rock. We need to educate people on the needs of soils for trees.
- Is there anything we could do for parking lots? Like those in Dartmouth crossing.
- In Germany every parking lot has a tree.
- There may be a way to engage snow removal with trees and parking lots.
- If we propose a tax break then we might have to deal with the facts that some people will plant trees on their properties to get their tax break and then remove the tree afterwards.
- When we build our industrial parks we compact everything and don't leave enough room for trees.
- A professor in Hong Kong just designed a green roof that can hold trees 12 metres tall.
- Can HRM develop a very specific guideline for planting, and pruning trees for residential properties that could guide people to better plant and take care of trees?
- If you show that it costs next to nothing to plant a tree and it returns many benefits, I think people will start wanting them for more than just their aesthetics.
- You could go into Point Pleasant Park, harvest the small whips that might die eventually from competition and have a very cheap sale.
- Why not have tree clubs for each neighbourhood or community?
- Other cities have nature and heritage tree walks in order to educate the people.
- We think that the neighbourhood associations are a practical method to start urban forest associations.
- All the UFMP communities have schools. Use the school system for further education on trees.
- Montreal has a tree by-law for private land.
- By using by-laws you can lose your support from public but with partnering with organizations you gain more allies.
- Let people know that trees can increase the value of their property.
- New subdivisions have hardly any trees. Many have

new Canadians living there who may value trees differently. Provide information in other languages. Provide training programs.
- There should be a by-law to plant on new developed lands.
- Neighbourhoods to adopt a tree, like adopt a highway.
- Promote financial gain from trees.
- Stop the initial clear-cut for new development, and then there would be no need to replant trees.
- We should put houses into woods not a typical subdivision with dense housing. This will provide room for more trees to grow.
- Have night schools for residents so they could learn to plant and prune.
- Promote businesses to partner with schools to plant trees in parks.
- Educate people that by living in the city they are part of a larger ecosystem that also comprises the urban forest.
- Go through grass roots organizations and build communities together. Similar to community gardens.
- get young people involved and this will continue through generations.
- Kids could motivate parents or parents instill values in kids.
- Have the water commission as a stakeholder in the whole urban forest.
- Bring all ideas into a big public campaign.
- Have canopy cover replacement in clear-cut subdivisions.
- Incentive programs instead of by-laws would be better.
- Always have a minimum % of canopy cover in any development.

Bedford Workshop
- Educate developers on the value of trees.
- Every time you add a cost to a developer they would take it down on the customer.
- The developers need to have regulations.
- I think the best way to target people is through neighbourhood volunteer organizations.
- You should target schools and education organizations.
- Schools are the best place to start. You're probably not going to be able to change my mind but a kid could carry on the message.
- Targeting scout groups would be a way to address this. We have already done some programs with them.
- People would like to enhance the wildlife value of their lot. Telling them that trees could do this we be a way to target people to plant trees.
- Sometimes people cut down trees for fear of criminals hiding behind them. Educating them on way to prune trees that would minimize hiding places would also be good.
- People should be told that trees increase their property value.
- Online media access is a good way to target the new generation not everybody reads papers.
- I think an incentive program is important.
- I can say that the majority of people love their trees; focus on that and make them emotional.
- People are also afraid of forest fires. They should know what species are more flammable and also the distance that a tree should be planted next to their home.
- You should educate people that not all trees turn out to be good. They should now which species to plant and where.
- Target social media, schools, volunteers, firefighters
- Link this information to the list of thing that a homeowner should do on an annual basis. I mean when they annually maintain their homes.
- Give tax rebates for planting trees on properties.
- Also educate people that their homes could become more energy efficient with trees around.
- A similar program like community gardening could be a way to target people.
- Provide opportunities for people to report to the city on which pockets of trees need to be saved.
- If somebody reports to the city don't ignore it. Listen. This will make people more interested.
- The trees should have some sort of connection. There is a lot of wildlife that could be protected and this should be incorporated into the plan. Recognize wildlife habitat.
- HRM should provide a copy of the UFMP to landscape companies and tree nurseries so people can look up their neighbourhood and get advice on what species they should plant on their property.

- Create social networking sites to foster care and stewardship of the HRM urban forest.
- Create a campaign similar to the "Don't Dump This" campaign.
- Create partnerships with NGOs, girl guides, scouts, EAC.
- Create a neighbourhood organization to connect people (especially people who have extra seedlings growing on their property and want to give them away).
- Use the existing groups, trail associations, garden clubs, conservation societies.
- Create a competition between UFMP neighbourhoods for # of new trees planted, or most improved, merit awards, possibly a plaque in a park for the winner.
- Hold tree planting events in each community, on private land, turn it into an educational tool.
- Reach out to Business Improvement Districts, BIDs.
- Get a corporate sponsor that wants to green their image to fund tree plantings, tree giveaways.
- Have these businesses put inserts into their product that will educate people on the urban forest and pruning.
- Debunk the myths and misconceptions about the negative aspects of trees and emphasize the positive aspects.
- Educate them in schools, especially elementary schools.
- Create pamphlets to go with tree giveaway programs.
- Start tree tours (similar to garden tours) urban forest walks.
- Show people how to properly prune and what species to plant with a workshop.
- Set up information booths at parks that people frequently walk through to teach them about the urban forest they are clearly enjoying.
- Start a 100,000 tree program.

Theme Three Discussions: Land use policies and regulations

Cole Harbour Workshop

- If you want to encourage people to plant on their lands how much value does it add to each community?
- Trees can increase your property value. Real estate agents should be partnered with to encourage people to plant trees on their property, which would be different in each community.
- By looking at examples from other cities, those with broader by-laws regarding trees, face more trouble and requests to cut down trees. A tree by-law in HRM may be more trouble than it's worth.
- I would personally like to see that whatever by-laws we have currently regarding trees in HRM in any book to be removed and to start all over again. This will give you a fresh start.
- One of the policies that people don't like is that if any trees from the city falls down and damages a property, the city is not liable for the damage. That's why people don't like these trees. Maybe a look and change of this by-law will change the attitude of people towards having a tree planted in front of their yards.
- Regulations need to be strengthened in HRM.
- I think that instead of prioritizing, all of these themes should improve at the same time and in conjunction with each other. I think it should be a unified thing. Also try to ensure your regulations are enforceable.
- Why aren't developments in line with regulations to plant a certain minimum number of trees? In HRM InDesign is there anything in it that allows us to regulate this?
- Yes there is. There has to be variance allowed as you move forward in each community. We can also look at how we write development agreements. We do have a mechanism to change the Municipal Planning Standards.
- The master plan is not going to change any by-law. It is a policy plan that would set recommendations for change and next steps.
- We shouldn't have by-laws we can't enforce.
- I don't think spending half a million dollars to regulate trees on private land is the right way, but spending half a million dollars to spend on regulating development would be better.
- We can really improve land use by-laws during development.
- If HRM makes a 'tree by-law' it has to be enforceable.
- Review Development Agreements and see if they can be improved to retain trees, make space for trees to grow, and replant to reach a certain % canopy cover.
- Change the Municipal Planning Strategy to incorporate room for trees.
- Create a cost incentive to plant trees.

Dalhousie Workshop

- I have noticed the fact of trees in conflict with utility lines. Who controls where and how utility lines go in? Sometimes they are underground.
- The utility review board controls it. Sometimes HRM has to fight for underground installation.
- Every major windstorm blows down trees on utility lines. When you think about policies on planting trees the fact of trees falling on utilities comes to mind. Do you think there could be a change in where trees go?
- That would likely lead to not planting any trees in HRM streets.
- We need to have land use by-laws that ensures that development is in a manner and way that improves the urban forest.
- In any development there needs to be a vegetation management section. There needs to be a by-law that sets that.
- Before development takes place, we should go in and assess properties to say which tree needs to be saved and which tree can come down.
- Do you want HRM to take action in protecting the landmark trees?
- I think that just keeping individual trees that once existed in a stand can isolate them and make them vulnerable to blow downs.
- Can by-laws reflect the benefits of trees? Maybe a reduction in taxes is a way? Is it possible to do a cost benefit analysis?
- HRM should educate homeowners that trees increase property values.
- Diameter replacement by-laws could cause people not to plant the tree in the first place because they are afraid that the tree will get too big and they will get into trouble with it.
- Replacement policies maybe better than diameter replacement.
- Trees are a liability and if one falls down there is no source of government funding that will help with the damage.
- There should be guidelines to how close a tree can be planted near a house. Maybe regulations?
- How much are you willing to pay to have a by-law enforced?
- It would be impossible to regulate on individual households but targeting developers maybe better.
- Protection of trees in riparian zones needs more emphasis.
- Is there a problem with landowners removing trees from their properties?
- No, but development is an issue and that should be targeted.
- Should trees be viewed as green infrastructure? Usually developers put trees in, but in bad situations which will cause them to die 2 years later. Do you think this should be amended? Can it be amended to regulate certain type of species to be planted?
- Yes. So this is what we are thinking.
- What about the neighbourhoods that are not in the plan?
- We are going to look at more rural neighbourhoods in the next steps of the plan.
- I believe that areas in transition should be looked at. If neighbourhoods are restricted to sewer systems then when someone sees a pipe coming down the street, they will go ahead and clear their property from trees so that they would not get into trouble later. Therefore I think a regulation to development should be more enforced.

Bedford Workshop

- We should have the UFMP online as an Epub document!
- More investment is needed for the UFMP. Start with the urban core and then to expand to areas like Hubbards. HRM must lead!
- How do we increase the budget for the UFMP?
- Sustaining the canopy is important, New York City budget is cut and now people are getting killed (10) – lawsuits cost more than budget savings from cuts ($20m in lawsuits).
- Proactive maintenance leads to cost avoidance of lawsuits.
- NSPI pruning - incentives are needed for private landowners to prune.
- Arborist on staff for HRM to respond to citizens request.
- Cost sharing approach.
- A private tree by-law is needed to protect all trees, regardless of size, diameter, or number.
- Trees should be removed by permit only. Diameter replacement is a good idea.
- Distinction important? Yes. Other improvement to retain canopy should be made to land-use by-laws and to the subdivision by-law. This should include the regional plan and the 18 sub-plan areas.
- Development Agreement; can tree retention be required?
- There would be resistance from developers.
- Development in areas with exposed bedrock and shallow rooted forests should be done with great

care to retain a portion of the native stand. This should be required in development agreements.
- Incentives for developers to value trees.
- Make developers plant more trees in new subdivisions.
- Should be more city staff to manage the UF.
- HRM would be wise to explore mentoring programs with post-secondary institutions to supplement staffing shortfalls.
- Arborists need to advise community councils.
- Use of Citizens On Patrol program to protect trees from vandalism.
- Consider a $0.05 per plastic bag fee to finance urban forest management in HRM.
- Will the retailers take part?
- A private tree by-law should include provisions for diameter replacement.
- 20m riparian buffers should become the property of HRM.
- Resistance from HRM to do this is for liability reasons.
- Work with developers and put some tree protection into development agreements
- If you have a tree by-law make sure it won't impinge on citizens with small properties and only a few trees who want to remove a single tree (for example). Ensure the process is expedited and not frustrating. Ensure people are well educated on the bylaw before it is implemented. Have a resource available to people with questions, like a tree hotline, "call before you cut".
- Instead of a bylaw, have neighbourhood associations take control of tree removal, call them for permission, or maybe have them as the watchdogs to enforce the bylaw.
- Have a 'no net loss' policy for trees removed during development (replant them nearb).

Community Consultation on the Implementation of the Urban Forest Master Plan: Summary Report 2 – July 2012

Introduction and Background

Halifax Regional Municipality and the School for Resource and Environmental Studies at Dalhousie University hosted a workshop on June 28th, 2012 to seek community input on how to most effectively implement the recommended actions of the Draft Urban Forest Master Plan (UFMP) and how to prioritize these actions. The session was held on the Dalhousie University campus at the Kenneth C. Rowe Building from 11:30 am – 2:30 pm. The invited participants included members of the development community, HRM staff and advisory committees, land use planners, professional arborists, landscape architects, institutional landowners, real estate companies, utility companies and non-governmental organizations. More than 50 individuals attended the workshop. This fourth and final UFMP public engagement workshop was preceded by similar events held in Halifax, Dartmouth and Bedford during May, 2012.

After an introductory presentation by Dr. Peter Duinker, the participants joined smaller breakout groups to discuss the UFMP's three main themes: trees in the public realm, trees in the private realm, and land use policies and by-laws. HRM and Dalhousie representatives served as facilitators and recorders. The groups had 80 minutes to talk about the three themes. Participants also had the opportunity to complete a UFMP opinion survey. The following is a summary of the suggestions that emerged, as well as issues that could be considered and addressed throughout the implementation of the UFMP.

Discussion comments were recorded by note-takers and are included at the end of this document.

Theme 1: Trees in the Public Realm

There was a general consensus at the public meetings that HRM could and should improve its urban forest by planting more street trees, park trees, and by reclaiming vacant land. There was also a general feeling that new trees being planted should be ones that are native to the region and that species should be selected in order to increase diversity within each neighbourhood and in the urban forest as a whole. It was suggested that such plantings on public lands would give HRM the best return on their investment and the most immediate results. There was a clear consensus that more trees needed to be planted in parks and along streets but it was less clear as to which was more important in the immediate future. Ultimately it was decided that trees should be planted in both parks and along streets with more effort going towards planting trees along streets. Park trees offer shade on hot days (along with many other benefits) and are crucial to the enjoyment of city parks but street trees offer many more benefits including increasing the longevity of paved surfaces, regulating temperature in the city overall and specifically for the buildings they are in front of, reducing traffic speed and noise, and beautifying the city. An important point which was raised in one of the discussions was that the focus should not be one or the other (planting street vs. park trees), rather it should be both and the focus of planting should be based on the priority areas for tree planting already outlined in the Draft Plan.

The development of a proactive 7-year pruning cycle was also discussed. HRM's street trees are currently pruned when maintenance is required. Compared to the existing reactive method of pruning, a 7-year cycle would require a significant budget increase for tree maintenance. However, ongoing maintenance would reduce the costs associated with problem trees such as damage from falling limbs. As such, many agreed that a switch to proactive pruning was appropriate with the stipulation that HRM establish a program to test the program first in a few neighbourhoods. There was also a concern that with so many plantable spots HRM might plant more trees than it can properly maintain. Thus the budget for maintenance and pruning should increase in conjunction with the budget for tree planting.

Many people were concerned by the pruning practices of Nova Scotia Power Incorporated (NSPI). They felt the pruning was not done with tree health in mind and caused unnecessary damage to the trees. To fix this problem people suggested that HRM work closely with NSPI to come to an agreement on how to appropriately prune the trees. There was support for HRM switching to a proactive 7-year pruning cycle, especially if HRM and NSPI adopted integrated management strategies. It was stressed by some that since a pruning cycle program would be costly it should focus on structural/safety issues and the prevention of trees interfering with overhead wires, not cosmetic pruning.

Many noted that while a 7-year pruning cycle would result in increased initial costs upfront, it would reduce costs in the future. Through proactive pruning possible issues can be identified before they become more serious resulting in fewer trees dying or needing to be removed and replaced. While on the topic of pruning, a discussion on dead standing trees (deadwood) arose. It was suggested that some deadwood in parks be left and not removed by HRM as it is actually useful habitat for some species of birds. Since many people see deadwood as a problem, its habitat benefits would need to be explained in UFMP public education programs.

Theme 2: Trees in the Private Realm

Over half of HRM's urban forest canopy exists on private property. With this fact in mind, the importance of trees in the private realm was clearly recognized at this meeting. Two distinct topics (public education and partnerships) emerged during the discussion of this theme.

Many felt that public education on the values, benefits, and importance of the urban forest was a key element of the UFMP to be implemented while others felt that partnerships with groups, organizations, institutions, associations, corporations, and businesses should be an implementation priority.

Although appearing to be separate, these topics were frequently intertwined during group discussions. Partnerships with Non-Governmental Organizations (NGOs) were identified as a great starting point since they are experienced at engaging the public and running education programs. Partnerships with NGOs could be used to produce informational booklets or pamphlets, run educational workshops, and create volunteer groups. Large corporations looking to 'green' their images were identified as targets for possible sponsorships of urban forest outreach programs. Participants also suggested tree planting partnerships with shopping mall and big box store owners to improve canopy cover on their properties.

There were also suggestions for partnerships with tree nurseries and garden centers to encourage the sale of more native trees. It was suggested that UFMP Neighbourhood Factsheet binders could be provided to assist customer selection of trees appropriate for their urban forest neighbourhood. Nurseries and garden centres could also be a distribution point for a subsidized tree planting program. One suggestion included the development of urban forest educational booklets containing discount coupons for tree purchases. Participants supported this approach over tree giveaways as it would foster a more direct sense of ownership and stewardship. Another idea was to give tax breaks for money spent on trees.

There was considerable interest in the possible formation of a network of Urban Forest Neighbourhood Associations (UFNAs) to get the public more involved and foster stewardship. The volunteer groups would be formed based on the neighbourhood boundaries set out in the UFMP. Existing neighbourhood associations could be used to aid in the creation of UFNAs and once a few UFNAs were created they could help nearby neighbourhoods to form their own local groups.

