Cootes Paradise Heritage Lands Management Plan

INVENTORY, ISSUES AND OPPORTUNITIES

Prepared for Cootes to Escarpment EcoPark System

May 2018

Cootes to Escarpment EcoPark System Partners

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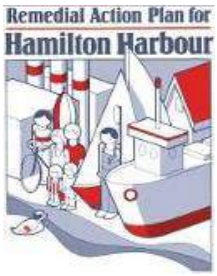

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Project Study Team

North-South Environmental Inc.
Leah Lefler – project manager, primary report author
Mirek Sharp – project manager, report editor
Holly Dodds – natural heritage research, contributing report author
Melissa Tonge – report editor
Pauline Catling – data management, contributing report author
Richard Czok – GIS analysis, mapping

LURA
Susan Hall – public consultation, facilitation
Lily-Ann D'Souza – public consultation
Ryan Adamson – public consultation

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

Cecelia Paine – cultural heritage expertise, contributing report author

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

Project Steering Committee

Peter Kelly, Cootes to Escarpment EcoPark System
Nigel Finney, Conservation Halton
Jen Baker, Hamilton Naturalists' Club
Cathy Plosz, City of Hamilton
Wayne Terryberry, McMaster University
Tys Theysmeyer, Royal Botanical Gardens
Lindsay Barr, Royal Botanical Gardens
Gary Beaudoin, Bruce Trail Conservancy
Matt Hall, Hamilton Conservation Authority
Kathy Smith, Hamilton Conservation Authority

Cover Photograph: Cootes Paradise by Holly Dodds, 2017

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1.0 Introduction

1.1 Study Context

Between 2007 and 2009, a group of public agencies and organizations consisting of the Royal Botanical Gardens (RBG), Hamilton Conservation Authority (HCA), Conservation Halton (CH), City of Hamilton, City of Burlington, Halton Region, Bruce Trail Conservancy, Hamilton Naturalists' Club, and Hamilton Harbour Remedial Action Plan (RAP), 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):

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

The Cootes to Escarpment EcoPark System faces intense pressures from the surrounding urbanized portions of Hamilton and Burlington, including major transportation arteries such as Highways 403 and 6. The effects of urban growth include stressors such as increased use, additional infrastructure, demand for recreation and educational programs and facilities, and unauthorized use and access. These stressors can be expected to result in damage to sensitive habitats and will jeopardize the long-term health of natural features and their functions. In response to this, the Phase II report recommended several 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, the management plans will provide guidance for the protection and conservation of valuable natural and cultural heritage resources located within the Heritage Lands, and direct future development and management efforts. Because much of the Cootes to Escarpment EcoPark System is part of the Niagara Escarpment Parks and Open Space System (NEPOSS), the management plans will be prepared following the NEPOSS land classifications and zones as a basis for recommending future management initiatives. The management plans will provide guidance to the partner agencies in such a manner that they can implement their respective mandates while still providing consistency throughout the EcoPark System.

The Heritage Lands include both publicly- and privately-owned lands. The management plans are restricted to the publicly-owned lands, which are referred to as "Current EcoPark System Lands" in this report. The privately-owned lands in the Cootes Paradise Heritage Lands are referred to as "Privately Owned Outreach Areas". Note that when there is a reference to just "Cootes Paradise" in this report, it is referring to just the water body that commonly is referred to by that name.

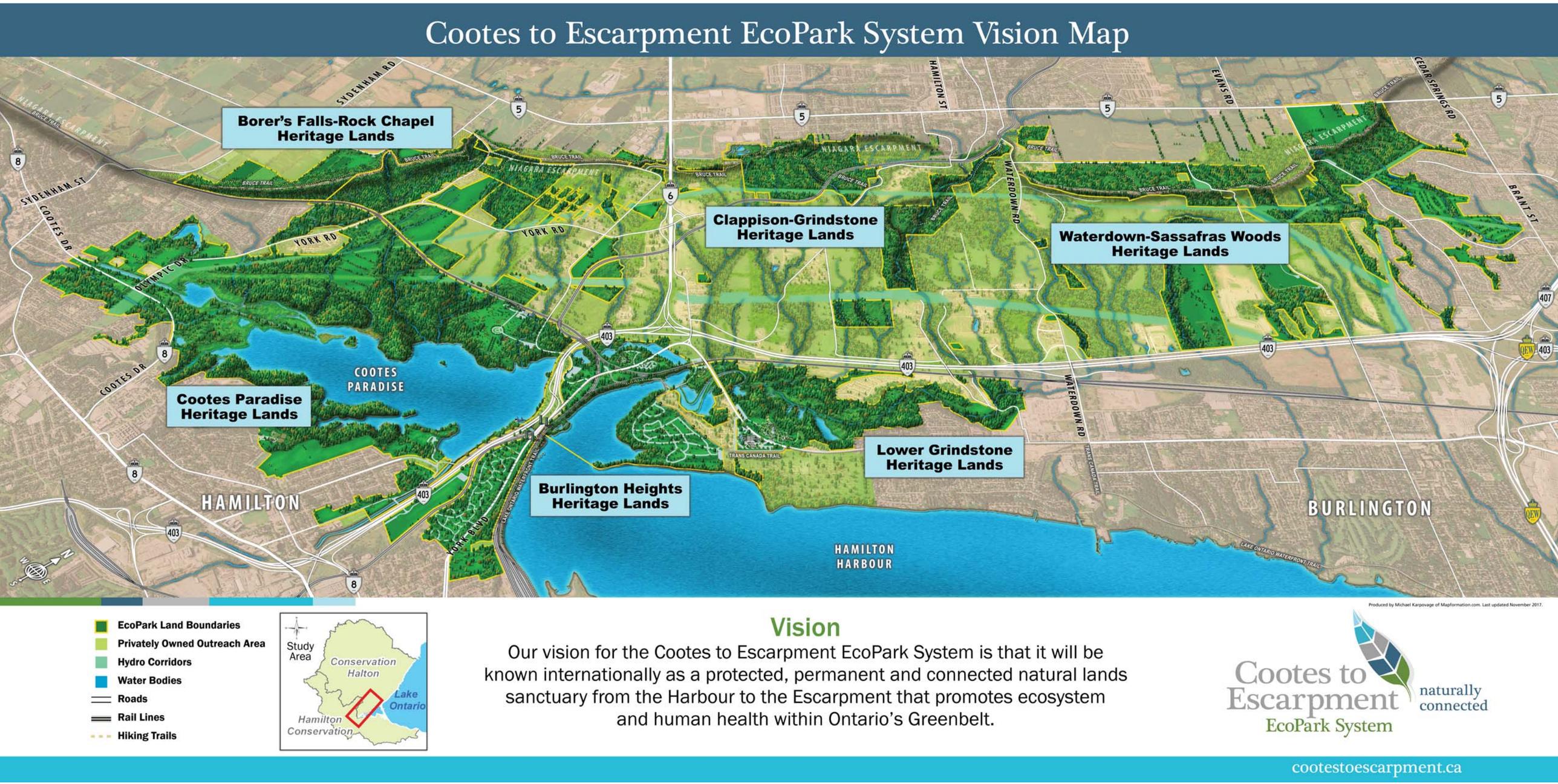


Figure 1. Cootes to Escarpment EcoPark System Study Area Location.

Management plans for Burlington Heights Heritage Lands (Cootes to Escarpment EcoPark System 2014a), Clappison-Grindstone Heritage Lands (Cootes to Escarpment EcoPark System 2016b) and Waterdown-Sassafras Woods Heritage Lands (Cootes to Escarpment EcoPark System 2016c) have been completed. The Current EcoPark System Lands in the Cootes Paradise Heritage Lands are owned and managed by three partner agencies: RBG, HCA and the City of Hamilton.

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 Cootes Paradise 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

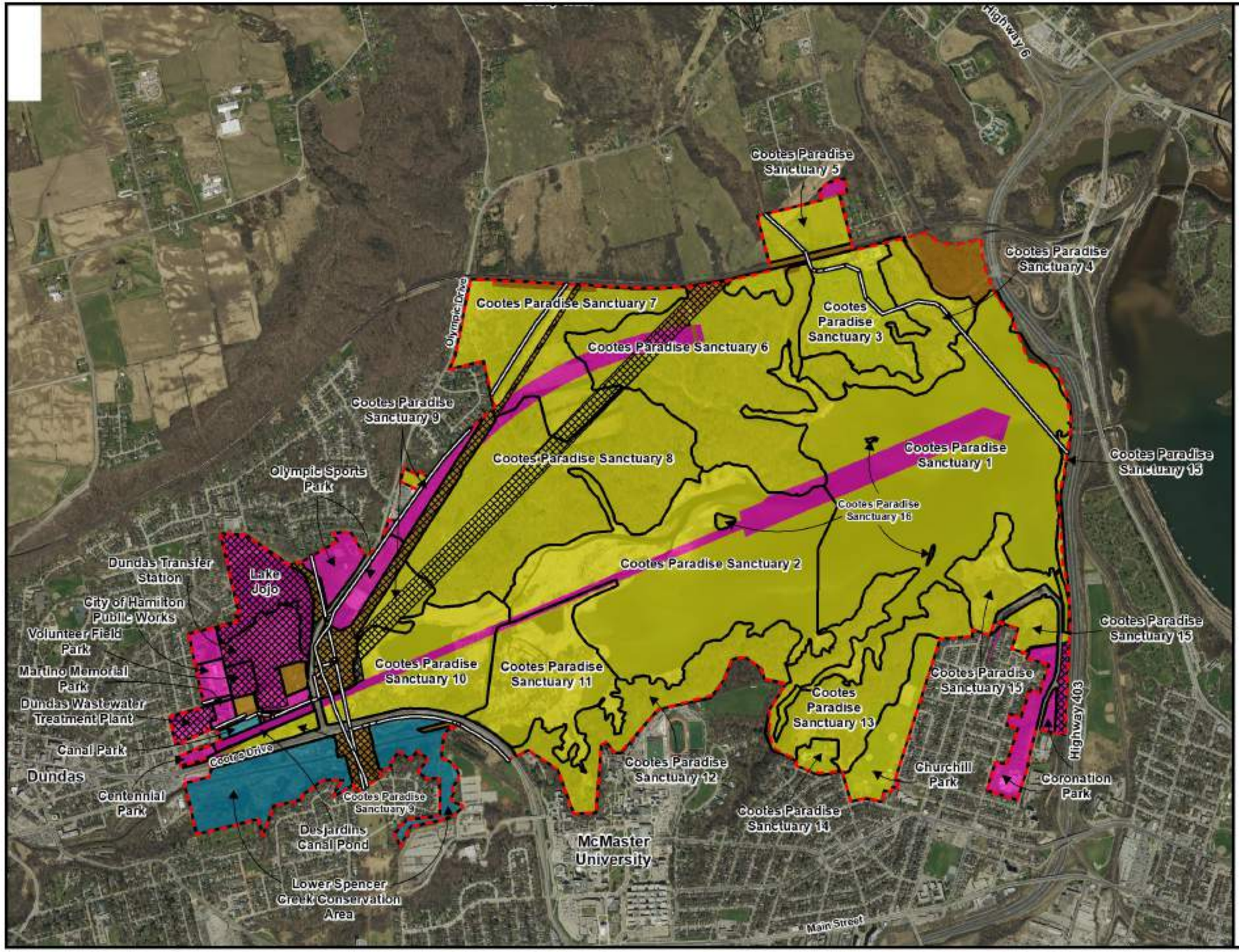
This report is a technical background report that will facilitate the development of the management plan for the Cootes Paradise Heritage Lands (Figure 2). This overall study contains several important milestones, including (with approximate completion date):

1. Project Charter (undertaken by Steering Committee);
2. Resource Inventory, Issues and Opportunities Report (December 2017);
3. Draft Land Classifications and Zones (January 2018);
4. Final Land Classifications and Zones and Management Policies (April 2018);
5. Draft Management Plan (April 2018);
6. Public Meeting to Present Draft Management Plan (June 2018); and
7. Final Management Plan (September 2018).

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

Cootes to Escarpment EcoPark System

Figure 2: Cootes Paradise Heritage Lands Management Units



Legend

- Heritage Lands Boundary
- Gas Pipeline
- Study Area
- Privately Owned Outreach Area
- Utilities

Current EcoPark System Lands

- City of Hamilton
- Hamilton Conservation Authority
- Royal Botanical Gardens

Sources of Information:
Royal Botanical Gardens
Hamilton Conservation Authority
City of Hamilton
Land Information Ontario

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March 19, 2018

1.3 General Overview

Management plans for the Burlington Heights, Clappison-Grindstone and Waterdown-Sassafras Woods Heritage Lands were completed between 2014 and 2016. Management plans for the Cootes Paradise and Borer's Falls-Rock Chapel Heritage Lands are currently being undertaken. A management plan for the Lower Grindstone Heritage Lands will be undertaken in the future.

The Cootes Paradise Heritage Lands comprise 762 ha of land and marsh located at the north end of the City of Hamilton. Cootes Paradise Heritage Lands includes an area extending generally between Olympic Drive east to Highway 403 and from Cootes Drive/McMaster University campus and Westdale neighbourhood in Hamilton north to York Road (including all of Cootes Paradise and adjacent lands). Of the 762 ha within the Heritage Lands, 711 ha (93%) are currently owned and managed by partner organizations (the Current Ecopark System Lands) (Figure 2). The majority of the Current EcoPark System Lands are owned by the RBG (582 ha), with smaller areas owned by the City of Hamilton (98 ha) and Hamilton Conservation Authority (30 ha). To the south, west, and northwest, Cootes Paradise Heritage Lands is located adjacent to urban areas including McMaster University. North of York Road, the Cootes Paradise Heritage Lands is bordered by privately-owned lands, some of which is open space, as well as rural residential areas. Cootes Paradise Heritage Lands also connects directly to the Burlington Heights Heritage Lands (on the east) and the Borer's Falls-Rock Chapel Heritage Lands (on the northwest).

Cootes Paradise Heritage Lands includes several recognized environmental designations including Environmentally Significant Areas (ESA), Areas of Natural and Scientific Interest (ANSI), Important Amphibian and Reptile Area (IMPARA) and a Provincially Significant Wetland (PSW), which includes the largest river mouth wetland on Lake Ontario. Cootes Paradise Heritage Lands is generally classified as a deciduous forest and wetland area. This area contains multiple small watersheds and floodplains, including Spencer Creek, Chedoke Creek and Ancaster Creek. Cootes Paradise Heritage Lands include over 320 ha of marshland known as Cootes Paradise Marsh, the largest in Western Lake Ontario, and approximately 25 km of shoreline.

A fishway was installed at the outlet of Cootes Paradise Marsh in 1997 as part of RAP initiative in response to a need to control Common Carp (*Cyprinus carpio*), an introduced invasive species having a destructive impact on the wetlands. The fishway acts as a barrier to carp while maintaining the flow of water and allowing native species to be sorted and released into the wetland. This barrier has been successfully excluding 95% of carp and, along with restoration plantings, has improved water quality, plant diversity, native fish diversity and amphibian abundance.

The Heritage Lands include a diverse network of trails, which include the Bruce Trail and the Hamilton Waterfront/Desjardins Trail. The Heritage Lands also contain more traditional urban parks with sports fields and playgrounds (Olympic Sports Park, Coronation Park, Volunteer Field Park, Martino Memorial Park and Churchill Park). The north shore of Cootes Paradise itself is wholly within the RBG and includes an arboretum and interpretive centre. Cootes Paradise Heritage Lands are used extensively by hikers, dog-walkers, birdwatchers, nature enthusiasts and the surrounding community due to their aesthetic, recreational, and natural value. The area provides spectacular views of Hamilton, Hamilton Harbour, deciduous forest and marshland.

Some of the Current EcoPark System Lands support existing infrastructure. Hydro and gas lines intersect the site. Several utilities border the site including a railway across the northern edge. The Dundas Transfer Station, City of Hamilton Public Works and Dundas Water Treatment occur on the western border of the Heritage Lands. The Desjardins Canal opened in 1837 and contributed to the development of the Hamilton area. The Great Western Railway was completed in 1853, including a rail bridge over the Desjardins Canal.

1.4 Study Methods

1.4.1 Project Governance and Study Team

The Cootes Paradise 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 RBG, HCA, CH, City of Hamilton, Hamilton Naturalists' Club and the Bruce Trail Conservancy, as well as the Cootes to Escarpment EcoPark System Coordinator.

