Clappison-Grindstone Heritage Lands Management Plan:

Inventory, Opportunities and Issues Report

Prepared for Cootes to Escarpment EcoPark System

January 2016

Cootes to Escarpment EcoPark System Partners

Conservation Halton

Close to nature.
Close to home.
THE BRUCE TRAIL CONSERVANCY

Hamilton

Halton REGION

ROYAL BOTANICAL GARDENS
www.rbg.ca

CITY OF Burlington
Ontario, Canada

HAMILTON NATURALISTS' CLUB

McMaster University
Inspiring Innovation and Discovery

Hamilton Conservation Authority
Healthy Streams...Healthy Communities!

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
Leah Lefler – project manager, primary report author, natural heritage research
Richard Czok – GIS analysis, mapping
Natalie Dunn – data entry and analysis, report formatting

LURA
Susan Hall – public consultation, facilitation, contributing report author
Leah Winter – public consultation

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

Unterman, McPhail & Associates
Richard Unterman – cultural heritage expertise, contributing report author

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

Project Steering Committee

Peter Kelly, Cootes to Escarpment EcoPark System
Brenda Axon, Conservation Halton
Nigel Finney, Conservation Halton
Richard Clark, Halton Region
Rob Peachey, City of Burlington
Adrienne Kupchanko, City of Hamilton
Adam Brylowski, Bruce Trail Conservancy

Cover Photograph of Grindstone Creek taken by Leah Lefler

Table of Contents

List of Tables

List of Figures

List of Appendices

1.0 Introduction

1.1 Study Context

Between 2007 and 2009, a group of public agencies and organizations consisting of the Royal Botanical Gardens, 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. 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):

- Borers-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 is 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, they 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 study area 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 such that they can implement their respective mandates while providing consistency throughout the EcoPark System.

The Heritage Lands include both publicly- and privately-owned lands. The management plans focus on the publicly-owned lands which are referred to as "Current EcoPark Lands" in this report. Management plans for the Clappison-Grindstone Heritage Lands and Waterdown-Sassafras Woods Heritage Lands are being completed concurrently as many of the opportunities and issues that pertain to these areas are similar, and it was deemed efficient to undertake them at the same time. This report is part of the

Cootes to Escarpment EcoPark System Vision Map

Legend:

- EcoPark Land Boundaries
- Stewardship Lands
- Hydro Corridors
- Water Bodies
- Roads
- Rail Lines
- Hiking Trails

Produced by Michael Karpovage of Mapformation.com. July, 2015

Vision

Our vision for the Cootes to Escarpment EcoPark System is that it will be known internationally 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.

Cootes to Escarpment naturally connected
EcoPark System

cootestoescarpment.ca

management plan that addresses the Clappison-Grindstone Heritage Lands (Figure 2). The Current EcoPark Lands in the Clappison-Grindstone Heritage Lands are owned and managed by four partner agencies: Bruce Trail Conservancy, City of Burlington, Conservation Halton, and the City of Hamilton. In addition, one property is owned by the Ontario Heritage Trust, but managed by the Bruce Trail Conservancy.

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 Clappison-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 four 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 overall study contains a number of important milestones:

1. Prepare Project Charter (undertaken by Steering Committee);
2. Prepare a Resource Inventory and Issues Report (September 2015);
3. Prepare draft Land Classifications and Zones (December 2015);
4. Finalize Land Classifications and Zones and Management Policies (May 2016);
5. Prepare draft Management Plan (May 2016);
6. Public Meeting to Present Draft Management Plan (June 2016); and
7. Finalize Management Plan (July 2016).

This current report constitutes the second milestone and provides a thorough inventory of the natural heritage, recreational and cultural resources of the Current EcoPark Lands, and identifies the management issues. Later reports will provide land classification and zoning and present management recommendations.

Although this report focuses on the Current EcoPark Lands, some inventory, opportunities and issues are provided that occur on adjacent lands.

Cootes to Escarpment EcoPark System

Clappison - Grindstone Heritage Lands

Figure 2: Partner-owned Lands

Legend

Partner Land Holdings

- Bruce Trail Conservancy
- City of Burlington
- City of Hamilton
- Conservation Halton
- Ontario Heritage Trust
- Bruce Trail Conservancy Managed Lands
- Stewardship Lands
- Utility Corridors
- Municipal Boundary
- Study Area
- Clappison - Grindstone Heritage Lands

Sources of Information:
Conservation Halton
Hamilton Conservation Authority
City of Burlington
City of Hamilton
Bruce Trail Conservancy
Ministry of Natural Resources and Forestry

0 100 200 400 600 800 1,000
Meters

North-South Environmental Inc.
Specialists in Sustainable Landscape Planning

January 13, 2016

1.3 General Overview

The Clappison-Grindstone Heritage Lands comprise 337 ha of land located in an area extending generally between Highway 6 and Waterdown Road in the City of Burlington and from Highway 403 north to the southern limit of Waterdown in the City of Hamilton. Of the 337 ha, 202 ha (60%) are currently owned and managed by partner organizations (Figure 2). The majority of the Current EcoPark Lands are owned by Conservation Halton (151.93 ha), with smaller areas owned by the City of Burlington (17.03 ha), City of Hamilton (14.67 ha), Bruce Trail Conservancy (9.72 ha), and Ontario Heritage Trust (8.36 ha).

The Clappison-Grindstone Heritage Lands are highly aesthetic and scenic, and are valued by cyclists, hikers, birdwatchers, and the surrounding community. The area provides spectacular views of Hamilton, west Burlington, and Escarpment features to the south and west across the Grindstone Creek valley (Halton Region and North-South Environmental Inc. 2005).

Some of the Current EcoPark Lands support existing infrastructure; however, with few exceptions, there are no existing management plans in place and no overall coordinating management strategy. While large blocks of protected natural areas are present, there are also significant gaps which include both natural features and habitats, and essential ecological linkages.

Clappison Woods is generally characterized as a deciduous forest situated on a south-facing Niagara Escarpment slope. It is a headwater area for several tributaries of Grindstone Creek. The main Grindstone Creek valley is steep-sided as it descends the Niagara Escarpment and crosses the south slope. The southerly exposure of the Heritage Lands results in a relatively warm, dry microclimate that supports many Carolinian and southern plants, including rare and uncommon species, endangered species and threatened species. Clappison Woods supports a diverse network of trails, including the Bruce Trail and many actively-used footpaths and cycling trails. A number of utilities bisect the site including a railway, a major hydro line, Snake Road (along the eastern edge) and a pipeline. The northwestern edge of the site abuts the former King City (Sheppard) repurposed quarry (Riley et al. 1996). The Clappison-Grindstone Heritage Lands include lands owned by the Bruce Trail Conservancy, Conservation Halton, City of Burlington, City of Hamilton, commercial enterprises, private residents, CP railway, Hydro One, Sun Canadian Pipelines Co. Ltd., Imperial Oil Ltd., Trans Canada Pipelines Limited, and more.

Grindstone Creek is an incised stream with a steep gradient, falling 19 m/km. It has eroded deeply into the Queenston Shale below the Niagara Escarpment (Halton Region and North-South Environmental Inc. 2005). The hard clay soils, which have developed on red shales are easily eroded producing a gully-effect (Chapman and Putnam 1984). Grindstone Creek Valley is the major watershed in the extreme southwest part of Halton Region, draining, in part, the highly erodible red clay soils so characteristic of the area. Most of the Grindstone Creek riparian natural area consists of floodplain and hazard lands. The creek originates on the tablelands above the brow of the Niagara Escarpment. Sugar Maple (*Acer saccharum*), Red Oak (*Quercus rubra*), and White Oak (*Q.* alba) forests dominate the west-facing valley slopes with stands of Eastern Hemlock (*Tsuga canadensis*) on the east-facing (Gould 1989). There is a broad floodplain in the southern portion of the Grindstone Creek system, which extends outside the Clappison-Grindstone Heritage Lands south of Highway 403. Several Carolinian species are represented in the valley including Black Walnut (*Juglans nigra*), Black Oak (*Q. velutina*), American Chestnut (*Castanea dentata*), Eastern Flowering Dogwood (*Cornus florida*) and American Columbo (*Frasera caroliniensis*). The forested slopes are in a relatively undisturbed condition.

1.4 Study Methodology

1.4.1 Project Governance and Study Team

The Clappison-Grindstone Heritage Lands Management Plan project is directed by a Steering Committee and will receive input and comment from a Stakeholder Advisory Committee and the public. The Steering Committee consists of representatives from Conservation Halton, City of Burlington, City of Hamilton, Halton Region, and the Bruce Trail Conservancy, as well as the Cootes to Escarpment EcoPark System Coordinator.

Responsibilities of the Steering Committee are as follows:

- responsible for all substantive decisions concerning preparation of the Clappison-Grindstone Heritage Lands Management Plan;
- responsible for organizing input, feedback and review by their home organizations at pertinent points through the process of management plan development; and
- provide guidance to Project Team and Cootes to Escarpment EcoPark System Coordinator.

The role of the Stakeholder Advisory Committee is to provide advice and input at various phases of the Clappison-Grindstone Heritage Lands Management Plan, as determined by the Steering Committee and Cootes to Escarpment EcoPark System Coordinator. Members include individuals and representatives of 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), Unterman, McPhail & Associates (cultural 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 the Steering Committee; and
- provide regular progress reports as required by the Cootes to Escarpment Ecopark System Coordinator.

1.4.2 Community Engagement

During the Phase 2 Inventory, Opportunities and Issues Phase, the consulting team in collaboration with the Steering Committee developed a combined Community Engagement and Communication program for the Clappison-Grindstone and Waterdown-Sassafras Woods Heritage Lands Management Plans that provides an opportunity for key stakeholder groups, as well as the general public, to participate in the development of the management plans.

We identified a series of engagement strategies and six overarching goals to guide the engagement process. 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 plans, 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 plans;

- actively engage and inspire key audiences in the creation of the management plans through the use of innovative tools and techniques;
- ensure that participants are informed and kept up to date on the progress of the Plans;
- inform the development of the management plans 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 components that will be rolled out throughout the next phases of the project (Table 1):

Table 1. Key Engagement Components in Phase 1.

Developing a Stakeholder List

A comprehensive stakeholder list that included over 130 individuals and stakeholder organizations with a potential interest in the management plans 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 Advisory Committee: includes a smaller subset of the complete list and represents knowledgeable and interested individuals who were invited to review reports and provide guidance to the consultant team.

Stakeholder Advisory Committee

An advisory committee has been established that is comprised of thirteen representatives from key stakeholder organizations with a broad geographic interest in the area. This committee will meet three times to discuss the development of the management plans and is comprised of representatives from:

- Greenbelt Foundation;
- Hamilton Harbour Remedial Action Plan;
- Hamilton Burlington Trails Council;
- Bicycle Works;

- Ministry of Natural Resources and Forestry (2 representatives);
- Hamilton Naturalists' Club;
- Niagara Escarpment Commission;
- Local Residents (2 representatives);
- Hager Creek Stewardship Group;
- Friends of Kerncliff Park; and
- Iroquoia Bruce Trail Club.

Key Informant Information Gathering Sessions

Six stakeholder information gathering sessions were held on April 28th, May 1st and June 19th to discuss management issues and gather information on natural heritage, cultural and recreation resources. A total of approximately 20 invitees attended. Invitations were extended to external stakeholders representing: aboriginal groups, government and agencies (including local municipalities and the local conservation authority), committees to City of Hamilton and City of Burlington Council, educational institutions, business and development organizations, local utilities and transit, as well as environmental, trails, community, agricultural and heritage groups. Each session began with welcoming remarks and a brief introduction to the project from the Cootes to Escarpment EcoPark System and Project Team members. Participants then engaged in a facilitated discussion to identify any data gaps and issues and opportunities for management on the sites.

1.4.3 Data Collection and Analysis

In order to organize information and prepare a format for reporting information within the Clappison-Grindstone Heritage Lands, the partner-owned parcels were subdivided and named based on ownership and habitat similarity (Figure 2). The parcel names are referred to throughout this report, and are as follows:

- Clappison Woods 1
- Clappison Woods 2
- Clappison Woods 3
- Bonta Property
- Little Property
- Grindstone Creek 1
- Grindstone Creek 2
- Johnson Easement
- Smokey Hollow
- Eileen and John Holland Nature Sanctuary

During the preparation of this report, the Bruce Trail Conservancy acquired an additional property referred to as the Robinson Property. This property is shown on Figures 2-6; however, detailed information on the property has not been included in this report.

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.

Fieldwork was prioritized based on data gaps, as well as a desire to visit all Current EcoPark Lands. Fieldwork was undertaken primarily in July 2015, but included an initial reconnaissance survey in April and some follow-up visits in September (Table 2).

Table 2. Dates of fieldwork completed.

Date	Description
22 April 2015	Reconnaissance Tour with Study Team
9 July 2015	Clappison Woods 1 Clappison Woods 2 Clappison Woods 3 Holland Nature Sanctuary Grindstone Creek 2 Bonta Property
15 July 2015	Grindstone Creek 1
30 July 2015	Johnson Easement Smokey Hollow
4 August 2015	Clappison Woods 1 Clappison Woods 2 Smokey Hollow Johnson Easement
7 September 2015	Little Property Clappison Woods 2

Method for Planning Inventory

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

- Niagara Escarpment Plan;
- Niagara Escarpment Development Control Regulation;
- Parkway Belt West Plan, as amended;
- Parkway Belt Land Use Regulation 482/73;
- Greenbelt Plan – Plan of Boundary of Protected Countryside;
- Greenbelt Plan Maps;
- City of Hamilton Official Plan;
- City of Hamilton Zoning Bylaw 05-200;
- Region of Halton Official Plan;
- City of Burlington Official Plan; and
- City of Burlington Zoning Bylaw 2020.

The Parkway Belt Land Use Regulation applies through North Aldershot except where revoked site specifically. Local knowledge was used to assess implications for the Current EcoPark Lands. For example, there are several locations where revocation is either known or expected to have occurred.

Information collected from the planning analysis was incorporated into a Characterization Matrix (Appendix 2) that summarizes the planning, policy and legislative framework for each parcel.

Method for Recreation Inventory

Members of the Steering Committee provided mapping both in digital (GIS) and hard copy (maps) format of existing unsanctioned and official trails, and proposed trail and cycling networks within Hamilton and Burlington. Stewardship plans developed by the Bruce Trail Conservancy were also provided and reviewed with respect to recreational issues. The trails from these various reports and maps were compiled and layered in GIS, along with identifying steeply sloped areas, access points and locations where trails extended outside of the Heritage Lands into neighbouring properties.

Representative sections of the partner-owned properties were visited between June-August (see Table 2) to identify additional access points, walk trails and identify management issues. Where potential management issues and additional access points were noted, they were recorded by GPS and compiled with the trails data. This provided a composite base plan of all mapped trails and access points. The map will be used to evaluate opportunities and constraints in the context of developing the management recommendations subsequent to this phase of the project.

The background review work was augmented with consultations consisting of an interview with a mountain biking enthusiast, and phone conversations and emails with members of the Bruce Trail Conservancy, Conservation Halton and Ontario Disc Golf Association.

Members of the City of Burlington Trails Advisory Committee identified additional resources to be reviewed, including:

- Hike Ontario Trails literature;
- International Mountain Biking Association Trail Design Guidelines;
- Waterdown Road Corridor Class EA, 2012; and
- City of Burlington Draft Community Trails Strategy (current).

During the inventory phase, the consultant team was made aware that the City of Burlington is currently developing a Community Trails Strategy that will carry out the City's vision for a linked open space system. The study will build on the City's existing trail system and address the following key objectives:

- engage the public and stakeholders;
- develop design guidelines for future projects;
- develop a plan that will result in a connected network of trails throughout Burlington;
- continue the trail signage program;
- prepare a phased implementation plan;
- identify maintenance standards for trails; and
- establish a strategy to promote Burlington's trails and encourage public use.

The outcomes of the study will be incorporated into the management plan to ensure alignment with principles and management outcomes. In addition, *Managing Recreational Trail Environments for Mountain Bike User Preferences* (Symmonds et al. 2000) was reviewed as part of the research for this management plan.

Method for Natural Heritage Inventory

A Data Gap Analysis was completed to identify areas where natural heritage data were lacking and to assist in the prioritization of fieldwork (Appendix 3). The Halton Natural Areas Inventory (Dwyer 2006) was the primary source of natural heritage information. Information was also compiled from

Conservation Halton's species occurrence data base, and rare species records from the Natural Heritage Information Centre. Information was also included from the Hamilton Natural Areas Inventory (Schwetz 2014), and Bruce Trail Conservancy Stewardship Plans. Field surveys were completed to collect additional information on vegetation communities and flora; however, updated wildlife surveys such as breeding bird surveys and bat surveys were not completed as part of the study.

Vegetation resources include Ecological Land Classification (ELC) for Southern Ontario (Lee et al. 1998). ELC data were provided by Conservation Halton, Hamilton Conservation Authority, Bruce Trail Conservancy, and North-South Environmental Inc. The ELC units were completed to the Vegetation Type level wherever possible. Community Series level was used for vegetation units that were not well-described in the ELC system (e.g., some cultural vegetation types do not fit well within the First Approximation ELC system, Lee et al. 1998). For the most part, vegetation types have been identified for natural communities. Incidental observations of wildlife and any other noteworthy occurrences (e.g., wildlife habitat, seepages, disturbances, etc.) were recorded, and GPS waypoints were taken where appropriate to enable mapping of management issues.

Natural heritage data were entered into a Microsoft Access database. Data were analysed to determine the presence of rare species and species at risk, and to determine the floristic quality of the Current EcoPark Lands. Percentages of native and non-native species, Floristic Quality Index (FQI) (Oldham et al. 1995), and Native Mean Coefficient of Conservatism (Native Mean C), were calculated for the Current EcoPark Lands. These analyses provide a relative measure of vegetation quality.

Species lists were screened for provincial, regional and local significance. Provincial flora and fauna rarity was based on rankings provided by the Natural Heritage Information Centre (NHIC; identified as S1-S3) or species identified as endangered, threatened or special concern by COSEWIC[1] and/or COSSARO[2]. Halton Regional floral and faunal rarity status has been based on listings provided by the Halton Natural Areas Inventory (Dwyer 2006). Fauna area-sensitivity was 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 using GIS. ELC maps were compiled based on data sources from Conservation Halton, Bruce Trail Conservancy, and the fieldwork completed by North-South Environmental. Rare species mapping was prepared based on data provided by Conservation Halton, the NHIC and fieldwork records observed by North-South Environmental. Trails and access point mapping was prepared based on data provided by Conservation Halton and the Bruce Trail Conservancy.

Method for Cultural Inventory

The background examination of cultural heritage resources included a physical windshield and pedestrian survey of the various Current EcoPark Lands within the Heritage Lands. This survey was

[1] Nationally rare species are designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and are subject to the Federal Species At Risk Act.

[2] Provincially rare species are designated by the Committee on the Status of Species At Risk in Ontario (COSSARO) and are subject to the Ontario Endangered Species Act.

complemented with background research on area settlement, the identification of cultural heritage resources of cultural heritage significance or interest and consultation with local municipalities. Halton Region and the City of Hamilton both have Archaeological Master Plans in place. The locations of archaeological sites are restricted to in-house use. Archaeological potential is shown in the mapping of the Master Plans, but is rather general in scope and relates mainly to the watercourses. Actual archaeological sites are not shown to protect sites from disturbance and potential theft.

The inventory of existing cultural heritage resources included the review of the "Imperial Atlas of Wentworth County, 1903, Township of Flamboro, East, the Department of National Defense Topographic Mapping, 30 M/5, 1938 and 30 M/5, 1968 and the Ontario Ministry of Natural Resources aerial photography dated 1954. The City of Hamilton's Inventory of Buildings of Architectural/or Historical Interest, Volume 2 was completed. Consultation with both the City of Hamilton and Ontario Heritage Trust was undertaken to confirm the identification of cultural heritage resources within the study area. The City of Burlington was contacted but no identified sites were listed or designated under the Ontario Heritage Act within the City of Burlington portion of the Heritage Lands.

Method for Management Issues Inventory

Management issues and opportunities were documented during the review of background information, through targeted fieldwork and from discussions held during the stakeholder engagement sessions, Steering Committee meetings and additional meetings with key stakeholders, including Conservation Halton staff. A list of all individuals and/or agencies consulted is included in Appendix 4. Management issues and opportunities were recorded in table format to provide a framework for organizing issues, opportunities, the general location of where a particular issue occurs, as well as possible recommendations. This table remains a work in progress, and will provide a concise summary for the management plan which will be prepared later in the study process.

2.0 Land Use

2.1 Existing Land Uses

Existing land uses in the Heritage Lands and lands adjacent to the Heritage Lands include agriculture, rural residential, industrial, and suburban developments. The community of Waterdown extends to the north of the Heritage Lands. The community of Hidden Valley is located in the main Grindstone Creek valley, immediately north of Highway 403. The Bruce Trail traverses the area. Most of the Heritage Lands are located below the escarpment brow, in Halton Region. Except for a repurposed limestone quarry along the escarpment rim (Clappison Woods 2, Figure 2), and hydro and railway corridors on the lower slopes, the study area is primarily used for conservation and passive recreation. Waterdown Road, Snake Road and the CPR railway cross the area, passing through the upper valley; two major power lines and a pipeline cross the lower valley within the Heritage Lands.

The lands on either side of the Grindstone Creek valley are, for the most part, undeveloped and currently used for agriculture. The steep slopes and shallow rocky soils in the Clappison Woods area have inhibited agricultural use and preserved forested areas. In the past, a greater percentage of the land was in agriculture. However, it has since been abandoned and is now in varying stages of succession ranging from old field with no shrubs to scrub and immature forest stands (Axon et al. 1989).

A small amount of agriculture does, however, continue to occur sporadically below the escarpment adjacent to the Heritage Lands.

2.2 Future Planned Uses

The following is a summary of current development applications affecting private and public property in the general vicinity of the Clappison-Grindstone Heritage Lands. This summary was prepared based on information provided by or available from the City of Burlington and the City of Hamilton.

2.2.1 City of Burlington

- 751 Old York Road – Fitzsimmons
  City Files 505-03/11 and 520-06/11

The property known as 751 Old York Road is comprised of approximately 4.5 ha of land located on the north side of Old York Road, east of Highway 6, and southeast of Clappison Woods 3 (Figure 2). The applications are for a site specific combined Official Plan amendment and Zoning Bylaw amendment, and revocation of Parkway Belt West Regulation 482/73 in order to permit the severance of three additional lots of single detached dwellings on private services. The applications are currently on hold pending resolution of private servicing requirements in accordance with the Region of Halton's requirements.

- 1429 Plains Road West – Sunrise Homes
  City Files 520-04/13 and 510-01/13

Planning applications have been approved to permit a rezoning and draft plan of subdivision at the southeast corner of Plains Road West and Glenbrooke Avenue. The 0.17 ha property will proceed as an infill development of five single detached dwellings on separate lots and on full municipal services. This development is proceeding to registration of the plans of subdivision shortly.

- 1663 Waterdown Road and 66 Horning Road – Paletta International Corporation
  City Files 505-12/04, 520-23/04 and 510-07/04
- 48 Flatt Road – JR Taylor and EA Taylor
  City Files 505-13/04, 520-24/04 and 510-07/04

These applications for amendments to the City Official Plan and Zoning Bylaw, and approval of draft plans of subdivision affect 106.6 ha of land within the central sector of North Aldershot located west of Waterdown Road on Flatt Road. The applications have been appealed to the Ontario Municipal Board by the applicants. The applications affecting the 97 ha Paletta International Corporation property on Flatt Road propose 171 single detached dwellings and 624 cluster homes (attached dwellings) for a total of 815 units. The west portion of the affected lands is located adjacent to Grindstone Creek 1 (Figure 2). The applications affecting the 9.6 ha Taylor property located south of Flatt Road propose 31 single detached dwellings and 24 cluster houses (attached dwellings) for a total of 55 units.

2.2.2 Region of Halton

- 1535 Plains Road West – New Horizon Group (Wedgewood Golf Centre)
  OMB file MM150009

This application is for an amendment to the Region of Halton Official Plan to add an Area Eligible for Urban Services overlay designation to the current North Aldershot Policy Area designation on the Wedgewood Golf Centre property, located on the east side of Plains Road West, adjacent to Highway 6. The purpose of the application is to permit development on full municipal services. The application as submitted has been deemed incomplete by the Region. The Ontario Municipal Board has considered a motion to deem the application complete. At the time of writing, a decision order has not been issued by the Ontario Municipal Board.

2.2.3 City of Hamilton

- 34/36/42 Highway No. 5 East – 6 and 5 Limited
  City File 25T-86029

The property known as 34/36/42 Highway No. 5 East is comprised of approximately 17.9 ha of land located on the southeast quadrant of the intersection of Highway No. 6 and Highway No. 5 within the Waterdown urban area, north of the Little property (Figure 2) and Mountain Brow Road. The application was submitted in 1986 and revised in November 1990 to permit a plan of subdivision of 18 lots for commercial and industrial purposes. Four of the proposed 18 lots extend to the north limit of Mountain Brow Road and are intended for business park uses with access from an internal future road. These lots are directly east of the Liburdi Engineering property located at 400 Highway No. 6 North. The balance of the proposed plan of subdivision consisting of 14 lots and internal roads is intended for commercial uses including wholesale and retail warehouse stores, home improvement, household furniture and similar scale uses. It is understood that the proposed plan of subdivision is draft approved, subject to conditions and can proceed subject to final approval and servicing.

- 400 Highway No. 6 North – Liburdi Engineering Ltd.
  City File SPA-10-072

The property known as 400 Highway No. 6 North is comprised of 2.3 ha of land occupied by the existing 2 storey Liburdi Engineering Ltd. building and facilities. These lands are north of the Little property (Figure 2) and Mountain Brow Road within the Waterdown urban area. The site plan approval application was submitted in 2010 to permit a penthouse addition to the existing two-storey building in order to facilitate interior equipment installation and operation. The application was approved subject to conditions.

- 54 Dundas Street East – Waterdown Mini-Storage
  City File SPA-12-247

The property known as 54 Dundas Street East is comprised of 2.2 ha of vacant land located south of the RONA hardware store at 52 Dundas Street East within the Waterdown urban area and adjacent to Clappison Woods 2 (Figure 2). The site plan approval application was submitted in 2012 to permit a self-storage facility consisting of 16 one storey buildings and an administration office with a combined total

floor area of 9733 sqm, and an associated 2,700 sqm open storage area for vehicles. The storage facility extends from the rear property line of the RONA hardware store to the north limit of the untraveled Mountain Brow Road allowance with the fenced open storage area adjacent to that road allowance. The site plan approval application was approved subject to conditions. During a May 1, 2015 site visit to Clappison Woods 1 and 2 (Figure 2), it was observed that site works were underway to raise the property grade.

- 100 Sunnycroft Court – Thomas
  City Files FL/B-11:122 and FL/B-11:123

The property known as 100 Sunnycroft Court is comprised of a 15.0 ha parcel with frontage on Sunnycroft Court and on Rockcliffe Road, east of Clappison Woods 1 (Figure 2). These lands do not share a common boundary with Clappison Woods 1 but rather are separated by an intervening private property; both properties are identified as "Stewardship Lands" within the Clappison-Grindstone Heritage Lands (Figure 2). Applications were submitted in 2011 to sever a 2,083 sqm irregular shaped parcel with frontage on Rockcliffe Road and to further sever that parcel into two lots of 1,120 sqm and 963 sqm size in order to permit two single detached dwellings on separate lots on full municipal services. The applicant proposed to retain the 14.8 ha remaining lands with frontage on Sunnycroft Court for an existing dwelling. The applications were tabled by the Committee of Adjustment on Thursday, February 12, 2012 and remain tabled at this time pending more information.

- 150 Mill Street South – City of Hamilton – Public Works
  City File MDA-15-042

The lands subject to this application comprise part of Grindstone Creek 2 (Figure 2) located on the south and west side of Mill Street on Grindstone Creek. This is an existing public access park overlooking waterfalls on the creek and point of access to the Bruce Trail. The application as submitted in February 2015 is for minor development site plan approval to undertake construction upgrades at Mill Street South wastewater pumping station DC013 including demolition of the existing building 2,300 sqm fenced enclosure which currently secures the existing pumping station building. The minor development application is still in process.

2.3 Utilities Adjacent to Partner-owned Heritage Lands

Sun Canadian Pipelines Co. Ltd

Sun Canadian Pipelines Ltd. operates a fuel pipeline within an easement which is oriented generally north-south through the Clappison-Grindstone Heritage Lands and in particular through Clappison Woods 1 (Figure 2). At this location, there is a second adjacent pipeline operated by Imperial Pipelines & Depots Ltd. in a parallel easement. Sun Canadian Pipelines Ltd. has no planned changes to the pipeline physical plant within the easement. Sun Canadian Pipelines Ltd. intends to exercise the rights of the pipeline easement/agreements which is understood to include operating and maintaining the pipeline which may include vegetation removal on the easement, access for maintenance, excavations as may be needed, etc.

Imperial Oil Ltd.

Imperial Oil Ltd. operates a petroleum pipeline within an easement which extends parallel to and beside the Sun Canadian Pipeline Co. Ltd. pipeline through the Clappison-Grindstone Heritage Lands, affecting

Clappison Woods 1 (Figure 2). Imperial Oil has no planned changes to the pipeline physical plant within the easement. Imperial Oil intends to exercise the rights of the pipeline easement/agreement which is understood to include operating and maintaining the pipeline which may include vegetation removal on the easement, access for maintenance, excavation and may be needed, etc.

Trans Canada Pipelines Limited

Trans Canada Pipeline operates a petroleum pipeline which is oriented generally east-west through the Clappison-Grindstone Heritage Lands and the Waterdown-Sassafras Woods Heritage Lands. The pipeline is located south of the Hydro One Dundas-Burlington Transmission Line except east of Kerns Road, the pipeline follows the Bell Trunk Line, extending east to Brant Street. The affected Clappison-Grindstone Heritage Lands are Clappison Woods 1 and Grindstone Creek 1 (Figure 2). Trans Canada Pipelines advises that there are no known changes to the pipeline physical plant within the easements. Trans Canada Pipelines intends to exercise the rights of the easements/agreements which is understood to include operating, accessing and maintaining the pipeline, which may include vegetation removal on the easement, access for maintenance, etc.

Hydro One

Hydro One owns and operates high voltage transmission lines extending from the Burlington Transformer Station at the Freeman Interchange (QEW/Hwy 403/Hwy 407) and affecting the Clappison-Grindstone Heritage Lands and Waterdown Sassafras Woods Heritage Lands. The transmission lines are described as follows:

- Mount Hope Transmission Line (oriented east-west and generally parallel to Highway 403) Dundas-Burlington Transmission Line (oriented east-west and defining the southerly extent of the Niagara Escarpment Plan area).
- Burlington-Guelph Transmission Line (oriented northwest-southeast extending from the transformer station through the Waterdown built-up area).
- Burlington-Richview Transmission Line (oriented east-west extending through the Burlington built-up area).

The affected adjacent Clappison-Grindstone Heritage Lands properties include Clappison Woods 1, Clappison Woods 3, Grindstone Creek 1 and Eileen and John Holland Nature Sanctuary (Figure 2). Hydro One has no known planned changes to the transmission facilities and intends to exercise the rights of any easement/agreements or owned transmission properties where they exist for the purpose of operating and maintaining transmission facilities. Hydro One conducts a program of vegetation management on transmission corridors to assist with compliance with the North America Electrical Reliability Corporation (NERC) and to meet corporate standards (www.hydroone.com/ourcommitment/pages/vegetation.aspx). Hydro One is planning vegetation removal on transmission corridors at various locations in the City of Burlington, has informed the City and will be informing residents and businesses along the corridors.

Hydro One owns and operates extensive high voltage transmission and low voltage distribution systems throughout Ontario on corridors and rights-of-way ownership varies including, for example, Hydro One, the Provincial government, private property owners, railway companies and First Nations communities. Hydro One does not own any land within the Heritage Lands. Infrastructure Ontario is now the land manager, except for right-of-way areas. Many of the corridors have sufficient space for expansion of transmission facilities and potentially secondary land uses. The Province has implemented a Provincial

Secondary Land Use Program to allow for secondary use of the corridors while recognizing the primary purpose to facilitate electricity transmission and distribution.

Secondary use of corridors and rights-of-way are dealt with on a site specific basis by way of municipal consultation, submission of a proposal by proponent to Hydro One followed by stakeholder review to ensure technical compatibility. If approved, the proponent agrees to terms and conditions of use, an agreement is completed between the proponent and Infrastructure Ontario. A number of key technical considerations apply to secondary land uses including minimum vertical clearance to transmission lines, access to transmission structures, roads and parking design and location, no permanent buildings, maximum mature height of landscape plantings, grading, drainage and stormwater management requirements (www.hydroone.com/secondarylanduse/pages/default.aspx).

3.0 Planning Context and Policy Framework

The existing planning policy and regulatory framework in the Clappison-Grindstone Heritage Lands is complex due to multiple jurisdictions at the provincial and municipal levels, and changes between these jurisdictions some of which are in-progress. Further, the boundaries between the municipal and provincial jurisdictions are not the same. This section provides a summary outline of the planning policy and regulatory framework. Planning documents are by nature living documents and subject to change. Existing available information has been used to establish the jurisdictional limits, including Zoning By-laws and Provincial regulations. At the time of detailed project planning, it is important to obtain updated information and confirm applicable requirements. The Characterization Matrix in Appendix 2 summarizes the planning context and policy framework as it relates to the Current EcoPark Lands, per parcel.

3.1 Planning Policy

3.1.1 Greenbelt Plan, 2006

The Greenbelt Plan 2006 is complemented by the Provincial Growth Plan 2006. The Greenbelt Plan identifies where urban growth will not occur in order to protect the agricultural land base and ecological features and functions of the landscape. The Niagara Escarpment Plan and the Parkway Belt West Plan both form part of the Greenbelt Plan and continue to apply where they exist. In these areas, the Protected Countryside policies of the Greenbelt Plan do not apply except section 3.3 applies in the case of the Niagara Escarpment Plan area and sections 3.2 and 3.3 apply in the case of the Parkway Belt West Plan Area. The boundary between the Niagara Escarpment Plan and the Parkway Belt West Plan is the Dundas-Burlington Transmission Line. The Clappison-Grindstone Heritage Lands south of the Dundas-Burlington Transmission Line in the City of Burlington are designated in the Greenbelt Plan as Protected Countryside with a Natural Heritage System overlay designation. This affects the Eileen and John Holland Nature Sanctuary, the southerly portions of Clappison Woods 1 and a major part of Grindstone Creek 1 (Figure 2). Since these lands are not considered prime agricultural area, the permitted uses in the Protected Countryside include existing uses which can continue and expand, and new non-agricultural uses including recreational uses, all subject to criteria. Key criteria are the appropriateness of the use for the rural setting, the manner of servicing and the natural heritage requirements outlined below.

The overlying Natural System policies require no negative impacts by new development on natural heritage and hydrologic features, and functions. Connectivity between these features is to be maintained and if possible enhanced. Except recreation uses, the disturbed area of any site, and impervious surfaces shall not exceed 25% and 10% of the total developable area respectively.

The Natural Heritage System policies also define key natural heritage and hydrologic features. Development is not permitted within these features except existing uses, forest, fish and wildlife management, conservation and flood control necessary to the public interest, and recreational uses. New development and site alteration within 120 m of any key natural heritage or hydrologic feature requires an environmental evaluation to establish an appropriate vegetation protection zone in natural self-sustaining vegetation. For wetlands, seepage areas, springs, fish habitat, streams, lakes and significant woodlands, a minimum vegetation protection zone of 30 m is required from the feature outside boundary.

These Greenbelt Plan policies are implemented by the Official Plans of the upper and lower tier municipalities.

3.1.2 Parkway Belt West Plan, 1978

The general intent of the Parkway Belt West Plan is to define and separate urban areas, provide for linkages between urban areas for transportation, communication and utilities, reserve lands for such linear facilities, open space and unanticipated needs, and preserve prominent natural features. Amendments 120 and 141 significantly reduced the extent of the Parkway Belt West Plan in North Aldershot. In this area, the Plan is limited to the Grindstone Creek valley within Grindstone Creek 1 (Figure 2) and to the various utility corridors.

The Grindstone Creek valley is designated as Public Open Space and Buffer Area, and the Mount Hope Transmission Line and Dundas – Burlington Transmission Line are designated as Electric Power Facility. Adjacent to the Mount Hope Transmission Line, the Plan identifies an approximate 30 m wide allowance for future utilities. The intent of the Plan is public acquisition of an approximate 30 m right-of-way in this area for future utility connections between the Hamilton urban area and Toronto through the Oakville and Mississauga urban areas. 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, and 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 Greenbelt Plan policies which apply in the Parkway Belt West Plan are the same Natural System policies outlined above (Section 3.1.1) and policies for Parkland, Open Space and Trails. These latter policies speak to the municipal role in providing a full range of built and natural settings for public recreation, and considerations for municipal parkland strategies and trail strategies. These policies recognize Conservation Authority and Provincial parklands as important components of the system of parklands.

The Parkway Belt West Plan is implemented by the Official Plans of the upper and lower tier municipalities, and by Parkway Belt Land Use Regulation also known as a Minister's Zoning Order.

3.1.3 Niagara Escarpment Plan, 2005

The purpose of the Niagara Escarpment Plan is to maintain the Niagara Escarpment and land in the vicinity substantially as a continuous natural environment, and to ensure only such development occurs as is compatible with that natural environment. The Plan sets out seven land use designations which define how land shall be used including permitted uses and lot creation. Development criteria applicable in each designation determine how a proposed land use or development shall be carried out. The Plan also sets out policies for the system of parks and open space within the Plan area.

The Clappison-Grindstone Heritage Lands north of the Dundas-Burlington Transmission Line within the City of Burlington and the City of Hamilton are subject to the Niagara Escarpment Plan and variously designated as follows (Figure 2):

- Escarpment Natural Area
  - Grindstone Creek 1 and 2
  - Bonta Property, Johnson Easement, Smokey Hollow, Little property
  - Clappison Woods 1, 2 and 3

- Escarpment Protection Area
  - Grindstone Creek 1
  - Bonta Property, Smokey Hollow
  - Clappison Woods 2 and 3

- Urban Area
  - Grindstone Creek 2
  - Clappison Woods 1 and 2

Some properties bear more than one land use designation depending on the physical conditions and property context. Generally, Escarpment Natural Areas are wooded slopes or landforms associated with the escarpment, the most significant stream valleys, wetlands and Areas of Natural and Scientific Interest (ANSIs). Escarpment Protection Areas are similar slopes and landforms, but where existing land uses have altered the natural environment, areas in close proximity to escarpment slopes, Regionally Significant ANSIs, and designated Environmentally Sensitive Areas. Urban Areas are developed or committed for urban uses in approved municipal official plans. Generally, Escarpment Natural Area is the most restrictive designation and Urban Area is the least restrictive designation.

Subject to the applicable Development Criteria, a partial list of permitted uses in the Escarpment Natural Area includes existing uses, non-intensive recreation uses such as nature viewing and trail activities excluding motorized vehicles, forestry, fish and wildlife management, essential watershed management, flood and erosion control by public authority or under public supervision, archaeology, essential transportation and utility facilities, accessory buildings and structures, incidental uses, the Bruce Trail and related trail installations, unserviced overnight rest areas, and access points, and uses permitted in park or open space master/management plans not in conflict with the Niagara Escarpment Plan.

Subject to the Development Criteria, a partial list of permitted uses in the Escarpment Protection Area are the same but include agricultural operations and accessory small scale commercial uses in non-agricultural areas, small scale institutional uses and recreation uses which are oriented toward the land

which require minimal changes to features (natural, topographic, landscape), and do not require major structures (e.g., picnic sites, day use sites, unserviced camp sites, trail uses).

Permitted uses in Urban Areas are those permitted in accordance with Official Plans and Zoning Bylaws not in conflict with the Niagara Escarpment Plan and in conformity with the Development Criteria, and the Urban Area Development Objectives set out in the Plan. The Development Criteria set out performance standards to be implemented with all permitted uses. Since the criteria deal with a variety of conditions, all criteria will not apply to every circumstance. The criteria address general matters of site capacity, servicing and design, and specific matters of steep slopes and ravines, water resources, wooded areas, wildlife habitat, forestry, cultural heritage, recreation, ANSIs and the Bruce Trail.

The Niagara Escarpment Plan also sets out a policy framework for the Niagara Escarpment Parks and Open Space System (NEPOSS) including the overall park system concept, park and open space classification, zoning and master/management planning policy. The following Clappison-Grindstone Creek Heritage Lands within the Niagara Escarpment Plan area are classified within the NEPOSS system:

- Clappison Woods (Natural Environment)
    - Clappison Woods 1, 2, 3 and the Little Property.

- Grindstone Creek (Nature Reserve)
    - Grindstone Creek 1, 2 and the Bonta Property.

Nature Reserves represent the most significant and distinctive natural areas and land forms, and serve to protect ANSIs. Management practices and uses are to protect in perpetuity, the features and values for which the reserve was established. Access and activities in these areas will be limited, and facilities will be the minimum necessary to support scientific research, nature appreciation and similar uses. Natural Environment parks are characterized by a variety of natural features, historical resources and landscapes, and provide protection for natural and cultural features. Activities range from trail uses to camping and day use in the more developed, and accessible areas.

The Greenbelt Plan policies which apply within the Niagara Escarpment Plan area are the same Parkland, Open Space and Trails policies outlined above for The Parkway Belt West Plan.

3.1.4 Region of Halton Official Plan 2009

The Regional Official Plan 2009 incorporates the Sustainable Halton planning exercise (ROPA 38), undertaken by the Region to bring the Official Plan into conformity with Places to Grow, the Greenbelt Plan and the Provincial Policy Statement. By orders of the Ontario Municipal Board dated February 4, 2014, and October 2, 2014, certain policies of the Regional Official Plan 2009 were approved and are now in force, and other policies were held for adjudication, including the Regional Natural Heritage System policies. Notwithstanding, this planning summary considers those policies of the Regional Official Plan 2009, approved or otherwise.

The municipal boundary between the Region of Halton/City of Burlington and the City of Hamilton differs from the boundary between Provincial plans as noted previously. Commencing at Highway 6 and proceeding east, the municipal boundary follows the Mountain Brow Road extension up to Waterdown Road, then follows the crest of the Niagara Escarpment, turning north at Kerns Road. In consequence,

east of Highway 6, both municipalities are within the Niagara Escarpment Plan area but only Halton/Burlington are within the Parkway Belt West Plan area.

Most of the Clappison-Grindstone Heritage Lands north of the Dundas-Burlington Transmission Line (and within the Niagara Escarpment Plan) are designated as Regional Natural Heritage System with small open areas on Grindstone Creek 1 (north end of Snake Road) designated as North Aldershot Policy Area. The jurisdiction of the Niagara Escarpment Plan is also recognized.

South of the same transmission line, the Heritage Lands are also designated as Regional Natural Heritage System but with a Greenbelt Natural Heritage System overlay in recognition of the Greenbelt Plan. The jurisdiction of the Parkway Belt West Plan is also recognized. A small section on the north east portion of the Holland Nature Sanctuary is designated as North Aldershot Policy Area.

The Regional Natural Heritage System includes components which are:

Key Features:
- significant habitat of endangered and threatened species (whether identified in the Official Plan or not);
- significant wetland;
- significant woodlands;
- significant valleylands;
- significant wildlife habitat;
- significant areas of natural and scientific interest; and
- fish habitat.

Additional Components:
- enhancements to the Key Features including Centres for Biodiversity;
- linkages;
- buffers;
- watercourses that are within a Conservation Authority Regulation Limit or that provide a linkage to a wetland or a significant woodland; and
- wetlands other than those considered significant.

In the Regional Natural Heritage System designation, a partial list of permitted uses includes all types, sizes and intensities of agricultural operations outside of designated Escarpment Natural Areas and Regional Natural Heritage System key features, existing uses, non-intensive recreation but only on public land or the Bruce Trail, forestry, fisheries and wildlife management, archaeology, essential transportation and utility facilities, accessory buildings and structures, incidental uses, essential watershed management and flood and erosion control projects by public authority or approved in a local Official Plan as of December 16, 2009, and uses permitted in approved park or open space master/management plans not in conflict with the Niagara Escarpment Plan. This list of permitted uses is similar to the provisions for designated Escarpment Natural Areas and Escarpment Protection Areas under the Niagara Escarpment Plan.

The basic goal of the Region's Natural Heritage System is to ensure that biological and ecological functions within the Halton landscape are preserved. Alteration of any component of the Natural

Heritage System is generally not permitted unless it has been demonstrated that there will be no negative impacts on the natural features or areas, and their functions. Development and site alteration is not permitted in significant wetlands, significant habitat of endangered or threatened species and fish habitat except in accordance with applicable law. Any development or site alteration, including public works located inside or within 120 m of the Regional Natural Heritage System is required to carry out an Environmental Impact Assessment (EIA) unless:

- the proposal is minor in scale and does not warrant an EIA;
- the use conforms to the local Official Plan and is permitted in the Zoning Bylaw;
- the use requires only a Zoning Bylaw amendment and is exempt from the requirement of an EIA by the local Official Plan; or
- as exempt or modified by the Regional Official Plan policies.

Generally, trail development within the Regional Natural Heritage System is encouraged but with limitations, as follows:

- only on public lands or part of the Bruce Trail;
- no negative impact on ecologically sensitive areas or resource uses such as agriculture;
- proper regard for private property trespass and liability in the event of property damage or personal injury; and
- adjacent landowners potentially affected are consulted.

The Greenbelt Natural Heritage System is a Region-wide overlay designation intended to implement the corresponding Greenbelt Plan policies. In this overlay designation the same key features for the Regional Natural Heritage System apply together with the following:

- sand barrens, savannahs and tall grass prairie;
- permanent and intermittent streams;
- lakes;
- seepage areas and springs;
- alvars; and
- significant habitat of species of special concern.

While the two Natural Heritage Systems have different policies, they are intended to complement each other. Development within the Greenbelt Natural Heritage System is subject to the Greenbelt Plan policies. Development is generally prohibited within the key features of the Greenbelt Natural Heritage System except per the Plan policies. The permitted uses within key features include forestry, fisheries and wildlife management (if carried out to maintain or improve these features), conservation and flood or erosion control (if necessary to the public interest after all alternatives are considered), essential transportation and utility facilities, non-intensive recreation where negative impacts are minimized, and existing uses.

Any development including the public works within the Greenbelt Natural Heritage System or within 120 m of a key feature is subject to an EIA which must identify vegetation protection zones of sufficient width to protect the key feature and to achieve natural self-sustaining vegetation. For wetlands, seepage areas, springs, fish habitat, streams, lakes and significant woodlands, the minimum required vegetation protection zone is 30 m.

The North Aldershot Policy Area designation implements the 1994 North Aldershot Inter-Agency Review. The intent is to maintain the unique character of the North Aldershot area within the context of the surrounding built-up area and to provide for limited development in certain areas while preserving significant natural areas, and the predominantly rural and open space landscape.

A partial list of permitted uses in this designation include existing uses, non-intensive recreation on public lands or the Bruce Trail, recreation uses including golf courses and driving ranges subject to specific conditions related to building scale, site design, water use, etc., forestry, fisheries and wildlife management, archaeology, transportation and utility facilities, accessory and incidental uses, and uses permitted in local Official Plans and Zoning Bylaws which implement the North Aldershot Inter-agency Review planning framework. All such permitted uses are subject to Regional Natural Heritage System boundary revisions to bring this designation into conformity with the Greenbelt Plan and the heritage systems approach. Upon such revision, the Regional Natural Heritage System and Greenbelt Plan policies will apply based on the revised Natural Heritage System boundaries.

All development in the North Aldershot Policy Area designation is permitted only on the basis of individual well and septic systems.

3.1.5 City of Burlington Official Plan, 2006

The land use designations and policies of the City of Burlington Official Plan as they affect the Clappison-Grindstone Heritage Lands implement the North Aldershot Inter-agency Review planning framework, the Regional Official Plan and the Provincial plans where they apply. The Heritage Lands are located outside of the Urban Planning Area Boundary, and within the North Aldershot Planning Area.

These Heritage Lands are variously designated in the City Official Plan, as follows:

- Greenlands (Escarpment Plan Area)
  - Clappison Woods 1 and 3
  - Grindstone Creek 1
  - Little property
  - Bonta property

- Escarpment Protection Area
  - Clappison Woods 3

- Parkway Belt West
  - Grindstone Creek 1

- Environmental Protection
  - Grindstone Creek 1
  - Clappison Woods 1
  - Holland Nature Sanctuary

- North Aldershot Special Study
  - Holland Nature Sanctuary

Except for portions of Grindstone Creek 1, the Holland Nature Sanctuary and the Little property, all of the Heritage Lands are within Environmentally Sensitive Areas (ESAs).

It is noted that all City Official Plan land use designations within the current Parkway Belt West Plan area are deferred and have no status. For the affected areas on the Grindstone Creek valley, 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, there is no significant difference.

The general intent of the City Official Plan in North Aldershot is to protect significant environmental areas, maintain the general open space setting, ensure that existing roads retain their character and ensure that new development is integrated with existing development, and compatible with existing settlement character.

The Parkway Belt West designation on the Grindstone Creek valley reflects the intent and requirements of the Parkway Belt West Plan.

The Environmental Protection Area designation includes ESAs, watercourses and valleys including those regulated by Conservation Halton, woodlots, hazard lands, significant wildlife habitat, natural Escarpment features, ANSIs, Provincially Significant Wetlands (PSWs), lands below staked top of bank, publicly-owned lands used for open space or conservation purposes, buffers of 7.5 m from valleys and 15 m from ESAs, and other areas of important natural and landscape interest.

A partial list of permitted uses in the Environmental Protection Area designation includes existing agriculture, existing uses, forestry, fisheries and wildlife management, archaeology, essential transportation and utility facilities, accessory buildings and structures, incidental uses and essential watershed management, and flood control projects by public authority. Non-intensive recreation is permitted only with preservation of natural features to the maximum possible degree, building and structures are minor in scale, and there is no or minimal parking provided. Further, no development is permitted in PSWs.

Any development within the Environmental Protection Area designation may require an Environmental Evaluation Report except detached dwellings on existing lots and agricultural uses such as barns, and sheds. Additional policies for the Environmental Protection Area designation reference the context of development and are intended to protect these areas through buffer, land assembly and development setback requirements. Generally, a 15 m development setback and buffer is required adjacent to the Grindstone Valley ESA and Clappison Escarpment Woods ESA, and a 7.5 m setback, and buffer adjacent to all other waterways.

The intent of the North Aldershot Special Study Area designation is to define lands that shall remain undeveloped until necessary studies and all other municipal requirements have been met. In the designated Special Study Areas, technical studies and evaluations are required for these areas, leading to detailed sub-area land use policies and design prescriptions, to be implemented by Official Plan amendment and rezoning. Interim uses in these areas are limited to existing uses, agriculture and home occupations in existing dwellings. When and if development in these areas proceeds, it shall only be by individual wells and septic systems.

The Greenlands (Escarpment Plan Area) designation reflects the intent and purpose of the Niagara Escarpment Plan – Escarpment Natural Area land use designation. A partial list of permitted uses is similar to the Escarpment Natural Area designation; they are existing uses, non-intensive recreation

without motorized vehicles, forestry, fisheries and wildlife management, archaeology, essential transportation and utility facilities, accessory uses, incidental uses. The Bruce Trail, essential watershed management and flood control by public authority and uses permitted in parks/open space master/management plans not in conflict with the Niagara Escarpment Plan.