Participants suggested that citizens should be able to learn more about their urban forest neighbourhoods. Educational initiatives were discussed thoroughly and noted as an important topic for HRM follow-up. Three target groups were strongly suggested for HRM's attention: youth, homeowners and business owners. Youth urban forest education should supplement existing school programs being run by HRM and NGOs. For homeowners and businesses it was suggested that educational messages should focus on the benefits of trees (aesthetic, environmental, increased real estate value) on private property. Participants noted that benefits include temperature regulation, wind protection, reduction of sun damage on pavement or other surfaces, as well as more general benefits like cleaner air, carbon sequestration, reduction of the heat island effect, and the aesthetic beauty which makes residential and business properties more attractive. Also recommended was a 'landmark tree' program to celebrate trees with rare or unique characteristics such as age, species or a relation to an historic event. There was additional support for the development of public workshops on tree selection, planting, pruning and ongoing care.

Participants felt very strongly that partnerships with development agencies, construction firms, and real estate agencies were crucial to the preservation and continued growth of HRM's urban forest. Real estate agencies can be used to educate new homeowners on the benefits of trees, possibly including some urban forest education booklets in the information packages they distribute. Developers need to be engaged in urban forest education since they are shaping today's and tomorrow's urban forest.

Theme 3: Land use Regulations and By-Laws

Land use regulations and by-laws that HRM could adopt to conserve urban forest canopy cover were discussed at the workshop. This was a difficult issue but some agreement was achieved on the following points. If a canopy conservation by-law was adopted it should not affect the removal of up to 10 trees/year for any private property. As well, the removal of trees less than 20 cm (6") in diameter and diseased or dead trees would not require a permit. Many also felt that an HRM by-law should be easily enforceable, and not be expensive to administer. While there was some trepidation about a by-law it was agreed that it could be a useful element in HRM's regulatory 'toolbox' and that the UFMP should recommend further research and community input before proceeding to by-law development.

Other forms of regulation that were discussed included changes to development agreements to preserve more existing trees during development or include provisions for replacement after development and/or nearby. Replacement could be done with a diameter replacement policy, where the diameter at breast height of the tree(s) to be removed is/are measured and the total diameter of the younger and smaller trees to be replanted must add up to the original tree(s) diameter(s). Current regulations generally include vegetation management provisions but it was suggested that they could be improved to provide more specific directions regarding the retention of native tree stands as well as planting specifications for trees to be planted after development. It was also suggested that municipal planting standards for HRM could be modified to allow better tree growth by increasing the size of planting pits, improving soil volume requirements and adding provisions for permeable surfaces to allow water to reach the root systems of trees. New housing developments and parking lots were another focal point for discussions. The main concerns for new housing developments were to preserve more existing native tree stands during development and to take proper care of street trees that are planted after development. Representatives of the development industry pointed out that HRM's regulations sometimes require street tree plantings in new subdivisions while home construction activities are still taking place. It was recommended that the regulations be changed in order to ensure that street trees could be planted at a later date to ensure their health and survival. Conversations concerning the need for more trees in parking lots focused on some of the benefits of trees planted adjacent to paved surfaces. Cars are shaded, asphalt lasts longer and treed parking lots are attractive to shoppers.

The possibility of a designation system for specific trees was also discussed. These trees would likely be denoted as "Landmark Trees" and could be individual trees or entire thickets. Designations would be made based on factors such as age, size, cultural associations, and history. These designations would likely not provide any permanent or legal protection for the trees but would be more of a celebration of nature.

Other discussions concerned amendments to the HRM Municipal Planning Standards (commonly known as the HRM Red Book). Participants talked about the 'greening' of the red book in order to include recognition of trees as green infrastructure and the many benefits they provide to urban living.

Concluding Statements

At the end of the workshop, breakout groups returned to the main auditorium for a final dialogue on the main themes of the UFMP. A presentation summarizing the key points brought up during the breakout sessions was given by Dr. Duinker followed by an extended question and answer period. The workshop concluded with an overview of 'next steps' in the ongoing development of the UFMP, including the completion of its final chapter on implementation and plans to have the UFMP ready to present to HRM Council in the fall of 2012.

Supplementary Information

These are the discussion notes from the workshop. The notes are not verbatim but are an accurate reflection of the meeting conversations.

Notes from June 28th UFMP Workshop at Dalhousie

- Going back HRM had a policy where developers had to plant trees on the property they were developing.
- I think that planting on both streets and parks are important, but I think that parks with a lot of trees like Point Pleasant Park are too big for people to handle and are thought not to be playgrounds so I think that planting on streets is important.
- I think that trees in parks are important, there is no shade in our parks right now and not healthy and are uncomfortable.
- Planting on streets and in parks are both important.
- Partner with NGOs, schools, and tree nurseries.
- Make an information package that can be handed out.
- To increase trees on industrial land is to have regulation. These should be in development agreements and site plan assessments.
- By-laws should have an adjustable scale so as not to target individual citizens.
- Can we not do better to integrate better design when developing? They are raising trees to the ground level and spending huge money to put them back.
- As a developer I must say that we try to keep trees that are valuable but you can't save all trees.
- People need to be educated on this design issue and the value of keeping precious trees. Why go buy a land in the woods and then cut down all the trees.
- Maybe if there would be a common area between houses that are considered public and people can't cut them down.
- Educating the public that trees are actually green infrastructure is important.
- We should educate people on the personal, public and even business benefits of trees.
- Urban forest neighbourhood volunteer groups could be created using current Resident Associations already in place. The idea being to create a self sustaining organization that HRM would run itself with little to no assistance from HRM after the initial phase.
- Educate kids in schools in a fashion similar to that of the recycling program. Run a program on school grounds where they kids help to plant seedlings on the property. Work with NGOs to accomplish this. Build off of the existing education program run by HRM on Arbour Day.
- People need to feel like they own the tree so that they will cherish it and protect it. Instead of giving trees away to people, HRM would be better served by including a coupon in an educational package. The coupon would allow people to purchase trees at a discounted rate from specific tree nurseries. Businesses would also appreciate not having the market flooded by free trees and coupons bring people into their stores where they might purchase other items.
- The education program must teach people about the numerous benefits of having a tree on your property, especially benefits that relate to money.
- Partnering with nurseries will be very important; workers should know about the plan and understand it. They should use it to aid people in their tree selection and a version of the plan and especially appendix should be made available to tree nurseries customers who wish to look up their neighbourhood.
- Development agreements currently have provisions for trees but they could have MORE.
- Large parking lots should be built with room for trees, in between the parking spots. This would regulate the extreme temperatures, shade cars, reduce wind, reduce the albedo effect, and heat island effect. It would also reduce damage caused by the sun to the asphalt, making it last longer, and it would make visiting the business a more pleasant experience.
- HRM staff must be educated on how to enforce different DAs.
- Any tree bylaw should be scaled to deal with the removal of a large number of trees.
- Landmark trees are a great idea, a celebration of an individual tree or copse of trees that are particularly old, large, or beautiful. However, trees are naturally ephemeral since they are living things and will eventually die. This will confuse people who equate in their minds that 'heritage homes' are to be protected 'forever'. Thus a landmark tree designation program must be rolled out with the proper education that they tree will not last forever.
- It is troublesome that the trees may not be legally protected by the designation, but they would

be 'socially' protected since many people would likely get upset if a landmark tree were cut down. Trees on HRM land can only be removed with HRM approval so there is some protection there. Protection of trees on private land is entirely up to the private land owner.
- Rather than a focus on parks vs streets in general the focus should be on priority areas. Some parks are more important than some streets and vice versa.
- Important to focus on diversity of species and age class diversity.
- Deadwood can be beautiful in its own way and is an important part of the natural habitat. The standard view of the public is that it should be removed and so HRM does exactly that. If both the public and HRM staff could be educated on this then it wouldn't be a problem. Sometimes deadwood does need to be removed due to safety issues.
- If a pruning cycle is implemented it should be to deal primarily with structural/safety issues and the prevention of trees interfering with infrastructure, not cosmetic.
- HRM could foster planting on private land though fund matching, tax rebates, coupons, etc. It's a good idea because people would own the new trees and this would create incentive for them to take care of the trees as well as foster a connection to the urban forest in general. HRM would have to organize it in a way to prevent people from planting ornamentals and focus the incentives on native species, or more specifically the proscribed trees to be planted by neighbourhood described in the appendix.
- HRM could run street tree pruning workshops for citizens.
- For children the best program would be one where they plant seedlings. Easier for kids to plant, cheaper for HRM, and the children get to grow up with the trees.
- The education and outreach program should teach people about their neighbourhood but should also educate them on the surrounding neighbourhoods and the difference between the rural and urban neighbourhoods. This will be pay dividends when people move houses.
- Shop owners need to be educated on the benefits of street trees and the negative myths need to be debunked. Use the Hydrostone as an example.
- For developers, the cost of maintaining the trees they plant needs to be addressed. Currently they plant them, do not take care of them, and then HRM inherits dead trees. This entire process needs to be looked at and changed. Trees need to be planted in new developments at the appropriate time and they need to be watered. Maybe the developer should simply provide the money to HRM and HRM will plant and take care of the trees. OR maybe they developer can have the option to give land instead of money, land which could be turned into parks.
- Trees are always going to be an afterthought until they are considered part of the (green) infrastructure and a capital asset.
- Maybe riparian buffers should be larger and have stricter protection. Maybe the riparian zones should be transferred into public ownership.
- Parks are the most commonly preferred option for planting trees on HRM property because of better survivorship and fewer obstacles. However, street trees are more valuable
- Lots of support for a pruning cycle, as it can reduce the number of trees that need to be removed and replanted.
- There is value in reaching out to and making partnerships with businesses, organizations (for example, homebuilders association, business commissions, chambers of commerce) and also citizens and neighbourhoods.
- Lots of support for neighbourhood associations. Education is very important.
- Trees should be planted in a subdivision a few years after construction is done to replace those removed. However the overall removal and damage done by development should be minimized.
- Street trees have the most impact (environmentally, socially, economically) and should be the priority. Currently there is little room for trees along streets and thus the red book development specifications need to be changed.
- Neighbourhood tree associations could be used to monitor the health of trees in the neighbourhood, identify problem trees that need pruning, help to educate, and monitor illegal tree removal.
- We are losing many trees because of poor maintenance. This issue could be resolved by adopting a pruning cycle. The cost of a pruning cycle may be high but it would reduce costs associated with removal of trees, planting of new trees, and damage caused by problem trees.
- Since HRM is so large it contains neighbourhoods with a variety of geophysical conditions; not every tree species will succeed in every neighbourhood.

The neighbourhood approach taken by the UFMP deals with this issue quite well.

- Planting on private property would work best if the people had some ownership in the tree as opposed to free trees given away by HRM. A sense of ownership encourages stewardship and can be achieved though subsidized trees, tax breaks, coupons etc.
- Money for trees could be attainted from commercial organizations that wish to donate and green their image. This prevents negative impacts to the private sector tree industry.
- A by-law is an interesting idea since it would give HRM the ability to intervene on the removal of large amounts of trees from forested land. A by-law could become costly and HRM may not have the funds or staff to properly enforce it. It remains an intriguing possibility and should be investigated further.
- By fostering a sense of stewardship in HRM citizens, volunteers can be extremely helpful. Public awareness is key (education) and access to the right information (how to plant, what to plant, how to prune, how to take care of a tree).
- Trees need to be viewed as green infrastructure.
- Green the red book.
- An urban forest advisory committee would likely be ineffective and not have 'teeth'.

Community Consultation HRM
UFMP Survey Report – July, 2012

The following report contains the results of an online survey launched on June 5th, 2012 and closed on July 15th, 2012. The survey was intended to solicit public feedback concerning the implementation of HRM's Urban Forest Master Plan. A total of 491 respondents took part in the survey with an overall completion rate of 88.7%.

Question 1. How important is it for HRM to allocate additional funding to increase the urban forest canopy by ensuring the number of trees on HRM streets planted each year exceeds the number of trees removed?

Response	Chart	Percentage	Count
Not Important		1%	6
Somewhat Important		9%	46
Important		25%	120
Very Important		65%	317
	Total Responses		489

Comment 1 – The responses to this question indicate that most survey participants wanted the current funding levels for tree planting on public land to be increased. While 65% of respondents felt this issue was 'very important' an additional 25% felt it was 'important' resulting in an overall support level of 90%.

Question 2. Over the next 5 years where should HRM focus on planting new trees?

Response	Chart	Percentage	Count
Parks only		1%	4
More in parks and less on streets		13%	62
Both at the same rate		62%	302
More on streets and less in parks,		23%	113
Only on streets		2%	10
	Total Responses		491

Comment 2 – The responses to Question 2 appear to show that planting along streets and in parks are equally important tasks. However, more people chose the option for HRM to plant 'more on streets and less in parks' implying that a slightly higher priority should be placed on improving canopy cover along streets.

Question 3. Tree pruning in HRM is conducted on an as needed basis once a problem is identified. Proactive pruning costs less on a per tree basis but the budget allotted to tree maintenance would need to be increased in order to inspect and prune each tree on HRM streets. Should HRM switch from a reactive pruning approach to a proactive pruning cycle?

Response	Chart	Percentage	Count
Strongly Agree		28%	138
Agree		37%	180
Neutral		23%	113
Disagree		9%	44
Strongly Disagree		2%	12
	Total Responses		487

Comment 3 – By combining the 'strongly agree' and 'agree' responses there was an overall agreement by 65% of respondents in support of HRM moving from a reactive pruning approach to a proactive pruning cycle. Since the 'neutral' category was neither a negative nor a positive response we also compared the combined 'agree' and 'strongly agree' results with the 'disagree' and 'strongly disagree' results. This too resulted in an overall response in favour of HRM adopting a proactive pruning cycle (65% to 11%, 318 to 56).

Question 4. Assign a percentage of effort to the three actions HRM could take to improve the urban forest on public lands?

Variable	Chart	Response
Plant more trees on HRM streets		40%
Plant more trees in HRM parks		35%
Adopt a pruning cycle		25%

Comment 4 – Planting more street trees emerged as a slightly higher priority than planting more park trees. Support for the adoption of a pruning cycle was the lowest priority however the 25% level of effort that respondents assigned to this task was significant.

Question 5. As part of an outreach educational program to encourage tree planting on private land, should HRM focus mainly on individual homeowners, businesses, organizations or institutions?

Response	Chart	Percentage	Count
Individual homeowners		10%	50
Businesses		13%	62
Organizations		4%	20
Institutions		3%	16
All the above		70%	342
	Total Responses		490

Comment 5 – Most respondents supported educational programs for all of the groups listed. Respondents that did not select 'all of the above' generally favoured 'homeowners' or 'businesses' compared to 'organizations' or 'institutions'

Question 6. How important is it for HRM to create partnerships to deliver educational programs, hold workshop events, and distribute information pamphlets with businesses, organizations, NGOs and neighbourhood/volunteer organizations?

Response	Chart	Percentage	Count
Not Important		5%	22
Somewhat Important		28%	138
Important		33%	163
Very Important		34%	165
	Total Responses		488

Comment 6 – The majority of respondents felt it was important for HRM to pursue partnerships with external organizations.

Question 7. HRM could work with other organizations to develop a non-profit trust (an Urban Forest Foundation/Trust) initially supported by HRM funds and private donations to educate the public, hold workshops, create, support, and co-ordinate neighbourhood volunteer groups, and conduct tree planting programs on private lands. How important is it for HRM to create an Urban Forest Foundation/Trust?

Response	Chart	Percentage	Count
Not Important		7%	32
Somewhat Important		25%	121
Important		38%	187
Very Important		30%	149
	Total Responses		489

Comment 7 – Most respondents (68%) felt that the creation of an Urban Forest Foundation/Trust was either 'important' or 'very important'.

Question 8. Please rank, in order of importance, these three possible actions HRM could employ to increase the canopy cover on private land. Where one is the most important

	1	2	3	Total Responses
Education program	170 (39%)	111 (26%)	154 (35%)	435
Partnerships	126 (29%)	196 (45%)	110 (25%)	432
Urban Forest Foundation/ Trust	164 (36%)	139 (30%)	158 (34%)	461

Comment 8 – Responses to this question were fairly even and indicated a rank order preference for the development of an education program slightly ahead of an urban forest foundation/trust, followed closely by partnerships. The results imply that all three actions were equally important to respondents.

Questions 9-13. Via the Halifax Regional Municipality Charter HRM can influence the adoption of policies and by-laws respecting trees or vegetation. Below is a list of possible policies and by-laws which could serve to preserve and create future urban forest within the Municipality. Please indicate whether you believe HRM should adopt each change:

	Yes	No	Total Responses
Q9. Sustain intact patches of native forests during development, especially in riparian (the interface between land and a river or stream) zones.	420 (98%)	9 (2%)	429
Q10. Develop a permitting system for the removal of 10 trees or more, annually, on private property	277 (65%)	149 (35%)	426
Q11. Adopt a diameter replacement policy (if you remove a tree you must plant new trees nearby which in total will equal the diameter of the removed tree)	259 (61%)	168 (39%)	427
Q12. Adopt municipal infrastructure and development design standards that will provide adequate space and soil for large trees.	400 (93%)	29 (7%)	429
Q13. Develop a conservation strategy for the protection of specific significant 'landmark trees'.	384 (90%)	45 (10%)	429

Comment 9 – Nearly all respondents (98%) favoured HRM's adoption of new regulations to ensure the sustainability of patches of native forests and riparian zones during development.

Comment 10 – Results appeared somewhat divided on this question. Although 65% were in favour of a permitting system for the removal of 10 trees or more from private properties, 35% were opposed.