Responsibilities of the Steering Committee are as follows:

- assist with substantive decisions concerning the preparation of the Cootes Paradise Heritage Lands management plan;
- organize input, feedback and review from the perspective of each organization 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 Cootes Paradise Heritage Lands Management Plan, as determined by the Steering Committee and Cootes to Escarpment EcoPark System Coordinator. Members include individuals and representatives from organizations that are affected by and/or can provide useful input to the management plan.

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

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

1.4.2 Community Engagement

During the Phase 2 Inventory, Issues and Opportunities Phase, the Project Team in collaboration with the Steering Committee developed a combined Community Engagement and Communication program for the Cootes Paradise Heritage Lands and Borer's Falls-Rock Chapel 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 management 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 include seven key engagement components that will be rolled out throughout the next phases of the project (Table 1).

Table 1. Key Engagement Components.

Developing a Stakeholder List

A comprehensive stakeholder list that included 18 individuals and stakeholder organizations with a potential interest in the management plans was developed and organized into 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 Project Team.

Stakeholder Advisory Committee

A Stakeholder Advisory Committee comprised of representatives from key stakeholder organizations with a broad geographic interest in the area has been established. The Stakeholder Advisory Committee will meet three times throughout the study process to discuss the development of the management plans and will be comprised of representatives from:

- Niagara Escarpment Commission
- Greenbelt Foundation
- Hamilton Harbour RAP
- Hamilton Waterfront Trust
- Environment Hamilton
- Ministry of Natural Resources and Forestry
- Iroquoia Bruce Trail Club
- Hamilton Burlington Trails Club
- Hamilton Trail Blazers Hiking and Outdoors Club
- Hamilton Burlington Mountain Bike/Cycling Club
- Hamilton Angling and Hunting Association
- Dundas Historical Society
- Pleasant View Rate Payers Association
- RBG Auxiliary
- McMaster University

Information Gathering Sessions

Four information gathering sessions were held on July 12th, 2017 to discuss management issues and gather information on natural heritage, cultural and recreation resources. A total of 21 people attended. Invitations were extended to external participants representing: Indigenous groups, government and conservation authorities (including the City of Hamilton, HCA and CH), committees to City of Hamilton 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, issues and opportunities for management of the Heritage Lands.

1.4.3 Data Collection and Analysis

In order to organize information and prepare a format for reporting information within the Cootes Paradise Heritage Lands, the Current EcoPark System Lands were subdivided into management units and named based on ownership and habitat similarity (Figure 2). The 29 Management Units listed below are referred to throughout this report and are as follows:

- Cootes Paradise Sanctuary 1-16
- Olympic Sports Park
- Lake Jojo
- Dundas Transfer Station
- City of Hamilton Public Works
- Volunteer Field Park
- Martino Memorial Park
- Dundas Wastewater Treatment Plant
- Canal Park
- Centennial Park
- Lower Spencer Creek Conservation Area
- Desjardins Canal Pond
- Churchill Park
- Coronation Park

Available background information and data were collected from the various partner agencies and a list of available reports, data sets, and maps were 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 undertaken within the Current EcoPark System Lands throughout 2017 to gain an understanding of recreational use patterns, management issues and opportunities. Table 2 provides dates and locations visited.

Table 2. Fieldwork dates and locations.

Date	Locations
April 25, 2017	Reconnaissance Site Walk with Project Team; Rock Chapel 1, Rock Chapel 3, Cootes Paradise Sanctuary 15, Desjardins Canal Pond
May 30, 2017	Canal Park Chimney Swift Survey
July 4, 2017	Borer's Falls Conservation Area 1-3, Berry Tract 1-2, Berry Tract South, Nicholson Tract 1, Cartwright Tract
July 8, 2017	Cootes Paradise Sanctuary 2, Cootes Paradise Sanctuary 6-8
August 14, 2017	Cootes Paradise Sanctuary 1, Cootes Paradise Sanctuary 10-14, Cootes Paradise Sanctuary 16, Churchill Park, Lower Spencer Creek Conservation Area
September 27, 2017	Cootes Paradise Sanctuary 15 (Waterfront/Desjardins Trail)
October 5, 2017	Hopkins Tract, Nicholson Tract 2, Nicholson Tract 3, Valley Community Centre Park, Lake Jojo, Dundas Transfer Station, City of Hamilton Public Works, Volunteer Field Park, Martino Memorial Park, Dundas Wastewater Treatment Plant, Canal Park, Centennial Park, Borer's Falls Conservation Area 1
October 18, 2017	Innovation Park
November 1, 2017	Rock Chapel 1, Rock Chapel 3, Rock Chapel 4, Borer's Falls Conservation Area 1, Lower Spencer Creek Conservation Area, Cootes Paradise Sanctuary 2-3, Cootes Paradise Sanctuary 5, Cootes Paradise Sanctuary 10-11, Cootes Paradise Sanctuary 15
November 7, 2017	Coronation Park, Olympic Sports Park, Cootes Paradise Sanctuary 9

1.4.4 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;
- Greenbelt Plan – Plan of Boundary of Protected Countryside;
- Greenbelt Plan Maps;
- City of Hamilton Official Plan; and
- City of Hamilton Zoning Bylaw 05-200.

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. A detailed planning inventory was prepared and is provided in Appendix 2.

1.4.5 Method for Recreation Inventory

Members of the Steering Committee provided mapping both in digital (GIS) and hard copy format of existing official and unsanctioned trails, and proposed trail and cycling networks within the Heritage Lands. Available parcel-specific reports provided by the Steering Committee were also reviewed with respect to recreational issues. The trails from these various reports and maps were compiled and layered in GIS. In addition, steeply sloped areas (>25%) were identified, along with access points, signage and locations where trails extend outside the Heritage Lands into neighbouring properties.

Representative sections of the Current EcoPark System Lands were visited between April-November (Table 2) to identify additional access points, walk trails and identify management issues. Where management issues and additional access points were noted, specific locations were recorded by GPS and compiled with the trails data. Trails and access point mapping (Figure 3) was prepared based on data provided by HCA, RBG, City of Hamilton and fieldwork completed by North-South Environmental. Mapping was completed in ArcMap using GIS. The mapping will be used to evaluate opportunities and constraints in the context of developing classification and zoning (NEPOSS), and management recommendations after this phase of the project. The background review also included a review of the City of Hamilton's Recreational Trails Master Plan (2016) and City-Wide Transportation Master Plan (2007) with a focus on active transportation.

1.4.6 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 Hamilton Natural Areas Inventory Project 3rd Edition (Schwetz 2014) and various background reports prepared by RBG (e.g., Ecological Land Classification of Royal Botanical Gardens' Natural Lands (Barr 2014)); see Appendix 1 for complete listing) were the primary sources of natural heritage information. Information was also compiled from HCA's species occurrence database, and rare species records from the Natural Heritage Information Centre (NHIC). Vegetation resources have been characterized following the Ecological Land Classification (ELC) for Southern Ontario (Lee et al. 1998). ELC data were provided by RBG, HCA and CH. Field surveys were completed by the Project Team to supplement information on vegetation communities, flora, and incidental observations of wildlife and any other noteworthy occurrences (e.g., wildlife habitat, seepages, disturbances, etc.).

Natural heritage data were entered into a Microsoft Access database. Data were analysed to determine the presence of rare species and species at risk, and to determine the floristic quality of the Current EcoPark System Lands. Percentages of native and non-native species, Floristic Quality Index (FQI) (Oldham et al. 1995), and Native Mean Coefficient of Conservatism (Native Mean C) were calculated for the Current EcoPark System Lands. These analyses provide a relative measure of vegetation quality. Where individual management units lack floristic data, FQI will be inaccurate. These values were still calculated but indicated as likely inaccurate to highlight areas where data are lacking.

Species lists were screened for provincial, regional and local significance. Provincial flora and fauna rarity were based on rankings provided by the NHIC (identified as S1-S3) or species identified as Endangered, Threatened or Special Concern by COSEWIC[1], Federal Species at Risk Act (SARA) and/or COSSARO[2]. Regional flora and fauna rarity has been based on listings provided by the Hamilton Natural Areas Inventory Project 3rd Edition (Schwetz 2014). 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).

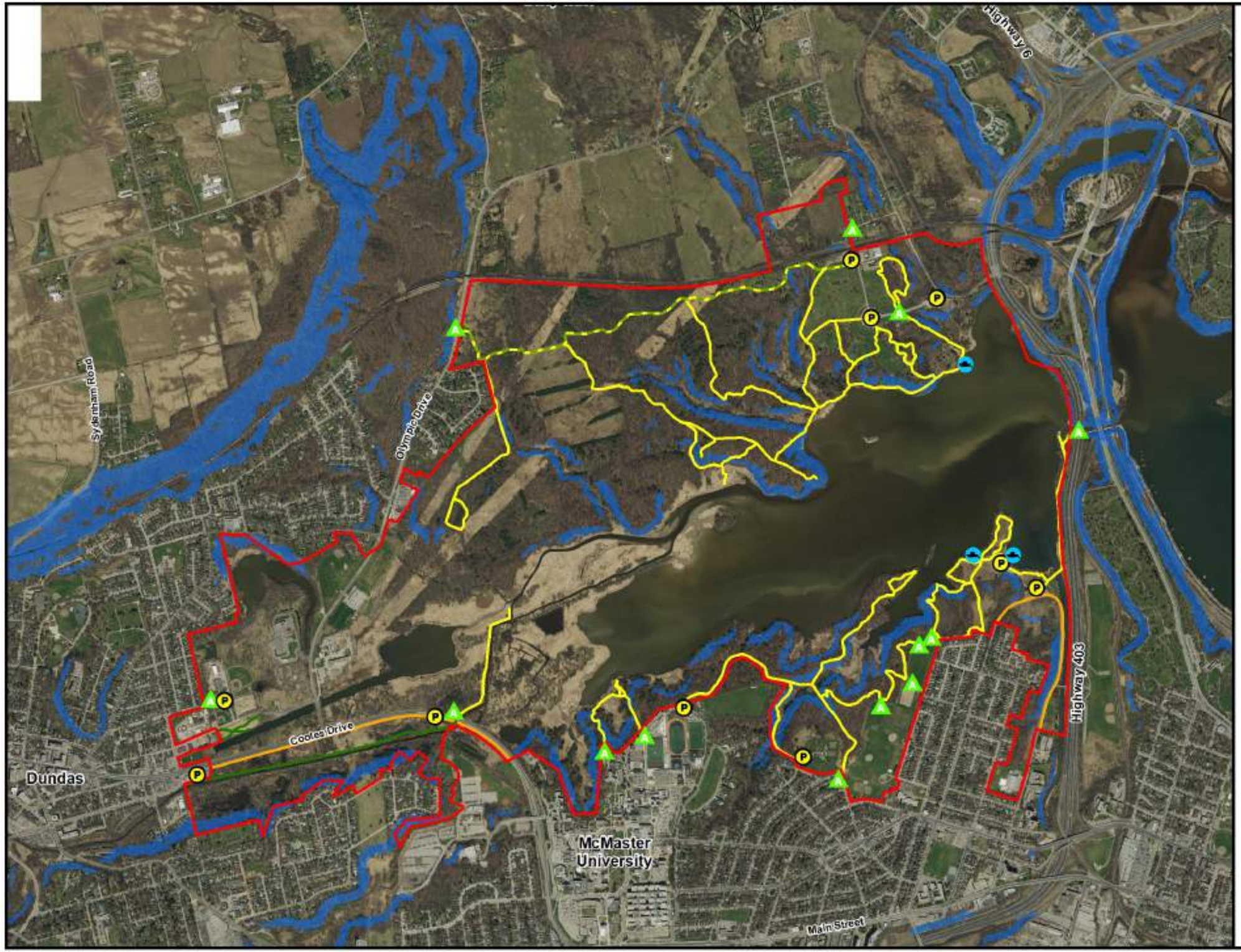
Mapping was completed in ArcMap using GIS. ELC mapping was compiled based on existing data from RBG, HCA and the City of Hamilton, and by fieldwork completed by the Project Team. Rare and

[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.

Cootes to Escarpment EcoPark System

Figure 3: Trails, Parking and Access Locations at Cootes Paradise Heritage Lands



Legend

Trails

- Bruce Side Trail
- RBG Trails
- Hamilton Conservation Authority Trail
- City of Hamilton Trails

Parking and Access Locations

- Access Locations
- Parking and Access Locations
- Boat Launch

- Slopes > 25%
- Heritage Lands Boundary

Sources of Information:
Royal Botanical Gardens
Hamilton Conservation Authority
City of Hamilton
Land Information Ontario

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March 20, 2018

significant species mapping was prepared based on data provided by NHIC, RBG, HCA and CH.

1.4.7 Method for Cultural Inventory

The Current EcoPark System Lands were examined first by windshield survey with the Project Study Team. Documentation of the history of the Town of Dundas, the City of Hamilton and the Township of West Flamborough provided background information on settlement of the sector, dating from First Nations to the present. Inventoried and designated heritage properties in the Cootes Paradise Heritage Lands sector were identified in Hamilton's Heritage: Volumes 2, 4 and 6. In addition to the cultural heritage landscapes listed in Hamilton's Heritage Volume 2, City of Hamilton planning staff identified additional cultural heritage landscapes to be included in this report. Details on heritage properties were available in Hamilton's Heritage Volume 5 and in technical reports and published papers. Information on land ownership was attained from historical maps in print form and from online archives. The City of Hamilton Archaeology Master Plan (2016), which is restricted to in-house use, provided information on areas potentially worthy of cultural heritage conservation.

To clarify the history and cultural value of sites and features, a review was conducted of other archival maps, air photographs, topographic maps and historical photographs from the City of Hamilton Archives, the Dundas Museum, the Flamborough Archives, the RBG map collection, the McMaster University Map Collection and the McMaster University Air Photo Collection.

Interviews with RBG personnel provided details on specific concentrations of cultural heritage features within RBG lands and an overview of current plans for integrating cultural landscape features into interpretation and management planning.

Field investigations were conducted on individual properties to identify or verify extant features.

A list of all references is found at the end of this report.

1.4.8 Method for Management Issues Inventory

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

2.0 Land Use

2.1.1 Existing Land Uses

The 762 ha Cootes Paradise Heritage Lands (711 ha of Current EcoPark System Lands) comprise approximately 502 ha (450 ha of Current EcoPark System Lands) of land and 260 ha of marsh/open water, located in the former Town of Dundas and former City of Hamilton, now in the new City of Hamilton, generally bounded by Highway 403, the Canadian National Railway line and the urbanized neighbourhoods of Dundas and Westdale. The bulk of the Heritage Lands consist of the rural Cootes Paradise Sanctuary wetlands and uplands.

The balance consists of Lower Spencer Creek valley lands and other lands within the City of Hamilton urban developed area. Existing land uses in and adjacent to the Cootes Paradise Heritage Lands include conservation lands, recreational areas, McMaster University campus, agriculture, rural residential and suburban developments, utilities and industrial uses.

The Westdale and Ainslie Wood North suburban communities along with the University of McMaster campus extend south of Cootes Paradise. Two more suburban-rural communities (Dundas and Pleasant View) border the western and northern edges respectfully, becoming more rural at the north end of the Heritage Lands. The Canadian National Railway line transverses the northern edge of Cootes Paradise with rural communities and agriculture on the other side. To the east lies the bridges for Highway 403, York Boulevard and the fishway that connects Cootes Paradise Marsh to the open water of Hamilton Harbour and Lake Ontario. The Bruce Trail traverses the area and links with the RBG trail network.

City parks and sports fields occur on the south shore areas adjacent to natural lands. The western edge of the Heritage Lands is comprised of a mixture of city parks, sports fields and utilities (Lake Jojo, Hamilton Public Works, Dundas Transfer Station and Dundas Water Treatment Plant).

2.1.2 Utilities Adjacent and Within Current EcoPark System Lands

Canadian National Railway (CN) operates a main track passenger and freight railway, known as “Dundas Subdivision”, extending from the Burlington Heights junction west through the Town of Dundas to points west. The railway forms the north boundary of the Cootes Paradise Heritage Lands and physically separates Cootes Paradise Sanctuary 5 from the balance of the Heritage Lands. A pedestrian bridge over the CN tracks provides a connection between Cootes Paradise Sanctuary 3 and 5 (Figure 2).

