Lower Grindstone Heritage Lands

Inventory, Issues and Opportunities

Prepared for Cootes to Escarpment EcoPark System

November 2019

Cootes to Escarpment EcoPark System Partners

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Funding for the preparation of this report was generously provided by the Ontario Trillium Foundation. The Ontario Trillium Foundation is an agency of the Government of Ontario.

Project Study Team

North-South Environmental Inc.
Mirek Sharp: project manager, report author and editor, natural heritage expertise
Melissa Tonge: primary report author, natural heritage research
Jennifer Lau Balsdon: editor Issues & Opportunities Report and Classification and Zoning Report, primary author Management Plan
Pauline Catling: data management, contributing report author
Richard Czok: GIS analysis, mapping

Lura Consulting
Susan Hall: public consultation, facilitation
Ryan Adamson: public consultation

Schollen & Company Inc.
Markus Hillar: recreation expertise, contributing report author

Cecelia Paine: cultural heritage expertise, contributing report author

Andlyn Ltd.
Ken Dakin: planning and policy expertise, contributing report author

Project Steering Committee

Tomasz Wiercioch, Cootes to Escarpment EcoPark System Coordinator
Nigel Finney, Conservation Halton
Lindsay Barr, Royal Botanical Gardens
Tys Theysmeyer, Royal Botanical Gardens
Ingrid Vanderbrug, City of Burlington

Cover Photograph: Hendrie Valley by Markus Hillar, 2019

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1.0 Introduction

1.1 Study Context

Between 2007 and 2009, a group of public agencies and organizations consisting of the Royal Botanical Gardens[1](RBG), Hamilton Conservation Authority, Conservation Halton, City of Hamilton, City of Burlington, Halton Region, Bruce Trail Conservancy, Hamilton Naturalists' Club, and Hamilton Harbour Remedial Action Plan, undertook to develop a strategy to protect, connect and restore natural lands and open space between the Niagara Escarpment and Cootes Paradise in Hamilton Harbour[2]. The initiative resulted in the "Cootes to Escarpment Park System Conservation and Land Management Strategy Phase II Report" (October 2009). This report was based on extensive background research, public engagement and stakeholder consultation, and articulates the vision for a new park system in this area. The Phase II report divides the Cootes to Escarpment EcoPark System into six core natural areas referred to as "Heritage Lands", named to reflect the natural and cultural components of each area (Figure 1):

- Borer's Falls-Rock Chapel Heritage Lands;
- Burlington Heights Heritage Lands;
- Clappison-Grindstone Heritage Lands;
- Cootes Paradise Heritage Lands;
- Lower Grindstone Heritage Lands; and
- Waterdown-Sassafras Woods Heritage Lands.

The Cootes to Escarpment EcoPark System faces intense pressures from the surrounding urbanized portions of Hamilton and Burlington, including major transportation arteries such as Highways 403 and 6. The effects of urban growth include stressors such as increased use, additional infrastructure, demand for recreation and educational programs and facilities, and unauthorized use and access. These stressors can be expected to result in damage to sensitive habitats and will jeopardize the long-term health of natural features and their functions. In response to this, the Phase II report recommended a number of actions, one of which was the preparation of a Management Plan for each of the Heritage Lands.

The Management Plans will contribute to achieving the vision of the Cootes to Escarpment EcoPark System as a "protected, permanent and connected natural lands sanctuary from the Harbour to the Escarpment that promotes ecosystem and human health within Ontario's Greenbelt". Thus, the Management Plans will provide guidance for the protection and conservation of valuable natural and cultural heritage resources located within the Heritage Lands, and direct future development and management efforts. Because much of the Cootes to Escarpment EcoPark System is part of the Niagara Escarpment Parks and Open Space System (NEPOSS), the Management Plans will be prepared following the NEPOSS land classifications and zones as a basis for recommending future management initiatives. The Management Plans will provide guidance to the partner agencies in such a manner that they can implement their respective mandates while still providing consistency throughout the EcoPark System.

[1] Royal Botanical Gardens is a charitable corporation which owns and manages its own lands, established by an Act of the Provincial Legislature in 1941. The Board of Directors is comprised of members appointed by both the federal and provincial government, the City of Hamilton, the Regional Municipality of Halton, McMaster University, and RBG Volunteers. Additional Board members are recruited and appointed by the Board itself.

[2] McMaster university also became a partner in the Cootes to Escarpment EcoPark System initiative at a later date.

Most of the Heritage Lands include both publicly and privately-owned lands; however, Lower Grindstone Heritage Lands are unique in that the entire area is either owned by RBG or are public lands, i.e., there are no privately-owned lands within the Lower Grindstone Heritage Lands. The privately-owned lands in the Cootes to Escarpment EcoPark System are referred to as "Privately Owned Outreach Areas". All the Management Plans are restricted to the publicly owned lands (as well as RBG) and are referred to as "Current EcoPark System Lands" in this report. Some consideration is given to adjacent privately-owned lands outside the Heritage Lands where they have bearing on management including context and connectivity.

To date, the Management Plans for Burlington Heights Heritage Lands (Cootes to Escarpment EcoPark System 2014a), Clappison-Grindstone Heritage Lands (Cootes to Escarpment EcoPark System 2016a), Waterdown-Sassafras Woods Heritage Lands (Cootes to Escarpment EcoPark System 2016b), Cootes Paradise Heritage Lands (Cootes to Escarpment Ecopark System 2018), and Borer's Falls-Rock Chapel Heritage Lands (Cootes to Escarpment Ecopark System 2018) have been completed. The Current EcoPark System Lands in the Lower Grindstone Heritage Lands are owned and managed by three partner agencies: RBG, City of Burlington (CoB) and Halton Region (HR) (Figure 2).

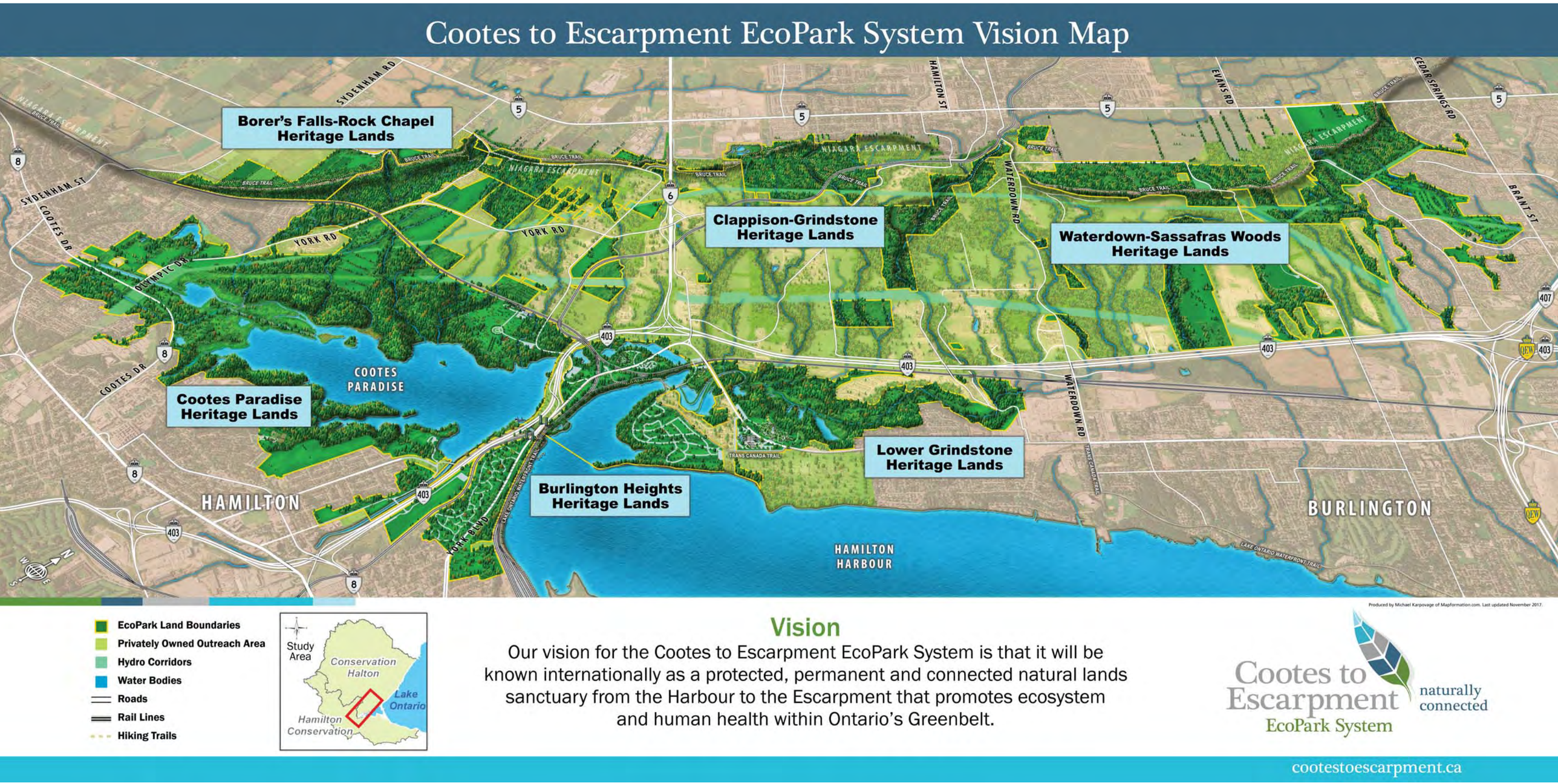


Figure 1. Cootes to Escarpment EcoPark System Study Area Location.

1.2 Purpose and Scope of Work

1.2.1 Purpose of the Management Plan

The overall goal of this project is to develop a comprehensive Management Plan for the Lower Grindstone Heritage Lands. The Management Plan will enhance protection of important natural and cultural features and improve sustainable recreation, research and education opportunities through addressing the following elements:

- protection and sustainable use of natural heritage resources;
- protection and sustainable use of cultural heritage resources;
- pressures and issues of concern identified by the two participating landowners, other Cootes to Escarpment EcoPark System partners, stakeholders and the public;
- wildlife corridors, eco-passages and pedestrian linkages;
- infrastructure maintenance, creation and decommissioning;
- recreation, education and research opportunities that are compatible with preserving the natural and cultural heritage of the area; and
- criteria and indicators for evaluation of the implementation and effectiveness of the Management Plan and an ongoing monitoring program to consistently collect supporting information.

1.2.2 Scope of Work

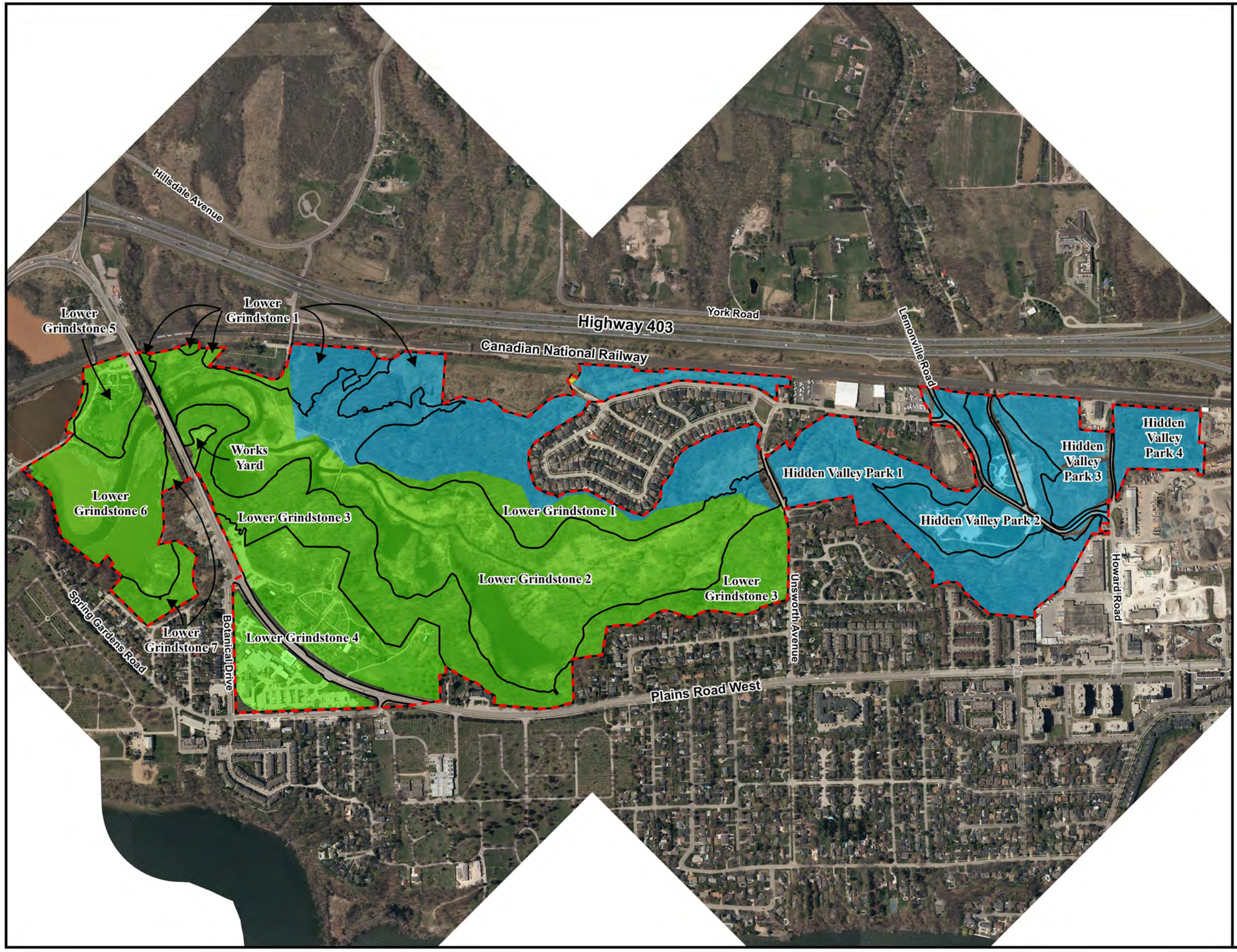
This report is a technical background report that will facilitate the development of the Management Plan for the Lower Grindstone Heritage Lands (Figure 2). This overall study contains a number of important milestones, including (with approximate completion date):

1. Project Charter (undertaken by Steering Committee);
2. Draft Resource Inventory, Issues and Opportunities Report (June 2019);
3. Final Resource Inventory, Issues and Opportunities Report (August 2019);
4. Draft Land Classifications and Zoning Report (June 2019);
5. Final Land Classifications and Zoning Report (August 2019);
6. Draft Management Plan (September 2019);
7. Public Meeting to Present Draft Management Plan (November 2019); and
8. Final Management Plan (December 2019).

This current report provides the planning context and policy framework for the entire Lower Grindstone Heritage Lands. However, the inventory of the natural heritage, recreational and cultural resources is restricted to the Current EcoPark System Lands, as are the management issues and preliminary management opportunities. Later reports will provide land classification and zoning and present management recommendations.

Cootes to Escarpment EcoPark System Lower Grindstone Heritage Lands Inventory, Issues and Opportunities

Figure 2: Management Units



Legend

Current EcoPark System Lands

- City of Burlington
- Halton Region
- Royal Botanical Gardens
- Management Units
- Heritage Lands Boundary

N W E S

0 100 200 400

Meters

Cootes to Escarpment EcoPark System

November 19, 2019

1.3 General Overview

Management Plans for the Burlington Heights, Clappison-Grindstone, Waterdown-Sassafras Woods, Cootes Paradise and Borer's Falls-Rock Chapel Heritage Lands were completed between 2014 and 2018. The Management Plan for Lower Grindstone Heritage Lands is currently being undertaken and is the final Management Plan to be developed for the EcoPark System.

The Lower Grindstone Heritage Lands comprise of 143.8 ha of land within the City of Burlington in an area extending generally between Plains Road West and Howard Road to the east and bordered by the CN railway to the north. The entire 143.8 ha is currently owned and managed by three partner organizations (the Current EcoPark System Lands) (Figure 2). The majority of the Current EcoPark System Lands are owned by RBG (90.2 ha) and the City of Burlington (53.6 ha), with a very small area owned by Halton Region (0.03 ha). To the south and east, Lower Grindstone Heritage Lands is located adjacent to residential and municipal infrastructure, and two urban cemeteries (Woodland Cemetery and Holy Sepulchre Cemetery West, City of Hamilton) which provide smaller scaled open space areas. Lower Grindstone Heritage Lands also connect directly to the Burlington Heights Heritage Lands (on the west) and Clappison Grindstone Heritage Lands (to the north).

Lower Grindstone Heritage Lands includes several recognized environmental designations including: a Provincially Significant Wetland (Hendrie Valley-Lambs Hollow Wetland), Urban River Valley, Significant Woodlands and other Natural Heritage System components (e.g., buffers) in the Region of Halton's Official Plan which serve to support natural processes necessary to maintain ecosystem services and ecological integrity. On adjacent lands to the north, the Heritage Lands also connect to the Grindstone Creek Valley Life Science ANSI. The character of the Heritage Lands is largely defined by Hendrie Valley (Grindstone Creek Valley), marshlands and Grindstone Creek.

The Heritage Lands include a diverse network of trails including: Grindstone Marshes Trail, Old Snake Road Trail, Bridle Trail, Creekside Walk Trail, and Hidden Valley Multi-Use Trail. The Heritage Lands also contain a traditional urban park and sport facilities (Hidden Valley Park), RBG Centre and numerous cultivated garden areas (e.g., Laking Garden, Hendrie Park). Lower Grindstone Heritage Lands are used extensively by hikers, dog-walkers, birdwatchers, nature enthusiasts and the surrounding community due to their aesthetic, recreational and natural values. The rich history of the area and significance of the botanical gardens has resulted in a number of significant cultural resources. The area provides spectacular views of Hendrie Valley, deciduous forests, marsh communities and Grindstone Creek.

Some of the current EcoPark System Lands support existing infrastructure including hydro and gas lines which intersect the site. A number of additional utilities border the site including a railway situated at the northern edge.

1.4 Study Methods

1.4.1 Project Governance and Study Team

The Lower Grindstone Heritage Lands Management Plan project is directed by a Steering Committee and will receive input and comment from Stakeholders, Indigenous Peoples, and the public. The Steering Committee consists of representatives from RBG, CH, CoB, as well as the Cootes to Escarpment EcoPark System Coordinator.

Responsibilities of the Steering Committee are as follows:

- assist with substantive decisions concerning preparation of the Lower Grindstone Heritage Lands Management Plan;
- organize input, feedback and review from the perspective of each partner organization at pertinent points through the process of Management Plan development; and
- provide guidance to the Project Team and the Cootes to Escarpment EcoPark System Coordinator.

The role of Stakeholders is to provide advice and input at various phases of the Lower Grindstone Heritage Lands Management Plan, as determined by the Steering Committee and the Cootes to Escarpment EcoPark System Coordinator. Members include individuals and representatives from organizations that are affected by and/or can provide useful input to the Management Plan.

The Project Team is led by North-South Environmental Inc. (project management and natural heritage expertise), and consists of LURA (public engagement expertise), Schollen & Company Inc. (recreation expertise), Cecelia Paine (cultural heritage expertise) and Andlyn Ltd. (planning expertise). Responsibilities of the Project Team are as follows:

- responsible for undertaking the project and all aspects of Management Plan development;
- facilitate and record stakeholder and public input;
- communicate with and take direction from the Cootes to Escarpment EcoPark System Coordinator and Steering Committee; and
- provide regular progress reports as required by the Cootes to Escarpment EcoPark System Coordinator.

1.4.2 Community Engagement

During Phase 2 of the management planning process (i.e., Inventory, Issues and Opportunities) the Project Team, in collaboration with the Steering Committee, developed a combined Community Engagement and Communication program for the Lower Grindstone Heritage Lands Management Plan that provides an opportunity for key stakeholder groups, as well as the general public, to participate in the development of the Management Plan.

A series of engagement strategies and six overarching goals to guide the engagement process were identified. The goals are:

- ensure that all stakeholders (community groups, service clubs, local agencies and institutions, businesses, and municipal staff, etc.) have the opportunity to participate in the development of the Management Plan, to the extent that they are willing and/or able to do so;
- provide interesting and stimulating discussion forums, which will enable everyone to be engaged in meaningful discussion about the development of the Management Plan;
- actively engage and inspire key audiences in the creation of the Management Plan through the use of innovative tools and techniques;
- ensure that participants are informed and kept up to date on the progress of the Management Plan;
- inform the development of the Management Plan through a collaborative and participatory process; and

- promote and engage a natural resource stewardship ethic among Cootes to Escarpment EcoPark System users.

The engagement and communications program includes seven key engagement components that will be rolled out throughout the next phases of the project (Table 1).

Table 1. Key Engagement Components.

Developing a Stakeholder List

A comprehensive stakeholder list that included 10 individuals and stakeholder organizations with a potential interest in the Management Plan was developed and organized under three categories:

- Complete List: includes all potential stakeholders, the intent being that this represents all people who should be notified about the project and receive invitations to the Community Meetings.
- Stakeholders to gather information from: includes a subset of the complete list and represents stakeholders that we expect can provide information on inventory, existing conditions and potential management issues and opportunities. They were invited to Information Gathering Sessions.

Stakeholder Workshop

A workshop invitation was extended to representatives from key stakeholder organizations with a broad geographic interest in the area. The workshop will be offered twice throughout the development of the Management Plans, and is comprised of representatives from:

- Burlington Historical Society
- City of Burlington, Department of City Building
- Ontario Heritage Trust
- MNRF – Aurora District
- MNRF – Niagara Escarpment Commission
- Hamilton-Burlington Trails Council
- Hamilton Waterfront Trust
- Burlington Green Environmental Association
- Bicycle Works
- Hamilton-Burlington Trails Council

Information Gathering

Information gathering was carried out on an individual basis to discuss management issues and gather information on natural heritage, cultural, recreation resources and planning. The consultant team reached out to external participants representing government and conservation authorities (including Conservation Halton, and the City of Burlington), business and development organizations, local utilities and transit, as well as environmental, trails, community, agricultural and heritage groups. Participants engaged in facilitated discussions and shared information through emails and phone conversations to identify any data gaps, issues and opportunities for management of the Heritage Lands.

1.4.3 Data Collection and Analysis

In order to organize information and prepare a format for reporting information within the Lower Grindstone Heritage Lands, the Current EcoPark System Lands were subdivided into management units and named based on ownership and habitat similarity (Figure 2). The 12 Management Units listed below are referred to throughout this report, and are as follows:

- Hidden Valley Park 1 - 4
- Lower Grindstone 1 - 7
- Works Yard

Available background information and data were collected from the various partner agencies and a list of available reports, data sets, and maps was compiled (Appendix 1). This list was used to keep track of requested and received information, as well as the source of each Geographic Information System (GIS) layer for metadata purposes.

Although not a principal component of this study, targeted fieldwork was undertaken within the Current EcoPark System Lands to gain an understanding of recreational use patterns, management issues and opportunities. Table 2 provides dates and locations visited.

Table 2. Fieldwork dates and locations.

Date	Locations
Jan 30, 2019	Windshield survey of Lower Grindstone 4, 5 and 6
February 19, 2019	Windshield survey of Hidden Valley Park 1, 2 and 3
May 1, 2019	Reconnaissance Site Visit with members of the Project Team: Hidden Valley Park 1-4, Lower Grindstone 4, 5 and 7
May 31, 2019	Site investigation of Lower Grindstone 1, 2, 4, 5, Works Yard, Hidden Valley Park 1-3
June 6, 2019	Site investigation and photography of Lower Grindstone 1, 2, 4, 5, Hidden Valley Park 1-3
June 10, 2019	Hidden Valley Park 1-4; Lower Grindstone 1-4 and 6
June 19, 2019	Hidden Valley Park 1 and 2; Lower Grindstone 1-4, and 6

1.4.4 Method for Planning Inventory

To prepare the planning review, the following source documents were referenced:

- Provincial Policy Statement 2014
- Growth Plan for the Greater Golden Horseshoe 2019

- Greenbelt Plan 2017
- Greenbelt Plan Maps
- Parkway Belt West Plan as amended
- Parkway Belt Land Use Regulation 482/73
- Region of Halton Official Plan (2018 Office Consolidation)
- City of Burlington Official Plan (2017 Office Consolidation)
- City of Burlington Zoning By-law 2020
- Conservation Authority Regulation Limits (GIS layer)

Information collected from the planning analysis was incorporated into a Planning Characterization Matrix (Appendix 2) that summarizes the planning, policy and legislative framework for each Management Unit. A detailed planning inventory was prepared and is provided in Appendix 2.

1.4.5 Method for Recreation Inventory

Members of the Steering Committee provided mapping both in digital and hard copy format of existing official and known unsanctioned trails within the Heritage Lands. Available subject and parcel-specific reports provided by the Steering Committee were also reviewed with respect to recreational issues. The trails from these various reports and maps were compiled and layered in GIS. In addition, access points, signage and locations where trails extend outside the Heritage Lands into neighboring properties were identified.

Representative sections of the Current EcoPark System Lands were visited in May and June 2019 (Table 2) to identify additional sanctioned, unsanctioned and potential access points, walk trails and identify management issues. The conditions of the trails were documented in photos (Appendix 9), which illustrate various issues pertaining to safety and user experience. Where management issues and additional access points were noted, specific locations were recorded by GPS and compiled with the trails data. Trails and access point mapping (Figure 3 and Appendix 9) were prepared based on data provided by the City of Burlington, RBG and fieldwork completed by North-South Environmental and Schollen & Company Inc. Mapping was completed in ArcMap GIS. The mapping will be used to evaluate opportunities and constraints in the context of developing classification and zoning (NEPOSS), and preliminary management recommendations.

Cootes to Escarpment EcoPark System Lower Grindstone Heritage Lands Inventory, Issues and Opportunities

Figure 3: Trails, Parking and Access Locations

Legend

Trails

- RBG Trails
- City of Burlington Trails

Access Locations

- Access Locations
- Parking and Access
- Slopes > 25%
- Heritage Lands Boundary

W N S E

0 100 200 400

Meters

Cootes to Escarpment EcoPark System

November 19, 2019

1.4.6 Method for Natural Heritage Inventory

A gap analysis was completed to identify areas where natural heritage data were lacking and to assist in the prioritization of fieldwork (Appendix 3). Various background reports prepared by RBG (e.g. 2018 Environmental Review of Hendrie Valley (Radassao et al. 2019), Ecological Land Classification of RBG' Natural Lands (Barr 2014), and CH reports (e.g., Grindstone Creek Watershed Study reports); see Appendix 1 for complete listing) were the primary sources of natural heritage information. Information was also compiled from RBG's and CH's species occurrence database, and rare species records from the Natural Heritage Information Centre (NHIC). Vegetation resources have been characterized following the Ecological Land Classification (ELC) for Southern Ontario (Lee et al. 1998). ELC data were provided by RBG and CH. Field surveys were completed by the Project Team to supplement information on vegetation communities, flora, and incidental observations of wildlife and any other noteworthy occurrences (e.g., wildlife habitat, seepages, disturbances, etc.).

Natural heritage data were entered into a Microsoft Access database. Data were analyzed to determine the presence of rare species and Species at Risk (SAR), and to determine the floristic quality of the Current EcoPark System Lands. Percentages of native and non-native species, Floristic Quality Index (FQI) (Oldham et al. 1995), and Native Mean Coefficient of Conservatism (Mean CC), were calculated for the Current EcoPark System Lands. These analyses provide a relative measure of vegetation quality. Where individual Management Units lack floristic data, FQI does not provide a realistic evaluation of floristic quality. These values were still calculated but indicated as unreliable to highlight areas where data are lacking.

Species lists were screened for provincial, regional and local significance. Provincial flora and fauna rarity are based on rankings provided by the NHIC (identified as S1-S3) or species identified as Endangered, Threatened or Special Concern by COSEWIC[3], Federal Species at Risk Act (SARA) and/or COSSARO[4]. Regional flora and fauna rarity are based on listings provided by the Hamilton Natural Areas Inventory Project 3rd Edition (Schwetz 2014). Fauna area-sensitivity is based on species reported as area-sensitive in the Ministry of Natural Resources Significant Wildlife Habitat Technical Guide Appendix C (MNR 2000).

Mapping was completed in ArcMap GIS. ELC mapping was compiled based on existing data from CH and RBG, and by fieldwork completed by the Project Team.

1.4.7 Method for Cultural Heritage Inventory

Field investigation began with a windshield survey of the Lower Grindstone Heritage Lands followed by field investigations of RBG property and Hidden Valley Park to identify and confirm the location of site features. Additional field investigations were conducted to identify potential locations of non-extant features.

The background review of Lower Grindstone Heritage Lands included a review of Wentworth County historical maps dated 1851, 1859 and 1875, National Topographic System maps dated 1909, 1931, and

[3] Nationally rare species are assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and listed by the MOECC or the Governor in Council; they are subject to the Federal Species At Risk Act.
[4] Provincially rare species are assessed by the Committee on the Status of Species At Risk in Ontario (COSSARO) and are listed by the relevant Ministry; they are subject to the Ontario Endangered Species Act.

1984, and Ontario Ministry of Natural Resources aerial photography dated 1954. Reviews of the City of Burlington, Ontario Heritage Trust and Canadian Register of Historic Places inventories of cultural heritage properties were undertaken. To clarify the history and location of sites and features, a review was conducted of maps, drawings and photographs held by the City of Burlington Archives and the City of Burlington Historical Society. Consultation took place with staff from the RBG and City of Burlington to review the history of cultural heritage features, identify other features of potential heritage value and gain information on plans for integrating cultural landscape features into interpretation and management planning. Through a public meeting and correspondence with the Burlington Historical Society, additional information was provided on a site of heritage interest associated with Hidden Valley Park as described in the report. Halton Conservation, the City of Burlington and RBG were consulted regarding the presence of archaeological resources and any known archaeological sites.

1.4.8 Method for Management Issues Inventory

Management issues and opportunities were documented during the review of background information, through targeted fieldwork as well as from conversations with agency personnel, Information Gathering Sessions, Steering Committee meetings and additional meetings with key stakeholders, including RBG. A list of all individuals and/or agencies consulted is included in Appendix 4. Management issues were recorded in table format to provide a framework for organizing issues and identifying the general location of where a particular issue occurs. This table remains a work in progress and will provide a basis for draft recommendations to be provided in the Management Plan, to be prepared later in the study process (Appendix 8).

2.0 Land Use

2.1 Existing Land Uses

The Lower Grindstone Heritage Lands comprise approximately 143 ha of land located in the City of Burlington, in the Regional Municipality of Halton, generally bounded to the north by the Canadian National mainline railway and to the south, east and west by the established urban residential, and industrial neighbourhoods of Aldershot. These lands lie within the City of Burlington urban designated area but are substantially undeveloped due to physical constraints, except in the vicinity of the RBG headquarters on Plains Road West and Hidden Valley Park. The terrain of the Heritage Lands is dominated by the deep valley of Lower Grindstone Creek and several tributaries all of which drain to Burlington Bay. Current land uses include forests, major parks and open space.

2.1.1 Utilities Adjacent and Within Current EcoPark System Lands

Canadian National Railway

Canadian National Railway (CN) operates a three-track passenger and freight railway, known as “Oakville Subdivision”, extending along the entire northern boundary of the Heritage Lands. This mainline railway facility carries freight and passenger traffic from points east and west, including Via Rail and GO Transit. During our background research and consultation with major utilities, we were unable to make contact or receive a response from CN regarding any planned changes to CN railway infrastructure adjacent to the Heritage Lands.

Ministry of Transportation

The Ministry of Transportation maintains Highway 403 as part of the Provincial controlled access 400 series highways in the province. Immediately north of and adjacent to the Canadian National mainline railway, Highway 403 takes the form of a six-lane divided freeway linking Burlington to Hamilton and points beyond.

No direct contact was made with Ministry of Transportation since the Ministry posts transportation planning information on its website. The Ministry's Southern Highways Program (SHP) is an annually published five-year investment plan for highway construction in Southern Ontario available on-line. (Ontario Ministry of Transportation 2017). For the Southern Highways Program 2017 to 2021 under the Southern Expansion category, no expansion to Highway 403 adjacent to the Heritage Lands is identified for the 2017 to 2021 period. For the Southern Rehabilitation category, rehabilitation of the culvert at Grindstone creek is identified for the 2019 to 2021 period. The timing of projects is subject to change based on funding, planning, design, environmental approvals, property acquisition where required and construction requirements.

The Ministry undertakes planning beyond 2021 to ensure that highways and bridges are built and maintained to support traffic levels and future transportation needs. For Highway 403 adjacent to the Heritage Lands, the SHP identifies planning for High Occupancy Vehicle lanes from the Brant County/City of Hamilton boundary to Highway 403/QEW interchange.

The Ministry is also undertaking a planning study to develop a long-term transportation plan for the Greater Golden Horseshoe (Ontario Ministry of Transportation 2019). Among other things, the Ministry has to-date released a Transportation Profile (December 2107), Socio-Economic Profile (December 2017) and an Environmental Profile (April 2018). This is a long-term study which will identify a 2051 Transportation System Plan and a transportation vision for 2071.

Sun Canadian Pipelines

Sun Canadian Pipelines operates an oil pipeline within an existing easement which crosses the Heritage Lands through Lower Grindstone 1, 2, 3 and 4. Sun Canadian advised that, based on available information, there are no current plans to make changes to the pipeline physical location within the easement. However, Sun Canadian expects to expose the existing pipeline at various locations in order to perform external pipeline inspections and may need additional lands outside of the easement to accommodate equipment and temporary stockpiling of excavated soil. The timing of these types of works and whether they will affect the Heritage Lands depends on the findings of internal pipeline inspections which are conducted every few years. Sun Canadian will exercise the rights of the easements and its obligations for operating and maintaining the pipeline.

Imperial Oil Pipelines

Imperial Oil operates two pipelines within easements adjacent to the Sun Canadian pipeline, affecting Lower Grindstone 1, 2, 3 and 4. Imperial Oil advised that there are no current plans to make changes to the pipelines and further advised that any work within 30m of the pipeline requires prior notification to Imperial Oil. In its response, Imperial Oil did not provide maintenance plans, however, it is reasonable to assume maintenance requirements are similar to Sun Canadian. Imperial Oil will exercise the rights of the easements and its obligations for operating and maintaining the pipelines.

Union Gas

Union Gas maintains and operates distribution gas lines within or adjacent to the public streets in the vicinity of the Heritage Lands and from these distribution lines, service lines are extended to individual properties. For 2019, Union Gas advised that no reinforcement or break/fix work is planned to these distribution lines. Further, Union Gas advised that the known potential location for gas service extension are the private development lands west of Sandcherry Drive adjacent to Lower Grindstone 1 (Garden Trails Development), however, no service extension request has been made. Union Gas continually works on long term asset management planning which may identify future infrastructure changes.

2.2 Future Planned Uses

2.2.1 City of Burlington Development Applications

The City of Burlington maintains an on-line summary of major development applications requiring City Official Plan amendments, Zoning By-law amendments, Plans of Subdivision etc. (City of Burlington 2019b). A review of the on-line list for Ward One which encompasses the North and South Aldershot areas, including the Heritage Lands indicates that there are no current development applications of these types affecting lands adjacent to the Heritage Lands. It is understood that the proposal to develop the residential designated and zoned lands west of Sandcherry Drive and adjacent to Lower Grindstone 1 is inactive (Garden Trails Development).

2.2.2 Environmental Assessments

The City of Burlington, on July 4 and 11, 2019, issued Notice of Commencement of two Schedule "B" concurrent Class Environmental Assessments affecting Grindstone Creek through the eastern portion of the Heritage Lands. The study area for the Grindstone Creek Erosion Control Project - Waterdown Road to Hidden Valley Park affects the main channel and eastern tributary of Grindstone Creek through Hidden Valley Park 1 ,2 ,3 and 4, and adjacent industrial lands east to Railway Road. Downstream to the west, the study area for the Grindstone Creek Erosion Control Project - Unsworth Avenue to Sumach Drive affects Hidden Valley Park 1 and parts of Lower Grindstone 1, 2 and 3 flanking Unsworth Avenue. The purpose of both studies is to address erosion concerns and protect natural heritage along these sections of Grindstone Creek. According to the Notices of Commencement, alternative erosion control strategies will be investigated including creek channel restoration and stabilization which may include natural channel design and native channel restoration methods. As Schedule "B" Class EA projects, public and stakeholder consultation will be key components of the study process. Public Information Centres (PIC) will be held as part of the process for both studies with Notice of the PIC's to be provided to the public, agencies and stakeholders. City contact information is available at the following:

- https://www.burlington.ca/en/services-for-you/grindstone-creek-erosion-control-ea-waterdown-road-to-hidden-valley-park.asp
- https://www.burlington.ca/en/services-for-you/grindstone-creek-erosion-control-ea-unsworth-ave-to-sumac-dr.asp?_mid_=9309

In the fall of 2019, the Ministry of Transportation is scheduled to commence a Class Environmental Assessment and Preliminary Design Study to investigate the future needs at the Highway 403/Highway 6 interchange and to ensure that infrastructure renewal projects include provision, and accommodations for future expansions. The study is projected to require 3 years to completion. As the Heritage Lands are

located approximately 600m west of the interchange and within the Class EA study area, it is expected that the partner owners of the Heritage Lands will receive notice of the Class EA study. At the time of this writing, the Ministry had not yet established a website for the Class EA.

The Region of Halton on-line listing of Class Environmental projects does not identify a current Class EA project and study affecting the Heritage Lands and vicinity (Halton Region 2019).

2.2.3 RBG Masterplan

Currently RBG is updating its land use and operational strategy and has initiated a new 25-year Masterplan. This project was publicly announced in June 2019 and will continue into spring 2020. This Masterplan will have a variety of new implications for the lands of RBG located within this Heritage Lands area and is expected to result in changes to many of features including access, infrastructure, and programming.

3.0 Planning Policy and Regulatory Framework

The existing planning policy and regulatory framework in this area consists of Provincial jurisdiction and municipal two-tier jurisdiction. The Provincial planning policy framework was updated in 2017 through the Coordinated Provincial Plan Review and more recently, in 2019.

This section provides a summary outline of the current planning policy and regulatory framework. Planning documents are by nature living documents and subject to review and change. Existing available information has been used to establish the jurisdictional limits including Zoning Bylaws and Provincial land use regulations. At the time of future detailed project planning, it is important to obtain updated information and confirm applicable requirements. A detailed review of the planning policy and regulatory framework is provided in Appendix 2, along with a Planning Characterization Matrix.

3.1 Planning Inventory Summary

For the Lower Grindstone Heritage Lands, the current planning policy and regulatory framework reflects the jurisdiction of multiple Provincial Plans, two tier municipal Official Plans, a Zoning Bylaw and Minister's Zoning Order.

The current Region of Halton Official Plan reflects the Provincial Plans and Provincial Policy Statement in place at the time of the Official Plan approval. The current City Official Plan, while dated, still reflects the fundamental environmental imperatives of the senior planning documents. The current City Official Plan is currently under review and will be replaced in the future by a new Official Plan which will conform fully to all senior planning documents.

Depending on location, the permitted uses on the Heritage Lands are restricted by the physical hazards and environmental conditions on these lands and the long-standing public use for which these lands were acquired. The lands of Lower Grindstone 4 and 5, in the RBG, are historically developed for intensive culture, education and administration uses, including ornamental gardens, and Hidden Valley Park 2 is historically developed for active recreation use.

Other than the RBG Headquarters in Lower Grindstone 4 and depending on location and scale, it is possible that individual developments on the Heritage Lands may require an Environmental Impact Assessment, although the criteria for relief from this requirement as set out in the Regional Official Plan may apply given the local Official Plan designations and applicable zoning permissions. Certainly, any development should strive achieve the intent of the Provincial Policy Statement, the Greenbelt Plan "Urban River Valley" provisions and the Regional and City Official Plans. The "public authority" provision of Zoning By-law 2020 and the public service provision of the Parkway Belt Land Use regulation may be important. Conservation Halton permits may apply, and site plan control may be required.

In advance of any proposed development, site alteration or activity on the Heritage Lands, it is important to review the applicable land use policy and regulation in order to determine conformity of the proposal and any planning application, and approval requirements or exemptions.

4.0 Recreation Inventory

4.1 Study Area Recreational Resources

4.1.1 Trails

Figure 3 illustrates the existing trail network, access points and parking areas in the Lower Grindstone Heritage Lands. Within the Current EcoPark System Lands, approximately 1.15 km of trail within Hidden Valley Park are maintained by the City of Burlington and 4.56 km are within the RBG. The recreational objectives of the two organizations are loosely consistent, with RBG access resources focused towards environmental protection, education and supporting programming. One principal difference is that cycling is allowed on trails within the City-owned Hidden Valley Park, but it is not a permitted use within the RBG. Within RBG the paths are split into natural area trails and garden paths. There are internal fences to ensure access is controlled to specific access points for the formal garden areas and event spaces within RBG. For the most part, nature trails are narrow footpaths, which are appropriate for a natural environment area. However, throughout the trail network the widths and surfaces of the travelled path differs. The conditions of the trails also vary from poor to good repair. The trails through Hidden Valley Park are denoted as multi-use, however, the width and material change intermittently. The trail network would benefit from a consistent design, meeting provincial standards for Accessibility, safety and multi-usability where appropriate.

Overall the area is a transportation pinch point at the head of Lake Ontario. It has undergone gradual transformation as the major transportation corridor serving an industrial community have shifted over the years, from a main route of the original Highway 2 along Spring Garden Road, to Plains Road West, to the current Highway 403. This has resulted in a gradual transformation of how the lands are used. The trail network is undergoing an evolution consistent with these land use changes, as in many cases, the current trails are based on historical roads, early cart-paths and even earlier Indigenous trails. The most recent shift in use was the closure of Spring Garden Road/Valley Inn Road as a through-road and its conversion to a multiuser trail route (2011). A similar conversion occurred on lower Snake Road, with part of this road at its south end, near the Laking Garden lower access road, becoming part of the RBG trail network in 1978.

The Hamilton Burlington Trails Council has put together a publicly accessible interactive Regional Trails Map available at: http://hamiltonburlingtontrails.ca/trail-map/. This map was put together through a Memorandum of Understanding with Cootes to Escarpment EcoPark System partners to provide the Hamilton Burlington Trails Council with GIS data available on trails.

RBG has put together a trail strategy to provide guidance for management of the trail network on RBG lands (RBG Master Plan). This approach is expected to evolve following the completion of the RBG masterplan. The guiding principles of the draft strategy are:

- focus to a single access for each area;
- maximize biodiversity protection;
- facilitate destination-based visitation;
- clarify trailhead standardization (e.g., RBG, NEPOSS, Nodal Park, Cootes to Escarpment EcoPark System logos); and
- support educational programming.

Unsanctioned trails occur in many locations within the Heritage Lands. In some cases, trails external to the Current EcoPark System Lands on neighboring private property extend into the Heritage Lands. Cooperation between RBG/City of Burlington and private landowners will be required to address the management of these trails.

The various trails that comprise the trail network in the Lower Grindstone Heritage Land is described below with references to photographs and maps located in Appendix 9, depicting trail conditions and issues.

Grindstone Marshes Trail (Appendix 9, Figure 2.0)

The trail is considered the main trail RBG' Hendrie Valley Nature Sanctuary and forms a large crescent shape accessed from a parking area at Cherry Hill Gate off of Plains Road West, terminating at the south end at Spring Gardens Road below the Laking Garden (Figure 4). The trail crosses Grindstone Creek and associated floodplain wetlands and serves as a connection between Hendrie Park and Laking Garden. From the Cherry Hill Gate access, the trail descends steeply through the Lower Grindstone 3 management unit to the valley floor. For purposes of education programming, a locked gate provides access to the Woodland Garden and Hendrie Park Garden within the RBG as seen in photos 18 and 19. The steep trail is a gravel surface trail and a timber railing provides a safety barrier. The surface is eroded from rivulets that have formed from drainage. Despite a number of signs prohibiting feeding of wildlife along this trail (see photo 22), this practice was widely observed and appears to be a well-known pastime at this location. This practice appears to be encouraged amongst users. It is a behaviour that should be discouraged through education amongst the hiking community and this message should be reinforced with information posted at RBG Centre and trailheads.

At the south end, the trail is accessed off Spring Gardens Road (see photo 17). In Spring 2019 the access was temporarily closed due to flooding as seen in photo 16. If flooding warrants safety concerns to vehicles and trail users, a chain link fence and gate is utilized by RBG to close access to the Spring Gardens Road and the trail access point at the south end of the trail, where it crosses the Creek. The trail extends northward from this access through the Lower Grindstone 6 management unit connecting with the Old Snake Road access which offers an alternate route out of the valley when this section of the Grindstone Marshes Trail is flooded as seen in photo 8. This section of trail provides a good view of the Plains Road West bridge over the valley as seen in photo 15. Beneath the bridge the abutments seen in

photo 14 have been fenced off. The location is a spot for informal partying, as evidenced by the garbage and fire pits observed. This section of trail is a remnant of the original surface of Old Snake Road. A section of the road/path seen in photo 13, had been repaired with tar sealant on coarse aggregate. There is a potential concern for leachate from the hydrocarbons that could end up washing into the nearby marsh.

Apart from flooding and temporary trail closures as seen in photo 6 and 8, much of the trail is in good condition. A large extent of the trail is wooden boardwalk enabling a spectacular perspective of the wetland and bird species within the Hendrie Valley. The boardwalk draws large crowds of nature enthusiasts at any time of the year many carrying photographic equipment. First constructed in the mid-1990s replacing seasonally flooded trails, the boardwalk railings and decking have been refreshed and so is relatively new construction and in good repair as seen in photos 1 through 5. Garbage was seen floating within the marsh as seen in photo 10; however, this may be an isolated incident.

Old Snake Road Trail (Appendix 9, Figure 2.0)

Although not a sanctioned access point, users of the Old Snake Road Trail can access the steeply descending access path from the dead end of Snake Road by the Beth Jacob Cemetery. The path, known as the Old Snake Road Trail, is an unresolved remnant of the Old Snake Road providing an alternate route when sections of the Grindstone Marshes Trail are flooded. As seen in photo 11, the entry point prohibits bike access on RBG lands consistent with signage at other RBG access points; however, the most common form of access from this site is by bike. This is another opportunity where the EcoPark branding in the form of signage could be integrated.

Woodland Garden Trail (Appendix 9, Figure 4.0/5.0)

The woodland trail, nestled within the valley within the RBG lands, forms a 200 m loop within the formal Hendrie Park Garden and is accessed through RBG Centre. The path enables access to a diversity of understory ornamental and native plants that can thrive in southern Ontario. Access into the garden for RBG programs is through a fence and gate as seen in photo 21 (located on Appendix 9, Figure 2.0). The path leading to the gate is unsanctioned and its location not well sign-posted from the main Grindstone Marshes Trail as seen in photo 20.

Hendrie Valley Trails

4.5 km of trail, 5 lookouts
2 boardwalks, 5 creek crossings

MAP KEY

- RBG Properties
- Roads
- Rail Lines
- Wide, Open Trails
- Narrow, Dirt Trails
- Lookout
- Canoe Launch
- Boardwalks
- Trail Heads
- Waterfront Trail
- Washrooms
- Wheelchair Access
- Parking
- Pay and Display Parking (free for RBG members displaying valid pass)
- See reverse for trail destination highlights

Trail Code

These lands are pa rt of Canada's biodiversity hot spot, open to **passive recreation** — leave only footprints, take only pictures.
Garbage receptacles located at trailheads.
Restrictions (per RBG's bylaws):

- Pets must remain leashed at all times
- Running/jogging and cycling are not permitted
- Motorized vehicles are not permitted
- Feeding the wildlife is not permitted
- Smoking is not permitted

Special Protection Areas

ROYAL BOTANICAL GARDENS
www.rbg.ca

Though the property spans more than 1,100 hectares, urban encroachment has left few true sanctuaries for sensitive species. To ensure that all species have an opportunity to thrive, 20 per cent of the property is set aside as Special Protection Areas (SPA) closed to the public. There are observation points and interpretive signage adjacent to the SPAs to help visitors understand the significance of these unique spaces.

North Bridle Trail (Appendix 9, Figure 4.0)

Hendrie Park was part of a horse farm owned by the family of William Hendrie until the early 1930s, and the trails developed by RBG in the 1950s followed existing trails used for riding, including the Bridle Trail that loops around the north and south sides of the valley. Leading from the north side of the extensive Grindstone Marshes Trail boardwalk, a natural surface trail extends up the steep north valley slope and eventually reaches a second boardwalk and bridge crossing Grindstone Creek that forms a connection to the Creekside Walk Trail, which extends eastward to Unsworth Avenue. The North section of Bridle Trail provides good opportunities for overlooking the Hendrie Valley but includes some sections where tree roots are exposed, and the trail surface is eroded and unsafe. The trail follows a portion of a high-pressure gas pipeline. Local slope instability associated with the pipeline construction has led to some trees falling along the path.

South Bridle Trail (Appendix 9, Figure 5.0)

The North and South Bridle Trails combine to form a loop around the wetland surrounding Grindstone Creek, providing multiple locations from which to view wildlife and nature as seen in the example at photo 2. The trail traverses the Lower Grindstone 3 management unit. The looped trail is incredibly busy and well-worn; however, it remains relatively narrow and for much of the path is an earthen surface. A fence associated with the Hendrie Park gardens follows sections of the trail. As seen in photo 5, the trail traverses seepage areas. Woodchip surfacing has therefore, been placed as a stop gap measure. A low section of the trail experiences flooding during record high events, such as this year and duplicate trails have been formed around the wet areas.

There is a trail leading from the South Bridle Trail to Hendrie Park's Helen M. Kippax Garden marked with a "service access road" sign discouraging public access. This is an RBG programs access route between Hendrie Park garden and the natural areas.

Kicking Horse Trail (Appendix 9, Figure 5.0)

This short trail traverses the Lower Grindstone 2 and 3 management units. It serves as an RBG service access route to the valley, as well as an RBG programs access route from Hendrie Park gardens. The short section of trail leading up the ridge of the valley to the rear gardens of Hendrie Park is steep, with a gravel surface. The lower section of the trail is marked with a "service access road" sign, which discourages public access as a locked gate is located at the head of the trail. The lower section of the trail contains a narrow asphalt strip to the side of the trail presumably to facilitate drainage as the steep hill is subject to erosion, as seen in photo 7. Adjacent this section of trail is an area overgrown with Periwinkle (*Vinca minor*) that was likely planted when the pipeline was first constructed through the valley. Northward the trail crosses an informal drainage feature seen in photo 8. This portion of the trail provides access to an overlook structure providing opportunities to view wildlife. Multiple interpretive signs and an audio unit are provided for education.

Creekside Walk Trail (Appendix 9, Figure 1.0)

Creekside Walk Trail is much beloved by the community as it has been left in its natural state next to the creek. The trail is a historical footpath between activities on the Hendrie Farm, and later RBG at the Unsworth Avenue area, and Hendrie Park. The trail runs near the creek and through the Grindstone Creek floodplain and is being flooded with increasing frequency. The trail traverses the Lower Grindstone 2 management unit as it follows the south bank and north bank of the creek seen in photos 4 and 9. The trail connection at Unsworth Avenue as seen in photos 1-3, Figure 3.0, Appendix 9. The trail

location is obvious with parking and signage; however due to dense roadside vegetation, there is a blind corner and it is difficult for drivers to see pedestrians crossing the road to access the City of Burlington's Hidden Valley Trail on the east side of the road.

The trail leading from the small parking area and access point off Unsworth Avenue is down a steep section of gravel path, a historical road and route to a former mill site. The steep hill is subject to erosion, and some of the material has eroded from the path into the valley. The remainder of the trail is natural surface with sections that are muddy and widened as a result of hikers navigating around the issue. This is seen in multiple photos at several locations (photos 2, 3, 4, 8, 9, 10, and 14). The result is a braided trail (duplicated trail). Rutting was observed indicating use of the trail by off-road cyclists along with ongoing flooding challenges. Trail crossing bridges are in generally good condition. Some erosion is also associated with the crossing locations as seen in photo 7.

Hidden Valley Park (Figure 3.0, Appendix 9)

The existing trail through Hidden Valley Park is identified as "Multi-use Trail" on the Existing and Proposed Cycling Networks in the City's updated Cycling Plan (Maps 1 and 5 respectively, City of Burlington 2019a). Howard Avenue and Unsworth Avenue, although not strictly part of the Heritage Lands, are part of the "Local Street bikeway" and are identified as "Signed Routes" in the current Cycling Master Plan (City of Burlington 2009). They are shown as "shared use lane" in the draft updated Cycling Plan. The draft update of the Cycling Plan also proposes a future Connector Route along Lemonville Road and York Road north of the Lower Grindstone Heritage Lands, which provides connectivity to proposed cycling routes to the north (including those within other Heritage Lands), but they are all identified as a "long-term" priority. The Community Trails Strategy (City of Burlington 2015) also proposes a link along Lemonville Road north of the York Road intersection that connects to natural lands that could include trails in the future. Southward, where Lemonville Road becomes Howard Avenue, the road winds tightly and descends toward the bridge over Grindstone Creek.

The multi-use trail in Hidden Valley can be accessed from the parking area within the Park, Unsworth Avenue or Lemonville Road (Figure 3). The trail is sign-posted as "multi-use" at the parking area access. There is also parking for approximately 10 cars at the Unsworth Avenue access point on the RGB lands, however there is no parking at Lemonville Road. Access from Lemonville Road is located south of the bridge on the westerly side of the road. The sightlines to this access point are poor from both the north and south approaches (refer to photos 29 through 33). Signage marking the access point at the road denotes the by-law for trail use but does not demarcate the entry as access to the Cootes to Escarpment EcoPark System, nor does it indicate that it is a multi-use trail. The Unsworth Avenue access point connects with and is opposite the Creekside Walk Trail access in the RBG and is described in the preceding section.

Within Hidden Valley Park the existing trail is within Management Units 1 and 2. As shown in photo 25, the trail is a granular surface, narrow and wet in many sections due to low-lying terrain and floodwaters from the creek. The trail is mostly forested to the junction of the trail with the main access point from the parking areas within Hidden Valley Park. This is the only access point in Hidden Valley Park with a Cootes to Escarpment EcoPark System sign as well as a multi-use trail sign as seen in photo 35, figure 3.3. This section of trail contains some invasive species adjacent to the path which include Dog Strangling Vine (*Cynanchum rossicum*), Common Buckthorn (*Rhamnus cathartica*) and Giant Hogweed (*Heracleum mantegazzianum*) (see photo 28). A mown maintenance path has been overgrown with

Burdock (*Arctium lappa*) and is the location of dumped brush. There is a grove of dead ash trees (*Fraxinus* spp.) that should be removed (see photo 26).