Comment 11 – Respondents also appeared divided on the question of a diameter replacement policy for tree removals. Although 61% agreed, 39% were opposed.

Comment 12 – A solid majority (93%) of respondents thought that municipal infrastructure and design standards should be improved to provide adequate space and soil for large trees in the urban environment.

Comment 13 – There was also strong support from respondents (90%) for the development of a conservation strategy for landmark trees.

Question 14. Where do you think it is most important for HRM to direct its efforts in order to improve the urban forest?

Response	Chart	Percentage	Count
Facilitate planting on public lands		46%	202
Encourage planting on private property		16%	71
Amend land-use policies and by-laws		38%	170
	Total Responses		443

Comment 14 – A slight majority of respondents (46%) thought that HRM's top priority for implementation of the UFMP should be to plant trees on public lands. This action was followed by 36% of respondents in favour of amendments to land-use policies and by-laws being a top priority. Encouraging tree planting on private property was a top priority for some respondents but at 16% it garnered far less support than the other two options. While all three actions are important components of the UFMP it appears that planting trees on public lands is the preferred priority for moving forward on plan implementation. This does not mean that the other proposed actions will be omitted from the UFMP however; it provides direction for establishing priorities regarding the resources and program scheduling necessary for an orderly implementation of the plan.

Supplementary Comments

Supplementary comments received from some respondents indicated a wide range of urban forest concerns and observations. Comments were requested concerning the questions posed in the survey. Additional comments were solicited in an 'Anything we missed?' section of the survey. Answers to all comments have been provided by UFMP research staff.

Comments

The 120 comments from survey participants can be found in Appendix E.

Anything we missed? Anything you want to comment on?

The 112 comments from survey participants can be found in Appendix F.

Are you a homeowner?

Response	Chart	Percentage	Count
Yes		64%	282
No		36%	160
	Total Responses		442

Do you rent?

Response	Chart	Percentage	Count
Yes		36%	159
No		64%	281
	Total Responses		440

Are there trees on the private property where you live?

Response	Chart	Percentage	Count
Yes		89%	392
No		11%	49
	Total Responses		441

Is there a tree on the public land in front of your residence?

Response	Chart	Percentage	Count
Yes		60%	262
No		40%	176
	Total Responses		438

What is your age and gender?

Gender Response	Chart	Percentage	Count
Male		50%	217
Female		50%	213
	Total Responses		430

Age Response	Chart	Percentage	Count
18 and under		0%	1
19-25		11%	50
26-34		26%	116
35-44		20%	90
45-54		17%	77
55-64		14%	61
65+		11%	47
	Total Responses		442

Appendix E

Comments

1. How much is spent on people's pets compared to enhancing the urban forest?
Answer: Pet ownership is expensive but it has its rewards much like an investment in a healthy urban forest.

2. I love trees in Halifax. Plant more of them.
Answer: Yes, we live in a beautiful City and the UFMP calls for many more trees to be planted here.

3. Areas should be identified that could benefit from even smaller tree plantings, especially on streets. As well, institutions (libraries, universities, etc.) in some areas can use more trees in their vicinity. Education should also focus on maintaining the trees, and benefits for yards and composting by having trees in your yard.
Answer: Good suggestions for further action. The UFMP focuses on neighbourhood-based tree planting and discusses many of the issues you have raised.

4. Education leads, while the others are an exercise in pushing the public for a response.
Answer: Public education is an important component of the UFMP that will help property owners understand the benefits of tree planting on their properties.

5. Some more info about pruning would be helpful on the 'enter a percentage' question, as i know nothing about its pros and cons. Please expand on 'partnerships' in the last question- perhaps some possible examples? Oh, and keep up the good work :-)
Answer: Please visit the Frequently Asked Questions (FAQ) section of the UFMP webpage for a more thorough explanation of the benefits of regular tree pruning. The website is available at: www.halifax.ca/RealPropertyPlanning/UFMP.

6. Keep up the good work!
Answer: Thank you for your support.

7. There is a small green area bounded by Pinewood Drive and Lovett street in Dartmouth that would make a nice sitting parking. Currently owned by Emera and not tended to.
Answer: Good suggestion. The UFMP recommends that HRM partner with corporations to achieve a better urban forest.

8. Focus should be placed on prevention of the destruction of our canopies first. Don't allow developers to clearcut because it's cheaper to build without trees in the way.
Answer: Canopy retention during development is a challenging task. The UFMP proposes that HRM work in partnership with the development community to achieve more positive outcomes with canopy retention.

9. The benefits of urban forests should be better presented to HRM citizens. That way, they realize the importance of urban forests and it makes the cost seem less like a cost.
Answer: Research conducted for the UFMP has produced a wide array of benefits that certainly justify the costs associated with maintaining and growing a healthy urban forest. Please visit the Frequently Asked Questions (FAQ) section of the UFMP webpage for a more thorough explanation of the many benefits associated with the urban forest. The website is available at: www.halifax.ca/RealPropertyPlanning/UFMP.

10. This is something I would consider volunteering for. I feel strongly towards having a green city.
Answer: Thank you for your support. The UFMP recommends that neighbourhood-based volunteer groups be established throughout the 111 urban forest neighborhoods identified in the Plan.

11. HRM should focus its efforts on streets that currently have no or almost no tree cover. While this is obviously more difficult in the downtown core, it would dramatically improve the aesthetic, and thus the business appeal, of streets like Quinpool to have trees in the business district, even if they are less regular than in residential neighbourhoods.
Answer: The UFMP includes information to enable staff to identify priority neighbourhoods where more tree planting is required. The Plan also calls for increased numbers of street trees along Quinpool Road and other business districts.

12. Consider putting a call out to youth groups, Girl Guides and Scout troops to help with awareness and planting efforts (children LOVE things like that, and to be able to see a tree in a park that they planted will be one of the greatest encouragements).
Answer: Youth groups certainly have a role to play.

The UFMP recommends that neighbourhood-based volunteer groups be established throughout the 111 urban forest neighborhoods identified in the Plan.

13. The Urban Tree Canopy in Halifax is spotty. Some neighbourhoods are well developed (i.e., by number and type of tree as opposed to maturity) and others are not. Green Space - in parks, and on roads - creates healthy communities that people are proud to live in and care for. It's good for the city to increase the urban forest in this respect.
Answer: The UFMP includes information to enable staff to identify priority neighbourhoods where more tree planting is required. You`re right about the benefits of green spaces in cities. Research has shown that cities with quality green spaces are more liveable.

14. Recently I heard in the news something to the effect of removing Maple trees from HRM because they have the disease with the black marks. EDUCATION. That is only Norway Maple. Make people aware that Norway Maple is a weed tree with problems but there are other varieties of Maples, our Native tree , which are wonderful. The way the message was given it was that Maples are bad.
Answer: Thank you for the correction. We heard the same news report and alerted the reporter that it was only Norway Maple that was infected with Tar Spot. Public education is a key element in the UFMP.

15. I understand that overhead wires must be accommodated, but is there another way other than the current and very ugly V-cutting?
Answer: Yes, damage to street trees can be avoided with more regular cycles of tree pruning. The UFMP points to problems associated with utility conflicts and proposes closer cooperation between HRM and NSPI to avoid overly aggressive pruning.

16. I know nothing of the Urban Forest Master Plan, and I have a hunch many of my friends would be in the same boat. Initially, I think some education for the public would be beneficial as a first step, to try to get individual buy in for a long term adoption.
Answer: Please visit the Frequently Asked Questions (FAQ) section of the UFMP webpage to learn more about our urban forest. The second draft of the UFMP is also available for download at the site. The website is available at: www.halifax.ca/RealPropertyPlanning/UFMP.

17. I think there is a lot of neighbourhood conflict over large trees on lots in the urban area that could be alleviated by education on tree value, maintenance and by-laws related to trees. Im also concerned about the number of "weed" trees (non native) on private lots vs intentionally planted and maintained trees.
Answer: Public education is an important component of the UFMP that will help property owners understand the benefits of the urban forest and the need to carefully select compatible tree species for plantings on residential properties.

18. Re: The question related to planting on streets and/or parks...Wrong question methinks. Planting should be done where needed - could be street or park, or a street next to a park. If there is a 'priority' policy in place, that would look after where the trees end up.
Answer: A fair observation. The UFMP includes information to enable staff to identify priority neighbourhoods where more tree planting is required.

19. It would be helpful to have a small definition of what each of the three possible actions would look like in practice.
Answer: Please visit the Frequently Asked Questions (FAQ) section of the UFMP webpage for a more thorough explanation of these actions. The website is available at: www.halifax.ca/RealPropertyPlanning/UFMP.

20. Developers, when clearing land, should be required to retain as many mature trees as possible, in residential and commercial developments. Planting trees along roadways should be a priority. Planting trees, creating islands of green should be a requirement for commercial parking lots. Mature neighbourhoods should be monitored to ensure mature trees are pruned or replaced when required. Homeowners in newer developments should be encouraged to plant trees, with HRM assistance. My neighbourhood is managed by our condo corporation. They have done an amazing job over three decades. The beauty of our landscaping and mature trees was a major factor in my purchase.
Answer: Good suggestions! The UFMP contains recommendations concerning all of the comments you have provided. It`s also interesting to note that the excellent tree planting and landscaping work of your condo corporation encouraged you to buy your current property. Real estate research has shown that trees add significant value to residential properties.

21.1 – HRM needs to look at reducing conflicts between trees and utilities (ie power lines) to ensure quality tree health.
Answer: Damage to street trees can be avoided with more regular cycles of tree pruning. The UFMP points to problems associated with utility conflicts and proposes closer cooperation between HRM and NSPI to avoid overly aggressive pruning.

21.2 – Partner with province to plant trees along provincial lands (i.e. along 100-series highway corridors).
Answer: The UFMP focuses on partnership opportunities and contains recommendations for tree retention and planting along these highways.

21.3 – Focus on providing high canopy coverage on Active Transportation (AT) Greenways.
Answer: The UFMP contains recommendations for tree retention and planting along AT Greenways.

22. Your focus is on the number of trees in HRM. One of my concerns is the removal of urban parks that we already had, like the little park between Dartmouth High and the Sportsplex. Unnecessary!! A bus depot could have been built on and under the parking lot that is already there without losing the Urban Park. It might have taken a little cooperation between HRM and the Sportsplex, but could have been done without removing a very pretty little park. HRM needs a policy to keep all existing parks.
Answer: The decision to build the new Dartmouth bus terminal on this former parkland area was difficult. Other solutions were considered but the site chosen will provide a needed service for local residents. Tree canopy will also be partially restored on the site with the planting of many new trees on the terminal grounds.

23. Plant native trees, not Norwegian maple.
Answer: The urban forest treatments outlined in the UFMP call for HRM to focus on native trees, refrain from planting Norway Maple and to educate the public about the problems associated with this type of tree

24. HRM needs to stop planting trees that become quite large under power lines.
Answer: Through proper species selection and ongoing pruning large trees can co-exist with power lines. Small trees could be planted under power lines however they would never achieve the type of canopy protection necessary for urban living.

25. The pruning of trees that has been done around power lines has maimed many trees. Is there some way that this can be done without butchering the trees?
Answer: Damage to street trees can be avoided with more regular cycles of tree pruning. The UFMP points to problems associated with utility conflicts and proposes closer cooperation between HRM and NSPI to avoid overly aggressive pruning.

26. 2 Foundation
Answer: Many cities across Canada have partnered in the development of non-profit organizations dedicated to public education and programs that support citizen-based urban forest projects. These organizations often provide additional funds for urban forest regeneration through donations from corporations.

27. Education is important, but it should be done wisely and at a reasonable budget. Partners should be involved. Why not bring some of this into the HRM school curriculum?
Answer: Good suggestions! The UFMP calls for public education and suggests partnerships as a means to developing and delivering urban forestry programs.

28. HRM should bring back programs that were created in the 60s and 70s. Municipal workers went door to door offering to plant two trees on every lot. Its how my Grandfather had some birch trees planted on their property in Woodlawn.
Answer: This is a good idea that could be considered.

29. I do not think that HRM needs to waste time involving themselves with the affairs of private property owners with trees on their own property. They have enough trees on public land that are poorly maintained. This is where the focus should be. I think there is a question not asked here, that is, are trees an important part of the city and do they contribute to the overall value to it's citizens. The answer varies from situation to situation and is not always yes.
Answer: The implementation of the UFMP will involve ongoing priority setting. Certainly, a current priority is the need to maintain trees on HRM-owned property. Research conducted for the UFMP has shown that trees on public and private property are a vital natural resource that provide a myriad of benefits to local residents. However, your point about the need for trees varying from situation to situation is well taken. The UFMP advocates for a planned approach

to urban forestry that will help to resolve these issues. The preservation of tree canopy on private property is another important issue that other cities in Canada have faced over the past number of years. Please visit the Frequently Asked Questions (FAQ) section of the UFMP webpage for a more thorough explanation of this issue. The website is available at: www.halifax.ca/RealPropertyPlanning/UFMP.

30. I find it hard to place these in order of importance. I think education is very important, but I do feel that a foundation or trust, as well as creating partnerships may give us more results sooner and education is something that is always ongoing.
Answer: Good points! The development of this program will require a balanced approach. Not all services can or should be delivered by HRM and partnerships may be a more efficient and timely approach.

31.1 – Green roofs should be part of this initiative.
Answer: Green roofs can support some trees but the goal of the UFMP is to retain and improve land-based tree canopy in HRM. Green roof technology is constantly improving and in the future it is likely that the UFMP will incorporate considerations of this approach.

31.2 – There absolutely needs to be a way to insure that trees or large tree prunings find their way to value added opportunities in HRM i.e. some other use than chipped and sent to the land fill.
Answer: Plant material is not permitted in the HRM solid waste facility. Trees branches are required to be chipped and transported to an HRM approved composting facility however most tree removal companies as well as HRM urban foresters use the material for mulch.

31.3 – Trees planted should be part of the Food Forest concept i.e. a large portion should be edibles.
Answer: Good news! HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future.

32. Glad HRM is examining its urban forest policy.
Answer: Thank you, the UFMP has taken several years to develop but the future benefits to HRM will make this approach worthwhile.

33. 1 Partnerships 2 Foundation 3 Education
Answer: Thank you for your comment.

34. Urban trees not only create connectivity for birds and other animals, but provide ozygen, cooling and beauty. Whether they are in parks or along the streets... all are equally important. Trees are a city's most valuable asset!
Answer: Thank you for your comments.

35. I work as an arborist, and always try to talk people out of cutting down healthy trees. Sometimes this works, sometimes it doesn't. What about a bylaw requiring private and institutional land owners to get a permit before cutting down trees? Even if a permit is always given, at least it would be a step they'd have to go through, and a chance to show the owner that it's not necessary to cut the tree.
Answer: Good points. In some cases the removal of a tree may not be necessary. Please visit the Frequently Asked Questions (FAQ) section of the UFMP webpage for a more thorough explanation of this issue. The website is available at: www.halifax.ca/RealPropertyPlanning/UFMP.

36. Tree planting on streets is really important, but they must be trees with the long-term potential to replicate the wonderful shaded streets we have, not the little lollipop trees mandated by NS Power
Answer: Through proper species selection and ongoing pruning, large trees can co-exist with power lines and also grow to provide canopy cover to local neighbourhoods.

37. We need trees for beauty and oxygen!
Answer: Thank you for your comment.

38. I'm not sure what the implication of partnerships would be and how partnering with different types of groups would impact the strategy. It was hard for me to answer the question.
Answer: Setting priorities is a challenge. Many urban forest programs involve a combination of partnerships with non-governmental organizations, urban forest foundations and public education.

39. I prune hardwood species commercially for timber production in NS. I cringe when I walk past young trees that need a second top lopped off, or would greatly benefit from having a heavy branch removed. This not only improves the timber quality of the tree, but removes heavy crotches from the trees that will allow the trees to be taller, stronger and more resilient in the long term.

Also, try to get the bole up 20 or 30' before the first live branches. That'll help the trees in the long run and will ultimately have more aesthetic value. I may go on a guerrilla pruning spree this winter...
Answer: Thank you for your professional insight. Please visit the Frequently Asked Questions (FAQ) section of the UFMP webpage for a more thorough explanation of this issue. The website is available at: www.halifax.ca/RealPropertyPlanning/UFMP.

40. HRM needs to establish regulations for any new business - especially in business parks that the site must include landscaping and tree planting - the partnership could be that HRM supplies (at cost) and plants the trees - so that the trees are suitable and planted in the correct manner for growth. Education programs do nothing if action isn't a requirement.
Answer: Good points. HRM`s business parks have recently adopted the types of guidelines you mention. The UFMP calls for HRM to plant more street trees in business parks and although grants to business owners for tree planting may not be practical, a partnership approach with local businesses is a recommendation of the Plan.

41. I'm not an expert on trees, but as a resident and an expert on air pollution I can tell you that trees are good for our health, make our built environment more inviting and are topic of conversation for many visitors to our city. People are thrilled to see green streets, and full parks.
Answer: Research conducted for the UFMP has shown that trees perform a myriad of natural services for local residents and visitors alike. The UFMP contains many references to the benefits of trees in an urban landscape. Also, please visit the Frequently Asked Questions (FAQ) section of the UFMP webpage for a more thorough explanation of this issue. The website is available at: www.halifax.ca/RealPropertyPlanning/UFMP.