TransCanada Pipelines operates a high-pressure natural gas pipeline, generally oriented northeast-southwest and alongside the Hydro One Dundas-Burlington Transmission Line. The pipeline is adjacent to several Cootes Paradise Heritage Lands management units, including Cootes Paradise Sanctuary 7 to 10, Olympic Sports Park and the Lower Spencer Creek Conservation Area, and is well marked at road crossings, etc. TransCanada advised that there are no known changes to the pipeline infrastructure within the pipeline easement or on pipeline lands. TransCanada intends to exercise the rights of the easement/agreements and its obligations for operating and maintaining the pipeline which may include vegetation removal, access for maintenance, excavation as may be needed (Ms. Gretchen Gordon, TransCanada Pipelines, pers. comm. May 26, 2017).

Union Gas operates a 500 mm high-pressure natural gas pipeline generally oriented north-south through the western section of the Cootes Paradise Heritage Lands in association with a Hydro One transmission corridor. The pipeline is located adjacent to the Lower Spencer Creek Conservation Area, Cootes Paradise Sanctuary 10, Olympic Sports Park and Lake Jojo. Union Gas advised that there are no current plans to alter the Union Gas system and infrastructure in the area. However, Union Gas continually works on long-term asset management planning which may identify future infrastructure changes. Union Gas intends to exercise the rights of easement/agreements and its obligations for operating and maintaining the pipeline which may include vegetation removal, access for maintenance, excavation as may be needed (Mr. Enzo Greco, Union Gas, pers. comm. May 18, 2017).

There is one cellular communications tower, reportedly owned/operated by Rogers Communications/Bell Canada and located on the Olympic Sports Park or adjacent Hydro One transmission corridor.

Hydro One owns and operates the Dundas Transformer Station on Olympic Drive at Cootes Drive and the following two high voltage transmission lines which extend from the Burlington Transformer Station at the Freeman Interchange (Highway 403/Queen Elizabeth Way) to the Dundas Transformer Station:

- Mount Hope Transmission Line; and
- Dundas-Burlington Transmission Line.

These transmission line names are derived from the Parkway Belt West Plan 1978 mapping and may not be in use by Hydro One today. The Mount Hope Transmission Line is located on or adjacent to Cootes Paradise Sanctuary 3 and 5 to 10, and the Lower Spencer Creek Conservation Area. The Dundas-Burlington Transmission Line is located on or adjacent to Cootes Paradise Sanctuary 7 to 9 and the Olympic Sports Park. Hydro one also owns and operates a third unnamed high voltage transmission line which extends from the Dundas Transformer Station in a north direction through the York Road neighbourhood of Dundas, over the escarpment and through the former Town of Flamborough. The unnamed transmission line is located between the Olympic Sports Park and Lake Jojo.

The February 2017 Burlington to Nanticoke – Regional Infrastructure Plan, prepared by Hydro One in association with the local hydro distribution companies, sets out investments in transmission and distribution facilities for the near term (5 years) and mid-term (5 to 10 years) that should be planned, developed or implemented to meet electricity infrastructure needs in the Burlington to Nanticoke Region. The Regional Infrastructure Plan observes that the Hamilton area transmission assets are some of the oldest installations in the Province. From a review of the Regional Infrastructure Plan, it appears that no changes are planned to the transmission corridor infrastructure; the planned changes in the vicinity of the Cootes Paradise Heritage Lands appear to be within the Dundas Transfer Station proper (Figure 2). This has not been confirmed with Hydro One due to the inability to reach the appropriate Hydro One technical staff.

Hydro One will exercise the rights of any easements/agreements or owned transmission properties where they exist for the purpose of operating and maintaining transmission facilities.

Hydro One owns and operates extensive high voltage transmission and low voltage distribution systems throughout the Province on corridors and rights-of-way owned by Hydro One, the Provincial government, private property owners, railway companies, Indigenous communities, etc. (Ms. Joan Zhao, Hydro One Networks Inc., pers. comm. May 24, 2017). Many of the corridors have sufficient space for expansion of transmission/distribution facilities and potentially, secondary land uses. The Province implements a Provincial Secondary Land Use Program (PSLUP) to allow for secondary use of corridors while recognizing the primary purpose to facilitate electricity transmission and distribution (www.hydroone.com/business-services/secondary-land-use). 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 a proponent to Hydro One followed by stakeholder review to ensure technical compatibility. If approved and the proponent agrees to terms and conditions of use, an agreement is completed between the proponent and Infrastructure Ontario.

Several 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, the maximum mature height of landscape plantings, grading, drainage and storm drainage requirements. Secondary land uses of transmission corridor lands may be subject to local

municipal land use policy and regulatory requirements. Hydro One implements a preventative vegetation management program on a six to eight-year cycle on transmission and distribution corridors. This includes promoting compatible vegetation on or beside rights-of-way. Compatible vegetation rarely grows to a height that would interfere with safe power line operation (www.hydroone.com/about/corporate-information/vegetation-management). Hydro One vegetation practices include removing incompatible vegetation and trimming vegetation to meet clearance standards, and access requirements, removing trees that could interfere with the safe and reliable delivery of electricity, use of compatible ground covers and selective application of herbicides to promote low-growing plant communities. Hydro One follows applicable laws for species at risk and works to control the spread of invasive species.

The City of Hamilton owns and operates three facilities of public infrastructure within the Cootes Paradise Heritage Lands along King Street East in Dundas: Dundas Wastewater Treatment Plant; Dundas Transfer Station; and the Roads Operation and Maintenance West District Yard (Figure 2). These are legacy facilities of the former Town of Dundas and Region of Hamilton-Wentworth.

The Dundas Wastewater Treatment Plant includes the Desjardins Canal Pond as the receiver of treated wastewater from the plant and Diversion Tank HC060, located on King Street East opposite the Canal Pond. The diversion tank was constructed to manage excess flow from the Waterdown and Dundas sanitary watersheds. City of Hamilton Public Works staff advised that no changes are planned to the diversion tank. Further, there may be changes to the Dundas Wastewater Treatment Plant to improve effluent quality; these changes will be internal to the plant, and the plant land base will remain as it exists today (Mr. Ian Routledge, Plant Operations, City of Hamilton Public Works Department, pers. comm. June 6, 2017, and October 31, 2017).

The Dundas Transfer Station consists of a solid waste transfer facility for waste from street collection and public waste drop off, public recyclables drop off and public hazardous waste drop off. The City Public Works staff advised that there are no planned changes to the facility or the technology used today, and the facility is not over-capacity. (Mr. Glenn Watt, Recycling and Waste Disposal, City of Hamilton Public Works Department, pers. comm. June 6, 2017, and October 31, 2017).

The Roads Operations and Maintenance facility consists of an office building and exterior yard with several buildings, all north of Martino Memorial Park. The Public Works staff advised that there are no planned changes to the facilities except as need may arise for storage of equipment and materials (Ms. Sarah Poole, Roads Operations and Maintenance, West District, City of Hamilton Public Works Department, pers. comm. June 6, 2017, and October 31, 2017).

2.2 Future Planned Uses

2.2.1 Niagara Escarpment Commission Development Permit Applications

The Niagara Escarpment Commission maintains an online searchable list of current and recent Development Permit applications in the former area municipalities in the City of Hamilton (in this instance, the former Town of Dundas and the former City of Hamilton). The applications are described by the nature of the proposal; some are identified by location but only where a technical staff recommendation report is required. For the 2016 and 2017 period to-date, there was one application in the former City of Hamilton and 11 applications in the former Town of Dundas. A review of the applications online indicates that the majority are minor in nature consisting of construction of single-

family dwellings and dwelling additions, accessory buildings, etc. and in the case of Hamilton, a public outbuilding. Some applications were received but the file was closed, and no permit was issued for a variety of reasons, including that the application was determined to be exempt.

For the City of Hamilton, the following is a summary of current and recent development applications under the Planning Act affecting private and public property in the general vicinity of the Cootes Paradise Heritage Lands. This summary was prepared based on information provided by the City. A review of the information indicated that most of the applications occurred in the 2012 - 2013 period or were minor in nature (e.g., rear yard deck or retaining wall) or had not proceeded beyond the stage of consultation and therefore, did not constitute formal applications. In some instances, the developments which are subject of older applications may be built and complete.

Included in the section below are summaries of current Class Environmental Assessments of relevance to the Cootes Paradise Heritage Lands.

70 Olympic Drive
City File MDA 12-021

The property known as 70 Olympic Drive is comprised of 4.6 ha of land consisting of the Olympic Sports Park and Westoby Arena on the east side of Olympic Drive.

The 2012 site plan approval application was to erect a 50 m tri-pole communication tower with possible co-location with a second telecommunication carrier west of the arena. It is understood that this facility is the telecommunication tower, which exists today and is referenced under the Utilities section of this report.

211 York Road
City File FC-16-054

The property known as 211 York Road is comprised of 0.67 ha of land located on the north side of York Road opposite Lake Jojo. The property is occupied by an existing two-story mixed-use building with ground floor local commercial uses, second-floor residential apartments and a licensed 17-bed retirement home.

The formal consultation in 2016 was to consider the requirements for a planning application for a proposal to demolish the commercial building and to expand the retirement home. As of May 2017, the formal consultation is identified as in progress.

55 Cootes Drive
City File FC-12-123

The property known as 55 Cootes Drive is comprised of 0.3 ha of land located on the northwest corner of the intersection of Cootes Drive and East Street North, opposite Centennial Park. The property is occupied by a one-storey commercial building.

The formal consultation in 2012 was to consider the requirements for a planning application to demolish the existing commercial building and to construct a four storey 84 unit residential apartment building. As of May 2017, the formal consultation is identified as in progress.

147 King Street East
City File MDA-12-071

The property reported as 147 King Street East is likely 189 King Street East which comprises 5.7 ha of land consisting of the City of Hamilton Public Works, Martino Memorial Park and the portion of the Dundas Transfer Station directly north and to the rear of the City of Hamilton Public Works. This City of Hamilton Public Works portion is occupied by the offices and yard of the City Public Works Roads Operation and Maintenance – West District.

The site plan approval application was to construct a pre-fabricated tent structure for road salt storage within the Public Works Yard. This structure likely exists today.

2.2.2 Environmental Assessments

New Waste Haulage Receiving Station

The City of Hamilton undertakes roads, water and wastewater projects which are subject to municipal class environmental assessment (Class EA) planning and design process, approved under the Environmental Assessment Act. Under the Class EA process, projects are classified depending on the degree of impact to the environment, as follows:

- Schedule A projects involve normal or emergency operation and maintenance activities, and are pre-approved;
- Schedule B projects involve improvement and minor expansions to existing facilities, and are subject to a screening process with public consultation; and
- Schedule C projects involve new facilities or major expansion of existing facilities and are subject to the full class environmental assessment process.

On its website, the City of Hamilton posts details of all current and recently completed class environmental assessments.

The City has initiated a Schedule B class environmental assessment to determine the preferred location for a new waste haulage receiving station. The purpose of the station is to receive hauled sanitary effluent resulting from rural septic system clean out, to be disposed into the urban sanitary sewer system. Based on the sanitary sewer system and potential receiving wastewater treatment plants in the City of Hamilton, the study area is extensive, generally encompassing the Waterdown, Dundas, Ancaster, Stoney Creek and south Hamilton urban areas. As it may affect the Cootes to Escarpment EcoPark System, the study area includes the east end of the Dundas urban area near Cootes Drive and Olympic Drive, as well as the Waterdown urban area vicinity of Dundas Street and Highway 6.

The first Public Information Centre was held November 9, 2017, at the Canadian Warplane Heritage Museum adjacent to the Hamilton Airport.

All other current and completed class environmental assessments posted by the City have no bearing on the Cootes Paradise Heritage Lands.

3.0 Planning Policy and Regulatory Framework

The existing planning policy and regulatory framework in this area consist of Provincial jurisdiction and municipal single tier jurisdiction. The Provincial planning policy framework has been recently updated through the Coordinated Provincial Plan Review. This section provides a summary outline of the current planning policy and regulatory framework. A planning characterization matrix and a detailed review of the planning policy and regulatory framework for the Cootes Paradise Heritage Lands is provided in Appendix 2. Planning documents are by nature living documents and subject to review and change. Existing available information has been used to establish the jurisdictional limits including Zoning Bylaws and Provincial land use regulations. At the time of detailed project planning, it is important to obtain updated information and confirm applicable requirements.

3.1 Planning Inventory Summary

For the Cootes Paradise Heritage Lands, the current planning policy and regulatory framework reflect the jurisdiction of the Niagara Escarpment Plan, the City Official Plan and Zoning Bylaws, and the small area which remains under the Parkway Belt West Plan at Coronation Park. The current City Official Plan reflects the Provincial Plans in-place at the time of the Official Plan approval. It is anticipated that an update to the City Official Plan will be undertaken to reflect the jurisdictional transfer of areas previously outside but now under the jurisdiction of the Niagara Escarpment Plan, in the case of the Cootes Paradise Heritage Lands, Cootes Paradise Sanctuary 5. As a practical matter, the update will effect little fundamental land use policy change on these lands.

The bulk of the Cootes Paradise Heritage Lands centred on the marsh and north shore uplands are within the designated Rural Area of the City Official Plan. The development context for these lands has been set for many years given sanctuary status and more recent land use governance by the Niagara Escarpment Plan. These lands are outside of the urban serviced area.

Within the designated Urban Area of the City Official Plan are the management units along the north edge of the Westdale neighbourhood and McMaster University. The development context for these lands is the same as outlined above except that that formal parklands such as Coronation Park, Churchill Park and Cootes Paradise Sanctuary 14 are within the urban serviced area. The Heritage Lands west and south of Olympic Drive and Cootes Drive respectively are also within the designated Urban Area but are governed solely by the City Official Plan and Zoning Bylaws. The development context for these lands is set by the long-standing utility and open space uses, and by floodplain constraints.

Depending on location, the permitted uses on the Cootes Paradise Heritage Lands and adjacent lands are restricted by the Niagara Escarpment Plan and Development Control regulations or by the City Official Plan and Zoning Bylaws. The current zoning in the areas west of Olympic Drive and south of Cootes Drive appears complicated by multiple Zoning Bylaws; however, the dominant zoning reflects the longstanding open space and utility uses noted above. Given the extent of the Natural Heritage System under the City Official Plan, individual uses on the Heritage Lands may require Environmental Impact Studies (although these can be scoped through discussion with the City). This and servicing limitations in the designated Rural Area will be important considerations. Development in proximity to key natural heritage features may require vegetation protection zones in order to maintain the integrity of these features.

In the area of Niagara Escarpment Development Control, development permits may be required for individual projects on the Cootes Paradise Heritage Lands unless the nature of the project falls under the development control exemptions. For the Cootes Paradise Sanctuary, preparation of a master plan or management plan in accordance with the NEPOSS planning framework will help to facilitate projects which are not minor. For the areas outside of Niagara Escarpment Development Control, existing Zoning Bylaws will govern uses on the Cootes Paradise Heritage Lands. The City will replace the multiple Zoning Bylaws and outdated zoning when it brings lands to the west of Olympic Drive and south of Cootes Drive under Zoning Bylaw 05-200.

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

4.0 Recreation Inventory

4.1 Study Area Recreational Resources

4.1.1 Trails

Figure 3 illustrates the existing trail network, access points and parking areas in the Cootes Paradise Heritage Lands. The Royal Botanical Gardens' Cootes Paradise Trails Guide is provided in Figure 4. Within their land holdings in the Cootes Paradise Heritage Lands, the RBG maintains 18 km of trails, ten lookouts (six of which are observation platforms), six boardwalks, four docks and 12 creek crossings (bridges). RBG's trail network is described below and has been organized into two categories: trails that occur on the north shore and trails that occur on the south shore of Cootes Paradise.