The Escarpment Protection Area designation policies essentially replicate the permitted uses in the same land use designation of the Niagara Escarpment Plan. The policies add that the City will provide comments to the Niagara Escarpment Commission and land owning agencies regarding permitted uses proposed in NEPOSS park and open space master/management plans.

All development in the Greenlands (Escarpment Plan Area) and Escarpment Protection Area designation, unless specifically identified, is to proceed on private self-sustaining services.

3.1.6 City of Hamilton Official Plan (Rural March 2012) (Urban August 2013)

Most of the Clappison-Grindstone Heritage Lands are located within the Rural Planning Area of the City Official Plan. Small sections of the Clappison Woods lands abutting urban land uses and all of the Grindstone Creek lands within the City are located within the Urban Planning Area of the City Official Plan.

On the Heritage Lands, the intent of the City Official Plan is to implement the requirements of the Niagara Escarpment Plan and the Provincial Policy Statement.

The Heritage Lands are variously designated in the City Official Plan as follows:

- Open Space (Rural Plan and Urban Plan)
  - Clappison Woods 1 and 2, in part
  - Grindstone Creek 2
  - Smokey Hollow and Johnson Easement

- Rural Area (Rural Plan)
  - Clappison Woods 2, in part

- Neighbourhoods (Urban Plan)
  - Clappison Woods 1, in part

In addition, these lands are variously designated within the Natural Heritage System, as follows:

- Core Areas
  - Clappison Woods 1 and 2
  - Grindstone Creek 2
  - Smokey Hollow and Johnson Easement

- Linkage
  - Smokey Hollow

The Open Space system includes the natural and open space features that form part of the Niagara Escarpment. The predominant use or function of these areas is recreation, conservation and other

appropriate open space uses including passive recreation, resource-based tourism and recreation, pedestrian trails, bikeways and walkways, forestry, fishery and wildlife management, hazard lands and limited ancillary uses, subject among other things, to the Natural Heritage System policies.

Lands designated as Open Space and included within the NEPOSS system are required to comply with the policies of the Niagara Escarpment Plan.

Lands within the Rural Area designation are not prime agricultural areas and not natural in state. The permitted uses in the Rural Area designation are limited to agriculture, agriculture-related commercial and industrial uses, on-farm secondary uses, other resource-based rural uses and institutional uses serving the rural community, all subject to specific requirements.

Clappison Woods 2 (Figure 2) is the former Sheppard's Quarry which was proposed in the mid-1990s for the Giant's Rib Discovery Centre. This proposal was abandoned when the larger property, which included the quarry, was sold and proposed for major retail use as it exists today. The former quarry is now an engineered storm water management facility with a naturalized wetland, serving the adjacent Clappison Corners major retail area. Clappison Woods 2 is also occupied by the Dundas Waste Water Pumping Station DC015.

The Neighbourhood designation applies to the urban residential environment of the City. Permitted uses include residential dwellings, open space and parks, local commercial uses, and local community facilities and services. Northerly portions of Clappison Woods 1 are within the Urban Area boundary and are areas of open space within the Rockcliffe neighbourhood which appear to have been set aside at the time of adjacent subdivision development.

Within the Natural Heritage System policy framework, key natural heritage features are identified, as follows:

- Life Science ANSI
  - Clappison Woods 1 and part of 2;
  - Grindstone Creek 2; and
  - Johnson Easement.

- Earth Science ANSI
  - Clappison Woods 2, in part; and
  - Grindstone Creek 2, in part.

- Significant Woodlands
  - Clappison Woods 1 and part of 2;
  - Grindstone Creek 2;
  - Johnson Easement; and
  - Smokey Hollow property.

- Environmentally Significant Area
  - Clappsion Woods 1 and part of 2;
  - Grindstone Creek 2; and
  - Johnson Easement.

- Hydrologic Feature (Streams)
    - Grindstone Creek 2;
    - Johnson Easement; and
    - Smokey Hollow property.

The Natural Heritage System consists of the Greenbelt Natural Heritage System, the Niagara Escarpment Plan area and Core Areas, and Linkages identified by the City based on the Provincial Policy Statement. The general intent is to protect and enhance these areas, and to provide opportunities for recreation and use where they do not impact natural heritage features. Where two or more natural features of differing significance overlap in the Natural Heritage System, the more restrictive policies pertaining to those features shall apply.

For lands outside of the Greenbelt Natural Heritage System (within the Niagara Escarpment Plan or City Official Plan Urban Area), new development is not permitted within or adjacent to a key natural heritage feature unless evaluated through an EIA and demonstrated that there will be no negative impacts to natural features and ecological functions. New development within or adjacent to any other core area shall also require an EIA with the additional requirements that connectivity between core areas be maintained or enhanced, that removal of other natural features be avoided and that the disturbed area of any site not exceed 25% of the developable area, with impervious surfaces not exceeding 10%.

The EIA shall propose vegetation protection zones of sufficient width to protect the core area and achieve natural self-sustaining vegetation. Where vegetation protection zones have not been specified the following minimum zone objectives are to be considered by the EIA:

- Permanent or intermittent stream – 30 m, both sides, measured from stable top of bank;
- Wetlands – 30 m;
- Fish habitat – 30 m from top of bank or meander belt allowance;
- Woodlands – 15 m from dripline;
- Significant woodlands – 30 m from dripline;
- ANSI – 30 m; and
- Designated valleylands – 15 m from top of bank.

Development adjacent to wetlands, seepage areas, springs, fish habitat, permanent and intermittent streams and significant woodlands shall maintain a 30 m vegetation protection zone. Permitted uses in all vegetation protection zones are limited to passive recreation uses, conservation, forest, fisheries and wildlife management, existing uses, and infrastructure projects, subject to specific policies.

Linkages are remnant natural features within the landscape that connect core areas. A linkage is shown in the City Official Plan in the vicinity of the Smokey Hollow property. The intent is that linkages be protected and enhanced in order to sustain the Natural Heritage System, wherever possible. Where new development is proposed within an identified linkage, a Linkage Assessment is required. Linkages typically include woodlands, other features such as meadows and streams, and watercourses. The City Official Plan sets out the basic information requirements for Linkage Assessments. The City Council has adopted guidelines for EIS and Linkage Assessment Reports.

In addition to linkages, the City Official Plan acknowledges that there are hedgerows that are worthy of protection as they function similar to linkages or represent a feature that contributes to the landscape.

3.2 Planning Regulation

3.2.1 Niagara Escarpment Development Control

Niagara Escarpment Development Control Regulation 828/90 regulates development within the designated Area of Development Control as defined by Regulation 826/90. Within the designated area of development control, all local Zoning Bylaws and Minister's Zoning Orders have no effect. The designated area of development control is not the same as the Niagara Escarpment Plan area. Some sections of the Plan area have been removed from development control, thus allowing local Zoning Bylaws to take effect. Examples are existing subdivided and developed areas within municipal Urban Area boundaries such as the Rockcliffe neighbourhood in Waterdown, adjacent to the Clappison-Grindstone Heritage Lands.

Current areas of development control are shown schematically on maps available from the NEC. At the time of any proposed development on the Heritage Lands, it is important to confirm whether development control or local zoning applies.

Generally, development control applies in the City of Burlington and the City of Hamilton from the Dundas – Burlington Transmission Line and the Bell Trunk Line north to the urbanized edges of Waterdown. Most of the Clappison-Grindstone Heritage Lands within the Niagara Escarpment Plan area are subject to development control.

Under the Niagara Escarpment Planning and Development Act, any development in the form of the change of use of land, building or structure requires a development permit prior to the issuance of any other approval, unless exempt. Change of use of land includes site alteration.

Under Regulation 828/90, certain classes of development are exempt from the requirement to obtain a development permit if the development is included as a permitted use in the Niagara Escarpment Plan and not in conflict with any development permit issued. There are numerous exemptions, and by way of example include:

1. The maintenance of lands, buildings and structures under the jurisdiction of a conservation authority, the establishment of hiking or cross-country ski trails and the erection of signs for the purposes of property identification or interpretive or recreational information on lands owned by a conservation authority.

2. The maintenance of land, buildings and structures for The Bruce Trail by the Bruce Trail Conservancy and the establishment of The Bruce Trail by the Bruce Trail Conservancy on land owned or managed by agreement with the Bruce Trail Conservancy.

Other exemptions deal with public maintenance matters, forestry, agriculture, etc. Any proposed development on the Heritage Lands should be reviewed against the exemption list.

3.2.2 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. The regulation applies in the City of Burlington south of the Dundas – Burlington Transmission Line from Highway 6 east generally to the vicinity of Kerns Road, excluding the residential subdivisions in this area. The Parkway Belt West Plan provides that the regulation will be revoked when local Zoning By-laws are brought into conformity with the Plan. Site specifically, the regulation has been amended and revoked numerous times throughout North Aldershot.

Given that the current City of Burlington Official Plan and Zoning By-law 2020 implement the North Aldershot Inter-agency Review, the City has made formal application to the Province to revoke the regulation in its entirety. That application is still in-process. A map showing the areas currently subject to the regulation was not available due to mapping discrepancies between the City and the Ministry of Municipal Affairs and Housing as to the extent of previous revocations.

Parkway Belt Land Use Regulation 482/73 co-exists with the local Zoning Bylaws such that the more restrictive prevails. The current City-proposed revocation is intended to give the underlying local Zoning Bylaw sole jurisdiction and effect.

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, including one single detached dwelling, subject to requirements for lot area, lot frontage, yards and dwelling size. Additional requirements address residential additions, residential accessory buildings and structures, and street/highway setbacks.

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. Should the regulation still operate at the time of any development on the Clappison-Grindstone Heritage Lands, it would be appropriate to consult with the City of Burlington and if necessary, the Ministry of Municipal Affairs and Housing for direction.

3.2.3 City of Hamilton Zoning Bylaw (Flamborough Zoning Bylaw 90-145-Z)

The City of Hamilton is in the process of preparing one comprehensive Zoning Bylaw to implement the City Urban Official Plan and Rural Official Plan by replacing six existing former area municipal Zoning Bylaws. At this time, comprehensive Zoning Bylaw 05-200 includes new downtown, open space and parks, institutional and industrial zones. Currently, the City is finalizing new rural zones. New residential and commercial zones will follow.

Notwithstanding the above, wherever Niagara Escarpment Development Control Regulation 828/90 operates, local Zoning Bylaws have no effect. Local Zoning Bylaws have no current effect on the Clappison-Grindstone Heritage Lands except a portion of Clappison Woods 1. These lands are within the Urban Area outside of Development Control and currently subject to former Town of Flamborough Zoning Bylaw 90-145-Z, which will continue to apply until repealed and replaced by Zoning Bylaw 05-200.

The affected lands are zoned as follows:

- Clappison Woods property 1 (adjacent to Rockcliffe Road and Grindstone Way) – Urban Residential R1-6 and Parkway Belt Open Space O1; and
- Clappison Woods 2 (north corner) – Park Open Space O2.

These zones reflect the context of surrounding development, constraints to development and previous Planning Act approvals.

The uses permitted in the O1 zone are agriculture, conservation and parks, subject to regulations, and in the O2 zone, are cemeteries, community centres, conservation, forestry and parks, also subject to regulations.

The uses permitted in the R1 zones are single detached dwellings, with different lot area and lot frontages in the applicable zones.

Nothing in the Zoning Bylaw prevents the use of any lot or the erection of any building or structure in any zone for conservation uses, or for the operation of any public utility, subject to all other requirements of the Zoning Bylaw, General Provisions section.

3.2.4 City of Burlington Zoning Bylaw 2020

Zoning Bylaw 2020 recognizes the jurisdiction of Niagara Escarpment Development Control Regulation 828/90 which operates between the Dundas – Burlington Transmission Line and the municipal boundary of the City of Burlington.

South of the transmission line, Zoning Bylaw 2020 establishes zones intended to implement the North Aldershot Policy Area provisions of the City Official Plan. In the Clappison-Grindstone Heritage Lands, the affected lands are zoned as follows:

- Clappison Woods 1 (south portion) – Open Space O3-196;
- Grindstone Creek 1 – Open Space O3-196 and North Aldershot Development DNA; and
- Holland Nature Sanctuary – Open Space O3-196 and North Aldershot Development DNA.

The permitted uses in the O3 zone are parks, open space, walking trails, forestry, fisheries and wildlife management, agriculture except within a woodlot, transportation and utilities, cultural heritage resources, archaeological restoration and storm water management, and erosion control but not permanent detention or retention ponds. The suffix 196 adds as a permitted use, a single detached dwelling on an existing lot of record, subject to regulations. The O3 zone is the least permissive Open Space zone in Zoning Bylaw 2020.

The DNA zone permits agricultural uses, accessory farm commercial uses and an accessory farm dwelling unit, veterinary services, forestry, fish and wildlife management, archaeological conservation projects, outdoor recreation and a detached dwelling on a lot of record existing as of January 6, 1995, subject to regulation. Outdoor recreation is restricted to non-intensive recreational use as a principal use.

Except for the off-street parking and loading provisions, and general parking provisions, the Zoning Bylaw does not apply to public authority in any zone except the Open Space O2 and O3 zone, and except the uses permitted in all zones. "Public authority" is defined as "federal or provincial bodies, the Region

or the City and any commission, board, authority or department established by or for any of them." This provision does not apply since the Clappison-Grindstone Heritage Lands are zoned Open Space O3.

In addition, Zoning Bylaw 2020 establishes a 15 m setback from the limits of an O3 zone for all buildings and structures including parking areas, and a 4.5 m setback from top of bank of creek not within a creek block.

3.2.5 Conservation Halton Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation

On portions of the Clappison-Grindstone Heritage Lands, Conservation Halton administers Ontario Regulation 162/06, the Development, Interference with Wetlands and Alterations to Shorelines, and Watercourses Regulation made under the Conservation Authorities Act s.28. Generally, the regulation does not permit development or site alteration within a Regional storm floodplain, a wetland or on a valley slope and requires development setbacks as follows:

- 15 m from stable top of bank of the Grindstone Creek and all tributaries, and 7.5 m from stable top of bank of other watercourses;
- 15 m from the floodplain or meander belt of Grindstone Creek and all tributaries, and 7.5 m from floodplain or meander belt of other watercourses;
- 120 m from a PSW or wetlands greater than 2 ha in size; and
- 30 m from a wetland less than 2 ha in size.

The regulation is administered based on guidelines which account for existing uses, additions, accessory structures and public uses. Permits are required for any building, structure or site alteration within the regulated area, unless exempted.

3.3 Additional Natural Heritage Legislation and Policy

3.3.1 Federal Legislation

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. Several federal species at risk have been noted within the Clappison-Grindstone Heritage Lands, including vascular plants, birds, amphibians and reptiles.

3.3.2 Provincial Legislation

Endangered Species Act (2007)

This legislation provides protection for species at risk and their habitat. Legal protection is provided for species that have been identified by the Committee on the Status of Species At Risk in Ontario

(COSSARO) as Endangered, Threatened or Special Concern. In addition, significant habitat of those species identified as Endangered or Threatened is protected from development and habitats of provincial Special Concern species are recognized under the Province's Significant Wildlife Habitat categories. A significant number of Endangered, Threatened and Species of Special Concern have been noted in the Clappison-Grindstone Heritage Lands.

3.3.3 Federal Policy

Great Lakes Water Quality Agreement (1972)

Signed in 1972, this agreement between Canada and the United States committed both nations to restore and enhance water quality in the Great Lakes Ecosystem. This agreement has established ecosystem-based management including the development of ecosystem objectives for the lakes. In 1987, annexes were initiated to develop and implement Remedial Action Plans (RAPs) to restore impaired water uses for significantly degraded areas (Areas of Concern) and Lakewide Management Plans (LaMPs) to address contamination by toxic substances. Hamilton Harbour was designated as an Area of Concern under the Great Lakes Water Quality Agreement (GLWQA). Wastewater treatment plants, industrial activity, and runoff from agriculture and urban development contributed to significant increases in nutrients in Cootes Paradise Marsh and Hamilton Harbour. Under the GLQWA, the RAP was developed to address these environmental problems in Hamilton Harbour (Clayton 2010). With this legislation, toxic substances in the harbour need to be eliminated. Considering that Grindstone Creek is connected to Hamilton Harbour, this legislation pertains to the Grindstone Creek Watershed.

Lake Ontario Bi-national Biodiversity Conservation Agreement (2009)

Canada and Ontario work cooperatively with the United States federal and state governments to protect and restore Lake Ontario's natural diversity under the Lake Ontario Lakewide Management Plan. This management plan includes conservation of critical lands and waters, reduction of the impact of aquatic invasive species, restoration of natural connections and hydrology, restoration of native fish communities, native species and aquatic ecosystems, the restoration of nearshore waters, and planning and adaptation for climate change. The recovery of habitat within the Clappison-Grindstone Heritage Lands (which is located within the Grindstone Creek watershed) would contribute to these goals.

3.3.4 Provincial Policy

Provincial Policy Statement (2014) and the Natural Heritage Reference Manual (2005)

The Provincial Policy Statement (PPS) is issued under the authority of Section 3 of the Planning Act. Section 3 requires that decisions affecting planning matters "shall be consistent with" policy statements under the Act. Part III of the PPS establishes that the PPS is to be read in its entirety and all relevant policies are to be applied to each situation. In that context, Section 2.1 of the PPS (2014), which is the section that relates specifically to natural heritage, establishes clear direction on the adoption of a systems approach through the implementation of natural heritage systems, and the protection of resources that have been identified as 'significant': wetlands, habitats of endangered or threatened species, fish habitat, woodlands, valleylands, wildlife habitat, and areas of natural and scientific interest.

Natural heritage system is currently defined under the PPS (2014) as follows:
"means a system made up of natural heritage features and areas, and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and

ecosystems. These systems can include natural heritage features and areas, federal and provincial parks and conservation reserves, other natural heritage features, lands that have been restored or have the potential to be restored to a natural state, areas that support hydrologic functions, and working landscapes that enable ecological functions to continue. The Province has a recommended approach for identifying natural heritage systems, but municipal approaches that achieve or exceed the same objective may also be used."

Furthermore, the PPS (2014) states in Section 2.1.3 that:
"Natural heritage systems shall be identified in Ecoregions 6E & 7E, recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas, and prime agricultural areas."

In March 2010, the Province released the Second Edition of the Natural Heritage Reference Manual (NHRM), which was intended to guide the implementation of the 2005 PPS. The NHRM explicitly recognizes linkages "between and among natural heritage features and areas, surface water features and ground water features, and hydrological functions" which are necessary for the ecological and hydrological integrity of watersheds. The protection of significant ecological and hydrological linkages as well as woodlands, fish habitat, valleylands and wetlands will be relevant for identifying issues and opportunities, as well as setting management zones, in the Clappison-Grindstone Heritage Lands.

Strategic Plan for Ontario Fisheries

This strategic plan is a policy to guide fisheries management in Ontario based on an ecosystem approach. The objectives for the Strategic Plan are to protect healthy aquatic ecosystems, rehabilitate degraded aquatic ecosystems and to improve cultural, social and economic benefits from Ontario's fisheries resources. These objectives directly apply to the Clappison-Grindstone Heritage Lands, and the Grindstone Creek watershed in particular.

Ontario Biodiversity Strategy (2005)

This strategy was developed to protect and conserve Ontario's biodiversity. This goal is achieved through a variety of measureable, time-bound targets. Partnership 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). Biodiversity of the Clappison-Grindstone Heritage Lands could be enhanced and better-protected. It may be beneficial to refer to the direction and recommendations of the Ontario Biodiversity Strategy, to guide the management planning process of the Clappison-Grindstone Heritage Lands.

3.4 Other Studies and Plans

Grindstone Creek Watershed Study, Our Legacy to Value: The Grindstone Creek

The Grindstone Creek Watershed Study, Our Legacy to Value: The Grindstone Creek sets out a vision for the watershed. This report provides a blueprint to care for and regenerate valued components of the watershed and achieve this vision. Surface water, groundwater, nature, community, and agriculture are reviewed in the context of watershed management. Implementation actions and strategies are also provided.

Clappison's Corners Master Drainage Plan

A Master Drainage Plan has been prepared for the Clappison's Concerns area; however, this plan was not available for review as part of the current study.

Hamilton Harbour Remedial Action Plan

The Hamilton Harbour Remedial Action Plan is a plan to delist Hamilton Harbour from the list of 43 Areas of Concern (AOC) for environmental degradation in the Great Lakes System. Hamilton Harbour was designated as an AOC in 1987 under the Canada-United States Great Lakes Water Quality Agreement (GLWQA). This agreement promotes bi-national consultation and cooperative action to restore, protect and enhance the water quality of the Great Lakes Basin. Through collaboration, Canada and the United States work towards AOC remediation. The states of the Remedial Action Plan include: (1) environmental conditions and problem definition; (2) goals, options and recommendations; and (3) evaluation of remediation measures and confirmation of restoration of uses.

Hamilton Harbour and Watershed Fisheries Management Plan

The Hamilton Harbour and Watershed Fisheries Management Plan was developed directly as a result of the success of the Hamilton Harbour Remedial Action Plan to restore water quality and fish habitat in Hamilton Harbour and its watershed (Bowlby et al. 2009). The goal of the plan is to "support diverse, well-balanced, and healthy aquatic ecosystems that provide sustainable benefits to meet society's present and future needs". The three objectives of the plan are to protect healthy aquatic ecosystems, rehabilitate degraded aquatic ecosystems, and improve cultural, social and economic benefits from the aquatic resources of Hamilton Harbour and its watershed.

Bruce Trail Conservancy Strategic Plan – 2015 to 2018

The Bruce Trail Conservancy Strategic Plan presents the strategic goals for the organization for 2015 to 2018. Four strategic goals, of equal importance, are included:

1. Secure and steward a permanent conservation corridor along the Niagara Escarpment that contains the Bruce Trail.
2. Have the necessary financial resources in place to carry out the Bruce Trail Conservancy's Mission.
3. Be a dynamic organization which is able to support its aggressive land acquisition and fundraising programs to be able to fulfill the Bruce Trail Conservancy's Mission.
4. Achieve a high public profile so that stakeholders and the general public know about the Bruce Trail Conservancy and the good work being done to protect the Niagara Escarpment.

The Bruce Trail Conservancy's Mission is "The Bruce Trail Conservancy is a charitable organization committed to establishing a conservation corridor containing a public footpath along the Niagara Escarpment, in order to protect its natural ecosystems and to promote environmentally responsible public access to this UNESCA World Biosphere Reserve."

Bruce Trail Conservancy Land Stewardship Plans

The Bruce Trail Conservancy prepares Land Stewardship Plans for the lands they manage. Within these plans, the following topics are covered:

- property description;
- property particulars;
- existing conditions (biophysical conditions, biotic conditions, cultural resources);

- land use restrictions and permitted uses; and
- summary of recommendations.

The following Land Stewardship Plans are available within the Clappison-Grindstone Heritage Lands, which provide specific management recommendations for Bruce Trail-managed properties:

- Bonta Bruce Trail Report;
- Johnson Easement Bruce Trail Report; and
- Smokey Hollow Bruce Trail Report.

Waterdown-Aldershot Transportation Master Plan Study

This Environmental Assessment and Master Plan study was completely jointly by Halton Region and the City of Hamilton in April 2015. This study addresses the expansion of Waterdown Road through Aldershot and south Waterdown.

3.5 Planning Inventory Summary

The Official Plans of the Region of Halton, the City of Burlington and the City of Hamilton have been brought into conformity with Provincial Plans, and policy. There is a high level of consistency between the Official Plans in terms of policies and permitted uses as applied to the Heritage Lands. Generally, these Heritage Lands are physically constrained and lack access to municipal services, or municipal services are not intended. The exceptions may be small areas along the north edge of the Heritage lands within or adjacent to urbanized Waterdown.

The permitted uses on the Heritage Lands are typically limited non-intensive recreation uses, trail uses and ancillary facilities like parking and access. The distinction between properties lies in the requirements for these uses depending on the applicable planning jurisdiction. Generally, these ancillary facilities are intended to be small in scale with the least impact on the environment and the landscape.

Individual permitted uses may require EIAs or other environmental evaluations depending on the location, conditions and applicable policy and regulation. Development in proximity to key natural heritage features may be subject to greater separation distances and vegetation protection zones in order to maintain the integrity of the features.

In the area of Niagara Escarpment Development Control, development permits may be required unless the nature of the development, for example, trails, falls under development control exemptions. The Parkway Belt Land Use Regulation exempts buildings, structures and uses which provide a service to the public but this exemption may be short-lived given the application by the City of Burlington to revoke the regulation. In the underlying Zoning Bylaw of the City of Burlington, most of the Heritage Lands south of the Dundas-Burlington Transmission Line are zoned Open Space O3 which permits parks at all levels of government, related buildings, structures and accessory facilities. In the few areas not zoned Open Space O3, the public authority provision of the Zoning Bylaw may apply.

Well in advance of any development, site alteration or activity on the Heritage Lands, it is important to review the applicable policy and regulation in order to determine conformity and any 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 Clappison-Grindstone Heritage Lands. The Bruce Trail is a public footpath running from Niagara to Tobermory. It is entirely built and maintained by volunteers for the purpose of protecting the Niagara Escarpment, the most significant landform in southern Ontario. The Heritage Lands fall within the Bruce Trail Iroquoia section, which extends from Grimsby to Milton. Waterfalls are abundant in this section of the Bruce Trail, including waterfalls at Smokey Hollow, which is a drawcard for tourists to Waterdown (BTC website).

The main trail route is referred to as the Main Bruce Trail. The Bruce Trail Conservancy has identified the preferred or "Optimum Route" of the Bruce Trail based on a set of criteria identified in the Niagara Escarpment Parks and Open Space System (NEPOSS) manual in Section 5.6 Bruce Trail (MNRF 2012). The Bruce Trail Conservancy seeks to establish a "continuous route for the Bruce Trail" and "works to establish trails on the Optimum Route where possible" (Bruce Trail Conservancy Strategic Plan – 2015 to 2018). The Bruce Trail Conservancy strives to fulfill its primary goal of securing and stewarding a permanent conservation corridor along the Niagara Escarpment that contains the Bruce Trail, with the aim of establishing and maintaining the Bruce Trail along the Optimum Route by fostering positive relationships with private landowners along the Optimum Route (Bruce Trail Conservancy Strategic Plan – 2015 to 2018). Within the Clappison-Grindstone Heritage Lands, the Bruce Trail follows the Optimum Route.

Within the Bruce Trail system, a number of Side Trails provide access to the main Bruce Trail. The Main Bruce Trail and Side Trails are managed by the Bruce Trail Conservancy and Bruce Trail Clubs.

The Main Bruce Trail and Side Trails traverse the Heritage Lands in a predominantly east-west direction from Hwy 6 to Mountain Brow Road, crossing Clappison Woods and the Grindstone Creek valley. Approximately 6.5 km of the Main Bruce Trail and 2.0 km of Bruce Trail Side Trails are present within the Heritage Lands. As the Bruce Trail enters the Heritage Lands from the west, beneath Hwy 6, it crosses through the Little Property, traverses the escarpment lands within Clappison Woods 1, and then passes through the incised valley slopes within Grindstone Creek 1.

A proliferation of unsanctioned trails with various informal and structured stream crossings, steps and rail edges occur in various sections of Clappison Woods 1. The density of trails is not consistent. In some places, the density of trails is excessive and in other areas trail density appears to be acceptable. At least one older minor trail appeared to be no longer used and is re-vegetating naturally. Where there is a proliferation of unsanctioned trails intersecting the Main Bruce Trail, it may be difficult for trail users to be certain of the alignment of the Main Bruce Trail. Bruce Trail trail blazes are placed far apart and signage is provided only at some confluences of the Bruce Trail and unsanctioned trails. This can lead to disorientation of the user.

Cootes to Escarpment EcoPark System

Clappison - Grindstone Heritage Lands

Figure 3: Trails, Parking and Access Locations

Legend

Bruce Trail

- Main Bruce Trail
- Bruce Trail Side Trail
- Unsanctioned Trails
- Parking and Access Locations
- Access Locations
- Slopes >25%
- Utility Corridors
- Municipal Boundary
- Study Area
- Clappison - Grindstone Heritage Lands

Sources of Information:
Conservation Halton
Hamilton Conservation Authority
City of Burlington
City of Hamilton
Bruce Trail Conservancy
Ministry of Natural Resources and Forestry

0 100 200 400 600 800 1,000
Meters

North-South Environmental Inc.
Specialists in Sustainable Landscape Planning

January 13, 2016

The Bruce Trail has relatively few switchbacks in Clappison Woods 1, and only one looped section through Smokey Hollow. A side trail of the Bruce Trail within Clappison Woods 1 links to the main trail from a parking area on Rockcliffe Road, and contains a granular surface trail in an otherwise all-natural trail system. Conservation Halton assists with the maintenance of this portion of trail. The network of trails in this area of Clappison Woods 1 is dedicated to the efforts of Doug Fearman and Bill Black who voluntarily established and managed it in the past. Some encroachment issues have been observed in this area from surrounding residential areas and are discussed further in section 7.4.

Between Clappison Woods 1 and Grindstone Creek 1 the Bruce Trail crosses Snake Road. There are safety concerns in relation to this road crossing, which are exacerbated by its use as an access point that only has road-side parking. This issue is discussed further in section 7.2. The Bruce Trail crosses the CNR rail line in one location, the hydro corridor in two locations and extends through one unopened road allowance through the Johnson Easement and Smokey Hollow properties. At the south end of Grindstone Creek 1, the Bruce Trail also intersects several unsanctioned All Terrain Vehicle (ATV) trails. There are issues and opportunities that need to be addressed related to these infrastructure corridors, which are identified in section 7.2.

As the Bruce Trail winds along the steep west-facing valley slope of Grindstone Creek the trail undercuts the slope in some sections, exposing roots and causing some erosion concerns. The trail then traverses the Bonta property and Johnson Easement before it climbs out of the valley and joins with a looped trail within the Smokey Hollow area. Relatively few unsanctioned trails have been observed or previously mapped in this area, apart from some minor single-track bike trails through the Bonta property.

A side trail of the Bruce Trail on the Bonta property utilizes a local road (Horning Road) to make a connection across Waterdown Road into farmland, and eventually connects with trails south of Mountain Brow Road, and subsequently eastward into the Waterdown-Sassafrass Woods Heritage Lands.

Apart from some entry structures and signage to control mountain bike access onto the Bruce Trail, there are no other structures or signage on the Bruce Trail within the Clappison-Grindstone Heritage Lands, nor have the other unsanctioned trails been marked in a consistent manner.

4.1.2 Uses

Trail use within the Heritage Lands primarily consists of hiking (ranging from casual outings by local residents to more serious hikers on the Bruce Trail), single-track mountain bike use and dog walking. In addition, a few trails are used for ATVs and although not confirmed, the study team has been told that winter snowmobiling also occurs in an unorganized manner along undulating portions of the utility corridors. These same locations are utilized in the spring by mountain bikers. Fishing also occurs from riparian trails on Grindstone Creek, although this is likely seasonal owing to low summer flows, and there are unsanctioned “party spots” scattered throughout the Heritage Lands, all of which are accessed through the existing trail system. Geocaching is a popular sport and is played in the Heritage Lands. The more common activities are discussed in greater detail below.

There are limited resources available for conservation-based agencies, such as Conservation Halton, to oversee the use of their lands and enforce the rules that apply to their lands. In this regard, unsanctioned structures and unsanctioned trails have been built and maintained by users and have been

left unchecked by agencies. Over time, this has the potential to perpetuate the perception that permissions to develop trails, structures, bridges, etc. are not needed by park visitors.

What is probably the largest issue is the anticipated increase in the use of the trails by hikers and mountain bikers alike as the area is promoted and as urban development and new access points are established. This is expected to increase pressure on the natural and existing recreational resource and will necessitate monitoring and an increased commitment to management to prevent and/or mitigate impacts.

Hiking

Regular hiking activities are focussed on the Bruce Trail, which sees several weekly-organized hiking groups convene to walk various portions of the trail. On weekends the known entry points to the trail are busy with parked cars. During the weekdays these same points regularly contain 1-3 vehicles at any given time. This attests to the current popularity of the Bruce Trail and side trails in this area of the Cootes to Escarpment EcoPark System. In addition, there are many local residents who use the trails for casual walking, which happens during weekdays as well as on weekends. These local casual users include residents who walk their dogs in the Heritage Lands, both on and off-leash. Incidents of conflict between dogs and cyclists have been reported to us.

There are some risks associated with hiking on the trails through natural areas and individuals must accept personal responsibility for their safety on the trails. Some trails follow through rocky talus and edges of creeks, often with no barriers from steep slopes. The City of Burlington and Bruce Trail Conservancy websites provide safety tips to Bruce Trail users and alerts users of these potential safety concerns. The Bruce Trail Conservancy website further advises that “in order to minimize the risk, volunteers work to ensure Trail blazes and other signs are visible, that the treadway is clear and that bridges and boardwalks are in a good state of repair.”

It has been reported that tour groups from Toronto drop as many as 30-50 hikers at various locations at or adjacent to the Heritage Lands to take in the fall colours or conduct early spring hikes.

Dog Walking

Dog walking occurs frequently in the Heritage Lands, and may represent the largest single user group in terms of numbers of visits per year. Many dogs are walked off leash through the Current EcoPark Lands. Identified impacts of off-leash dogs on natural areas can include:

- soil nutrient enrichment due to urination and defecation, which can ultimately affect the type of vegetation and wildlife supported in the area and would change the composition of the natural area in this regard;
- 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 of 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;
- wildlife disturbed 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 hikers, mountain bikers, 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 urban development.

There are no established off-leash fenced dog parks within the Clappison-Grindstone Heritage Lands. The closest off-leash dog park is located at Bayview Park, within the Waterdown-Sassafras Woods Heritage Lands. This dog park appears to be well-used by the public in the morning and in the late afternoon/early evening. Given that dog owners often need to drive a fair distance from residential areas to this dog park, many dog owners utiltize existing EcoPark System trails that are located closer to their homes to provide unsanctioned off-leash opportunities for their dogs.

Mountain Biking

The escarpment offers diverse and challenging routes and environments to explore and enjoy as a mountain bike rider. However, it should be noted that many of the trails utilized by mountain bike riders were constructed without authorization from the agency or municipality that manages the lands (Figure 3). Notwithstanding, there are a number of easily accessed points into the Clappison-Grindstone Heritage Lands from the surrounding street network and residential areas that attract those that enjoy this pastime. The density and also level of challenge offered by the myriad of trails observed results in a large number of riders.

There is some level of commitment to education and skills training in the biking community. Weekly evening riding groups are organized by the local bike shop in Waterdown throughout the summer. Members of riding groups contribute voluntarily to the development of new mountain biking trails with input from the larger biking community, but without input from the landowner (e.g., Conservation Halton or municipality). There are mountain bikers with a broad range of skill levels accessing the Heritage Lands, and a broad range of environmental awareness and commitment to environmental stewardship. The mountain bike user group includes a subset of thrill seekers who are looking to construct elaborate pump tracks and jumps. This type of activity is discouraged, and carries significant liability to the managing agencies, and requires education about safety and the environmental impacts of the use. It also requires vigilance in managing the removal of structures and unsanctioned trails.

It is also important to note that unsanctioned trail development is prohibited on Heritage Lands and, therefore, all trail development is encouraged to be done in consultation with Conservation Halton, or other land owner. Moreover, many of the trails extend beyond the Current EcoPark Lands onto neighbouring private property, which essentially amounts to trespassing.

There have been some conflicts identified between late spring snowmobilers and hikers and mountain bikers both in physically wanting to be on the trails at the same time and also resulting from trail damage caused by the bikers, snowmobiles and hikers generating muddy conditions.

There is a wide range of bicycle use in the Heritage Lands ranging from casual, family-oriented excursions, through disciplined, highly technical mountain bike riding[3], to thrill seekers who construct jumps and other structures to challenge themselves. This last group frequently include extremely dangerous activities that have no place in a public space, and should only be undertaken in a very controlled and well-supervised environment. Unfortunately, all users of mountain bikes often get lumped into one category, and this is unfair to the many cyclists who are competent, responsible riders that often contribute their time and resources to sound trail construction.

Observations from fieldwork revealed that in many cases mountain biking activity identified in the Clappison-Grindstone Heritage Lands was confined to defined trails with limited areas of impact resulting from trampling and soil erosion. In most cases the trails were observed to be single track bike trails which are narrow (width of the bike), most of which require a relatively high level of technical proficiency on the part of the rider, and include trails that were criss-crossed with exposed roots, rock outcrops and natural uncut or placed logs. In a few locations, noticeable impacts to understory vegetation and soil conditions were noted, particularly within Clappison Woods 1 (Figure 3).

Generally, with the current level of use, mountain biking in the Heritage Lands appears to be having a limited impact on the surrounding natural system. However, there are some locations in Clappison Woods 1 where trail density is high and there is an unacceptable amount of bare soil, root exposure, erosion, etc. These areas would benefit from trail closures with commensurate restoration, and management to address existing impacts. In addition, the bike jumps and other structures created and used by thrill-seeking individuals need to be identified and removed, with subsequent monitoring and education on sanctioned uses, as features are likely to be re-built. Alternatively, individuals interested in this type of activity are encourage to participate in discussions with agencies. For example, interested individuals could collaborate with agencies to develop a plan to locate, sign, monitor and maintain mountain biking features that provide a mid-level challenge (e.g., such as at Kelso Conservation Area). This opportunity will be further discussed in the management plan.

Safety Issues

There are several off-trail hikes that offer long views to the harbour and are popular gathering points. There is limited signage warning hikers to stay back from the edges of the escarpment. Visitors must also take care when walking below the brow of the escarpment due to the chances of falling rocks, or slips and falls on wet or moss-covered rocks. Visitors should stay on marked trails at all times, not only for their own safety, but also to prevent impacts to ground flora including the many rare and sensitive plants in the area.

Improved safety signage, consistent blazes and measures to assess and close redundant or unsafe trails, should be considered to improve safety. It is also important that safety messages are offered consistently across all the partner agency websites. It may be beneficial to produce a leaflet or information guide that all partners vet and adopt and then promote to their respective constituencies to

[3] Trails within the Heritage Lands have been used as training grounds for several world-class professional mountain bike athletes, including the former Olympian Seamus McGrath who frequently rode these trails with the local bike shop (K. Van De Sompel, Conservaiton Halton, pers. comm. November 2015).

add to the consistency and effectiveness of getting this message out to the public. This will be addressed in future management recommendations.

Unsanctioned Party Spots/Fire Pits

Although confined to a small number of locations, several unsanctioned after-hour gatherings ("party spots") were noted. These have generated garbage, debris from fire pits and contributed to soil compaction and erosion. Picnic tables, a rope swing and log seats have been identified at some of the sites. People visit these locations to enjoy the surrounding natural setting, socialize and recreate. Issues associated with unsanctioned party spots/fire pits largely involve safety concerns and vandalism. Unsafe behavior can be associated with this type of use, including the setting of fires, influence of alcohol/drugs on good judgement, thrill-seeking acts, etc. Vandalism of surrounding trees, spreading of garbage and disturbance to understory vegetation and soils can result. This type of unsanctioned use can also cause other trail users to feel unsafe. There is a management opportunity to restore these areas and mitigate impacts associated with this unsanctioned use. An additional management opportunity includes identifying appropropriate locations for benches and/or picnic tables to facilitate small social gatherings.

IMBA's Trail Principles of Sustainable Trail Design and Construction

Given the role of the International Mountain Biking Association (IMBA), their stated intent to work with other trail users and their commitment to environmentally responsible trail use and design, it is worth discussing their potential role in the Heritage Lands. The IMBA trail design and use standards could be used in the future design and management of cycling trails in the Heritage Lands. The IMBA's website indicates that the organization "strives for the following goals in designing and building trails: 1) limit environmental impacts; 2) keep maintenance requirements to a minimum; and 3) avoid user conflicts". These goals are generally consistent with the use of the Heritage Lands.

In order to build sustainable trails, the IMBA have offered the following guiding principles to trail builders on their website: "A contour trail is a path that gently traverses a hill or sideslope. It's characterized by a gentle grade, undulations called grade reversals, and a tread that usually tilts or outslopes slightly toward the outer edge. These features minimize tread erosion by allowing water to drain in a gentle, non-erosive manner called sheet flow. When water drains in thin, dispersed sheets, dirt stays where it belongs - on the trail." The IMBA guidelines go on to note that sustainable contour trail development should:

1. Do everything you can to keep the water off the tread, and users on it.
2. Build on the contour and use frequent grade reversals - surf the hillside.
3. Follow the half-rule: A trail's grade shouldn't exceed half the grade of the sideslope.
4. Maximum grade should be 15 percent (except for natural or built rock structures).
5. Average grade should stay under 10 percent (with grade reversals).
6. Route trails to positive control points (viewpoints, water, other attractions).
7. Use bench-cut construction, and excavate soil from the hillside.
8. For reroutes, reclaim old trail thoroughly - the visual corridor as well as the trail tread.
9. For highly technical trails where grade will sometimes exceed 15 percent, use natural rock, rock armoring or other rock features to add challenge and improve sustainability.

Not all of the principles noted above may apply in all circumstances. It is best to first assess the terrain and particular natural environmental features and constraints that may exist when developing a sustainable trail plan. Only after the existing natural resources have been evaluated should it be

determined if a trail of any kind is appropriate and secondly what the appropriate type of construction ought to be. For example, the use of switchbacks on slopes alluded to in point number 2 could lead to soil erosion where shallow rooted vegetation and/or sandy erosive soils are present. The recommendation to excavate soils on slopes similarly could lead to erosion and further disruption to the environment by dumping the excavated soils in the surrounding environment. It should also be noted that necessary permits may also be required to construct trails. Despite this, what is evident from the IMBA literature is that at least most of the trail and user issues identified in the Clappison-Grindstone Heritage Lands would also be of concern to IMBA, and thus they will likely be a useful partner in the future management of trails within the Heritage Lands.

Recent collaboration with IMBA to develop mountain biking trails at Kelson Conservation Area and Christie Lake Conservation Area have been deemed successes by both the Ontario Cycling Community and partners who worked to develop the trails (e.g., Conservation Halton). A similar collaborative approach should be considered in the planning, design and development of potential mountain biking trails within the Heritage Lands where, or if, deemed an appropriate use in a given area.

4.1.3 Existing Infrastructure

Recreational pursuits include a substantial amount of unsanctioned mountain biking activity. Associated with these uses are many unsanctioned stream crossing structures, bike jumps, rails, boardwalks and retaining walls. In some cases, fallen limbs or tree trunks have been positioned to challenge technical mountain biking skills.

Over the last several years trails have been planned, designed and implemented in association with the stormwater management ponds in Clappison Woods 2 (Figure 3). The stormwater management pond area is surrounded by a chain link fence, and access into the pond area is identified on Figure 3. The repurposed quarry in Clappison Woods 2 has been rehabilitated and contains stormwater management ponds which receive stormwater drainage from the Waterdown sewer network. The ponds are planted with cattails and rushes, and contain a matrix of intersecting gravel pathways and boardwalks. A gravel perimeter trail connects to the surrounding natural trail system that extends into Clappison Woods 1 and subsequently to the main and side trails of the Bruce Trail (Figure 3).

4.1.4 Access Points

A number of informal and semi-formalized entry points provide access to the current trail system (Figure 3). In all but three cases parking is not formally provided and occurs on the roadside edges, which is potentially unsafe and dangerous. This is particularly evident where the Bruce Trail intersects Snake Road.

Other entry points are associated with adjacent residential roads and are marked with a small Bruce Side Trail marker, including at Horning Road, Rockcliffe Road and Redwood Place. There is also access into Grindstone Creek via Hidden Valley Road; however, it is necessary to trespass a short distance over private property to get from the parking area to the Current EcoPark Lands. This presents an issue that will need to be dealt with in more detail in the management plan. The entry point at the end of Hidden Valley Road is accessed by ATVs, as well as hikers, mountain bikers and anglers, and probably because it leads onto private property before getting to the Current EcoPark Lands, is not marked in any way. The access point is located within a Flood Damage Centre, and formalizing an access point would not be suitable at this location due to safety concerns. Hidden Valley has been designated a Flood Damage Centre due to the significant level of floodrisk to life and property for large flood events. For example,

under the Regional Storm, maximum flood depths would be approximately 3 metres. Due to trespassing and flood risk, this access point should not be promoted as an access point to the Heritage Lands.

Further on, the continuation of the trails along Horning Road and Flanders Drive toward Mountain Brow Road is not well signed. The entry point off Grindstone Way is obscured behind an armourstone wall, and provides no parking and no signage. The pathway is used to provide access to the adjacent fenced stormwater management pond, but is also being used as a link to access the unsanctioned trail system (Figure 3).

There is one marked entry point to the stormwater management pond behind the RONA/Walmart Power Centre. The entry point is marked with boulders and regulatory signage on the north side of the pond, but it is not visible from the adjoining commercial area as it is located at a lower elevation. It is important to note that the entry is adjacent to the loading service area of the commercial area and does not offer any parking. A discussion and potential agreement with the owner(s) would need to be struck to enable or develop parking in this location. It should be determined if the area is utilized for snow storage, which would hinder access to the Heritage Lands during winter months. There is also a direct trail link to this area from the residential area to the northeast which is heavily used. The access point is from Grindstone Way along an easement between two residential properties (Figure 3).

Three access points with parking include a small granular surface pull off at Rockcliffe Road for 5-7 vehicles, Smokey Hollow, which offers 25 parking spaces on a granular surface, is marked with bollards, and drains overland to Grindstone Creek, and a newly paved (asphalt) parking area at the Holland Nature Sanctuary, which provides parking for up to 12 cars. Currently there is no access to any trails from this location. There is Cootes to Escarpment EcoPark System signage at the Holland Nature Sanctuary parking lot, including interpretive elements, details about the Cootes to Escarpment EcoPark System, and the EcoPark System logo.

The Rockcliffe access is located in a residential area, the parking being located between two private residences. The trail entrance leads to the main branch of the Bruce Trail. There is no signage indicating rules and regulations for trail use, although, as previously noted, there is a commemorative plaque dedicated to Doug Fearman and Bill Black who were instrumental in establishing and managing the trail system in Clappison Woods 1.

At Smokey Hollow, some rilling and erosion is evident in the parking area. One mullock garbage bin is embedded in the parking surface. Historical signage, stairs, cliffside trail and an overlook with fencing are provided from the parking area to the waterfall and trail system. Visitors frequently climb over the wooden safety rail and bike or hike down the steep valley slope into the valley, short-cutting the nearby switchback trail/ steps. This is a dangerous practice that needs to be addressed through improved signage and/or fencing. An open mowed area provides some open recreational space at Smokey Hollow. This area is steeply inclined, and offers clear sightlines for motorists that wind along Mill Street.

Some private landowners that back onto the ravine have fenced their properties and placed gates to access unsanctioned, self-made and maintained trails in the Heritage Lands. The gates and trails are both unauthorized.

In general, it is felt that there is inadequate access to the Heritage Lands and that much of the existing parking at unsanctioned access points is unsafe. Although there are no user survey data to confirm this,

it is probably an issue at existing use levels and it will only be exacerbated by the anticipated increased desire to use these sites. Addressing safe access will be a significant issue to be addressed in the management plan.

4.1.5 Existing Programming

Currently, there are no active sports facilities offered within the Clappison-Grindstone Heritage Lands. The natural setting predominantly supports passive recreational pursuits including hiking trails, nature appreciation and some locations suitable for mountain biking.

Geocaching is also a popular sport with limited usership. Conservation Halton post links on their website for geocaching referring to the rules of the Ontario Geocaching Association for guidelines, permissions and applications required to participate in the sport. The City of Burlington website boasts geocaching as "a great opportunity to get out and explore new areas or find hidden treasures in your own community and to spend a few hours to find one of many hidden geocaches in the Halton Region." However, the Bruce Trail Conservancy has a "No Physical Geocaches on BTC Managed Land" policy. Coordination of partner agency efforts may be beneficial to the user group; furthermore, geocaching can potentially be a great interpretive tool.

The City of Burlington is undertaking the re-writing of the Parks By-law in 2016. This will likely have implications for the issues and opportunities identified in the forthcoming management plan, and also the preliminary issues and opportunities identified in this report.

4.2 Adjacent Recreational Resources

4.2.1 Trails

A number of unsanctioned trails extend beyond the Heritage Lands boundary and connect to adjacent private properties and farms. In several cases portions of the trail system rely on accessing the public lands through the private lands (e.g., Hidden Valley Road). In cases where bike tours utilize these trails, conflicts have been known to occur, resulting in physical altercations and frustration on the part of private landowners.

The Bruce Trail has handled private land access appropriately with good signage, fencing and climbable structures (turnstiles) making it obvious to the trail user that they are entering private lands and that a particular set of rules apply to the user.

4.2.2 Uses

Motorized vehicle (e.g., ATV or snowmobile) trails are apparent along the utility corridors in the Heritage Lands. Brush is cleared out of utility corridors on a routine basis, which enables motorized vehicles to access these areas. ATV use is, however, an unsanctioned use and is viewed as trespassing. A new study by the province to assess and potentially promote native restoration plantings in all utility corridors could change the management and maintenance of utility corridors in the future. However, the appropriateness of ATV or snowmobile use on the utility corridors is dependent on the authorization of the landowners, and is generally considered an unsanctioned use.

The development of multi-use trails on roadside shoulders, in rights-of-way or utilizing the utility corridors to make some east-west linkages is currently lacking across the Heritage Lands, and is an opportunity that should be explored in more detail as part of this management process. It should be

noted, however, that east-west linkages may not be feasible in all desired locations due to the presence of significant species and steep valleys. Considerations should also be given for future planned road works such as potential re-alignment, widening or geometric improvements within the surrounding road system.

4.2.3 Existing Infrastructure

The surrounding road pattern is actively used by on-road cyclists and includes a mapped 15 km loop (posted online) which utilizes Main Street South, Mountain Brow Road, King Road, North Service Road, Brant Street, Plains Road East, Lakeshore Boulevard, then Plains Road West and Snake Road to close the loop. The speed at which cyclists descend the roads, especially Snake Road is well known, and is recommended to be addressed to address safety concerns and potential conflicts with hikers and motorists.

Abandoned logging routes and access ways may provide other opportunities for linkage or trail re-alignment within the Current EcoPark Lands to alleviate other areas where erosion or steep slopes are concerned.

While technically outside of the Heritage Lands, a CN railway line bisects Clappison Woods 1. As the official route of the Bruce Trail, as well as several other unsanctioned trails, crosses the railway the management plan will need to address how this crossing is achieved with regard to CN requirements and safety for trail users.

4.2.4 Access Points

There are a number of locations where new access points into the Heritage Lands may be developed from surrounding areas that are not part of the Heritage Lands. For example, as urban development occurs on adjacent lands, opportunities for additional access points external to the Heritage Lands may be identified and implemented. Any new proposed access points or trail linkages should be reviewed in the context of the management plan and any Trails Master Plan documents in order to identify enhancements to trail linkages or to suggest alternate access points.

5.0 Natural Heritage Inventory

5.1 Physiography and Surface Geology

The Clappison-Grindstone Heritage Lands encompass a segment of the Niagara Escarpment and are part of the continuous greenbelt of natural areas along the Escarpment through the City of Burlington and the City of Hamilton. The defining landscape features of the Clappison-Grindstone Heritage Lands are the Niagara Escarpment and the Grindstone Creek Valley. Clappison Woods is situated along a south-facing escarpment slope. In the western portion, the slopes are topped by intermittent dolostone cliffs of the Lockport Formation, the caprock of the Niagara Escarpment. This bedrock is also exposed along the escarpment rim. Erosion from the cliffs has produced prominent talus slopes. Most of the site consists of gradual escarpment shale slopes, known as the Queenston Formation, the basal unit of the escarpment. The slopes are covered in clay-rich Halton Till and are highly dissected by numerous intermittent streams, resulting in a complex series of uplands, ridges and valleys (Varga 1995). The northern portion of the Grindstone Creek Valley is situated in a major Escarpment re-entrant valley within the City of Burlington. Grindstone Creek has deeply dissected the Escarpment and formed a narrow sheltered valley.