42. Introduce a ban on urban clear cutting for new development project over 2 acres.
Answer: Outright bans sometimes appear to provide immediate and effective solutions to problems but the devil is always in the details. What if someone proposed a new development on 1.9 acres? The UFMP recommends that land use policies and land use by-laws be amended to include canopy retention and/or canopy replacement considerations for areas of new development in the urban forest but it also recognizes that existing forest types (Spruce) and surficial geology (rockland) pose special challenges to canopy retention during development.

43. I'd LOVE to get involved as a volunteer!
Answer: Thank you for your support. The UFMP recommends that neighbourhood-based volunteer groups be established throughout the 111 urban forest neighborhoods identified in the Plan.

44. Any action taken should be backed up by legislation - while there are many in the community who are interested - decisions must not be left in the hands of individual land lords, developers or institutions (the NS Power Co. is the worst kind of violator when it comes to hacking down trees no matter how beautiful they may be). There must be a clear plan presented for all urban areas which will be followed as development takes place with a consequence for those who don't follow the rules.
Answer: The Halifax Regional Municipality Charter provides authority to Regional Council to enact by-laws concerning the urban forest. If the current draft UFMP is adopted by Council it will provide a policy and management framework for the further development of land use policies and land use by-laws to conserve tree canopy within the serviced areas (municipal water and sanitary sewer services) of the City. The development of these regulations will be a collaborative process involving ongoing public engagement.

45. Consider edible forests: fruit, nut, berry trees as part of landscape – bring in permaculture principles to build overall ecology and sustainability of landscape- multiple purposes for trees, not just ornamental or shade – it has to be considered that shade is not desirable in every space – examples: where gardens will grow food, roofs have solar heating systems installed etc. shade in these particular spots impractical and hinders sustainability. That said, more canopy mostly very good!
Answer: All very good points! HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future. The neighbourhood-scale planning for the UFMP identifies areas with full as well as minimal canopy cover. In some cases it may be beneficial to maintain areas with minimal canopy cover for urban gardening and solar energy uses but in most cases gardens will continue to thrive and solar power generation will not be affected by our seasonal canopy.

46. I would prefer by-laws that limit cutting trees for private developments to any of the suggestions above.
Answer: Thank you for your comment. Regulatory efforts to reduce tree loss in new developments can be effective elements in a municipality's urban forest management tool-box but programs to plant more trees on municipal land as well as incentive programs and public education can be equally effective. The UFMP proposes a balanced approach to promoting the growth of HRM's urban forest.

47. Don't forget fruit and nut bearing trees!
Answer: HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future.

48. The most important thing to focus on is to get the money first from funding, then to carry out a plan and campaign.
Answer: In many Canadian cities urban forest fundraising has been undertaken by non-profit organizations that have established partnership agreements with the cities. The campaigns and associated planning efforts are also partnership based. This is an idea that could work in HRM.

49. Halifax should partner with Urban Orchard to help develop food security in HRM.
Answer: The UFMP calls for partnerships with volunteer groups to achieve the urban forest VOITs (Values, Objectives, Indicators, Targets) of the Plan.

50. Should encourage by-laws for land usage that govern tree cutting and removal for development lands. Replacing trees is fine, but why wait 25 years for a mature tree to replace one that was cut down during development?
Answer: The Halifax Regional Municipality Charter provides authority to Regional Council to enact by-laws concerning the urban forest. If the current draft UFMP is adopted by Council it will provide a policy and management framework for the further development of land use policies and land use by-laws to conserve tree canopy within the serviced areas (municipal water and sanitary sewer services) of the City. The development of these regulations will be a collaborative process involving ongoing public engagement.

51. Don't plant trees if you don't have the budget to maintain them. The biggest problem in the parks is the lack of maintenance and care and repair. I love the parks and in our local park I make a point of cleaning up the refuse and garbage. I'm disappointed with the level of care in Dartmouth parks, especially the Commons. This is irksome when viewed in comparison to parks in south end Halifax which are far better maintained.
Answer: First, thank you for your volunteer efforts in local parks. Your stewardship is admirable. The UFMP recognizes the need for improved tree maintenance and calls for more regular tree pruning and general tree care efforts on HRM's part. Currently, tree care is performed on a reactive basis across all HRM parks. A proactive program would improve tree care throughout all parks.

52. Plant more fruit trees.
Answer: HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future.

53. Implement strict controls over undeveloped lands. It is a shame that developers clear cut land they plan to develop. This should not be allowed. Strict regulations are required.
Answer: The Halifax Regional Municipality Charter provides authority to Regional Council to enact by-laws concerning the urban forest. If the current draft UFMP is adopted by Council it will provide a policy and management framework for the further development of land use policies and land use by-laws to conserve tree canopy within the serviced areas (municipal water and sanitary sewer services) of the City. The development of these regulations will be a collaborative process involving ongoing public engagement.

54. Focus on planting the greatest quantity of trees possible. That`s why you should focus on streets and residences over parks and other land uses because I assume most land is consumed by residences and streets. Trees on streets in residential neighbourhoods also provide the greatest social benefit as I believe people like to interact with trees where they live. Also be as proactive as possible to get trees in the ground. Educational programs are important but don`t necessarily get trees in the ground, we need a task force to go out and get the work done. Don`t know much about the science of pruning, consult a specialist about best practices. Good work!

Answer: Good points. HRM has over 90,000 spaces available for new street trees but the work of planting the trees will be scheduled over many years to avoid future problems with even aged stands.

55. Knowledge strengthens the need for investing in partnership and a trust. Trees are the air we breathe, and provide an aesthetic that is priceless. Start with schools and all institutions and businesses. There should be a certain amount of taxes allotted to the planting and caring of trees.
Answer: Trees provide a range of benefits to urban living. Partnerships and the establishment of an urban forest foundation or trust organization could be helpful in extending educational programs to schools, institutions and businesses.

56. The trees in our city are so important. We must protect them, and foster their continued growth and renewal for many generations to come.
Answer: Thank you for your comment. It's true that improvements to today's urban forest will benefit future generations.

57. Programs like Urban Orchard and other fruit sharing programs should be run by HRM.
Answer: The UFMP calls for partnerships with volunteer groups to achieve the urban forest VOITs (Values, Objectives, Indicators, Targets) of the Plan.

58. This is a great process and we have a beautiful treed city already. This process and its outcome are hugely important to preserving and maintaining the character of our city. Canopy and riparian protection are both essential - but so is preserving pockets of old growth, heritage value trees and forests, and developed areas on the edges of the city that transition back to wild land. We must not forget that the canopy, etc. are part of a network of air purification and animal movement. I urge the city to consider these things as they refine this excellent effort. Thanks.
Answer: The UFMP focuses on all of the points you have made through its community and neighbourhood scale management plans.

59. This survey is not very well-written – some questions fairly redundant and others are just unclear.
Answer: Thank you for your comments. The survey was reviewed for repetition and clarity issues prior to release but there is always room for improvement.

60. It is very difficult (impossible really) to overestimate the importance of trees.
Answer: Thank you for your comment.

61. HRM needs to atone for tearing out the urban wilderness that is now the bridge bus terminal.
Answer: The decision to build the new Dartmouth bus terminal on this former parkland area was difficult. Other solutions were considered but the site chosen will provide a needed service for local residents. Tree canopy will also be partially restored on the site with the planting of many new trees on the terminal grounds.

62. This is an exceptional survey!!
Answer: Thank you.

63. I live in Clayton Park, on Parkland Drive. The Clayton Park area is largely devoid of mature street trees. There are some streets such as Kilbirnie Lane which have a lot of large trees and it is beautiful and shady in the summer, whereas Roxbury Crescent (also off Langbrae) have only small spindly trees that serve virtually no function. Compare the two streets during the summer, and you will see a dramatic difference!!Parkland Drive is the same way. It was not designed for pedestrian comfort in any way. The trees are widely spaced and extremely small. They have grown barely at all in the past 12 years since the street was constructed. They provide absolutely no shade, no protection, no wind buffer, nothing at all. Apparently Nova Scotia Power restricts the type of trees that can be planted near their power lines. However, this was not an issue in older parts of the city. Meanwhile, everything that has been built in the last 15 years (at least) looks barren due to lack of substantial trees. It is a disgrace to The City of Trees. Again, take a look at Kilbirnie Lane and Roxbury Crescent during the height of summer when the trees are in bloom, and you will see a night and day difference. These two streets were constructed during different eras, yet are only a few blocks apart. More evergreens such as pines and firs should be planted by the city in areas where appropriate.
Answer: Thank you for your keen observations. Trees require good soil and room for root development in order to grow and eventually form a canopy. The UFMP recognizes that municipal standards for street tree planting could be improved and calls for new planting guidelines to ensure that new street trees will thrive.

64. Work with private/public groups on the trees you take down, rather than mulching them, they could be recycled into other items.
Answer: It's an unfortunate fact of urban forestry but the wood from most urban trees cannot be sawmilled due to the presence of nails or other metal objects in the wood. Just one nail can destroy expensive saws and endanger the lives of sawmill workers.

65. Increase property taxes to apply for protecting our Urban Forests. Pay NGO's to help out, Save our trees now, let's get on it.
Answer: The funding required for implementing the UFMP is unlikely to affect property taxes. The Plan also calls for a balanced approach to developing partnerships with non-profit organizations and others to raise funds for urban forest programs. Many other cities in Canada have adopted this successful approach.

66. Please work with RP+5 city revitalization. Please review the 'practice' of appropriating land against owners wishes.
Answer: The current five year review of HRM's Regional Plan (RP+5) takes into account the policies recommended by the UFMP. Land appropriation is generally known as expropriation. Although municipalities have the authority to expropriate land for public purposes the process is subject to strict guidelines and is rarely used.

67. I believe there is an existing Community Trust. Why can it not be used for this purpose as well?
Answer: Thank you for this information.

68. The Ecology Action Centre is well positioned to partner with HRM in delivering educational services. Other organizations such as EAC must be part of this plan. I don't want to see a duplication of providers which I think the UFMP might do.
Answer: The Plan calls for a balanced approach to developing partnerships with non-profit organizations and others to raise funds and develop urban forest programs. It's agreed that program duplication should be avoided.

69. In general, sidewalk canopy has dropped well below two (2) meters on wet days. Most sidewalks are impassible to some degree during rain. Do the inventory during inclement weather but get out of your vehicles and walk the sidewalks - we have to walk.
Answer: Regular tree pruning focuses on selective limb removal to raise the canopy of street trees. The UFMP recommends that HRM adopt a regular cycle of tree pruning.

70. Urban gardening is also important and shade from trees can be a problem.
Answer: In some cases it may be beneficial to maintain areas with minimal canopy cover for urban gardening but in most cases gardens will continue to thrive in conditions with partial shade.

71. Now I know I can call HRM. I've been pruning trees along my walking routes, but an experienced pruner is a better option. A FAQ about trees would be a good idea.
Answer: Service requests can be made with the HRM Call Centre at: 490 4000. The city employs a crew of trained arborists. Please visit the Frequently Asked Questions (FAQ) section of the UFMP webpage for a more thorough explanation of this issue. The website is available at: www.halifax.ca/RealPropertyPlanning/UFMP.

72. The message I have heard from authorities in HRM is, "Plant trees, but not ones which are going to get big - maybe 12 to 15 ft. maximum. If this is not the message you want to transmit, you will need to change your education program.
Answer: The information you received wasn't correct. Currently, HRM doesn't have a uniform set of policies regarding trees and the urban forest. The UFMP will provide a comprehensive approach to establishing a sustainable urban forest in the City.

73. The primary value of the Urban Forest Foundation/Trust, it seems to me, is as a signaling device about the importance of the initiative. Legitimacy is more important right now than promotion. Later education will be more important than legitimacy.
Answer: Establishing priorities is a challenge but you make a good case for the need to establish an Urban Forest Foundation/Trust before pursuing partnerships and developing public education programs.

74. It is a real shame to see massive destruction of nature in order to see private (often out of province) corporations make huge profits. Increasing the tax base is not good enough excuse.
Answer: Not all development results in the impacts you describe. In some cases developers have designed new subdivisions with tree retention in mind.

The trees enhance the appearance of the new development and show that the developer has considered the environment. It's also true that some development does result in excessive canopy loss but the UFMP recommends a balanced approach of education and regulation that could be implemented to reduce canopy loss during development.

75. HOW ABOUT PROTECTING EXISTING URBAN FORESTS? STOP DEVELOPMENT in urban forest areas like PURCELL'S COVE and Williams Lake. This survey is just a way for HRM to make people think they have a say and then nothing happens.
Answer: The survey is intended to provide citizens with a forum to express their views on how to best implement the UFMP. The Plan has not been developed to prevent development but it will help to ensure that our urban forest canopy is sustainable and that tree canopy is considered before, during and after development takes place.

76. Too many new developers are being allowed to denude the land to the point of clear cutting so that new homes and apartments built have no tree nearby to purify the air and act as wind breaks in event of storms. How did they get away with this abuse of our environment? The existence of healthy trees create a calm friendly environment in which to rear children. This denudation has to be stopped.
Answer: The Plan has not been developed to prevent development but it will help to ensure that our urban forest canopy is sustainable and that tree canopy is considered before, during and after development takes place.

77. The major issue of power and other cables on poles and running through trees which may have to be pruned substantially or removed has been ignored. Future power outages may bring this conflict to the fore so needs to be anticipated.
Answer: Damage to street trees as well as utility lines can be avoided with more regular cycles of tree pruning. The UFMP points to problems associated with utility conflicts and proposes closer cooperation between HRM and NSPI to avoid overly aggressive pruning while also ensuring an uninterrupted power supply.

78. There are many forgotten green spaces around HRM that are important to local wildlife, create sound barriers, and increase the beauty of our neighborhood. Why are these areas not address in your survey? I often find that these areas are neglected. It's unfortunate. Streets and parks are not the only urban forest in Halifax, as a matter of fact; they aren't the urban forest areas AT ALL.
Answer: The survey is intended to provide citizens with a forum to express their views on how to best implement the UFMP. Although our research has been extensive it's likely that some special green spaces have been missed in our inventory and analysis of the 111 urban forest neighbourhoods discussed in Appendix A of the UFMP (available at: www.halifax.ca/RealPropertyPlanning/UFMP). The Plan anticipates the need for ongoing research and partnerships with neighbourhood organizations that can provide this much needed information to improve the Plan over time. Finally, urban forests are complex structures and don't conform to our traditional understanding of what a forest is. Simply stated, an urban forest is all of the trees in a City.

79. HRM should do a program like fruit share in Manitoba, or Not Far From the Tree in Toronto.
Answer: These are excellent programs that have been developed over several years. HRM's urban forest program development capacity is limited for now but in the future such programs could be possible.

80. N/A

81. Trees help balance temperature extremes, provide habitat, and could be commercially valuable (fruit, nut, sap).
Answer: Good points! Please visit the Frequently Asked Questions (FAQ) section of the UFMP webpage for a discussion on the many environmental benefits of HRM's urban forest. The website is available at: www.halifax.ca/RealPropertyPlanning/UFMP.

82. I think there are many smaller plots of land around the city that would be marvelous to plant up such as: Armdale Rotary: probably no trees for visibility, but could have low shrubs throughout for example and a statue or feature in the middle. Why have boring ugly grass when it could be visually appealing and demonstrate pride and care in our surroundings? I think people are aware and educated enough to support efforts to grow the tree canopy. I think they don't know what they can do to help; any education program should focus on that. Mostly, any tree planting program should be easy. The city or potential forest foundation should have tree planting days in the city where people could volunteer! I have done that in other cities and love

it. I like having more trees, and I feel connected to my city and am inspired to take care of my city and it could attract more private donations if they get any publicity from the event. On a related note, I am very interested in planting spaces with more than grass. I understand for a city that it is more of a budget wishlist to be able to plant beautiful plants, but lawns can be topseeded with clover for example, or any number of groundcover plants, or wildflowers, which can be mowed down just like a lawn.
Answer: Thank you for all of the good suggestions. It will take time to develop public education programs and volunteer tree planting efforts but the UFMP recommends that HRM should consider the great contributions that local residents and volunteers can make to maintaining and growing our urban forest. With regard to the Armdale Roundabout, there are safety and visibility considerations that have precluded any shrubs or statuary being located in the grassed traffic circle however a seasonal flower garden has been developed there and many trees have been planted along the approaches to the roundabout.

83. Include in the education info – care should be taken to ensure that increased canopy on neighboring properties does not limit the sun available to urban farmers. Balance!
Answer: In some cases it may be beneficial to maintain areas with minimal canopy cover for urban gardening but in most cases gardens will continue to thrive in conditions with partial shade.

84. You could require that new developments have to plant trees with the build and then HRM would take care of them after that.
Answer: Good suggestion. In most instances of new development this is already the case for street trees where HRM assumes ownership and maintenance responsibilities but it does not extend to residential properties. Some developers voluntarily plant trees on new residential properties but others do not.

85. Where is the Federal Government hurricane relief funding gone to for the replacement of the damaged trees from Hurricane Juan?
Answer: The Federal Disaster Assistance Fund did not apply to the replacement of HRM-owned trees as they were not accepted as tangible assets. While this fund did not assist in the replacement of HRM's urban forest "green infrastructure", it did provide assistance towards the repair the City's other types of municipal infrastructure. At a later date, and through a separate fund, the Federal Government did provide $1M towards the restoration of Point Pleasant Park that included forest restoration work in the Park valued at $200K.