RBG North Shore Trails

- Ontario Trees Trail: 0.7 km loop, packed earth trail, accessed from the Arboretum entrance driveway, near the Nature Interpretive Centre. This trail travels through a collection of trees native to the Carolinian forest region.
- Anishinaabe Waadiziwin Trail: 1.1 km trail (formerly part of the Captain Cootes Trail), accessed from the Nature Interpretive Centre, and connecting to the Captain Cootes Trail at Hickory Valley. This trail explores plants used by the Anishinaabe peoples, and their connections to culture, language, ecology and history. The trail surface varies and includes sections of packed
- earth, gravel and wood mulch. The RBG boathouse and boat storage yard are accessed by this trail.
- Captain Cootes Trail: 0.4 km trail, with connections to the Anishinaabe Waadiziwin, Grey Doe, Hickory Valley Trail and Bull's Point Trails. This trail extends along part of the north shore of Cootes Paradise and provides access to where Hickory Brook ad Long Valley Brook empty into Cootes Paradise Marsh.
- Lilac Dell Trail: 0.1 km gravel and asphalt trail, with connections to the Anishinaabe Waadiziwin Trail. This trail is accessed from the central parking area of the Arboretum and provides access to the horticultural lilac and magnolia collections. A staircase connects this trail to the Anishinaabe Waadiziwin Trail at the edge of Cootes Paradise Marsh.

Cootes Paradise Trails

18 km of trail, 10 lookouts
5 boardwalks, 12 creek crossings

MAP KEY

- RBG Properties
- Roads
- Rail Lines
- Wide, Open Trails
- Narrow, Dirt Trails
- Lookout
- Canoe Launch
- Boardwalks

- Waterfront Trail
- Wheelchair Access
- Trail Heads
- Parking
- Pay and Display Parking (free for RBG members displaying valid pass)
- See reverse for trail destination highlights

Trail Code

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

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

Special Protection Areas

ROYAL BOTANICAL GARDENS
www.rbg.ca

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

- Hickory Valley Trail: 0.7 km gravel trail, leading from the Rasberry House, along the westerly edge of the Arboretum, through the Hickory Brook valley, to the north shore of Cootes Paradise Marsh. This trail provides connections to the Pinetum, Anishinaabe Waadiziwin and Captain Cootes Trails.
- Grey Doe Trail: 1.1 km packed earth trail located to the east of Long Valley. This trail segment includes a bridge and provides connections to the Pinetum and Captain Cootes Trails.
- Bull's Point Trail: 1.5 km wood chip trail, with connections to the Pinetum and Captain Cootes Trails. The Bull's Point Trail dead ends at Bull's Point where a wooden lookout to the marsh has been erected.
- George North Lookout Trail: 0.1 km packed earth trail, connected to Bull's Point Trail. This short trail segment leads to a wooden lookout platform.
- Marsh Walk: 0.5 km packed earth trail, and 200 m marsh boardwalk, which extends into Cootes Paradise Marsh to provide a lookout to the marsh and Rat Island. The northern and southern terminus of this trail connect to the Bull's Point Trail to create a loop.
- Pinetum Trail (also known as the Ray Lowes Side Trail of the Bruce Trail): 2.1 km gravel trail, extending from York Road to the Rasberry House and Arboretum. This trail is gated at York Road to discourage cyclists and motorized vehicles. Parking is not provided at this access point (see discussion in section 4.1.2 and7.3). The Pinetum Trail is connected to Hopkins Loop, and Bull's Point, Grey Doe and Hickory Valley Trails. A broader trail connection is provided to the north, along York Road to the off-leash dog park where the Ray Lowes Side Trail enters Borer's Falls Conservation Area and eventually connects with the Main Bruce Trail above the Niagara Escarpment. This trail includes two wooden bridges located east of Bull's Point Trail and one wooden shelter. An old stone silo (a remnant of the old Rasberry family farm; see section 6.2.11) and trailhead signage are situated at the east access of this trail.
- Hopkins Loop: 1.2 km trail with a short loop at southern terminus. This trail is connected to the Pinetum Trail near the York Road access and provides connections to two utility corridors. Several single-family dwellings back onto this trail off of Ernest Street and Hopkins Court.
- Cootes Paradise Marsh Loop: RBG has proposed a canoe/kayak route through the Cootes Paradise Marsh, which begins at Spencer Creek, north of Cootes Drive, and extends around a loop through the marsh. RBG would like to establish a buoy system to restrict canoe/kayak access from sensitive waterbird nesting habitat. Signage of the proposed canoe/kayak route has been posted at the boathouse (see section 7.4).

RBG South Shore Trails

- Spencer Creek Trail: 0.6 km trail, extending from Cootes Drive into the Cootes Paradise Marsh along the outlet of Spencer Creek. This trail is connected to the Spencer Creek Rail Trail that cuts through Spencer Creek Conservation Area (described below). Access to this trail is challenging, as parking is available only on the opposite side of Cootes Drive (a four-lane road with an 80 km/hour speed limit).
- Chegwin Trail: 0.6 km trail with access points off Michell Crescent and to the rear of Brandon Hall off Stearn Drive on the McMaster University campus. This loop trail has sections of single track packed earth and boardwalk. This trail includes a 30 m long inner slope rail intended to guide users away from the edge of steep side slopes.
- Ravine Road Trail: 1.3 km trail, extending from McMaster University Stadium Parking Area H to Marion Avenue North, east of the Aviary and west of Churchill Park. This trail provides

connections to Ginger Valley Trail, Sassafras Point Trail, and Caleb's Walk. This trail is surfaced with segments of gravel and wood chip and includes a lookout onto Westdale Creek.

- Caleb's Walk: 0.5 km packed earth trail with a 225 m boardwalk and bridge. This trail is accessed from the Aviary access drive, off Oak Knoll Drive, and connects to the Ravine Road Trail. Parking is available at the Community Gardens.
- Sassafras Point Trail: 1.0 km linear trail with a small loop at Sassafras Point, extending from the Ravine Road Trail to Sassafras Point. At the tip of Sassafras Point, a lookout to the marsh and Cockpit and Hickory Islands is provided. Sections of this trail are surfaced with gravel and packed earth.
- Ginger Valley Trail: 0.9 km linear packed earth trail, connecting Churchill Park to the Westdale Ravine Trail. This trail can be accessed from three locations along the western edge of Churchill Park. From Ravine Road Trail, the Ginger Valley Trail crosses a bridge and includes two staircases and two retaining walls through hilly terrain. This trail includes a 15 m long inner slope rail intended to guide users away from the edge of steep side slopes.
- Princess Point Trail: 2.3 km trail network consisting of three short loop segments, with connections to the Ginger Valley Trail and Churchill Park, and the Desjardin Trail. This trail can be accessed off of Ginger Valley Trail at the north end of Churchill Park in two locations, from the end of Bond Street North, and from the Princess Point parking lot located at the end of Longwood Road North and Macklin Street North. This trail includes a bridge, a lookout platform at Cockpit Island, 40 m boardwalk through a marshy inlet, a wood chip lookout at Westdale Inlet, a wood chip lookout at Princess Point, a mowed grass lookout at Princess Point Bay, Princess Point parking lot and trailhead signage, and a 14 m wooden dock which provides water access to Cootes Paradise. Informal access to the water is also provided to the west of the dock, west of Princess Point (see Figure 3 and section 7.3.1). This trail consists of sections of mowed grass, packed earth, gravel, wood chip and asphalt. Several single-family dwellings on Parkview Drive and Bond Street North back onto this trail. During the winter months, a skating loop is maintained on Cootes Paradise Marsh by RBG, which is accessed from the Princess Point parking lot and trail.
- Desjardins Trail: 0.8 km paved multiuse trail which extends from the Cootes Paradise Heritage Lands into the Burlington Heights Heritage Lands and connects to the City of Hamilton Waterfront Trail. This trail is accessed from the south end of the Princess Point access drive, and passes vis a bridge over Chedoke Creek, along the eastern edge of Cootes Paradise Marsh and outlet to the Hamilton Harbour, and then under Highway 403. This trail provides access to the fishway and supporting infrastructure, which consists of two docks, a shelter, storage facilities and the fishway structure which is constructed across the outlet of Cootes Paradise Marsh to the Hamilton Harbour.

HCA Trails

- Spencer Creek Rail Trail: 1.3 km gravel trail constructed along an abandoned railway on the north bank of Spencer Creek through the Lower Spencer Creek Conservation Area. This trail is maintained by HCA, including a portion of the trail which passes through lands owned by Ontario Hydro by way of an agreement. In exchange, HCA provides maintenance around the access to the utility line. This trail extends from a gravel parking lot (owned by Canadian Tire) located on the east side of Dundas Street, just south of Cootes Drive. The Spencer Creek Rail Trail connects to RBG's Spencer Creek Trail at Cootes Drive. On-street parking is provided along the south side of Cootes Drive. The trail crosses Cootes Drive (a four-lane road with an 80 km/hour speed limit). There is no formal pedestrian crossing, thus it is not marked, nor is it

facilitated by a designated crossing or flashing lights (see section 7.3.1 for additional detail on this issue). Unsanctioned boat access occurs at the Spencer Creek Bridge on the south side of Cootes Drive, from McMaster University-owned property (i.e., from the eastern bank of the creek).

- Canal Park Trail: 0.5 km gravel trail that crisscrosses Canal Park, and outlets onto King Street East. Canal Park and an adjacent gravel pull off on King Street East, south of the Dundas Transfer Station, are popular locations for wildlife feeding, primarily for geese and ducks.

City of Hamilton Trails

- Centennial Park Trail: 0.1 km gravel trail running from East Street North to the Urquhart Butterfly Garden. This trail extends along the Desjardins Canal to access Canal Park. Small paths connect to the Centennial Park Trail and weave through the six large raised beds, which are planted with nectar and foliage plants for butterflies and associated caterpillars.
- Waterfront Trail: 0.1 km of the Waterfront Trail occurs within the Cootes Paradise Heritage Lands. The Waterfront Trail is a paved multi-use pathway, maintained by the City of Hamilton. This trail travels along the Hamilton Harbour to the north and south of its connection to the Desjardins Trail.
- Lake Jojo: An informal trail network has established around Lake Jojo. One trail runs from the City of Hamilton Public Works yard to the Dundas Transfer Station. Access to this trail is also possible from the end of Cairns Avenue. A second trail begins at York Road and traverses the north shore and ends at the Olympic Sports Park soccer field on the west side of Olympic Drive. The trail network consists of sections of mowed grass and packed earth, and includes multiple small pathways leading to the edge of Lake Jojo, which are frequently used to access fishing spots. Since this trail network has not been formalized, mapping is not available from the City of Hamilton and thus has not been included in Figure 3. Lake Jojo is allegedly used for skating in the winter.
- Multiuse Trail: There is a multi-use trail located along the eastern edge of Macklin Avenue, on the west bank of Chedoke Creek. This multi-use trail connects to the Desjardins Trail at Princess Point. This paved trail is not currently maintained by the City of Hamilton as a trail or used as a trail. Instead, cyclists and pedestrians use Macklin Avenue or Longwood Road North to access Princess Point and adjoining trails.

Unsanctioned trails occur in many locations within the Heritage Lands and many of these unsanctioned trails extend beyond the Current EcoPark System Lands onto neighbouring private property. It is important to note that unsanctioned trail development and trespassing is prohibited within the EcoPark System. RBG has closed approximately fifteen km of unsanctioned trails, and an additional eight km of old RBG trails to reduce impacts to the natural environment, minimize maintenance requirements, and simplify the trail network to avoid redundancy and duplication (see section 7.4.1).

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

RBG has put together a draft trail strategy to provide guidance for management of the trail network (RBG in progress). The guiding principles of the draft strategy are:

- focus on a single access for each area;

- maximize biodiversity protection;
- destination-based visitation;
- trailhead standardization (e.g., RBG, NEPOSS, Nodal Park, Cootes to Escarpment EcoPark System logos); and
- support educational programming.

4.1.2 Access Points

Figure 3 illustrates the sanctioned access points and parking areas provided by the land-owning partners in the Cootes Paradise Heritage Lands. Unsanctioned access points are described below but are not included in mapping.

Arboretum Access

The Arboretum Access is considered the main access point to RBG North Shore nature trails and the Arboretum (Figure 3). This access point is located within Cootes Paradise Sanctuary 3 (Figure 2) and is located at 16 Old Guelph Road. Paid parking is available in two large parking lots, which provide parking spaces for up to 108 vehicles, and includes four accessible parking spaces. Two bike racks are available. This access point is not on a public transit route, nor are bike lanes provided on Old Guelph Road. Non-motorized boat access is possible from the dock associated with the boathouse, however, users must portage canoes and kayaks approximately 400 m from the Nature Centre to access the water (see section 7.3.1 for additional detail on this issue).

Informal Access to Cootes Paradise Sanctuary 5

Informal access to Cootes Paradise Sanctuary 5 occurs at the ends of Parkview Avenue and Homestead Avenue. Parkview Avenue dead ends at a utility corridor. Unsanctioned trails have formed through the utility corridor and Cootes Paradise Sanctuary 5. An unsanctioned trail leads from the Homestead Avenue dead end, over a bridge that crosses the CNR railway and enters Cootes Paradise Sanctuary 3 at the Rasberry House, connecting to the North Shore trails. People allegedly use these informal access points to avoid admission and parking fees associated with the Arboretum Access.

York Road Access Point

The York Road Access provides pedestrian access to the Pinetum Trail/Ray Lowes Side Trail and Hopkins Loop and is located at the edge of Cootes Paradise Sanctuary 7 at York Road approximately 200 m north of Hopkins Court (Figure 3). Parking is not formally provided at this access point. In 2014, RBG closed the York Road parking lot located approximately 250 m south of the CNR railway. At the time of decommissioning, signs were posted with information about three alternative parking locations. Rather than parking in the recommended alternative parking locations, people frequently park along the shoulder of York Road, which poses safety concerns. See section 7.3.1 for additional detail on this issue.

Princess Point Access

The Princess Point Access is considered a primary entrance which provides access to the South Shore nature trails and Desjardins Multiuse Trail. It is located at 335 Longwood Road and provides parking for up to 88 vehicles, including four accessible parking spaces. Two bike racks are available and bike lanes are partially available along routes to this access. A bus stop is present on the adjacent road, making this access point accessible by public transit. Visitors must pay for parking using RBG's pay and display parking system. Pedestrian access to the trail system at Princess Point is also provided at the end of Bond Street North, and from the north end of Churchill Park.

Westdale Access

The Westdale Access is considered a primary entrance which provides access to the South Shore nature trails. It is located at 85 Oak Knoll Drive, at the Aviary and Westdale Teaching Gardens. Parking is provided at this access point for up to 22 vehicles, including two accessible parking spaces. Bike racks are not available, nor are bike lanes. A bus stop is present on the adjacent road, making this access point accessible by public transit. Visitors must pay for parking using RBG's pay and display parking system. The service access and the main trail access to the Westdale Ravine Trail are located at the juncture of Marion Drive and Dromore Crescent, just north of the former lawn bowling facility and east of the Westdale Access described above (85 Oak Knoll Drive). Improvements to this access to enhance its function as a trailhead were discussed with RBG and include proposed pathway surfacing and gradient improvements, installation of bike racks, and the addition of wayfinding and educational signage to inform users about trail conduct and the sensitivities of Cootes Paradise. Two additional pedestrian access points to the Westdale Ravine Trail are provided from Churchill Park via the Ginger Valley Trail.

Access Points adjacent to McMaster University

Access points to the Chegwin Trail and the west end of the Westdale Ravine Trail are located adjacent to the McMaster University campus. Pay parking is available nearby at McMaster University Stadium Parking Area H and underground parking north of the Ron Joyce Stadium. Descriptions of these access points are provided above in the trail descriptions (section 4.1.1).

Spencer Creek Access

On-street parking is provided on the south side of Cootes Drive at the crossing of Spencer Creek. Trail users can access the Lower Spencer Creek Rail Trail and Spencer Creek Trail from this location; however, safety concerns have been raised around the pedestrian crossing of Cootes Drive (see section 7.3.1). This is also considered a water access point for canoeists and kayakers. Users must portage their boats across Cootes Drive (a four-lane road with an 80 km/hour speed limit and no formal crossing) to access Spencer Creek on the north side, and can then paddle Spencer Creek into the open waters of Cootes Paradise Marsh. The gravel parking lot owned by Canadian Tire and adjacent to the Canadian Tire on Dundas Street, just south of Cootes Drive, is used as an unsanctioned parking and access location for the Lower Spencer Creek Conservation Area and Spencer Creek Rail Trail. Additional unsanctioned access points have been created at the end of Meadow Lane and from Sheldon Manor Park, a City of Hamilton Park located to the south of the Cootes Paradise Heritage Lands. These unsanctioned access points are used to access an unsanctioned trail network that has formed to the south of Spencer Creek, within the Lower Spencer Creek Conservation Area.

