Toronto and Region Conservation
for The Living City®

BRUCE'S MILL

Conservation Area Master Plan

October 2011

Toronto and Region Conservation
for The Living City®

PREPARED BY:

Bruce's Mill Conservation Area Master Plan Advisory Committee

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EXECUTIVE SUMMARY

The Bruce's Mill Conservation Area Master Plan was developed to protect, conserve and restore the valuable ecological features and functions of the site, while guiding the current and potential future public uses of the area. It is intended to provide a vision of what is possible at Bruce's Mill Conservation Area (BMCA), and inspire partners and supporters to help Toronto and Region Conservation Authority (TRCA) achieve that vision.

Bruce's Mill Conservation Area (BMCA) occupies 108 hectares in the Rouge River watershed, within the Town of Whitchurch-Stouffville. Its diverse ecosystem includes Bruce Creek, a tributary of the Rouge River, a number of high-quality wetlands and extensive forests including almost nine hectares of interior forest.

The Bruce's Mill Conservation Area Master Plan was initiated by TRCA in 2004. At meeting #06/2004 of the TRCA Board on June 25, 2004, Resolution #A180/04 was adopted as follows:

> "THAT staff be directed to develop a master plan for Bruce's Mill Conservation Area;
>
> THAT an advisory committee be established, which would include one member each from the Rouge Park staff and the Rouge Park Alliance, interested community groups, business representatives, community residents, agency staff, municipal staff and local and regional councilors to assist with the development of the master plan and to facilitate the opportunity for public input;
>
> *AND* FURTHER *THAT the final master plan be brought to the Toronto and Region Conservation Authority for approval."*

As a part of the process for developing the Bruce's Mill Conservation Area Master Plan, TRCA prepared the Bruce's Mill Conservation Area Master Plan Background Report that details the current knowledge about the property. This report was developed by TRCA staff in partnership with the BMCA Master Plan Advisory Committee.

The Bruce's Mill Conservation Area Master Plan contains seven chapters, each of which is briefly described below.

The introductory chapter provides a description of the development of the master plan for BMCA, including the study process and a brief description of the park. The master plan was developed by TRCA and the BMCA Master Plan Advisory Committee. Input was gathered throughout the process at public meetings and through surveys.

Chapter two contains the plan vision, concept themes, and guiding principles as well a series of goals and objectives. These were developed by the BMCA Advisory Committee. The following vision statement, together with the accompanying goals, objectives and management principles (see Chapter Two) should guide all current and future actions.

> Through dynamic partnerships and community involvement, Bruce's Mill will enhance its significant natural areas and unique cultural heritage resources to provide the best opportunities for nature appreciation, education and outdoor recreational enjoyment. In addition, public health and safety will be integrated in harmony with all park programs, ensuring the natural and cultural values of the park are protected and will flourish.

Chapter three provides a summary of the management zones and how the zones are delineated. The zones and definitions are based on the planning and management policies of Ontario Provincial Parks. The recommended conservation land management zoning and policies have then been modified to more closely address the requirements of BMCA and TRCA. The nine management

zones defined for BMCA include nature reserve, natural environment, primary restoration, secondary restoration, cultural heritage, operations, public use, public use-lease, and residential-lease. Approximately 60 per cent of the park is classified as nature reserve, natural environment, primary restoration or secondary restoration, while 29 per cent is zoned as public use.

Chapter four contains a series of management recommendations regarding natural heritage, cultural heritage resources, conservation education and tourism, stewardship and outreach, operations and park management, land use management and plan implementation. The key recommendations include:

- Regular monitoring of flora, fauna and the overall condition of the ecosystems of BMCA.
- Increase the natural cover in BMCA by restoring the north half of the agricultural fields as well as allowing natural succession in the secondary restoration areas.
- Create a nature reserve area with limited public use in the central area of BMCA to protect and enhance the interior forest habitats.
- Integrate the heritage buildings into all aspects of the park management and development, such as trails, public uses, education and signage.
- Implement urgent repair and restoration activities required to stabilize the Mill building and Mill Attendant's house.
- Initiate a public consultation process to develop an adaptive re-use plan for the Mill building.
- Develop a stewardship group to provide implementation support at BMCA.

Chapters five and six present more detailed plans based on the management zones and recommendations that were developed. The plans are:

- the public use and recreation concept plan (Chapter Five), and the trail plan (Chapter Six), which is intended to guide the development and management of trails, access points, signage and related facilities in order to achieve the master plan goals and objectives.

Key features of the public use and recreation plan include:

- Removal of the driving range and development of a nature-based activity/recreation area.
- Installation of a skills development area, including a ropes course.
- Development of a multi-purpose recreation area in the west fields.
- Restoration and development of adaptive re-use plans for the Mill building.
- Development of a new aquatic facility, including a splash pad.
- Construction of a second entrance and driveway from Warden Avenue.

Key features of the trail plan include:

- Improved signage and way-finding along the entire trail system.
- Repair and replacement of boardwalk and bridge structures.
- Closures of informal or inappropriate trails.
- Extension of the wagon trail.
- Relocation of the trailhead located west of the start of the main driveway.
- Development of a multi-use trail to accommodate visitors who use bicycle transportation to access the property.
- Development of an interpretive program along the trail system.

Chapter seven provides a summary of guidelines for implementing the Bruce's Mill Conservation Area Master Plan. Included are an implementation schedule and key directions for the stewardship committee to support TRCA in implementing the master plan. Opportunities for agency, municipal and private land stewardship are also discussed. The total cost to implement the major recommendations of the master plan is $2,817,400. This chapter includes a recommended phased implementation schedule.

The Bruce's Mill Conservation Area Master Plan will guide BMCA for the next 25 years, with regular reviews and updates conducted every seven to ten years. Through diligent implementation of this plan, BMCA will be further enhanced as a valuable environmental, recreational and educational resource for residents of the Greater Toronto Area.

1 INTRODUCTION

1.1 Overview

The Bruce's Mill Conservation Area (BMCA) is 108 hectares of rolling hills and creeks located in the western part of the Town of Stouffville. The park is on the southern edge of the Oak Ridges Moraine and boasts more than 70 hectares of wetlands, forests and meadows. In addition to providing valuable habitat to wetland and forest species, it has the potential to be a prime tourist destination for local and regional visitors to enjoy nature-based recreation opportunities.

The Bruce's Mill Conservation Area Master Plan was generated to protect, conserve and restore the valuable ecological features and functions of the site, while guiding the current and potential future public uses of the area. It is intended to provide a vision of what is possible at BMCA, and inspire partners and supporters to help TRCA achieve that vision.

The master planning process occurred in several phases that consisted of compiling background materials and research, conducting extensive public consultation, developing the vision, concept themes, goals, and objectives, developing management recommendations and developing trail and public use plans. The master plan includes a description and evaluation of the property based on relevant plans and policies, existing resource inventories and environmental conditions, site limitations and opportunities. Additionally, the plan identifies specific management zones for the site that delineate and guide the types and levels of appropriate activities. The plan also makes recommendations for future initiatives, including the protection of natural features and habitat regeneration based on an ecosystem approach to planning and management. Finally, detailed plans for trails and public use are presented.

1.2 Context

The Bruce's Mill Conservation Area is located on the southern edge of the Oak Ridges Moraine, and is designated under the Oak Ridges Moraine Conservation Plan (ORMCP). The west and north east corner of the property, have been classified as Countryside Area. The natural areas of BMCA that fall within boundaries of the ORMCP are identified as "Key Natural Heritage Features" and "Hydrologically Sensitive Features," and are protected under the plan.

The Bruce's Mill Conservation Area is also located within the Rouge River Watershed and forms part of Rouge Park, both of which are considered to have particular significance within the Protected Countryside designation of the Greenbelt Plan. Under the Greenbelt Plan, BMCA is designated as Protected Countryside and is classified as part of the Natural System. Bruce's Mill Conservation Area is also covered under the policies of the Rouge North Management Plan.

The two provincial plans and the Rouge North Management Plan provide the policy context for management of BMCA. The master plan will also be developed in accordance with TRCA's vision for The Living City®, where human settlement can flourish forever as part of nature's beauty and diversity.

Toronto and Region Conservation's vision of The Living City® region has four objectives:

- **Healthy Rivers and Shorelines** - To restore the integrity and health of the region's rivers and waters from the headwaters in the Oak Ridges Moraine, throughout each of the nine watersheds in TRCA's jurisdiction, to the Toronto waterfront on Lake Ontario.
- **Regional Biodiversity** - To protect and restore a regional system of natural areas that provide habitat for plant and animal species, improve air quality and provide opportunities for the enjoyment of nature.
- **Sustainable Communities** - To facilitate broad community understanding, dialogue and action toward integrated approaches to sustainable living and city building that improves the quality of life for residents, businesses and nature.
- **Business Excellence** - To produce continuous improvement in the development and delivery of all programs through creative partnerships, diverse funding sources and careful auditing of outcomes and effectiveness.

Two key TRCA Living City strategies that have been integrated into the BMCA Master Plan are:

- Terrestrial Natural Heritage System Strategy
- Rouge River Watershed Plan: Towards a Healthy and Sustainable Future

1.2.1 TRCA's Terrestrial Natural Heritage System Strategy

The Terrestrial Natural Heritage System Strategy (TNHSS) was approved by the TRCA Board in 2007. It provides extensive data, scientific models, mapping and guidance for TRCA staff, TRCA's partner municipalities and community groups for achieving natural heritage protection objectives.

The need for a TNHSS originated from observations by TRCA and others that showed an alarming reduction in vegetation communities and species populations, and their distribution within TRCA's area of jurisdiction. This change was occurring simultaneously with urban expansion despite best efforts at protection. The reduction in forests, wetlands, meadows and their species was also accompanied by an increase in flooding and erosion, and in conflicting recreational uses, in protected areas. Changes in land use were being approved site by site without understanding how, cumulatively, they were impacting the region's natural system and environmental health.

Toronto and Region Conservation Authority has redefined its approach towards biodiversity conservation to better reflect the role of ecosystems in the landscape. One important premise is that the distribution and quantity of natural cover and species is intricately linked to water, air quality and climate regulation, quality of life, and sustainability for citizens of our Living City region. Conservation efforts should therefore, not focus solely on the conventional protection of rare species or special natural areas. TRCA collected a large database of flora and fauna species and land cover from across the region. From that, a computer model was developed to evaluate the existing conditions and to predict the response of the region's biodiversity to urbanization, should it proceed following the current practices in natural system protection. From a known 1,111 species, 693 were predicted to either disappear from the region or be severely restricted in their distribution. This dramatic loss would be accompanied by further impacts on water quality, flooding, erosion and visitor crowding within the natural system. It was concluded that in order to meet the objectives of the Living City Strategic Plan – to protect biodiversity and its ancillary benefits in the face of urbanization – more natural cover would be needed in the region than exists today.

A second model was developed to assist in designing an expanded target natural system. The model selected the areas of highest value to the region's natural system based on a variety of criteria, both ecological and planning. The result was a target system that includes much of the existing forests, wetlands and meadows (adding up to 25 per cent of the region) plus additional areas to be restored. This target system was evaluated using the landscape analysis model.

It was determined that at least 30 per cent of the region should be natural cover in order to sustain the existing distribution and populations of species of concern. That target system would also help to sustain the environmental and social benefits of the existing system.

The Terrestrial Natural Heritage System Strategy was developed and finalized in consultation with stakeholders including municipalities, Non-Governmental Organizations (NGOs), provincial and federal governments, community groups, academics and the development industry. The data, mapping and models are now available to stakeholders to assist them in the decision making process surrounding land planning, management, stewardship and securement. The target terrestrial natural system was used and refined at the watershed scale in the development of watershed plans. The target system within the Growth Plan area is subject to further analysis and refinement to integrate with other community planning objectives as part of growth planning exercises. Applications and refinements will also occur through the more detailed planning at the secondary, subdivision and site plan scales. The target system within the rural areas will be refined at the detailed scale with landowners in stewardship initiatives. Thus, guided by the TNHSS, decisions at smaller scales will be made in consideration of the sustainability of the region.

The Terrestrial Natural Heritage System Strategy guides the natural heritage approach used in the development of this master plan. The approach considers the site within the context of the region and regional pressures. It provides clear and detailed direction for gathering and analyzing information about natural habitats, vegetation communities and species. This approach evaluates a site's contribution to the landscape at three levels:

1. The entire TRCA jurisdiction.
2. Defined areas of planning units such as the watershed and sub-watershed.
3. Municipal areas.

A key component of the terrestrial natural heritage approach is the scoring and ranking of vegetation communities and fauna species. The ranking information is used to determine if there are any species or vegetation communities of concern on the site. A second key component of the approach is the terrestrial natural heritage indicators and measures that are used to establish quantitative targets for the terrestrial ecosystem. The indicators are:

- Quantity of natural cover
- Distribution
- Matrix influence
- Patch size and shape
- Landscape connectivity
- Biodiversity

The terrestrial natural heritage information that was gathered was analyzed and used to determine the appropriate management zones and trail alignments. The scoring and ranking of vegetation communities and fauna species reflects their primary resistance to urbanization and human encroachment. Species are ranked based on local distribution or local (L) ranks. These L ranks are in some ways analogous to the provincial (S) and global (G) rank that are assigned to vegetation communities, flora and fauna. The TRCA ranks range from L1 to L5. Generally, L1 to L3 species or vegetation communities are of regional conservation concern, e.g. within TRCA jurisdiction, and their locations have been protected through the plan. The complete list of species and vegetation communities for BMCA can be found in appendices A, B and C. A complete copy of the biological inventory report for BMCA can be found in the Bruce's Mill Conservation Area Master Plan Background Report (TRCA, 2009).

1.2.2 Rouge River Watershed Plan

Recommendations from the Rouge River Watershed Plan: Towards a Healthy and Sustainable Future (TRCA, 2007) were integrated into the Bruce's Mill Conservation Area Master Plan to ensure a consistent watershed management approach.

The Rouge River watershed is an extraordinary resource in Southern Ontario. It spans 336 square kilometers of land and water in the Regional Municipalities of York and Durham, the Cities of Toronto and Pickering, and the Towns of Markham, Richmond Hill and Whitchurch-Stouffville. It includes all the lands that drain to the Rouge River and its tributaries, including the Little Rouge River, starting in the hills of the Oak Ridges Moraine and flowing south to Lake Ontario.

The watershed plan was prepared by a multi-stakeholder task force that included representatives from all levels of government agencies, private businesses, not-for-profit organizations and the public and was coordinated by TRCA and Rouge Park. The plan has a strong technical foundation, based on decades of monitoring of environmental conditions combined with a leading edge approach to modeling of potential future conditions. A series of management summits were held to convene experts who could help identify best practices and recommendations to achieve the objectives of the Rouge watershed task force.

The guiding framework for the watershed plan comprises an overall goal, a set of principles, nine goals and twenty two objectives with specific targets. The overall goal is:

> To work towards a healthy and sustainable Rouge watershed by protecting, restoring and enhancing its ecological and cultural integrity within the context of a regional natural heritage system.

The goals, objectives and targets address:

- Groundwater
- Surface water
- Stream form
- Aquatic system
- Terrestrial system
- Air quality and climate change
- Cultural heritage
- Nature-based recreation
- Sustainable land and resource use

The pathway to a healthy watershed that emerged from the plan is based on a comprehensive and inter-dependent set of strategies that will protect and enhance valued resources, regenerate damaged systems, and build more sustainable communities. These strategies encompass three broad themes:

1) **Establish the targeted terrestrial natural heritage system:** An expanded natural heritage system that will provide multiple benefits, including biodiversity and habitats, water balance maintenance and restoration, opportunities for nature-based recreation, improved quality of life, and greater resilience to urban growth and climate change. This can be accomplished by protecting existing valued assets, securing additional lands, regenerating degraded areas and improving stewardship of public private lands.

2) **Build sustainable communities:** The plan identifies more sustainable approaches to urban form, infrastructure, transportation and resource use that will contribute to overall improved quality of life. These approaches should be applied to new communities, as well as to the intensification or redevelopment of existing ones.

3) **Recognize and develop a regional open space system:** The Rouge watershed has the basis for a significant, inter-connected regional open space system including Rouge Park and regional trails, conservation areas and major municipal parks. The plan recommends that this system be further developed to reach its potential to provide nature-based recreation experiences for a growing population, support for healthy communities, interpretation of natural and cultural heritage, linkages with local neighbourhoods and connections to surrounding watersheds.

1.2.3 TRCA and Conservation Lands

The goal of TRCA in managing conservation lands is:

"To ensure the environmental stewardship of Authority lands and to continue to bring into ownership additional conservation and hazard lands essential for achieving a healthy regional environment and sustainable communities" (TRCA, 2001)

Currently, TRCA lands are managed under the following categories:

- Active-use conservation areas
- Passive-use areas/resource management tracts
- Residential properties
- Rented farm land
- Contract/lease and easement land
- Limited-use open land
- Management agreement land

1.3 Study Process

Experience has shown that residents and community groups have grown more concerned with the impact of land use change on the remaining natural landscapes within the Greater Toronto Area. At the same time, user groups, businesses and municipalities have expressed a growing interest in using public lands for a variety of outdoor recreation and public uses. The provision of public uses on TRCA-owned land must consider economic factors and the recreational needs of the community, as well as ensure the natural landscape is protected and properly managed.

Toronto and Region Conservation Authority initiated the preparation of a comprehensive master plan for BMCA in the summer of 2004. At meeting #3/04, held on June 11, 2004, of the TRCA Board, Res. #A180/04 as follows, was adopted.

> "THAT staff be directed to develop a Master Plan for Bruce's Mill Conservation Area (CA);
>
> THAT an advisory committee be established, which would include one member each from the Rouge Park staff and the Rouge Park Alliance, interested community groups, business representatives, community residents, agency staff, municipal staff and local and regional councilors to assist with the development of the master plan and to facilitate the opportunity for public input;
>
> AND FURTHER THAT the final master plan be brought to the Toronto and Region Conservation Authority (TRCA) for approval."

The Bruce's Mill Conservation Area Master Plan was undertaken in three phases as follows:

Phase One

- Prepare the Bruce's Mill Conservation Area Master Plan Background Report.
- Establish an advisory committee and hold meetings.
- Establish and circulate a study newsletter.
- Host a public information session.
- Develop the plan vision, goals, objectives and management principles.

Phase Two

- Determine draft management zones.
- Develop draft management recommendations.
- Integrate watershed management recommendations.
- Host advisory committee meetings.
- Develop public use and recreation concepts.
- Develop concept themes.
- Develop an overall draft trail plan for the property.
- Circulate a study update newsletter.
- Host public meetings to review draft material.

Phase Three

- Finalize draft public use and recreation and trail plans.
- Develop a plan implementation strategy and cost schedule.
- Host advisory committee meetings.
- Host public meetings to present final draft plan.
- Obtain partners and TRCA Board endorsement and/or approval of plan.
- Circulate a study update newsletter.

1.3.1 The Advisory Committee

The Master Plan Advisory Committee consisted of representatives from the following groups and municipalities:

- Town of Whitchurch-Stouffville
- Town of Markham
- Town of Richmond Hill
- Regional Municipality of York
- Whitchurch-Stouffville Chamber of Commerce
- Whitchurch-Stouffville Museum
- Rouge Park Alliance
- Community Safety Village of York Region
- Meadowbrook Golf & Country Club
- Bruce's Mill Driving Range
- Whitchurch Highlands Public School
- Whitchurch-Stouffville Soccer Club
- Oak Ridges Trail Association
- Whitchurch-Stouffville Environmental Advisory Committee
- Rotary Club of Stouffville
- TRCA
- YMCA

The Advisory Committee worked with TRCA staff to finalize the project terms of reference, establish the vision, themes, goals and objectives, determine the management zones and management recommendations, and develop the trail and public use plans. The committee also provided technical input and assisted with the public consultation program for the master plan.

In summary, the Advisory Committee was responsible for the following major functions:

- Ensuring that appropriate staff and members at their respective municipalities/agencies/associations were adequately informed throughout the process.
- Providing commentary and input on suggestions brought to the Advisory Committee.
- Assisting in the identification of current outstanding issues and making suggestions regarding appropriate ways to resolve them.
- Assisting TRCA in presentations and public forums, where appropriate.

The representative for the Whitchurch-Stouffville Environmental Advisory Committee (EAC) participated in the Master Plan Advisory Committee until 2007, at which time the EAC was discontinued by the Whitchurch-Stouffville Council.

This study is the result of over five years of work and commitment by this dedicated committee and by TRCA staff. Copies of the minutes for the Advisory Committee meetings have been compiled and can be obtained from TRCA upon request.

1.3.2 Public Consultation

At the outset of the master plan, it was agreed that public use, enjoyment and stewardship of BMCA would be important to the community. As a result, the public had to have meaningful input in the planning process.

The public consultation program included:

- Meetings with interested organizations and groups in the community.
- Information sessions, newsletters, questionnaires and mailings to the community to identify a broad range of potential needs and opportunities for the site.
- Public meetings to present the background information, plan vision, concept themes, proposed management zones, concept plans, trail plan, public use plan and management recommendations.

1.4 Location, Site Description and Resource Uses

This section provides an overview of the current state and past history of BMCA. It is a summary of the information provided in the Bruce's Mill Conservation Area Master Plan Background Report, which can be obtained from TRCA upon request.

Bruce's Mill Conservation Area is located in the Rouge River watershed (Map 1.1). It is approximately 108 hectares (ha) in size and is located immediately south of Stouffville Road, north of 19th Avenue, immediately east of Warden Avenue and west of Kennedy Road (Map 1.2). Bruce's Mill Conservation Area is located in the Town of Whitchurch-Stouffville and the Regional Municipality of York.

The park's diverse ecosystem includes:

- A number of tributaries of Bruce Creek, which feeds into the Rouge River
- 1.2 hectares of wetland, including the newly restored wetland on the former Mill pond site
- 44 hectares of deciduous, coniferous and mixed forests, including 4 hectares of interior forest
- Rolling hills that are indicative of the topography of the Oak Ridges Moraine

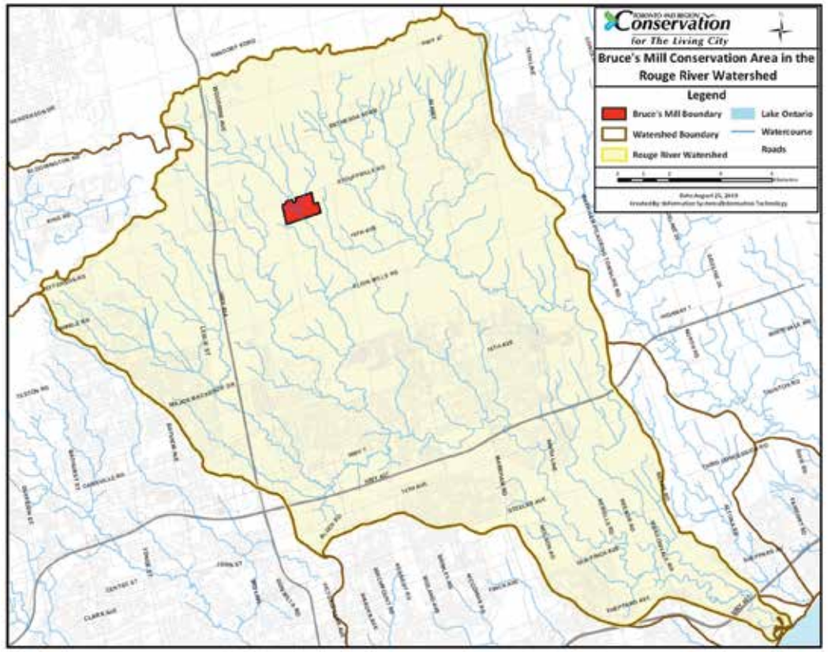
The Bruce's Mill Conservation Area has many important natural features. The large forested area is composed of numerous vegetation communities and a large section of interior forest. Throughout the forest there are also a number of high quality swamps that provide important habitat for birds and other wildlife. The newly restored wetland at the site of the former Mill pond provides excellent habitat for a variety of flora and fauna, and helps to improve the riverine ecosystem of Bruce Creek. Other restoration efforts on the site include the active management of the plantation woodlot on the northern boundary and the planting of shrubs and wildflowers in various locations around BMCA as part of the York Region Children's Water Festival.

The Bruce's Mill Conservation Area came into existence in 1961 when the Metropolitan Toronto and Region Conservation Authority purchased 52.6 hectares of land from Mr. H. Kennedy and 56.9 hectares from Mr. R. A. Bruce. At the time of acquisition, there were several buildings on site as well as a road system. The only historic buildings remaining today are the Mill Attendant's House' and the Mill building. In order to create the conservation area, the road system was replaced, the spillway was rebuilt to restore the Mill pond and a new bridge over the pond was constructed. Throughout the years other key infrastructure components have been added, including picnic shelters, parking lots, a septic system, washrooms and water services. A gatehouse was constructed on the main driveway along with a maintenance shop and office for staff. A small building was constructed to provide a pro-shop area for the driving range facility. A chalet was built near the primary trailhead area to provide dining space for the Maple Syrup Festival. The beach house was originally used as a chalet by cross-country skiers but has since been re-purposed to support the swimming pool that was built in 2005. Sports fields, including baseball and soccer facilities, are located in the south west corner of the property.

A lease was granted to the York Region Police in 2003 for 5.69 acres to open a community safety village. The facility opened in 2005 and features a main educational building as well as a miniature village. The Village is not open to the public, but welcomes 25,000 students a year who learn about safety and also hosts special events throughout the year.

Today, BMCA offers a number of attractions, including picnicking, hiking, soccer and baseball fields, maple syrup production, bird watching and wildlife viewing. The park is officially open from mid-April through to Thanksgiving weekend each year.

Map 1.1 – Bruce's Mill Conservation Area location in the Rouge River watershed



Map 1.2 – Bruce's Mill Conservation Area

2 PLAN VISION, GOALS, OBJECTIVES AND PRINCIPLES

2.1 A Vision for Bruce's Mill Conservation Area

It is important that the vision, goals and objectives of the Bruce's Mill Conservation Area Master Plan adhere to and are integrated with the Rouge River Watershed Plan: Towards a Healthy and Sustainable Future (TRCA, 2007).

The overall goal for the watershed plan is as follows:

> To work towards a healthy and sustainable Rouge watershed by protecting, restoring and enhancing its ecological and cultural integrity within the context of a regional natural heritage system.

Working within this watershed framework, the vision for the master plan reflects the essence of conservation planning values and sets a definite direction for the future management of BMCA. The vision of BMCA is as follows:

> Through dynamic partnerships and community involvement, Bruce's will enhance its significant natural areas and unique cultural heritage resources to provide the best opportunities for nature appreciation, education and outdoor recreational enjoyment. In addition, public health and safety will be integrated in harmony with all park programs, ensuring the natural and cultural values of the park are protected and will flourish.

The primary focus of the vision is to protect the natural features of the park while providing opportunities for appropriate recreation. It also highlights the importance of community involvement and partnerships, which are vital to the success of BMCA. Heritage appreciation is an important part of BMCA, particularly the Mill building and its role in Ontario's industrial heritage. The interpretation of cultural heritage needs to be integrated throughout the park. Lastly, the vision highlights the important partnership with the York Region Community Safety Village by focusing on the importance of safety throughout all park programs.

2.2 Concept Themes

To compliment the vision for BMCA, concept themes were developed to guide the master plan. These themes serve to focus the plan on identifying and enhancing strengths of the property, while also considering opportunities for growth. The concept themes for BMCA include the following:

Active Lifestyles
The provision of active lifestyle opportunities is an important function of BMCA, and the master plan seeks to enhance existing recreational features and experiences, while considering the implementation of new opportunities. Promoting active lifestyles is an important value to TRCA and its municipal partners. The master plan for BMCA seeks to appeal to a diverse audience of users through a range of recreational features and experiences.

Canadian Heritage
Heritage appreciation is an important part of BMCA, and a number of significant heritage features and opportunities currently exist on the property, particularly the Mill structure and its role in Ontario's industrial heritage. There is great potential for the enhancement of these existing heritage features and the master plan for BMCA seeks to create a unique visitor experience by integrating the celebration and interpretation of these features under a theme of Canadian Heritage that will extend throughout the park.

2.3 Guiding Principles

Given the importance of recognizing the unique natural and cultural features of BMCA, the following guiding principles were developed for the BMCA Master Plan.

Ecological
Recognize that protected natural heritage is essential to the health and future of the watershed and must be protected and enhanced so it can be used and enjoyed by future generations.

Cultural
Value, protect and celebrate linkages to the history and past uses of the area and use their lessons to help guide present and future actions.

Social
Foster development and engagement of community members as a key to building a stewardship ethic. Recognize and value people's connections to land and provide recreation and experiential learning that is compatible with the natural and cultural values of the land.

Economic
Encourage long-term economic vitality through strategic planning and partnership development.

2.4 Master Plan Goals and Objectives

The goals and objectives of the master plan build on the framework established by the plan's vision and are consistent with the watershed plan for the Rouge River and the management plans for Rouge Park. The goals are laid out in a series of categories that support the priorities of the park, such as natural heritage, cultural heritage and recreation. Specific actions to support these objectives are detailed in chapter four.

Natural Heritage Resources

- **Goal:** To protect and restore the natural ecosystems by ensuring the health and diversity of native species, habitats, landscapes and ecological processes
  - o Objective: Improve the size & shape of habitat through restoration and protection.
  - o Objective: Establish a nature reserve area within Bruce's Mill Conservation Area to protect the sensitive natural features of the park.
- **Goal:** To maximize linkages and connectivity of the natural heritage features to one another and to adjacent areas.
  - o Objective: Complete a major restoration project in the northwest field to expand the natural cover.
  - o Objective: Build on the corridor function of the creeks and riparian zones as part of the Little Rouge ecological corridor.
  - o Objective: Enhance the health of the Rouge watershed by restoring and protecting the cold-water features of Bruce Creek and its tributaries.

Public Use & Recreation

- **Goal:** To provide opportunities for appropriate, accessible, nature-based recreation and active-lifestyle activities that are consistent with all other objectives.
  - o Objective: Plan and manage appropriate outdoor recreation facilities in a manner that protects ecological health while providing social benefits.
  - o Objective: Encourage appropriate, low-impact recreational activities to build healthy communities and healthy people.
  - o Objective: Construct and manage trails that are linked to communities, other watersheds, and inter-regional trails.

Cultural Heritage Resources

- **Goal:** To identify, protect, conserve and celebrate the cultural heritage features for their inherent value and depiction of the long-term human use and occupancy of the area.
  - o Objective: Identify, promote and celebrate the area's heritage features, including Bruce's Mill, the Mill Attendant's House and Maple Syrup collection.
  - o Objective: Identify and protect known (Lewis Site and Bruce's Mill area) and potential archaeological sites.

Land Use and Management

- Goal: To ensure protection of the ecological integrity and cultural values of the land through innovative planning, management and appropriate conservation, recreation and other land uses.
  - o Objective: Promote public ownership and the responsible use of surrounding lands that connect to and influence the natural system of BMCA, through outreach education including establishment of a stewardship group, and distribution of newsletters and reports.
  - o Objective: Promote compatible uses within and around BMCA, including promoting rural or "non-urban" land use in surrounding lands and communities.
  - o Objective: Encourage environmental planning and design techniques, such as minimizing the amount of impervious surfaces on secondary roads, driveways and parking lots.
  - o Objective: Use relevant land-use policies in all development and planning processes for BMCA, including the Greenbelt Plan, the Oak Ridges Moraine Conservation Plan, the York Region Official Plan, the Town of Whitchurch-Stouffville Official Plan and the Rouge North Management Plan.
  - o Objective: Employ, promote and support the use of Beneficial Management Practices for agriculture on surrounding lands, through programs such as TRCA's Rural Clean Water Program and the Canada-Ontario Environment Farm Plan.
- **Goal:** To create a sound economic model through the building of partnerships and to manage BMCA using an ecosystem approach.
  - o Objective: To implement a progressive park model at BMCA that will foster a strong sense of community involvement and provide a diverse and well-connected natural system.
  - o Objective: Review each park development proposal to ensure compliance with Rouge Park management plans and the Rouge River Watershed Plan and that activities and uses contribute to the watershed management mandate.
  - o Objective: Strive to build effective and innovative partnerships with community stakeholders, such as the York Region Community Safety Village, YMCA and the York Region Children's Water Festival.

Conservation Education

- **Goal:** To promote knowledge and understanding of the natural and cultural values of the land and water, their protection and stewardship requirements, as well as their significance, sensitivities and interrelationships in BMCA and surrounding areas.
  - o Objective: Offer both informal and formal learning opportunities at BMCA about the natural environment, health & safety, cultural heritage resources and sound environmental practices.

Stewardship and Outreach

- **Goal:** To promote and facilitate ongoing public involvement towards a partnership that will foster sustainable living and will accomplish watershed management objectives, as well as implement master plan recommendations.
  - o Objective: Create a Bruce's Mill Conservation Area Stewardship Committee that consists of representatives of local governments, residents, community groups, corporations, business owners and other stakeholders.
  - o Objective: Promote BMCA as a venue for watershed stewardship, outreach, education and demonstration projects;
  - o Objective: Promote partnerships among environmental, cultural heritage, recreation and education organizations, private industry and public agencies.

3 MANAGEMENT ZONES

A variety of natural and cultural heritage information was compiled for the Bruce's Mill Conservation Area Master Plan Background Report (TRCA, 2009) that was studied in phase one of the master planning process. This information formed the basis for determining a series of management zones for the property. The management zones guide the location and type of land use that are permitted on the property and form the basis for all other plans on the property, such as trail plans and public use plans. The zones are distinguished by their different levels of ecological protection, management needs and acceptable levels of public use. The various management zones and their permitted uses are outlined in table 3.1.

The zones and definitions are based on the planning and management policies of Ontario Provincial Parks. The recommended conservation land management zoning categories and policies have been modified to more closely address the requirements of BMCA and TRCA. Given the current pressures of urbanization on the quality and quantity of natural cover throughout TRCA's jurisdictions, it is paramount to approach the management of any natural area in a way that addresses that particular site in the larger regional context. By implementing the following system of management zones, TRCA will move toward improving the condition and resilience of natural habitats in the Toronto region.