A 30 metre section of paved trail, extending from the bridge crossing Grindstone Creek from Hidden Valley Park, is in disrepair and "honeycombing" is evident from repeated flooding as is seen in photo 16 and 17. This section could benefit from being raised above the inundation point. Westward from this point the trail surface is granular with a suitable 3.0m width. Access to a mown, secluded picnic area next to the creek is level and meant for small group activities accommodating up to 30 people comfortably on three picnic tables. The tables are secure to grade with no level pad and are in disrepair as seen in photos 13 and 14. There are multiple access points and erosion scars from this section of trail to the creek as seen in photo 15. An unsanctioned side trail follows the edge of the creek for the length of the sanctioned trail westward from the picnic area to another section of asphalt path at a steep section of trail. At the top of the bank, the trail is marked with wooden posts and boulders demarcating the location of a small Queenston Shale bluff. It marks a significant point of geological interest. Visible from either side of the creek, erosion areas have formed from access paths created from users trying to see the feature as seen in photos 7, 8 and 23. Perhaps the best vantage point is from a looped access path on the opposite (north) bank of the creek (see photo 23). Parts of the trail are mown, and others surfaced with woodchips. It extends from the picnic areas within Hidden Valley Park.

The granular trail surface has been stabilized with a binding agent and narrows with poor sightlines as it extends westward to make a connection to Unsworth Avenue. An informal mown trail runs parallel to the sanctioned trail. Signage marking the access point at the road denotes the by-law for trail use but does not demarcate the entry as access to the Cootes to Escarpment EcoPark System.

There are a number of unsanctioned trails (footpaths) in Hidden Valley Park:

- in the area that was conveyed from the Province (although these appear to have become over-grown);
- around the Queenston Shale bluff to gain visual access to the feature;
- along the bank of Grindstone Creek; and
- between the multi-use trail and Grindstone Creek, probably to facilitate fishing and as a result of dog walkers looking for access to allow dogs to get drink or play in the creek.

4.1.2 RBG Gardens

Royal Botanical Gardens Centre

RBG Centre is the main visitor centre and staff facility within the Ecopark System. The centre hosts various plant collections, a Mediterranean Garden greenhouse, multiple rentable meeting rooms/auditorium and is the principle staff facility of RBG. A description of its history is found in the cultural heritage section of this document.

The Centre and surrounding gardens provides a key access point to the trail system in the Hendrie Valley from which families, couples, organized groups and hikers out for a day stroll can experience nature. The trails are fairly accessible with low challenge. The North and South Bridle Trails form a reasonably-sized loop that can be completed in a short timeframe.

In the summer months the RBG run educational camps for children ranging in age from 4-12.

Hendrie Park Gardens

Hendrie Park Garden is the primary display, educational, and event hosting garden of RBG. To facilitate site function and security there is a full perimeter fence around the garden, two large event tents, a teahouse and an operations storage building. Hendrie Park hosts multiple plant collections including Roses, Lilies, Native Plants (Kippax Garden), and Medicinal Plants. Events include programs and a range of arts and cultural activities, including a large and growing sculpture collection. A description of its history is found in the cultural heritage section of this document.

Laking Garden

Laking Garden is the smallest of the RBGs formal garden areas, and is named after the RBGs longest serving director, Leslie Laking. The garden is set on a fertile terraced plain, formerly a market garden overlooking the Grindstone Marshes system. Laking Garden is home to RBG's herbaceous perennial collections. The large belvedere platform at the entrance provides a panoramic view over the entire garden. This garden, also overlooked by a small cottage for staff, offers the visitor an overview of the depth and breadth of perennial plants. The garden features collections of Ontario heritage plants, Irises, Hostas and Peonies. A description of its history is found in the cultural heritage section of this document.

4.1.3 Parking and Access Points

Sanctioned parking areas and access points are found within the Current EcoPark System Lands (Figure 3). Sanctioned access points are described below.

- RBG Centre: A large parking lot with space for up to 320 vehicles is located on the south side of Plains Road West. This parking area serves as an access point to RBG Centre which features winter exhibitions, plant displays, a children's natural playground, a Mediterranean Garden, a café, gift shop and conference services. During busy events and conferences, the parking lot can fill up very quickly. Spillover parking is sent onto local streets and sometimes to neighbors such as the Austrian Club and Bay Garden's Funeral Home. Staff parking and program drop-off is located at the west end of the building off Botanical Drive and serves 36 vehicles. A service entrance is also located off Botanical Drive with some additional staff parking; however, this area is mainly used for deliveries.
- Hendrie Valley Parking (Cherry Hill Gate): Access to RBGs signature boardwalk above the floodplain of Grindstone Creek at Cherry Hill Gate offers parking for 95 vehicles. Parking is metered but free to RBG members displaying passes on their dashboard.
- Valley Inn (Burlington): Beside the bridge over Grindstone Creek on Spring Gardens Road, this access point is between the Laking Garden and the lower end of the Grindstone Marshes Trail. Parking is available for 10 vehicles plus 1 accessible spot.
- Grindstone Marshes Trailhead (RBG): At the start of the Grindstone Marshes Trail is a small lot for 3 vehicles, accessibility parking only.
- Laking Garden: Associated with the Laking Garden are two parking lots, one on either side of the rail line, and accessed via Spring Garden Rd from Valley Inn, or from Plains Rd. West. A pedestrian bridge over the tracks connects the two lots. The north lot accommodates 33 vehicles and is not metered while the south lot serves 40 vehicles and is metered.
- Hidden Valley Park: Three parking lots provide a total of 92 parking spaces servicing six picnic areas, a baseball diamond and playground. An additional parking lot for 100-120 cars services the splash pad on the other side of Hidden Valley Road. Capital projects to renew assets including parking lots, playgrounds and picnic areas are planned and budgeted for. Potable water supply and electrical service are being considered pending decisions on future use.

- Snake Road Access: No associated parking exists at this location. Associated with the Beth Jacobs Cemetery there is a parking area for up to 16 cars provided for cemetery visitors.
- Unsworth Avenue/Lamb's Hollow: Access to east end of RBG's Hendrie Valley trails and west end of Burlington's Hidden Valley Park trails. There is room for 7 cars and the lot is not metered.

An unsanctioned trail leads from the splash pad at Hidden Valley Park a short distance into the natural heritage area to the east. The access is informal and not well marked and the trail is earthen surface and terminates in the natural area. Another well-utilized access point and informal trail extends from the main picnic area within Hidden Valley Park into the adjacent natural heritage area. Sections of the path surface are woodchip-based, and the remaining is an informal mown grass trail. The trails are well used and access secluded picnic sites. The unsanctioned trails are identified in Appendix 9, Figures 5.0.

4.1.4 Recreational Uses

Trail use within the Heritage Lands primarily consists of walking, jogging, hiking (ranging from casual outings by local residents, to more serious day-hikers) and dog walking. The primary use of the nature trails in this region is for educational programming associated with RBG, and nature appreciation. Cycling is permitted on City of Burlington lands; however, opportunities are limited within the Lower Grindstone Heritage Lands. Some cycling occurs on a regular basis on streets and Hidden Valley Park; however, this use is not permitted on trails owned and maintained by RBG. Cross-country skiing is also not permitted on RBG trails, and trails are not maintained for this use, nor are they suitable for it. Running/jogging is also not permitted on RBG trails, though this does take place. Generally, the current level of recreational use appears to be having little impact on the surrounding natural system. However, there are some specific locations where there is an unacceptable amount of bare soil, root exposure, erosion, etc. These areas would benefit from trail management or closure with commensurate restoration, and management to address existing impacts. These issues and locations are described in section 7.3 and will be addressed in the Management Plan.

Walking/Jogging/Hiking

Walking, jogging, running, and hiking are all permitted uses of City of Burlington sanctioned trails. Recreational uses on RBG trails are limited to hiking and walking along with educational program and natural heritage protection. RBG policy does not permit cross-country skiing, cycling, or running as trails are not designed or maintained for these types of higher impact uses.

On holidays and weekends, especially nice sunny days, the access points described in section 7.2 are crowded with parked cars and EcoPark System users. On special event days in particular, both the RBG and Cherry Hill parking lots are well over capacity. This attests to the current popularity of the RBG and other recreational trails, including unsanctioned ones, in this area of the Cootes to Escarpment EcoPark System. During weekdays these same parking lots are under capacity at any given time.

There are some minor risks associated with hiking on nature trails and individuals must accept personal responsibility for their safety on the trails. Some trails follow closely alongside existing watercourses and the surfaces are wet, muddy and undulating, which can lead to trip and fall hazards. RBG provides a "Trail User's Resource Guide" on their website, which provides safety tips and alerts users of these potential safety concerns (https://www.rbg.ca/files/pdf/gardenareas/trails/TrailUsersResourceGuide.pdf, Accessed June 3, 2109). Similarly, the Hamilton-Burlington Trails Council provides information on their website on conservation

trail etiquette, which includes safety messages (http://hamiltonburlingtontrails.ca/trail-safety-and-etiquette/, Accessed June 3, 2019).

In order to minimize risks, RBG and the City of Burlington work to ensure trail blazers and other signs are visible, trails are clear of fallen tree limbs, hazard trees are removed, and bridges and boardwalks are in a good state of repair. However, each agency should ensure that procedures in place to evaluate conditions of trails and infrastructure is done so to ensure trails and structures remain safe and accessible where possible, respecting all current day regulations and bylaws.

Birdwatching and Photography/Nature Appreciation

Birdwatching and other forms of nature appreciation such as, botanizing and photography, occur throughout the Lower Grindstone Heritage Lands. This is the single largest user group for this Heritage Lands area supported by the RBG Gardens and nature trails. Most users undertaking these forms of recreation tend to stick to sanctioned trails, and have minimal impact on the natural environment, though some engage in off-trail activity while seeking desirable/rare species. Birding and botanical hikes and courses are hosted and well attended by members and visitors of RBG.

Visitors who frequent RBG may consider wildlife feeding as a form of nature appreciation. In a study completed by RBG in 2018, 65% of visitors to the Grindstone Marshes Trail accessed from the Cherry Hill Gate, were seen feeding wildlife (Peirce 2019). This activity is not permitted and is further discussed as an issue in this document.

Dog Walking

Dog walking occurs frequently in the Lower Grindstone Heritage Lands. Neither RBG or the City of Burlington allow off-leash dogs within the Lower Grindstone Heritage Lands and there are currently no designated off-leash dog parks. Identified impacts attributable to off-leash dogs include:

- soil nutrient enrichment resulting from urination and defecation, which can ultimately affect the type of vegetation and wildlife supported in the area and change the composition of natural areas;
- risk of spread of disease from domestic dogs to wildlife or vice versa;
- trampling, denuding and altering vegetation structure can result in damage to low-growing plants, resulting in a change of structural diversity in the natural area;
- near-surface tree roots are also often damaged resulting in tree die-back and death;
- introduction of non-native seeds carried into natural areas on dog fur and feces; and
- wildlife and ground-nesting species disturbed, and bird opportunities affected due to hunting, chasing and scent impacts by dogs.

Off-leash dogs may also impact the experience of other visitors by charging or jumping up on individuals or other dogs. Other issues include the lack of proper disposal of dog feces (e.g., either not picked up and left on or beside the trail or picked up in a bag and left along the trail or at an access point). Both on- and off-leash dog walking activities will likely increase with the anticipated increase in visitor use.

Arts and Culture

Royal Botanical Gardens' hosts ongoing activities pertaining to arts, music, and food in its formal gardens at RBG Centre.

Educational Programs

Royal Botanical Gardens uses the gardens and nature trails for educational programming associated with school, camps and public programs.

Cycling

RBG has a policy to prohibit cycling within RBG owned lands and this policy is reinforced with signage at all sanctioned access points to RBG trails. Although enforcement of this policy is low, cycling activity was not evident on any trails other than the Creekside Walk Trail where wheel ruts were seen in muddy patches of the trail. The reason for this could be accidental, as Hidden Valley Trail, as a City of Burlington facility, enables bike access and Creekside Walk Trail is the logical extension of this trail westward. Users not familiar with the RBG's policy on no biking may miss the sign at the access point and carry on.

Fishing

Angling was noted during a site reconnaissance, particularly at the Valley Inn area. Grindstone Creek and Rivermouth marsh are primary fish spawning areas associated with the Lake Ontario fisheries and fishing is especially popular in the Valley Inn area. The significance of this area is summarized in the Hamilton Harbour Fisheries Management Plan. A seasonal fish sanctuary exists starting at the Plains Rd bridge crossing of Grindstone Creek to help protect spawning fish, particularly trout and salmon. Issues include fishing line and hooks left along the shore, and a high population of raccoons being fed by the anglers, especially those fishing for Bullhead at night. This raccoon problem is a factor in the decline of turtles in the valley.

Fish viewing is popular during migratory periods, especially during the fall salmon run. The RBG trail bridge crossings along Grindstone Creek provide good vantage points, and people also gather along Creekside Walk between Lambs Hollow and the first downstream bridge, to watch fish swimming up through the shallows.

Train Watching/Railfanning

Two of Canada's busiest rail lines converge beside Carroll's Bay at Bayview Junction, making this site one of North America's top railfanning locations. train spotters come from far and wide to photograph trains from the pedestrian bridge by RBG's Laking Garden (and other bridges in the area).

Rock Climbing/Ice Climbing

The physiography of the valley system in the Hendrie Valley is not conducive to rock climbing or ice climbing and no evidence of this recreational activity was observed or researched within the study area.

Equestrian Use

There are no known equestrian uses within the Lower Grindstone Heritage Lands.

Winter Sports

Sunfish Pond is a popular spot for skating, shinny, and curling during the winter when ice conditions are suitable.

Motorized Vehicle Use

ATV use is prohibited in all Heritage Lands and there was little evidence of this activity within the Lower Grindstone Heritage Lands. The exception was in the open meadowlands west of Unsworth Avenue, which are easily accessible from the road. There is a myriad of trails that cut into this area (see routes evident on aerial Figure 1.0, Appendix 9 at photo location 16). It is assumed that this barricaded access

point is utilized by Hydro personnel to service the nearby hydro lines; however, it appears that ATVs also take advantage of this to access the Heritage Lands at this location.

Motorized vehicles such as dirt bikes and ATVs have been an ongoing issue on the ice surface at Valley Inn during the winter months.

Hunting/Poaching/Foraging

Although a relatively common management issue in Natural Heritage Systems across southern Ontario, there is little evidence that this activity is occurring within the uplands of the study area; however, it is a significant issue pertaining to the fisheries.

Unsanctioned Party Spots/Fire Pits

Although this use was limited in its scale in the Lower Grindstone Heritage Lands, evidence of partying was noticed including litter and empty cans left behind on sections of the Hidden Valley Trail and Park, as well as in the southern section of the lower Grindstone Marshes Trail.

4.1.5 Existing Infrastructure Summary

The Lower Grindstone Heritage Lands contain the following existing forms of infrastructure that facilitate recreational use.

- Baseball Diamond (Hidden Valley Park)
- Splash pad and playground (Hidden Valley Park)
- Shelters for group gatherings (Hidden Valley Park)
- Washroom facilities (Hidden Valley Park)
- Six picnic areas and informal play spaces/ manicured lawns (Hidden Valley Park)
- Sections of asphalt and granular trails
- Small secluded picnic spaces with tables and garbage bins (Hidden Valley Park)
- Overlooking structures and boardwalks (on RBG lands)
- Educational signage at points of interest (on RBG lands) and directional signage/trail maps
- Benches
- Pedestrian footbridges
- Garbage and recycling containers
- RBG Centre and parking lot
- Hendrie Park Gardens and amenities including Tea House/Washrooms, accessible paths, water features and storage barn
- Laking Garden and amenities including staff facility, public washrooms, drinking water fountain, lookout, storage barn, and parking lots

There are several major roads that occur within but are not formally part of the Lower Grindstone Heritage Lands, including Unsworth Avenue, Plains Road West, Lemonville Road, Spring Garden's Road and the service roads within RBG. The existing road network directly affects recreational transportation through the area as well as impacting wildlife corridors. Turtle crossings are marked along Unsworth Avenue and Lemonville Roads.

The section of Plains Road West within the Heritage Lands area does not have existing on-road cycling facilities. The updated draft Cycling Plan (City of Burlington 2019a) identifies Plains Road as part of the Spine Network and as a "Protected Bikeway". This means that future proposed plans would include a

physically separated bikeway. Howard Avenue (just south of the Lower Grindstone Heritage Lands) and Unsworth Avenue are both part of the Local Street Bikeway, which means that they include shared use lanes, indicated through signage and pavement markings. No changes to this designation are proposed in the draft updated Cycling Master Plan.

4.2 Adjacent Recreational Resources

4.2.1 Trails

The City of Burlington Community Trails Strategy Map 2.0 illustrates the existing and proposed multiuse trails that over the long term will complete a connected system of trails. The off-road trails within the Lower Grindstone Heritage Lands have the opportunity to connect routes existing at Lemonville Road and Spring Gardens Road which is an extension of the Waterfront Trail. Not identified on the Trails Strategy is a potential on-road connection northward on Snake Road from the access point to the Old Snake Road Trail. Bike parking facilities would be required at this access point as biking is not allowed on the trails within RBG property.

4.2.2 Access Points

There is a range of access points, each with its own look and posted information. For example, the Cherry Hill Gate and Spring Gardens Road access points include a kiosk with trail map and local information. Signs for the code of conduct on the trails and permitted uses are clearly posted. However, on secondary access points such as at Old Snake Road access, Unsworth Avenue and Lemonville Road the access points have limited signage and no EcoPark System map or sign. The Hidden Valley Park trail access point includes a large Cootes to Escarpment EcoPark System sign and is an example of what all other primary and secondary access points perhaps should include.

4.2.3 Recreational Uses

Hiking, bird watching, and photography are the key passive recreational pursuits within the RBG-owned lands of the Study Area. The Hidden Valley Park caters to active and passive recreational pursuits attracting large weekend crowds for informal and organized events in the picnic areas, playing fields and splash pad while trails provide a quiet outlet from the manicured open spaces. Dog walking (leashed) is a popular activity. Limited ATV use, not permitted within the Heritage Lands, was observed to have been confined to the clearing in the floodplain west of Unsworth Avenue. Group photography sessions are a popular experience within different parts of the Hendrie Valley and Hidden Valley Park.

Anecdotal evidence suggests that there is a strong desire for looped trails within the Hidden Valley Park and Creekside Walk Trail sections of the study area which are currently serviced by a linear trail route. This would provide a more diverse set of experiences within the valley providing choices to different age groups with different abilities.

Currently, the City of Burlington actively maintains some informal grassed hiking trails. The trails are utilized to complete loops through natural heritage areas. For example, motorized vehicle mowers are utilized to maintain swaths of mown pathway into sections of the Lower Grindstone Creek floodplain within Hidden Valley Park.

4.2.4 Existing Infrastructure

Various boardwalks, pedestrian footbridges and overlook structures provide access to the marshlands within the Hendrie Valley. Each of the structures are built to different standards and many do not fulfill modern day codes and accessibility standards.

Drainage features include pipe culverts, box culverts and paved ditches. There are no grade retention techniques deployed where trails traverse steep slopes. Timber guard rails, boulders and timber posts are utilized in various locations as safety barriers.

5.0 Natural Heritage Inventory

5.1 Physiography and Surface Geology

The main natural landscape features of this area are forested ravines, Grindstone Creek, and floodplain marshes. The Lower Grindstone Heritage Lands are located within the Sand Plain physiographic region (Chapman and Putnam 1984). The northern portion of the Grindstone Creek is situated in a major Escarpment re-entrant valley within the City of Burlington. South of Highway 403, within the current Heritage Land boundary, the area broadens into a well-developed flood plain that extends into Hamilton Harbour. The underlying bedrock in the area is Queenston Shale (which was the source for clay used for making pipe and bricks, see section 6.4.2). Surficial deposits in the Heritage Lands include Halton Till (Pleistocene), glacial Lake Iroquois near-shore sands, the Aldershot Bar (Pleistocene) and alluvial deposits from the river (Recent). The description of the Grindstone Creek ESA notes, “The Aldershot Bar is a large sand and gravel bayhead bar which currently forms the southeast bank of the lower portion of Grindstone Creek [which includes the RBG lands on the south side of the creek]. It is contemporaneous with the Hamilton Bar which created Cootes Paradise. The presence of the bar prevented Grindstone Creek from finding a more direct route to the Lake (Hamilton Harbour), redirecting the creek toward the southwest and increasing its length by approximately 2 km.” (Halton Region and North-South Environmental Inc. 2005).

5.2 Surface Water

The Lower Grindstone Heritage Lands are located in the Grindstone Creek Watershed, which drains approximately 9,000 ha of land. It conveys about 14% of water that flows into Hamilton Harbour/Burlington Bay. Grindstone Creek and the associated valley is the dominating feature of the Heritage Lands and essentially divides the Heritage lands into three sections: the area south and east of the valley, the valley itself, and the area north and west of the valley. Grindstone Creek has its origins north of the Niagara Escarpment, flowing southward and draining into Hamilton Harbour. The upper reaches have cut deeply into the underlying Queenston Shale. Where is crosses the shale, it has a relatively steep gradient, falling 19m/km, but is less steep in the lower reaches at 2.8 m/km (Karrow 1987, as noted in Halton Region and North-South Environmental Inc. 2005). The Heritage Lands are generally within the lower, less steep reaches. The mouth of Grindstone Creek has been deepening owing to the slight but continuous rising of Lake Ontario water levels owing to isostatic re-bound since the last glaciation (Karrow 1987, as noted in Halton Region and North-South Environmental Inc. 2005).

Grindstone Creek serves as a major groundwater discharge area, especially along the Escarpment face north of the Lower Grindstone Heritage Lands boundary (Ecologistics 1977). The Grindstone Creek is ecologically important since it is one of only two cold-water streams that outlet into Hamilton Harbour (Axon et al. 1989). Water quality monitoring shows that several of the smaller Grindstone Creek tributaries are significant sources of sediment and are impairing water quality. Although sediment contributions are considered to be natural, they are exacerbated by increases in peak flows (Conservation Halton 2013).

5.3 Vegetation Communities

5.3.1 Inventory

There are 16 vegetation community types identified in the Current EcoPark System Lands. This diversity results from the varied topography and exposure, with a subsequent effect on temperature, moisture availability and soil development. Figure 5 illustrates the vegetation communities of the Current EcoPark System Lands to Ecosite Level. Table 3 summarizes the number of polygons, area and percentage of the Current EcoPark System Lands that each ELC vegetation community comprises. Table 4 summarizes ELC composition of each management unit.

Cootes to Escarpment EcoPark System Lower Grindstone Heritage Lands Inventory, Issues and Opportunities

Figure 5: Ecological Land Classification

Legend

Ecological Land Classification

- **ANTH** - Anthropogenic
- **CUM** - Cultural Meadow
- **CUS** - Cultural Savannah
- **CUT** - Cultural Thicket
- **CUW** - Cultural Woodland
- **FOD** - Deciduous Forest
- **FOM** - Mixed Forest
- **MAM** - Meadow Marsh
- **MAS** - Shallow Marsh
- **MEM** - Meadow
- **OAO** - Open Water
- **SA** - Shallow Water
- **SAF** - Floating-leaved Shallow Aquatic
- **SAS** - Shallow Water
- **SWD** - Deciduous Swamp
- **SWT** - Thicket Swamp

Heritage Lands Boundary

N W E S

0 100 200 400

Meters

Cootes to Escarpment EcoPark System

November 19, 2019

Table 3. Vegetation communities of Current EcoPark System Lands in Lower Grindstone Heritage Lands

ELC Code	# of Polygons	Hectares	% of Current EcoPark System Lands
CUM – Cultural Meadow	13	7.50	5.09
CUS – Cultural Savannah	1	0.32	0.21
CUT – Cultural Thicket	11	5.21	3.54
CUW – Cultural Woodland	4	1.42	0.97
FOD – Deciduous Forest	41	71.35	48.44
FOM – Mixed Forest	6	0.70	0.47
MAM – Meadow Marsh	24	11.08	7.52
MAS – Shallow Marsh	10	7.02	4.77
MEM – Mixed Meadow	2	0.61	0.42
OAO – Open Aquatic	7	5.13	3.49
SA – Shallow Water	13	0.26	0.17
SAF – Floating-leaved Shallow Aquatic	3	5.05	3.43
SAS – Submerged Shallow Aquatic	3	3.07	2.08
SWD – Deciduous Swamp	12	4.35	2.95
SWT – Thicket Swamp	29	4.70	3.19
ANTH - Anthropogenic	45	19.52	13.25
TOTAL:		**147.29**	**100.0**

Cultural Communities

Regenerating cultural communities are scattered throughout the Current EcoPark System Lands. They sustain old fields, thickets of Staghorn Sumac (*Rhus typhina*), *European* Buckthorn (*Rhamnus cathartica*) and hawthorn (*Crataegus* spp.) as well as successional groves of White Ash (*Fraxinus americana*), Trembling Aspen (*Populus tremuloides*) and White Elm (*Ulmus americana*).

Cultural Meadows (CUM) represent a very early stage of natural succession. They have less than 25% tree cover and less than 25% shrub cover, and often have a large proportion of non-native plant species (Lee et al. 1998). They lack woody species and are dominated primarily by opportunistic forbs and grasses. Cultural meadows generally result from or are maintained by cultural or anthropogenic-based disturbances. Depending on soil moisture regimes, these communities can vary from dry pasture grass-dominated areas to aster and goldenrod assemblages on fresh to moist substrates. Mineral Cultural Meadow Type (CUM1) have been documented in Lower Grindstone 2, 3 and 4 (Figure 5, Tables 3 and 4). This vegetation community type represents approximately 7.5 ha of the Current EcoPark System Lands in Lower Grindstone Heritage Lands (5.09%).

Cultural Thickets (CUT) include areas in a somewhat later stage of succession than cultural meadows. They have less than 25% tree cover and greater than 25% shrub cover, and also often have a large proportion of non-native plant species (Lee et al. 1998). Cultural thicket communities are dominated

by woody shrubs and often have an understory of forbs and grasses. Like cultural meadows, cultural thickets generally result from, or are maintained by modern cultural or anthropogenic-based disturbances. Cultural thickets have been documented within the following management units: Lower Grindstone 1, 2, 4, 5, 6, and 7. Cultural thickets represent approximately 5.21 ha of the Current EcoPark System Lands (3.54%). The following cultural thicket vegetation types occur in the Current EcoPark System Lands (Figure 5, Tables 3 and 4):

- Sumac Cultural Thicket Type (CUT1-1)

Savannahs (CUS) have between 25% and 35% tree cover, and often have a large proportion of non-native plant species resulting from cultural or anthropogenic disturbances (Lee et al. 1998). They are generally open in character, with scattered trees and shrubs and an understory dominated by forbs and grasses. Savannahs are located in Lower Grindstone 1, in a small amount (0.32 ha) (Figure 5, Tables 3 and 4). Savannah vegetation types include Hawthorn Cultural Savannah Type (CUS1-1).

Forested Communities

Forested communities have greater than 60% tree cover and can be dominated by deciduous and/or coniferous trees.

Deciduous Forest (FOD) have greater than 75% canopy cover of deciduous tree species (Lee et al. 1998). Deciduous forests are found throughout the Current EcoPark System Lands, above and below the Niagara Escarpment (Figure 5, Tables 3 and 4), with 21 different deciduous forest vegetation types covering 70.97 ha (48.18%) of the Current EcoPark Lands. Forests are dominated by Sugar Maple (*Acer saccharum*), oak (*Quercus* spp.), hickory (*Carya* spp.), Black Maple (*Acer nigrum*) and Black Walnut (*Juglans nigra*).

The following Deciduous Forest vegetation types have been documented within the Current EcoPark System Lands:

- Dry-Fresh Red Oak Deciduous Forest Type (FOD1-1);
- Dry-Fresh Oak-Maple-Hickory Deciduous Forest Type (FOD2);
- Dry-Fresh Oak-Red Maple Deciduous Forest Type (FOD2-1);
- Dry-Fresh Oak – Hardwood Deciduous Forest Type (FOD2-4);
- Dry-Fresh Poplar Deciduous Forest Type (FOD3-1);
- Dry-Fresh White Ash Deciduous Forest Type (FOD 4-2);
- Dry-Fresh White Ash Deciduous Forest Type (FOD4-2);
- Dry-Fresh Hackberry Deciduous Forest Type (FOD4-3);
- Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1);
- Dry-Fresh Sugar Maple – Oak Deciduous Forest Type (FOD5-3);
- Dry-Fresh Sugar Maple – White Ash Deciduous Forest Type (FOD5-8)
- Fresh-Moist Lowland Deciduous Forest Type (FOD 7);
- Fresh-Moist Green Ash – Hardwood Lowland Deciduous Forest Type (FOD 7-2)
- Fresh-Moist Willow Lowland Deciduous Forest Type (FOD 7-3);
- Fresh-Moist Black Walnut Lowland Deciduous Forest Type (FOD7-4);
- Fresh-Moist Black Maple Lowland Deciduous Forest Type (FOD7-5);
- Fresh-Moist Poplar-Sassafras Successional Deciduous Forest Type (FOD8);
- Fresh-Moist Sassafras Deciduous Forest Type (FOD8-2);
- Fresh-Moist Oak-Sugar Maple Deciduous Forest Type (FOD9-1);

- Fresh-Moist Shagbark Hickory Deciduous Forest Type (FOD9-4);
- Naturalized Deciduous Plantation Forest Type (FODM12*[5])

Mixed Forest (FOM) have greater than 25% canopy cover of conifer tree species and greater than 25% of deciduous tree species (Lee et al. 1998). Deciduous forests are found in Lower Grindstone 2 and 3 (Figure 5, Tables 3 and 4). These forests are dominated by Hemlock with Red Oak, Red Maple, White Birch and White Pine. The following Mixed Forest type is found within the Current EcoPark System Lands:

- Dry-Fresh Hardwood-Hemlock Mixed Forest Type (FOM3-2)

[5] ELC community following the updated ELC vegetation list (Lee 2008) and for which 'old' vegetation types do not exist.

Table 4. Vegetation communities of Current EcoPark System Lands in Lower Grindstone Heritage Lands per management unit

Management Unit	Vegetation Community (ha)																	
	ANTH	CUM	CUS	CUT	CUW	FOD	FOM	MAM	MAS	MEM	OAO	SA	SAF	SAS	SWD	SWT	TAT	Total
Hidden Valley Park 1	0.31	0.79		0.18	0.18	10.04			0.07		0.75				1.15	0.84		14.31
Hidden Valley Park 2	5.29	0.52		0.13	1.25	0.18					0.23					0.54		8.14
Hidden Valley Park 3	0.07	0.23		0.11		4.81					0.01					0.03		5.26
Hidden Valley Park 4	0.08					3.52		0.12								0.00		3.72
Lower Grindstone 1	0.25	3.00	0.32	4.03		17.01										0.00		24.61
Lower Grindstone 2		0.83		0.01		10.50	0.04	9.96	4.40		2.30		5.05		3.20	2.68		38.97
Lower Grindstone 3	0.03	0.19				18.09	0.66	0.63	0.00	0.03								19.63
Lower Grindstone 4	11.22	1.94				2.56				0.59								16.31
Lower Grindstone 5	1.93			0.04		0.97											0.27	3.21
Lower Grindstone 6	0.08			0.06		1.63		0.38	2.55		1.85	0.26		3.07		0.62	0.11	10.61
Lower Grindstone 7	0.11			0.65		1.44												2.20
Works Yard	0.15					0.22												0.37
Total:	**19.52**	**7.50**	**0.32**	**5.21**	**1.43**	**70.97**	**0.70**	**11.09**	**7.02**	**0.62**	**5.14**	**0.26**	**5.05**	**3.07**	**4.35**	**4.71**	**0.38**	**147.34**

Open Wetland Communities

Meadow Marsh (MAM) vegetation communities have less than 25% tree and shrub cover and are characterized by emergent hydrophytic macrophytes and tend to be dominated by species that are less tolerant of prolonged flooding (Lee et al. 1998). Areas of Meadow Marsh tend to receive seasonal flooding, where soils are flooded in the spring but become moist to dry during the summer. These vegetation communities represent the interface between wetland and terrestrial ecosystems. Within the Current EcoPark System Lands, the following Meadow Marsh vegetation types have been documented within Lower Grindstone 2, 3 and 6 (Figure 5, Tables 3 and 4):

- Reed-canary Grass Mineral Meadow Marsh Type (MAM2-2); and
- Forb Mineral Meadow Marsh Type (MAM2-10).

Shallow Marsh (MAS) vegetation communities have less than 25% tree and shrub cover and are usually dominated by cattails, grasses, sedges and/or rushes (Lee et al. 1998). They can have water up to 2 m deep, with standing or slowly flowing water for much or all of the growing season. Within the Current EcoPark System Lands, the following seven Shallow Marsh communities have been documented within Lower Grindstone 2, 3 and 6 (Figure 5, Tables 3 and 4):

- Cattail Mineral Shallow Marsh Type (MAS2-1);
- Giant Manna Grass Mineral Shallow Marsh (MAS2);
- Graminoid Mineral Shallow Marsh (MAS2);
- Forb Mineral Shallow Marsh Type (MAS2-9);
- Mixed Forb Organic Shallow Marsh Type (MAS3-10);
- Water Willow Organic Shallow Marsh Type (MAS3-12); and
- Mixed Organic Shallow Marsh Ecosite (MAS).

Meadow Communities

Mixed Meadow (MEM) communities have tree and shrub cover <25% with open herbaceous communities and ground cover varying from scattered and patchy to continuous. MEM communities exhibit a mix of grass-like and broadleaf species (Lee et al. 2008). Within the Current EcoPark System lands, Mixed Meadow communities have been documented within Lower Grindstone 3 and 4 (Figure 5, Tables 3 and 4), and cover 0.61 ha (0.41%).

Aquatic Communities

Open Aquatic (OAO) communities have water greater than 2 m in depth with little macrophyte vegetation and no tree or shrub cover and tend to be dominated by plankton (Lee et al. 1998). Open Aquatic (OAO) communities are present within Lower Grindstone 2 and 6 along the Grindstone Creek, representing 5.16 ha (3.43%) of Current EcoPark System Lands. Sections of Lower Grindstone 6 are shallow in terms of water depth and have been classified as Shallow Aquatic rather than open aquatic (Figure 5, Tables 3 and 4).

Shallow Aquatic (SA) communities have water up to 2 m in depth that persists year-round. Shallow Aquatic (SA) communities are present within Lower Grindstone 6, representing 0.26 ha (0.17%) of Current EcoPark System Lands (Figure 5, Tables 3 and 4).

Floating-leaved Shallow Aquatic (SAF) communities have water up to 2 m in depth, with standing water present year-round, and are dominated by floating-leaved macrophytes (Lee et al. 1998). Water Lily-Bullhead Lily Floating-leaved Shallow Aquatic Type (SAF1-1) covers 5.05 ha (3.43%) of the

Current EcoPark System Lands (Figure 5, Tables 3 and 4).

Submerged Shallow Aquatic (SAS) communities have water up to 2 m in depth that persists year-round. Submerged Shallow Aquatic communities are dominated by submerged macrophytes, which have greater than 25% cover. Pondweed Submerged Shallow Aquatic Type (SAS1-1) dominates Lower Grindstone 6 (3.07 ha, 2.08%).

Swamp Communities

Swamp communities are subject to a range of flooding regimes but by definition have a water depth of less than 2 m. Standing water or vernal pools represent less than 20% of the surface area. Species dominating these communities are hydrophytic, meaning they have adaptations to allow them to grow in saturated, anoxic soils.

Deciduous Swamp (SWD) has tree cover over 25%, with deciduous trees comprising over 75% of the canopy. Trees may include oak, willow, birch, maple, elm or ash. Ground flora typically includes Spotted Touch-me-not (*Impatiens capensis*), Skunk Cabbage (*Symplocarpus foetidus*), Marsh Marigold (*Caltha palustris*), bedstraw (*Gallium* spp.) and Stinging Nettle (*Urtica s*p.), with numerous ferns and sedges (*Carex* spp.). Deciduous swamps occur in Lower Grindstone 2. Deciduous Swamp vegetation communities represent 2.88 ha of Current EcoPark System Lands (1.96%). Deciduous Swamp communities found in the Current EcoPark System Lands include:

- Green Ash Mineral Deciduous Swamp (SWD2-2); and
- Manitoba Maple Mineral Deciduous Swamp Type (SWD3-4).

Thicket Swamp (SWT) communities have less than 25% tree cover and are dominated by hydrophytic shrubs, covering more than 25% of the vegetation community. Shrub species may include dogwood (*Cornus* spp.), willow (*Salix* spp.), Buttonbush (*Cephalanthus occidentalis*), alders (*Alnus* spp.), Spicebush (*Lindera benzoin*) and others. Thicket Swamp covers 4.7 ha of land (3.19%). Within the Current EcoPark System Lands, the following Thicket Swamp vegetation communities have been recorded:

- Red-osier Dogwood Mineral Deciduous Thicket Swamp Type (SWT2-1);
- Silky Dogwood Mineral Thicket Swamp Type (SWT2-2); and
- Bebb's Willow Mineral Deciduous Thicket Swamp Type (SWTM3-2[6]).

Anthropogenic

Several Anthropogenic (ANTH) areas are present within the Current EcoPark System Lands (Figure 5, Tables 3 and 4). These lands contain land uses that are not easily classified using the ELC for Southern Ontario (Lee et al. 1998). Anthropogenic areas include manicured areas present along natural area boundaries, parking lots, sports fields, and lawns. Anthropogenic areas cover 19.52 ha (13.25%) and occur in Hidden Valley 1-4, Lower Grindstone 1, 3-6, and in the Works Yard.

5.3.2 Significant Vegetation Communities

There are 5 provincially significant vegetation communities present within the Lower Grindstone

[6] ELC community following the updated ELC vegetation list (Lee 2008) and for which 'old' vegetation types do not exist.

Heritage Lands (Figure 6):

- Dry - Fresh Hackberry Deciduous Forest Type (FOD4-3)
- Fresh - Moist Black Maple Lowland Deciduous Forest Type (FOD7-5)
- Fresh - Moist Sassafras Deciduous Forest Type (FOD8-2)
- Fresh - Moist Shagbark Hickory Deciduous Forest Type (FOD9-4)

The Fresh Hackberry Deciduous Forest Type (FOD 4-3) and Moist Shagbark Hickory Deciduous Forest Type (FOD9-4) occur in Lower Grindstone 1 and 2. These are based on RBG's older ELC records which are currently being updated; effort should be made to confirm that these rare communities continue to exist. Moist Black Maple Lowland Deciduous Forest Type (FOD 7-5) occurs in Lower Grindstone 5 and 6 and Moist Sassafras Deciduous Forest Type mostly occurs in Lower Grindstone 6, with a small sliver in Lower Grindstone 7.

There are several areas within Lower Grindstone that contain prairie indicator species such as big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), round-headed bush clover (*Lespedza capitate*), butterfly milkweed (*Asclepias tuberosa*) and New Jersey tea (*Ceanothus americanus*). While these areas are too small to map as ELC polygons, their locations are noted on Figure 6.

Figure 6. Distribution of Provincially Rare Flora, Fauna and Vegetation Communities in the Lower Grindstone Heritage Lands

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Some of the vegetation communities found within the Current EcoPark System Lands may qualify as Significant Wildlife Habitat, which includes rare vegetation communities or specialized habitat for wildlife including old growth forest, other rare vegetation communities, and seeps and springs (MNRF 2015). Seeps and springs are typical of headwater areas and are often at the source of cold-water streams. These communities often also support species considered Threatened or Endangered, although these are very likely under-reported, especially bats. Identification and delineation of Significant Wildlife Habitat and the habitat of Threatened and Endangered Species contributes to the identification of habitat to protect as well as provides guidance for targeted restoration and management activities. Coordination with current and future planned uses should have regard for Significant Wildlife Habitat and the habitat of Threatened and Endangered species (for example, RBG's South Pasture Swamp Special Protection area in LG 2 and 3).

5.4 Flora

A conservative approach was used to summarize flora within the Lower Grindstone Heritage Lands. Plant records without specific location information and those that have not been recently confirmed within the Lower Grindstone Heritage Lands were not included in this summary.

5.4.1 Inventory

A total of 828 floral species have been documented in the Lower Grindstone Heritage Lands (data accessed August 2019). Of the 828 species, 552 (66.8%) are native species, 253 (30.6%) are non-native species and 23 (2.8%) were identified to Genus only, and consequently their nativeness could not be confirmed. See Appendix 5 for the complete listing of flora documented within Lower Grindstone Heritage Lands. A total of 27 Carolinian Indicator species (*sensu* Riley *et al.* 1989) and 25 plant species with prairie - savannah affinities (*sensu* Riley *et al.* 1989) have been noted (Appendix 6).

The Floristic Quality Assessment (FQA) is used to assess the area's ecological integrity based on its plant composition (Wilhelm and Rericha 2017). The FQA uses the Floristic Quality Index (FQI) and Coefficient of Conservatism (CC). The FQI is a quantitative evaluation of an area based on the quality of flora. The premise upon which the evaluation is based derives from both the fidelity of native species for a particular habitat (habitat conservatism) and species richness. It is calculated from the average CC divided by the square root of the number of plant species in the community (Oldham et al. 1995). Coefficient of Conservation is a measure of a species' specificity of habitat requirements, with a coefficient of 0 indicating a plant tolerant of a wide range of conditions (typically 'weedy' species) and 10 indicating a plant that is intolerant of disturbance and only persist in specific habitats (plants that occur in undisturbed, high-quality native communities). The FQI and mean CC ultimately provide a measure of the study area's flora integrity.

The FQA of the Current EcoPark System Lands in the Lower Grindstone Heritage Lands as a whole is a very high value (FQI= 121.04, Mean CC= 5.15), while the individual management units (Table 5) have FQAs expected of an EcoPark. As a comparison, communities in urban areas of southern Ontario typically have FQIs in the 15-30 range; FQIs of 40-45 are high for rural landscapes in the Greater Toronto Area. A mean CC of 4 indicates that the community is composed of species intolerant of disturbance, while a mean CC less than 3 indicates that the community is composed of species tolerant of disturbance. Another aspect of FQA is, although species richness can increase based on the size of a community (i.e., larger sites can hold more species), the FQI is not necessarily correlated

to size. Additionally, communities with incomplete inventories or inventories of only rare plants can provide biases results. The following scale is recommended for interpreting FQI and mean CC: FQI (high > 40, medium = 30 to 39.99, low < 30) and Mean CC (remnant landscape > 4.5, high > 4.00, medium = 3.3 to 3.99, and low < 3.3).

The majority of management units have medium or high FQI and they all have high or very high (remnant landscape) mean CC values. A medium or high mean CC but low FQI likely reflects a diminishing quality; this is better explained as a few non-native species displacing a larger number of native species, resulting in lower species richness (i.e., FQI). The mean CC is preserved as some of those native species are still present. The FQIs found are not low values but this interpretation is presented here as a caution. Likewise, restored landscapes rarely attain, let alone sustain, mean CC values over 3.2 ± 0.7 (Whilhelm and Rericha 2017). Thus, landscapes with high natural quality (like those at Lower Grindstone) must be preserved and managed adequately as once they are destroyed, they cannot be readily reconstructed. Table 5 provides the number of native flora species, their FQI, and Mean CC within Lower Grindstone Heritage Lands.

Table 5. Floristic Quality of the Lower Grindstone Heritage Lands.

Management Unit	# Native Flora Species	FQI	Mean CC
Hidden Valley Park 1	76	35.10	4.03
Hidden Valley Park 2	2	12.02	8.50
Hidden Valley Park 3	68	36.14	4.38
Hidden Valley Park 4	N/A	N/A	N/A
Within Hidden Valley 1-4	*216*	*69.93*	*4.76*
Lower Grindstone 1	34	29.50	5.06
Lower Grindstone 2	82	41.36	4.57
Lower Grindstone 3	90	45.94	4.84
Lower Grindstone 4	27	27.91	5.37
Lower Grindstone 5	N/A	N/A	N/A
Lower Grindstone 6	75	43.88	5.07
Lower Grindstone 7	N/A	N/A	N/A
Works Yard	N/A	N/A	N/A
Within Lower Grindstone 1-7	*516*	116.0	5.11
Total	**552**	**121.04**	**5.15**

5.4.2 Invasive Flora Species

Invasive species have been identified as one of the greatest threats to the integrity of the ecosystems within the Lower Grindstone Heritage Lands. Table 6 lists the major invasive species and provides an indication of whether they have been observed as being a dominant species in the communities where they occur ("locally dominant" in Table 6). This table has been prepared based on several background reports, data sets and field observations. Professional judgement of the characteristics of invasive species was applied to identify the major invasive plant species that are considered high priorities for management.

Table 6. Major invasive flora species found within Lower Grindstone Heritage Lands

Common Name	Scientific Name	Locally Dominant*
Herbaceous Plants		
Garlic Mustard	*Alliaria petiolata*	x
Lesser Celandine	*Ficaria verna*	x
Great mannagrass	*Glyceria Maxima*	x
Himalayan Balsam	*Impatiens glandulifera*	
Yellow Iris	*Iris pseudocorus*	x
Nipplewort	*Lapsana communis*	x
Creeping Jenny	*Lysimachia numularia*	x
Purple Loosestrife	*Lythrum salicaria*	
Common Butterbur	*Petasites hybridus*	x
Reed Canarygrass	*Phalaris arundinacea*	
Phragmites	*Phragmites australis*	x
Japanese Knotweed	*Polygonum cuspidatum*	
Japanese Hedgeparsley	*Torilis japonica*	x
Periwinkle	*Vinca minor*	x
Pale Swallow-wort	*Vincetoxicum rossicum*	x
Shrubs		
Japanese Barberry	*Berberis thunbergii*	
Common Privet	*Ligustrum vulgare*	x
Non-native Honeysuckles	e.g., *Lonicera tatarica*	x
White Mulberry	*Morus alba*	
Common Buckthorn	*Rhamnus cathartica*	x
Multiflora Rose	*Rosa multiflora*	x
Trees		
Norway Maple	*Acer platanoides*	x
Manitoba Maple	*Acer negundo*	x
Black Locust	*Robinia pseudo-acacia*	

* local dominance was based on field observations by the study team or RGB staff and indicates where species was noted as dominating the vegetation in the community it occurred.

5.4.3 Significant Flora

A number of significant flora species are identified in the Lower Grindstone Heritage Lands, including:

- 4 nationally and provincially Endangered species;
- 1 nationally and provincially Threatened species;
- 27 provincially rare species (ranked S1-S3); and
- 79 regionally rare and 125 regionally uncommon species in the Region of Halton (Halton 2006).

Table 7 lists flora Species at Risk and provincially rare species (S1-S3) noted within the Lower Grindstone Heritage Lands.

Table 7. Provincially significant flora species in Lower Grindstone Heritage Lands

Scientific Name	Common Name	S_Rank	COSEWIC	ESA	SARA
Eupatorium altissimum L.	Tall Boneset	S1			
*Stylophorum diphyllum (Michx.) Nutt.**	Wood Poppy	S1	END	END	END
Sphenopholis nitida (Biehler) Scribn.	Shiny Wedgegrass	S1			
Crataegus margaretae Ashe	Margarett's Hawthorn	S1			
*Aesculus glabra Willd. var. glabra***	Ohio Buckeye	S1			
Scirpus georgianus Harper	Georgia Bulrush	S1?			
Corydalis flavula (Raf.) DC.	Yellow Corydalis	S1S2			
Phleum alpinum L.	Alpine Timothy	S1S2			
Azolla caroliniana Willd.	Eastern Mosquito Fern	S1S2			
Eurybia schreberi (Nees) Nees	Schreber's Aster	S2			
*Silphium perfoliatum L. var. perfoliatum**	Cup Plant	S2			
Gymnocladus dioicus (L.) K.Koch	Kentucky Coffee-tree	S2	THR	THR	THR
Frasera caroliniensis Walter	American Columbo	S2	END	END	END
Cornus florida L.	Eastern Flowering Dogwood	S2?	END	END	END
Gleditsia triacanthos L.	Honey Locust	S2?			
Juglans cinerea L.	Butternut	S2?	END	END	END
Aureolaria pedicularia (L.) Raf.	Fern-leaved Yellow False Foxglove	S2?	THR		
Populus deltoides subsp. monilifera (Aiton) Eckenwalder	Plains Cottonwood	S2?			
Elymus curvatus L.	Awnless Wildrye	S2S3			
Asimina triloba (L.) Dunal	Pawpaw	S3			
Solidago rigida L.	Stiff Goldenrod	S3			

Scientific Name	Common Name	S_Rank	COSEWIC	ESA	SARA
Carex albicans Willd. ex Spreng. var. albicans	White-tinged Sedge	S3			
Desmodium cuspidatum (Muhlenb. ex Willd.) DC. ex G.Don	Largebract Tick-trefoil	S3			
Carya glabra (Mill.) Sweet	Pignut Hickory	S3			
Zizania aquatica L. var. aquatica	Southern Wildrice	S3			
Ranunculus hispidus Michx. var. hispidus	Bristly Buttercup	S3			
Thalictrum thalictroides (L.) A.J.Eames & B.Boivin	Rue-anemone	S3			

* planted
** planted and escaped

COSEWIC – Committee on the Status of Endangered Wildlife in Canada (END = Endangered; THR = Threatened)
SARA – Species at Risk Act (END = Endangered)
ESA – Endangered Species Act (END = Endangered)

S-Rank = Sub-national Rank
Ontario Ministry of Natural Resources. 2018. Vascular Plant Species List. Peterborough, Ontario.
S1 – Extremely rare in Ontario
S2 – Very rare in Ontario
S3 – Rare to uncommon in Ontario
? – Uncertain classification due to insufficient information

Halton Natural Areas Inventory. 2006.
HU – Uncommon in Halton [moderately significant in Halton] – known in 6-10 sites in the Halton area
HR – Rare in Halton [Highly significant in Halton] – known in 5 or fewer sites in the Halton area

5.5 Fauna

A conservative approach was used to summarize fauna within the Lower Grindstone Heritage Lands; records without specific location information and those that have not been recently confirmed to have been documented within the Lower Grindstone Heritage Lands were not included in this summary.

A total of 490 fauna species have been documented within the Lower Grindstone Heritage Lands, including 470 native species and 20 introduced species (Appendix 7). Table 8 summarizes provincially significant faunal species found within the Current Lower Grindstone Heritage Lands. In this report, provincially significant species are those that are identified as Endangered, Threatened, of Special Concern, or ranked S1-S3. Regional rarity is also listed and is based on rankings provided by Halton Region (2006).

5.5.1 Inventory

Butterflies and Moths (Lepidoptera)

A total of 69 species of butterfly or moth have been recorded within the Lower Grindstone Heritage Lands. Two of these species are non-native (Cabbage White (*Pieris rapae*) and European Skipper (*Thymelicus lineola*)) (Appendix 7). This group, in particular moths, is no doubt under-studied and these numbers should be considered to be very conservative. Significant species are listed in Table 8 (provincial) and Appendix 7 (regional).

- 4 S1-S3 species;
- 2 nationally and provincially listed species; and
- 2 species rare in Halton.

Dragonflies and Damselflies (Odonata)

A total of 53 species of dragonfly or damselfly have been identified within the Lower Grindstone Heritage Lands, all of which are native (Appendix 7). Provincially rare species are listed in Table 8. Regionally significant species are listed in Appendix 7. These rankings should be considered tentative as this group is not well studied in Ontario and the distributions of some species are likely not fully understood.

- 4 S1-S3 species;
- 1 species rare in Halton; and
- 1 species uncommon in Halton.

Fish and Mussels

Fish and Mussel community sampling has been undertaken by CH at Grindstone Creek. A total of 49 fish species and 11 mussel species have been documented within the Lower Grindstone Heritage Lands. Provincially rare species are listed in Table 8. Regionally significant species are listed in Appendix 7.

- 2 S1-S3 fish species; 3 S1-S3 mussel species;
- 2 nationally and provincially listed fish species;
- 2 nationally and provincially listed mussel species; and
- 2 fish species rare in Halton.

Amphibians

A total of 16 species of amphibians have been recorded in the Lower Grindstone Heritage Lands, all of which are native. No provincially or regionally rare species are known to be present within the Lower Grindstone Heritage Lands.

- 1 S1-S3 species (historic record);
- 1 nationally and provincially listed species (historic record);
- 2 species rare in Halton; and
- 3 species uncommon in Halton.

Reptiles

A total of 17 species of reptile have been recorded in the Lower Grindstone Heritage Lands, 16 of which are considered native to Ontario. Provincially rare species are listed in Table 8, and regionally rare species are listed in Appendix 7.

- 7 S1-S3 species, including 3 historic records;
- 7 nationally and provincially listed species, including 3 historic records;
- 4 species rare in Halton;
- 2 species uncommon in Halton;
- 1 non-native (introduced) – Pond Slider (Trachemys scripta)

Birds

A total of 236 bird species have been noted within the Lower Grindstone Heritage Lands, including 5 non-native species. Provincially rare species are listed in Table 8, and regionally rare species are listed in Appendix 7.

- 30 S1-S3 species;
- 4 Federally and Provincially Endangered species;
- 4 Federally and Provincially Special Concern species;
- 2 Federally Endangered and Provincially Special Concern species;
- 1 Federally Special Concern and Provincially Threatened species;
- 1 Provincially Endangered species not listed Federally;
- 1 Provincially Threatened species not listed Federally;
- 1 Provincially Special Concern species not listed Federally;
- 1 species rare in Halton;
- 1 species uncommon in Halton; and
- 8 area sensitive species.

Mammals

A total of 21 mammal species have been recorded within the Lower Grindstone Heritage Lands. Provincially or regionally rare mammals have not been identified within the Lower Grindstone Heritage Lands. Notably, targeted surveys for bats have not been completed and there are likely a number of bats, including SAR bats, present in the Heritage Lands given the diversity of habitats present. One Regionally rare species, the Northern Flying Squirrel (*Glaucomys sabrinus*) has been documented in the Lower Grindstone Heritage Lands.