Western Cootes Paradise Heritage Lands Pedestrian Access Points

Pedestrian access from the western portion of the Cootes Paradise Heritage Lands is provided at Centennial Park, Canal Park and along Desjardins Canal Pond. An unsanctioned access point located to the east of Olympic Drive on private property provides water access for canoeists and kayakers. Users must park along Olympic Drive and trespass on private property to access the water east of Olympic Drive, as boats cannot currently access the Cootes Paradise Marsh from the Desjardins Canal Pond due to a metal barrier at the Olympic Drive culvert. Once accessing the water, users then paddle through the canal into West Pond, and then into Cootes Paradise Marsh, when water levels permit.

Lake Jojo Access

Access to the informal trail network at Lake Jojo is achieved from five locations: (1) the City of Hamilton Public Works yard provides access through a trail that extends from the Volunteer Field to the lands south of Lake Jojo; (2) the end of Cairns Avenue is used to access informal trails that have formed around the Delsey Wetlands (located west of Lake Jojo) and connect to trails south of Lake Jojo; (3) the Dundas Transfer Station is used to access trails south of Lake Jojo, where users must walk up the Dundas Transfer Station access drive and pass behind the chain-link fence that lines the eastern perimeter to connect with the informal trail network; (4) the narrow utility corridor that cuts across the north shore of Lake Jojo from York Road is used to access Lake Jojo for fishing, and is also used as a shortcut to Olympic Sports Park from York Road; and (5) access to the south end of the narrow utility corridor is achieved from a small gravel parking area off of Olympic Drive, located on private property, to the west of Olympic Sports Park, and from the sports fields at Olympic Sports Park. People park on the shoulder along Olympic Drive, and some may also access Lake Jojo via one of the trail entrances.

Unsanctioned Private Access

Some private landowners that back onto the Cootes Paradise Heritage Lands have fenced their properties and placed gates to access unsanctioned, self-made and maintained trails which, in some cases, connect to the sanctioned trail system maintained by RBG. The gates and trails are both unauthorized (see section 7.5 for additional detail on encroachment).

Gravel Pull-off South of Railway on York Road

There is a gravel pull-off located to the south of the railway on York Road. People previously parked here to access the Heritage Lands; however, CNR installed cameras in this location and will call the police if cars are parked there (Figure 3). Parking in this location has reduced significantly as a result.

4.1.3 Recreational Uses

Trail use within the Heritage Lands primarily consists of walking, jogging, hiking (ranging from casual outings by local residents and McMaster University staff and students, to more serious day-hikers), dog walking, and cycling. Cycling is permitted on sanctioned trails on City of Hamilton and HCA lands within Cootes Paradise; in fact, Cootes Paradise Drive features a multi-use path that is a primary transportation corridor between Dundas and McMaster/City of Hamilton. Cycling is not permitted on trails owned and maintained by RBG. While HCA does not groom or maintain trails specific to cross-country skiing, the public is permitted to travel by cross-country ski on sanctioned trails. Cross-country skiing is not permitted on RBG trails; trails are not maintained for this use and trails are very steep in many sections and are not suitable for this use. Running/jogging is not permitted on RBG trails. Generally, the current level of recreational use appears to be having little impact on the surrounding natural system. However, there are some specific locations where there is an unacceptable amount of bare soil, root exposure, erosion, etc. These areas would benefit from trail closures with commensurate restoration, and management to address existing impacts (e.g., sections of Chegwin Trail). These issues and locations are described in section 7.4.1 and will be addressed in the management plan.

Walking/Jogging/Hiking

Walking, jogging, running, and hiking are all permitted uses of City of Hamilton and HCA sanctioned trails. Recreational uses on RBG trails are limited to hiking and walking. RBG policy does not permit cross-country skiing, cycling, or running as trails are not set up for these types of higher-impact uses. Whereas HCA and City of Hamilton do not have similar restrictions, cross-country skiing is not known to be occurring regularly on sanctioned trails within the Heritage Lands, likely as a result of the proximity of

the Hamilton-Brantford Rail Trail which is a popular and well-traveled cross-country ski route. HCA and City of Hamilton trails are not groomed for cross-country skiing within the Heritage Lands.

Regular hiking activities occur throughout RBG's nature trails on both the north and south shores of Cootes Paradise. Avid Bruce Trail hikers use the Pinetum Trail/Ray Lowes Side Trail to connect to other RBG trails to extend their hike through the north shore area. On weekends, the access points described in section 4.1.2 are busy with parked cars and EcoPark System users. During weekdays these same points regularly contain multiple vehicles at any given time. This attests to the current popularity of RBG's nature trails, Bruce Trail Side Trail and other recreational trails, including unsanctioned ones, in this area of the Cootes to Escarpment EcoPark System. In addition, there are many local residents, students and staff of McMaster University who use the south shore nature trails for casual walking and as a short-cut to McMaster University campus during weekdays as well as on weekends. Tour groups from the Greater Toronto Area and other areas organize hikes to take in the fall colours, enjoy the plant collections at the Arboretum (e.g., lilac festival), or in the early spring to enjoy wildflowers.

Walking, jogging, and running are common occurrences on both the multi-use trail associated with Cootes Drive and the adjacent Spencer Creek Rail Trail (City of Hamilton and HCA owned-lands, respectively). This route is very well travelled and popular for both commuting, casual, and fitness pursuits.

The Hamilton Burlington Trails Council completed a trail use survey between 2015-2016 which included a survey location at Cootes Drive Trail at Saunders Boulevard (Zhou and Maich 2017). Although this survey location is located south of the Cootes Paradise Heritage Lands, trail users most likely use the multi-use trail that extends along Cootes Drive between Cootes Paradise and Lower Spencer Creek Conservation Area (in the Cootes Paradise Heritage Lands). According to the survey, most users access the trail by foot (almost 80% of users). Most trail users report commute, exercise and relaxation as the purpose of their trail use (Zhou and Maich 2017).

There are some risks associated with hiking on nature trails and individuals must accept personal responsibility for their safety on the trails. Some trails follow along edges of ravines, often with no barriers from steep slopes. RBG provides a "Trail User's Resource Guide" on their website, which provides safety tips and alerts users of these potential safety concerns (https://www.rbg.ca/files/pdf/gardenareas/trails/TrailUsersResourceGuide.pdf, Accessed November 21, 2017). In order to minimize risks, RBG staff and volunteers work to ensure trail blazes and other signs are visible, trails are clear of fallen tree limbs, hazard trees are removed, and bridges and boardwalks are in a good state of repair. HCA similarly posts Trail Safety & Etiquette (https://conservationhamilton.ca/trail-safety-etiquette/), Accessed May 3, 2018, which provides guidance on general trail rules and specific etiquette for Hikers and Dog Walkers.

Birdwatching/Nature Appreciation

Birdwatching and other forms of nature appreciation, which include botanizing and photography, occur throughout the Heritage Lands, which are rich in biodiversity and scenic landscapes. Cootes Paradise Heritage Lands are a focal point for migratory birds as the site is strategically located at the intersection of the Niagara Escarpment and Lake Ontario. The area represents multiple Important Bird Area designations including concentrations of breeding/rare species and migratory bird concentration and staging areas. Users undertaking these forms of recreation tend to stick to sanctioned trails and look out platforms and have minimal impact on the natural environment. Within RBG's Cootes Paradise

Sanctuary, birdwatching and nature appreciation is a focal activity with various lookout points outfitted with birding interpretation signs. Multiple birding and botanical programs are provided through RBG and are also a highlighted interest of the Hamilton Naturalists' Club. Canal Park and the Desjardins Canal Pond (HCA and City of Hamilton owned-lands, respectively) are both actively visited by birdwatchers, primarily seeking to view waterfowl, during migration period and throughout the breeding season. HCA also uses the Lower Spencer Creek Conservation Area for programming (e.g., Spencer Creek Salmon Stroll); this part of the Heritage Lands is also, to a lesser extent, frequented by birdwatchers.

Dog Walking

Dog walking occurs frequently in the Heritage Lands and may represent the largest single user group in terms of the number of visits per year (approximately 50-75/day on average). Many dogs are walked off leash through the Current EcoPark System Lands. Neither HCA, RBG or the City of Hamilton allow off-leash dogs within the Cootes Paradise Heritage Lands. Identified impacts of off-leash dogs on natural areas include:

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

Off-leash dogs may also impact the experience of other visitors by charging or jumping up on individuals or other dogs. As some people are afraid of dogs several users do not visit the Cootes Paradise Heritage Lands or visit it once and never return due to an upsetting experience, an outcome reported to RBG on many occasions and similarly voiced during the Public Open House consultation. 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.

The closest off-leash dog park is located at Borer's Falls Conservation Area, within the Borer's Falls-Rock Chapel 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 utilize existing EcoPark System trails that are located closer to their homes to provide unsanctioned off-leash opportunities for their dogs. The Arboretum is also frequently used as an unsanctioned off-leash dog park, which results in issues including those listed above as well as issues related to trampling display gardens and plant collections.

The trail use survey completed by the Hamilton Burlington Trails Council found that 3% of multi-use trail users at Cootes Drive and Saunders Boulevard use the trail for dog-walking (Zhou and Maich 2017). Most dog-walking occurs within the natural areas of the Cootes Paradise Heritage Lands.

Cycling

Cycling is not permitted on RBG nature trails. Cycling is permitted on the Spencer Creek Rail Trail (owned and maintained by HCA), Desjardins Trail and Waterfront Trail. In general, the desire for cycling within the Cootes Paradise Heritage Lands is limited by the fact that the topography is so variable and steep in many sections, particularly on south shore nature trails. For the most part, avid cyclists, especially mountain bikers, would like to utilize the trail network within the Cootes Paradise Heritage Lands as a means to connect to the trail network at Clappison Woods located within the Clappison-Grindstone Heritage Lands, east of Highway 6 (Cootes to Escarpment EcoPark System 2016a), i.e., they do not want to use it as a destination, only to access another area without using roads, which do not accommodate cycling safely.

Unsanctioned cycling does occur, however, throughout the north shore nature trails to a limited extent, and particularly along the Pinetum Trail/Ray Lowes Side Trail which provides a connection between York Road and Old Guelph Road, through the Arboretum. A primary concern related to the overall cycling issue is the unsafe nature of York Road for cyclists as a result of the speed limit, narrow road width and lack of road shoulder, particularly as York Road crosses through Hickory Valley. Cycling on south shore nature trails is generally limited to the use of trails as a shortcut to McMaster University (i.e., using Ravine Road Trail). Over the last few years, cycling use has reduced on RBG lands, with increased signage and other amenities intended to deter cycling activities. Cyclists frequently use the Spencer Creek Rail Trail (a permitted use), through the Lower Spencer Creek Conservation Area. Also, at Lower Spencer Creek Conservation Area, mountain bike/BMX routes have been constructed on lands south of the creek. These routes are not sanctioned, and this type of activity is discouraged 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.

Observations from fieldwork revealed that in most cases, cycling activity is confined to defined trails with limited areas of impact resulting from trampling and soil erosion. In a few locations, impacts to understory vegetation and soil conditions were noted, particularly on the Chegwin Trail (Figures 3 and 9), which can in part be attributed to cycling use. In addition, small animals including small turtles, snakes and amphibians are occasionally run over by cyclists within the Cootes Paradise Heritage Lands. This, unfortunately, is how RBG has learned about the presence of some snake species on their property. On Spencer Creek Rail Trail, hatchling turtles are frequently run over by cyclists as the rail trail is a major nesting area for the turtles of Cootes Paradise. Wildlife corridor work completed in the area may increase the number of turtles nesting in the area. This issue is discussed further in section 7.4.1.

The trail use survey completed by the Hamilton Burlington Trails Council found that 13% of trail users access the multiuse trail at Cootes Drive and Saunders Boulevard by bicycle (Zhou and Maich 2017). Most trail users report commute, exercise and relaxation as the purpose of their trail use (Zhou and Maich 2017).

The City of Hamilton Cycling Plan (2009) and the Recreational Trails Master Plan (2016) identify the cycling routes around Cootes Paradise as key travel routes for two reasons: (1) to facilitate a cycling route around Cootes Paradise; and (2) to provide a cycling link between Hamilton and Burlington. Key roads include Macklin Street/Longwood Road, King Street, Main Street adjacent to McMaster University, Cootes Drive, York Road/Olympic Drive and Old Guelph Road. Valley Road is also considered a key travel route, providing the cycling connection to Borer's Falls-Rock Chapel Heritage Lands.

The City of Hamilton Cycling Plan (2009) identifies a plan for paved shoulders on the full length of York Road; however, the City of Hamilton intends to modify this plan given the challenge of widening the York Road platform (City of Hamilton, Daryl Bender, pers. comm. February 15, 2018). The updated Cycling Master Plan, which is part of the Transportation Master Plan for the City of Hamilton (planned to be approved in spring of 2018), proposes a multi-use trail along a powerline corridor to bypass a large portion of York Road. The portion of the multi-use trail along the York Road Right-of-Way is planned to be along the north side of the roadway. The Hamilton Burlington Trails Council is currently pursuing funding to proceed with a functional design for this facility, which is part of a route they are calling the 'Cootes Loop' (City of Hamilton, Daryl Bender, pers. comm. February 15, 2018).

Fishing

Fishing occurs at various locations along the shores of Cootes Paradise Marsh, Spencer Creek and Lake Jojo. Fishers often access the water's edge via unsanctioned single-track footpaths. In some areas, the density of these footpaths has had a negative impact on shoreline vegetation, including marsh restoration plantings installed by RBG (Theysmeyer et al. 2016). These footpaths are also used by hikers and dog walkers to view and access the water/marsh. Fishing is regulated to protect spawning fish through provincial regulations. Spawning to support Lake Ontario fish populations is one of the primary ecological functions of lower Spencer Creek and Cootes Paradise. Poaching of spawning fish is a significant current issue, particularly in lower Spencer Creek.

Canoeing and Kayaking

Canoeing, kayaking, paddle boarding, parasailing, ice boating, etc. occur in Cootes Paradise Marsh when water levels and conditions permit. Managing people and access to water and ice must be safe, but also must minimize impacts to the natural environment. This issue is elaborated on in section 7.3.1 and will be addressed further in the management plan.

Skating

RBG maintains a skating loop in the winter when ice conditions on the marsh are suitable. This skating loop is accessed from Princess Point. Lake Jojo is also a popular skating destination during winter months and is organized and maintained by local residents.

Community Gardens

There are currently three locations where community gardens occur within the Cootes Paradise Heritage Lands: (1) a community vegetable garden adjacent to Olympic Arena (Olympic Sports Park) on RBG and Ontario Hydro owned-lands; (2) a community vegetable garden at the teaching garden in the Westdale area (Cootes Paradise Sanctuary 14); and (3) a plant collections garden located at the Arboretum, cared for by RBG volunteers. This use requires further consideration on how it fits into the Cootes to Escarpment EcoPark System and the Cootes Paradise Heritage Lands.

Additional Recreational Uses

Additional recreational uses of the Heritage Lands include soccer (Churchill Park), baseball (Volunteer Field Park, Martino Memorial Park, and Churchill Park), swimming (Coronation Park outdoor swimming pool), skating/hockey (Olympic Sports Park Arena and Coronation Park Arena), and gardening (Arboretum, Urquhart Butterfly Garden, Teaching Gardens at the Aviary). All these are permitted where they occur in maintained facilities.

Motorized Vehicle Use

Some of the north shore nature trails and utility corridors receive occasional motorized vehicle use (i.e., ATVs, dirt bikes, e-bikes and snowmobiles). Dirt bikes equipped with spike tires are also used occasionally on ice that forms on Cootes Paradise Marsh during winter months. Motorized vehicle use is not permitted within the Current EcoPark System Lands and has been observed to cause destruction to vegetation, wildlife, wildlife habitat and soils.

Hunting/Poaching/Foraging

Hunting allegedly occurs within the Heritage Lands, including both bow-hunting and hunting with firearms. Hunting is prohibited within the Current EcoPark System Lands. Poaching of wildlife also occurs and is illegal. Foraging for mushrooms and wild plants also occurs, and although not illegal, RBG has created a policy to address the impacts associated with this use (see section 7.5.1 for additional detail on this issue).

Wildlife Feeding

Although unsanctioned and discouraged, wildlife feeding is a popular activity at Canal Park and Desjardins Canal Pond. People feed ducks and geese from these locations (most frequently bread) on a regular basis. Section 7.7.1 provides additional detail on this issue.