3.1 Management Zones Defined

The nine management zones defined for BMCA include nature reserve, natural environment, cultural heritage, primary restoration, secondary restoration, operations, public use, public use – lease, and residential – lease. More detailed definitions are provided in table 3.2.

3.2 Determining the Management Zones

In order to apply the appropriate management zones to a particular area, TRCA staff reviewed, inventoried, analyzed and ranked the features and functions for the area using the terrestrial natural heritage approach outlined in section 1.2.1.

The critical information that was analyzed and ranked for the nature reserve, natural environment and public use zones included:

- Interior habitat
- Vegetation communities
- Species of concern
- Wetlands
- Existing public use areas
- Lease areas
- Existing infrastructure

Due to BMCA's location in the northern portion of the Rouge River watershed, additional investigations were followed in developing the management zones. Bruce's Mill Conservation Area is located in an area of the Rouge River watershed that is designated as "Middle Reaches Study Area" in the Rouge North Management Plan (RNMP) (Rouge Park, 2001). Further details on the RNMP can be found in the Bruce's Mill Conservation Area Master Plan Background Report.

Rouge Park study areas are defined as areas "within which investigations will be undertaken with the objective of identifying resources that should be encompassed within the Rouge Park to achieve specific ecological objectives" (Rouge Park, 2001). The RNMP defines the specific criteria for studies to be undertaken in order to determine the boundary of Rouge Park North within the study areas. While the catalyst for activation of the process of defining the park boundary within the study area is the application for development of lands that fall within the study area limits, it was decided to apply the ecological boundary criteria at BMCA in an effort to ensure that the highest level of ecological protection is achieved. The ownership and management of BMCA will reside with TRCA in the future, though it should be noted that BMCA is designated as a special management zone of Rouge Park.

Further details on the ecological criteria can be found in the RNMP. The result of the application of the ecological criteria was a series of lines or boundaries that outlined the natural and cultural heritage features of the site, as well as buffers for those features. The maps illustrating these boundaries can be found in the Bruce's Mill Conservation Area Master Plan Background Report. Those lines were then integrated with the existing inventories and information for the property to produce the management zones. Where feasible, all areas included within the ecological boundary lines were designated as nature reserve, natural environment or primary and secondary restoration zones. Areas that were not identified as being ecologically sensitive were classified as public use, operations, lease, and so on. It should be noted that the boundary line was used as a guideline, not as an absolute. In places where strict adherence to the boundary was not possible due to site limitations, such as existing buildings, equal or additional lands were protected on other parts of the property.

The draft management zones were then presented to the Advisory Committee, who reviewed and endorsed the process and management zone designations. This same information was also presented to the public as part of the public consultation process described in chapter one. The final management zones delineation is shown in Map 3.1.

The primary restoration zones were established in accordance with TRCA's Terrestrial Natural Heritage System Strategy (see section 1.2.1) and through a landscape-level analysis to determine possible additions to the size and shape of the interior habitat. Additionally, primary restoration zones were considered adjacent to sensitive areas, as buffers, especially those located close to higher-intensity public uses. Other primary restoration areas include those within public use zones where users would enjoy tree cover and visually interesting landscapes if the current cultural practices and maintenance activities were altered.

To determine secondary restoration zones, TRCA staff examined and analyzed areas within BMCA that were previously cultural landscapes used for public activities, or areas that are somewhat degenerated or already regenerating. These areas differ however from the above-mentioned primary restoration zones because they will be allowed to regenerate naturally instead of being actively planted or managed. Some management will be carried out as needed, for example the removal of non-native plant species.

Table 3.1: Permitted Resource Uses by Management Zone

MANAGEMENT ZONE	PERMITTED INTENSITY OF USES	EXAMPLE RESOURCE USES
Nature Reserve This zone includes areas that are ecologically significant such as ESAs, ANSIs, Interior Forest, etc.	None to Low Intensity	Local and inter-regional trail, nature viewing/interpretation, research, education, photography and cross-country skiing
Natural Environment This zone includes areas that have potential for ecological succession and restoration.	Low Intensity	Local and inter-regional trail, nature viewing/interpretation, research, education, photography and cross-country skiing
Primary Restoration This zone will be allowed to evolve into a Natural Environment or Nature Reserve zone.	Low Intensity	Local and inter-regional trail, nature viewing/interpretation, research, education, photography and cross-country skiing.
Secondary Restoration This zone will undergo natural succession and regeneration, ultimately becoming part of the surrounding Natural Environment or Nature Reserve zone.	Low to Moderate Intensity	Local and inter-regional trail, nature viewing/interpretation, research, education, photography and cross-country skiing.
Cultural Heritage These areas have important human heritage features or landscapes.	Low to Moderate Intensity	Local and inter-regional trail, nature viewing/interpretation, research, education, photography, cross-country skiing, archaeological excavations, interpretation and education opportunities.
Public Use This zone will feature a variety of activities deemed appropriate.	Low to High Intensity	Activities may include, but are not limited to, local and inter-regional trails, nature viewing/interpretation, research, education, photography and cross-country skiing, sports fields, group picnic areas, day camp and group camping facilities, water play facilities, ropes courses, recreation buildings, and parking.
Public Use – Lease These areas are under lease agreement for specific public uses.	Low to High Intensity	Considered a private area subject to specific lease agreements. Possible resource uses could include recreational activities, private buildings and parking for the leased areas.
Residential - Lease These areas house residential property that will be used as private residences.	Low, Moderate and High Intensity (no public use)	Considered a private area subject to specific lease agreements.
Operations This zone contains buildings and facilities used by TRCA staff.	Low to High Intensity (no public use)	Considered a private area for the purposes of TRCA staff operations.

3.0 MANAGEMENT ZONES

Table 3.2: Bruce's Mill Conservation Area Management

MANAGEMENT ZONE	PERMITTED INTENSITY OF USES	EXAMPLE RESOURCE USES
Nature Reserve	Areas which have significant or unique natural features, landforms, species or habitats that require careful management to ensure long-term protection.	Local and inter-regional trail, nature viewing/interpretation, research, education, photography and cross-country skiing
Natural Environment	Large core habitat areas and corridors which are "natural" in character, but do not meet the criteria of the Nature Reserve Zone.	Local and inter-regional trail, nature viewing/interpretation, research, education, photography and cross-country skiing
Primary Restoration	Priority lands within Bruce's Mill Conservation Area where ecological health and diversity could be enhanced through active environmental restoration.	Local and inter-regional trail, nature viewing/interpretation, research, education, photography and cross-country skiing.
Secondary Restoration	Lands within Bruce's Mill Conservation Area where ecological health and diversity could be enhanced by allowing the processes of natural regeneration to occur.	Local and inter-regional trail, nature viewing/interpretation, research, education, photography and cross-country skiing.
Cultural Heritage	Areas that have important human heritage features or landscapes that require careful management to ensure long-term protection.	Local and inter-regional trail, nature viewing/interpretation, research, education, photography, cross-country skiing, archaeological excavations, interpretation and education opportunities.
Public Use	Areas which have existing or potential for recreational and educational uses, facilities or services. This designation may include areas with suitability to low, moderate or high intensity public uses.	Activities may include, but are not limited to, local and inter-regional trails, nature viewing/interpretation, research, education, photography and cross-country skiing, sports fields, group picnic areas, day camp and group camping facilities, water play facilities, ropes courses, recreation buildings, and parking.
Public Use – Lease	Public use areas with existing lease agreements that should be renewed or areas where potential for lease opportunities exist.	Considered a private area subject to specific lease agreements. Possible resource uses could include recreational activities, private buildings and parking for the leased areas.
Residential - Lease	An area of the property containing a residential dwelling which is leased by the TRCA.	Considered a private area subject to specific lease agreements.
Operations	This refers to an area of the property containing operational buildings and their surrounding areas used by the TRCA staff for operational, maintenance and administrative duties. No public use is allowed.	Considered a private area for the purposes of TRCA staff operations.

Map 3.1 – Management Zones

4 MANAGEMENT RECOMMENDATIONS

The management recommendations are intended to guide the actions of TRCA, its partners and stakeholders to ensure that the property will remain a healthy and vital part of the Rouge River watershed. They provide a foundation for managing BMCA in a manner that protects and regenerates the ecological form and function of the area while providing opportunities for public enjoyment and stewardship. The recommendations have been separated into the following sections: natural heritage resources; conservation education and tourism; stewardship and outreach; operations and park management; and land use and management. They are consistent with the provisions outlined in relevant TRCA policies and strategies, including the Valley and Stream Corridor Management Program (1994), the Strategy for Public Use of Conservation Authority Lands *(1995),* the Terrestrial Natural Heritage System Strategy (2007) and the watershed management objectives outlined in the Rouge River Watershed Plan (2007).

4.1 Natural Heritage Resources

Natural heritage includes the physical, chemical and biological elements of the natural environment – what is often termed "nature" or the "environment." A "natural heritage system" refers to the interactions and dependencies between and among the elements of natural heritage. It is these interactions that control the hydrologic cycle and the quality of habitat for plants, animals, birds and fish.

Bruce's Mill Conservation Area's natural heritage should not be considered in isolation. It is connected to the lands beyond its boundaries, as well as to the greater Rouge River watershed.

The recommendations focus on terrestrial habitat, wetlands, geology and aquatic systems. All management activities will be designed and implemented in compliance with federal and provincial legislation such as the Migratory Birds Conservation Act, Fisheries Act, Endangered Species Act, Conservation Authorities Act, Planning Act, Lakes and Rivers Improvement Act and Ontario Water Resources Act.

When considering the recommendations set out in this section, it is important to consider the inter-relationship of the indicators used to develop the recommendations – namely: quantity; distribution; matrix influence; patch size and shape; habitat interior; connectivity; and biodiversity.

Overall Recommendation:

- For both aquatic and terrestrial ecosystems, regular monitoring of the flora, fauna and overall condition of the ecosystems of BMCA is recommended to evaluate the effects of the various management policies, uses and activities on these ecological systems.

4.1.1 Terrestrial Natural Heritage

Bruce's Mill Conservation Area is located within the southern portion of the Great Lakes – St. Lawrence floristic region, which is composed of mixed coniferous and deciduous forest. It also lies on the Peel Clay Plain, just south of the Oak Ridges Moraine. The Peel Plain is characterized by an area that is mostly flat or gently undulating with the exception of ravines cutting through it which carry streams heading to Lake Ontario.

The BMCA study area supports 40 vegetation communities, 215 flora species and 48 fauna species in total. Of these, six vegetation communities, 23 flora species and ten fauna species are considered to be of regional concern in TRCA's jurisdiction. All of the vegetation communities and most of the flora species of concern are associated with the high-quality wetlands, especially the organic swamps, which occur along the Rouge River at this site.

The over-arching recommendation for the enhancement of the natural heritage system at BMCA is to protect and enhance the natural cover. This will improve all of the six indicators that are used to assess the function of the site, including: quantity of natural cover, distribution, matrix influence, patch size and shape, interior habitat, connectivity, and biodiversity. Connectivity to other sites is also identified as a key challenge for BMCA, and any efforts to improve connectivity north and south along the Bruce Creek corridor would be beneficial. A number of recommendations, perhaps most relevant to this master plan, are also outlined regarding the management of public use and trails to mitigate potential negative impacts on sensitive habitats and species.

Using TRCA's Terrestrial Natural Heritage System Strategy (2007), potential restoration opportunities to expand the existing natural cover, interior habitat, and habitat connectivity of BMCA have been identified and are shown on Map 4.1.

4.1.1.1 Quantity

The more natural cover is retained at BMCA, the better it can support a healthy level of biodiversity. As a general rule under the terrestrial natural heritage approach, natural cover should be maximized and conversion to urban or agricultural use (including manicured land such as golf courses) should be minimized. Restoration of natural cover is best achieved by initially concentrating on high functioning remnants of the entire natural system and then extending the action to all remaining natural cover and creating, through restoration or natural regeneration, new habitat patches. The result of this process will be to gradually recover the high quality natural system that once functioned through the entire region.

Bruce's Mill Conservation Area covers 89.5 hectares of natural cover, which contributes 1.1 per cent to the total natural cover within the Rouge River watershed. Of this, 52 hectares are forest and 2.5 hectares are wetland (primarily swamp) which make up 1.2 per cent of the watershed total for forest and wetland combined.

Conserving and expanding the quantity of natural cover at BMCA would also serve to protect the regionally-rare vegetation communities at BMCA, many of which may be restricted to particular geophysical conditions that are not commonly found across the TRCA jurisdiction. Similarly, most of the rare or declining plants found in the BMCA study area have factors associated with their status that are related to habitat dependence and

Map 4.1 – Terrestrial Natural Heritage System Strategy – Target System for Bruce's Mill Conservation Area

sensitivity. While using rarity as the sole rationale for protection is insufficient, protecting and enhancing the natural cover at BMCA will protect the rare species that have been located while enhancing the natural function of the system.

Recommendations:

- Increase the natural cover in BMCA by restoring the north half of the agricultural fields, as per the recommendations of TRCA's Terrestrial Natural Heritage System Strategy (2007). This would result in six hectares of additional natural cover, an increase of 10 per cent.
- Continue restoration efforts in the plantation forest on the north edge of BMCA as well as the former beach area west of the former pond.
- Actively maintain the primary restoration areas to ensure the success of the plant materials and the achievement of restoration goals.
- Restore or enhance the buffers around the stream immediately west of the main entrance once the trail has been closed in that area.
- Maximize natural cover at BMCA by allowing natural succession in the secondary restoration areas, which would result in 9 hectares of additional natural cover, an increase of 15 per cent. Naturalization projects in these areas may be appropriate, as discussed in section 4.1.1.8.

4.1.1.2 Distribution

Bruce's Mill Conservation Area is located in the northeast section of the TRCA region, just south of the Oak Ridges Moraine. In general, this part of the region has higher natural cover that is capable of supporting representative biodiversity. However, the Rouge watershed is atypical in the TRCA region because the largest areas of natural cover are in the southern portions of the watershed, due to the Rouge Park. The middle reaches have very sparse cover and the upper reaches, closer to and on the Oak Ridges Moraine, have slightly higher cover.

Conserving habitats at BMCA is extremely important for the distribution of natural cover in the whole region and especially in the Rouge River watershed. Loss of natural cover at this site would further skew the balance of cover in the Rouge River watershed and it would negatively affect natural cover in the TRCA region. Achieving optimal distribution of natural cover requires the preservation of all habitats in a remnant regional natural system.

Six of the 40 vegetation communities found at Bruce's Mill are considered to be of regional concern, and all are swamps. A total of 25 of the 215 vascular plant species identified were found to be of regional concern. These plant species are of conservation concern due to their sensitivity to development and restriction to certain habitats or certain areas within the TRCA jurisdiction. Many of the flora species of concern are associated with the vegetation communities that are of regional concern; consequently, they are highly susceptible to changes in development and recreational influences.

Almost all of the ten species of concern (eight birds, two non-avian fauna) that occur at BMCA have a regional distribution very much weighted to the north, outside of the southern, more urbanized portion. Loss of any one of these species at Bruce's Mill would tend towards an overall reduction in the distribution of that species in the northern part of the region, continuing a trend towards the undesirable level of distribution that presently exists in the southern portion of the region.

Recommendations:

- Management strategies should ensure the continued presence of all L1-L4 species in their current distribution, such as in the high-quality swamps in the interior forest. For example, trail density should be reduced in sensitive areas and impacts of trails in wet areas mitigated through construction of elevated boardwalks and bridges.
- Management strategies should work to enhance the distribution of all L1-L4 species through creating or restoring habitat as outlined in section 4.1.1.1

4.1.1.3 Matrix Influences

To properly address specific sites, attention should be paid to surrounding land uses, rather than simply on-site issues. Urban land use should be kept from intruding onto BMCA and non-natural land uses should be kept to specific nodes on the perimeter of the area with wide buffer zones around them.

The largely agricultural (including a golf course) and old field matrix surrounding BMCA results in an overall "good" matrix influence on the site, negated somewhat by the proximity of local housing developments. The rather poor representation by certain key fauna species suggests perhaps that the matrix influence is considerably more negative than the landscape analysis shows. The landscape level analysis does not take into account the potentially detrimental effect that a much-used trail system can have on an area of natural cover. Many of the negative effects associated with urban development are reproduced in highly used public sites in rural situations because of the increased human and animal (domestic pets) traffic. All of the flora and fauna species of concern at BMCA are sensitive to such impacts.

All of the 25 flora species of concern at BMCA show a high sensitivity to development, indicating that the majority of species have sensitivities to at least one of the impacts brought by urban development and trail creation. A significant and irreversible change in hydrology would negatively impact many species, to varying degrees. A number of the flora species of concern identified at BMCA have delicate stems and root systems and are not able to withstand trampling and soil compaction. Trampling becomes an issue in high-use areas therefore, any trail proposals should avoid areas where such species have been identified.

Other development influences that could negatively impact flora species at BMCA include;

- elevated numbers of herbivores, such as white-tailed deer, that are associated with settlement patterns
- pollution and other forms of chemical alteration of habitat
- presence or spread of invasive species
- risk of picking and digging visually appealing species

At Bruce's Mill Conservation Area, all ten species of concern would be negatively affected in a variety of ways by the impacts of development. Five of these ten species prefer forest-interior while the other five are dependent on wetland habitat. While the range of impacts is broad, some should be noted and can be mitigated.

The tendency for trail development to be accompanied by the clearing and tidying of woodlands and thickets would dramatically disrupt any species that are dependent on such scrub cover for nesting and foraging. The creation of informal trails or other unauthorized recreational areas, such as fire-pits, children's forts and so on would have similar impacts.

Several of the bird species found at BMCA nest low in the ground vegetation or on the ground and are highly susceptible both to increased predation from ground-foraging predators and to repeated flushing from the nest, which can occur as a result of off-trail users and off-leash dogs. Additionally, both of the wetland habitat bird species at BMCA would be severely affected by any increase in pedestrian or dog traffic within their habitat.

Impacts from adjacent lands can be mitigated through measures such as the removal of invasive exotic species including European buckthorn and garlic mustard. The impacts of high public use should be managed properly and trails should be correctly located to ensure that highly sensitive species and habitats are avoided.

The largest concentration of flora and fauna species of concern occurs in the swamps just north and slightly east of the former mill pond. Existing boardwalk trails should be limited in this area. Interpretation along the trail could educate users of the sensitivity of these vegetation communities and their resident species. Trails should be well maintained to limit informal trail formation and the concentration of trails in wetlands and upland forests should be reduced.

Recommendations:

- Well-planned trail development to mitigate potential impacts on sensitive natural habitats
  - o Locate trails away from areas where species sensitive to trampling and compaction have been identified.
  - o Utilize proper design techniques, including boardwalks, to mitigate impacts on species and habitats.
- Manage public use to mitigate impacts.
  - o Cluster non-natural land uses to specific nodes on perimeter of BMCA with buffer zones.
- Convert nearby agricultural land and old field to natural cover.
- Prevent further invasive species spread into high-quality natural areas, and monitor and manage existing invasive species (European buckthorn and garlic mustard)
  - o Removal of garlic mustard in forested areas
  - o Removal of buckthorn from south-east forest
- Encourage stewardship from neighbouring landowners.
- Limit any land-use changes (e.g. loss of natural cover) within the matrix that will reduce matrix influence cover.
- Install signage to educate visitors about impacts of unauthorized activities, such as picking plants and off-leash dogs.

4.1.1.4 Patch Size, Shape and Habitat Interior

The protection and judicious restoration of natural cover would ensure that large habitat patches with forest interior remain intact in BMCA. The larger the habitat block, the more resilient the fauna and flora communities are to developments within the landscape. Restoration of currently open areas within BMCA will enhance the overall size of continuous blocks on the site, leading to an increase in the forest interior available for interior obligate species, which is also an effective way of mitigating the negative effects of human disturbance. Since it is unlikely that human disturbance levels will decrease in the future, the only way to restore the area's natural system is to take steps to mitigate the impacts.

Almost all of BMCA receives a score of 9-10 points for habitat patch quality, the median category. If any one of the three landscape measures (size, shape or matrix) within the study area were to be diminished, the area would decline in habitat patch total score, perhaps to the extent of introducing larger lower-quality habitat patches, accompanied by a decline in the quality of the local natural system (reflected in the decline and loss of the more sensitive communities and species). Efforts should be made to improve the habitat patch total score of the area to the same level as currently exists in the upper reaches of the neighbouring Duffins Creek watershed, thereby improving the function of the natural system locally and bolstering the relatively healthy system that exists in the upper Rouge River watershed area.

At Bruce's Mill, there is a narrow patch of forest interior centered on the swamp community to the north of the former mill pond. As would be expected it is in, or near, the area that the highest density of forest interior fauna occurs. Six of the ten fauna species of concern at BMCA are considered to be area-sensitive. Three require in excess of 20 hectares of forest and the other three require at least 5 hectares of continuous habitat. Five of these species are considered forest-interior obligates.

Recommendations:

- Reforest interstitial open habitat with appropriate native tree species to improve forest patch size and shape and increase forest interior.
- Restore adjacent agricultural field and some manicured areas to increase habitat interior and improve shape and size.
- Restoration of gaps in somewhat convoluted forest edge will help increase the amount of forest interior on site.

4.1.1.5 Connectivity

Habitat fragmentation presents a problem for any species of flora or fauna that needs to migrate or disperse for breeding, feeding and colonization. At the watershed level, the Rouge is fairly well connected in the middle and lower reaches, however BMCA is situated in the upper reaches where connectivity is not so continuous.

The natural area at BMCA is quite isolated in terms of forested and swamp habitat and is not well connected to the remainder of the Bruce Creek natural cover. In both the north and south, there is a golf course and pond development; as well as extensive roads systems that have resulted in the loss of swamp and forest cover along the river corridor.

Six of the species of concern at BMCA show a requirement for continuity of habitat to facilitate mobility, for example, adult birds foraging for food during the nestling and fledgling stage of the breeding season. Maintaining and improving the connectivity of natural cover within the landscape (e.g. by reforestation of intervening lands) will positively influence the populations of such species. The two wetland dependent species – Virginia rail and sora – are most sensitive to this issue since both species are habitually restricted to wetland vegetation patches. Any fragmentation of such patches by heavily manicured and developed areas seriously restricts the mobility of these species.

Recommendations:

- Maintain/enhance continuous links between habitat patches, especially forest & wetland.
  - o Look at opportunities to improve connectivity immediately south of the Mill and former Mill pond, where a forested area of the golf course surrounds the creek.
- Recruit local stakeholders to restore riparian natural cover in order to reconnect the site with other sites in the Rouge watershed.
- Work to improve natural conditions north and south of BMCA.
- Reforest intervening lands to increase connectivity
- Create a natural buffer around the wetland at the former mill pond.
- Maintain and or enhance continuous links between habitat patches.
- Provide access for fauna movement under barriers such as roads.

4.1.1.6 Biodiversity

Bruce's Mill Conservation Area is perhaps most notable for its variety of swamps, especially those on thick accumulations of organic soil. Bruce's Mill Conservation Area generally has good biodiversity for flora and fauna, but several of the fauna species of concern are represented by only one or two territories.

The site inventory includes 40 vegetation communities, all of which have exacting hydrological requirements and the effects of any management actions should be carefully considered in terms of drainage, seepage and recharge zones. A total of 215 flora species were found at Bruce's Mill Conservation Area, 58 of which are listed as exotic or non-native species. Bruce's Mill Conservation Area is home to 48 bird species, four mammal, one amphibian and one reptile species.

Twenty two of the flora species of concern found at BMCA are habitat specialists, meaning they are dependent on very specific conditions or types of habitat. Most of these species are found in the organic wetlands that are of concern or the rich upland forest that surround the wetlands. Any loss or alteration of these habitats will result in the disappearance of these habitat dependent species.

The three fauna species at Bruce's Mill Conservation Area that are considered habitat dependent are reliant on fairly specific forest habitat – either interior-type conditions or the presence of relatively large, mature trees. In addition, several of the fauna species of concern are dependent on particular hydrologic conditions and as such any changes or impacts on the local hydrology are likely to influence these species. Changes in hydrology can be the result of adjacent irrigation or storm water management, or simply through the construction of paved trail and road systems that alter the surface water and drainage features of the habitat.

The biodiversity of flora and fauna at BMCA will be protected if all other recommendations outlined in above sections are followed.

Recommendations:

- Consider hydrology requirements of the site in all planning and management decisions.
- Ensure protection of vulnerable organic swamps.
- Monitor all natural areas, including secondary restoration areas, for the presence of invasive exotic species or noxious weeds and manage for the presence of these species according to TRCA policies.

4.1.1.7 Forests

Almost half of BMCA (approximately 50 hectares) is covered by forests. Some are natural forests (82 per cent), while others are plantations (18 per cent). Forest stands within BMCA are actively managed in accordance with TRCA's participation in the Managed Forest Tax Incentive Program. Details on forest management recommendations can be found in section 4.1.5 of the Bruce's Mill Conservation Area Master Plan Background Report (2009).

Recommendations:

- Restoration of currently open areas within BMCA to enhance the overall size of continuous forest blocks on the site.
- Restore the agricultural fields to natural cover.
- Create a nature reserve area with limited public use in the central area of BMCA to protect and enhance the interior forest habitats.
- Invasive species, such as garlic mustard and European buckthorn, should be controlled using control methods appropriate to the proximity to public use areas and sensitive herbaceous species. European buckthorn, currently located in the isolated south-east forest at BMCA, has high invasive potential and should be cut and managed in accordance with the TRCA *Pest Management Policy*.
- Reforestation plantings should be established to enlarge forest blocks, connect isolated forest compartments, create wildlife corridors, increase vegetation around streams and create contiguous forest cover in priority areas.
- Two of the deciduous forest compartments (totaling 14 hectares) are located on sensitive sites and should not be managed by active forest operations. In these areas, natural processes should be allowed to shape the ecological structure and function.
- Management of the deciduous forest that is used in the Maple Syrup Festival is being done by staff of BMCA in conjunction with the Maple Syrup operations, and should continue to be monitored for growth of trees as well as overall health and structure, to determine when and if active operations are needed.
- Where appropriate, tree thinning should take place to select for better quality and spacing of residual stems. Removals from overstocked diameter classes will provide growing space to establish new regeneration and provide an opportunity for the manager to adjust species composition.

- Using a variety of techniques, coniferous plantations will be converted to mixed deciduous-coniferous compartments.
- Felling of hazard trees should be subject to TRCA's Policy for Managing Hazard Trees and Operation Procedures for Managing Hazard Trees.
- Subject to the hazard tree program, public use areas should be inspected twice a year by a competent assessor.

4.1.1.8 Flora and Fauna

A total of 215 flora species were found at BMCA. This includes 23 species of regional concern and 58 exotic or non-native species. Most of the rare plants found in BMCA are associated with vegetation communities that are similarly of regional concern. Consequently, these species are highly susceptible to changes in development and recreational influences.

A total of 54 fauna species have been recorded at BMCA, including 48 birds, four mammals and two herpetofauna species. Twenty two of these species are of regional concern.

It is important to note that conservation efforts must be exercised before a species becomes rare. Once a species is considered rare, damage to its habitat and the species itself is often irreparable.

Recommendations:

- Prepare a conservation strategy for the regionally-rare vegetation communities at BMCA or unusual associations of common species, including an investigation into the cause of their rarity.
- Consider the effects of drainage, seepage and recharge zones of any management actions. BMCA is located at the southern edge of the Oak Ridges Moraine and wetlands in this physiographic area are often important recharge zones.
- Maintain and protect the diverse vegetation communities of the organic swamps.
- Undertake invasive species management to reduce competition for native flora. Replace exotic species with site appropriate native plants as needed.
- Locate trails and other public uses away from flora species sensitive to trampling and other human disturbances.
- Close or minimize trails in sensitive wetland habitats, particularly in the area immediately west of the main entrance way to BMCA.
- Educate visitors about sensitive flora species. Include information about not picking, trampling or otherwise harming vegetation.
- Maintain closed and open habitat areas to allow for a full complement of fauna species.

4.1.2 Wetlands

The predominant wetland area located at BMCA is in the location of the former Mill pond. A number of wetland vegetation communities are found in the forested area in the northern half of the property, such as mixed swamps, meadow marshes and thicket marshes, however recommendations for these areas are covered in terrestrial natural heritage recommendations outlined in section 4.1.1 above.

The wetlands located on the site of the former mill pond were created as part of the restoration that followed the draining of the pond. Details on this site restoration project can be found in the Bruce's Mill Conservation Area Master Plan Background Report. In addition to the recommendations listed below, a monitoring program for the wetland should be considered. In particular, impacts to the wetland proper as well as the edges from dog activity should be monitored. If necessary, a dog-free area could be established around the perimeter of the wetland.

Recommendations:

- Prohibit adverse impacts and/or interference with the form and function of the wetland and its supporting system.
- At a minimum, maintain the percentage of BMCA covered by wetlands.
- Regular monitoring of wetland health and conditions should be implemented, with continuance of monitoring activities already in place and expansion of these efforts where gaps exist.

4.1.3 Geology

Bruce's Mill Conservation Area is located in the Peel Plain, a region of flatter topography that overlies the central portion of the South Slope (Chapman and Putnam, 1984). In this region, a thin veneer of silt and clay lacustrine deposits up to five meters thick was deposited over the till. The soils are predominantly clay with localized clay loam and loam.

Groundwater flow within the underlying geologic setting is generally from north in the Oak Ridges Moraine to south at Lake Ontario. Bruce's Mill Conservation Area is located on the southern edges of the Oak Ridges Moraine and maps indicate that there are two areas of aquifer vulnerability on the property.

Recommendations:

- Protect the two areas of aquifer recharge by limiting any development, particularly hard surfacing, in the recharge areas. Any works completed in the recharge areas should incorporate designs that ensure good infiltration.

4.1.4 Aquatic Resources and Conditions

Bruce Creek is located in Fisheries Management Zone Three (TRCA, 2009b), which is a relatively non-urban zone with natural forest cover mixed with agriculture (active and fallow) in the upper reaches. Golf courses, such as the one located immediately south of BMCA, have become prominent on the landscape below Bethesda Road. Bruce's Creek is considered a cold-cool water system that supports brook trout in the upper reaches and abundant redside dace through the mid-lower reaches. Two strong groundwater discharge zones characterize the brook trout habitat, maintaining very cold, high quality conditions. Further down in the system, major stream structures limit brook trout distribution both physically and through thermal impacts. However, as both rainbow and brown trout are currently stocked in Bruce Creek, there may be reason to retain a barrier as strategic to species partitioning. However, the stocking practices of these species, particularly brown trout, in this zone will undergo an assessment as per recommendations in the updated Rouge River Fisheries Management Plan which may lead to alternate stocking locations.

The Mill dam splits redside dace habitat and continues to hold back water that contributes to downstream warming and alters the stream gradient. Another groundwater discharge zone occurs where redside dace are in highest abundance and may be mitigating thermal impacts and water quality associated with ponds and adjacent land use.

Recommendations:

- Encourage stewardship approaches by private landowners towards long-term, ecologically compatible water-taking practices.
- Investigate feasibility of mitigating thermal and sediment impacts due to online ponds upstream of BMCA to improve downstream habitat for target species and aquatic communities.
- Identify and implement appropriate types of riparian planting opportunities in areas lacking riparian cover to improve in stream habitat quality and quantity while also stabilizing thermal conditions.
- Maintain a 30 metre buffer plus stream meander belt width for all watercourses, in an effort to protect potential redside dace survival habitat.
- Maintain and re-create riparian habitat that consists of cedar swamp or cedar trees, planted along the stream margin with exposed roots, in support of Iowa darter habitat.

- Investigate feasibility of removing the Bruce's Mill dam to improve the aquatic ecosystem and to improve channel habitat for redside dace and/or brook trout. Investigation should include consideration of impacts on the cultural heritage landscape as the dam structure is a part of the history of the Bruce's Mill building.
- All construction projects in proximity to watercourses should have a timing window of July 1 to September 15 to minimize impacts to redside dace and brook trout.
- Improved education and implementation of sediment and erosion controls by project proponents and/or contractors to achieve zero discharge of deleterious substances (e.g. sediment) to watercourses in areas that have been identified as current or potential habitat for redside dace and/or other sensitive species.

4.2 Cultural Heritage Resources

Bruce's Mill Conservation Area draws its name from the historic gristmill on the property. The Mill building, the Mill Attendant's house and the cultural heritage landscape on the site are of enormous heritage value. In addition to the stewardship responsibility that TRCA has for these buildings, they offer the potential to be the keystones around which the park develops. It is vital that these heritage features not be considered as stand-alone, but be integrated into all aspects of the park development and celebrated as part of the Canadian Heritage theme of BMCA. Furthermore, the public and community should be engaged into planning for the restoration and adaptive re-use of the Mill building in order to ensure long-term success.

To better understand the heritage features on site, an architectural firm was contracted to prepare a condition report for the Mill building and the Mill Attendant's house. The report included a condition assessment of both buildings, order of priority recommendations for building stabilization and state of good repair, and preliminary cost estimates.

The report further recommended additional restoration work to maintain the historical values of the structures and included suggestions for adaptive re-use of the buildings. The assessment of the Mill included an architectural investigation of the historic gristmill, including its equipment and machinery. The entire report is on file with TRCA and is available upon request.

The report was reviewed by a subcommittee of staff from TRCA and the Town of Whitchurch-Stouffville, and the following recommendations were prepared.