Soil development in the Grindstone Creek valley is limited due to the steep unstable slopes of the escarpment valley and lower ravine (Schwetz 2014). Overburden both above and below the escarpment consists of the clayey Halton Till.

According to Chapman and Putnam (1984), the Clappison-Grindstone Heritage Lands are comprised of the Niagara Escarpment physiographic region. The Niagara Escarpment extends from the Niagara River to the northern tip of the Bruce Peninsula, and continuing through the Manitoulin Islands.

The Clappison-Grindstone Heritage Lands are located in the Grindstone Creek watershed, which drains 5,757 ha of land, and outlets to Hamilton Harbour at Carroll's Bay (the location Willow Point wetland and the newly created Windermere Basin wetland restoration project, some of the few coastal wetlands on the shores of Hamilton Harbour). Most of the streams in the Grindstone Creek watershed (approximately 85%) are small tributaries with the remainder of the system confined to the main branches. Grindstone Creek cascades over bedrock ledges and talus blocks as it descends the escarpment, and then forms a fast, actively-eroding stream in a V-shaped valley. It is one of the deepest river valleys within the Queenston Formation, exposing both the shale and overlying Halton Till (Halton Region and North-South Environmental Inc. 2005). Gradually, the valley floor widens and forms a box-shaped valley averaging 50 m in depth (Axon et al. 1989). The natural vegetation on the ravine slopes moderates the rate of erosion, while the vegetation on the valley bottom slows and filters surface runoff.

The Clappison-Grindstone Heritage Lands contribute significantly to maintaining surface water quantity, as these lands are the source of seepage springs for intermittent tributaries to the lower Grindstone Creek. Grindstone Creek serves as a major groundwater discharge area, especially along the Escarpment face (Ecologistics 1977). In addition, new mapping from Hamilton-Halton Source Water Protection shows that significant groundwater recharge and discharge zones occur in the study area (Conservation Halton 2015, Draft Figure 11 Significant Groundwater Discharge and Recharge Area). The Grindstone Creek is important since it is one of only two coldwater streams that outlet into Hamilton Harbour (Axon

et al. 1989). However, water quality monitoring shows that some of the Grindstone Creek tributaries are currently producing water quality impairments (Conservation Halton 2013).

The ecology of the Heritage Lands has developed in response to the unique physical attributes found there. The Clappison-Grindstone Heritage Lands provide habitat for many locally, provincially, and nationally rare species, some of which require interior forest habitat. The Grindstone Creek valley has been described as one of the top botanical sites in Halton Region (Varga and Allan 1990). The south-facing slope of Clappison Woods is steep and rather thinly wooded on the western part. In the eastern portion, the deeper red clay soils support a dense hardwood forest in undulating terrain (Halton Region and North-South Environmental Inc. 2005).

Karst is found in several areas within the EcoPark System, including the Clappison-Grindstone Heritage Lands. Karst is a landscape underlain by limestone that has been eroded by dissolution, producing ridges, towers, fissures, sinkholes, and other characteristic landforms. It is a unique feature which requires unique management. Karst should be considered in the development of any site-specific plans prepared for development or site alteration.

5.2 Surface Water

The main branch of Grindstone Creek is the predominant surface water feature in the Clappison-Grindstone Heritage Lands. The main branch of Grindstone Creek flows year round. However, its tributaries are intermittent over much of their length. Groundwater discharge, emanating as springs in the central portion of the watershed, moderates stream temperatures and creates the potential to regenerate coldwater aquatic habitat (Halton Region Conservation Authority 1998). Grindstone Creek does not exhibit the thermal characteristics of most southern Ontario streams; instead it temporarily becomes colder and cleaner in its lower reaches as aerated water below the falls at Waterdown/Smokey Hollow mixes with groundwater seepage emanating from the Escarpment (Halton Region Conservation Authority 1998).

Clappison-Bridgeview Tributaries originate in Clappison Woods 1, from groundwater discharge, emanating as springs. Two of these tributaries flow through the Holland Nature Sanctuary, through deeply incised valleys.

Other surface water features present within the study area include the stormwater management ponds located in Clappison Woods 2 (Sheppards Quarry).

5.3 Vegetation

5.3.1 Inventory

Figure 4 illustrates the vegetation community coverage of the study area. Table 3 summarizes the number of polygons, area and percentage of the study area that each ELC vegetation community comprises within the study area. Table 4 summarizes ELC composition of each parcel. Some polygons were too small to map (i.e., small slivers often located at the very edge of the Current EcoPark Lands); therefore, the number of polygons, size and percentage of study area reported in Table 3 may not appear to match what is illustrated in Figure 4.

Table 3. Vegetation communities of partner-owned Clappison-Grindstone Heritage Lands

ELC Community Series	# of Polygons	Hectares	% Study Area
CLO – Open Cliff	1	0.89	0.44
CLT – Treed Cliff	1	0.16	0.08
TAT – Treed Talus	1	6.26	3.10
CUM – Cultural Meadow	9	20.98	10.39
CUT – Cultural Thicket	10	6.73	3.33
CUS – Cultural Savannah	3	4.57	2.26
CUW – Cultural Woodland	2	0.53	0.26
CUP – Cultural Plantation	2	0.40	0.20
FOD – Deciduous Forest	48	149.80	74.15
FOM – Mixed Forest	6	5.25	2.60
MAM – Meadow Marsh	5	2.12	1.05
MAS – Shallow Marsh	1	0.02	0.01
SAF – Floating-leaved Shallow Aquatic	1	0.00	0.00
OAO – Open Aquatic	3	1.67	0.83
ANT - Anthropogenic	6	1.75	0.87
UNC - Unclassified	5	0.88	0.44
Totals:	**104**	**202.01**	**100.00**

Cootes to Escarpment EcoPark System

Clappison - Grindstone Heritage Lands

Figure 4: Vegetation Communities

Legend

Ecological Land Classification

ANT - Anthropogenic
CLO1-2 - Bulblet Fern-Herb Robert Carbonate Open Cliff Type
CLT1-1 - White Cedar Treed Carbonate Cliff Type
CUM - Cultural Meadow
CUM1 - Mineral Cultural Meadow Ecosite
CUM1-1 - Dry-Moist Old Field Meadow Type
CUP3-2 - White Pine Coniferous Plantation Type
CUP3-3 - Scots Pine Coniferous Plantation Type
CUS1-1 - Hawthorn Cultural Savannah Type
CUT1-4 - Gray Dogwood Cultural Thicket Type
CUT2 - Bedrock Cultural Thicket Ecosite
CUW1 - Mineral Cultural Woodland Ecosite
FOD - Deciduous Forest
FOD1-1 - Dry-Fresh Red Oak Deciduous Forest Type
FOD1-2 - Dry-Fresh White Oak Deciduous Forest Type
FOD4-2 - Dry-Fresh White Ash Deciduous Forest Type
FOD5-1 - Dry-Fresh Sugar Maple Deciduous Forest Type
FOD5-3 - Dry-Fresh Sugar Maple-Oak Deciduous Forest Type
FOD5-4 - Dry-Fresh Sugar Maple-Ironwood Deciduous Forest Type
FOD5-8 - Dry-Fresh Sugar Maple-White Ash Deciduous Forest Type
FOD6-1 - Fresh-Moist Sugar Maple-Lowland Ash Deciduous Forest Type
FOD6-5 - Fresh-Moist Sugar Maple-Hardwood Deciduous Forest Type
FOD7-4 - Fresh-Moist Black Walnut Lowland Deciduous Forest Type
FOM2-2 - Dry-Fresh White Pine-Sugar Maple Mixed Forest Type
FOM3-2 - Dry-Fresh Sugar Maple-Hemlock Mixed Forest Type
FOM4 - Dry-Fresh White Cedar Mixed Forest Ecosite
FOM6-1 - Fresh-Moist Sugar Maple-Hemlock Forest Type
MAM2 - Mineral Meadow Marsh Ecosite
MAM2-2 - Reed-canary Grass Mineral Meadow Marsh Type
MAM2-5 - Narrow-leaved Sedge Mineral Meadow Marsh Type
MAM2-9 - Jewelweed Mineral Meadow Marsh Type
MAS2-3 - Narrow-leaved Sedge Mineral Shallow Marsh Type
OAO - Open Aquatic
SAF1-3 - Duckweed Floating-leaved Shallow Aquatic Type
TAT1-4 - Fresh-Moist Sugar Maple Carbonate Treed Talus Type

Utility Corridors

Municipal Boundary

Study Area

Clappison - Grindstone Heritage Lands

Sources of Information:
Conservation Halton
Hamilton Conservation Authority
City of Burlington
City of Hamilton
Bruce Trail Conservancy
Ministry of Natural Resources and Forestry

North-South Environmental Inc.
Specialists in Sustainable Landscape Planning

January 14, 2016

Table 4. Vegetation communities of partner-owned Clappison-Grindstone Heritage Lands, broken down by parcel

Parcel Name	Vegetation Community (ha)																
	CLO	CLT	TAT	CUM	CUT	CUS	CUW	CUP	FOD	FOM	MAM	MAS	SAF	OAO	ANT	UNC	Total
Bonta					0.00				7.70	0.66							8.36
Clappison Woods 1	0.51		6.26	0.58	3.25	1.42			74.46		0.15				0.48	0.11	87.22
Clappison Woods 2	0.31			5.72		0.02			1.13					1.67	0.09	0.51	9.45
Clappison Woods 3									0.67						0.48		1.15
Eileen and John Holland Nature Sanctuary				5.38	2.23				7.11						0.13	0.25	15.10
Grindstone Creek 1				5.65	1.25	3.13			47.21	4.57	1.97	0.02	0.00				63.80
Grindstone Creek 2									3.39	0.02					0.57		3.98
Johnson Easement		0.16							0.70								0.86
Little	0.07								3.15								3.22
Robinson									0.36								0.36
Smokey Hollow				3.65			0.53	0.40	3.92							0.01	8.51
Total:	**0.89**	**0.16**	**6.26**	**20.98**	**6.73**	**4.57**	**0.53**	**0.40**	**149.80**	**5.25**	**2.12**	**0.02**	**0.00**	**1.67**	**1.75**	**0.88**	**202.01**

Cliff and Talus

Open Cliffs have less than 25% tree cover and less than 25% shrub cover. They are typically found on the vertical or near-vertical bare bedrock faces, and are highly exposed and subject to extremes in temperature and moisture (Lee et al. 1998). Bulblet Fern – Herb Robert Carbonate Open Cliff Type (CLO1-2) has been documented along the escarpment rim in Clappison Woods 1, Clappison Woods 2 and the Little Property (Figure 4 and Tables 3 and 4).

Treed Cliffs have between 25-60% tree cover, and are typically restricted to the narrow cliff rim of the escarpment, and depends on how broken and fractured the cliff rim and face are (Lee et al. 1998). White Cedar Treed Carbonate Cliff Type (CLT1-1) has been documented along the escarpment edge in the Johnson Easement (Figure 4 and Tables 3 and 4).

Treed Talus vegetation communities have between 25-60% tree cover, varying from patchy and barren to more closed in nature (i.e., savannah or woodland) depending on the availability of substrate accumulated between rocks (Lee et al. 1998). Fresh-Moist Sugar Maple Carbonate Treed Talus Type (TAT1-4) has been documented below the escarpment rim in Clappison Woods 1 (Figure 4 and Tables 3 and 4). The talus slopes in Clappison Woods have rich Sugar Maple forests and semi-open Basswood (*Tilia americana*) groves.

Cultural Communities

Regenerating cultural communities are scattered throughout the shale slopes in Clappison Woods. They sustain old fields, thickets of Grey Dogwood (*Cornus racemosa*), Staghorn Sumac (*Rhus typhina*) and hawthorn (*Crataegus* sp.) as well as successional groves of White Ash (*Fraxinus americana*), Large-toothed Aspen (*Populus grandidentata*), Trembling Aspen (*P. tremuloides*) and White Elm (*Ulmus americana*). Near the old quarry (Clappison Woods 2, Figure 4), successional plain forests of White Ash and thickets of European Buckthorn (*Rhamnus cathartica*) predominate (Varga 1995). Successional vegetation communities and manicured areas are locally present within the Grindstone Creek valley system.

Cultural Meadows 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 the aster and goldenrod assemblages on fresh to moist substrates. Dry-Moist Old Field Meadow Type (CUM1-1) and other cultural meadow communities (i.e., CUM and CUM1) have been documented in Clappison Woods 1, Clappison Woods 2, Holland Nature Sanctuary, and Grindstone Creek 1 (Figure 4 and Tables 3 and 4). The two CUM polygons located at the south end of Grindstone Creek 1, west of the creek, consist of young plantations, which have been planted with woody native tree and shrub species by Conservation Halton. Over time, this vegetation community will be reclassified as a CUP or FOD if the plantings are successful.

Cultural Thickets 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 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 cultural or anthropogenic-based disturbances. Cultural thickets have

been documented within the following parcels: Bonta, Clappison Woods 1, Clappison Woods 2, Holland Nature Sanctuary, and Grindstone Creek 1. The following cultural thicket vegetation type/ecosites have been documented within the study area (Figure 4 and Tables 3 and 4):

- Gray Dogwood Cultural Thicket Type (CUT1-4); and
- Bedrock Cultural Thicket Ecosite (CUT2).

Cultural Savannahs 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. Hawthorn Cultural Savannah Type (CUS1-1) has been documented in Clappison Woods 1, Clappison Woods 2 and Grindstone Creek 1 (Figure 4 and Tables 3 and 4).

Drier conditions below the escarpment and within the Grindstone Creek valley support some prairie elements including remnants of oak woodland. The Diary of Lady John Graves Simcoe from the late 1700's describes "accounts of open, parklike areas with large oak trees, no underwood, and fine turf suggest[ing] that prairie and oak savanna vegetation was fairly widespread around the perimeter of the western end of Lake Ontario" (as referenced in Goodban et al. 1997). In "The Historical and Present Extent and Florsitic Composition of Prairie and Savanna Vegetation in the Vicinity of Hamilton, Ontario", Goodban and others (1997) found that at least 3,800 ha of prairie and savanna occurred in Hamilton and vicinity at the time of settlement, and that a more realistic estimate of the extent of this vegetation is between 5,000 and 6,000 ha. These areas were dominated by prairie grasses and oaks and included many other species with prairie and open ground affinities. Currently, far less than 1% of the presettlement prairie and savanna remains. Therefore, prairie and savanna remnants represent the rarest and most threatened community type in the City of Hamilton (Goodban et al. 1997), and likely in Halton Region also.

Cultural Woodlands are treed areas that have between 35% and 60% tree cover, and often have a large proportion of non-native plant species resulting from cultural or anthropogenic disturbances (Lee et al. 1998). Mineral Cultural Woodland Ecosite (CUW1) has been documented in Smokey Hollow (Figure 4 and Tables 3 and 4).

Cultural Plantations have greater than 60% tree cover and consist of deciduous and/or coniferous trees that have primarily been planted (Lee et al. 1998). The following two cultural plantation types have been documented in Smokey Hollow (Figure 4 and Tables 3 and 4):

- White Pine Coniferous Plantation Type (CUP3-2); and
- Scots Pine Coniferous Plantation Type (CUP3-3).

In addition to cultural plantations mapped as CUP, there are two CUM polygons associated with Grindstone Creek 1, located on tableland, west of the creek, which have both recently been planted as plantations. Approximately 50% coniferous and 50% deciduous woody vegetation was planted in rows to accelerate the restoration of old field communities to woodland. Although ELC does not capture this, these young plantations will regenerate to CUP or FOD if the plantings are successful.

Forested Communities

A dramatic increase in forest cover has occurred within the Grindstone Creek watershed over the past 70 years. This increase is associated with the abandonment of marginal farmlands adjacent to wetlands and regeneration along the Niagara Escarpment (Halton Region Conservation Authority 1998). The

Heritage Lands, and Grindstone Creek system in particular, may serve as a corridor for species, thus connecting natural areas within the highly urbanized City of Burlington and the Niagara Escarpment.

Forested communities have greater than 60% tree cover, and can be dominated by deciduous and/or coniferous trees. Forested communities are characterized based on the species that dominate the canopy layer. For example, a forest that is dominated by Sugar Maple would be classified as a deciduous forest dominated by Sugar Maple. The Heritage Lands contain both **Deciduous Forests** and **Mixed** Forests. Deciduous forests have greater than 75% canopy cover of deciduous tree species, and mixed forests have greater than 25% canopy cover of coniferous tree species and greater than 25% canopy cover of deciduous tree species (Lee et al. 1998).

Forested communities are found throughout the study area, along the Grindstone Creek valley and along the Niagara Escarpment (Figure 4 and Tables 3 and 4). Within the study area, forested communities are primarily dominated by deciduous forest (148.68 ha), with a small proportion of mixed forest (5.26 ha). The drier shale ridges and south-facing valley slopes in Clappison Woods support deciduous forests dominated by White Oak, Red Oak and Sugar Maple, with Black Oak and Shagbark Hickory (*Carya ovata*) as common secondary species. One ridge supports a mixed forest of White Birch (*Betula papyrifera*) – Black Cherry (*Prunus serotina*) – White Pine (*Pinus strobus*). Moister valleys are dominated by Sugar Maple forests. The Grindstone Creek valley consists of a core strip of wooded floodplain bordered by wooded ravines. The floodplain generally consists of mesic to wet-mesic deciduous forests. The ravine slopes are characterized by very steep slopes with a mesic to dry-mesic moisture regime with deciduous and mixed forests. Mixed forests tend to consist of Sugar Maple with Eastern Hemlock, White Pine or White Cedar (*Thuja occidentalis*) as the associate. Within the Grindstone Creek valley, deciduous and mixed forests are occasionally characterized by the presence of exposed escarpment rock face, which can be over three meters high in some areas (Schwetz 2014).

The following forested communities have been documented within the study area:

- Dry-Fresh Red Oak Deciduous Forest Type (FOD1-1);
- Dry-Fresh White Oak Deciduous Forest Type (FOD 1-2);
- Dry-Fresh White Ash Deciduous Forest Type (FOD4-2)
- Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1);
- Dry-Fresh Sugar Maple – Oak Deciduous Forest Type (FOD5-3);
- Dry-Fresh Sugar Maple – Ironwood Deciduous Forest Type (FOD5-4);
- Dry-Fresh Sugar Maple – White Ash Deciduous Forest Type (FOD5-8);
- Fresh-Moist Sugar Maple – Lowland Ash Deciduous Forest Type (FOD6-1);
- Fresh-Moist Sugar Maple – Hardwood Deciduous Forest Type (FOD6-5);
- Fresh-Moist Black Walnut Lowland Deciduous Forest Type (FOD7-4);
- Dry-Fresh White Pine – Sugar Maple Mixed Forest Type (FOM2-2);
- Dry-Fresh Sugar Maple – Hemlock Mixed Forest Type (FOM3-2);
- Dry-Fresh White Cedar Mixed Forest Ecosite (FOM4); and
- Fresh-Moist Sugar Maple – Hemlock Mixed Forest Type.

Oak Woodlands

Oak woodland communities are one of the most significant ecosystems in the study area. Oak woodlands are not itemized or described in the 1998 ELC System (Lee et al. 1998), and are thus included under oak dominated deciduous forest types, such as Dry-Fresh Red Oak Deciduous Forest Type (FOD1-

1) and Dry-Fresh White Oak Deciduous Forest Type (FOD1-2). Many of the rare and uncommon species present within the Heritage Lands are located within these open oak woodland communities.

The draft 2008 update of ELC codes includes vegetation types for oak woodlands under the Ecosite "Deciduous Woodland", where deciduous trees dominate and cover >75%. The following Deciduous Woodland communities have been noted within Grindstone Creek 1; however, the following oak woodland vegetation types have not been fully mapped within the study area and are not shown on Figure 4:

- Dry Red Oak Woodland Type (WODM3-1); and
- Dry White Oak Woodland Type (WODM3-3).

Wetland Communities

In general, wetland communities are scarce within the Current EcoPark Lands, comprising just 2% of the study area. This is due to the physiography, soils and terrain which all promote rapid drainage below the escarpment and in the Grindstone Creek valley. **Meadow Marsh** 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 by summer. This vegetation community represents the interface between wetland and terrestrial ecosystems. **Shallow Marsh** vegetation communities have less than 25% tree and shrub cover and are usually dominated by grasses, sedges and rushes (Lee et al. 1998). They can have water up to 2 m deep, with standing or flowing water for much or all of the growing season.

Within the study area, meadow marsh and shallow marsh communities have been documented within Clappison Woods 1 and Grindstone Creek 1, with the majority noted along Grindstone Creek (Figure 4 and Tables 3 and 4). Two small open marshy areas have been documented in the floodplain of Grindstone Creek. The following wetland community vegetation types have been noted within the study area:

- Mineral Meadow Marsh Ecosite (MAM2);
- Reed Canary Grass Mineral Meadow Marsh Type (MAM2-2);
- Narrow-leaved Sedge Mineral Meadow Marsh Type (MAM2-5);
- Jewelweed Mineral Meadow Marsh Type (MAM2-9); and
- Narrow-leaved Sedge Mineral Shallow Marsh Type (MAS2-3).

Aquatic Communities

Open Aquatic communities have water greater than 2 m in depth with no macrophyte vegetation and no tree or shrub cover, and tend to be dominated by plankton (Lee et al. 1998). **Floating-leaved Shallow Aquatic** 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). Open Aquatic (OAO) communities may be present within the stormwater management ponds at Clappison Woods 2. Based on site visits completed in 2015, the water column appears to be quite shallow due to the fact that the stormwater management ponds have likely had no sediment clean-out since they were installed circa late 1990's. These OAO communities may actually have developed into SAF or MAS vegetation types based on the increased depth of sediment present. A small area of Duckweed Floating-leaved Shallow Aquatic Type (SAF1-3) is present within an oxbow of Grindstone Creek (Figure 4 and Tables 3 and 4).

Anthropogenic

Several anthropogenic (ANT) areas are present within the Current EcoPark Lands (Figure 4 and Tables 3 and 4). These lands contain land uses that are not easily classified using the ELC for southern Ontario. For example, small slivers of manicured areas are often present along the study area boundaries, portions of anthropogenic use such as parking lots are present within Clappison Woods 2, etc.

5.3.2 Significant Vegetation Communities

There are three provincially significant vegetation communities within the Clappison-Grindstone Heritage Lands (Figure 4).

- Fresh-Moist Sugar Maple Carbonate Treed Talus Type (TAT1-4) – S3
- Bulblet Fern – Herb Robert Carbonate Open Cliff Type (CLO1-2) – S3
- Sugar Maple – Ironwood – White Ash Treed Carbonate Cliff Type (CLT1-2) – S3

In addition, the following oak woodland vegetation communities are also considered to be provincially significant, but are not currently mapped under the 1998 ELC system (Lee et al. 1998), and are thus not mapped on Figure 4:

- Dry Red Oak Woodland Type (WODM3-1); and
- Dry White Oak Woodland Type (WODM3-3).

Historical records indicate that prairie and oak savannah were associated with well-drained, sandy sites south of the Escarpment. Only a handful of tiny prairie-savannah remnants remain within the dry oak/hickory forests of Clappison Woods. Adjacent dry, open ridges within utility corridors support clusters of prairie plant species (Halton Region Conservation Authority 1998). Similar clusters are also found in more disturbed areas such as the junction of CNR and CPR railway lines in Aldershot. Far less than 1% of the pre-settlement prairie and savannah remains in southern Ontario (Goodban et al. 1997). The remnant prairie/savannah features represent the rarest and most threatened community type within the Clappison-Grindstone Heritage Lands.

The Grindstone Creek valley is covered in older forests of Red Oak, White Oak, Sugar Maple and Eastern Hemlock with trees in excess of 100 years old. By some definitions, these forests would quality as old growth.

According to the Halton Natural Areas Inventory, Clappison Woods and the Grindstone Creek Valley contain forest interior habitat, which is defined as forested areas that are greater than 100 m away from a forest edge. Forest interior habitat provides important refuges for area-sensitive wildlife species, particularly some bird species. According to Conservation Halton, the main valley branch of Grindstone Creek supports 40 ha of interior forest, the Clappison-Bridgeview Tributaries support 119 ha of interior forest, and the average interior forest for the Grindstone Creek watershed is 8.9% (Conservation Halton, unpublished Grindstone Creek Watershed Study).

Much of the forest within the study area would qualify as significant woodland using Halton Region's significant woodlands criteria (ROPA 38, November 28, 2014).

Schedule B-2 of the City of Hamilton's Urban Official Plan maps significant woodland and includes forested areas along the Grindstone Creek Valley.

There are no provincially significant wetlands within the Clappison-Grindstone Heritage Lands.

The Grindstone Creek valley would qualify as a significant valleyland, based on the 2014 Provincial Policy Statement definition which states that significant valleylands are "ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system".

Some of the vegetation communities found within the study area may qualify as significant wildlife habitat, which includes rare vegetation communities or specialized habitat for wildlife including cliffs and talus slopes, 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 coldwater streams.

5.4 Flora

5.4.1 Inventory

A total of 896 floral species have been documented in the Clappison-Grindstone Heritage Lands. See Appendix 5 for the complete listing of floral species documented within each of the partner-owned parcels, and within the Clappison-Grindstone Heritage Lands as a whole. Of these 896 species, 602 (67%) are native species.

A total of 22 Carolinian Indicator species (*sensu* Riley *et al.* 1989) and 30 plant species with prairie - savannah affinities (*sensu* Riley *et al.* 1989) have been noted (Appendix 6).

Table 5 provides the number of native floral species, Floristic Quality Index (FQI), and Native Mean C for each partner-owned parcel. FQI, a measure of both habitat conservatism and species richness and thus an indicator of vegetation quality, is the average Coefficient of Conservatism (CC) divided by the square root of the number of plant species in the community (Oldham et al. 1995). CC is a measure of a plant's specificity of habitat requirements, with a coefficient of 0 indicating a plant tolerant of a wide range of conditions and 10 indicating a plant that has the most specific habitat requirements. Mean CC is thus a masure of the habitat requirements of a plant community.

The Native FQI of the Clappison-Grindstone Heritage Lands as a whole is an extremely high value. In southern Ontario, most natural areas within urban or urbanizing landscapes have Native FQI values of around 70-80. Remnant patches of natural habitat in urban areas of Ontario typically have FQIs in the 15-30 range. FQIs of 40-45 are fairly high for agricultural landscapes. A mean C under 4 indicates that the site is primarily vegetated with adaptable species that can withstand a variety of habitat changes. Areas with high coefficients (higher than 4) are likely to be more sensitive to disturbance, for example a change in hydrology, influx of non-native species, or change in canopy cover.

Table 5. Floristic Quality of the Clappison-Grindstone Heritage Lands

Site Name	# Native Flora Species	Native FQI	Native Mean C
Bonta	536	118.26	5.11
Clappison Woods 1	334	90.59	4.96
Clappison Woods 2	326	89.30	4.95
Clappison Woods 3	333	89.82	4.92
Eileen and John Holland Nature Sanctuary	533	117.17	5.08
Grindstone Creek 1	584	126.10	5.22
Grindstone Creek 2	273	85.20	5.16
Johnson Easement	287	86.75	5.12
Little	327	89.73	4.96
Smokey Hollow	317	89.08	5.00
Clappison-Grindstone Heritage Lands	**602**	**128.53**	**5.24**

Invasive species have been identified as one of the greatest threats to the integrity of the ecosystems of the Clappison-Grindstone Heritage Lands. Table 6 below lists the major invasive species and provides an indication of whether they are dominant in their respective habitats. This table has been prepared based on several background reports, data sets and field observations completed by North-South Environmental Inc. Expert knowledge of the characteristics of invasive species was applied to identify the major invasive plant species that are considered high priorities for management. This list has been compiled based on several background reports, data sets and fieldwork completed by North-South Environmental Inc.

Table 6. Major invasive plant species found within Clappison-Grindstone Heritage Lands

Common Name	Scientific Name	Locally Dominant
Herbaceous Plants		
Garlic Mustard	*Alliaria petiolata*	x
Dog-strangling Vine	*Cynanchum rossicum*	x
English Ivy	*Hedera helix*	
Periwinkle	*Vinca minor*	
Himalayan Balsam	*Impatiens glandulifera*	
Japanese Knotweed	*Polygonum cuspidatum*	
Phragmites	*Phragmites australis*	
Purple Loosestrife	*Lythrum salicaria*	
Shrubs		
White Mulberry	*Morus alba*	
Common Buckthorn	*Rhamnus cathartica*	x
Non-native Honeysuckles	e.g., *Lonicera tatarica*	x
Multiflora Rose	*Rosa multiflora*	x
Japanese Barberry	*Berberis thunbergii*	
Trees		
Norway Maple	*Acer platanoides*	
Manitoba Maple	*Acer negundo*	x
Black Locust	*Robinia pseudo-acacia*	

5.4.2 Significant Flora

A total of 141 significant floral species have been identified within the study area, including five nationally and provincially Endangered species, 17 provincially rare species (S1-S3 provincially ranked), 87 regionally rare species (based on Halton Region, *sensu* Dwyer 2006), and 99 regionally rare species in the City of Hamilton (Schwetz 2014). Table 7 lists floral species at risk and provincially rare species (S1-S3) noted within the study area. Figure 5 illustrates the distribution of significant flora within the Clappison-Grindstone Heritage Lands, where known.

Table 7. Species at Risk and provincially rare floral species in Clappison-Grindstone Heritage Lands

Scientific Name	Common Name	SAR	S Rank	Historic Record
Ranunculus hispidus Michx. var. hispidus	Bristly Buttercup		S3	
Morus rubra L.	Red Mulberry	END	S2	
Carya glabra (Miller) Sweet	Pignut Hickory		S3	
Juglans cinerea L.	Butternut	END	S3?	
Castanea dentata (Marshall) Borkh.	American Chestnut	END	S2	
Crataegus margarettae Ashe	Margarett's Hawthorn		S1	Yes
Desmodium cuspidatum (Muhlenb. ex Willd.) DC. ex Louden var. *cuspidatum*	Large-bracted Tick-trefoil		S3	
Cornus florida L.	Eastern Flowering Dogwood	END	S2?	
Frasera caroliniensis Walter	American Columbo	END	S2	
Aureolaria virginica L. Pennell	Downy Yellow False Foxglove		S1	
Aureolaria flava L. Farw.	Smooth Yellow False Foxglove		S2?	Yes
Hieracium paniculatum L.	Panicled Hawkweed		S2?	Yes
Carex oligocarpa Schkuhr ex Willd.	Eastern Few-fruited Sedge		S3	
Festuca hallii (Vasey) Piper	Plains Rough Fescue		S1	
Phleum alpinum L.	Alpine Timothy		S1S2	
Poa languida Hitchc.	Drooping Bluegrass		S3	Yes
Uvularia perfoliata L.	Perfoliate Bellwort		S1	

Historic Records are >20 years old.

Figure 5. Distribution of rare flora and fauna in Current EcoPark Lands

[This figure contains sensitive information and has been intentionally left out.]

5.5 Fauna

Fauna data were mostly obtained from existing inventories of natural features, and the boundaries of the Current EcoPark Lands are not coincident with ESA, ANSI and other natural area designations. Because of this, some of the species reported below may actually be located on non-partner owned lands within the Heritage Lands, or on lands adjacent to the Heritage Lands. However, because the habitats in an adjacent to Current EcoPark Lands are usually identical, it is reasonable to assume for the purpose of this management plan that all species reported occur within the partner-owned properties. The complete listing of faunal species documented within the Clappison-Grindstone Heritage Lands can be found in Appendix 7. Figure 5 illustrates the distribution of significant fauna within the Clappison-Grindstone Heritage Lands. Table 8 summarizes significant faunal species found within the Heritage Lands. In this report, significant is meant to mean any species that has been identified as Endangered, Threatened, of Special Concern, ranked S1-S3, or listed as regionally rare by Dwyer (2006).

5.5.1 Inventory

Butterflies and Moths (Lepidoptera)

A total of 49 species of butterfly or moth have been recorded within the Clappison-Grindstone Heritage Lands. All but one of these species is native. Two provincially significant species, four regionally rare and two regionally uncommon species have been noted (Appendix 7). The provincially significant species noted are (Figure 5):

- Monarch (*Danaus plexippus*) – S2N/S4B, Special Concern Species (COSEWIC and COSSARO); and
- Mottled Duskywing (*Erynnis martialis*) – S2, Endangered Species (COSEWIC and COSSARO).

Dragonflies and Damselflies (Odonata)

A total of 38 species of dragonfly or damselfly have been identified within the Clappison-Grindstone Heritage Lands, all of which are native. A total of ten regionally rare and nine regionally uncommon species (*sensu* Dwyer 2006), as well as two provincially rare species have been noted (Figure 5):

- Arrowhead Spiketail (*Cordulegaster obliqua*) – S2; and
- Unicorn Clubtail (*Arigomphus villosipes*) – S2S3.

Fish

Downstream of the Niagara Escarpment, the gradient increases resulting in large substrates and faster flows. Additional groundwater discharges make this area suitable for resident cool and coldwater fish species, while also providing suitable spawning conditions for migratory salmonids, including Rainbow Trout (*Oncorhynchus mykiss*) and Chinook Salmon (*Inchorhynchus tshawytscha*). Three tributaries of Grindstone Creek arise along the Escarpment slopes within Clappison Woods. The main Grindstone Creek above and below Smokey Hollow Falls at Waterdown is also located in the Heritage Lands. The waterfall at this location is a barrier to upstream fish movement including migratory salmonids. The lower Grindstone Creek could be managed as a migratory Rainbow Trout and resident Brown Trout (*Salmo trutta*) fishery until the watershed is capable of supporting Atlantic Samon (*Salmo salar*).

Within the main reaches of the Grindstone Creek watershed, fish community sampling has occurred on a number of occasions from the 1970s to the present. A total 52 fish species have been recorded, including 11 introduced species.

A total of 27 regionally rare and 10 regionally uncommon fish species have been noted within the Clappison-Grindstone Heritage Lands (*sensu* Dwyer 2006).

Round Goby (*Neogobious melanostomus*), which are native to Europe, were first introduced to the Great Lakes region in 1990 where they quickly spread from their initial discovery in Lake St. Clair to across the Great Lakes and their tributaries. Round Gobies are small benthic fish who are able to out-compete native fish due to their diverse diet, aggressive behavior, their ability to spawn numerous times and their ability to adapt to different habitat types (Holm et al. 2009). It is likely that small numbers of Round Goby travel further upstream into the Grindstone Creek Valley from Lake Ontario; however, no specimens have been observed upstream of the Niagara Escarpment to date.

Amphibians and Reptiles (Herpetofauna)

A total of 17 species of amphibians or reptiles have been recorded in the Heritage Lands, including one non-native species, Pond Slider (*Trachemys scripta*).

A total of three provincially rare species, one Endangered species, and two species of Special Concern have been noted. In addition, three regionally uncommon species have been noted (*sensu* Dwyer 2006). Provincially rare species include (Figure 5):

- Milksnake (*Lampropeltis triangulum*): S3, Special Concern nationally and provincially;
- Snapping Turtle (*Chelydra serpentina*): S3, Special Concern nationally and provincially; and
- Jefferson/Blue-spotted Salamander Complex (*Ambystoma jeffersonianum*): Jefferson dominated polyploids are considered S2, Endangered species and are protected under the Ontario Endangered Species Act.

Birds

A total of 100 bird species have been noted within the Clappison-Grindstone Heritage Lands, including four non-native species. Of these, 85 are considered to possibly breed within the Current EcoPark Lands, six are considered to possibly breed within the Stewardship Lands, and the remaining nine bird species are considered to migrate through the Heritage Lands or casually visit the Heritage Lands (i.e., these nine species do not likely breed within the Heritage Lands).

In addition, of the species that are thought to breed within the Heritage Lands, nine are rare in Halton Region and 12 are rare in the City of Hamilton, 23 are uncommon in Halton Region and 28 are uncommon in the City of Hamilton. A total of 19 area-sensitive species have been noted within the Current EcoPark Lands, three area-sensitive species have been noted within the Stewardship Lands, and one area-sensitive migrant has been noted (Appendix 7). A total of six provincially rare and/or significant bird species have been documented within the Heritage Lands (* indicates a species associated with the Stewardship Lands):

- *Barn Swallow (*Hirundo rustica*) – S4B, Threatened (COSSARO);
- *Bobolink (*Dolichonyx oryzivorus*) – S4B, Threatened (COSSARO);
- *Eastern Meadowlark (*Sturnella magna*) – S4B, Threatened (COSSARO);
- Louisiana Waterthrush (*Parkesia motacilla*) – S3B, Special Concern (COSEWIC and COSSARO);
- Eastern Wood-pewee (*Contopus virens*) – S4B, Special Concern (COSSARO); and
- Wood Thrush (*Hylocichla mustelina*) – S4B, Special Concern (COSSARO).

Mammals

A total of 18 mammals have been recorded within the Heritage Lands. None of these species are considered provincially or regionally rare. However, bat surveys have not been completed and there are likely bat species at risk present in the Heritage Lands given the diversity of habitats and escarpment cliff crevices present.

Table 8. Provincially/Nationally Significant faunal species within Clappison-Grindstone Heritage Lands

Common Name	G Rank	S Rank	COSEWIC	COSSARO
Butterflies and Moths				
Mottled Duskywing	G3	S2	END	END
Monarch	G5	S2N,S4B	SC	SC
Dragonflies and Damselflies				
Arrowhead Spiketail	G4	S2		
Unicorn Clubtail	G5	S2S3		
Amphibians and Reptiles				
Jefferson/Blue-spotted Salamander Complex	GNA	S2		
Milksnake	G5	S3	SC	SC
Snapping Turtle	G5	S3	SC	SC
Birds				
*Barn Swallow	G5	S4B	THR	THR
*Bobolink	G5	S4B	THR	THR
*Eastern Meadowlark	G5	S4B	THR	THR
Eastern Wood-pewee	G5	S4B	SC	SC
Louisiana Waterthrush	G5	S3B	SC	SC
Wood Thrush	G5	S4B	THR	SC

*=species associated with Stewardship Lands

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 Clappison-Grindstone Heritage Lands may provide the following forms of significant wildlife habitat:

1. Seasonal Concentration Areas of Animals
    - Raptor Wintering Area
    - Bat Hibernacula
    - Bat Maternity Colonies
    - Migratory Butterfly Stopover Areas
    - Deer Winter Congregation Areas
2. Rare Vegetation Communities
    - Cliffs and Talus Slopes
    - Old Growth Forest
    - Other Rare Vegetation Communities
3. Specialized Habitat for Wildlife
    - Woodland Raptor Nesting Habitat
    - Seeps and Springs
    - Amphibian Breeding Habitat (Woodland)
    - Woodland Area-sensitive Breeding Bird Habitat
4. Habitat for Species of Conservation Concern
    - Special Concern and Rare Wildlife Species
5. Animal Movement Corridors

A thorough analysis of the extent of Significant Wildlife Habitat is not possible at this scale of study, however we are confident that substantial areas of the Current EcoPark Lands would qualify as Significant Wildlife Habitat.

5.6 Other Natural Heritage Designations

The following designations apply to lands found within the Clappison-Grindstone Heritage Lands.

Grindstone Creek Valley Provincial Life Science ANSI (Gould 1989)
This ANSI comprises the steep-sided valley of Grindstone Creek which dissects shale deposits below the Escarpment. Sugar Maple – Red Oak – White Oak forests dominate the west-facing slopes with stands of Eastern Hemlock on the east-facing. There is a broad floodplain in the southern portion and this is dominated by willow and dogwood. Several Carolinian species are represented in the valley including Black Walnut, Black Oak, American Chestnut, Eastern Flowering Dogwood and American Columbo.

Grindstone Creek Provincial Earth Science ANSI (HRCA 1998)
This ANSI occurs within Grindstone Creek valley and includes a section of the Niagara Escarpment that contains significant bedrock formations. It consists of a dissected creek valley within the Queenston Formation with exposed shale bedrock and overlying Halton Till.

Clappison Escarpment Woods Regional Life Science ANSI (Varga 1995)

The Clappison Escarpment Woods provides moderate representation of south-facing Niagara Escarpment slope features. There is high representation of drier broadleaf forests on shale slopes, and moderate representation of moist broadleaf talus forests and moist shale slope forests. South-facing slopes are uncommon along the southern portion of the Niagara Escarpment.

King City Quarry Provincial Earth Science Candidate ANSI

The King City Quarry Provincially Significant Earth Science ANSI is located within the Clappison-Grindstone Heritage Lands (Clappison Woods 2, Figure 2), within the City of Hamilton. This site is within a section of the Niagara Escarpment that contains significant bedrock formations. The floor of the quarry is comprised of siltstone of the Thorold Formation. The Reynales, Irondequoit, Rochester, and Gasport Formations (of the Clinton Group), and the overlying Lockport Formation are exposed in the quarry face. The Rochester Formation here is about one metre thick and pinches out to the north (Schwetz 2014).

Environmentally Sensitive/Signficant Areas (ESAs)

The Halton Regional Official Plan no longer uses Environmentally Sensitive Areas (ESAs) as a basis for protecting natural heritage as they have been replaced, and incorporated into a Regional Natural Heritage System. However, ESAs were the basis for inventory and reporting on the Region's natural heritage for 37 years and still provide a useful framework for reporting and describing natural heritage features. The City of Hamilton does, however, still include Environmentally Significant Areas (ESAs) in their Official Plan.

The following ESAs are found within the Clappison-Grindstone Heritage Lands:

- Halton Region ESA: Clappison Escarpment Woods and Extension (NAI-1 and NAI-1A);
- Halton Region ESA: Grindstone Creek Valley (NAI-3);
- City of Hamilton ESA: Clappison Escarpment Woods (FLAM-48); and
- City of Hamilton ESA: Grindstone Creek Escarpment Valley (FLAM-50).

The Niagara Escarpment, including the Clappison-Grindstone Heritage Lands, is designated as a UNESCO MAB Reserve (United Nations Educational, Scientific and Cultural Organization Man and Biosphere Reserve).

The Grindstone Creek area has been identified by the Hamilton Remedial Action Plan (Ontario Ministry of the Environment et al. 1992) for restoration activities at the lower end of the creek, outside the study area.

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; (2) connections and linkages among the Heritage Lands; and (3) connections and linkages within individual Heritage Lands. The Heritage Lands and their linkage function are captured within the Region of Halton and City of Hamilton's Natural Heritage Systems.

Clappison Woods is part of a significant corridor that stretches the entire length of the Niagara Escarpment. The Heritage Lands fall within a nine km stretch stretching to the west to include the Rock Chapel Escarpment and Spencer Gorge. This corridor has several breaks including a substantial one at Highway 6. Clappison Woods is also connected via valley corridors (Grindstone Creek valley) to Hamilton Harbour and the Lake Ontario shoreline (Varga 1995) and thus links Lake Ontario with the Niagara Escarpment.

In terms of inter-Heritage Land connections, the adjacent escarpment natural areas (e.g., Clappison Woods and Waterdown Woods) converge at the upper end of the Grindstone Creek valley, immediately south of Waterdown. The Grindstone Creek system provides a natural corridor for species moving between natural areas through the highly urbanized City of Burlington, from Lake Ontario to the Niagara Escarpment. Thus, inter-Heritage Land connections are achieved between the Clappison-Grindstone and Lower Grindstone Heritage Lands. To the west, connections (albeit significantly interrupted by Hwy 6) are made to Borer's Fall-Rock Chapel Heritage Lands. For example, there is a strong connection for deer and other wildlife movements from Grindstone Creek to Sassafras Woods across Waterdown Road.

Within the Clappison-Grindstone Heritage Lands, Current EcoPark Lands and natural area units are relatively well-connected through Clappison Woods, and the Grindstone Creek Valley system. Natural area patch size is large, and forest interior habitat is available for area-sensitive species.

5.8 Natural Heritage Inventory Summary

The following table inclues some natural heritage-related policy categories such as ESA, significant woodland and significant wildlife habitat, as well as strictly natural heritage inventory summary information.

Table 9. Summary of natural heritage inventory findings.

Features	Designation	Study Area
Environmentally Sensitive/Signficant Area (ESA)	• Halton Region Environmentally Sensitive Area • City of Hamilton Environmentally Significant Area	• Halton Region ESA: Clappison Escarpment Woods and Extension (NAI-1 and NAI-1A) • Halton Region ESA: Grindstone Creek Valley (NAI-3) • City of Hamilton ESA: Clappison Escarpment Woods (FLAM-48) • City of Hamilton ESA: Grindstone Creek Escarpment Valley (FLAM-50)

Features	Designation	Study Area
Area of Natural and Scientific Interest (ANSI)	As designated and mapped by MNRF: • Provincially Significant Life Science ANSI • Provincially Significant Earth Science ANSI • Regionally Significant Life Science ANSI • Regionally Significant Earth Science ANSI	• Grindstone Creek Valley Provincial Life Science ANSI • Grindstone Creek Provincial Earth Science ANSI • Clappison Escarpment Woods Regional Life Science ANSI • King City Quarry Provincial Earth Science Candidate ANSI
Provincially Significant Wetland (PSW)	Evaluated as a PSW as defined and mapped by MNRF.	There are no PSWs within the study area.
Significant Woodland	• Significant Woodlands as identified in the City of Hamilton's Urban Official Plan (effective 2013) • Significant Woodlands as identified by criteria in Halton Region's Official Plan (effective 2014)	• Deciduous and mixed forests along Grindstone Creek system • Deciduous forests of Clappison Woods
Significant Valleyland	• As defined and mapped by Conservation Halton and Hamilton Conservation Authority: • Regulatory floodplain • Rivers and associated valleylands to top of bank	• Regulated lands of the Grindstone Creek system
Species at Risk	• Habitat for Endangered Species and Threatened Species • Provincially designated in Ontario's Endangered Species Act • Records considered historical (i.e., more than 20 years old) have not been included in the analysis	• 5 Endangered floral species • 3 Threatened bird species[4] • 1 Endangered amphibian species • 1 Endangered butterfly species

[4] Wood Thrush is listed as Threatened by COSEWIC, but is listed as Special Concern under the ESA. Wood Thrush has been included as Special Concern in Table 9, and is therefore not included in the total number of Threatened bird species.

Features	Designation	Study Area
Significant Wildlife Habitat	• Provincially significant vegetation types; ELC vegetation types ranked as S1, S2, S3 or S3S4 by NHIC • Habitat for globally, nationally and provincially significant species; includes species designated as Endangered or Threatened by COSEWIC, Special Concern by COSEWIC or COSSARO, or identified as S1, S2, S3, or S3S4 by NHIC • Seeps and Springs • Amphibian woodland breeding ponds • Woodland raptor nesting habitat • Woodland area-sensitive bird breeding habitat • Migratory stopover area • Site potentially linked to an animal movement corridor	Examples of Significant Wildlife Habitat within the study area include: • Clappison-Grindstone Heritage Lands are an important breeding area for 91 species of birds, including 22 area-sensitive species • The area supports 6 species of special concern (1 butterfly, 2 reptile and three bird species), rarely found elsewhere in Ontario and Canada • The area supports several areas of woodland breeding habitat for amphibians • The area supports seeps and springs, a form of specialized habitat for wildlife
Surface water and fisheries resources	• Permanent streams (including ponds) • Cold-water fish habitat	• Grindstone Creek is a permanent cold-water stream that provides important fish habitat.
Flora	• COSEWIC and COSSARO • NHIC • Dwyer 2006	• 896 flora species; 602 native flora species • 22 Carolinian Indicators; 30 Prairie-Savannah Indicators • 128.53 FQI; 5.24 Mean C • 5 END species • 17 S1-S3 species • 87 regionally rare species in Halton Region • 99 regionally rare species in the City of Hamilton
Butterlies and Moths	• COSEIC and COSSARO • NHIC • Dwyer 2006	• 49 species; 48 native species • 1 END species; 1 SC species • 1 S2 species • 4 regionally rare species
Dragonflies and Damselflies	• COSEIC and COSSARO • NHIC • Dwyer 2006	• 38 native species • 2 S1-S3 species • 10 regionally rare species

Features	Designation	Study Area
Fish	• COSEIC and COSSARO • NHIC • Dwyer 2006	• 52 species; 42 native species • 27 regionally rare species
Amphibians and Reptiles	• COSEIC and COSSARO • NHIC • Dwyer 2006	• 17 species; 16 native species • 1 END species; 2 SC species • 3 S1-S3 species • 3 regionally uncommon species
Birds	• COSEIC and COSSARO • NHIC • Dwyer 2006 • SWHTG (MNR 2000)	• 100 species (91 breeding); 96 native species • 3 THR* species; 3 SC species • 1 S3B species • 9 regionally rare species in Halton Region, excluding migrants • 12 regionally rare species in the City of Hamilton, excluding migrants • 22 area-sensitive species, excluding migrants
Mammals	• COSEIC and COSSARO • NHIC • Dwyer 2006	• 18 species • 0 regionally/provincially rare species • bat surveys not completed to date

*THR bird species are known to breed in the Stewardship Lands, and not Current EcoPark Lands.

6.0 Cultural Heritage Inventory

6.1 History, Identification and Existing Conditions

Within the Clappison-Grindstone Heritage Lands the primary existing cultural heritage resources are related to milling and quarrying activities. The escarpment is a strong physical element that influenced the settlement pattern contributing to the historical, social and commercial development of this part of what was formerly East Flamborough Township. The cultural history of the Grindstone Creek watershed is summarized in the 1997 Grindstone Creek Watershed Study (Halton Region Conservation Authority 1998). This summary provides details about the mills along Grindstone Creek, the installation of the CN railway, origins of Snake Road, among other topics.

The cultural heritage inventory identified three principal sites. The availability of a good source of flowing water enabled early milling to be established at Smokey Hollow (Grindstone Creek 1) south of Waterdown, adjacent to Mill Street. Smokey Hollow is now part of the City of Hamilton park system. Former quarrying extraction at the King City Quarry is identified in Clappison Woods 2 land parcel below Highway 5 (Figure 2). The Little property on the east side Highway 6 below Clappison Corners contains a dry stonewall ruin which is likely a former residential or agricultural structure. The 1880 Flamborough County map shows the landowners of the Little Property in 1880 were the “Smith” family (available

online at: http://web.library.mcgill.ca/countyatlas/Images/Maps/TownshipMaps/wen-m-flamboro-e.jpg). Overall, the study area is represented through remnant agricultural land usage as identified in historical settlement mapping, with Waterdown representing the principal centre of settlement.

The character of the cultural heritage landscape in itself is not uniform, in part because of the fragmentation and delineation of partner-owned land holdings. The property boundaries often overlap with adjacent cultural landscapes, some of which are Stewardship Lands in the Cootes to Escarpment EcoPark System, in private ownership. The landscapes are not in themselves identified as discreet cultural heritage landscape units, although many carry similar open space characteristics. However, the former Smokey Hollow mill site in Grindstone Creek 1 is an example that can be interpreted as a discreet cultural heritage landscape unit. It benefits from the history of place and existing public commemorative recognition.

6.2 Built Heritage and Cultural Heritage Landscape Conservation Guidelines

Natural heritage and built heritage conservation disciplines have long viewed landscape conservation as common ground. It is useful to view conservation as a tool to enhance life in a community or area. In Ontario, the *Ontario Heritage Act* (OHA) provides local municipalities with the tools to protect cultural heritage properties of regional and local heritage significance or interest under Part IV and Part V of the Act. It also enables the Ontario Heritage Trust to act through ownership and the implementation of heritage conservation easements to better protect and manage cultural and natural heritage resources of provincial and local significance.