86. Please plant more trees that provide fruit and nuts. These trees can be used by programs like Urban Orchard to provide food to needy people.
Answer: HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future.

87. Slow down on the trees please.
Answer: The UFMP does not call for a "quick fix" approach to improving the urban forest. Instead, the Plan calls for a measured response involving annual plantings with HRM's existing tree planting program supplemented by additional plantings in priority areas identified through UFMP research. An urban forest with good age-class and species diversity will, in time, result in sustainable canopy coverage throughout the urban areas of HRM.

88. All non-HRM lands should be targeted equally for increasing forest canopy with NATIVE species. A foundation or trust could be helpful, but it should be coupled with partnerships and education programs with non-government organizations, institutions, and the private sector.
Answer: Good suggestions. Native trees such as sugar maple and red oak thrive in our maritime climate. Consideration should also be given to planting coniferous trees on residential properties. Trees on private property account for over half of our urban forest. Without the ongoing stewardship efforts of HRM citizens the current 43% tree canopy in HRM could not exist. Support through foundations/trusts, partnerships and educational programs could provide assistance to property owners to ensure good tree maintenance and more tree planting.

89. Why can't the people hired to maintain the city's lawns, be trained to either report trees in need of pruning or be given the basic tools to do it themselves as they see it.
Answer: Good idea. In some cases these grass cutting crews are contracted from the private sector and are not authorized to perform work on HRM-owned trees. However, they could be asked to report tree damage to the HRM urban forestry crew of trained arborists.

90. One of your questions is unclear to me, the one about homeowners, businesses, etc. I assume you

mean businesses, organizations and institutions that own land. My impression as a lifelong resident is that the trees are badly maintained. Not only is pruning reactive, as you note, but there is no attempt to remove the nefarious plastic bags from trees or make the NSP stop maiming trees, often with fatal effects.
Answer: The question was, "As part of an outreach educational program to encourage tree planting on private land, should HRM focus mainly on individual homeowners, businesses, organizations or institutions?" The question was asked in order for citizens to voice their opinions concerning priority audiences for the implementation of UFMP public education program. Seventy percent (70%) of survey respondents felt that all of the groups listed above should be able to participate in public education programs. With regard to tree maintenance the UFMP points to HRM's need to adopt a cyclical pruning schedule to improve tree maintenance. The Plan also notes problems associated with utility conflicts and proposes closer cooperation between HRM and NSPI to avoid overly aggressive pruning. Finally, although plastic bags caught in tree branches are a visual blight, they do not harm trees and removal costs would be substantial.

91. An Urban Forest Foundation to work in partnership with the communities to educate the public.
Answer: The development of an urban forest foundation could be an important first step towards public education efforts recommended by the UFMP.

92. In addition to trees plant some shrubs and native plants.
Answer: Point Pleasant Park is a good example of an area where HRM has focused on reintroducing native plant material.

93. We need to take care of the trees we already have. The beech tree leaf boring weevil needs to be stopped asap. All the beech trees along the Portobello Road are dying as are many in Fall River, and along the Cobequid Road. From these, the weevil is moving onto private property. I have 8 beech trees in my back yard (Waverley) that provide a beautiful canopy. All are affected by this weevil, and no one seems to have the ability to stop them because of our 'green policy' even though there are ways available to stop them that are not harmful to the environment – i.e. systemic pesticides injected into the tree trunks. These weevils are almost ready to hibernate for the season (begin to do so in July). If we don't treat the trees before spring, they will completely defoliate and kill the trees in the spring. Then we are faced with the cost of removing them safely along with planting new trees which will not mature even in my lifetime. The beauty we have now will be gone forever. As well, this weevil attacks fruit trees when it has no beech trees left. When they get to the apple trees in the valley, our famous NS apple industry will be decimated. It is absolutely not prudent to be so slow in addressing this problem.
Answer: The UFMP points to the need to develop strategies to deal with invasive insect species. In this case the weevil has been in Nova Scotia for many years but local outbreaks appear to be increasing in some areas of HRM. Although seasonal defoliation is a concern, Beech trees can generally survive a weevil infestation for several years. The control of this type of insect infestation is a Federal government responsibility and HRM is currently working with the Canadian Food Inspection Agency (CFIA) to determine a course of action.

94. Do not make a new layer of bureaucracy and tax-funded programs to force people to plant trees. An education program and good-will, maybe discounted 'new tree' buys could be made available through the buying power of HRM. Our taxes are already way too high for the service level we receive. For example - there should never be a requirement forcing developers or private land owners to plant a certain percentage of trees or face fines or denial of permits.
Answer: Your concerns are valid. The development of public policy involves balancing the greater public good with the rights of property owners. UFMP research has shown that HRM has an acceptable canopy cover but it is slowly decreasing as new development takes place. Research has also shown that trees in an urban setting provide valuable environmental services such as air purification, protection from urban heat island effects, and stormwater retention. The loss of these natural services comes with a cost that can be quantified. The question is who should pay? Should it be the taxpayer or the developer? The UFMP provides a middle ground for this problem by proposing a mix of volunteer programs, public education, fundraising partnerships, increased public investment and regulatory controls to achieve a sustainable urban forest for today and for future generations.

95. Too many developments are approved which abut directly with the sidewalk with no green space or trees. There needs to be a better balance between encouraging higher density and cheek-by-jowl building with little or no green space. The mowing down of most of the trees in the new Boscobel Gate development was a travesty. I am glad to know the urban forest is being studied and a plan is being developed.
Answer: Good observations. HRM is focused on creating vibrant, livable and sustainable urban communities. The UFMP is part of HRM's efforts to successfully integrate green infrastructure like street trees with the City's grey infrastructure of sidewalks, curbs, and roadways. The UFMP points to the need for HRM to adopt design standard for the sustainable coexistence of these two essential types of municipal infrastructure.

96. Tax incentives. A discount could be given for the number of trees on a lot. A stepped amount for the percentage of coverage on the open land. Or a rebate to buy or have trees planted on your lot? By-laws, policies, tax rebates, education, and getting Haligonians involved will create a great urban forest.
Answer: Although HRM is not permitted to provide tax discounts for trees it could establish partnership programs with tree nurseries and garden centres to offer rebates to homeowners who plant trees on their properties. Other cities in Canada have adopted similar programs. The UFMP provides recommendations for a balanced approach to policy, regulations, education and municipal investments intended to restore and maintain our urban forest.

97. I live in the downtown core of Halifax and have been shocked at the tree "management" to date, especially how trees have been pruned around power lines (seemingly by individuals with no knowledge of tree architecture, and staying intact only by pure willpower under snow load) and the general health of this aging forest. THANK YOU THANK YOU THANK YOU for thinking proactively about our urban forest. I've also noticed sweet sap dripping from winter-broken twigs. Could we not do some kind of urban maple syrup tapping? I know it would be a tough one logistically, but imagine the ownership our youth would take of these trees if the trees themselves gave out candy? :)
Answer: Damage to street trees as well as utility lines can be avoided with more regular cycles of tree pruning. The UFMP points to problems associated with utility conflicts and proposes closer cooperation between HRM and NSPI to avoid overly aggressive pruning while also ensuring an uninterrupted power supply. In most cases the sap comes from other species of maple that are unsuitable for tapping. Although there are some Sugar Maples along HRM streets they are also unsuitable for tapping as they need all their sap to support their stressful lives as urban trees.

98. Businesses and public institutions/government should be encouraged or even legislated to plant trees on their land. Attempting to make individual single family home owners to take on planting of trees will take much more time and money. Focus should be on government/business/institutions THEN educate the homeowners. Thank you for asking our opinion; this is an important issue for our city.
Answer: Thank you for your thoughts. Government agencies, public institutions and businesses have all shown interest in becoming involved in the UFMP.

99. How will people grow food in an urban environment if backyards are covered in shade by a canopy of trees? Sounds like a good idea but in practice it isn't too forward thinking.
Answer: In some cases it may be beneficial to maintain areas with minimal canopy cover for urban gardening but in most cases gardens will continue to thrive in conditions with partial shade.

100. This survey overlooks the best solution to maintain or increase the "Urban Canopy", which would be to protect more land from clear cutting and development. A natural forest is always going to have more value from an environmental standpoint than any amount of money spent on planting trees on streets.
Answer: Regulatory efforts to reduce tree loss in new developments can be effective elements in a municipality's urban forest management tool-box but programs to plant more trees on municipal land as well as incentive programs and public education can be equally effective. The UFMP proposes a balanced approach to promoting the growth of HRM's urban forest.

101. Good survey. Thanks for asking about this. As an HRM taxpayer I like the idea of an Urban Forest Foundation Trust being created to support urban reforestation in the long run. I also think education is very, very important. I would like to see people

make some different and careful choices about the trees they plant based on more than just what may be cheap and convenient. We need fewer maple trees and more diverse species of deciduous trees. The Common Roots Urban Farm, for example, is planting fruit and nut trees. Not only will that enhance diversity but it will add beauty and produce healthy food. Again, thanks for the opportunity to comment.
Answer: Many cities across Canada have partnered in the development of non-profit organizations dedicated to public education and programs that support citizen-based urban forest projects. These organizations often provide additional funds for urban forest regeneration through donations from corporations. The UFMP recommends a number of actions to ensure proper tree planting and selection through new public education programs. It also addresses the need for greater age-class and species diversity in our planting programs. HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future.

102. It is very ironic that HRM is instating an urban forest program considering that council voted to level the urban forest at the Dartmouth Commons. Maybe we can try to mitigate the damage by not only planting trees, but also planting native plants - that include fruits and berries - under those new trees.
Answer: The decision to build the new Dartmouth bus terminal on this former parkland area was difficult. Other solutions were considered but the site chosen will provide a needed service for local residents. Tree canopy will also be partially restored on the site with the planting of many new trees on the terminal grounds. HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future.

103. In hard economic times, it helps homeowners to cut future costs and increase property values, pro-active tree health measures, reduction in street noise and pollution, and providing shade for an increasingly warming environment is essential.
Answer: Good points! The UFMP contains several recommendations intended to conserve the many environmental, economic and aesthetic values of the urban forest

104. Homeowners would benefit from businesses also adopting green landscape policies. Less energy used to air-condition a warming environment means less energy costs passed down to them.
Answer: A healthy urban forest canopy can significantly reduce air conditioning costs for homeowners and businesses.

105. The urban forest should also include under-planting of native species on the "forest" floor. Also the greenstrip "buffer zones" currently planted around should be wider and planted with larger trees and native undergrowth not bark mulch and grass. It's a pity the adoption of an urban forest policy came too late to save the urban forest on the Dartmouth Common. It will be replaced by grass, pavement and concrete planters.
Answer: The UFMP calls for the naturalization of some park and greenspace areas through increased tree planting as well as through the reduced use of landscaping materials such as bark and mulch. In these areas it is likely that the forest understory will naturally regenerate. The decision to build the new Dartmouth bus terminal on the former parkland area was difficult. Other solutions were considered but the site chosen will provide a needed service for local residents. Tree canopy will also be partially restored on the site with the planting of many new trees on the terminal grounds.

106. Halifax is known for its great number of urban trees. Our trees add greatly to the quality of life in our city. Maintaining and increasing our urban forests should be a top priority.
Answer: Halifax is known nationally as "the Forest City" and it is a priority to continue to maintain and restore our urban forest.

107. We need the money to make changes, which is why the trust comes first. However, local education and partnerships are imperative to maintaining and increasing the urban canopy.
Answer: Many cities across Canada have partnered in the development of non-profit organizations dedicated to public education and programs that support citizen-based urban forest projects. These organizations often provide additional funds for urban forest regeneration through donations from corporations.

108. Promotions with schools during earth day, not just to give plants out but to have them active in planting the trees.

Answer: Good suggestions! The UFMP calls for public education and suggests partnerships as a means to developing and delivering urban forestry programs.

109. The trees on the streets are what make Halifax so wonderful. You really notice their absence in cities that do not have them. In Halifax, could we not partner with businesses so that they plant trees in parking lots? I think that parking lots devoid of trees should be banned for example. Thanks
Answer: The UFMP is part of HRM's efforts to successfully integrate green infrastructure like street trees with the City's grey infrastructure of parking lots, sidewalks, curbs, and roadways. The UFMP points to the need for HRM to adopt design standard for the sustainable coexistence of these two essential types of municipal infrastructure. Trees and vegetation also contribute to the urban landscape's ability to retain stormwater. In some cities there are additional stormwater charges levied for homeowners and businesses with extensive impervious surfaces on their properties.

110. Businesses seem to be the most bereft of trees, and it would be great to see some programs to encourage them to beautify their properties with trees and foliage. Let them take a sense of ownership.
Answer: Government agencies, public institutions and businesses have all shown interest in becoming involved in the UFMP. Many cities across Canada have partnered in the development of non-profit organizations dedicated to public education and programs that support citizen-based urban forest projects. These organizations often provide additional funds for urban forest regeneration through donations from corporations. Local businesses also take part in these programs and local award programs often highlight their beautification efforts.

111. Would like to see clear goals set for increasing canopy cover on streets, parks and on private property and then encourage people and organizations to sign on and "register" their plantings - person's name , location, no of trees and type. Goals could specify species of trees in different categories. School children could participate on selected properties with the help of nursery stock and then register their plantings.
Answer: Good news, the UFMP neighbourhood fact-sheets contained in Appendix A of the Plan provide neighbourhood-scale goals for canopy cover and recommendations for the development of local stewardship organizations to foster local tree planting.

112. Please don't forget to extend your reach to HRM East to Ecum Secum. Our forests have been devastated by insect infestation and high winds/ eroded top soil. Would love to see a program that would help get our woodlands cleaned up and replanted, possibly providing employment along the Eastern Shore. If that's a possibility, will change my "Foundation/Trust" score to a "1"... double that if the paper companies foot the bill. I sell trees seedlings for weddings/memorials, etc. and they're all registered with the UN Billion Tree Campaign, for starters, but there are many global and national organizations that HRM could partner with to spread the word and educate the public.
Why reinvent the wheel...
Answer: HRM's urban forests encompass communities in HRM that receive municipal water and wastewater services. These urban and suburban areas generally feature higher population densities as well as accompanying intensifications of commercial, institutional and industrial land uses. The policies of the Plan are intended for urban areas and would likely not be as effective or necessary in areas outside the serviced core.

113. Re Urban Forest geographical definition, it must include areas that are planned to receive water and wastewater services in the future. This means that tree removal in preparation for development must not occur until all mature trees are identified and a significant proportion of them are designated to be retained not only on HRM property but also on lots which will belong to individual or multi-family dwellings.
Answer: The Halifax Regional Municipality Charter only provides authority to Regional Council to enact by-laws concerning the conservation of the urban forest in areas within the current serviced areas.

114. Need to know more about the concept and cost associated with the urban forest foundation/trust.
Answer: Many cities across Canada have partnered in the development of non-profit organizations dedicated to public education and programs that support citizen-based urban forest projects. These organizations often provide additional funds for urban forest regeneration through donations from corporations. A good example of this type of organization is Toronto's Parks and Trees Foundation at: torontoparksandtrees.org/trees.

115. HRM should look into the possibilities of tree that produce fruit! Having an orchard on the peninsula would be fantastic. Also the Citadel needs trees it's a barren hill that cost money and CO_2 to maintain that much grass.
Answer: HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future. There are several opportunities to plant more trees in the vicinity of the Citadel and the Common that could be explored in the future.

116. I would like to see more tree retention when new development areas are being constructed in tandem with planting of new urban trees.
Answer: Canopy retention during development is a challenging task. The UFMP proposes that HRM work in partnership with the development community to achieve more positive outcomes with canopy retention as well as with the planting of new trees.

117. I understand the importance of trees for our environment, beauty, pleasure, protection, air quality - especially on the peninsula. Trees will not only afford us better health but they also make the city liveable & beautiful & comfortable to walk & bike & breathe in the very densely populated old city of Halifax. As more buildings are being squeezed in, we MUST provide more trees. I live in the center of Halifax. I am 72 years old & I walk & bike everywhere I go on the peninsula. I would love to see more trees in city center (not just the south end). Even around parking lots & on every grassy verge & even where there is no grassy verge (by cutting a hole in the cement as has been done in a few places already). All construction sites, like the new Gladstone North should be required by law to reforest on the grassy verge. We are losing green spaces at an alarming rate & trees are one of the best ways to help make our city liveable. I have lived most of my life in this city which I love.
Answer: Diameter-based guidelines have proven to be effective when combined with other requirements for the retention of tree canopy in high density urban areas. For example, re-planting trees on a property would be a priority but in cases where it wasn't practical (or there was no space available) a second option would be to plant new trees nearby in order to retain local canopy cover. The UFMP is part of HRM's efforts to successfully integrate green infrastructure like street trees with the City's grey infrastructure of parking lots, sidewalks, curbs, and roadways. The UFMP points to the need for HRM to adopt design standard for the sustainable coexistence of these two essential types of municipal infrastructure. Regulatory efforts to reduce tree loss in new developments can be effective elements in a municipality's urban forest management tool-box but programs to plant more trees on municipal land as well as incentive programs and public education can be equally effective. The UFMP proposes a balanced approach to promoting the growth of HRM's urban forest.

118. Wish there was space to add comments under each question.
Answer: Thank you. We'll provide more opportunities for comments in upcoming surveys.