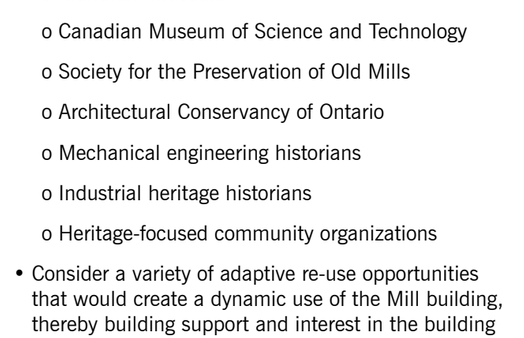
General

- Establish a management program to ensure the physical condition of the buildings and all cultural resources, including a monitoring protocol and an annual maintenance and operating budget.
- Integrate the heritage buildings into all aspects of the park management and development, such as trails, public uses (e.g. aquatic facility – see section 5.1.2), education, interpretation, signage, and so one.
- Continue research and historical investigation into the history of the buildings and the site and document findings.
- Work with the Town of Whitchurch-Stouffville to determine the appropriateness of listing the Mill building and the Mill Attendant's house as provincial heritage buildings. Investigate the possibility and appropriateness of having the site listed as a "cultural heritage landscape" in recognition of its overall heritage value.
- Work with the Town of Whitchurch-Stouffville staff to develop a seasonal heritage interpretation program focused around the Mill that is financially sustainable.
- Implement urgent repair and restoration activities required to stabilize the buildings, as recommended in the condition report.
- Conduct archaeological assessments of any locations where ground disturbances are planned in order to identify and protect all known and unknown archaeological sites and cultural landscapes.
- Develop, promote and celebrate a theme of Canadian Heritage at BMCA.

Site Specific
House

- Continue use as a residential rental with a tenant, or conversion to office space for TRCA staff or a third party.
- Recognize that the heritage values of the house will not be conducive to all office uses, and any redevelopment must first consider maintenance of the heritage features.

Mill



- Recognize that the milling equipment in the Bruce's Mill building is an integral component of Canada's and Ontario's industrial heritage, and its value is enhanced by the intact and in situ nature of the equipment.
- Recognize that a long-term plan, including engagement of appropriate partners, is essential to the successful restoration of the Mill building.
- Engage in a public consultation process to develop concepts and plans for an adaptive re-use for the mill building. The process would benefit from consultation with the public, community, and technical experts. Following is a suggested but not exclusive list of possible stakeholders:
  - o Markham Museum
  - o Canadian Museum of Science and Technology
  - o Society for the Preservation of Old Mills
  - o Architectural Conservancy of Ontario
  - o Mechanical engineering historians
  - o Industrial heritage historians
  - o Heritage-focused community organizations
- Consider a variety of adaptive re-use opportunities that would create a dynamic use of the Mill building, thereby building support and interest in the building and its heritage. Suggestions provided by the subcommittee included heritage interpretation, educational/classroom space, gift shop and artist space/co-op.
- Adaptive re-use development should be limited to the main floor of the Mill building in an effort to reduce extent and cost of retrofit and construction activities.

Lewis Site

- Develop and install interpretive signage on the Forest Trail near the excavated Lewis site.
- Relocate and rebuild the kiln artifacts located on the excavated Lewis Site. The feature could be re-constructed in proximity to the Mill building, with interpretive signage directing visitors to the portion of the Forest Trail where the site is further interpreted.

4.3 Conservation Education and Tourism

4.3.1 Conservation Education

Bruce's Mill Conservation Area has the potential to be an important site for environmental education activities. The primary formal programs that are hosted at BMCA are the York Children's Water Festival (YWCF) and the Maple Syrup Festival. However, the existing facility for these programs (the Chalet) does not provide sufficient space. Other recent program developments and improvements at BMCA include the construction of an Outdoor Classroom, implementation of the Knowing Nature, Staying Safer program, the construction of a dipping platform in the wetland at the former mill pond site and the development of weekend guided hikes.

Tremendous opportunities exist to partner with Community Safety Village (CSV) of York Region for the delivery of education programs. Over 45,000 students visit CSV each year. CSV's programs are focused on teaching students about fire, traffic and personal safety. New programs are focusing on internet safety and safety around water.

Recommendations:
General

- Increase passive and active education opportunities and programs for existing and new users to promote TRCA's mandate.
- Provide an interpretive function along the trails, thereby educating trail users about proper trail etiquette and environmental issues via a trail head sign and brochures. Topics for interpretation could include:
  - o Natural heritage – restored wetland, interior forest, flora and fauna, creek ecology, etc…
  - o Canadian heritage – Lewis site, Mill building, site history, Bruce family, maple syrup, etc…
- Pursue opportunities to interpret natural and cultural heritage sites for public education. Develop permanent, durable displays to raise awareness at these sites.
- Develop a theme of Canadian Heritage across the property, tying together all of the cultural resources present on site.
- Align naturalization efforts at the YCWF with a specific grade's curriculum and plant in naturalization areas (secondary restoration zones) throughout BMCA.
- Share the overall vision for regeneration with participating schools and community groups so that individual projects are put into the context of long term plans.

York Region's Community Safety Village

- Work with the York Region Community Safety Village to provide half-day programs that complement their programming and encourage visitors to utilize both the Community Safety Village and the Conservation Area facilities.
- Incorporate safety themes into public use and recreation where appropriate, such as through existing "Knowing Nature, Staying Safer" interpretive signs.

4.3.2 Tourism

At the time of publication of this master plan, York Region had recently circulated a draft Long Term Tourism Destination Development Strategy. The vision of the strategy is to seek economic, social and cultural development based on sustainable tourism, which preserves the environment and respects local populations. York Region is seeking to establish itself as a tourist destination, building upon its cultural identify and the quality of its environment. More specifically, the strategy recognizes the need to focus on encouraging longer-stay tourism rather than just day visitors and ensuring the level of tourist satisfaction. The strategy recognizes the need to develop tourism opportunities in a way that avoids triggering ecological problems and even improves the overall quality of the environment. On the topic of historical and cultural resources, the strategy suggests that they must be preserved in a way that allows them to be used in the future. Lastly, the strategy recognizes that local community and businesses must be closely involved in determining a sustainable future for tourism in the Region, to ensure that community interests are taken into consideration.

- Work with tourism providers in Whitchurch-Stouffville to leverage and promote BMCA.

4.4 Stewardship and Outreach

Currently, BMCA does not have a stewardship group associated with the park. After the master plan process is complete, it is anticipated that BMCA will have an active stewardship group. This group will assist TRCA in the implementation of the master plan and outreach to the local community. The committee should include representatives from partner municipalities, stakeholder groups and local residents. Many of the same groups that participated in the Master Plan Advisory Committee should be represented on the stewardship committee.

Recommendations
Stewardship Group

- Develop a stewardship group to provide implementation support at BMCA. This committee will include representatives of local governments, residents, community groups, business owners and other stakeholders.
- Create a terms of reference for the BMCA Stewardship Committee. This document will include a list of appropriate stakeholders, committee organization and term length, responsibilities, rules of conduct and issue resolution procedures. It is suggested that among other things, responsibilities of the committee will include restoration project implementation, trail maintenance, outreach and education and other activities that support the master plan and TRCA.
- Create stewardship partnerships with local groups, such as the YMCA, local school groups (especially environmental clubs), local historical societies and other local community groups.
- Plan annual stewardship events that include interactive learning experiences.

Outreach

- Promote active community involvement and develop community stewardship that will foster an integrated approach to land use planning and implementation strategies.
- Target the promotion of Best Management Practices and stewardship to landowners in proximity to BMCA, particularly those whose land includes sections of Bruce's Creek and its tributaries.
- Develop and implement plans to improve communication, awareness and education of park issues and initiatives, and backyard practices that support conservation land management.
- Provide information to park visitors about the environmental and safety concerns regarding dogs roaming freely in the park.
- Work cooperatively with the local community on issues such as vandalism, security and trespassing.

4.5 Operations and Park Management

Bruce's Mill Conservation Area employs full-time and seasonal staff whose responsibilities include carrying out the day-to-day operations in the park. Staff must be kept abreast of the plans and policies that affect their park so their actions are consistent with the recommendations in this master plan.

Recommendations

- Follow all TRCA policies. Example policies include the TRCA Animal Control Policy, the TRCA Policy for Managing Hazard Trees and the TRCA *Pest Management Policy*. These policies support TRCA's Living City objectives and best management practices.
- Follow the policies and procedures set forth in the Conservation Parks' Operations Manual. This manual provides reference materials and detailed instructions on how to operate the park in order to meet environmental, customer service and corporate objectives.
- Utilize flexible management approaches and continually evaluate management options to ensure that operations and existing infrastructure are both effective and appropriate.
- Manage the park according to Audubon Certification Program.
- Manage the park office according to the eco-office program established by TRCA.
- Ensure all new facilities meet Leadership in Energy and Environmental Design (LEEDTM) Green Building System (or similar rating system) standards. Incorporate green roofs on new and existing buildings where appropriate.
- Reduce landfill waste by encouraging reducing, reusing and recycling programs, including composting of organic waste to reduce the environmental impacts of waste disposal.
- Use local and regional materials to reduce environmental impacts resulting from transportation and to support the local economy when financially feasible.
- Adhere to sustainable design standards as outlined in section 5.1.3 and appendix F.
- Implement the highest appropriate level of storm water control for new and retrofit developments.
- Utilize the best erosion management practices in all construction or development projects.
- Illustrate sustainable practice techniques and backyard habitats at BMCA to act as a model for local residents and other park visitors.

- Provide a bulletin board in a public use space to inform the community of TRCA, BMCA Stewardship Committee and other local community events and initiatives.

4.6 Land Use and Management

Bruce's Mill Conservation Area is an important component of the natural and social community. In order to maintain and enhance BMCA as an attractive location for people, flora and fauna, its natural environment must be protected and linked to the surrounding lands. Appropriate management techniques will help to maintain BMCA as a vital piece of greenspace and public use space.

As part of TRCA's land management program, annual monitoring of the property boundaries should be conducted. A baseline inventory was conducted in the summer of 2009, the results of which are summarized in appendix H. Overall, the boundaries are in good condition. There are several fence repairs that should be conducted, and sections that are not fenced at all. There are several minor encroachments, mostly in the form of unauthorized entries that should be addressed.

Recommendations
General

- Maintain leases as appropriate to act as a source of revenue for TRCA and to provide additional surveillance on the property.

Site Securement

- Repair and install fencing or natural barriers as needed along BMCA boundaries. Sign boundaries as appropriate.
- Address unauthorized access points through fencing or natural barriers and signage as needed. Contact with neighbouring landowners may be required where entry points are from private land.
- Create natural buffers along the edges of natural areas at BMCA.
- Provide sound buffers along residential borders.
- Monitor boundaries annually to assess condition of fencing, locate any unauthorized access points and identify any encroachments or illegal activities, such as dumping.

4.7 Implementation, Monitoring and Review of the Master Plan

This master plan and the associated recommendations are appropriate given the current knowledge and conditions at BMCA. The plan allows for the changes in the natural, cultural, social and economic environment. Regular reviews should be conducted and updates prepared to make the plan as relevant as possible.

Recommendations

- Develop performance measures and indicators that are tied to the management recommendations, implementation plans and the implementation guide for the master plan to determine the impacts and level of success of the master plan. These measures and indicators should be monitored regularly. The results of this monitoring program will inform reviews of the master plan.
- Review and update the Bruce's Mill Conservation Area Master Plan as necessary. A review should take place every seven to ten years.
- Prepare a new master plan for BMCA in 25 years.
- When proposals for park use come forward, consider how the activity supports the vision of BMCA as established in this master plan and the cumulative impacts of the activity. Uses should be evaluated in terms of the facilities required, the demand for the activity and/or program and the economic feasibility. All projects should be subject to appropriate environmental assessments and building approvals as required.
- Consult with the BMCA Stewardship Committee, local governments, community stakeholders and local residents when developing detailed plans that support the master plan.

5 PUBLIC USE AND RECREATION PLAN AND RECOMMENDATIONS

5.1 Public Use and Recreation Plan

Bruce's Mill Conservation Area is an important greenspace that is available for public use by visitors throughout York Region and beyond, including residents of the Towns of Whitchurch-Stouffville, Richmond Hill and Markham. The municipalities provide parks, recreation and cultural facilities that have the potential to complement and compete with BMCA. The focus of recreation at BMCA will be on activities that provide opportunities for a regional audience, to reduce competition with municipal facilities and ensure a broad visitor base. Recreation activities at BMCA will also be in line with TRCA's Vision for a Living City and the visions of Rouge Park and BMCA.

The public use and recreation plan provides a vision for nature-based recreation opportunities at BMCA. In some areas the plan is very concrete and lists recommendations such as the construction of a ropes course or splash pad. Other recommendations are more conceptual, such as the development of an active recreation area on the west side of the park. This diversity is deliberate and is intended to provide a reasonable number of tangible recommendations to build a vibrant and successful park, while allowing enough flexibility to capture and develop new opportunities that may arise.

The public use and recreation plan is informed by the master plan with respect to natural environment objectives and allowable uses within specific zones of the park. A detailed overview of the process used to inform and develop the public use and recreation plan can be found in appendix E. Included in this appendix is a report on outdoor recreation trends and a summary of demographic information for the surrounding communities.

The report on outdoor recreation trends notes that active lifestyles are increasingly popular, with many adults expressing an interest in individual activities that are less structured and can fit easily into busy schedules. Canadians under the age of 45 years are most likely to participate in outdoor activities, as are those with an education beyond secondary school and personal incomes of $30,000 or more. Activities that are

increasing in popularity include walking, jogging, cycling, rollerblading, skateboarding, wall climbing, basketball and the use of spray pads. Public gardens, heritage and historical properties, festivals and special events are also increasingly popular. The report highlights trends in outdoor recreation facility design and development, and talks about an increased focus on multi-purpose buildings that use sustainable building practices. Lastly, the report discusses outdoor education programming and the growing importance of environmental and nature-based education.

Demographic profiles were reviewed for the towns of Whitchurch-Stouffville, Richmond Hill and Markham. For each community, the dominant age class is 25-44, with 45-54 being the second most numerous. Nearly 50 per cent of all private households are couples with children, and the median household income is in the range of $72,455 - $77,163. The ethnic make-up of the three communities varies considerably. In Whitchurch-Stouffville, 18,080 residents are Canadian-born, while only 3,655 are foreign-born. In Richmond Hill, 66,735 are Canadian-born while 63,620 are foreign-born, and in Markham 96,385 are Canadian-born and 109,930 are foreign-born. In all three communities the highest number of visible minority residents, are Chinese, followed by South Asian.

The concepts included in the public use and recreation plan were designed to address known recreation trends while also appealing to the area and regional demographics wherever possible.

The process to develop the public use and recreation plan was extensive and considered a series of different uses, activities and concepts. For a concept to be included in the final plan, it must meet as many of the following criteria as possible:

- Potential for revenue generation
- In-line with TRCA's vision for The Living City®
- Provide nature-based recreation to a regional audience
- Support from the Staff Steering Committee, the Public Advisory Committee, and other stakeholders.

It should be noted that any new concepts or opportunities that arise in the future should also be evaluated using the above criteria and should be presented to the Advisory or Stewardship Committee for review. When assessing potential uses, consider how it will impact current public use opportunities and the cumulative impacts of these multiple uses at BMCA. In addition to environmental impacts, uses should be evaluated in terms of the facilities they require, the demand for the activity and/or program, and the cost associated with its undertaking.

The public use and recreation concept plan, as illustrated in Map 5.1, lays out general recommendations for recreation and enhancements throughout the park, as well as detailed recommendations for each area of the park. It also details sustainable design standards that should be followed in all park management and development. The public use and recreation concept plan focuses on the managed portions of the site that support recreation uses. The master plan map for BMCA (see Map 5.2), integrates both recreational uses with proposed ecological enhancement and restoration initiatives for the overall conservation area. The trail plan, which is further detailed in chapter six and Map 6.1, illustrates the important connections between trails and public use opportunities.

The major recommendations that are outlined in the public use and recreation plan can be summarized as follows:

- Development of a nature-based recreation area in the field east of the main entrance
- Restoration of the Mill building, including a public engagement process to determine an appropriate adaptive re-use for the building
- Installation of a state-of-the-art waterplay facility, including a splashpad and wading pool
- Construction of a skills development area, including a ropes course
- Development of a multi-purpose active recreation area in the west fields
- New entrance area and driveway off of Warden Avenue

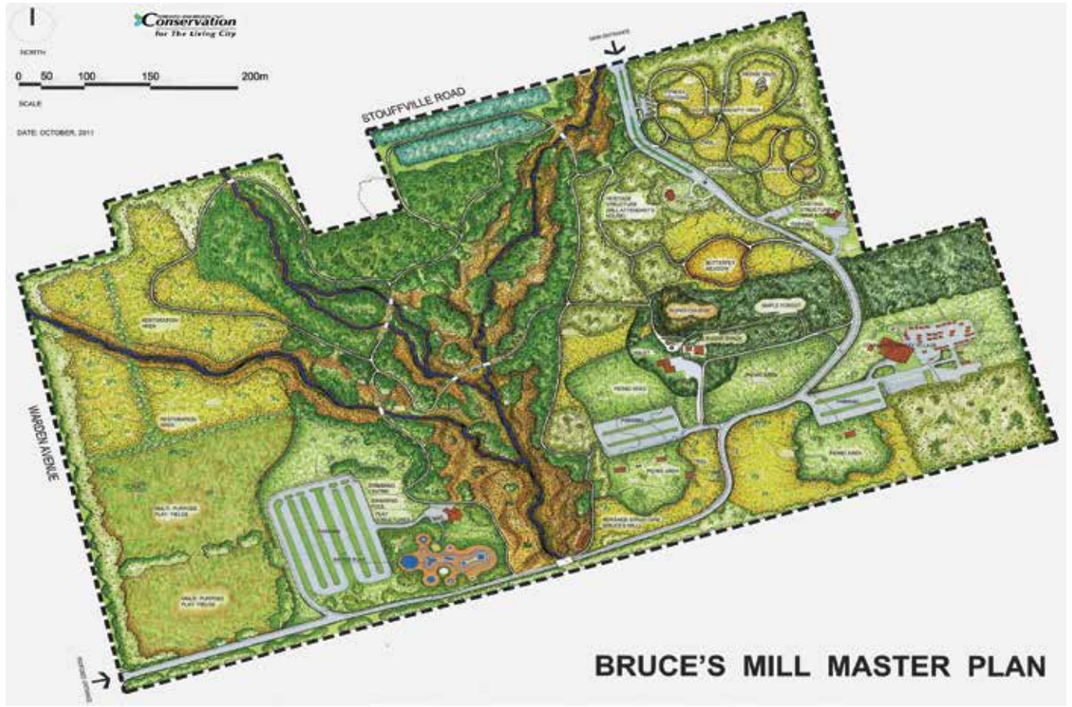
Map 5.1 – Recreation Concept Plan

5.1.1 General Recommendations

The following are recommendations for public use within BMCA that provide the framework for the plan:

- Focus on nature-based recreation activities that support the core function of the site as a conservation area and are sustainable from an ecological, economic and social perspective.
- Enhance the aesthetic appeal of the park by landscaping and planting as many open areas as possible, such as edges of picnic areas, along roads, parking lot edges and so on.
- Incorporate protection and interpretation of the Mill building and its cultural landscape, as well as the Lewis site, into public use and recreation opportunities as appropriate
- Maintain/enhance picnicking, hiking and other nature-based activities as a core focus of the park.
- Maintain sufficient open recreation area to be able to provide attractive areas for events such as the York Region Children's Water Festival. Key areas include the Maple Grove, Trail View, Cedar Glen, Pond View, Mill View and Sunny Acres picnic areas, all of which are located east of the former mill pond.
- The cross-country running races that take place annually at BMCA currently uses the area just north of the Open Acres picnic area as the staging area for their races. Space for these events should continue to be provided, either in the current location or in an alternative location that provides ready access to the trails.
- Add/update amenities that support core conservation park uses and that expand visitor and revenue generating opportunities as outlined in section 5.1.2
- Consolidate new facilities in existing public use areas in an effort to reduce the overall footprint of the area.
- Incorporate design standards that support ecological objectives, e.g. LEEDTM standard or equivalent buildings, environmentally compatible site design, passive storm water management/water recycling; use of recycled materials.

Map 5.2 – Bruce's Mill Conservation Area Master Plan



- Improve lighting along roadways and at high use areas to ensure visitor safety.
- Develop a new water play and education area to compensate for the removal of swimming in the former Mill pond.
- Develop and provide recreation activities that have opportunities for a regional audience, to reduce competition with municipal facilities and ensure a broad visitor base
- Promote BMCA visitor's environmental responsibility. Include an environmental code of conduct with camping and picnic permits. The environmental code of conduct should also be posted at the chalet, the beach house and the trail heads.
- Promote BMCA as a destination for active-lifestyle choices and Canadian heritage experiences.

5.1.2 Key Elements & Recommendations

The following sections describe the key elements of the public use and recreation plan.

Stouffville Road Park Entrance Area
The widening of Stouffville Road that is planned for 2009 will significantly impact the entrance to BMCA as the road will be raised by more than two metres (m). York Region has committed to rebuilding the entrance to BMCA, which will include a new entrance sign and repaving of a portion of the driveway.

It should be noted that as part of the master planning process there was discussion about relocating the main entrance further east to provide more buffer and protection for the creek and wet area located west of the driveway. It was determined by York Region that this was not logistically feasible due to safety concerns and sightlines on Stouffville Road. Instead, buffer plantings will be implemented on the west side of the driveway to reduce runoff and mitigate impacts on the creek.

Furthermore, the trailhead that is located on the west side of the driveway will be removed, as the trail it leads to will be decommissioned as part of the implementation of the trail plan. See chapter six for more details on the trail plan.

5.0 PUBLIC USE AND RECREATION PLAN AND RECOMMENDATIONS

In an effort to support free, off-hours access to the trails at BMCA, a small, 12-car, gravel parking facility with gates will be constructed off of the main driveway, before the gatehouse. To further accommodate users who wish to use the park during off-hours, a trailhead will be created in a safe and appropriate location to allow access to the trail system from the new parking area. These plans are contingent on site assessment and feasibility studies.

The Mill Attendant's House is located east of the main driveway to BMCA. Based on the condition review that was completed for the house and the Mill building, it is recommended that the house be occupied by a tenant through a residential lease, or be converted to office space for TRCA or a third party.

North East Field
This field was recently home to a driving range facility that was operated under a lease agreement. Through the master planning process, it was determined that the driving range does not represent the highest and best use of these lands. Instead, the area should be developed into a nature-based activity/ recreation area that would incorporate significant naturalization and landscaping. The focus will be on providing aesthetic appeal as well as recreational opportunities. Possibilities could include a fitness trail, wildflower gardens, interpretive trails, playgrounds, hedge mazes, picnic areas, low impact sports, to name a few. The goal is to provide an area that is appealing to those driving by on Stouffville Road and provide an attractive entranceway to the Park. This area provides great potential to provide increased recreational opportunities and experiences at BMCA, and would assist in further developing the theme of active lifestyles on the property. A concept sketch is provided in Map 5.3.

This area of BMCA has been identified as a potential site for enhancement through the placing of fill and was approved as a possible site in a report to the Authority Board (Res #A142/08). While a date for a filling project has not yet been determined, landscape plans for a filling project should be tailored to the recreation use that is desired for the area. It is recommended that a portion of any revenues generated on site through fill placement enhancements be directed back into implementation of the BMCA Master Plan.

Workshop & Operations Building
No significant changes are planned for the operations buildings. Additional plantings along the eastern edge of the driveway should be undertaken to screen the view of the buildings. Additionally, plantings to the north of the buildings may be necessary to block access by the public, depending on the details of the re-development plan for the driving range.

There is an open area on the west side of the main driveway, opposite the workshop & operations area, that is currently used to store a trailer belonging to the York Region Children's Water Festival. In the event that a new storage facility is provided for the festival, this trailer should be removed and the area re-planted and naturalized.

Skills Development Area
A skills development area, with a high and/or ropes course and zipline is proposed for the natural environment zone to the north of the Chalet. The proposed location is at a confluence of a number of trails and has very little understory. Further detailed review of the siting of the facility will be undertaken as the proposal is developed, and will give consideration to designing the facility in such a way as to minimize impacts to surrounding natural features. The skills development area could be managed by trained BMCA staff or tendered to a private operator. Further investigation on the feasibility and design of the skills development area is required.

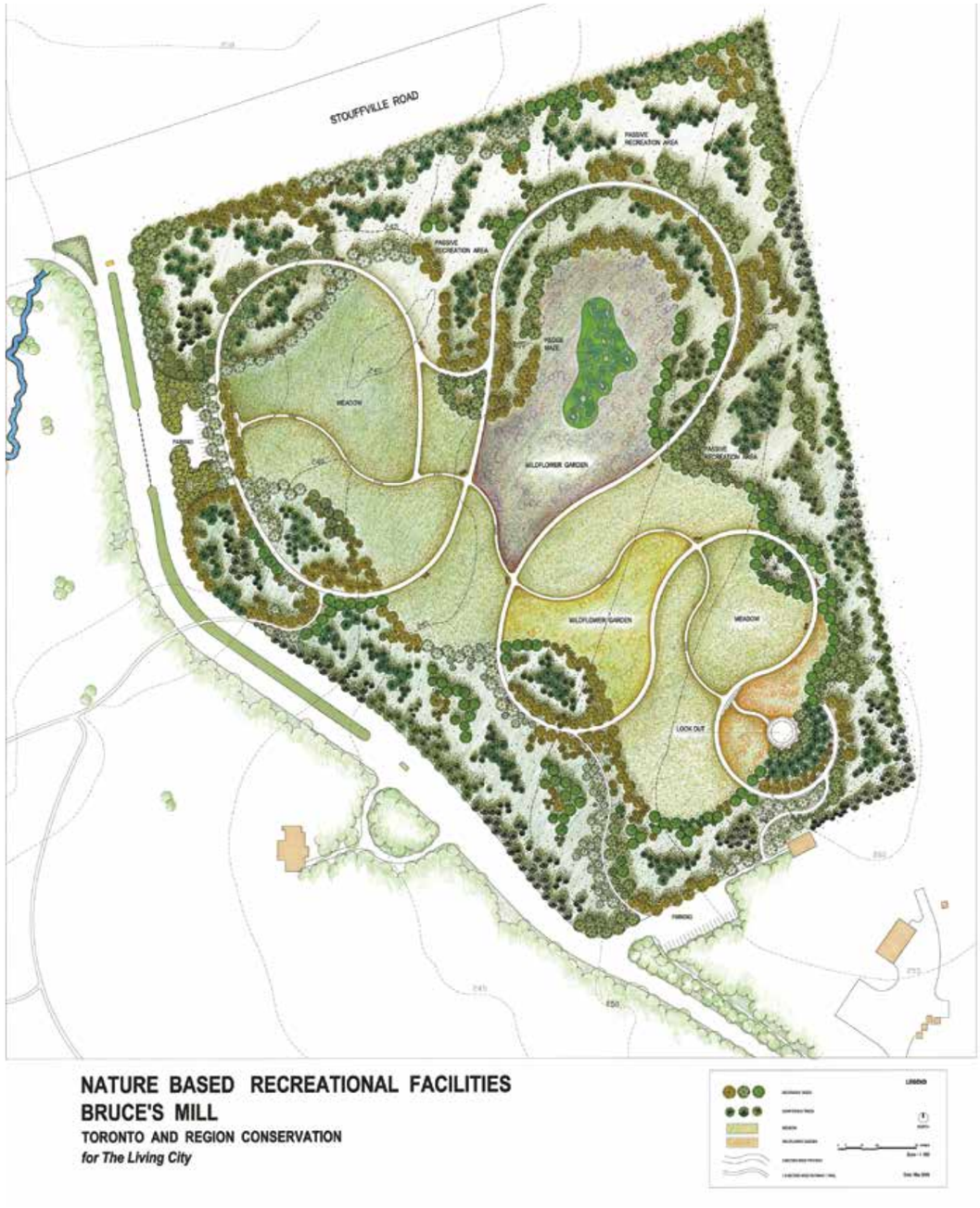
Mill Restoration

The recommendations from the condition review and the subcommittee (see details in section 4.2) include immediate repairs to prevent further deterioration of the Mill building. Beyond these urgent repairs, the report begins to recommend possible adaptive re-uses that would not only ensure the continued maintenance of the building condition, but would also engage visitors in understanding the cultural heritage of the building and the site.

The over-arching recommendation is to engage in a public consultation process to develop a plan for restoration and adaptive re-use of the site. Any adaptive re-use should create a dynamic use of the Mill building, thereby building support and interest in the building and creating opportunities for funding to ensure its protection and maintenance. Any consideration for re-use should be limited to the main floor of the building to reduce costs.

Following the public consultation process, TRCA should prepare and distribute a request for proposal for an adaptive re-use of the building. Following an analysis of

Map 5.3 – Nature-based Activity/ Recreation Area, North East Field



submitted proposals, TRCA should determine if there is one which should be pursued and finalized.

In addition to fulfilling TRCA's stewardship responsibility for this building, implementing a plan for adaptive re-use would integrate the Mill and its heritage into the rest of the park, building on its potential to attract and entertain visitors.

A management program should be established to ensure the physical conditions of the Mill building and Mill Attendant's house are maintained, including an annual maintenance and operating budget.

Aquatic Area

Since the Mill pond was drained and restored in 2004, there has been a need for an aquatic facility at BMCA. The existing pool is sufficient for the YMCA day camp and any groups wishing to rent the pool on evenings and weekends, but does not provide aquatic opportunities for the general public.

The recommendation is to construct a water play facility that uses state-of-the-art water conservation techniques. This will provide a safe and clean water experience and attract visitors during hot summer months. The facility would include a splash pad and wading pool.

It is also recommended that an interactive watershed model be constructed that would provide educational and interpretive opportunities to teach about the importance of water conservation and the function of watersheds.

The ideal location would be southwest of the existing pool, as there is infrastructure in place to support it. This would also allow for connections to be developed between the waterplay facility and the nearby Mill building, hence increasing visitor interest in the Mill. One way to accomplish this would be to integrate Mill-style features into the splash pad, such as waterwheels and flues.

Proximity to the pool would also allow users of the waterplay facility to take advantage of the existing washroom and change room facilities in the Beach House, though some renovation would be needed to accommodate the increased use.

Setbacks would be required to ensure protection of any nearby natural heritage features. The facility would need to utilize state-of-the-art equipment and operations to maximize water conservation and energy efficiency.

West Fields

The overall vision for the western fields at BMCA is to create a large, level and open multi-purpose turf area that can be used for a larger-scale recreation opportunity.

Currently, the southern portion of the west fields are home to a baseball diamond and a number of soccer fields. The baseball diamond is under-utilized and should be removed in favour of a more desirable use. The soccer fields can continue in the short-term, however there is potential to enhance these fields in order to accommodate a more diverse range of potential uses

The removal of the baseball field and enhancement of the soccer fields will create a sizeable space that can be used for a number of active recreational opportunities such as cricket, ultimate Frisbee, picnics, event staging and soccer.

This area of BMCA has been identified as a potential site for enhancement through the placing of fill, and was approved as a possible site in a report to the Authority Board (Res. #A142/08). While a date for a filling project has not yet been determined, landscape plans for a filling project should be tailored to creating a level turf, multi-purpose recreational activity field in this area. It is recommended that a portion of any revenues generated on site through fill placement enhancements will be directed back into implementation of the BMCA Master Plan.

The northern portion of the west fields were historically under lease for agriculture. TRCA's Terrestrial Natural Heritage System Strategy highlights that this area is important for restoration to natural cover. As such, a wide buffer has been created on either side of the creek that transects the fields to protect water quality and provide habitat. Furthermore, it was identified that the northern portion of the agricultural field will be restored to natural cover as illustrated in Map 5.4.

A filling project that was initiated in the fall of 2008 represents the first step in this restoration project. The project includes habitat enhancement projects, trail development and a lookout, and is expected to be completed in the spring of 2012. The remaining portion of the agricultural fields, south of the existing creek, should be targeted for restoration or naturalization in order to

provide a natural buffer to the creek, as well as increase the overall natural cover at BMCA. Restoration should begin at the southern boundary of the stream buffer and expand south toward the multi-purpose activity field.

New Entrance
It is recommended that a new driveway and secondary entrance be constructed off of Warden Avenue at the southern edge of the BMCA property. There is currently a maintenance access here that should be formalized. This entrance would provide access for users of the soccer fields and the future multi-purpose activity fields. The entrance can be gated to provide controlled access at certain times of day and may require staffing. This access would also provide an alternative route for emergency service needs.

5.1.3 Sustainable Design Standards

In keeping with Living City objectives, TRCA has a mandate to design all new buildings with sustainable and green building design principles, using LEEDTM or LEEDTM Canada certification, as administered by the Canada Green Building Council, an adaptation of the American program tailored specifically for the Canadian climate, building codes and practices. The LEEDTM program recognizes leading edge design, construction and operational practices that reduce environmental impacts. This is achieved through the award of credits for achieving performance criteria that outperform standard building practices.

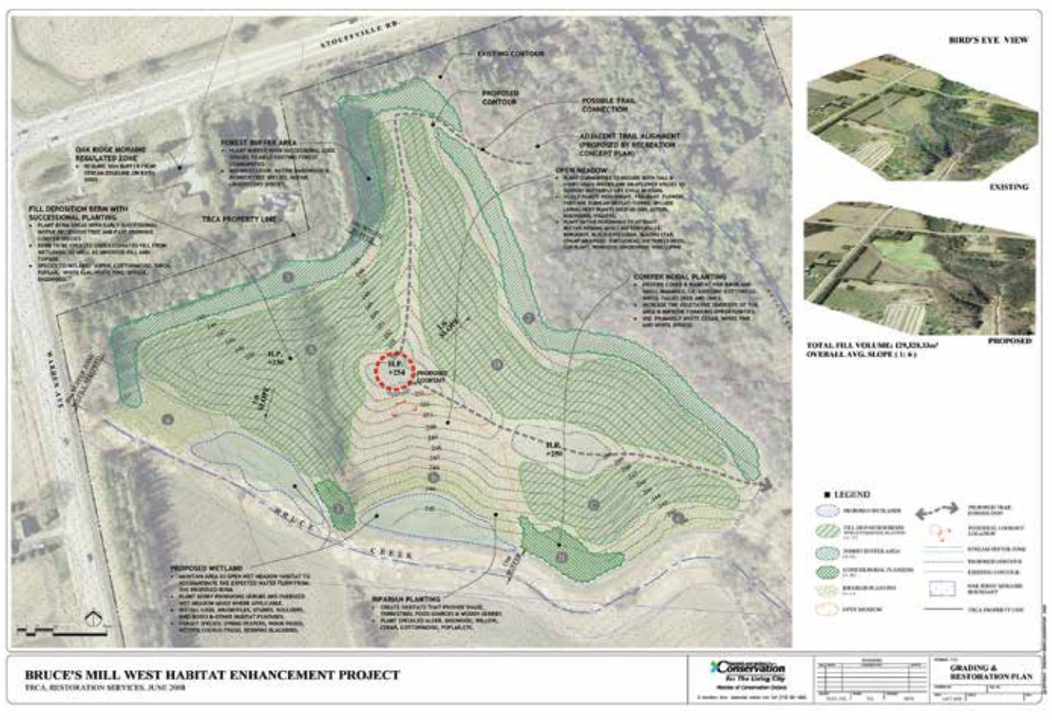
The LEEDTM Canada for New Construction and Major Renovations program issues credits within five areas:

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality

Within each of the categories there is flexibility to accommodate a wide range of green building strategies that best fit the constraints and goals of particular projects.