Unsanctioned Party Spots/Fire Pits

Unsanctioned after-hour gathering locations ("party spots") were noted in several locations within the Heritage Lands, all of which are accessed through the existing trail network, mostly on unsanctioned trails. 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, consumption of alcohol and drugs, 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 (see section 7.4.1 for additional detail on this issue and management opportunities).

4.1.4 Existing Infrastructure

RBG's Cootes Paradise Trail system contains extensive infrastructure to assist trail users in navigating across creeks and marshy terrain. This infrastructure includes six lookout platforms, six boardwalks and eight bridges, several of which are equipped to provide service vehicle access. The Cootes Paradise Heritage Lands contain several existing forms of infrastructure that facilitate recreational use, which are inventoried below:

- Arboretum: located in Cootes Paradise Sanctuary 3, the Arboretum serves as the main access to the north shore nature trails with six linking locations, and includes the Nature Interpretive Centre, Rasberry House, plant propagation facilities and greenhouses, parking areas, access kiosk, interpretive signs, and the following formal plant collections:
    - Katie Osborne Lilac Collection;
    - Magnolia Collections East and West;
    - Dogwood and Redbud;
    - Crabapple Collection;
    - Flowering Cherries;
    - Avenues of Trees; and
    - Synoptic Shrub Collection.

- Rasberry House and Silo: the house and silo once belonging to the Rasberry family are located within Cootes Paradise Sanctuary 3. See section 6.2.11 for additional detail on the cultural heritage significance of this resource.
- Nature Interpretive Centre: located on the north shore of Cootes Paradise in the Arboretum (Cootes Paradise Sanctuary 3), just off Old Guelph Road. The Nature Interpretive Centre is used to host events, is used extensively for summer nature-based camp programs and environmental school programs and serves as the trailhead for many of the nature trails located on the north shore of Cootes Paradise. The Nature Interpretive Centre includes an outdoor amphitheatre and three classrooms.
- Boat House: the RBG boathouse is located in Cootes Paradise Sanctuary 4 on the north shore of Cootes Paradise, south of the Arboretum (Figure 3). The boathouse is used for boat and equipment storage and as a boat launch by RBG staff and is the hub for summer camp canoe programs.
- Teaching Garden: located at Cootes Paradise Sanctuary 14 (Figure 2) on the south shore of Cootes Paradise. The Teaching Garden includes a building where exotic birds are kept on a temporary basis (the Aviary), a parking lot, teaching gardens and garden plots, and storage buildings. Caleb's Walk is accessed from the access drive to the Teaching Garden (Figure 3). The property also contains two trailheads to RBG nature trails.
- Urquhart Butterfly Garden: located at Centennial Park, consists of six large raised beds which are planted with nectar and foliage plants needed by butterflies and their caterpillars.
- Canal Park: located north of the Desjardins Canal Pond, contains an old chimney (see section 6.2.4 for cultural heritage significance). HCA has installed interpretive signs and plans to create a shade structure and a lookout platform (footings for this structure are already in place). HCA has created and protected turtle nesting areas at Canal Park. As part of restoration initiatives, HCA has prepared floating mats of marsh vegetation, which have been placed in the Desjardins Canal Pond, adjacent to Canal Park.
- Olympic Sports Park: located on Olympic Drive, this park consists of one baseball diamond, two full-sized soccer pitches, six junior soccer pitches, and the Olympic Ice Surface Arena. A community garden has also been created adjacent to Olympic Sports Park, on privately-owned lands within the utility corridor.
- Volunteer Field Park: located off King Street East, adjacent to the City of Hamilton Public Works Yard. This park consists of one baseball diamond.
- Martino Memorial Park: located off King Street East, adjacent to the Dundas Wastewater Treatment Plant. This park consists of two junior baseball diamonds.
- Churchill Park: located on Cline Avenue North, adjacent to the Aviary. This park consists of the Churchill Park Club House, former lawn bowling facilities, two baseball diamonds, six soccer pitches, a playground, spray pad, and trail entrances to RBG nature trails.
- Princess Point: located in Cootes Paradise Sanctuary 15 off Longwood Road North/Macklin Street North. This area contains a large parking lot and trailhead, rain gardens, a boat dock for public access to Cootes Paradise Marsh, and interpretive signs and trail highlighting prairie habitat and restoration.
- Coronation Park: located on Macklin Street North. This park consists of the Coronation Arena and Outdoor Pool, change rooms, parking facilities, and playground.
- Cootes Paradise Fishway: located on the Desjardins Canal between Hamilton Harbour and Cootes Paradise, under the McQuesten (High-Level) Bridge on York Boulevard. The primary function of the fishway is to prevent the spring migration of adult carp from Hamilton Harbour

into the marsh. Grates on the fishway act as a strainer preventing passage of all large fish (>30 cm) into the marsh, while maintaining water flow and access for smaller fish (see section 5.5 for additional detail, and a description of the Cootes Paradise fishway prepared by RBG (https://www.rbg.ca/files/pdf/exploreandlearn/naturallands/fishway.pdf, Accessed November 21, 2017).

The Cootes Paradise Heritage Lands also include the following pieces of public infrastructure:

- Dundas Transfer Station;
- City of Hamilton Public Works yard;
- Dundas Wastewater Treatment Plant;
- a closed landfill (located at Olympic Park); and
- road network.

There are several major roads that occur within, but are not formally part of, the Cootes Paradise Heritage Lands, including: Macklin Street North, Longwood Road North and South, Main Street West, King Street East, Cootes Drive, Olympic Drive, York Road and Old Guelph Road. The existing road network directly affects recreational transportation through the area as well as impacting wildlife corridos. These issues are discussed in further detail in sections 7.4 and 7.7 respectively.

4.1.5 Existing Programming

The natural setting of Cootes Paradise Heritage Lands lends itself to passive recreational pursuits including hiking and nature appreciation. RBG Auxiliary leads nature walks through RBG lands from the Arboretum/Nature Interpretive Centre along Ray Lowes/Pinetum Trail, Bull's Point Trail, Captain Cootes Trail and Anishinaabe Waadiziwin Trail on the north shore. They also lead walks from Churchill Park along Caleb's Walk, Sassafras Point Trail, Ginger Valley Trail and Westdale Ravine Trail, and along the Princess Point Trail system (Figure 3) on the south shore. To become a trail volunteer, RBG Auxiliary Trailwatchers must provide 40 hours of service per year/volunteer, and attend instructional hikes that occur once a month, guide hikes to RBG natural areas that occur weekly, and report issues related to trail conditions and trail use. The RBG Auxiliary provide important educational programming for participants and report wildlife sightings to RBG staff.

Stewards of Cootes Watershed are an important component of community engagement and were recognized as Hamilton Environmentalists of the Year (2016). Volunteer members work together to restore the condition of the Cootes watershed by cleaning and removing natural and human-made refuse, primarily on weekends. This organization has been in operation for five years and has successfully removed 380,000 lbs of waste from the watershed to date. This group is growing and has begun taking on other stewardship-based projects. Sites for clean up are selected based on observations on where waste has accumulated.

The Arboretum hosts multiple large-scale visitor events annually, including the Biodiversity Festival, Fall Migration Festival, and the Lilac Festival. Secondary events and site rentals for events also occur throughout the season. Summer camps are provided annually by RBG and McMaster University, which provide recreation and education opportunities that are based in the Cootes Paradise Heritage Lands. These camps also provide important stewardship opportunities for participating youth.

RBG provides a wide variety of cross-curricular resources and school programs for preschool, kindergarten, grades 1-8, and grades 9-12. Programs focus on early years exploration, self-guided

exploration, science, cross-curricular – arts/language/social studies + science, physical education and healthy living, team building and leadership, science/environment/geography. Special exhibits and holiday-themed events are also available at different times of the year. Adult programming includes a speaker series, gardening workshops, botanical identification workshops, art workshops, health and wellness classes and workshops, and culinary-themed events.

RBG has an interpretation plan that looks at key messaging for all their properties. More than 250 signs, including approximately 50 interpretive signs are included as part of RBG's programming.

Visitors are welcome at the fishway and guided group tours can be arranged. Fishway baskets are lifted and emptied twice a day (usually at 8:30 am and 2:30 pm), and professional fishway technicians sort and measure the fish that have been caught. This provides an excellent learning opportunity as fish can be viewed up close. Visitors can also watch the carp being put back to the Hamilton Harbour.

Research is currently being carried out on RBG lands by the following organizations:

- McMaster University;
- University of Guelph;
- University of Toronto;
- Fisheries and Oceans Canada;
- Environment and Climate Change Canada;
- Canadian Food Inspection Agency;
- City of Hamilton;
- Ontario Ministry of Natural Resources and Forestry; and
- local high schools and elementary schools.

RBG has a Trail Monitoring Program to assist in the management of the trail network and supporting infrastructure. Trail monitoring also includes a hazard trees maintenance schedule, which generally examines RBG trails on a three-year rotation. Highly-used educational program trails are assessed on an annual basis. All scheduled hazard tree removal and maintenance is carried out between October and March to minimize impacts to the natural environment. RBG is currently updating their Hazard Tree Assessment procedure.

Active sports facilities and programming are offered in several locations within the Cootes Paradise Heritage Lands, which include baseball, soccer, hockey, figure skating, and until recently lawn bowling (see sections 2.1 and 6.2.7).

The most recent master plan for RBG was completed in 2003 by Landplan (Landplan 2003), and there is a desire to create a new one. RBG is currently completing an overall visioning exercise to provide direction to the master planning process, and the master plan process is expected to begin in 2018. Steps will need to be determined for how best to mesh the current management plan study with the master planning process.

4.2 Adjacent Recreational Resources

4.2.1 Trails

Existing adjacent and/or connecting trails include:

- Pinetum Trail/Ray Lowes Side Trail is used to connect to the adjacent Borer's Falls-Rock Chapel Heritage Lands and the Bruce Trail;
- Waterfront Trail is used to connect to the adjacent Burlington Heights Heritage Lands; and
- trails within the Cootes Paradise Heritage Lands are used by cyclists to connect to the road network and Clappison Woods, east of Highway 6 in the Clappison-Grindstone Heritage Lands. Cycling is permitted on only some of these trails (e.g., HCA does not restrict cycling on rail trails such as the Spencer Creek Rail Trail).

Additional trail connections to the Borer's Falls-Rock Chapel Heritage Lands are desired by the Cootes to Escarpment EcoPark System partners and the community. However, opportunities for additional trail connections to lands adjacent to the Cootes Paradise Heritage Lands are limited by existing residential development, lands in private ownership, and the constraints associated with major roadways (e.g., Olympic Drive and Cootes Drive), including how to provide safe crossing areas. This issue is discussed further in section 7.4.

4.2.2 Access Points

In several cases, portions of the unsanctioned trail system rely on accessing the Current EcoPark System Lands through adjacent privately-owned lands (see section 7.3.1 on the issue of trespassing):

- water access east of Desjardins Canal Pond, east of Olympic Drive, into Cootes Paradise Sanctuary 10;
- end of Parkview Avenue into Cootes Paradise Sanctuary 5; and
- access to the north shore of Lake Jojo through the narrow utility line (privately-owned), running between York Road and Olympic Drive.

There are several locations where new access points, parking areas and trail linkages could potentially be developed on recently acquired lands in the Borer's Falls-Rock Chapel Heritage Lands, adjacent to the Cootes Paradise Heritage Lands.

There are no sanctioned trail connections from north shore nature trails to the Borer's Falls-Rock Chapel Heritage Lands, particularly the Pleasant View Natural Areas (Cartwright Tract, Nicholson Tracts, Hopkins Tract). Opportunities to develop multi-use trails on roadside shoulders in rights-of-way and/or utility corridors, to create these much-needed trail linkages, will be explored in more detail as part of the management plan. It should be noted, however, that trail connections may not be feasible in all desired locations due to the presence of significant species and steep slopes. Considerations should also be given for future planned road works such as potential re-alignments, and/or widening or geometric improvements within the surrounding road network.

4.2.3 Recreational Uses

Motorized vehicle (e.g., ATV, dirtbike) trails are apparent along utility corridors and in other areas of the Heritage Lands. The appropriateness of recreational motorized vehicle use is dependent on the authorization of the landowners. In the Current EcoPark System Lands, it is considered an unsanctioned use and is viewed as trespassing.

4.2.4 Existing Infrastructure

The surrounding road network is actively used by on-road cyclists and includes routes that incorporate Cootes Drive, Olympic Drive, and York Road. Cycling on York Road in particular, has been raised as a

major safety concern due to the narrow width of the road, poor sight-lines, traffic volume and the speed at which motorized travel. Section 7.4.1 provides additional detail on this issue.

The CNR railway bisects the Cootes Paradise Heritage Lands, as well as the adjacent Borer's Falls-Rock Chapel Heritage Lands (Figure 2), which presents challenges for north-south trail connections between the two Heritage Lands. An existing pedestrian bridge over the CNR railway is located between Cootes Paradise Sanctuary 3 and Cootes Paradise Sanctuary 5, just west of the Rasberry House. Opportunities for this connection will be addressed in the management plan, as well as the general topic of achieving safe railway crossings in the Cootes to Escarpment EcoPark System.

5.0 Natural Heritage Inventory

5.1 Physiography and Surface Geology

The Cootes Paradise Heritage Lands are situated at the base of the 18 km-long Dundas re-entrant valley of the Niagara Escarpment. This is a deep preglacial river valley in the bedrock (Chapman and Putnam 1984). The Heritage Lands are dominated by a large, shallow water lagoon known as Cootes Paradise. The lagoon is separated from Hamilton Harbour by a baymouth gravel bar formed by glacial Lake Iroquois (now Lake Ontario) that has been highly modified in the past to change the connection between Cootes Paradise and the harbour. The Cootes Paradise Heritage Lands are located within the Iroquois Plain physiographic region and are characterized as possessing significant earth science features due to the presence of: "an array of drowned valley landform features which demonstrate the evolution of Lake Iroquois and Lake Ontario" (Schwetz 2014).

Areas surrounding the Cootes Paradise lagoon are overlain by sand and gravel lacustrine deposits that have since been eroded to produce a landscape of rolling hills and ravines (Schwetz 2014). With the retreat of the glacial lake at the end of the last ice age, 15 m-deep valleys were carved into the lacustrine soils surrounding the Cootes Paradise lagoon. Subsequent isostatic rebound has increased the levels of the lake and created the existing "drowned valley" lagoon (Riley et al. 1996). The surficial deposits in the Cootes Paradise Heritage Lands are underlain by the Queenston Bedrock Formation, which is exposed only along some ravines and occasional shoreline bluffs. Overlain on the Queenston Bedrock Formation is a plain of Halton Till, which is subsequently overlain by the aforementioned lacustrine sediment deposits. The Halton Till is exposed only in the northern and western areas of the Cootes Paradise Heritage Lands (Schwetz 2014). Several of the peninsulas that jut into the marsh are a function of underlying sandstone and conglomerate rock. Examples of this are visible along Ravine Road Trail on the south side of Cootes Paradise.

The soils of the areas surrounding the Cootes Paradise lagoon are characterized as Grimsby sandy loam and Springdale sandy loam. Beneath the waters of the lagoon, the area is underlain by sediments and marsh muck. Poorly-formed soils occur along the slopes of the steep ravines, where erosion and steepness have inhibited their development (Schwetz 2014). This has substantial consequences for the sensitivity of soils and vegetation to disturbance, and their rehabilitation/restoration.

Several areas within the Heritage Lands are the result of infilling. For example, Olympic Park is located on the site of the closed Olympic Drive landfill. At Princess Point, the parking lot and the land between the parking lot and marsh to the northeast is the result of infilling.

5.2 Surface Water

The Cootes Paradise Heritage Lands are located within the Spencer Creek Watershed (Hamilton Conservation Authority) and the North Cootes Paradise Watershed Area (Conservation Halton). Spencer Creek Watershed has a drainage area of 27,800 ha of land and consists of 13 subwatersheds extending northwest of Lake Ontario. The subwatersheds that occur within the Cootes Paradise Heritage Lands are Lower Spencer Creek, Borer's Creek and Chedoke Creek. Within the Heritage Lands, several additional small tributaries drain to the Spencer Creek watershed (Delsey Creek, Ancaster Creek, Chegwin Creek, Double Marsh Springs, and Westdale Creek). The terminus of the Spencer Creek watershed occurs at the fishway under the Hamilton baymouth gravel bar where it drains into Hamilton Harbour (Hamilton Conservation Authority 2010). Within the Cootes Paradise Heritage Lands, the North Cootes Paradise Watershed Area includes Mink Brook, Spring Brook, Long Valley Brook, Hickory Brook, Highland Creek, Corner Brook and Mercer Spring, all of which drain into Cootes Paradise. Drainage and outflow at the west end of Cootes Paradise has been altered substantially. Figure 5 illustrates the watercourses that drain into the Cootes Paradise Heritage Lands.