119. The ideas outlined above sound excellent. I also am a strong supporter of edible trees being planted on city and privately owned land in HRM, and would like to see policy developed around this (e.g. edible urban forest areas, as per examples in San Francisco and Portland in the USA).
Answer: Thank you for your support. HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. The UFMP also includes policy support for this item.

120. There are other possibilities, such as restrictions on tree removal from private land, recognizing that trees are an asset to the community, and that the community is affected by their removal.
Answer: The development of public policy involves balancing the greater public good with the rights of property owners. UFMP research has shown that HRM has an acceptable canopy cover but it is slowly decreasing as new development takes place. Research has also shown that trees in an urban setting provide valuable environmental services such as air purification, protection from urban heat island effects, and stormwater retention. The loss of these natural services comes with a cost that can be quantified. The question is who should pay? Should it be the taxpayer or the developer? The UFMP provides a middle ground for this problem by proposing a mix of volunteer programs, public education, fundraising partnerships, increased public investment and regulatory controls to achieve a

Appendix F

Anything we missed? Anything you want to comment on?

1. Is the second answer in the last question supposed to read "planning" or "planting"?
Answer: Thank you for noticing the error. It's been corrected.

2. N/A

3. Looking good. Make it happen.
Answer: Thank you for your support.

4. The policies all sound great- why wouldn't I say 'yes' to them? Maybe prioritising them would be more helpful (unless you really could get all of them implemented, in which case, fantastic!)
Answer: The survey was intended to provide citizens with a forum to express their views on how to best implement the UFMP. Several of the questions were designed to elicit comments concerning priorities. In some cases respondents opted for "all of the above" but in other questions it was apparent that some issues were more important.

5. Involve the school system as part of an educational initiative to develop leadership on this issue with young residents. Explore some go the existing partnering/funding opportunities such as Tree Canada – very little money has ever been granted to the maritime provinces. Work with local nurseries to increase availability of native species to home owners and educate as to importance of using native species and encouraging diversity in plantings.
Answer: Thank you for your suggestions.

6. It is important to keep new by-law standards (especially for home owners) to a reasonable level. If things are over-regulated and there is too much red tape people will lose focus of the intent. It should not be easier for a developer to by-pass the standard (because they have the know how), and the home owner to be over managed.
Answer: Good points. In central Canada, municipalities such as Toronto and Mississauga, Ontario have adopted by-laws for the conservation of trees on private property in order to preserve canopy cover. Property owners can still remove trees but a permit fee is charged and replacement trees can be required. Trees less that 30 cm (12") in diameter, and diseased and dead trees can usually be removed without a permit or requirements for replacement trees. It should be noted that it has taken these municipalities several years to develop their own urban forest toolbox of plans, public education programs and by-laws based on their unique needs. An HRM by-law concerning trees on private property could be an effective public policy tool for the retention of canopy cover but it would require a "made in HRM" approach that considered local urban forest conditions as well as the cultural values of its citizens.

7. The lifespan and benefits of trees far out-span any political time frame. It would be nice of these policies could be implemented and followed up on by successive governments.
Answer: Thank you for your comments.

8. In order to encourage planting new trees, perhaps have a way to make it accessible to get new trees?
Answer: Good suggestion.

9. Multifunctional trees- fruit and nut bearing! I personally think there is too much openness in downtown Halifax (citadel, commons). I think it would be great with more trees here. I also think a permitting system for the removal of 10 trees or more is too little, especially if it is a wooded neighbourhood, where the removal of 9 trees would cause an eyesore.
Answer: HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future. There are several opportunities to plant more trees in the vicinity of the Citadel and the Common that could be explored in the future. With regard to a tree canopy by-law, the idea of allowing homeowners to remove up to 10 trees annually without a permit is certainly open to further discussion. The threshold might be better set at 5 trees.

10. The diameter replacement policy is great stewardship of the land, hands down. Adding adequate space and soil is a great consideration, too, but only in parts of HRM that have traditionally had soils that can sustain trees (i.e., let's not go terraforming our beautiful ocean town and country into a giant suburb.)
Answer: Soil conditions are a key to success but proper species selection is also important.

11. I fully support efforts to increase tree cover in HRM. It is beneficial for air, water and soil quality, for carbon sequestration to mitigate climate change, and also for the general, physical and mental well-being of HRM residents. The more trees that are present, people feel less detached from nature and less stressed. If those trees are native, there is increased biodiversity as well. Extremely happy this initiative is being pursued. I think it would be beneficial to include the public in the actual activities as well. Interested individuals could be mobilized to help plant and prune trees. I believe there would be a lot of people interested in this (including myself), and it would increase the effectiveness and decrease the cost to taxpayers of the program.
Answer: Thank you for your comments and support.

12. Simply said, developers should not be allowed to clear cut a site destined for commercial or residential development. They should have to work with an HRM Urban Planner to plan the development in the most environmentally sustainable way possible, ensuring that the max number of native trees are left intact and not made more vulnerable to future weather events.
Answer: In some cases developers have designed new subdivisions with tree retention in mind. The trees enhance the appearance of the new development and show that the developer has considered the environment. It's also true that some development does result in excessive canopy loss but the UFMP recommends a balanced approach of education and regulation that could be implemented to reduce canopy loss during development.

13. Downtown has lots of nice old big trees, but new developments that have such a huge span do not. We need to focus on maintenance of large trees and planting of larger trees in these areas, with soil to sustain them and soil to allow planting of more trees.
Answer: Urban trees face several challenges, but the worst is the problem of soil compaction. Most street trees planted in HRM's urban core live less than 10 years but with proper planting conditions they could live well over 50 years and provide canopy cover to urban residents. Trees thrive when they are planted in uncompacted soil because this allows water, air and nutrients to reach their roots. However, an urban environment requires hard surfaces to support people and vehicles, and hard surfaces naturally compact soil. Silva Cells are rigid frames that support hard surfaces such as asphalt parking lots or sidewalks, but they keep soil loose and provide space for irrigation systems and utilities. Although expensive, trees planted with this system can grow as much as 25 cm in one season. A study conducted in Minneapolis showed that the cost of planting a tree using Silva Cells averaged around $14,000. Although a tree planted without a Silva Cell had a lower installation cost, an analysis of total estimated costs and benefits showed that each of its tree plantings in a Silva Cell would save the city $28,521.51 over 50 years compared to a tree planted without a Silva Cell.

14. Re the last question... Most builders and developers will ONLY act based on policies and by-laws. They are in the business to make money, not save trees. I dont see how you can isolate any of these three options in preference for the others.
Answer: In some cases developers have designed new subdivisions with tree retention in mind. The trees enhance the appearance of the new development and show that the developer has considered the environment. It's also true that some development does result in excessive canopy loss but the UFMP recommends a balanced approach of education and regulation that could be implemented to reduce canopy loss during development.

15. I'd really like to see more green along the streets in winter. Halifax is beautiful from May to October, but for the other six months of the year it is grey and depressing. I understand that evergreen trees can be a bit of a hassle to maintain but I think they would be worth it. As someone who walks or bikes to get around all year, I would really appreciate a greener winter streetscape.
Answer: The UFMP recommends that more coniferous trees be planted especially in places such as Armdale where trees such as white pine form an important element of the area's cultural landscape.

16. A diameter policy only takes the girth of a tree into account. It puts an emphasis on trees that quickly amass girth rather than putting an emphasis on creating a varied forest or streetscape for reasons of biodiversity. I agree with finding some sort of standard for how to replace a trees negative carbon footprint. I feel, however, that it would be hard for those without adequate knowledge of a trees needs and impacts (spacing, soil type, shadow

area upon maturity, impact on surrounding plant life and human areas) to make good decisions on what types of trees to plant and where. It would be a shame to see careless planting of new trees just for the sake of upholding ones role in a new by-law. When adopting new design standards for urban tree sites I feel it is essential to leave room for continual updating and editing based on new information from trial and error as well as research done in other parts of the world. It would be unfortunate to build a set of strict guidelines that do not allow for simple innovation and changes considering the varied necessities of differing species of trees and sites.
Answer: Good points. The services of certified arborists will be an essential resource for all the tasks you've described. The development of these regulations will take time and ongoing research will be necessary as well. The UFMP recommends ongoing research and the overall approach of the Plan follows the tenets of adaptive management.

17. Legislation must be encouraging, not discouraging.
Answer: The UFMP recommends a balanced approach of education and regulation that could be implemented to reduce canopy loss during development.

18. I'd like to see a by-law in regards to parking lots. ie. for every five parking spaces a tree should be planted within the parking lot. The tree species should be prescribed.
Answer: This approach has been adopted in Toronto's Green Standard for development. Information on Toronto's program is available at: http://www.toronto.ca/planning/urbdesign/greening_parking_lots.htm

19. Very important to encourage/ educate private landowners, including developers about benefits of trees. Especially when developing undisturbed land. Also fruit trees should be encouraged.
Answer: The UFMP recommends a balanced approach of education and regulation that could be implemented to reduce canopy loss during development. HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future.

20. Adopt a Green Belt/Spaces System similar to Toronto's to keep all existing green spaces and connect them to each other and enable public access to them.
Answer: The Plan recommends that urban forests be used to provide connectivity between green spaces. The forthcoming HRM Open Space Plan will also be looking at ways to improve the quality, quantity and connectivity of our green spaces.

21. Help and educate people to have the right tree on their private property.
Answer: Public education is a key recommendation of the UFMP.

22. Again, I recommend incorporating urban forestry into the public school curriculum and that HRM staff use creative approaches to involving partners in urban forestry management.
Answer: Thank you for your comments. We hope that City schools become a part of the educational programs recommended in the UFMP.

23. Large trees while beautiful are not appropriate in many areas of the core and pose hazards due to poor maintenance. Removal of them is necessary for safety and new development. I think more thought needs to go into what is really important for Haligonians.
Answer: Large trees in the downtown core can coexist with new development. Hundreds of Halifax residents have taken part in the creation of the UFMP and have consistently stated that trees are vital and contribute greatly to the quality of urban life.

24. Given the geographic scope of HRM policies need to account for urban/suburban and rural areas. The "urban forest" should not be separate from "other" forests
Answer: HRM's urban forests encompass communities in HRM that receive municipal water and wastewater services. These urban and suburban areas generally feature higher population densities as well as accompanying intensifications of commercial, institutional and industrial land uses. The policies of the Plan are intended for urban areas and would likely not be as effective *or nec*essary in areas outside the serviced core.

25. HRM should adopt a stronger focus on maintenance plans, including replanting failed trees, in areas planted by developers; these plantings are basically abandoned by the city. Even if they replaced all the trees planted over the last five years that have since died, they would meet extensive goals for increasing the tree canopy.

Answer: The development community has signaled a genuine interest in improving the health of newly planted trees in their developments. Did you know that developers are responsible for replacing trees up to two years after they are planted? Some developers have suggested that HRM change current regulations requiring tree planting while home construction activities are taking place and instead wait until the development is finished before requiring tree planting. HRM also has a role to play by ensuring that newly planted trees receive ongoing maintenance. The UFMP calls for more effective maintenance programs for street trees.

26. HRM should direct their efforts to all of the above... also the fines for violating the removal of trees should be substantial enough to discourage the practice. An example in point; in Surrey, BC developers will purchase a single family property to construct multi-units, then will remove the trees to facilitate the new construction and pay the fines. They factor the cost of the fines into the cost of the development. This practice is very much changing the look of many neighbourhoods in Surrey. Perhaps the fines should be based on the size of the tree... bigger the tree removed, bigger the fine.
Answer: In a more robust economic climate the "all of the above" option would be possible. The UFMP recommendations will be implemented over time but for now, priorities must be established in order for the program to be sustainable. Thank you for the information about Surrey. We will contact the Municipality of Surrey to learn more about this situation.

27. The diameter by-law is in the right direction, but obviously not practical. Instead, could require people who cut trees to contribute to new trees in another way - some fee equal to the cost of planting more trees elsewhere in the city, for example.
Answer: Diameter-based guidelines have proven to be effective when combined with other requirements for the retention of tree canopy. For example, re-planting trees on a property would be a priority but in cases where it wasn't possible a second option would be to plant new trees nearby in order to retain local canopy cover.

28. Power lines again
Answer: Damage to street trees as well as utility lines can be avoided with more regular cycles of tree pruning. The UFMP points to problems associated with utility conflicts and proposes closer cooperation between HRM and NSPI to avoid overly aggressive pruning while also ensuring an uninterrupted power supply.

29. Please stop clear cutting by developers!!!!!!!!!!!!
Answer: Regulatory efforts to reduce tree loss in new developments can be effective elements in a municipality's urban forest management tool-box but programs to plant more trees on municipal land as well as incentive programs and public education can be equally effective. The UFMP proposes a balanced approach to promoting the growth of HRM's urban forest.

30. There is not root space for tall trees everywhere. Please start planting smaller species (fruit species, ironwoods, lilac, etc.) in places that have limited ground to grow in. It's sad to see an oak or sugar maple stunted in a small strip of grass because it is root bound by pavement and concrete.
Answer: Some species of trees can thrive and grow tall in constrained growing environments. City arborists select trees for the growing conditions where they will be planted and often plant a variety of smaller trees. Another approach to this problem would be to design new municipal infrastructure to accommodate the growth of trees. The UFMP recommends that HRM revise some of its infrastructure design standards to require a minimum soil volume for tree planting pits to encourage the long term health and growth of trees.

31. I would like to have the option of 'all of the above' for the last question! Thank you for providing this survey.
Answer: In a more robust economic climate the "all of the above" option would be possible. The UFMP recommendations will be implemented over time but for now, priorities must be established in order for the program to be sustainable.

32. In my work with Communities in Bloom, urban forestry is one of the eight criteria - judging small and medium communities across the country I saw a lot of communities that have by-laws and protection in place to ensure a vibrant urban forestry - you should look at their criteria for Landscapes and Forestry www.communitiesinbloom.ca. HRM should have qualified arborists if they don't now. I just visited a part of Toronto I lived in 50 years ago - it was then a new subdivision built under the guidance of a renowned historian and visionary who owned the

land - it was a joy to visit and see the beautiful trees now at their full glory - The tree canopy for urban living is very important and cities larger than Halifax - like Winnipeg nave nurtured a beautiful canopy. Every new development or business should by law be mandated to plant trees and landscape for the vista. Every builder of new homes should be required to plant trees on boulevards.
Answer: HRM is fortunate to have a team of qualified arborists. In some cases HRM developers have designed new subdivisions with tree retention in mind. The trees enhance the appearance of the new development and show that the developer has considered the environment. It's also true that some development does result in excessive canopy loss but the UFMP recommends a balanced approach of education and regulation that could be implemented to reduce canopy loss during development. HRM's current development guidelines require new street trees to be planted in subdivisions however it can take several years before tree canopy is restored.

33. Make opportunities for adults, not seniors, students or children to plant trees. Often the decisions to keep trees around are informed by information received as an adult. If we want an urban forest, (the aging trees in Halifax suggest we need to act fast) let's bring in everyone!
Answer: The UFMP recommends that neighbourhood-based volunteer groups be established throughout the 111 urban forest neighborhoods identified in the Plan. This neighbourhood-scale approach sets the stage for local residents to become involved.

34. I hope we are not too late!
Answer: It's not too late if work starts soon. HRM still has an overall canopy cover of approximately 43%.

35. I have no problem with a regulated development system that allows private land owners to remove trees but this (for developments of a certain scale) should be allowed only after the overall development plan - including forestation etc. has been finalized and approved. There should be significant penalties in the by-law for jumping the gun.
Answer: The UFMP recommends a balanced approach of education and regulation that could be implemented to reduce canopy loss during development. Other regulations could also be considered to limit lot clearing before a development application is made but today, more developers are working to limit tree loss. Penalties are sometimes effective but for the most part they are rarely necessary.

36. Businesses should be required to leave a set-back of X feet for green space between their building front and curb. The new building on Almond, across from the post office (formerly CNIB) has their front wall, a sidewalk and then the road. Even walking on the sidewalk will be risky in rainy, slushy weather as cars will spew wet on pedestrians. The permit for removal of 10 or more trees is tricky. I don't want to see work impeded by more permits, but trees of a certain diameter should be described for the 10 or more trees. Removing a bunch of saplings would not have the impact of one huge maple.
Answer: The loss of green space arising from re-development is a challenge. There are benefits to increasing urban density but the removal of trees is problematic. The UFMP recommends that HRM develop new requirements for the retention of tree canopy. For example, re-planting trees on the former CNIB property isn't possible but a second option would be to plant new trees nearby in order to retain local canopy cover. Most cities in Canada with tree by-laws exempt any tree under 12" in diameter from their permitting requirements.

37. Please don't over-legislate what people do on their own property. This makes them unhappy. Giving even token tax breaks for planting trees would be much more useful!
Answer: In central Canada, municipalities such as Toronto and Mississauga, Ontario have adopted by-laws for the conservation of trees on private property in order to preserve canopy cover. Property owners can still remove trees but a permit fee is charged and replacement trees can be required. Trees less that 30 cm (12") in diameter, and diseased and dead trees can usually be removed without a permit or requirements for replacement trees. It should be noted that it has taken these municipalities several years to develop their own urban forest toolbox of plans, public education programs and by-laws based on their unique needs. An HRM by-law concerning trees on private property could be an effective public policy tool for the retention of canopy cover but it would require a "made in HRM" approach that considered local urban forest conditions as well as the cultural values of its citizens.

38. Plant more edible trees. Perhaps an edible forest at Needham hill or the Commons.
Answer: HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future.