With respect to any proposed new structures and enhancements at BMCA, designing to LEEDTM criteria includes these considerations: cost of construction, the seasonal use of the buildings, ease of maintenance and suitability of the strategies for moderately-sized structures.

Map 5.4 – Habitat Enhancement Concept Plan, North West Field



Many green building strategies are relatively easy to achieve without significantly modifying the construction technologies or the desired appearance of the building or unduly impacting building operations. For example, for credit as a reduced Heat Island, both green vegetated roofs and Energy Star® compliant highly reflective and high emissivity roofing (high albedo) will achieve points. Green roofs are more complex and expensive to achieve, require more maintenance and are most often associated with large, flat-roofed buildings. High albedo roofing is applicable to all types of structures including open-air pavilions. Other relatively simple building measures include maximizing for day lighting and views, incorporation of green power sources and reduced energy and water consumption in appliances and fixtures.

Sustainable site design credits include many strategies that are typically considered for compatibility with a natural setting and ecologically sensitive practices including: limiting grading and site disturbance, use of native and water efficient plant material, passive stormwater management and reducing impervious surfaces. Even without LEEDTM certification objectives, these would be recommended measures for the BMCA site.

The following are a range of possible green building and sustainable site measures that should be incorporated at BMCA. Appendix F provides additional detailed information on sustainable design measures based on criteria contained within the five principle LEED® areas.

Green Building Measures

- Reduce potable water use for wastewater or provide 100 per cent on site treatment through such measures as on-site greywater treatment units, dual flush toilets and composting toilets.
- Reduce potable water use through such measures as ultra-low flow fixtures, metered faucets, composting toilets, waterless urinals and the re-use of greywater for non-potable water use.
- Design building envelope and building systems to maximize energy performance.
- Use high performance windows to limit winter heat loss and summer solar gain (may involve glazing, shading and framing).
- Use specialized insulation measures to support thermal conservation (through exterior wall and roof construction).
- Use building orientation measures (e.g. south-facing orientation for roof; east/west windows with overhangs to block out summer sun).
- Use Energy Star® compliant, highly reflective and low emissivity roofing over 75 per cent of the surface area. Green roofs are also credited but will be more difficult to achieve.
- Design passive solar measures, e.g. windows, skylights, thermal storage in flooring or walls;
- Consider alternative power sources: solar electric (photovoltaic) systems, wind energy, geothermal heat pump, heat recovery ventilators (HRV's).
- Reduce building and site light emissions and increase access to dark skies.
- Reduce use of scarce natural resources. Use salvaged or recycled materials, rapidly renewable resources or those that require less energy to produce.
- Divert and recycle construction waste.

Sustainable Site Design and Landscape Measures

- Design with minimal building footprint and designate an area of adjacent open space equal to building footprint.
- Minimize site disturbance including earthwork and clearing to reduce development impact area.
- Demonstrate that post-development peak discharge rate and quantity doesn't exceed pre-development peak discharge rate and quantity. Examples of stormwater management (SWM) measures include infiltration trenches, vegetated swales, porous paving, detention areas and constructed wetlands.
- Provide passive stormwater treatment measures (e.g., run-off movement through bioswales, meadows, wetlands, SWM retention areas).
- Use water recycling technologies such as harvesting of roof/downspout run-off for irrigation or to water planted areas, re-use of building greywater and waterplay drainage for landscape or non-potable building use (e.g. toilets, custodial use).
- Use permeable paving materials: gravel, porous asphalt, pavers ('ecopavers', 'turfstone').
- Use recycled materials, limit use of scarce resources and select materials requiring less energy to produce and/or manufactured regionally.
- Apply xeriscape principles: native plant material selected for reduced water consumption, drought resistance, climate hardiness.

- Limit turf. Use groundcovers, mulched shrub areas, permeable surfaces, gravel and pavers.
- Locate and plant trees to shade hard surfaces and buildings to reduce heat island effect and to cool buildings.
- Install solar powered landscape lighting on trails and in parking lots.
- Use of down-turned and shielded streetlight fixtures to promote dark skies.
- Promote alternative modes of transportation (e.g. ensure site connectivity with internal/external trails and bike routes and provide bicycle racks and storage areas).
- Encourage access to transit.

5.2 Implementation Strategy

The total cost to implement all of the items outlined in the public use and recreation plan is approximately $2,817,400. Note that this total, and the subtotals listed below, do not include costs of implementing the adaptive re-use plans for the Mill, the nature-based recreation area or the multi-purpose active use recreation area. Costs for implementation in these areas will be determined as detailed proposals are developed and site plans are confirmed.

The public use and recreation plan will be implemented in phases as described below. An integrated implementation guide, including more details on costs and schedules can be found in Appendix G.

The following order of development is proposed for BMCA over a ten-year period and is subject to available budget.

Immediate Projects ($107,000)

- Complete first phase of restoration of northern portion of the west agricultural fields
- Implement “urgent” recommendations from the architectural assessment (GBCA, 2008) to prevent further deterioration of the house Mill and Mill Attendant’s house.
- Initiation of public consultation process to determine adaptive re-use plans for the Mill building
- Develop detailed design for multi-purpose recreation fields
- Replaced dilapidated bridge structures along Forest Trail

Short-Term Projects ($2,161,900) *1-5 years*

- Installation of skills development area
- Complete paving on main entrance driveway
- Installation of new front entrance sign
- Implement design for multi-purpose activity area in the west fields, including removal of baseball diamond and installation of fill enhancement as appropriate
- Installation of new trailhead and parking area near gatehouse, with construction of connecting trails as needed.
- Removal of existing trailhead off of the main driveway and de-commissioning of associated trail. Realignment of connecting trails as needed.
- Plantings around workshop and office buildings
- Implement phase one recommendations from architectural assessment for Mill building and Mill Attendant’s house
- Completion of adaptive re-use plans for the Mill building. Release an RFP for development and implementation of adaptive re-use for the Mill building.
- Construction of new driveway and secondary entrance from Warden Avenue
- Allowance for environmental and educational enhancements
- Implementation of trail plan

Long-Term Projects ($548,500) *5-10 years*

- Design and installation of waterplay facility, including any necessary renovations to the Beach House
- Develop and implement design for nature-based recreation area in the northeast field, including installation of fill enhancement as appropriate.
- Plantings around workshop and office buildings
- Restoration of former trailer storage area west of the driveway and operations building.
- Implement phase two recommendations from architectural assessment for Mill building and Mill Attendant’s house
- Implementation of adaptive re-use for Mill building as per RFP submissions received
- Conduct improvements to west parking lot
- Development of multi-use trail
- Installation of interpretive signage

6 TRAIL PLAN AND RECOMMENDATIONS

6.1 Introduction

The Bruce’s Mill Conservation Area (BMCA) is currently a healthy and diverse natural environment with interior forest and wetland habitats. Any and all public uses must be carefully planned, implemented and monitored to ensure the long term sustainability of these and other natural features and functions. While these lands remain healthy from an ecological perspective, they face the recreational pressures exerted from a fairly extensive trail system that includes both informal and formal trails. A large portion of the lands in the planning area have been designated as a nature reserve zone. By providing controlled public access to such sensitive natural areas, trails can provide both valuable educational and aesthetic exposure to our natural heritage system. However, the critical issue of not increasing the impacts on these natural areas to the extent that their ecological function becomes disrupted must be addressed and achieved.

As part of the master planning process for BMCA, a trail plan has been developed for the area (see Map 6.1). The trail plan complements the overall master plan for BMCA and offers guidelines for the development of an integrated trail system throughout the property.

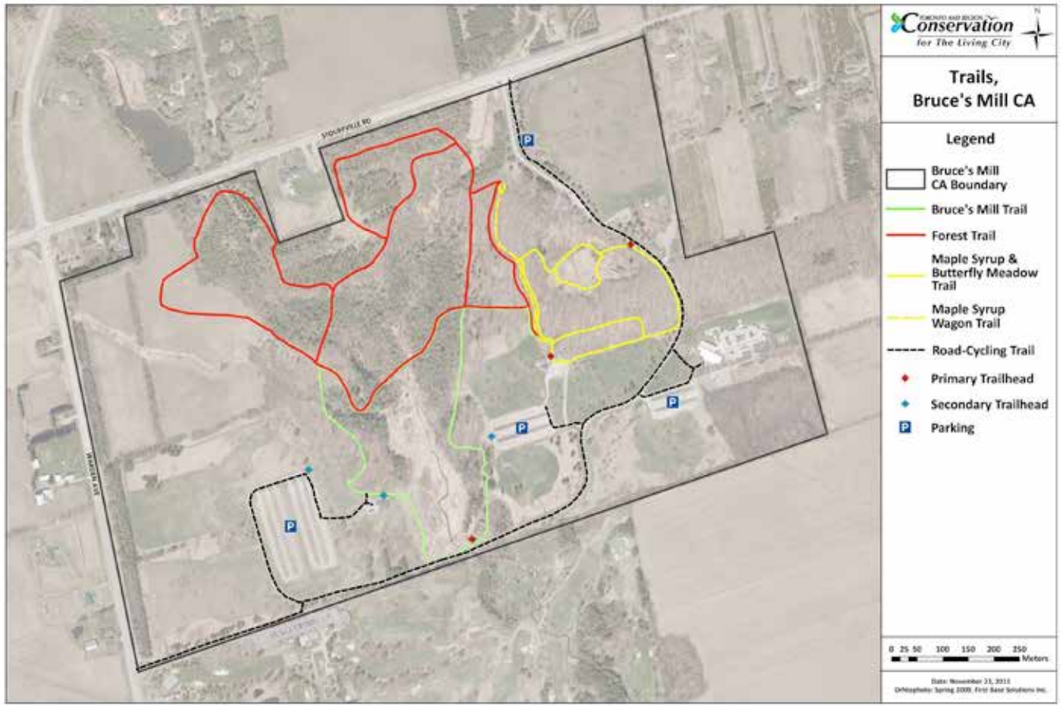
Currently, there are more than 10 kilometres (km) of trail at BMCA, some of which are formal and others which are informal or socially-created. The trail plan lays out a new trail system that builds on existing trails, where appropriate, and closes down surplus or inappropriate trails, as well as informal trails.

The plan includes local loop trails within BMCA as well as proposed connections to inter-regional trails such as the Oak Ridges and Rouge Park Trails. The trail systems outlined in the plan are designed to address the different levels and abilities of hikers, offering a variety of trail lengths, difficulties and types. For the majority of the trails, hiking is the only permitted use. Cross-country skiing is permitted informally in the winter, though no trail grooming or maintenance takes place. A multi-use trail that will accommodate cyclists has been proposed and will run along the existing road network through the property. This multi-use trail is intended to cater to those visiting the property by bicycle, and is not intended to be a recreational or mountain biking trail.

The information in the trail plan is intended to guide the development and management of trails, access points, signage and related facilities in order to achieve the master plan goals and objectives. Note that all trail development, including signage, should adhere to TRCA’s Trail Planning and Design Guidelines manual.

Further details on trail design standards; impact mitigation techniques and trail construction, management and maintenance are outlined in appendix F.

Map 6.1 – Bruce's Mill Conservation Area Trail Plan



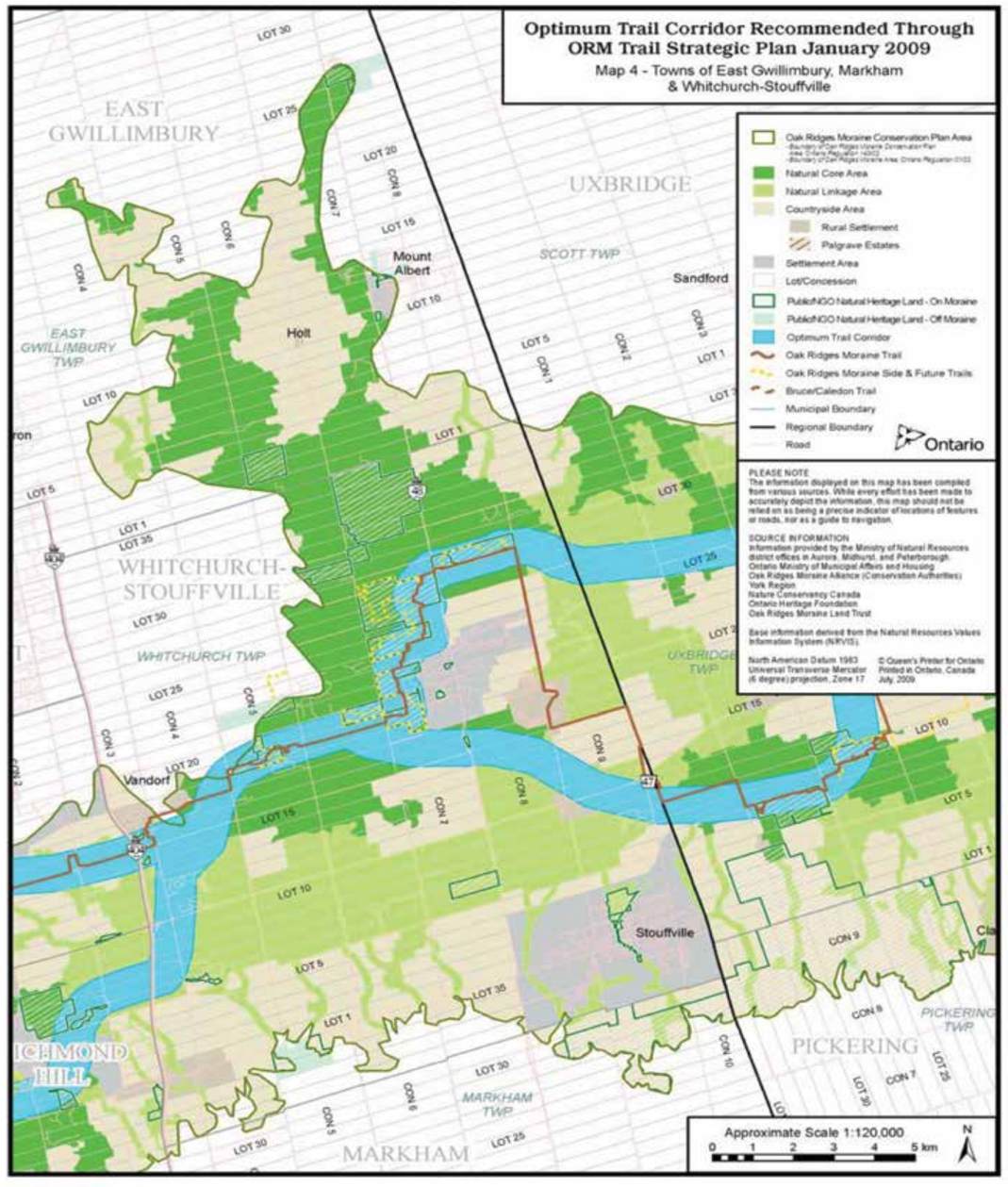
6.2 Trail Plan Goal, Objectives and Management Principles

This plan aims to develop a trail network that allows visitors to travel through the park and to access public use areas and facilities while protecting and promoting awareness of the unique natural and cultural features of BMCA.

6.2.1 Trail Plan Objectives

- Connect the BMCA trails to local and regional trail systems. The Oak Ridges Trail is currently located quite a distance to the north of BMCA however the Optimum Trail Corridor identified by the Oak Ridges Trail Association will bring the trail further south, potentially providing an opportunity for a future connection to the BMCA trail system (see Map 6.2). The Rouge Park spine trail is proposed to continue north in the future, and there may be opportunities for connections to the BMCA trail system.
- Provide trails that can also serve as wildlife access routes and natural linkages.
- Promote limited and passive public uses that have minimal negative environmental impacts.
- Protect the environment by implementing sensitive trail design solutions.
- Design trails that respect aesthetic considerations.
- Reduce social impacts (e.g. privacy, security, etc…) on neighbouring properties.
- Involve local community members as trail stewards to help care for and maintain the trail system.
- Develop a comprehensive and integrated approach to interpreting the area's natural values, ecological processes and cultural heritage.
- Provide opportunities for appropriate public use consistent with the master plan.
- Provide a trail system that will withstand an appropriate amount of use and enjoyment by users.
- Assess, analyze and fulfill user needs while ensuring ease of movement, safety, comfort and protection of the environment.

Map 6.2 – Oak Ridges Trail Association Optimum Trail Corridor



6.2.2 General Management Recommendations

- Provide trail head maps, directional signage (blazes or markers) and a trail guide to ensure user enjoyment and safety.
- Provide an interpretive function along the trails, thereby promoting appreciation and protection of the natural and cultural environment. Topics for interpretation could include:
  - o Natural heritage – restored wetland, interior forest, flora and fauna, creek ecology and so on
  - o Cultural heritage – Lewis site, Mill building, Mill Attendant's house, maple syrup, site history, Bruce family, and so on
- Utilize best erosion management practices.
- Effectively manage public use safety and liability issues.
- Provide lighting at trail heads, where possible. Motion sensors could provide light only when necessary to reduce power consumption and to limit light pollution for fauna. Solar power or other alternative energy sources could be used for lights.
- Close all informal trails, particularly those that go through nature reserve or natural environment zones.
- Ensure that trails avoid areas where species of concern have been identified. Trampling can become an issue in high-use public areas and trail users occasionally stray from defined trails, creating a network of informal paths. In order to protect species and their habitats, new trails should avoid such areas and existing trails in these areas should be closed. Specifically, the existing trail in the wet area west of the main entrance should be closed, as should any surplus trails in the wet areas in the Nature Reserve zone.
- Provide bike parking at all parking lots and trailheads to accommodate visitors who travel by bicycle.
- Provide a multi-use trail for visitors who travel to BMCA by bike. The trail should connect high use areas such as picnic areas, entrance, Chalet, etc. The trail should be restricted to the perimeter of any natural areas and should not enter the nature reserve or natural environment zones.
- Replace or repair boardwalks and bridges on formal trails that traverse wet areas.

In order to ensure that trail users have a safe and enjoyable experience at BMCA, specific considerations should be undertaken to allow access to the lands for patrol and emergency response purposes. As a result of the land's natural character, many areas are inaccessible by conventional response vehicles, such as fire, ambulance and police vehicles. Special considerations are therefore required, including:

- A trail locator system such as a series of distance markers along the trails to locate and orient users.
- Geographic integration of the trail location system into the emergency response system of the fire, police and ambulance departments. A fully integrated map depicting all named trails and location of markers along each trail should be installed at all primary and secondary trail heads.
- An emergency response plan for BMCA with involvement from local and neighbouring emergency service providers.

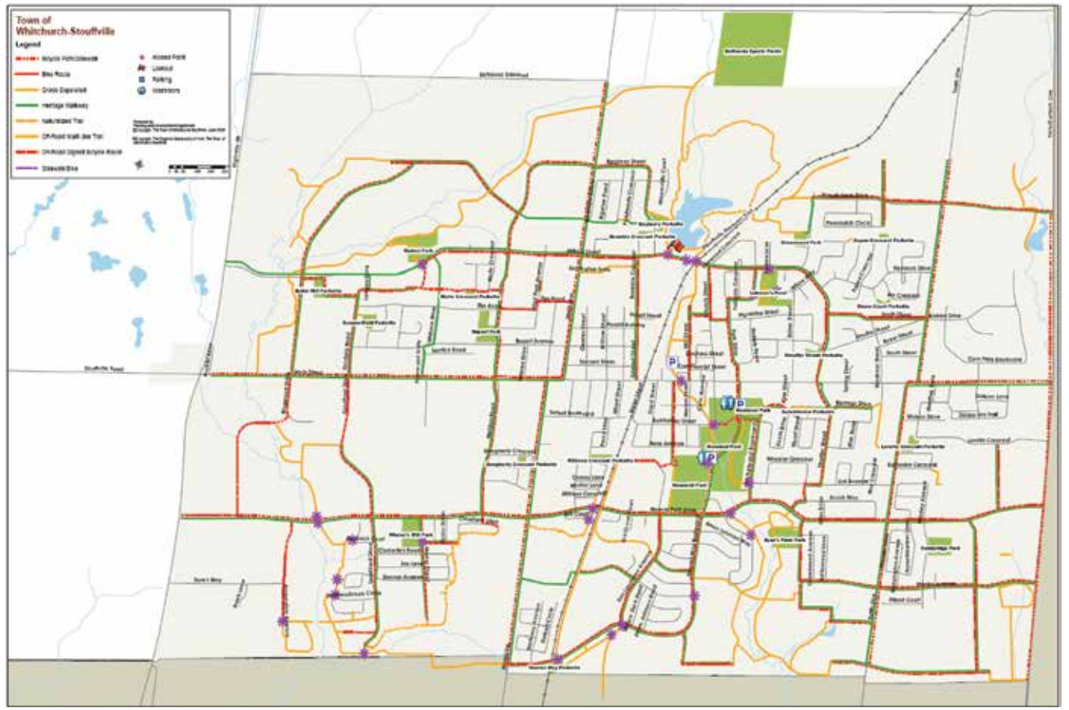
6.3 Existing Regional and Local Trail Systems

6.3.1 Existing Regional Trails

Town of Whitchurch-Stouffville's Trails Plan
The Town of Whitchurch-Stouffville is in the process of implementing an extensive trail network in Stouffville and surrounding communities, including Gormley and Vandorf. Some of these trail projects will have the potential to integrate with the trails at BMCA, such as links to the Rouge Park system to the south and to the Whitchurch-Stouffville Museum and the Oak Ridges Trail to the north (see Map 6.3).

Currently throughout the Town of Whitchurch-Stouffville there are approximately 18-20 km of trails, a total that includes the trails located within BMCA. The other main trails in Whitchurch-Stouffville are the Stouffville Town Trail (6-8 km), the Vandorf Park Trail (2 km) and the trails at Whitchurch Conservation Area (0.5 km).

Map 6.3 – Town of Whitchurch-Stouffville Trail Map (Town of Whitchurch-Stouffville website, 2009)



Inter-regional Trails
Bruce's Mill Conservation Area's location in the headwaters of the Rouge River Watershed underlines the importance of connections to the Rouge Park and the Rouge River Watershed, both ecologically and in terms of recreation.

As part of the planning process for the Rouge River Watershed Plan, a trails concept plan was developed (see Map 6.4). This plan highlights a number of proposed trails, including the expansion northwards of the Rouge Park spine trail, a number of east-west connections and a connection to the Oak Ridges Trail to the north. The most significant trail proposals for the BMCA planning process is the development of trail links from the Rouge Park spine trail up into BMCA, and the creation of a trail from BMCA North West towards Lake St George and the Kettle Lakes Nature Reserve.

6.3.2 Existing Local Trails

Currently, BMCA has an extensive network of well-used recreational trails throughout the park. These trails include those established by TRCA as well as those created by park users. There is a formal trail map at all the major trailheads; however, intensive and prolonged use has created numerous unmarked side trails. Therefore, the network of trails that exists in the park is far more prolific than the trail map indicates. Additionally, any signage that is currently present has become degraded.

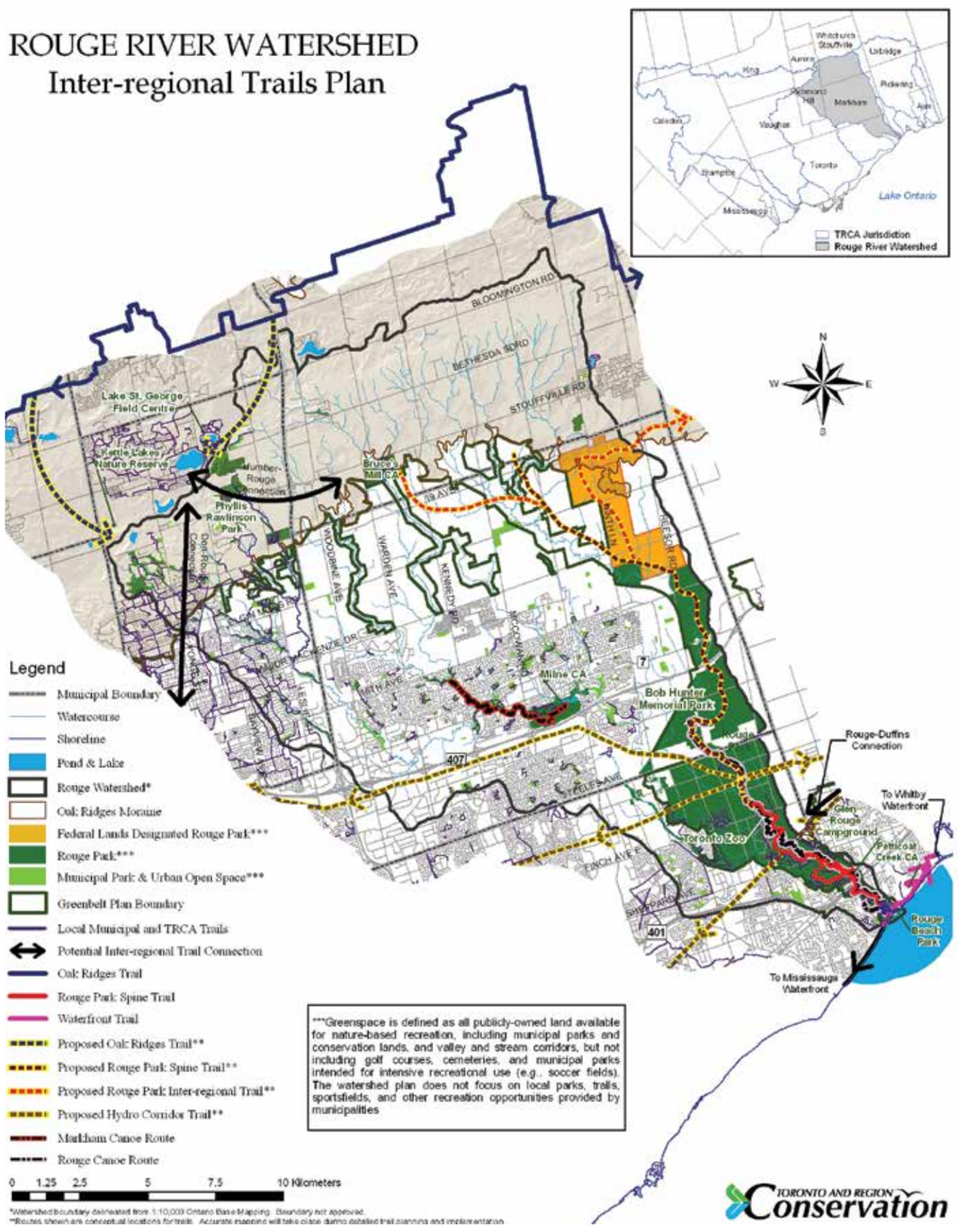
6.4 Proposed Trail Systems

The proposed trail system for BMCA will include a number of trail loops and connecting trails that will allow trail users to experience many different areas of the park. The total length of the trail system is 8.8 km.

Toronto and Region Conservation Authority's Trail Planning and Design Guidelines: A Handbook for an Inter-Regional Trail System in the Greater Toronto Area (1992) provides detailed trail standards and guidelines

6.0 TRAIL PLAN AND RECOMMENDATIONS

Map 6.4 – Rouge River Watershed Inter Regional Trails Plan



for the development of trails on TRCA lands. General design guidelines and standards for each of the trails in the BMCA trail system are contained in Appendix F and should be followed for all trail development and construction projects. Appendix F also contains details on trail management, maintenance and monitoring.
Each of the trails at BMCA is described below. Following the name of the trail, the colour of the trail (used on blazes on the trail as well on trail maps) is listed, followed by the length of the trail. Unless otherwise noted, all trails are designed primarily for walking, hiking, bird-watching and leashed dog-walking. Cycling will be allowed only on signed multi-use routes and cycling lanes along the internal road network of the park.

6.4.1 Bruce's Mill Trail
(Green, 1.8 km)

This short loop trail has the potential to be the feature trail at BMCA. There will be two primary trail heads for this trail – one at the Chalet/Pancake House and one adjacent to the Mill building. Users may also access the trail from a secondary trail head on the eastern edge of the large parking lot in the west fields.

The trail will begin at the Mill building in the flat open area just south of the Mill. The trail will then go up the stone steps and along the eastern edge of the meadow. It continues north through a mixed coniferous-deciduous forest. Users will then be able to continue to the north or west along the Chickadee trail, or can continue along the Bruce's Mill Trail that heads west. The trail emerges from the forest at the top of one of the two tributaries of Bruce's Creek that lead through the restored wetland. Users cross two bridges before re-entering the forest. The trail then leads up a hill into upland, deciduous forest. The trail heads back down the hill and travels for a distance through mixed forest. It emerges again from the forest adjacent to the Beach House, and then travels along the western edge of the wetland. Near its end it travels briefly along the road before re-joining its start at the Mill.

A spur trail should be constructed that extends from the Mill building to parking lot A (see Map 6.1). This spur trail should be multi-use and paved to provide a clear access from the parking area to the Mill building in order to increase accessibility and visitor interest to the site.

There are numerous opportunities and themes for interpretation along this trail. Interpretive signs or guides could talk about the history and uses of the Mill, the transition of the pond from a Mill pond to a swimming area to a wetland, the role and function of wetlands, as well as numerous opportunities for natural heritage interpretation throughout the forest.

6.4.2 Forest Trail - Short
(Red, 1.9 km)

This loop trail extends off of the primary Bruce's Mill Trail and affords users an opportunity for a longer walk through a number of diverse habitats. Users can start this trail from the primary trail head located adjacent to the Pancake House, or can access it from the Bruce's Mill Trail.

From its start at the Pancake House, the trail heads north along the Wagon Trail. There are two opportunities to head west and connect with the dominant loop that makes up this trail. The trail runs north through predominantly deciduous forest, before heading into mixed forest. This area features a number of swamps and wet areas that the user can see and enjoy from a series of boardwalks and bridges. Users can follow this trail south until it reconnects with the Bruce's Mill Trail.

Interpretive opportunities along this trail would focus on natural heritage, and could include topics such as the important of interior forest habitat, the swamp communities, and the variety of flora and fauna species that live in the area.

6.4.3. Forest Trail - Long
(Red, 2.1 km)

This loop trails extends off of the primary Bruce's Mill Trail and allows users to access the northern reaches of BMCA. Users can access this trail from the Bruce's Mill Trail, or via the primary trail head located adjacent to the Pancake House and Sugar Shack buildings.

From its start at the Pancake House, the trail heads north along the Wagon Trail. From the top of the wagon trail, users will head northwest into the pine plantation. The trail continues through the plantation area heading alternatively south and west. Towards the mid-point, the trail comes into close proximity to the excavated Lewis site, offering an excellent opportunity for interpretation. The trail then winds west and then south again through deciduous forest, including crossing over one of the tributaries of Bruce's Creek.

6.4.4 Lookout Trail
(Red, 360 m)

This trail will be constructed as part of the habitat enhancement project that is underway on the northern portion of the agricultural fields in the northwest corner of the property. The trail will connect to the Pine trail in the north, and will connect back to the Bruce's Mill Trail next to the beach house near the wetland.

6.4.5 Wagon Trail
(Yellow-dashed, 410 m)

This short trail is intended primarily for use by the horse-drawn wagon that is a popular feature of the annual Maple Syrup Festival. The trail starts adjacent to the Pancake House and Sugar Shack, and runs north through the forest to a turnaround point.

6.4.6 Sugar Shack Trail
(Yellow-solid, 820 m)

The Sugar Shack Trail allows families to enjoy a short stroll through primarily deciduous forest. During the syrup season, users can see the tubes and taps that make up the maple syrup operation. This trail is used more extensively during the Maple Syrup Festival, when a series of interpretive stations are set up. Interpretive signage along this trail would improve user experience during the remainder of the year.

6.4.7 Butterfly Meadow Trail
(Yellow-solid, 680 m)

The Butterfly Meadow Trail is a series of short loops that run through the donation forest and butterfly meadow. This area features a number of benches that encourage users to sit and enjoy the peaceful atmosphere. This trail is accessible from a primary trail head located on the main driveway just after the gatehouse. This trailhead will be the main off-hours access to the trail system once the existing trailhead near Stouffville Road is removed. There is an existing overlap between the Butterfly Meadow Trail and the Maple Syrup Trail, allowing users to access the larger trail system at BMCA during off-hours.

6.4.8 Multi-Use Trail
(Black-dashed, hiking, bicycling, 2.6 km)

Toronto and Region Conservation encourages active transportation, including walking and cycling. To support users who wish to travel to BMCA by bike, the trail plan includes a multi-use trail that will run predominantly as a bike lane along the edge of the existing roadway.

The route should be signed and marked on road with painted lines. The trail will allow cyclist to travel between the main entrance on Stouffville Road to the secondary entrance on Warden Avenue, while also accessing each of the parking lots and the Community Safety Village. Bike storage structures should be constructed in appropriate areas, including each entrance and at all parking lots. Signage will need to be installed at each trail access point that clearly indicates that cycling is not a permitted use on the trails.

6.4.9 Trail Heads and Access Points

Map 6.1 features the locations of both primary and secondary trail heads, descriptions of which can be found in Appendix F. Primary trail heads will features kiosks with full trail maps. In addition to these primary and secondary trail heads, smaller signs featuring 'you are here' maps will be located strategically throughout the trail system.