Table 8. Significant fauna species recorded from Lower Grindstone Heritage Lands

Scientific Name	Common Name	Historic Record	G_Rank	S_Rank	COSEWIC	SARA	ESA
Amphibians							
Pseudacris maculata	Western Chorus Frog (Great Lakes/ St. Lawrence population)	yes	G5TNR	S3	THR	THR	
Birds							
Setophaga palmarum hypochrysea	Eastern Palm Warbler		G5TU	S1B			
Protonotaria citrea	Prothonotary Warbler		G5	S1B	END	END	END
Icteria virens	Yellow-breasted Chat		G5	S1B	END	END	SC
Aythya valisineria	Canvasback		G5	S1B, S4N			
Podiceps auritus	Horned Grebe		G5	S1B, S4N	SC	SC	SC
Buteo lagopus	Rough-legged Hawk		G5	S1B, S4N	NAR		NAR
Calidris canutus rufa	Red Knot rufa subspecies		G4T2	S1N	END	END	END
Pelecanus erythrorhynchos	American White Pelican		G4	S2B			THR
Ardea alba	Great Egret		G5	S2B			
Aquila chrysaetos	Golden Eagle		G5	S2B			END
Larus marinus	Great Black-backed Gull		G5	S2B			
Sterna forsteri	Forster's Tern		G5	S2B	DD		DD
Lanius ludovicianus	Loggerhead Shrike		G4	S2B	END	END	END
Vireo griseus	White-eyed Vireo		G5	S2B			
Aythya americana	Redhead		G5	S2B, S4N			
Pluvialis dominica	American Golden-Plover		G5	S2B, S4N			
Haliaeetus leucocephalus	Bald Eagle		G5	S2N, S4B			SC
Asio flammeus	Short-eared Owl		G5	S2N, S4B	SC	SC	SC
Empidonax virescens	Acadian Flycatcher		G5	S2S3B	END	END	END
Clangula hyemalis	Long-tailed Duck		G5	S3B			
Falco peregrinus	Peregrine Falcon		G4	S3B	SC	SC	THR
Phalaropus tricolor	Wilson's Phalarope		G5	S3B			

Scientific Name	Common Name	Historic Record	G_Rank	S_Rank	COSEWIC	SARA	ESA
Hydroprogne caspia	Caspian Tern		G5	S3B			NAR
Chlidonias niger	Black Tern		G4	S3B		SC	SC
Setophaga discolor	Prairie Warbler		G5	S3B			NAR
Setophaga cerulea	Cerulean Warbler		G4	S3B	END	END	SC
Parkesia motacilla	Louisiana Waterthrush		G5	S3B	THR	SC	SC
Nycticorax nycticorax	Black-crowned Night-heron		G5	S3B, S3N			
Calidris pusilla	Semipalmated Sandpiper		G5	S3B, S4N			
Limnodromus griseus	Short-billed Dowitcher		G5	S3B, S4N			
Butterfly/Moth							
Danaus plexippus	Monarch		G4	S2N, S4B	END	SC	SC
Euphyes conspicua	Black Dash		G4	S3			
Pieris virginiensis	West Virginia White		G3	S3			SC
Asterocampa clyton	Tawny Emperor		G5	S3			
Dragonfly/Damselfly							
Cordulegaster obliqua	Arrowhead Spiketail		G4	S2			
Enallagma anna	River Bluet		G5	S2			
Epiaeschna heros	Swamp Darner		G5	S2S3			
Arigomphus villosipes	Unicorn Clubtail		G5	S3			
Mussel							
Ligumia nasuta	Eastern Pondmussel			S1	END	END	END
Toxolasma parvum	Lilliput			S1	END	END	
Utterbackia imbecilis	Paper Pondshell			S2			
Fish							
Anguilla rostrata	American Eel		G4	S1?	THR	NS	END
Clinostomus elongatus	Redside Dace	Yes	G3G4	S2	END	END	END
Reptile							
Sistrurus catenatus pop. 2	Massasauga (Carolinian population)	Yes	G4TNR	S1	END	END	THR
Glyptemys insculpta	Wood Turtle	Yes	G3	S2	THR	THR	END
Apalone spinifera	Spiny Softshell	yes	G5	S2	END	THR	THR
Chelydra serpentina	Snapping Turtle		G5	S3	SC	SC	SC

Scientific Name	Common Name	Historic Record	G_Rank	S_Rank	COSEWIC	SARA	ESA
Sternotherus odoratus	Eastern Musk Turtle		G5	S3	SC	THR	THR
Emydoidea blandingii	Blanding's Turtle		G4	S3	END	THR	THR
Graptemys geographica	Northern Map Turtle		G5	S3	SC	SC	SC

COSEWIC – Committee on the Status of Endangered Wildlife in Canada (END = Endangered; THR = Threatened)
SARA – Species at Risk Act (END = Endangered)
ESA – Endangered Species Act (END = Endangered)

S-Rank = Sub-national Rank
Ontario Ministry of Natural Resources. 2018. Vascular Plant Species List. Peterborough, Ontario.
S1 – Extremely rare in Ontario
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Halton Natural Areas Inventory. 2006.
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HR – Rare in Halton [Highly significant in Halton] – known in 5 or fewer sites in the Halton area

5.5.2 Significant Wildlife Habitat

Based on a preliminary assessment of the Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF, January 2015), the Lower Grindstone Heritage Lands may provide the following types of significant wildlife habitat:

1. Seasonal Concentration Areas of Animals
    - Waterfowl Stopover and Staging Areas (Aquatic)
    - Shorebird Migratory Stopover Area
    - Bat Hibernacula
    - Bat Maternity Colonies
    - Turtle Wintering Area
    - Colonially Nesting Bird Breeding Habitat (Tree/Shrub)
    - Migratory Butterfly Stopover Areas
    - Landbird Migratory Stopover Areas
    - Deer Winter Congregation Areas
2. Rare Vegetation Communities
    - Old Growth Forest
    - Savannah
    - Other Rare Vegetation Communities
3. Specialized Habitat for Wildlife
    - Waterfowl Nesting Area
    - Bald Eagle and Osprey Nesting, Foraging and Perching Habitat
    - Woodland Raptor Nesting Habitat
    - Turtle Nesting Areas
    - Seeps and Springs
    - Amphibian Breeding Habitat (Woodland)
    - Amphibian Breeding Habitat (Wetland)
    - Shrub/Early Successional Bird Breeding Habitat
4. Habitat for Species of Conservation Concern
    - Marsh Bird Breeding Habitat
    - Woodland Area-sensitive Breeding Bird Habitat
    - Shrub/Early Successional Bird Breeding Habitat
    - Special Concern and Rare Wildlife Species
5. Animal Movement Corridors
    - Amphibian Movement Corridor

A thorough analysis of the extent of significant wildlife habitat is not possible at this scale of study; however, it is likely that substantial areas of the Current EcoPark System Lands would qualify as significant wildlife habitat.

5.6 Other Natural Heritage Designations

The following designations have been applied to lands found within the Lower Grindstone Heritage Lands.

Area of Natural and Scientific Interest

The following Areas of Natural and Scientific Interest (ANSI) are found within the Lower Grindstone Heritage Lands:

- Grindstone Creek Regional Life Science ANSI

Environmentally Sensitive Areas

The following Environmentally Sensitive Areas (Halton Region and North-South Environmental Inc. 2005, Dwyer 2006) are found within the Lower Grindstone Heritage Lands:

- Grindstone Creek Valley Environmentally Sensitive Area (ESA)

It is noteworthy that the ESA designations date back to an Environmentally Sensitive Area Study (Regional Municipality of Halton EEAC 1978) and originally formed the basis of the Region's approach to protecting natural heritage in the Regional Official Plan. With the adoption of a Natural Heritage System (NHS) in the current Regional Official Plan, the ESA designation was removed from the Region's policies, although they were included as a feature in the mapping of the NHS. Thus, there is no current policy status for ESAs at the Regional level, although they remain in the current City of Burlington Official Plan.

Provincially Significant Wetland

The following PSW is found within the Lower Grindstone Creek Heritage Lands:

- Hendrie Valley-Lambs Hollow Provincially Significant Wetland

Urban River Valley

Hendrie Valley, including portions of Grindstone Creek in Hidden Valley Park is designated as an Urban River Valley in the Greenbelt Plan.

Important Reptile and Amphibian Area (IMPARA)

Cootes Paradise, Carroll's Bay and Grindstone Valley Nature Sanctuaries have been designated as IMPARA sites by the Canadian Herpetological Society owing to, "… their special worth and significance for the conservation of amphibian and reptile biodiversity and Species At Risk." (http://canadianherpetology.ca/conservation/impara.html).

5.7 Natural Heritage Connections and Linkages

Natural Heritage connections and linkages occur at various scales: (1) large-scale, provincial, connections through natural areas located along the Niagara Escarpment and Lake Ontario; (2) connections and linkages among the six Heritage Lands; and (3) connections and linkages among parcels within individual Heritage Lands. The Heritage Lands within the Cootes to Escarpment EcoPark System and their linkage function are generally captured within the Region of Halton's and City of Burlington's Natural Heritage Systems.

In terms of inter-Heritage Land connections, creek valleys generally provide natural corridors for species movement. However, northward and westward movement from the Lower Grindstone Heritage lands is curtained by the CNR rail corridor and Hwy 403.Grindstone Creek Valley serves as the only reasonable linkage to the north by providing connection beneath the railway and Highway 403, but even this connection is largely consumed by Lemonville Road. Similarly, westward, Grindstone Creek provides opportunity for linkage where it flows beneath the rail line and Hwy 403, but this linkage is marginal for

terrestrial species. Residential development restricts movement to the south and east, with the exception that the cemetery lands provide some connection to Lake Ontario, though as they are maintained (i.e., are not natural), that function is limited.

Within Lower Grindstone Heritage Lands, Current EcoPark System Lands are contiguous and thus are reasonably well connected and configured. However, the area is bisected by Plains Road West, Spring Gardens Road, Unsworth Ave, Lemonville Road and Hidden Valley Road (Figure 2). Lower Grindstone 1 - 3 and 6 are generally well connected and configured. Hidden Valley Park 2 – 4, are limited in connectivity due to existing park infrastructure and development.

Significant wildlife corridor issues have been identified with major roadways within the Cootes to Escarpment EcoPark System, and within the Lower Grindstone Heritage Lands. Locations with wildlife corridor issues within the Lower Grindstone Heritage Lands include Plains Road West, Spring Gardens Road and Unsworth Ave at multiple points where the existing culverts are undersized relative to wildlife and where regular at-grade crossing occurs by wildlife.

Additional discussion on wildlife crossing and corridor issues is provided in Section 7.6.1.

5.8 Natural Heritage Inventory Summary

The following table includes some natural heritage-related policy designations such as Environmentally Significant Areas, significant woodland and significant wildlife habitat, as well as strictly natural heritage inventory summary information for Lower Grindstone Heritage Lands. The inventory excludes historical records and records of non-breeding bird species. Species at Risk listings refer to the Ontario Endangered Species Act, where END=endangered, THR=threatened.

Table 9. Summary of natural heritage inventory findings for Lower Grindstone Heritage Lands. Species considered to be extirpated from Lower Grindstone Heritage Lands have not been included.

Features	Lower Grindstone Heritage Lands
Environmentally Significant Area	• Grindstone Creek Escarpment Valley ESA
Area of Natural and Scientific Interest (ANSI)	• Regional Life Science ANSI
Species at Risk	• 4 END (ESA/SARA) and 1 THR (ESA/SARA) flora species • 1 SC (ESA/SARA) and 1 SC (ESA) butterfly/moth species • 3 THR (ESA/SARA) and 2 SC (ESA/SARA) turtle species • 1 END (ESA) and 1 END (ESA/SARA) fish species • 1 END (ESA/SARA) and 1 END (SARA) mussel species • 4 END (SARA and ESA), 4 SC (SARA and ESA), 2 SC (ESA)/END (SARA), 1 THR (ESA)/SC (SARA), 1 END (ESA), 1 THR (ESA), 1 SC (ESA) bird species

Features	Lower Grindstone Heritage Lands
Significant Wildlife Habitat	Examples of Significant Wildlife Habitat within the Lower Grindstone Heritage Lands: • Seasonal Concentration Areas of Animals ▪ Bat Hibernacula ▪ Bat Maternity Colonies ▪ Deer Winter Congregation Areas • Rare Vegetation Communities ▪ Other Rare Vegetation Communities • Specialized Habitat for Wildlife ▪ Seeps and Springs ▪ Shrub/Early Successional Breeding Bird Habitat • Habitat for Species of Conservation Concern • Animal Movement Corridors
Surface water and fisheries resources	• Grindstone Creek provides important fish habitat • Cold-water fish habitat
Flora	• 828 flora species; 552 native flora species • 27 Carolinian Indicators; 25 Prairie-Savannah Indicators • 121.04 FQI; 5.15 Mean C • 4 END (ESA/SARA) flora species • 27 S1-S3 species • 79 regionally rare and 125 uncommon species in Halton
Butterflies and Moths	• 69 species; 67 native species • 1 SC (ESA/SARA) species, 1 SC (ESA) • 4 S1-S3 species • 2 regionally rare species in Halton
Dragonflies and Damselflies	• 53 native species • 4 S1-S3 species • 1 regionally rare species in Halton • 1 regionally uncommon species in Halton
Fish and mussels	• 49 species fish; 38 native fish species • 11 species of mussel • 2 S1-S3 species of fish; 3 S1-S3 species of mussels • 2 regionally rare species of fish in Halton
Amphibians	• 16 native species • 2 species rare in Halton • 3 species uncommon in Halton
Reptiles	• 17 native species; 16 native • 4 S1-S3 species • 2 THR (SARA and ESA), 2 SC (SARA and ESA) • 3 regionally rare species in Halton

Features	Lower Grindstone Heritage Lands
Birds	• 236 species; 234 native species • 4 END (SARA and ESA), 4 SC (ESA and SARA), 2 END (SARA)/SC (ESA), 1 SC (SARA)/ SC (ESA), 1 END (ESA), 1 THR (ESA), 1 SC (ESA) • 30 S1-S3 species • 1 regionally rare species in Halton • 1 regionally uncommon species in Halton • 14 area-sensitive species
Mammals	• 21 species • 1 regionally rare species in Halton • Note: bat surveys not completed to date

6.0 Cultural Heritage Inventory

6.1 Overview

Background review of Lower Grindstone Heritage Lands included a review of Wentworth County historical maps dated 1851, 1859 and 1875, National Topographic System maps dated 1909, 1931, and 1984, and Ontario Ministry of Natural Resources aerial photography dated 1954. Reviews of the City of Burlington, Ontario Heritage Trust and Canadian Register of Historic Places inventories of cultural heritage properties were undertaken. To clarify the history and location of sites and features, a review was conducted of maps, drawings and photographs held by the City of Burlington Archives and the City of Burlington Historical Society. Consultation took place with staff from RBG and City of Burlington to review the history of cultural heritage features, identify other features of potential heritage value and gain information on plans for integrating cultural landscape features into interpretation and management planning. Through a public meeting and correspondence with the Burlington Historical Society, additional information was provided on a site of heritage interest associated with Hidden Valley Park as described in the report. Halton Conservation, the City of Burlington and RBG were consulted regarding the presence of archaeological resources and any known archaeological sites.

This section provides a general overview of human activity in the Lower Grindstone, from Indigenous Peoples' use to the present day. Details of cultural heritage resources, including key people, are found in following sections.

6.1.1 Early Settlement History

Human use dating from Early Archaic times (8000-6000 B.C.) through to the end of the Woodland period (at A.D. 1650) has been documented on heritage lands adjacent to the Lower Grindstone (Haines, H. et al. 2011). Although no archaeological sites have been identified within the Lower Grindstone lands, other than a surface investigation described in relation the Rifle Range (see section6.2.7), this area is

anticipated to have high archaeological potential due to its location at the head of Lake Ontario and the presence of water corridors and early transportation routes.

The Iroquoian-speaking nation known as Neutrals occupied the Niagara peninsula region, including the Lower Grindstone watershed, until the mid-1600s (Noble 2015). The name "Neutrals" reflected their peaceful relations with their warring neighbours, the Huron-Wendat (Hurons) to the north and the Haudenosaunee (now Six Nations of the Iroquois Confederacy) to the south and east in upstate New York. In 1649-1650, weakened by disease and war, the Huron-Wendat and Neutrals were attacked and expelled by the Seneca, one of the Haudenosaunee nations. By the end of the 1600s, the Mississauga's, an Anishinaabe nation who controlled the Great Lakes, were successful in driving the Haudenosaunee back to their homelands south of Lake Ontario. The Royal Proclamation of 1763 confirmed First Nations' sovereignty over Mississauga lands and prevented anyone, other than the Crown, from purchasing that land. The "Between the Two Lakes Treaty" of 1784 and 1792 ceded the Mississauga's land to the Crown and granted land to the Six Nations of the Iroquois Confederacy who had fought with the British during the American Revolution.

By the latter part of the 1700s, United Empire Loyalists, British soldiers and others were attracted to the area for its arable land, mature trees, sources of building stone, abundant water, and fish and game. Early settlers in the Lower Grindstone watershed included Alexander Brown, who purchased 800 acres near what is now LaSalle Park in Burlington and opened two mills on Grindstone Creek and later operated a stone quarry; William Applegarth who received a grant from the Crown on the shore of Burlington Bay and later built the first grist mill in the watershed and other mills along Grindstone Creek; Alex Brown Jr., who built Brown's Wharf on the shore of Burlington Bay, from which squared pine and oak timbers were shipped; and James Griffin, who improved Snake Road and Centre Road from Burlington Bay to Carlisle and introduced tolls for maintenance and repairs.

By the mid-1800s pioneer farms and settlements dominated the landscape. Farmers grew hay, grain, corn, potatoes and turnips as well as mixed crops, including hay and wheat, combined with specialty crops of tobacco, flax and hops. Later in the century, livestock breeding expanded, along with market gardens, tender fruit production (melons and strawberries) and apples, many of which were shipped abroad. In 1875, primary landowners of Concession 1, East Flamborough Township, south of the Great Western Railway (now the Canadian National Railway) and north of what was to become Plains Road West, included C. Feely and A. Jameson (Lot 8), B. Crick (Lot 9), Wm. Hendrie (Lot 10), A. Beval (Lot 11), A. Henderson and S. Snoke & brother (Lot 12), and P. Carroll (Lot 13) as shown on the 1875 map of Wentworth County (Page and Smith). By the end of the 1800s, much of the watershed was cleared of its forests and Major John Connon had established the horticulture industry in the region.

The Southern Ontario Canadian Pacific Railway was extended up the Grindstone Creek valley through Waterdown in 1910-1911, connecting Guelph Junction with Hamilton. A 1931 topographic map indicates orchards on properties along Plains Road West. With construction of the Queen Elizabeth Way in the late 1930s, followed by Highway 403 in the 1960s, much of the best land for market gardens and tender fruit in Lower Grindstone area was lost, replaced by residential development and land used for industry and commerce.

6.1.2 Twentieth Century Context and Local Cultural History

The early decades of the twentieth century were a period of reform in cities across Canada. The City Beautiful movement, represented best by Burnham and Olmsted's design of the 1893 Chicago World's Fair site, offered organized structure and civic beauty in the form of unified architecture, boulevards, parkways and civic plazas as an alternative to industrial urban landscapes with their congested traffic, cramped housing and lack of green space. Canadian examples of the City Beautiful could be found through the work of landscape architects and town planners in Ottawa, Edmonton and Regina as early as 1911 (Williams 2014). In Britain, the Garden City movement, championed by social reformer Ebenezer Howard, resulted in the creation of new towns that sought to combine all the good qualities of both city and countryside into an ideal settlement surrounded by a greenbelt. Garden City ideas were applied by town planners and landscape architects at the neighbourhood scale in the design of Tuxedo Park in Winnipeg, Mount Royal in Montreal and Shaughnessy Heights in Vancouver. At the city scale, planning for botanical gardens in Vancouver with UBC, and Montreal, with U de M, contributed to not only green space but opportunities for scientific advancement These two movements were supported by civic-minded residents across Canada and the City of Hamilton was at the forefront of cities interested in their benefits (Bouchier and Cruikshank 2016: Williams 2014).

Hamilton's most prominent proponent of civic improvements was Thomas B. McQuesten, a lawyer, civic leader and politician, who served for many years on the Hamilton Board of Park Management (BPM) and developed an interest in civic improvement early in his career (Best 1991). Through authority granted by the provincial government, the BPM levied taxes which were used to acquire and develop park land. McQuesten's vision was to use this source of funds to acquire land and establish Hamilton as a model city to reflect the aims of both the City Beautiful and Garden City movements. The BPM was successful in meeting its aims and by 1934 Hamilton had more acres as public park than any other city in Canada (Terpstra 1985). A botanical garden would provide opportunities for scientific study, offer additional green space for urban residents, attract visitors and contributed to the image of Hamilton as a progressive city.

McQuesten understood that creating a botanical garden would provide opportunities for scientific study, offer additional green space for urban residents, attract visitors and contribute to the image of Hamilton as a progressive city. By 1927, the Board of Park Management had acquired 162 hectares (400 acres) that included lots around Cootes Paradise and lands in the Westdale subdivision for conservation and botanical garden purposes. Offered a site for a campus on the south shore of Cootes Paradise, McMaster University accepted the invitation to relocate from Toronto to Hamilton in 1928, providing the research capacity that would be needed to develop a world-class botanical garden. In 1929, the first display garden was constructed on the grounds of the newly established campus of McMaster University. The Sunken Garden, designed by landscape architect Howard Dunington-Grubb, was intended to serve as an entrance to both the university and to the western end of the proposed botanical gardens. Capping off these early steps toward establishment of a world-class botanical garden was receiving a memo from King George himself in early 1930 granting the use of the title 'Royal' by the

Hamilton Botanical Gardens (Laking 2006). Soon after, the Royal Botanical Gardens science advisory committee was appointed, and McMaster campus officially opened.

6.2 Lower Grindstone Cultural Heritage Inventory

The cultural heritage themes associated with these Heritage Lands includes William and John Applegarth and milling on Grindstone Creek, the history of William Hendrie and his Valley Farm, development of Hendrie Park and RBG Centre for purposes of civic improvement and scientific study, and the history of Hidden Valley Park as a recreation site. Quarrying is a minor theme, associated with Valley Farm and William Hendrie on land that is now adjacent to the Heritage Lands. Background on these themes and the cultural heritage resources associated with them are presented in the following sections and illustrated in Figure 7. The following Section (Section 6.3) provides details on cultural heritage resources located on adjacent lands.

6.2.1 Milling

Mills were located along the length of Grindstone Creek, as documented by HRCA (1997). William Applegarth settled in Aldershot in 1791 and his brother, John, joined him there in 1801. They are credited with building the first grist mill in the Lower Grindstone Creek watershed in 1809 which burned down in 1812 and was later rebuilt several times, possibly in different locations along the creek (Turcotte 1989). Remnants of a dam associated with the mill site can be found along Grindstone Creek west of Unsworth Ave.

Mill Site - Cultural Heritage Resources: A mill site, possibly the first Applegarth mill, is located along Grindstone Creek, near or under the intersection of Highway 403 and Lemonville Road as documented by a long-time Aldershot resident (see Figure 7, K. Thornborrow, personal communication 2019). Archival photographs indicate the mill was present in or adjacent to the Lower Grindstone Heritage Lands, although previous field investigation revealed no evidence of the mill structure likely due to disturbance resulting from road and railway construction and stream corridor disturbance. The City of Burlington has identified public interest in incorporating one or two grindstones thought to have been part of the Applegarth mill, and now located on private property, into a future interpretive site within Hidden Valley Park.

6.2.2 Extraction

Extraction of clay took place on Lower Grindstone 1 and 2. In 1910, the National Fireproofing Company, later known as NATCO, established a plant located on the west side of Unsworth Avenue, south of Highway 403 on land that was previously part of Valley Farm. Clay tile and pipe for industrial uses were manufactured on the site. The factory was dismantled in the 1990s following an attempt to save at least one of the eight beehive kilns on the site (Downey 2017). At the entrance to Gardens Trail Development on Sandcherry Drive is a rock with a commemorative plaque attached that cites the history of the National Fireproofing Company factory (Figure 7). The plaque was installed by EMSHIH Developments Inc., who developed Phase I of the subdivision.

Cootes to Escarpment EcoPark System

Cootes to Escarpment EcoPark System
Lower Grindstone Heritage Lands
Inventory, Issues and Opportunities
Figure 7: Cultural Heritage Resources

Hillsdale Avenue
Highway 403
Canadian National Railway
York Road
Lemonville Road
Hidden Valley Road
Grindstone Creek
Spring Gardens Road
Botanical Drive
Plains Road West
Unsworth Avenue
Howard Road
Hidden Valley Park
Royal Botanical Gardens

0 100 200 400
Meters

Legend

Heritage Landscapes

- Barbara Laking Garden
- Centennial Rose Garden
- Hendrie Park
- Hidden Valley Park
- Medicinal Garden
- Morrison Woodland Garden
- Rifle Range
- Rock Garden Lodge Site

(#) Heritage Structures

1 - Toll House Site
2 - Laking Garden Farmhouse
3 - Cherry Hill Gate
4 - Royal Botanical Gardens Centre
5 - Turner Pavilion
6 - The Hendrie Gates
7 - Hendrie House Site/RBG Director's Home/Former Bird Branding Stations
8 - Remnant of Old Mill
9 - Woodcutter's Cottage

Heritage Roads

- Old Coach Trails
- Old Snake Road

(#) Heritage Trees

1 - Apple Tree
2 - Bitternut Hickory
3 - Red Oak
4 - Shagbark Hickory
5 - Black Oak
6 - Eastern Cottonwood

(#) Commemorative Markers and Plaques

1 - Laking Gardens Gazebo Markers
2 - Sondra Cornett Peony Collection Plaque
3 - Fastigiate Tulip Tree Commemorative Tree
4 - Tricolour Beech Commemorative Tree
5 - Hendrie Family Marker
6 - Medicinal Garden
7 - Martimus Marker
8 - Society of Directors of Municipal Recreation of Ontario Plaque
9 - O.A.A. Commemoration
10 - ORFA Marker
11 - National Fireproofing Company Plaque
12 - Aldershot Community Council Plaque

Lower Grindstone Heritage Lands

November 20, 2019

6.2.3 William Hendrie and Valley Farm – Entrepreneur and Breeder

Valley Farm was owned and operated by William Hendrie. Hendrie emigrated from Scotland in 1855 to work for the Great Western Railway, first in Niagara Falls and later in Hamilton (Burley 2003). He and a former employee, John Shedden, formed a company with the exclusive right to serve as cartage agents for the Great Western. The company provided pick-up and delivery of freight to points along the railway from Hamilton to London and soon expanded service to the Grand Trunk Railway, serving Toronto and Montreal. Hendrie's further cartage business expanded to Hamilton, St. Catharine's, Chatham and later to St. Thomas and to the Toronto, Grey and Bruce Railway.

Hendrie's other business interests included investment in his brother George's purchase of the Detroit City Railway, a horse-drawn streetcar line in 1859, and in the Michigan Car Company, a freight-car manufacturing enterprise with expectations to build cars for the Canada Southern Railway. Hendrie also became involved in railway construction projects in Ontario and Michigan, eventually placing him on the boards of railway companies with influence in Ontario, Quebec, Manitoba and Detroit. In 1872, Hendrie became a founding director of the Hamilton Tool company, which in 1881 became Hamilton Bridge and Tool company, with Hendrie as president.

With much of his early business relying on horses, Hendrie became involved in horse-breeding in addition to breeding sheep and cattle. At Valley Farm, Hendrie and Company bred saddle, road and carriage horses which were sold to the cartage company and others, including the British army. Valley Farm was also where William Hendrie bred racehorses, reflecting his interest in horse-racing. As early as 1866, he served as steward of the Hamilton Riding and Driving Association and in 1881 he helped organize the Ontario Jockey Club, of which he was president from 1892 until his death in 1906. On Valley Farm, Hendrie had about 80 horses, showing thoroughbreds at Woodbine Park racetrack in Toronto and at other North American tracks. A 1931 National Topographic System map shows a racetrack on land across from the Hendrie Farm at the corner of what is now Plains Road West and Unsworth Avenue. Although parts of Valley Farm remained in Hendrie family ownership until 1931, an executor's notice of sale by tender in *The Globe* in 1908 provides a detailed description of the Hendrie property two years after Hendrie's death, indicating the topography of the site, its buildings and services, and the acreage of the three parcels of land that comprised Valley Farm.

In 1931, William Hendrie's Valley Farm property was conveyed to the City of Hamilton by his son, George H. Hendrie, in recognition of the 100th anniversary of his father's birth (City of Burlington 1991). This gift of land, 49.4 hectares (122 acres) in size was to be "… a natural park for the free use of its citizens in perpetuity (Laking, p. 32)." Ten years later, the City of Hamilton Board of Parks Management petitioned the Government of Ontario to vest the Hendrie lands and other land acquired for botanical garden purposes in a separate corporate body with a board responsible for administration and development of the Royal Botanical Gardens. A Private Members bill was introduced to the Legislature and on April 1,1941 the bill passed, and the Royal Botanical Gardens was officially established.

Hendrie Family Cultural Heritage Resources: Cultural heritage resources connected to the Hendrie family include all the land conveyed to the City of Hamilton in 1931. Hendrie Gates and a Hendrie family granite marker are memorials to William Hendrie and his family. A granite marker in memory of one of Hendrie's prized horses, Martimus, is located behind a hedge, north of the Hendrie Gates. The park, gates and two commemorative markers, all located within Hendrie Park, are described in Section 3.3.2 (Figure 7).

6.2.4 RBG Lands in the Lower Grindstone

Royal Botanical Gardens Director Leslie Laking described the Valley Farm site, renamed "Hendrie Park", as property that was "coveted by the Hamilton Board of Park Management for a naturalistic park" long before the Hendrie family gifted this land to the City of Hamilton (Laking 2006, p. 31). The property offered a favourable climate for plant cultivation, well-drained fertile land that was accessible from Queen Elizabeth Way and visible along Plains Road West, and a variety of micro-climates including the valley slopes and wetlands of Lower Grindstone Creek. These characteristics made the property attractive to the Hamilton Board of Park Management, providing a site well-suited for both horticultural gardens and scientific study. The site's location near other Hamilton civic landmarks, including the north-western entrance, the High-Level Bridge and the Rock Garden, contributed to its potential to convey the image of Hamilton as a progressive city. In 1941, provincial legislation was passed to recognize RBG as a corporate body and as an institution of provincial significance.

Overall, RBG is recognized by the federal government as a National Historic Site of Canada, designated under the Historic Sites and Monuments Act and listed on the Canadian Register of Historic Places. Character-defining elements of RBG that are located within the Lower Grindstone Heritage Lands include:

> *…its layout reflecting a 20th-century approach to botanical gardens, and consisting of a series of discrete gardens set within the network of a parkway; its horticultural collections; the classification and labelling of collections;… the Laking Garden, including its informal beds of herbaceous perennials; and its major collections of irises and other perennials; …Hendrie Park, including its geometric layout along a principal axis, major gardens such as the Centennial Rose Garden, the Medicinal Garden, the World of Botany, and the Morrison Woodland Garden, as well as garden structures such as a fountain court, a tea house, the Turner Pavilion, rose arbours, and plant collections such as the climbing plant collection; the interpretive centre, including its greenhouses and indoor gardens such as the Mediterranean Garden* (Parks Canada 2009)

Presented in the following sections is the cultural history and cultural heritage resources of RBG Centre, Hendrie Park and Laking Garden and additional cultural heritage resources within the Lower Grindstone Heritage Lands. For the purposes of this report, Hendrie Park is defined as the fenced property north of Plains Road West (Figure 7).

6.2.5 Royal Botanical Garden Centre Cultural Heritage Resources

Royal Botanical Garden Centre is a cultural heritage resource, identified as a character-defining element of RBG (Parks Canada 2009).

The first phase of the Centre, opening in the 1950s, was the design of architects Husband Roberson and Wallace. The second phase, designed by Prack Partners and opened in 1979, was sited with a view overlooking Hendrie Park. The most recent addition is the Dalglish Atrium, located on the north side of RBG Centre, which provides a programmable space that facilitates climate-controlled transition to the pedestrian underpass leading to Hendrie Park.

Cultural Heritage Resources: Features of RBG Centre that are included in the Historic Sites and Monuments citation include RBG Centre, its greenhouses and the Mediterranean Garden. Other features that have been added since this listing include the Dalglish Atrium, and an outdoor terrace and water feature, in the Aldershot Escarpment Garden.

Cherry Hill Gate: The original "gate" dates back to 1960s and has since been renewed/improved (Figure 7).

Commemorative Plaque: A bronze plaque recognizing RBG as a national historic site hangs in the entry corridor of RBG Centre (Figure 7).

RBG Centre

- Plant Records 2717
- Accessions 1519
- **Taxa 1239**
- Families 97
- Genera 387
- Species 946
- Individuals 11861
- Collections Highlights – Street Tree Collection, Mediterranean Garden, Cacti & Succulents, Interior Plants, Bromeliads, New World Species Orchids, Display Orchids, Aldershot Escarpment Garden, Hinton Court, Spicer Court, Royal Court, Natural Playground, Jim Pringle Gentian Garden, Synchronous Phenological Indicator Garden

6.2.6 Hendrie Park Cultural Heritage Resources

The entirety of Hendrie Park Garden is a cultural heritage resource, identified as a character-defining element of RBG (Parks Canada 2009).

Landscape architect J. Austin Floyd prepared a master plan for Hendrie Park in 1962, introducing a "geometric framework for avenues and floral beds, organized along a principal axis" and linking it to RBG Centre. Walls and paths were completed in 1963 and the pedestrian underpass beneath Plains Road West was constructed in 1964. The first display garden was the Centennial Rose Garden, completed in

1967 and redesigned several times since. Other garden and garden features in Hendrie Park that have been identified as character-defining elements include the Medicinal Garden, the Global Garden, the Morrison Woodland Garden, the Lily Garden (which was moved from Laking Garden - formerly Spring Gardens in 1977) and rose arbours, and plant collections such as the climbing plant collection. Architectural garden features include the Turner Pavilion in the Rose Garden, dedicated in 1974 and used as a tearoom during the summer months.

Gardens and garden features that have been added to Hendrie Park since the time of the Canadian Register listing include the Helen Kippax Garden, Veggie Village, the Scented Garden, Imagination Grove, and the White Garden. In 2014, the Dan Lawrie International Sculpture Collection was initiated. This collection of sculptures by both Canadian and international artists is being expanded with a new installation each year over a 10-year period.

Hendrie Gates: At the time the Valley Farm property was donated to the City of Hamilton, the Hendrie family commissioned Frederick John Flatman to create wrought iron gates to serve as an entrance marker to the former Hendrie farm. Commissioned in 1932, the gates were installed in their current location in Hendrie Park in 1953. In 1991 the Hendrie Gates were designated as a heritage property under Part IV of the Ontario Heritage Act and listed on the City of Burlington Municipal Register of Cultural Heritage Resources (City of Burlington 1991). The design and craftsmanship of the iron gates and their relationship to William Hendrie, a successful Hamilton businessman, are the reasons cited for designation.

Hendrie Park Commemorative Plaques, Markers and Trees: Nine plaques and markers commemorating events, organizations, individuals and Martimus, William Hendrie's prized racehorse, are located within Hendrie Park (Figure 7).

Hendrie Park:

- Plant Records 3267
- Accessions 1819
- **Taxa 1517**
- Families 111
- Species 351
- Individuals 44041
- Collections Highlights – Rose Garden, Lily Collection, Morrison Woodland Garden, Medicinal Plants, Canadian originated Trees, Scented Garden, Helen M. Kippax Garden, Prehistoric Grove, Veggie Village, Global Garden, Imagination Grove, White Garden, Medieval Garden, Annual Trials Garden, AAS Trials Garden, Oak Allée

6.2.7 Laking Garden

The entirety of Laking Garden is a cultural heritage resource, identified as a character-defining element of RBG (Parks Canada 2009).

Formerly known as Spring Garden, it includes a farmhouse and surrounding land that was a market garden prior to the 1940s. This perennial showcase is the oldest of RBG's permanent horticultural gardens and was designed by landscape architect Matt Broman in 1946-1947. The late nineteenth-century wood-framed farmhouse was rehabilitated for use by the Laking family in the 1980s. It was further modified in 1991, at which time the heritage dooryard garden was constructed.

Laking Garden has three distinct terraces with a central flagstone walk and stairs linking all three levels. The upper terrace includes a cottage garden designed by RBG landscape architect Ann Milosoroff in 1991, largely using perennials grown in Ontario gardens from the 1880s to the 1920s. It was renamed Barbara Laking Heritage Garden and dedicated to Barbara Laking, wife of Leslie Laking, a trained horticulturalist and the driving force behind RBG's early volunteer group. The middle terrace comprises a rectilinear panel of informally arranged mixed perennials on each side of the walk, surrounded by a semi-circular hedge. The lowest terrace walk is flanked by rectilinear beds of iris, set in a wide, flat grass plain. A cross axis is planted with beds of iris and peonies that lead to Laking Gazebo, overlooking Hamilton Bay.

Laking Garden Commemorative Markers and Plaques: There are three commemorative plaques and markers in Laking Garden (Figure 7).

Apple Tree: A remnant apple tree that was once part of the orchard that existed prior to the garden is located on the lower terrace (Figure 7).

Laking Garden:

- Plant Records 3006
- Accessions 2581
- **Taxa 2225**
- Families 66
- Genera 196
- Species 409
- Individuals 34500
- Collection Highlights – Iris Collection, Peony Collection, Hosta Collection, Daylily Collection, Clematis Collection, Herbaceous Perennials Collection, Barbara Laking Heritage Garden, Boxwood Display, Heritage Orchard

6.2.8 Other RBG Cultural Heritage Resources

Other features on RBG land in the Lower Grindstone that are of cultural heritage interest include the following:

Valley Trails: Public trails were introduced to RBG in 1954, largely employing "old coach trails" that traversed the site along Grindstone Creek and linking them to Snake Road and Plains Road West. Some trails were named to reflect the horse farm history of the area, including Brood Mare's Walk, Bridle Trail, and Brackenbrae Trail (Laking 2006). Cherry Hill Gate, at the western end of the valley and Lamb's

Hollow Gate at Unsworth Avenue were added in 1958. Most of these trails are still in use as walking and access trails. Some trail names have been changed to reflect dominant natural heritage features, e.g. Grindstone Marshes Trail.

Rifle Range: Adjacent to the Lodge site is a flat area known as the "Rifle Range." This site is thought to have used as a rifle range in the period 1920 – 1940. A surface examination by archaeologists yielded shell casings from small caliber guns along with quantities of chert chips (personal communication, RBG staff 2019). Due to the possibility of unexploded ordinances being present on the site, there was no further archaeological investigation of this site (Figure 7).

Rock Garden Lodge Site: Rock Garden Lodge, also referred to as Bessie's Inn, was a two-story hotel. The building was converted in the 1940s to serve as RBG's first headquarters building and housed staff and families along with divinity students and their families shortly after WWII and was later demolished. The site is now used by RBG as a storage yard (Figure 7).

Hendrie House Site: This house, located on the west side of Unsworth Avenue, was originally the summer houses of the Hendrie family (Laking 2006). From 1948 to 1953 it was the residence of the first director of the RBG and later housed other RBG staff until 1990 when it was demolished.

Snake Road: Snake Road was a route by which Indigenous people moved from the western shore of Hamilton Bay to the north, likely including Lake Medad, north of Waterdown (personal communication, RBG staff 2019). The route was improved by settlers through the 1800s with the section north of the CP Railway maintained continuously as a road to the present time. The Grindstone Marshes Trail follows the Snake Road alignment, from Spring Garden Road, branching off southwest of Beth Jacob Cemetery and heading east to meet with the Bridle Trail (both North and South sections) and then south to Cherry Hill Gate.

Toll House Site: A toll house stood on the east side of Snake Road near Valley Inn Road Bridge; the foundation of the structure remains (personal correspondence, RBG staff 2019).

Heritage Trees: RBG's unofficial definition of a "heritage tree" is one that is a very large representative of the historical forest community, or a tree of cultural importance, or one of horticultural significance relative to RBG and other botanical gardens collections. Trees listed are ones accessible to the public, in order to assist with education and storytelling. Heritage trees in the Lower Grindstone Heritage Lands include a Red Oak (*Quercus rubra*) on the upper terrace near the Lily Collection, a Shagbark Hickory (*Carya ovata*) located at the top of the Woodland Garden Trail, a Bitternut Hickory (*Carya cordiformis*) on the Grindstone Marshes Trail, a Black Oak (*Quercus velutina*) on the South Bridle Trail, and a Cottonwood (*Populus deltoides*) located near the east end of the South Bridle Trail (Figure 7).

6.2.9 Hidden Valley Park

Hidden Valley Park includes those Lower Grindstone Heritage Lands east of Unsworth Avenue in the City of Burlington. The park originated as a private park in the 1930s with facilities that included a pavilion, dance hall, concession building and swimming pool. Park users and other residents fished for salmon and other species in the Grindstone Creek (City of Burlington staff 2019). The Aldershot Community Council bought Hidden Valley Park in 1958 and maintained the use of the site for public use. In 1965, following expansion of its west boundary in 1962 and amalgamation of the Village of Waterdown, the Town of Burlington took possession of the park and purchased adjacent land to the west, providing access to the park off Unsworth Avenue. In 2007, Ontario Realty Corporation transferred to the City of Burlington three additional parcels of land, all of which now form part of Hidden Valley Park. A second swimming pool was built in 1973; the pool building, and former pool area are used by the model railroad club. Current park facilities include picnic sites, a baseball diamond, playgrounds, washrooms, parking areas and trails.

6.3 Cultural Heritage Resources on Adjacent Lands

Hidden Valley Park Cultural Heritage Resources: An extant stone building, referred to as "The Woodcutter's Cottage" is thought to have been used by the original owner of Hidden Valley Park (see Figure 7 for approximate location (personal communication, City of Burlington staff 2019)). No other information was available on the origins of this small building.

Hidden Valley Commemorative Plaques: Park resources include two commemorative plaques related to the park's history. One is mounted on a boulder in the park; the other is held in storage (Figure 7).

6.3.1 National Fireproofing Company

When parts of Valley Farm were sold following Hendrie's death in 1906, one parcel was identified as being suitable for clay extraction (The Globe *(1844-1936)*. 1908, July 11).

6.3.2 "Around the Bay" Marker

"Around the Bay" is a 30-kilometre footrace, the oldest in North America, established in 1894. Three granite bollards that marked the route are still in existence, one near the intersection of Plains Road West and Spring Gardens Road. There are plans to install an interpretive panel providing information on the race at this location (personal communication, City of Burlington staff 2019).

7.0 Management Issues and Opportunities

Generally, the natural features within the Lower Grindstone Heritage Lands are in good condition. They support a diverse assemblage of flora, fauna and vegetation communities, including many significant species. Although the current EcoPark System Lands are used predominantly for passive recreation (e.g. hiking and birdwatching), other more aggressive uses also take place such as mountain biking, parties and large events such as weddings and these activities are a source of impact to natural and cultural

heritage features. In addition, past management practices (e.g., the planting of invasive non-native plant species and using horticultural practices for erosion control), which were implemented before current management concerns were recognized, are current threats that impact the biodiversity and ecological function of these Heritage Lands. Given the popularity of several areas within these Heritage Lands (e.g., management units Lower Grindstone 2, Hidden Valley Park 2), and anticipated increased use in the future, it is important to identify sources of impact, and initiate management prescriptions to manage use and hopefully reverse current impacts through restoration. Similarly, and concurrently, it is important to encourage the continued use of these lands for recreation, education, interpretation and scientific study. The challenge is to balance the management of the Current EcoPark System Lands such that natural and cultural resources are maintained and improved while still providing appropriate public use.

At present, impacts to the natural features and functions of the Lower Grindstone Heritage Lands are primarily from current use, although there are a number of impacts that have resulted from influences from beyond the EcoPark System boundaries (e.g., commercial, rural and agricultural run-off, pest outbreaks, record high water-levels) and past management practices. Impacts noted from the existing extent of use are generally relatively minor, as evidenced by the overall good condition of the area. However, given that considerably greater use of the Heritage Lands is anticipated, these impacts could increase if left unmanaged. Management recommendations thus should be viewed as being important as preventative tools, as much as being corrective. This section provides a summary of the identified management issues, with a focus on highlighting overlap between and among recreational resources, natural heritage resources and cultural heritage resources to assist in identifying integrated options and solutions. These items are set out below and will guide the development of recommendations in the future Management Plan. This section also identifies preliminary management opportunities. Although this is not a required component of the Inventory and Issues Report, ideas and solutions that have been identified thus far are presented for preliminary discussion and feedback and will be refined for presentation in the Management Plan.

The Management Plan is being developed predicated on the expectation that use is going to increase in the Current EcoPark System Lands. The Project Team is of the opinion that the Cootes to Escarpment EcoPark System as a whole, including Lower Grindstone Heritage Lands are at a critical juncture. Recent and on-going land acquisitions, current management and restoration initiatives by the partner agencies, recognition of the need for protection in policy documents and the development of these Management Plans are all positive steps that, if continued and focused on potential problem areas, will help protect and improve the long term integrity of the Lower Grindstone Heritage Lands. If management is not implemented where needed, current and anticipated increases in impacts are expected to result in eventual degradation of the natural, recreational and cultural value of the area. Prioritizing management of these lands is extremely important and timely to preserve the condition of the existing natural features and instigate management practices to accommodate future use.

Although the Management Plan will focus on Current EcoPark System Lands within the Lower Grindstone Heritage Lands, there are also pressures originating from privately-owned lands adjacent to the Heritage Lands. The management plan does not make recommendations for management of lands outside the Current Park Ecosystem; however, these pressures are identified, and where appropriate recommendations suggested. Communication, education and stewardship with adjacent landowners will be a key consideration for future management.

The management issues and preliminary opportunities that have been identified within the Lower Grindstone Heritage Lands are organized under the following headings:

- overarching Cootes to Escarpment EcoPark System management issues;
- land use planning issues;
- access, parking and infrastructure issues;
- recreation issues;
- encroachment issues;
- hydrologic impacts;
- ecosystem management issues; and
- cultural heritage issues.

Many of these issues are inter-related and, in many cases, management issues cannot be addressed individually. For example, over-use of trails from hiking and/or cycling has in places resulted in erosion issues, which can lead to ecological management issues. The organization of issues and opportunities under the headings provided above provides a framework for the development of management recommendation to be provided in the Management Plan. They are organized by Management Unit in Appendix 8.

A description of the management issues and/or opportunities is provided below. The report focuses on identification of issues although some preliminary management recommendations are also provided. The identification of issue and opportunities is a work in progress and will be refined as the management process continues. Figure 8 illustrates known locations for management issues within the Lower Grindstone Heritage Lands. It does not provide an exhaustive inventory of where all of the management issues are occurring as it is based primarily on existing information with only limited field work. Photographs of representative examples of recreational issues are provided in Appendix 9 and are linked to the locations provided in Figure 8.

7.1 Overarching Cootes to Escarpment EcoPark System Management Issues

Several management issues are not specific to the Lower Grindstone Heritage Lands and span the entire Cootes to Escarpment EcoPark System. Although strictly beyond the mandate of this Management Plan (which is restricted to Current EcoPark System Lands in the Lower Grindstone Heritage Lands), it was deemed important to bring them forward for consideration, as they have in previous Management Plans (Waterdown-Sassafras Woods Management Plan Clappison-Grindstone Management Plan, Borer's Falls-Rock Chapel Management Plan and Cootes Paradise Management Plan). These issues are primarily related to the recognition and identification of the EcoPark System, both in terms of boundary identification and the public perception or knowledge of the EcoPark System.

7.1.1 Issues

Awareness of the Cootes to Escarpment EcoPark System

The Cootes to Escarpment EcoPark System is a relatively recent initiative and is novel in its concept. Each of the partner agencies operate under their own policies and protocols in response to their individual mandates and governance. However, there are commonalities among the partners with respect to natural heritage, recreation and cultural heritage. In particular is the desire to facilitate connections between Lake Ontario and the Escarpment, which was the impetus for the C2E EcoPark System. One challenge in implementing the initiative is achieving recognition of these commonalities

without impinging on the identity or mandate of the individual partners. Establishing a distinct identity for the EcoPark System and raising its profile would benefit the overall intent; however, achieving this cannot compromise the mandates and branding of the land-owning partners.

To promote identity, some signage has been posted along roadways to identify the boundaries of the system and more signage is planned for installation in the future; however, at present the signage is scattered and it is very difficult to determine when a user is in the EcoPark System or leaving it. The lack of signage and generally poor general public knowledge of where and what the EcoPark System is hinders opportunities to engage the public in stewardship, educate EcoPark System users about the cooperative arrangement among the partners, the importance of managing use, and garnering support for management. It is important to note that awareness is continuing to increase through Cootes to Escarpment EcoPark System stewardship programming and community events. Notably, the substantial fund-raising event "A Dinner on the Bridge" held in the summer of 2017 served to raise the general awareness of the EcoPark System. Events such as that, held on a regular basis, are important for increasing the general awareness of the initiative.

Delineation of Current EcoPark System Lands

Generally, in the EcoPark System, it is often difficult for users to determine when they are within the Current EcoPark System Lands. This is not an issue *per se* in the Lower Grindstone Heritage Lands as there are no Privately-Owned Outreach Areas; however, the concern can also relate to unclear demarcation within the partner-owned lands. For example, it is unclear to trail users when RBG lands changes to City Lands across Unsworth Avenue. In many locations, the Heritage Lands abut private residential properties. At these locations it is practically impossible to enforce policies regarding use and encroachment in areas at the periphery of Current EcoPark System Lands. This creates issues for both adjacent landowners (e.g., trespassing and privacy issues) and Current EcoPark System Lands (e.g., encroachment of manicured areas and structures from adjoining lands).

Need to Better Communicate the Multi-agency Management of the EcoPark System

Each partner agency has their own set of policies and rules that respond to their individual mandates. As noted above, this creates a challenge to communicate the structure of the EcoPark System to the public, since the varying permitted land uses, signage, branding, etc. of the individual owners does not convey the traditional notion of a single park, and nor is this the intent of the EcoPark System mandate. For example, the RBG allow only pedestrian traffic on their trails; however, cycling is permitted by by the City of Burlington in Hidden Valley Park. Not only is this mixture of permitted uses confusing to EcoPark System users, but users are often not aware of the relevant rules and regulations of use. Different rules and permitted uses will continue to apply to different properties, depending on who owns the land and the sensitivity of the property. However, partner agency rules and policies need to be more clearly communicated along with the unique structure of the EcoPark System. Also, to the extent that it is possible within their individual mandates, the partner agencies for each of the Current EcoPark System Lands should identify and build on commonalities to better promote the overall connection between Lake Ontario and the Niagara Escarpment that is achieved through the EcoPark System.

Cootes to Escarpment EcoPark System
Lower Grindstone Heritage Lands
Inventory, Issues and Opportunities

Cootes to Escarpment EcoPark System

Hillsdale Avenue
Lower Grindstone 5
Lower Grindstone 1
Highway 403
York Road
Canadian National Railway
Lennorville Road
Lower Grindstone 1
Hidden Valley Park 4
Hidden Valley Park 3
Works Yard
Lower Grindstone 3
Lower Grindstone 6
Lower Grindstone 2
Hidden Valley Park 2
Hidden Valley Park 1
Howard Road
Unsworth Avenue
Spring Gardens Road
Lower Grindstone 7
Botanical Drive
Lower Grindstone 4
Lower Grindstone 3
Plains Road West

N W E S

0 100 200 400
Meters

Figure 8: Management and Opportunities

Legend

Heritage Lands Boundary

Management Issues and Opportunities

- Access Issues
- Cultural or Environmental Education Opportunities
- Dumping (incl. pool drainage)
- Erosion
- Invasive Species
- Parking Issues
- Poaching and Plant Foraging
- Signage Opportunity (Interpretation Wayfindings)
- Signage (Safety Issue)
- Stormwater Management Issue
- Vandalism/Theft
- Trail Issues
- Trail Structure Issues
- Unsanctioned Trails
- Unsanctioned Use
- Water Quality Issues
- Wildlife Conservation
- Wildlife Crossing
- Wildlife Feeding
- Wildlife Viewing

Bank Erosion Sensitivity (GEO-Morphix Ltd. 2016)

- Sensitive
- Relatively Stable
- Very Stable

Views

- External
- Internal
- Management Units

November 19, 2019

Population and Use

A major overarching management issue is the anticipated increase in use that will result from future development adjacent to all the Heritage Lands and the associated population growth. Increased use from this growth has the potential to degrade the natural, recreational and cultural resources unless mitigation in the way of carefully planned management initiatives is implemented. Such developments will be desirable communities to live in partly because of the proximity of the aesthetic beauty and recreational opportunities provided by the Heritage Lands. It is thus fitting that management or mitigation of any population-induced negative impacts on nearby Heritage Lands resulting from development, and the increased cost of management needs, should be contributed to by development proponents, where appropriate.

At present, there are no policies that would directly facilitate the implementation of relevant management recommendations in the Management Plan through development approvals. However, where geographic-specific park or public land Management Plans exist, the Greenbelt Plan 2017 indicates that municipalities, agencies, and other levels of government must consider them when making decisions on land use or infrastructure proposals. As the Cootes to Escarpment EcoPark System represents such a park, it would be incumbent on planning authorities to consider increased use pressures and likely environmental impacts in their assessment of development applications.

Several planning policies in local and Regional Official Plans require proponents of development applications to consider impacts on adjacent natural features and areas resulting from their development proposals, and to mitigate them accordingly. It is especially important that the impacts associated with future developments adjacent to the Heritage Lands be clearly identified and assessed in Environmental Impact Studies (or similar studies) in the context of the role the Heritage Lands play in the overall Cootes to Escarpment EcoPark System. In other words, the value and significance of the natural features captured in the Heritage Lands is greater because they are part of the EcoPark System, and because they have an ecological function that goes beyond the feature itself. In determining impact mitigation for future development, this higher value should be considered when determining the limits of the developable area, buffer widths, management needs such as design and provision of trails within the Heritage Lands. The management issues and opportunities identified for the Heritage Lands provide information on current impacts that could be exacerbated by future adjacent development. Management recommendations may assist in the determination of appropriate mitigation that could be implemented through the development process.

Owing to the multi-agency agreement to implement the EcoPark System and the public resources that have already been spent on the acquisition and management of the Heritage Lands, potential population-induced negative impacts from development should be mitigated through conditions of the approval process wherever possible. More generally, the partner agencies that are directly involved in the development approval process in and adjacent to the Heritage Lands (in the case of the Lower Grindstone Heritage Lands these are the Cities of Burlington and Hamilton and Conservation Halton), should continue to consider and incorporate the significance of the Heritage Lands in their reviews and the subsequent conditions they impose on development applications. This is viewed as part of their commitment to implementing the Vision of the Cootes to Escarpment EcoPark System. Partner agencies that are not directly involved in the development approval process should be encouraged to comment as landowners on development applications that may impact their lands. Where a public or private development proposal may exacerbate existing management issues and/or create new ones, adjacent

landowners should make such concerns known so they may be addressed accordingly through the development approval process.

Funding

There are differences in approach to management by the partner agencies. These differences should not be at the expense of the asset that the designation of the Cootes to Escarpment EcoPark System brings. Individual partners manage lands in a variety of models, from pay to use to free to use. Future operating and capital costs associated with the Cootes to Escarpment EcoPark System will be high and no clear or uniform model for allocating these and financing them has been proposed. Cootes to Escarpment EcoPark System does not own land; partnering agencies do and manage them according to their own policies. Funding estimates will not be included in the Management Plan; however, funding as a broad management issue is included as the Cootes to Escarpment EcoPark System creates both challenges and opportunities in this regard.

Desire and Need for Trail Connections and Recreation Plan

Pedestrian and cycling use along Plains Road West has been identified as a significant recreation issue within the Lower Grindstone Heritage Lands, mainly due to safety concerns. Plains Road West is a well-travelled vehicular commuter route, but it is also a desirable commuter cycling route. As part of the Spine Network, Plains Road will have protected on-road bike lanes or cycle track. There is an existing on-road signed route to the Waterfront Trail from Plains Road along Gorton Ave.

There is also a desire for trail connections through the Lower Grindstone Heritage Lands that does not require cycling on Plains Road West; however, there currently is no plan in place that proposes such a facility. Furthermore, the Cootes to Escarpment EcoPark System does not currently have a recreation plan in place to provide guidance on trail-related issues that span individual Heritage Lands boundaries.