The conservation of cultural heritage within the Clappison–Grindstone Heritage Lands can best be positioned to conserve cultural heritage resources by providing:

- access to information;
- the tools and best practices to guide the stewardship;
- opportunities to develop co-operative action; and
- eligibility for specific programs and maintenance designed to support the protection and presentation of the historic sites.

The most effective conservation and protection will come from integrating the cultural heritage resources into the larger comprehensive planning for the management of the Clappison-Grindstone Heritage Lands.

6.3 Cultural Heritage Commemoration and Recognition

There is an opportunity within the Heritage Lands to develop a commemorative plan based on local history and the recognition of community values. These efforts can be associated within a cultural heritage tourism plan or within the trail network plan. The Smokey Hollow mill site interpretation can be made more dynamic through greater emphasis on the industrial history associated with the site. Existing mill grindstones should be preserved and displayed properly. The use of a digital story-telling web-based application can be implemented to relate the history of the site through Smartphone technology. New storyboard panels discussing various themes represented in the park merit consideration. The mill grindstone set in the grassed area adjacent to the Smokey Hollow parking lot is not being protected and the present condition will eventually lead to the loss of the artefact. This

should be reviewed and a conservation strategy should occur to ensure continued protection and presentation.

The former King City Quarry site provides another opportunity to explore the importance of quarrying in the Clappison-Grindstone Heritage Lands through well-positioned trail network commemorative signage and panels. The Little property adjacent the Bruce Trail would benefit from a similar programing action.

Photograph 1. Dry stonewall ruin located along Bruce Trail in Little Property (taken by Leah Lefler).

7.0 Management Opportunities and Issues

This section provides a summary of the identified management opportunities and 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 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 by the consulting team are presented for preliminary discussion and feedback.

The current types and intensity of use is most likely degrading the natural features and functions of the study area. Impacts have been noted within the existing extent of use, and considerably greater use of the Heritage Lands is anticipated. Lands must be planned and managed wisely to prevent further impacts.

This management plan is being developed predicated on the expectation that use is going to increase in these areas based on approved development applications in close proximity to the Heritage Lands, and

the likelihood of additional approvals in the near future. The consulting team is of the opinion that the Clappison-Grindstone Heritage Lands are at a critical juncture and that if management is not implemented current and anticipated increases in impacts will result in substantial degradation of the natural, recreational and cultural value of the area. Thus, prioritizing management of these lands is extremely important and timely. Although the management plan will focus on Current EcoPark Lands within the Clappison-Grindstone Heritage Lands, there are also pressures being placed on Stewarship Lands within the Heritage Lands, and adjacent privately-owned lands. In some instances, management issues on these lands affect the Current EcoPark Lands, and will influence the efficacy of management initiatives. Thus, communication, education and stewardship with adjacent landowners will be a key consideration in future management. Where appropriate, consideration of these adjacent pressures is provided.

Appendix 8 provides a detailed summary of the management issues and preliminary opportunities that have been identified within the Clappison-Grindstone Heritage Lands. This table organizes the identified management issues under the following headings:

- overarching Cootes to Escarpment EcoPark System management issues;
- uses on adjacent lands;
- trails;
- hiking;
- bicycle use;
- motorized vehicle use;
- other recreational uses;
- invasive species;
- ecological management issues;
- encroachment from adjacent lands;
- safety issues;
- infrastructure issues;
- other activities; and
- other management issues.

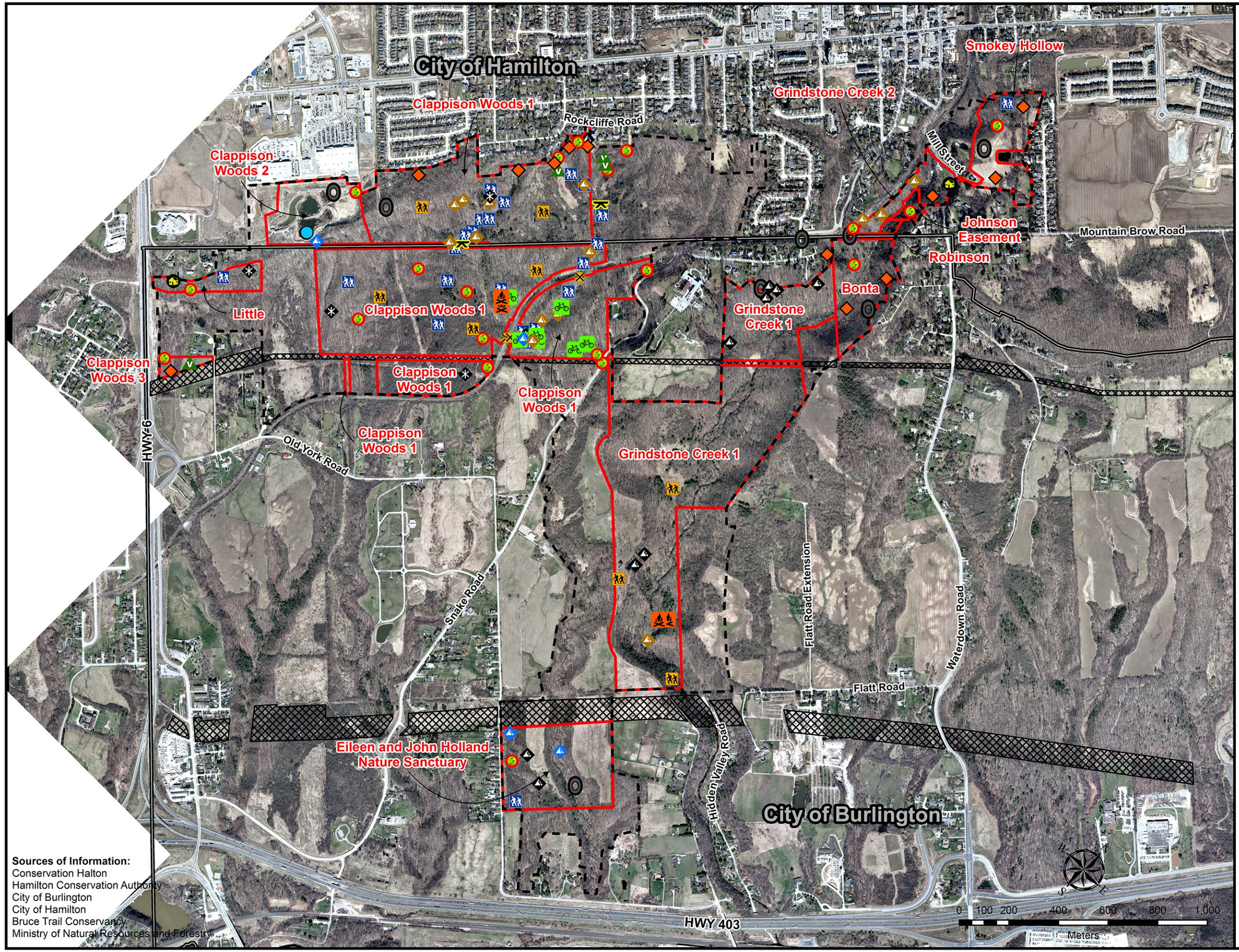
Many of these issues are inter-related and in many cases management issues cannot be addressed individually. For example, over-use of trails from hiking and/or cycling has in places resulted in erosion issues, which can lead to ecological management issues. The organization of issues in the headings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

A description of the management issues and/or opportunities is provided. This table currently focuses only on identification of issues although some management recommendations are currently provided. The table is a work in progress and will be refined as the management process continues. Figure 6 illustrates known locations for management issues within the Clappison-Grindstone Heritage Lands. It does not provide an exhaustive inventory of where all of the management issues are occurring. Photographs of representative examples of management issues are provided and are linked to the locations provided in Figure 6. These are provided in Appendix 9 and in the sections that follow.

Cootes to Escarpment EcoPark System

Clappison - Grindstone Heritage Lands

Figure 6: Examples of Management Issues



Sources of Information:
Conservation Halton
Hamilton Conservation Authority
City of Burlington
City of Hamilton
Bruce Trail Conservancy
Ministry of Natural Resources and Forestry

Legend

Management Issues

- Unsanctioned Trail
- Cultural Interpretation Issue
- Stormwater Impacts
- Unsanctioned Trail Management
- Unsanctioned Creek Crossing
- Encroachment
- Garbage/Dumping
- Gully Erosion
- High Density of Trails
- Invasive Species
- Mountain Bike Structures
- Picnic Area/Fire Pit
- Trail/Rail Crossing
- Stream Erosion
- Trail Erosion
- Vegetation Clearing
- Utility Corridors
- Municipal Boundary
- Study Area
- Clappison - Grindstone Heritage Lands

Note:
Not all management issues have been mapped.

North-South Environmental Inc.
Specialists in Sustainable Landscape Planning

January 13, 2016

7.1 Overarching Cootes to Escarpment EcoPark System Management Issues

7.1.1 Description

Several management issues are not constrained just to the Clappison-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 Lands in the Clappison-Grindstone Heritage Lands), it was deemed important to bring them forward for consideration. These issues are 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. These issues are elaborated on in Section 7.1.2.

7.1.2 Issues

Consistent Branding of Cootes to Escarpment EcoPark System

The Cootes to Escarpment EcoPark System is a relatively recent initiative. Some signage has been posted along roadways to identify the boundaries of the system and more signage will be installed in the future; however, at present the signage is scattered and it is very difficult to determine when one is in the EcoPark System and when one is leaving it. Without signage and general public knowledge of where and what the EcoPark System is, there is little opportunity to engage the public in stewardship, educate EcoPark System users about the importance of managing use, and garner support for the management plan. A number of individuals that were interviewed, who clearly visit lands in the EcoPark System for recreation, where unaware they were using it.

The placement of signage can be challenging, especially because there are so many access points into the Cootes to Escarpment EcoPark System. Considerations for the future placement of signage include: locations of other signage, density of brush, proximity to intersections, etc.

Need for Better Identification of Property Boundaries to Reduce Trespass and Encroachment Issues

When you are within the EcoPark System there is no way of knowing when you are within Current EcoPark Lands and when you are on Stewardship Lands. The natural areas that compose the majority of the Heritage Lands extend well beyond individual property owners, and a single natural area unit may be owned by multiple landowners. This makes it literally impossible to enforce policies regarding use and encroachment in areas around the periphery of Current EcoPark Lands. It could create issues for both adjacent landowners (e.g., EcoPark System users inadvertently trespassing, privacy issues if users are walking/cycling along property boundaries), and park management as adjacent owners unintentionally manicure areas within the park, erect structures, etc. (see section 7.4 below).

Lack of Uniform Set of Rules for EcoPark System

There is a lack of a uniform set of rules for the EcoPark System, and each partner agency has their own set of policies and rules. For example, the Bruce Trail Conservancy allows only pedestrian traffic on the Bruce Trail; however, bicyle use occurs throughout the Heritage Lands, including the Bruce Trail and Bruce Trail Side Trails. Not only would this be confusing to EcoPark System users, but users are generally not aware of the relevant rules and regulations of use within the EcoPark System. Different rules and permitted uses may continue to apply to different properties, depending on who owns the land and the properties' sensitivities. However, communication of partner agency rules and policies could be improved.

Implementation

As noted in the discussion of recreation resources, the study team feels that a major management issue is the anticipated increase in use that will result from future development adjacent to the Heritage Lands. The major development proposed on the east side of Grindstone Creek is one current example (see section 2.2.1). Future development on lands adjacent to the Heritage Lands has the potential to degrade their natural, recreational and cultural resources unless mitigation in the way of increased management initiatives is implemented. It is also worth noting that these 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 the impacts on nearby Heritage Lands resulting from development and the increased cost of management needs should be mitigated, by the developer where appropriate.

At present, there are no policies that would directly facilitate the implementation of relevant management recommendations in the management plans through development approvals. However, where geographic-specific park or public land management plans exist, the Greenbelt Plan 2005 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 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 Assessments (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 Areas, etc. 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 impacts from development should be mitigated through conditions of the approval process. The management issues identified for Clappison Woods – Grindstone Creek, and the subsequent recommendations in the management plan, provide information on current impacts (over-use of trails, unsanctioned trails, trampling, invasive species, etc.) that could be exacerbated by future adjacent development. The recommendations in the management plan may assist in the determination of appropriate mitigation that could be implemented through the development process.

More generally, the partner agencies that are directly involved in the development approval process (in the case of the Clappison-Grindstone Heritage Lands these are the City of Hamilton, City of Burlington, Halton Region and Conservation Halton), should 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 would 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. The recommendations in the management plan may assist adjacent landowners in identifying proximity-related concerns and in advocating for implementation of appropriate mitigation options to resolve them.

Funding

There are differences in approach to open space and park management by the partner agencies. These differences should not expose or penalize EcoPark System users. This means that the partner agencies may need to come to a consensus and understanding of how the Current EcoPark Lands are to be accessed by users and on what terms (e.g., pay for use). In addition, capital and revenue costs associated with any future development proposed in the Current EcoPark Lands (e.g., parking lot) will be high. Funding for the management of Current EcoPark Lands has not currently been identified in detail. It is important to identify funding as a management issue so that realistic expectations are perpetuated from the outset, and to identify the issue to the partner agencies.

Fragmentation

Some of the natural areas within the EcoPark System are relatively isolated and/or fragmented in the landscape. Often there are few opportunities for making ecological connections due to adjacent urban land uses, including traffic/transportation corridors. Not only is the isolation physical: some of the Current EcoPark Lands are isolated within the Heritage Lands through ownership. For example, Clappison Woods 3 is surrounded by privately-owned lands. In many cases, this has led to EcoPark System users trespassing on privately owned lands in order to access publicly-owned lands.

High Run-off and Peak Flows

There is an overarching issue of high run-off and peak flows associated with the increase in impervious surfaces associated with development (e.g., buildings and asphalt restrict the ability of precipitation to infiltrate in the ground). High run-off and peak flows can accelerate erosion rates and decrease groundwater infiltration. Any steps possible to limit run-off would be beneficial to the Grindstone Creek watershed and the Hamilton Harbour.

7.1.3 Opportunities

Preliminary management opportunities to be explored include the following:

- Establish the Cootes to Escarpment EcoPark System, and Heritage Area names as the primary branding, with partner ownership becoming the second priority. Signage, promotional material, advertising, educational material, etc. should emphasize and headline the Cootes to Escarpment EcoPark System and Heritage Lands first, and then provide the partner ownership. This will raise the EcoPark System profile, contribute to name-recognition and promote the park as a collaborative initiative among the partner agencies.
- Consistently post signage to indicate when users are entering and leaving the Cootes to Escarpment EcoPark System.
- Develop and implement a consistent system to locate and mark boundaries of Current EcoPark Lands within the Cootes to Escarpment EcoPark System.

- Establish a list of appropriate uses that apply to all Current EcoPark Lands with agreement from all partners, recognizing that some areas may have specific uses as a result of zoning (to be provided in future reporting). Appropriate 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.
- Continue to purchase or receive donations of lands within the Clappison-Grindstone Heritage Lands and Cootes to Escarpment EcoPark System, as they become available through the Land Securement Strategy, with a priority placed on "joining" existing partner-owned parcels.
- There is currently no policy basis for agencies to insist on implementation of management plan recommendations. Considerations should be given to creating such a policy in the agency's Official Plans as part of the next round of Official Plan Reviews, and any future review of the North Aldershot Plan.
- Any planned impervious surfaces as part of the future park infrastruce should provide demonstrations of low impact development methods.

7.2 Infrastructure

7.2.1 Description

Parking and access is limited at the Clappison-Grindstone Heritage Lands. Figure 3 illustrates the locations of existing parking areas, and known access locations. Some of these parking and access points are sanctioned and some are not. In terms of parking, there are a few small parking areas available (e.g., Rockcliffe Road, Snake Road, Waterdown Road, Bruce Trail parking lot west of Highway 6). Park visitors also frequently park behind the RONA and Walmart located to the north of Clappison Woods 2, and in the cul de sac at the end of Renwood Place east of Smokey Hollow and Hidden Valley Road to access the south end of Grindstone Creek 1. Utility corridors are also frequently used to access the Heritage Lands.

7.2.2 Issues

Lack of Adequate and Safe Parking

There is a lack of adequate and safe parking to provide access to the Heritage Lands. In particular the informal parking areas, which essentially consists of shoulder pull-offs along Snake Road are located along a curve, and are potentially dangerous owing to the 60 kph speed limit coupled with poor sightlines. This represents an issue associated with a trail/road crossing.

It is important to note that none of the current sanctioned parking areas provide any accessibility, and because of the steep terrain, wheelchair access is not always possible. For example, the parking area off Mill Street South, Waterdown at Smokey Hollow does not provide accessibility to the overlook at the waterfall; however, accessibility may be feasible in this location. The parking area is frequently over capacity, even during the week, as this is the only access point to the Bruce Trail with parking along Grindstone Creek (Figure 3).

Relative Isolation of some Current EcoPark Lands

As mentioned above, some of the Current EcoPark Lands are isolated in the landscape, and are not directly connected to other Current EcoPark Lands. For example, Clappison Woods 3 is not connected to other Current EcoPark Lands (Figure 2). Also, there are no connections between the Holland Nature Sanctuary and other Current EcoPark Lands, due to it recently coming to public ownership. Additional opportunities for land securement and protection of the Stewardship Lands could be sought.

Trespassing

Due to the relative isolation of some of the Current EcoPark Lands, and the general lack of access, trespassing on privately-owned lands within the Heritage Lands is an issue. Many "No Trespassing" signs have been posted by adjacent landowners as a result, and conflicts between landowners and park users have been noted. This issue ties into the lack of access, as well as the need to identify and mark boundaries of the Current EcoPark Lands. Trespassing also includes unauthorized trail construction on Current EcoPark Lands and encroachment from adjacent private properties; however, these topics are covered in section7.3 Trails and section7.4 Encroachments below.

Flood Damage Centre

A Flood Damage Centre is an area consisting of residential, commercial and institutional development that is adjacent to a creek and prone to flooding that threatens the safety, welfare of people, and damage to public and/or private property. Using floodplain mapping developed for each watershed, structures within the floodplain are grouped into Flood Damage Centres by Conservation Authorities. The main purpose of identifying Flood Damage Centres is to enable Conservation Authorities the ability to provide alerts and warnings to assist emergency response agencies with directing their efforts to the appropriate locations during flooding events.

A Flood Damage Centre is located at the south end of Grindstone Creek 1. It is noteworthy that several unsanctioned trails have been developed within the Flood Damage Centre located at the south end of Grindstone Creek 1, which pose a potentially serious health and safety risk.

7.2.3 Opportunities

Preliminary management opportunities to be explored include:

- using utility corridors and/or unopened road allowances as additional access points;
- consider securement of additional lands that would enable creation of access zones;
- formalize parking behind the RONA and Walmart as an access point to the Heritage Lands;
- look for locations for additional parking;
- complete trail connections throughout the Heritage Lands and beyond through a comprehensive Trail Plan;
- close trails within the Flood Damage Centre at the south end of Grindstone Creek 1 to reduce risks to human health and safety; and
- continue to purchase lands within the Clappison-Grindstone Heritage Lands and Cootes to Escarpment EcoPark System, as they become available through the Land Securement Strategy, with a priority placed on "joining" existing partner-owned parcels.

7.3 Trails

7.3.1 Description

The existing trail system through the Heritage Lands is extensive, and consists of sanctioned and unsanctioned trails (Figure 3). The Bruce Trail traverses Clappison Woods. In addition, a large network of unsanctioned mountain biking trails and footpaths have been constructed. Some of these are maintained by cyclists and the local community. In some areas the trails are no longer being used and are naturally regenerating. In one particular case in Clappison Woods 1, existing rotted out bridge structures pose a potential hazard (Figure 6). The following uses have currently been documented on trails in the study area:

- hiking;
- on- and off-leash dog use;
- cycling on trails, ranging from casual trail riding to very aggressive mountain biking, in all seasons; and
- motorized vehicle use.

Associated trail uses or activities include unsanctioned trail improvements such as the construction of boardwalks or erosion control measures, cycling structures (e.g., jumps and ramps) and trail modifications (e.g., berms, banked corners), and the use of the CN rail line as a trail or trail connection.

7.3.2 Issues

Duplication and Density of Trails

As illustrated by Figure 3, some portions of the study area currently support a very high density of trails. In many cases, this network could be simplified to avoid duplication and impact to the natural environment. One of the highest priorities for management of the Clappison-Grindstone Heritage Lands is trail closure, in conjunction with trail rationalization and formalization.

Overuse of Trails

Some portions of the trail system show signs of overuse, including exposure of tree roots, impacts to ground flora, soil compaction and widening of the trails. Trail overuse has resulted in soil erosion in places.

Erosion on Trails

Unacceptable erosion on trails was noted under a number of circumstances related to overuse, improper trail construction, and/or drainage issues. In a few locations, water ponding on trails was noted, which has led to trail widening or braiding to avoid wet patches on trails (Figure 6). Within the Johnson Easement, there is a portion of trail that is crossed by an ephemeral stream. It should be noted that some erosion, compaction, water ponding, etc., is inevitable on footpaths within natural features and as long as it is sustainable (i.e., not expanding) and not impacting significant species, habitats or hydrological functions, it is considered to be acceptable and part of the trail experience in such areas. However, this would need to be assessed to determine the acceptability of the impact.

CN Safety Issue

The existing trail network crosses and in some instances, dead ends along the CN rail line (Figure 3). It is clear that park users are currently crossing the train tracks, and/or walking along the train tracks to access another trail. This poses serious safety and liability issues.

Single Track Mountain Bike Trails

These trails were developed by relatively few individuals without consultation or authorization, and are being used by the wider technical biking community. Most of the existing trails are respectful of natural terrain, drainage features and trees. In many cases logs have been placed over the trail to prevent impacts to tree roots. The single track paths are narrow, most as narrow as 0.5 m so the impact to surrounding vegetation is limited and soil compaction is confined. However, the relative intensity of the use has resulted in tire rutting in moist areas and down-cutting of soils in many areas. Where the trails traverse steep sections of slope, erosion is prevalent.

The Bruce Trail Conservancy manages its trails and does not permit cycling on them. However, bike use inevitably and unavoidably continues along the main Bruce Trail. Improved signage could partially resolve the use issue as some users are unaware of where cycling is permitted.

User Conflicts

Potential conflicts between different trail user groups include:

- hiker – cyclist;
- off-leash dog – hiker;
- off-leash dog – cyclist; and
- off-leash dog – off- or on-leash dog.

These conflicts can impact the safety of park users, and can also decrease the enjoyment of park users.

Off-leash Dogs

It is recommended that off-leash dog parks are located away from environmentally sensitive areas. This recreational use offers potential impacts to these areas such as erosion, soil compaction, water quality impacts, and effects on wildlife. Several municipalities required that an Environmental Impact Study/Environmental Impact Assessment be developed when off-leash parks are cited adjacent to natural areas in order to assess impacts and mitigate the effects, given that they could be significant. Due to these impacts, it is recommended that off-leash dog parks be cited away from significant natural areas.

Additional off-leash dog parks, located in close proximity to residential areas, would provide an opportunity for these users to focus this recreational use outside sensitive natural areas. Traditionally, municipalities offer the services of dog parks as part of their tax-supported Parks and Recreational programs and facilities.

Interpretation

There is very little signage or interpretation of the EcoPark System within the Clappison-Grindstone Heritage Lands. A large, informative sign has been posted in the parking lot of the Holland Nature Sanctuary, which provides some examples of species that occur within the area. An interpretive marker rock and plaque dedicated to Bill Black and Doug Fearman for blazing the Rockcliffe trail network is

placed at the access point from Rockcliffe Road. The Hamilton Historical Board has placed an interpretive sign at the parking area of Smokey Hollow describing some of the industries historically active along Grindstone Creek. However, there are many more opportunities for interpretation and education within the park system, which are discussed in part below and in Section 6.3.

7.3.3 Opportunities

Preliminary management opportunities to be explored include:

- one of the highest priorities for management of the Clappison-Grindstone Heritage Lands is trail closure, in conjunction with trial rationalization and formalization:
    - limit access to physically and ecologically sensitive habitats, including riverbanks and seepage areas as trail location should be placed in a manner which creates the least disturbance to habitat and wildlife;
    - ensure appropriate routing of trails and trail activities that minimize the potential for harm, 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 communitites;
    - consider adopting the approach of 'preferred' trail use rather than promoting single-use trails;
    - as an alternative to permanent trail closure, consider seasonal trail closure to keep users out of seasonally wet parts of the trail system;
    - improve signage, trail marking (e.g., blazes) and implement measures to assess and close redundant trails;
    - construct bridges and boardwalks to address erosion and wet trail conditions where they are resulting in unacceptable impacts (e.g., create a raised pathway on the portion of the trail over which the ephemeral stream crosses in the Johnson Easement);
    - investigate alternative trail surfaces that are commensurate with the trail use and location;
    - consider retrofitting remnant logging roads/old cart trails and incorporating them into the trail system where they may complete logical connections; and
    - prepare a protocol for active trail closure to address closure of trails, re-routing of trails, etc..
- complete a survey to determine how the area is currently being used, what the desires of the park users are, etc.;
- provide consistent signage that clearly explain 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);
- monitor for bicycle activity and take appropriate action such as closing unauthorized trails and, to the extent possible, enforcing use violations;
- securement tends to focus on highly sensitive lands; however, consideration could be given to purchasing lands that are less ecologically sensitive that could provide opportunities and would be more suitable for dog walking, "extreme" mountain biking or other forms of more intensive recreation;

- identify and connect with individuals and/or groups undertaking unsanctioned stewardship initiatives to formalize good working relationships through providing guidance, support and recognition of their efforts;
- look for suitable locations for intensive off-leash dog activities to occur, preferably within disturbed open space areas with low natural heritage value[5];
- continue to monitor for trail erosion and implement appropriate trail construction and remediation measures on steeper slopes where warranted;
- engage mountain bike riders in the ongoing monitoring and management of the trail system, in collaboration with and with approval from the landowner; and
- identify and implement commemorative and interpretive opportunities (e.g., in Clappison Woods 2 at the old King City (Sheppard) Quarry where representative examples of bedrock lithology have been identified).

7.4 Encroachments

7.4.1 Description

Adjacent land uses can create issues for natural areas. The Clappison-Grindstone Heritage Lands are surrounded by various land uses including, residential and commercial uses (refer to Section 2.1). Impacts associated within different land uses can encroach onto the partner-owned portions of the Heritage Lands. For example, encroachment from residences abutting the northern portion of the study area.

7.4.2 Issues

Cats/Domestic Pets

Domestic pets, in particular cats, which inevitably roam freely within natural areas, 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 each year (Marks and Duncan 2009).

Dumping

Yard waste, such as grass clippings and trimmed branches, is often thrown inside the edge of natural areas from adjacent residences. Yard waste dumping can be a vector for the spread of non-native invasive species. It also smothers existing vegetation and degrades the aesthetic and floristic quality of an area. Garbage, and other refuse (e.g., old stoves, tires) are also found within natural areas, which can impact the quality of the natural area. A large tire pile is currently located within the Holland Nature Sanctuary, and several old stoves are present within Grindstone Creek 1 (Figure 6).

Structures and "Yard Extension"

Structures such as retaining walls, picnic tables and small sheds, and household objects such as lounge chairs and composters were noted within the Current EcoPark Lands, adjacent to residential properties.

[5] The City of Hamilton has a Dog Leash Free Program Policy, which should be referred to when exploring opportunities for dog parks within the City of Hamilton to assist with reducing impacts to the natural environment.

Also, yards are occasionally extended by mowing, and by the placement of flowerbeds within the natural area boundary. This has an impact on edge vegetation and reduces the overall size of the natural area.

Personal Trails

Personal trails are occasionally created from private residences to connect into the adjacent natural area's trail system. Gates are installed into rear lot fencing in some cases to facilitate access. This speaks to the frequency of use that these trails experience. When combined, this can have an impact on the quality of the natural area and can also impact wildlife through the increased level of disturbance.

Vegetation Removal

Removal of vegetation occasionally occurs along the edges of natural areas. For example, tree cutting of both dead and alive trees occurs, as well as clearing of brush, and tree topping to maintain views. These activities reduce the quality of natural areas by reducing or degrading the structure of edge vegetation, and removing snags which have high wildlife value.

Drainage and Erosion

Drainage and resulting erosion can encroach into natural areas from adjacent land uses. This has resulted in erosion and subsequent turbidity and siltation within Grindstone Creek (Figure 6). For example, stormwater management ponds, such as those at Clappison Woods 2, often discharge into natural areas and the Bridgeview Tributary. When designed and maintained appropriately, these facilities can have a relatively small impact on natural areas. However, if designed and maintained poorly, these facilities can have a very large and negative impact. There is also the potential for a large maount of chloride to discharge into the creek following the snowmelt in the spring. As the stormwater management pond in the study area is a concern for water quality, there is a management opportunity to develop a maintenance program that limits the impacts on the wildlife utilitizing the very unique stormwater management structures in Clappison Woods 2 (e.g., Sora, Virginia Rail, and Trumpeter Swam).

In addition, it appears that local residents use the stormwater management ponds as a skating rink under suitable conditions, as indicated by the sunken hockey nets in the pond. Per stormwater management guidelines, ice skating and hockey are prohibited on the ice that form on stormwater management ponds.

Stormwater has and continues to cause erosion on the banks along the main branch of Grindstone Creek and also the small escarpment subwatersheds referred to as the Clappison-Bridgeview Tributaries and Sassafras Tributary. Swimming pool drainage from private residences can also lead to severe erosion and the formation of gullies over time, especially on highly erodible soils such as the shales that occur within the study area.

Total suspended solids and phosphorus loadings into Hamilton Harbour are a major watershed concern related to the delisting of the Area of Concern. These escarpment tributaries historically had natural erosion rates, which slowly increased the incised nature of the valleys, but changes to the landscape in recent history have accelerated the rate of erosion considerably in some areas.

Impacts of drainage and erosion can significantly damage vegetation. In vast areas within the Current EcoPark Lands, bank erosion has exposed tree roots and has resulted in deadfall. Some fallen trees have blocked the creek, which in turn impacts the hydrology and fluvial geomorphology of the watercourse. Habitat for herbaceous plants is also impacted. In some places where creek banks had naturally sloped gently toward the creek, soil has been washed away until the banks have become almost vertical (through a process called down-cutting). This impacts the ability of riparian vegetation to establish with subsequent impacts for further erosion and bank stability. Also, sediment accumulation in areas of slower moving water has resulted in some destruction of habitat for aquatic vegetation. Reduction of light penetration from increased turbidity also impacts the aquatic life living in the creek system. Undercut banks also pose a concern for the safety of trail users.

Sheppard Quarry Stormwater Management

Sheppard Quarry was redeveloped in the 1990s to provide a passive recreational area and to be used in part for stormwater runoff detention to support the development of the Clappison's Corner Industrial Business Park (Totten Sims Hubicki Associates, 1989). Based on existing catchment conditions, the stormwater management ponds at Sheppard Quarry appear to be having water quantity impacts on the downstream watercourse based on observations of erosion in the receiving waterbody. Based on future planned development, additional downcutting of the watercourse and associated slumping of creek banks, leading to the loss of riparian vegetation and overall widening of the watercourse, is anticipated. Impacts associated with heavy erosion of watercourses include:

- loss of instream substrates that support aquatic benthic invertebrates, which provide productivity for downstream fish communities;
- bank slumping and loss of riparian vegetation;
- impairment of myriad riparian functions (e.g., wildlife habitat, filtration of surface water runoff, shading of watercourse, input of allochthonous inputs, etc.); and
- sediment loading to Hamilton Harbour, which impacts the ability for the harbor to be delisted as an Area of Concern.

7.4.3 Opportunities

Preliminary management opportunities to be explored include:

- establish a program to educate adjacent residential landowners by providing information on the impacts of free-ranging cats, disposing yard waste, garbage and other forms of encroachments in natural areas;
- review and evaluate the effectiveness of existing by -laws[6] and identify gaps in by-laws to facilitate the enforcement of use policies, including a cat control by-law;
- post signage to educate the public about the impacts associated with encroachment;
- develop a maintenance program that limits that impact of chloride and other pollutants on wildlife utilizing the stormwater management ponds in Clappison Woods 2;
- post signage to educate the public that skating and hockey are prohibited on stormwater management facilities;

[6] Many by-laws exist ; however, due to the lack of staffing resources, municipalities are unable to enforce them and are thus unable to address encroachment issues through this approach.

- remove garbage and dumped refuse from the Current EcoPark Lands (e.g., remove tire pile from Holland Nature Sanctuary, remove old stoves from Grindstone Creek valley);
- encourage monitoring of upper Grindstone Creek to determine any changes resulting from development above the Escarpment brow should be used to inform future development applications;
- encourage implementation of low impact development techniques through the development and re-development process (e.g., underground storage tanks or super pipes, green rooftops) to reduce peak flow volumes to stormwater infrastructure receiving watercourses; and
- review the need to modify and/or improve water quality and quantity discharging from the stormwater management ponds at Clappison Woods 2 (Halton Region Conservation Authority 1998), and consider the following options:
    - Pond expansion to allow longer detention time of water, and installation of an outflow device that would introduce an erosion control element to the discharge from the stormwater management facility. A bottom draw outlet is suggested to help the thermal stability of the receiving watercourse.
    - Either a hybrid (pond + wetland pond) or fully wetland pond would improve the quality of water to be discharged from the facility. A full wetland pond would provide more water quality polishing than a hybrid pond; however, it would also require more land to treat the same volume of water.
    - Exterior features such as a stone core wetland could be installed downstream of the outlet of the stormwater management facility to allow for groundwater recharge and potentially some additional polishing of water discharged overland from the stormwater management facility. This type of feature would also infiltrate some sotrmwater into the ground.
    - The addition of a device, such as an Imbrium Jellyfish Filter, could provide water quality improvements; however, they require frequent maintenance in order to remain effective over time.
    - Other treatment train approaches could be considered immediately upstream or downstream of the stormwater management facility such as bioswales, infiltration trenches, and grassed ditches. It would be beneficial to locate such features downstream of the outlet of the stormwater management facility so they would infiltrate cleaner effluent into the ground. This type of option should only be considered if the area is considered geologically appropriate for the infiltration of stormwater.

7.5 Other Uses

7.5.1 Description

Other uses identified within the Heritage Lands through inventory and fieldwork include picnicking, party spots (identified by the presence of fire pits and rope swings, etc.), tobogganing, fishing, rock climbing, geocaching/orienteering, adventure racing, bow hunting, and historic uses such as agriculture (identified by the presence of old cart trails and paige wire fencing within natural areas).

7.5.2 Issues

Natural Area Degradation

Many of the other uses identified above are relatively benign and do not have a significant negative impact on the natural environment within the Heritage Lands. Certain activities, such as partying, have localized impacts which can include disposal of garbage and can degrade the quality of natural areas by removing or tramping vegetation, contributing to creation of enlarged soil compaction areas that can become prone to erosion, damaging or vandalizing trees, and can lead to the introduction and spread of invasive species.

Safety Concerns

There are safety concerns associated with some of the other uses noted within the study area, such as partying, rope swings, tobogganing, rock climbing and bow hunting. Partying and use of rope swings to jump into the creek(s) can often lead to dangerous behaviours that can result in injury. Tobogganing can also be a dangerous activity depending on the grade of the slope and the nature of the surround vegetation. Tobogganing is known to occur within Clappison Woods 1. Bow hunting has been reported and is incompatible with recreational uses in the park system due to the potential for injury and/or death.

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. Improve spill prevention and response by ensuring that spill prevention plans, contingency plans and emergency response plans are updated for the prupose of protecting natural features along roads, railway lines and pipelines.

7.5.3 Opportunities

Preliminary management opportunities to be explored include:

- educate users about sanctioned uses and the impacts associated with unsanctioned uses and dangers associated with unsafe uses, such as after-hours use and partying, bow hunting, etc.;
- post signage indicating permitted uses and impacts associated with unsanctioned uses stating fines for illicit uses;
- ensure local ordinances and bylaw policies are updated to include prohibition of these uses in natural areas;
- identify locations of dumped garbage and yard waste and facilitate clean up;
- remove old paige wire fencing from natural areas;
- close and restore unsanctioned party spots;
- look for appropriate locations for additional benches and picnic tables to facilitiate small social gatherings in desired locations;
- report illegal activities to law enforcement if encountered; and
- improve 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.

7.6 Ecosystem Management

7.6.1 Description

Management issues and opportunities related to ecosystem management are aimed at conserving major ecological services and restoring natural resources while meeting the recreational needs of the study area. The principal objective of ecosystem management is the restoration of natural ecosystems, preservation of significant species, as well as efficient maintenance and ethical use of natural resources.

7.6.2 Issues

Forest Health Decline

Several factors are currently impacting the health of forests in the study area and beyond. Oak Decline, Beech Bark Disease, Emerald Ash Borer, Gypsy Moth, Chestnut Blight, 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 earthworms also appear to be contributing to the decline of forest health, particularly impacting the diversity of the ground flora and soil microinvertebrate communities (with subsequent issues higher up in the food chain). 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, slope erosion and/or lightning strikes 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, natural slope erosion and lightening strikes are part of providing habitat heterogeneity within an ecosystem and may not be an issue. Many of the forests pests, such as Emerald Ash Borer, are causing significant death and dieback of trees, which create hazard tree and safety issues. Gaining access to and managing the dead trees creates a secondary management issue. Proper disposal of infected trees is also a concern in areas of poor access.

Loss of Open Woodland Habitat

There is significant literature noting the vast open oak woodland and grassland understory within and around the study area due to several centuries of indigenous peoples periodic burning to maintain hunting areas, tree seed and fruit production (e.g., Goodban et al. 1997). Due to the indicators of prairie species in the area, it is likely that pre-contact vegetation communities would have been comprised of a great area and coverage of open oak woodland. Where possible, open oak woodland should be incorporated into restoration targets as a reference ecosystem type.

Over time, open woodland habitat has been lost or diminished within the study area due to the loss of disturbances, probably including fire, which would have maintained a more open forest character. Over time, forest canopies have closed, reducing the amount of light that is able to penetrate to the forest floor. This has had an impact on the flora in the area, which has resulted in a reduction of the abundance of prairie, savannah and open woodland-dependent species. Some habitat for these species remains within the study area, and is supported by habitat provided in utility corridors that is maintained as open habitat based on the needs of the utility infrastructure.

More detail on management directions for restoring open woodland habitat in the Clappison-Grindstone Heritage Lands will be provided in the management plan.

Conservation and Recovery of Species at Risk

The conservation and recovery of species at risk in the Clappison-Grindstone Heritage Lands is largely associated with conserving and restoring open woodland habitat. The vast majority of species at risk and rare species in the study area require open woodlands to persist. Management of conditions surrounding known locations of species at risk (e.g., maintaining open woodland characteristics) may be necessary, as the natural disturbance regime of the ecosystem type many species at risk rely upon has been halted (i.e., open oak woodlands historically maintained their open character due to disturbance cuase by fire). In addition, recreational uses that have become established in many locations may not be compatible with the conservation and recovery of species at risk and rare species. This issue will be explored in greater detail in the management plan.

Hydrological Functions

Water quantity impacts have been noted downstream of the stormwater management facility location in Clappison Woods 2. Erosion and undercutting has been noted in the downstream watercourse. This has an impact on the hydrological function of the watercourse (Figure 6). Furthermore, as more of the surrounding area becomes developed, increased impacts to hydrological functions are anticipated, as an increase in impervious cover results in decreased infiltration and increased runoff. This puts an even greater strain on existing stormwater management facilty infrastructure, and increases the likelihood of impacts to water quantity and quality.

Management of Fish Communities

Fish communities within the lower Grindstone Creek system could be managed as a migratory Rainbow Trout and resident Brown Trout fishery until the watershed is capable of supporting Atlantic Salmon. Currently, the waterfall located at Smokey Hollow in Grindstone Creek 2 is a barrier to upstream fish movement, including migratory salmonids.

Invasive Species

Several invasive species have been noted within the study area, which include: Garlic Mustard, Dog-strangling Vine, English Ivy, Periwinkle, Himalayan Balsam, Japanese Knotweed, Phragmites, Purple Loosestrife, White Mulberry, Common Buckthorn, non-native honeysuckles, Multiflora Rose, Japanese Barberry, Norway Maple, Manitoba Maple, and Black Locust. Table 6 summarizes the major invasive species noted within the Current EcoPark Lands. Invasive insect species noted within the study area include, Gypsy Moth and Emerald Ash Borer. Invasive species tend to spread aggressively and out-compete native species. Dog-strangling Vine is particularly prevalent within hydro-corridors and on the tablelands to the east of the King City Quarry(Figure 6).

Noxious Plants

Poison ivy and other noxious plants pose health and safety issues for park users. Poison ivy is found throughout the Current EcoPark Lands in various concentrations. Giant Hogweed has not been noted within the Current EcoPark Lands, but has the potential to colonize floodplain valleys (Appendix 5).

Wildlife Crossing

Wildlife crossing has been identified as an issue of concern within the study area. There is a large population of White-tailed Deer within the Grindstone Creek Valley system. Crossing of urban and rural roads by White-tailed Deer poses issues for wildlife and for the safety of the public. Furthermore, road mortality is a large contributor to declines in amphibian and reptile populations. Due to the fragmented

nature of the natural areas that compose the Clappison-Grindstone Heritage Lands (i.e., highways and roads, hydro-corridors, and railways), wildlife are forced to cross roads, hydro-corridors and railways.

The City of Hamilton is establishing a wildlife corridors committee to exame road kill locations as they relate to the City of Hamilton's Natural Heritage Plan.

7.6.3 Opportunities

Preliminary management opportunities to be explored include:

Ecosystem Rehabilitation, Restoration, and Naturalization

- develop a plan for identifying ecosystem targets for the Heritage Lands, based on historical and current composition:
    - include guidelines for local grassland restoration, including target amount, patch size, and best management practices;
    - include recommendations for the use of prescribed burns, which are considered the best means of managing prairie, savannah and open woodland habitats[7];
- improve condition of rare and uncommon ecosystems such as open oak woodlands
- restoration of degraded woodlands and plantations;
- research into the ecological disturbances that maintained the original forest ecosystems, including the feasibility of re-introducing or emulating such disturbances;
- reforestation and naturalization of depauperate lands (e.g.,reforestation/restoration of field between two wooded ravines at the Holland Nature Sanctuary);
- enhance buffers along natural area edges of Clappison Woods 2, and lands bordered by residential development;
- allow treed sections to develop naturally, allowing existing snags, den trees and downed logs to be left for wildlife value;
- investigate the possibility of restoring portions of the existing meadow area on the Smokey Hollow property into native wildflower meadow or prairie;
- wherever possible, retain mature trees and snags for cavity nesting birds, and fallen logs for salamander and other wildlife habitat; and
- wherever possible, tableland restoration should aim to achieve pre-settlement run-off conditions to reduce peak flows to watercourses (e.g., kettle and palustrine tableland wetland pockets could be included in restoration plans to reduce run-off).

Management of Species at Risk and Rare Species Habitat

- ecosystem restoration and enhancement, where feasible, are required to sustain and recover species at risk and rare species, as the majority of species at risk and rare species are associated with open oak woodlands, savannas and prairies which require ongoing management;
- restoration should follow an ecosystem-based approach to species at risk restoration, and not species specific restoration;

[7] For example, Clappison Woods 1 would be an excellent candidate to replicate the oak woodland burn plans of the Town of Oakville's Iroquois Shoreline Woods.

- continue ongoing monitoring of the populations of significant plants found in the area (e.g., American Columbo);
- develop and implement rare species recovery strategies applicable to the study area
- watch for the presence of species at risk and rare species, and report locations to Conservation Halton and the Natural Heritage Information Centre;
- ensure that trails and recreational uses are not impacting species at risk and rare species habitat; and
- look into management options for reducing existing recreational impacts on species at risk and species at risk habitat (e.g., alternatives to pruning Eastern Flowering Dogwood cited near trails).

Invasive Species Management

- develop a control strategy for the removal of priority invasive plant species throughout the Cootes to Escarpment EcoPark System;
- continue to document and map the locations of major aggressive invasive species; and
- monitor and control the spread of invasive plant species.

Management of Noxious Plants

- post educational signage noting the identification and toxic properties of Poison Ivy in a few key trailhead locations within the study area.

Wildlife Crossing

- maintain and protect the continuity and integrity of the Niagara Escarpment and Grindstone Creek natural greenspace corridors through the Clappison-Grindstone Heritage Lands, particularly across Waterdown and Snake Roads;
- investigate the need for and feasibility of implementing wildlife corridors and ecopassages;
- develop a strategy to prioritize and upgrade existing crossing structures (e.g., road culverts); and
- contribute to long-term monitoring opportunities by continuing to monitor wildlife crossing and road mortality.

8.0 Next Steps

Following the completion of this Inventory, Opportunities and Issues Report, work will continue on the preparation of the management plan for the Clappison-Grindstone Heritage Lands. A number of issues and preliminary opportunities have been identified through the preparation of this report. These will be discussed in greater detail, with recommendations refined 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 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.

9.0 References

Axon, Brenda K., D. Bradley, S. Newton-Harrison, J. Krug. 1989. A Biophysical Inventory of the Niagara Escarpment and Grindstone Creek Public Open Space Areas, The Parkway Belt West Plan. Halton Region Conservation Authority, Burlington, Ontario. xv + 147 pp.

Bird Studies Canada. Environment Canada. 2007. Atlas of the Breeding Birds of Ontario.

Bowlby, J.N., K. McCormack, and M.G. Heaton. 2009. Hamilton Harbour and Watershed Fisheries Management Plan. Ontario Ministry of Natural Resources and Royal Botanical Gardens.

Bruce Trail Conservancy. Strategic Plan 2015-2018.

Brylowski, Adam, and B.P. Popelier. 2010. Land Stewardship Plan: Johnson Easement Bruce Trail Property Number 28-019, Iroquoia Bruce Trail Club.

Brylowski, Adam, and B.P. Popelier. 2012. Land Stewardship Plan: Smokey Hollow Bruce Trail Property Number 28-009, Iroquoia Bruce Trail Club.

Canada-US Great Lakes Water Quality Agreement. 1972.

Chapman, L.J. and D.F. Putnam. 1984. The Physiography of Southern Ontario. Third Edition, Ontario Geological Survey, Special Vol.: 270pp.

Clayton, K. 2010. Carroll's Bay Recovery and Management Strategy. Royal Botanical gardens. Hamilton, Ontario.

Chapman, L.J. and D.F. Putnam. 1984. The physiography of southern Ontario. Special Volume 2, Ontario Geological Survey, Ministry of Natural Resources, Toronto, Ontario. 270 pp.

City of Burlington. Official Plan. Approved by the Ontario Municipal Board on October 24, 2008. Text and Maps updated in December 2013.

City of Burlington Zoning By-law 2020.

City of Hamilton. The Rural Hamilton Official Plan. Effective Date: March 7, 2012.

City of Hamilton. The Urban Hamilton Official Plan. Effective Data: August 16, 2013 except for policies, schedules, maps.

City fo Hamilton Zoning Bylaw, Flamborough Zoning Bylaw 90-145-Z.

City of Hamilton Leash Free Parks Program Policy (PW03067) – (City Wide). May 14, 2003.

Conservation Halton. 2013. Long Term Environmental Monitoring Program Grindstone Creek, Sixteen Mile Creek and Supplemental Monitoring. Conservation Halton, Burlington, ON. 176 pp.

Conservation Halton. 2006. Ontario Regulation 162/06 Development, Interference with Wetlands and Alteration to Shorelines and Watercourses.

Cootes to Escarpment Conservation and Land Management Strategy, Phase 1 – Background Report. December 2007. 61 pp. + maps.

Dwyer, Jill K. 2006. Halton Natural Areas Inventory 2006. Volume 1 Site Summaries and Volume 2 Species Checklists.

Ecological and Environmental Advisory Committee. 1978. Environmentally Sensitive Area Study, (Part of east half Lot 17, Concession 8, Town of Halton Hills). Southfield Holdings Ltd.

Ecologistics Ltd. 1977. A Hydrogeological Study of Environmentally Sensitive Areas in the Region of Halton. 2 vols. Report prepared for the Halton Region Conservation Authority.

Endangered Species Act, 2007, S.O. 2007, c.6

Geomatics International Inc. 1995. Regional Municipality of Halton Environmentally Sensitive Area Study. 324 pp.

Goodban, A.G., W.D. Bakowsky, and B.D. Bricker. 1997. The historical and present extent and floristic composition of prairie and savanna vegetation in the vicinity of Hamilton, Ontario. Fifteenth North American Prairie Conference.

Gould, J. 1989. Life Science Areas of Natural and Scientific Interest in Site District 7-3 outside the Niagara Escarpment Planning Areas. Parks and Recreational Areas Section, Ontario Ministry of Natural Resources. Open File Ecological Report SR8901. Central Region, Richmond Hill, Ontario iv + 32 pages + 1 folded map.

Halton Region Conservation Authority. 1998. Grindstone Creek Watershed Study. Our Legacy to Value: The Grindstone Creek. vi + 50 pp.

Halton Region Conservation Authority. 1998. Grindstone Creek Watershed Study: Grindstone Creek Watershed Natural Areas Report Appendix 7. Prepared by Brenda Axon, and David Featherstone. Iii + 32 pp.

Halton Region and North-South Environmental Inc. 2005. Halton Region Environmentally Sensitive Areas Consolidation Report. Unpublished report prepared by Halton Region Planning and Public Works Department in conjunction with North-South Environmental Inc. 222 pp. + app.

Halton Region. Regional Official Plan Amendment No. 38 (ROPA 38). Last Amended March 17, 2015.

Hemson Consulting Ltd. and Hough Stansbury Woodland Ltd. May 1994. North Aldershot Inter-Agency Review. Final Report.

Holm, E., N. Mandrak, and M. Burridge. 2009. The ROM field guide to freshwater fishes of Ontario. Royal Ontario Museum Science Publication. Toronto, ON. 462 pp.

Lake Ontario Biodiversity Conservation Strategy Working Group. 2006. The Beautiful Lake: A Binational Biodiversity Conservation Strategy for Lake Ontario.

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.

Marks, Britni K., and R. Scot Duncan. 2009. Use of Forest Edges by Free-ranging Cats and Dogs in an Urban Forest Fragment. Southeastern Naturalist 8(3): 427-436.

Migratory Birds Convention Act, 1994 (S.C. 1994, c. 22).

Mirek Sharp & Associates Inc. Environmental Consulting Services. 2002. Halton Region Environmentally Sensitive Areas Update Study. 36 pp+appendices.

Niagara Escarpment Commission. 2005, updated 2012. Niagara Escarpment Plan.

Niagara Escarpment Commission Development Control Regulation 828/90.

Oldham, M.J., W.D. Bakowsky and D.A. Sutherland. 1995. Floristic Quality Assessment System for Southern Ontario. Natural Heritage Information Centre, Ministry of Natural Resources.

Ontario Biodiversity Countil. 2001. Ontario's Biodiversity Strategy: protecting what sustains us.

Ontario Ministry of Municipal Affairs and Housing. 1978. Parkway Belt West Plan.

Ontario Ministry of Municipal Affairs and Housing. 2005. The Greenbelt Plan.

Ontario Ministry of Municipal Affairs and Housing. 2006. Places to Grow: Better Choices, Brighter Future. Growth Plan for the Greater Golden Horseshoe.

Ontario Ministry of Municipal Affairs and Housing. 2014. Ontario Provincial Policy Statement.

Ontario Ministry of Natural Resources. 1992. Strategic Plan for Ontario Fisheries – SPOF II – an aquatic ecosystem approach to managing fisheries. 22 pp.