Primary trail heads

- Off of the main driveway near the gatehouse
- Next to the Chalet/Pancake House and Sugar Shack
- Off of the main driveway, south of the Mill Building

Secondary trailheads

- At the beach house
- South west corner of parking area A
- East side of parking area B (note – depending on the use developed in the active recreation area in the west fields, this may need to be a primary trail head)

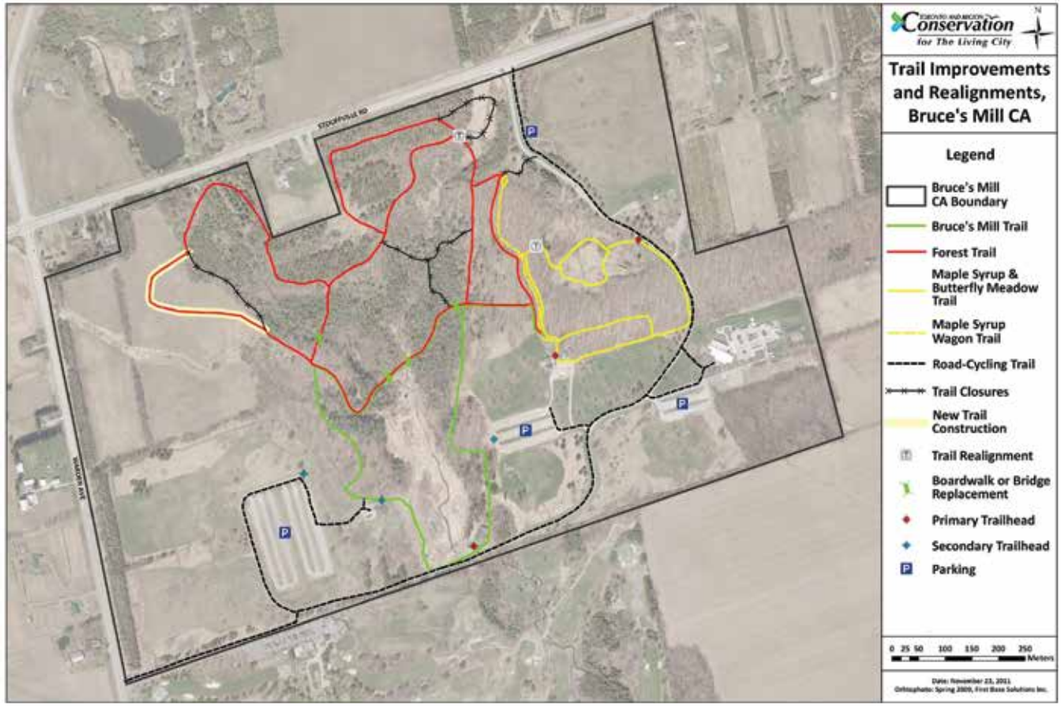
6.5 Planning Recommendations

This trail plan provides an overview of trail locations and associated recommendations. It is recommended that TRCA's Conservation Parks and Conservation Lands staff lead the implementation of the trail plan in collaboration with other departments. Conservation Lands can lend trail planning and design expertise, ecology staff should be consulted regarding appropriate trail alignment and impacts on flora and fauna, and archaeology staff should be consulted on any trail construction that will involve soil removal.

Recommendations

- Generate a trail map of BMCA to be posted at primary trail heads.
- Realign trails as identified on Map 6.5.

Map 6.5 – Trail Improvements and Realignments



- Clearly distinguish and sign the various trails, trail types, trail lengths and level of difficulty in both trail head signage and trail guides.
- Use the gate house, located at the main entrance to BMCA, as the primary trail head location and information centre. Trail maps and guides, along with trail user code, guidelines and regulations, and other visitor information could be located here.
- Create an interpretive trail guide, map and signage for trail heads.
- Ensure that property boundaries and access points of BMCA are clearly marked through signage or fencing or both, as deemed appropriate through further investigation.
- Highlight vistas and ecological features located along trails through signage and interpretive posts. Mark these areas on trail maps and guides and provide interpretive information.
- Replace or repair boardwalks and bridges as outlined on Map 6.3.
- Consistent with efforts to minimize the environmental impact of the trail systems within BMCA, it is recommended that a system of pulverized gravel/ limestone screening paths be used. Boardwalks may be required where trails pass through wet areas
- Use the trail network to connect and interpret cultural heritage resources on the property.

6.5.1 Public Uses

Appropriate public uses are permitted along trails including hiking, leashed dog-walking and nature appreciation. Cycling will be included on multi-use portions of the trails, which are primarily located alongside the roadways.

Recommendations

- Provide a natural terrain surface with boardwalks or spot hardening in wet areas.
- Permit cycling on designated trails only.
- Disallow horseback riding and all motorized recreational vehicle use on trails.
- Provide signage clearly identifying permitted trail uses at all access points and trail heads.

6.5.2 Signage

Trail signs are an important element that enhances the trail experience and provides guidance to the user. Signs provide four major functions:

- Identification
- Direction
- Regulations
- Information/Interpretation

Sign location is critically important. All signs should be placed so that they face the anticipated direction of traffic, are unobstructed by vegetation and are easy to read and understand. The colour and scale must be compatible with the site conditions and the mounting height should fit the specific user.

6.5.2.1 Primary Trail Head

The facilities that should be provided at the three primary trail heads include:

- Parking
- General signage with identification, direction, regulations and information about trail length, time and difficulty
- A fully integrated map depicting all named trails and locations of markers along each trail for emergency response.

6.5.2.2 Secondary Trail Head

Necessary facilities at the three secondary trail heads include general signage information with identification, direction, regulations and information about trail length, time and difficulty.

6.5.2.3 Trail Map and Guide

A trail map and guide should be developed and made available to trail users at trail head locations, public buildings and the TRCA web site. Links to the TRCA site from the Town of Whitchurch-Stouffville, Town of Markham, Town of Richmond Hill and the Regional Municipality of York web sites should be developed. Information should include:

- Location of formal trails, points of interest and rules of conduct for trail use ("take nothing but pictures and leave nothing but footprints").
- Interesting features and facts about the natural and cultural heritage of the area, cross-referenced to numbered sign posts.

6.5.2.4 Interpretive Signs

Interpretive signs should be incorporated into the sign program at a few key locations to highlight natural and cultural heritage facts and features and increase public awareness of conservation.

Recommendations

- Develop a series of interpretive programs along the many theme opportunities presented by BMCA. Programs should highlight the various trails and/or sites around the property. Possible themes include:
  - o Natural heritage – restored wetland, interior forest, flora and fauna, creek ecology, etc…
  - o Water – restored wetland, aquatic facility, etc…
  - o Cultural heritage – Lewis site, Mill building, site history, Bruce family, etc…

6.5.2.5 Trail Markers

Trail markers with distance indicators provide reference information for trail users and emergency response personnel.

Recommendations

- All formal trails should include a trail locator system such as a series of distance markers along the trails to locate and orient trail users.

6.5.3 Trail Linkages

Linkages to other trails and greenspaces should be encouraged wherever possible to provide corridors for animals, birds and humans. Linkages provide a longer hike for the user as well as various experiences and landscapes.

Recommendations

- Encourage trail links to the Stouffville and Richmond Hill municipal trail systems.
- Encourage trail links to regional and inter-regional trails such as the Oak Ridges Trail and the Rouge Park Spine Trail.
- Provide information through signage detailing links to adjacent trail systems.
- Promote such linkages through collaboration with adjacent municipalities, regions and partners.

6.5.4 Implementation Strategy

The trail plan will be implemented in phases in line with those planned for the public use and recreation plan.

The total cost of implementing the trail plan is $194,000. Further detail on each of the items listed below can be found in appendix H. Information on potential partnerships for development and implementation of the trail plan is outlined in chapter seven.

Short-Term Projects ($158,400)
1-5 years

- Construction of new primary trailhead, including parking area, trail kiosk and connecting granular trail to butterfly meadow
- Closure of Stouffville Road trailhead, including removal of bridge
- Improvements to maple syrup trail, including upgrading surface to granular to allow for improved access
- Extension of wagon trail northward, construction of new turnaround area, and surface upgrade to granular
- Installation of secondary trailhead kiosks
- Replace bridges (2) and boardwalks on Bruce's Mill Trail
- Replace/repair bridge (1) and boardwalk on NAME Trail
- Install interpretive signage throughout trail system
- Install directional signage throughout trail system
- Develop trail guide

Medium-Term Projects ($35,600)
5-10 years

- Installation of multi-use trail, including directional and interpretive signage
- Development of multi-use trail

6.5.5 Monitoring and Review

The trail plan provides initial recommendations for development and management. As implementation occurs and uses change, the plan should be monitored and reviewed. Monitoring and a review of the trail system within BMCA should be conducted on a yearly basis to assess the success of implementation objectives, trail use and quality. Monitoring and review of the trail plan should be conducted at a minimum of every three years, or as deemed necessary by managers, staff, the Stewardship Committee and partners.

6.5.6 Summary

Through collaboration and consultation with the BMCA Stewardship Committee and the local community, TRCA should implement the proposed trail plan and undertake detailed trail design and implementation plans, management and maintenance of the trails at BMCA.

These recommendations will guide the development of the trail system, as well as the decommissioning of some existing trails and the development of signage, trail markers, interpretive signs and so forth. This plan provides an initial development and management strategy for BMCA. It is essential that, as the plan is implemented and uses change, the entire plan should be monitored and reviewed.

7 PLAN IMPLEMENTATION

It is anticipated that BMCA will become a model of sustainability, achieved through protecting and enhancing the park's natural environment while providing environmental, public use and outdoor education benefits to the community through revenue generation and community stewardship. It is therefore imperative that management of the property follows sound environmental management principles and collaboration with partner municipalities, interest groups and the local community.

The implementation of the public use and recreation plan and the trail plan will take place in phases dependent on feasibility studies and available budget. Given the lack of budget currently available for BMCA, focus should be in urgent expenses that will reduce further deterioration, as well as those related to visitor safety. The total cost for implementation of both plans is approximately $2,817,400. Appendix G includes a detailed implementation plan, including phasing and costing.

7.1 Master Plan Implementation Schedule

The Bruce's Mill Conservation Area Master Plan will require the cooperation of TRCA, the BMCA Stewardship Committee and other partners. Table 7.1 summarizes the major projects and costs for implementation that are proposed in this plan. Conservation Parks will lead the implementation of the public use facilities. Conservation Lands will lead the implementation of the trail plan and will assist with TRCA's work with the Stewardship Committee.

In addition, there will be annual costs to maintain the implementation of the master plan. Table 7.2 summarizes some of the annual costs associated with the plan.

Table 7.1 Master Plan Implementation Schedule and Costs
Please refer to Appendix H for more detail about development and implementation cost.

ITEM	TRCA LEAD	SUPPORTING GROUPS AND FUNDING PARTNERS	ANTICIPATED COST ($)
Immediate Projects			
Mill restoration – urgent recommendations	Conservation Parks	Conservation Lands; Archaeology; Black Creek Pioneer Village; Town of Whitchurch-Stouffville	37,500
Mill Attendant's house – urgent recommendations	Conservation Parks	Conservation Lands; Archaeology; Black Creek Pioneer Village; Town of Whitchurch-Stouffville	49,500
Initiation of public consultation process for Mill building	Conservation Lands	Conservation Parks; Archaeology; Black Creek Pioneer Village; Town of Whitchurch-Stouffville; Stewardship Committee	20,000
Immediate Projects Sub-total			**107,000**
Short Term Projects (1 – 5 years)			
Stouffville Road park entrance improvements, including trail improvements	Conservation Parks & Conservation Lands	York Region; Town of Whitchurch-Stouffville; Stewardship Committee	74,500
Installation of skills development area and ropes course	Conservation Parks	Town of Whitchurch-Stouffville	40,000
Mill restoration – 1-5 year recommendations	Conservation Parks	Conservation Lands; Archaeology; Black Creek Pioneer Village; Town of Whitchurch-Stouffville	75,000
Design and installation of waterplay facility	Conservation Park	Town of Whitchurch-Stouffville; York Region; York Region Community Safety Village; Stewardship Committee	1,543,500
Implement multi-use recreation area in south half of west fields	Restoration Services & Conservation Parks	Conservation Lands	75,000
Construction of Warden Avenue entrance	Conservation Parks	Town of Whitchurch-Stouffville; York Region	195,500
Trail development	Conservation Lands	Conservation Parks; Town of Whitchurch-Stouffville; Stewardship Committee	158,400
Short-term Projects Sub-total			**2,161,900**
Long Term Projects (5 – 10 years)			
Development of nature-based activity/ recreation area in the northeast field	Conservation Lands & Conservation Parks	Town of Whitchurch-Stouffville; Stewardship Committee	min. 110,000*
Restoration of former trailer storage area (workshop & operations building area)	Conservation Lands	Conservation Parks	32,900
Implementation of adaptive re-use plans for Mill building	Conservation Lands & Conservation Parks	Archaeology; Black Creek Pioneer Village; Town of Whitchurch-Stouffville; Stewardship Committee	min. 38,000*
Implement upgrades and restoration to west parking lot and multi-purpose active recreation area in west fields	Conservation Parks; Restoration Services	Conservation Lands	min. 152,000*
Development of multi-use trail and completion of trail enhancements and interpretive signage installation	Conservation Lands	Conservation Parks; Town of Whitchurch-Stouffville; Stewardship Committee	35,600
Long-term Projects Sub-total			**368,500**
General Improvements	Conservation Parks		**180,000**
Projects Total			**2,817,400**

*costs for these items will be based on development of site plans and proposals

Table 7.2 Annual Master Plan Implementation Costs

ITEM	TRCA LEAD	SUPPORTING GROUPS AND FUNDING PARTNERS	ANTICIPATED COST ($)
Stewardship Committee & Newsletter	Conservation Lands		25,000
Trail Maintenance	Parks & Conservation Lands		25,000
Restoration Maintenance	Restoration Services		25,000
TOTAL			75,000

7.0 PLAN IMPLEMENTATION

7.2 Partnership Opportunities

Partnerships are identified as a key component in the vision for BMCA (see section 2.1). The existing partners at BMCA have been instrumental in achieving the successes of the park thus far. Partners thus far have included, amongst others, the York Region Community Safety Village, the York Region Children's Water Festival, the YMCA, the Town of Whitchurch-Stouffville, Rouge Park, the Regional Municipality of York, the Whitchurch-Stouffville Soccer Association, The Whitchurch-Stouffville Museum, and the Rotary Club of Stouffville.

Toronto and Region Conservation will continue to look to partnerships for assistance in achieving its objectives for BMCA. Past partners who are stakeholders in the park and who have a mutual interest as recreation providers include the Regional Municipality of York and the Town of Whitchurch-Stouffville. A continued collaborative relationship and cost-sharing among the partners over the long term will be important in realizing the recommendations of the Public Use and Recreation Plan to the mutual benefit of all parties. With new and improved public use facilities and programs, additional partners will be possible.

The Town of Whitchurch-Stouffville has a potential interest in several key projects in the conservation area. Given their focus on developing trails and recreation opportunities, the Town may wish to partner on the development of trails, trailhead infrastructure and trail guides. Building on past partnerships between TRCA and the Whitchurch-Stouffville Museum, the Town would be an appropriate partner on the development of cultural heritage interpretation opportunities at the Mill building. Additionally, any projects that provide opportunities for nature appreciation and recreation to the residents of Whitchurch-Stouffville would be of interest to the Town, including the skills development area, the splash pad, and the development of the nature-based and active recreation areas.

The Regional Municipality of York partners with TRCA on the provision of regional recreational facilities. York Region has an interest in several key projects at BMCA, including the Community Safety Village and the Children's Water Festival. These important aspects of BMCA would be enhanced by additional trails and interpretive opportunities, such as self-guided walk brochures and educational signage.

York Region has also underlined the importance of developing BMCA's potential as a regional tourism destination, and as such may have an interest in assisting with the construction of a new skills development area that would further support groups and corporate teams in their use of the park. Additionally, the Region would benefit from the development of the multi-purpose and nature based recreation areas on the property that could draw visitors from throughout and beyond the Region.

York Region has recently begun examining its role in coordinating a natural heritage trails system throughout the region and would therefore benefit from supporting trail linkages between BMCA and regional and inter-regional trail such as the Oak Ridges Trail and the Rouge Park Spine Trail.

Neighbouring municipalities, including the Town of Markham and the Town of Richmond Hill, will benefit from projects that satisfy the public use and recreation demands of their residents. Such initiatives could include trail development, the skills development area, the splash pad and any nature-based or active recreation areas.

Toronto and Region Conservation Area is interested in promoting use of its conservation parks as part of a component of healthy living. As part of this wellness program, there is potential to partner with public health departments and other health promotion industries.

There is also potential for TRCA to partner with local community service groups to implement the master plan. The Rotary Club of Stouffville has recently partnered on the construction of a new covered picnic pavilion. Partners such as the Rotary Club and the YMCA are vital to the success of BMCA.

Toronto and Region Conservation Area will look to local businesses and fundraising as a source of funds to support the implementation of the master plan. In addition, local businesses can sponsor programs and events at BMCA.

Additionally, it is TRCA's intent to establish a BMCA stewardship committee to assist in the long-term management of the conservation area. There is potential for the continued involvement of such volunteers in activities such as planting, park clean-up, trail maintenance and monitoring. Many of these activities are already undertaken as voluntary measures by local residents and the dedicated volunteers who have served on the Master Plan Advisory Committee. The Stewardship Committee will also be a key group in raising awareness and funds for BMCA.

7.3 Stewardship Committee

This plan contains a variety of detailed management recommendations that were established with the assistance and support of the Master Plan Advisory Committee. All of the recommendations are important management actions that will protect and improve BMCA. An integral part of BMCA management is the establishment of a working stewardship committee to oversee and participate in the management and implementation of the necessary and numerous plan objectives. The committee would assist with specific aspects such as trails, education and communications. It would also assist TRCA to implement site development, maintenance, environmental protection, and restoration activities. Finally, the committee would assist in the monitoring of environmental and public use indicators and of plan implementation.

The master plan recommendations provide a basic framework from which the Stewardship Committee can begin to operate. While the key recommendations are outlined here, it is anticipated that the committee will undertake a complete assessment of the master plan on a regular and ongoing basis and will establish a thorough priority list. The key directions for the Stewardship Committee include:

- Review the master plan and establish priority actions for implementation.
- Implement a detailed trail plan and develop a trail guide for users.
- Develop and maintain a BMCA newsletter and communications plan to raise awareness and inform surrounding communities about the area.
- Negotiate with private landowners in and around BMCA regarding stewardship practices, conservation easements, land donations and sales.
- Establish a list of volunteers willing to aid in a volunteer program.
- Prepare and install natural and cultural heritage interpretive signs.
- Assist TRCA in implementing the various stewardship programs including the Rural Clean Water Program.
- Develop educational resources and tools for private landowners and visitors.
- Monitor the trails for invasive plant species and prevent their spread through barriers and other eradication techniques.
- Monitor the presence of noxious weeds and remove as necessary.
- Organize celebration events to increase public awareness.
- Assist TRCA in implementing the Terrestrial Natural Heritage Monitoring Program.
- Secure financial and in-kind resources to undertake the work.

7.4 Agency and Municipal Stewardship

The natural, cultural and recreational resources that exist in BMCA provide benefits beyond the TRCA property boundaries; these resources extend into the surrounding landscape. Therefore, integration with the community was considered throughout the planning process. To support TRCA policies, municipalities and government agencies should be encouraged to have regard for the following recommendations when considering new community design:

- Protect, restore and enhance as many natural open spaces as possible to maintain terrestrial natural habitat connectivity and interior habitats.
- Create publicly accessible trail systems that will connect communities to the Town of Whitchurch-Stouffville, the Town of Markham and the Town of Richmond Hill trail systems as well as other trails in the Rouge River watershed.
- Promote private land stewardship that increases awareness about the best management practices and creates opportunities to engage landowners in protecting and enhancing BMCA and its valuable resources.

7.5 Private Land Stewardship

Bruce's Mill Conservation Area will provide opportunities for outdoor recreation, conservation education and nature appreciation to the surrounding communities. It will also provide many health and economic benefits to the community. Adjacent landowners and users of the TRCA property can help to ensure that the surrounding landscape does not negatively impact the environmental quality of this unique natural area. One of the key recommendations of this master plan is the creation of a stewardship committee. As outlined in section 4.4, the committee will be made up of representatives of local government, residents, community groups, business owners and other stakeholders. The role of the committee will be to assist in implementation where appropriate, such as in trail development, clean-up activities and restoration or naturalization projects. The committee can also help to encourage area residents to undertake the following actions in an effort to fulfill the goals and objectives of this master plan:

- Restore and enhance watercourses by naturalizing edges.
- Improve watershed by removing on-line ponds.
- Plant native species on adjacent lands instead of using exotic horticultural species, some of which can be invasive, such as Norway maple and purple loosestrife.
- Leash pets on site to minimize disturbance to wildlife and pick up waste to prevent feces from entering watercourses after rainfall.
- Protect and restore private lands identified for natural area regeneration through the application of TRCA's Terrestrial Natural Heritage approach.
- Participate in a private land stewardship program that assists landowners with agricultural best management practices and preservation of woodlots and other wildlife habitat on their property.
- Participate in TRCA's Rural Clean Water Program.
- Assist with the implementation recommendations of the Walkerton Inquiry's Part 2 Report regarding source protection, particularly for private wells.

All priorities should be reviewed and re-evaluated in terms of their feasibility as needed.

7.6 Public Use

Completion and implementation of the public use and recreation plan and the trail plan, which were developed for this master plan, is critical to ensure the protection of the environment, appropriate public use and user safety. Both plans were developed through extensive consultation with all user groups and the proposed plans are fully supported. If realized, these plans will help TRCA to increase user enjoyment and protect the environment.

7.7 Safety and Security

Discussions will be held with police and other emergency service providers to identify their concerns and questions regarding accessing the lands for patrol and emergency response purposes. As a result of the land's natural character, many areas are inaccessible by conventional response vehicles, such as fire, ambulance and police vehicles. Special considerations are therefore required, including:

- A trail locator system such as a series of distance markers along the trails to locate and orient users.
- Geographic integration of the trail location system into the emergency response system of the fire, police and ambulance departments. A fully integrated map depicting all named trails and location of markers along each trail should be installed at all primary and secondary trail heads.
- An emergency response plan for BMCA with involvement from local and neighbouring emergency service providers.

7.8 Endorsement and Maintenance of the Master Plan

As a partnership between York Region, the Town of Whitchurch-Stouffville, the Master Plan Advisory Committee, Rouge Park and the community, this master plan required endorsement from a variety of groups. The public, local community and BMCA users were informed and consulted throughout the process through newsletters, questionnaires, open houses and public meetings held for each phase of the master plan process. Their concerns, comments and suggestions were heard and integrated into the plan.

The Advisory Committee brought the many interests, issues and insights from the broader community to the forefront of the planning process, and their comments and suggestions were also integrated into this plan.

Toronto and Region Conservation Authority and the newly formed Stewardship Committee will continue to work together towards implementing, maintaining and adapting the plan.

7.9 Plan Review and Amendment

With the support of the BMCA Stewardship Committee, the master plan will undergo a review every seven to ten years. If major revisions are necessary to reflect changing environmental, social or economic conditions, they will only be made after consultation with the affected groups and individuals. Revisions of the plan will be consistent with the original stated vision, goals and objectives to protect the natural recreational and educational values of the property.

The master plan identifies public use zones, with uses detailed in the public use and recreation plan. Any additional uses proposed for these zones will be screened and assessed according to the Strategy for Public Use of Conservation Authority Lands (1995) as well as the criteria outlined in section 4.3.1. The BMCA Stewardship Committee will provide input on all such proposals. The screening process for specific public uses will ensure that all proposed uses, facilities and landscape changes are thoroughly examined and designed to minimize disruption and to protect, enhance or restore the natural values of this area.

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For a complete bibliography, please refer to the Bruce's Mill Conservation Area Master Plan Background Report.

Acknowledgements

Appreciation and thanks are extended to all of the members of the Bruce's Mill Conservation Area Advisory Committee, which included the following individuals:

Dorie Billich, Town of Whitchurch-Stouffville
Steve Elliott, Meadowbrook Golf & Country Club
Kim Empringham, Local Resident and Leaseholder
Helene Johnson, Whitchurch-Stouffville Chamber of Commerce
Kerri Lewis, YMCA
Ken Prentice, Rotary Club of Stouffville
Arnis Pukitis, Whitchurch Highlands Public School
Karen Richards, York Region Community Safety Village
John Saringer, Oak Ridges Trail Association
Clyde Smith, Whitchurch-Stouffville Councillor
Lewis Yaeger, Rouge Park
Alan Wells, Rouge Park Alliance
Klaas Westera, Whitchurch-Stouffville

Past members

Don Chubbuck, Whitchurch-Stouffville Environmental Advisory Committee
Mark Cullen, Cullen Gardens
Elio Di Lorio, Richmond Hill Councillor and Rouge Park Alliance
Jim Fagan, Leaseholder
Bill O'Donnell, Markham Councillor
Diane Pomeroy, York Region

Additional Advisory Committee Members/Alternates

Ian Buchanan, York Region
Tom Graham, Town of Whitchurch-Stouffville
Brenda McGowan, York Region
Andrew McNeely, Town of Whitchurch-Stouffville
Tracy Smith, Ministry of Natural Resources

The TRCA's Bruce's Mill Conservation Area Steering Committee included TRCA staff who provided technical information and advice to the Advisory Committee. This group also provided technical information for the development of the Bruce's Mill Conservation Area Master Plan Background Report. Members of the working group included:

Mike Bender, Conservation Lands
David Boccia, Parks and Culture
Marty Brent, Black Creek Pioneer Village
Lori Colussi, Property and Asset Management
Ron Dewell, Property and Asset Management
Derek Edwards, Parks and Culture
Mike Giona, Parks and Culture
Mike Goodyear, Conservation Lands
Darryl Gray, Education
Tom Hildebrand, Restoration Services
Steven Joudrey, Conservation Lands
Margie Kenedy, Archaeological Resources Management
Rod Krick, Ecology
Doug Miller, Parks and Culture
Patricia Moleirinho, Geographic Information Systems
Tim Rance, Ecology
Susan Robertson, Planning and Development Services
Brad Stephens, Ecology
John Stille, Restoration Services
April Weppler, Conservation Lands
Melanie Williams, Stewardship and Outreach Education
Nick Pankiw, Conservation Lands

The Bruce's Mill Condition Report was prepared by the consulting firm Goldsmith Borgal and Company Ltd. Architects.

In addition to the Advisory Committee members, special thanks and acknowledgement should be given to the following individuals, whose assistance and input were vital in the development of this master plan:

Jim Dillane, Finance and Business Services, TRCA
Ronald Domerchie, Marketing and Communications, TRCA
Adele Freeman, Watershed Management, TRCA
Dena Lewis, Ecology, TRCA
Maryam Nassar, formerly Rouge Park
Carolyn Woodland, Planning and Development Services, TRCA
Gord Weeden, formerly Rouge Park Alliance

Appendix A: List of Fauna Species Found in Bruce's Mill Study Area

TRCA RANK (L1-L5)	COMMON_NAME	LO	PT(N)	PT(L)	HD	AS	MR	STD	AP	TS
L3	beaver	2	2	1	1	2	3	4	0	15
L3	black and white warbler	2	1	2	2	5	2	4	1	19
L3	common snapping turtle	1	3	2	2	1	2	4	0	15
L3	golden-crowned kinglet	3	2	2	2	3	2	3	0	17
L3	northern waterthrush	1	1	2	2	3	2	5	1	17
L3	ovenbird	0	2	3	3	4	2	4	0	18
L3	pileated woodpecker	1	2	2	3	4	2	3	0	17
L3	sora	3	2	2	2	2	3	4	0	18
L3	Virginia rail	1	2	2	2	2	3	4	0	16
L3	wood duck	2	1	1	3	3	1	4	0	15
L4	belted kingfisher	0	3	2	2	2	2	2	0	13
L4	common yellowthroat	0	2	2	2	1	2	4	0	13
L4	eastern cottontail	1	2	2	0	2	2	4	0	13
L4	eastern phoebe	1	2	2	2	1	2	1	0	11
L4	eastern screech-owl	1	2	2	3	1	2	3	0	14
L4	eastern wood-pewee	0	4	2	1	2	2	3	0	14
L4	great-crested flycatcher	0	2	3	1	3	2	2	0	13
L4	green frog	0	2	2	1	1	2	4	0	12
L4	grey catbird	0	3	1	1	1	2	3	0	11
L4	hairy woodpecker	0	2	1	2	3	2	3	0	13
L4	indigo bunting	0	2	2	2	1	1	4	0	12
L4	northern flicker	0	3	2	1	1	2	2	0	11
L4	red squirrel	2	2	2	0	1	2	2	0	11
L4	red-breasted nuthatch	1	1	1	3	3	2	2	0	13
L4	red-eyed vireo	0	2	2	1	2	2	3	0	12
L4	rose-breasted grosbeak	0	2	2	2	3	2	3	0	14
L4	savannah sparrow	0	3	1	2	1	1	3	0	11
L4	spotted sandpiper	1	2	3	2	1	1	4	0	14
L4	swamp sparrow	0	1	2	2	1	2	5	1	14
L4	tree swallow	0	2	2	2	1	1	3	0	11
L4	white-breasted nuthatch	1	2	1	3	3	2	2	0	14
L5	American Crow	0	2	1	0	1	1	1	0	6
L5	American goldfinch	0	2	2	0	1	1	1	0	7
L5	American robin	0	1	2	0	1	1	2	0	7
L5	Baltimore oriole	0	2	2	0	1	1	2	0	8
L5	barn swallow	0	2	2	2	1	1	0	0	8
L5	black-capped chickadee	0	1	1	1	1	2	0	0	6
L5	blue jay	0	4	2	0	1	1	0	0	8
L5	brown-headed cowbird	0	2	2	0	1	1	1	0	7
L5	Canada goose	0	1	0	1	1	1	0	0	4
L5	cedar waxwing	0	1	2	0	1	1	2	0	7
L5	chipping sparrow	0	2	2	0	1	1	2	0	8
L5	common grackle	0	3	2	0	1	1	2	0	9
L5	downy woodpecker	0	2	1	1	1	2	2	0	9
L5	eastern kingbird	0	2	2	1	2	1	1	0	9
L5	grey squirrel	0	2	2	0	1	2	0	0	7
L5	mallard	0	1	2	1	1	1	3	0	9
L5	northern cardinal	0	2	1	0	1	2	2	0	8
L5	red-tailed hawk	0	2	2	1	2	1	1	0	9
L5	red-winged blackbird	0	2	2	0	1	1	3	0	9
L5	song sparrow	0	2	2	0	1	2	2	0	9
L5	warbling vireo	0	1	2	0	1	2	2	0	8
L5	yellow warbler	0	1	1	1	1	2	3	0	9

LEGEND FOR TABLE

LO	Local Occurrence
PT(N)	Population Trend (National)
PT(T)	Population Trend (TRCA Region)
HD	Habitat Dependence
AS	Area Sensitivity
MR	Mobility Restriction
StD	Sensitivity to Development
AP	Additional Points
TS	Total Score

APPENDICES

Appendix B: Fauna Species List

TRCA RANK L1-L5	SCIENTIFIC NAME	COMMON NAME	LO 1-5	PT 1-5	HD 0-5	STD 0-5	TS 2-20	RANK TRCA L1-L5
L3	Clintonia borealis	yellow clintonia or bluebead lily	2	5	4	5	16	L3
L3	Anemone acutiloba (Hepatica acutiloba)	sharp-lobed hepatica	2	4	4	5	15	L3
L3	Abies balsamea	balsam fir	3	3	3	5	14	L3
L3	Alnus incana ssp. rugosa (A. rugosa)	speckled or tag alder	2	4	4	5	15	L3
L3	Larix laricina	tamarack	2	4	4	4	14	L3
L3	Streptopus roseus	rose twisted-stalk	2	4	4	5	15	L3
L3	Coptis trifolia (C. groenlandica)	goldthread	3	5	3	5	16	L3
L3	Claytonia caroliniana	broad-leaved spring beauty	4	4	3	5	16	L3
L3	Hydrocotyle americana	marsh pennywort	3	4	4	4	15	L3
L3	Pilea fontana	spring clearweed	4	4	3	3	14	L3
L3	Taxus canadensis	Canada yew or ground hemlock	2	4	4	5	15	L3
L3	Spiraea alba	meadowsweet or wild spiraea	3	4	4	3	14	L3
L3	Pyrola elliptica	shinleaf	2	4	4	4	14	L3
L3	Ribes triste	swamp red currant	4	4	2	4	14	L3
L3	Bromus ciliatus (B. canadensis)	fringed brome grass	3	4	4	5	16	L3
L3	Equisetum scirpoides	dwarf scouring rush	3	4	4	5	16	L3
L3	Carex plantaginea	plantain-leaved sedge	2	4	4	4	14	L3
L3	Mitella nuda	naked mitrewort	3	4	4	5	16	L3
L3	Uvularia grandiflora	large-flowered bellwort	2	4	4	5	15	L3
L3	Gymnocarpium dryopteris	oak fern	2	3	4	5	14	L3
L3	Cicuta bulbifera	bulblet-bearing water-hemlock	3	3	4	4	14	L3
L3	Dryopteris cristata	crested wood fern	3	4	4	4	15	L3
L3	Dicentra canadensis	squirrel-corn	3	4	5	4	16	L3
L3	Caulophyllum giganteum (C. thalictroides var. giganteum)	long-styled blue cohosh	5	2	4	3	14	L3
L3	Polystichum acrostichoides	Christmas fern	2	3	5	5	15	L3
L4	Populus grandidentata	large-toothed aspen	2	3	4	3	12	L4
L4	Salix amygdaloides	peach-leaved willow	2	2	5	3	12	L4
L4	Maianthemum canadense	Canada mayflower	2	4	0	5	11	L4
L4	Trillium grandiflorum	white trillium	1	4	3	5	13	L4
L4	Trillium erectum	red trillium or stinking Johnny	2	4	2	5	13	L4
L4	Polygonatum pubescens	downy Solomon's seal	2	4	2	5	13	L4
L4	Allium tricoccum	wild leek or ramps	2	3	4	4	13	L4
L4	Fraxinus nigra	black ash	2	4	2	3	11	L4
L4	Juglans cinerea	butternut	2	4	4	3	13	L4
L4	Boehmeria cylindrica	false nettle	2	4	2	3	11	L4
L4	Betula allegheniensis (B. lutea)	yellow or curly birch	1	4	3	5	13	L4
L4	Acer rubrum	red maple	2	4	1	5	12	L4
L4	Tiarella cordifolia	foam-flower	2	3	1	5	11	L4
L4	Mitella diphylla	mitrewort	2	3	1	5	11	L4
L4	Cardamine diphylla (Dentaria diphylla)	broad- or two-leaved toothwort	2	3	4	4	13	L4
L4	Rubus pubescens	dwarf raspberry	2	3	1	5	11	L4
L4	Caltha palustris	marsh marigold	2	4	2	3	11	L4
L4	Actaea pachypoda	white baneberry	2	3	4	3	12	L4
L4	Acer spicatum	mountain maple	2	3	2	4	11	L4
L4	Betula papyrifera	paper or white birch	1	4	2	4	11	L4
L4	Asarum canadense	wild ginger	2	3	4	3	12	L4
L4	Carex stricta	tussock sedge	2	3	4	3	12	L4
L4	Circaea alpina	smaller enchanter's nightshade	2	4	4	2	12	L4
L4	Quercus macrocarpa	bur oak	1	3	4	3	11	L4
L4	Fagus grandifolia	American beech	1	4	3	4	12	L4