7.1.2 Opportunities

Preliminary management opportunities to be explored include the following:

- While recognizing the identity of the partner agencies, standardize elements of signage used in the Cootes to Escarpment EcoPark System. Signage, promotional material, advertising, educational material, etc. should emphasize and headline the Cootes to Escarpment EcoPark System and Heritage Lands first, and then provide partner ownership. This will raise the EcoPark System profile, contribute to name-recognition and promote the EcoPark System as a collaborative initiative;
- Encourage partners to collaborate on standardizing signage within the EcoPark System. For example, standardization of colour, size, messaging, graphics, font, AODA compliance, placement and size of the Cootes to Escarpment EcoPark System and partner logos, etc. could be established;
- Develop and implement a consistent system to locate and mark boundaries of Current EcoPark System Lands within the Cootes to Escarpment EcoPark System. This includes the posting of signage to indicate when users are entering and leaving the Cootes to Escarpment EcoPark System as well as demarcating the ownership of partner-owned lands within each Heritage Lands area;
- Permitted uses for each of the land-owning partners should be clearly communicated throughout the Current EcoPark System Lands. Permitted uses do not have to be consistent

throughout all properties or areas, and should be established based on the sensitivity of the area and the mandate of the landowning agency;

- When reviewing development applications within the EcoPark System, partners should require the evaluation of potential impacts in the context of the entire Cootes to Escarpment EcoPark System, and encourage mitigation measures that are consistent with the recommendations in the Management Plans;
- There is currently no clear policy direction for planning authorities to consider Heritage Lands Management Plan recommendations. Consideration could be given to encouraging recognition of the Cootes to Escarpment EcoPark System in Official Plans as part of the next round of Official Plan Reviews. It would also be beneficial to identify the Cootes to Escarpment EcoPark System on Official Plan mapping. The Region of Halton is considering this as part of their current Official Plan review;
- Per the Greenbelt Plan 2017, municipalities, agencies and other levels of government must consider the Lower Grindstone Heritage Lands Management Plan when making decisions on land use or infrastructure proposals;
- Consider updating the funding formula for the Cootes to Escarpment EcoPark System;
- Continue to purchase or receive donations of lands within the Cootes to Escarpment EcoPark System, as they become available through the Land Securement Strategy, with a priority placed on "joining" Current EcoPark System Lands;
- Opportunities to develop connecting nature trails, as well as multi-use trails on roadside shoulders, in rights-of-way and/or utility corridors to create these much-needed trail connections will be explored in more detail as part of the Management Plan. In addition, consideration should also be given to incorporating multiuse trails in future planned road works such as potential re-alignment, widening or geometric improvements within the surrounding regional road network; and
- Prepare a recreation plan for the Cootes to Escarpment EcoPark System to provide guidance on trail-related issues that span individual Heritage Lands boundaries, with an emphasis placed on addressing the need for trail connections throughout the EcoPark System. The Hamilton Burlington Trail Council should be engaged to provide comment and review of the recreation plan, and the City of Burlington Community Trails Strategy (2015) should be referenced.

7.2 Access, Parking and Infrastructure Issues

Issues and opportunities related to access, parking and infrastructure are described below. It is acknowledged that transportation is an important issue in order to bring users to the lands but addressing this is beyond the scope of the Management Plan.

7.2.1 Issues

Parking, Access and Signage

Several issues related to parking and access have been identified in association with the Lower Grindstone Heritage Lands:

- Cherry Hill Gate: This parking lot is situated near a major arterial road generating queuing on the road as vehicles enter and exit the lot on busy weekends. The lot is chaotic with pedestrians and vehicles, and without proper wayfinding signage and pathways to reach the main trail access point there are inherent safety concerns at this location.

- RBG Centre: The large parking lot with space for up to 320 vehicles is well organized with proper sightlines and egress points from all sides. Similar to other RBG lots there is little wayfinding signage and no defined pedestrian pathway system in which to safely navigate through the parking lot to the front door of the building or the gardens.
- Pedestrian Crossing of Plains Road West: Municipal bus stops are located on both sides of the road in front of the RBG Centre and it is the only bus stop in this general area. The bus stop is called the "Royal Botanical Gardens" stop and is a key access for visitors taking public transit system, with connections to the GO transit system. RBG visitors and staff, as well as other users, require a safe way to get from the north side bus stop across the road.
- Valley Inn (Burlington): Within the flood zone at the mouth of the Grindstone Marshes Trail parking is available for a small number of vehicles. Roadside parking is not preferred but is a secondary option many visitors take. It is a safety concern to have visitors access the Heritage Lands on foot along the road.
- Grindstone Marshes Trailhead (RBG): Parking and trail access to the Grindstone Marshes Trail are prone to seasonal closure/ inaccessibility due to flooding.
- Laking Garden: Isolated by Spring Garden Rd flooding. Spring Garden Road includes a bridged causeway built across Grindstone Marsh/Creek. Winter maintenance of the railway crossing pedestrian bridge to maintain a link from Plains Rd at Laking Garden to Valley Inn is very challenging. This bridge also poses accessibility issues with the steepness of the ramp, and the hill descending towards Valley Inn.
- Snake Road Trail Access: Although not intended for trail users, a parking area in the adjacent cemetery provides an option for short term parking at this location. Discussions with the cemetery superintendent should be held to agree on a shared parking arrangement to avoid potential issues.
- Unsworth Avenue Trail Access: Roadside parking at this location is perpendicular to the roadway and is situated around a blind corner on the roadway which is posted at 50 km/ hr. In the absence of warnings, signage and line marking it is unclear to drivers that they are approaching a trail crossing, thus creating a safety issue.
- Hidden Valley Parking Lots: Four parking lots combine to provide over 200 spaces within Hidden Valley Park. The parking lots and access roads are gravel and asphalt surfaces. There is a lack of line-marking to organize where to park cars and this can affect the movement of pedestrians through the parking area. During busy periods this could lead to pedestrian safety issues.
- Hendrie Park: there are 3 links from the formal gardens of Hendrie Park to the Hendrie Valley nature sanctuary trail system which are gated and locked. These gates are only unlocked for special programing (ex. school programs, camps, special events, tours etc.), however they are noted on the visitor maps. This is frustrating for RBG visitors who are unable to find access to the nature sanctuaries from Hendrie Park.

Trail Structure

Most of the existing boardwalks and pedestrian crossings are in a state of good repair. However, many of the features have not yet been updated to current accessibility codes but will be when they are scheduled for renewal. There are no staircases incorporated into the trail system other than two sets of stairs integrated with two footbridges that cross the creek at the Creekside Walk Trail. In the case of existing timber boardwalks, where rot is a concern, there may be an opportunity to replace the aging superstructure with steel secured upon a helical pile system to minimize impact to trees, mitigate erosion and boost the longevity of these structures. There are also sections of the trail where new

boardwalks or a trail re-route should be considered. For example, the section of muddy trail along the Creekside Walk Trail would be a high priority for an addition of a boardwalk if it was to remain in its current location. Other locations where the trail crosses seepage areas currently are addressed through the addition of woodchips to the trail surface. While this provides a short-term solution, over time if there has been a heavy cover of woodchips applied, they can work into the surrounding vegetative cover and suppress natural regeneration. Addressing the issue with a well-constructed boardwalk should be considered, utilizing steel and roughhewn natural wood projects such as hemlock or Douglas Fir selected for longevity and durability.

Drainage Structures

All of the trails could benefit from enhancements to drainage. Currently, drainage is left to cross trails in an uncontrolled fashion leading to erosion and rut-formation. Although not a problem in all situations, it has led to erosion in places and may do so in others in the future. Currently there are few locations where culverts are installed and maintained.

7.2.2 Opportunities

Preliminary management opportunities to be explored include:

- Develop a trail design standard for the EcoPark System that clearly denotes trail widths, surfacing and treatments in various conditions and terrains;
- Develop a plan for addressing safety and accessibility on trails within Heritage Lands;
- Investigate the need for providing a safe crossing of Plains Road West in front of the RBG Centre;
- Further branding and signing of the EcoPark logo at park and trail entry points;
- Seek to balance the natural surface trail experience with mitigation of erosion and sedimentation into Grindstone Creek and wetlands; and,
- Improve opportunities for environmental education and awareness building through interactive narration tools i.e. Bitly's at locations of interest, cultural, geological or environmental significance.

Other individual key opportunities are described below.

RBG Centre:

As a key destination point the Centre is the natural starting point from which to explore many of the looped trails within the Hendrie Valley. The building itself is the place to promote the trail system and the Cootes to Escarpment EcoPark System brand. Displaying highly visible maps of the Lower Grindstone Heritage Lands and trails in the context of the larger EcoPark System is an important opportunity to showcase and promote the significance of the EcoPark to the RBG, the Region and Greater Toronto and Hamilton Area.

Local Tim Horton's:

Located across the road from the Cherry Hill Gate into the Lower Grindstone trail system, Tim Horton's is well-used by visitors to the area. There may be an opportunity for The Cootes to Escarpment EcoPark System to seek a partnership to promote the EcoPark brand at the café providing leaflets and educational materials to customers. The company also has a history of involvement with youth camps and promotion of outdoor activities for children. There may be an opportunity to engage camps

supported by Tim Horton's that could offer educational environmental-based camps through the EcoPark partners.

Engaging Local Schools:
Similarly, engaging with local schools the EcoPark Partners may provide an opportunity to promote the EcoPark System mission while offering environmental education in the form of outdoor classroom activities, hikes and wildlife identification. The limitation of introducing school groups would be the impact to other user groups whose experience of the marshes and trails of the Lower Grindstone EcoPark System may be affected.

7.3 Recreation Issues

Through the review of background information, conversations with key stakeholders and fieldwork, it is clear that the management plans need to be as much about managing people as they are about managing the natural environment. In fact, people management is key to effective management of the Cootes to Escarpment EcoPark System in general. The provision of recreational opportunities must be balanced with natural and cultural heritage protection in order to minimize impacts. However, in order to provide long-term sustainability and to not degrade the resources that make the Lower Grindstone EcoPark System so desirable to visit, primacy must be placed on preserving natural and cultural resources. Issues and opportunities related to recreation are described below.

7.3.1 Issues

Flooding on Trails
A significant proportion of the trail network and a number of parking access points are located in the floodplain. Floodplain environments create obvious management issues where trails and other recreational infrastructure may be located. Maintenance is expected to be on-going to keep recreational assets in safe, usable condition. Some areas may require re-alignment of the trail to protect the sensitive natural features in the area (i.e. floodplain of Creekside Walk Trail). While the experience of nature for many users is an important drawcard, management of trail conditions and safety issues should include signage to alert users of potential dangers while recreating in floodplain areas.

Overuse of Trails
The majority of the existing trail network is frequently used throughout the Lower Grindstone Heritage Lands. With the addition of the boardwalks to the Grindstone Marshes Trail, large numbers of nature photographers and birders have been attracted to the area. The trails surrounding the boardwalks are being impacted through over-use. Some impact from trail use is inevitable and acceptable, however there are portions of the trail system that show signs of overuse, including excessive exposure of tree roots, unacceptable impacts to ground flora, soil compaction and widening of trails/creation of new trails to circumvent areas that periodically flood. Trail overuse has resulted in soil erosion in places. Some erosion, compaction, and water ponding are considered acceptable on trails within natural areas and as long as it is sustainable (i.e. not expanding) and not impacting significant species, habitats or hydrological functions. Use of unsurfaced footpaths is considered to be part of the trail experience for some users. Unacceptable erosion on trails was noted and can be attributed to inappropriate trail surface for the location and/or level of use, overuse, improper trail construction, poor trail alignment and/or drainage issues. In a few locations, water ponding has led to trail widening or braiding to avoid wet patches on trails. This is most evident along much of the Creekside Walk Trail where the trail is

located along the bank of Grindstone Creek and multiple trails have formed to avoid floodwater (or ponding by beavers) at certain times of the year. Periodic flooding is also an issue on the continuation of this trail through Hidden Valley Park, again owing to its location within the floodplain of the Creek. On steeper sections of trails where some erosion or unevenness can lead to trip hazards, the use of grade bars (i.e., hewn logs or concrete bars for enhanced durability) could help to successfully prevent erosion. All sections where trails traverse steeper slopes are showing some form of erosion, although there is some improvement through the application of woodchips to limit impacts to tree roots and reduce drainage issues due to seepage.

Unsanctioned Uses

While it is the RBG's policy to prohibit cycling within the Heritage Lands under their ownership, it is an on-going management issue on some trails. Continued efforts to educate, sign post and enforce this behavior will be required. For example, cyclists currently access trails within the RBG lands from Old Snake Road.

Both snowboarding and skateboarding have been identified as occurring on the paved trails at Laking Garden. Neither of these recreational uses are sanctioned by RBG and there is potential for user conflicts. Bearing in mind the older demographic that frequents the RBG gardens, this is a safety issue as well as a user experience issue.

The bridge over the railway tracks linking the parking area with Laking Garden is a popular site for trainspotting. Train spotters sometimes set up chairs and often come in groups, which blocks/reduces the pathway from the parking lot off plains road. The excessive use can be exacerbated in years when access to Valley Inn (Spring Gardens Road) is unavailable, for example when closed due to flooding.

Cycling Route Connectivity

Currently there is good connectivity between the Creekside Walk Trail and on-road cycling routes along Lemonville Road and Unsworth Road. However, the condition of the asphalt sidewalk on the south/ west side of the roadway connecting to the trail, is in poor condition and in need of repair. Northward connecting routes extend from Lemonville Road and Unsworth; however, an additional one could be considered along Snake Road.

Pedestrian and cycling use along Plains Road West has been described as a significant recreation issue within the Lower Grindstone Heritage Lands, mainly due to safety concerns related to the high volume and speed of traffic along Plains Road West. The relatively narrow area within the shoulder of the roadway is not a cycling facility. There is a regional bike route trail connection with the Waterfront Trail along Gorton Avenue. Although not ideal, limited use of roads to provide connectivity for recreational cycling trails is sometimes necessary and there are existing examples such as the Waterfront Trail in Toronto.

Since cycling is not allowed on RBG lands, there is a disconnect in the trail system between the RBG and Hidden Valley. Cyclists traveling westbound in Hidden Valley, who are unfamiliar with the area (or with RBG's policies), encounter confusing signage that makes decision-making difficult whether to continue west of Unsworth Avenue on the RBG trail system. Cycling along Unsworth Avenue, although marked as a "shared route" between motorists and cyclists, is narrow with poor sightlines and therefore, not conducive to cycling, especially for certain cyclists (e.g. family groups or younger cyclists).

Plains Road West is a well-travelled automobile commuter route, but it is also a desired route of commuting cyclists. There is a desire for trail connections through the Lower Grindstone Heritage Lands that do not require cycling on Plains Road West.

Other Trail Connectivity

Overall, trails connect well within the Lower Grindstone Heritage Lands study area forming loops in several locations. However, east of Unsworth Avenue there are no loops in either the Creekside Walk Trail or the Hidden Valley Trail system. Consideration to formalize some of the informal mown trails and provide an additional creek crossing may offer an opportunity to generate loops. This will reduce the incentive to create unsanctioned trails.

There is also a desire to provide connection(s) to the creek. An abundance of unsanctioned access paths to the creek have been formed off the main trail system, generally where fall salmon viewing is best. Consideration for formalized access points to the creek coupled with signage about the impact of trampling upon the creek banks should be considered.

Unsanctioned Trails

Overall, the development of unsanctioned trails is far less of an issue than in other Heritage Lands within the EcoPark System. Within RBG lands there are very few unsanctioned trail closures and no new trail development. The current lack of a looped system of trails east of the North and South Bridle Trail network may be resulting in unsanctioned trail creation in this area as users are looking to generate other experiences “off the beaten track”. These are often situated in meadows/clearings in tree canopy, and the periphery of wetlands and the creek.

Within Hidden Valley there are erosion areas along unsanctioned paths created from users trying to gain views to the Queenston Shale bluff along the creek. There are multiple unsanctioned trails to gain access to Grindstone Creek within Hidden Valley Park, probably to facilitate fishing and as a result of dog walkers looking for access to allow dogs to get drink or play in the creek. There were also unsanctioned footpaths in Hidden Valley Park in the area that was conveyed from the Province (Figure 8), however these appear to have become over-grown, and may no longer be used. However, this area should be evaluated to determine how it functions with the rest of the Park and the footpaths should be examined as part of that exercise to determine if they require management, e.g., planting, re-alignment and/or incorporated into the Park trail system. Overall, the unsanctioned trails in Hidden Valley Park should be periodically monitored to evaluate if they are sustainable as footpaths in their current condition, or whether they should be formalized or closed.

Trail Proliferation

This issue is confined to places where wet conditions persist and have led to a muddy trail surface. Users have continually widened the path or created new paths through vegetation to circumvent the problem area, thereby trampling understory vegetation. In limited locations some single-track bike use has led to multiple narrow trails resulting in “braiding” of the trail system.

Wayfinding and Information Signage

In general, the Lower Grindstone Heritage Lands are inconsistently signed and the Cootes to Escarpment EcoPark System logo is not always present on signage. Partner agencies are encouraged to include the

Cootes to Escarpment EcoPark System logo on future signage and indicate that the parcel is part of the larger EcoPark System. The logo should also be included on park furniture, waste bins and public shelters owned by the EcoPark partners.

Site-specific issues and opportunities related to signage include the following:

1. Lack of wayfinding/ directional signage along trails. The distance of a trail to the next destination point or to complete a loop is currently not sign posted.
2. Inclusion of a small version of the EcoPark map graphic at all sanctioned access points is an opportunity to promote the EcoPark brand and promote awareness of the many features visitors to the Heritage Lands can enjoy.
3. The trail crossing at Unsworth Avenue is currently not well signposted and there is little warning to drivers on Unsworth coming around the blind corner near the crossing location. There are opportunities for the City of Burlington to improve safety of this crossing by adding signage, line marking and potentially a flashing signal to warn motorists approaching the pedestrian crossing. Depending on potential increased use over time, this crossing may require a pedestrian signalized crossing (push button activated overhead signal). This would be determined through a transportation study.
4. Popular destination points such as the outlook at the foot of the Kicking Horse trail, certain vantage points over the valley along the South Bridle Trail or the observation point within Hidden Valley Park of the Queenston Shale bluff, are not well presented given the popularity of the outlook point. There is an opportunity to enhance the experience of these destinations with improved infrastructure and improved signage. In some cases, such as the Queenston Shale bluff feature, erosion, fire pits, and debris are emerging from use of this popular site for picnics and gatherings. Enhancements to improve the viewability of the feature without compromising the surrounding natural heritage system should be considered.

User Conflicts

Particular uses such as biking, cross-country skiing, running/jogging and motorized vehicle use have been prohibited on parts of the trail system due to the fact that the terrain and sensitivity of the natural area warrants prevention of such use, or it is not perceived as being consistent with the overall goals/mission and/or policies of the land-owning partner. Conflicts typically arise when prohibitions are ignored. There is evidence bike use is occurring within RBG lands and this is focused along Creekside Walk Trail and also the valley slopes above the Grindstone Marshes Trail (below the Beth Jacob Cemetery). There is no direct evidence that this activity is creating problems for users of these trails; however, if cycling is also occurring along the boardwalks, the prohibition should be heavily enforced due to potential safety/conflict issues as well as the potential to compromise the experience of a large number of people that enjoy the experience of walking and nature viewing along boardwalks.

Although designated for multi-use, sections of the Hidden Valley Trail are narrow, with poor sightlines and the surface material is loose. This makes it difficult for different user groups such as cyclists, dog walkers, and hikers to safely share the travelled path. Opportunities should be explored to improve sightlines, apply more reliable binding agents to granular surfaces if this type of surface is preferred, or provide boardwalks or granular trails that are properly designed to handle spring flooding and convey drainage. In limited situations short sections of asphalt trail may be appropriate e.g. steeper slopes where erosion may be a problem. Mitigation techniques are available to limit impacts to the Natural Heritage System when installing asphalt trails. This includes the use of small tracked vehicles to limit soil

disturbance and compaction during installation, use of a geogrid product to limit the depth of compacted sub base, thereby limiting impact on tree roots and use of recycled asphalts in which the hydrocarbons have already been leached, limiting impacts to water quality. This material is available free-of-charge from large suppliers such as Miller Paving and require a binder agent which could consist of natural resins to improve the cohesion of the asphalt.

Wildlife Viewing

Wildlife observers/photographers and fishermen frequent who frequent Valley Inn often congregate on Spring Gardens Rd. by the bridge. Wildlife observers have been known to cut back vegetation along the edge of the marsh in an attempt to view or photograph wildlife.

Wildlife Feeding Along Trails

This issue is described in sections 7.6.1 and 7.6.2. Trail users actively feeding birds, chipmunks, ducks, geese, swans, and other wildlife is a specific concern that is most prevalent in the Grindstone Marshes Trail system. It is so prevalent that the behavior of wildlife has appeared to have adapted and now have an expectation of being fed. Signage has no apparent impact on preventing feeding, which is a practice that may be spread by word of mouth and social media, and has rapidly become widely known amongst the community and visitors. Education, more assertive signage, active enforcement for a limited period of time, and spreading the message to youth through outdoor classrooms and other programs will likely be required to resolve this problem.

Off-leash Dogs

Off-leash dog use in natural areas and on trails is an issue that is prevalent within all Heritage Lands, often leading to user conflicts and improperly disposed excrement which, apart from aesthetic considerations, affects soil nutrition and possibly could negatively affect water quality. Education, signage and enforcement is required to deter this activity.

Motorized Vehicle Use

As noted elsewhere, other than the use of motorized vehicles to mow defined grassed trails, there is little evidence that this activity is occurring within the Lower Grindstone Heritage Lands.

Fishing

Fishing is not permitted in the RBG lands but is in Hidden Valley Park. Fishing is permitted in the Lower Grindstone estuary from Plains Rd. West bridge to Carroll's Bay/Valley Inn. Fishing is an issue in the Valley Inn Area which is recommended to become a seasonal sanctuary.

"No Fishing" signage is posted along the South Bridle Trail which provides access to the edge of the open water in the marsh. It is suspected that the boardwalks also provide good access to fishing areas and enforcement in that area may be required in the future.

Waterfowl continually become tangled in fishing line. Salmon poaching is common in the fall along Creekside Walk Trail.

Fire Pits and Party Spots

Little evidence of fire pits and "bush-party" gatherings were noted, possibly due to the RBG lands being more managed and, in some cases, not adjacent to residential areas. Also, there is an accessible City

park that provides large gathering spaces and open space for active recreation in the east part of the Heritage Lands, and this may remove some of the incentive for unsanctioned party spots. Overall the presence of garbage within the Lower Grindstone Heritage Lands was very limited; a testament to good management which has instilled into users the sense that that this is a special place. Despite this, it was noted that there are very few garbage bins along the trail system and as usership is expected to increase in the future, planning for additional bins at key locations along the trail system is suggested.

Vandalism/Theft

A significant issue at multiple locations often associated with locations in close proximity to the rail corridor. Laking Garden in particular has been a regular target for theft and vandalism in recent years. Similar issues arise at Hendrie Park and at Hendrie Park parking lot.

7.3.2 Opportunities

Preliminary management opportunities to be explored include the following:

- Review and evaluate the location of trails and access points/parking within the flood zone within both RBG and Hidden Valley Park;
- Undertake a study of the area in Hidden Valley Park that was conveyed from the Province to determine how it functions with the rest of the Park, and if and how any remaining unsanctioned footpaths can be incorporated into the trail system;
- There is a need for improved public education and awareness of trail use for all user groups (e.g., hikers, walkers, dog walkers and cyclists). There is an opportunity to work with bike shops in the area to educate cyclists about appropriate trail use and trail etiquette. Although there is limited opportunity because cycling is not allowed in the RBG lands, where feasible the cycling community should be engaged in bicycle trail planning, as well as building and maintenance. Consider including a trail use pamphlet with the sale/maintenance of bicycles in area cycling shops;
- Create an EcoPark System-wide Recreation Plan, including a plan for hiking trails and cycling use. This plan should build on the existing trail and/or cycling plans such as the City of Burlington's Trail Plan. This could be done as two separate but coordinated initiatives by RBG and the City of Burlington. It should address all trails, viewpoints, cultural points of interest, etc., and identify problems/issues and prioritize management issues. The Plan should, to the extent possible, provide consistent design and for trails and structures meet the provincial standards for accessibility and safety;
- Generate a comprehensive trail map developed with input from all partners that combines RBG and City of Burlington trails into a single map that spans the entire Heritage Lands. The map should illustrate connections to the on-road cycling network and links to public transportation to reflect the true multi-modal system. The combined map would reduce potential mixed messaging for each jurisdiction. These should be made available at all entry points;
- Consider completing trail connections throughout the EcoPark System using utility corridors and/or unopened road allowances as additional access points or trail connections, noting limited use of cycling on specific trails contributes to the current 'lack of connectivity' issue. The Hamilton Burlington Trails Council can provide expertise and support for any necessary planning;
- Consider the following principles when assessing options for trail closure, rationalization and formalization:
    - limit access to physically and ecologically sensitive habitats, including creekbanks and

seepage areas, as trail location should be placed in a manner which creates the least disturbance to habitat and wildlife;
    - where access to sensitive habitats is deemed appropriate, trail design should be undertaken to minimize impact (e.g., boardwalks, railings, greater attention to drainage, etc.);
    - ensure appropriate routing of trails and trail activities as to minimize impacts to natural heritage features, minimize the potential for damage to wildlife habitat, and avoid impact to the habitat of Species at Risk and other significant and/or rare species and ecological communities;
    - where possible and appropriate (i.e., respecting existing use policies of land-owning partners), consider adopting the approach of 'preferred' trail use rather than promoting single-use trails (e.g., bike and hiking trails);
    - as an alternative to permanent trail closure, consider seasonal trail closure where the limitation is to keep users out of seasonally wet parts of the trail system, recognizing that this imposes a maintenance challenge as closure signs need to be installed/removed at appropriate times;
    - improve signage, trail marking (e.g., blazes) and implement measures to assess and close redundant trails;
    - when trail closure is undertaken, post signage to communicate reasons why the closure was necessary as people are more apt to respect the trail closure if they know why it has occurred;
    - construct bridges and boardwalks to address erosion and wet trail conditions where they are perennial, segments constitute key connections in the trail system (i.e., can't be closed seasonally), and where they result in unacceptable impacts;
    - investigate alternative trail surfaces that are commensurate with the intensity and type of trail use and location; and
    - prepare a protocol, including post-closure monitoring, for active trail closure.
- Initiate a survey to determine the awareness of the EcoPark System, how the area is currently being used, what the desires of the EcoPark System users are, etc.;
- Provide consistent signage that clearly explains permitted uses (e.g., cycling permitted, off-leash dog area), or conversely, uses that are prohibited (e.g., dogs must be on-leash, no cycling);
- At the RBG Centre, there is an opportunity to install a sign for staff parking and to direct the location for program drop-offs;
- As cycling activity was noted on some RBG trails, it is recommended that cycling activity be monitored, and appropriate action taken to address management concerns such as further enforcement of cycling in unauthorized areas or closing unauthorized;
- Continue to monitor for trail erosion and implement appropriate trail construction and remediation measures on steeper slopes and in flood-prone areas, where warranted, especially along unsanctioned trails;
- Add pedestrian barriers along trails where there are potential safety issues created by steep slopes;
- Complete an accessible boardwalk to the base of the hill for the Woodland Garden;
- Encourage increased dialogue with all trail user groups to ensure that opinions and users' needs are being heard and incorporated into trail management considerations;
- Engage cyclists and educate on appropriate use of the trail system;

- Consider alternatives to traditional signs. Signs are not always effective tools for informing trail users and are often targeted for vandalism/removal. Suggestions for specific signage themes will be provided in the Management Plan;
- Post signage indicating permitted uses including an educational component that identifies impacts associated with unsanctioned uses (e.g., cycling, cross-country skiing, running/jogging, motorized vehicles), and stating fines for illicit uses;
- Ensure local ordinances and by-law policies are updated to include prohibition of the more prevalent and/or damaging unsanctioned uses in natural areas. This is necessary to be able to engage by-law enforcement officers when needed;
- Identify locations of dumped garbage and yard waste, and facilitate clean up;
- Close and restore unsanctioned party spots;
- Look for appropriate locations for additional benches and picnic tables to facilitate small social gatherings and rest areas in desired locations and keep existing furniture in good repair;
- Improve communication of spill prevention and response by ensuring that spill prevention plans, contingency plans and emergency response plans are updated for the purpose of protecting natural features along roads, railway lines and pipelines;
- Update the seasonal Fish Sanctuary zone to include the Grindstone Creek Marsh area in the Valley Inn Area;
- Reduce Hendrie Park parking lot to one entrance and fence border between lot and road;
- Raise Spring Garden Road and widen to accommodate a multiuser trail;
- Transfer entrance control and management of Valley Inn to RBG;
- Construct a viewing platform at Valley Inn to relocate wildlife observers away from Spring Garden's Road and to provide them with improved views; and,
- Ensure there is safe pedestrian crossing at Unsworth Avenue between Hendrie Valley and Hidden Valley.

7.4 Encroachment Issues

The Lower Grindstone Heritage Lands are surrounded by various land uses, including residential development and urban development (refer to section 2.1). Various impacts associated with encroachment have been noted on Current EcoPark System Lands, particularly from residences abutting the Current EcoPark System Lands. Encroachment works both ways, with EcoPark System users trespassing on adjacent private lands, and adjacent private landowners accessing and/or encroaching illegitimately on Current EcoPark System Lands. Many by-laws exist to address encroachment; however, due to the lack of staffing resources within municipalities it is often difficult to enforce them.

7.4.1 Issues

Private Unsanctioned Trails

A number of private residential properties back onto the Lower Grindstone Heritage Lands. Where this occurs, homeowners should be made aware of the impacts of their actions on the natural environment. For example, trail creation can lead to soil compaction and downcutting into soft soils on steep slopes that can lead to erosion and impacts to the roots of trees. Private access gates and trail creation is an on-going issue in areas where private residential lots back onto the Heritage Lands.

Structures and "Yard Extension"

Several structures such as garden sheds, seating areas and storage areas, have been noted in rear lots at or within the Heritage Lands. It is unfortunately a common practice for many homeowners that back onto natural areas to utilize the relative seclusion to dump yard waste and build private structures. Some owners intentionally clear space behind their properties in order to open sightlines to the natural area. Generally, homeowners are not aware that these activities suppress sensitive understory plants and reduce biodiversity. Education and outreach, including perhaps a letter drop to homeowners, is often the most effective way to address this issue.

Dumping

There are several locations where dumping was either observed in the field or noted by the partner agencies (Figure 8). This includes refuse left over from construction projects, brush piles/timber believed to be from tree removals (App 9, Fig 2.0, photo 27), yard waste from adjacent residential properties, old sites (typical pre-1950s informal dumps sites) where garbage such as metal, glass and old concrete had been dumped, as well as garbage and litter left behind from group gatherings and parties. Locations where pool water was being drained from adjacent properties was also mapped as dumping on Figure 8. Dumping should carry fines, and this should be sign posted if not done already. Locations where dumping has occurred within the RBG include:

- former access off the west side of Grandview and Plains Rd towards the marsh;
- road access (south corner) to the water for general access; and
- from construction pertaining to Plain Rd bridge (north corner property – but south corner of the bridge).

Vegetation Trampling

In sections of the existing trail system, secondary trials have been created alongside the creek system. In other areas trails have widened considerably to avoid muddy areas. Vegetation is trampled and ground flora is suppressed in these areas. To a lesser degree similar impacts have been observed in natural heritage features surrounding open spaces that attract large group gathering and active recreation, such as within the Hidden Valley Park. Encroachment into natural areas for a quick stroll, picnic by the creek or to have a fire at night, are activities that lead to trampling and often are associated with garbage left behind.

Septic & Pool Drainage

Although not confirmed to be a specific issue within this Study Area, direct disposal of pool water and/ or of septic systems either intentionally or unintentionally through leaks, is a common issue where private residential lands abut the Heritage Lands. There are a number of in-ground pools situated at the edge of the Heritage Lands, two septic systems in Hidden Valley Park, and one at the cemetery. Although unconfirmed, there is the potential that direct drainage of pool water or septic systems into high quality marshes and wetlands, could potentially lead to elevated levels of chemicals, hydrocarbons and pathogens in the hydrological system.

7.4.2 Opportunities

Preliminary management opportunities to be explored include:

- Contact any adjacent private landowners that have developed unsanctioned trails from the rear of their residences and explain the impacts and policies regarding encroachment, including dumping of garden refuse and draining of pool water. These trails need to be closed, including

the removal of gates;
- Clarify Current EcoPark System Lands boundaries to prevent accidental trespassing. For example, private residential lot boundaries should be fenced;
- Continue outreach and stewardship activities that address the impacts of planting non-native and potential invasive species in the backyard of a lot of residential properties;
- Enhance edge vegetation, for example living fencing, where Current EcoPark System Lands are bordered by residential development to better delineate Current EcoPark System Lands boundary, improve buffer and mitigate impacts, including "property creep" and dumping of garden refuse;
- Post signage, include text in educational pamphlets and develop interpretive material to educate the public about the impacts associated with encroachment;
- Verify the water quality in the Grindstone Creek and develop a better understanding of the potential impact to Current EcoPark System Lands of potential contamination sources identified (i.e., pool water and septic discharge) and seek potential solutions; and
- initiate a program to clean up old dump sites.

7.5 Hydrologic Impacts

7.5.1 Issues

High Run-off and Peak Flows

Within the Current EcoPark System Lands, concentrated run-off and peak flows have caused some erosion along Grindstone Creek and on slopes off trails at higher elevations (Figure 8). Generally, mitigation and control of run-off through employing Low Impact Development (LID) techniques or ecological restoration (e.g., buffer plantings) should be encouraged.

Drainage and Erosion

Impacts from surface run-off and subsequent erosion can impact riparian vegetation and can affect water quality. Grindstone Creek has natural rates of erosion that result in natural down-cutting, which slowly increases the incised nature of the valleys. In some places, vertical banks occur. This can lead to unstable slope conditions, exacerbating erosion. Although some rates of erosion have been accelerated due to higher peak runoff volumes, experienced in heavy storm events, much of the Lower Grindstone Heritage Lands have not undergone significant land use change due to this activity. The majority of down-cutting is natural and a result of the topographic difference between the Niagara Escarpment and Lake Ontario.

It was noted that there is an erosion issue near the storm-drain at the old Rifle Range on the RBG property that requires a stormwater management solution.

Bank erosion sensitivity has been mapped for Lower Grindstone Creek from just upstream of Lemonville Road to approximately Spring Gardens Road (i.e., it excludes a short reach of the creek within Hidden Valley Park and the extreme downstream reach) (App D, Fig 5.3d, GEO-Morphix Ltd. 2016). Upstream of Unsworth Avenue, the Creek has been classified as "sensitive", while the reaches downstream of Unsworth Avenue are classified as "relatively stable" and "very stable". The GEO-Morphix Report recommends geomorphology monitoring at locations where Rapid Assessments were undertaken, however, none of them are located within the Lower Grindstone Heritage Lands. The report also

recommends more complete characterization of bank and bed materials and hydrometric monitoring throughout their study area, including at the outlet of Grindstone Creek.

In some areas, the combined effects of flooding and trail use has resulted in erosion. This occurs in multiple locations along the Creekside Walk Trail, which flanks Grindstone Creek. Much of the trail system is wide, muddy and eroded. This can be seen in the photographs mapped at locations marked by photos 2 through 12, Appendix 9, Figure 1.0.

There are several erosion sites on Grindstone Creek within Hidden Valley Park. These should be addressed as part of the current EA being undertaken in that area (Grindstone Creek Erosion Control EA, Waterdown Road to Hidden Valley Park). These erosion issues include:

- A major erosion site upstream of the Lemonville Road bridge crossing (Figure 8). The banks require stabilization in this area to reduce the excessive erosion and minimize sedimentation and turbidity in the creek. The banks of the creek have been stabilized on the south (down-stream) side of the bridge; however, the north side would benefit from this treatment. The erosion area can be seen in photo 34, App 9, Figure 3.0;
- Upstream and downstream of the pedestrian bridge (upstream of Lemonville Road and across from the bathroom facilities), a large beaver dam has impacted the realigned channel and associated fascines and plantings. The dam has been removed, but numerous shrubs were lost, and the channel banks were eroded as they were inundated due to the back-water effect. On the upstream side, some fascines were damaged and/or lost so additional bank stabilization may be required through this reach (upstream). The downstream side appears to have recovered but did not have as much original damage;
- The pedestrian bridge structure may need to be assessed as flows from the dam were directed at the bridge footings and are beginning to erode the adjacent banks. This may have been done at the time of the dam removal, but it is unclear if that was ever completed; and
- There is some erosion associated with the grouted vortex weirs downstream of the pedestrian bridge. These may need to be stabilized and should be investigated.

Water Quality

A number of water quality issues have been identified in the Lower Grindstone Heritage Lands:

- Parts of the Lower Grindstone Heritage Lands may be exposed to residential septic system overflows;
- Chloride from de-icing agents discharge into creek systems from roads and snow-dumps during snowmelt in the spring;
- Turbidity and warmed water caused by stormwater runoff, erosion, siltation, limited vegetative buffer on cold-water streams, etc.;
- Issues with water contamination in shallow groundwater resulting from upstream rural and agricultural runoff and improperly functioning septic systems;
- It has been reported that there is an incomplete understanding of water quality in Grindstone Creek, largely related to the paucity of sampling locations;
- Continue with outreach initiatives and work with partners to improve quality and quantity of urban runoff entering Grindstone Creek; and,
- Local funeral homes have posted on their websites that cremated remains (ashes) can be scattered in various parts of the EcoPark System, including Grindstone Creek. Given the proximity of the funeral homes, this would likely occur upstream of the Lower Grindstone

Heritage Lands. This activity is not sanctioned and has the potential to negatively impact water quality. There is an opportunity to reach-out to funeral homes to educate on the potential impacts of this activity and to request that the suggestion be removed from their website and associated platforms.

Polluting Spills

Due to the presence of roadways, pipelines and railway lines within the Heritage Lands, there is a potential for polluting spills to occur. Spill prevention and response protocols, as well as associated management plans, should be reviewed and where necessary refined by ensuring that spill prevention plans, contingency plans and emergency response plans are updated and disseminated among all relevant agencies for the purpose of protecting natural features along roads, railway lines and pipelines, as well as human safety.

Road salt

As noted above under water quality, de-icing agents applied to roads during winter months mixes with surface run-off and is eventually discharged in the nearest watercourse. This issue is likely most prevalent along Plains Road West, as run-off would be directed to Grindstone Creek and because Plains Road is a major, busy arterial that would receive substantial applications of de-icing agents to maintain road safety. The specific discharge locations on Plains Road should be confirmed, and discharge locations on other roads that are prone to conveying de-icing agents specifically identified. The City follows a Salt Management Plan utilizing best management practices to minimize the application of road salt while providing safe road conditions. It would be beneficial to engage in discussions with the City to review the Salt Management Plan in the Heritage Lands area.

7.5.2 Opportunities

Preliminary management opportunities to be explored include the following:

- Continue to engage in discussion and initiatives to improve urban infrastructure to mitigate stormwater management, high run-off and peak flows. Hamilton Harbour Remedial Action Plan (HHRAP) released a report in 2014 addressing urban runoff in Burlington and Hamilton with municipal, conservation authority, provincial, federal, RBG and community stakeholder representatives which identifies opportunities for Low Impact Development (Bay Area Restoration Council 2014);
- Ensure that the several erosion issues on Grindstone Creek within Hidden Valley Park are addressed in the current and on-going Environment Assessment on erosion control in Grindstone Creek;
- Opportunity for stormwater management at RBG's "rifle range" adjacent to the Woodland Garden (LG 3);
- Any planned impervious surfaces as part of future infrastructure within the EcoPark System should be required to present and evaluate options for Low Impact Development solutions;
- Initiate discussion with the City of Burlington to review the Salt Management Plan, with the intent of looking for opportunities to minimize the impacts of de-icing agents where run-off discharges into Grindstone Creek, particularly along Plains Road West. This could include review of the type of de-icing agent used to select the least toxic option, application rates, and the feasibility and potential to provide pre-treatment of run-off that is prone to carrying de-icing agents. The discussion should acknowledge that this is an issue that extends well beyond the Heritage Lands and is part of a broader water quality concern for Hamilton Harbour and the

Great Lakes;

- Look for opportunities to increase area of vegetated buffers along Grindstone Creek and manage them with the intent of creating native vegetation communities;
- There is an opportunity to improve climate change resiliency in the area through the creation of a comprehensive and long-term regional plan for climate change mitigation and adaptation, with particular attention paid to impacts resulting from spring flooding and heavy storm events. This is an issue that transcends the Current EcoPark System Lands and would be led by another agency, and would benefit from representation of EcoPark System partners;
- Reach-out to local funeral homes to educate on the potential impacts of scattering cremated remains (ashes) in natural areas, and to request that the suggestion be removed from their website and associated platforms; and,
- Undertake a review of the current water quality sampling program in the Lower Grindstone Heritage Lands, starting from Unsworth Avenue downstream to the Plains Road West bridge. The review should address the number of sampling locations and what is being monitored, with particular reference to the need to include heavy metal analysis.

7.6 Ecosystem Management

Management issues and opportunities related to ecosystem management are aimed at conserving major ecological services and restoring natural communities. It is recognized that to the extent possible the Heritage Lands must also meetrecreational needs, but this must be accommodated within the capacity of the natural resources to ensure that ecological integrity, including biologicl diverwity, is maintained and where possible improved.. The principal objective of ecosystem management is the restoration of natural ecosystems, the maintenance and improvement of ecological services, preservation of significant species, as well as efficient maintenance and ethical use of natural resources.

Ecological restoration is underway at several of the management units in the Current EcoPark System Lands as discussed in this section of the report. For example:

- RBG has used Christmas tree barriers at the mouth of Grindstone Creek to restore the floodplain ponds by protecting them from destructure Common Carp activity;
- RBG has reduced slope erosion by removing the asphalt road from the Old Snake Road Trail followed by the addition of soil and vegetation. Water can now freely infiltrate the slope, significantly reducing erosion. The eroded sections of the slope were rehabilitated with the addition of soil and vegetation. A rain garden now captures the water that runs off from the remaining paved section of Snake Rd draining into the RBG property- further reducing water erosion;
- RBG has almost eliminated *Phragmites australis* from Hendrie Valley. Sites where Phragmites has been eliminated have been revegetated with native plants;
- RBG is currently developing a plan to control *Glyceria maxima*;
- Other invasive species are also being managed (ex. Garlic Mustard, Dames Rocket, Lesser Celandine, Yellow Iris, Himalayan Balsam and invasive shrubs); and
- Restoration plans for the Lower Grindstone area include stream and flood plain restoration, and wetlands.

Portions of the Current EcoPark System Lands were historically farmed (e.g., Hidden Valley Park 1 and 2), and all wetlands in the area would have been removed in the process. Thus, any opportunities to confirm historic wetland locations and restore them, where feasible should be explored.

7.6.1 Issues

Decline in Natural Feature Quality

An overall decline in the overall quality of natural features, and a reduction in biodiversity, has resulted from increased pressures from adjacent lands and intensification of recreational uses. Although not noted as a major issue, evidence of some off-trail use was noted. This can result in trampling and if habitual, the development of unsanctioned trails. Forest monitoring is beginning to show compositional changes in the forest structure. For example, Ash species and Norway Maple are increasing in numbers, and native shrub species are in decline in Hendrie Valley forest monitoring plots (Radassao et al. 2019). A key theme in the Management Plan will be to provide recommendations on how the Current EcoPark System Lands can be managed for biodiversity values in the face of habitat fragmentation, invasive species, climate change, human uses, etc.

Conservation and Recovery of Species including SAR

The current conservation and recovery of SAR in the Lower Grindstone Heritage Lands is focused on conserving and restoring their habitat, for example, habitat for SAR turtles (e.g., Snapping Turtle, Blanding's Turtle, and Map Turtles), and plant species (e.g., American Chestnut (*Castenea dentata*), American Columbo (*Frasera caroliniensis*), and Wood Poppy (*Stylophorum diphyllum*). In addition, there are some populations of non-SAR which are also subject to impacts and need to be managed to preserve biodiversity. For example:

- low abundances of amphibians throughout Lower Grindstone which warrant management;
- there are turtles nesting in the garden's compost pile near Kicking Horse Trail which is used for the maintenance of horticultural collections. Species at Risk staff have to relocate these nests into incubators or nesting piles; and
- there are reported issues of lead levels found in some wildlife species (e.g., waterfowl).

Management activities focused on the conservation and recovery of Species at Risk and their habitats in the Current EcoPark System Lands include:

- Between 1995 to 2000, planting Wood Poppy in Hendrie Valley in *ex situ* populations;
- removal of invasive species in proximity to known locations of Species at Risk;
- closure of trails in proximity to known locations of Species at Risk and Species at Risk habitat (e.g., trail closure on the south side of Pond 4);
- maintaining open woodland characteristics for Species at Risk that rely upon gaps in the canopy (e.g., American Columbo);
- Developing a site-specific recovery plan for turtles on RBG lands (Harrison and Theysmeyer 2014); and
- Monitoring and stewardship programming.

The conservation and recovery of Species at Risk is an important component of maintaining biodiversity and should continue to be supported and expanded to include other species.

Forest Fragmentation

Within the Current EcoPark System Lands, some forest patches are fragmented and poorly configured, which provides restoration opportunities to increase forest area, especially where it will create additional interior habitat. In the past, the majority of tableland forests in and adjacent to the Current EcoPark System Lands were removed for development and agriculture. There is a need to restore the north side of the valley in Lower Grindstone 1 and 2, to increase forest area and reduce forest edge habitats. There is also an opportunity to restore the old Rifle Range location in Lower Grindstone 4; however this may require an unexploded ordnance survey and site remediation to ensure there are no risks to human health and the environment associated with the historic uses of the site (e.g., lead bullet fragments).

Forest Health Decline

Several factors are currently impacting the health of forests in Lower Grindstone. Oak Decline, Beech Bark Disease, Emerald Ash Borer, Gypsy Moth, Fall Cankerworms, Dogwood Anthracnose, Butternut Canker, and other diseases are currently impacting the health of trees and forests overall. Asian Long-horn Beetle has not yet been noted in the area but is a potential threat. Non-native European earthworms also appear to be contributing to the decline of forest health, particularly impacting the diversity of the ground flora, soil micro-invertebrate communities (with subsequent issues higher up in the food chain) as well as soil structure and chemistry. Earthworms are keystone detritivores that can act as “ecosystem engineers” and have the potential to change fundamental soil properties, with cascading effects on ecosystem functioning and biodiversity. Tree blowdowns associated with the death of trees, and slope erosion can also impact the health of forests by creating large gaps in forest canopy. If within the natural range in terms of extent and intensity, tree death, and natural slope erosion are part of providing habitat heterogeneity within an ecosystem and may not be an issue. Many of the forest pests, such as Cankerworm, are causing significant death and dieback of trees, which create hazard tree and safety issues. Garlic mustard (*Alliaria petiolata*) may also be affecting forest health. Garlic mustard has been shown to disrupt mutualistic relationships between native tree seedlings and mycorrhizal fungi suppressing native plant growth (Stinson et al. 2006; Wolfe et al. 2008). Gaining access to and managing dead trees creates a secondary management issue, along with invasive species management. Proper disposal of infected trees is also a concern in areas of poor access. Fortunately, Red Maple and Red Oak dominate the forest canopy and ash is a relatively minor component of the forest ecosystem within the Heritage Lands.

Ecosystem Rehabilitation, Restoration, and Naturalization

One important aspect of managing for biodiversity values is to restore vegetation communities to the extent possible. Vegetation communities that are composed of native species with appropriate soils, light, drainage, etc. (i.e., located on appropriate eco-sites), along with natural disturbance regimes (flooding, fire, windthrow, etc.) will support rich and diverse plant and animal communities and provide the full array of ecosystem functions. Such ecosystems also contribute to the maintenance of rare species and communities, including SAR. The removal of invasive species and other issues identified in this report are all associated with ecosystem restoration. It is thus a unifying imperative.

All the communities in the Lower Grindstone Heritage Lands have been subject to human-related disturbance, directly or indirectly, that has degraded the quality of the native ecosystems. These disturbances include activities such as logging and clearing of native vegetation, introduction of invasive species, habitat destruction, hunting, changes in flooding regimes, and more generally changes in

stream and wetland hydrology through altered run-off volumes and frequencies, changes in baseflow, etc. Occupation and land management by indigenous peoples over thousands of years also shaped the plant and wildlife communities that were considered "pristine" when first encountered by early explorers and settlers. Cessation of the land management activities of indigenous communities (e.g., fire, judicious creation of forest openings, etc.), is also an impact on native vegetation and wildlife communities.

Although it is impossible to re-create pre-European settlement communities, they can still serve to assist in the development of restoration goals and help define target communities.

Stream Habitat Improvement

Grindstone Creek is a principal feature of the Lower Grindstone Heritage Lands and provides connection between the two main land holdings: RBG and Hidden Valley Park, as well as natural features in the watershed upstream of the Heritage Lands. Maintaining and preferably improving its condition and reducing the current impacts is a key component of the overall long-term ecological health of the Lower Grindstone Heritage Lands.

There are numerous impacts to Grindstone Creek that compromise its natural values. These include:

- establishment of non-native, invasive plants, for example, Common Reed (*Phragmites australis*), Himalayan Balsam (*Impatiens glandulifera*), Rough Mannagrass (*Glyceria maxima*);
- changes in hydrology, mainly from up-stream changes to vegetation cover and increases in impervious surfaces resulting in altered run-off characteristics, and erosion/sedimentation issues; and
- erosion from over-use and inappropriate alignment of stream-side trails.

Invasive Species

Table 6 summarizes the major invasive species noted within the Current EcoPark System Lands. Invasive species tend to spread aggressively and out-compete native species with resulting losses in species diversity and ecosystem function. Invasive species management is a major priority requiring considerable management effort as many invasive species occur in the Heritage Lands. Some of these are very difficult and/or resource-intensive to eradicate. RBG has developed an Invasive Plant Strategy for the Terrestrial Lands (Barr 2016) in addition to species-specific management plans (e.g., Common Buckthorn, Ornamental Honeysuckles) to help manage the spread of non-native species. Site-specific examples of current invasive species management include the following:

- Invasive plant removal and replanting at Cherry Hill Gate;
- Targeted invasive shrub and other non-native trees, shrub and plant removal (estimated 6,000 plants) within Lower Grindstone 1, 2 and 3;
- The current initiative to develop a management protocol to eliminate *Glyceria maxima*;
- Common Buckthorn removal and replanting in Lower Grindstone 6 at the Grindstone Marshes Trail west entrance; and,
- The almost total eradication of *Phragmites australis* from Hendrie Valley.

A small population of Himalayan Balsam has been identified along Grindstone Creek. It is though that it may originate from an upstream source. Its occurrence in Hidden Valley should be investigated and if so, management should be implemented.

Invasive ornamental species (for example Chocolate Vine (*Akebia quinata*) and Lily of the Valley (*Convallaria majalis*)) have spread into Lower Grindstone Heritage Lands. Most notably are from the former RBG's Director's Home (west of Unsworth Avenue) and adjacent to the backyards.

RBG is currently completing an Invasive Species Strategy for the entire organization and has adopted an Invasive Species Policy.

Domestic pets, in particular cats, can have a significant impact on native wildlife populations. Cats are very proficient predators and are responsible for killing millions of birds, small mammals, reptiles and amphibians throughout North America each year (Marks and Duncan 2009). Education is the principal solution to this issue.

Noxious Plant Species

Poison ivy and other noxious native plants pose health and safety issues for park users. Poison ivy is found throughout the Current EcoPark System Lands in various concentrations. Giant Hogweed has been noted within the Current EcoPark System Lands (Appendix 5).

Poaching and Plant Foraging

Poaching and harassment of salmon during the fall salmon run is an issue along the Creekside Walk Trail where the first downstream bridge crosses the Grindstone Creek. Wild plant and mushroom foraging have been noted to take place on RGB lands within the Cootes Paradise Heritage Lands and is suspected of also occurring in Hendrie Valley. People have been observed leaving the RBG with plant material, possibly for home native gardens, although it is not clear exactly where the plant material was removed from. Harvesting of plant material is not permitted within the RBG or Hidden Valley Park. Plant collecting, especially rare species and/or SAR, or foraging large numbers of edible plants such as wild leek (*Allium tricoccum*), will impact biodiversity and can also cause other indirect impacts such as the spread of invasive species and trampling. The impacts of this activity are not currently being monitored and are therefore largely anecdotal.

Wildlife Feeding Impact on Population Balance

Hendrie Valley has been experiencing high-intensity wildlife feeding for a number of years. In a recently published report by RBG, Lower Grindstone 2 and 3 (Grindstone Marshes Trail between Cherry Hill Gate and the boardwalk) had the highest number of visitors observed and is where the most wildlife feeding occurred. Consequently, wildlife in these areas have become extremely habituated to human presence. An alarming 90% of transect visits to Cherry Hill (Lower Grindstone 3) had wildlife feeding by visitors observed (Peirce 2019). High numbers of Mallards, House Sparrows, Black-capped Chickadees, and Eastern Chipmunks show that these species are congregating to feed on supplemental food, which can increase the risk of disease spread, increase rodent predation on ground-nesting birds, and can lead to nutritional deficiencies (Peirce 2019). This issue has also resulted in extensive turtle nest predation by racoons, skunks and other small mammals.

Urban-adapted Wildlife

Some wildlife species benefited from the forest cutting and agricultural intensification that followed European settlement in North America, resulting in an increase in their population sizes and ranges (Naughton 2012, p. 517). Some of these species have also become well-adapted to urban life. Within the Lower Grindstone Heritage Lands, urban-adapted wildlife species include squirrels, racoons, skunks

and deer. Over-population of meso-predators, such as raccoons and skunks, impact other wildlife through predation, resource depletion and by dominating habitat. Their ability to capitalize on urban land use provides them with a competitive advantage over other wildlife.

Fragmented landscapes favour White-tailed Deer, a species which prefers forest edges. In addition, the added complexity of intense highway development adjacent to the Lower Grindstone Heritage Lands interrupts natural wildlife movement patterns, as well as being a cause of mortality. Urban areas also have few natural predators and no hunting. MNRF completed a wintering deer survey in the Ancaster Area in 2009 (Yagi and Timmerman 2009). This study concluded that "concerns regarding health, public safety, vehicle collisions, impacts to forest ecosystems, biodiversity, conservation of Species At Risk, damage to ornamental plants, landscaping, agricultural crops and nursery stocks indicate that in some areas deer populations have exceeded society's tolerance levels", and "in areas where normal deer movement behaviours are impaired, and there is no predation, deer populations have likely exceeded the carrying capacity of their habitat".

Royal Botanical Gardens has taken some steps to control deer populations on their lands and has partnered with Haudenosaunee to organize a cull which resulted in the removal of seven deer. Conservation Halton has in places a hunting model for a nearby conservation area (Dundas Valley) but not within the Heritage Lands. Although controversial, deer management of some kind must continue within the Current EcoPark System Lands in order to address impacts to natural heritage and human safety.