Ontario Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide Appendix C.

Ontario Government, Ministry of Natural Resources. Fish & Wildlife Branch.

Ontario Ministry of Natural Resources. Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005, Second Edition. March 18, 2010. xi + 233 pp.

Ontario Ministry of Natural Resources and Forestry. 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E.

Orland Conservation. 2011. Cootes to Escarpment Park System Land Securement Strategy. Ontario, Canada. 93 pp.

Parkway Belt West Land Use Regulation 482/73.

Remedial Action Plan for Hamilton Harbour: Goals, Options and Recommendations. Volume 1 – Summary. RAP Stage 2. November 1992. ISMN 0-7778-0532-4.

Riley, J.L. 1989. Distribution and Status of the Vascular Plants of Central Region. Ontario Ministry of Natural Resources, Central Region, Parks and Recreational Areas Section.

Riley, J.L., J.V. Jalava, and S. Varga. 1996. Ecological Survey of the Niagara Escarpment Biosphere Reserve. Volume I. Significant Natural Areas. Volume II. Technical Appendices. Ontario Ministry of Natural Resources, Southcentral Region, Peterborough Ontario. Open File Site Report SR 9601. V + 629 pp., vii + 310 pp.

Schwetz, Nicholas. 2014. Hamilton Conservation Authority. Nature Counts. Hamilton Natural Areas Inventory Project, 3rd Edition. Site Summaries, Species Checklists. 753 pp + 287 pp.

Species at Risk Act (S.C. 2002, c. 29).

Spitale, Sal. 2012. Land Stewardship Plan: Bonta, Bruce Trail Property Number 28-013.

Symmonds, M.C., W.E. Hammitt, and V.L. Quisenberry. 2000. Managing Recreational Trail Environments for Mountain Bike User Preferences. Environmental Management 25(5): 549-564.

Totten Sims Hubicki Limited. 1994. Clappison's Corner Industrial Business Park Master Drainage Plan: Final Report. Prepared for the Town of Flamborough.

Varga, S. and G.M. Allen. 1990. County/Regional Municipality vascular plant floras for the Carolinian Zone of Canada. pp. 129-153 in G.M. Allen, P.F.J. Eagles and S.D. Price (eds.) Conserving Carolinian Canada. University of Waterloo Press. Waterloo, Ontario.

Varga, S. 1995. Clappison Escarpment Woods Site Summary. Pp. 154-157, in J.L. Riley, J.V. Jalava and S. Varga. 1996. Ecological Survey of the Niagara Escarpment Biosphere Reserve. Volume 1: Significant Natural Areas. Ontario Ministry of Natural Resources.

Vlasman, Kara. 2005. Atlas of the Mammals of Hamilton. Hamilton Naturalists' Club.

Wong, Janet. 2009. Cootes to Escarpment Park System: Conservation and Land Management Strategy. Royal Botanical Gardens. Burlington, Ontario, Canada.

Appendix 1: Data Sources

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

NAME OF RECEIVED GIS LAYER	SUB-LAYER	SOURCE
2013 orthophotography		Halton Region
Roads		Halton Region
SewerMain		Halton Region
ESA		Halton Region
Parcels_MPAC		Halton Region
ParkwayBeltWestPlan_Designations		Halton Region
ROPA38_LandUse	agricultural area	Halton Region
	mineral resource extraction area	Halton Region
	north aldershot policy area	Halton Region
	regional NHS	Halton Region
	urban area	Halton Region
Map1G_EnhancementAreas		Halton Region
Map1G_NHS_Key_Features		Halton Region
Map1G_NHS_Key_RegLimit_Streams		Halton Region
Map1G_NHS_KeyShoreline_Lake_Ontario		Halton Region
roads		LIO
ANSIs		LIO
NEC		LIO
Greenbelt		LIO
soils		LIO
wetlands		LIO
woodlands		LIO
creeks		LIO
waterbodies		LIO
contours		LIO
quarries and pits		LIO
rare species/vegetation communities (1km squares)		NHIC
EOs_SAR_C2E_sites_20150303		NHIC
Obs_SAR_C2E_sites_20150303		NHIC

NAME OF RECEIVED GIS LAYER	SUB-LAYER	SOURCE
COB_Bridges_January_2015		City of Burlington
COB_Building_Polygons_January_2015		City of Burlington
COB_Road_Segments_January_2015		City of Burlington
COB_Storm_Line_January_2015		City of Burlington
COB_Storm_Point_January_2015		City of Burlington
COB_Topo_Building_Fences		City of Burlington
COB_Zn2020_January_2015 (zoning)		City of Burlington
COB_LandImprov_Line		City of Burlington
COB_ParksBoundaries		City of Burlington
PipelinesUpdatesInprgress		City of Burlington
fields and courts (excel spreadsheet)		City of Burlington
BTC_ELC_Codes		Bruce Trail
BTC_Invasive_Species_Data		Bruce Trail
BTC_Management_Concerns		Bruce Trail
BTC_Rogue_Trails		Bruce Trail
BTC_SAR		Bruce Trail
C2E_ComplimentaryLands		Conservation Halton
C2E_HeritageSystemBoundary		Conservation Halton
C2E_Parking_Access		Conservation Halton
C2E_PartnerLandHoldings		Conservation Halton
C2E_PotentialParkLands		Conservation Halton
CH_Approx_Reg_Limit		Conservation Halton
CH_ARL_Floodplain		Conservation Halton
CH_ARL_MeanderBelt		Conservation Halton
CH_ARL_Ponds		Conservation Halton
CH_ARL_StableTopofBank		Conservation Halton
CH_ARL_Watercourse	stream order	Conservation Halton
CH_ELC		Conservation Halton
CH_EMAN		Conservation Halton
CH_FBMP		Conservation Halton
CH_FishOccurrence		Conservation Halton
CH_ForestryPlanting		Conservation Halton

NAME OF RECEIVED GIS LAYER	SUB-LAYER	SOURCE
CH_InvasiveSpecies		Conservation Halton
CH_InvasiveSpeciesPoly		Conservation Halton
CH_Landcover		Conservation Halton
CH_MMP		Conservation Halton
CH_RoadEcologySurvey		Conservation Halton
CH_SalamanderBoards		Conservation Halton
CH_SpeciesOccurrence		Conservation Halton
CH_SpeciesOccurrencePoly		Conservation Halton
CH_SubwatershedBoundary		Conservation Halton
CH_Trails		Conservation Halton
CH_VernalPool		Conservation Halton
CH_Wetlands		Conservation Halton
SubjectBoundary		Conservation Halton
NAISpeciesQuery (excel spreadsheet)		Conservation Halton
Terrestrial Monitoring info for C2E (Word file)		Conservation Halton
elc_areas		Hamilton Conservation Authority
ALLLIFE with SPECIES STATUS_FLAM51_2015 (excel spreadsheet)		Hamilton Conservation Authority
ALLLIFE with SPECIES STATUS_FLAM-48_2015 (excel spreadsheet)		Hamilton Conservation Authority
ALLLIFE with SPECIES STATUS_FLAM-50_2015 (excel spreadsheet)		Hamilton Conservation Authority
BIKEWAYS		City of Hamilton
BUILDINGS		City of Hamilton
CAMPGROUNDS		City of Hamilton
CITY_BOUNDARY		City of Hamilton
CITY_WATERFALLS		City of Hamilton
ESA_BOUNDARIES		City of Hamilton
ESCARPMENT		City of Hamilton
GOLF_COURSES		City of Hamilton
LAKES		City of Hamilton
PARKING_LOTS		City of Hamilton

NAME OF RECEIVED GIS LAYER	SUB-LAYER	SOURCE
PARK_AMENITIES		City of Hamilton
PARKS		City of Hamilton
RAILWAYS		City of Hamilton
REC_COMM_CENTRES		City of Hamilton
RIVERS		City of Hamilton
ROADS		City of Hamilton
TOURISM_LISTINGS		City of Hamilton
PED_LANDUSE_PRIMARY	Land use designations	City of Hamilton
C2E_HamHC_District		City of Hamilton
C2E_HamSigWood		City of Hamilton
C2EHamSportsFields		City of Hamilton
C2E_HamTrails		City of Hamilton
C2EHamZoningAtt		City of Hamilton
C2EHamAirphotoTiles		City of Hamilton
Air Photos		City of Hamilton
SchE1_LandUseDes_Urban_UpdateDec2014_GeoTiff		City of Hamilton
NAI_Study_Areas		Conservation Halton

REPORTS	SOURCE/REFERENCE	FORMAT	RECEIVED
A Biological Inventory of Halton Region Conservation Authority Properties (1979)	CH	paper	x
A Biological Inventory of Halton Region Conservation Authority Properties (1980)	CH	paper	x
A Biophysical Inventory of the Niagara Escarpment and Grindstone Creek Public Open Space Areas: the Parkway Belt West Plan volume 1 (1989)	CH	paper	x
A Biophysical Inventory of the Niagara Escarpment and Grindstone Creek Public Open Space Areas: the Parkway Belt West Plan volume 2 (1989)	CH	paper	x
Biological Inventory and Evaluation of the Sassafras Woods ANSI (1992)	MNRF	paper	x
Bonta Property Management Plan	BTC	digital copy	x
BTC Invasive Species Strategy - October 2012	BTC	digital copy	x

REPORTS	SOURCE/REFERENCE	FORMAT	RECEIVED
Burlington Easement Management Plan Bruce Trail Report	BTC	digital copy	x
Burlington Heights Heritage Lands Management Plan: Inventory and Issues Report (June 2013)	MHBC	paper	x
Cootes to Escarpment Conservation and Land Management Strategy, Phase 1 Background Report (December 2007)	C2E	paper	x
Cootes to Escarpment EcoPark System: A Plan for the Burlington Heights Heritage Lands (August 2014)	MHBC/C2E	paper	x
Cootes to Escarpment Park System Conservation and Land Management Strategy, Phase II Report (October 2009)	C2E	paper	x
Cootes to Escarpment Park System: Land Securement Strategy (2011)	Orland Conservation/C2E	paper	x
Ecological Survey of the Niagara Escarpment Biosphere Reserve, volume 1 and 2 (1996)	MNR	paper	x
Fenco Reports GO-ALRT Burlington Project: Technical Paper, Burlington Project	Fenco Lavalin/MTO	paper	x
Grindstone Creek Subwatershed Study	CH	paper	x
Grindstone Creek Valley ANSI report	MNR	paper	x
Grindstone Creek Watershed Study (1977)	MNR	paper	x
Grindstone Creek, Sixteen Mile Creek and Supplemental Monitoring Long Term Environmental Monitoring Program (2011)	CH	digital copy	x
Halton Natural Areas Inventory (2006) volumes 1 and 2	CH	paper	x
Halton Region Environmentally Sensitive Areas Consolidation Report (April 2005)	NSE/Halton Region	paper	x
Halton Region Environmentally Sensitive Areas Update Study (2002)	Mirek Sharp/Halton Region	paper	x
Hamilton Harbour and Watershed Fisheries Management Plan (2009)	CH	digital copy	x
Johnson Easement Management Plan Bruce Trail Report	BTC	digital copy	x
Kerncliff Park Biophysical Inventory (1998)	CH	paper	x
Kerncliff Park Revised Master Plan (1998)	Burlington	paper	x
Land Steward Invasive Monitoring Protocol Bruce Trail Report	BTC	digital copy	x
Life Science ANSI in Site District 7-3 Outside the NEPA (MNR 1989)	MNR	digital copy	x
McNally Property Management Plan Bruce Trail Report	BTC	digital copy	x

REPORTS	SOURCE/REFERENCE	FORMAT	RECEIVED
Mount Nemo CA Management Plan Stage 1 and 3 Reports	CH	digital copy	x
National Sewer Pipe Limited Environmental Appraisal, Sanitary Landfill Proposal, Burlington, Ontario	Proctor & Redfern	paper	x
NEPOSS Planning Manual	NEC	digital copy	x
Niagara Escarpment Commission Strategic Plan 2012-2016	NEC	paper	x
North Shore Subwatershed Study 2006	CH	digital copy	x
Regional Municipality of Halton Environmentally Sensitive Area Study (1995)	Geomatics/Halton Region	paper	x
Results of Hydrogeology, Hydrology and Rock Stability Work Programs, Kerncliff Park, Ontario	Golder/Burlington	paper	x
Smokey Hollow Management Plan Bruce Trail Report	BTC	digital copy	x
South Waterdown SWS Stage 1 Final Report	NSE	digital copy	x
The Historical and Present Extent and Floristic Composition of Prairie and Savanna Vegetation in the Vicinity of Hamilton, Ontairo (Goodban et al. 1997)	CH/MNR	digital copy	x
North Aldershot Inter-Agency Review Final Report May 1994	Hemson Consulting Ltd.	digital copy	x
Waterdown/Aldershot Transportation Master Plan - City of Hamilton Public Works	City of Hamilton	digital copy	x
Hamilton's Cycling Master Plan Shifting Gears 2009	City of Hamilton	digital copy	x

MAPS	SOURCE	RECEIVED
BTC Invasive Species Maps	BTC	x
Burlington Easement Rogue Trails to be Closed	BTC	x
Grindstone Creek Subwatershed Named - Figure1_OverviewMap	CH	x
Draft Regulated Habitat Red - Burlington South	MNRF	x

Appendix 2: Characterization Matrix

Appendix 2. Clappison-Grindstone Heritage Lands Characterization Matrix

PROPERTY NAME	OWNERSHIP	MANAGED BY	CURRENT LANDUSE	AREA (ha)	Conservation Authority	PROVINCIAL				REGIONAL		LOCAL		
					REGULATED AREA	PARKWAY BELT WEST	PARKWAY BELT REG	NEP/GREENBELT	NEC DEV CONTROL REG	PLAN	LANDUSE DESIGNATION	PLAN	LANDUSE DESIGNATION	ZONING
Bonta	Ontario Heritage Trust	Bruce Trail Conservancy	forest	8.36	full	no	no	NEC (Escarpment Natural Area, Escarpment Protection Area)	yes	Halton OP	North Aldershot Policy Area, Regional Natural Heritage System	Burlington OP	Greenlands (Escarpment Plan Area); Escarpment Protection Area	NEC DEV CONTROL AREA
Clappison Woods 1	Conservation Halton; City of Hamilton	Conservation Halton; City of Hamilton	field, forest, rural residential, urban residential	87.22	partial (75%)	no	partial yes	Greenbelt (Protected Countryside); Natural Heritage System; NEC (Escarpment Natural Area, Urban Area)	partial yes	Halton OP; Hamilton OP	Regional Natural Heritage System	Burlington OP; Hamilton OP	Environmental Protection Area; Greenlands (Escarpment Plan Area); Open Space; Neighbourhoods	O3-196; O1; R1-3; R1-6; NEC DEV CONTROL AREA
Clappison Woods 2	City of Hamilton	City of Hamilton	utility, manicured, forest, stormwater management facility, engineered wetland	9.45	partial (15%)	no	no	NEC (Escarpment Protection Area, Escarpment Natural Area, Urban Area)	partial yes	Hamilton OP	n/a	Hamilton OP	Rural; Open Space	O1; O2; NEC DEV CONTROL AREA
Clappison Woods 3	Conservation Halton	Conservation Halton	agriculture, field, forest, rural residential	1.15	partial (50%)	no	no	NEC (Escarpment Natural Area, Escarpment Protection Area)	yes	Halton OP	Regional Natural Heritage System	Burlington OP	Greenlands (Escarpment Plan Area); Escarpment Protection Area	NEC DEV CONTROL AREA
Eileen and John Holland Nature Sanctuary	City of Burlington	City of Burlington	agriculture, field, forest, hedgerow	15.10	partial (75%)	no	yes	Greenbelt (Protected Countryside); Natural Heritage System	no	Halton OP	North Aldershot Policy Area, Regional Natural Heritage System	Burlington OP	Environmental Protection Area; North Aldershot Special Study	DNA, O3-196
Grindstone Creek 1	Conservation Halton	Conservation Halton	agriculture, field, forest, marsh, rural residential, grass	63.80	full	partial yes; partial Public Open Space	partial yes	Greenbelt (Protected Countryside); Natural Heritage System; NEC (Escarpment Natural Area, Escarpment Protection Area)	partial yes	Halton OP	Regional Natural Heritage System; North Aldershot Policy Area	Burlington OP	Environmental Protection Area; Parkway Belt West; Greenlands (Escarpment Plan Area); Escarpment Protection Area	DNA, O3-196, NEC DEV CONTROL AREA
Grindstone Creek 2	City of Hamilton	City of Hamilton	forest, grass, transportation	3.98	full	no	no	NEC (Escarpment Natural Area, Urban Area)	yes	Hamilton OP	n/a	Hamilton OP	Open Space	NEC DEV CONTROL AREA
Johnson Easement	Bruce Trail Conservancy	Bruce Trail Conservancy	forest	0.86	full	no	no	NEC (Escarpment Natural Area)	yes	Hamilton OP	n/a	Hamilton OP	Open Space	NEC DEV CONTROL AREA

PROPERTY NAME	OWNERSHIP	MANAGED BY	CURRENT LANDUSE	AREA (ha)	Conservation Authority	PROVINCIAL				REGIONAL		LOCAL		
					REGULATED AREA	PARKWAY BELT WEST	PARKWAY BELT REG	NEP/GREENBELT	NEC DEV CONTROL REG	PLAN	LANDUSE DESIGNATION	PLAN	LANDUSE DESIGNATION	ZONING
Little	Conservation Halton	Conservation Halton	forest	3.22	partial (20%)	no	no	NEC (Escarpment Natural Area)	yes	Halton OP	Regional Natural Heritage System	Burlington OP	Greenlands (Escarpment Plan Area)	NEC DEV CONTROL AREA
Smokey Hollow	Bruce Trail Conservancy	Bruce Trail Conservancy	field, forest, grass, rural residential, urban residential	8.51	partial (20%)	no	no	NEC (Escarpment Natural Area, Escarpment Protection Area, Urban Area)	yes	Hamilton OP	n/a	Hamilton OP	Open Space	NEC DEV CONTROL AREA

Appendix 3: Data Gap Analysis

Appendix 3. Clappison-Grindstone Heritage Lands Data Gap Analysis

PROPERTY NAME	ANSI	ESA	Wetland	Landcover	ELC	Plants	Birds	Amphibians	Reptiles	Mammals	Fish
Bonta	Grindstone Creek Valley Provincial Life Science ANSI	Grindstone Creek Valley	no	forest	complete (CH/BTC)	yes (Halton NAI-3, Hamilton FLAM-50, BTC Management Plan)	yes (Halton NAI-3 2004, Hamilton FLAM-50, BTC Management Plan)	yes (Halton NAI-3 2004, Hamilton FLAM-50, BTC Management Plan)	yes (Halton NAI-3 2004, Hamilton FLAM-50, BTC Management Plan)	incidental observations (Halton NAI, Hamilton NAI, BTC Management Plan)	yes (CH Fish Occurrence Database)
Clappison Woods 1	Clappison Escarpment Woods Regional Life Science ANSI; King City Quarry Provincial Earth Science ANSI; King City Quarry Candidate Provincial Earth Science ANSI	Clappison Escarpment Woods	no	field, forest, rural residential, urban residential	partial (CH/HCA)	partial (Halton NAI-1, Hamilton FLAM-48); parcel near Little without much inventory	yes (Halton NAI-1 2003, Hamilton FLAM-48 2002)	yes (Halton NAI-1 2004, Hamilton FLAM-48 2002)	yes (Halton NAI-1 2004, Hamilton FLAM-48 2002)	incidental observations (Halton NAI, Hamilton NAI)	no
Clappison Woods 2	King City Quarry Provincial Earth Science ANSI; King City Quarry Candidate Provincial Earth Science ANSI; Clappison Escarpment Woods Regional Life Science ANSI	Clappison Escarpment Woods	no	utility, manicured, forest, stormwater management facility, engineered wetland	complete (CH)	yes (Hamilton FLAM-48)	yes (Conservation Halton Marsh Monitoring Plot 2015, Hamilton FLAM-48 2002)	yes (Hamilton FLAM-48 2002)	yes (Hamilton FLAM-48 2002)	incidental observations (Hamilton NAI)	no
Clappison Woods 3	no	Clappison Escarpment Woods	no	agriculture, field, forest, rural residential	complete (CH)	yes (Halton NAI-1, Hamilton FLAM-48)	yes (Halton NAI-1 2003, Hamilton FLAM-48 2002)	yes (Halton NAI-1 2004, Hamilton FLAM-48 2002)	yes (Halton NAI-1 2004, Hamilton FLAM-48 2002)	incidental observations (Halton NAI, Hamilton NAI)	no
Eileen and John Holland Nature Sanctuary	no	Grindstone Creek Valley	no	agriculture, field, forest, hedgerow	partial (CH)	no	no	no	no	no	yes (last surveyed in 1997)
Grindstone Creek 1	Clappison Escarpment Woods Regional Life Science ANSI; Grindstone Creek Valley Provincial Life Science ANSI	Grindstone Creek Valley	yes	agriculture, field, forest, marsh, rural residential, grass	complete (CH)	yes (Halton NAI-3, Hamilton FLAM-50)	yes (Halton NAI-3 2004, Hamilton FLAM-50)	yes (Halton NAI-3 2004, Hamilton FLAM-50)	yes (Halton NAI-3 2004, Hamilton FLAM-50)	incidental observations (Halton NAI, Hamilton NAI)	no
Grindstone Creek 2	Grindstone Creek Valley Provincial Life Science ANSI; Grindstone Creek Provincial Earth Science ANSI	no	no	forest, grass, transportation	complete (CH)	yes (Hamilton FLAM-50)	yes (Hamilton FLAM-50)	yes (Hamilton FLAM-50)	yes (Hamilton FLAM-50)	incidental observations (Hamilton NAI)	yes (CH Fish Occurrence Database)
Johnson Easement	Grindstone Creek Valley Provincial Life Science ANSI; Grindstone Creek Provincial Earth Science ANSI	no	no	forest	complete (CH/BTC)	yes (Hamilton FLAM-50, BTC Management Plan)	yes (Hamilton FLAM-50, BTC Management Plan)	yes (Hamilton FLAM-50, BTC Management Plan)	yes (Hamilton FLAM-50, BTC Management Plan)	incidental observations (Hamilton NAI, BTC Management Plan)	no
Little	Clappison Escarpment Woods Regional Life Science ANSI	Clappison Escarpment Woods	no	forest	complete (CH)	yes (Halton NAI-1)	yes (Halton NAI-1 2003)	yes (Halton NAI-1 2004)	yes (Halton NAI-1 2004)	incidental observations (Halton NAI)	no
Smokey Hollow	no	no	no	field, forest, grass, rural residential, urban residential	complete (CH/BTC)	partial (Hamilton FLAM-50, BTC Management Plan); specialized habitats (riparian areas) require additional inventory	yes (Hamilton FLAM-50, BTC Management Plan)	yes (Hamilton FLAM-50, BTC Management Plan)	yes (Hamilton FLAM-50, BTC Management Plan)	incidental observations (Hamilton NAI, BTC Management Plan)	no

NA = not applicable

Appendix 4: List of Individuals and/or Agencies Consulted

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

Information Gathering Sessions

1. Group A: Hamilton and Conservation Halton Staff – 28 April 2015, 9:00am – 11:00am
    - Kent Rundle, Conservation Halton
    - Nigel Finney, Conservation Halton
    - Andrea Dunn, Conservation Halton
    - Brenda Axon, Conservation Halton
    - Adrienne Kupchanko, City of Hamiton

2. Group B: Burlington and Hamilton Staff + Cultural/Historical Representatives – 28 April 2015, 12:30pm – 2:30pm
    - Brenda VanRyswyk, Conservation Halton
    - Sonia Mrva, City of Hamilton
    - John Hall, Hamilton RAP
    - Cathy McMaster, Hamilton-Wentworth Federation of Agriculture
    - Jim Thurston, Burlington Senior's Advisory Committee
    - Jim Frohlick, Burlington Senior's Advisory Committee

3. Group C: Six Nations of the Grand River – 28 April 2015, 3:00pm – 5:00pm
    - Paul General, Six Nations of the Grand River

4. Group D: Community Groups, Citizen Advisory Committees + Evening Alternate Option – 28 April 2015, 7:30pm – 9:00pm
    - Robert Patrick, CONE
    - Linda Axford, Aldershot resident
    - Cam Levack, Tyandaga Residents Association and Hager Creek Stewardship Group

5. Group E: Niagara Escarpment Commission – 1 May 2015, 9:00am – 11:00am
    - Anne Marie Laurence, Niagara Escarpment Commission

6. Group F: Additional Information Gathering Session – 19 June 2015, 9:00am - 11:00am
    - Bob Zawislak, Halton Region
    - Niall Lobley, Conservation Halton
    - Ingrid Vanderbrug, City of Burlington
    - Vito Tolone, City of Burlington
    - Leah Smith, City of Burlington
    - Rosalind Minaji, City of Burlington
    - Cathy Plosz, City of Hamilton
    - Jessica Hale, City of Hamilton
    - Paul Toffoletti, Bruce Trail
    - Wayne Terryberry, McMaster University and Burlington Trails Club

Focus Group on Trails held at City of Burlington

- Ingrid Vanderbrug, City of Burlington
- Niall Lobley, Conservation Halton
- Wayne Terryberry, McMaster University and Burlington Trails Club
- Peter Kelly, Cootes to Escarpment EcoPark System
- Markus Hillar, Schollen & Company

Meetings with Conservation Halton and Study Team

- 17 February 2015, 10:00am – 12:00pm
- 11 August 2015, 10:00am – 2:00pm

Additional Meetings/Conversations

Cultural Heritage

- Alissa Golden, Heritage Planner, City of Hamilton – 9 September 2015
- Michael Sawchuck, Manager, Acquisition and Conservation Services, Ontario Heritage Trust – 9 September 2015

Planning and Utilities

- Paul Lane, Property and Construction Technologist, Sun Canadian Pipelines – 26 May 2015
- Kelly Hollman, ROW Coordinator/Community Awareness Officer, Imperial Oil Ltd. – 1 June 2015
- Gretchen Gordon, Regional Community Liaison, Trans Canada Pipelines – 29 May 2015
- Lana Kejel, Senior Real Estate Coordinator, Halton Area, Hydro One – 28 May 2015
- Jim Oriotis, Senior Real Estate Coordinator, Hamilton Area, Hydro One – 28 May 2915

Recreation

- Adam Brylowski, Bruce Trail Conservancy – 8 April, 2015
- Paul Schnepf, Owner of Bicycle Works – 4 August 2015
- Dustin Fournier, Disc Golf Enthusiast – 4 and 5 September 2015

Appendix 5: Flora

Appendix 5. Floral species at Clappison-Grindstone Heritage Lands. * indicates a non-native species

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Asteraceae																	
	Nabalus sp.	Rattlesnakeroot											x		x			
	Orthotrichaceae																	
	Zygodon viridissimus (Dicks.) Brid.	A Moss	G5	S2									x	x		x		x
	Lycopodiaceae																	
	Lycopodium clavatum L.	Running Clubmoss	G5	S5			H	HR		x	x	x	x				x	
	Equisetaceae																	
	Equisetum arvense L.	Field Horsetail	G5	S5					x	x	x	x	x	x	x	x	x	x
	Equisetum fluviatile L.	Water Horsetail	G5	S5				HU	x				x		x			
	Equisetum hyemale	Common Scouring-rush	G5	S5					x	x	x	x	x		x		x	
	Equisetum palustre L.	Marsh Horsetail	G5	S5			H		x				x		x			
	Equisetum sylvaticum L.	Woodland Horsetail	G5	S5				HU	x				x		x			
	Equisetum variegatum Schleich. ex Fried., Weber & Mohr ssp. variegatum	Variegated Horsetail	G5	S5				HU		x	x	x	x				x	
	Equisetum x litorale Kuhl. ex Rupr.	Hybrid Horsetail	GNA	SNA					x				x		x			
	Ophioglossaceae																	
	Botrypus virginianus L. Michaux	Rattlesnake Fern	G5	S5					x	x	x	x	x		x		x	
	Osmundaceae																	
	Osmunda claytoniana L.	Interrupted Fern	G5	S5				HU					x					
	Osmundastrum cinnamomeum (Linnaeus) C. Presl	Cinnamon Fern	G5	S5					x				x		x			
	Pteridaceae																	
	Adiantum pedatum L.	Northern Maidenhair Fern	G5	S5					x				x		x			
	Dennstaedtiaceae																	
	Pteridium aquilinum L. Kuhn var. latiusculum (Desv.) L. Underw. ex A. Heller	Bracken Fern	G5	S5					x	x	x	x	x		x		x	
	Thelypteridaceae																	
	Thelypteris palustris Schott	Marsh Fern	G5	S5					x				x		x			
	Dryopteridaceae																	
	Athyrium filix-femina L. Roth ex Mert. var. angustum (Willd.) G. Lawson	Northeastern Lady Fern	G5T5	S5					x	x	x	x	x		x		x	

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Athyrium filix-femina L. Roth ex Mert. var. cyclosorum Rupr.	Northwestern Lady Fern	G5T5	SH					x	x	x	x	x		x		x	
	Cystopteris bulbifera L. Bernh.	Bulblet Bladder Fern	G5	S5					x	x	x	x	x	x	x	x	x	x
	Cystopteris fragilis L. Bernh.	Fragile Fern	G5	S5					x				x		x			
	Cystopteris tenuis (Michx.) Desv.	Mackay's Brittle Fern	G5	S5					x				x	x	x	x		x
	Deparia acrostichoides (Swartz) M. Kato	Silvery Spleenwort	G5	S4			h	HU	x				x		x			
	Dryopteris carthusiana (Vill.) H.P. Fuchs	Spinulose Wood Fern	G5	S5					x	x	x	x	x	x	x	x	x	x
	Dryopteris cristata L. A. Gray	Crested Wood Fern	G5	S5					x				x		x			
	Dryopteris intermedia (Muhlenb. ex Willd.) A. Gray	Evergreen Wood Fern	G5	S5					x				x	x	x	x		x
	Dryopteris marginalis L. A. Gray	Marginal Wood Fern	G5	S5					x	x	x	x	x	x	x	x	x	x
	Dryopteris x triploidea Wherry	Hybrid Wood Fern	GNA	SNA					x				x		x			
	Matteuccia struthiopteris var. pensylvanica (Willd.) C.V. Morton	Ostrich Fern	G5	S5					x	x	x	x	x	x	x	x	x	x
	Onoclea sensibilis L.	Sensitive Fern	G5	S5					x	x	x	x	x	x	x	x	x	x
	Polystichum acrostichoides (Michx.) Schott	Christmas Fern	G5	S5					x	x	x	x	x	x	x	x	x	x
	Polypodiaceae																	
	Polypodium virginianum L.	Rock Polypody	G5	S5			h		x	x		x	x	x	x	x		x
	Pinaceae																	
*	Picea abies L. Karsten	Norway Spruce	G5	SNA			I			x	x	x	x	x		x	x	x
	Picea glauca (Moench) Voss	White Spruce	G5	S5			I/N	HU	x	x	x	x	x	x	x	x	x	x
*	Pinus nigra Arnold	Black Pine	GNR	SNA			I								x			x
	Pinus resinosa Sol. ex Aiton	Red Pine	G5	S5			I/N	HR		x	x	x	x				x	x
	Pinus strobus L.	White Pine	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Pinus sylvestris L.	Scots Pine	GNR	SNA			I			x	x	x	x	x		x	x	x
	Tsuga canadensis L. Carrière	Eastern Hemlock	G5	S5					x	x	x	x	x	x	x	x	x	x
	Cupressaceae																	
	Juniperus communis L.	Common Juniper	G5	S5			H	HR	x				x	x	x	x		x
	Juniperus virginiana L.	Eastern Red Cedar	G5	S5				HU	x	x	x	x	x		x		x	
	Thuja occidentalis L.	Eastern White Cedar	G5	S5					x	x	x	x	x	x	x	x	x	x
	Lauraceae																	

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Lindera benzoin L. Blume	Spicebush	G5	S5					x				x	x	x	x		x
	Sassafras albidum (Nutt.) Nees	Sassafras	G5	S4				HU	x	x	x	x	x	x	x	x	x	x
	Aristolochiaceae																	
	Asarum canadense L.	Canada Wild Ginger	G5	S5					x	x	x	x	x	x	x	x	x	x
	Nymphaeaceae																	
	Nuphar variegata Durand in Clinton	Variegated Pond-lily	G5T5	S5				HU	x				x		x			
	Nymphaea odorata Ait. spp. tuberosa (Paine) Wiersma & Hellquist	Tuberous White Water-lily	G5T5	SU					x				x		x			
	Ceratophyllaceae																	
	Ceratophyllum demersum L.	Common Hornwort	G5	S5			h	HU	x				x	x	x	x		x
	Ranunculaceae																	
	Actaea pachypoda Elliott	White Baneberry	G5	S5					x	x	x	x	x	x	x	x	x	x
	Actaea rubra (Aiton) Willd.	Red Baneberry	G5	S5					x	x	x	x	x	x	x	x	x	x
	Anemone acutiloba (DC.) G. Lawson	Sharp-lobed Hepatica	G5	S5					x	x	x	x	x	x	x	x	x	x
	Anemone americana (DC.) H. Hara	Round-lobed Hepatica	G5	S5				HU	x	x	x	x	x	x	x	x	x	x
	Anemone canadensis L.	Canada Anemone	G5	S5					x	x	x	x	x	x	x	x	x	x
	Anemone cylindrica A. Gray	Long-headed Anemone	G5	S4			h	HU	x				x		x			
	Anemone quinquefolia L.	Wood Anemone	G5	S5					x	x	x	x	x	x	x	x	x	x
	Anemone virginiana L. var virginiana	Tall Anemone	G5	S5					x	x	x	x	x		x		x	
	Anemone virginiana L. var. alba (Oakes) A.W. Wood	Riverbank Anemone	G5T4T5	S4					x				x		x			
	Anemone virginiana L. var. cylindroidea B. Boivin	Cylindrical Anemone	G5T4T5	SU					x	x	x	x	x		x		x	
	Aquilegia canadensis L.	Wild Columbine	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Aquilegia vulgaris L.	European Columbine	GNR	SNA			I		x				x		x			
	Caltha palustris L.	Yellow Marsh Marigold	G5	S5					x				x		x			
*	Clematis orientalis L.	Oriental Virgin's-bower	G4	SNA									x	x		x		x
	Clematis virginiana L.	Virginia Virgin's-bower	G5	S5					x				x		x	x		
*	Consolida ajacis L. Schur	Rocket Larkspur	GNR	SNA					x				x		x			
	Ranunculus abortivus L.	Kidney-leaved Buttercup	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Ranunculus acris L.	Tall Buttercup	G5	SNA			I		x	x	x	x	x	x	x	x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Ranunculus fascicularis Muhlenb. ex Bigelow	Early Buttercup	G5	S4			H		x				x	x		x		x
	Ranunculus flammula L. var. reptans L. E. Meyer	Creeping Spearwort	G5	S5					x				x		x			
	Ranunculus hispidus Michx. var. caricetorum (Greene) T. Duncan	Swamp Buttercup	G5T5	S5					x				x		x			
	Ranunculus hispidus Michx. var. hispidus	Bristly Buttercup	G5T5	S3			H	HR	x				x		x			
	Ranunculus hispidus Michx. var. nitidus (Chapman) T. Duncan	Swamp Buttercup	G5T5	SU						x	x	x	x	x		x	x	x
	Ranunculus pensylvanicus L. f.	Pennsylvania Buttercup	G5	S5				HU	x				x	x	x	x		x
	Ranunculus recurvatus Poir.	Hooked Buttercup	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Ranunculus repens L.	Creeping Buttercup	GNR	SNA			I		x	x	x	x	x		x		x	
	Ranunculus sceleratus L. var. multifidus Nutt.	Cursed Buttercup	G5T5	S5									x		x			
	Ranunculus sceleratus L. var. sceleratus	Cursed Buttercup	G5T5	SNA					x			x	x		x			
	Thalictrum dioicum L.	Early Meadow-rue	G5	S5					x	x	x	x	x	x	x	x	x	x
	Thalictrum pubescens Pursh	Tall Meadow-rue	G5	S5					x				x	x	x	x		x
	Berberidaceae																	
*	Berberis thunbergii DC.	Japanese Barberry	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Berberis vulgaris L.	European Barberry	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Caulophyllum giganteum (Farw.) Leconte & Blackwell	Giant Blue Cohosh	G4G5Q	S4?				H?	x	x			x		x			
	Caulophyllum thalictroides L. Michx.	Blue Cohosh	G4G5	S5				H?	x	x	x	x	x	x	x	x	x	x
	Jeffersonia diphylla L. Pers.	Twinleaf	G5	S4			h	HU	x				x	x	x	x		x
	Podophyllum peltatum L.	May-apple	G5	S5					x	x	x	x	x	x	x	x	x	x
	Menispermaceae																	
	Menispermum canadense L.	Canada Moonseed	G5	S4					x	x	x	x	x	x	x	x	x	x
	Papaveraceae																	
*	Chelidonium majus L.	Greater Celadine	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Papaver orientale L.	Oriental Poppy	GNR	SNA			I		x				x		x			
	Sanguinaria canadensis L.	Bloodroot	G5	S5					x	x	x	x	x	x	x	x	x	x
	Hamamelidaceae																	
	Hamamelis virginiana L.	American Witch-hazel	G5	S5					x	x	x	x	x	x	x	x	x	x
	Ulmaceae																	

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Celtis occidentalis L.	Common Hackberry	G5	S4			h	HR	x				x		x			x
	Ulmus americana L.	American Elm	G5?	S5					x	x	x	x	x	x	x	x	x	x
*	Ulmus pumila L.	Siberian Elm	GNR	SNA			I											x
	Ulmus rubra Muhlenb.	Slippery Elm	G5	S5					x	x	x	x	x	x	x	x	x	x
	Cannabaceae																	
*	Cannabis sativa L.	Marijuana	GNR	SNA					x				x		x			
	Moraceae																	
*	Morus alba L.	White Mulberry	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Morus rubra L.	Red Mulberry	G5	S2	END	END	H	HR		x							x	
	Urticaceae																	
	Boehmeria cylindrica L. Sw.	False Nettle	G5	S5					x				x	x	x	x		x
	Laportea canadensis L. Wedd.	Wood Nettle	G5	S5					x	x	x	x	x	x	x	x	x	x
	Pilea fontana (Lunnell) Rydb.	Springs Clearweed	G5	S4				HU	x									
	Pilea pumila L. A. Gray	Canada Clearweed	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Urtica dioica L. ssp. dioica	European Stinging Nettle	G5T5?	SNA			I		x	x	x	x	x		x		x	
	Urtica dioica L. ssp. gracilis (Aiton) Selander	Slender Stinging Nettle	G5T5	S5					x	x	x	x	x		x		x	
	Juglandaceae																	
	Carya cordiformis (Wangenh.) K. Koch	Bitternut Hickory	G5	S5					x	x	x	x	x	x	x	x	x	x
	Carya glabra (Miller) Sweet	Pignut Hickory	G5	S3			H	HR		x	x	x	x				x	
	Carya ovata (Miller) K. Koch	Shagbark Hickory	G5	S5					x	x	x	x	x	x	x	x	x	x
	Juglans cinerea L.	Butternut	G4	S3?	END	END			x	x	x	x	x	x	x	x	x	x
	Juglans nigra L.	Black Walnut	G5	S4					x	x	x	x	x	x	x	x	x	x
	Fagaceae																	
	Castanea dentata (Marshall) Borkh.	American Chestnut	G4	S2	END	END	h	HU	x	x	x	x	x	x	x	x	x	x
	Fagus grandifolia Ehrh.	American Beech	G5	S4					x	x	x	x	x	x	x	x	x	x
	Quercus alba L.	White Oak	G5	S5					x	x	x	x	x	x	x	x	x	x
	Quercus macrocarpa Michx.	Bur Oak	G5	S5					x	x	x	x	x	x	x	x	x	x
	Quercus muhlenbergii Engelm.	Chinquapin Oak	G5	S4				HU	x	x	x	x	x		x		x	

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Quercus rubra L.	Northern Red Oak	G5	S5					x	x	x	x	x	x	x	x	x	x
	Quercus velutina Lam.	Black Oak	G5	S4				HU	x	x	x	x	x	x	x	x	x	x
	Betulaceae																	
*	Alnus glutinosa L. Gaertn.	European Alder	GNR	SNA			I						x	x		x		x
	Alnus incana L. Moench spp. rugosa (Du Roi) Clausen	Speckled Alder	G5	S5				HU	x				x		x			
	Betula alleghaniensis Britton	Yellow Birch	G5	S5					x	x	x	x	x	x	x	x	x	x
	Betula papyrifera Marshall	Paper Birch	G5	S5					x	x	x	x	x	x	x	x	x	x
	Carpinus caroliniana Walter ssp. virginiana (Marshall) Furlow	Blue-beech	G5	S5			H		x	x	x	x	x	x	x	x	x	x
	Corylus americana Walter	American Hazelnut	G5	S5				HR										x
	Corylus cornuta Marshall	Beaked Hazel	G5	S5					x				x	x	x	x		x
	Ostrya virginiana (Miller) K. Koch	Eastern Hop-hornbeam	G5	S5					x	x	x	x	x	x	x	x	x	x
	Phytolaccaceae																	
	Phytolacca americana L.	Common Pokeweed	G5	S4			h	HR	x				x		x			
	Chenopodiaceae																	
	Chenopodiastrum simplex (Torrey) S. Fuentes, Uotila & Borsch	Maple-leaved Goosefoot	G5	S5			h	HU	x				x		x			
*	Chenopodium album L.	Common Lamb's Quarters	G5	SNA			I			x	x	x	x				x	
*	Dysphania botrys (L.) Mosyakin & Clemants	Jerusalem-oak	GNR	SNA			I		x				x		x			
*	Oxybasis glauca (L.) S. Fuentes, Uotila & Borsch ssp. Glauca	Oak-leaved Goosefoot	G5	SNA			I		x				x		x			
	Amaranthaceae																	
*	Amaranthus hybridus L.	Smooth Amaranth	G5?TNR	SNA			I		x				x	x	x	x		x
	Portulacaceae																	
	Claytonia caroliniana Michx.	Carolina Spring-beauty	G5	S5				HU	x	x	x	x	x		x		x	
	Claytonia virginica L.	Narrow-leaved Spring Beauty	G5	S5				HU	x				x	x	x	x		x
	Caryophyllaceae																	
*	Cerastium arvense L. ssp. arvense	Field Chickweed	G5T5	SNA			I/N			x	x	x					x	x
	Cerastium arvense L. ssp. strictum (Haenke) Gaudin	Matted Field Chickweed	G5T5	S4					x				x		x			
*	Cerastium fontanum Baumg.	Common Mouse-ear Chickweed	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Cerastium pumilum Curtis	Curtis' Mouse-ear Chickweed	GNR	SNA			I		x				x		x			

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
*	Cerastium semidecandrum L.	Five-stamen Mouse-ear Chickweed	GNR	SNA			I		x				x		x			
*	Cerastium tomentosum L.	Snow-in-summer	GNR	SNA			I		x				x		x			
*	Dianthus armeria L.	Deptford Pink	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Gypsophila paniculata L.	Tall Baby's-breath	GNR	SNA					x				x		x			
*	Holosteum umbellatum L.	Jagged Chickweed	GNR	SNA			I		x				x		x			
*	Saponaria officinalis L.	Bouncing-bet	GNR	SNA			I		x				x		x			
	Silene antirrhina L.	Sleepy Catchfly	G5	S5			H	HR	x				x		x			
*	Silene latifolia Poir.	White Campion	GNR	SNA			I		x				x	x	x	x		x
*	Silene noctiflora L.	Night-flowering Catchfly	GNR	SNA			I		x				x	x	x	x		x
*	Silene vulgaris (Moench) Garcke	Bladder Campion	GNR	SNA			I		x				x		x			
*	Stellaria graminea L.	Grass-leaved Starwort	GNR	SNA			I		x				x	x	x	x		x
*	Stellaria media L. Vill.	Common Chickweed	GNR	SNA			I		x				x		x			
	Polygonaceae																	
*	Fagopyrum esculentum Moench	Buckwheat	GNR	SNA			I		x				x		x			
*	Fallopia convolvulus (L.) A. Löve	Black Bindweed	GNR	SNA			I		x				x		x			
*	Fallopia japonica (Houttuyun) Ronse-Decraene	Japanese Knotweed	GNR	SNA			I		x	x	x	x	x		x		x	
*	Persicaria hydropiper (L.) Delarbre	Marshpepper Smartweed	GNR	SNA			I											x
	Persicaria lapathifolia (L.) Delarbre	Pale Smartweed	G5	S5			I	HU	x				x		x			
*	Persicaria maculosa Gray	Spotted Lady's Thumb	G3G5	SNA			I		x	x	x	x	x		x		x	
	Persicaria punctata (Elliott) Small	Dotted Smartweed	G5	S5				HU	x	x	x	x	x		x		x	
	Persicaria virginiana (L.) Gaertner	Virginia Knotweed	G5	S4				HU	x	x	x	x	x		x		x	
	Polygonum achoreum Blake	Leathery Knotweed	G5	S5			H	H?	x				x		x			
*	Polygonum aviculare ssp. depressum (meisner) Arcangeli	Oval-leaf Knotweed	G5?	SNA			I			x	x	x	x				x	
	Polygonum aviculare ssp. neglectum (Besser) Arcangeli	Narrow-leaved Knotweed	GNR	SNA					x				x		x			
?	Polygonum sp.	Knotweed	GNR	S?									x	x		x		x
*	Rumex acetosella L.	Sheep Sorrel	GNR	SNA			I		x	x	x	x	x		x		x	x
*	Rumex crispus L.	Curly Dock	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Rumex obtusifolius L.	Bitter Dock	GNR	SNA			I		x				x		x			

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Rumex orbiculatus A. Gray	Water Dock	G5	S4S5			I	HU	x				x		x			x
	Guttiferae																	
*	Hypericum perforatum L.	Common St. John's-wort	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Hypericum punctatum Lam.	Common St. John's-wort	G5	S5				HU	x				x		x			
	Tiliaceae																	
	Tilia americana L.	American Basswood	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Tilia cordata Miller	Little-leaf Linden	GNR	SNA			I		x				x		x			
	Malvaceae																	
*	Alcea rosea L.	Hollyhock	GU	SNA			I		x				x		x			
*	Hibiscus trionum L.	Flower-of-an-hour	GNR	SNA			I			x	x	x	x				x	
*	Malva neglecta Wallr.	Dwarf Cheeseweed	GNR	SNA			I		x	x	x	x	x		x		x	
	Violaceae																	
	Viola affinis J. Le Conte	Le Conte's Violet	G5	S4?				HU	x				x		x			
	Viola canadensis L.	Canada Violet	GNR	S5						x	x	x	x				x	
	Viola cucullata Aiton	Marsh Blue Violet	G4G5	S5				HU	x				x	x	x	x		x
	Viola pubescens Aiton	Downy Yellow Violet	G5T5	S5					x	x	x	x	x	x	x	x	x	x
	Viola rostrata Pursh	Long-spur Violet	G5	S5					x	x	x	x	x	x	x	x	x	x
	Viola sagittata Aiton var. ovata (Nutt.) Torr. & A. Gray	Sand Violet	G5T5	S4			H	HR	x				x		x			
	Viola sagittata Aiton var. sagittata	Arrow-leaved Violet	G5T5	S4					x				x	x	x	x		x
	Viola sororia Willd.	Woolly Blue Violet	G5	S5			H	HU	x	x	x	x	x	x	x	x	x	x
*	Viola tricolor L.	Johnny-jump-up	GNR	SNA			I		x				x		x			
	Cucurbitaceae																	
	Echinocystis lobata (Michx.) Torr. & A. Gray	Wild Mock-cucumber	G5	S5					x	x	x	x	x	x	x	x	x	x
	Sicyos angulatus L.	One-seed Bur-cucumber	G5	S5			h	HR	x	x	x	x	x	x	x	x	x	x
	Salicaceae																	
	Populus balsamifera L.	Balsam Poplar	G5	S5					x	x	x	x	x		x		x	
	Populus deltoides Bartram ex Marshall ssp. deltoides	Eastern Cottonwood	G5T5	S5					x	x	x	x	x		x		x	x
	Populus grandidentata Michx.	Large-tooth Aspen	G5	S5					x	x	x	x	x	x	x	x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Populus tremuloides Michx.	Trembling Aspen	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Salix alba L.	White Willow	G5	SNA			I		x	x	x	x	x	x	x	x	x	x
	Salix amygdaloides Anderss.	Peach-leaved Willow	G5	S5					x				x		x			x
	Salix bebbiana Sarg.	Bebb's Willow	G5	S5						x	x	x	x				x	
	Salix discolor Muhlenb.	Pussy Willow	G5	S5					x	x	x	x	x	x	x	x	x	x
	Salix eriocephala Michx.	Heart-leaved Willow	G5	S5					x	x	x	x	x	x	x	x	x	x
	Salix exigua Nutt.	Sandbar Willow	G5	S5					x	x	x	x	x	x	x	x	x	x
	Salix humilis Marshall	Prairie Willow	G5	S5			H	HR	x				x	x	x	x		x
	Salix lucida Muhlenb.	Shining Willow	G5	S5				HU		x	x	x	x				x	
	Salix nigra Marshall	Black Willow	G5	S4?				HU	x	x	x	x	x	x	x	x	x	x
*	Salix purpurea L.	Basket Willow	G5	SNA			I		x	x	x	x	x	x	x	x	x	x
?	Salix sp.	Willow	GNR	S?					x	x	x	x	x	x	x	x	x	x
*	Salix x fragilis L.	Hybrid White Willow	GNA	SNA			I		x				x		x			x
	Capparidaceae																	
	Polanisia dodecandra L. DC.	Common Clammyweed	G5T5?	S4			H	HR	x				x		x			
	Brassicaceae																	
*	Alliaria petiolata (M. Bieb.) Cavara & Grande	Garlic Mustard	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Alyssum alyssoides L. L.	Pale Alyssum	GNR	SNA			I		x				x		x			
*	Arabidopsis thaliana L. Heynh.	Wall-cress	GNR	SNA			I		x				x		x			
*	Armoracia rusticana (Lam.) P. Gaertn., Meyer & Scherb.	Horseradish	GNR	SNA					x				x		x			
*	Aurinia saxatilis L. Desv.	Basket-of-gold	GNR	SNA					x				x		x			
*	Barbarea vulgaris R. Br.	Bitter Wintercress	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Berteroa incana L. DC.	Hoary False-alyssum	GNR	SNA			I		x				x		x			
	Borodinia canadensis L. P.J. Alexander & Windham	Sicklepod Rockcress	G5	SU			h	HU	x	x	x	x	x		x		x	
*	Brassica nigra L. Koch	Black Mustard	GNR	SNA			I		x				x		x			x
*	Brassica rapa L.	Field Mustard	GNR	SNA			I		x				x		x			
*	Camelina microcarpa Andrz. ex DC.	Small-seed False-flax	GNR	SNA			I		x				x		x			
*	Capsella bursa-pastoris L. Medik.	Common Shepherd's Purse	GNR	SNA					x				x		x			