39. You want to bring in a new policy. If the city simply maintained the parks they have and thinned out the understory so we could enjoy walking through the parks this would be a big improvement. We don't need a lot of urban forest - we need user friendly parks that are well maintained. As for adding more trees it seems to me that trees grow in abundance given our climate. There is no concern that we are deficient in trees. That being said I am opposed to wholesale slaughter of trees on development lots when it is done to make the construction easier - more sensitivity needed in this category.
Answer: The UFMP is a unique mixture of a management plan and policy. It's understood that more work is required in parks and the Plan calls for improvements to tree maintenance through the adoption of a seven year pruning cycle. While HRM's estimated overall urban forest canopy of 43% is healthy some local neighbourhoods have canopy cover of less than 10%. The UFMP sets out a strategy to improve canopy cover in urban forest neighbourhoods where it is deficient and maintain canopy in areas where it is good. Regulatory efforts to reduce tree loss in new developments can be effective elements in a municipality's urban forest management tool-box but programs to plant more trees on municipal land as well as incentive programs and public education can be equally effective. The UFMP proposes a balanced approach to promoting the growth of HRM's urban forest.

40. Partner with the Urban Orchard project and the Ecology Action Centre to build a working urban fruit sharing program!
Answer: The UFMP contains recommendations for partnership with non-governmental organizations.

41. Policies aren't good enough. You need by-laws with penalties sufficient enough to end clear cutting and other bad behaviour.
Answer: The UFMP recommends a balanced approach of education and regulation that could be implemented to reduce canopy loss during development. Other regulations could also be considered to limit lot clearing before a development application is made but today, more developers are working to limit tree loss. Penalties are sometimes effective but for the most part they are rarely necessary.

42. Would like to see native species to the Halifax region flourish in the city. I think that planting should be encouraged on private property but done so through land use policy and regulation. I don`t think education and encouragement alone will result in more trees on private lots. Trees on public lands should be planted through HRM programs in partnership with community volunteers as you have presented.
Answer: The planting of native trees is a core value of the UFMP. They thrive in our maritime climate. Regulatory efforts can be effective elements in a municipality's urban forest management tool-box but programs to plant more trees on municipal land as well as incentive programs, public education and volunteer efforts can be equally effective. The UFMP proposes a balanced approach to promoting the growth of HRM's urban forest.

43. Wonderful effort to raise our quality of life for generations-good work!!
Answer: Thank you for your positive comments.

44. It is important to encourage homeowners and private businesses to plant more trees and landscaping. Offering pruning, and fruit harvesting could help make it more appealing.
Answer: The UFMP recommends the development of public education programs to encourage homeowners and local businesses to plant more trees on their properties. Other cities in Canada offer workshops for residents to learn more about pruning and the benefits of planting fruit and nut bearing trees.

45. A by-law or policy that affects developers directly. An edict that restricts removal of the forest canopy on a piece of land before review by the city or before some form of structured community involvement and feedback. Also, a by-law that affects what developers can do with the land they give to community use - so the decision reflects community and local ecosystem needs.
Answer: In central Canada, municipalities such as Toronto and Mississauga, Ontario have adopted by-laws for the conservation of trees on private property in order to preserve canopy cover. Property owners can still remove trees but a permit fee is charged and replacement trees can be required. Trees less that

30 cm (12") in diameter, and diseased and dead trees can usually be removed without a permit or requirements for replacement trees. It should be noted that it has taken these municipalities several years to develop their own urban forest toolbox of plans, public education programs and by-laws based on their unique needs. An HRM by-law concerning trees on private property could be an effective public policy tool for the retention of canopy cover but it would require a "made in HRM" approach that considered local urban forest conditions as well as the cultural values of its citizens.

46. Want to mention that I don't currently live in Halifax, but plan on moving there. Hope you don't mind me giving some input!
Answer: Your input is welcome.

47. N/A

48. Please, overrule Nova Scotia Power and permit the installation of LARGE trees in areas such as Clayton Park, Bedford South, and other areas where street trees are currently restricted to small spindly trees that contribute nothing to the streetscape.
Answer: Through proper species selection and ongoing pruning, large trees can co-exist with power lines and also grow to provide canopy cover to local neighbourhoods. HRM is working cooperatively with NSPI to improve tree pruning and resolve tree selection issues.

49. Street trees and shrubs act as a buffer for air pollution for walkers and cyclists.
Answer: The UFMP makes several recommendations for the maintenance and establishment of treed buffers along our active transportation corridors.

50. We need to get on with this, UFMP must be passed and Councillors must step up and pass this NOW!!! We need more HRM staff to help out with protecting our trees. More resources for HRM staff to do a proper job. The UFMP must b extended to all of the HRM - Moshers River to Hubbards.
Answer: HRM Council has been a champion for the development of a UFMP for more than a decade. In a more robust economic climate the creation of additional staff resources would be helpful but the UFMP will be implemented over time based on priorities established in order for the program to be sustainable. HRM's urban forests encompass communities in HRM that receive municipal water and wastewater services. These urban and suburban areas generally feature higher population densities as well as accompanying intensifications of commercial, institutional and industrial land uses. The policies of the Plan are intended for these urban areas and would likely not be as effective or necessary in areas outside the serviced core.

51. Trees such as "The Willow Tree" (for which the intersection is named.) are culturally important and must be protected (and replaced if they die or are damaged beyond repair.)
Answer:

52. In terms of the diameter policy and why I said no - while I think it's important that trees are replaced when cut down, I think this question or thought suggests that all trees are equal, which is not the case. Ten small pines do not equal a hundred year old maple, even if they cover the same land mass. Furthermore, in this scenario, biodiversity is not taken into consideration. I'd prefer to see a clear policy that is not solely based on numbers and replacement strategy, but is based on the age/location/type of tree being cut, with parameters in place to respect biodiversity in the area. (I do like the conservation strategy component re: 'landmark trees', but I worry that only few trees would achieve this status.)
Answer: In central Canada, municipalities such as Toronto and Mississauga, Ontario have adopted by-laws for the conservation of trees on private property in order to preserve canopy cover. Property owners can still remove trees but a permit fee is charged and replacement trees can be required. Trees less than 30 cm (12") in diameter, and diseased and dead trees can usually be removed without a permit or requirements for replacement trees. It should be noted that it has taken these municipalities several years to develop their own urban forest toolbox of plans, public education programs and by-laws based on their unique needs. An HRM by-law concerning trees on private property could be an effective public policy tool for the retention of canopy cover but it would require a "made in HRM" approach that considered local urban forest conditions as well as the cultural values of its citizens. The UFMP contains detailed management plans for 111 urban forest neighbourhoods

53. Trees that are planted must be looked after. No good planting trees in tiny holes surrounded by concrete, or where snowplough equipment and salt will injure them (Herring Cove Rd median)...
Answer: The UFMP is part of HRM's efforts to successfully integrate green infrastructure like street trees with the City's grey infrastructure of sidewalks, curbs, and roadways. The UFMP points to the need for HRM to adopt design standard for the sustainable coexistence of these two essential types of municipal infrastructure.

54. HRM needs to develop clear policies and by-laws and honour them. Developers are a significant challenge. Clearing land is less expensive than working around trees - it should not be allowed however. We need large trees for all the reasons stated in the plan.
Answer: In some cases developers have designed new subdivisions with tree retention in mind. The trees enhance the appearance of the new development and show that the developer has considered the environment. It's also true that some development does result in excessive canopy loss but the UFMP recommends a balanced approach of education and regulation that could be implemented to reduce canopy loss during development. HRM's current development guidelines require new street trees to be planted in subdivisions however it can take several years before tree canopy is restored.

55. The waterfront is barren. Development has stripped sunshade from our high-pedestrian-traffic areas and magnified the global warming effect of concrete and glass making hot days dangerously hot for those susceptible to sun-stroke etc. Families of very young or very old members have to avoid areas where tax dollars are providing events/entertainments.
Answer: The harsh weather conditions and artificial substrate of the waterfront combine to create a difficult environment for the growth of trees. In some areas shielded from the wind tree canopy has developed. Species selection of salt tolerant species and site selection of areas shielded from the wind could result is a series of areas with canopy along the waterfront.

56. Pro-active pruning will help prevent power outages from damaged limbs and trees falling on wires during storms. Perhaps HRM can coordinate its efforts with NS Power on this for the benefit of all HRM residents.
Answer: Through proper species selection and ongoing pruning, large trees can co-exist with power lines and also grow to provide canopy cover to local neighbourhoods. HRM is working cooperatively with NSPI to improve tree pruning and resolve tree selection issues.

57. Do not regulate homeowners who may want to replace trees with a food production garden to grow local food.Extend "interface" by ravines. Several years ago on Hemlock Ravine a landslide from huge development filled a chunk of ravine and eliminated the walk-able ravine.
Answer: In some cases it may be beneficial to maintain areas with minimal canopy cover for urban gardening but in most cases gardens will continue to thrive in conditions with partial shade.

58. Yes; the reason I put lower priority on educating the public is because although well-meaning, it is often not the best use of funds --only because you are "preaching to the converted". For example, I'm guessing the people who take this survey are the ones who are already interested in environmental sustainability --great to ask, and definitely important to educate, but you need to consider ways to get at the "non-converted" -bylaws, but only enforced by laws- may be one way.
Answer: Regulatory efforts to reduce tree loss in new developments can be effective elements in a municipality's urban forest management tool-box but programs to plant more trees on municipal land as well as incentive programs and public education can be equally effective. The UFMP proposes a balanced approach to promoting the growth of HRM's urban forest.

59. Tree policy should be part of larger green policy. For instance, hard surface standards. Conversion of single family residential to rentals often includes paving of front yards to provide adequate parking. This should be banned. Or, for instance, multiple-unit residential buildings which provide some green space above parking garages, but elevated above the street level because they haven't spent the money to dig down deeply enough, leading to inappropriate street pedestrian interface, etc.
Answer: The UFMP is part of HRM's efforts to successfully integrate green infrastructure like street trees with the City's grey infrastructure of sidewalks, curbs, and roadways. The UFMP points to the need for HRM to adopt design standard for the sustainable coexistence of these two essential types of municipal infrastructure.

Trees and vegetation also contribute to the urban landscape's ability to retain stormwater. In some cities there are additional stormwater charges levied for homeowners with extensive impervious surfaces on their properties.

60. Urban sprawl - better long range planning is required in order to preserve the vegetation in this province.
Answer: The HRM Regional Plan is a 25 year long range plan that has been established to avoid unplanned growth and preserve green spaces. The UFMP is one of the functional plans called for in the Regional Plan.

61. It would nice to see more emphasis on native fruit bearing trees and shrubs. They would add much more colour and texture to any landscape.
Answer: HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future.

62. And please follow those by-laws once adopted (no amendments).
Answer: By-law amendments are a necessary part of land use planning. They allow for changes to address planning issues that were not anticipated by those that originally developed the by-law. This is not to say that land use by-laws should be lax but instead, they should contain provisions to allow for amendments as they become necessary.

63. Certain valuable or interesting trees should have a designated marker and protection like the historic status of buildings.
Answer: The city of Ann Arbor in Michigan has land use regulations for the conservation of "landmark trees" in the city's urban forest. Landmark trees according to Ann Arbor regulations are "large, old, picturesque, rare, well-located, or otherwise special and interesting trees that play an important role in the character of individual properties and in the fabric of the City as a whole". Developers are required to consider landmark trees in their site plans.

64. It may have been implied in some phrases that I missed, but planting native trees that can withstand increasing temperatures over the next century will be important. The past forest may not be a good guide for future planting.
Answer: The UFMP considers the potential impacts of a changing climate and provides information concerning the species of native trees that could be considered for planting in the future (Principle 1 – UFMP pg. 33).

65. HRM Needs to put much more effort into protecting the existing canopy, on public AND on private land, before it invests in a planting program. There is a much stronger environmental impact to mature trees than to young, small trees.
Answer: The UFMP proposes increased maintenance and a regular pruning cycle for HRM's trees. However, it also points out that age class diversity is in decline and that more trees should be planted to restore this diversity.

66. Follow cities like Toronto that require approval to remove any tree with a diameter of x size measured x distance above the ground.
Answer: In central Canada, municipalities such as Toronto and Mississauga, Ontario have adopted by-laws for the conservation of trees on private property in order to preserve canopy cover. Property owners can still remove trees but a permit fee is charged and replacement trees can be required. Trees less that 30 cm (12") in diameter, and diseased and dead trees can usually be removed without a permit or requirements for replacement trees. It should be noted that it has taken these municipalities several years to develop their own urban forest toolbox of plans, public education programs and by-laws based on their unique needs. An HRM by-law concerning trees on private property could be an effective public policy tool for the retention of canopy cover but it would require a "made in HRM" approach that considered local urban forest conditions as well as the cultural values of its citizens.

67. A replacement policy is definitely needed, but I'm not sure whether the diameter scheme is very practical.
Answer: Diameter-based guidelines have proven to be effective when combined with other requirements for the retention of tree canopy. For example, re-planting trees on a property would be a priority but in cases where it wasn't practical a second option would be to plant new trees nearby in order to retain local canopy cover.

68. Please protect our small green belt areas.
Answer: The UFMP identifies small green belt areas for enhanced urban forest management.

69. Plant more edible plants and trees.
Answer: HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future

70. N/A

71. Keep it simple, stupid. You don't need more by-laws, you want to encourage tree planting!
Answer: Regulatory efforts to reduce tree loss in new developments can be effective elements in a municipality's urban forest management tool-box but programs to plant more trees on municipal land as well as incentive programs and public education can be equally effective. The UFMP proposes a balanced approach to promoting the growth of HRM's urban forest.

72. Thanks for including our opinion. Now save the trees so we can breathe!
Answer: Thank you for your support.

73. Some trees are nuisances, casting unwanted shade or invasive roots. This should be considered when evaluating tree value.
Answer: In some cases it may be beneficial to maintain areas with minimal canopy cover for urban gardening but in most cases gardens will continue to thrive in conditions with partial shade.

74. See comment box from previous page. There is much public or institutional land that could be "forested" I particularly like when spaces between roads, like highway onramps, are planted up. I really like the protecting of riparian space. The city should really move to protect waterways and re-naturalize them. The coastline of the northwest arm should be regulated. The coastline is mostly developed and damaged, but it could at least be prevented from getting worse. You should really have to get a permit for removing just 3 trees. I certainly have lived in places you have to get a permit just to remove one tree, or to trim a tree on your property, but lining the street.
Answer: The UFMP addresses many of the issues you have raised in Appendix A – Urban Forest Neighbourhood Factsheets. Riparian protection policies for the Northwest Arm are also under review. In central Canada, municipalities such as Toronto and Mississauga, Ontario have adopted by-laws for the conservation of trees on private property in order to preserve canopy cover. Property owners can still remove trees but a permit fee is charged and replacement trees can be required. Trees less that 30 cm (12") in diameter, and diseased and dead trees can usually be removed without a permit or requirements for replacement trees. It should be noted that it has taken these municipalities several years to develop their own urban forest toolbox of plans, public education programs and by-laws based on their unique needs. An HRM by-law concerning trees on private property could be an effective public policy tool for the retention of canopy cover but it would require a "made in HRM" approach that considered local urban forest conditions as well as the cultural values of its citizens

75. Financially support the replacement of storm damaged or diseased trees on private lands and don't hinder their removal.
Answer: Tree maintenance is a landowner's responsibility but there could be opportunities for homeowners to take part in future incentive programs. Tree regulations typically do not hinder the removal of damaged or diseased trees.

76. Stop planting trees that grow too large and lift sidewalks put smaller trees around sidewalk and do not let trees grow into power lines
Answer: The UFMP is part of HRM's efforts to successfully integrate green infrastructure like street trees with the City's grey infrastructure of sidewalks, curbs, and roadways. The UFMP points to the need for HRM to adopt design standard for the sustainable coexistence of these two essential types of municipal infrastructure. Through proper species selection and ongoing pruning large trees can coexist with power lines. Small trees could be planted under power lines however they would never achieve the type of canopy protection necessary for urban living.

77. I think we should make sure to plant a variety of trees. There are lots of native species that all have their benefits. We need much stronger laws to protect trees and make sure we plant them wherever possible. I wish there could be some incentive for green roofs, as well.
Answer: The planting of native trees is a core value of the UFMP. They thrive in our maritime climate. Regulatory efforts can be effective elements in a municipality's urban forest management tool-box but programs to plant more trees on municipal land as well as incentive programs, public education and volunteer efforts can be equally effective. The UFMP proposes a balanced

approach to promoting the growth of HRM's urban forest. Green roofs can support some trees but the goal of the UFMP is to retain and improve land-based tree canopy in HRM. Green roof technology is constantly improving and in the future it is likely that the UFMP will incorporate considerations of this approach.

78. Although planting or public and private lands are very important, policies and by-laws are surefire ways to better manage tree cutting by knowing where trees are cut and where they have been kept standing. Landmark trees are an excellent idea I have noticed in Ontario. A program like that not only ensures landmark or 'model' trees are kept standing, but if used on private property, also gives the owner a sense of value and stewardship in protecting them. These trees also provide landmark seed for new trees. These trees should be prized and celebrated.
Answer: Regulatory efforts to reduce tree loss in new developments can be effective elements in a municipality's urban forest management tool-box but programs to plant more trees on municipal land as well as incentive programs and public education can be equally effective. The UFMP proposes a balanced approach to promoting the growth of HRM's urban forest.