Wildlife Crossing/Corridors

Wildlife mortality associated with road crossing has been identified as a major issue of concern within the Cootes to Escarpment EcoPark System in general and is a particular issue in the Lower Grindstone Heritage Lands. The issue includes impacts to wildlife populations as well as human safety issues in the case of collisions involving deer. The existing assemblage of land parcels that comprise the Current EcoPark System Lands are fragmented by transportation infrastructure. As a result, wildlife crossroads and railways in order to access lands that are required for fulfilling their various life processes (e.g., nesting, foraging, over-wintering, dispersal, etc.). Plains Road West serves as a significant barrier to both north-south and east-west wildlife movement through the Lower Grindstone Heritage Lands. Vehicular speed and wildlife collision on roads severely impacts the safe passage of wildlife, and ultimately wildlife populations. Likewise, the CNR/Hwy 403 transportation corridor along the north boundary of the Lower Grindstone Heritage Lands without doubt limits wildlife movement, although the extent of road mortality does not appear to have been investigated. The main issue related to wildlife crossing and corridors that has been identified relates to reptiles, particularly Blanding's Turtle, which has been reported as nesting in the RBG Works Yard adjacent to Plains Road West. The population of this species is being impacted by mortality on Plains Road West (i.e., movement from candidate overwintering areas to foraging and reproduction areas).

7.6.2 Opportunities

Owing to the large number of preliminary opportunities identified for Ecosystem Management issues, they are organized below by Management Theme. Preliminary management opportunities to be explored include:

Decline in Natural Feature Quality

- Discourage off-trail use by:
    - closing unsanctioned trails;
    - education regarding the impacts of off-trail use;
    - not permitting orienteering as a sanctioned use; and
    - providing sanctioned trail access to points of interest (thus discouraging off-trail hiking).
- Prioritize management to improve biodiversity values including the implementation of recommendations provided in this management plan; and
- Enhance buffers and discourage encroachment through edge plantings with native species along Heritage Lands boundaries bordered by residential development.

Conservation and Recovery of Species Including SAR

- Continue and expand ongoing monitoring of the populations of significant plants and wildlife found in the Current EcoPark System Lands;
- Improve turtle nesting areas in the vicinity of the Hendrie Park barn in Lower Grindstone 4;
- Develop interpretive signage and increase awareness in Lower Grindstone 6 on the pathogen Ranavirus and its transmission, including waterborne exposure (i.e., transfer between waterbodies via equipment such as canoes, kayaks, paddles). Include contact information for organizations responsible for handling sick reptiles and amphibians if found;
- Continue and expand the conservation and recovery of Species at Risk in the Current EcoPark System Lands, especially within Lower Grindstone 1, 2 and 6 management units;
- Employ the recommendations outlined in the RBG American Columbo (*Frasera caroliniensis*) Site Specific Recovery Plan (Richer 2019) and consider land acquisition opportunities in areas with and/or adjacent to Endangered American Columbo occurrences where it would enhance its protection and management;
- Propagate SAR plants in decline in Lower Grindstone Heritage Lands including American Chestnut (*Castanea dentata)* and Butternut (*Juglans cinerea)*;
- Develop and implement Species at Risk recovery strategies, including the Turtles of RBG Site Specific Recovery Plan (Harrison and Theysmeyer 2014) applicable to the Current EcoPark System Lands. Recovery strategies should be ecosystem-based (i.e., where possible manage communities to benefit a wide range of flora and fauna) and where possible integrated with broader restoration initiatives. Species-specific restoration should be implemented only where necessary;
- Continue and expand ongoing inventory and mapping of flora and fauna in the Current EcoPark System Lands, with an emphasis on Species at Risk and rare species;
- Undertake an analysis of current trail locations (including unsanctioned trails) with respect to their proximity to rare and/or significant species and communities to identify where there are potential conflicts and ensure that trails and recreational uses are not impacting Species at Risk and rare species habitat;
- Continue and further develop partnerships with businesses and adjacent landowners to improve awareness (e.g., educational pamphlets) and stewardship support;
- Support research efforts that focus on heavy metals sources in sediment, water (including groundwater) and aquatic invertebrates along Grindstone Creek (Radassao et al. 2019); and
- Maintain breeding bird surveys to monitor presence/absence of SAR birds such as Wood Thrush throughout the Lower Grindstone Heritage Lands. Explore opportunities for additional targeted

SAR bird surveys in the Lower Grindstone Management Units to monitor for presence and abundance of SAR birds.

Forest Fragmentation

- Look for opportunities to expand Lower Grindstone Heritage Lands through ongoing acquisition to increase the extent of natural features in public ownership, including areas that can be restored to native communities; and
- Undertake forest restoration initiatives as recommended in under Ecosystem Rehabilitation, Restoration, and Naturalization.

Forest Health Decline

- Engage in and support research into management of forest pathogens, as well as non-native earthworms;
- Given the relatively small area of forest, monitor for blowdown events and restore affected areas to forest as soon as possible to mitigate effects of fragmentation;
- Prioritize the management of invasive species that may be allelopathic and/or affect soil mycorrhizal relationships;
- Restore degraded woodlands;
- Target areas where there is a high presence of ash and encourage plantings of other native species to mitigate some of the impacts of Emerald Ash Borer. Trees may also be planted in woodlands and thickets to encourage succession of native species; and
- Follow management recommendations provided in RBG's Ecological Land Classification Report (Barr 2014).

Ecosystem Rehabilitation, Restoration, and Naturalization

- Where feasible and beneficial, restore habitat features that are under-represented in the landscape, for example pit and mound forest restoration;
- Develop a map that identifies and prioritizes potential forest restoration areas, including opportunities to increase the area of forest interior habitat;
- Promote the succession of forest habitat and prioritize restoration that increases the area to edge ratio of forests (i.e., maximizes forest area relative to its edge);
- Identify ecosystem restoration targets for the Lower Grindstone Heritage Lands, based on historical and current composition:
    - include considerations for reference ecosystems and adaptability to climate change;
    - include considerations for habitat creation for Species at Risk (SAR) and the restoration/management of provincially rare vegetation communities; and
    - incorporate land use impacts to the study area and subwatershed, such as the amount of impervious surfaces and threat to wetlands.
- Where feasible and appropriate, explore opportunities to restore rare and uncommon ecosystems;
- Where feasible and if the opportunity arises, support restoration of tableland wetlands as part of managing surface run-off (see Hydrologic Issues). Wherever possible, tableland restoration should aim to achieve pre-settlement run-off conditions to reduce peak flows to Grindstone Creek (e.g., kettle and palustrine tableland wetland pockets could be retained in any future development proposals and restoration should be encouraged to manage run-off);
- Continue to discourage off-trail use and disturbance to minimize impacts to native ground

vegetation layer and understory;
- Implement management recommendations provided in RBG's Ecological Land Classification (Barr 2014) and Environmental Review of Hendrie Valley Report (Radassao et al. 2019), which include:
    - Increase interior forest cover and promote the natural succession of a native forest community;
    - Plant other native species in areas where there is a high presence of die-back to mitigate some of the impacts of diseases impacting tree canopy;
    - Review rare plant lists from inventories, in addition to known rare plant occurrences for potential propagation opportunities to assist with plant re-establishment.
- As part of ecosystem restoration, look for opportunities to re-establish features that have been historically removed;
- Relocate the Works Yard, also known as the "the Lodge', and restore the area; and
- Explore opportunities to enhance wildlife habitat through pit and mound restoration, ephemeral pond creation and the addition of woody debris where soil conditions permit.

Stream Habitat Improvement

- Continue restoration efforts along Grindstone Creek within Lower Grindstone 2 including removal of Common Reed (*Phragmites australis*), in-stream habitat improvements, and planting native vegetation in the riparian area to improve buffer function; and
- addressing issues with the Creekside Walk Trail including potential re-alignment and closure of unsanctioned side-trails (see Recreation Issues).

Invasive Species

- Coordinate management efforts to control/remove invasive species populations among Cootes to Escarpment EcoPark System partners. This is particularly germane in the Lower Grindstone Heritage Lands as invasive species likely disperse up and down Grindstone Creek Valley, thus necessitating coordination between the City and RGB (as well as partners upstream of the Heritage Lands) in order to effectively manage invasive species;
- Continue to document and map the locations of major aggressive invasive species;
- Continue efforts and improve the buffer along forest edges through ecological restoration and removal of invasive, non-native species;
- Determine if Himalayan Balsam occurs in Hidden Valley Park, and if so, undertake management as to prevent its further spread downstream in Hendrie Valley;
- Implement invasive species management recommendations provided in RBG's Ecological Land Classification (Barr 2014) and Environmental Review of Hendrie Valley Report (Radassao et al. 2019), which include:
    - Control invasive species, especially in proximity to trails;
    - Address seed sources and initiate a Norway Maple removal project starting at South Pasture Swamp in Lower Grindstone 2 and continue removal efforts throughout the Heritage Lands;
    - Coordinate removal and treatments for ornamental escapes from adjacent RBG gardens for species including Common Butterbur, Common Barberry, Chocolate Vine, Porcelain Berry, Black Jetbead, Winged Euonymus and Amur Cork Tree;
    - Continue targeted ornamental non-native invasive plant removal and develop a best

management practice document for managing Lesser Celandine;
    - Employ rapid responses to new introductions and satellite populations of ornamental invasive plants before their populations expand. Focus areas include the residential properties along Patricia Drive and Sandcherry Drive which back onto Lower Grindstone 1;
    - Continue outreach and stewardship activities which address the impacts of planting ornamental invasive plants and yard waste dumping (introductions of non-native invasive species, etc.) and offer options to local homeowners for proper yard waste disposal; and
    - Plant other native species in areas where there is a high presence of die-back to mitigate some of the impacts of Emerald Ash Borer and other diseases impacting tree canopy.
- Remove the grove of dead ash (from Emerald Ash Borer) that occurs along the multi-use path in Hidden Valley Park;
- Explore opportunities and funding for an invasive species department or task force at RBG to manage both terrestrial and aquatic invasive species establishment and spread;
- As part of other monitoring and inventory programs, continue to watch for signs of new forest pathogens (e.g., Asian long-horned beetles) to enable a response at the outset of infestation.
- Continue the monitoring and removal/control of priority invasive plant species;
- Continue to educate the public on the impact that invasive plants have on biodiversity and the cost of controlling them once established. Targeting the residential properties along Sandcherry Drive that back onto the Heritage Lands in Lower Grindstone 1 is highly recommended;
- Address the issue of feral and domestic cats within the Current EcoPark System Lands by disseminating educational material to adjacent landowners and establishing an acceptable approach to trapping/removal of free-ranging cats where persistent issues are identified;
- Review and evaluate the effectiveness of existing by-laws and identify gaps in by-laws to facilitate the enforcement of use policies. This could include a cat control by-law which would facilitate the removal of free-roaming cats in much the same manner that free-roaming dogs would be controlled; and
- Install boot brushes and invasive species education at trailheads.

Noxious Plant Species

- Post educational signage noting the identification and toxic properties of Poison Ivy in a few key trailhead locations within the Heritage Lands where this species is abundant; and
- Similarly, post signage warning about Giant Hogweed (e.g., along the multi-use trail in Hidden Valley Park) and continue to monitor and remove populations as they are encountered.

Poaching and Plant Foraging

- Install signage at known salmon poaching locations indicating: i) it is illegal ii) fines (if any) that could be levied, and iii) encourage reporting of violations;
- Install signage at principal tailheads clearly indicating that the collection of any plants or animals is not permitted;
- Monitor known salmon poaching areas to gain a better understanding of the extent of the issue and enforce regulations;
- Through monitoring and investigation (including questioning of visitors caught carrying plant material out of the Heritage Lands), determine i) what species of plants are being removed and for what purpose, and ii) the location from which plants are being removed;

- Convey the issue of poaching and plant collecting to security and operations staff and encourage them to report any violations they observe. Where within their job responsibilities, encourage City/RGB staff to question visitors seen removing and/or transporting plants from natural areas within the Heritage Lands; and
- Review relevant by-laws to determine what charges/fines can be levied against visitors violating poaching and plant collecting regulations. Assess if by-laws are adequate to discourage these activities and if warranted, pursue amending them.

Wildlife Feeding

- Implement recommendations provided in RBG's Supplemental Feeding of Wildlife in Hendrie Valley Report (Peirce 2019) and the Environmental Review of Hendrie Valley Report (Radassao et al. 2019) which include:
    - Discontinue the advertising of feeding wildlife, including chickadees, in the Lower Grindstone management units;
    - Develop a factsheet outlining reasons why RBG has a bylaw regarding not feeding wildlife and effects observed in the Lower Grindstone management units for outreach, stewardship and staff training;
    - Increase supervision and management in high visitor traffic areas during popular visiting times. Explore opportunities to offer more frequent guided hikes by RBG staff and volunteers to engage the public on the trails and communicate the potential impacts of feeding wildlife;
    - Adjust RBGs education programming with bird feeding to cultural land areas only (i.e., manicured gardens) such as the Kippax Garden and the Woodland Garden in Lower Grindstone 4. Ensure messaging is provided that wildlife cannot be fed in the natural areas (Lower Grindstone 1, 2, 3 and 6);
    - Reasons why all wildlife (including birds) do not need to be fed in natural areas, as well as potential risks to feeding wildlife, should be the main emphasis of stewardship and outreach activities; and
    - Further explore by-law enforcement opportunities (municipal, RBG security, conservation officers) for wildlife feeding violations.

Urban Adapted Wildlife

- Continue to pursue opportunities to control deer populations, including options that engage Indigenous communities; and
- Install deer exclusion fencing in areas which have been recently restored/planted.

Wildlife Crossings/Corridors

- Develop a program to track and analyze roadkill data in order to quantify the magnitude of the issue and identify the location(s) where mitigation (e.g., control fencing and/or eco-passages) should be implemented. This should include a data collection protocol for road-killed wildlife that tracks the number of animals killed, the species, date, the location and the source of the information (e.g., City of Burlington, RBG staff, etc.). This is particularly important along Plains Road West;
- Investigate the possibility of formalizing an arrangement with the City of Burlington department that is responsible for clearing up road-killed animals to report the species that are killed and its location and provide this information to RBG;

- Continue to look for opportunities to enhance the continuity and integrity of natural corridors, particularly across Plains Road West and Spring Gardens Road;
- Identify additional areas where wildlife habitually crosses the roads within the Lower Grindstone Heritage Lands to gain a better understanding of where wildlife passages or other mitigation needs to be initiated. This may include:
    - continue to collect and map roadkill data from municipal and other sources;
    - establish a program that encourages the reporting of all roadkill from the public and partner agencies, and enters it into a database to facilitate analysis and mitigation efforts;
    - include wildlife impact analyses into the Terms of Reference of major road reconstruction projects within the Heritage Lands; and
    - stay informed of current and future alternatives for improving wildlife road crossings, traffic calming, signage, etc. through review of relevant literature, participating in conferences, workshops, etc., addressing wildlife road mortality.
- Develop a strategy to prioritize and upgrade existing crossing structures (e.g., road culverts) where they may be used by wildlife. Partner agencies could investigate culverts scheduled for replacement to determine if they are used for by wildlife (e.g., track studies, short-term camera monitoring) to determine if larger culverts or more sophisticated eco-passages are warranted;
- Where eco-passages cannot be developed install wildlife barriers where wildlife (particularly turtles) are hit;
- Contribute to long-term monitoring opportunities by continuing to monitor wildlife crossing and road mortality; and
- Continue to explore options for managing deer populations within the Current EcoPark System Lands.

7.7 Cultural Heritage Issues

7.7.1 Issues

A number of issues were identified through the inventory and evaluation of cultural heritage resources as follows.

Dated Information

The description of character-defining features of RBG currently posted on the Canadian Register of Historic Places website is out of date. Some of the gardens identified as features in Hendrie Park have been replaced with new gardens. An inaccurate or out-of-date description of critical features may present management problems if it necessary to defend the conservation of existing garden areas or boundaries.

The listing of RBG on the Canadian Register of Historic Places does not provide protection as a cultural heritage resource. Consideration should be given to cultural heritage designation of RBG through the Ontario Heritage Act to strengthen protection.

Milling

Milling in early settlement history is a significant theme of Grindstone Creek. Extant cultural heritage resources associated with milling are limited, making any remaining resources more significant in conveying the story of milling along the length of Grindstone Creek.

Cultural Heritage Interpretation

Commemorative markers and plaques on the grounds of Hendrie Park and Laking Gardens vary widely in format, message and location. Other historic activities such as clay extraction in LG 1 also provide opportunities for interpretation.

Climate Change Impacts

Impacts on character-defining garden features may result from precipitation and temperature changes associated with climate change. Specific species collections may be costly to maintain. Low-lying trails conflict with increasing flooding.

7.7.2 Opportunities

Preliminary management opportunities to be explored include:

- Applegarth Mill: An interpretive feature in Hidden Valley Park incorporating authentic millstone(s) provides an opportunity to communicate the cultural history of Lower Grindstone Creek and the importance of early mills that throughout the Heritage Lands. Local interest in this mill provides an opportunity for citizen engagement;
- Clay extraction has been identified as an interpretive theme relevant to other heritage lands. The commemorative marker at the former NATCO site adjacent to the Lower Grindstone on Unsworth Avenue provides an opportunity to connect this theme to the Lower Grindstone area;
- Valley Farm interpretation: With local interest in horses and riding, the origins and evolution of Valley Farm present an opportunity exists to communicate the story of William Hendrie and his impact on horse breeding;
- Indigenous Peoples have interest in the historic land use, current occupancy and traditional rights associated with the Cootes to Escarpment EcoPark System heritage lands, including access to these areas for harvesting as part of their traditional culture and diet. Continue on-going consultation and meaningful engagement in recognition of Indigenous Peoples rights and traditions as part of developing management strategies for the heritage lands, as well as advancing reconciliation;
- Indigenous garden: Significant interest has been shown in indigenous gardens in Canadian botanical gardens in recent years, including those at Montreal, UBC and University of Alberta. In addition to the recently opened Indigenous trail at Cootes Paradise, an indigenous garden offers further opportunity for meaningful outreach and consultation and shows respect for the original inhabitants of this landscape;
- Commemorative marker policy: A policy on the format, message and location of markers and plaques will provide the opportunity to limit and control placement of commemorations of all types on Heritage Lands;
- Commemorative trail development: Markers and plaques on this site tell a story of the people who have been involved in building RBG. Connecting the markers and plaques via website and through a self-guided trail is an opportunity to demonstrate all who have contributed to the site and the many organizations that support it today;

- Heritage Tree interpretation: The presence of Heritage Trees in the Lower Grindstone presents the opportunity to communicate the heritage value of trees and the factors that limit or enhance their lifespan;
- Horticulture history: The history of Hendrie Park and Laking Gardens is connected to the history of early growers in the Aldershot area. An opportunity exists to develop local and regional awareness of this history and to support tourism for those interested in the horticultural heritage of this part of Ontario, linking these resources to the St. Catherine's and Niagara regions; and,
- Initiate viewshed management (required tree culling to preserve views) and create a viewshed management plan.

8.0 Next Steps

Following the review of this Inventory, Issues and Opportunities Report, work will continue on the preparation of the Management Plan for the Lower Grindstone Heritage Lands. A large number of issues and preliminary management opportunities have been identified through the preparation of this report and have been presented at this early stage in the process to allow adequate time for review and discussion with the Steering Committee, Stakeholders, Indigenous communities and the public. These opportunities will be further developed and discussed in greater detail to refine the recommendations, as the project moves forward.

Preparation of the Management Plan includes preparing a land classification system based on the Niagara Escarpment Parks and Open Space System (NEPOSS) zones, followed by the development of the actual Management Plan that will guide future management activities. Further public consultation will occur through the development of the NEPOSS zones and the Management Plan, and public meetings will be held to gain and incorporate feedback.

This Inventory, Issues and Opportunities Report is intended to be used in conjunction with the Management Plan.

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Appendix 1: Data Sources

Appendix 1. Data sources referenced to prepare the Inventory, Issues and Opportunities report for Lower Grindstone Heritage Lands.

NAME OF RECEIVED GIS LAYER	FILE TYPE	SOURCE
RBG GrindstoneProperty	.shx, .shp, .sbx, .sbn, .prj, .dbf, .cpg	RBG
RBG_Fence	.shx, .shp, .sbx, .sbn, .prj, .dbf, .cpg	RBG
RBG_Site Ammenties	.shx, .shp, .sbx, .sbn, .prj, .dbf, .cpg	RBG
RBG_streams	.shx, .shp, .sbx, .sbn, .prj, .dbf, .cpg	RBG
RBG_StructuresGrindstone	.shx, .shp, .sbx, .sbn, .prj, .dbf, .cpg	RBG
RBG_TrailsGrindstone	.shx, .shp, .sbx, .sbn, .prj, .dbf, .cpg	RBG
RBG_wetlands	.shx, .shp, .sbx, .sbn, .prj, .dbf, .cpg	RBG
C2E_ComplimentaryLands	.shx, .shp, .sbx, .sbn, .prj, .dbf, .cpg	CH
C2E_PartnerLandHoldings	.shx, .shp, .sbx, .sbn, .prj, .dbf, .cpg	CH
C2E_PotentialParkLands	.shx, .shp, .sbx, .sbn, .prj, .dbf, .cpg	CH
CurrentEcoParkLands_2018	.shx, .shp, .sbx, .sbn, .prj, .dbf, .cpg	CH
ELC_CH	.shx, .shp, .sbx, .sbn, .prj, .dbf, .cpg	CH
Wetlands_CH	.shx, .shp, .sbx, .sbn, .prj, .dbf, .cpg	CH
COB_Parcels_Feb122019	.shx, .shp, .sbx, .sbn, .prj, .cpg, wordpad	COB
Parcel_Private_Feb122019	.shx, .shp, .sbx, .sbn, .prj, .cpg, wordpad	COB

REPORTS	SOURCE/REFERENCE	FORMAT
1985 RBG BIOLOGICAL RESOURCE INVENTORY (up to Section 2.2.3)	RBG	pdf
20 Year Trends in Water Quality: Coots Paradise and Grindstone Creek Marsh	RBG	pdf
2009_parks_recreation_and_culture_master_plan	COB	pdf
2018 Environmental Review of Hendrie Valley	RBG	pdf
805-00-00-01-SW-Grindstone_Creek_Stream_Restoration_Class_EA	COB	pdf
805-00-00-02-SW-Grindstone_Creek_Stream_Restoration_Class_EA	COB	pdf
805-00-07-SW-Grindstone_Creek_Restoration	COB	pdf
AmericanColumboSSP_Draft	RBG	docx
An Invasive Plant Strategy for Royal Botanical Gardens' Terrestrial Lands 2016	RBG	pdf
CTS_Report_Sept2015_FullPDF_05Nov2015	COB	pdf
ELC Grindstone Marsh 2013	RBG	pdf
Hendrie Valley Molluscs	RBG	docx
Hendrie Valley Ponds Report 2001	RBG	docx
Historical Snake Road Chinquapin Slope Habitat Recovery Project	OMNR	docx
Management Plan for Common Buckthorn: Rhamnus cathartica at Royal Botanical Gardens	RBG	pdf
Management Plan for Ornamental Honeysuckles Loncicera spp. At Royal Botanical Gardens	RBG	pdf
OspreyMarsh2004	RBG	pdf
ProjectParadise 2016	RBG	pdf
RBG Grindstone Heritage Lands – RBG concerns-DRAFT	RBG	docx

REPORTS	SOURCE/REFERENCE	FORMAT
RBG_Lilliput_OMNRF-SAR-Funding	RBG	pdf
SimserLen 1990 Management Plan for Wildlife Sanctuaries RBG	RBG	pdf
Small Mammal Report RBG 1985	RBG	pdf
Tributary monitoring 08-09	RBG	pdf
Turtles of RBG confidential version Site Specific Recovery Plan	RBG	pdf
Water Quality in the Conservation Halton Watershed - 1964-2014	CH	pdf
Wetland Restoration Plan RBG 2016-2021	RBG	pdf
Wildlife Feeding in Hendrie Valley	RBG	pdf

MAPS	SOURCE
D70323-Attachment -Hidden Valley Park- Key Plan	COB
Hendrie design map – 1945	RBG
Hendrie valley species of concern	RBG
HIDDEN_VALLEY_PARK-PROPOSED_POOL_LOCATION (1)	COB
Parkland 1965	Cecilia Paine, University of Guelph

Excel Data	SOURCE
BioBlitz Data	RBG
C2E Fish and mussel information	CH
CHBIS-HiddenValleyParkC2EQuery	CH
Flora checklist for HV	RBG
Hendrie Valley- Bird Count Records	RBG
Hendrie Valley Bird Records	RBG
Hendrie Valley-Forest Monitoring Data	RBG
Ode and Lep records for HV	RBG
RBG Herps	RBG

Other	SOURCE
Background Documents	COB
COB_Background Documents	COB
Description of Valley Farm buildings land for sale 1908	RBG
Fish_occurrence_ch	CH
Lower Grindstone CH Data Request	Cecilia Paine, University of Guelph
RBG Grindstone Heritage Lands - RBG concerns - DRAFT	RBG

Photos	SOURCE
IMG_2441	Cecilia Paine, University of Guelph
LSHRP - 00151 Photos	N/A
PAVILLION PLAQUE	Cecilia Paine, University of Guelph
Press Photo of Aldershot Community Council 1958	Cecilia Paine, University of Guelph

Appendix 2: Planning Characterization

Appendix 2. Lower Grindstone Heritage Lands Planning Characterization Matrix

PROPERTY NAME	OWNERSHIP	CURRENT LANDUSE	AREA (ha)	Conservation Authority	PROVINCIAL		CITY OF BURLINGTON OFFICIAL PLAN		
					NEP/GREENBELT	NEC DEV CONTROL REG	PLAN	LANDUSE DESIGNATION	ZONING
Hidden Valley Park 1	City of Burlington	Forest, cultural meadow, creek	8.72	Conservation Halton	Greenbelt (Urban River Valley)	no	Burlington OP	Major Parks and Open Space	By-law 2020 (Open Space O3)
Hidden Valley Park 2	City of Burlington	Manicured recreation, sports facilities, amenities, creek	5.06	Conservation Halton	Greenbelt (Urban River Valley)	no	Burlington OP	Major Parks and Open Space; Environmentally Sensitive Area	By-law 2020 (Community Park PC)
Hidden Valley Park 3	City of Burlington	Forest	3.69	Conservation Halton	Greenbelt (Urban River Valley)	no	Burlington OP	Major Parks and Open Space; Environmentally Sensitive Area	By-law 2020 (Community Park PC)
Hidden Valley Park 4	City of Burlington	Forest	24.58	Conservation Halton	Greenbelt (Urban River Valley)	no	Burlington OP	Major Parks and Open Space	By-law 2020 (Open Space O3)
Lower Grindstone 1	City of Burlington / RBG	Forest, cultural meadow	38.88	Conservation Halton	Greenbelt (Urban River Valley)	no	Burlington OP	Greenlands (partial); Watercourse (partial); Environmentally Sensitive Area (partial)	By-law 2020 (Neighborhood Park P, Open Space O1, Open Space O2, Open Space O3)
Lower Grindstone 2	City of Burlington / RBG	Forest, isolated meadow/meadow marshes/swamps	19.48	Conservation Halton	Greenbelt (Urban River Valley)	no	Burlington OP	Greenlands; Environmentally Sensitive Area	By-law 2020 (Open Space O1)
Lower Grindstone 3	RBG	Forest, shallow aquatic, pockets of meadow marsh and meadow	17.47	Conservation Halton	Greenbelt (Urban River Valley)	no	Burlington OP	Greenlands; Environmentally Sensitive Area	By-law 2020 (Open Space O1)
Lower Grindstone 4	RBG	Manicured gardens, amenities, parking, grass	3.04	Conservation Halton	Greenbelt (Urban River Valley)	no	Burlington OP	Greenlands	By-law 2020 (Open Space O1)
Lower Grindstone 5	RBG	Manicured gardens, grass, forest, amenities	10.41	Conservation Halton	Greenbelt (Urban River Valley)	no	Burlington OP	Greenlands; Environmentally Sensitive Area	By-law 2020 (Open Space O1)
Lower Grindstone 6	RBG	Open water, marshes	1.97	Conservation Halton	Greenbelt (Urban River Valley)	no	Burlington OP	Greenlands; Environmentally Sensitive Area	By-law 2020 (Open Space O1)

PROPERTY NAME	OWNERSHIP	CURRENT LANDUSE	AREA (ha)	Conservation Authority	PROVINCIAL		CITY OF BURLINGTON OFFICIAL PLAN		
					NEP/GREENBELT	NEC DEV CONTROL REG	PLAN	LANDUSE DESIGNATION	ZONING
Lower Grindstone 7	RBG	Forest, meadow marsh, cultural thicket	0.31	Conservation Halton	Greenbelt (Urban River Valley)	no	Burlington OP	Greenlands; Environmentally Sensitive Area	By-law 2020 (Open Space O1)
Works Yard	RBG	Gravel, staging grounds	14.71	Conservation Halton	Greenbelt (Urban River Valley)	no	Burlington OP	Greenlands; Environmentally Sensitive Area	By-law 2020 (Open Space 01)

Appendix 2. Detailed Planning Policy and Regulatory Framework

1. Planning Policy

Within the Greater Golden Horseshoe, the Provincial Policy Statement, several Provincial Plans and municipal Official Plans work together to manage growth, protect the environment and support economic development.

Provincial Policy Statement 2014

The Provincial Policy Statement came into effect on April 30, 2014 and applies Province-wide. The Policy Statement provides direction on matters of Provincial interest related to land use planning and development and is a key part of the Provincial policy-led planning system. All land use decisions must be consistent with the Policy Statement.

In specific geographic areas, Provincial plans build upon the policy foundation provided by the Policy Statement in order to address issues unique to these areas. Provincial plans are to be read together with the Policy Statement but where they apply, take precedence over the Policy Statement to the extent of any conflict except in those instances where relevant legislation provides otherwise. Where Provincial Plans apply, all land use decisions must conform to or at least not conflict with the Plans.

The Provincial Policy Statement is divided into three broad categories of guidance; Building Strong (and) Healthy Communities, Wise Use and Management of Resources, and Protecting Public Health and Safety. The Policy Statement focuses growth and development into urban and rural settlement areas while supporting the viability of rural areas. The Policy Statement recognizes that land use must be carefully managed to achieve appropriate and efficient development while avoiding, and protecting significant or sensitive resources, and areas which may pose risk to public health and safety.

As management plans are prepared and implemented for the Heritage Lands, it is important to ensure that the plans are consistent with the Policy Statement.

Growth Plan for the Greater Golden Horseshoe 2019

A Place to Grow: Growth Plan for the Greater Golden Horseshoe came into effect on May 16, 2019. The original 2006 Growth Plan provided a framework for implementing the Provincial vision for stronger, prosperous communities by managing urban growth in Greater Golden Horseshoe region. Since then, the region has experienced a shift to compact development patterns, mixed use development in growth centers and better integration of transit, and land use planning. A Place to Grow 2019 builds upon the success of the original Growth Plan by responding with enhanced policy direction to challenges the region will continue to face in the future.

A Place to Grow must be read together with the other Provincial plans that may apply; on the Lower Grindstone Heritage Lands, this includes the Greenbelt Plan 2017 and the Parkway Belt West Plan 1978. These plans apply in defined areas and provide specific policy on certain matters.

On Schedule 2: A Place to Grow Concept, the south Aldershot area of Burlington is identified as a "Built-up Area" outside of the Greenbelt Area while the adjacent corridor of the CN railway and Highway 403 is identified as "Existing Higher Order Transit". The Built-up Area designation relates generally to policy directions for urban growth and intensification targets in suitable developable areas. Higher Order Transit generally refers to transit operating in partially or completely dedicated rights-of-way which can achieve speed and reliability greater than transit in mixed traffic.

On May 2, 2019, the Province released Environmental Registry decision 013-4506 with respect to the designation of Provincially Significant Employment Areas under A Place to Grow. The general intent is to allow greater flexibility to municipalities to change the use of employment lands to other uses while protecting key employment areas for the future. Based on mapping set out on the Ministry of Municipal Affairs and Housing website https://ero.ontario.ca/notice/013-4506#decision-details, it appears that management unit Hidden Valley Park 4 has been included in the significant employment lands designation. The Ministry website advises that during the consultation period in early 2019, the designated lands were revised based on municipal feedback and that revisions will continue to be considered. The designation of Hidden Valley Park 4 as significant employment lands at the Provincial level appears to be a mapping error and should be reviewed given the inclusion of these lands in the Lower Grindstone Heritage Lands.

A Place to Grow sets out policies for the Natural Heritage System for the Growth Plan as mapped by the Province. Policy 4.2.2.1 states that the Natural Heritage System for the Growth Plan excludes lands within settlement area boundaries that were approved and in effect as of July 1, 2017. As the Lower Grindstone Heritage Lands are within the Urban Area boundary of the City of Burlington as designated in the City Official Plan approved by the Region of Halton March 5, 1997, the policies for the Natural Heritage System for the Growth Plan do not apply.

However, there are environmental, open space and other policies of general application in A Place to Grow some of which are summarized as follows:

- Upper tier municipalities together with lower tier municipalities and conservation authorities will partner to ensure that watershed planning is undertaken to support the protection and enhancement or restoration of water quality and quantity in watersheds
- Water resource systems will be identified to provide for the long-term protection of key hydrologic features and key hydrologic areas, and their functions
- *Beyond the Natural Heritage System for the Growth Plan*, within settlement areas, municipalities will continue to protect natural heritage features and areas, and may continue to protect any other natural heritage system or identify new systems all in a manner consistent with the Provincial Policy Statement
- Municipalities, conservation authorities, NGO's and other interested parties are encouraged to develop publicly accessible parkland, open space and trails that clearly demarcate where public access is and is not permitted, and that are based on a coordinated approach to trail planning, and good land stewardship practices
- Within settlement areas, municipalities are encouraged to develop open space to meet a wide range of opportunities.

Additional policies not repeated here address such matters as heritage conservation, climate change and a culture of conservation.

Greenbelt Plan 2017

As amended through the Coordinated Provincial Plan Review, the updated Greenbelt Plan became effective on July 1, 2017. The Greenbelt Plan complements the Growth Plan for the Greater Golden Horseshoe 2019 which manages and guides urban growth. Where it applies, the Greenbelt Plan provides permanent agricultural and environmental protection in areas where urban growth is not intended to occur.

The Lower Grindstone Heritage Lands are located entirely outside of the Greenbelt Area as identified on the schedules to the Greenbelt Plan. However, the amended Greenbelt Plan designates and sets out policies for certain urban river valleys outside of the Greenbelt Area. The Lower Grindstone Creek between Highway 403 and the outlet marsh at Spring Gardens Road is one such designated "Urban River Valley" in the Plan.

The intent of the designation is to integrate the greenbelt into urban areas that were not a part of the original 2006 Greenbelt Plan by promoting the following within designated Urban River Valleys:

- Protection of natural and open space lands along urban river valleys that link the Greenbelt Area to Lake Ontario
- Protection of natural heritage and hydrologic features, and functions along urban river valleys including coastal wetlands
- Conservation of cultural heritage resources
- Provision of gateways to the rural landscape of the greenbelt, and
- Provision of a range of natural settings on publicly owned lands for recreation, culture and tourism uses needed to support urban uses

The designation applies to the main river valley and associated lands characterized by natural and hydrologic features, and lands designated in municipal Official Plans for such uses as parks, open space, recreation, conservation and environmental protection. Based on physical characteristics and current City of Burlington Official Plan land use designations, the "Urban River Valley" designation appears to encompass all of the Lower Grindstone Heritage Lands, including Lower Grindstone 4 and the Works Yard.

The policies of the" Urban River Valley" designation apply only to publicly owned lands including lands of the Province, a municipality, a local board including the conservation authority. As a creature of Provincial legislation, it is understood that RBG lands are included. The policies provide that the uses of these lands are governed by applicable municipal Official Plan policies that have regard to the Greenbelt Plan objectives. Existing, expanded and new infrastructure which is subject to or approved under the Environmental Assessment Act or similar approval is permitted provided it supports the needs of the adjacent urban area or serves the growth and economic development expected in Southern Ontario, and supports the goals and objectives of the Greenbelt Plan. The Protected Countryside policies of the Greenbelt Plan do not apply to designated "Urban River Valleys" except the policies of sections 3.2.6 and 3.3.

Section 3.2.6 addresses all external connections to the Greenbelt including designated "Urban River Valleys". The general intent is to encourage decision authorities to consider how activities and land use changes within and adjacent to the Greenbelt affect these external connections and river

valleys, and to promote planning and design towards maintaining and enhancing these areas. In recognition of the function of river valleys in contributing to long term health of the natural environment, decision authorities are encouraged to:

- Continue stewardship, remediation and park initiatives which maintain and where possible, enhance ecological features and functions in these areas,
- In considering land conversions and redevelopments in or abutting urban river valleys, strive to establish or increase vegetation protection zones in natural self-sustaining vegetation especially in the most ecologically sensitive areas , increase or improve fish habitat, include landscaping and habitat restoration, and seek to avoid, and minimize or mitigate the impacts of urban runoff water quality and quantity on valley systems, and
- Integrate watershed planning and management approaches taking into account the goal of improving and restoring the Great Lakes.

Section 3.3 outlines policies for Parkland, Open Space and Trails in order to provide opportunities for recreation, tourism and natural, and cultural heritage appreciation. In partnership with land-owning agencies and other parties, the intent is to encourage a system of publicly accessible open space, to promote a coordinated approach to the trail planning and to promote good stewardship practices for public lands and publicly accessible private lands in the Greenbelt system of open space. The policies speak to the municipal role in providing a full range of built and natural settings for public recreation, and considerations for municipal park planning, open space and trail strategies. These policies also recognize Provincial and Conservation Authority lands as important components of the system of open space and park lands.

Parkway Belt West Plan 1978

The Parkway Belt West Plan was implemented on July 19, 1978 to establish a multi-purpose utility corridor, urban separator and open space system, and to preserve prominent natural features. Since 1978, successive amendments to the Plan have reduced the affected lands such that the primary effect today of the Plan is to designate and protect land needed for linear regional infrastructure such as transit, utility and electric power corridors. In the City of Burlington, the Plan continues to include Grindstone Creek valley as a prominent natural feature.

The Parkway Belt West Plan continues to apply and designates as “Public Open Space and Buffer Area” all of the Lower Grindstone Heritage Lands except portions of Lower Grindstone 1 and 2 between Sandcherry Drive and the Beth Jacob Cemetery. These natural lands were removed from the Parkway Belt West by Amendment 95 in conjunction with the development approvals for the Sandcherry Drive residential subdivision (Garden Trails Development).
The permitted uses in the “Public Open Space and Buffer Area” are limited to existing uses, linear facilities for transportation, communication and utilities, public open space and buffers, related incidental uses, other open space uses provided that they are available to the public and other (unanticipated) public uses. These use permissions are subject to criteria with the intent of protecting natural features, maintaining open space character and minimizing building height, bulk and coverage.

The Parkway Belt West Plan is implemented by the Regional Official Plan, City Official Plan and Zoning By-laws, and Parkway Belt Land Use regulation (Minister’s Zoning Order).

Region of Halton Official Plan (2018 Office Consolidation)

The Regional Official Plan was approved in November 1995 and subsequently amended through two major reviews known as Amendment 25 (2006) and Amendment 38 –Sustainable Halton (2017). The June 19, 2018 Office Consolidation is the current Regional Official Plan which incorporates all modifications, subsequent approvals and approved amendments up to and including this consolidation date.

The Regional Official Plan must be updated every 10 years to reflect changes in the community and the vision for the Region, and to ensure conformity with current Provincial Land use policy. The current Regional Official Plan Review was initiated in 2015 with the objective of adoption of an updated Plan in 2020. The Regional Official Plan Review will focus on rural and agricultural policy, natural heritage policy, growth management, and climate change adaptation.

On the Lower Grindstone Heritage Lands, the general intent of the current Regional Official Plan is to implement the requirements of the Provincial Policy statement, the Greenbelt Plan, the Parkway Belt West Plan, natural heritage and open space considerations, and local land use objectives.

On Map 1-Regional Structure to the Regional Official Plan, the Heritage Lands are located within the Built Boundary of the Burlington urban area and designated as "Regional Natural Heritage System " except Hidden Valley Park 2 and Lower Grindstone 4 south of Plains Road West (RBG Headquarters) are designated as "Urban Area" given the developed condition of these areas. On Map 1G- Key Features within the Greenbelt and Regional Natural Heritage System, the same Regional Natural Heritage lands shown on Map 1 are designated as a "Key Feature". On Map 1 and Map 1A-Provincial Plan Areas and Land Use Designations, the jurisdiction of the Parkway Belt West Plan on the Heritage Lands is recognized, where it exists. On Map 1 and Map 1C-Future Strategic Employment Areas, the industrial lands along Howard Road and Sumach Drive adjacent to the Heritage Lands are designated as "Employment Area", all other adjacent residential neighbourhoods are designated as "Urban Area" on Map 1.

Within the "Urban Area" designation, the range of permitted uses and lot creation is determined by the local Official Plan and Zoning By-laws; all development is to proceed on full municipal services. The "Employment Area" designation is an overlay on top of the "Urban area" designation. The intent is to protect and preserve employment areas for current and future use by prohibiting residential, and other non-employment uses, including major retail uses with certain local exceptions. The Plan recognizes that development within the Parkway Belt West Plan area is subject to the Provincial plan and applicable land use regulations (Minister's Zoning Order).

The "Regional Natural Heritage System" designation consists of the area identified on Map1 together with the Burlington Bay/Lake Ontario shoreline and significant habitat of endangered, and threatened species. The System components include key features and relate enhancements, linkages, buffers, regulated watercourses and floodplains, and wetlands. Key Features are significant habitat of endangered and threatened species, wetlands, coastal wetlands, woodlands, valleylands, wildlife habitat, ANSI's and fish habitat. The purpose of the Key Features is to assist the implementation of the Regional Natural Heritage System policies for permitted uses and Environmental Impact Assessment (EIA) preparation. A partial list of permitted uses in the "Regional Natural Heritage System" designation includes existing uses, non-intensive recreational

uses only on publicly owned lands, forestry, fish and wildlife management, archaeology, essential transportation and utility facilities, accessory building or structures , incidental uses and essential flood, and erosion control projects carried out or supervised by public authority.

The intent of the Regional Plan is to not permit any alteration of any components of the "Regional Natural Heritage System" unless it has been demonstrated that there will be no negative impact of the natural features and areas, and their ecological functions. For any development or site alteration including public works that are located wholly or partially within 120m of the "Regional Natural Heritage System", an EIA is required unless:

- the proponent can demonstrate that the proposal is minor in scale and/or nature and does not warrant an EIA,
- it is a use conforming to the local Official Plan and permitted by local Zoning By-laws,
- it is a use requiring only an amendment to the local Zoning By-laws and is exempt from the EIA requirement by the local Official Plan or exempt or modified by specific polies of the Regional Plan

The Regional Plan also encourages the development of trails within the "Regional Natural Heritage System" on publicly owned lands provided that the trails and related activities do not impact negatively on ecologically sensitive areas, proper consideration is given to issues of trespass and adjacent private landowners are consulted.

Finally, the Regional Plan requires that local Zoning By-laws prohibit new construction and expansion or replacement of existing non-conforming uses on hazard lands unless specifically exempted and to impose setbacks for development from regulated floodplains depending on the nature of the hazard.

City of Burlington Official Plan (2017 Office Consolidation)

The City Official Plan was approved in July 1994 and subsequently amended through a major review known as Amendment 55 (2006) and various general, and site-specific amendments. The October 2017 Office Consolidation is the current City Official Plan which incorporates all modifications, subsequent approvals and approved amendments up to and including the consolidation date.

On April 27, 2018, City Council adopted a proposed new Official Plan which had been developed over the course of several years to address the challenges and opportunities faced by the City as it continues to grow, and to bring the City Official Plan into conformity with Provincial and Regional planning policy. As approval authority, the Region of Halton in December 2018 identified several areas of non-conformity in the adopted Official Plan which require additional review and revision before consideration of the Plan for approval. In addition, City Council in February 2019 instructed that no weight be given to the adopted Official Plan and further directed that a new staff review, and public engagement process be undertaken to consider potential modifications to the adopted Official Plan. In these circumstances, the designations and policies of the adopted City Official Plan are not reported here.

The land use designations and policies of the current City Official Plan as they affect the Heritage Lands implement previous versions of the Provincial Policy Statement, the Regional Official Plan, the

Parkway Belt West Plan and local planning objectives. The intent is to protect the natural features, functions and open space of the Heritage Lands, and to recognize the active recreation use of the Hidden Valley Park lands, and the scientific, cultural, educational and administrative functions of the RBG Headquarters.

The approved City Official Plan consists of land use policies specific to land use designations and functional policies which apply City-wide regardless of land use designation. The discussion which follows is specific to land use designation and policies.

On Schedule A-Settlement Pattern, the Lower Grindstone Heritage Lands are located within the Urban Planning Area Boundary and identified as "Natural Features/Open Space" with adjacent "Residential Areas" and "Employment Areas" as described previously.
On Schedule B-Comprehensive Land Use Plan-Urban Planning Area, the Heritage Lands are identified as within the Parkway Belt West Plan Area and designated as follows:

- Major Parks and Open Space Hidden Valley Park 1, 2, 3 and 4
- Greenlands Lower Grindstone 2, 3, 4, 5, 6, 7, Works Yard, and Portions of Lower Grindstone 1
- Watercourse Portions of Lower Grindstone 1 west of Sandcherry Drive
- Environmentally Sensitive Area overlay Hidden Valley Park 2 and 3 Lower Grindstone 2, 3, 5, 6, 7, Works Yard, and Portions of Lower Grindstone 1

Similar to the Parkway Belt Plan West, the portions of Lower Grindstone 1 excluded from the "Greenlands" designation and "Environmentally Sensitive Area" overlay designation are the watercourse and small undeveloped tablelands between Sandcherry Drive and the Beth Jacob Cemetery (Garden Trails Development).

Adjacent residential neighbourhoods are designated "Residential-Low Density" and "Residential Medium Density". Adjacent industrial areas on Howard Road and Sumach Drive are designated as "General Employment" and on Plains Road West, as "Mixed Use Corridor-General". A designated area of "Neighbourhood Commercial" is located on the south side of Plains Road West and Botanical Drive, opposite the Hendrie Park entrance.

According to the City Official Plan, the "Greenlands" and "Major Parks and Open Space" land use designations within the current Parkway Belt West Plan area are deferred and have no status. For the affected areas on the Heritage Lands, the operative City land use designation are those contained in the City Official Plan 1971 which recognizes the jurisdiction of the Parkway Belt West Plan, 1978. As a practical matter, the two deferred land use designations reflect the general intent of the Parkway Belt.

The intent of the "Greenlands" designation is to preserve and protect significant natural and cultural heritage features, landforms which perform biological and ecological functions, and areas providing non-intensive recreation. The permitted uses in the "Greenlands" designation are similar to those permitted in the "Regional Natural Heritage System" including existing uses. Non-intensive recreation uses are permitted only where natural features are preserved to the maximum possible degree, buildings and structures are minor in scale and there is no, or minimal parking provided on-site. No development is permitted in Provincially Significant wetlands and regulatory floodplains, in

the case of the latter, unless approved by the Conservation Authority. Any development within the "Greenlands" designation which would adversely affect the environment may require an Environmental Evaluation Report, prepared in accordance with City Official Plan requirements. "Environmentally Sensitive Areas" (ESA) are identified by the overlay designation based on the 2006 Regional Official Plan ESA's. Alteration of physical and biological features is restricted and any development, including public works, inside and within 50m of an ESA must prepare an Environmental Evaluation Report. Alteration of conditions or land use that may affect an ESA will be subject to the approval of the appropriate authority based on site plan details and implementing agreements.

The intent of the" Major Parks and Open Space" designation is to identify and recognize City level parks and Community level parks (as distinct from minor level parks). The permitted land uses include municipal parks and related community facilities, golf courses and related facilities, and outdoor recreation facilities. In park design and development, connections between parks and neighbourhoods will be promoted together with a high priority placed on environmental protection, public safety, public access and high visibility into parks from adjacent streets.

The intent of the "Watercourse" designation is to ensure protection of life and property in floodplain areas, to minimize the impacts of flooding and to promote a net gain in fish habitat. Development on designated "Watercourses" is prohibited and permitted land uses are limited to non-intensive outdoor recreation, essential public utilities and services, flood and erosion control facilities, and watershed management works. In general, new development adjacent to "Watercourses" shall be subject setbacks from the stable top of bank, the floodplain or meander belt width as determined by the Conservation Authority. Given that the designated "Watercourse" on Lower Grindstone 1 was acquired through the development approval for the Sandcherry Drive neighborhood and is now publicly owned, the intent of these "Watercourse" policies has been met.

PLANNING REGULATION

Parkway Belt Land Use Regulation 482/73 (Minister's Zoning Order)
Parkway Belt Land Use Regulation 482/73 was established in 1973 to control development within the Parkway Belt West Planning Area in the City of Burlington pending preparation, approval and implementation of the Parkway Belt West Plan. It is understood that the regulation has been amended so as to apply only to the area recognized in the City Official Plan as subject to the Parkway Belt West Plan Area. As such, the following Heritage Lands are subject to the regulation:

- Hidden Valley Park 1, 2, 3 and 4
- Lower Grindstone 3, 4, 5, 6 and 7, and
- Portions of Lower Grindstone 1 and 2

Portions of Lower Grindstone 1 and 2 are unaffected by the regulation because these lands were part of the Sandcherry Drive subdivision Planning Act approvals where the regulation was revoked concurrent with the removal of these lands from the Parkway Belt West Plan by Amendment 95 (Garden Trails Development).

Parkway Belt Land Use Regulation 482/73 co-exists with the local Zoning Bylaws such that the more restrictive prevails.

The regulation recognizes uses that existed lawfully before the regulation came into effect (August 4, 1973) and prohibits all other uses except agricultural uses, and accessory building and structures.

A key regulation states that the City of Burlington and any Provincial or Federal ministry, department or agency, telephone company, Hydro One, gas company holding franchise in Burlington, and Conservation Halton may use land or erect a building or structure for the purpose of providing a service to the public. The phrase "providing a service to the public" is not defined in the regulation.

At the time of any development on the Heritage Lands, it is important to consult with the City to determine how the regulation applies and whether a regulation amendment is needed given that the regulation is more restrictive than the Zoning By-law.

City of Burlington Zoning By-law 2020

City of Burlington Zoning By-law 2020 was passed by City Council on June 21, 1999 for the purpose of implementing the approved City Official Plan.

Under Zoning Bylaw 2020, the Heritage Lands are zoned as follows:

- Hidden Valley Park 1 and 4 – Open Space O3
- Hidden Valley Park 2 and 3 – Community Park PC zone
- Lower Grindstone 1 – Neighbourhood Park P zone, Open Space O1 zone, Open Space O2 zone and Open Space O3 zone
- Lower Grindstone 2, 3, 4, 5, 6, 7 and Works Yard– Open Space O1

The multiple zones on Lower Grindstone 1 were established at the time of the Sandcherry Drive residential subdivision approval when these lands were removed from the Parkway Belt West Plan by Amendment 95 and the Parkway Belt Land Use Regulation (Garden Trails Development).

Most of these zones reflect the longstanding public ownership and use of these lands, the constraints to development and limitations on servicing. The park and open space zone hierarchy ranges from active use recreation parks with built forms to passive use, natural parks.

The permitted uses in the Community Park PC zone are Community level and City level parks, and recreation facilities, cultural heritage resources and festive, cultural and ceremonial uses. Regulations set out required yards, landscape areas and buffers and importantly, the maximum accessory commercial floor area.

The permitted uses in the Neighbourhood Park P zone are Neighbourhood level parks and parkettes, outdoor community and recreation facilities, cultural heritage resources, and special heritage resources.

The permitted uses in the Open Space O1 zone are municipal parks, public private open space, golf courses and associated uses such as curling clubs, tennis clubs, arena, gymnasia and swimming pools, cultural heritage resources, stormwater management and erosion control facilities, cemeteries and crematoria. Regulations set out yard, landscape area and buffer requirements.

The permitted uses in the Open Space O2 zone are municipal parks and public open space, stormwater management and erosion control facilities, public utilities and services, cultural heritage resources and non-intensive outdoor recreation such as trails.

The permitted uses in the Open Space O1 zone are municipal and Provincial parks, public and private open space, cultural heritage resources, archaeological restoration, trails, forestry, fish and wildlife management, transportation and utilities, agriculture except within a woodlot and stormwater management and erosion control facilities excluding permanent detention ponds.

Common to all of these park and open space zones are regulations permitting principal use and accessory use buildings, and regulations requiring a 30m setback from a railway right of way for public assembly buildings.

All permitted uses are subject to the Part 1: General Conditions and Provisions of the Zoning By-law and may be subject to site plan control.

Part 1: General Conditions and Provisions section of the Zoning By-law sets out an important regulation for public authority. Except for Part 1, Subsection 2.25 (Off-Street Parking and Loading Requirements) and Part 1, Subsection 2.26 (General Parking Provisions), the regulations of the Zoning By-law do not apply to public authority in any zone except the Open Space O2 and O3 zones and the uses and provisions of Part 1, Subsection 2.21 (Uses Permitted in all Zones). Part 16 defines "public authority" as "Federal or Provincial bodies, the Regional Municipality of Halton, the City of Burlington and includes any commission, board, authority or department established by or for any of them …." Through the site plan approval for the Camila and Peter Dalglish Atrium and related improvements at the RBG Headquarters, it was established with the City of Burlington that this public authority provision of the Zoning By-law applies to RBG.

Conservation Authority Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Regulations

The Heritage Lands are located within the watershed jurisdictions of Conservation Halton.

Conservation Halton administers Development, Interference with Wetland and Alteration to Shorelines, and Watercourses regulations made under the Conservation Authorities Act s.28, specifically Ontario Regulation 162/06. Except for the table lands of Lower Grindstone 4, small tableland areas on Lower Grindstone 1 as well as Hidden Valley Park 1 and 4, the Heritage lands are subject to the regulations. Generally, the regulations do not permit development or site alteration within natural hazard limits defined as follows:

- The regulatory storm floodplain plus 15m,
- On confined watercourses, the stable top of bank plus 15m
- On unconfined watercourses, the predicted meander belt plus 15m
- Provincially Significant Wetlands plus 120m, and
- All other wetlands plus 30m

The regulations are administered based on guidelines which reflect local watershed conditions and objectives, and account for circumstances such as existing land uses and development, additions

and accessory structures, and public uses. Permits are required for any building, structure or site alteration within all regulated areas, unless exempted.