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Cardamine bulbosa (Schreb. ex Muhlenb.) B.S.P.	Bulbous Bitter-cress	G5	S4				HU	x				x	x	x	x		x
	Cardamine concatenata (Michx.) Schwein.	Cut-leaved Toothwort	G5	S5					x				x	x	x	x		x
	Cardamine diphylla (Michx.) Alph. Wood	Two-leaved Toothwort	G5	S5					x				x	x	x	x		x
	Cardamine douglassii Britton	Limestone Bittercress	G5	S4				HU	x				x		x			
*	Cardamine hirsuta L.	Hairy Bittercress	GNR	SNA			I		x				x		x			
	Cardamine pensylvanica Muhlenb. ex Willd.	Pensylvania Bittercress	G5	S5				HU	x				x	x	x	x		x
*	Cardamine pratensis L.	Meadow Bittercress	G5TU	SNA			H		x				x		x			
*	Diplotaxis tenuifolia L. DC.	Slim-leaf Wallrocket	GNR	SNA			I		x				x		x			
*	Draba verna L.	Spring Draba	GNR	SNA			I		x				x		x			x
*	Erucastrum gallicum (Willd.) O. Schulz	Common Dogmustard	G5	SNA			I		x				x		x			
*	Erysimum cheiranthoides L. ssp. cheiranthoides	Wormseed Wallflower	G5	SNA			I		x	x	x	x	x		x		x	
*	Hesperis matronalis L.	Dame's Rocket	G4G5	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Lepidium campestre L. R. Br.	Field Peppergrass	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Lepidium ruderale L.	Roadside Peppergrass	GNR	SNA			I		x				x		x			
	Lepidium virginicum L.	Poor-man's Peppergrass	G5	S5			h	HR	x				x		x			
*	Lobularia maritima L. Desv.	Sweet Alyssum	GNR	SNA			I		x				x		x			
*	Lunaria annua L.	Annual Honesty	GNR	SNA			I		x				x		x			
*	Nasturtium microphyllum (Boenn.) Reichb.	Small-leaved Watercress	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Rorippa palustris L. Besser ssp. hispida (Desv.) Jonsell	Hispid Marsh Yellowcress	G5T5	S5				H?	x				x		x			
	Rorippa palustris L. Besser ssp. palustris	Marsh Yellowcress	G5T5	S5?					x				x		x			
*	Sinapis arvensis L.	Corn Mustard	GNR	SNA			I		x				x		x			
*	Sisymbrium altissimum L.	Tall Hedge Mustard	GNR	SNA			I		x				x		x			
*	Sisymbrium officinale L. Scop.	Common Tumble Mustard	GNR	SNA			I		x	x	x	x	x		x		x	
*	Thlaspi arvense L.	Field Penny-cress	GNR	SNA			I		x				x		x			
	Ericaceae																	
	Gaultheria procumbens L.	Eastern Teaberry	G5	S5				HU	x	x	x	x	x	x	x	x	x	x
	Gaylussacia baccata (Wangenh.) K. Koch	Black Huckleberry	G5	S4			h	HU	x	x	x	x	x		x		x	
	Vaccinium angustifolium Aiton	Late Lowbush Blueberry	G5	S5				HU	x	x	x	x	x	x	x	x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Vaccinium myrtilloides Michx.	Velvetleaf Blueberry	G5	S5			H	HU		x								
	Vaccinium pallidum Aiton	Early Lowbush Blueberry	G5	S4				HU	x	x	x	x	x	x	x	x	x	x
	Pyrolaceae																	
	Chimaphila umbellata L. Barton ssp. cisatlantica (S.F. Blake) Hultén	Common Pipsissewa	G5	S5			H	HR		x	x	x	x				x	
	Pyrola elliptica Nutt.	Shinleaf	G5	S5					x				x		x			
	Monotropaceae																	
	Monotropa uniflora L.	Indian Pipe	G5	S5					x	x	x	x	x	x	x	x	x	x
	Primulaceae																	
	Lysimachia ciliata L.	Fringed Loosestrife	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Lysimachia nummularia L.	Creeping Jennie	GNR	SNA			I		x				x	x	x	x		x
	Lysimachia quadrifolia L.	Whorled Loosestrife	G5	S4			H	HR	x				x	x	x	x		x
	Lysimachia thyrsiflora L.	Water Loosestrife	G5	S5					x				x	x	x	x		x
	Trientalis borealis Raf. ssp. borealis	Northern Starflower	G5	S5					x				x		x			
	Hydrangeaceae																	
*	Philadelphus coronarius L.	Sweet Mock Orange	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Grossulariaceae																	
	Ribes americanum Miller	Wild Black Currant	G5	S5					x				x	x	x	x		x
*	Ribes aureum var. villosum D.C.	Buffalo Currant	G5T4T5	SNA			I		x				x		x			
	Ribes cynosbati L.	Prickly Gooseberry	G5	S5					x	x	x	x	x	x	x	x	x	x
	Ribes hirtellum Michx.	Smooth Gooseberry	G5	S5			h	HR	x				x	x		x		x
*	Ribes rubrum L.	Northern Red Currant	G4G5	SNA			I		x			x	x		x			x
?	Ribes sp.	Gooseberry	GNR	S?									x	x		x		x
	Ribes triste Pall.	Swamp Red Currant	G5	S5					x	x	x	x	x	x	x	x	x	x
	Crassulaceae																	
*	Sedum acre L.	Mossy Stonecrop	GNR	SNA			I		x				x		x			
*	Sedum sarmentosum Bunge	Stringy Stonecrop	GNR	SNA			I		x				x		x			
	Saxifragaceae																	
	Chrysosplenium americanum Schwein.	American Golden Saxifrage	G5	S5			h	HU	x				x		x			

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Micranthes virginiensis (Michx) Small	Early Saxifrage	G5	S5				HU	x	x	x	x	x		x		x	
	Mitella diphylla L.	Two-leaf Bishop's-cap	G5	S5					x				x		x			
	Penthorum sedoides L.	Ditch-stonecrop	G5	S5				HU	x				x		x			
	Tiarella cordifolia L.	Heart-leaved Foam-flower	G5	S5					x				x	x	x	x		x
	Rosaceae																	
	Agrimonia gryposepala Wallr.	Hooked Agrimony	G5	S5					x	x	x	x	x	x	x	x	x	x
	Agrimonia pubescens Wallr.	Soft Agrimony	G5	S4			h	HR	x				x		x			
	Amelanchier alnifolia (Nutt.) Nutt. ex R. Roem.	Saskatoon	G5	S4?			H	HR	x				x	x	x	x		x
	Amelanchier arborea (Michx. f.) Fern.	Downy Serviceberry	G5	S5					x	x	x	x	x	x	x	x	x	x
	Amelanchier laevis Wiegand	Smooth Serviceberry	G4G5Q	S5				HU	x	x	x	x	x		x		x	x
	Amelanchier sanguinea (Pursh) DC.	Round-leaved Serviceberry	G5	S5?			h	HU	x	x	x	x	x	x	x	x	x	x
?	Amelanchier sp.	Serviceberry	GNR	S?						x	x	x	x	x		x	x	x
	Amelanchier spicata (Lam.) K. Koch	Running Serviceberry	G5	S4?			H	HU	x	x	x	x	x	x	x	x	x	x
	Comarum palustre L.	Marsh Cinquefoil	G5	S5			H	HR	x				x		x			
	Crataegus calpodendron (Ehrh.) Medik.	Pear Hawthorn	G5	S4S5			h	HU	x	x	x	x	x	x	x	x	x	x
	Crataegus coccinea L. var. coccinea	Scarlet Hawthorn	GNR	S4			H		x	x	x	x	x		x		x	
	Crataegus dodgei Ashe	Dodge's Hawthorn	G4	S4			h	HR	x				x		x			
	Crataegus macracantha Lodd.	Large-thorn Hawthorn	GNRTNR	SU			h	HU	x				x		x			
	Crataegus macrosperma Ashe	Big-fruit Hawthorn	G5	S5				HU	x				x	x	x	x		x
	Crataegus margarettae Ashe	Margarett's Hawthorn	G5?	S1					x				x		x			
	Crataegus mollis (Torr. & A. Gray) Scheele	Downy Hawthorn	G5	S5			h											x
*	Crataegus monogyna Jacq.	English Hawthorn	G5	SNA			I		x	x	x	x	x		x		x	
	Crataegus punctata Jacq.	Dotted Hawthorn	G5	S5					x	x	x	x	x	x	x	x	x	x
?	Crataegus sp.	Hawthorn	GNR	S?					x	x	x	x	x	x	x	x	x	x
	Dryas integrifolia M. Vahl ssp. integrifolia	Entire-leaved Mountain Avens	G5	S5									x					
	Fragaria vesca L.	Woodland Strawberry	G5	S5					x	x	x	x	x		x		x	x
	Fragaria virginiana Miller	Wild Strawberry	G5	S5					x	x	x	x	x		x		x	x
	Geum aleppicum Jacq.	Yellow Avens	G5	S5					x	x	x	x	x	x	x	x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Geum canadense Jacq.	White Avens	G5	S5					x	x	x	x	x	x	x	x	x	x
	Geum fragarioides (Michx.) Smedmark	Barren Strawberry	G5	S5					x	x	x	x	x		x		x	
	Geum laciniatum Murray	Rough Avens	G5	S4					x	x	x	x	x		x		x	
?	Geum sp.	Geum	GNR	S?						x	x	x	x	x		x	x	x
*	Geum x catlingii J.-P. Bernard & Gaut.	Catling's Avens	GNA	SNA			I		x				x		x			
	Gillenia trifoliata (L.) Moench	Bowman's-root	G4G5	SX			H	HE	x				x		x			
*	Malus baccata L. Borkh.	Siberian Crabapple	GNR	SNA			I		x				x		x			x
	Malus coronaria L. Miller	Sweet Crabapple	G5	S4				HU	x	x	x	x	x		x		x	x
*	Malus pumila Miller	Common Apple	G5	SNA			I		x	x	x	x	x	x	x	x	x	x
	Physocarpus opulifolius L. Maxim.	Eastern Ninebark	GNR	S5				HR	x				x	x	x	x		x
	Potentilla anserina L. ssp. anserina	Common Silverweed	GNR	S5			h	HU	x				x		x			
*	Potentilla argentea L.	Silvery Cinquefoil	GNR	SNA			I		x	x	x	x	x		x		x	
	Potentilla norvegica L.	Rough Cinquefoil	G5	S5			I		x				x	x	x	x		x
*	Potentilla recta L.	Sulphur Cinquefoil	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Potentilla simplex Michaux	Old-field Cinquefoil	G5	S5				HU	x	x	x	x	x	x	x	x	x	x
	Potentilla supina ssp. paradoxa (Nuttall) Sojak	Bushy Cinquefoil	G5	S4			H	HR	x				x		x			
	Prunus americana Pursh	American Plum	G5	S4			h	HR										x
*	Prunus avium L. L.	Sweet Cherry	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Prunus cerasus L.	Sour Cherry	GNR	SNA			I											x
*	Prunus mahaleb L.	Perfumed Cherry	G5	SNA			I		x				x		x			
	Prunus nigra Aiton	Canada Plum	G4G5	S4				HU	x	x	x	x	x		x		x	x
	Prunus pensylvanica L. f.	Pin Cherry	G5	S5				HU	x	x	x	x	x		x		x	
	Prunus serotina Ehrh.	Black Cherry	G5	S5					x	x	x	x	x	x	x	x	x	x
	Prunus virginiana L.	Choke Cherry	G5	S5					x	x	x	x	x		x	x	x	x
*	Pyrus communis L.	Common Pear	G5	SNA			I		x	x	x	x	x	x	x	x	x	x
	Rosa acicularis Lindl. ssp. sayi (Schwein.) W. Lewis	Prickly Rose	G5	S5			H	HR	x	x	x	x	x		x		x	
	Rosa blanda Aiton	Smooth Rose	G5	S5					x				x	x	x	x		x
*	Rosa canina L.	Dog Rose	GNR	SNA			I											x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Rosa carolina L.	Carolina Rose	GNR	S4					x	x	x	x	x		x		x	x
*	Rosa multiflora Thunb. ex Murray	Multiflora Rose	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Rosa palustris Marshall	Swamp Rose	G5	S5				HU	x	x	x	x	x	x	x	x	x	x
*	Rosa rubiginosa L.	Sweetbrier Rose	GNR	SNA			I			x	x	x	x				x	
?	Rosa sp.	Rose	GNR	S?						x	x	x	x		x		x	
	Rubus allegheniensis Porter	Allegheny Blackberry	G5	S5					x	x	x	x	x	x	x	x	x	x
	Rubus flagellaris Willd.	Northern Dewberry	G5	S4			h	HU	x				x		x			
	Rubus idaeus L. ssp. strigosus (Michx.) Focke	Wild Red Raspberry	G5T5	S5					x	x	x	x	x		x		x	x
	Rubus occidentalis L.	Black Raspberry	G5	S5					x	x	x	x	x	x	x	x	x	x
	Rubus odoratus L.	Purple-flowering Raspberry	G5	S5					x	x	x	x	x	x	x	x	x	x
	Rubus pubescens Raf.	Dwarf Raspberry	G5	S5					x				x		x			
?	Rubus sp.	Raspberry	GNR	S?						x	x	x	x				x	
	Sorbus americana Marshall	American Mountain-ash	G5	S5				HR	x				x		x			
*	Sorbus aucuparia L.	European Mountain-ash	G5	SNA			I		x	x	x	x	x	x	x	x	x	x
	Spiraea alba Du Roi	White Meadowsweet	G5	S5					x				x		x			x
*	Spiraea x vanhouttei (Briot) Zabel	Hybrid Spiraea	GNA	SNA					x				x		x			
	Fabaceae																	
	Amphicarpaea bracteata L. Fern.	American Hog-peanut	G5	S5					x	x	x	x	x	x	x	x	x	x
	Apios americana Medik.	American Groundnut	G5	S5			h	HU	x				x		x			
	Cercis canadensis L.	Eastern Redbud	G5	SX					x				x		x			x
	Desmodium canadense L. DC.	Showy Tick-trefoil	G5	S4				HU	x				x		x			
	Desmodium cuspidatum (Muhlenb. ex Willd.) DC. ex Louden var. cuspidatum	Large-bracted Tick-trefoil	G5	S3			H	HU	x	x	x	x	x	x	x	x	x	x
	Desmodium paniculatum (L.) de Candolle	Narrow-leaved Tick-trefoil	G5	S4			H	HR		x	x	x	x				x	
*	Glycine max L. Merr.	Soy Bean	GNR	SNA					x				x		x			
	Hylodesmum glutinosum (Muhlenb. Ex Willdenow) H. Ohashi & R.R. Mill	Large Tick-trefoil	G5	S4					x	x	x	x	x		x		x	
	Hylodesmum nudiflorum (L.) H. Ohashi & R.R. Mill	Bare-stemmed Tick-trefoil	G5	S4			H	HU		x	x	x	x				x	
	Lespedeza capitata Michx.	Round-head Bush-clover	G5	S4				HR	x				x	x	x	x		x
	Lespedeza hirta L. Hornem.	Hairy Bush-clover	G5	S4			h	HR		x	x	x	x				x	

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
*	Lotus corniculatus L.	Garden Birds-foot Trefoil	GNR	SNA			I			x	x	x	x				x	x
*	Medicago lupulina L.	Black Medic	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Medicago sativa L.	Alfalfa	GNR	SNA			I		x	x	x	x	x		x		x	
*	Melilotus albus Medik.	White Sweet-clover	G5	SNA			I		x	x	x	x	x		x		x	x
*	Robinia pseudoacacia L.	Black Locust	G5	SNA			I			x	x	x	x				x	
*	Securigera varia (L.) Lassen	Purple Crown-vetch	GNR	SNA			I		x				x		x			
	Strophostyles helvola L. Elliott	Trailing Wild Bean	G5	S4			H	HR	x				x		x			
*	Trifolium campestre Schreb.	Low Hop Clover	GNR	SNA			I						x	x		x		x
*	Trifolium hybridum L.	Alsike Clover	GNR	SNA			I		x				x		x			
*	Trifolium pratense L.	Red Clover	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Trifolium repens L.	White Clover	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Vicia cracca L.	Tufted Vetch	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Vicia sativa L	Common Vetch	GNR	SNA			I		x				x		x			
*	Vicia tetrasperma L. Schreb.	Slender Vetch	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Elaeagnaceae																	
*	Elaeagnus angustifolia L.	Russian Olive	GNR	SNA			I			x	x	x					x	
*	Elaeagnus umbellata Thunb.	Autum Olive	GNR	SNA			I		x	x	x	x	x		x		x	
	Shepherdia canadensis L. Nutt.	Canada Buffalo-berry	G5	S5			H	HU	x	x	x	x	x	x	x	x	x	x
	Lythraceae																	
	Decodon verticillatus L. Elliott	Hairy Swamp Loosestrife	G5	S5			H	HR	x				x	x	x	x		x
*	Lythrum salicaria L.	Purple Loosestrife	G5	SNA			I		x	x	x	x	x	x	x	x	x	x
	Onagraceae																	
	Circaea alpina L.	Small Enchanter's Nightshade	G5	S5					x				x		x			
	Circaea canadensis (L.) Hill	Broad-leaved Enchanter's Nightshade	G5T5	S5					x	x	x	x	x		x	x	x	x
	Epilobium ciliatum Raf.	Northern Willowherb	G5	S5					x	x	x	x	x	x	x	x	x	x
	Epilobium coloratum Biehler	Purple-veined Willowherb	G5	S5				HU	x				x		x			
*	Epilobium hirsutum L.	Hairy Willowherb	GNR	SNA			I		x				x	x	x	x		x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
*	Epilobium parviflorum Schreb.	Small-flowered Willowherb	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Ludwigia palustris L. Elliott	Marsh Seedbox	G5	S5				HU	x				x		x			
	Oenothera biennis L.	Common Evening Primrose	G5	S5				H?	x				x		x			x
	Oenothera parviflora L.	Small-flowered Evening Primrose	G4?	S5						x	x	x	x				x	
	Cornaceae																	
	Cornus alternifolia L. f.	Alternate-leaf Dogwood	G5	S5					x	x	x	x	x	x	x	x	x	x
	Cornus amomum Miller ssp. obliqua (Raf.) J.S. Wilson	Silky Dogwood	G5	S5					x	x	x	x	x		x		x	
	Cornus florida L.	Eastern Flowering Dogwood	G5	S2?	END	END	h	HU	x	x	x	x	x	x	x	x	x	x
	Cornus racemosa Lamarck	Grey Dogwood	G5	S5					x	x	x	x	x		x		x	x
	Cornus rugosa Lam.	Round-leaved Dogwood	G5	S5					x	x	x	x	x	x	x	x	x	x
	Cornus stolonifera Michx.	Red-osier Dogwood	G5	S5					x	x	x	x	x	x	x	x	x	x
	Santalaceae																	
	Comandra umbellata L. Nutt.	Umbellate Bastard Toad-flax	G5	S5				HU	x	x	x	x	x	x	x	x	x	x
	Celastraceae																	
	Celastrus scandens L.	Climbing Bittersweet	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Euonymus alatus (Thunb.) Siebold	Winged Euonymus	GNR	SNA			I		x				x		x			
*	Euonymus europaea L.	European Euonymus	GNR	SNA									x		x			
*	Euonymus fortunei (Turcz.) Hand.-Mazz.	Climbing Euonymus	GNR	SNA			I		x				x		x			
	Euonymus obovata Nutt.	Running Strawberry Bush	G5	S5					x	x	x	x	x	x	x	x	x	x
	Euphorbiaceae																	
	Acalypha rhomboidea Raf.	Common Three-seed Mercury	G5	S5					x				x		x			
*	Euphorbia maculata L.	Spotted Spurge	G5?	SNA			I			x	x	x	x				x	
*	Euphorbia marginata Pursh	Snow-on-the-mountain	G5	SNA			I		x				x		x			
	Euphorbia nutans Lagasca	Nodding Spurge	G5	S4S5			h		x				x		x			
*	Euphorbia peplus L.	Petty Spurge	GNR	SNA			I		x				x		x			
	Rhamnaceae																	
	Ceanothus americanus L.	New Jersey Tea	G5	S4			h		x	x	x	x	x	x	x	x	x	x
*	Rhamnus cathartica L.	European Buckthorn	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Vitaceae																	
	Parthenocissus quinquefolia (L.) Planchon ex de Candolle	Virginia Creeper	G5	S4?				H?	x	x	x	x	x	x	x	x	x	x
	Vitis aestivalis Michx.	Summer Grape	G5	S4				HU	x	x	x	x	x	x	x	x	x	x
	Vitis riparia Michx.	Riverbank Grape	G5	S5					x	x	x	x	x	x	x	x	x	x
	Polygalaceae																	
	Polygala senega L.	Seneca Snakeroot	G4G5	S4			h		x				x	x	x	x		x
	Polygala verticillata L.	Whorled Milkwort	G5	S4			H	HR		x	x	x	x				x	
	Polygaloides paucifolia (Willd.) J.R. Abbott	Fringed Milkwort	G5	S5			h	HU	x				x		x			
	Staphyleaceae																	
	Staphylea trifolia L.	American Bladdernut	G5	S4				HU		x	x	x	x				x	
	Hippocastanaceae																	
*	Aesculus hippocastanum L.	Horse Chestnut	GNR	SNA			I		x				x	x	x	x		x
	Aceraceae																	
*	Acer campestre L.	Hedge Maple	GNR	SNA					x				x		x			
	Acer negundo L.	Manitoba Maple	G5	S5					x	x	x	x	x	x	x	x	x	x
	Acer nigrum F. Michaux	Black Maple	G5T5	S4?					x	x	x	x	x	x	x	x	x	x
	Acer pensylvanicum L.	Striped Maple	G5	S5					x									
*	Acer platanoides L.	Norway Maple	GNR	SNA			I		x				x	x	x	x		x
*	Acer pseudoplatanus L.	Sycamore Maple	GNR	SNA			I		x				x		x			
	Acer rubrum L.	Red Maple	G5	S5					x	x	x	x	x	x	x	x	x	x
	Acer saccharinum L.	Silver Maple	G5	S5						x	x	x	x	x		x	x	x
	Acer saccharum Marshall	Sugar Maple	G5	S5					x	x	x	x	x		x	x	x	x
	Acer spicatum Lam.	Mountain Maple	G5	S5					x	x	x	x	x	x	x	x	x	x
	Anacardiaceae																	
	Rhus typhina L.	Staghorn Sumac	G5	S5					x	x	x	x	x	x	x	x	x	x
	Toxicodendron radicans L. Kuntze var. radicans	Eastern Poison-ivy	G5	S5					x	x	x	x	x		x		x	
	Toxicodendron radicans L. Kuntze var. rydbergii (Small ex Rydberg) A. Love & D. Love	Western Poison-ivy	G5	S5						x	x	x	x		x	x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Toxicodendron vernix	Poison Sumac	G5	S4			H	HR	x				x		x			
	Rutaceae																	
	Zanthoxylum americanum Miller	Northern Prickly Ash	G5	S5						x	x	x	x				x	
	Oxalidaceae																	
	Oxalis dillenii Jacq.	Slender Yellow Wood-sorrel	G5	S5?					x				x	x	x	x		x
	Oxalis stricta L.	European Wood-sorrel	G5	S5					x	x	x	x	x	x	x	x	x	x
	Geraniaceae																	
*	Erodium cicutarium L. L'Hér.	Common Storksbill	GNR	SNA			I		x				x		x			
	Geranium maculatum L.	Spotted Geranium	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Geranium robertianum L.	Herb-Robert	G5	S5			I		x	x	x	x	x	x	x	x	x	x
	Balsaminaceae																	
	Impatiens capensis Meerb.	Spotted Jewel-weed	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Impatiens glandulifera Royle	Purple Jewelweed	GNR	SNA			I		x				x	x	x	x		x
	Impatiens pallida Nutt.	Pale Jewelweed	G5	S5					x				x		x			
	Araliaceae																	
	Aralia nudicaulis L.	Wild Sarsaparilla	G5	S5					x	x	x	x	x	x	x	x	x	x
	Aralia racemosa L.	American Spikenard	G4G5	S5					x				x		x			
*	Hedera helix L.	English Ivy	GNR	SNA			I			x								
	Apiaceae																	
*	Aegopodium podagraria L.	Goutweed	GNR	SNA			I		x				x	x	x	x		x
	Angelica atropurpurea L.	Purple-stemmed Angelica	G5	S5			h	HR	x				x		x			
	Cicuta bulbifera L.	Bulb-bearing Water-hemlock	G5	S5					x				x		x			
	Cicuta maculata L. var. maculata	Spotted Water-hemlock	G5T5	S5					x				x	x	x	x		x
	Cryptotaenia canadensis L. DC.	Canada Honewort	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Daucus carota L.	Wild Carrot	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Heracleum maximum W. Bartram	Cow-parsnip	G5	S5				HU	x				x		x			
*	Myrrhis odorata L. Scop.	Anise	GNR	SNA					x				x		x			
	Osmorhiza berteroi DC.	Mountain Sweet Cicely	G5	S4												x		

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Osmorhiza claytonii (Michx.) C.B. Clarke	Hairy Sweet Cicely	G5	S5					x	x	x	x	x	x	x	x	x	x
	Osmorhiza longistylis (Torr.) DC.	Smooth Sweet Cicely	G5	S5			h	HU		x	x	x	x				x	
	Sanicula marilandica L.	Maryland Sanicle	G5	S5					x	x	x	x	x	x	x	x	x	x
	Sanicula odorata (Raf.) Pryer & Phillippe	Clustered Sanicle	G5	S5			h	HR	x				x	x	x	x		x
	Sium suave Walter	Hemlock Water-parsnip	G5	S5					x				x		x			
	Taenidia integerrima L. Drude	Yellow Pimpernell	G5	S4			h	HU	x	x	x	x	x	x	x	x	x	x
*	Torilis japonica (Houtt.) DC.	Erect Hedge-parsley	GNR	SNA			I		x				x		x			x
	Gentianaceae																	
	Frasera caroliniensis Walter	American Columbo	G5	S2	END	END	H	HR	x	x	x	x	x	x	x	x	x	x
	Apocynaceae																	
	Apocynum androsaemifolium L.	Spreading Dogbane	G5	S5					x	x	x	x	x		x		x	x
	Apocynum cannabinum L. var. hypericifolium A. Gray	Clasping-leaved Indian Hemp	G5?	SU					x	x	x	x	x	x	x	x	x	x
*	Vinca minor L.	Periwinkle	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Asclepiadaceae																	
	Asclepias exaltata L.	Poke Milkweed	G5	S4				HU	x	x	x	x	x	x	x	x	x	x
	Asclepias incarnata L.	Swamp Milkweed	G5	S5					x	x	x	x	x		x		x	
	Asclepias syriaca L.	Common Milkweed	G5	S5					x	x	x	x	x	x	x	x	x	x
	Asclepias tuberosa L.	Butterfly Milkweed	G5?	S4			h	HU	x				x	x	x	x		x
*	Cynanchum louiseae Kartesz & Gandhi	Black Swallowwort	GNR	SNA			I		x	x	x	x	x		x		x	
*	Cynanchum rossicum (Kleopov) Borhidi	European Swallowwort	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Solanaceae																	
*	Datura stramonium L.	Jimson Weed	GU	SNA			I		x				x		x			
*	Nicandra physalodes L. Gaertn.	Apple-of-Peru	GNR	SNA			I		x				x		x			
*	Physalis alkekengi L.	Strawberry Ground-cherry	GNR	SNA			I		x				x		x			
	Physalis heterophylla Nees	Clammy Ground-cherry	G5	S4				HU		x	x	x	x				x	
*	Solanum dulcamara L.	Climbing Nightshade	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Solanum ptychanthum Dunal ex DC.	Black Nightshade	G5	S5					x				x		x			
	Convolvulaceae																	

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Calystegia sepium L. R. Br.	Hedge False Bindweed	G5	S5				HU	x				x		x			
	Calystegia spithamaea L. Pursh	Low False Bindweed	G4G5	S4S5			H	HR	x				x		x			
*	Convolvulus arvensis L.	Field Bindweed	GNR	SNA			I		x				x		x			
	Cuscuta gronovii Willd. ex Schultz	Swamp Dodder	G5T5	S5?				HU	x				x	x	x	x		x
*	Ipomoea purpurea L. Roth	Common Morning Glory	GNR	SNA			I		x				x		x			
	Polemoniaceae																	
	Phlox divaricata L.	Wild Blue Phlox	G5	S4				HU	x				x	x	x	x		x
*	Phlox paniculata L.	Fall Phlox	G5	SNA			I		x	x	x	x	x		x		x	
	Hydrophyllaceae																	
	Hydrophyllum canadense L.	Bluntleaf Waterleaf	G5	S4				HU	x				x		x			
	Hydrophyllum virginianum L.	Virginia Waterleaf	G5	S5					x	x	x	x	x	x	x	x	x	x
	Boraginaceae																	
*	Anchusa officinalis L.	Common Bugloss	GNR	SNA					x				x		x			
*	Cynoglossum officinale L.	Common Hound's-tongue	GNR	SNA			I		x	x	x	x	x		x		x	
*	Echium vulgare L.	Common Viper's-bugloss	GNR	SNA			I		x	x	x	x	x		x		x	
	Hackelia deflexa (Wahlenb.) Opiz	Northern Stickseed	G5	S5			H	HU					x					
	Hackelia virginiana L. I.M. Johnston	Virginia Stickseed	G5	S5				HU	x	x	x	x	x	x	x	x	x	x
	Lappula squarrosa (Retz.) Dumort. ssp. squarrosa	Bristly Stickseed	GNR	SNA			I		x				x		x			
*	Lithospermum officinale L.	European Gromwell	GNR	SNA			I											x
*	Myosotis arvensis L. Hill	Rough Forget-me-not	GNR	SNA			I		x				x		x			
	Myosotis laxa Lehm.	Small Forget-me-not	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Myosotis scorpioides L.	True Forget-me-not	G5	SNA			I		x	x	x	x	x	x	x	x	x	x
?	Myosotis sp.	Forget-me-not	GNR	S?									x	x		x		x
*	Myosotis sylvatica H. Hoffm.	Woodland Forget-me-not	G5	SNA			I		x				x		x			
	Myosotis verna Nutt.	Spring Forget-me-not	G5	S4?			H	HR	x				x	x	x	x		x
*	Pulmonaria officinalis L.	Common Lungwort	GNR	SNA														x
*	Symphytum officinale L. ssp. officinale	Common Comfrey	GNR	SNA			I			x	x	x					x	
	Phrymaceae																	

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Phryma leptostachya L.	Lopseed	G5	S4S5					x				x		x			
	Verbenaceae																	
	Verbena hastata L.	Blue Vervain	G5	S5					x	x	x	x	x	x	x	x	x	x
	Verbena urticifolia L.	White Vervain	G5	S5					x	x	x	x	x	x	x	x	x	x
	Lamiaceae																	
	Agastache nepetoides L. Kuntze	Yellow Giant Hyssop	G5	S4			H	HR		x	x	x					x	
	Clinopodium vulgare L.	Field Basil	G5	S5					x	x	x	x	x		x		x	
	Collinsonia canadensis L.	Canada Horse-balm	G5	S4				HU	x	x	x	x	x	x	x	x	x	x
*	Galeopsis tetrahit L.	Common Hemp-nettle	GNR	SNA			I		x				x		x			
*	Glechoma hederacea L.	Ground Ivy	GNR	SNA			I		x				x	x	x	x		x
*	Leonurus cardiaca L.	Common Motherwort	GNR	SNA			I		x	x	x	x	x		x		x	x
	Lycopus americanus Muhlenb. ex Bartram	American Water-horehound	G5	S5					x			x	x	x	x	x		x
	Lycopus asper Greene	Rough Water-horehound	G5	S4			H	HR	x				x		x			
*	Lycopus europaeus L.	European Water-horehound	GNR	SNA			I		x				x		x			
	Lycopus uniflorus Michx.	Northern Water-horehound	G5	S5						x	x	x	x				x	
*	Melissa officinalis L. ssp. officinalis	Lemon Balm	GNR	SNA			I		x				x		x			
	Mentha arvensis L.	Field Mint	G5	S5					x				x		x			
?	Mentha sp.	Mint	GNR	S?						x	x	x	x	x		x	x	x
*	Mentha x piperita L.	Pepper Mint	GNA	SNA			I		x	x	x	x	x	x	x	x	x	x
	Monarda fistulosa L.	Wild Bergamot	G5T5?	S5					x	x	x	x	x	x	x	x	x	x
*	Nepeta cataria L.	Catnip	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Physostegia virginiana L. Benth. Ssp. virginiana	Virginia False Dragonhead	G5	S4			H	H?	x				x		x			
	Prunella vulgaris L. ssp. lanceolata (W.C. Barton) Hultén	Lance-leaved Self-heal	G5T5	S5					x	x			x		x			x
*	Prunella vulgaris L. ssp. vulgaris	Common Self-heal	G5TU	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Salvia pratensis L.	Meadow Sage	GNR	SNA			I		x				x		x			
	Stachys hispida Pursh	Hispid Hedge-nettle	G5T4Q	S4S5			H	HR	x				x		x			
	Teucrium canadense L. ssp. canadense	Canada Germander	G5T5	SU			h	HR	x	x	x	x	x		x		x	
	Teucrium canadense L. ssp. viscidum (Piper) R.L. Taylor & Macbryde	Western Germander	GNR	SU			H	HR	x				x		x			

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
*	Thymus praecox Opiz ssp. arcticus (E. Durand) Jalas	Creeping Thyme	GNR	SNA			I		x				x		x			
	Trichostema brachiatum L.	False Pennyroyal	G5	S4			h	H?	x				x		x			
	Plantaginaceae																	
*	Plantago lanceolata L.	English Plantain	G5	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Plantago major L.	Common Plantain	G5	SNA			I		x	x	x	x	x	x	x	x	x	x
	Plantago rugelii Decne.	Rugel's Plantain	G5	S5					x	x	x	x	x	x	x	x	x	x
	Oleaceae																	
	Fraxinus americana L.	White Ash	G5	S4					x	x	x	x	x	x	x	x	x	x
	Fraxinus nigra Marshall	Black Ash	G5	S4					x				x	x	x	x		x
	Fraxinus pennsylvanica Marshall	Green Ash	G5	S4						x	x	x	x	x	x	x	x	x
*	Ligustrum vulgare L.	European Privet	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Syringa vulgaris L.	Common Lilac	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Scrophulariaceae																	
	Aureolaria flava L. Farw.	Smooth Yellow False Foxglove	G5	S2?			H	HR					x	x		x		x
	Aureolaria virginica L. Pennell	Downy Yellow False Foxglove	G5	S1			H	HR		x	x	x	x				x	
*	Chaenorrhinum minus L. Lange	Dwarf Snapdragon	GNR	SNA			I			x	x	x	x				x	
	Chelone glabra L.	White Turtlehead	G5	S5					x				x	x	x	x		x
*	Linaria dalmatica (L.) Miller subsp. dalmatica	Dalmatian Toadflax	G5T5?	SNA			I		x				x		x			
*	Linaria vulgaris Miller	Butter-and-eggs	GNR	SNA			I			x	x	x	x		x		x	
	Lindernia dubia L. Pennell var. dubia	Yellow-seed False Pimpernel	G5T5	S4				HR	x				x		x			
	Melampyrum lineare Desr.	American Cow-wheat	G5	S4S5			H	HU	x	x	x	x	x		x		x	
	Mimulus ringens L.	Square-stemmed Monkeyflower	G5	S5				HU	x				x	x	x	x		x
	Pedicularis canadensis L.	Canada Lousewort	G5	S5			h	HU	x	x	x	x	x	x	x	x	x	x
	Penstemon hirsutus L. Willd.	Hairy Beardtongue	G4	S4					x	x	x	x	x		x		x	
	Scrophularia marilandica L.	Carpenter's Square Figwort	G5	S4			h	HU	x	x	x	x	x		x		x	
*	Verbascum blattaria L.	White Moth Mullein	GNR	SNA			I			x	x	x	x				x	
*	Verbascum phlomoides L.	Clasping-leaved Mullein	GNR	SNA					x				x		x			
*	Verbascum thapsus L.	Great Mullein	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Veronica americana (Raf.) Schwein. ex Benth.	American Speedwell	G5	S5				HU	x				x		x			
*	Veronica anagallis-aquatica L.	Water Speedwell	G5	SNA			I		x				x	x	x	x		x
*	Veronica arvensis L.	Corn Speedwell	GNR	SNA			I											x
*	Veronica officinalis L.	Common Speedwell	G5	SNA			I		x	x	x	x	x	x	x	x	x	x
	Veronica peregrina L. ssp. peregrina	Purslane Speedwell	G5T5	S5			h	H?	x				x		x			
*	Veronica persica Poir.	Bird's-eye Speedwell	GNR	SNA			I		x				x		x			
*	Veronica polita Fr.	Wayside Speedwell	GNR	SNA			I		x				x		x			
*	Veronica serpyllifolia L. ssp. serpyllifolia	Thyme-leaved Speedwell	G5TNR	SNA			I		x	x	x	x	x		x		x	x
	Orobanchaceae																	
	Conopholis americana L. Wallr.	Squaw-root	G5	S4?			H	HU		x	x	x	x				x	
	Epifagus virginiana L. Barton	Beechdrops	G5	S5					x				x	x	x	x		x
	Orobanche uniflora L.	One-flowered Broomrape	G5	S4			H	HR	x				x	x	x	x		x
	Bignoniaceae																	
*	Catalpa speciosa Warder ex Engelm.	Northern Catalpa	G4?	SNA			I						x					
	Lentibulariaceae																	
	Utricularia vulgaris L.	Greater Bladderwort	G5	S5			h	HU	x				x		x			
	Campanulaceae																	
	Campanula americana L.	Tall Bellflower	G5	S4			h	HR	x	x	x	x	x	x	x	x	x	x
*	Campanula rapunculoides L.	Creeping Bellflower	GNR	SNA			I		x	x			x	x	x	x		x
	Campanula rotundifolia L.	Harebell	GNR	SNA			h	HR	x	x	x	x	x	x	x	x	x	x
	Lobelia inflata L.	Indian-tobacco	G5	S5					x	x	x	x	x		x		x	
	Lobelia siphilitica L.	Great Blue Lobelia	G5	S5					x	x	x	x	x	x	x	x	x	x
	Rubiaceae																	
	Galium aparine L.	Cleavers	G5	S5					x	x	x	x	x	x	x	x	x	x
	Galium asprellum Michx.	Rough Bedstraw	G5	S5						x	x	x	x				x	
	Galium boreale L.	Northern Bedstraw	G5	S5				HU	x	x	x	x	x		x		x	
	Galium circaezans Michx.	Wild Licorice	G5	S5					x	x	x	x	x	x	x	x	x	x
	Galium lanceolatum Torr.	Lanceleaf Wild Licorice	G5	S5			h	HU		x	x	x	x				x	

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
*	Galium mollugo L.	Smooth Bedstraw	GNR	SNA			I		x				x		x			x
	Galium palustre L.	Marsh Bedstraw	G5	S5					x	x	x	x	x	x	x	x	x	x
?	Galium sp.	Bedstraw	GNR	S?						x	x	x	x	x		x	x	x
	Galium tinctorium L.	Stiff Marsh Bedstraw	G5	S5				HU	x				x	x	x	x		x
	Galium trifidum L.	Three-petalled Bedstraw	G5	S5				HU	x				x		x			
	Galium triflorum Michx.	Three-flowered Bedstraw	G5	S5					x	x	x	x	x	x	x	x	x	x
	Mitchella repens L.	Partridge-berry	G5	S5						x	x	x	x				x	
	Caprifoliaceae																	
	Diervilla lonicera Miller	Northern Bush-honeysuckle	G5	S5					x	x	x	x	x	x	x	x	x	x
	Lonicera canadensis Bartram	Canada Fly-honeysuckle	G5	S5						x	x	x	x				x	
	Lonicera dioica L.	Limber Honeysuckle	G5	S5					x	x	x	x	x	x	x	x	x	x
	Lonicera hirsuta Eaton	Hairy Honeysuckle	G4G5	S5			h	HR	x				x		x			
*	Lonicera maackii (Rupr.) Maxim.	Amur Honeysuckle	GNR	SNA			I		x	x	x	x	x		x		x	
*	Lonicera morrowii A. Gray	Morrow Honeysuckle	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
?	Lonicera sp.	Honeysuckle	GNR	S?						x	x	x	x	x		x	x	x
*	Lonicera tatarica L.	Tartarian Honeysuckle	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Lonicera x bella Zabel	Hybrid Honeysuckle	GNA	SNA			I		x				x		x			
	Sambucus canadensis L.	Common Elderberry	G5T5	S5					x	x	x	x	x	x	x	x	x	x
	Sambucus racemosa L. (Michx.)	Red Elderberry	G5	S5					x	x	x	x	x		x	x	x	x
	Symphoricarpos albus L. S.F. Blake	Snowberry	G5T5	S5					x	x	x	x	x	x	x	x	x	x
	Triosteum aurantiacum E.P. Bicknell	Orange-fruited Horse-gentian	G5	S5					x	x	x	x	x		x		x	
	Viburnum acerifolium L.	Maple-leaved Viburnum	G5	S5					x	x	x	x	x	x	x	x	x	x
	Viburnum edule (Michx.) Raf.	Squashberry	G5	S5					x									
*	Viburnum lantana L.	Wayfaring Tree	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Viburnum lentago L.	Nannyberry	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Viburnum opulus L. ssp. opulus	Cranberry Viburnum	GNR	SNA			I											x
	Viburnum opulus ssp. trilobum	Highbush Cranberry	GNR	S5					x	x	x	x	x	x	x	x	x	x
	Viburnum rafinesquianum Schult.	Downy Arrowwood	G5	S5					x	x	x	x	x	x	x	x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Viburnum recognitum Fern	Southern Arrowwood	G4G5	S4				HR	x				x	x	x	x		x
	Dipsacaceae																	
*	Dipsacus fullonum L.	Common Teasel	GNR	SNA			I		x	x	x	x	x		x		x	x
	Asteraceae																	
*	Achillea millefolium L.	Common Yarrow	G5	SNA			I		x	x	x	x	x	x	x	x	x	x
	Ageratina altissima L. R.M. King & H. Robinson	White Snakeroot	G5	S5					x	x	x	x	x		x	x	x	x
	Ambrosia artemisiifolia L.	Annual Ragweed	G5	S5					x	x	x	x	x	x	x	x	x	x
	Ambrosia trifida L.	Great Ragweed	G5	S5			h	HU	x				x	x	x	x		x
	Antennaria neglecta Greene	Field Pussytoes	G5	S5					x	x	x	x	x	x	x	x	x	x
	Antennaria parlinii Fern. ssp. fallax (E. Greene) R.J. Bayer & Stebb.	Deceitful Pussytoes	G5T4T5	S5					x	x	x	x	x		x		x	
*	Anthemis arvensis L.	Corn Camomile	GNR	SNA			I		x				x		x			
*	Arctium lappa L.	Greater Burdock	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Arctium minus (Hill) Bernh.	Common Burdock	GNR	SNA			I		x	x	x	x	x		x	x	x	x
*	Artemisia annua L.	Annual Wormwood	GNR	SNA					x				x		x			
	Artemisia ludoviciana Nutt.	Silver Wormwood	G5	S4?				HR	x				x		x			
*	Artemisia vulgaris L.	Common Wormwood	GU	SNA			I						x	x		x		x
	Bidens beckii Torrey ex Sprengel	Water-marigold	G4G5	S5			H	HR	x				x		x			
	Bidens cernua L.	Nodding Beggarticks	G5	S5					x	x	x	x	x	x	x	x	x	x
	Bidens frondosa L.	Devil's Beggarticks	G5	S5					x	x	x	x	x	x	x	x	x	x
?	Bidens sp.	Beggarticks	GNR	S?						x	x	x	x				x	
	Bidens tripartita L.	Three-parted Beggarticks	GNR	S5						x	x	x	x				x	
	Bidens vulgata Greene	Tall Beggarticks	G5	S5				HU	x	x	x	x	x	x	x	x	x	x
*	Cichorium intybus L.	Chicory	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Cirsium arvense L. Scop.	Canada Thistle	GNR	SNA			I		x	x			x	x	x	x		x
	Cirsium muticum Michx.	Swamp Thistle	G5	S5			H						x	x		x		x
?	Cirsium sp.	Thistle	GNR	S?						x	x	x	x				x	
*	Cirsium vulgare (Savi) Ten.	Bull Thistle	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Doellingeria umbellata Miller var. umbellata	Flat-top White Aster	G5T5	S5			H		x				x		x			

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Erechtites hieracifolia L. Raf. ex DC.	Eastern Burnweed	G5	S5			h	HU	x				x	x	x	x		x
	Erigeron annuus L. Pers.	Annual Fleabane	G5	S5					x	x	x	x	x	x	x	x	x	x
	Erigeron canadensis L.	Canada Horseweed	G5	S5					x				x		x			
	Erigeron philadelphicus L.	Philadelphia Fleabane	G5	S5					x	x	x	x	x		x		x	
	Erigeron pulchellus Michx.	Robin's Plantain	G5	S5				HU	x	x	x	x	x		x		x	
	Erigeron strigosus Muhlenb. ex Willd.	Rough Fleabane	G5	S5					x	x	x	x	x	x	x	x	x	x
	Eupatorium perfoliatum L.	Common Boneset	G5	S5					x	x	x	x	x	x	x	x	x	x
	Eurybia macrophylla L. Cass in Cuvier	Large-leaved Aster	G5	S5					x	x	x	x	x		x		x	
	Euthamia graminifolia L. Nutt.	Grass-leaved Goldenrod	G5	S5					x	x	x	x	x	x	x	x	x	x
	Eutrochium maculatum L. E.E. Lammont var. maculatum	Spotted Joe Pye Weed	G5T5	S5					x	x	x	x	x		x		x	
	Helianthus divaricatus L.	Woodland Sunflower	G5	S5			h	HU	x	x	x	x	x	x	x	x	x	x
	Helianthus strumosus L.	Pale-leaf Sunflower	G5	S5			h	HR	x				x	x	x	x		x
	Helianthus tuberosus L.	Jerusalem Artichoke	G5	SU			I		x				x		x			
	Hieracium paniculatum L.	Panicled Hawkweed	G5	S2?			H	HR		x	x	x	x				x	
	Hieracium scabrum Michx.	Rough Hawkweed	G5	S4				HR					x	x		x		x
*	Hieracium umbellatum L.	Umbellate Hawkweed	G5	S4S5			H	HR	x				x		x			
*	Hieracium x floribundum Wimm. & Grab.	King Devil Hawkweed	GNA	SNA			I		x				x	x	x	x		x
*	Inula helenium L.	Elecampane	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Lactuca canadensis L.	Canada Lettuce	G5	S5				HU										x
*	Lactuca serriola L.	Prickly Lettuce	GNR	SNA			I		x				x	x	x	x		x
*	Lapsana communis L.	Common Nipplewort	GNR	SNA			I		x	x		x	x	x	x	x		x
*	Leucanthemum vulgare Lamarck	Oxeye Daisy	GNR	SNA			I		x	x	x	x	x		x		x	x
*	Matricaria discoidea de Candolle	Pineappleweed	G5	SNA			I		x				x		x			
	Nabalus albus (L.) Hooker	White Rattlesnakeroot	G5	S5					x	x	x	x	x		x		x	
	Nabalus altissimus (L.) Hooker	Tall Rattlesnakeroot	G5?	S5					x	x	x	x	x		x	x	x	
*	Petasites japonicus (Siebold & Zucc.) Maxim.	Japanese Butterbur	GNR	SNA					x				x		x			
*	Pilosella aurantiaca (L.) F.W. Shultz & Schultz Bipontinus	Orange Hawkweed	GNR	SNA			I		x	x			x		x			x
*	Pilosella caespitosa (Dumortier) P.D. Sell & C. West	Meadow Hawkweed	GNR	SNA			I		x	x	x	x	x		x		x	

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
*	Pilosella piloselloides (Villars) Soják ssp. Piloselloides	Tall Hawkweed	GNR	SNA			I		x	x	x	x	x		x		x	
	Polymnia canadensis L.	White-flower Leafcup	G5	S4			h	HU		x	x	x	x				x	
	Rudbeckia hirta L.	Black-eyed Susan	G5	S5					x				x		x			
	Rudbeckia laciniata L.	Cut-leaved Coneflower	G5	S5			h	HU	x				x	x	x	x		x
*	Rudbeckia triloba L.	Brown-eyed Susan	G5	SNA			I		x	x	x	x	x		x		x	
*	Senecio vulgaris L.	Common Ragwort	GNR	SNA			I		x				x		x			
	Solidago altissima L. var. altissima	Tall Goldenrod	G5T5	S5					x	x	x	x	x		x		x	
	Solidago bicolor L.	White Goldenrod	G5	S4?			h	HU	x	x	x	x	x	x	x	x	x	x
	Solidago caesia L.	Blue-stemmed Goldenrod	G5	S5					x	x	x	x	x	x	x	x	x	x
	Solidago canadensis L. var. canadensis	Canada Goldenrod	G5T5	S5					x			x			x			x
	Solidago canadensis var. hargeri Fernald	Harger's Goldenrod	G5T4T5	S4?					x	x	x	x	x	x	x	x	x	x
	Solidago flexicaulis L.	Zigzag Goldenrod	G5	S5					x	x	x	x	x	x	x	x	x	x
	Solidago gigantea Aiton	Smooth Goldenrod	G5	S5				HU	x	x	x	x	x	x	x	x	x	x
	Solidago hispida Muhlenb. Ex Willd.	Hairy Goldenrod	G5	S5			h	HR	x	x	x	x	x		x		x	
	Solidago juncea Aiton	Early Goldenrod	G5	S5				HU	x	x	x	x	x	x	x	x	x	x
	Solidago nemoralis Aiton ssp. nemoralis	Gray-stemmed Goldenrod	G5T5	S5					x	x	x	x	x		x		x	
	Solidago rugosa Miller ssp. rugosa	Northern Rough-leaved Goldenrod	G5T5	S5														x
	Solidago rugosa ssp. aspera Miller	Southern Rough-leaved Goldenrod	G5TNR	SU					x				x		x			
?	Solidago sp.	Goldenrod	GNR	S?						x	x	x	x	x		x	x	x
	Solidago squarrosa Muhlenb. ex Nutt.	Squarrose Goldenrod	G4?	S4			H	HU	x				x	x	x	x		x
*	Sonchus arvensis L. ssp. arvensis	Field Sow-thistle	GNRTNR	SNA			I		x	x	x	x	x		x		x	
*	Sonchus arvensis L. ssp. uliginosus (M. Bieb.) Nyman	Smooth Sow-thistle	GNRTNR	SNA			I		x	x	x	x	x		x		x	
*	Sonchus asper L. Hill ssp. asper	Prickly Sow-thistle	GNR	SNA			I											x
*	Sonchus oleraceus L.	Common Sow-thistle	GNR	SNA			I		x				x		x			
	Symphyotrichum cordifolium L. Nesom	Heart-leaved Aster	G5	S5					x	x	x	x	x		x	x	x	
	Symphyotrichum ericoides L. Nesom var. ericoides	White Heath Aster	G5T5	S5					x	x	x	x	x		x		x	
	Symphyotrichum laeve L. Löve & Löve var. laeve	Smooth Aster	G5T5	S5				HU	x	x	x	x	x		x		x	
	Symphyotrichum lanceolatum (Willd.) G.L. Nesom	White Panicled Aster	G5T5	S5					x				x		x			