79. When new trees are planted within walking distance of schools, you could make a presentation to them, teaching them about the particular kind of trees and their importance as part of the urban forest.
Answer: Good idea. There are also many opportunities for trees to be planted on school grounds throughout the UFMP study area.

80. New plantings provide opportunity for the introduction of variety but the choices sometimes do not make much sense and wind patterns seldom seem to be considered, often with unfortunate results. I would vote for more evergreens because of year-round interest although I realize climate imposes restrictions, as well as more flowering trees (i.e. spectacular flowers rather than humdrum ones) such as black locust.
Answer: The UFMP recommends that more coniferous trees be planted especially in places such as Armdale where trees such as white pine form an important element of the area's cultural landscape.

81. Diameter replacement trees can be planted in nearby parks or other properties
Answer: The UFMP recommends that HRM develop new requirements for the retention of tree canopy. For example, re-planting trees on a property may not be possible but a second option would be to plant new trees nearby in order to retain local canopy cover.

82. I believe it is important to put into place a plan that will protect the trees we already have. It is impossible to replace a mature tree taken down with another tree the same size. If that were required on private property, such as a home owner, it would be beyond the financial ability of most homeowners. Also see comment in preceding section.
Answer: In central Canada, municipalities such as Toronto and Mississauga, Ontario have adopted by-laws for the conservation of trees on private property in order to preserve canopy cover. Property owners can still remove trees but a permit fee is charged and replacement trees can be required. Trees less that 30 cm (12") in diameter, and diseased and dead trees can usually be removed without a permit or requirements for replacement trees. It should be noted that it has taken these municipalities several years to develop their own urban forest toolbox of plans, public education programs and by-laws based on their unique needs. An HRM by-law concerning trees on private property could be an effective public policy tool for the retention of canopy cover but it would require a "made in HRM" approach that considered local urban forest conditions as well as the cultural values of its citizens.

83. Stop new subdivisions from being clear cut so the developer can save money by downing trees so they can make one long trench for housing foundations. Too many developers tear down healthy trees to make it easier for machines to get in to dig multi-foundations. The motto should be "Think before you Axe!"
Answer: In some cases developers have designed new subdivisions with tree retention in mind. The trees enhance the appearance of the new development and show that the developer has considered the environment. It's also true that some development does result in excessive canopy loss but the UFMP recommends a balanced approach of education and regulation that could be implemented to reduce canopy loss during development.

84. Is there any talk of planting fruit bearing trees for urban edible projects? (apple, pear, cherry etc)? Seattle recently launched an "urban food forest" initiative, see news.discovery.com/earth/edible-forest-free-for-all-in-seattle-120321.html.
Answer: HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more of this in the future.

85. N/A

86. The Regional Development Strategy is a good idea but there have been many exceptions allowed. If land-use policies and by-laws were amended, would there be a way to have few exceptions to the rule?
Answer: Exceptions are a necessary part of land use planning. They allow for creative solutions to planning issues that were not anticipated by those that originally developed the policy. This is not to say that land use policies should be lax but instead, they should contain provisions to allow for exceptions in certain circumstances.

87. Now is the time to be proactive with our green spaces – to preserve and protect them – before they disappear and we can't get them back. There are things which can be done to encourage tree growth without making it too bureaucratic. In encouraging planting on private property, education is necessary so planting is done properly. Improper planting creates as much of a problem as no planting. I feel green space and urban forestry really add to a city.
Answer: Regulatory efforts to reduce tree canopy loss can be effective elements in a municipality's urban forest management tool-box but programs to plant more trees on municipal land as well as incentive programs and public education to encourage tree planting on private property can be equally effective. The UFMP proposes a balanced approach to promoting the growth of HRM's urban forest.

88. Public funds should stay with public lands not go to private. Encouraging private partnership is important; however, funding private land with public is not appropriate unless engagement with all stakeholders and Regional Council approved the funds.
Answer: It appears that many other people who have completed this survey agree with you. Close to 90% of respondents said that it was very important or important for HRM to plant more trees on municipal property. Others supported public partnerships, incentive programs and educational efforts to encourage citizens and businesses to plant trees on private property. Many other cities in Canada have developed similar programs but the decision to proceed will ultimately rest with Regional Council.

89. You should look at planting food trees as well, like fruit and nut trees. Chestnuts for example. What would be native species as they belong here?
Answer: HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. Expect more projects like this in the future. The UFMP also includes policy support for the planting of nut and fruit bearing trees. Although the nuts from some species of Chestnut are edible they are not native to Nova Scotia.

90. NS power should be allowed to put the wires underground, it will cause less problems with power outages (because the tree's won't be falling on them, and there are less hazards that will affect power lines underground), less unneeded pruning to trees, and make it easier to put up more trees.
Answer: In some cases Nova Scotia Power Incorporated (NSPI) will provide underground services but cost factors generally dictate that conventional power pole systems are preferred. Damage to street trees as well as utility lines can be avoided with more regular cycles of tree pruning. The UFMP points to problems associated with utility conflicts and proposes closer cooperation between HRM and NSPI to avoid overly aggressive pruning while also ensuring an uninterrupted power supply.

91. I do not believe in having negative outcomes in setting up by-laws and policies. Positive reinforcement should be the aim. Educate everyone, give incentives, setup a volunteer program, etc. BUT DON'T have charges, fees, and more redtape, it just costs money and will cause a backlash.
Answer: Regulatory efforts to reduce tree canopy loss can be effective elements in a municipality's urban forest management tool-box but programs to plant more trees on municipal land as well as incentive programs and public education can be equally effective. The UFMP proposes a balanced approach to promoting the growth of HRM's urban forest.

92. The diameter replacement policy has worked elsewhere, but I can just see people planting very haphazardly - so many trees do not have the space they currently need (see metasequoia near Dal's Life Sciences centre - and that was presumably planted in consultation with a botanist!!!). Diameter replacement could be a nightmare to enforce, especially if the previous tree is already down. As well, if you purchase a property, you inherit trees that may have been planted with little or no thought to the next 20 years. A friend of mine recently purchased a place where five trees had been planted directly under power lines (large white pines) or within 1 ft. of his foundation. The tree health was poor, since they had been topped every year or two by the previous owner, for the last 20 years! He had little choice but to remove them, and still has several trees in his small yard. Under a permaculture strategy, he does not need to replace all of these trees to maintain a productive and sustainable property.
Answer: Good points. In central Canada, municipalities such as Toronto and Mississauga, Ontario have adopted by-laws for the conservation of trees on private property in order to preserve canopy cover. Property owners can still remove trees but a permit fee is charged and replacement trees can be required. Trees less that 30 cm (12") in diameter, and diseased and dead trees can usually be removed without a permit or requirements for replacement trees. It should be noted that it has taken these municipalities several years to develop their own urban forest toolbox of plans, public education programs and by-laws based on their unique needs. An HRM by-law concerning trees on private property could be an effective public policy tool for the retention of canopy cover but it would require a "made in HRM" approach that considered local urban forest conditions as well as the cultural values of its citizens. Public education is an important component of the UFMP that will help property owners understand the benefits of the urban forest and the need to carefully select compatible tree species for plantings on residential properties.

93. I think developing an urban garden system to feed people is more important than a canopy of trees that will blow over in a hurricane and wreck property.
Answer: Trees and gardens are both important. The neighbourhood-scale planning for the UFMP identifies areas with full as well as minimal canopy cover. In some cases it may be beneficial to maintain areas with minimal canopy cover for urban gardening but in most cases gardens will continue to thrive even in areas with partial shade. Properly maintained trees that are pruned on a regular basis are able to withstand most storm conditions including hurricanes

94. Too many areas in HRM are overlooked for their environmental and recreational value in favour of developer dollars. We should be building up instead of out in an effort to control commuter traffic, protect existing green spaces and promote a healthy city.
Answer: The UFMP doesn't directly address these issues. These concerns are reflected in the policies of HRM's Regional Municipal Planning Strategy.

95. What about tree succession planning, for our "landmark" trees? Encourage developers to plant trees and greenspaces through land-use policies and by-laws. Maximize opportunities to facilitate planting on public lands.
Answer: Good comments. All of these issues are addressed in the UFMP's recommended implementation actions.

96. Good, comprehensive policy is only the first step - an important one - but it also needs to be supported by good education, communication and outreach. Regarding policy and by-laws, I think it's important for property owners to take appropriate care of the trees on their properties, including culling and thinning tree growth along the edge of bordering properties, especially where those trees may be causing problems for the neighbours (close proximity trees to buildings, which cause damage in wind storms, etc.).
Answer: Regulatory efforts to retain the urban forest canopy can be effective elements in a municipality's urban forest management tool-box but programs to plant more trees on municipal land as well as incentive programs and public education can be equally effective. The UFMP proposes a balanced approach to promoting the growth of HRM's urban forest.

97. Plant native species as under growth beneath the new trees to provide food and habitat for birds and other wildlife.
Answer: The UFMP calls for the naturalization of some park and greenspace areas through increased tree planting as well as through the reduced use of landscaping materials such as bark and mulch. In these

areas it is likely that the forest understory will naturally regenerate without the need for planting. The UFMP also calls for the retention of dead standing trees in remote areas of parks for wildlife habitat.

98. Ensure that the trees used for reforestation are compatible with the area, and not just low cost pine to fill a quota.
Answer: The UFMP calls for the careful selection of tree species in all circumstances.

99. Ensure trees used in reforestation fit the ecology, not just a low cost quota.
Answer: The UFMP calls for the careful selection of tree species in all circumstances.

100. Concentrate new developments in core. Designate greenbelts. Reduce impervious surfaces with bylaws. Control storm water surface runoff with innovative landscaping.
Answer: The UFMP doesn't directly address these issues. These concerns are reflected in the policies of HRM's Regional Municipal Planning Strategy.

101. When trees on streets are trimmed for power lines they are often hacked and destroyed instead of pruned properly. This weakens the tree and causes improper growth, rot and disease. Dead, damaged or weakened branches are left on the tree while healthy branches are cut off.
Answer: Damage to street trees can be avoided with more regular cycles of tree pruning. The UFMP points to problems associated with utility conflicts and proposes closer cooperation between HRM and NSPI to avoid overly aggressive pruning.

102. Have free trees/bushes given away once a year to encourage tree planting. This is where partnerships would be very important.
Answer: HRM could establish partnership programs with tree nurseries, landscaping companies and garden centres to offer rebates to homeowners who plant trees on their properties. Other cities in Canada have adopted similar programs.

103. Must keep in mind all aspects of life and community needs.
Answer: Agreed.

104. But see to those parking lots too...huge areas in the business parks are just sterile tarred over areas. How nice it would be to have trees and bushes dividing the areas instead of concrete barriers.
Answer: HRM's business parks have recently adopted the types of guidelines you mention. The UFMP calls for HRM to plant more street trees in business parks and also advocates for a partnership approach with local businesses.

105. See my longer answer about creating a campaign. I would add that nurseries and building supply firms (gardening centres) could also be encouraged to hand out "register" your planting with every tree purchase. Also do not forget landscaping firms!
Answer: HRM could establish partnership programs with tree nurseries, landscaping companies and garden centres to offer rebates to homeowners who plant trees on their properties. Other cities in Canada have adopted similar programs.

106. Planting on public lands is great but removes responsibility from individuals, especially where privately owned woodlots are clear cut and they just leave the mess without being forced to replant. True, it comes back nicely in 20 years or so, but all the heat is on public lands, which, as we all know, is a small percentage of NS forests. In Europe, you can't even cut one tree on your own property without a special permit. Let's not wait until it's that badly deforested here.
Answer: The Halifax Regional Municipality Charter provides authority to Regional Council to enact by-laws concerning the urban forest. Forestry practices on private woodlots are regulated by the Province.

107. Where native forest exists, then HRM, private landowners and developers should be required to take additional steps when necessary to "save" mature trees from the possible effects of shallow soil, exposure, wind throw or any combination thereof.
Answer: In some cases developers have designed new subdivisions with tree retention in mind. The trees enhance the appearance of the new development and show that the developer has considered the environment. It's also true that some development does result in excessive canopy loss but the UFMP recommends a balanced approach of education and regulation that could be implemented to reduce canopy loss during

development. HRM's current development guidelines require new street trees to be planted in subdivisions however it can take several years before tree canopy is restored.

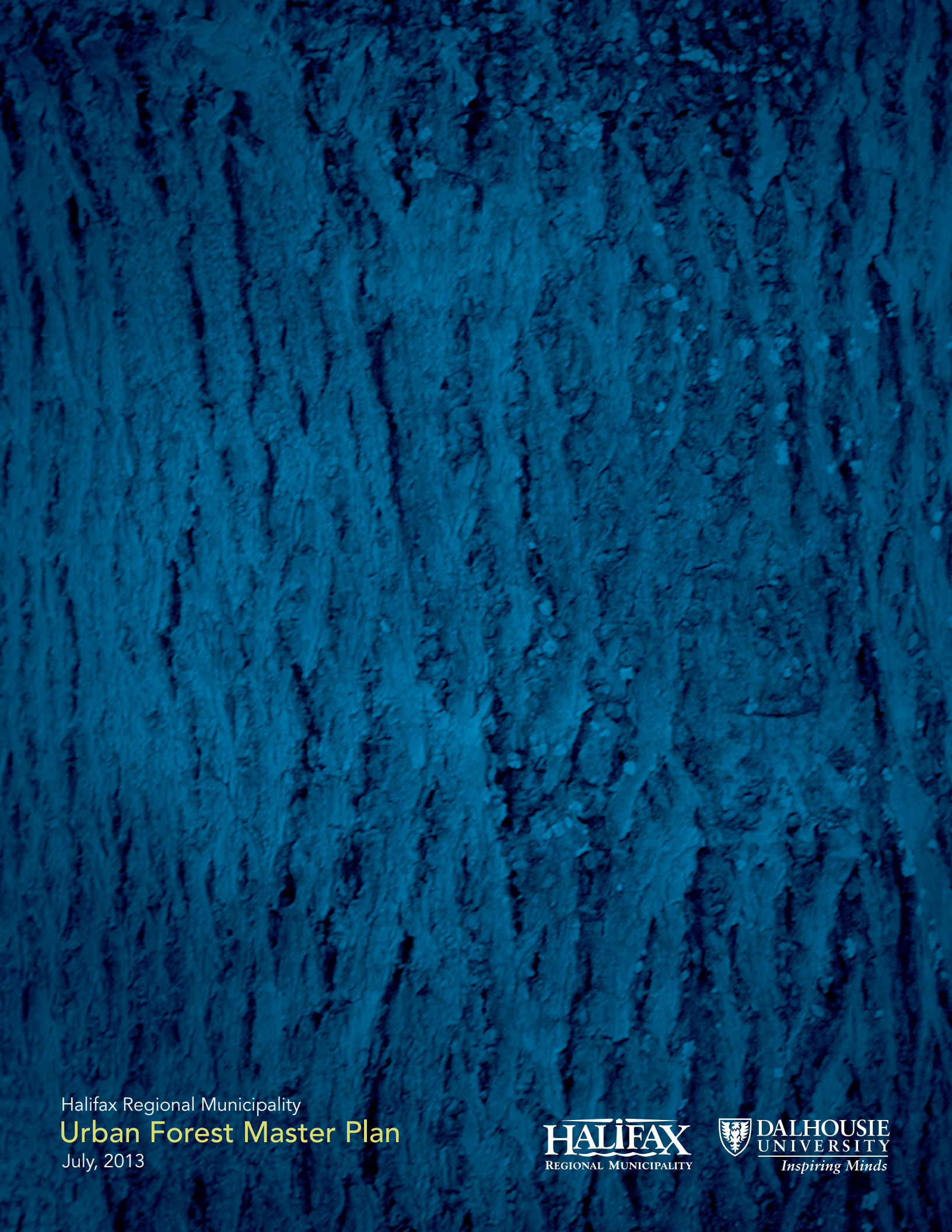
108. Have schools and institutions start seedlings and donate to private property owners and businesses.
Answer: Thank you for your comments. We hope that City schools and institutions will take part in the educational programs recommended in the UFMP.

109. I have heard that larger trees (like oaks) are not being planted (policy) because they are more apt to interfere with power lines. I hope this is not true because I would like to see the larger, longer living trees increased in number...not decreased, as they age and disappear...
Answer: There is no such municipal policy. In fact, the UFMP calls for more planting of oak trees (and other large tree species) throughout the urban forest. Through proper species selection and ongoing pruning, large trees can co-exist with power lines. Small trees could be planted under power lines however they would never achieve the type of canopy protection necessary for urban living.

110. A permitting system for tree removal has no teeth unless it can be enforced and fines levied for violators.
Answer: Adequate enforcement and robust fine structures are key elements of canopy conservation by-laws but prosecutions are rarely necessary in jurisdictions where the by-laws are administered in tandem with extensive public education efforts.

111. When cutting brush back from trails, wait until harvest time for wild raspberries or elderberries is over so that people can pick the wild fruit on the trails.
Answer: Thank you for the suggestion.

112. All the areas mentioned above seem important. Again, the edible tree planting aspect would be great to start highlighting. It could give great motivation for any private property planting encouragement campaigns.
Answer: HRM is currently developing a plan to plant a grove of fruit and nut-bearing trees in a public park. The UFMP also includes policy support for this item.



Halifax Regional Municipality

Urban Forest Master Plan

July, 2013

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