3. Additional Natural Heritage Legislation and Policy

Federal Legislation

Federal Fisheries Act
The Federal Fisheries Act contains two key provisions on conservation and protection of fish habitat essential to sustaining freshwater and marine fish species. The Department of Fisheries and Oceans administers section 35, the key habitat protection provision, prohibiting any work or undertaking that would cause the harmful alteration, disruption or destruction of fish habitat. Environment and Climate Change Canada administers section 36, the key pollution prevention provision, prohibiting the deposit of deleterious substances into waters frequented by fish, unless authorized by regulations under the Fisheries Act or other federal legislation. A deleterious substance can be any substance that, if added to any water, would degrade or alter its quality such that it could be harmful to fish, fish habitat or the use of fish by people.

Aquatic Invasive Species Act
Under the Fisheries Act, the Aquatic Invasive Species Act prohibits the import, transport, possession and/or release of priority invasive species, including Asian carps and Zebra Mussels.

Federal Canadian Environmental Assessment Act
The Canadian Environmental Assessment Act, S.C. 1992, c. 37 (CEAA) is an Act of Parliament that was passed by the Government of Canada in 1992. The Act requires federal departments, including Environment Canada, agencies, and Crown corporations to conduct environmental assessments for proposed projects where the federal government is the proponent or where the project involves federal funding, permits, or licensing. The purposes of the Act were set out as follows: (1) to achieve sustainable development that conserves environmental quality by integrating environmental factors into the planning and decision-making process; (2) exercise leadership within Canada and internationally; and (3) to provide access to information and to facilitate public participation.

Migratory Birds Convention Act (1994)
Most species of birds in Canada are protected under the Migratory Birds Convention Act through the Migratory Birds Regulations and the Migratory Birds Sanctuary Guidelines. These policies and regulations ensure the protection of listed migratory bird species, their nests, eggs and offspring.

Species at Risk Act (2002)
Enacted in 2002, the Species at Risk Act (SARA) provides legal protection for federally listed Species at Risk (i.e., listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)) on federal lands. The Act helps to protect sensitive species from becoming extinct by securing actions for their recovery.

Provincial Legislation

Ontario Endangered Species Act (2007)

This legislation provides science-based assessment whereby species are assessed by an independent body based on the best-available science and Aboriginal Traditional Knowledge. Species classified as endangered or threatened automatically receive legal protection. Furthermore, when a species is classified as endangered or threatened, its habitat is also protected. This legislation sets out timelines in the law for producing strategies and plans to recover at-risk species, tools to help reduce the impact of human activity on species and their habitats, and tools to encourage protection and recovery activities.

Ontario Invasive Species Act (2015)
The Ontario Invasive Species Act aims to prevent invasive species (defined as species that are non-native to Ontario and is harming the natural environment or is likely to harm the natural environment) from entering or spreading within the province. Prohibited and restricted species include those that have not yet been established in Ontario but are predicted to have a strong negative influence if they are introduced or species which are already established in Ontario.

Ontario Fisheries Regulation (2007)
The Ontario Fisheries Regulation prohibits the possession, transport or release of invasive species.

Ontario Environmental Assessment Act (1990)
The Environmental Assessment Act (and amendments and regulations thereto) is a provincial statute that sets out a planning and decision-making process to evaluate the potential environmental effects of a proposed undertaking. Proponents wishing to proceed with an undertaking must document their planning and decision-making process and submit the results from their environmental assessment to the Minister for approval.

Ontario Conservation Authorities Act (1990)
The Conservation Authorities Act was created by the Ontario Provincial Legislature in 1946 to ensure the conservation, restoration and responsible management of hydrological features through programs that balance human, environmental and economic needs. The Act authorizes the formation of conservation authorities. The Conservation Authorities implement regulations associated with some natural heritage features as described in section 3.2.3 above.

Ontario Lakes and Rivers Improvement Act (1990)
The purposes of the Lakes and Rivers Improvement Act are to provide for: (a) the management, protection, preservation and use of the waters of the lakes and rivers of Ontario and the land under them; (b) the protection and equitable exercise of public rights in or over the waters of the lakes and rivers of Ontario; (c) the protection of the interests of riparian owners; (d) the management, perpetuation and use of the fish, wildlife, and other natural resources dependent on the lakes and rivers; (e) the protection of the natural amenities of the lakes and rivers and their shores and banks; and (f) the protection of persons and of property by ensuring that dams are suitably located, constructed, operated and maintained and are of an appropriate nature.

Ontario Clean Water Act (2006)
The Ontario government passed the Clean Water Act in 2006 to implement some of the recommendations of the Walkerton Inquiry. The Clean Water Act ensures communities protect their drinking water supplies through prevention by developing collaborative, watershed-based source protection plans that are locally driven and based on science. The Act established source

protection areas and source protection regions. It also created a local multi-stakeholder source protection committee for each area. The committees identify significant existing and future risks to their municipal drinking water sources and develop plans to address these risks.

Provincial Plans and Strategies

Ontario Biodiversity Strategy (2005)
This strategy was developed to protect and conserve Ontario's biodiversity. This goal is achieved through a variety of measurable, time-bound targets. Partnerships between government, private landowners, academic institutions, non-governmental agencies, industrial sectors, urban and rural communities, and Aboriginal communities is key to the success of the protection and sustainable use of biological assets. To ensure sustainable use, the Ontario Biodiversity Strategy uses the concept of "sustainable use: the use of components of biodiversity in a way and at a rate that does not lead to their long-term decline, thereby maintaining the potential for future generations to meet their needs and aspirations" (OMNR 2005).

Ontario Invasive Species Strategic Plan (2012)
Invasive species are a growing threat to the economy and environment in Ontario. This plan details the current threats posed by invasive species and highlights work that has been undertaken, identifies gaps in current programs/policies and outlines necessary future actions to meet objectives. This plan also identifies a need for collaboration with other jurisdictions (nationally and internationally) to expand research, monitoring and enforcement.

A Wetland Conservation Strategy for Ontario 2017-2030 (2017)
This Strategy outlines a framework to guide the future of wetland conservation across the province. The intent of the Strategy is to establish a common focus to protect wetlands. Providing both a primer on applicable legislation, regulations, policies, guidelines, programs, and partnerships as well as a clear vision, goals, desired outcomes, and actions that the Ontario governemnt will undertake that will ultimately lead to halting loss and restoring wetlands across the province.

Appendix 3: Natural Heritage Data Gap Analysis

Appendix 3. Lower Grindstone Heritage Lands Natural Heritage Data Gap Analysis

PROPERTY NAME	ANSI	ESA	Wetland	Landcover	ELC	Plants	Birds	Amphibians	Reptiles	Mammals	Fish
Hidden Valley Park 1	No	Grindstone Creek Valley (Halton Region)	No	Forest, cultural meadow, creek	Partial (RBG)	CHBIS - HiddenValleyParkC2EQuery (CH);	Yes	No	Yes CHBIS - HiddenValleyParkC2EQuery (CH);	Yes CHBIS - HiddenValleyParkC2EQuery (CH);	C2E Fish and Mussel Information (CH);
Hidden Valley Park 2	No	Grindstone Creek Valley (Halton Region)	No	Manicured recreation, sports facilities, amenities, creek	Complete (HC)	CHBIS - HiddenValleyParkC2EQuery (CH);	Yes	No	No	Yes CHBIS - HiddenValleyParkC2EQuery (CH);	C2E Fish and Mussel Information (CH);
Hidden Valley Park 3	No	Grindstone Creek Valley (Halton Region)	No	Forest	Complete (RBG)	CHBIS - HiddenValleyParkC2EQuery (CH);	Yes	No	No	Yes CHBIS - HiddenValleyParkC2EQuery (CH);	C2E Fish and Mussel Information (CH);
Hidden Valley Park 4	No	No	No	Forest	No	No	No	no	No	No	C2E Fish and Mussel Information (CH);
Lower Grindstone 1	Hendrie Valley ANSI (MNR) (source: Conservation Halton interactive mapping tool)	Grindstone Creek Valley (Halton Region)	Yes	Forest, cultural meadow	Partial (RBG)	CHBIS - HiddenValleyParkC2EQuery (CH);	No	No	CHBIS - HiddenValleyParkC2EQuery (CH);	No	C2E Fish and Mussel Information (CH);
Lower Grindstone 2	Hendrie Valley ANSI (MNR) (source: Conservation Halton interactive mapping tool)	Grindstone Creek Valley (Halton Region)	Yes Hendrie Valley-Lambs Hollow Wetland (PSW)	Forest, isolated meadow/meadow marshes/swamps	Complete (RBG)	CHBIS - HiddenValleyParkC2EQuery (CH);	Yes	CHBIS - HiddenValleyParkC2EQuery (CH);	CHBIS - HiddenValleyParkC2EQuery (CH);	Yes CHBIS - HiddenValleyParkC2EQuery (CH);	C2E Fish and Mussel Information (CH);
Lower Grindstone 3	Hendrie Valley ANSI (MNR) (source: Conservation Halton interactive mapping tool)	Grindstone Creek Valley (Halton Region)	No	Forest, shallow aquatic, pockets of meadow marsh and meadow	Partial (RBG)	CHBIS - HiddenValleyParkC2EQuery (CH);	Yes	CHBIS - HiddenValleyParkC2EQuery (CH);	CHBIS - HiddenValleyParkC2EQuery (CH);	Yes CHBIS - HiddenValleyParkC2EQuery (CH);	No
Lower Grindstone 4	no	Grindstone Creek Valley (Halton Region)	Yes	Manicured gardens, amenities, parking, grass	no	CHBIS - HiddenValleyParkC2EQuery (CH);	Yes	CHBIS - HiddenValleyParkC2EQuery (CH);	CHBIS - HiddenValleyParkC2EQuery (CH);	Yes CHBIS - HiddenValleyParkC2EQuery (CH);	No

PROPERTY NAME	ANSI	ESA	Wetland	Landcover	ELC	Plants	Birds	Amphibians	Reptiles	Mammals	Fish
Lower Grindstone 5	no	Grindstone Creek Valley (Halton Region)	No	Manicured gardens, grass, forest, amenities	Partial (RBG)	no	No	CHBIS - HiddenValleyParkC2EQuery (CH);	CHBIS - HiddenValleyParkC2EQuery (CH);	no	no
Lower Grindstone 6	Hendrie Valley ANSI (MNR) (source: Conservation Halton interactive mapping tool)	Grindstone Creek Valley (Halton Region)	Hendrie Valley-Lambs Hollow Wetland (PSW)	Open water, marshes	Complete (RBG)	CHBIS - HiddenValleyParkC2EQuery (CH);	Yes	CHBIS - HiddenValleyParkC2EQuery (CH);	CHBIS - HiddenValleyParkC2EQuery (CH);	Yes CHBIS - HiddenValleyParkC2EQuery (CH);	C2E Fish and Mussel Information (CH);
Lower Grindstone 7	Hendrie Valley ANSI (MNR) (source: Conservation Halton interactive mapping tool)	Grindstone Creek Valley (Halton Region)	Yes	Forest, meadow marsh, cultural thicket	Complete (RBG)	No	No	No	No	No	No
Works Yard	No (although partially covered)	Grindstone Creek Valley (Halton Region)	Yes	Gravel, staging grounds	no	No	No	No	Yes (Lindsay Barr, pers. Comm. 2019)	No	no

Appendix 4: Information Gathering Session Participants

Appendix 4. List of Individuals and/or Agencies Consulted in the preparation of the Lower Grindstone Heritage Lands Inventory, Issues and Opportunities Report (to date).

Individuals and/or Agencies Consulted
Aldershot BIA
City of Burlington Historical Society
City of Burlington
Halton Conservation
Royal Botanical Gardens
Ontario Heritage Trust
Ontario Ministry of Natural Resources and Forestry
International Mountain Biking Association (IMBA)
Paul Schnepf - A Local Cycling Advocate

Appendix 5: Flora Species in Lower Grindstone Heritage Lands

Appendix 5. Flora species at Lower Grindstone Heritage Lands.

Family	*Scientific Name*	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Historic Record	Planted
Acoraceae	*Acorus americanus (Raf.) Raf.*	American Sweetflag	No	G5	S4				HR		
Acoraceae	*Acorus calamus L.*	European Sweetflag	Yes	G4?	SE1						
Adoxaceae	*Viburnum dilatatum*	Linden arrowood	Yes								
Adoxaceae	*Sambucus canadensis L.*	Common Elderberry	No	G5	S5						
Adoxaceae	*Sambucus racemosa subsp. pubens var. pubens (Michx.) Trautv. & C.A.Mey.*	Red Elderberry	No	G5T5	S5						
Adoxaceae	*Viburnum acerifolium L.*	Maple-leaved Viburnum	No	G5	S5						
Adoxaceae	*Viburnum lentago L.*	Nannyberry	No	G5	S5						
Adoxaceae	*Viburnum opulus L.*	Cranberry Viburnum	No	G5	S5						
Adoxaceae	*Viburnum opulus subsp. trilobum var. americanum Aiton*	Highbush Cranberry	No	G5T5	S5						
Adoxaceae	*Viburnum rafinesquianum Schult.*	Downy Arrowwood	No	G5	S5						
Adoxaceae	*Viburnum lantana L.*	Wayfaring Viburnum	Yes	GNR	SE2						
Alismataceae	*Alisma plantago-aquatica Linnaeus*	European water-plantain	Yes								
Alismataceae	*Alisma triviale Pursh*	Northern Water-plantain	No	G5	S5						
Alismataceae	*Sagittaria latifolia Willd.*	Broad-leaved Arrowhead	No	G5	S5						
Amaranthaceae	*Chenopodiastrum simplex (Torr.) S.Fuentes, Uotila & Borsch*	Maple-leaved Goosefoot	No	G5	S5				HU		
Amaranthaceae	*Amaranthus retroflexus L.*	Redroot Amaranth	Yes	G5	SE5						
Amaranthaceae	*Atriplex prostrata Boucher ex DC.*	Creeping Saltbush	Yes	G5	SE5						
Amaranthaceae	*Bassia scoparia (L.) Voss*	Common Kochia	Yes	GNR	SE5						
Amaranthaceae	*Chenopodium album L.*	Common Lamb's-quarters	Yes	G5	SE5						
Amaranthaceae	*Dysphania botrys (L.) Mosyakin & Clemants*	Jerusalem-oak Goosefoot	Yes	GNR	SE5						
Amaranthaceae	*Oxybasis glauca (L.) S.Fuentes, Uotila & Borsch subsp. glauca*	Oak-leaved Goosefoot	Yes	G5T5	SE5						
Amaryllidaceae	*Allium sp.*	Allium	?	G?	S?						
Anacardiaceae	*Toxicodendron vernix (L.) Kuntze*	Poison Sumac	No	G5	S4				HR		
Anacardiaceae	*Rhus typhina L.*	Staghorn Sumac	No	G5	S5						
Anacardiaceae	*Toxicodendron radicans (L.) Kuntze var. radicans*	Eastern Poison Ivy	No	G5T5	S5						
Anacardiaceae	*Toxicodendron radicans var. rydbergii (Small ex Rydb.) Erskine*	Western Poison Ivy	No	G5T5	S5						
Annonaceae	*Asimina triloba (L.) Dunal*	Pawpaw	No	G5	S3						
Apiaceae	*Taenidia integerrima (L.) Drude*	Yellow Pimpernel	No	G5	S4				HU		
Apiaceae	*Angelica atropurpurea L.*	Purple-stemmed Angelica	No	G5	S5				HR		
Apiaceae	*Cicuta bulbifera L.*	Bulbous Water-hemlock	No	G5	S5						
Apiaceae	*Cicuta maculata L.*	Spotted Water-hemlock	No	G5	S5						
Apiaceae	*Cryptotaenia canadensis (L.) DC.*	Canada Honewort	No	G5	S5						
Apiaceae	*Heracleum maximum W.Bartram*	American Cow Parsnip	No	G5	S5				HU		
Apiaceae	*Osmorhiza claytonii (Michx.) C.B. Clarke*	Hairy Sweet Cicely	No	G5	S5						
Apiaceae	*Sanicula marilandica L.*	Maryland Sanicle	No	G5	S5						
Apiaceae	*Sium suave Walter*	Common Water-parsnip	No	G5	S5						
Apiaceae	*Zizia aurea (L.) W.D.J.Koch*	Golden Alexanders	No	G5	S5				HR		

Family	*Scientific Name*	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Historic Record	Planted
Apiaceae	*Heracleum sphondylium L.*	Meadow Cow-parsnip	Yes	GNR	SE1						
Apiaceae	*Myrrhis odorata (L.) Scop.*	Anise	Yes	GNR	SE1						
Apiaceae	*Heracleum mantegazzianum Sommier & Levier*	Giant Hogweed	Yes	GNR	SE2						
Apiaceae	*Conium maculatum L.*	Poison-hemlock	Yes	G5	SE2?						
Apiaceae	*Torilis japonica (Houtt.) DC.*	Erect Hedge-parsley	Yes	GNR	SE4						
Apiaceae	*Aegopodium podagraria L.*	Goutweed	Yes	GNR	SE5						
Apiaceae	*Daucus carota L.*	Wild Carrot	Yes	GNR	SE5						
Apiaceae	*Pastinaca sativa L.*	Wild Parsnip	Yes	GNR	SE5						
Apocynaceae	*Asclepias exaltata L.*	Poke Milkweed	No	G5	S4				HU		
Apocynaceae	*Asclepias tuberosa var. interior (Woodson) Shinners*	Butterfly Milkweed	No	G5T5?	S4				HU		
Apocynaceae	*Apocynum androsaemifolium L. subsp. androsaemifolium*	Spreading Dogbane	No	G5	S5						
Apocynaceae	*Asclepias incarnata L. subsp. incarnata*	Swamp Milkweed	No	G5T5	S5						
Apocynaceae	*Asclepias syriaca L.*	Common Milkweed	No	G5	S5						
Apocynaceae	*Vinca minor L.*	Lesser Periwinkle	Yes	GNR	SE5						
Apocynaceae	*Vincetoxicum rossicum (Kleopow) Barbaricz*	European Swallowwort	Yes	GNR	SE5						
Apocynaceae	*Vincetoxicum hirundinaria Medik.*	White Swallowwort	Yes	G5	SEH						
Araceae	*Wolffia borealis (Engelm.) Landolt & Wildi ex Gandhi, Wiersema & Brouillet*	Northern Watermeal	No	G5	S4S5				HU		
Araceae	*Wolffia columbiana H.Karst.*	Columbia Watermeal	No	G5	S4S5				HU		
Araceae	*Arisaema triphyllum (L.) Schott subsp. triphyllum*	Jack-in-the-pulpit	No	G5T5	S5						
Araceae	*Calla palustris L.*	Wild Calla	No	G5	S5						
Araceae	*Lemna trisulca L.*	Star Duckweed	No	G5	S5				HU		
Araceae	*Spirodela polyrhiza (L.) Schleid.*	Great Duckweed	No	G5	S5				HR		
Araceae	*Symplocarpus foetidus (L.) Salisb. ex W.P.C.Barton*	Eastern Skunk Cabbage	No	G5	S5				HU		
Araceae	*Lemna minor L.*	Small Duckweed	No	G5	S5?						
Araceae	*Pistia stratiotes L.*	Water Lettuce	Yes	G5	SE1						
Araliaceae	*Aralia nudicaulis L.*	Wild Sarsaparilla	No	G5	S5						
Araliaceae	*Aralia racemosa L.*	American Spikenard	No	G5	S5						
Araliaceae	*Aralia elata (Miq.) Seem.*	Japanese Angelica-tree	Yes	GNR	SE1						
Aristolochiaceae	*Asarum canadense L.*	Canada Wild Ginger	No	G5	S5						
Asparagaceae	*Maianthemum canadense Desf.*	Wild Lily-of-the-valley	No	G5	S5						
Asparagaceae	*Maianthemum racemosum (L.) Link*	Large False Solomon's Seal	No	G5	S5						
Asparagaceae	*Maianthemum stellatum (L.) Link*	Star-flowered False Solomon's-seal	No	G5	S5						
Asparagaceae	*Polygonatum pubescens (Willd.) Pursh*	Hairy Solomon's Seal	No	G5	S5						
Asparagaceae	*Polygonatum multiflorum (L.) All.*	Eurasian Soloman's Seal	Yes	GNR	SE1						
Asparagaceae	*Scilla siberica Haw.*	Siberian Squill	Yes	GNR	SE2						
Asparagaceae	*Muscari botryoides (L.) Mill.*	Common Grape Hyacinth	Yes	GNR	SE3						
Asparagaceae	*Asparagus officinalis L.*	Garden Asparagus	Yes	G5?	SE5						

Family	*Scientific Name*	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Historic Record	Planted
Asparagaceae	*Convallaria majalis L. var majalis*	European Lily-of-the-valley	Yes	G5T5	SE5						
Asteraceae	*Callistephus chinensis (L.) Nees*	Chinese Aster	Yes								
Asteraceae	*Bidens sp.*	Beggarticks	?	G?	S?						
Asteraceae	*Cirsium sp.*	Thistle	?	GNR	S?						
Asteraceae	*Solidago sp.*	Goldenrod	?	GNR	S?						
Asteraceae	*Symphyotrichum sp.*	Aster	?	GNR	S?						
Asteraceae	*Eupatorium altissimum L.*	Tall Boneset	No	G5	S1						
Asteraceae	*Eurybia schreberi (Nees) Nees*	Schreber's Aster	No	G4	S2				HR		
Asteraceae	*Silphium perfoliatum L. var. perfoliatum*	Cup Plant	No	G5T5?	S2						
Asteraceae	*Solidago rigida L.*	Stiff Goldenrod	No	G5	S3				HE		
Asteraceae	*Bidens discoidea (Torr. & A.Gray) Britton*	Small Beggarticks	No	G5	S4				HR		
Asteraceae	*Solidago patula Muhlenb. ex Willd.*	Spreading Goldenrod	No	G5	S4				HU		
Asteraceae	*Solidago squarrosa Muhl. ex Nutt.*	Squarrose Goldenrod	No	G4G5	S4				HU		
Asteraceae	*Symphyotrichum oolentangiense (Riddell) G.L.Nesom*	Sky Blue Aster	No	G5	S4				HR		
Asteraceae	*Symphyotrichum urophyllum (Lindl. ex DC.) G.L.Nesom*	Arrow-leaved Aster	No	G4G5	S4				HU		
Asteraceae	*Solidago bicolor L.*	White Goldenrod	No	G5	S4?				HU		
Asteraceae	*Heliopsis helianthoides (L.) Sweet*	False Sunflower	No	G5	S4S5						
Asteraceae	*Ageratina altissima (L.) R.M.King & H.Rob. var. altissima*	Common White Snakeroot	No	G5T5	S5						
Asteraceae	*Ambrosia artemisiifolia L.*	Common Ragweed	No	G5	S5						
Asteraceae	*Ambrosia trifida L.*	Great Ragweed	No	G5	S5				HU		
Asteraceae	*Anaphalis margaritacea (L.) Benth. & Hook.f.*	Pearly Everlasting	No	G5	S5				HU		
Asteraceae	*Antennaria neglecta Greene*	Field Pussytoes	No	G5	S5						
Asteraceae	*Antennaria parlinii Fernald*	Parlin's Pussytoes	No	G5	S5						
Asteraceae	*Antennaria parlinii subsp. fallax (Greene) R.J.Bayer & Stebbins*	Deceitful Pussytoes	No	G5T5	S5						
Asteraceae	*Bidens beckii Torr. ex Spreng.*	Water Beggarticks	No	G5	S5				HR		
Asteraceae	*Bidens cernua L.*	Nodding Beggarticks	No	G5	S5						
Asteraceae	*Bidens frondosa L.*	Devil's Beggarticks	No	G5	S5						
Asteraceae	*Doellingeria umbellata (Mill.) Nees*	Flat-top White Aster	No	G5	S5						
Asteraceae	*Erechtites hieracifolia (L.) Raf. ex DC. var. hieraciifolius*	Eastern Burnweed	No	G5T5	S5				HU		
Asteraceae	*Erigeron annuus (L.) Pers.*	Annual Fleabane	No	G5	S5						
Asteraceae	*Erigeron philadelphicus L. var. philadelphicus*	Philadelphia Fleabane	No	G5T5	S5						
Asteraceae	*Erigeron pulchellus Michx. var. pulchellus*	Robin's-plantain Fleabane	No	G5T5	S5				HU		
Asteraceae	*Erigeron strigosus Muhlenb. ex Willd.*	Rough Fleabane	No	G5	S5						
Asteraceae	*Eupatorium perfoliatum L.*	Common Boneset	No	G5	S5						
Asteraceae	*Eurybia macrophylla (L.) Cass.*	Large-leaved Aster	No	G5	S5						
Asteraceae	*Euthamia graminifolia (L.) Nutt.*	Grass-leaved Goldenrod	No	G5	S5						
Asteraceae	*Eutrochium maculatum (L.) E.E.Lamont*	Spotted Joe Pye Weed	No	G5	S5						
Asteraceae	*Helianthus divaricatus L.*	Woodland Sunflower	No	G5	S5				HU		

Family	*Scientific Name*	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Historic Record	Planted
Asteraceae	*Helianthus strumosus L.*	Pale-leaved Sunflower	No	G5	S5				HR		
Asteraceae	*Hieracium umbellatum L.*	Umbellate Hawkweed	No	G5	S5				HR		
Asteraceae	*Lactuca biennis (Moench) Fernald*	Tall Blue Lettuce	No	G5	S5				HR		
Asteraceae	*Nabalus albus (L.) Hook.*	White Rattlesnakeroot	No	G5	S5						
Asteraceae	*Nabalus altissimus (L.) Hook.*	Tall Rattlesnakeroot	No	G5	S5						
Asteraceae	*Rudbeckia hirta var. pulcherrima Farw.*	Black-eyed Susan	No	G5T5	S5						
Asteraceae	*Rudbeckia laciniata L. var. laciniata*	Cut-leaved Coneflower	No	G5T5	S5				HU		
Asteraceae	*Solidago altissima L.*	Tall Goldenrod	No	G5	S5						
Asteraceae	*Solidago caesia L. var. caesia*	Blue-stemmed Goldenrod	No	G5T5	S5						
Asteraceae	*Solidago canadensis L.*	Canada Goldenrod	No	G5	S5						
Asteraceae	*Solidago flexicaulis L.*	Zigzag Goldenrod	No	G5	S5						
Asteraceae	*Solidago gigantea Aiton*	Giant Goldenrod	No	G5	S5				HU		
Asteraceae	*Solidago hispida Muhlenb. ex Willd.*	Hairy Goldenrod	No	G5	S5				HR		
Asteraceae	*Solidago juncea Aiton*	Early Goldenrod	No	G5	S5				HU		
Asteraceae	*Solidago nemoralis Aiton*	Grey-stemmed Goldenrod	No	G5	S5						
Asteraceae	*Solidago rugosa Mill.*	Rough-stemmed Goldenrod	No	G5	S5						
Asteraceae	*Symphyotrichum cordifolium (L.) G.L.Nesom*	Heart-leaved Aster	No	G5	S5						
Asteraceae	*Symphyotrichum ericoides (L.) G.L.Nesom*	White Heath Aster	No	G5	S5						
Asteraceae	*Symphyotrichum laeve (L.) Á.Löve & D.Löve var. laeve*	Smooth Aster	No	G5T5	S5				HU		
Asteraceae	*Symphyotrichum lanceolatum (Willd.) G.L.Nesom*	White Panicled Aster	No	G5	S5						
Asteraceae	*Symphyotrichum lateriflorum (L.) Á.Löve & D.Löve*	Calico Aster	No	G5	S5						
Asteraceae	*Symphyotrichum novae-angliae (L.) G.L.Nesom*	New England Aster	No	G5	S5						
Asteraceae	*Symphyotrichum pilosum (Willd.) G.L.Nesom*	Old Field Aster	No	G5	S5						
Asteraceae	*Symphyotrichum puniceum (L.) Á.Löve & D.Löve var. puniceum*	Purple-stemmed Aster	No	G5T5	S5						
Asteraceae	*Taraxacum ceratophorum (Ledeb.) DC.*	Horned Dandelion	No	G5	S5						
Asteraceae	*Xanthium strumarium L.*	Rough Cocklebur	No	G5	S5						
Asteraceae	*Antennaria howellii subsp. neoindica (Greene) R.J.Bayer*	Northern Pussytoes	No	G5T5	S5?				H?		
Asteraceae	*Achillea millefolium L.*	Common Yarrow	Yes	G5	SE						
Asteraceae	*Artemisia annua L.*	Annual Wormwood	Yes	GNR	SE1						
Asteraceae	*Echinacea purpurea (L.) Moench*	Eastern Purple Coneflower	Yes	G4	SE1						
Asteraceae	*Petasites japonicus (Siebold & Zucc.) Maxim.*	Japanese Sweet Coltsfoot	Yes	GNR	SE1						
Asteraceae	*Tanacetum parthenium (L.) Sch.Bip.*	Common Feverfew	Yes	GNR	SE3						
Asteraceae	*Rudbeckia triloba L. var. triloba*	Brown-eyed Susan	Yes	G5T4T5	SE4						
Asteraceae	*Anthemis arvensis L.*	Corn Camomile	Yes	GNR	SE5						
Asteraceae	*Anthemis cotula L.*	Stinking Chamomile	Yes	G5	SE5						
Asteraceae	*Arctium lappa L.*	Great Burdock	Yes	GNR	SE5						
Asteraceae	*Arctium minus (Hill) Bernh.*	Common Burdock	Yes	GNR	SE5						
Asteraceae	*Artemisia vulgaris L.*	Common Wormwood	Yes	GU	SE5						

Family	*Scientific Name*	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Historic Record	Planted
Asteraceae	*Centaurea nigrescens Willd.*	Short-fringed Knapweed	Yes	GNR	SE5						
Asteraceae	*Centaurea stoebe subsp. micranthos (S.G. Gmel. ex Gugler) Hayek*	Spotted Knapweed	Yes	GNRTNR	SE5						
Asteraceae	*Cichorium intybus L.*	Wild Chicory	Yes	GNR	SE5						
Asteraceae	*Cirsium arvense (L.) Scop.*	Canada Thistle	Yes	GNR	SE5						
Asteraceae	*Cirsium vulgare (Savi) Ten.*	Bull Thistle	Yes	GNR	SE5						
Asteraceae	*Inula helenium L.*	Elecampane	Yes	GNR	SE5						
Asteraceae	*Lactuca serriola L.*	Prickly Lettuce	Yes	GNR	SE5						
Asteraceae	*Lapsana communis L.*	Common Nipplewort	Yes	GNR	SE5						
Asteraceae	*Leucanthemum vulgare Lam.*	Oxeye Daisy	Yes	GNR	SE5						
Asteraceae	*Matricaria discoidea DC.*	Pineappleweed	Yes	G5	SE5						
Asteraceae	*Pilosella aurantiaca (L.) F.W. Shultz & Sch.Bip.*	Orange Hawkweed	Yes	GNR	SE5						
Asteraceae	*Pilosella caespitosa (Dumort.) P.D. Sell & C. West*	Meadow Hawkweed	Yes	GNR	SE5						
Asteraceae	*Sonchus arvensis L.*	Field Sow-thistle	Yes	GNR	SE5						
Asteraceae	*Sonchus arvensis L. subsp. arvensis*	Field Sow-thistle	Yes	GNRTNR	SE5						
Asteraceae	*Sonchus arvensis subsp. uliginosus (M. Bieb.) Nyman*	Smooth Sow-thistle	Yes	GNRTNR	SE5						
Asteraceae	*Sonchus oleraceus L.*	Common Sow-thistle	Yes	GNR	SE5						
Asteraceae	*Tanacetum vulgare L.*	Common Tansy	Yes	GNR	SE5						
Asteraceae	*Taraxacum officinale F.H.Wigg.*	Common Dandelion	Yes	G5	SE5						
Asteraceae	*Tussilago farfara L.*	Coltsfoot	Yes	GNR	SE5						
Asteraceae	*Pilosella x floribunda (Wimmer & Grabowski) Fr.*	King Devil Hawkweed	Yes	GNA	SNA						
Athyriaceae	*Deparia acrostichoides (Swartz) M. Kato*	Silvery Spleenwort	No	G5	S4				HU		
Athyriaceae	*Athyrium filix-femina (L.) Roth ex Mert.*	Common Lady Fern	No	G5	S5						
Balsaminaceae	*Impatiens pallida Nutt.*	Pale Jewelweed	No	G5	S4						
Balsaminaceae	*Impatiens capensis Meerb.*	Spotted Jewelweed	No	G5	S5						
Balsaminaceae	*Impatiens glandulifera Royle*	Himalayan Balsam	Yes	GNR	SE4						
Berberidaceae	*Berberis sp.*	Barberry	Yes	G?	S?						
Berberidaceae	*Jeffersonia diphylla L. Pers.*	Twinleaf	No	G5	S4				HU		
Berberidaceae	*Caulophyllum giganteum (Farw.) Leconte & Blackwell*	Giant Blue Cohosh	No	G4G5	S5				H?		
Berberidaceae	*Podophyllum peltatum L.*	May-apple	No	G5	S5						
Berberidaceae	*Caulophyllum thalictroides L. Michx.*	Blue Cohosh	No	G5	S5				H?		
Berberidaceae	*Berberis thunbergii DC.*	Japanese Barberry	Yes	GNR	SE5						
Berberidaceae	*Berberis vulgaris L.*	European Barberry	Yes	GNR	SE5						
Betulaceae	*Alnus incana subsp. rugosa (Du Roi) R.T.Clausen*	Speckled Alder	No	G5T5	S5				HU		
Betulaceae	*Betula alleghaniensis Britton*	Yellow Birch	No	G5	S5						
Betulaceae	*Betula papyrifera Marshall*	Paper Birch	No	G5	S5						
Betulaceae	*Carpinus caroliniana subsp. virginiana (Marshall) Furlow*	Blue-beech	No	G5T5	S5						
Betulaceae	*Corylus americana Walter*	American Hazelnut	No	G5	S5				HR		
Betulaceae	*Corylus cornuta Marshall subsp. cornuta*	Beaked Hazelnut	No	G5T5	S5						

Family	*Scientific Name*	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Historic Record	Planted
Betulaceae	*Ostrya virginiana (Mill.) K.Koch*	Eastern Hop-hornbeam	No	G5	S5						
Betulaceae	*Alnus glutinosa (L.) Gaertn.*	European Black Alder	Yes	GNR	SE4						
Betulaceae	*Betula pendula Roth*	Weeping Birch	Yes	GNR	SE4						
Bignoniaceae	*Catalpa speciosa Teas*	Northern Catalpa	Yes	G4?	SE1						
Boraginaceae	*Pulmonaria saccharata P. Miller*	Bethlehem Lungwort	Yes								
Boraginaceae	*Myosotis sp.*	Forget-me-not	?	GNR	S?						
Boraginaceae	*Hydrophyllum canadense L.*	Bluntleaf Waterleaf	No	G5	S4				HU		
Boraginaceae	*Myosotis verna Nutt.*	Spring Forget-me-not	No	G5	S4				HR		
Boraginaceae	*Hackelia virginiana (L.) I.M.Johnst.*	Virginia Stickseed	No	G5	S5				HU		
Boraginaceae	*Hydrophyllum virginianum L. var. virginianum*	Virginia Waterleaf	No	G5T5	S5						
Boraginaceae	*Myosotis arvensis (L.) Hill*	Field Forget-me-not	Yes	GNR	SE4						
Boraginaceae	*Myosotis sylvatica Hoffm.*	Woodland Forget-me-not	Yes	G5	SE4						
Boraginaceae	*Cynoglossum officinale L.*	Common Hound's-tongue	Yes	GNR	SE5						
Boraginaceae	*Echium vulgare L.*	Common Viper's Bugloss	Yes	GNR	SE5						
Boraginaceae	*Lappula squarrosa (Retz.) Dumort. ssp. squarrosa*	Bristly Stickseed	Yes	GNR	SE5						
Brassicaceae	*Cardamine bulbosa (Schreb. ex Muhlenb.) Britton, Sterns & Poggenb.*	Bulbous Bitter-cress	No	G5	S4				HU		
Brassicaceae	*Cardamine douglassii Britton*	Limestone Bittercress	No	G5	S4				HU		
Brassicaceae	*Borodinia canadensis (L.) P.J. Alexander & Windham*	Canada Rockcress	No	G5	S4?				HU		
Brassicaceae	*Cardamine concatenata (Michx.) O.Schwarz*	Cut-leaved Toothwort	No	G5	S5						
Brassicaceae	*Cardamine diphylla (Michx.) Alph.Wood*	Two-leaved Toothwort	No	G5	S5						
Brassicaceae	*Cardamine pensylvanica Muhlenb. ex Willd.*	Pennsylvania Bittercress	No	G5	S5				HU		
Brassicaceae	*Erysimum cheiranthoides L.*	Wormseed Wallflower	No	G5	S5						
Brassicaceae	*Rorippa palustris (L.) Besser*	Marsh Yellowcress	No	G5	S5						
Brassicaceae	*Rorippa palustris subsp. hispida (Desv.) Jonsell*	Hispid Marsh Yellowcress	No	G5T5	S5				H?		
Brassicaceae	*Nasturtium officinale W.T.Aiton*	Watercress	Yes	GNR	SE						
Brassicaceae	*Lobularia maritima (L.) Desv.*	Sweet Alyssum	Yes	GNR	SE2						
Brassicaceae	*Armoracia rusticana P.G. Gaertner, B.Meyer & Scherb.*	Horseradish	Yes	GNR	SE4						
Brassicaceae	*Cardamine hirsuta L.*	Hairy Bittercress	Yes	GNR	SE4						
Brassicaceae	*Alliaria petiolata (M.Bieb.) Cavara & Grande*	Garlic Mustard	Yes	GNR	SE5						
Brassicaceae	*Barbarea vulgaris W.T.Aiton*	Bitter Wintercress	Yes	GNR	SE5						
Brassicaceae	*Berteroa incana (L.) DC.*	Hoary Alyssum	Yes	GNR	SE5						
Brassicaceae	*Brassica nigra (L.) W.D.J.Koch*	Black Mustard	Yes	GNR	SE5						
Brassicaceae	*Camelina microcarpa Andrz. ex DC.*	Small-seed False-flax	Yes	GNR	SE5						
Brassicaceae	*Capsella bursa-pastoris (L.) Medik.*	Common Shepherd's Purse	Yes	GNR	SE5						
Brassicaceae	*Draba verna L.*	Spring Draba	Yes	GNR	SE5						
Brassicaceae	*Hesperis matronalis L.*	Dame's Rocket	Yes	G4G5	SE5						
Brassicaceae	*Lepidium campestre (L.) W.T.Aiton*	Field Peppergrass	Yes	GNR	SE5						
Brassicaceae	*Nasturtium microphyllum (Boenn.) Reichb.*	Small-leaved Watercress	Yes	GNR	SE5						

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Brassicaceae	*Sinapis arvensis L.*	Corn Mustard	Yes	GNR	SE5						
Brassicaceae	*Sisymbrium altissimum L.*	Tall Tumble Mustard	Yes	GNR	SE5						
Brassicaceae	*Thlaspi arvense L.*	Field Pennycress	Yes	GNR	SE5						
Butomaceae	*Butomus umbellatus L.*	Flowering-rush	Yes	G5	SE5						
Buxaceae	*Pachysandra terminalis Siebold & Zucc.*	Japanese Spurge	Yes	GNR	SE1						
Campanulaceae	*Campanula gieseckeana Vest*	Giesecke's Bellflower	No	G5	S5				HR		
Campanulaceae	*Lobelia inflata L.*	Indian Tobacco	No	G5	S5						
Campanulaceae	*Lobelia siphilitica L.*	Great Blue Lobelia	No	G5	S5						
Cannabaceae	*Cannabis sativa L.*	Hemp	Yes	GNR	SE1						
Caprifoliaceae	*Lonicera sp.*	Honeysuckle	?	GNR	S?						
Caprifoliaceae	*Diervilla lonicera Mill.*	Northern Bush-honeysuckle	No	G5	S5						
Caprifoliaceae	*Lonicera dioica L.*	Limber Honeysuckle	No	G5	S5						
Caprifoliaceae	*Symphoricarpos albus (L.) S.F. Blake*	Thin-leaved Snowberry	No	G5	S5						
Caprifoliaceae	*Lonicera maackii (Rupr.) Herder*	Maack's Honeysuckle	Yes	GNR	SE2						
Caprifoliaceae	*Lonicera morrowii A.Gray*	Morrow's Honeysuckle	Yes	GNR	SE3						
Caprifoliaceae	*Dipsacus fullonum L.*	Common Teasel	Yes	GNR	SE5						
Caprifoliaceae	*Lonicera tatarica L.*	Tartarian Honeysuckle	Yes	GNR	SE5						
Caprifoliaceae	*Lonicera x bella Zabel*	Bell's Honeysuckle	Yes	GNA	SNA						
Caryophyllaceae	*Holosteum umbellatum L. subsp. umbellatum*	Jagged Chickweed	Yes	GNRTNR	SE3						
Caryophyllaceae	*Cerastium fontanum subsp. vulgare (Hartm.) Greuter & Burdet*	Common Mouse-ear Chickweed	Yes	GNRTNR	SE5						
Caryophyllaceae	*Dianthus armeria L. subsp. armeria*	Deptford Pink	Yes	GNRTNR	SE5						
Caryophyllaceae	*Silene latifolia Poir.*	White Campion	Yes	GNR	SE5						
Caryophyllaceae	*Silene noctiflora L.*	Night-flowering Catchfly	Yes	GNR	SE5						
Caryophyllaceae	*Silene vulgaris (Moench) Garcke*	Bladder Campion	Yes	GNR	SE5						
Celastraceae	*Euonymus obovatus Nutt.*	Running Strawberry-bush	No	G5	S4						
Celastraceae	*Celastrus scandens L.*	Climbing Bittersweet	No	G5	S5						
Celastraceae	*Celastrus orbiculatus Thunb.*	Oriental Bittersweet	Yes	GNR	SE2						
Celastraceae	*Euonymus alatus (Thunb.) Siebold*	Winged Euonymus	Yes	GNR	SE2						
Celastraceae	*Euonymus fortunei (Turcz.) Hand.-Mazz.*	Climbing Euonymus	Yes	GNR	SE2						
Ceratophyllaceae	*Ceratophyllum demersum L.*	Common Hornwort	No	G5	S5				HU		
Colchicaceae	*Uvularia grandiflora Sm.*	Large-flowered Bellwort	No	G5	S5						
Convolvulaceae	*Cuscuta gronovii var. latiflora Engelm.*	Large-flowered Dodder	No	G5T5?Q	S4?				HU		
Convolvulaceae	*Calystegia spithamaea subsp. stans (Michx.) Brummitt*	Low False Bindweed	No	G4G5T4T5	S4S5				HR		
Convolvulaceae	*Calystegia sepium (L.) R.Br.*	Hedge False Bindweed	No	G5	S5						
Convolvulaceae	*Cuscuta gronovii Willd. ex Roem. & Schult.*	Swamp Dodder	No	G5	S5						
Convolvulaceae	*Convolvulus arvensis L.*	Field Bindweed	Yes	GNR	SE5						
Cornaceae	*Cornus florida L.*	Eastern Flowering Dogwood	No	G5	S2?	END	END	END	HU		
Cornaceae	*Cornus alternifolia L.f.*	Alternate-leaved Dogwood	No	G5	S5						

Family	*Scientific Name*	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Historic Record	Planted
Cornaceae	*Cornus obliqua Raf.*	Silky Dogwood	No	G5	S5						
Cornaceae	*Cornus racemosa Lam.*	Grey Dogwood	No	G5	S5						
Cornaceae	*Cornus rugosa Lam.*	Round-leaved Dogwood	No	G5	S5						
Cornaceae	*Cornus sericea L.*	Red-osier Dogwood	No	G5	S5						
Cucurbitaceae	*Echinocystis lobata (Michx.) Torr. & A.Gray*	Wild Cucumber	No	G5	S5						
Cucurbitaceae	*Thladiantha dubia Bunge*	Manchu Tuber-gourd	Yes	GNR	SE2						
Cupressaceae	*Metasequoia glyptostroboides*	Dawn Redwood	Yes								
Cupressaceae	*Juniperus virginiana L. var. virginiana*	Eastern Red Cedar	No	G5T5	S5				HU		
Cupressaceae	*Thuja occidentalis L.*	Eastern White Cedar	No	G5	S5						
Cyperaceae	*Carex sp.*	Sedge	?	GNR	S?						
Cyperaceae	*Eleocharis sp.*	Spike-rush	?	GNR	S?						
Cyperaceae	*Scirpus sp.*	Bulrush	?	GNR	S?						
Cyperaceae	*Scirpus georgianus Harper*	Georgia Bulrush	No	G5	S1?						
Cyperaceae	*Carex albicans Willd. ex Spreng. var. albicans*	White-tinged Sedge	No	G5T5	S3				HR		
Cyperaceae	*Carex alopecoidea Tuckerm.*	Foxtail Sedge	No	G5	S4						
Cyperaceae	*Carex atherodes Spreng.*	Wheat Sedge	No	G5	S4				HR		
Cyperaceae	*Carex cephaloidea (Dewey) Dewey*	Thin-leaved Sedge	No	G5	S4				HR		
Cyperaceae	*Carex grayi J.Carey*	Gray's Sedge	No	G4G5	S4				HU		
Cyperaceae	*Carex grisea Wahlenb.*	Grey Sedge	No	G5	S4				HU		
Cyperaceae	*Carex normalis Mack.*	Larger Straw Sedge	No	G5	S4				HR		
Cyperaceae	*Carex tribuloides Wahlenb.*	Blunt Broom Sedge	No	G5	S4				HU		
Cyperaceae	*Cyperus erythrorhizos Muhlenb.*	Red-rooted Flatsedge	No	G5	S4				HR		
Cyperaceae	*Cyperus odoratus L.*	Rusty Flatsedge	No	G5	S4				HR		
Cyperaceae	*Eleocharis intermedia Schult.*	Matted Spikerush	No	G5	S4				HU		
Cyperaceae	*Bolboschoenus fluviatilis (Torr.) Soják*	River Bulrush	No	G5	S4S5				HR		
Cyperaceae	*Carex digitalis Willd. var. digitalis*	Slender Woodland Sedge	No	G5T5	S4S5				HU		
Cyperaceae	*Carex molesta Mack.*	Troublesome Sedge	No	G4	S4S5				HU		
Cyperaceae	*Carex platyphylla J. Carey*	Broad-leaved Sedge	No	G5	S4S5						
Cyperaceae	*Carex sparganioides Muhlenb. ex Willd.*	Burreed Sedge	No	G5	S4S5						
Cyperaceae	*Carex muehlenbergii Schkuhr ex Willd. var. muhlenbergii*	Muhlenberg's Sedge	No	G5T5	S4S5				HR		
Cyperaceae	*Carex albursina E.Sheld.*	White Bear Sedge	No	G5	S5						
Cyperaceae	*Carex arctata Boott*	Drooping Woodland Sedge	No	G5	S5						
Cyperaceae	*Carex bebbii (L.H.Bailey) Olney ex Fernald*	Bebb's Sedge	No	G5	S5						
Cyperaceae	*Carex blanda Dewey*	Woodland Sedge	No	G5	S5						
Cyperaceae	*Carex cephalophora Muhlenb. ex Willd.*	Oval-headed Sedge	No	G5	S5						
Cyperaceae	*Carex communis L.H. Bailey var. communis*	Fibrous-root Sedge	No	G5T5	S5						
Cyperaceae	*Carex comosa Boott*	Bearded Sedge	No	G5	S5						
Cyperaceae	*Carex cristatella Britton*	Crested Sedge	No	G5	S5						

Family	*Scientific Name*	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Historic Record	Planted
Cyperaceae	*Carex deweyana Schwein. var. deweyana*	Dewey's Sedge	No	G5T5	S5						
Cyperaceae	*Carex gracillima Schwein.*	Graceful Sedge	No	G5	S5						
Cyperaceae	*Carex granularis Muhlenb. ex Willd.*	Limestone Meadow Sedge	No	G5	S5						
Cyperaceae	*Carex hystericina Muhlenb. ex Willd.*	Porcupine Sedge	No	G5	S5						
Cyperaceae	*Carex interior L.H. Bailey*	Inland Sedge	No	G5	S5						
Cyperaceae	*Carex lacustris Willd.*	Lake Sedge	No	G5	S5						
Cyperaceae	*Carex laxiflora Lam.*	Loose-flowered Sedge	No	G5	S5						
Cyperaceae	*Carex pedunculata Muhlenb. ex Willd.*	Long-stalk Sedge	No	G5	S5						
Cyperaceae	*Carex pellita Willd.*	Woolly Sedge	No	G5	S5				HU		
Cyperaceae	*Carex pensylvanica Lam.*	Pennsylvania Sedge	No	G5	S5						
Cyperaceae	*Carex plantaginea Lam.*	Plantain-leaved Sedge	No	G5	S5						
Cyperaceae	*Carex projecta Mack.*	Necklace Sedge	No	G5	S5				HU		
Cyperaceae	*Carex pseudocyperus L.*	Cyperus-like Sedge	No	G5	S5						
Cyperaceae	*Carex retrorsa Schwein.*	Retrorse Sedge	No	G5	S5						
Cyperaceae	*Carex rosea Schkuhr ex Willd.*	Rosy Sedge	No	G5	S5						
Cyperaceae	*Carex scoparia Schkuhr ex Willd.*	Pointed Broom Sedge	No	G5	S5				HR		
Cyperaceae	*Carex stipata Muhlenb. ex Willd.*	Awl-fruited Sedge	No	G5	S5						
Cyperaceae	*Carex stricta Lam.*	Tussock Sedge	No	G5	S5						
Cyperaceae	*Carex tenera Dewey*	Tender Sedge	No	G5	S5						
Cyperaceae	*Carex umbellata Schkuhr ex Willd.*	Umbellate Sedge	No	G5	S5				HR		
Cyperaceae	*Carex utriculata Boott*	Northern Beaked Sedge	No	G5	S5				HU		
Cyperaceae	*Carex vulpinoidea Michx.*	Fox Sedge	No	G5	S5						
Cyperaceae	*Cyperus bipartitus Torr.*	Shining Flatsedge	No	G5	S5				HR		
Cyperaceae	*Cyperus esculentus L.*	Perennial Yellow Flatsedge	No	G5	S5						
Cyperaceae	*Cyperus strigosus L.*	Straw-colored Flatsedge	No	G5	S5				HR		
Cyperaceae	*Eleocharis erythropoda Steud.*	Red-stemmed Spikerush	No	G5	S5						
Cyperaceae	*Eleocharis obtusa (Willd.) Schult.*	Blunt Spikerush	No	G5	S5				HU		
Cyperaceae	*Eleocharis palustris (L.) Roemer & Schultes*	Creeping Spikerush	No	G5?	S5				HU		
Cyperaceae	*Schoenoplectus pungens (Vahl) Palla*	Common Three-square Bulrush	No	G5	S5				HR		
Cyperaceae	*Schoenoplectus tabernaemontani (C.C. Gmelin) Pall.*	Soft-stemmed Bulrush	No	G5	S5						
Cyperaceae	*Scirpus atrovirens Willd.*	Dark-green Bulrush	No	G5	S5						
Cyperaceae	*Carex spicata Hudson*	Spiked Sedge	Yes	GNR	SE5						
Cystopteridaceae	*Cystopteris tenuis (Michx.) Desv.*	Mackay's Brittle Fern	No	G5	S4						
Cystopteridaceae	*Cystopteris bulbifera (L.) Bernh.*	Bulblet Bladder Fern	No	G5	S5						
Dennstaedtiaceae	*Pteridium aquilinum var. latiusculum (Desv.) Underw. ex A. Heller*	Bracken Fern	No	G5T5	S5						
Dioscoreaceae	*Dioscorea villosa L.*	Wild Yam	No	G4G5	S4				HR		
Dryopteridaceae	*Dryopteris carthusiana (Vill.) H.P. Fuchs*	Spinulose Wood Fern	No	G5	S5						
Dryopteridaceae	*Dryopteris intermedia (Muhlenb. ex Willd.) A.Gray*	Evergreen Wood Fern	No	G5	S5						

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Dryopteridaceae	*Dryopteris marginalis (L.) A.Gray*	Marginal Wood Fern	No	G5	S5						
Dryopteridaceae	*Polystichum acrostichoides (Michx.) Schott*	Christmas Fern	No	G5	S5						
Elaeagnaceae	*Shepherdia canadensis (L.) Nutt.*	Soapberry	No	G5	S5				HU		
Elaeagnaceae	*Elaeagnus angustifolia L.*	Russian Olive	Yes	GNR	SE3						
Elaeagnaceae	*Elaeagnus umbellata Thunb.*	Autum Olive	Yes	GNR	SE3						
Equisetaceae	*Equisetum arvense L.*	Field Horsetail	No	G5	S5						
Equisetaceae	*Equisetum fluviatile L.*	Water Horsetail	No	G5	S5				HU		
Equisetaceae	*Equisetum hyemale L.*	Common Scouring-rush	No	G5	S5						
Equisetaceae	*Equisetum pratense Ehrh.*	Meadow Horsetail	No	G5	S5				HU		
Equisetaceae	*Equisetum sylvaticum L.*	Woodland Horsetail	No	G5	S5				HU		
Equisetaceae	*Equisetum x litorale Kuhlewein ex Rupr.*	Shore Horsetail	No	GNA	SNA						
Ericaceae	*Gaylussacia baccata (Wangenh.) K. Koch*	Black Huckleberry	No	G5	S4				HU		
Ericaceae	*Vaccinium pallidum Aiton*	Pale Blueberry	No	G5	S4				HU		
Ericaceae	*Gaultheria procumbens L.*	Eastern Teaberry	No	G5	S5				HU		
Ericaceae	*Monotropa uniflora L.*	Indian Pipe	No	G5	S5						
Ericaceae	*Pyrola elliptica Nutt.*	Shinleaf	No	G5	S5						
Ericaceae	*Vaccinium angustifolium Aiton*	Early Lowbush Blueberry	No	G5	S5				HU		
Euphorbiaceae	*Acalypha rhomboidea Raf.*	Common Three-seed Mercury	No	G5	S5						
Euphorbiaceae	*Euphorbia marginata Pursh*	Snow-on-the-mountain	Yes	G5	SE2						
Fabaceae	*Gymnocladus dioicus (L.) K.Koch*	Kentucky Coffee-tree	No	G5	S2	THR	THR	THR			
Fabaceae	*Gleditsia triacanthos L.*	Honey Locust	No	G5	S2?						
Fabaceae	*Desmodium cuspidatum (Muhlenb. ex Willd.) DC. ex G.Don*	Largebract Tick-trefoil	No	G5	S3				HU		
Fabaceae	*Desmodium canadense (L.) DC.*	Canada Tick-trefoil	No	G5	S4				HU		
Fabaceae	*Hylodesmum glutinosum (Muhlenb. ex Willd.) H. Ohashi & R.R. Mill*	Large Tick-trefoil	No	G5	S4						
Fabaceae	*Lespedeza capitata Michx.*	Round-head Bush-clover	No	G5	S4				HR		
Fabaceae	*Strophostyles helvola (L.) Elliott*	Trailing Wild Bean	No	G5	S4				HR		
Fabaceae	*Amphicarpaea bracteata (L.) Fernald*	American Hog Peanut	No	G5	S5						
Fabaceae	*Apios americana Medik.*	American Groundnut	No	G5	S5				HU		
Fabaceae	*Lathyrus palustris L.*	Marsh Vetchling	No	G5	S5						
Fabaceae	*Vicia americana Muhlenb. ex Willd. var. americana*	American Vetch	No	G5T5	S5						
Fabaceae	*Galega officinalis L.*	Common Goat's-rue	Yes	GNR	SE1						
Fabaceae	*Glycine max (L.) Merr.*	Soybean	Yes	GNR	SE2						
Fabaceae	*Lathyrus tuberosus L.*	Tuberous Vetchling	Yes	GNR	SE3						
Fabaceae	*Lotus corniculatus L.*	Garden Bird's-foot Trefoil	Yes	GNR	SE5						
Fabaceae	*Medicago lupulina L.*	Black Medick	Yes	GNR	SE5						
Fabaceae	*Medicago sativa L. subsp. sativa*	Alfalfa	Yes	GNRTNR	SE5						
Fabaceae	*Melilotus albus Medik.*	White Sweet-clover	Yes	G5	SE5						
Fabaceae	*Melilotus officinalis (L.) Lam.*	Yellow Sweet Clover	Yes	GNR	SE5						