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Symphyotrichum lanceolatum (Willd.) Nesom ssp. lanceolatum	Panicled Aster	G5T5	S5					x	x	x	x	x		x		x	x
	Symphyotrichum lateriflorum (L.) Löve & Löve	Calico Aster	G5	S5					x	x	x	x	x		x		x	x
	Symphyotrichum novae-angliae L. Nesom	New England Aster	G5	S5					x	x	x	x	x		x		x	
	Symphyotrichum oolentangiense (Riddell) Nesom	Sky-blue Aster	G5	S4				HR	x	x	x	x	x		x		x	
	Symphyotrichum pilosum (Willd.) Nesom var. pilosum	Old Field Aster	G5T5	S5				HU	x	x	x	x	x		x		x	x
	Symphyotrichum puniceum L. Love & Love	Purple-stemmed Aster	G5	S5					x				x		x			
?	Symphyotrichum sp.	Aster	GNR	S?						x	x	x	x				x	
	Symphyotrichum urophyllum (Lindl. in DC.) Nesom	Arrow-leaved Aster	G4G5	S4				HU	x	x	x	x	x		x		x	
	Symphyotrichum x amethystinum (Nutt.) Nesom	Amethyst Aster	GNA	SNA					x		x	x	x		x		x	
*	Tanacetum parthenium L. Schultz-Bip.	Common Feverfew	GNR	SNA					x				x		x			
*	Taraxacum erythrospermum Andrz. ex Besser	Red-seeded Dandelion	GNR	SNA			I			x	x	x	x				x	
*	Taraxacum officinale G. Weber	Common Dandelion	G5	SNA					x	x	x	x	x	x	x	x	x	x
*	Tragopogon dubius Scop.	Meadow Goat's-beard	GNR	SNA			I			x	x	x	x				x	
*	Tragopogon porrifolius L.	Purple Goat's-beard	GNR	SNA			I		x				x		x			
*	Tussilago farfara L.	Colt's-foot	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Xanthium strumarium L.	Rough Cocklebur	G5	S5					x				x	x	x	x		x
	Alismataceae																	
	Alisma plantago-aquatica L.	European Water-plantain	G5	S5					x	x	x	x	x	x	x	x	x	x
	Sagittaria cuneata E. Sheld.	Northern Arrowhead	G5	S4?			H	HR	x				x		x			
	Sagittaria latifolia Willd.	Broad-leaved Arrowhead	G5	S5					x				x	x	x	x		x
	Hydrocharitaceae																	
	Elodea canadensis Rich. ex Michx.	Broad Waterweed	G5	S5				HR	x				x	x	x	x		x
	Vallisneria americana Michx.	Eel-grass	G5	S5			H	HR	x				x		x			
	Potamogetonaceae																	
*	Potamogeton crispus L.	Curly-leaved Pondweed	G5	SNA			I		x				x	x	x	x		x
	Potamogeton foliosus Raf.	Leafy Pondweed	G5	S5			H	HR	x				x		x			
	Potamogeton friesii Rupr.	Fries' Pondweed	G4	S4			H	HR	x				x		x			
	Potamogeton nodosus Poir.	Long-leaved Pondweed	G5	S5			H	HR	x				x	x	x	x		x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Potamogeton pectinatus L.	Clasping-leaved Pondweed	G5	S5				HU	x				x		x			
	Potamogeton pusillus ssp. tenuissimus (M. & W.D.J. Koch) R.R. H. & H.	Narrow-leaved Small Pondweed	G5T5	S4S5			H	HR	x				x		x			
	Potamogeton strictifolius A. Bennett	Straight-leaved Pondweed	G5	S4			H	HR	x				x		x			
	Potamogeton zosteriformis Fern.	Flatstem Pondweed	G5	S5			H	HR	x				x	x	x	x		x
	Zannichelliaceae																	
	Zannichellia palustris L.	Horned Pondweed	G5	S4			H	HR	x				x	x	x	x		x
	Araceae																	
	Acorus americanus (Raf.) Raf.	American Sweetflag	G5	S4			H	HR	x				x		x			
*	Acorus calamus L.	European Sweetflag	G4?	SNA									x	x		x		x
	Arisaema triphyllum L. Schott	Jack-in-the-pulpit	G5	S5					x	x	x	x	x		x	x	x	x
	Calla palustris L.	Wild Calla	G5	S5					x				x		x			
	Symplocarpus foetidus L. Salisb. ex Nutt.	Skunk Cabbage	G5	S5				HU	x	x	x	x	x	x	x	x	x	x
	Lemnaceae																	
	Lemna minor L.	Lesser Duckweed	G5	S5					x	x	x	x	x	x	x	x	x	x
	Lemna trisulca L.	Star Duckweed	G5	S5				HU	x				x		x			
	Spirodela polyrhiza L. Schleid.	Greater Duckweed	G5	S5				HR	x				x		x			
	Wolffia borealis (Engelm.) Landolt	Northern Watermeal	G5	S4S5			H	HU	x				x		x			
	Wolffia columbiana Karst.	Columbia Watermeal	G5	S4S5			H	HU	x				x		x			
	Commelinaceae																	
*	Tradescantia virginiana L.	Virginia Spiderwort	G5	SNA			I			x	x	x	x				x	
	Juncaceae																	
	Juncus articulatus L.	Jointed Rush	G5	S5				HU	x	x	x	x	x	x	x	x	x	x
	Juncus bufonius L.	Toad Rush	GNR	S5					x	x	x	x	x		x		x	
*	Juncus compressus Jacq.	Flattened Rush	G5	SNA			I			x	x	x	x				x	
	Juncus dudleyi Wiegelb	Dudley's Rush	G5	S5					x	x	x	x	x	x	x	x	x	x
	Juncus effusus L.	Soft Rush	G5	S5				H?	x				x		x			
	Juncus nodosus L.	Knotted Rush	G5	S5			H	HU	x				x		x			
	Juncus tenuis Willd.	Path Rush	G5	S5					x	x	x	x	x	x	x	x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Juncus torreyi Coville	Torrey's Rush	G5	S5				HU	x	x	x	x	x		x		x	
	Luzula acuminata Raf.	Hairy Woodrush	G5	S5				HU	x	x	x	x	x	x	x	x	x	x
	Luzula multiflora (Retz.) Lej. ssp. multiflora	Many-flowered Woodrush	G5T5	S5				HU	x	x	x	x	x		x		x	
	Cyperaceae																	
	Carex albursina E. Sheld.	White Bear Sedge	G5	S5					x	x	x	x	x	x	x	x	x	x
	Carex alopecoidea Tuckerm.	Foxtail Sedge	G5	S5			h		x				x		x			
	Carex atherodes Spreng.	Wheat Sedge	G5	S4S5			H	HR	x				x	x	x	x		x
	Carex aurea Nutt.	Golden Sedge	G5	S5						x	x	x	x				x	
	Carex bebbii (L.H. Bailey) Olney ex Fern.	Bebb's Sedge	G5	S5					x			x	x		x			
	Carex blanda Dewey	Woodland Sedge	G5?	S5					x	x	x	x	x		x		x	x
	Carex brevior (Dewey) Mack. ex Lunell	Short-beaked Sedge	G5?	S4S5				HR	x				x	x	x	x		x
	Carex cephaloidea (Dewey) Dewey	Thin-leaved Sedge	G5	S5			H	HR	x				x		x			
	Carex cephalophora Muhlenb. ex Willd.	Oval-headed Sedge	G5	S5					x	x	x	x	x		x		x	
	Carex communis L.H. Bailey	Fibrous-root Sedge	G5	S5					x				x		x			
	Carex comosa Boott	Bearded Sedge	G5	S5					x				x		x			
	Carex crinita Lam.	Fringed Sedge	G5	S5				HU	x				x		x			
	Carex cristatella Britton	Crested Sedge	G5	S5					x	x	x	x	x		x		x	x
	Carex cryptolepis Mack.	Northeastern Sedge	G4	S4			H	HR		x	x	x	x	x		x	x	x
	Carex deweyana Schwein.	Dewey's Sedge	G5	S5					x				x		x			
	Carex digitalis Willd.	Slender Wood Sedge	G5	S4S5				HU	x				x		x			
	Carex eburnea Boott	Bristle-leaved Sedge	G5	S5									x	x		x		x
	Carex gracillima Schwein.	Graceful Sedge	G5	S5					x	x		x	x		x			
	Carex granularis Muhlenb. ex Willd.	Limestone Meadow Sedge	G5	S5					x	x			x	x	x	x		x
	Carex grayi Carey	Gray's Sedge	G4	S4			h	HU	x				x	x	x	x		x
	Carex grisea Wahlenb.	Grey Sedge	G5?	S4			h	HU	x				x	x	x	x		x
	Carex hitchcockiana Dewey	Hitchcock's Sedge	G5	S5						x	x	x					x	
	Carex hystericina Muhlenb. ex Willd.	Porcupine Sedge	G5	S5					x	x	x	x	x		x		x	
	Carex intumescens Rudge	Bladder Sedge	G5	S5					x				x	x	x	x		x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Carex lacustris Willd.	Lake Sedge	G5	S5					x				x		x			
	Carex laevivaginata (Kükenth.) Mack.	Smooth-sheath Sedge	G5	S4			h	HU					x	x		x		x
	Carex laxiculmis Schwein.	Spreading Sedge	G5T3T5	S4?				HU	x				x		x			
	Carex laxiflora Lam.	Loose-flowered Sedge	G5	S5					x	x	x	x	x	x	x	x	x	x
	Carex molesta Mack.	Troublesome Sedge	G4	S4?				HU	x				x		x			
	Carex normalis Mack.	Larger Straw Sedge	G5	S4			h	HR	x	x	x	x	x	x	x	x	x	x
	Carex oligocarpa Schkuhr ex Willd.	Eastern Few-fruited Sedge	G4	S3			H	HR		x	x	x					x	
	Carex oligosperma Michx.	Few-seeded Sedge	G5	S4			H			x	x	x	x				x	
	Carex pellita Willd.	Woolly Sedge	G5	S5				HU	x				x		x			
	Carex pensylvanica Lam.	Pennsylvania Sedge	G5	S5					x	x	x	x	x	x	x	x	x	x
	Carex plantaginea Lam.	Plantain-leaved Sedge	G5	S5					x	x			x	x	x	x		x
	Carex platyphylla J. Carey	Broad-leaved Sedge	G5	S5					x	x	x	x	x	x	x	x	x	x
	Carex prasina Wahlenb.	Drooping Sedge	G4	S4			h	HU		x	x	x	x				x	
	Carex projecta Mack.	Necklace Sedge	G5	S5			h	HU	x				x		x			
	Carex pseudocyperus L.	Cyperus-like Sedge	G5	S5					x	x	x	x	x		x		x	
	Carex radiata (Wahlenb.) Small	Eastern Star Sedge	G4	S4					x	x	x	x	x		x		x	x
	Carex retrorsa Schwein.	Retrorse Sedge	G5	S5					x				x		x			
	Carex rosea Schkuhr ex Willd.	Rosy Sedge	G5	S5					x	x	x	x	x	x	x	x	x	x
	Carex scoparia Schkuhr ex Willd.	Pointed Broom Sedge	G5	S5			h	HR	x				x	x	x	x		x
?	Carex sp.	Sedge	GNR	S?									x	x		x		x
	Carex sparganioides Muhlenb. ex Willd.	Burreed Sedge	G5	S5					x	x	x	x	x		x		x	x
*	Carex spicata Hudson	Spiked Sedge	GNR	SNA			I		x				x		x			
	Carex sprengelii Dewey ex Spreng.	Sprengel's Sedge	G5	S5			H	HU		x	x	x					x	
	Carex stipata Muhlenb. ex Willd.	Awl-fruited Sedge	G5	S5					x			x	x	x	x	x		x
	Carex stricta Lam.	Tussock Sedge	G5	S5					x				x		x			
	Carex tenera Dewey	Tender Sedge	G5	S5					x				x		x			
	Carex tonsa (Fern.) Bicknell var. rugosperma (Mack.) Crins	Rough-fruited Deep-green Sedge	G5T5	S5			H	HR		x	x	x	x				x	
	Carex tribuloides Wahlenb.	Blunt Broom Sedge	G5	S4S5				HU	x				x		x			

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Carex umbellata Schkuhr ex Willd.	Umbellate Sedge	G5	S5			H	HR	x				x		x			
	Carex utriculata Boott	Northern Beaked Sedge	G5	S5			h	HU	x				x		x			
	Carex viridula Michx. ssp. viridula	Greenish Sedge	G5	S5			H	HR		x	x	x	x				x	
	Carex vulpinoidea Michx.	Fox Sedge	G5	S5					x	x	x	x	x		x		x	x
	Cyperus bipartitus Torr.	Shining Flatsedge	G5	S5			H	HR	x				x		x			
	Cyperus esculentus L.	Perennial Yellow Flatsedge	G5	S5					x				x		x			
	Cyperus lupulinus (Spreng.) Marcks ssp. lupulinus	Hop Flatsedge	G5T5?	SU				HR	x				x		x			
	Cyperus odoratus L.	Rusty Flatsedge	G5	S4			H	HR	x				x		x			
	Cyperus strigosus L.	Straw-colored Flatsedge	G5	S5			h	HR	x				x	x	x	x		x
	Eleocharis intermedia Schult.	Matted Spike-rush	G5	S4			H	HU	x				x		x			
	Eleocharis obtusa (Willd.) Schult.	Blunt Spike-rush	G5	S5				HU	x				x		x			
	Eleocharis palustris (L.) Roemer & Schultes	Creeping Spike-rush	G5?	S5			H	HU	x				x		x			
	Schoenoplectus pungens (Vahl) Palla	Common Three-square Bulrush	G5	S5			H	HR	x				x		x			
	Schoenoplectus tabernaemontani (C.C. Gmelin) Pall.	Soft-stemmed Bulrush	G5	S5					x	x	x	x	x		x		x	
	Scirpus atrovirens Willd.	Dark-green Bulrush	G5?	S5					x	x	x	x	x	x	x	x	x	x
	Scirpus microcarpus C. Presl	Red-tinge Bulrush	G5	S5			H	HR										x
	Scirpus pendulus Muhlenb. ex Willd.	Rufous Bulrush	G5	S5				HU		x	x	x	x				x	
	Poaceae																	
*	Agrostis gigantea Roth	Redtop	G4G5	SNA			I		x	x	x	x	x	x	x	x	x	x
	Agrostis perennans (Walter) Tuckerm.	Upland Bentgrass	G5	S5				HU	x	x	x	x	x	x	x	x	x	x
	Agrostis stolonifera L.	Creeping Bentgrass	G5	SNA					x	x	x	x	x		x		x	
	Alopecurus aequalis Sobol.	Short-awned Foxtail	G5	S5			H	HU	x				x		x			
*	Alopecurus pratensis L.	Field Foxtail	GNR	SNA			I		x				x		x			
	Andropogon gerardii Vitman	Big Bluestem	G5	S4			h	HU	x				x	x	x	x		x
*	Arrhenatherum elatius L. P. Beauv. ex Presl	Tall Oatgrass	GNR	SNA			I		x	x	x	x	x		x		x	
	Brachyelytrum erectum (Schreb.) P. Beauv.	Bearded Shorthusk	G5T4T5	S4?			h	HU	x				x	x	x	x		x
	Bromus ciliatus L.	Fringed Brome	G5	S5			h	HU	x				x		x			
*	Bromus commutatus Schrad.	Hairy Brome	GNR	SNA			I		x				x		x			

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
*	Bromus hordeaceus L. ssp. hordeaceus	Soft Brome	GNR	SNA			I		x				x		x			
*	Bromus inermis Leyss.	Smooth Brome	G5TNR	SNA			I		x	x	x	x	x		x		x	x
	Bromus kalmii A. Gray	Kalm's Brome	G5	S4			H	HR	x				x	x	x	x		x
	Bromus latiglumis (Shear) Hitchc.	Broad-glumed Brome	G5	S4			H	HR	x				x		x			
	Bromus pubescens Muhl. ex Willd.	Hairy Woodland Brome	G5	S4			h		x	x	x	x	x	x	x	x	x	x
*	Bromus secalinus L. ssp. secalinus	Rye Brome	GNR	SNA			I			x	x	x	x				x	
*	Bromus tectorum L.	Downy Brome	GNR	SNA			I		x				x		x			
	Calamagrostis canadensis (Michx.) Beauv.	Bluejoint Reedgrass	G5	S5					x				x		x			
*	Calamagrostis epigejos L. Roth	Feathertop	G5	SNA			I		x				x		x			
	Cinna arundinacea L.	Stout Wood Reedgrass	G5	S4					x				x		x			
*	Dactylis glomerata L.	Orchard Grass	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Danthonia spicata L. P. Beauv. ex Roem. & Schult.	Poverty Oatgrass	G5	S5					x	x	x	x	x		x		x	
	Dichanthelium acuminatum (Swartz) Gould & C.A. Clark subsp. Acuminatum	Hairy Panic Grass	G5T5	S5					x				x		x			
	Dichanthelium latifolium (Linnaeus) Harvill	Broad-leaf Panicgrass	G5	S4			H	HU	x	x	x	x	x		x		x	
	Dichanthelium linearifolium (Scribner) Gould	Linear-leaved Panicgrass	GNR	S5			h	HR	x	x	x	x	x		x		x	
*	Digitaria sanguinalis L. Scop.	Hairy Crabgrass	G5	SNA			I		x				x		x			
*	Echinochloa crus-galli L. P. Beauv.	Large Barnyard Grass	GNR	SNA			I		x				x		x			
	Echinochloa muricata var. microstachya Wiegand	Western Barnyard Grass	G5T5	S5			h	HU	x	x	x	x	x	x	x	x	x	x
	Elymus canadensis L.	Canada Wildrye	G5	S4S5			H	HU	x				x		x			
	Elymus hystrix L.	Bottlebrush Grass	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Elymus repens L. Gould	Creeping Wildrye	GNR	SNA			I		x	x	x	x	x		x		x	x
	Elymus riparius Wiegand	Eastern Riverbank Wildrye	G5	S4?			h	HR	x				x	x	x	x		x
	Elymus trachycaulus (Link) Gould in Shinn. ssp. trachycaulus	Slender Wildrye	G5T5	S5			H	HR	x				x		x			
	Elymus virginicus L.	Virginia Wildrye	G5T5	S5					x				x		x			
*	Eragrostis cilianensis (All.) Lutati ex Hubb.	Stinkgrass	GNR	SNA			I		x				x		x			
	Festuca hallii (Vasey) Piper	Plains Rough Fescue	G4	S1					x				x		x			
	Festuca rubra L. ssp. rubra	Red Fescue	G5T5	SNA			I		x				x		x			
	Festuca subverticillata (Pers.) Alexeev	Nodding Fescue	G5	S4			h		x	x	x	x	x		x		x	

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
*	Festuca trachyphylla (Hack.) Krajina	Hard Fescue	GNR	SNA			I		x				x		x			
	Glyceria borealis (Nash) Batch.	Boreal Mannagrass	G5	S5			h	HU	x				x		x			
	Glyceria grandis S. Watson	Tall Mannagrass	G5	S4S5					x	x	x	x	x		x		x	
*	Glyceria maxima (Hartm.) F.O. Holmb.	Rough Mannagrass	GNR	SNA			I		x				x		x			
	Glyceria septentrionalis Hitchc.	Floating Mannagrass	G5	S4				HU	x				x		x			
	Glyceria striata (Lam.) A. Hitchc.	Fowl Mannagrass	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Hordeum jubatum L.	Foxtail Barley	G5T5	S5			I			x	x	x	x				x	
*	Hordeum jubatum L. ssp. x intermedium Bowden	Foxtail Barley	G5T5	SNA						x	x	x					x	
*	Hordeum marinum subsp. gussoneanum (Parlatore) Thellung	Sea Barley	GNR	SNA					x				x		x			
	Leersia virginica Willd.	Virginia Cutgrass	G5	S4					x	x	x	x	x	x	x	x	x	x
*	Lolium arundinaceum (Schreber) Darbyshire	Tall Fescue	GNR	SNA			I		x				x		x			
*	Lolium perenne L.	Perennial Ryegrass	GNR	SNA			I		x				x		x			
*	Lolium pratense (Hudson) Darbyshire	Meadow Ryegrass	G5	SNA			I		x	x	x	x	x		x		x	x
	Milium effusum L.	Wood Millet	G5	S4S5			H	HU	x				x		x			
	Muhlenbergia mexicana L. Trin var. mexicana	Mexican Muhly	G5	S5						x								
	Muhlenbergia mexicana L. Trin. var. filiformis (Willd.) Scribn.	Slim-stemmed Mexican Muhly	G5	S4			H	HR	x				x		x			
	Oryzopsis asperifolia Michx.	White-grained Mountain-ricegrass	G5	S5					x	x	x	x	x	x	x	x	x	x
	Panicum capillare L.	Common Panicgrass	G5	S5					x	x	x	x	x		x		x	
*	Panicum dichotomiflorum Michx.	Fall Panicgrass	G5	SNA			I											x
*	Panicum miliaceum L.	Proso Millet	GNR	SNA			I		x				x		x			
	Phalaris arundinacea L.	Reed Canary Grass	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Phalaris canariensis L.	Common Canary Grass	GNR	SNA			I		x				x		x			
	Phleum alpinum L.	Alpine Timothy	G5	S1S2					x				x		x			
*	Phleum pratense L.	Common Timothy	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Phragmites australis (Cav.) Trin. ex Steud. ssp. australis	European Reed	G5T5	SNA			I		x	x	x	x	x	x	x	x	x	x
	Poa alsodes A. Gray	Grove Meadow Grass	G4G5	S4			h	HU	x				x	x	x	x		x
*	Poa annua L.	Annual Bluegrass	GNR	SNA			I		x				x	x	x	x		x
*	Poa bulbosa L.	Bulbous Bluegrass	GNR	SNA			I		x				x		x			

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
*	Poa compressa L.	Canada Bluegrass	GNR	SNA					x	x	x	x	x	x	x	x	x	x
	Poa languida Hitchc.	Drooping Bluegrass	G5T3T4Q	S3			H	HR		x	x	x	x				x	
*	Poa nemoralis L.	Woods Bluegrass	G5	SNA			I			x	x	x					x	
	Poa palustris L.	Fowl Bluegrass	G5	S5			I		x				x		x			x
	Poa pratensis L. ssp. pratensis	Kentucky Bluegrass	G5T5	S5			I		x	x	x	x	x		x		x	x
	Poa pratensis ssp. alpigena (Lindman) Hiitonen	Alpine Meadow Bluegrass	G5T5	S4S5					x	x	x	x	x		x		x	
*	Poa trivialis L.	Rough Bluegrass	GNR	SNA			I		x	x	x	x	x		x		x	
*	Puccinellia distans (Jacq.) Parl.	Spreading Alkaligrass	G5	SNA			I		x				x		x			
	Schizachyrium scoparium (Michx.) Nees	Little Bluestem	G5T5	S4			H	HU	x				x		x			
*	Setaria pumila (Poir.) Schult.	Yellow Foxtail	GNR	SNA			I		x	x	x	x	x		x		x	
*	Setaria verticillata L. P. Beauv.	Bristly Foxtail	GNR	SNA			I		x				x		x			
*	Setaria viridis L. P. Beauv.	Green Foxtail	GNR	SNA			I		x	x	x	x	x		x		x	
	Sorghastrum nutans L. Nash	Yellow Indian-grass	G5	S4			H	HR	x				x		x			
	Sphenopholis intermedia (Rydb.) Rydb.	Slender Wedge Grass	G5	S4S5					x				x		x			
*	Thinopyrum ponticum (Podpěra) Barkworth & D.R. Dewey	Tall Wheat Grass	GNR	SNA					x				x		x			
	Trisetum melicoides (Michx.) Vasey ex Scribn.	Purple False Oats	G4	S4			H	HR	x				x	x	x	x		x
	Sparganiaceae																	
	Sparganium eurycarpum Engelm. ex A. Gray	Broad-fruited Burreed	G5	S5				HU	x				x	x	x	x		x
	Typhaceae																	
*	Typha angustifolia L.	Narrow-leaved Cattail	G5	SNA					x	x	x	x	x		x		x	
	Typha latifolia L.	Broad-leaved Cattail	G5	S5					x	x	x	x	x	x	x	x	x	x
*	Typha x glauca Godron	Blue Cattail	GNA	SNA					x				x	x	x	x		x
	Pontederiaceae																	
	Heteranthera dubia (Jacq.) MacMill.	Grassleaf Mud-plantain	G5	S5			H	HR	x				x		x			
	Liliaceae																	
	Allium tricoccum Aiton var. tricoccum	Wild Leek	G5	S4					x				x	x	x	x		x
*	Asparagus officinalis L.	Garden Asparagus	G5?	SNA			I		x	x	x	x	x	x	x	x	x	x
*	Convallaria majalis L.	European Lily-of-the-valley	G5	SNA			I		x				x	x	x	x		x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Erythronium americanum Ker Gawl.	Yellow Trout-lily	G5	S5					x	x	x	x	x		x	x	x	x
*	Hemerocallis fulva L. L.	Orange Daylily	GNA	SNA			I			x	x	x	x				x	
	Lilium michiganense Farw.	Michigan Lily	G5	S5					x				x	x	x	x		x
	Maianthemum canadense Desf.	Wild-lily-of-the-valley	G5	S5					x	x	x	x	x	x	x	x	x	x
	Maianthemum racemosum L. Link	False Solomon's Seal	G5	S5					x	x	x	x	x		x	x	x	x
	Maianthemum stellatum L. Link	Star-flower False Solomon's-seal	G5	S5					x	x	x	x	x	x	x	x	x	x
	Medeola virginiana L.	Indian Cucumber-root	G5	S5				HU	x				x		x			
*	Muscari botryoides L. Miller	Common Grape-hyacinth	GNR	SNA			I		x				x		x			
	Polygonatum biflorum (Walter) Ell.	Giant Solomon's Seal	G5T5	S4			H	HR	x				x	x		x		x
*	Polygonatum multiflorum L. All.	Eurasian Soloman's Seal	GNR	SNA			I											x
	Polygonatum pubescens (Willd.) Pursh	Downy Solomon's Seal	G5	S5					x	x	x	x	x	x	x	x	x	x
	Prosartes lanuginosa (Michaux) D. Don	Yellow Mandarin	G5	S4				HU	x	x	x	x	x		x		x	
*	Scilla siberica Haw.	Siberian Squill	GNR	SNA			I		x				x		x			
	Streptopus lanceolatus (Aiton) Reveal var. lanceolatus	Eastern Rose Twisted-stalk	G5	S5					x	x	x	x	x		x	x	x	
	Trillium erectum L.	Red Trillium	G5	S5					x	x	x	x	x	x	x	x	x	x
	Trillium grandiflorum (Michx.) Salisb.	White Trillium	G5	S5					x	x	x	x	x	x	x	x	x	x
	Uvularia grandiflora Sm.	Large-flowered Bellwort	G5	S5					x	x	x	x	x	x	x	x	x	x
	Uvularia perfoliata L.	Perfoliate Bellwort	G5	S1			H	HR		x	x	x	x				x	
	Iridaceae																	
	Iris versicolor L.	Harlequin Blue Flag	G5	S5					x				x	x	x	x		x
	Iris virginica L.	Southern Blue Flag	G5	S5			H	HR	x				x		x			
	Sisyrinchium montanum Greene	Strict Blue-eyed-grass	G5T4T5	S5					x	x	x	x	x		x		x	
	Smilacaceae																	
	Smilax herbacea L.	Herbaceous Carrionflower	G5	S4					x	x	x	x	x	x	x	x	x	x
	Smilax tamnoides L.	Hispid Greenbrier	G5	S4						x	x	x	x				x	
	Dioscoreaceae																	
	Dioscorea villosa L.	Wild Yam	G4G5	S4				HR	x	x	x	x	x		x		x	
	Orchidaceae																	

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Cypripedium parviflorum var. makasin (Farwell) Sheviak	Small Yellow Lady's Slipper	G5T4T5	S4S5					x				x		x			
	Cypripedium parviflorum var. pubescens (Willdenow) Knight	Large Yellow Lady's Slipper	G5T5	S5			H		x				x		x			
*	Epipactis helleborine L. Crantz	Eastern Helleborine	GNR	SNA			I		x	x	x	x	x	x	x	x	x	x
	Liparis loeselii L. Rich. ex Lindl.	Loesel's Twayblade	G5	S4S5				HU		x	x	x	x				x	

Appendix 6: Carolinian, Prairie and Savannah Indicators

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

Scientific Name	Common Name	Carolinian Zone	Prairie/ Savannah
Collinsonia canadensis L.	Canada Horse-balm	Yes	
Prosartes lanuginosa (Michaux) D. Don	Yellow Mandarin	Yes	
Persicaria virginiana (L.) Gaertner	Virginia Knotweed	Yes	
Crataegus dodgei Ashe	Dodge's Hawthorn	Yes	
Frasera caroliniensis Walter	American Columbo	Yes	
Polygonatum biflorum (Walter) Ell.	Giant Solomon's Seal	Yes	
Malus coronaria L. Miller	Sweet Crabapple	Yes	
Vitis aestivalis Michx.	Summer Grape	Yes	
Dioscorea villosa L.	Wild Yam	Yes	
Strophostyles helvola L. Elliott	Trailing Wild Bean	Yes	
Morus rubra L.	Red Mulberry	Yes	
Cornus florida L.	Eastern Flowering Dogwood	Yes	
Euonymus obovata Nutt.	Running Strawberry Bush	Yes	
Aureolaria virginica L. Pennell	Downy Yellow False Foxglove	Yes	
Aureolaria flava L. Farw.	Smooth Yellow False Foxglove	Yes	
Quercus velutina Lam.	Black Oak	Yes	
Carya glabra (Miller) Sweet	Pignut Hickory	Yes	
Juglans nigra L.	Black Walnut	Yes	
Castanea dentata (Marshall) Borkh.	American Chestnut	Yes	
Uvularia perfoliata L.	Perfoliate Bellwort	Yes	
Symphyotrichum laeve L. Löve & Löve var. laeve	Smooth Aster		Yes
Vaccinium pallidum Aiton	Early Lowbush Blueberry		Yes
Lespedeza capitata Michx.	Round-head Bush-clover		Yes
Symphyotrichum oolentangiense (Riddell) Nesom	Sky-blue Aster		Yes
Cyperus lupulinus (Spreng.) Marcks ssp. lupulinus	Hop Flatsedge		Yes
Symphyotrichum urophyllum (Lindl. in DC.) Nesom	Arrow-leaved Aster		Yes
Lysimachia quadrifolia L.	Whorled Loosestrife		Yes

Scientific Name	Common Name	Carolinian Zone	Prairie/ Savannah
Comandra umbellata L. Nutt.	Umbellate Bastard Toad-flax		Yes
Polygala senega L.	Seneca Snakeroot		Yes
Erigeron pulchellus Michx.	Robin's Plantain		Yes
Viola sagittata Aiton var. ovata (Nutt.) Torr. & A. Gray	Sand Violet		Yes
Ceanothus americanus L.	New Jersey Tea		Yes
Rosa carolina L.	Carolina Rose		Yes
Helianthus strumosus L.	Pale-leaf Sunflower		Yes
Elymus canadensis L.	Canada Wildrye		Yes
Andropogon gerardii Vitman	Big Bluestem		Yes
Ranunculus fascicularis Muhlenb. ex Bigelow	Early Buttercup		Yes
Sorghastrum nutans L. Nash	Yellow Indian-grass		Yes
Dichanthelium acuminatum (Swartz) Gould & C.A. Clark subsp. Acuminatum	Hairy Panic Grass		Yes
Asclepias tuberosa L.	Butterfly Milkweed		Yes
Anemone cylindrica A. Gray	Long-headed Anemone		Yes
Schizachyrium scoparium (Michx.) Nees	Little Bluestem		Yes
Polygala verticillata L.	Whorled Milkwort		Yes
Bromus kalmii A. Gray	Kalm's Brome		Yes
Corylus americana Walter	American Hazelnut		Yes
Amelanchier alnifolia (Nutt.) Nutt. ex R. Roem.	Saskatoon		Yes
Desmodium canadense L. DC.	Showy Tick-trefoil		Yes
Campanula rotundifolia L.	Harebell		Yes
Lespedeza hirta L. Hornem.	Hairy Bush-clover	Yes	Yes
Desmodium cuspidatum (Muhlenb. ex Willd.) DC. ex Louden var. cuspidatum	Large-bracted Tick-trefoil	Yes	Yes

Appendix 7: Fauna

Appendix 7. Faunal species at Clappison-Grindstone Heritage Lands. * indicates a non-native species / under Breeding Status: PO = possibly breeding; SL = largely associated with Stewarship Lands; M = migrant/casual visitor

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Area Sensitive	Breeding Status	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Bird																			
	Branta canadensis	Canada Goose	G5	S5						PO	x				x		x			
	Anas platyrhynchos	Mallard	G5	S5						PO	x	x	x	x	x	x	x	x	x	x
	Bonasa umbellus	Ruffed Grouse	G5	S4			h			PO	x				x		x			
	Meleagris gallopavo	Wild Turkey	G5	S5				HU		PO					x	x		x		x
	Butorides virescens	Green Heron	G5	S4B			h	HU		PO										x
	Cathartes aura	Turkey Vulture	G5	S5B			h			M	x	x	x	x	x	x	x	x	x	x
	Circus cyaneus	Northern Harrier	G5	S4B	NAR		H	HU	Yes	SL										x
	Accipiter striatus	Sharp-shinned Hawk	G5	S5	NAR		H	HU	Yes	PO		x	x	x	x				x	
	Buteo platypterus	Broad-winged Hawk	G5	S5B			H	HR	Yes	PO	x				x		x			
	Buteo jamaicensis	Red-tailed Hawk	G5	S5	NAR					PO	x	x	x	x	x	x	x	x	x	x
	Rallus limicola	Virginia Rail	G5	S5B			h			PO		x	x	x	x				x	
	Porzana carolina	Sora	G5	S4B			h	HU		PO		x	x	x	x				x	
	Charadrius vociferus	Killdeer	G5	S5B,S5N						PO	x	x	x	x	x		x		x	
	Actitis macularia	Spotted Sandpiper	G5	S5						PO	x	x	x	x	x		x		x	
	Scolopax minor	American Woodcock	G5	S4B						PO	x				x		x			
*	Columba livia	Rock Pigeon	G5	SNA						PO	x				x		x			
	Zenaida macroura	Mourning Dove	G5	S5			h			PO	x	x	x	x	x	x	x	x	x	x
	Coccyzus erythropthalmus	Black-billed Cuckoo	G5	S5B			H	HU		PO		x	x	x	x				x	
	Bubo virginianus	Great Horned Owl	G5	S4			h			PO	x				x		x			
	Strix varia	Barred Owl	G5	S5					Yes	M	x				x		x			
	Archilochus colubris	Ruby-throated Hummingbird	G5	S5B			h			PO	x				x	x	x	x		x
	Megaceryle alcyon	Belted Kingfisher	G5	S4B			h			PO	x				x	x	x	x		x
	Melanerpes carolinus	Red-bellied Woodpecker	G5	S4			h	HU		PO					x	x		x		x
	Sphyrapicus varius	Yellow-bellied Sapsucker	G5	S5B			H	HU	Yes	PO	x				x		x			
	Picoides pubescens	Downy Woodpecker	G5	S5						PO	x	x	x	x	x	x	x	x	x	x
	Picoides villosus	Hairy Woodpecker	G5	S5			h		Yes	PO	x	x	x	x	x	x	x	x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Area Sensitive	Breeding Status	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Colaptes auratus	Northern Flicker	G5	S4B						PO	x	x	x	x	x	x	x	x	x	x
	Dryocopus pileatus	Pileated Woodpecker	G5	S5			h	HU	Yes	PO	x	x	x	x	x	x	x	x	x	x
	Contopus virens	Eastern Wood-pewee	G5	S4B	SC	SC				PO	x	x	x	x	x	x	x	x	x	x
	Empidonax traillii	Willow Flycatcher	G5	S5B				HU		PO	x				x		x			
	Sayornis phoebe	Eastern Phoebe	G5	S5B			h			PO	x				x		x			
	Tyrannus tyrannus	Eastern Kingbird	G5	S4B						PO	x	x	x	x	x	x	x	x	x	x
	Myiarchus crinitus	Great Crested Flycatcher	G5	S4B						PO	x	x	x	x	x	x	x	x	x	x
	Vireo gilvus	Warbling Vireo	G5	S5B						PO	x	x	x	x	x	x	x	x	x	x
	Vireo olivaceus	Red-eyed Vireo	G5	S5B						PO	x	x	x	x	x	x	x	x	x	x
	Cyanocitta cristata	Blue Jay	G5	S5						PO	x	x	x	x	x	x	x	x	x	x
	Corvus brachyrhynchos	American Crow	G5	S5B						PO	x	x	x	x	x	x	x	x	x	x
	Progne subis	Purple Martin	G5	S4B			h	HU		PO		x	x	x	x				x	
	Tachycineta bicolor	Tree Swallow	G5	S4B						PO	x				x		x			x
	Stelgidopteryx serripennis	Northern Rough-winged Swallow	G5	S4B				HU		PO	x				x	x	x	x		x
	Hirundo rustica	Barn Swallow	G5	S4B	THR	THR				SL	x	x	x	x	x		x		x	x
	Poecile atricapillus	Black-capped Chickadee	G5	S5						PO	x	x	x	x	x	x	x	x	x	x
	Sitta carolinensis	White-breasted Nuthatch	G5	S5					Yes	PO	x	x	x	x	x	x	x	x	x	x
	Certhia americana	Brown Creeper	G5	S5B			h	HU	Yes	PO		x	x	x					x	
	Thryothorus ludovicianus	Carolina Wren	G5	S4			H	HR		PO					x	x		x		x
	Troglodytes aedon	House Wren	G5	S5B						PO	x	x	x	x	x	x	x	x	x	x
	Troglodytes hiemalis	Winter Wren	G5	S5B			h	HU	Yes	PO								x		
	Regulus satrapa	Golden-crowned Kinglet	G5	S5B			H	HR		PO	x	x	x	x	x		x		x	
	Regulus calendula	Ruby-crowned Kinglet	G5	S4B						M	x	x	x	x	x		x		x	
	Polioptila caerulea	Blue-gray Gnatcatcher	G5	S4B			h	HU	Yes	PO	x				x		x			
	Sialia sialis	Eastern Bluebird	G5	S5B	NAR		h	HU		PO		x	x	x					x	
	Hylocichla mustelina	Wood Thrush	G5	S4B	THR	SC				PO	x	x	x	x	x	x	x	x	x	x
	Turdus migratorius	American Robin	G5	S5B						PO	x	x	x	x	x	x	x	x	x	x
	Dumetella carolinensis	Gray Catbird	G5	S4B						PO	x	x	x	x	x	x	x	x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Area Sensitive	Breeding Status	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Mimus polyglottos	Northern Mockingbird	G5	S4			h	HU		PO		x	x	x	x				x	
	Toxostoma rufum	Brown Thrasher	G5	S4B			h			PO		x	x	x	x	x		x	x	x
*	Sturnus vulgaris	European Starling	G5	SNA						PO	x	x	x	x	x	x	x	x	x	x
	Bombycilla cedrorum	Cedar Waxwing	G5	S5B						PO	x	x	x	x	x	x	x	x	x	x
	Vermivora cyanoptera	Blue-winged Warbler	G5	S4B			h	HU		PO	x	x	x	x	x		x		x	
	Oreothlypis ruficapilla	Nashville Warbler	G5	S5B			h	HR		PO		x	x	x					x	x
	Setophaga petechia	Yellow Warbler	G5	S5B						PO	x	x	x	x	x	x	x	x	x	x
	Setophaga pensylvanica	Chestnut-sided Warbler	G5	S5B			h	HU		PO		x	x	x	x	x		x	x	x
	Setophaga magnolia	Magnolia Warbler	G5	S5B			H	HR	Yes	PO		x	x	x					x	
	Setophaga caerulescens	Black-throated Blue Warbler	G5	S5B			H	HR	Yes	PO										x
	Setophaga coronata	Yellow-rumped Warbler	G5	S5B			H	HR		M					x	x		x		x
	Setophaga virens	Black-throated Green Warbler	G5	S5B			H	HU	Yes	PO	x				x		x			x
	Setophaga fusca	Blackburnian Warbler	G5	S5B			H	HR	Yes	PO		x	x	x					x	
	Setophaga pinus	Pine Warbler	G5	S5B			h	HU	Yes	PO					x	x		x		x
	Setophaga castanea	Bay-breasted Warbler	G5	S5B						M		x	x	x					x	
	Mniotilta varia	Black-and-white Warbler	G5	S5B			h	HU	Yes	PO		x	x	x					x	
	Setophaga ruticilla	American Redstart	G5	S5B			h		Yes	PO					x	x		x		x
	Seiurus aurocapillus	Ovenbird	G5	S4B					Yes	PO		x	x	x					x	
	Parkesia motacilla	Louisiana Waterthrush	G5	S3B	SC	SC	H	HR		PO	x									
	Geothlypis philadelphia	Mourning Warbler	G5	S4B				HU		PO					x	x		x		x
	Geothlypis trichas	Common Yellowthroat	G5	S5B						PO	x	x	x	x	x	x	x	x	x	x
	Piranga olivacea	Scarlet Tanager	G5	S4B			h		Yes	PO	x	x	x	x	x	x	x	x	x	x
	Pipilo erythrophthalmus	Eastern Towhee	G5	S4B			h	HU		PO	x	x	x	x	x	x	x	x	x	x
	Spizella arborea	American Tree Sparrow	G5	S4B						M	x				x		x			
	Spizella passerina	Chipping Sparrow	G5	S5B						PO	x	x	x	x	x	x	x	x	x	x
	Spizella pusilla	Field Sparrow	G5	S4B						SL	x	x	x	x	x	x	x	x	x	x
	Pooecetes gramineus	Vesper Sparrow	G5	S4B			h	HU		SL										x
	Passerculus sandwichensis	Savannah Sparrow	G5	S4B					Yes	PO				x						

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Area Sensitive	Breeding Status	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Melospiza melodia	Song Sparrow	G5	S5B						PO	x	x	x	x	x	x	x	x	x	x
	Melospiza georgiana	Swamp Sparrow	G5	S5B						PO	x				x	x	x	x		x
	Zonotrichia albicollis	White-throated Sparrow	G5	S5B			h	HU		M										x
	Junco hyemalis	Dark-eyed Junco	G5	S5B						M		x	x	x					x	
	Cardinalis cardinalis	Northern Cardinal	G5	S5						PO	x	x	x	x	x	x	x	x	x	x
	Pheucticus ludovicianus	Rose-breasted Grosbeak	G5	S4B						PO	x	x	x	x	x	x	x	x	x	x
	Passerina cyanea	Indigo Bunting	G5	S4B						PO	x	x	x	x	x	x	x	x	x	x
	Dolichonyx oryzivorus	Bobolink	G5	S4B	THR	THR			Yes	SL	x				x	x	x	x		x
	Agelaius phoeniceus	Red-winged Blackbird	G5	S4						PO	x	x	x	x	x	x	x	x	x	x
	Sturnella magna	Eastern Meadowlark	G5	S4B	THR	THR			Yes	SL		x	x	x					x	
	Quiscalus quiscula	Common Grackle	G5	S5B						PO	x	x	x	x	x	x	x	x	x	x
	Molothrus ater	Brown-headed Cowbird	G5	S4B						PO	x	x	x	x	x	x	x	x	x	x
	Icterus spurius	Orchard Oriole	G5	S4B			h	HR		PO		x	x	x	x	x		x	x	x
	Icterus galbula	Baltimore Oriole	G5	S4B						PO	x	x	x	x	x	x	x	x	x	x
	Haemorphous purpureus	Purple Finch	G5	S4B			H	HU		M					x	x		x		x
*	Haemorhous mexicanus	House Finch	G5	SNA						PO	x	x	x	x	x	x	x	x	x	x
	Carduelis tristis	American Goldfinch	G5	S5B						PO	x	x	x	x	x	x	x	x	x	x
*	Passer domesticus	House Sparrow	G5	SNA						PO	x	x	x	x	x	x	x	x	x	x
	Mammal																			
	Blarina brevicauda	Northern Short-tailed Shrew	G5	S5											x	x		x		x
	Sorex fumeus	Smoky Shrew	G5	S5							x				x		x			
	Sylvilagus floridanus	Eastern Cottontail	G5	S5							x	x	x	x	x		x		x	x
	Marmota monax	Groundhog (Woodchuck)	G5	S5								x	x	x					x	x
	Sciurus carolinensis	Eastern Grey Squirrel	G5	S5							x	x	x	x	x	x	x	x	x	x
	Tamias striatus	Eastern Chipmunk	G5	S5							x	x	x	x	x	x	x	x	x	x
	Tamiasciurus hudsonicus	Red Squirrel	G5	S5								x	x	x	x	x		x	x	x
	Castor canadensis	Beaver	G5	S5							x				x		x			
	Microtus pennsylvanicus	Meadow Vole	G5	S5								x	x	x	x	x		x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Area Sensitive	Breeding Status	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Peromyscus leucopus	White-footed Mouse	G5	S5											x	x		x		x
	Zapus hudsonius	Meadow Jumping Mouse	G5	S5											x	x		x		x
	Canis latrans	Coyote	G5	S5								x	x	x					x	
	Vulpes vulpes	Red Fox	G5	S5								x	x	x					x	x
	Procyon lotor	Raccoon	G5	S5							x	x	x	x	x		x		x	x
	Mephitis mephitis	Striped Skunk	G5	S5								x	x	x					x	
	Mustela frenata	Long-tailed Weasel	G5	S4							x				x	x	x	x		x
	Mustela vison	American Mink	G5	S4																x
	Odocoileus virginianus	White-tailed Deer	G5	S5							x	x	x	x	x	x	x	x	x	x
	Amphibian																			
	Notophthalmus viridescens viridescens	Red-spotted Newt	G5T5	S5			h				x				x		x			
	Ambystoma jeffersonianum-laterale	Jefferson/blue-spotted salamander complex	GNA	S2			H	HU			x				x		x			
	Plethodon cinereus	Eastern Red-backed Salamander	G5	S5							x	x	x	x	x	x	x	x	x	x
	Bufo americanus	American Toad	G5	S5							x	x	x	x	x		x		x	
	Hyla versicolor	Gray Treefrog	G5	S5							x	x	x	x	x	x	x	x	x	x
	Pseudacris crucifer	Spring Peeper	G5	S5								x	x	x					x	
	Lithobates catesbeiana	American Bullfrog	G5	S4			h	HU	Yes		x				x		x			
	Lithobates clamitans	Green Frog	G5	S5							x	x	x	x	x	x	x	x	x	x
	Lithobates palustris	Pickerel Frog	G5	S4	NAR		H	HU			x				x		x			
	Lithobates pipiens	Northern Leopard Frog	G5	S5	NAR						x	x	x	x	x		x		x	x
	Lithobates sylvaticus	Wood Frog	G5	S5							x	x	x	x	x	x	x	x	x	x
	Reptile																			
	Chelydra serpentina	Snapping Turtle	G5	S3	SC	SC					x				x		x			
	Chrysemys picta marginata	Midland Painted Turtle	G5T5	S4							x				x		x			
*	Trachemys scripta	Pond Slider	G5	SNA							x				x		x			
	Lampropeltis triangulum	Milksnake	G5	S3	SC	SC					x	x			x		x			
	Storeria dekayi	DeKay's Brownsnake	G5	S5	NAR	NAR					x	x	x	x	x		x		x	

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Area Sensitive	Breeding Status	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Thamnophis sirtalis sirtalis	Eastern Garter Snake	G5T5	S5							x	x	x	x	x	x	x	x	x	x
	Fish																			
	Lepisosteus osseus	Longnose Gar	G5	S4				HR			x				x		x			
*	Osmerus mordax	Rainbow Smelt	G5	S5							x				x		x			
	Amia calva	Bowfin	G5	S4				HR			x				x		x			
*	Alosa pseudoharengus	Alewife	G5	SNA							x				x		x			
	Dorosoma cepedianum	Gizzard Shad	G5	S4				HR			x				x		x			
*	Carassius auratus	Goldfish	G5	SNA							x				x		x			
*	Cyprinus carpio	Common Carp	G5	SNA							x				x		x			
	Hybognathus hankinsoni	Brassy Minnow	G5	S5				HR			x				x		x			
	Notropis atherinoides	Emerald Shiner	G5	S5				HR			x				x		x			
	Notropis cornutus	Common Shiner	G5	S5				HU			x				x		x			
	Notropis heterodon	Blackchin Shiner	G5	S4	NAR			HR			x				x		x			
	Notropis heterolepis	Blacknose Shiner	G4	S5				HR			x				x		x			
	Notropis hudsonius	Spottail Shiner	G5	S5				HR			x				x		x			
	Notropis volucellus	Mimic Shiner	G5	S5				HR			x				x		x			
	Phoxinus eos	Northern Redbelly Dace	G5	S5				HR			x				x		x			
	Phoxinus neogaeus	Finescale Dace	G5	S5				HR			x				x		x			
	Pimephales notatus	Bluntnose Minnow	G5	S5	NAR						x				x		x			
	Pimephales promelas	Fathead Minnow	G5	S5							x	x	x	x	x		x		x	
	Rhinichthys atratulus	Blacknose Dace	G5	S5				HU			x	x	x	x	x		x		x	
	Rhinichthys cataractae	Longnose Dace	G5	S5				HU			x				x		x			
	Semotilus atromaculatus	Creek Chub	G5	S5							x	x	x	x	x		x		x	
	Catostomus commersoni	White Sucker	G5	S5							x				x		x			
	Hypentelium nigricans	Northern Hog Sucker	G5	S4				HU			x				x		x			
	Ameiurus melas	Black Bullhead	G5	S4				HR			x				x		x			
	Ameiurus nebulosus	Brown Bullhead	G5	S5				HR			x				x		x			
	Ictalurus punctatus	Channel Catfish	G5	S4				HR			x				x		x			

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Area Sensitive	Breeding Status	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Noturus flavus	Stonecat	G5	S4				HR			x				x		x			
	Noturus gyrinus	Tadpole Madtom	G5	S4				HR			x				x		x			
	Esox lucius	Northern Pike	G5	S5				HR			x				x		x			
	Umbra limi	Central Mudminnow	G5	S5				HU			x				x		x			
*	Oncorhynchus keta	Chum Salmon	G5	SNA							x				x		x			
*	Oncorhynchus kisutch	Coho Salmon	G4	SNA							x				x		x			
*	Oncorhynchus mykiss	Rainbow Trout	G5	SNA							x				x		x			
*	Oncorhynchus tshawytscha	Chinook Salmon	G5	SNA							x				x		x			
*	Salmo trutta	Brown Trout	G5	SNA							x				x		x			
	Ambloplites rupestris	Rock Bass	G5	S5				HU			x				x		x			
	Lepomis cyanellus	Green Sunfish	G5	S4	NAR			HR			x				x		x			
	Lepomis gibbosus	Pumpkinseed	G5	S5				HU			x				x		x			
	Lepomis macrochirus	Bluegill	G5	S5				HR			x				x		x			
	Micropterus dolomieu	Smallmouth Bass	G5	S5				HR			x				x		x			
	Micropterus salmoides	Largemouth Bass	G5	S5				HU			x				x		x			
*	Morone americana	White Perch	G5	SNA							x				x		x			
	Morone chrysops	White Bass	G5	S4				HR			x				x		x			
	Pomoxis annularis	White Crappie	G5	S4				HR			x				x		x			
	Pomoxis nigromaculatus	Black Crappie	G5	S4				HR			x				x		x			
	Etheostoma caeruleum	Rainbow Darter	G5	S4				HU			x				x		x			
	Etheostoma flabellare	Fantail Darter	G5	S4				HR			x				x		x			
	Etheostoma nigrum	Johnny Darter	G5	S5				HU			x				x		x			
	Perca flavescens	Yellow Perch	G5	S5				HR			x				x		x			
	Percina caprodes	Logperch	G5	S5				HR			x				x		x			
	Aplodinotus grunniens	Freshwater Drum	G5	S5				HR			x				x		x			
*	Neogobius melanostomus	Round Goby	G5	SNA							x				x		x			
	Dragonfly/ Damselfly																			
	Cordulegaster obliqua	Arrowhead Spiketail	G4	S2								x	x	x	x				x	