Extensive modifications have occurred to three of the tributaries within the Heritage Lands, including the main Spencer Creek channel which was channelized to facilitate the now abandoned rail line and canal construction, Delsey Creek through various infilling, and Chedoke Creek which was modified through the infilling of the marsh for the closed Kay Drage Landfill and construction of Highway 403.

The outlet of Cootes Paradise Marsh into Lake Ontario is a relocation of the original outlet. The original outlet was much wider than the relocated one. The narrowness of the relocated outlet creates an artificial bottleneck, which can backflood lower Dundas in extreme flow conditions. The width of the relocated outlet is restricted by bridge abutments which support the oldest freeway bridge and oldest train bridge in Ontario (Cooper 2014).

Major springs, a small tributary and a pond feature occur on the south side of the Lower Spencer Creek Conservation Area.

Figure 5. Watercourses of the Cootes Paradise Heritage Lands

Cootes Paradise Marsh is the central water feature in the Cootes Paradise Heritage Lands. Water levels within Cootes Paradise Marsh fluctuate substantially on an annual basis (±70 cm) (Theysmeyer et al. 2016). The average spring high water level in Cootes Paradise Marsh is 75.15 msl and the average winter low water level is 74.45 msl (Water Level Implications, RBG 2004). Peak spring water level generally occurs mid-May to mid-June. Several urban storm drains empty directly into Cootes Paradise Marsh, including McMaster Campus, Main Street East in front of McMaster Campus, Longwood Road/Macklin Avenue, and Highway 403. Of these, the McMaster and Main Street drains provide the largest contributions of stormwater, which enters into an extremely environmentally sensitive area of the marsh (Spencer Creek Special Protection Area).

A dominant feature of Cootes Paradise is the Desjardins Canal, which formally had an important economic role for the Town of Dundas, and resulted in the current connection to Hamilton Harbour. Only remnants of it are still visible and it is more fully discussed as a cultural heritage resource (section 6.2.4).

Lake Jojo, located north of the Dundas Transfer Station (Figure 2), was historically a marsh (pre-1960s) fed by small streams at its southwestern and northern corners and a spring at its northwestern corner (Duncan 1990). After the eastern and southern parts of the wetland were used as a municipal dumpsite and Olympic Drive was constructed, the drainage of the marsh changed, and the lake formed (Duncan 1990). Lake Jojo is connected to Cootes Paradise by Delsey Creek (Figure 5), which flows to the south

through a drainage ditch that runs to the east of the Dundas Transfer Station driveway and under King Street East through a culvert that drains into the Desjardins Canal.

5.3 Vegetation Communities

5.3.1 Inventory

Figure 4 illustrates the vegetation communities of the Current EcoPark System Lands. Table 3 summarizes the number of polygons, area and percentage of the Current EcoPark System Lands that each ELC vegetation community comprises. Table 4 summarizes ELC composition of each parcel. Some polygons were too small to map (i.e., small slivers often located at the very edge of the Current EcoPark System Lands); therefore, the number of polygons reported in Table 3 may not match Figure 4. In addition, methods used to digitize ELC polygons resulted in the by-product of small slivers between polygons, and areas of overlap. Efforts were made to clean up the data set, however, due to the vast number of slivers and overlap, small slivers remain. These small slivers are categorized as "Unclassified – UNC".

Table 3. Vegetation communities of Current EcoPark System Lands in Cootes Paradise Heritage Lands

ELC Code	# of Polygons	Hectares	% of Current EcoPark System Lands
ANTH - Anthropogenic	11	40.98	5.77
BBO - Open Beach/Bar	17	2.44	0.34
BBT - Treed Beach/Bar	5	0.83	0.12
CUM - Cultural Meadow	18	30.18	4.25
CUP - Cultural Plantation	18	23.36	3.29
CUS - Cultural Savannah	3	2.44	0.34
CUT - Cultural Thicket	20	28.40	4.00
CUW - Cultural Woodland	2	2.60	0.37
FOC - Coniferous Forest	2	0.18	0.03
FOD - Deciduous Forest	63	194.01	27.30
FOM - Mixed Forest	10	21.09	2.97
MAM - Meadow Marsh	42	20.62	2.90
MAS - Shallow Marsh	25	29.88	4.20
OAO - Open Aquatic	4	6.72	0.95
SAF - Floating-leaved Shallow Aquatic	2	5.73	0.81
SAS - Submerged Shallow Aquatic	7	197.27	27.76
SWD - Deciduous Swamp	9	28.56	4.02
SWT - Thicket Swamp	9	1.44	0.20
TPO - Open Tallgrass Prairie	1	2.87	0.40
UNC - Unclassified	1747	71.44	10.05

ELC Code	# of Polygons	Hectares	% of Current EcoPark System Lands
Total	**2015**	**711.04**	**100.04**

Beach/Bar Communities

Beach/Bar communities have less than 60% tree cover but can range from patchy to closed or treed. Active shoreline processes occur within this community, including disturbance from ice scour, waves, erosion and deposition. There may also be extremes of temperature and moisture. Substrates may include coarse materials such as rock or bedrock, as well as sand.

Open Beach/Bar (BBO) has sparse or low vegetation cover, with less than 25% tree cover and less than 25% shrub cover, due to rocky substrates and shoreline processes. This community occurs at Cootes Paradise Sanctuary 1, Cootes Paradise Sanctuary 2, Cootes Paradise Sanctuary 4, Cootes Paradise Sanctuary 6, Cootes Paradise Sanctuary 12, Cootes Paradise Sanctuary 13 and Cootes Paradise Sanctuary 15, and covers 2.44 ha of the Current EcoPark System Lands (Figure 6, Tables 3 and 4).

Treed Beach/Bar (BBT) has more prominent vegetation than Open Beach/Bar communities and shoreline processes are less severe leading to increased tree and shrub cover; between 25-60 %. In the Current EcoPark System Lands, less than one hectare of this community occurs in Cootes Paradise Sanctuary 1 and Cootes Paradise Sanctuary 15 combined (Figure 6, Tables 3 and 4).

Prairie Communities

Open Tallgrass Prairie (TPO) communities have ground flora dominated by prairie graminoids such as Big Bluestem (*Andropogon gerardii*), Little Bluestem (*Schizachyrium scoparium*) and Indian Grass (*Sorghastrum nutans*). Open Tallgrass Prairies have less than 25% tree cover and less than 25% shrub cover. Trees in this community are typically open-grown (i.e., have spreading crowns). The Dry Tallgrass Prairie Type are generally subject to prolonged periods of drought and may include prairie associates such as Cylindric Anemone (*Anemone cylindrica*) and Scribner's Panic Grass (*Dichanthelium oligosanthes scribnerianum*), among others. Small amounts of Open Tallgrass Prairie occur in Cootes Paradise Sanctuary 1 and Cootes Paradise Sanctuary 15 (Figure 6, Tables 3 and 4).

Drier conditions below the escarpment support some prairie elements including remnants of oak woodland. Lady Simcoe, in The Diary of Mrs. John Graves Simcoe written in the late 1700s, noted that the point of land separating Burlington Bay from Coote's Paradise *"… is quite like a park, with large oak trees dispersed, but no underwood"* (Simcoe, Lady John Graves 1792-96). In "The Historical and Present Extent and Floristic Composition of Prairie and Savanna Vegetation in the Vicinity of Hamilton, Ontario", Goodban and others (1997) estimated 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).

Cultural Communities

Regenerating cultural communities are scattered throughout the shale slopes in Current EcoPark System

Cootes to Escarpment EcoPark System

Figure 6: Ecological Land Classification

Legend

Ecological Land Classification

- **ANTH** - Anthropogenic
- **BBO** - Open Beach/Bar
- **BBT** - Treed Beach/Bar
- **CLT** - Treed Cliff
- **CUM** - Cultural Meadow
- **CUP** - Plantation
- **CUS** - Cultural Savannah
- **CUT** - Cultural Thicket
- **CUW** - Cultural Woodland
- **FOC** - Coniferous Forest
- **FOD** - Deciduous Forest
- **FOM** - Mixed Forest
- **MAM** - Meadow Marsh
- **MAS** - Shallow Marsh
- **OAO** - Open Aquatic
- **SAF** - Floating-leaved Shallow Aquatic
- **SAS** - Submerged Shallow Aquatic
- **SWD** - Deciduous Swamp
- **SWT** - Thicket Swamp
- **TAS** - Shrub Talus
- **TAT** - Treed Talus
- **TPO** - Open Tallgrass Prairie
- **TPW** - Tallgrass Woodland
- **UNC** - Unclassified

Privately Owned Outreach Area

Study Area

Heritage Lands Boundary

Note:
Not all ELC codes appear on map

Sources of Information:
Royal Botanical Gardens
Hamilton Conservation Authority
City of Hamilton
Land Information Ontario

Data Disclaimer:
All boundaries on this map should be considered approximate. No responsibility or liability is assumed by the C2E EcoPark System partners or their employees, officers and agents for any errors, omissions or inaccuracies, whether due to their negligence or otherwise. Some data on this map is used under license from the Ministry of Natural Resources. © Queen's Printer for Ontario, 2016. © Teranet Enterprises Inc. and its suppliers. All rights reserved. NOT A PLAN OF SURVEY.

Cootes to Escarpment EcoPark System

December 6, 2017

Dundas
Cootes Drive
Olympic Drive
McMaster University
Main Street
Highway 6
Highway 403
0 250 500 1,000
Meters

Table 4. Vegetation communities of Current EcoPark System Lands in Cootes Paradise Heritage Lands per management unit

Parcel Name	Vegetation Community (ha)																			Total
	ANTH	BBO	BBT	CUM	CUP	CUS	CUT	CUW	FOC	FOD	FOM	MAM	MAS	OAO	SAF	SAS	SWD	SWT	TPO	UNC	
Canal Park																				1.01	**1.01**
Centennial Park	0.53														0.22					0.13	**0.88**
Churchill Park	12.10									0.00										0.08	**12.18**
City of Hamilton Public Works	2.42																			0.00	**2.42**
Cootes Paradise 1	0.02	1.94	0.14	0.04		0.10	0.18			1.85	0.12	3.48	1.01		0.72	112.11	1.64	0.57	0.00	1.78	**125.70**
Cootes Paradise 2		0.45		0.76						3.45		3.93	14.94			68.70	0.48			0.06	**92.77**
Cootes Paradise 3										0.67										26.19	**26.86**
Cootes Paradise 4		0.00		0.04	0.65		0.44			9.64	1.10	0.01	0.00			0.00	0.03	0.01		9.11	**21.03**
Cootes Paradise 5					3.47		3.09			0.09	0.01									2.98	**9.64**
Cootes Paradise 6		0.00		1.23	0.55		5.90			45.20	9.19	0.21	0.00			0.12	0.65	0.14		3.36	**66.56**
Cootes Paradise 7				13.84	6.54		11.05	0.00		6.77		0.03						0.04		3.54	**41.81**
Cootes Paradise 8				4.26	11.02		6.11			44.59	0.12	0.56				0.07	7.73			0.05	**74.51**
Cootes Paradise 9					1.09					1.64		0.03	0.00		2.57	0.01				7.87	**13.21**
Cootes Paradise 10										0.82		3.82	5.86			10.27	8.66			3.46	**32.89**
Cootes Paradise 11										3.92	0.21	5.49	6.65			5.75	9.37			0.24	**31.63**
Cootes Paradise 12		0.00		0.10					0.17	20.17	4.55	0.68	0.22			0.00	0.00	0.44		0.39	**26.72**
Cootes Paradise 13	2.13	0.02		0.78		1.86	0.81			28.43		0.11	0.00			0.00		0.25		0.57	**34.96**
Cootes Paradise 14	2.63			0.01		0.48							0.06							0.00	**3.18**
Cootes Paradise 15		0.02	0.69	3.13			0.82			5.75		0.02				0.00			2.87	0.86	**14.16**
Cootes Paradise 16										0.48						0.00				0.19	**0.67**
Coronation Park	3.14									1.61										3.50	**8.25**
Desjardins Canal Pond															1.94					0.12	**2.06**
Dundas Transfer Station	4.02			4.39								0.77								4.40	**13.58**
Dundas Water Treatment Plant	2.47																			0.00	**2.47**
Lake Jojo										6.25		0.70		4.95						0.93	**12.83**
Lower Spencer Creek Conservation Area	0.75			1.50				2.60		11.65	5.80		0.59	1.77						3.58	**28.24**
Martino Memorial Park	1.06																				**1.06**
Olympic Sports Park	7.97									0.85										0.92	**9.74**
Volunteer Field Park	1.74			0.09								0.11									**1.94**
Unclassified	0.03	0.00		0.00	0.04		0.00	0.00	0.01	0.21	0.01	0.00	0.00		0.29	0.16	0.01	0.00		2.66	**3.43**
Total:	**41.01**	**2.44**	**0.83**	**30.17**	**23.36**	**2.44**	**28.40**	**2.60**	**0.18**	**194.04**	**21.11**	**19.95**	**29.34**	**6.72**	**5.74**	**197.20**	**28.57**	**1.45**	**2.87**	**77.98**	**716.41***

*Total area reported (which is 716.41) is greater than the total area of the Current EcoPark System Lands (which is 711 ha) due to slivers of overlap present in the ELC data layer.

Lands. They sustain old fields, thickets of Grey Dogwood (*Cornus racemosa*), Staghorn Sumac (*Rhus typhina*), European Buckthorn (*Rhamnus cathartica*) and hawthorn (*Crataegus* spp.) as well as successional groves of White Ash (*Fraxinus americana*), Large-toothed Aspen (*Populus grandidentata*), Trembling Aspen (*P. tremuloides*) and Black Walnut (*Juglans nigra*).

Cultural Meadows (CUM) represent a very early stage of natural succession. They have less than 25% tree cover and less than 25% shrub cover, and often have a large proportion of non-native plant species (Lee et al. 1998). They lack woody species and are dominated primarily by opportunistic forbs and grasses. Cultural meadows generally result from or are maintained by modern cultural or anthropogenic-based disturbances. Depending on soil moisture regimes, these communities can vary from dry pasture grass-dominated areas to aster and goldenrod assemblages on fresh to moist substrates. Dry-Moist Old Field Meadow Type (CUM1-1) and other cultural meadow communities (i.e., CUM and CUM1) have been documented in Cootes Paradise Sanctuary 1, Cootes Paradise Sanctuary 2, Cootes Paradise Sanctuary 4, Cootes Paradise Sanctuary 6-8, Cootes Paradise Sanctuary 12-15, Dundas Transfer Station, Lower Spencer Creek Conservation Area and Volunteer Field Park (Figure 6, Tables 3 and 4). This vegetation community type represents approximately 30 ha of the Current EcoPark System Lands in Cootes Paradise Heritage Lands (4.3%) and is the third most widespread community.

Cultural Thickets (CUT) include areas in a somewhat later stage of succession than cultural meadows. They have less than 25% tree cover and greater than 25% shrub cover, and also often have a large proportion of non-native plant species (Lee et al. 1998). Cultural thicket communities are dominated by woody shrubs and often have an understory of forbs and grasses. Like cultural meadows, cultural thickets generally result from, or are maintained by, modern cultural or anthropogenic-based disturbances. Cultural thickets have been documented within the following management units: Cootes Paradise Sanctuary 1, Cootes Paradise Sanctuary 4-8, Cootes Paradise Sanctuary 13, and Cootes Paradise Sanctuary 15. Cultural thickets represent approximately 28 ha of the Current EcoPark System Lands (4.0%). The following cultural thicket vegetation types/ecosites occur in the Heritage Lands (Figure 6, Tables 3 and 4):

- Sumac Cultural Thicket Type (CUT1-1);
- Buckthorn Deciduous Shrub Thicket Type (CUT);
- Exotic Deciduous Shrub Thicket Type (CUT);
- Serviceberry Deciduous Shrub Thicket Type (CUT);
- Gray Dogwood Cultural Thicket Type (CUT); and
- Raspberry Deciduous Shrub Thicket Type (CUT).