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Fabaceae	*Robinia pseudoacacia L.*	Black Locust	Yes	G5	SE5						
Fabaceae	*Securigera varia (L.) Lassen*	Purple Crown-vetch	Yes	GNR	SE5						
Fabaceae	*Trifolium hybridum L.*	Alsike Clover	Yes	GNR	SE5						
Fabaceae	*Trifolium pratense L.*	Red Clover	Yes	GNR	SE5						
Fabaceae	*Trifolium repens L.*	White Clover	Yes	GNR	SE5						
Fabaceae	*Vicia cracca L.*	Tufted Vetch	Yes	GNR	SE5						
Fabaceae	*Vicia sativa L.*	Common Vetch	Yes	GNR	SE5						
Fabaceae	*Vicia tetrasperma (L.) Schreb.*	Four-seed Vetch	Yes	GNR	SE5						
Fabaceae	*Vicia villosa Roth var. villosa*	Hairy Vetch	Yes	G5TNR	SE5						
Fabaceae	*Cercis canadensis L. var. canadensis*	Eastern Redbud	No	G5T5	SX						
Fagaceae	*Fagus grandifolia Ehrh.*	American Beech	No	G5	S4						
Fagaceae	*Quercus bicolor Willd.*	Swamp White Oak	No	G5	S4				HR		
Fagaceae	*Quercus muehlenbergii Engelm.*	Chinquapin Oak	No	G5	S4				HU		
Fagaceae	*Quercus velutina Lam.*	Black Oak	No	G5	S4				HU		
Fagaceae	*Quercus alba L.*	White Oak	No	G5	S5						
Fagaceae	*Quercus macrocarpa Michx.*	Bur Oak	No	G5	S5						
Fagaceae	*Quercus rubra L.*	Northern Red Oak	No	G5	S5						
Gentianaceae	*Frasera caroliniensis Walter*	American Columbo	No	G5	S2	END	END	END	HR		
Gentianaceae	*Gentiana andrewsii Griseb. var. andrewsii*	Andrews' Bottle Gentian	No	G5?T5?	S4				HR		
Geraniaceae	*Geranium maculatum L.*	Spotted Geranium	No	G5	S5						
Geraniaceae	*Geranium robertianum L.*	Herb-Robert	No	G5	S5						
Ginkgoaceae	*Ginkgo biloba*	Ginkgo	Yes								
Grossulariaceae	*Ribes sp.*	Gooseberry/Currant	?	GNR	S?						
Grossulariaceae	*Ribes americanum Mill.*	American Black Currant	No	G5	S5						
Grossulariaceae	*Ribes cynosbati L.*	Eastern Prickly Gooseberry	No	G5	S5						
Grossulariaceae	*Ribes triste Pall.*	Swamp Red Currant	No	G5	S5						
Grossulariaceae	*Ribes nigrum L.*	European Black Currant	Yes	GNR	SE2						
Grossulariaceae	*Ribes aureum Pursh*	Golden Currant	Yes	G5	SE3						
Grossulariaceae	*Ribes rubrum L.*	European Red Currant	Yes	G4G5	SE5						
Haloragaceae	*Myriophyllum sibiricum Kom.*	Siberian Water-milfoil	No	G5	S5				HR		
Haloragaceae	*Myriophyllum spicatum L.*	Eurasian Water-milfoil	Yes	GNR	SE5						
Hamamelidaceae	*Hamamelis virginiana L.*	American Witch-hazel	No	G5	S4S5						
Hydrangeaceae	*Philadelphus coronarius L.*	European Mock-orange	Yes	GNR	SE1						
Hydrocharitaceae	*Najas flexilis (Willd.) Rost. & W.L.E.Schmidt*	Slender Naiad	No	G5	S4S5				HR		
Hydrocharitaceae	*Elodea canadensis Michx.*	Canada Waterweed	No	G5	S5				HR		
Hydrocharitaceae	*Vallisneria americana Michx.*	American Eelgrass	No	G5	S5				HR		
Hydrocharitaceae	*Najas minor All.*	Brittle-leaved Naiad	Yes	GNR	SE2						
Hypericeae	*Hypericum virginicum L.*	Virginia St. John's-wort	No	G5	S4						

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Hypericeae	*Hypericum punctatum Lam.*	Spotted St. John's-wort	No	G5	S5				HU		
Hypericeae	*Hypericum perforatum L. subsp. perforatum*	Common St. John's-wort	Yes	GNR	SE5						
Iridaceae	*Iris versicolor L.*	Harlequin Blue Flag	No	G5	S5						
Iridaceae	*Sisyrinchium montanum Greene*	Strict Blue-eyed Grass	No	G5	S5						
Iridaceae	*Iris pseudacorus L.*	Yellow Iris	Yes	GNR	SE4						
Juglandaceae	*Juglans cinerea L.*	Butternut	No	G4	S2?	END	END	END			
Juglandaceae	*Carya glabra (Mill.) Sweet*	Pignut Hickory	No	G5	S3				HR		
Juglandaceae	*Juglans nigra L.*	Black Walnut	No	G5	S4?						
Juglandaceae	*Carya cordiformis (Wangenh.) K.Koch*	Bitternut Hickory	No	G5	S5						
Juglandaceae	*Carya ovata (Mill.) K.Koch var. ovata*	Shagbark Hickory	No	G5T5	S5						
Juglandaceae	*Juglans regia L.*	English Walnut	Yes	GNR	SE1						
Juncaceae	*Juncus articulatus L. subsp. articulatus*	Jointed Rush	No	G5TNR	S5				HU		
Juncaceae	*Juncus balticus subsp. littoralis (Engelm.) Snogerup*	Shoreline Rush	No	G5T5	S5				HR		
Juncaceae	*Juncus bufonius L.*	Toad Rush	No	G5	S5						
Juncaceae	*Juncus dudleyi Wiegand*	Dudley's Rush	No	G5	S5						
Juncaceae	*Juncus effusus subsp. solutus (Fernald & Wiegand) Hämet-Ahti*	Soft Rush	No	G5T5	S5						
Juncaceae	*Juncus nodosus L.*	Knotted Rush	No	G5	S5				HU		
Juncaceae	*Juncus tenuis Willd.*	Path Rush	No	G5	S5						
Juncaceae	*Juncus torreyi Coville*	Torrey's Rush	No	G5	S5				HU		
Juncaceae	*Luzula acuminata Raf. subsp. acuminata*	Hairy Woodrush	No	G5T5	S5				HU		
Juncaceae	*Luzula multiflora (Ehrh.) Lej.*	Many-flowered Woodrush	No	G5	S5						
Lamiaceae	*Agastache nepetoides (L.) Kuntze*	Yellow Giant Hyssop	No	G5	S4				HR		
Lamiaceae	*Collinsonia canadensis L.*	Canada Horsebalm	No	G5	S4				HU		
Lamiaceae	*Hedeoma pulegioides (L.) Pers.*	American False Pennyroyal	No	G5	S4				HU		
Lamiaceae	*Lycopus asper Greene*	Rough Water-horehound	No	G5	S4				HR		
Lamiaceae	*Physostegia virginiana (L.) Benth. subsp. virginiana*	Virginia False Dragonhead	No	G5T5	S4				H?		
Lamiaceae	*Stachys hispida Pursh*	Hispid Hedge-nettle	No	G4Q	S4				HR		
Lamiaceae	*Teucrium canadense L.*	Canada Germander	No	G5	S4S5						
Lamiaceae	*Clinopodium vulgare L.*	Wild Basil	No	G5	S5						
Lamiaceae	*Lycopus americanus Muhlenb. ex W.P.C.Barton*	American Water-horehound	No	G5	S5						
Lamiaceae	*Lycopus uniflorus Michx.*	Northern Water-horehound	No	G5	S5						
Lamiaceae	*Monarda fistulosa L.*	Wild Bergamot	No	G5	S5						
Lamiaceae	*Prunella vulgaris L.*	Common Self-heal	No	G5	S5						
Lamiaceae	*Prunella vulgaris subsp. lanceolata (W.P.C.Barton) Piper & Beattie*	Lance-leaved Self-heal	No	G5T5	S5						
Lamiaceae	*Scutellaria galericulata var. pubescens Benth.*	Hooded Skullcap	No	G5T5	S5						
Lamiaceae	*Scutellaria lateriflora L.*	Mad-dog Skullcap	No	G5	S5						
Lamiaceae	*Mentha canadensis L.*	Canada Mint	No	G5	S5						
Lamiaceae	*Mentha aquatica L.*	Aquatic Mint	Yes	GNA	SE1						

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Lamiaceae	*Ajuga reptans L.*	Creeping Bugleweed	Yes	GNR	SE2						
Lamiaceae	*Prunella vulgaris L. subsp. vulgaris*	Common Self-heal	Yes	G5TU	SE3						
Lamiaceae	*Mentha spicata L.*	Spearmint	Yes	GNR	SE4						
Lamiaceae	*Galeopsis tetrahit L.*	Common Hemp-nettle	Yes	GNR	SE5						
Lamiaceae	*Glechoma hederacea L.*	Ground-ivy	Yes	GNR	SE5						
Lamiaceae	*Leonurus cardiaca L. subsp. cardiaca*	Common Motherwort	Yes	GNRTNR	SE5						
Lamiaceae	*Lycopus europaeus L.*	European Water-horehound	Yes	GNR	SE5						
Lamiaceae	*Nepeta cataria L.*	Catnip	Yes	GNR	SE5						
Lamiaceae	*Stachys palustris L.*	Marsh Hedge-nettle	Yes	G5	SE5				HR		
Lamiaceae	*Teucrium canadense L. subsp. canadense*	Canada Germander	No	G5T5	SU				HR		
Lardizabalaceae	*Akebia quinata*	Fireleaf Akebia	Yes								
Lauraceae	*Lindera benzoin (L.) Blume*	Northern Spicebush	No	G5	S4						
Lauraceae	*Sassafras albidum (Nutt.) Nees*	Sassafras	No	G5	S4				HU		
Lentibulariaceae	*Utricularia vulgaris subsp. macrohiza (Leconte ex Torr.) R.T. Clausen*	Greater Bladderwort	No	G5T5	S5				HU		
Liliaceae	*Tulipa turkestanica*	Tulip	Yes								
Liliaceae	*Lilium michiganense Farw.*	Michigan Lily	No	G5	S4						
Liliaceae	*Prosartes lanuginosa (Michx.) D.Don*	Yellow Fairybells	No	G5	S4				HU		
Liliaceae	*Erythronium americanum Ker Gawl. subsp. americanum*	Yellow Trout Lily	No	G5T5	S5						
Liliaceae	*Medeola virginiana L.*	Indian Cucumber-root	No	G5	S5				HU		
Liliaceae	*Streptopus lanceolatus (Aiton) Reveal*	Rose Twisted-stalk	No	G5	S5						
Linaceae	*Linum usitatissimum L.*	Common Flax	Yes	GNR	SE3						
Linderniaceae	*Lindernia dubia (L.) Pennell*	Yellow-seed False Pimpernel	No	G5	S4				HR		
Lythraceae	*Decodon verticillatus (L.) Elliott*	Swamp Loosestrife	No	G5	S5				HR		
Lythraceae	*Lythrum salicaria L.*	Purple Loosestrife	Yes	G5	SE5						
Magnoliaceae	*Magnolia tripetala*	Umbrella Magnolia	Yes								
Magnoliaceae	*Liriodendron tulipifera L.*	Tulip Tree	No	G5	S4						
Malvaceae	*Tilia americana L.*	American Basswood	No	G5	S5						
Malvaceae	*Tilia cordata Mill.*	Little-leaved Linden	Yes	GNR	SE1						
Malvaceae	*Alcea rosea L.*	Hollyhock	Yes	GU	SE4						
Malvaceae	*Malva neglecta Wallr.*	Common Mallow	Yes	GNR	SE5						
Melanthiaceae	*Trillium cernuum L.*	Nodding Trillium	No	G5	S5						
Melanthiaceae	*Trillium grandiflorum (Michx.) Salisb.*	White Trillium	No	G5	S5						
Montiaceae	*Claytonia caroliniana Michx.*	Carolina Spring-beauty	No	G5	S5				HU		
Montiaceae	*Claytonia virginica L.*	Eastern Spring Beauty	No	G5	S5				HU		
Moraceae	*Morus alba L.*	White Mulberry	Yes	GNR	SE5						
Nymphaeaceae	*Nuphar variegata Engelm. ex Durand*	Variegated Pond-lily	No	G5	S5				HU		
Nymphaeaceae	*Nymphaea odorata Aiton*	Fragrant Water-lily	No	G5	S5						
Oleaceae	*Fraxinus americana L.*	White Ash	No	G5	S4						

Family	*Scientific Name*	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Historic Record	Planted
Oleaceae	*Fraxinus nigra Marshall*	Black Ash	No	G5	S4						
Oleaceae	*Fraxinus pennsylvanica Marshall*	Red Ash	No	G5	S4						
Oleaceae	*Ligustrum vulgare L.*	European Privet	Yes	GNR	SE5						
Oleaceae	*Syringa vulgaris L.*	Common Lilac	Yes	GNR	SE5						
Onagraceae	*Oenothera sp.*	Evening Primrose	?	GNR	S?						
Onagraceae	*Epilobium strictum Muhlenb. ex Spreng.*	Downy Willowherb	No	G5	S4				HU		
Onagraceae	*Circaea alpina L. subsp. alpina*	Small Enchanter's Nightshade	No	G5T5	S5						
Onagraceae	*Circaea canadensis (L.) Hill subsp. canadensis*	Canada Enchanter's Nightshade	No	G5TNR	S5						
Onagraceae	*Epilobium ciliatum Raf.*	Northern Willowherb	No	G5	S5						
Onagraceae	*Epilobium coloratum Biehler*	Purple-veined Willowherb	No	G5	S5				HU		
Onagraceae	*Epilobium palustre L.*	Marsh Willowherb	No	G5	S5						
Onagraceae	*Oenothera biennis L.*	Common Evening Primrose	No	G5	S5				H?		
Onagraceae	*Epilobium hirsutum L.*	Hairy Willowherb	Yes	GNR	SE5						
Onocleaceae	*Onoclea sensibilis L.*	Sensitive Fern	No	G5	S5						
Onocleaceae	*Matteuccia struthiopteris var. pensylvanica (Willd.) C.V. Morton*	Ostrich Fern	No	G5T5	S5						
Ophioglossaceae	*Botrypus virginianus (L.) Michx.*	Rattlesnake Fern	No	G5	S5						
Orchidaceae	*Cypripedium parviflorum Salisb.*	Yellow Lady's-slipper	No	G5	S5						
Orchidaceae	*Epipactis helleborine (L.) Crantz*	Braod-leaved Helleborine	Yes	GNR	SE5						
Orobanchaceae	*Aureolaria pedicularia (L.) Raf.*	Fern-leaved Yellow False Foxglove	No	G5	S2?	THR			HR		
Orobanchaceae	*Epifagus virginiana (L.) W.P.C. Barton*	Beechdrops	No	G5	S5						
Orobanchaceae	*Melampyrum lineare Desr.*	American Cow-wheat	No	G5	S5				HU		
Orobanchaceae	*Euphrasia stricta D. Wolff ex J.F. Lehmann*	Drug Eyebright	Yes	GNRQ	SE4?						
Osmundaceae	*Osmunda claytoniana L.*	Interrupted Fern	No	G5	S5				HU		
Osmundaceae	*Osmundastrum cinnamomeum (L.) C. Presl*	Cinnamon Fern	No	G5	S5						
Oxalidaceae	*Oxalis stricta L.*	European Wood-sorrel	No	G5	S5						
Oxalidaceae	*Oxalis montana Raf.*	White Wood-sorrel	No	G5	S5				HR		
Oxalidaceae	*Oxalis dillenii Jacq.*	Slender Yellow Wood-sorrel	No	G5	S5?						
Papaveraceae	*Stylophorum diphyllum (Michx.) Nutt.*	Wood Poppy	No	G5	S1	END	END	END			
Papaveraceae	*Corydalis flavula (Raf.) DC.*	Yellow Corydalis	No	G5	S1S2						
Papaveraceae	*Sanguinaria canadensis L.*	Bloodroot	No	G5	S5						
Papaveraceae	*Papaver orientale L.*	Oriental Poppy	Yes	GNR	SE1						
Papaveraceae	*Chelidonium majus L.*	Greater Celadine	Yes	GNR	SE5						
Penthoraceae	*Penthorum sedoides L.*	Ditch Sstonecrop	No	G5	S5				HU		
Phrymaceae	*Phryma leptostachya L. var. leptostachya*	Lopseed	No	G5T5	S4S5						
Phrymaceae	*Mimulus ringens L. var. ringens*	Square-stemmed Monkeyflower	No	G5T5	S5				HU		
Phytolaccaceae	*Phytolacca americana L. var. americana*	Common Pokeweed	No	G5T5	S4				HR		
Pinaceae	*Pseudotsuga menziesii (Mirbel) Franco*	Douglas Fir	Yes								

Family	*Scientific Name*	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Historic Record	Planted
Pinaceae	*Picea glauca (Moench) Voss*	White Spruce	No	G5	S5				HU		
Pinaceae	*Pinus strobus L.*	Eastern White Pine	No	G5	S5						
Pinaceae	*Tsuga canadensis (L.) Carrière*	Eastern Hemlock	No	G5	S5						
Pinaceae	*Picea pungens Engelm.*	Blue Spruce	Yes	G5	SE1						
Pinaceae	*Larix decidua Mill.*	European Larch	Yes	G5	SE2						
Plantaginaceae	*Veronica austriaca Linnaeus*	Broad-leaved Speedwell	Yes								
Plantaginaceae	*Penstemon digitalis Nutt. ex Sims*	Foxglove Beardtongue	No	G5	S4				HU		
Plantaginaceae	*Penstemon hirsutus (L.) Willd.*	Hairy Beardtongue	No	G4	S4						
Plantaginaceae	*Chelone glabra L.*	White Turtlehead	No	G5	S5						
Plantaginaceae	*Veronica americana (Raf.) Schwein. ex Benth.*	American Speedwell	No	G5	S5				HU		
Plantaginaceae	*Veronica scutellata L.*	Marsh Speedwell	No	G5	S5				HR		
Plantaginaceae	*Veronica anagallis-aquatica L.*	Water Speedwell	Yes	G5	SE						
Plantaginaceae	*Linaria vulgaris Mill.*	Butter-and-eggs	Yes	GNR	SE5						
Plantaginaceae	*Plantago major L.*	Common Plantain	Yes	G5	SE5						
Plantaginaceae	*Veronica officinalis L.*	Common Speedwell	Yes	G5	SE5						
Plantaginaceae	*Veronica serpyllifolia L.*	Thyme-leaved Speedwell	Yes	G5	SE5?						
Platanaceae	*Platanus occidentalis L.*	Sycamore	No	G5	S4				HR		
Poaceae	*Festuca sp.*	Fescue	?	GNR	S?						
Poaceae	*Poa sp.*	Bluegrass	?	GNR	S?						
Poaceae	*Sphenopholis nitida (Biehler) Scribn.*	Shiny Wedgegrass	No	G5	S1				HR		
Poaceae	*Phleum alpinum L.*	Alpine Timothy	No	G5	S1S2						
Poaceae	*Elymus curvatus L.*	Awnless Wildrye	No	G4G5	S2S3						
Poaceae	*Zizania aquatica L. var. aquatica*	Southern Wildrice	No	G5T5	S3				HR		
Poaceae	*Alopecurus aequalis Sobol. var. aequalis*	Short-awned Foxtail	No	G5T5	S4				HU		
Poaceae	*Andropogon gerardi Vitman*	Big Bluestem	No	G5	S4				HU		
Poaceae	*Brachyelytrum erectum (Schreb.) P.Beauv.*	Southern Shorthusk	No	G4G5	S4				HU		
Poaceae	*Bromus kalmii A.Gray*	Kalm's Brome	No	G5	S4				HR		
Poaceae	*Bromus latiglumis (Schibner ex Shear) Hitchc.*	Broad-glumed Brome	No	G5	S4				HR		
Poaceae	*Bromus pubescens Spreng.*	Hairy Woodland Brome	No	G5	S4						
Poaceae	*Cinna arundinacea L.*	Stout Woodreed	No	G5	S4						
Poaceae	*Elymus villosus Muhlenb. ex Willd.*	Downy Wildrye	No	G5	S4						
Poaceae	*Festuca subverticillata (Pers.) Alexeev*	Nodding Fescue	No	G5	S4						
Poaceae	*Glyceria septentrionalis Hitchc. var. septentrionalis*	Eastern Mannagrass	No	G5T5	S4				HU		
Poaceae	*Graphephorum melicoides (Michx.) Desv.*	Purple False Oats	No	G4G5	S4				HR		
Poaceae	*Leersia virginica Willd.*	White Cutgrass	No	G5	S4						
Poaceae	*Poa alsodes A.Gray*	Grove Bluegrass	No	G4G5	S4				HU		
Poaceae	*Dichanthelium latifolium (L.) Harvill*	Broad-leaved Panicgrass	No	G5	S4				HU		
Poaceae	*Sorghastrum nutans (L.) Nash*	Yellow Indiangrass	No	G5	S4				HR		

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Poaceae	*Phragmites australis (Cav.) Trin. ex Steud.*	Common Reed	Yes	G5	S4?						
Poaceae	*Milium effusum var. cisatlanticum Fernald*	Wood Millet	No	G5T5	S4S5				HU		
Poaceae	*Sphenopholis intermedia (Rydb.) Rydb.*	Slender Wedgegrass	No	G5	S4S5						
Poaceae	*Bromus ciliatus L.*	Fringed Brome	No	G5	S5				HU		
Poaceae	*Calamagrostis canadensis (Michx.) P.Beauv.*	Bluejoint Reedgrass	No	G5	S5						
Poaceae	*Danthonia spicata (L.) P.Beauv. ex Roem. & Schult.*	Poverty Oatgrass	No	G5	S5						
Poaceae	*Dichanthelium acuminatum (Swartz) Gould & C.A. Clark*	Tapered Panicgrass	No	G5T5	S5						
Poaceae	*Dichanthelium linearifolium (Scribner) Gould*	Linear-leaved Panicgrass	No	G5	S5				HR		
Poaceae	*Echinochloa muricata (P.Beauv.) Fernald*	Rough Barnyard Grass	No	G5	S5						
Poaceae	*Echinochloa muricata var. microstachya Wiegand*	Western Barnyard Grass	No	G5T5	S5				HU		
Poaceae	*Elymus hystrix L.*	Bottlebrush Grass	No	G5	S5						
Poaceae	*Elymus trachycaulus (Link) Gould ex Shinners*	Slender Wildrye	No	G5	S5						
Poaceae	*Festuca rubra L.*	Red Fescue	No	G5	S5						
Poaceae	*Glyceria borealis (Nash) Batch.*	Boreal Mannagrass	No	G5	S5				HU		
Poaceae	*Glyceria grandis S.Watson var. grandis*	Tall Mannagrass	No	G5T5	S5						
Poaceae	*Glyceria striata (Lam.) Hitchc. var. striata*	Fowl Mannagrass	No	G5	S5						
Poaceae	*Leersia oryzoides (L.) Sw.*	Rice Cutgrass	No	G5	S5						
Poaceae	*Muhlenbergia mexicana (L.) Trin.*	Mexican Muhly	No	G5	S5						
Poaceae	*Panicum capillare L.*	Common Panicgrass	No	G5	S5						
Poaceae	*Phalaris arundinacea L.*	Reed Canarygrass	Yes	G5	S5						
Poaceae	*Poa pratensis L.*	Kentucky Bluegrass	No	G5	S5						
Poaceae	*Elymus virginicus L.*	Virginia Wildrye	No	G5	S5						
Poaceae	*Hordeum jubatum L.*	Foxtail Barley	No	G5	S5?						
Poaceae	*Zizania palustris L.*	Northern Wildrice	No	G5	S5?						
Poaceae	*Sorghum bicolor (L.) Moench*	Sorghum	Yes	GNR	SE1						
Poaceae	*Avena sativa L.*	Cultivated Oats	Yes	GNR	SE2						
Poaceae	*Calamagrostis epigejos (L.) Roth*	Chee Reedgrass	Yes	G5	SE2						
Poaceae	*Poa trivialis L.*	Rough Bluegrass	Yes	GNR	SE3						
Poaceae	*Thinopyrum ponticum (Podpěra) Barkworth & D.R. Dewey*	Tall Wheatgrass	Yes	GNR	SE3						
Poaceae	*Arrhenatherum elatius (L.) P.Beauv. ex J.Presl & C.Presl subsp. Elatius*	Tall Oatgrass	Yes	GNRTNR	SE4						
Poaceae	*Glyceria maxima (Hartm.) Holmb.*	Rough Mannagrass	Yes	GNR	SE4						
Poaceae	*Lolium perenne L.*	Perennial Ryegrass	Yes	GNR	SE4						
Poaceae	*Panicum miliaceum L. subsp. miliaceum*	Proso Millet	Yes	GNRTNR	SE4						
Poaceae	*Poa nemoralis L.*	Eurasian Woodland Bluegrass	Yes	G5	SE4						
Poaceae	*Agrostis gigantea Roth*	Redtop	Yes	G4G5	SE5						
Poaceae	*Agrostis stolonifera L.*	Creeping Bentgrass	Yes	G5	SE5						
Poaceae	*Alopecurus pratensis L.*	Meadow Foxtail	Yes	GNR	SE5						
Poaceae	*Dactylis glomerata L.*	Orchard Grass	Yes	GNR	SE5						

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Poaceae	*Echinochloa crus-galli (L.) P.Beauv.*	Large Barnyard Grass	Yes	GNR	SE5						
Poaceae	*Elymus repens (L.) Gould*	Quackgrass	Yes	GNR	SE5						
Poaceae	*Eragrostis cilianensis (All.) Vignolo ex Janchen*	Stinkgrass	Yes	GNR	SE5						
Poaceae	*Lolium pratense (Huds.) Darbyshire*	Meadow Ryegrass	Yes	G5	SE5						
Poaceae	*Phleum pratense L. subsp. pratense*	Common Timothy	Yes	GNRTNR	SE5						
Poaceae	*Poa compressa L.*	Canada Bluegrass	Yes	GNR	SE5						
Poaceae	*Puccinellia distans (Jacq.) Parl.*	Spreading Alkaligrass	Yes	G5	SE5						
Poaceae	*Setaria pumila (Poir.) Roem. & Schult. subsp. pumila*	Yellow Foxtail	Yes	GNRTNR	SE5						
Poaceae	*Setaria viridis (L.) P.Beauv. var. viridis*	Green Foxtail	Yes	GNRTNR	SE5						
Polemoniaceae	*Phlox divaricata L.*	Wild Blue Phlox	No	G5	S4				HU		
Polemoniaceae	*Phlox paniculata L.*	Garden Phlox	Yes	G5	SE3						
Polygalaceae	*Polygala senega L.*	Seneca Snakeroot	No	G4G5	S4						
Polygalaceae	*Polygaloides paucifolia (Willd.) J.R. Abbott*	Fringed Milkwort	No	G5	S5				HU		
Polygonaceae	*Rumex palustris*	Marsh Dock	Yes								
Polygonaceae	*Persicaria virginiana (L.) Gaertner*	Virginia Smartweed	No	G5	S4				HU		
Polygonaceae	*Polygonum articulatum L.*	Northern Jointweed	No	G5	S4						
Polygonaceae	*Rumex verticillatus L.*	Swamp Dock	No	G5	S4				HR		
Polygonaceae	*Polygonum aviculare L.*	Prostrate Knotweed	No	G5	S4?						
Polygonaceae	*Persicaria amphibia (L.) Delarbe*	Water Smartweed	No	G5	S5						
Polygonaceae	*Persicaria lapathifolia (L.) Delarbre*	Pale Smartweed	No	G5	S5				HU		
Polygonaceae	*Persicaria pensylvanica (L.) M.Gomez*	Pennsylvania Smartweed	No	G5	S5				HU		
Polygonaceae	*Persicaria punctata (Elliott) Small*	Dotted Smartweed	No	G5	S5				HU		
Polygonaceae	*Polygonum achoreum S.F.Blake*	Leathery Knotweed	No	G5	S5				H?		
Polygonaceae	*Rumex britannica L.*	Greater Water Dock	No	G5	S5				HU		
Polygonaceae	*Fagopyrum esculentum Moench*	Common Buckwheat	Yes	GNR	SE3						
Polygonaceae	*Fallopia convolvulus (L.) A.Löve*	Eurasian Black Bindweed	Yes	GNR	SE5						
Polygonaceae	*Persicaria hydropiper (L.) Delarbre*	Marshpepper Smartweed	Yes	GNR	SE5						
Polygonaceae	*Persicaria maculosa Gray*	Spotted Lady's Thumb	Yes	G3G5	SE5						
Polygonaceae	*Reynoutria japonica Houtt. var. japonica*	Japanese Knotweed	Yes	GNR	SE5						
Polygonaceae	*Rumex acetosella L.*	Sheep Sorrel	Yes	GNR	SE5						
Polygonaceae	*Rumex crispus L.*	Curled Dock	Yes	GNR	SE5						
Polygonaceae	*Rumex obtusifolius L.*	Bitter Dock	Yes	GNR	SE5						
Pontederiaceae	*Pontederia cordata L.*	Pickerelweed	No	G5	S5						
Pontederiaceae	*Eichhornia crassipes (Mart.) Solms*	Common Water Hyacinth	Yes	G5	SE1						
Potamogetonaceae	*Potamogeton friesii Rupr.*	Fries' Pondweed	No	G5	S4				HR		
Potamogetonaceae	*Zannichellia palustris L.*	Horned Pondweed	No	G5	S4				HR		
Potamogetonaceae	*Potamogeton pusillus L.*	Small Pondweed	No	G5	S4?				HR		
Potamogetonaceae	*Potamogeton strictifolius A. Bennett*	Straight-leaved Pondweed	No	G5	S4S5				HR		

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Potamogetonaceae	*Potamogeton berchtoldii Fieber*	Narrow-leaved Small Pondweed	No	G5	S5				HR		
Potamogetonaceae	*Potamogeton foliosus Raf. subsp. foliosus*	Leafy Pondweed	No	G5T5	S5				HR		
Potamogetonaceae	*Potamogeton nodosus Poir.*	Long-leaved Pondweed	No	G5	S5				HR		
Potamogetonaceae	*Potamogeton zosteriformis Fern.*	Flat-stemmed Pondweed	No	G5	S5				HR		
Potamogetonaceae	*Stuckenia pectinata (L.) Börner*	Sago Pondweed	No	G5	S5				HU		
Potamogetonaceae	*Potamogeton crispus L.*	Curly-leaved Pondweed	Yes	G5	SE5						
Primulaceae	*Lysimachia quadriflora Sims*	Four-flowered Yellow Loosestrife	No	G5?	S4						
Primulaceae	*Lysimachia borealis (Raf.) U. Manns & Anderberg*	Northern Starflower	No	G5	S5						
Primulaceae	*Lysimachia ciliata L.*	Fringed Yellow Loosestrife	No	G5	S5						
Primulaceae	*Lysimachia punctata L.*	Spotted Yellow Loosestrife	Yes	GNR	SE3						
Primulaceae	*Lysimachia nummularia L.*	Creeping Yellow Loosestrife	Yes	GNR	SE5						
Pteridaceae	*Adiantum pedatum L.*	Northern Maidenhair Fern	No	G5	S5						
Ranunculaceae	*Thalictrum fendleri*	Fendler's Meadow Rue	Yes								
Ranunculaceae	*Actaea sp.*	Baneberry	?	G?	S?						
Ranunculaceae	*Ranunculus hispidus Michx. var. hispidus*	Bristly Buttercup	No	G5T5	S3				HR		
Ranunculaceae	*Thalictrum thalictroides (L.) A.J.Eames & B.Boivin*	Rue-anemone	No	G5	S3				HR		
Ranunculaceae	*Anemone cylindrica A.Gray*	Long-headed Anemone	No	G5	S4				HU		
Ranunculaceae	*Anemone virginiana var. alba (Oakes) Alph.Wood*	Riverbank Anemone	No	G5T4T5	S4						
Ranunculaceae	*Ranunculus fascicularis Muhlenb. ex Bigelow*	Early Buttercup	No	G5	S4						
Ranunculaceae	*Actaea pachypoda Elliott*	White Baneberry	No	G5	S5						
Ranunculaceae	*Actaea rubra (Aiton) Willd. subsp. rubra*	Red Baneberry	No	G5T5	S5						
Ranunculaceae	*Anemonastrum canadense (L.) Mosyakin*	Canada Anemone	No	G5	S5						
Ranunculaceae	*Anemone quinquefolia L. var. quinquefolia*	Wood Anemone	No	G5T5	S5						
Ranunculaceae	*Anemone virginiana L.*	Tall Anemone	No	G5	S5						
Ranunculaceae	*Aquilegia canadensis L.*	Red Columbine	No	G5	S5						
Ranunculaceae	*Clematis virginiana L.*	Virginia Clematis	No	G5	S5						
Ranunculaceae	*Coptis trifolia (L.) Salisb.*	Goldthread	No	G5	S5						
Ranunculaceae	*Hepatica acutiloba DC.*	Sharp-lobed Hepatica	No	G5	S5						
Ranunculaceae	*Hepatica americana (DC.) Ker Gawler*	Round-lobed Hepatica	No	G5	S5				HU		
Ranunculaceae	*Ranunculus abortivus L.*	Kidney-leaved Buttercup	No	G5	S5						
Ranunculaceae	*Ranunculus flammula L.*	Lesser Spearwort	No	G5	S5						
Ranunculaceae	*Ranunculus flammula L. var. reptans (L.) E.Meyer*	Creeping Spearwort	No	G5T5	S5						
Ranunculaceae	*Ranunculus hispidus var. caricetorum (Greene) T.Duncan*	Northern Swamp Buttercup	No	G5T5	S5						
Ranunculaceae	*Ranunculus pensylvanicus L.f.*	Pennsylvania Buttercup	No	G5	S5				HU		
Ranunculaceae	*Ranunculus recurvatus Poir. var. recurvatus*	Hooked Buttercup	No	G5T5	S5						
Ranunculaceae	*Ranunculus sceleratus L.*	Cursed Buttercup	No	G5	S5						
Ranunculaceae	*Thalictrum dioicum L.*	Early Meadow-rue	No	G5	S5						

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Ranunculaceae	*Thalictrum pubescens Pursh*	Tall Meadow-rue	No	G5	S5						
Ranunculaceae	*Caltha palustris L.*	Yellow Marsh Marigold	No	G5	S5						
Ranunculaceae	*Ficaria verna Huds.*	Fig-root Buttercup	Yes	GNR	SE1						
Ranunculaceae	*Ranunculus acris L.*	Tall Buttercup	Yes	G5	SE5						
Ranunculaceae	*Ranunculus repens L.*	Creeping Buttercup	Yes	GNR	SE5						
Rhamnaceae	*Ceanothus americanus L.*	New Jersey Tea	No	G5	S4						
Rhamnaceae	*Rhamnus cathartica L.*	European Buckthorn	Yes	GNR	SE5						
Rosaceae	*Amelanchier sp.*	Serviceberry	?	G?	S?						
Rosaceae	*Crataegus sp.*	Hawthorn	?	GNR	S?						
Rosaceae	*Geum sp.*	Geum	?	GNR	S?						
Rosaceae	*Rosa sp.*	Rose	?	GNR	S?						
Rosaceae	*Rubus sp.*	Raspberry	?	GNR	S?						
Rosaceae	*Crataegus margarettae Ashe*	Margarett's Hawthorn	No	G5?	S1						
Rosaceae	*Agrimonia pubescens Wallr.*	Soft Agrimony	No	G5	S4				HR		
Rosaceae	*Amelanchier spicata (Lam.) K.Koch*	Running Serviceberry	No	G5	S4				HU		
Rosaceae	*Crataegus calpodendron (Ehrh.) Medik.*	Pear Hawthorn	No	G5	S4				HU		
Rosaceae	*Crataegus dodgei Ashe*	Dodge's Hawthorn	No	G4	S4				HR		
Rosaceae	*Geum laciniatum Murray*	Rough Avens	No	G5	S4						
Rosaceae	*Malus coronaria (L.) Mill.*	Sweet Crabapple	No	G5	S4				HU		
Rosaceae	*Potentilla supina subsp. paradoxa (Nutt.) Sojak*	Bushy Cinquefoil	No	G5T5	S4				HR		
Rosaceae	*Prunus nigra Aiton*	Canada Plum	No	G4G5	S4				HU		
Rosaceae	*Rosa carolina L.*	Carolina Rose	No	G5	S4						
Rosaceae	*Rubus flagellaris Willd.*	Northern Dewberry	No	G5	S4				HU		
Rosaceae	*Amelanchier alnifolia (Nutt.) Nutt. ex M.Roem. var. alnifolia*	Saskatoon	No	G5T5	S4?				HR		
Rosaceae	*Agrimonia gryposepala Wallr.*	Hooked Agrimony	No	G5	S5						
Rosaceae	*Amelanchier arborea (F.Michx.) Fernald*	Downy Serviceberry	No	G5	S5						
Rosaceae	*Amelanchier laevis Wiegand*	Smooth Serviceberry	No	G5	S5				HU		
Rosaceae	*Comarum palustre L.*	Marsh Cinquefoil	No	G5	S5				HR		
Rosaceae	*Crataegus coccinea L.*	Scarlet Hawthorn	No	G5	S5						
Rosaceae	*Crataegus macracantha Lodd. ex Loudon*	Large-thorned Hawthorn	No	G5	S5				HU		
Rosaceae	*Crataegus punctata Jacq.*	Dotted Hawthorn	No	G5	S5						
Rosaceae	*Fragaria vesca L.*	Woodland Strawberry	No	G5	S5						
Rosaceae	*Fragaria virginiana Mill.*	Wild Strawberry	No	G5	S5						
Rosaceae	*Geum aleppicum Jacq.*	Yellow Avens	No	G5	S5						
Rosaceae	*Geum canadense Jacq.*	Canada Avens	No	G5	S5						
Rosaceae	*Potentilla anserina L.*	Silverweed	No	G5	S5						
Rosaceae	*Potentilla norvegica L.*	Rough Cinquefoil	No	G5	S5						
Rosaceae	*Potentilla simplex Michx.*	Old Field Cinquefoil	No	G5	S5				HU		

Family	*Scientific Name*	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Historic Record	Planted
Rosaceae	*Prunus pensylvanica L.f.*	Pin Cherry	No	G5	S5				HU		
Rosaceae	*Prunus serotina Ehrh. var. serotina*	Black Cherry	No	G5T5	S5						
Rosaceae	*Prunus virginiana L. var. virginiana*	Chokecherry	No	G5T5	S5						
Rosaceae	*Rosa blanda Aiton*	Smooth Rose	No	G5	S5						
Rosaceae	*Rosa palustris Marshall*	Swamp Rose	No	G5	S5				HU		
Rosaceae	*Rubus allegheniensis Porter*	Allegheny Blackberry	No	G5	S5						
Rosaceae	*Rubus idaeus L.*	Red Raspberry	No	G5	S5						
Rosaceae	*Rubus occidentalis L.*	Black Raspberry	No	G5	S5						
Rosaceae	*Rubus odoratus L.*	Purple-flowering Raspberry	No	G5	S5						
Rosaceae	*Rubus pubescens Raf.*	Dwarf Raspberry	No	G5	S5						
Rosaceae	*Sorbus decora (Sarg.) C.K.Schneid.*	Showy Mountain-ash	No	G5	S5						
Rosaceae	*Spiraea alba Du Roi*	White Meadowsweet	No	G5	S5						
Rosaceae	*Rubus idaeus subsp. strigosus (Michx.) Focke*	North American Red Raspberry	No	G5T5	S5						
Rosaceae	*Filipendula rubra (Hill) B.L.Robin.*	Queen-of-the-prairie	Yes	G4G5	SE1						
Rosaceae	*Malus baccata (L.) Borkh.*	Siberian Crabapple	Yes	GNR	SE1						
Rosaceae	*Rhodotypos scandens (Thunb.) Makino*	Black Jetbead	Yes	GNR	SE1						
Rosaceae	*Prunus mahaleb L.*	Mahaleb Cherry	Yes	G5	SE2						
Rosaceae	*Geum urbanum L.*	Wood Avens	Yes	G5	SE3						
Rosaceae	*Malus pumila Mill.*	Common Apple	Yes	G5	SE4						
Rosaceae	*Poterium sanguisorba var. polygamum (Waldst. & Kit.) Visiani*	Small Burnet	Yes	G5TNR	SE4						
Rosaceae	*Prunus avium (L.) L.*	Sweet Cherry	Yes	GNR	SE4						
Rosaceae	*Sorbus aucuparia L.*	European Mountain-ash	Yes	G5	SE4						
Rosaceae	*Potentilla argentea L.*	Silvery Cinquefoil	Yes	GNR	SE5						
Rosaceae	*Potentilla recta L.*	Sulphur Cinquefoil	Yes	GNR	SE5						
Rosaceae	*Rosa multiflora Thunb.*	Multiflora Rose	Yes	GNR	SE5						
Rosaceae	*Spiraea x vanhouttei (Briot) Carriere*	Van Houtte's Meadowsweet	Yes	GNA	SNA						
Rosaceae	*Rubus pensilvanicus Poir.*	Pennsylvania Blackberry	No	G5	SU						
Rosaceae	*Gillenia trifoliata (L.) Moench*	Bowman's-root	No	G4G5	SX				HE		
Rubiaceae	*Galium sp.*	Bedstraw	?	GNR	S?						
Rubiaceae	*Cephalanthus occidentalis L.*	Eastern Buttonbush	No	G5	S5				HU		
Rubiaceae	*Galium aparine L.*	Common Bedstraw	No	G5	S5						
Rubiaceae	*Galium asprellum Michx.*	Rough Bedstraw	No	G5	S5						
Rubiaceae	*Galium boreale L.*	Northern Bedstraw	No	G5	S5				HU		
Rubiaceae	*Galium circaezans Michx.*	Licorice Bedstraw	No	G5	S5						
Rubiaceae	*Galium palustre L.*	Common Marsh Bedstraw	No	G5	S5						
Rubiaceae	*Galium triflorum Michx.*	Three-flowered Bedstraw	No	G5	S5						
Rubiaceae	*Galium odoratum (L.) Scop.*	Sweet-scented Bedstraw	Yes	GNR	SE1						
Rutaceae	*Phellodendron amurense Rupr.*	Amur Corktree	Yes	GNR	SE1						

Family	*Scientific Name*	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Historic Record	Planted
Salicaceae	*Salix sp.*	Willow	?	GNR	S?						
Salicaceae	*Populus deltoides subsp. monilifera (Aiton) Eckenwalder*	Plains Cottonwood	No	G5T5	S2?						
Salicaceae	*Salix nigra Marshall*	Black Willow	No	G5	S4				HU		
Salicaceae	*Populus balsamifera L.*	Balsam Poplar	No	G5	S5						
Salicaceae	*Populus deltoides W.Bartram ex Marshall*	Eastern Cottonwood	No	G5	S5						
Salicaceae	*Populus deltoides W.Bartram ex Marshall subsp. deltoides*	Eastern Cottonwood	No	G5T5	S5						
Salicaceae	*Populus grandidentata Michx.*	Large-tooth Aspen	No	G5	S5						
Salicaceae	*Populus tremuloides Michx.*	Trembling Aspen	No	G5	S5						
Salicaceae	*Salix amygdaloides Andersson*	Peach-leaved Willow	No	G5	S5						
Salicaceae	*Salix discolor Muhlenb.*	Pussy Willow	No	G5	S5						
Salicaceae	*Salix eriocephala Michx.*	Cottony Willow	No	G5	S5						
Salicaceae	*Salix humilis Marshall var. humilis*	Prairie Willow	No	G5T5	S5				HR		
Salicaceae	*Salix interior Rowlee*	Sandbar Willow	No	GNR	S5						
Salicaceae	*Salix euxina I.V. Belyaeva*	Crack Willow	Yes	GNR	SE						
Salicaceae	*Salix alba L.*	White Willow	Yes	G5	SE4						
Salicaceae	*Salix purpurea L.*	Purple Willow	Yes	G5	SE4						
Salicaceae	*Salix x fragilis L.*	Hybrid White Willow	Yes	GNA	SNA						
Salicaceae	*Salix x sepulcralis Simonkai*	Golden Weeping Willow	Yes	GNA	SNA						
Salviniaceae	*Azolla caroliniana Willd.*	Eastern Mosquito Fern	No	G5	S1S2						
Santalaceae	*Comandra umbellata (L.) Nutt. subsp. umbellata*	Eastern Bastard Toad-flax	No	G5T5	S5				HU		
Sapindaceae	*Aesculus glabra Willd. var. glabra*	Ohio Buckeye	No	G5T5	S1						
Sapindaceae	*Acer nigrum F.Mich.*	Black Maple	No	G5	S4?						
Sapindaceae	*Acer negundo L.*	Manitoba Maple	No	G5	S5						
Sapindaceae	*Acer rubrum L.*	Red Maple	No	G5	S5						
Sapindaceae	*Acer saccharinum L.*	Silver Maple	No	G5	S5						
Sapindaceae	*Acer saccharum Marshall*	Sugar Maple	No	G5	S5						
Sapindaceae	*Acer spicatum Lam.*	Mountain Maple	No	G5	S5						
Sapindaceae	*Acer campestre L.*	Hedge Maple	Yes	GNR	SE1						
Sapindaceae	*Acer pseudoplatanus L.*	Sycamore Maple	Yes	GNR	SE1						
Sapindaceae	*Aesculus hippocastanum L.*	Horse Chestnut	Yes	GNR	SE2						
Sapindaceae	*Acer platanoides L.*	Norway Maple	Yes	GNR	SE5						
Sapindaceae	*Acer x freemanii E. Murray*	Freeman's Maple	No	GNA	SNA						
Saxifragaceae	*Tellima grandiflora (Pursh) Douglas ex Lindley*	Fringe Cups	Yes								
Saxifragaceae	*Chrysosplenium americanum Schwein. ex Hook.*	American Golden-saxifrage	No	G5	S4				HU		
Saxifragaceae	*Micranthes virginiensis (Michx) Small*	Early Saxifrage	No	G5	S5				HU		
Saxifragaceae	*Mitella diphylla L.*	Two-leaved Mitrewort	No	G5	S5						
Saxifragaceae	*Tiarella cordifolia L.*	Heart-leaved Foamflower	No	G5	S5						
Scrophulariaceae	*Scrophularia marilandica L.*	Carpenter's Figwort	No	G5	S4				HU		

Family	*Scientific Name*	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Historic Record	Planted
Scrophulariaceae	*Verbascum thapsus L. subsp. thapsus*	Great Mullein	Yes	GNR	SE5						
Simaroubaceae	*Ailanthus altissima (Mill.) Swingle*	Tree-of-heaven	Yes	GNR	SE5						
Smilacaceae	*Smilax herbacea L.*	Herbaceous Carrionflower	No	G5	S4?						
Smilacaceae	*Smilax tamnoides L.*	Bristly Greenbrier	No	G5	S5						
Solanaceae	*Solanum ptychanthum Dunal ex DC.*	Eastern Black Nightshade	No	G5	S5						
Solanaceae	*Solanum dulcamara L.*	Bittersweet Nightshade	Yes	GNR	SE5						
Thelypteridaceae	*Thelypteris palustris var. pubescens (G.Lawson) Fernald*	Marsh Fern	No	G5T5	S5						
Typhaceae	*Sparganium eurycarpum Engelm.*	Broad-fruited Burreed	No	G5	S5				HU		
Typhaceae	*Typha latifolia L.*	Broad-leaved Cattail	No	G5	S5						
Typhaceae	*Typha angustifolia L.*	Narrow-leaved Cattail	Yes	G5	SE5						
Typhaceae	*Typha x glauca Godron*	Blue Cattail	Yes	GNA	SNA						
Ulmaceae	*Ulmus americana L.*	White Elm	No	G5	S5						
Ulmaceae	*Ulmus rubra Muhlenb.*	Slippery Elm	No	G5	S5						
Ulmaceae	*Ulmus pumila L.*	Siberian Elm	Yes	GNR	SE3						
Urticaceae	*Parietaria pensylvanica Muhlenb. ex Willd.*	Pennsylvania Pellitory	No	G5	S4				HR		
Urticaceae	*Pilea fontana (Lunnell) Rydb.*	Lesser Clearweed	No	G5	S4				HU		
Urticaceae	*Boehmeria cylindrica (L.) Swartz*	Small-spike False Nettle	No	G5	S5						
Urticaceae	*Laportea canadensis (L.) Wedd.*	Canada Wood Nettle	No	G5	S5						
Urticaceae	*Pilea pumila (L.) A.Gray*	Canada Clearweed	No	G5	S5						
Urticaceae	*Urtica dioica L.*	Stinging Nettle	No	G5	S5						
Urticaceae	*Urtica dioica subsp. gracilis (Aiton) Selander*	Slender Stinging Nettle	No	G5T5	S5						
Urticaceae	*Urtica dioica L. subsp. dioica*	European Stinging Nettle	Yes	G5T5?	SE2						
Verbenaceae	*Verbena hastata L.*	Blue Vervain	No	G5	S5						
Verbenaceae	*Verbena urticifolia L.*	White Vervain	No	G5	S5						
Verbenaceae	*Verbena incompta P.W. Michael*	Common Clasping Vervain	Yes	GNR	SE1						
Violaceae	*Viola sp.*	Violet	?	GNR	S?						
Violaceae	*Viola sagittata Aiton*	Arrow-leaved Violet	No	G5	S4						
Violaceae	*Viola affinis Leconte*	Leconte's Violet	No	G5	S4?				HU		
Violaceae	*Viola pubescens Aiton*	Downy Yellow Violet	No	G5	S5						
Violaceae	*Viola sororia Willd.*	Woolly Blue Violet	No	G5	S5				HU		
Vitaceae	*Vitis aestivalis Michx.*	Summer Grape	No	G5	S4				HU		
Vitaceae	*Parthenocissus quinquefolia (L.) Planch. ex DC.*	Virginia Creeper	No	G5	S4?				H?		
Vitaceae	*Parthenocissus vitacea (Knerr) Hitchc.*	Thicket Creeper	No	G5	S5						
Vitaceae	*Vitis riparia Michx.*	Riverbank Grape	No	G5	S5						

Halton NAI (2006):
HR – Rare in Halton Region
HU – Uncommon in Halton Region

H? – Regional status unknown

Appendix 6: Carolinian, Prairie and Savannah Indicators in Lower Grindstone Heritage Lands

Appendix 6. Carolinian, Prairie and Savannah Indicator species at Lower Grindstone Heritage Lands.

Scientific Name	Common Name	Carolinian Zone	Prairie/Savannah
Asclepias tuberosa var. interior (Woodson) Shinners	Butterfly Milkweed		Yes
Symphyotrichum oolentangiense (Riddell) G.L.Nesom	Sky Blue Aster		Yes
Erigeron pulchellus Michx. var. pulchellus	Robin's-plantain Fleabane		Yes
Helianthus strumosus L.	Pale-leaved Sunflower		Yes
Symphyotrichum laeve (L.) Á.Löve & D.Löve var. laeve	Smooth Aster		Yes
Corylus americana Walter	American Hazelnut		Yes
Campanula gieseckeana Vest	Giesecke's Bellflower		Yes
Carex muehlenbergii Schkuhr ex Willd. var. muhlenbergii	Muhlenberg's Sedge		Yes
Vaccinium pallidum Aiton	Pale Blueberry		Yes
Desmodium canadense (L.) DC.	Canada Tick-trefoil		Yes
Lespedeza capitata Michx.	Round-head Bush-clover		Yes
Andropogon gerardi Vitman	Big Bluestem		Yes
Bromus kalmii A.Gray	Kalm's Brome		Yes
Sorghastrum nutans (L.) Nash	Yellow Indiangrass		Yes
Dichanthelium acuminatum (Swartz) Gould & C.A. Clark	Tapered Panicgrass		Yes
Polygala senega L.	Seneca Snakeroot		Yes
Anemone cylindrica A.Gray	Long-headed Anemone		Yes
Ranunculus fascicularis Muhlenb. ex Bigelow	Early Buttercup		Yes
Ceanothus americanus L.	New Jersey Tea		Yes
Rosa carolina L.	Carolina Rose		Yes
Amelanchier alnifolia (Nutt.) Nutt. ex M.Roem. var. alnifolia	Saskatoon		Yes
Comandra umbellata (L.) Nutt. subsp. umbellata	Eastern Bastard Toad-flax		Yes
Asimina triloba (L.) Dunal	Pawpaw	Yes	
Eurybia schreberi (Nees) Nees	Schreber's Aster	Yes	
Silphium perfoliatum L. var. perfoliatum	Cup Plant	Yes	
Euonymus obovatus Nutt.	Running Strawberry-bush	Yes	
Cornus florida L.	Eastern Flowering Dogwood	Yes	
Carex albicans Willd. ex Spreng. var. albicans	White-tinged Sedge	Yes	
Dioscorea villosa L.	Wild Yam	Yes	

Scientific Name	Common Name	Carolinian Zone	Prairie/Savannah
Gleditsia triacanthos L.	Honey Locust	Yes	
Desmodium cuspidatum (Muhlenb. ex Willd.) DC. ex G.Don	Largebract Tick-trefoil	Yes	Yes
Strophostyles helvola (L.) Elliott	Trailing Wild Bean	Yes	
Quercus velutina Lam.	Black Oak	Yes	
Frasera caroliniensis Walter	American Columbo	Yes	
Carya glabra (Mill.) Sweet	Pignut Hickory	Yes	
Juglans nigra L.	Black Walnut	Yes	
Collinsonia canadensis L.	Canada Horsebalm	Yes	
Prosartes lanuginosa (Michx.) D.Don	Yellow Fairybells	Yes	
Liriodendron tulipifera L.	Tulip Tree	Yes	
Aureolaria pedicularia (L.) Raf.	Fern-leaved Yellow False Foxglove	Yes	Yes
Corydalis flavula (Raf.) DC.	Yellow Corydalis	Yes	
Platanus occidentalis L.	Sycamore	Yes	
Sphenopholis nitida (Biehler) Scribn.	Shiny Wedgegrass	Yes	
Persicaria virginiana (L.) Gaertner	Virginia Smartweed	Yes	
Thalictrum thalictroides (L.) A.J.Eames & B.Boivin	Rue-anemone	Yes	
Crataegus dodgei Ashe	Dodge's Hawthorn	Yes	
Malus coronaria (L.) Mill.	Sweet Crabapple	Yes	
Azolla caroliniana Willd.	Eastern Mosquito Fern	Yes	
Vitis aestivalis Michx.	Summer Grape	Yes	

Appendix 7: Fauna species in Lower Grindstone Heritage Lands

Appendix 7. Fauna species in Lower Grindstone Heritage Lands.