APPENDICES

TRCA RANK L1-L5	SCIENTIFIC NAME	COMMON NAME	LO 1-5	PT 1-5	HD 0-5	STD 0-5	TS 2-20	RANK TRCA L1-L5
L4	Carpinus caroliniana ssp. virginiana	blue beech or American hornbeam	2	3	4	2	11	L4
L4	Scirpus microcarpus (S. rubrotinctus)	barber-pole sedge or bulrush	2	2	5	3	12	L4
L4	Ranunculus hispidus var. caricetorum (R. septentrionalis)	swamp buttercup	2	4	3	2	11	L4
L4	Typha latifolia	broad-leaved cattail	1	4	4	3	12	L4
L4	Dryopteris intermedia (D. spinulosa var. intermedia)	evergreen wood fern	2	4	4	3	13	L4
L4	Thelypteris palustris var. pubescens	marsh fern	2	4	3	4	13	L4
L4	Pinus strobus	white pine	1	4	3	4	12	L4
L4	Calamagrostis canadensis	Canada blue joint	2	2	4	3	11	L4
L4	Dryopteris marginalis	marginal wood fern	1	3	3	4	11	L4
L4	Lycopus americanus	American or cut-leaved water-horehound	2	4	2	3	11	L4
L4	Tsuga canadensis	eastern hemlock	1	4	3	5	13	L4
L4	Mimulus ringens	square-stemmed monkey-flower	2	2	4	4	12	L4
L4	Sagittaria latifolia	common arrowhead	2	2	5	4	13	L4
L4	Asclepias incarnata ssp. incarnata	swamp milkweed	2	3	3	3	11	L4
L4	Cystopteris bulbifera	bulblet fern	1	4	3	5	13	L4
L4	Carex lacustris	lake-bank sedge	3	3	2	4	12	L4
L4	Carex scabrata	rough sedge	2	2	4	3	11	L4
L4	Thuja occidentalis	white cedar	1	4	2	4	11	L4
L4	Pteridium aquilinum var. latiusculum	eastern bracken	2	4	2	4	12	L4
L5	Rhus typhina	staghorn sumach	1	1	2	2	6	L5
L5	Eupatorium maculatum ssp. maculatum	spotted Joe-Pye weed	1	2	1	2	6	L5
L5	Parthenocissus inserta (P. vitacea)	thicket creeper	2	2	4	2	10	L5
L5	Acer saccharum ssp. saccharum	sugar maple	1	3	3	2	9	L5
L5	Bidens cernuus	nodding bur-marigold	2	2	0	2	6	L5

TRCA RANK L1-L5	SCIENTIFIC NAME	COMMON NAME	LO 1-5	PT 1-5	HD 0-5	STD 0-5	TS 2-20	RANK TRCA L1-L5
L5	Impatiens capensis (I. biflora)	orange touch-me-not (spotted jewelweed)	1	2	0	2	5	L5
L5	Amphicarpaea bracteata	hog-peanut	2	2	3	2	9	L5
L5	Eupatorium perfoliatum	boneset	1	3	0	3	7	L5
L5	Eupatorium rugosum	white snakeroot	2	2	2	1	7	L5
L5	Prunus serotina	black cherry	1	2	2	2	7	L5
L5	Crataegus macracantha (C. succulenta var. macracantha)	long-spined hawthorn	2	2	3	2	9	L5
L5	Solidago flexicaulis	zig-zag goldenrod	1	1	2	1	5	L5
L5	Fragaria virginiana (incl. ssps. glauca & virginiana)	wild or common strawberry	1	2	0	2	5	L5
L5	Solidago canadensis var. canadensis	Canada goldenrod	1	2	0	1	4	L5
L5	Prunus virginiana ssp. virginiana	choke cherry	1	2	0	2	5	L5
L5	Rhus rydbergii (R. radicans ssp. rydbergii)	poison ivy (shrub form)	1	2	0	2	5	L5
L5	Rubus idaeus ssp. melanolasius (R. strigosus)	wild red raspberry	1	1	0	1	3	L5
L5	Solidago altissima	tall goldenrod	1	2	0	1	4	L5
L5	Euthamia graminifolia (Solidago graminifolia)	grass- or narrow-leaved goldenrod	1	1	2	1	5	L5
L5	Vitis riparia	riverbank grape	1	1	0	1	3	L5
L5	Apocynum cannibinum (inc. var. hypericifolium)	Indian-hemp dogbane	2	2	2	2	8	L5
L5	Aster lanceolatus ssp. lanceolatus	panicled or tall white aster	1	2	0	1	4	L5
L5	Aster puniceus var. puniceus	swamp or purple-stemmed aster	2	2	1	2	7	L5
L5	Tilia americana	basswood	1	4	2	3	10	L5
L5	Lysimachia ciliata	fringed loosestrife	1	2	0	2	5	L5
L5	Mentha arvensis ssp. borealis	wild mint	1	2	3	1	7	L5
L5	Lycopus uniflorus	northern water-horehound or bugleweed	2	3	1	3	9	L5
L5	Verbena urticifolia	white vervain	2	2	1	2	7	L5
L5	Verbena hastata	blue vervain	2	2	4	2	10	L5

TRCA RANK L1-L5	SCIENTIFIC NAME	COMMON NAME	LO 1-5	PT 1-5	HD 0-5	STD 0-5	TS 2-20	RANK TRCA L1-L5
L5	Fraxinus americana	white ash	1	2	0	2	5	L5
L5	Hackelia virginiana	Virginia stickseed	4	2	2	2	10	L5
L5	Cornus stolonifera	red osier dogwood	1	2	0	4	7	L5
L5	Hydrophyllum virginianum	Virginia waterleaf	1	2	2	1	6	L5
L5	Asclepias syriaca	common milkweed	1	2	3	1	7	L5
L5	Fraxinus pennsylvanica var. subintegerrima	green ash	2	2	2	2	8	L5
L5	Apocynum androsaemifolium	spreading dogbane	2	3	2	3	10	L5
L5	Scutellaria galericulata (S. epilobiifolia)	common skullcap	2	2	2	3	9	L5
L5	Cornus alternifolia	alternate-leaved dogwood	2	2	3	2	9	L5
L5	Viola pubescens (inc. vars. pubescens & scabriuscula)	stemmed yellow violet	2	3	1	2	8	L5
L5	Sambucus racemosa ssp. pubens (S. pubens)	red-berried elder	1	3	4	2	10	L5
L5	Aster novae-angliae (Virgulus novae-angliae)	New England aster	1	2	2	2	7	L5
L5	Circaea lutetiana ssp. canadensis (C. quadrisulcata)	enchanter's nightshade	1	1	2	1	5	L5
L5	Ambrosia artemisiifolia	common ragweed	1	1	4	1	7	L5
L5	Echinocystis lobata	wild cucumber	2	2	1	2	7	L5
L5	Oenothera biennis	common or hairy evening-primrose	2	1	3	1	7	L5
L5	Sambucus canadensis	common elderberry	2	3	1	2	8	L5
L5	Scutellaria lateriflora	mad-dog skullcap	2	2	1	3	8	L5
L5	Aralia nudicaulis	wild sarsaparilla	2	3	1	3	9	L5
L5	Diervilla lonicera	bush honeysuckle	2	3	1	4	10	L5
L5	Phryma leptostachya	lopseed	2	2	3	2	9	L5
L5	Sium suave	water-parsnip	2	2	3	3	10	L5
L5	Agrimonia gryposepala	agrimony	2	2	0	2	6	L5
L5	Equisetum arvense	field or common horsetail	1	2	0	1	4	L5
L5	Ribes cynosbati	prickly gooseberry	2	3	2	2	9	L5
L5	Erythronium americanum ssp. americanum	yellow trout-lily	1	3	2	2	8	L5

TRCA RANK L1-L5	SCIENTIFIC NAME	COMMON NAME	LO 1-5	PT 1-5	HD 0-5	STD 0-5	TS 2-20	RANK TRCA L1-L5
L5	Carex vulpinoidea	fox sedge	1	2	5	1	9	L5
L5	Arisaema triphyllum	Jack-in-the-pulpit	1	3	3	2	9	L5
L5	Lemna minor	common or lesser duckweed	2	2	4	2	10	L5
L5	Populus balsamifera ssp. balsamifera	balsam poplar	1	2	2	2	7	L5
L5	Maianthemum racemosum ssp. racemosum (Smilacina racemosa)	false Solomon's seal	2	3	2	3	10	L5
L5	Ribes americanum	wild black currant	2	3	0	2	7	L5
L5	Populus deltoides (inc. ssp. monilifera)	cottonwood	2	1	4	1	8	L5
L5	Populus tremuloides	trembling aspen	1	3	1	3	8	L5
L5	Salix eriocephala (S. rigida; S. cordata misapplied)	narrow heart-leaved or Missouri willow	1	1	3	1	6	L5
L5	Carex stipata	awl-fruited sedge	2	3	0	2	7	L5
L5	Carex cristatella	crested sedge	2	2	1	2	7	L5
L5	Carex pedunculata	early-flowering sedge	2	3	2	3	10	L5
L5	Quercus rubra	red oak	1	3	1	3	8	L5
L5	Onoclea sensibilis	sensitive fern	2	3	1	3	9	L5
L5	Athyrium filix-femina var. angustum	northeastern lady fern	1	3	2	3	9	L5
L5	Dryopteris carthusiana (D. spinulosa)	spinulose wood fern	1	3	1	2	7	L5
L5	Matteuccia struthiopteris var. pensylvanica	ostrich fern	1	2	3	3	9	L5
L5	Glyceria striata (incl. vars. striata & stricta)	fowl manna grass	2	2	1	2	7	L5
L5	Alisma plantago-aquatica (A. triviale)	water-plantain	2	2	4	2	10	L5
L5	Poa palustris	fowl meadow-grass	2	2	3	2	9	L5
L5	Leersia oryzoides	rice cut grass	2	2	4	2	10	L5
L5	Muhlenbergia mexicana var. filiformis	slender muhly grass	2	2	3	2	9	L5
L5	Muhlenbergia mexicana var. mexicana	common muhly grass	2	2	1	1	6	L5
L5	Ostrya virginiana	ironwood	1	3	3	2	9	L5

TRCA RANK L1-L5	SCIENTIFIC NAME	COMMON NAME	LO 1-5	PT 1-5	HD 0-5	STD 0-5	TS 2-20	RANK TRCA L1-L5
L5	Carex pseudo-cyperus	pseudocyperus sedge	1	3	2	4	10	L5
L5	Ranunculus abortivus	small-flowered or kidneyleaf buttercup	1	3	3	2	9	L5
L5	Equisetum hyemale ssp. affine	scouring rush	2	2	1	2	7	L5
L5	Ulmus americana	white elm	1	4	0	2	7	L5
L5	Podophyllum peltatum	May-apple	2	3	3	2	10	L5
L5	Clematis virginiana	virgin's bower	2	2	4	2	10	L5
L5	Actaea rubra	red baneberry	2	3	2	3	10	L5
L5	Urtica dioica ssp. gracilis (U. procera)	American stinging nettle	2	3	2	2	9	L5
L5	Laportea canadensis	wood nettle	2	3	3	2	10	L5
L+	Ranunculus acris	tall buttercup	+					L+
L+	Viburnum lantana	wayfaring tree	+					L+
L+	Bromus inermis ssp. inermis	smooth brome grass	+					L+
L+	Lonicera x bella (L. morrowi x tatarica)	hybrid shrub or Bell's honeysuckle	+					L+
L+	Dactylis glomerata	orchard grass	+					L+
L+	Festuca arundinacea (F. elatior ssp. arundinacea)	tall fescue	+					L+
L+	Elymus repens (Agropyron repens; Elytrigia repens)	quack grass	+					L+
L5	Quercus rubra	red oak	1	3	1	3	8	L5
L5	Onoclea sensibilis	sensitive fern	2	3	1	3	9	L5
L5	Athyrium filix-femina var. angustum	northeastern lady fern	1	3	2	3	9	L5
L5	Dryopteris carthusiana (D. spinulosa)	spinulose wood fern	1	3	1	2	7	L5
L5	Matteuccia struthiopteris var. pensylvanica	ostrich fern	1	2	3	3	9	L5
L5	Glyceria striata (incl. vars. striata & stricta)	fowl manna grass	2	2	1	2	7	L5
L5	Alisma plantago-aquatica (A. triviale)	water-plantain	2	2	4	2	10	L5
L5	Poa palustris	fowl meadow-grass	2	2	3	2	9	L5

TRCA RANK L1-L5	SCIENTIFIC NAME	COMMON NAME	LO 1-5	PT 1-5	HD 0-5	STD 0-5	TS 2-20	RANK TRCA L1-L5
L5	Leersia oryzoides	rice cut grass	2	2	4	2	10	L5
L5	Muhlenbergia mexicana var. filiformis	slender muhly grass	2	2	3	2	9	L5
L5	Muhlenbergia mexicana var. mexicana	common muhly grass	2	2	1	1	6	L5
L5	Ostrya virginiana	ironwood	1	3	3	2	9	L5
L5	Carex pseudo-cyperus	pseudocyperus sedge	1	3	2	4	10	L5
L5	Ranunculus abortivus	small-flowered or kidneyleaf buttercup	1	3	3	2	9	L5
L5	Equisetum hyemale ssp. affine	scouring rush	2	2	1	2	7	L5
L5	Ulmus americana	white elm	1	4	0	2	7	L5
L5	Podophyllum peltatum	May-apple	2	3	3	2	10	L5
L5	Clematis virginiana	virgin's bower	2	2	4	2	10	L5
L5	Actaea rubra	red baneberry	2	3	2	3	10	L5
L5	Urtica dioica ssp. gracilis (U. procera)	American stinging nettle	2	3	2	2	9	L5
L5	Laportea canadensis	wood nettle	2	3	3	2	10	L5
L+	Ranunculus acris	tall buttercup	+					L+
L+	Viburnum lantana	wayfaring tree	+					L+
L+	Bromus inermis ssp. inermis	smooth brome grass	+					L+
L+	Lonicera x bella (L. morrowi x tatarica)	hybrid shrub or Bell's honeysuckle	+					L+
L+	Dactylis glomerata	orchard grass	+					L+
L+	Festuca arundinacea (F. elatior ssp. arundinacea)	tall fescue	+					L+
L+	Elymus repens (Agropyron repens; Elytrigia repens)	quack grass	+					L+
L+	Daucus carota	Queen Anne's lace or wild carrot	+					L+
L+	Robinia pseudoacacia	black locust	+					L+
L+	Rumex crispus	curly dock	+					L+
L+	Glechoma hederacea	creeping Charlie or ground-ivy	+					L+

TRCA RANK L1-L5	SCIENTIFIC NAME	COMMON NAME	LO 1-5	PT 1-5	HD 0-5	STD 0-5	TS 2-20	RANK TRCA L1-L5
L+	Salix x sepulcralis (S. alba var. vitellina x babylonica)	weeping willow	+					L+
L+	Phleum pratense	timothy grass	+					L+
L+	Leonurus cardiaca ssp. cardiaca	motherwort	+					L+
L+	Galeopsis tetrahit	hemp-nettle	+					L+
L+	Echium vulgare	viper's bugloss or blueweed	+					L+
L+	Salix x rubens (S. alba x fragilis)	European tree willow	+					L+
L+	Medicago lupulina	black medick	+					L+
L+	Poa pratensis ssp. pratensis	Kentucky blue grass	+					L+
L+	Epipactis helleborine	helleborine	+					L+
L+?	Acer negundo	Manitoba maple	+?					L+?
L+?	Typha x glauca (T. angustifolia x latifolia)	hybrid cattail	+?					L+?
L+?	Geranium robertianum	herb Robert	+?					L+?
L+?	Phalaris arundinacea	reed canary grass	+?					L+?
L+?	Poa compressa	Canada or flat-stemmed blue grass	+?					L+?
L+?	Prunella vulgaris (incl. ssp. lanceolata and vulgaris)	heal-all	+?					L+?
L+?	Agrostis stolonifera (A. alba var. palustris)	creeping bent grass	+?					L+?
L+?	Typha angustifolia	narrow-leaved cattail	+?					L+?
pL1	Pinus resinosa	red pine	5	5	4	5	19	L1
pL+	Picea abies	Norway spruce	+					L+
pL+	Larix decidua	European larch	+					L+

LEGEND:
LO=local occurrence StD=sensitivity to development
PT=population trend TS=total score
HD=habitat dependence

Appendix C: Vegetation Communities

TRCA RANK L1-L5	CODE	COMMUNITY UNITS	LOCAL DISTRIBUTION	GEOPHYSICAL REQUIREMENTS	TOTAL SCORE	LOCAL RANK (2002-01)
L4	FOC2-2	Dry-Fresh White Cedar Coniferous Forest	2	2	4	L4
L4	FOC3-1	Fresh-Moist Hemlock Coniferous Forest***	2	2	4	L4
L4	FOM4-1	Dry-Fresh White Cedar - Paper Birch Mixed Forest***	3	1	4	L4
L4	FOM6-1	Fresh-Moist Sugar Maple - Hemlock Mixed Forest***	2	2	4	L4
L5	FOD3-1	Dry-Fresh Poplar Deciduous Forest***	2	0	2	L5
L4	FOD3-2	Dry-Fresh Paper Birch Deciduous Forest***	2	1	3	L4
L+	FOD4-b	Dry-Fresh Manitoba Maple Deciduous Forest***	2	0	2	L+
L+	FOD4-e	Dry-Fresh Exotic Deciduous Forest***	5	0	5	L+
L5	FOD5-1	Dry-Fresh Sugar Maple Deciduous Forest	1	0	1	L5
L5	FOD5-2	Dry-Fresh Sugar Maple - Beech Deciduous Forest	1	0	1	L5
L4	FOD5-6	Dry-Fresh Sugar Maple - Basswood Deciduous Forest	4	0	4	L4
L5	FOD5-8	Dry-Fresh Sugar Maple - White Ash Deciduous Forest	2	0	2	L5
L4	FOD5-10	Dry-Fresh Sugar Maple - Paper Birch - Poplar Deciduous Forest	2	1	3	L4
L5	FOD8-1	Fresh-Moist Poplar Deciduous Forest	2	0	2	L5
L+	CUP1-4	Hybrid Poplar Deciduous Plantation***	2	0	2	L+
L5	CUP1-5	Silver Maple Deciduous Plantation***	2	0	2	L5
L5	CUP1-8	Red Oak Deciduous Plantation***	3	0	3	L5
L+	CUP1-b	Willow Deciduous Plantation***	4	0	4	L+
L5	CUP3-1	Red Pine Coniferous Plantation	2	0	2	L5
L5	CUP3-2	White Pine Coniferous Plantation	2	0	2	L5

TRCA RANK L1-L5	CODE	COMMUNITY UNITS	LOCAL DISTRIBUTION	GEOPHYSICAL REQUIREMENTS	TOTAL SCORE	LOCAL RANK (2002-01)
L+	CUP3-e	Norway Spruce Coniferous Plantation***	2	0	2	L+
L5	CUP3-H	Mixed Conifer Coniferous Plantation	2	0	2	L5
L5	CUM1-A	Native Forb Old Field Meadow***	1	0	1	L5
L5	CUH1-A	Treed Hedgerow	1	0	1	L5
L5	CUS1-A1	Native Deciduous Cultural Savannah***	2	0	2	L5
L3	SWC3-1	White Cedar Organic Coniferous Swamp***	2	3	5	L3
L4	SWM1-1	White Cedar - Hardwood Mineral Mixed Swamp	2	2	4	L4
L3	SWM4-1	White Cedar - Hardwood Organic Mixed Swamp	2	3	5	L3
L2	SWM6-1	Birch - Conifer Organic Mixed Swamp	4	3	7	L2
L3	SWD2-1	Black Ash Mineral Deciduous Swamp	3	2	5	L3
L2	SWD5-1	Black Ash Organic Deciduous Swamp***	5	3	8	L2
L2	SWD7-2	Yellow Birch Organic Deciduous Swamp***	4	3	7	L2
L4	SWT2-1	Alder Mineral Thicket Swamp ***	2	2	4	L4
L5	SWT2-5	Red-osier Mineral Thicket Swamp	2	0	2	L5
L5	MAM2-2	Reed Canary Grass Mineral Meadow Marsh***	2	0	2	L5
L4	MAM2-5	Narrow-leaved Sedge Mineral Meadow Marsh	2	1	3	L4
L4	MAM2-9	Jewelweed Mineral Meadow Marsh	2	1	3	L4
L5	MAS2-1b	Narrow-Leaved Cattail Mineral Shallow Marsh	1	0	1	L5
L+	OAO1-T	Turbid Open Aquatic (disturbed)				L+

*** found only in complex &/or inclusion

Appendix D: Public Use and Recreation Plan Study

Appendix D1: Outdoor Recreation Trends

The following report was prepared in 2005 by ENVision – The Hough Group, dmA Planning & Management Services, and Joseph Bogdan Associates Inc., who were hired by TRCA to complete a public use and recreation plan for the Heart Lake Conservation Area Master Plan. This report on outdoor recreation trends was prepared within a regional context and the content is relevant to other properties in TRCA's jurisdiction.

The review of trends highlights key observations and data documenting changes in participation and interest in outdoor recreation. The information is summarized from the North American literature and the experience of the consultants. The discussion of trends is presented in four parts:

- Outdoor Recreation Participation
- Outdoor Recreation Facility Design and Development
- Activity Participation Trends
- Outdoor Education Programming

1) Trends in Outdoor Recreation Participation

- Value shifts toward personal growth and improved quality of life contribute to a personal wellness trend that is supportive of activities that promote an active lifestyle. For adults, this active lifestyle often focuses on individual rather than team activities, as well as activities that are less structured and therefore fit more easily into busy, unpredictable schedules.
- One of the primary complaints among Canadians regarding daily life is "not enough time." In 1995, two thirds of Canadians reported they were working longer hours. Sixty per cent of Canadians polled in 1996 said their leisure time had shrunk. This leisure-time deficit has led to greater interest in activities that can be pursued alone and relatively easily, around more fixed-time commitments and increasingly hectic schedules. With lack of time often cited as one of the prime reasons for not participating in recreational activities, Canadians tend to adopt activities that can be easily integrated into their daily lives. Unstructured activities, often taking place outdoors and on an individual basis or with family/ friends, are increasingly popular. Facilities that support access to the out-of-doors must be flexible in terms of access and available on weekends, when participants have the free time to participate in outdoor pursuits.
- Barriers to participation have been documented by various researchers. "Too busy with work," "cost of equipment and supplies" and "facilities overcrowded" were the most common barriers to participation in self-directed outdoor pursuits.
- Cost will increasingly be a constraint to participation in outdoor recreation activities, particularly as the population ages. Low cost, casual and self-directed activities will be more popular than those with higher costs.
- Participation in outdoor recreation is correlated to age, income and education. 84.8 per cent of Ontarians over the age of 15 participate in nature-related outdoor recreation activities. Canadians under the age of 45 years are most likely to participate in outdoor activities. As age increases beyond 45 years, participation decreases.
- As income and level of education increases so does one's likelihood of participating in outdoor recreation activities. Canadians with an education beyond secondary school and those with personal incomes of $30,000 or more are more likely to participate in nature-related outdoor pursuits.
- The 2000 Alberta recreation survey provides a good comparison with Ontario statistics. Outdoor pursuits with the highest levels of household participation include walking for pleasure, overnight camping, picnicking, day hiking, jogging/ running and fishing. Respondents with a household income of $30,000 to $50,000 participated in the widest variety of outdoor activities.
- Outdoor active pursuits relevant to this study that are becoming more popular include bicycling, jogging/ running, day hiking and cross country skiing (various sources).
- Continued advances in medical science that positively affect individual quality of life and longevity and technological advances that affect communication and transportation will lead to growing participation in nature-based outdoor pursuits. This will offset the decline in participation due to the aging of the population. The outdoor recreation activities that will continue to be popular with older adults will be the more passive activities such as bird watching, nature study and walking for pleasure.
- Growing concern for the environment will continue to positively influence participation in nature-based outdoor pursuits.

2) Trends in Outdoor Recreation Facility Design and Development

- Increasingly, new and redeveloped facilities for outdoor education and recreation are adopting sustainable building practices to support the natural environment and demonstrate the principles of conservation. Sustainable building practices include the following:
- Sensitivity to the ecology of each building site
- Use of recycled and recyclable materials
- Use of interior finishes that promote a healthy interior environment
- Use of locally derived material
- Use of passive solar design for energy efficiency
- Use of active solar, wind and water systems to fulfill energy requirements, where possible
- Use of ecologically sensitive wastewater treatment systems, where possible
- A high degree of user participation in learning about and caring for the building.
- Reductions in traditional funding sources (taxes, provincial and federal grants) have encouraged facility providers to look increasingly to partnerships to assist in providing services and facilities. Through the strengthening of Foundations and "friends of" organizations, potential corporate partners and public donors have been provided opportunities to contribute to all aspects of facility development and program delivery. Outdoor education facility providers are increasingly looking to these alternative funding sources to ensure future sustainability.
- Today's facilities are designed to be aesthetically pleasing and welcoming, rather than utilitarian, to meet the need for quality, relaxing experiences. Facilities that can be considered a destination and that convey a sense of having arrived somewhere will be more appealing than those that do not focus the visitor's time and attention.
- There is a shift away from single purpose facilities to spaces that blend a multitude of spaces and uses. Facilities that are flexible, both in terms of access and programming, will be more appealing and financially viable than those designed for a single purpose. Flexibility in terms of building components may involve such things as movable doors, rooms with movable partitions, designs that allow for future expansion, etc.
- Risk management and liability issues will continue to affect the future provision of outdoor educational/ recreation programming and facilities.
- As the corporate sector becomes more aware of how leadership development enhances corporate culture, the demand for outdoor-based facilities and programs to serve the corporate sector will increase. Leadership development, team building, conflict resolution, delegation of skills and developing strategy are all examples of the types of corporate training sessions that can be accommodated and enhanced through an outdoor setting.

3) Activity Participation Trends

Unscheduled Outdoor Activities
Unscheduled recreation activities refer to those that people undertake spontaneously, using facilities provided for this purpose. Participation rates in all trail-based activities, such as walking, running, cycling and in-line skating have increased rapidly in recent years, and this trend is anticipated to continue into the future.
In addition to the natural fit between hectic lifestyles, environmental stewardship and trail activities, demand for this type of involvement is also being driven by the needs of an aging population. Activities such as walking and cycling are suitable for participation among older adults. Similarly, an aging population is generating greater participation in other unstructured and more passive forms of leisure. These include activities such as golf, gardening and visits to public gardens and attendance at cultural or leisure events.

Among youth, participation in activities such as skateboarding and basketball has increased dramatically in recent years. These types of activities offer the preferred type of involvement among youth – unstructured and social, with a loose affiliation to the group. Activities like skateboarding also provide a desired element of risk. While future trends suggests continued growth in these areas of activity, concurrent concerns regarding increasing obesity among youth due to sedentary lifestyles emphasizes the importance of providing appropriate, attractive facilities to encourage increased participation by this age group.

Walking: Between 1998 and 2001, walking was reported as the most popular activity among Ontario adults, with proportions of those reporting participation in the past year ranging from 69 per cent to 86 per cent. 89 per cent of those aged 15-17 and 60 per cent of those aged 12-19 reported walking as the most popular activity in 2000 and 2001 respectively.

Walking among men increased 3.8 per cent from 26.2 per cent in 1987 to 30.1 per cent in 2000. For women, walking increased 6.6 per cent during the same time period, from 40.4 per cent to 46.9 per cent. As a result of the aging population, participation in walking as a recreational activity is expected to be one of the fastest growing areas of outdoor recreation. More than 80 per cent among 65,000 Americans 12 years of age or older surveyed in the continuous National Survey on Recreation and the Environment (formerly the National Recreation Survey) walk, and walking for pleasure, was noted as a favourite among seniors. While teenagers consistently indicate walking as their most common activity, over half of Canadian teenagers reported getting less than 1 hour of walking time per day.

Running/jogging: National trends indicate increased participation in road running. Major road race events (Sporting Life 10 km in Toronto, Scotia Bank marathon in Toronto, Vancouver Sun Run) have experienced 20 per cent to 40 per cent growth in the number of participants. This increase is in large part due to increased involvement of women in the 25 to 34 year age category. The focus is on participation and health rather than competing to win. From 1998 to 2001, between 13 per cent and 36 per cent of Ontario adults had participated in running/jogging in the past year. 53 per cent of those aged 15-17 and 42 per cent of those aged 12-19 had participated in running/jogging in 2000 and 2001, respectively.

Cycling: Between 1998 and 2001, cycling was reported as the sixth most popular activity among Ontario adults. Proportions of those reporting participation in the past year ranged from 21 per cent to 50 per cent. In 2001, 49 per cent of those aged 12-19 had cycled in the past year; in 2000, 88 per cent of those aged 5-17 had cycled in the past year.

Rollerblading: In-line skating/rollerblading is growing in popularity both as a form of recreation and a mode of transportation. From 1998 to 2001, between 6 per cent and 20 per cent of Ontario adults had participated in in-line skating in the past year. 62 per cent of those aged 15-17 and 27 per cent of those aged 12-19 had participated in rollerblading in 2000 and 2001, respectively. In-line skating/rollerblading is the most popular extreme sport in the United States.
Triathlon: Triathlon participation is experiencing an increase in membership numbers. Out of the four disciplines

(triathlon, duathlon, long distance and aquathlon), triathlon holds the most number of participants.

Skateboarding: Popularity and legitimacy of skateboarding has been growing in recent years, likely as a result of movement away from organized structured, comparatively more expensive team-based activities. Skateboarding offers the preferred type of involvement for youth aged 10-17 as it is unstructured and social, provides a desired element of risk, and results in a loose affiliation to a group. Growing concerns about the sedentary lifestyles of youth and the consequential child obesity rates emphasize the importance of providing appropriate, attractive facilities to encourage participation. Municipalities all over Ontario are beginning to invest in safe, well-lit places for youth to enjoy this activity. Skateboarding is the third most popular extreme sport in the United States.

Climbing Walls are also growing in popularity across North America. Climbing walls can be added to gymnasia or built as stand-alone outdoor facilities located in parks.

Climbing walls are not always "walls" – some are free-standing, multi-sided structures that can be permanent or moved from site to site. While climbing walls usually involve protective gear and rappelling lines, there are walls designed for the edge of pools for use without gear and lines. Fitness climbing walls attract adults as well as children and youth and are more likely to be combined with other facilities (e.g., field houses, gymnasia) rather than as stand-alone structures.

Basketball: Basketball Ontario has experienced strong growth in the past ten years. The number of participants has climbed from 3,050 in 1993 to 8,775 in 2002. Basketball is a youth-oriented sport as 43 per cent of its participants are between the ages of 15 and 18.

Spray Pads: Spray pads are increasingly being developed to replace more traditional outdoor aquatic facilities. Spray pads offer an extended season of use from May to September, reduce the need for supervision and are safer for children. They are increasingly being provided as "community cool zones" in response to warmer than normal summer months.

Public Gardens: Admission revenues increased by 11 per cent from 2000 to 2001 at attractions such as the Royal Botanical Gardens. Visits to historical sites, wineries and botanical gardens are expected to increase as the population ages. Increasingly, communities across Ontario and Canada are participating in gardening programs and initiatives, such as Communities in Bloom.

Heritage/Historical Properties Preservation: Provincially and nationally there is a continuing trend to preserve heritage and historical properties. Events such as "Doors Open Toronto" are encouraging and increasing the use of, and visits to, heritage and historical properties. Of 23.3 million Canadian adults in 2000, about 11 per cent are interested in Heritage Tourism. Of these, 8 in 10 have indicated taking a leisure trip within Canada during the past 2 years.

Festivals and Special Events:

Festivals and events in Ontario benefit their communities in many ways. They attract tourists, help to revitalize communities, increase sales for local businesses and provide increased leisure opportunities for local residents. Increased participation is anticipated in Ontario. Cultural activities with the greatest appeal to tourists include museums, festivals, fairs and markets.

Organized Sports and Recreation Pursuits
With the exception of beach volleyball, noted below, we have not summarized recreational activity trends for active sports because we assume that these facilities would not be provided by the Conservation Authority. However, within the local market we should anticipate very strong and sustained demand for soccer and, in part due to the multicultural character of the community, growing demand for cricket, field hockey and lacrosse. If space were made available for active sports fields of this type, they would be very well used and in very high demand. Other outdoor sports, such as baseball and tennis are declining in popularity but even in these areas there could be local demand due to the population growth and the limited supply of municipal parkland.