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Area Sensitive	Breeding Status	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Arigomphus villosipes	Unicorn Clubtail	G5	S2S3				HU			x				x		x			
	Aeshna constricta	Lance-tipped Darner	G5	S5							x	x	x	x	x		x		x	
	Aeshna umbrosa	Shadow Darner	G5	S4				HU			x				x		x			
	Anax junius	Common Green Darner	G5	S5							x	x	x	x	x	x	x	x	x	x
	Epitheca cynosura	Common Baskettail	G5	S5				HU				x	x	x	x				x	
	Celithemis elisa	Calico Pennant	G5	S5							x				x	x	x	x		x
	Celithemis eponina	Halloween Pennant	G5	S4				HR			x				x		x			
	Erythemis simplicicollis	Eastern Pondhawk	G5	S5							x	x	x	x	x		x		x	
	Leucorrhinia intacta	Dot-tailed Whiteface	G5	S5							x		x		x		x			
	Libellula luctuosa	Widow Skimmer	G5	S5								x	x	x	x	x		x	x	x
	Libellula pulchella	Twelve-spotted Skimmer	G5	S5							x	x	x	x	x	x	x	x	x	x
	Pachydiplax longipennis	Blue Dasher	G5	S5							x	x	x	x	x	x	x	x	x	x
	Pantala hymenaea	Spot-winged Glider	G5	S4				HR			x				x		x			
	Perithemis tenera	Eastern Amberwing	G5	S4				HU			x				x		x			
	Plathemis lydia	Common Whitetail	G5	S5							x	x	x	x	x	x	x	x	x	x
	Sympetrum internum	Cherry-faced Meadowhawk	G5	S5							x				x		x			
	Sympetrum obtrusum	White-faced Meadowhawk	G5	S5							x	x	x	x	x		x		x	
	Sympetrum semicinctum	Band-winged Meadowhawk	G5	S4				HU			x	x			x	x	x	x		x
	Sympetrum vicinum	Yellow-legged Meadowhawk	G5	S5				HU			x				x		x			
	Tramea lacerata	Black Saddlebags	G5	S4							x				x	x	x	x		x
	Sympetrum rubicundulum	Ruby Meadowhawk	G5	S5							x				x	x	x	x		x
	Calopteryx maculata	Ebony Jewelwing	G5	S5							x	x			x	x	x	x		x
	Lestes dryas	Emerald Spreadwing	G5	S5							x				x	x	x	x		x
	Lestes rectangularis	Slender Spreadwing	G5	S5							x				x		x			
	Lestes unguiculatus	Lyre-tipped Spreadwing	G5	S5				HU			x				x		x			
	Argia apicalis	Blue-fronted Dancer	G5	S4				HR			x				x	x	x	x		x
	Argia fumipennis violacea	Violet Dancer	G5T5	S5				HU			x				x		x			
	Coenagrion resolutum	Taiga Bluet	G5	S5				HR			x				x		x			

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Area Sensitive	Breeding Status	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Enallagma annexum	Northern Bluet	G5	S4				HR							x	x		x		x
	Enallagma boreale	Boreal Bluet	G5	S5				HR												x
	Enallagma civil	Familiar Bluet	G5	S5							x	x	x	x	x	x	x	x	x	x
	Enallagma ebrium	Marsh Bluet	G5	S5							x				x		x			
	Enallagma exsulans	Stream Bluet	G5	S5				HR			x				x		x			
	Enallagma geminatum	Skimming Bluet	G5	S4				HR			x				x		x			
	Enallagma signatum	Orange Bluet	G5	S4				HR			x				x		x			
	Ischnura posita	Fragile Forktail	G5	S4				HR				x	x	x	x	x		x	x	x
	Ischnura verticalis	Eastern Forktail	G5	S5							x		x		x	x	x	x		x
	Nehalennia irene	Sedge Sprite	G5	S5				HU				x	x	x	x				x	
	Butterfly/ Moth																			
	Anatrytone logan	Delaware Skipper	G5	S4											x	x		x		x
	Ancyloxypha numitor	Least Skipper	G5	S5								x	x	x	x	x		x	x	x
	Epargyreus clarus	Silver-spotted Skipper	G5	S4							x	x	x	x	x	x	x	x	x	x
	Erynnis baptisiae	Wild Indigo Duskywing	G5	S4				HR				x	x	x	x				x	
	Erynnis juvenalis	Juvenal's Duskywing	G5	S5							x	x	x	x	x	x	x	x	x	x
	Erynnis lucilius	Columbine Duskywing	G4	S4				HR				x	x	x	x	x		x	x	x
	Erynnis martialis	Mottled Duskywing	G3	S2	END	END						x	x	x					x	
	Euphyes vestris	Dun Skipper	G5	S5							x	x	x	x	x		x		x	
	Pholisora catullus	Common Sootywing	G5	S4				HR				x	x	x	x				x	
	Poanes hobomok	Hobomok Skipper	G5	S5								x	x	x	x	x		x	x	x
	Polites mystic	Long Dash Skipper	G5	S5							x				x	x	x	x		x
	Polites peckius	Peck's Skipper	G5	S5								x	x	x	x	x		x	x	x
	Polites themistocles	Tawny-edged Skipper	G5	S5								x	x	x	x	x		x	x	x
	Pompeius verna	Little Glassywing	G5	S4							x	x			x		x			
	Thorybes pylades	Northern Cloudywing	G5	S5								x	x	x	x	x		x	x	x
	Thymelicus lineola	European Skipper	G5	SNA							x	x	x	x	x	x	x	x	x	x
	Wallengrenia egeremet	Northern Broken-Dash	G5	S5							x	x	x	x	x	x	x	x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Area Sensitive	Breeding Status	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Papilio cresphontes	Giant Swallowtail	G5	S4								x	x	x	x				x	
	Papilio glaucus	Eastern Tiger Swallowtail	G5	S5								x	x	x	x	x		x	x	x
	Papilio polyxenes	Black Swallowtail	G5	S5								x	x	x	x	x		x	x	x
	Papilio troilus	Spicebush Swallowtail	G4?	S4				HR							x	x		x		x
	Colias eurytheme	Orange Sulphur	G5	S5							x	x	x	x	x	x	x	x	x	x
	Colias philodice	Clouded Sulphur	G5	S5							x	x	x	x	x	x	x	x	x	x
*	Pieris rapae	Cabbage White	G5	SNA							x	x	x	x	x	x	x	x	x	x
	Celastrina ladon	Spring Azure	G4G5	SU							x				x		x			
	Celastrina neglecta	Summer Azure	G5	S5							x	x	x	x	x		x		x	
	Cupido (Everes) comyntas	Eastern Tailed Blue	G5	S5								x	x	x	x				x	
	Glaucopsyche lygdamus	Silvery Blue	G5	S5								x	x	x	x	x		x	x	x
	Satyrium calanus	Banded Hairstreak	G5	S4							x	x			x	x	x	x		x
	Satyrium caryaevorus	Hickory Hairstreak	G4	S4							x	x			x		x			
	Satyrium liparops	Striped Hairstreak	G5	S5								x	x	x	x	x		x	x	x
	Satyrium titus	Coral Hairstreak	G4G5	S5				HU							x	x		x		x
	Cercyonis pegala	Common Wood-Nymph	G5	S5							x	x	x	x	x	x	x	x	x	x
	Chlosyne nycteis	Silvery Checkerspot	G5	S5				HU				x	x	x					x	
	Coenonympha tullia	Common Ringlet	G5	S5								x	x	x	x	x		x	x	x
	Danaus plexippus	Monarch	G5	S2N,S4B	SC	SC						x	x	x	x	x		x	x	x
	Enodia anthedon	Northern Pearly-Eye	G5	S5							x	x	x	x	x		x		x	
	Limenitis archippus	Viceroy	G5	S5											x	x		x		x
	Limenitis arthemis astyanax	Red-spotted Purple	G5T5	S5								x	x	x	x	x		x	x	x
	Megisto cymela	Little Wood-Satyr	G5	S5							x	x	x	x	x	x	x	x	x	x
	Nymphalis antiopa	Mourning Cloak	G5	S5							x	x	x	x	x	x	x	x	x	x
	Phyciodes cocyta	Northern Crescent	G5	S5							x	x	x	x	x		x		x	
	Phyciodes tharos	Pearl Crescent	G5	S4							x	x	x	x	x	x	x	x	x	x
	Polygonia comma	Eastern Comma	G5	S5							x				x		x			
	Polygonia interrogationis	Question Mark	G5	S5							x	x	x	x	x	x	x	x	x	x

	Scientific Name	Common Name	GRank	SRank	COSEWIC	ESA	Hamilton NAI	Halton NAI	Area Sensitive	Breeding Status	Bonta	CW1	CW2	CW3	GC1	GC2	Holland	Johnson	Little	Smokey Hollow
	Speyeria cybele	Great Spangled Fritillary	G5	S5								x	x	x	x	x		x	x	x
	Vanessa atalanta	Red Admiral	G5	S5							x	x	x	x	x		x		x	
	Vanessa cardui	Painted Lady	G5	S5								x	x	x	x				x	
	Vanessa virginiensis	American Lady	G5	S5								x	x	x	x	x		x	x	x

Appendix 8: Summary of Management Issues and Preliminary Opportunities

Appendix 8. Summary of management issues and preliminary opportunities at Clappison-Grindstone Heritage Lands

Clappison-Grindstone Heritage Lands													
MANAGEMENT ISSUE	**DESCRIPTION OF OPPORTUNITY/ISSUE**	**MANAGEMENT RECOMMENDATION**	**MANAGEMENT PRIORITY**	**Clappison Woods 1**	**Clappison Woods 2**	**Clappison Woods 3**	**Little**	**Grindstone Greek 1**	**Grindstone Creek 2**	**Holland Nature Sanctuary**	**Bonta**	**Johnson Easement**	**Smokey Hollow**	**NOTES**
Issues Pertaining to Current EcoPark Lands and Stewardship Lands														
Overarching Cootes to Escarpment EcoPark System Management Issues														
Cootes to Escarpment EcoPark System Identity Issue	• no way of knowing when you are in the EcoPark System or out of it • there are a few signs posted to indicate that you are entering or are in the EcoPark System • Burlington will be adding more signs in their parks this summer • system identity is important for raising the profile of the EcoPark System, increasing public awareness, branding, usership, funding • roads/access/trailhead issue; consistent signage throughout the Cootes to Escarpment EcoPark System	• consistent signage throughout the EcoPark System • promoting a higher profile in the community • consistent recognition in all partner documentation		x	x	x	x	x	x	x	x	x	x	
Partner-Owned Boundary Identification	• natural areas extend beyond partner-owned land holdings and trail networks appear to extend between privately owned and Current EcoPark Lands • as a user, it is difficult to know if you are on public versus private lands, and whether or not access is permitted on privately-owned lands • posting of “No Trespassing” signs	• consistent signage throughout the EcoPark System • consistent boundary delineation for all Current EcoPark Lands • all partners commit to consistently showing/mapping boundaries of EcoPark System		x	x	x	x	x	x	x	x	x	x	
Relative Isolation of some Current EcoPark Lands	• limited ecological and recreational linkage between some of the Current EcoPark Lands in the landscape	• continue pursuing acquisition of Stewardship Lands • continue pursuing stewardship initiatives on intervening lands				x	x	x	x					
Wildlife Crossing	• wildlife crossing issue noted along Waterdown Road (wildlife movement between Sassafras Woods and the Grindstone Creek Valley) • likely also an issue along Snake Road • monitoring • rail tracks			x	x	x	x	x	x	x	x	x	x	

Clappison-Grindstone Heritage Lands													
MANAGEMENT ISSUE	**DESCRIPTION OF OPPORTUNITY/ISSUE**	**MANAGEMENT RECOMMENDATION**	**MANAGEMENT PRIORITY**	**Clappison Woods 1**	**Clappison Woods 2**	**Clappison Woods 3**	**Little**	**Grindstone Greek 1**	**Grindstone Creek 2**	**Holland Nature Sanctuary**	**Bonta**	**Johnson Easement**	**Smokey Hollow**	**NOTES**
Lack of Uniform Set of Rules for EcoPark System	• partners all have different policies • users generally do not know what the rules are, or who owns the land they are on • a unified set of rules may be part of building the EcoPark System's identity • membership fees – partners have differences; relationship building with community • target MB and dog-walking communities	• identify similarities, differences		x	x	x	x	x	x	x	x	x	x	
Uses on Adjacent Lands														
CN Rail Line	• multiple informal crossings and walking along tracks • trails cross over and dead end on CN Rail Line • in cases where trails dead end, users likely walk along the tracks • safety and liability issue	• formalize one crossing with CN • Discourage access • Engage in conversation regarding formalizing at-grade crossing		x										
Utility Corridors	• several utility corridors pass through Clappison-Grindstone • informal single foot track hiking • hydro corridors require routine maintenance to maintain vegetation • hydro corridors in Clappison Woods and Grindstone provide habitat for several SAR, which could potentially be impacted during routine maintenance; can be a beneficial practice (sometimes intentional sometimes not) • corridors for access (good and bad) • hydro corridors also rife with invasive species, especially DSV	• sanction low key trail use • issue of taxes associated with secondary uses (could include ATV use)		x		x		x	x	x	x	x		
Municipal Roads/Hwy 6	• barriers to wildlife movement, recreation connectivity • potential for safety issues associated with recreational uses/access (e.g. conflicts between vehicles and bicycles) • lack of safe parking options on Snake Road/access to natural areas	• further study to enhance safe use/crossing within ROWs				x	x							
Unopened Road Allowances	• extension of Flatt Road; extension of Mountain Brow Road • public lands • unifying access								x	x		x		
Cats/Domestic Pets	• cats are proficient predators and have a very significant impact on wildlife populations			x	x	x	x	x	x	x	x	x	x	
Residential Uses	• e.g., Rockcliffe neighbourhood in Waterdown and others in close proximity to Current EcoPark Lands • see also Encroachment from Adjacent Lands	• ongoing support of stewardship initiatives with adjacent landowners		x	x	x	x	x	x		x	x		
Issues Inside Current EcoPark Lands														

Clappison-Grindstone Heritage Lands														
MANAGEMENT ISSUE	**DESCRIPTION OF OPPORTUNITY/ISSUE**	**MANAGEMENT RECOMMENDATION**	**MANAGEMENT PRIORITY**	**Clappison Woods 1**	**Clappison Woods 2**	**Clappison Woods 3**	**Little**	**Grindstone Greek 1**	**Grindstone Creek 2**	**Holland Nature Sanctuary**	**Bonta**	**Johnson Easement**	**Smokey Hollow**	**NOTES**
Trails														
Duplication of Trails	• duplication of trails exacerbates the trampling of ground flora, compaction and exposure of tree roots, and spread of invasive species • duplication appears to largely be a result of mountain biking activity • extreme duplication of trails appears to be a fairly localized management issue	• formalization selection of existing unsanctioned trails • re-routing some trails to less sensitive areas • improved access throughout • closure of some unsanctioned trails to improve safety and mitigate environmental impact		x				x	x		x	x	x	• duplication of trails extensive in some parts of Clappison Woods
Density of Trails	• some areas have a very high density of trails, which causes issues of trampling, compaction, loss of ground flora/regeneration			x										
Water on Trails/Ponding	• indicator of poor trail design • causes erosion, trail widening			x	x		x	x	x		x	x	x	
Erosion on or near Trails	• erosion on or near trails was noted occasionally on slopes and near watercourses • sometimes associated with seepages • local improvements (sanctioned or unsanctioned) have often been undertaken to resolve trail erosion issues (e.g., bridges, boardwalks, placement of logs, slope stabilization measures)	• remove and replace/relocate with properly designed structure specific to the local drainage pattern and sensitivity to the environment • build awareness of impacts of developing unsanctioned structures		x	x		x	x	x		x	x	x	• locations with water on trail/need for boardwalk
Unsanctioned Improvements	• unsanctioned trail improvements (placing stepping stones and boardwalks in wet areas, clearing brush and cutting deadfall over trails, etc.) were noted mostly on unsanctioned trails • self-organized groups taking on invasive species management and building trails and structures • separate unsanctioned from user group-based activities	• not necessarily an issue • need to connect and coordinate with those making these unsanctioned trail improvements • two-way awareness building		x										
Commemorative Opportunities	• commemorative opportunities and integration into the trail system			x			x	x	x	x	x	x	x	
Hiking														

Clappison-Grindstone Heritage Lands														
MANAGEMENT ISSUE	**DESCRIPTION OF OPPORTUNITY/ISSUE**	**MANAGEMENT RECOMMENDATION**	**MANAGEMENT PRIORITY**	**Clappison Woods 1**	**Clappison Woods 2**	**Clappison Woods 3**	**Little**	**Grindstone Greek 1**	**Grindstone Creek 2**	**Holland Nature Sanctuary**	**Bonta**	**Johnson Easement**	**Smokey Hollow**	**NOTES**
Overuse of Trails	• many trails appear to be very well used and worn • in some areas, tree roots are exposed in part due to trail use • some unsanctioned trails branch off larger sanctioned trails, leading to trail duplication and deterioration of ecosystem health/biodiversity through unnecessary impact • garbage was very occasionally noted along trails • managing/locating garbage bins is difficult	• undertake a systematic approach to trail management planning • develop a hierarchy to develop a system of trail types, design principles and appropriate uses		x										
Off-leash Dogs	• hikers are sometimes accompanied by off-leash dogs • off-leash dogs impact wildlife by disturbing ground-nesting birds, chasing mammals (white-tailed deer, squirrels, ducks, etc.), spreading invasive species, and damaging/trampling sensitive ground flora and wildlife habitat • dog urine in nesting and sensitive wildlife habitats "marks" the territory and makes it undesirable or uninhabitable to the wildlife living there • off-leash dogs extend the zone of impact that surrounds a trail considerably	• sign post leashed areas and enforce and/or promote casual enforcement with reporting stations and online digital 'user police' initiatives		x	x		x	x	x		x	x	x	
Bicycle Use														
Use of Trails	• multiplicity of uses on many trails • causes impacts to soil (erosion), animals, plants, tree roots, soil organisms, resulting in ecosystem degradation • habitat destruction, displacement of soil, noise • speed, distance travelled, increase in number of visitors that bikes allow, increased trail-building all factor into extent of impact • manner of riding (skidding, braking, acceleration, turning, etc.) and tire tread type influence degree of impact • also, impacts to other users include loss of feelings of safety, loss of natural setting feeling • different types of bike use (families, versus technical riding, etc.); describe range of bike use • off trail use: ride down creeks in low base flow	• develop hierarchy of trail uses		x	x		x	x	x		x	x	x	

Clappison-Grindstone Heritage Lands														
MANAGEMENT ISSUE	**DESCRIPTION OF OPPORTUNITY/ISSUE**	**MANAGEMENT RECOMMENDATION**	**MANAGEMENT PRIORITY**	**Clappison Woods 1**	**Clappison Woods 2**	**Clappison Woods 3**	**Little**	**Grindstone Greek 1**	**Grindstone Creek 2**	**Holland Nature Sanctuary**	**Bonta**	**Johnson Easement**	**Smokey Hollow**	**NOTES**
Overuse of Trails	• only in specific concentrated areas • impacts listed above become exacerbated through overuse of trails • ecological tipping points, shifting an ecosystem to a new state (significant changes to biodiversity and the services to people it underpins) • changes are long-lasting and hard to reverse • can be a significant time lag between the pressures driving the change and the appearance of impacts, making management difficult	• develop site specific management protocols that address overuse		x										
Mountain Biking/BMX Structures/Trail Modification	• presence of old decaying bike structures (i.e., rails, pump tracks and jumps) • presence of maintained bridge crossings and retaining wall structures (especially in Clappison Woods 1 area) • intense concentration of impacts • safety and liability issues • conflicts between and among user groups (e.g., mountain biking community, hiking, etc.)	• dismantle old structures and leave rotted timber scattered in the forest • work with user group to develop strategic plan for appropriate use and management of cycling uses		x	x		x	x	x		x	x	x	• ramps, embankments, jumps
Winter Bike Use	• use snowmobile trails • hikers sometimes mess up trails in early spring / conflict in use			x	x		x	x	x		x	x	x	
Motorized Vehicle Use														
Trail Use	• ATV use noted off the end of Hidden Valley Road and into the Grindstone Creek Valley system • noted on Current EcoPark Lands and Stewardship Lands in the EcoPark System • dirt bikes and snowmobiles • hydro corridor south of Clappison Woods historically used by ATVs • snowmobiles use pipeline easements in winter • ATV use on pipeline in CW1, and hydro line south of CW1	• assess impacts on specific use areas and promote or relocate if popular in the ATV community • setting specific management protocols, monitoring and reporting framework that must be met in order to remain an active use		x				x						• noted signs posted prohibiting ATV use
Off-trail Use	• ATVs, snowmobiles, dirt bikes • Motorized vehicle use extends off trails into natural areas, causing impacts to vegetation and wildlife, safety, erosion, etc.							x						
Other Recreational Uses														

Clappison-Grindstone Heritage Lands															
MANAGEMENT ISSUE	**DESCRIPTION OF OPPORTUNITY/ISSUE**	**MANAGEMENT RECOMMENDATION**	**MANAGEMENT PRIORITY**	**Clappison Woods 1**	**Clappison Woods 2**	**Clappison Woods 3**	**Little**	**Grindstone Greek 1**	**Grindstone Creek 2**	**Holland Nature Sanctuary**	**Bonta**	**Johnson Easement**	**Smokey Hollow**	**NOTES**
Fishing	• fishing activities occur occasionally within the creek systems • lures and fishing line can sometimes be found in streams • small side trails occasionally branch off of a main trail to provide anglers with access to a watercourse • out of season fishing issues • too many log jams/pike get stuck	• develop clear set of management protocols rooted in regulation and enforcement						x	x					• fishing mostly associated with Grindstone Creek
Geocaching/Orienteering	• this activity is largely participant-created and run with little oversight for monitoring and control • caches are often placed off-trail and often in environmentally-sensitive areas • garbage left behind “cache in trash out” • expands off-trail use • there is an active geocaching community in the area but there are no real management concerns • orienteering tends to go off trail; would like to do permitting for this use • geocache locations should be checked with CH first; by in large are (geocache will not publish until they see a permit from CH first)	• make use official within the management plan as basis for inclusion in education and communications programming		x	x	x	x	x	x		x	x	x	
Adventure Racing	• higher impact on trails than hiking • some race courses extend beyond trails			x	x			x	x		x		x	
Bow Hunting	• bow hunting for deer occurs in Clappison Woods and Grindstone Creek Valley (according to some mountain bikers) • incompatible use, safety/liability issue	• low level use • no management response needed						x						
Marijuana Grow-ops	• grow ups; incompatible with SAR (especially American Columbo) in hydro-cuts													
Picnicking	• in CW1 – picnic table			x										
Tobogganing	• in CW1			x										
Invasive Species														

Clappison-Grindstone Heritage Lands													
MANAGEMENT ISSUE	**DESCRIPTION OF OPPORTUNITY/ISSUE**	**MANAGEMENT RECOMMENDATION**	**MANAGEMENT PRIORITY**	**Clappison Woods 1**	**Clappison Woods 2**	**Clappison Woods 3**	**Little**	**Grindstone Greek 1**	**Grindstone Creek 2**	**Holland Nature Sanctuary**	**Bonta**	**Johnson Easement**	**Smokey Hollow**	**NOTES**
Garlic Mustard	• can displace native plants • reduces biodiversity and wildlife habitat • threatens several species at risk • known allelopathic effects • interferes with growth of fungi and nutrient uptake of other plants	• pull plants before seeds develop • fall digging of rosettes can also be effective • mowing can deplete seed bank • spray 1-6% glyphosate just before flowering in early spring, but may require at least 5 years of treatment • controlled burns may be considered in large monocultures		x	x	x	x	x	x	x	x	x	x	• species, extent, severity, estimated population size
Dog-strangling Vine	• transforms healthy forest into open woodland • strangles vegetation and prevents forest regeneration • can interfere with recreational activities • increases grazing pressure on native plants • threatens Monarch, a species at risk	• mechanical control generally ineffective • spray 1-6% glyphosate in flowering season, performing multiple passes • Arsenal® (imazapyr) also recommended but may kill nearby trees • trials underway with several insect species		x	x	x	x	x	x	x	x	x	x	• DSV widespread in hydro corridor in Clappison Woods
English Ivy	• forms dense mats through spread by rhizomes • outcompetes native vegetation			x	x	x	x	x				x	x	
Periwinkle	• forms dense mats through spread by rhizomes • outcompetes native vegetation	• tarp small areas • spray 1-6% glyphosate June to August, multiple passes necessary for full eradication		x	x	x	x	x				x	x	
Himalayan Balsam	• can completely cover an area and crowd out native vegetation • prolific nectar producer, drawing pollinators away from surrounding native species • an annual species that can aggressively replace native perennial plants along river banks, leading to soil erosion • pesticides applied to treat population at Clappison Woods			x				x						
Japanese Knotweed	• present in Clappison Woods 1 • seriously damages houses, buildings, hard surfaces and infrastructure growing through concrete, tarmac and other hard surfaces • threatens native plants and animals by forming dense thickets • block routes used by wildlife to disperse • in riparian settings, damages flood defence structures and reduces the capacity of channels to carry flood water			x				x						

Clappison-Grindstone Heritage Lands														
MANAGEMENT ISSUE	DESCRIPTION OF OPPORTUNITY/ISSUE	MANAGEMENT RECOMMENDATION	MANAGEMENT PRIORITY	Clappison Woods 1	Clappison Woods 2	Clappison Woods 3	Little	Grindstone Greek 1	Grindstone Creek 2	Holland Nature Sanctuary	Bonta	Johnson Easement	Smokey Hollow	NOTES
Phragmites	• forms dense monocultures, choking out all other vegetation • difficult to manage populations, requiring a lot of resources • small patches found in ponds at Old Quarry							x						
Purple Loosestrife	• generally well-controlled by Purple Loosestrife beetle • small pockets found in wetland vegetation fringe around ponds at Old Quarry and in other small low-lying areas throughout the heritage lands			x				x						
White Mulberry	• hybridizes with native Red Mulberry • readily spread by birds you disperse seeds after eating mulberries			x	x	x	x	x	x	x	x	x	x	
Common Buckthorn	• forms dense thickets that crowd and shade out native plants • it can alter nitrogen levels in the soil, creating better conditions for its own growth and discouraging the growth of native species • it produces large numbers of seeds that germinate quickly and prevent the natural growth of native trees and shrubs	• small specimens can be pulled out of moist soils and larger plants can be dug or pulled out using a weed wrench tool, re-sprouting can occur unless all roots are removed or chemical control is used • cutting should be following up with an application of 1-6% glyphosate to ensure that re-sprouting does not occur		x	x	x	x	x	x	x	x	x	x	
Non-native Honeysuckles	• rapidly forms dense thickets • rapidly colonizes forest ecosystems, reducing biodiversity and degrading habitat • hybridize with native relatives • allelopathic effect, which inhibits forest regeneration	• small specimens can be pulled out of soft sand or moist ground • spray foliage summer-early fall with 1-6% glyphosate • cut and treat individual stumps with 0.33mL of concentrated glyphosate per 5cm dbh • Amitrol 240 (triazole) also recommended in control		x	x	x	x	x	x	x	x	x	x	

Clappison-Grindstone Heritage Lands														
MANAGEMENT ISSUE	DESCRIPTION OF OPPORTUNITY/ISSUE	MANAGEMENT RECOMMENDATION	MANAGEMENT PRIORITY	Clappison Woods 1	Clappison Woods 2	Clappison Woods 3	Little	Grindstone Greek 1	Grindstone Creek 2	Holland Nature Sanctuary	Bonta	Johnson Easement	Smokey Hollow	NOTES
Multiflora Rose	• forms impenetrable thickets that exclude native plant species • readily invades open woodlands, forest edges, successional fields, savannahs and prairies that have been disturbed • prevalent in some areas of Clappison Woods			x	x	x	x	x	x	x	x	x	x	
Japanese Barberry	• forms dense thickets that reduce wildlife habitat, affect native plants and restrict recreational activities along trails • dense growth shades out native species in the forest understory • capable of invading undisturbed forests			x	x	x		x	x		x	x	x	
Norway Maple	• form dense forest canopy that shades out most other species • seedlings can form a thick mat on the forest floor that will further limit regeneration of other native trees and shrubs • forest floor vegetation becomes more scarce, exposing bare soil and leading to increased erosion			x				x						
Manitoba Maple	• aggressive growth dominates a site to exclude all other species, and remains dominant on the site indefinitely in the absence of management • aggressively invades almost all habitat types			x	x	x	x	x	x	x	x	x	x	
Black Locust	• spreads clonally as well as by seed • dense thickets shade out native vegetation • leaf litter has a higher nitrogen concentration than most native tree species • in low nutrient habitats, excess nitrogen can facilitate invasion by weedy, nitrogen-loving non-natives, which can slow and sometimes alter patterns of succession			x				x					x	

Clappison-Grindstone Heritage Lands														
MANAGEMENT ISSUE	**DESCRIPTION OF OPPORTUNITY/ISSUE**	**MANAGEMENT RECOMMENDATION**	**MANAGEMENT PRIORITY**	**Clappison Woods 1**	**Clappison Woods 2**	**Clappison Woods 3**	**Little**	**Grindstone Greek 1**	**Grindstone Creek 2**	**Holland Nature Sanctuary**	**Bonta**	**Johnson Easement**	**Smokey Hollow**	**NOTES**
Gypsy Moth	• sprayed 5-6 years ago: Cootes Paradise to Oakville (aerial spray operation) – North Aldershot area • see LEMP report for details			x	x	x	x	x	x	x	x	x	x	
Ecological Management Issues														
Management of SAR Habitat and Habitat of Rare Species	• habitat for SAR and rare species is present within the Clappison-Grindstone Heritage Lands • some habitats (e.g., open woodlands) require specific disturbance regimes to maintain their character • since certain disturbance regimes (e.g., fire) are supressed, other forms of management to maintain the open character of these habitats is necessary in order to maintain the species assemblages that rely on them			x			x	x	x	x	x	x	x	• especially open woodland
Ecosystem Restoration	• many ecosystems have undergone significant degradation which has had a negative impacts on biological diversity • ecosystem restoration is a fundamental element of ecosystem management • restoration of treed and open (meadow) habitats • restoration of plantations	• ecosystem level approach • recommend a study to determine ecological priorities and specify management needs • oak woodland and kettle wetland restoration on tableland between two ravines at Holland Nature Sanctuary		x	x	x	x	x	x	x	x	x	x	
Convert Sod to Natural Vegetation	• areas of sod were noted on the slope near the parking lot at Smokey Hollow • small areas of sod were noted at the edges of Clappison Woods 1			x									x	

Clappison-Grindstone Heritage Lands														
MANAGEMENT ISSUE	DESCRIPTION OF OPPORTUNITY/ISSUE	MANAGEMENT RECOMMENDATION	MANAGEMENT PRIORITY	Clappison Woods 1	Clappison Woods 2	Clappison Woods 3	Little	Grindstone Greek 1	Grindstone Creek 2	Holland Nature Sanctuary	Bonta	Johnson Easement	Smokey Hollow	NOTES
Invasive Species Management	• invasive species were noted throughout Clappison-Grindstone • Invasive species presence, extent and severity differed through, with some areas only minimally impact while others extensively impacted	• prepare an invasive species management plan • develop early detection and rapid response (EDRR) protocols where invasion not advanced • develop clear action plan to approach invaded areas • include native restoration replanting program and repeat management • map invasive species populations and set priorities • develop monitoring and reporting program • highest priority for managing Giant Hogweed		x	x	x	x	x	x	x	x	x	x	
Blowdowns/Lightning Strikes	• area (approximately 20m x 30m) in Grindstone Creek valley where mature trees have fallen over • unclear of the cause: possibly lightning strike (burned root flare noted in field)	• reforestation and control of weedy, invasive species		x				x						
Ash Tree Death and Dieback	• white ash and green ash are common associated species within the forests in Clappison-Grindstone • emerald ash borer is causing ash tree death and dieback • dead/dying ash trees can become hazardous if along a trail, forest edge • management effort is one-off, and resource intensive in infested areas • “surgical” extraction of infested trees required in difficult to access environments • requires disposal plan of dead trees removed • ash not a big component of woodlands in these areas • some big ash; could be good candidates for treatment	• tie to existing local municipal or regional Emerald Ash Borer Management Plan • if not too advanced, develop EAB plan with immediate action plan		x	x	x	x	x	x	x	x	x	x	
Earthworm Invasion	• non-native earthworms are changing soil conditions and impacting forest health			x	x	x	x	x	x	x	x	x	x	

Clappison-Grindstone Heritage Lands														
MANAGEMENT ISSUE	**DESCRIPTION OF OPPORTUNITY/ISSUE**	**MANAGEMENT RECOMMENDATION**	**MANAGEMENT PRIORITY**	**Clappison Woods 1**	**Clappison Woods 2**	**Clappison Woods 3**	**Little**	**Grindstone Greek 1**	**Grindstone Creek 2**	**Holland Nature Sanctuary**	**Bonta**	**Johnson Easement**	**Smokey Hollow**	**NOTES**
Need for Interpretation	• some ecological and recreational issues require interpretation to educate users of issues (invasive species, restoration activities, mountain biking structures, trail closures, etc.) • gathering spots (more than just signage) • benches • Land Ownership – heritage – e.g. Black Family • Dedication opportunities (funding source, revenue)			x	x		x	x	x	x	x	x	x	
Oak Decline	• due to lack of management (mostly related to Red Oak) • area off Snake Rd • need for hazard tree management			x				x	x	x	x	x	x	
Encroachment from Adjacent Lands														
Yard Waste Dumping	• clippings and brush dumped into natural setting behind properties • smothers vegetation and can introduce invasive species • can inhibit forest regeneration	• prepare homeowner education package • could tie into taxes/by-laws		x					x	x	x	x	x	
Structures (e.g., picnic tables, lounge chairs, composters)	• discarded refuse and litter dumped near trails • some adjacent landowners place structures beyond their property boundaries, within Current EcoPark Lands • further extends edge impacts • removes/tramples natural vegetation • potential impacts to wildlife habitat	• develop stewardship program to modify behaviour		x									x	
Yard Extension (e.g., mowing, flower beds)	• some adjacent landowners extend their yards by mowing portions of and/or installing flower beds within Current EcoPark Lands • extend perceived land ownership and add utility to property by mowing and planting back into natural area	• municipal by-law and enforcement • legal survey and mapping		x										
Swimming Pool Drainage	• several areas of erosion were noted within the Grindstone Creek system that could potentially be associated with swimming pool drainage • overtime, eroded gullies can form, which can cause tree failure • impacts to water quality	• education						x						
Tree Cutting/Topping	• to maintain views • plantation and cutting of Black Walnut for financial gain	• fine perpetrators • education						x						
Personal Trails	• gates • access to natural areas from backyards			x										

Clappison-Grindstone Heritage Lands														
MANAGEMENT ISSUE	**DESCRIPTION OF OPPORTUNITY/ISSUE**	**MANAGEMENT RECOMMENDATION**	**MANAGEMENT PRIORITY**	**Clappison Woods 1**	**Clappison Woods 2**	**Clappison Woods 3**	**Little**	**Grindstone Greek 1**	**Grindstone Creek 2**	**Holland Nature Sanctuary**	**Bonta**	**Johnson Easement**	**Smokey Hollow**	**NOTES**
Safety Issues														
Hazard Tree Management	• hazardous trees were occasionally noted along trails and adjacent to privately owned lands • some associated with EAB and others • broken branches, destabilization of trees, exposed roots • susceptibility of non-native trees to disease and structural (tree) failure • this is a safety and liability issue	• develop tree hazard abatement program • education • active tree management		x	x	x	x	x	x	x	x	x	x	• related to death and dieback of ash trees
Safe Access and Parking	• general issue with lack of access • limited parking available in Rockcliffe lot and on Snake Road • some park behind RONA/Walmart to access and off Hidden Valley Road • top end of Lemonville Road • poor sightlines for motorists in relation to roadside parking • safety issue and lack of access could hinder use • safe crossing of roads and rails	• conduct traffic counts and survey to determine use patterns and potential risks • report incidences of conflict/accidents • develop safe parking and crossings where data suggests		x								x	x	
Noxious Weeds	• e.g., Poison Ivy, Giant Hogweed, Wild Parsnip • poses danger to EcoPark System users (skin rashes, etc.)	• invasive species management plan		x	x	x	x	x	x	x	x	x	x	• Giant Hogweed was not noted, but could be introduced
Infrastructure Issues														
Parking	• see safe access and parking above • general need for more parking • need to formalize parking behind RONA/Walmart • pull off parking bays and on-road parking with poor sightlines • multi-partner	• monitor level of use • conduct risk assessment and implement vehicular access and parking strategy in future • suggestions for areas to investigate		x	x			x	x		x	x	x	
Trail Access	• see safe access and parking above • informal in all cases • no clear indication of where to enter and what you are entering • evident desire to access the EcoPark System at end of Hidden Valley Road • multi-partner	• study patterns of access and develop hierarchy of access types • close access points that contradict with natural heritage values or where risk to public safety is unreasonable		x	x	x	x	x	x	x	x	x	x	
Trail Surface	• mostly earthen trails, a few areas with screening • erosion/sloughing of granular in places • formation of rivulets • improper surface for use • may not need to include this one; partner-level	• study use patterns • determine surfacing based on type of use allowed (hierarchy) and frequency		x	x	x	x	x	x	x	x	x	x	

Clappison-Grindstone Heritage Lands														
MANAGEMENT ISSUE	**DESCRIPTION OF OPPORTUNITY/ISSUE**	**MANAGEMENT RECOMMENDATION**	**MANAGEMENT PRIORITY**	**Clappison Woods 1**	**Clappison Woods 2**	**Clappison Woods 3**	**Little**	**Grindstone Greek 1**	**Grindstone Creek 2**	**Holland Nature Sanctuary**	**Bonta**	**Johnson Easement**	**Smokey Hollow**	**NOTES**
Bridges and Boardwalks	• BTC has constructed several bridges and boardwalks along the BT in Clappison-Grindstone • all BTC structures appeared to be in good condition • unsanctioned crossings, drainage improvements and retaining structures • may not need to include; partner-level	• remove and replace or relocate with properly designed structure specific to the local drainage patter and sensitivity to the environment • build awareness of impacts in developing unsanctioned structures		x	x	x	x	x	x	x	x	x	x	
Other Activities														
Party Spots, Fire pits, Rope Swings	• evidence of camping, garbage and/or vandalism present • dumping of litter, large soil-compacted areas, unsanctioned seating and burning of brush	• restore sites where in conflict with natural setting • formalize other sites into small group gathering sites • prohibit fires with signage and enforcement		x										
Unsanctioned Access Points	• related to lack of access • development of multiple access points, including some over private properties • at end of Hidden Valley Road • behind RONA/Walmart	• assess all access points and linkages • evaluate most important and formalize these • close all others • use bio-sensitive techniques to close and monitor		x	x			x					x	
Trespassing on Adjacent Private Property	• related to issue of partner-owned boundary identification • signs posted for “no trespassing” • can lead to angry/frustrated landowners • trail creation on private lands as a result of unclear demarcation of property lines • crossing rail road ROWs etc.	• conduct boundary survey using an Ontario Land Surveyor		x	x			x	x		x	x	x	
Other Management Issues														
Dumping	• old tires, stoves, building materials, etc. dumped within edge of natural area or down into ravines • tire pile in ravine at Holland Property • old stoves in Grindstone Creek ravine • dumping of beer bottles, etc. also noted in several areas • clinical waste issue/sanitary issue			x	x	x	x	x	x	x	x	x	x	
Erosion	• see Swimming Pool Drainage • erosion noted at the outfall of the SWM Ponds in Clappison Woods 2 • natural drainage pattern altered by presence of trails and construction of unsanctioned drainage conveyance features	• remove and restore unsanctioned features • address drainage across trails that are to remain		x	x			x	x			x		• cause, severity, approximate extent

Clappison-Grindstone Heritage Lands															
MANAGEMENT ISSUE	DESCRIPTION OF OPPORTUNITY/ISSUE	MANAGEMENT RECOMMENDATION	MANAGEMENT PRIORITY	Clappison Woods 1	Clappison Woods 2	Clappison Woods 3	Little	Grindstone Greek 1	Grindstone Creek 2	Holland Nature Sanctuary	Bonta	Johnson Easement	Smokey Hollow	NOTES
Old Paige Wire Fencing	• old fencing noted in several areas within Clappison-Grindstone • often in state of disrepair and hard to see in the forest • can be trip or impalement hazard	• fencing should be removed unless it is contributing to a management technique		x				x						
Remnant Logging Roads/Old Cart Trails	• a few locations in Clappison Woods and in the Grindstone Creek valley • overgrown and unused	• potential to re-open if generate key connections		x				x						
Built Heritage and Cultural Heritage Landscape Conservation	• significant views/landscapes • stone foundation at Little property			x	x	x	x	x	x	x	x	x	x	

Appendix 9: Management Issues Index, Key Map and Photographs

Cootes Escarpment Eco Park System

Clappison - Grindstone Heritage Lands

Management Issues Key Map

Legend

- Waypoints
- Study Area
- Clappison - Grindstone Heritage Lands

Clappison Woods 1
Clappison Woods 2
Clappison Woods 3
Clappison Woods 1
Clappison Woods 1
Clappison Woods 1
Clappison Woods 1
Little
Grindstone Creek 2
Grindstone Creek 1
Grindstone Creek 1
Smokey Hollow
Johnson Easement
Bonta
Eileen and John Holland Nature Sanctuary
Mountain Brow Road
Old York Road
Snake Road
Hidden Valley Road
Waterdown Road
HWY 6
HWY 403

0 100 200 400 600 800 1,000

Meters

North-South Environmental Inc.

Specialists in Sustainable Landscape Planning

Geosphere Infomatic Services

September 15, 2015

Issue #	Easting	Northing	Management Issue	Photograph #	Description
1	589533	4796515	unsanctioned trail management		
2	589512	4796493	unsanctioned trail management		
3	589269	4797088	unsanctioned trail management	0354, 0355, 0356, 0357, 0358, 0359, 0360, 0361, 0362	trail erosion; unsanctioned bridge structure
5	589328	4796552	unsanctioned trail management		
6	589555	4796493	unsanctioned trail management		
7	590490	4796060	unsanctioned trail	487, 488, 489, 490, 491, 492, 493	ATV trail, continuation of the trail that leads off the road on the west side of valley
8	590387	4796473	unsanctioned trail	479, 480, 500, 501, 502, 503	ATV trail in MAM in bottom of valley
9	590140	4797363	hazard trees		
10	589119	4797151	encroachment	0343, 0344, 0345, 0346, 0347	earthen dam/pool/pipe
12	589563	4796642	trail erosion	426, 427, 428, 429, 430, 431, 438, 439, 440	eroded path with exposed tree roots on main trail
13	590748	4795970	trail erosion	464, 465, 466, 467, 468	well used node of trails at bend in creek, bare soil and exposed roots
14	589379	4796506	party spot /fire pit		
15	590747	4796086	party spot/fire pit		
16	590170	4797699	garbage/dumping	9282, 9283	garbage
17	590045	4797552	garbage/dumping	9284	new bridge, left gabion baskets
18	590068	4797295	garbage/dumping		
20	589531	4796492	gully erosion	395, 396, 397, 398, 415, 416, 417, 418	eroded gullies in watercourses
21	590494	4796205	gully erosion	475, 476, 477, 478, 483, 484, 485, 486, 494, 495	major gully with exposed roots , trickle of water running in gully
22	590499	4796148	gully erosion	481, 482, 505	seepage area flows across trail and has created huge gully down slope

Issue #	Easting	Northing	Management Issue	Photograph #	Description
23	590218	4797469	gully erosion	9285	eroded gully from backyard, possibly swimming pool drainage
24	590087	4797324	gully erosion		
26	589117	4797091	invasive species	374	chemical treatment of Himalayan Balsam
27	589292	4797306	invasive species	459, 460	extensive walnut, invasive species garlic mustard, DSV
28	590159	4797730	invasive species		
29	589828	4796631	invasive species		
30	589580	4796509	mountain bike structures		
31	589376	4796552	mountain bike structures		
32	589711	4796590	mountain bike structures	441, 442, 443, 444	old built structure by Hydro cut
33	589352	4796530	party spot /fire pit	385, 390, 391, 392, 393, 394	foot path off of Bruce Trail leading to picnic table, fire pit, built up area of mountain bike use
34	589149	4797225	gully erosion		
35	590112	4797282	gully erosion		
36	589168	4797206	encroachment	363, 364, 365, 366, 367	shed in woods; seepage
40	590722	4796059	party spot /fire pit	469, 470, 471, 472, 473, 474	fire pit and tire swing
42	589482	4796427	rail crossing		
43	589547	4796506	trail erosion		
44	589269	4797088	trail erosion	0354, 0355, 0356, 0357, 0358, 0359, 0360, 0361, 0362	trail erosion; unsanctioned bridge structure
47	590163	4797783	trail erosion		
50	589244	4797224	vegetation clearing		
51	589151	4797056	vegetation clearing	0348, 0349, 0350, 0351, 0353	small cleared area with picnic table; mowed pathways
54	590160	4797581	encroachment		
55	589540	4796537	unsanctioned trail management		

Issue #	Easting	Northing	Management Issue	Photograph #	Description
59	589074	4796692	unsanctioned trail management		unsanctioned crossing
60	589081	4796634	unsanctioned trail management		
61	589074	4796604	unsanctioned trail management		
63	589090	4796809	unsanctioned trail management		unsanctioned crossing
64	589095	4796717	unsanctioned trail management		
66	589555	4796474	unsanctioned trail management		
67	589529	4796737	unsanctionedtrail management		
68	589489	4796860	unsanctioned trail management		unsanctioned crossing structure
69	589476	4796955	unsanctioned trail management		
70	589407	4797050	unsanctioned trail management		unsanctioned crossing structure
72	589082	4796539	unsanctioned trail management		
73	589563	4796521	mountain bike structures		
75	589553	4796674	mountain bike structures		
77	589015	4796806	unsanctioned trail management		
78	589050	4796764	trail erosion		
79	589032	4796785	high density of trails	61/62	bike wheel ruts/ unsanctioned crossing
83	589492	4796441	rail crossing		
84	589518	4796811	rail crossing	78	CN rail crossing
85	589527	4796461	mountain bike structures		
86	589536	4796474	stream erosion		
89	589090	4796569	unsanctioned trail crossing		
91	589294	4797197	invasive species		

Issue #	Easting	Northing	Management Issue	Photograph #	Description
92	589268	4797207	vegetation clearing		
94	589240	4796448	invasive species		
99	589478	4796912	trail erosion		
100	588968	4796699	trail erosion		
101	588960	4796661	trail erosion		
102	589111	4796629	trail erosion		
103	589051	4796539	trail erosion		
104	589568	4796495	trail erosion		
115	588768	4796458	garbage/dumping		
122	589374	4797079	unsanctioned trail crossing		
136	589535	4796579	trail erosion		
137	589418	4796360	invasive species		
144	588655	4796429	unsanctioned trail	59	walk along top of SWM pond (safety hazard)
145	588445	4795666	invasive species		
146	588567	4795396	invasive species		
147	588621	4795376	encroachment		
148	588650	4795456	vegetation clearing		
149	588667	4796163	stream erosion		
150	588575	4796351	garbage/dumping		
151	588639	4796415	invasive species		
152	589129	4797192	invasive species		
153	589122	4797064	encroachment		
154	589200	4797079	unsanctioned trail management		
155	589692	4797022	invasive species		
156	589687	4796679	hazard trees		
157	589730	4796641	mountain bike structures		
158	589790	4796640	invasive species		

Issue #	Easting	Northing	Management Issue	Photograph #	Description
159	590927	4795928	ATV trail		
160	590816	4795403	stream erosion		
161	590622	4795312	stream erosion		
162	590956	4795348	garbage/dumping		
163	590732	4795299	gully erosion		
164	590846	4795250	gully erosion		
165	590705	4795238	invasive species		
166	590774	4795154	hazard trees		
167	590831	4795134	unsanctioned trail management		
168	590119	4797336	gully erosion		
169	590274	4797942	invasive species		
215	588558	4795886	high density of trails		
216	588908	4796005	high density of trails		
217	589469	4796208	high density of trails		
218	588502	4795794	unsanctioned trail management		
219	588872	4796136	unsanctioned trail management		
220	589151	4796423	unsanctioned trail management		
221	589250	4796272	unsanctioned trail management		
222	589008	4796061	invasive species		
223	589035	4796375	invasive species		
224	589513	4796292	invasive species		
225	588769	4796642	encroachment		
226	589039	4796941	encroachment		
227	590134	4797052	gully erosion		
228	590369	4797482	encroachment		
229	590397	4797681	encroachment		

Issue #	Easting	Northing	Management Issue	Photograph #	Description
230	590294	4798048	encroachment		
231	590421	4798279	encroachment		
232	590298	4798561	encroachment		
233	590266	4797630	invasive species		
234	590278	4798434	invasive species		
235	590242	4798525	unsanctioned trail management		
236	590306	4798330	garbage/dumping		
237	590202	4797849	trail erosion		
238	590202	4797849	trail erosion		
239	590202	4798040	trail erosion		
240	590433	4797542	garbage/dumping		
241	590307	4798132	cultural Interpretation		grindstones at GC
242	588372	4795641	cultural Interpretation		drystone wall, Little property

Photograph Examples of Management Issues at Clappison-Grindstone Heritage Lands
(photographs taken by Mirek Sharp, Markus Hillar, and Leah Lefler)

Unsanctioned ATV Trail

Cultural Interpretation Issue

Crossing Structure Needed

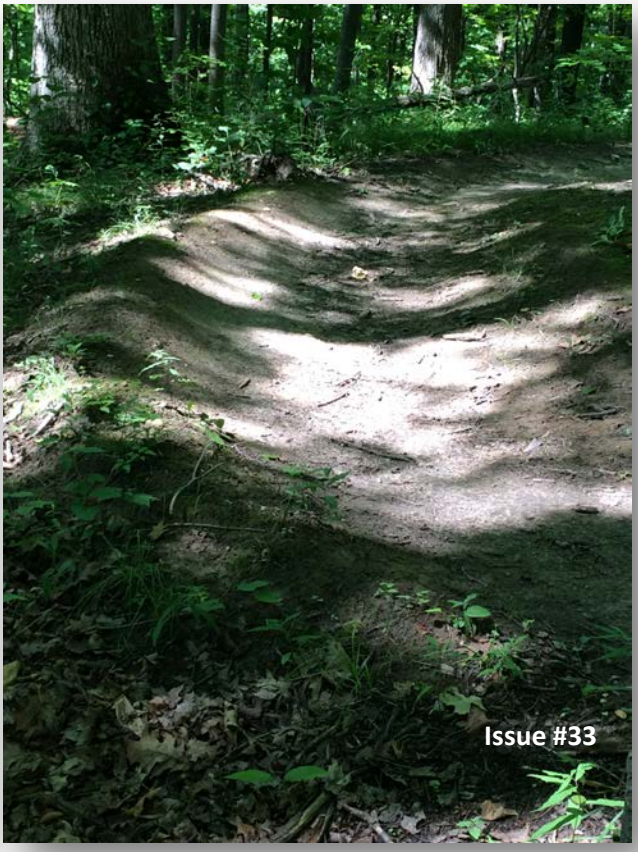
Gully Erosion

Garbage/Dumping

High Density of Trails

Invasive Species

Mountain Bike Structures



Party Spot /Fire Pit

Rail Crossing

Stream Erosion

Trail Erosion


Issue #12


Issue #21

Unsanctioned Trail Management


Issue #6


Issue #3


Issue #44


Issue #242