Scientific Name	Common Name	Introduced	G-Rank	S-Rank	COSEWIC	SARA	ESA	Halton NAI	Area_Sensitive
Amphibian									
Necturus maculosus	Mudpuppy		G5	S4				HR	YES
Notophthalmus viridescens viridescens	Red-spotted Newt		G5T5	S5					
Ambystoma laterale	Blue-spotted Salamander		G5	S4				HR	
Ambystoma maculatum	Spotted Salamander		G5	S4				HU	YES
Plethodon cinereus	Eastern Red-backed Salamander		G5	S5					
Pseudacris crucifer	Spring Peeper		G5	S5					
Pseudotriton ruber rube	Northern Red Salamander	YES	G5	S4					
Anaxyrus americanus	American Toad		G5	S5					
Hyla versicolor	Gray Treefrog		G5	S5					
Pseudacris maculata	Western Chorus Frog (Great Lakes/ St. Lawrence population)		G5TNR	S3	THR	THR			YES
Pseudacris triseriata	Boreal Chorus Frog (Western Chorus Frog - Carolinian Population)		G5TNR	S4					
Lithobates catesbeianus	American Bullfrog		G5	S4				HU	YES
Lithobates clamitans	Green Frog		G5	S5					
Lithobates palustris	Pickerel Frog		G5	S4				HU	YES
Lithobates pipiens	Northern Leopard Frog		G5	S5					YES
Lithobates sylvaticus	Wood Frog		G5	S5					YES
Bird									
Ammodramus nelsoni	Nelson's Sparrow		G5	S4B					
Chen rossii	Ross's Goose								
Corvus ossifragus	Fish Crow								
Helmitheros vermivorum	Worm-eating Warbler								
Setophaga dominica	Yellow-throated Warbler								
Branta canadensis	Canada Goose		G5	S5					
Cygnus olor	Mute Swan	YES	G5	SNA				HU	
Cygnus buccinator	Trumpeter Swan		G4	S4					
Cygnus columbianus	Tundra Swan		G5	S4					
Aix sponsa	Wood Duck		G5	S5					
Mareca strepera	Gadwall		G5	S4				HU	
Mareca americana	American Wigeon		G5	S4				HU	
Anas rubripes	American Black Duck		G5	S4				HU	
Anas platyrhynchos	Mallard		G5	S5					
Spatula discors	Blue-winged Teal		G5	S4				HU	
Spatula clypeata	Northern Shoveler		G5	S4					
Anas acuta	Northern Pintail		G5	S5					YES
Anas crecca	Green-winged Teal		G5	S4					

Aythya valisineria	Canvasback		G5	S1B,S4N					YES
Aythya americana	Redhead		G5	S2B,S4N					YES
Aythya collaris	Ring-necked Duck		G5	S5					
Aythya marila	Greater Scaup		G5	S4					
Aythya affinis	Lesser Scaup		G5	S4					
Clangula hyemalis	Long-tailed Duck		G5	S3B					
Bucephala albeola	Bufflehead		G5	S4					
Bucephala clangula	Common Goldeneye		G5	S5					YES
Lophodytes cucullatus	Hooded Merganser		G5	S5B,S5N				HU	
Mergus merganser	Common Merganser		G5	S5B,S5N					YES
Mergus serrator	Red-breasted Merganser		G5	S4B,S5N				HU	YES
Oxyura jamaicensis	Ruddy Duck		G5	S4B,S4N					
Bonasa umbellus	Ruffed Grouse		G5	S4					
Meleagris gallopavo	Wild Turkey		G5	S5				HU	
Gavia immer	Common Loon		G5	S5B,S5N					YES
Podilymbus podiceps	Pied-billed Grebe		G5	S4B,S4N				HU	
Podiceps auritus	Horned Grebe		G5	S1B,S4N	SC	SC	SC		
Pelecanus erythrorhynchos	American White Pelican		G4	S2B			THR		
Phalacrocorax auritus	Double-crested Cormorant		G5	S5B					
Botaurus lentiginosus	American Bittern		G5	S4B				HR	YES
Ixobrychus exilis	Least Bittern		G4G5	S4B	THR	THR	THR	HR	YES
Ardea herodias	Great Blue Heron		G5	S4					
Ardea alba	Great Egret		G5	S2B					
Butorides virescens	Green Heron		G5	S4B				HU	
Nycticorax nycticorax	Black-crowned Night-heron		G5	S3B,S3N				HU	
Cathartes aura	Turkey Vulture		G5	S5B					
Pandion haliaetus	Osprey		G5	S5B				HR	
Haliaeetus leucocephalus	Bald Eagle		G5	S2N,S4B			SC		YES
Circus cyaneus	Northern Harrier		G5	S4B				HU	YES
Accipiter striatus	Sharp-shinned Hawk		G5	S5				HU	YES
Accipiter cooperii	Cooper's Hawk		G5	S4				HU	YES
Accipiter gentilis	Northern Goshawk		G5	S4				HU	YES
Buteo lineatus	Red-shouldered Hawk		G5	S4B		SC		HR	YES
Buteo platypterus	Broad-winged Hawk		G5	S5B				HR	YES
Buteo jamaicensis	Red-tailed Hawk		G5	S5					
Buteo lagopus	Rough-legged Hawk		G5	S1B,S4N					
Aquila chrysaetos	Golden Eagle		G5	S2B			END		
Falco sparverius	American Kestrel		G5	S4					
Falco columbarius	Merlin		G5	S5B				HU	
Falco peregrinus	Peregrine Falcon		G4	S3B	SC	SC	THR		

Rallus limicola	Virginia Rail		G5	S5B					
Porzana carolina	Sora		G5	S4B				HU	
Gallinula galeata	Common Gallinule		G5	S4B				HR	
Fulica americana	American Coot		G5	S4B					YES
Grus canadensis	Sandhill Crane		G5	S5B					YES
Pluvialis squatarola	Black-bellied Plover		G5	S4N					
Pluvialis dominica	American Golden-Plover		G5	S2B,S4N					
Charadrius semipalmatus	Semipalmated Plover		G5	S4B,S4N					
Charadrius vociferus	Killdeer		G5	S5B,S5N					
Tringa melanoleuca	Greater Yellowlegs		G5	S4B,S4N					
Tringa flavipes	Lesser Yellowlegs		G5	S4B,S4N					
Tringa solitaria	Solitary Sandpiper		G5	S4B					
Tringa semipalmata	Willet		G5	SNA					
Actitis macularius	Spotted Sandpiper		G5	S5					
Arenaria interpres	Ruddy Turnstone		G5	SNA					
Calidris canutus rufa	Red Knot rufa subspecies		G4T2	S1N	END	END	END		
Calidris alba	Sanderling		G5	S5N					
Calidris pusilla	Semipalmated Sandpiper		G5	S3B,S4N					
Calidris minutilla	Least Sandpiper		G5	S4B,S5N					
Calidris fuscicollis	White-rumped Sandpiper		G5	S5N					
Calidris bairdii	Baird's Sandpiper		G5	SNA					
Calidris melanotos	Pectoral Sandpiper		G5	SHB,S5N					
Calidris alpina	Dunlin		G5	S4B,S5N					
Calidris himantopus	Stilt Sandpiper		G5	S4B,S4N					
Limnodromus griseus	Short-billed Dowitcher		G5	S3B,S4N					
Gallinago delicata	Wilson's Snipe		G5	S5B				HU	
Scolopax minor	American Woodcock		G5	S4B					
Phalaropus tricolor	Wilson's Phalarope		G5	S3B					
Larus fuscus	Lesser Black-backed Gull		G5	SNA				HR	
Larus hyperboreus	Glaucous Gull		G5	S4N					
Larus marinus	Great Black-backed Gull		G5	S2B					
Chroicocephalus philadelphia	Bonaparte's Gull		G5	S4B,S4N					
Larus delawarensis	Ring-billed Gull		G5	S5B,S4N					
Larus argentatus	Herring Gull		G5	S5B,S5N					
Hydroprogne caspia	Caspian Tern		G5	S3B					
Sterna hirundo	Common Tern		G5	S4B					
Sterna forsteri	Forster's Tern		G5	S2B	DD		DD		YES
Chlidonias niger	Black Tern		G4	S3B		SC	SC		YES
Columba livia	Rock Pigeon	YES	G5	SNA					
Zenaida macroura	Mourning Dove		G5	S5					

Coccyzus erythropthalmus	Black-billed Cuckoo		G5	S5B				HU	
Coccyzus americanus	Yellow-billed Cuckoo		G5	S4B				HR	
Megascops asio	Eastern Screech-owl		G5	S4					
Bubo virginianus	Great Horned Owl		G5	S4					
Asio otus	Long-eared Owl		G5	S4				HR	
Asio flammeus	Short-eared Owl		G5	S2N,S4B	SC	SC	SC		YES
Aegolius acadicus	Northern Saw-whet Owl		G5	S4					
Chordeiles minor	Common Nighthawk		G5	S4B	SC	THR		HR	
Antrostomus vociferus	Eastern Whip-poor-will		G5	S4B	THR	THR	THR	HR	YES
Chaetura pelagica	Chimney Swift		G4G5	S4B,S4N	THR	THR		HU	
Archilochus colubris	Ruby-throated Hummingbird		G5	S5B					
Megaceryle alcyon	Belted Kingfisher		G5	S4B					
Melanerpes erythrocephalus	Red-headed Woodpecker		G5	S4B	END	THR	SC	HR	
Melanerpes carolinus	Red-bellied Woodpecker		G5	S4				HU	
Sphyrapicus varius	Yellow-bellied Sapsucker		G5	S5B				HU	YES
Picoides pubescens	Downy Woodpecker		G5	S5					
Picoides villosus	Hairy Woodpecker		G5	S5					YES
Colaptes auratus	Northern Flicker		G5	S4B					
Dryocopus pileatus	Pileated Woodpecker		G5	S5				HU	YES
Contopus cooperi	Olive-sided Flycatcher		G4	S4B	SC	THR	SC		
Contopus virens	Eastern Wood-pewee		G5	S4B	SC	SC	SC		
Empidonax flaviventris	Yellow-bellied Flycatcher		G5	S5B					
Empidonax virescens	Acadian Flycatcher		G5	S2S3B	END	END	END		
Empidonax alnorum	Alder Flycatcher		G5	S5B					YES
Empidonax traillii	Willow Flycatcher		G5	S5B				HU	
Empidonax minimus	Least Flycatcher		G5	S4B				HU	YES
Sayornis phoebe	Eastern Phoebe		G5	S5B					
Tyrannus tyrannus	Eastern Kingbird		G5	S4B					
Myiarchus crinitus	Great Crested Flycatcher		G5	S4B					
Lanius ludovicianus	Loggerhead Shrike		G4	S2B	END	END	END	HR	
Lanius borealis	Northern Shrike		G5	SNA					
Vireo griseus	White-eyed Vireo		G5	S2B					
Vireo flavifrons	Yellow-throated Vireo		G5	S4B				HR	YES
Vireo solitarius	Blue-headed Vireo		G5	S5B				HU	YES
Vireo gilvus	Warbling Vireo		G5	S5B					
Vireo philadelphicus	Philadelphia Vireo		G5	S5B					
Vireo olivaceus	Red-eyed Vireo		G5	S5B					
Cyanocitta cristata	Blue Jay		G5	S5					
Corvus brachyrhynchos	American Crow		G5	S5B					
Corvus corax	Common Raven		G5	S5				HR	

Eremophila alpestris	Horned Lark		G5	S5B				HU	
Progne subis	Purple Martin		G5	S4B				HU	
Tachycineta bicolor	Tree Swallow		G5	S4B					
Stelgidopteryx serripennis	Northern Rough-winged Swallow		G5	S4B				HU	
Riparia riparia	Bank Swallow		G5	S4B	THR	THR	THR		
Petrochelidon pyrrhonota	Cliff Swallow		G5	S4B					
Hirundo rustica	Barn Swallow		G5	S4B	THR	THR	THR		
Poecile atricapillus	Black-capped Chickadee		G5	S5					
Baeolophus bicolor	Tufted Titmouse		G5	S4				HU	YES
Sitta canadensis	Red-breasted Nuthatch		G5	S5				HU	YES
Sitta carolinensis	White-breasted Nuthatch		G5	S5					YES
Certhia americana	Brown Creeper		G5	S5B				HU	YES
Thryothorus ludovicianus	Carolina Wren		G5	S4				HR	
Troglodytes aedon	House Wren		G5	S5B					
Troglodytes hiemalis	Winter Wren		G5	S5B				HU	YES
Cistothorus platensis	Sedge Wren		G5	S4B					
Cistothorus palustris	Marsh Wren		G5	S4B				HU	
Regulus satrapa	Golden-crowned Kinglet		G5	S5B				HR	
Regulus calendula	Ruby-crowned Kinglet		G5	S4B					
Polioptila caerulea	Blue-gray Gnatcatcher		G5	S4B				HU	YES
Sialia sialis	Eastern Bluebird		G5	S5B				HU	
Catharus fuscescens	Veery		G5	S4B					YES
Catharus minimus	Gray-cheeked Thrush		G5	S4B					
Catharus ustulatus	Swainson's Thrush		G5	S4B					
Catharus guttatus	Hermit Thrush		G5	S5B					YES
Hylocichla mustelina	Wood Thrush		G4	S4B	THR	THR			
Turdus migratorius	American Robin		G5	S5B					
Dumetella carolinensis	Gray Catbird		G5	S4B					
Mimus polyglottos	Northern Mockingbird		G5	S4				HU	
Toxostoma rufum	Brown Thrasher		G5	S4B					
Sturnus vulgaris	European Starling	YES	G5	SNA					
Anthus rubescens	American Pipit		G5	S4					
Bombycilla cedrorum	Cedar Waxwing		G5	S5B					
Vermivora chrysoptera	Golden-winged Warbler		G4	S4B	THR	THR	SC	HR	
Oreothlypis peregrina	Tennessee Warbler		G5	S5B					
Oreothlypis celata	Orange-crowned Warbler		G5	S4B					
Oreothlypis ruficapilla	Nashville Warbler		G5	S5B				HR	
Setophaga americana	Northern Parula		G5	S4B					YES
Setophaga petechia	Yellow Warbler		G5	S5B					
Setophaga pensylvanica	Chestnut-sided Warbler		G5	S5B				HU	

Setophaga magnolia	Magnolia Warbler		G5	S5B				HR	YES
Setophaga tigrina	Cape May Warbler		G5	S5B					
Setophaga caerulescens	Black-throated Blue Warbler		G5	S5B				HR	YES
Setophaga coronata	Yellow-rumped Warbler		G5	S5B				HR	
Setophaga virens	Black-throated Green Warbler		G5	S5B				HU	YES
Setophaga fusca	Blackburnian Warbler		G5	S5B				HR	YES
Setophaga pinus	Pine Warbler		G5	S5B				HU	YES
Setophaga discolor	Prairie Warbler		G5	S3B					
Setophaga palmarum hypochrysea	Eastern Palm Warbler		G5TU	S1B					
Setophaga palmarum palmarum	Western Palm Warbler		G5T5	S5B					
Setophaga castanea	Bay-breasted Warbler		G5	S5B					
Setophaga striata	Blackpoll Warbler		G5	S4B					
Setophaga cerulea	Cerulean Warbler		G4	S3B	END	END	SC		YES
Mniotilta varia	Black-and-white Warbler		G5	S5B				HU	YES
Setophaga ruticilla	American Redstart		G5	S5B					YES
Protonotaria citrea	Prothonotary Warbler		G5	S1B	END	END	END		YES
Seiurus aurocapilla	Ovenbird		G5	S4B					YES
Parkesia noveboracensis	Northern Waterthrush		G5	S5B				HU	
Parkesia motacilla	Louisiana Waterthrush		G5	S3B	THR	SC	SC	HR	
Oporornis agilis	Connecticut Warbler		G4G5	S4B					
Geothlypis philadelphia	Mourning Warbler		G5	S4B				HU	
Geothlypis trichas	Common Yellowthroat		G5	S5B					
Setophaga citrina	Hooded Warbler		G5	S4B				HR	
Cardellina pusilla	Wilson's Warbler		G5	S4B					
Cardellina canadensis	Canada Warbler		G5	S4B	THR	THR		HR	YES
Icteria virens	Yellow-breasted Chat		G5	S1B	END	END	SC		
Piranga olivacea	Scarlet Tanager		G5	S4B					YES
Pipilo erythrophthalmus	Eastern Towhee		G5	S4B				HU	
Spizella arborea	American Tree Sparrow		G5	S4B					
Spizella passerina	Chipping Sparrow		G5	S5B					
Spizella pallida	Clay-colored Sparrow		G5	S4B					
Spizella pusilla	Field Sparrow		G5	S4B					
Pooecetes gramineus	Vesper Sparrow		G5	S4B				HU	
Passerculus sandwichensis	Savannah Sparrow		G5	S4B					YES
Ammodramus savannarum	Grasshopper Sparrow		G5	S4B	SC	SC		HU	YES
Passerella iliaca	Fox Sparrow		G5	S4B					
Melospiza melodia	Song Sparrow		G5	S5B					
Melospiza lincolnii	Lincoln's Sparrow		G5	S5B					
Melospiza georgiana	Swamp Sparrow		G5	S5B					
Zonotrichia albicollis	White-throated Sparrow		G5	S5B				HU	

Zonotrichia leucophrys	White-crowned Sparrow		G5	S4B					
Junco hyemalis	Dark-eyed Junco		G5	S5B					
Plectrophenax nivalis	Snow Bunting		G5	SNA					
Cardinalis cardinalis	Northern Cardinal		G5	S5					
Pheucticus ludovicianus	Rose-breasted Grosbeak		G5	S4B					
Passerina cyanea	Indigo Bunting		G5	S4B					
Dolichonyx oryzivorus	Bobolink		G5	S4B	THR	THR	THR		YES
Agelaius phoeniceus	Red-winged Blackbird		G5	S4					
Sturnella magna	Eastern Meadowlark		G5	S4B	THR	THR	THR		YES
Euphagus carolinus	Rusty Blackbird		G4	S4B	SC	SC			
Quiscalus quiscula	Common Grackle		G5	S5B					
Molothrus ater	Brown-headed Cowbird		G5	S4B					
Icterus spurius	Orchard Oriole		G5	S4B				HR	
Icterus galbula	Baltimore Oriole		G5	S4B					
Pinicola enucleator	Pine Grosbeak		G5	S4B					
Haemorphous purpureus	Purple Finch		G5	S4B				HU	
Haemorhous mexicanus	House Finch	YES	G5	SNA					
Acanthis flammea	Common Redpoll		G5	S4B					
Acanthis hornemanni	Hoary Redpoll		G5	SNA					
Spinus pinus	Pine Siskin		G5	S4B					
Spinus tristis	American Goldfinch		G5	S5B					
Coccothraustes vespertinus	Evening Grosbeak		G5	S4B	SC				
Passer domesticus	House Sparrow	YES	G5	SNA					
Butterfly/Moth									
Ctenucha virginica	Virginia Ctenucha		G5	S5					
Haploa confusa	Confused Hapola		G5	S5					
Trichodezia albovittata	White-striped Black Moth		G5	SNR					
Anatrytone logan	Delaware Skipper		G5	S4					
Ancyloxypha numitor	Least Skipper		G5	S5					
Carterocephalus palaemon	Arctic Skipper		G5	S5					
Epargyreus clarus	Silver-spotted Skipper		G5	S4					
Erynnis baptisiae	Wild Indigo Duskywing		G5	S4					
Erynnis juvenalis	Juvenal's Duskywing		G5	S5				HR	
Erynnis lucilius	Columbine Duskywing		G5	S4				HR	
Euphyes conspicua	Black Dash		G4	S3				HR	
Euphyes dion	Dion Skipper		G4	S4				HU	
Euphyes vestris	Dun Skipper		G5	S5					
Hylephila phyleus	Fiery Skipper		G5	SNA					
Pholisora catullus	Common Sootywing		G5	S4				HR	
Poanes hobomok	Hobomok Skipper		G5	S5					

Polites mystic	Long Dash Skipper		G5	S5					
Polites origenes	Crossline Skipper		G4G5	S4					
Polites peckius	Peck's Skipper		G5	S5					
Polites themistocles	Tawny-edged Skipper		G5	S5					
Pompeius verna	Little Glassywing		G5	S4				HR	
Thorybes pylades	Northern Cloudywing		G5	S5					
Thymelicus lineola	European Skipper	YES	G5	SNA					
Wallengrenia egeremet	Northern Broken-Dash		G5	S5				HR	
Papilio canadensis	Canadian Tiger Swallowtail		G5	S5					
Papilio cresphontes	Giant Swallowtail		G5	S4					
Papilio glaucus	Eastern Tiger Swallowtail		G5	S5					
Papilio polyxenes	Black Swallowtail		G5	S5					
Papilio troilus	Spicebush Swallowtail		G4?	S4				HR	
Colias eurytheme	Orange Sulphur		G5	S5					
Colias philodice	Clouded Sulphur		G5	S5					
Pieris rapae	Cabbage White	YES	G5	SNA					
Pieris virginiensis	West Virginia White		G3	S3			SC		
Celastrina ladon	Spring Azure		G4G5	SU					
Celastrina neglecta	Summer Azure		G5	S5					
Cupido comyntas	Eastern Tailed Blue		G5	S5					
Feniseca tarquinius	Harvester		G5	S4				HR	
Glaucopsyche lygdamus	Silvery Blue		G5	S5					
Satyrium acadica	Acadian Hairstreak		G5	S4				HU	
Satyrium calanus	Banded Hairstreak		G5	S4					
Satyrium caryaevorus	Hickory Hairstreak		G4	S4					
Satyrium edwardsii	Edwards' Hairstreak		G5	S4				HR	
Satyrium liparops	Striped Hairstreak		G5	S5					
Satyrium titus	Coral Hairstreak		G5	S5				HU	
Strymon melinus	Gray Hairstreak		G5	S4					
Aglais milberti	Milbert's Tortoiseshell		G5	S5				HR	
Asterocampa clyton	Tawny Emperor		G5	S3				HR	
Cercyonis pegala	Common Wood-Nymph		G5	S5					
Chlosyne nycteis	Silvery Checkerspot		G5	S5				HU	
Coenonympha tullia	Common Ringlet		G5	S5					
Danaus plexippus	Monarch		G4	S2N,S4B	END	SC	SC		
Euptoieta claudia	Variegated Fritillary		G5	SNA					
Junonia coenia	Common Buckeye		G5	SNA					
Lethe anthedon	Northern Pearly-Eye		G5	S5					
Libytheana carinenta	American Snout		G5	SNA					
Limenitis archippus	Viceroy		G5	S5					

Limenitis arthemis arthemis	White Admiral		G5T5	S5					
Limenitis arthemis astyanax	Red-spotted Purple		G5T5	S5					
Megisto cymela	Little Wood-Satyr		G5	S5					
Nymphalis antiopa	Mourning Cloak		G5	S5					
Nymphalis l-album	Compton Tortoiseshell		G5	S5				HU	
Phyciodes cocyta	Northern Crescent		G5	S5					
Phyciodes tharos	Pearl Crescent		G5	S4					
Polygonia comma	Eastern Comma		G5	S5					
Polygonia interrogationis	Question Mark		G5	S5					
Polygonia progne	Gray Comma		G5	S5				HR	
Speyeria aphrodite	Aphrodite Fritillary		G5	S5				HU	
Speyeria cybele	Great Spangled Fritillary		G5	S5					
Vanessa atalanta	Red Admiral		G5	S5					
Vanessa cardui	Painted Lady		G5	S5					
Vanessa virginiensis	American Lady		G5	S5					
Dragonfly/Damselfly									
Cordulegaster obliqua	Arrowhead Spiketail		G4	S2					
Arigomphus villosipes	Unicorn Clubtail		G5	S3				HU	
Aeshna constricta	Lance-tipped Darner		G5	S5					
Aeshna interrupta interrupta	Variable (Interrupted) Darner		G5T5	S5				HR	
Aeshna umbrosa	Shadow Darner		G5	S5				HU	
Anax junius	Common Green Darner		G5	S5					
Epiaeschna heros	Swamp Darner		G5	S2S3				HR	
Epitheca princeps	Prince Baskettail		G5	S5				HR	
Somatochlora walshii	Brush-tipped Emerald		G5	S4				HU	
Celithemis elisa	Calico Pennant		G5	S5					
Celithemis eponina	Halloween Pennant		G5	S4				HR	
Erythemis simplicicollis	Eastern Pondhawk		G5	S5					
Ladona julia	Chalk-fronted Corporal		G5	S5					
Leucorrhinia intacta	Dot-tailed Whiteface		G5	S5					
Libellula luctuosa	Widow Skimmer		G5	S5					
Libellula pulchella	Twelve-spotted Skimmer		G5	S5					
Libellula quadrimaculata	Four-spotted Skimmer		G5	S5					
Pachydiplax longipennis	Blue Dasher		G5	S5					
Pantala flavescens	Wandering Glider		G5	S4				HR	
Pantala hymenaea	Spot-winged Glider		G5	S4				HR	
Perithemis tenera	Eastern Amberwing		G5	S4				HU	
Plathemis lydia	Common Whitetail		G5	S5					
Sympetrum internum	Cherry-faced Meadowhawk		G5	S5					
Sympetrum obtrusum	White-faced Meadowhawk		G5	S5					

Sympetrum rubicundulum	Ruby Meadowhawk		G5	S5					
Sympetrum semicinctum	Band-winged Meadowhawk		G5	S4				HU	
Sympetrum vicinum	Autumn Meadowhawk		G5	S5				HU	
Tramea lacerata	Black Saddlebags		G5	S4					
Tramea onusta	Red Saddlebags		G5	SNA					
Calopteryx maculata	Ebony Jewelwing		G5	S5					
Hetaerina americana	American Rubyspot		G5	S4				HR	
Lestes congener	Spotted Spreadwing		G5	S5				HU	
Lestes disjunctus	Northern Spreadwing		G5	S5				HR	
Lestes dryas	Emerald Spreadwing		G5	S5					
Lestes rectangularis	Slender Spreadwing		G5	S5					
Lestes unguiculatus	Lyre-tipped Spreadwing		G5	S5				HU	
Lestes vigilax	Swamp Spreadwing		G5	S4					
Amphiagrion saucium	Eastern Red Damsel		G5	S4				HR	
Argia apicalis	Blue-fronted Dancer		G5	S4				HR	
Argia fumipennis violacea	Violet Dancer		G5T5	S5				HU	
Argia moesta	Powdered Dancer		G5	S5				HR	
Coenagrion resolutum	Taiga Bluet		G5	S5				HR	
Enallagma anna	River Bluet		G5	S2					
Enallagma antennatum	Rainbow Bluet		G5	S4				HR	
Enallagma carunculatum	Tule Bluet		G5	S5				HR	
Enallagma civile	Familiar Bluet		G5	S5					
Enallagma ebrium	Marsh Bluet		G5	S5					
Enallagma exsulans	Stream Bluet		G5	S5				HR	
Enallagma geminatum	Skimming Bluet		G5	S4				HR	
Enallagma signatum	Orange Bluet		G5	S4				HR	
Ischnura posita	Fragile Forktail		G5	S4				HR	
Ischnura verticalis	Eastern Forktail		G5	S5					
Nehalennia irene	Sedge Sprite		G5	S5				HU	
Mussel									
Anodontoides ferussacianus	Cylindrical Papershell			S4					
Elliptio complanata	Eastern Elliptio			S5					
Lampsilis siliquoidea	Fatmucket			S5					
Lasmigona compressa	Creek Heelsplitter			S5					
Leptodea fragilis	Fragile Papershell			S4					
Ligumia nasuta	Eastern Pondmussel			S1	END	END	END		
Potamilus alatus	Pink Heelsplitter								
Pyganodon grandis	Giant Floater			S5					
Quadrula quadrula	Mapleleaf								
Toxolasma parvum	Lilliput			S1	END	END			

Utterbackia imbecilis	Paper Pondshell			S2					
Fish									
Petromyzon marinus	Sea Lamprey	YES	G5	SNA				HR	
Amia calva	Bowfin		G5	S4				HR	
Anguilla rostrata	American Eel		G4	S1?	THR	NS	END	HR	
Alosa pseudoharengus	Alewife	YES	G5	SNA					
Dorosoma cepedianum	Gizzard Shad		G5	S4				HR	
Carassius auratus	Goldfish	YES	G5	SNA					
Clinostomus elongatus	Redside Dace		G3G4	S2	END	END	END	HR	
Cyprinella spiloptera	Spotfin Shiner		G5	S4				HR	
Cyprinus carpio	Common Carp	YES	G5	S4					
Hybognathus hankinsoni	Brassy Minnow		G5	S5				HR	
Luxilus chrysocephalus	Striped Shiner		G5	S4				HR	
Nocomis biguttatus	Hornyhead Chub		G5	S4				HR	
Nocomis micropogon	River Chub		G5	S4				HR	
Notemigonus crysoleucas	Golden Shiner		G5	S5				HR	
Notropis atherinoides	Emerald Shiner		G5	S5				HR	
Notropis cornutus	Common Shiner		G5	S4				HU	
Notropis heterolepis	Blacknose Shiner		G4	S4				HR	
Notropis hudsonius	Spottail Shiner		G5	S5				HR	
Notropis volucellus	Mimic Shiner		G5	S5				HR	
Phoxinus eos	Northern Redbelly Dace		G5	S5				HR	
Pimephales notatus	Bluntnose Minnow		G5	S5					
Pimephales promelas	Fathead Minnow		G5	S5					
Rhinichthys atratulus	Blacknose Dace		G5	SNR				HU	
Rhinichthys cataractae	Longnose Dace		G5	S5				HU	
Semotilus atromaculatus	Creek Chub		G5	S5					
Catostomus commersoni	White Sucker		G5	S5					
Hypentelium nigricans	Northern Hog Sucker		G5	S4				HU	
Ictiobus cyprinellus	Bigmouth Buffalo		G5	SU				HR	
Moxostoma macrolepidotum	Shorthead Redhorse		G5	S5				HR	
Ameiurus melas	Black Bullhead		G5	S4				HR	
Ameiurus nebulosus	Brown Bullhead		G5	S5				HR	
Noturus flavus	Stonecat		G5	SNA				HR	
Noturus gyrinus	Tadpole Madtom		G5	S4				HR	
Esox lucius	Northern Pike		G5	S5				HR	
Umbra limi	Central Mudminnow		G5	S5				HU	
Oncorhynchus gorbuscha	Pink Salmon	YES	G5	SNA				HR	
Oncorhynchus kisutch	Coho Salmon	YES	G5	SNA	THR				
Oncorhynchus mykiss	Rainbow Trout	YES	G5	SNA					

Oncorhynchus tshawytscha	Chinook Salmon	YES	G5	SNA	END				
Salmo trutta	Brown Trout	YES	G5	SNA					
Salvelinus fontinalis	Brook Trout		G5T5	S5				HR	
Percopsis omiscomaycus	Trout-perch		G5	S5				HR	
Labidesthes sicculus	Brook Silverside		G5	S4				HR	
Ambloplites rupestris	Rock Bass		G5	S5				HU	
Lepomis cyanellus	Green Sunfish		G5	S4				HR	
Lepomis gibbosus	Pumpkinseed		G5	S5				HU	
Lepomis macrochirus	Bluegill		G5	S5				HR	
Micropterus dolomieu	Smallmouth Bass		G5	S5				HR	
Micropterus salmoides	Largemouth Bass		G5	S5				HU	
Morone americana	White Perch	YES	G5	SNA					
Pomoxis annularis	White Crappie		G5	S4				HR	
Pomoxis nigromaculatus	Black Crappie		G5	S4				HR	
Etheostoma caeruleum	Rainbow Darter		G5	S4				HU	
Etheostoma exile	Iowa Darter		G5	S5				HR	
Etheostoma flabellare	Fantail Darter		G5	S4				HR	
Etheostoma nigrum	Johnny Darter		G5	S5				HU	
Perca flavescens	Yellow Perch		G5	S5				HR	
Percina caprodes	Logperch		G5	S5				HR	
Stizostedion vitreum vitreum	Walleye		G5	S5				HR	
Neogobius melanostomus	Round Goby	YES	G5	SNA					
Mammal									
Didelphis virginiana	Virginia Opossum		G5	S4					
Blarina brevicauda	Northern Short-tailed Shrew		G5	S5					
Sorex cinereus	Masked Shrew		G5	S5					
Condylura cristata	Star-nosed Mole		G5	S5					
Glaucomys sabrinus	Northern Flying Squirrel		G5	S5				HR	YES
Sciurus carolinensis	Eastern Gray Squirrel		G5	S5					
Tamias striatus	Eastern Chipmunk		G5	S5					
Tamiasciurus hudsonicus	Red Squirrel		G5	S5					
Castor canadensis	Beaver		G5	S5					
Microtus pennsylvanicus	Meadow Vole		G5	S5					
Ondatra zibethicus	Muskrat		G5	S5					
Peromyscus leucopus	White-footed Mouse		G5	S5					
Peromyscus maniculatus	Deer Mouse		G5	S5					
Zapus hudsonius	Meadow Jumping Mouse		G5	S5					
Canis latrans	Coyote		G5	S5					
Vulpes vulpes	Red Fox		G5	S5					
Procyon lotor	Raccoon		G5	S5					

Mephitis mephitis	Striped Skunk		G5	S5					
Mustela frenata	Long-tailed Weasel		G5	S4					
Neovison vison	American Mink		G5	S4					
Odocoileus virginianus	White-tailed Deer		G5	S5					
Reptile									
Chelydra serpentina	Snapping Turtle		G5	S3	SC	SC	SC		
Sternotherus odoratus	Eastern Musk Turtle		G5	S3	SC	THR	THR	HR	
Chrysemys picta marginata	Midland Painted Turtle		G5T5	S4	SC				
Emydoidea blandingii	Blanding's Turtle		G4	S3	END	THR	THR	HR	
Glyptemys insculpta	Wood Turtle		G3	S2	THR	THR	END	HE	YES
Graptemys geographica	Northern Map Turtle		G5	S3	SC	SC	SC	HR	YES
Trachemys scripta	Pond Slider		G5	SNA					
Apalone spinifera	Spiny Softshell		G5	S2	END	THR	THR	HR	YES
Diadophis punctatus	Ring-necked Snake		G5	S4				HR	
Lampropeltis triangulum	Eastern Milksnake		G5	S4	SC	SC	SC		
Nerodia sipedon sipedon	Northern Watersnake		G5T5	S5				HU	
Opheodrys vernalis	Smooth Greensnake		G5	S4				HR	
Storeria dekayi	DeKay's Brownsnake		G5	S5					
Storeria occipitomaculata	Red-bellied Snake		G5	S5					
Thamnophis sirtalis sirtalis	Eastern Gartersnake		G5T5	S5					
Crotalus horridus	Timber Rattlesnake		G4	SX	EXP	EXP	EXP	HE	
Sistrurus catenatus pop. 2	Massasauga (Carolinian population)		G4TNR	S1	END	END	THR	HE	

S-Ranks
S1 Critically Imperiled—Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2 Imperiled—Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3 Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation. S
? Not Ranked Yet; or if following a ranking, Rank Uncertain (e.g. S3?).
S#S# Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4)

SARA/ESA/COSEWIC Ranking
END - Endangered
THR - Threatened
SC – Special Concern
EXP – Extirpated

Halton NAI
HR – Regionally rare
HU – Regionally uncommon
HE – Regionally extirpated

Appendix 8: Summary of Management Issues

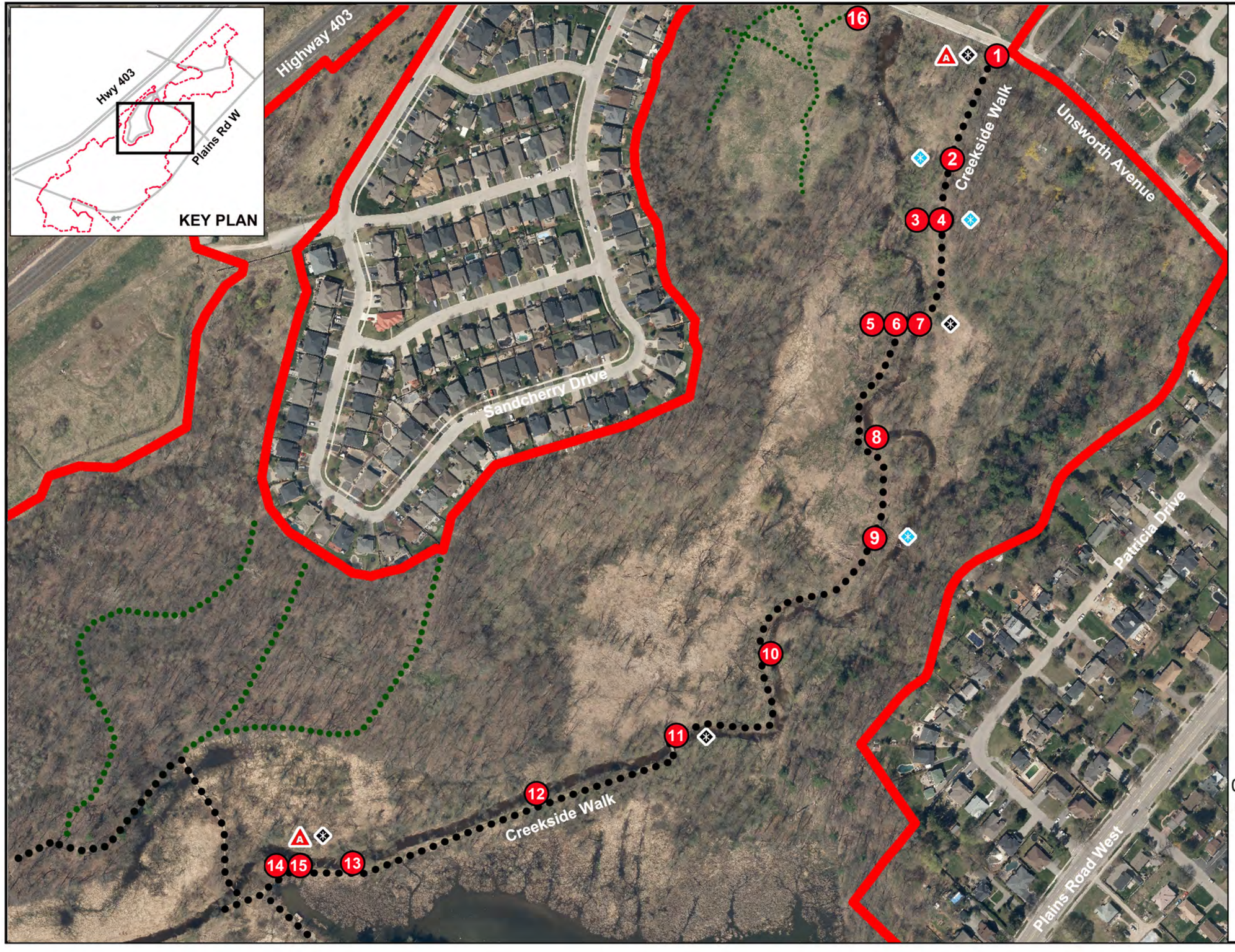
Appendix 8. Inventory of management issues per management unit in the Lower Grindstone Heritage Lands. See Figure 2 for delineation of management units.

MANAGEMENT ISSUE	*HV1*	*HV2*	*HV3*	*HV4*	*LG1*	*LG2*	*LG3*	*LG4*	*LG5*	*LG6*	*LG7*	*WY*
Overarching Cootes to Escarpment EcoPark System Management Issues												
Awareness of Cootes to Escarpment EcoPark System	x	x	x	x	x	x	x	x	x	x	x	x
Delineation of Current EcoPark System Lands	x	x	x	x	x	x	x	x	x	x	x	x
Population and Use	x	x	x	x	x	x	x	x	x	x	x	x
Funding	x	x	x	x	x	x	x	x	x	x	x	x
Desire and Need for Trail Connections and Recreation Plan	x	x	x	x	x	x	x	x	x	x	x	x
Access, Parking and Infrastructure Issues												
Parking, Access and Signage Issues	x	x	x	x	x	x	x	x	x	x		
Trail Structure	x	x			x	x	x		x			
Drainage Structures	x					x				x		
Recreation Issues												
Flooding on Trails	x					x	x			x		
Overuse of Trails	x				x	x	x	x				
Unsanctioned Uses	x		x		x	x	x					
Cycling Route Connectivity	x	x	x			x	x	x				
Other Trail Connectivity	x	x	x			x	x	x	x	x		
Unsanctioned Trails	x	x	x		x	x	x					
Trail Proliferation	x		x		x	x	x					
Wayfinding and Information Signage	x	x	x		x	x	x	x	x	x	x	
User Conflicts	x	x	x		x	x		x				
Wildlife Viewing										x		
Wildlife Feeding Along Trails						x	x	x				
Off-leash Dogs	x	x	x	x	x	x	x	x	x	x	x	

MANAGEMENT ISSUE	*HV1*	*HV2*	*HV3*	*HV4*	*LG1*	*LG2*	*LG3*	*LG4*	*LG5*	*LG6*	*LG7*	*WY*
Fishing						x						
Fire Pits and Party Spots	x	x				x				x		
Vandalism/Theft									x			
Encroachment Issues												
Private Unsanctioned Trails	x				x		x					
Structures and “Yard Extension”	x				x		x					
Dumping					x	x	x	x	x	x	x	
Vegetation Trampling	x	x										
Septic & Pool Drainage					x		x				x	
Hydrologic Impacts												
High Run-off and Peak Flows						x						
Drainage and Erosion	x		x		x	x	x	x	x		x	
Water Quality					x	x						
Polluting Spills									x			
Road Salt						x	x	x				
Ecosystem Management												
Decline in Natural Feature Quality	x	x	x	x	x	x	x	x	x	x	x	
Conservation and Recovery of Species including SAR	x	x	x	x	x	x	x	x	x	x	x	
Forest Fragmentation					x	x		x				
Forest Health Decline	x	x	x	x	x	x	x	x	x	x	x	
Ecosystem Rehabilitation, Restoration and Naturalization	x	x	x	x	x	x	x	x	x	x	x	x
Stream Habitat Improvement						x						
Invasive Species	x	x	x	x	x	x	x	x	x	x	x	x
Noxious Plant Species	x	x	x	x	x	x	x	x	x	x	x	
Poaching and Plant Foraging						x						
Wildlife Feeding Impact on Population Balance						x	x					

MANAGEMENT ISSUE	*HV1*	*HV2*	*HV3*	*HV4*	*LG1*	*LG2*	*LG3*	*LG4*	*LG5*	*LG6*	*LG7*	*WY*
Urban-adapted Wildlife	x	x	x	x	x	x	x	x	x	x	x	x
Wildlife Crossing/Corridors	x	x	x			x	x	x		x		x
Cultural Heritage Issues												
Dated Information	x	x	x	x	x	x	x	x	x	x	x	x
Milling		x										
Cultural Heritage Interpretation					x							
Climate Change Impacts		x				x	x	x	x	x		

Appendix 9: Recreation Management Issues Photographs and Index



Lower Grindstone Heritage Lands Study Area

Appendix 9 - Figure 1.0

Creekside Walk

Photo Location Plan

- Photo Location
- Informal Side Trails
- Existing Trails
- Lower Grindstone Heritage Lands Boundary
- Access Issues
- Cultural Heritage Opportunity
- Dumping
- Encroachment
- Erosion Issues
- Invasive Species
- Parking Issues
- Party Spot/Fire Pit
- Trail Structure Issues
- Unsanctioned Use
- Water Quality Issues
- Wildlife Crossing

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Lower Grindstone Heritage Lands Inventory, Issues & Opportunities Report Photos: Creek Side Walk

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

Photo 11

Photo 12

Lower Grindstone Heritage Lands Inventory, Issues & Opportunities Report Photos: Creek Side Walk

Photo 13

Photo 14

Photo 15

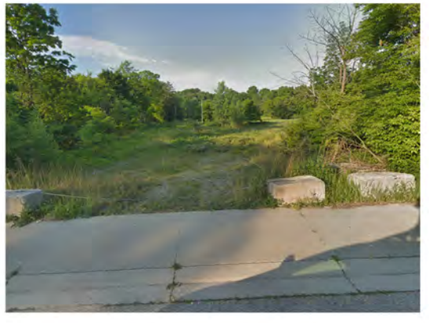

Photo 16

Lower Grindstone Creek Heritage Lands Study Area

Appendix 9 - Figure 2.0

Grindstone Marshes

Photo Location Plan

Highway 403

Grindstone Marshes Trail

Plains Road West

Grindstone Marshes Trail

Grindstone Marshes Trail

Grindstone Marshes Trail

- 1 Photo Location
- Informal Side Trails
- Existing Trails
- Lower Grindstone Heritage Lands Boundary
- Access Issues
- Cultural Heritage Opportunity & Environmental Education
- Dumping
- Encroachment
- Erosion Issues
- Invasive Species
- Parking Issues
- Party Spot/Fire Pit
- Trail Issues
- Trail Structure Issues
- Unsanctioned Use
- Water Quality Issues
- Wildlife Crossing

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Lower Grindstone Heritage Lands Inventory, Issues & Opportunities Report Photos: Grindstone Marshes Trail

Photo 1

Photo 2

Photo 3

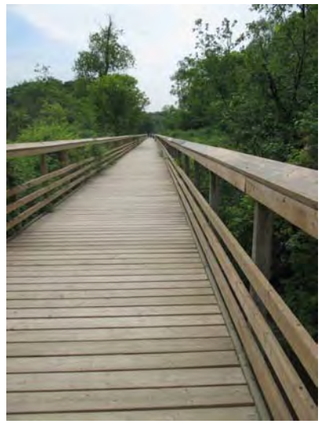


Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

Photo 11

Photo 12

Lower Grindstone Heritage Lands Inventory, Issues & Opportunities Report Photos: Grindstone Marshes Trail

Photo 13

Photo 14

Photo 15

Photo 16

Photo 17

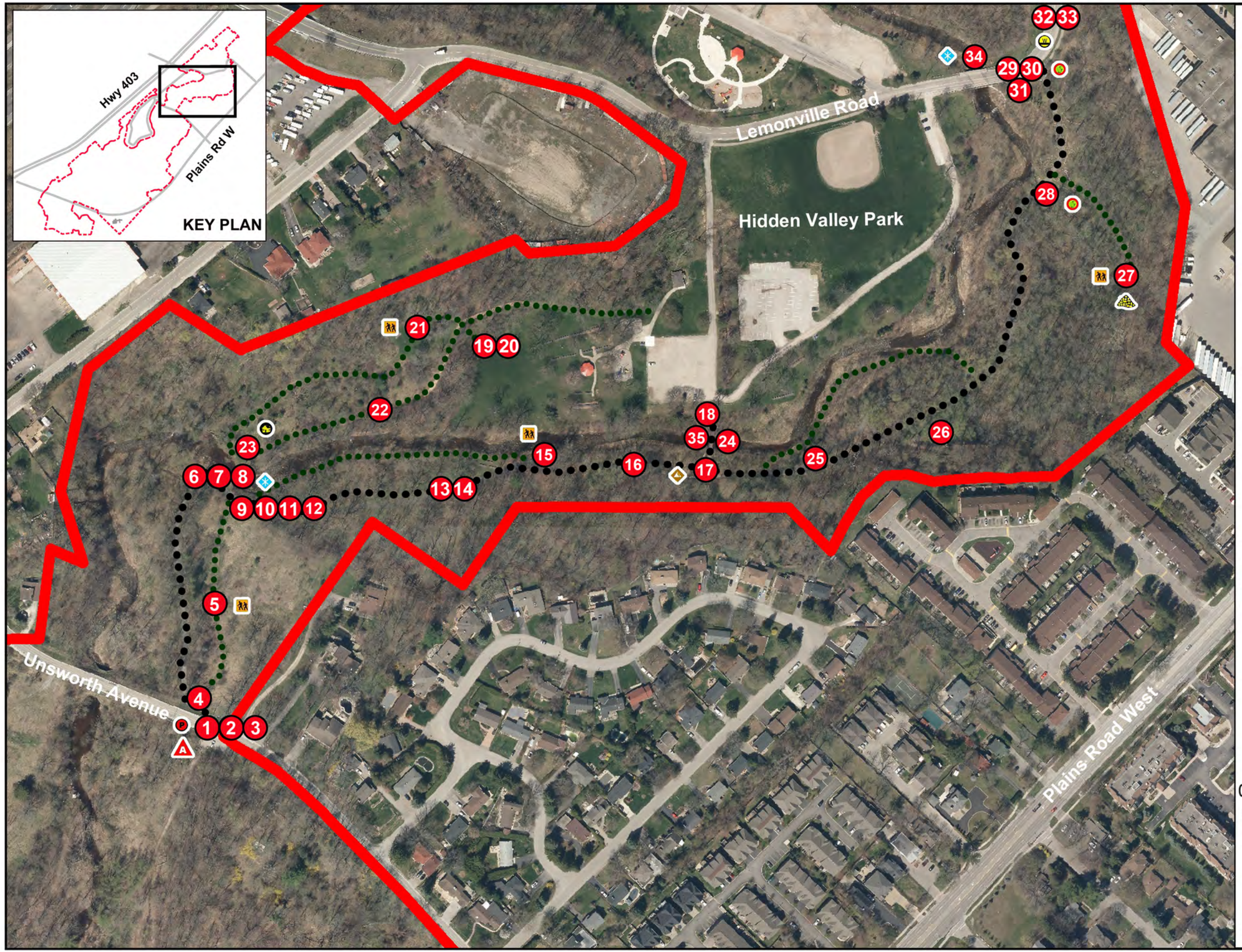
Photo 18

Photo 19

Photo 20

Photo 21

Photo 22



Lower Grindstone Heritage Lands Study Area

Appendix 9 - Figure 3.0

Hidden Valley Trail

Photo Location Plan

- Photo Location
- Informal Side Trails
- Existing Trails
- Lower Grindstone Heritage Lands Boundary
- Access Issues
- Cultural Heritage Opportunity & Environmental Education
- Dumping
- Encroachment
- Erosion Issues
- Invasive Species
- Parking Issues
- Party Spot/Fire Pit
- Trail Structure Issues
- Unsanctioned Use
- Water Quality Issues
- Wildlife Crossing

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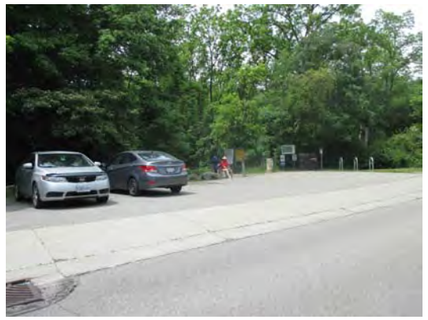
Lower Grindstone Heritage Lands Inventory, Issues & Opportunities Report Photos: Hidden Valley Trail

Photo 1



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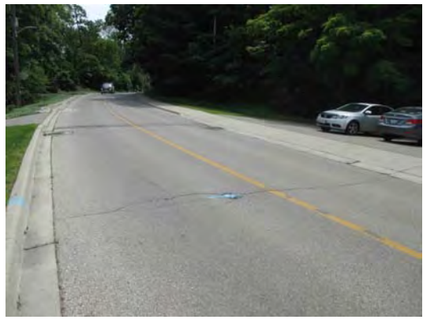

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

Photo 11

Photo 12

Lower Grindstone Heritage Lands Inventory, Issues & Opportunities Report Photos: Hidden Valley Trail

Photo 13

Photo 14

Photo 15

Photo 16

Photo 17

Photo 18

Photo 19

Photo 20

Photo 21

Photo 22

Photo 23

Photo 24

Lower Grindstone Heritage Lands Inventory, Issues & Opportunities Report Photos: Hidden Valley Trail

Photo 25

Photo 26

Photo 27

Photo 28

Photo 29

Photo 30

Photo 31

Photo 32

Photo 33

Photo 34

Photo 35

Lower Grindstone Heritage Lands Study Area

Appendix 9 - Figure 4.0

North Bridle Trail

Photo Location Plan

- 1 — Photo Location
- Informal Side Trails
- Existing Trails
- Lower Grindstone Heritage Lands Boundary
- A — Access Issues
- Cultural Heritage Opportunity & Environmental Education
- Dumping
- Encroachment
- Erosion Issues
- Invasive Species
- Parking Issues
- Party Spot/Fire Pit
- Trail Structure Issues
- Unsanctioned Use
- Water Quality Issues
- Wildlife Crossing

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Lower Grindstone Heritage Lands Inventory, Issues & Opportunities Report Photos: North Bridle Trail

Photo 1

Photo 2

Photo 3

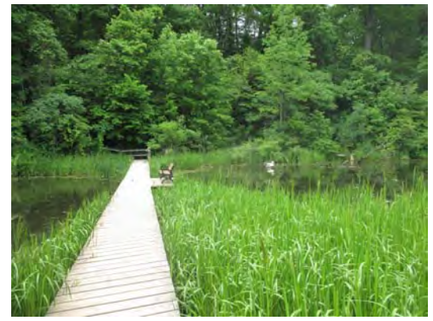

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

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Photo 10

Photo 11

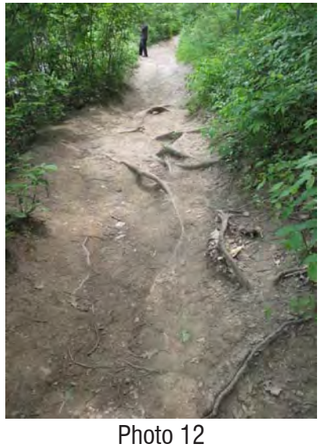

Photo 12

Lower Grindstone Heritage Lands Inventory, Issues & Opportunities Report Photos: North Bridle Trail

Photo 13

Lower Grindstone Heritage Lands Study Area

Appendix 9 - Figure 5.0

South Bridle & Kicking Horse Trail

Photo Location Plan

- Photo Location
- Informal Side Trails
- Existing Trails
- Lower Grindstone Heritage Lands Boundary
- Access Issues
- Cultural Heritage Opportunity & Environmental Education
- Dumping
- Encroachment
- Erosion Issues
- Invasive Species
- Parking Issues
- Party Spot/Fire Pit
- Trail Structure Issues
- Unsanctioned Use
- Water Quality Issues
- Wildlife Crossing

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Lower Grindstone Heritage Lands Inventory, Issues & Opportunities Report Photos: South Bridle Trail

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8