Beach volleyball is one of the fastest growing areas of volleyball and is played on any number of beaches or sand courts in Ontario. As with indoor volleyball, the majority of players participate in recreational divisions and therefore are not represented in the provincial statistics. Women comprise almost half of the participants. The active sport, which attracts people between the ages of 15 and 34, can be played at Olympic caliber, as doubles competition, or as recreational co-ed pick up. This is an activity that may be consistent with other recreational uses at Heart Lake and for which growing interest can be anticipated.

4) Outdoor Education Programming

- The history of outdoor education or environmental programming begins with the growing environmental movement of the 60s and 70s, with origins in the Scouting and Guiding programs and early camping initiatives. The original impetus was survival skills, and then nature study and exploration became the main thrust of the educational movement. At the time when progressive educators legitimized the introduction of science laboratories and other experiential methodologies to schooling, environmental education programs were taking root in education system. Environmental education has at its heart two relationships: the ecosystem relationships of the interdependence of all living organisms, and the relationships between humans, human society and the natural resources of the environment.
- Environmental educational programming has taken many forms over the years. Program themes have included survival skills, leadership development and team building, sensory awareness and experiential learning, identification and classification. Today, outdoor education programming is grounded in naturalsciences and ecology, is geared to the public educational curriculum and is becoming increasingly targeted to specific age groups and types of users.
- The large organizations involved in outdoor education such as Scouts and Guides, Outward Bound, Project Adventure, and NOLS all faced a very difficult decade in the 1990s. The "big movers" now are the medium-sized, specialist organizations. Very small operators are going to continue to suffer greatly with all the increasing administrative and legislative challenges of running programs. The larger organizations will not become extinct – they will simply continue to adapt and fractionate.
- The role and purpose of nature in outdoor education will become more apparent. As society becomes more disconnected from natural environments, the primary importance of human experience in nature becomes more highly valued and studied. While the U.S. dominance of outdoor education during the 1960's-on human relationship with nature, it is predicted that the role of nature will emerge during the next decade as being more critical in outdoor education theory and practice.
- Children growing up today in the developed nations of the world have a much greater global awareness and social conscience than they did in the previous decade, and are more aware of their ecological place in the world. Much of this awareness stems from a growing sense of humanity's devastating impact on the natural world.
- Outdoor education centres that can successfully target their programs to meet specific curriculum requirements for specific grades, and that can tailor programs to meet the needs and challenges of specific user groups, will fare better than those that provide generic programming. Flexibility will be the key to remaining successful in the future.

Appendix D2: Demographic Profile: Whitchurch-Stouffville, Richmond Hill and Markham

This appendix provides a demographic profile for selected indicators based on 2001 and 2006 Census data for Whitchurch-Stouffville, Richmond Hill and Markham.

Table D1 indicates basic age distributions for the 2006 population of Whitchurch-Stouffville, Richmond Hill and Markham.

POPULATION AGE DISTRIBUTION						
AGE	WHITCHURCH-STOUFFVILLE	% OF TOTAL	RICHMOND HILL 2006	% OF TOTAL	MARKHAM 2006	% OF TOTAL)
Age 0-4	1,200	5	9,560	6	14,165	5
Age 5-14	3,235	13	21,925	13	33,485	13
Age 15-19	1,775	7	12,330	8	19,395	7
Age 20-24	1,380	6	10,540	6	19,250	7
Age 25-44	5,790	24	48,780	30	73,775	28
Age 45-54	4,140	17	26,745	16	43,180	17
Age 55-64	3,175	13	16,400	10	30,460	12
Age 65-74	1,995	8	9,380	6	16,325	6
Age 75 +	1,695	7	7,045	4	11,540	4
Total	**24,390**		**162,705**		**261,575**	

Table D2 provides household statistics divided by family type for Whitchurch-Stouffville, Richmond Hill and Markham.

SELECTED HOUSEHOLD AND FAMILY CHARACTERISTICS			
	WHITCHURCH-STOUFFVILLE 2001	RICHMOND HILL 2001	MARKHAM 2001
Total – all private households	7,470	41,345	60,660
Couple with children	3,090	19,070	29,465
Couple without children	2,320	10,235	14,720
One-person households	1,255	5,615	6,050
Other household types	805	6,430	10,435
Median household income (2000)	$75,743	$72,455	$77,163
Total – number of families	6,230	36,895	58,555
Married/common-law families	5,635	32,745	51,845
Median income couple families (2000)	$86,538	$77,790	$66,476
Lone-parent families	595	4,155	6,710

SELECTED HOUSEHOLD AND FAMILY CHARACTERISTICS			
	WHITCHURCH-STOUFFVILLE 2001	RICHMOND HILL 2001	MARKHAM 2001
Median income lone-parent families ($)	$48,567	$44,381	$33,724

Table D3 presents education statistics identifying attainment levels in trades, colleges and university for Whitchurch-Stouffville, Richmond Hill and Markham.

SELECTED EDUCATION LEVEL INDICATORS			
	WHITCHURCH-STOUFFVILLE 2001	RICHMOND HILL 2001	MARKHAM 2001
Total population 15 years and over attending school full time	1900	14,635	27,225
% of population aged 20-34 with:			
Trades certificate or diploma	7.4	5.3	4.5
College certificate or diploma	24.6	16.0	16.1
University certificate, diploma or degree	26.5	42.7	37.2
% of population aged 35-44 with:			
Trades certificate or diploma	11.6	6.9	7.0
College certificate or diploma	23.8	21.0	19.2
University certificate, diploma or degree	24.6	41.7	37.9
% of population aged 45-64 with:			
Trades certificate or diploma	11.9	9.7	8.3
College certificate or diploma	19.3	16.2	17.1
University certificate, diploma or degree	23.5	32.6	31.7

Table D4 provides immigration, ethnicity and aboriginal statistics for Whitchurch-Stouffville, Richmond Hill and Markham.

ETHNICITY CHARACTERISTICS			
	WHITCHURCH-STOUFFVILLE 2001	RICHMOND HILL 2001	MARKHAM 2001
Immigration Characteristics:			
Canadian-born population	18,080	66,735	96,385
Foreign-born population	3,655	63,620	109,930
Visible Minority Characteristics:			
Total visible minority population	990	53,185	115,485
Chinese	350	28,760	62,355
South Asian	205	8,180	26,360

ETHNICITY CHARACTERISTICS			
	WHITCHURCH-STOUFFVILLE 2001	RICHMOND HILL 2001	MARKHAM 2001
Black	115	2,650	7,860
West Asian	80	4,420	2,305
Filipino	50	1,580	5,265
Korean	45	1,510	2,265
Arab	25	1,935	1,660
Latin American	25	735	1,055
Southeast Asian	10	895	955
Japanese	25	430	670
Aboriginal Population			
Aboriginal identity population	115	160	290

Table D5 provides earnings characteristics for Whitchurch-Stouffville, Richmond Hill and Markham based on salaries of people 15 years and over who worked 49-52 weeks either for pay or self-employed.

EARNING CHARACTERISTICS (2000)			
WORKED FULL YEAR - FULL TIME	WHITCHURCH-STOUFFVILLE 2000	RICHMOND HILL 2000	MARKHAM 2000
Average Earnings ($):			
All people with earnings	$59,304	$54,045	$54,163
Male with earnings	$67,505	$61,361	$63,105
Female with earnings	$46,077	$44,262	$42,172

Table D6 provides the number of private occupied dwellings, ratio of dwellings owned and rented expressed as a percentage and construction and real estate indicators for Whitchurch-Stouffville, Richmond Hill and Markham.

DWELLING CHARACTERISTICS			
	WHITCHURCH-STOUFFVILLE 2001	RICHMOND HILL 2001	MARKHAM 2001
Total number of dwellings	7,470	41,350	60,665
% of dwellings owned	82	83.5	87
% of dwellings rented	18	6.5	13
Number of dwellings constructed	5,985+1,485	24,920+16,425	43,845+16,815
Average value of dwelling ($)	324,797	$312,071	$306,493

Appendix D3: Review of Concepts Considered in Public Use and Recreation Planning Process

Concept #1 – Campground

Description:
Campground area that could feature either tent-only or both tent and RV camping sites. Supporting infrastructure could include (as needed) electrical servicing, water, septic, lighting, washrooms, and a campground office building.

Rationale:
There are few to no camping facilities in the communities surrounding BMCA. This camping would accommodate school groups and day camps that want a multi-day experience while also encouraging overnight visitors to BMCA and the surrounding communities. A campground would also represent a revenue-generating opportunity for BMCA, which is a strategic priority for our conservation parks.

Support:
Oak Ridges Trail Association – Staff indicated that there is great demand for camping facilities for users of the trail. Given the proximity of the Trail to BMCA, the facility would be attractive to hikers and other trail users. (Meeting, December 17, 2007).
York Region – Staff from the Tourism department are very supportive of a campground. They see it as a good match for the eco-tourism that York Region is trying to promote. Also indicate their desire to increase multi-day tourism to the area, so any ability to provide overnight accommodations is desirable. (Meeting, March 6, 2008).
Town of Whitchurch-Stouffville – Staff from Planning and Leisure Services departments are supportive of a campground and see it as a good match to the trails work that is being undertaken by the Town. (Meeting, December 17, 2007).
BMCA Master Plan Advisory Committee - Numerous committee members have indicated their support for a tent-only campground, including the Rouge Park, Rouge Park Alliance, Town of Whitchurch-Stouffville (staff and councilor), Chamber of Commerce, etc… Concerns from committee members include increased vandalism and safety concerns.

Risks/Negatives
The predominant obstacle in the implementation of a campground facility continues to be the high cost of constructing the facility. Costs for building a campground include electrical, water servicing, dump station, washroom upgrades, lighting, landscaping, etc…

Status
There is widespread support for a campground at BMCA, but the major obstacle is the high capital cost for construction. Toronto and Region Conservation does not have the capital to invest in such a project, nor is there any immediate indication that funding will become available. Toronto and Region Conservation would be interested in working with an external partner who would be interested in building and operating a campground, however no such partner has been identified at this time.

Toronto and Region Conservation staff have determined that it is not financially feasible at this point in time to build such a facility. As such, it will not be included in the primary short and medium term recommendations for BMCA, however it will remain as a potential use to be considered in the long term. Should additional support or funding become available in the future, or should a partner express interest in constructing and running such a facility, it would be recommended that the campground be located on the west side of the park where the sports fields are currently located.

Concept #2 – Driving Range

Description:
Primary use would be a driving range, with possible supporting facilities such as a mini-golf area, putting area, or office. Design would be dependant on space available.

Rationale:
A driving range is a good interim use for areas that may be slated for other recreational uses in the future. A driving range also represents a revenue- generating opportunity, both from the initial filling project that would take place in the design and construction phase, as well as from the on-going operation of the driving range.

A re-designed driving range at Bruce's Mill that offers unique facilities such as water features would have the potential to be successful and provide revenue for park operations. Partnership opportunities also exist with Meadowbrook Golf & Country Club, located south of Bruce's Mill.

Two locations have been looked at for the driving range. One is to leave the range where it is currently located, but to potentially complete a re-design of the facility. The second location is in the southwest corner where the baseball diamonds are currently located. The rationale behind the relocation would be that the current location is restricted in terms of available space.

Support:
Meadowbrook Golf & Country Club have indicated some interest in partnering in the use of the facility. They would only be supportive of the relocation to the southwest corner if the facility had a north-south orientation.

Risks/Negatives:

- Some stakeholders (York Region Tourism department staff, various members of the Advisory Committee) have indicated that they do not see the driving range as being a good fit for the park.
- An unsuccessful operation would compromise revenue generating potential
- Construction of an east-west course in the southwest corner is not supported by Meadowbrook due to concerns about proximity to their parking lot

Status:
The driving range will remain in its current location until the existing lease expires in April 2009. Following that date, the area will be developed into a nature-based recreation area, more details of which can be found in section 5.1.2

Concept #3 – Aquatic Facility

Description:
An expanded water-based recreation facility, that could include a waterplay facility (splashpad and wading pool), a larger swimming pool, and an interactive watershed model. The facility would be located west of the former pond site, in proximity to the existing pool and beach house.

Rationale:
There is growing demand for swimming and water-based facilities throughout the GTA. Since the removal of swimming in the pond at BMCA, there has been demand from the public for water-based recreation. An expanded aquatic area would also increase day use to the park and help to promote BMCA as a nature-based recreation destination.

Support
There has been overall support for this concept from all stakeholders and members of the Advisory Committee.

Risks/Negatives
The primary obstacle for the implementation of this facility will be the cost of construction. Toronto and Region Conservation staff will prepare a full business case outlining costs and revenue generating potential, and will seek appropriate funding for the project.

Status
Plans for an aquatic facility are to be included in the preferred recreation concept plan.

Concept #4 – Farmer's Market/Agricultural Demonstration Area

Description
The concept is to feature specialty and/or demonstration crop areas and to host a farmer's market or farm retail area, as well as to provide opportunities for agricultural interpretation and education.

Rationale
The rationale for this concept is to build interpretive opportunity for agriculture through specialty crop or demonstration areas and to provide revenue potential through farmer's market or farm retail operations. At the time that this concept was developed, the farmer's market in Stouffville was believed to be looking to re-locate and the Bruce's Mill location may be a good alternative.

Support
There was support for this concept from some members of the Advisory Committee, notably from the Rouge Park Alliance and the council representative from the Town of Whitchurch-Stouffville.

Risks/Negatives
The lack of a water source on site would specialty or demonstration crops difficult and costly. One member of the Advisory Committee indicated that the retail farm area could create competition with nearby farm operations that have retail areas. Toronto and Region Conservation staff also felt that there was limited revenue potential for the park from this concept. Recent information also indicates that the Town of Whitchurch-Stouffville has extended its lease at the current location.

Status
This concept will not be included in the preferred recreation concept plan. Due to the risks outlined above, as well as the fact that TRCA's Terrestrial Natural Heritage System Strategy has highlighted the agricultural field area as being of priority for restoration to natural cover.

Concept #5 – Mill Restoration

Description:
This concept features a full restoration of the Mill building to accommodate a future use as yet to be decided. Additional space is outlined in the recreation concept plan map to accommodate buildings or facilities that might be required to support future dynamic use of the Mill.

Rationale
The Mill is a key feature at BMCA and is an important cultural feature. Restoration of the building, to a future use that is yet to be decided, will be integral to the Master Plan and vision for BMCA. For the restoration to be successful there needs to be a detailed, long-term plan for the use of the building.

Support
There has been general support for this concept from all stakeholders and members of the Advisory Committee.

Risks/Negatives
The only obstacle to this concept that has been identified is the potential cost in restoring the building, and the on-going costs that would be associated with operating any programs at the Mill building.

Status
A consultant was hired to assess the Mill building, as well as the historic house located near the main entrance, and make recommendations about restoration and possible future use. The recommendations from that assessment were reviewed by staff and the Advisory Committee, and subsequently by a subcommittee focused on cultural heritage (see section 4.2 for details). The recommendations from the subcommittee have been incorporated into the Master Plan.

Concept #6 – BMX Bike Park

Description
A BMX bike park featuring a main track, a pump track, bleachers, and space for concession stands. The facility could be enhanced by informal camping space, such as a flat field, to allow race participants to camp on site.

Rationale
Research shows a growing interest in this sport across North America that is intensified by the recent inclusion of BMX biking as an official sport in the 2008 Bejing Olympics. Accompanying this interest is an increased demand for facilities. There is revenue potential in this concept, through a filling project during construction and through the on-going operation of the facility. The bike park would also represent significant revenue potential for surrounding communities, due the high influx of tourists during race events. The bike park facility would be inexpensive to construct.

Support
York Region – Staff from the Tourism department are very supportive of this concept, and see it fitting well with their vision for York Region as an eco-tourism and biking destination. (Meeting, March 8, 2008).
Ontario Cycling Association - there is a high level of interest in developing a facility at BMCA, and the Association will be able to offer expertise and resources towards construction. (Meeting, February 4, 2008).

Risks/Negatives
There have been concerns expressed about unauthorized use of the trail system by cyclists. Staff will mitigate this risk by providing a multi-use pathway around the perimeter of the natural area that will not only serve the BMX users but will also encourage active transportation to the park. Cyclists will not be allowed to use the trails located within the natural areas of the park, and appropriate signage will erected.

Status
The installation of a BMX bike park is planned for the active use recreation area, either as an interim use until another proposal is received, or as a long-term use if it is successful and supporting uses can be developed in the area.

Concept #7 – Ropes Course

Description
Construction of a skills development area that would incorporate a high and/or low level ropes course facility.

Rationale
This concept would provide a unique, nature-based recreation opportunity for families, day camps and corporate groups. The facility is constructed in a way that minimizes any impact to trees, and can be closed up completely when not staffed to ensure the safety of park users.

Support
There has been general support from stakeholders and Advisory Committee members for this concept.

Risks/Negatives
The primary concern expressed is impact to the forest ecosystem due to increased use, tramping, etc… on the forest floor. Staff will mitigate this risk by locating the ropes course in an area that is designated for medium levels of recreational use (Natural Environment zone) through the management planning process. Staff from our Ecology group will be consulted regarding the specific location of the facility.

Status
A ropes course will be included in the preferred recreation concept plan.

Concept #8 – Chalet Renovation

Description
The concept is to renovate or replace the chalet building to provide additional space for classrooms, dining (Maple Syrup Festival), storage, and meeting rooms.

Rationale
The additional space is needed for the Maple Syrup Festival and the York Region Children's Water Festival. The improved space would allow more marketing of BMCA as a destination for corporate groups, day camps, etc…

Support
There has been general support from stakeholders and Advisory Committee members for this concept.

Risks/Negatives
There have been no risks associated with this project, provided that appropriate funding can be secured.

Status
A Chalet renovation or replacement will be included in the preferred recreation concept plan.

Appendix E: Sustainable Design Measures

LEED® CANADA GREEN BUILDING SYSTEM RATING CRITERIA & Sustainable design measures

Further details on each section are available from the LEEDTM Canada - NC V 1.0 Green Building Rating System (Canada Green Building Council 2004).

SUSTAINABLE SITE	
Erosion and Sedimentation Control	Apply erosion and stabilization control measures during construction e.g. preservation of natural vegetation; seeding; mulching; geotextiles; silt fences; drainage swales; sediment basins.
Site Selection	Do not develop in areas identified as ecologically sensitive; habitat for endangered species, within 1.5 metres (vertical) of 100 year floodplain, or 0.9 metres (vertical) of 100 year floodplain, within 30.5 metres of a wetland.
Development Density	N/A
Redevelopment of Contaminated Site	N/A
Alternative Transportation: Public Transportation Access	Develop within 400 metres of two or more bus lines TBD. Brampton Transit has plans to expand service along Mayfield Road and Sandalwood Parkway in future.
Alternative Transportation: Bicycle Storage & Change Rooms	Provide secure bicycle storage and shower/change facilities for 5 per cent or more of building occupants to encourage cycling.
Alternative Transportation: Alternative Fuel Vehicles	Hybrid or alternative fuel for 3 per cent or more of building occupants. More applicable to corporate policy.
Alternative Transportation: Parking Capacity	Meet but don't exceed local parking by-law AND provide designated parking for car-share or car pool lots equal to 10 per cent of non-visitor parking. For rehabilitation projects demonstrate that no new parking capacity was added AND provide designated parking for car-share or car pool lots equal to 10 per cent of non-visitor parking.
Reduced Site Disturbance: Protect or Restore Open Space	Limit site disturbance including earthwork and clearing to within 12 metres of building perimeter; 1.5 metres of existing roadways, curbs; and 7.5 metres of constructed permeable surfaces, e.g. drainage swales OR on previously developed sites restore 50 per cent of disturbed site area by replacing impervious surfaces with native or adapted vegetation.
Reduced Site Disturbance: Development Footprint	Design with minimal building footprint and designate area of adjacent open space equal to building footprint
Stormwater Management (SWM): Rate and Quantity	Demonstrates that post-development peak discharge rate and quantity doesn't exceed pre-development peak discharge rate and quantity. Examples of SWM measures include: infiltration trenches, vegetated swales, porous paving, detention areas, constructed wetlands, re-use of stormwater for non-potable use, e.g. irrigation, toilet flushing.
Stormwater Management: Treatment	Remove 80 per cent of post-development total suspended solids. Examples of SWM measures include: infiltration trenches, vegetated swales, porous paving, detention areas, and constructed wetlands.

SUSTAINABLE SITE	
Heat Island Effect: Reduce heat islands to minimize effect on wildlife and vegetation	Non-roof: Shade parking and hard-surface areas, Use high albedo materials, and open grid (50 per cent porous) materials over minimum 30 per cent of impervious areas, walkways, plazas, parking, etc. Examples of permeable materials: gravel, porous asphalt, pavers '(ecopavers, turfstone') for paths. Roof: Use Energy Star® compliant, highly reflective and low emissivity roofing over 75 per cent of the surface area. Note: 'Green Roofs' are also credited but will be more difficult to achieve
Light Pollution Reduction	Eliminate light trespass from building and site, improve night sky access, and reduce impacts on nocturnal environments. Measures include: lowering light levels, shielding of lights and windows, and reducing light displacement through fixture selection.

WATER EFFICIENCY	
Water Efficient Landscaping: Reduce by 50 per cent, or no irrigation	Rainwater harvesting system from roofs for use in irrigation (cisterns) or direct to bioswales in parking areas Directing/re-use of stormwater and waterplay wastewater to bioswales in parking areas or planted areas Use of greywater recycling system (from buildings) for irrigation Low maintenance native, drought resistant species xeriscaping landscaping around buildings
Innovative Wastewater Technologies	Reduce potable water use by 50 per cent or 100 per cent on-site treatment: through such measures as: on-site grey-water treatment units; dual flush toilets; composting toilets
Water Use Reduction: 20-30 per cent	Reduce potable water use through such measures as: ultra-low flow fixtures, metered faucets, composting toilets, waterless urinals, re-use of stormwater/ greywater for non-potable water use

ENERGY & ATMOSPHERE	
Fundamental Building Systems Commissioning	Best practice commissioning procedures: Required
Minimum Energy Performance	Design building to CBIP program. Required
CFC Reduction in HVAC&R Equipment	Zero use of CFC refrigerants. Required
Optimize Energy Performance	Design building envelope and building systems to maximize energy performance Highly reflective & highly emissive roofing to reduce heat islands High performance windows to limit winter heat loss and summer solar gain (may involve glazing, shading and framing) Specialized insulation measures to support thermal conservation (specialized exterior walls and roof) Building orientation measures (e.g. south-facing orientation for roof; east/west windows with overhangs to block out summer sun)

APPENDICES

ENERGY & ATMOSPHERE	
Renewable Energy: 5 per cent - 20 per cent of on-site renewable energy source to reduce dependency on fossil fuels	Passive solar measures, e.g. windows, skylights, thermal storage in flooring or walls Solar electric (photovoltaic) systems Wind energy Geothermal heat pump Heat Recovery Ventilators (HRVs)
Best Practice Commissioning	Implement a commissioning plan during design and post-occupancy
Ozone Protection	Reduce ozone depletion, through use of non HCFCs
Measurement and Verification	Optimize monitoring of building energy and water consumption performance through metering / implementation of a Measurement and Verification Plan
Green Power	Purchase certified Green Power (OPG Evergreen) or alternate supplier

MATERIALS AND RESOURCES	
Storage and Collection of Recyclables	Designate area for storage and collection of recyclable materials
Building Re-use: 50 per cent - 95 per cent	N/A
Construction Waste Management	Divert 50 per cent to 75 per cent of construction waste from landfill through recycling
Resource Re-use	5 per cent to 10 per cent use of salvaged or recycled materials such as: wood beams, flooring, etc.
Recycled Content	Use materials with recycled content: 7.5 per cent to 15 per cent post-consumer plus 1/2 post-industrial, e.g. recycled concrete, steel rebar
Regional Materials	10 per cent to 20 per cent extracted and manufactured regionally. Criteria range from within 800 kilometres to 2400 kilometres.
Rapidly Renewable Materials	Products made from rapidly renewable materials, such as bamboo, linoleum, wheatboard, wool carpet. Reduce use of scarce natural resources Use renewable resources or those that require less energy to produce.
Certified Wood	Use of FSC-certified wood for lumber
Durable Building	Develop a Building Durability Plan

INDOOR ENVIRONMENTAL QUALITY	
Minimum IAQ Performance	Establish minimum requirements for indoor air quality, based on ASRAE 62-2001
Environmental Tobacco Smoke (ETS Control)	Required: Prevent or minimize exposure (smoking is prohibited by by-law)
Carbon Dioxide Monitoring	Install carbon dioxide monitoring system
Ventilation Effectiveness	Optimize air exchange effectiveness through mechanical or natural ventilation, to required standard
Construction IAQ Management Plan	Develop Indoor Air Quality monitoring program during construction, and pre-occupancy
Low-Emitting Materials	Specify low-VOC emitting adhesives and sealants, paints, coatings, carpet, composite wood and laminates
Indoor Chemical and Pollutant Control	Minimize migration of airborne biological and chemical contaminants from building systems
Controllability of Systems	Provide a high level of control for thermal, ventilation and lighting systems for individual and group spaces, both perimeter and non-perimeter
Thermal Comfort: Compliance and Monitoring	Comply with ASHRAE Standard 55-2004 Provide permanent monitoring system to ensure building performance
Daylight and Views	Ensure connection between indoor spaces and outdoors through daylighting of 75 per cent of regularly occupied spaces Provide open concept spaces with views to outdoors from 90 per cent of regularly occupied spaces
Innovation in Design	Points for exceptional design and/or innovative performance beyond the requirements of the LEEDTM Green Building Rating System
LEED® Accredited Professional	One principal team member has successfully completed the LEEDTM Accredited Professional Exam

Appendix F: Trail Design and Management

1.0 Trail Design Standards

1.1 Terminology and Definitions

The profile of a typical trail shows the basic components that compromise the user zone for any trail type (see Table F1).

Table F1: Definitions of Basic Trail

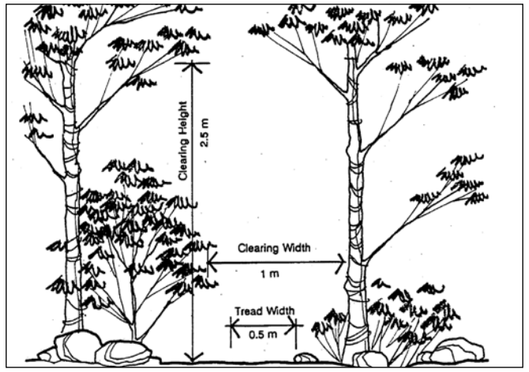
TRAIL COMPONENT	DESCRIPTION
Clearing Width	The dimension measured across the trail from which all vegetation, rocks or other obstructions are removed so as not to obstruct movement along the trail.
Clearing Height	The vertical dimension that must be cleared of all branches that would otherwise obstruct movement along the trail.
Tread Width	The horizontal dimension across the trail that provides adequate space for comfortable and safe movement.
Tread	The traveled portion of the trail right-of-way (ROW) typically sloped or crowned to shed water.
Drainage	Provision of methods to manage excessive water runoff (ditch, dip, waterbar, culvert, French drain, etc.).
Clearing Limits	Point at which the disturbance to the natural environment is limited. Defines the trail ROW.
Clearing Limits	Point at which the disturbance to the natural environment is limited. Defines the trail ROW.

1.2 Trail Standards

Toronto and Region Conservation's Trail Planning & Design Guidelines: A Handbook for an Inter-Regional Trail System in the Greater Toronto Area (1992) provides trail standards and guidelines for the development of trails at BMCA. The following are the general design standards and guidelines for each of the trails. (Note: These are general standards and are not intended for construction. Each trail should be designed based on its type, level of use and specific site conditions.)

All pedestrian trails (Bruce's' Mill, Forest – Short, Forest - Long, Lookout, Maple Syrup, Butterfly Meadows)
The majority of the trails at BMCA will be built to the hiking trail design standards of TRCA (see Figure F1).

Figure F1: Trail design standards for hiking trails



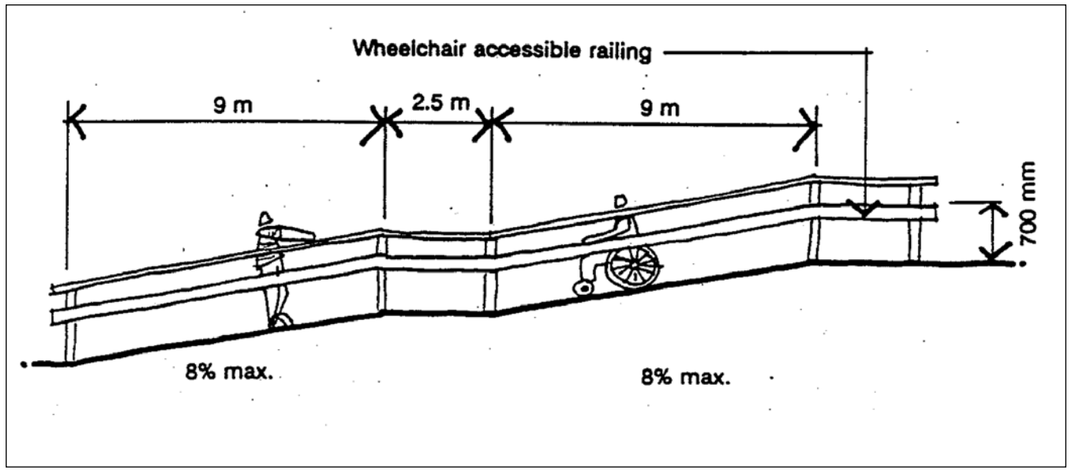
General Design Standards – Minimum

- Clearing Width: ..... 1 metre
- Clearing Height: ..... 2.5 metres
- Tread Width: ..... 0.5 metres
- Tread Surface: ..... natural terrain
- Desirable Grades: ..... 0-20 per cent
- Maximum Sustained Grade: ..... 25 per cent
- Form: ..... linear or loop

Minimum trail standards for a hiking trail provided for a low to moderate level of use is a cleared ROW with minimum grubbing and no special tread surface (e.g., a natural trail). Although multi-use trails generally allow for a natural system of habitat patches, trails may contribute to a reduction in the quality of the natural system. Therefore, careful trail planning, including decommissioning trails which are inappropriately located, is recommended to protect the numerous sensitive areas at BMCA.

Multi-Use Trail (multiple users)
The Multi-Use Trail is designed to accommodate visitors who choose to access BMCA via bicycle, while also accommodating other users (e.g. hikers). As such, the trails will be designed according to TRCA's combined use trail standards for rural and/or low intensity use areas (see Figure F2).

Figure F2: Trail design standards for universal access



General Design Standards – Minimum

- Clearing Width: ..... 4.0 metres
- Clearing Height: ..... 3.0 metres
- Tread Width: ..... 3.0 metres
- Tread Surface: ..... compacted stone fines
- Desirable Grades: ..... 0-3 per cent
- Maximum Sustained Grade: . 6 per cent
- Form: ..... linear, loop, stacked loop, and satellite loop

Bruce's Mill Trail – Spur Trail (universal access)
The spur trail of the Bruce's Mill Trail that leads from the Mill to the parking lot will be built to the universal accessibility trail guidelines of TRCA (see Figure F2).

General Design Standards – Minimum

- Clearing Width: .....3.0 metres
- Clearing Height: .....3.5 metres
- Tread Width: .....1.5 metres
- Tread Surface: .....limestone screening
- Desirable Grades: .....0-5 per cent
- Maximum Sustained Grade: .....8 per cent
- Form:.....loop or satellite loop

2.0 Trail Impacts and Mitigation Techniques

The major sources of disturbance to the environment include clearing of the trail route, human contact with wildlife, soil erosion, trail side trampling and shortcutting. Key potential causes of disturbance and their recommended mitigation methods are listed below.

2.1 Clearing the Trail Route

Clearing the trail refers to the actual creation of a trail according to the above-noted trail design standards. It may also refer to amendments and repairs to existing trails. Correctly routing the trail and implementing trail construction and clearing will help eliminate many of the potential impacts caused by clearing. Of course, clearing by its very nature will always result in some impact, but the type and extent of impact can be controlled through careful planning, design and implementation.

Recommendations

- Route the trail to avoid important ecological elements, cultural features, rare plants and important habitat zones.
- Strictly control the limit of disturbance to within the defined ROW zone.

2.2 Human Contact

Wildlife species and plant communities have different environmental levels of tolerance to human activity that could result in abandonment of habitats or ecological imbalances. As a result, trail routing and accompanying signage should focus on preventing disturbance to sensitive or rare species through avoidance of associated habitats. Education and proactive approaches such as signage and positive interpretation can also help ensure that interactions between humans and wildlife within BMCA are positive.

Recommendations

- Ensure that detailed trail routing is conducted both on site and using detailed natural heritage mapping to route trails appropriately for species of concern, interior forest, ESAs and other natural features.
- Erect signage and provide interpretive sites along the trail to encourage viewing opportunities that are safe for both humans and wildlife and minimize the potential negative impacts of human contact with wildlife.
- Decommission trails that currently travel through ecologically sensitive areas, including interior forest habitat and other areas deemed ecologically sensitive through the natural heritage approach.
- Apply all of the above recommendations to aquatic as well as terrestrial habitats within BMCA.

2.3 Environmental Impacts Created by Overuse

Environmental impacts caused by overuse can include trampled vegetation, slope erosion, soil compaction, increased root exposure and trail widening around wet areas. These impacts can negatively affect the surrounding natural area and features over time. The result is a spreading, compacted trail system that not only affects the ecological quality of the surroundings, but also negatively affects the user experience.

Recommendations

- Avoid important habitat zones.
- Favour the natural environment where there is a question regarding specific impacts.
- Locate activities for large groups and noisy recreational activities 100-200 metres away from ESAs.
- Avoid the use of large-scale equipment for construction and schedule construction operations at times that do not conflict with critical phases of seasonal wildlife.
- Provide limited access to sensitive habitat areas through small tributary trails and then only when kept to an acceptable level as determined by qualified TRCA staff, or discourage completely.
- Develop viewing stations to allow visitors to view sensitive areas from suitable distances.
- Control use by turning tributary trails into dead ends to minimize flow-through circulation.
- Design tributary trails to be suitably difficult to encourage only serious users. Lessen trail width and, where applicable, downgrade the trail surface. This will provide an immediate message to the user.
- Monitor trail condition throughout the year and relocate trails as required.
- Restrict access to specific areas during critical seasons of the year and, where necessary, close trails during spring melt or other significant weather events to prevent damage and reduce risk to human safety.

2.4 Soil Erosion

Erosion is the natural process through which soil and rock are worn away by wind and water. Trail erosion can be accelerated by a combination of users, water and gravity. When left unmitigated, erosion can destroy a trail and damage the surrounding environment (IMBA 2004).

Erosion affects functional utility, safety, ecological balance and aesthetics. The effects include loss of topsoil, root exposure, stream sedimentation, contaminations of water supplies, and slides and slumping. Erosion is caused by erosion-susceptible soils (especially when wet), excessive removal of vegetation, excessive compaction due to trampling, uncontrolled surface runoff, and improper installation of bridges and culverts. Erosion is often a problem on steep grades. When runoff water concentrates, it cuts into the soil. This forms single or numerous channels referred to as gullies. The development of gullies is common on steep slopes where there is concentrated water runoff (IMBA 2004).

Bruce's Mill Conservation Area has a significant number of groundwater discharge areas. These areas tend to remain wet year round, thus making them particularly sensitive to erosion from trail use. Trails should be planned and designed accordingly with boardwalks and other construction features offering possible solutions to minimize impacts from trails.

Recommendations

- Locate trails where soils are most resistant to erosion.
- Use tread surfacing or bridging to protect soil. Provide dry walking surfaces in wet areas or poor soil conditions, particularly in groundwater discharge areas.
- Ensure proper control of drainage on sloping trail sections by use of waterbars or culverts. Cross-slope the tread in the direction of the natural grade.

- For areas in and out of a valley only, locate trails diagonally across slopes rather than directly down the face of a slope, at an angle that will sufficiently lower the trail grade to a suitable level.
- For low use hiking trails, incorporate natural trail dips into the trail surface to divert drainage at frequent intervals of 50-75 metres.
- Install “waterbars” to provide trail crossings for runoff where cross slope and grade dips are inadequate. Generally, a waterbar will provide a more efficient means of drainage where the grade along the length of the trail is less that 2 per cent, thus minimizing ponding.
- Use switchbacks on steep slopes to maintain optimum grades.
- Slope cross section of tread a minimum of 2 per cent to direct small amounts of water across the trail surface.
- Intercept excessive runoff with ditches and a central crown and provide periodic crossings of culverts to minimize runoff build-up.
- Maintain vegetation as close to the trail edge as possible to stabilize soil and encourage percolation of water into the soil.
- Ensure proper siting and design of culverts and bridges to provide for adequate peak drainage flows. Minimize disturbance to stream beds and banks; locate on straight sections of streams parallel to flow. Construct bridges as they are more suitable than culverts for large streams.

2.5 Trail-Side Trampling

Damage to vegetation and soils occurs when users wander off trails. This happens due to overly narrow trails, overuse, ill-defined trail edges and difficult or unsafe trails (muddy, eroded, blocked, subject to mud slide, etc.).

Recommendations

- Provide trail widths that can accommodate expected traffic volume based on design standards.
- Provide widenings where people are likely to gather (viewing points, features of interest, interpretive displays, etc.).
- Raise the trail tread by using boardwalks.
- Restrict use to optimum levels through management controls such as signage or temporary closures.
- Perform frequent checks to ensure that deadfalls do not block or obscure trails.
- Use logs, branches and rocks to mark trail edges wherever problems occur in keeping users on trails.
- Designate travel routes for maintenance vehicles within BMCA. Keep vehicles off sensitive terrain and non-designated routes.
- Consider applying special tread surfaces to routes designated for maintenance or emergency vehicle access to reduce compaction and erosion problems.

2.6 Shortcutting

Damage to vegetation and soils occurs when users wander off trails. This happens if trails are too difficult or unsafe, if the user is attracted to an interesting feature off trail, or if an easier route is visible.

Recommendations

- Use natural features such as land form and vegetation to block or screen potential shortcut routes. Placing rocks or planting shrubs provides a suitable natural deterrent.
- Restrict construction of switchbacks to only the most essential circumstances as these provide ample opportunity for shortcutting and will generally require numerous introduced deterrents such as planting or rock placement.
- Locate switchbacks with dense vegetation or rough ground between to eliminate the need for constructed barriers.
- Build in rough steps with boulders or logs on switchbacks to channel shortcutting traffic along a predetermined route.

3.0 Trail Construction

In addition to the impact yielded by on-going use, the actual trail construction process results in various impacts to the environment. These can include pruning, removal of vegetation and soil compaction caused by construction machinery traveling repeatedly over the same access route. Great care must be taken to control direct and indirect impacts during the construction process. Work done on existing and new trails should be completed to minimize the amount of disturbance to the site.

3.1 Timing

Timing of construction is important.

Recommendations

- Avoid construction during wet/rainy periods and nesting/breeding seasons to minimize impact.

3.2 Clearing

The clearing operation refers to cutting of trees and to removing all materials that may obstruct movement along the trail, thus creating a potential hazard. Prior to clearing, a tree impact assessment will be completed to describe the trees, numbers, species, condition and location. The assessment will ensure appropriate trail routing with acceptable environmental impact. Large trees will be felled and stumps will be cut off flush, or preferably below grade, and removed completely from the trail. Complete flush-to-grade clearing will generally occur on the tread surface, while the rest of the cleared right-of-way (ROW) will only see the removal of trees and large shrubs. Smaller shrubs and groundcover will remain.

Recommendations

- All natural wastes should be removed from the site and disposed of properly. Natural materials can be left on site but spread out so as not to cause a fire hazard.

3.3 Surfacing

The existing grade should not be unnecessarily disturbed to obtain a trail base, especially on flat, solid ground. Minimum disturbance will provide the best natural image for the final product. When native soil is not a suitable tread surface to carry a specific user or does not provide adequate support, special tread surfaces can be provided. The surfaces should provide an appropriate level of comfort and safety for the user and should be constructed to blend in with the surrounding environment.

A mulch-type surface (bark/wood chips) is attractive and compatible with the natural environment, but does not compact well. It is therefore not suitable for heavy-use foot traffic, or multi-use trails.

Recommendations

- Wood chips should be placed on the trail in sections where root exposure is extreme or drainage is a slight problem.
- Where wood chips are required they should be laid down the width of the tread at a depth of 50-75 millimetres. Chips should be no larger than 50 millimetres by 10 millimetres thick. Subgrade preparation is generally not required for this application.

3.4 Boardwalks

The boardwalks should be constructed on site. Generally, the construction involves untreated timber and planking fixed on timber posts, large flat rocks or concrete piles. A variety of configurations are possible depending on whether the boardwalk is a simple walkway or a lookout platform, and whether it overhangs a slope or a water body. Boardwalk construction should consider the level of use and the potential for vandalism, and should be constructed to withstand both as best as possible. The construction technique for a particular application should conform to local building codes.

Recommendations

- Where drainage becomes a safety concern, boardwalks should be used. Boardwalk construction or improvements are required in a number of locations along BMCA trails.
- A detailed site assessment should be conducted prior to construction.

3.5 Barriers

Barriers can be constructed from a variety of materials including rock, timber or steel. Care should be taken to choose a material and appropriate barrier to meet safety requirements while still being able to blend into the natural landscape. “Green” barriers may also be suitable in certain situations (e.g. hawthorn, raspberry bushes, etc.).

Recommendations

- Barrier construction may be required in certain locations in BMCA, such as the proposed Heart Lake Trail to ensure public safety along the lake edge.
- Natural barrier construction will be required along the northern section of the Peel Trail to deter trail users from venturing off the trail into sensitive habitat.
- Careful assessments of all potential barrier sites should be conducted prior to constructing or establishing any barrier.

4.0 Trail Management

Environmental concerns identified in this study include the need for trail rehabilitation and/or closure. Measures such as the rerouting of trails, trail edge definition and structures will help to protect sensitive areas.

A trail implementation sub-committee of the BMCA Stewardship Committee should be established to report to TRCA about ongoing trail management and maintenance.

4.1 User Management

Trail operation involves managing the type, volume and season of trail use to achieve the goal and objectives for trail development and management. The elements of user management include monitoring volume of use, type of use and effects of use on the trail management objectives; implementing trail restrictions; and informing users through newsletters, brochures, maps and signs of the types and levels of use intended for the trail.

4.2 Managing Trail Use

Restricted use may be necessary on trails where there is concern for safety, significant conflicts, unacceptable resource damage or when operation and maintenance costs are excessive due to overuse, type of user or seasonal conditions. The trails should be actively monitored and closed as required to protect the environment.

In the case where trails are to be decommissioned, several practices can be adopted:

- Frequent patrolling of trail by maintenance and/or security staff or responsible user groups.
- Remove trail signage or interpretive posts; remove bridges or other access features; allow natural regeneration of the trail; erect barriers (plantings, fences, gates or natural stone blocks); erect positive signage describing the reasons for the closure; and where possible describe nearby alternatives.

- The decommissioning of trails, especially well established, long-term trails, can result in negative reactions from user groups. For this reason, it is important that the process be open and involves public outreach and education. A key group to assist in this work will be the BMCA Stewardship Committee, along with local hiking, cycling or trail groups.

- In cases where trail uses are to be restricted, such as restricting bicycle use while permitting pedestrian use, providing barriers may help restrict the former while allowing the latter access. The decision to erect barriers, in addition to signage in this instance should be carefully considered and analyzed, and any barriers erected must be frequently monitored to ensure that the barrier is successful. In this instance, monitoring will involve determining whether or not the undesired use is in fact being restricted, or whether users are simply creating new trails or access areas.
- Advisory restrictions include posting of notices to warn users of ongoing maintenance works, fallen trees or other natural conditions that potentially restrict trail use. Positive signage communicates a “good host” image and explains why a particular behaviour is requested. Negative signage should be avoided.
- Community involvement and support for prohibitions prior to taking action will help in enforcing restrictions. Notices of restrictions should be shown on maps as well as newsletters and trail guides.

5.0 Maintenance

A well-designed and constructed trail system is the foundation for many enjoyable years of walking, hiking and cycling. To keep the trails safe, functional and attractive through the years, a routine maintenance program is necessary. Maintenance should be carried out on a regular basis by TRCA staff with the help of the Stewardship Committee to prevent the trails from falling into disrepair.

5.1 Surface Treatment

The material on top of the trailbed can provide the desired tread, thereby minimizing the impact of the user on the trailbed and surrounding flora. The three most important factors to consider when providing a special tread surface are firmness, evenness and dryness. Surface treatments can be used to lessen the compaction of soil, provide a dry surface for users, and prevent potential erosion and abrasion. Trails can be surfaced with asphalt, a boardwalk, dirt, rock, gravel, sand, mud, snow, grass and other substances, depending on the user group and their needs (IMBA 2004; TRCA 1992).

A firmer tread and even grades are generally required on trails traveled by bicycles, those with mobility problems and for persons using wheelchairs. Strength of the tread and the underlying soil becomes a factor on trails traveled by maintenance vehicles (TRCA 1992).

Recommendations

- Fill low spots with native soil or woodchip mulch.
- Where root exposure is hazardous, cover with mulch to protect the roots from further damage.

5.2 Erosion

As mentioned in Section 6.7.4, erosion affects functional utility, safety, ecological balance and aesthetics. Minimizing and mitigating erosion is important to keeping the trails at BMCA in good working order.

Recommendations

- Monitor trails for erosion damage.
- Fill channels eroded through trails with appropriate compacted material.
- Give prompt attention to serious damage while diverting trail traffic for safety reasons.
- During periods of snow melt or heavy rain fall, such as in spring and fall, close certain trails to minimize damage to trails and risk to human safety.

5.3 Litter Removal

A common phrase among hikers is “Take only pictures; leave only footprints.” The latter half of this motto applies well to the idea of trash on trails. As more people use the trails at BMCA, there is a greater potential for litter along the trails. While not every trail user will follow the idea of leaving only footprints, the provision of waste receptacles along the trails and at trail heads will help to reduce the trash that lies along the trails and their surroundings.

Recommendations

- Discourage littering though the provision of sufficient and properly located waste receptacles. Receptacles should be located at all parking, access and trail head locations, and in areas that will receive higher traffic and that will likely be used as rest stops. Receptacles should be durable and secured to minimize the risk of vandalism and damage.
- Ensure that garbage left along the trails by users or blown in from adjacent properties is picked up on a regular basis.
- Check for garbage periodically, especially in high use areas.

- Separate bottles and tin cans from other garbage for recycling.
- If excess litter becomes a problem, consider organizing clean-up days and providing scavenger-proof disposal bins at access points and trail heads.

5.4 Invasive Vegetation Control

These plants include dog-strangling vine, purple loosestrife, garlic mustard, European buckthorn, dame's rocket, Norway maple, Manitoba maple, Russian olive and Japanese knotweed.

Recommendations

- Mechanical methods (digging/hand-pulling) may be useful in controlling or eradicating small infestations, and preventing the establishment of new colonies in unaffected areas. However, many invasive plants are very resilient, and can withstand several years of top-growth removal.
- Toronto and Region Conservation and the Stewardship Committee should research the application of herbicides.

5.5 Pruning and Trimming

All pruning and trimming of trees along trail routes shall be subject to the standards and guidelines established in TRCA's Policy for Managing Hazard Trees and the associated Operational Procedures for Managing Hazard Trees.

Recommendations

- Remove major limbs or trees adjacent to the trail that are in poor condition.
- Remove branches, limbs and any other debris on the trail tread. These can be piled to encourage wildlife use or used as trail edges.
- Using pruners or loppers, prune back branches leaning into the trail ROW and prune off at ground level any woody sapling growth in the ROW.
- Conduct sensitive vegetation control on a semi-regular basis. This is necessary to ensure that the path is not crowded or blocked while maintaining natural character along the path edge.

5.6 Windfalls/Hazard Tree Removal

Hazard tree removal along trail routes shall be subject to the standards and guidelines established in TRCA's Policy for Managing Hazard Trees and the associated Operational Procedures for Managing Hazard Trees.

Recommendations

- Monitor trails for fallen trees, limbs and debris, and coordinate their removal as soon as possible.
- If material cannot be removed immediately, eliminate dangerous hanging branches and trunks or "leaners." Cut a path through fallen tree debris to allow user thoroughfare and leave remainder in place. Extra debris in the ROW may be cleaned up at a later date.
- Leave in place tree trunks that have fallen over pedestrian trails, with the exception of the section of the tree blocking the clearing width of the trail, which will be cut and removed to allow pedestrians to cross.
- Redirect trail users during the clearance work or close the trail to ensure user safety.
- Remove debris entirely in trail head areas. In natural areas, the trunk and debris may be left to encourage wildlife use, but they should be deposited out of sight from the trail.
- Ensure the trail is returned to its intended condition after completion of maintenance. This may involve repairs to the trail surface.

5.7 Structures

Trail structures may include bridges, drainage structures, raised trails, stairways, retaining walls and barriers. The first consideration of providing a trail structure is to actually determine the need. Structures are expensive and should only be used where they are essential to retain the level of comfort and safety on the trail. The type of structure should be designed to reflect the natural surroundings. As a general rule, natural materials are best, and if possible, local materials should be used (TRCA 1992).

Recommendations

- Inspect all structures for safety and stability on a yearly basis. A monthly check is also useful for preventing major damage or accident.
- Monitor boardwalk decking and support members on a regular basis. Replace broken or rotting wood immediately.

5.8 Signage

Trail signs are an important element that enhances the trail experience and provides guidance to the user. There are four major functional types of signs: identification, directional, regulatory and interpretive (please refer to TRCA's Trail Planning & Design Guidelines for more detail). All signs should be placed so that they face the anticipated direction of traffic, are unobstructed by vegetation and are easy to read and understand. Signs should be mounted at a height appropriate to the specific user (TRCA 1992).

Recommendations

- Check to ensure that signs have not been removed or repositioned. Replace missing signs as soon as possible, even if a temporary sign is required.
- Replace or repair damaged signs as soon as possible to maintain trail quality and direction.
- Evaluate signage on a regular, yearly basis to maintain finish and message quality.
- Straighten and secure posts.
- Install seasonal signs with appropriate sign posts. Remove them promptly when their message is no longer appropriate or necessary.

6.0 Monitoring and Management Systems

An operations system is required to plan, schedule, perform and evaluate maintenance activities. The following guidelines outline the development of such a system. Toronto and Region Conservation should encourage user groups to actively participate with the Trail Implementation Sub-Committee in this program.

1. Establish Maintenance Objectives
These may vary from trail to trail depending on traffic flow or special trail features such as ESAs. The major objectives will include (1) ensuring user safety and (2) maintaining the trail and its amenities at a level consistent with the design and planning standards. This may also involve undertaking seasonal trail closures if deemed appropriate through monitoring.

2. Evaluate Trail Needs
This process of making lists of maintenance tasks and seasonal requirements would be required to satisfy the maintenance objectives. It may be determined that certain trails will require closure or seasonal signage as a part of this evaluation of trail needs. These would prevent safety hazards and negative impacts on the trail and surrounding ecosystem due to inappropriate use during certain times of the year (e.g., washouts due to rain or snowmelt).

3. Develop a Maintenance Program
Condense the maintenance tasks and seasonal requirements into a preliminary schedule. Use this schedule to determine the number of crews required to complete the program and the number of staff per crew. With this information, an initial inventory of hand equipment and power equipment, including motor vehicles, can be determined. Of course, the maintenance budget becomes a factor in all these decisions.

4. Establish a Trail Monitoring System
To facilitate prompt repairs along a trail system or to determine if a trail needs additional seasonal maintenance, trails must be monitored regularly. This involves a thorough inspection of the trails, reporting all deficiencies and their location in a log format. Specific tasks can be assigned a code number for ease of reference and execution by staff.

5. Schedule and Record Maintenance
Regular maintenance can be scheduled on a yearly basis. This forms the basic structure of the maintenance program for which labour and equipment can be allocated. However, special maintenance (such as windfalls or vandalism, which are unplanned occurrences) must also be given attention during scheduling. Schedules will become the basis for work orders. As the work orders are completed by staff on the trails, work reports should be kept detailing the tasks completed, time required and work conditions (such as sun, rain, brush, bog, etc.). These work reports should be filed according to each particular trail and can be used to develop activity summary sheets or work standards. Activity summaries should be reviewed every two to three years to ensure that they conform to the work on the trails. The summaries can be used to evaluate efficiency or work crews and create time-efficient maintenance schedules.

6. Maintenance Evaluation
The trail logs and work reports should be reviewed on an annual basis, if not more frequently, to determine excessive trail use, vandalism, damage and environmental degradation. This information must be communicated to trail planning and routing authorities so that they can

reassess the trail routes. This evaluation may result in trail closures, upscaling, downscaling or rerouting.

7.0 Vandalism

Trails are subject to many forms of vandalism including the carving, defacing and misuse of washrooms, shelters, benches, picnic tables and trees. Such acts of willful or negligent destruction require both preventive and reactive attention.

Although very little will stop the determined vandal, many techniques deter casual vandalism or bring the vandal to justice. Bollards, posts or gates should be used to control unwanted vehicular access. Semi-regular police patrols can be used to monitor trail sections that are particularly attractive to vandals. Strategically placed lighting will discourage destructive activity. Lighting should be placed at main trail head locations, and associated buildings wherever possible. Also, all lighting should function on motion sensors and be directional – directed downward, lighting only the area associated with the building or trail head. Perhaps the most important effort that should be made in the prevention and apprehension of vandalism is the education of the public. Various media, including television and newspaper as well as educational programs in schools, can raise public awareness regarding the issues surrounding vandalism.

Within parks and along trails, orientation displays can be used to educate trail users about the damages of vandalism. Trail brochures and eye-catching posters can also service similar functions. Outreach programs to children in their classrooms, as well as sponsoring outdoor education programs, allow TRCA to teach respect for the facilities and foster pride in the natural environment. Neighbourhood Watch and other volunteer surveillance programs should be encouraged to reduce vandalism.

When vandalism does occur, the damage should be repaired as soon as possible so it does not encourage further damage. Sanding out carvings on wood structures and painting over graffiti eliminates the instigation for others to repeat the offence. Frequently damaged objects or structures can be made less susceptible to damage or constructed in a manner that involves easy repairs.

If vandals are caught, they should be prosecuted as an example for others. Tolerance of destructive acts resembles an open invitation to repeat the vandalism with impunity. Trail staff should be trained to be aware of the causes and types of vandalism and how to handle a vandalism incident if they manage to apprehend someone in the act. These reactive measures can serve to significantly reduce the acts of vandalism on trails.

Appendix G: Detailed Implementation Guide

The implementation guides provides details on the phasing and anticipated costs of building and developing the various components of the master plan, with a focus on the public use and recreation plan and the trail plan. This guide should be read in tandem with chapters 5 and 6, which provide context and detail on the public use and recreation plan and the trail plan.

The phasing of the major projects is outlined below. Table G1 provides the major implementation actions referenced by area on the property and by phase. A map showing the areas is included (see Map G1). Approximate costs for each major action are included. The total estimated cost for implementation of the master plan is $2,817,400.

Tables G2 – G10 then detail the anticipated development and implementation costs associated with the programs and facilities detailed in the master plan. Detailed cost estimates will be developed with site plans and funding applications are developed.

Table G11 provides estimates for areas of general improvement that are needed at BMCA, including park road improvements, restoration and habitat improvements, and fencing.

Map G1: Implementation Action Areas at Bruce's Mill Conservation Area

Table G1: Summary of implementation actions by phase and area, with approximate total costs. Details on implementation and costing of each of these items can be found in tables G2 – G11.

IMMEDIATE	SHORT-TERM (1-5 YEARS)	LONG-TERM (5-10 YEARS)
Stouffville Road Park Entrance Area ($74,500)		
	Driveway paving and installation of new entrance sign	
	Removal of existing trailhead, and de-commissioning of associated trail. Realignment of connecting trails as needed.	
	Installation of new trailhead and parking area near gatehouse, including construction of connecting trails as needed.	
North East Field ($110,000)		
		Develop and implement design for recreation area in the northeast field, including installation of fill as appropriate.
Workshop & Operations Building ($32,900)		
		Plantings around workshop and office buildings
		Restoration of former trailer storage area west of the driveway and operations building.
Skills Development Area ($40,000)		
	Installation of skills development area	
Mill & Mill Attendant's House Restoration ($220,000)		
Implement "urgent" recommendations from architectural assessment for Mill building and Mill Attendant's house	Implement phase one recommendations from architectural assessment for Mill building and Mill Attendant's house	Implement phase two recommendations from architectural assessment for Mill building and Mill Attendant's house
Initiation of public consultation process to determine adaptive re-use plans for the Mill building	Completion of adaptive re-use plans for the Mill building. Release of a Request for Proposal (RFP) for implementation of adaptive re-use plans.	Implementation of adaptive re-use for Mill building as per RFP submissions received.
		Install interpretive signage and landscaping
Aquatic Area ($1,543,500)		
		Design and installation of waterplay facility, including any necessary renovations to the Beach House.

IMMEDIATE	SHORT-TERM (1-5 YEARS)	LONG-TERM (5-10 YEARS)
West Fields ($227,000)		
Complete restoration of northern portion of agricultural fields	First phase of restoration of northern portion of agricultural fields, including installation of fill as appropriate	Continued implementation of active recreation area
Develop detailed design for multi-purpose recreation fields	Removal of sports fields and installation of fill to support implementation of plans proposed in RFP submissions	Conduct improvements to west parking lot
New Entrance ($195,500)		
	Construction of new driveway and secondary entrance from Warden Avenue	
Trails ($194,000)		
Replaced dilapidated bridge structures along Forest Trail	Closure of existing Stouffville Road Trailhead and trail, including removal of bridge.	Development of multi-use trail
	Development of new trailhead and connecting trail to Butterfly Meadow area	Installation of interpretive signage
	Improvements to Maple Syrup Trail Extension of Wagon Trail	
	Improvements to Bruce's Mill and Forest trails	
	Installation of directional signage and development of trail guide	
General Improvements ($180,000)		

Table G2: Public Use and Recreation Site Development Costs, Stouffville Road Park Entrance Area

ITEM	UNIT	QUANTITY	UNIT COST ($)	ITEM COST ($)	TOTAL ($)
Roadway and Parking Areas					**51,000**
Creation of parking lot adjacent to gatehouse – 12 spaces (granular surface)	each	1	50,000	50,000	
Bike racks - parking lot and gatehouse	each	2	500	1,000	
Signage					**3,000**
Information and interpretive signs	each	2	1,500	3,000	
Soft Landscape Area					**20,500**
Shrub & tree plantings (entrance, decommissioned trailhead, driveway edges)	allowance			20,000	
Restoration seeding – decommissioned trail entrance area	square metres	350	1.2	500	
TOTAL					**74,500**

Table G3: Public Use and Recreation Site Development Costs, North East Field

ITEM	UNIT	QUANTITY	UNIT COST ($)	ITEM COST ($)	TOTAL ($)
Site Development					**90,000**
Restoration	lump sum			50,000	
Recreation support	lump sum			40,000	
Trail development				Please see table G10	
Building and Facilities					**9,000**
Removal of clubhouse building	lump sum			9,000	
Roadway and Parking Areas					**11,000**
improve parking area and driveway	lump sum			10,000	
bike rack	each	2	500	1,000	
TOTAL					**$110,000**

Table G4: Public Use and Recreation Site Development Costs, Workshop and Operations Building

ITEM	UNIT	QUANTITY	UNIT COST ($)	ITEM COST ($)	TOTAL ($)
Soft Landscape Area					**22,400**
Shrub & tree plantings	allowance			5,000	
Restoration seeding, open lawn areas	square metres	2,000	1.2	2,400	
Restoration of access road west of parking lot	lump sum			15,000	
Roadway and Parking Areas					**10,500**
Improvements to parking area (including driveway)	lump sum			10,000	
Bike rack	each	1	500	500	
TOTAL					**$32,900**

Table G5: Public Use and Recreation Site Development Costs, Skills Development Area

ITEM	UNIT	QUANTITY	UNIT COST ($)	ITEM COST ($)	TOTAL ($)
Ropes course	lump sum	1	40,000	40,000	
TOTAL					**$40,000**

Table G6: Public Use and Recreation Site Development Costs, Mill and Mill Attendant's House

ITEM	UNIT	QUANTITY	UNIT COST ($)	ITEM COST ($)	TOTAL ($)
Mill building					**112,500**
Urgent repairs	lump sum	1	37,500	37,500	
Phase One repairs (1-5 years)	lump sum	1	287,250	75,000	
Mill Attendant's House					**49,500**
Urgent repairs	lump sum	1	49,500	49,500	
Signage					**8,000**
Interpretive signage	Unit cost	4	2,000	8,000	
Soft Landscape Area					**30,000**
Landscaping (including trail edges)				30,000	
Public Consultation & Request for Proposal process					**20,000**
	lump sum	1	20,000	20,000	
TOTAL					**$220,000**

Table G7: Public Use and Recreation Site Development Costs, Aquatic Area

ITEM	UNIT	QUANTITY	UNIT COST ($)	ITEM COST ($)	TOTAL ($)
Building and Facilities					**1,400,000**
Waterplay facilities	lump sum	1	1,400,000	1,400,000	
Walkways and Paving					**13,500**
Access road paving (gravel)	square metres	450	30	13,500	
Trail development				see table H10	
Signage					**50,000**
Interactive watershed model	each	1	50,000	50,000	
Soft Landscape Areas					**80,000**
Shrub & tree planting	allowance		80,000	80,000	
TOTAL					**$1,543,500**

Table G8: Public Use and Recreation Site Development Costs, West Fields

ITEM	UNIT	QUANTITY	UNIT COST ($)	ITEM COST ($)	TOTAL ($)
Southwest Fields					**75,000**
Landscaping				75,000	
Roadway & Parking Areas					**152,000**
Parking lot improvements (500 spaces)	lump sum		150,000	150,000	
Bike racks	each	4	5	2,000	
TOTAL					**$227,000**

Table G9: Public Use and Recreation Site Development Costs, New Entrance

ITEM	UNIT	QUANTITY	UNIT COST ($)	ITEM COST ($)	TOTAL ($)
Roadway, installation and paving	square metres	1,750	90	157,500	
Gates	each	2	1,500	3,000	
Entrance sign	each	1	10,000	10,000	
Soft landscape area	allowance		25,000	25,000	
TOTAL					**$195,500**

Table G10: Public Use and Recreation Site Development Costs, Trails

ITEM	UNIT	QUANTITY	UNIT COST ($)	ITEM COST ($)	TOTAL ($)
Gatehouse Area Entrance and Butterfly Meadow Trail					**11,700**
Closure of Stouffville Rd Trailhead	lump sum	1	2,500	2,500	
Primary trail head	each	1	6,000	6,000	
Interpretive signage	each	2	1,000	2,000	
60m granular trail	square metres	60	20	1,200	
North East Field					**20,000**
Trail development	lump sum	1	20,000	20,000	
Chalet Area Trail Head					**6,000**
Primary trail head	each	1	6,000	6,000	
Maple Syrup Trail					**7,000**
1 km granular surface	square metres	1,000	20	2,000	
Interpretive signage	each	5	1,000	5,000	
Wagon Trail					**5,200**
Extension of trail northward – 4m wide granular trail	square metres	260	20	5,200	
Bruce's Mill Trail					**43,500**
Primary trail head	each	1	6,000	6,000	
Secondary trail head	each	1	3,500	3,500	
Interpretive signage	each	4	1,000	4,000	
Bridges - 2	each	2	7,000	14,000	
New boardwalk sections (80m)	square metres	160	100	16,000	
Chickadee Trail					**41,500**
Secondary Trail Head	each	1	3,500	3,500	
Bridge	each	2	7,000	14,000	
Boardwalk sections	square metres	200	100	20,000	
Interpretive signage	each	4	1,000	4,000	
Pine Trail					**44,500**
Secondary Trail Head	each	1	3,500	3,500	
Bridge	each	1	7,000	7,000	
Boardwalk sections	square metres	200	100	20,000	
2 km natural surface trail	metres	2,000	5	10,000	
Interpretive signage	each	4	1,000	4,000	
Multi-Use Trail					**2,600**
2.6 km on road bike lane	metres	2,600	1	2,600	
General – All Trails					**12,000**
Directional Signage	allowance			2,000	
Trail Guide	lump sum			10,000	
TOTAL					**$194,000**

Table G11: Public Use and Recreation Site Development Costs, Additional Items

ITEM	UNIT	QUANTITY	UNIT COST ($)	ITEM COST ($)	TOTAL ($)
General Park Improvements					**180,000**
Park Road Improvements	lump	1		75,000	
Restoration and habitat improvements	lump	1		50,000	
Fencing improvements	per metre	5,000	11	55,000	
TOTAL					**$180,000**

APPENDICES

Appendix H: Bruce's Mill Conservation Area – Site Securement Report

The following report summarizes the condition of the boundaries of Bruce's Mill Conservation Area, and can serve as a baseline for annual monitoring. The primary issues summarized below include fencing, access and hazards. Field work for this report was conducted in August of 2009.

Fencing
The boundary between Meadowbrook Golf and Country Club and BMCA has sections that are either completely missing or damaged (photos 1-3). Addressing this boundary should be a high priority as it is the main way of controlling access between the two properties. Repair and/or replacement of the fencing along this boundary should be discussed with the Meadowbrook Golf and Country Club.

The fencing on BMCA's western boundary along Warden Avenue is lacking in some locations. Though there does not appear to be any access from this area, a barrier should still be in place to discourage future unauthorized access.

Bruce's Mill Conservation Area's northern boundary along Stouffville Road is fenced in some places, but the fencing is patchy or non-existent. There are large gaps in the fencing that should be repaired, as these areas may be providing unauthorized access points for the public.

Fencing along the eastern boundary of BMCA, where it fronts private property, is in need of serious repair. In many places trees have fallen on the fencing causing damage (photos 6-10). The location of the fence should also be examined, as it may not follow the property boundary.

Access
There are unauthorized access points along Warden Avenue and Stouffville Road. Warden Avenue has two unauthorized access points – one at the southwest corner of BMCA where it borders the Meadowbrook Golf and Country Club (photos 11-12), and the other just north of this point at the access gate to the BMCA service road. The chain and lock on the gate need to be repaired (photos 13-14).

There are two service gates on the south side of Stouffville Road that are currently not secured (photos 15-17). These unauthorized access points create a safety hazard for the public, as in one case an informal trail could lead trail users to the edge of Stouffville Road.

Bruce's Mill Conservation Area is bordered by two private homes on its northern edge. There is access from these properties to BMCA, either through holes in the fencing or through damaged fencing (photos 4-5). Discussion should take place with these landowners and the fences repaired.

Hazards
There is an historic well structure on the south side of Stouffville Road (photos 18-19). The well is in close proximity to the Lewis Site excavation. It is possible that this well site may be removed as part of the road widening on Stouffville Road. If it is not, it should be secured immediately.

Bruce's Mill Conservation Area – Site Securement Report, Photographs

Date of field work: August 19, 2009
Photographs taken by: Steve Roesch and Kevin Thompson

1. Fence damage along boundary with Meadowbrook Golf & Country Club

2. Fence down along boundary with Meadowbrook Golf & Country Club

3. Fence down along boundary with Meadowbrook Golf & Country Club, looking into Bruce's Mill

4. Access from private home on Stouffville Rd.

5. Fence damage and access from private home on Stouffville Rd.

6. Tree fallen on fencing along eastern border of BMCA

7. Tree fallen on fencing along eastern border of BMCA

8. Tree fallen on fencing along eastern border of BMCA

9. Tree fallen on fencing along eastern border of BMCA

12. Service gate next to Meadowbrook Golf & Country Club, along Warden Ave.

10. Corner of fencing along eastern border of BMCA

13. Gate access along Warden Ave. north of Meadowbrook Golf & Country Club

11. Access at boundary between Meadowbrook Golf & Country Club and BMCA, along Warden Ave.

14. Access at gate along Warden Ave. north of Meadowbrook Golf & Country Club

15. Gate access along Stouffville Rd

18. Well on Stouffville Rd.

16. Gate access along Stouffville Rd (view 2)

19. Well on Stouffville Rd. (view 2)

17. Open access along Stouffville Rd.