Savannahs (CUS) have between 25% and 35% tree cover, and often have a large proportion of non-native plant species resulting from cultural or anthropogenic disturbances (Lee et al. 1998). They are generally open in character, with scattered trees and shrubs and an understory dominated by forbs and grasses. Savannahs are located at Cootes Paradise Sanctuary 1, Cootes Paradise Sanctuary 13-14, always in small amounts (less than 2 ha) (Figure 6, Tables 3 and 4). Savannahs include:

- Hawthorn Deciduous Savannah Type (CUS1-4); and
- Dry Red Oak Deciduous Savannah Type (CUS1-3).

Woodlands (CUW) 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). Woodlands have been documented in Cootes Paradise Sanctuary 3, Cootes Paradise Sanctuary 6,

Cootes Paradise Sanctuary 7 and Lower Spencer Creek Conservation Area, representing a small portion of the Current EcoPark System Lands (2.6 ha) (Figure 6, Tables 3 and 4). Woodlands in the Current EcoPark System Lands are dominated by Red Oak, Black Walnut, Green Ash, White Ash, poplar and Sugar Maple types, with Dry Red Oak Woodland (CUW1-2) occurring most frequently. These areas may represent small inclusions not visible in Figure 6.

Cultural Plantations (CUP) have greater than 60% tree cover and consist of deciduous and/or coniferous trees that have primarily been planted (Lee et al. 1998). Cultural plantations cover 23.4 ha (3.3%) of the Current EcoPark System Lands and are located in Cootes Paradise Sanctuary 4-9 (Figure 6, Tables 3 and 4). Many of the cultural plantations that occur within the Heritage Lands are not described adequately in the ELC for southern Ontario (Lee et al. 1998). Where an appropriate ELC vegetation type was not available, these areas were classified only to ecosite (e.g., cultural plantation). The following cultural plantation types have been documented in the Heritage Lands:

- Cultural Plantation Type (CUP);
- White Spruce Coniferous Plantation Type (CUP3-8);
- White Pine Coniferous Plantation Type (CUP3-2); and
- Red Pine Coniferous Plantation Type (CUP3-1).

Forested Communities

Forested communities have greater than 60% tree cover and can be dominated by deciduous and/or coniferous trees. The Current EcoPark System Lands contain **Coniferous Forests** (FOC), **Deciduous Forests** (FOD) and **Mixed Forests** (FOM). Coniferous forests and deciduous forests have greater than 75% canopy cover of coniferous and deciduous tree species, respectively, 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).

A diverse array of forested communities are found throughout the Current EcoPark System Lands, along the north and south shores of Cootes Paradise (Figure 6, Tables 3 and 4), with 32 different forested ELC communities having been delineated. Within the Current EcoPark System Lands, forested communities are primarily dominated by deciduous forest (196.0 ha, 27.3%), with a smaller proportion of coniferous (0.18 ha, >0.1%) and mixed forest (21.1 ha, 3.0%). The north shore of Cootes Paradise Heritage Lands consists largely of oak forests (*Quercus rubra, Q. velutina, Q. alba, Q. macrocarpa*) and Sugar Maple (*Acer saccharum*) with ash (*Fraxinus americanum, F. pennsylvanica*) and Black Cherry (*Prunus serotina*) co-dominating in the canopy. The south shore forests are typically composed of oak, Black Cherry, ash, Red Maple (*A. rubrum*), hickory (*Carya* spp.) and Eastern Hemlock (*Tsuga canadensis*).

Dry-Fresh Black Cherry Deciduous Forest spans the southwestern edge of the Heritage Lands, including the upland areas near the McMaster University sports fields and valley slopes behind McMaster University campus (Schwetz 2014). Opposite the valley slopes behind McMaster University, Dry-Fresh Red Oak Deciduous Forest with some savannah (Black Oak) and Carolinian (Tulip Tree) elements occurs. The northwest and northeast portions of the Heritage Lands have widespread Sugar Maple forest communities with oak often co-dominating as well. Understory layers include Witch Hazel (*Hamamelis virginiana*), Sassafras (*Sassafras albidium*), Common Privet (*Ligustrum vulgare*) and ash (Schwetz 2014).

The following forested communities have been documented within the Current EcoPark System Lands:

- Fresh-Moist Hemlock Coniferous Forest (FOC3-1);
- Dry-Fresh Mixed Red Oak Deciduous Forest Type (FOD1-1);

- Dry-Fresh White Oak Deciduous Forest Type (FOD1-2);
- Dry-Fresh Mixed Oak Deciduous Forest Type (FOD1-4);
- Dry-Fresh Oak – Red Maple Deciduous Forest Type (FOD2-1);
- Dry-Fresh Oak – Hickory Deciduous Forest Type (FOD2-2);
- Dry-Fresh Oak – Hardwood Deciduous Forest Type (FOD2-4);
- Dry-Fresh White Birch Deciduous Forest Type (FOD3-2);
- Dry-Fresh Beech Deciduous Forest Type (FOD4-1);
- Dry-Fresh White Ash Deciduous Forest Type (FOD4-2);
- Dry-Fresh Black Cherry Deciduous Forest Type (FOD4-8);
- Dry-Fresh Basswood Deciduous Forest Type (FOD4-9);
- Dry-Fresh Sugar Maple Deciduous Forest Type (FOD5-1);
- Dry-Fresh Sugar Maple – Ironwood Deciduous Forest Type (FOD5-4);
- Dry-Fresh Sugar Maple – White Ash Deciduous Forest Type (FOD5-8);
- Dry-Fresh Sugar Maple – Red Maple Deciduous Forest Type (FOD5-9);
- Dry-Fresh Sugar Maple – White Birch – Poplar Deciduous Forest Type (FOD5-10);
- Dry-Fresh Sugar Maple – Hardwood Deciduous Forest Type (FOD5-11);
- Fresh-Moist Ash Lowland Deciduous Forest Type (FOD7-2);
- Fresh-Moist Willow Lowland Deciduous Forest Type (FOD7-3);
- Fresh-Moist Black Walnut Lowland Deciduous Forest Type (FOD7-4);
- Fresh-Moist Sassafras Deciduous Forest Type (FOD8-2);
- Fresh-Moist Bur Oak Deciduous Forest Type (FOD 9-3);
- Dry-Fresh White Pine – Oak Mixed Forest Type (FOM2-1);
- Dry-Fresh White Pine – Hardwood Mixed Forest Type (FOM2-3);
- Dry-Fresh White Pine – Early Successional Forest Type (FOM2-4);
- Dry-Fresh Hemlock – White Pine Mixed Forest Type (FOM3-3);
- Fresh-Moist Sugar Maple – Hemlock Mixed Forest Type (FOM6-1);
- Fresh-Moist Poplar Mixed Forest Type (FOM8-1);
- Fresh-Moist White Pine – Sugar Maple Mixed Forest Type (FOMM9-1); and
- Fresh-Moist White Pine – Hardwood Mixed Forest Type (FOMM9-2).

Swamp Communities

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

Deciduous Swamp (SWD) has tree cover over 25%, with deciduous trees comprising over 75% of the canopy. Trees may include oak, willow, birch, maple, elm or ash. Ground flora typically includes Spotted Touch-me-not (*Impatiens capensis*), Skunk Cabbage (*Symplocarpus foetidus*), Marsh Marigold (*Caltha palustris*), bedstraw (*Gallium* spp.) and Stinging Nettle (*Urtica s*p.), with numerous ferns and sedges (*Carex* spp.). Deciduous swamps occur at Cootes Paradise Sanctuary 1-2, Cootes Paradise Sanctuary 4, Cootes Paradise Sanctuary 6, Cootes Paradise Sanctuary 8, Cootes Paradise Sanctuary 10-12. Deciduous Swamp vegetation communities represent 28.6 ha of Current EcoPark System Lands (4.0%). Deciduous Swamp communities found in the Current EcoPark System Lands include:

- Green Ash Mineral Deciduous Swamp (SWD2-2);

- Willow Mineral Deciduous Swamp Type (SWD4-1); and
- Yellow Birch Mineral Deciduous Swamp Type (SWD4-4).

Thicket Swamp (SWT) communities have less than 25% tree cover and are dominated by hydrophytic shrubs, covering more than 25% of the vegetation community. Shrub species may include dogwood (*Cornus* spp.), willow (*Salix* spp.), Buttonbush (*Cephalanthus occidentalis*), alders (*Alnus* spp.), Spicebush (*Lindera benzoin*) and others. Thicket Swamp covers only a small portion of the Current EcoPark System Lands (1.5 ha) and occurs in small amounts at Cootes Paradise Sanctuary 1, Cootes Paradise Sanctuary 4, Cootes Paradise Sanctuary 6-7, and Cootes Paradise Sanctuary 12-13. Within the Current EcoPark System Lands, the following Thicket Swamp vegetation communities have been recorded on both the north and south shore areas of Cootes Paradise:

- Alder Mineral Thicket Swamp Type (MAM1-1);
- Red-osier Dogwood Mineral Deciduous Thicket Swamp Type (SWT2-5);
- Gray Dogwood Mineral Thicket Swamp Type (SWT2-9);
- Speckled Alder Organic Deciduous Thicket Swamp Type (SWT3-1); and
- Spicebush Organic Deciduous Thicket Swamp Type (SWT3-11).

Open Wetland Communities

Cootes Paradise includes over 260 ha of marshland, representing 36.6% of the Current EcoPark System Lands. This is the largest remaining lacustrine wetland on Lake Ontario.

Meadow Marsh (MAM) vegetation communities have less than 25% tree and shrub cover and are characterized by emergent hydrophytic macrophytes and tend to be dominated by species that are less tolerant of prolonged flooding (Lee et al. 1998). Areas of Meadow Marsh tend to receive seasonal flooding, where soils are flooded in the spring but become moist to dry during the summer. These vegetation communities represent the interface between wetland and terrestrial ecosystems. Within the Current EcoPark System Lands, the following 11 Meadow Marsh communities have been documented within Cootes Paradise Sanctuary 1-2, Cootes Paradise Sanctuary 4-13, Cootes Paradise Sanctuary 15, Dundas Transfer Station, Lake Jojo and Volunteer Field Park (Figure 6, Tables 3 and 4):

- Mixed Mineral Meadow Marsh (MAM2);
- Graminoid Mineral Meadow Marsh (MAM2);
- Common Reed Graminoid Mineral Meadow Marsh (MAM2);
- Rice Cut-grass Graminoid Mineral Meadow Marsh (MAM2);
- Reed Manna Grass Graminoid Mineral Meadow Marsh (MAM2);
- Cattail Graminoid Mineral Meadow Marsh (MAM2);
- Joe-pye-weed Forb Mineral Meadow Marsh Type (MAM2-10);
- Graminoid Organic Meadow Marsh (MAM3);
- Cattail Graminoid Organic Meadow Marsh (MAM3); and
- Jewelweed Forb Organic Meadow Marsh Type (MAM3-8).
- Mixed Forb Organic Meadow Marsh Type (MAM3-9).

Shallow Marsh (MAS) vegetation communities have less than 25% tree and shrub cover and are usually dominated by cattails, grasses, sedges and/or rushes (Lee et al. 1998). They can have water up to 2 m deep, with standing or slowly flowing water for much or all of the growing season. Within the Current EcoPark System Lands, the following seven Shallow Marsh communities have been documented within Cootes Paradise Sanctuary 1-2, Cootes Paradise Sanctuary 4, Cootes Paradise Sanctuary 6, Cootes

Paradise Sanctuary 9-14 and Lower Spencer Creek Conservation Area, with the largest amount noted in Cootes Paradise Sanctuary 2 (Figure 6, Tables 3 and 4):

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

Aquatic Communities

Open Aquatic (OAO) communities have water greater than 2 m in depth with little macrophyte vegetation and no tree or shrub cover and tend to be dominated by plankton (Lee et al. 1998). Open Aquatic (OAO) communities are present within Lake Jojo and Lower Spencer Creek Conservation Area, representing 6.72 ha of Current EcoPark System Lands. Large sections of Cootes Paradise Sanctuary 1 and Cootes Paradise Sanctuary 2 are shallow in terms of water depth and have been classified as Submerged Shallow Aquatic rather than open aquatic (Figure 6, Tables 3 and 4).

Submerged Shallow Aquatic (SAS) communities have water up to 2 m in depth that persists year-round. Submerged Shallow Aquatic communities are dominated by submerged macrophytes, which have greater than 25% cover. Pondweed Submerged Shallow Aquatic Type (SAS1-1) dominates Cootes Paradise (197.2 ha, 27.8%), occurring in Cootes Paradise Sanctuary 1-2, Cootes Paradise Sanctuary 4, Cootes Paradise Sanctuary 6, Cootes Paradise Sanctuary 8-13 and Cootes Paradise Sanctuary 15-16.

Floating-leaved Shallow Aquatic (SAF) communities have water up to 2 m in depth, with standing water present year-round, and are dominated by floating-leaved macrophytes (Lee et al. 1998). Water Lily-Bullhead Lily Floating-leaved Shallow Aquatic Type (SAF1-1) covers 5.7 ha (0.8%) of the Current EcoPark System Lands. Other small areas of Floating-leaved Shallow Aquatic communities are present in Canal Park, Centennial Park, Cootes Paradise Sanctuary 1, Cootes Paradise Sanctuary 9 and Desjardins Canal (Figure 6, Tables 3 and 4).

Anthropogenic

Several Anthropogenic (ANT) areas are present within the Current EcoPark System Lands (Figure 6, Tables 3 and 4). These lands contain land uses that are not easily classified using the ELC for southern Ontario (Lee et al. 1998). Anthropogenic areas include manicured areas present along natural area boundaries, parking lots, sports fields, lawns and manicured gardens. Anthropogenic areas occur in: Cootes Paradise Sanctuary 1, Cootes Paradise Sanctuary 13-14, City of Hamilton Public Works, Churchill Park, Olympic Sports Park, Centennial Park, Lower Spencer Creek Conservation Area and more. Anthropogenic areas are often not mapped due to their small size. Furthermore, some Anthropogenic areas are currently mapped as Unclassified (Figure 6, Tables 3 and 4).

Restoration Areas

Although not a vegetation type and not mapped on Figure 6, restoration areas that have not yet developed into classifiable communities occur within the Current EcoPark System Lands. A variety of restoration work has occurred throughout the Cootes Paradise Heritage Lands. RBG has completed a great deal of shoreline wetland restoration. Other significant restoration areas include areas around the

Boathouse along Anishinaabe Waadiziwin Trail and directly behind the Hopkins Court/Earnest Avenue community, along Hopkins Trail. Plants associated with a Carolinian Forest Community have been planted and invasive species such as European Buckthorn and non-native honeysuckles have been manually controlled and treated with herbicide. Garlic Mustard is occasionally pulled manually from these areas by RBG staff and volunteers and Dog-strangling Vine is either pulled manually or treated with herbicide. Invasive shrub removals and native shrub plantings have occurred throughout Cootes Paradise Sanctuary 4, 6, 7, 8, 12, 13 and 15, which is anticipated to continue to restore and enhance the understory over time. Significant tree plantings have occurred at the Community Gardens and along the forest edge at Churchill Park in Cootes Paradise Sanctuary 14 and in an old field between Princess Point and Bond Street in Cootes Paradise Sanctuary 15.

5.3.2 Significant Vegetation Communities

There are six provincially significant vegetation communities present within the Cootes Paradise Heritage Lands (Figure 7):

- Spicebush Organic Thicket Swamp (SWT3-11);
- Fresh-Moist Sassafras Deciduous Forest (FOD8-2);
- Fresh-Moist Sugar Maple – Black Maple Deciduous Forest (FOD6-2);
- Fresh-Moist Black Walnut Deciduous Forest (FOD7-4);
- Dry Tallgrass Prairie Type (TPO1-1);
- Dry Black Oak – White Oak Tallgrass Woodland Type (TPW1-1).

Historical records indicate that prairie and oak savannah communities were associated with well-drained, sandy sites south of the Escarpment. Currently, only a handful of tiny prairie-savannah remnants remain within the Cootes Paradise Heritage Lands. Tallgrass Prairie (TPO) occurs at Princess Point and Sassafras Point, although some of these areas were too small to delineate on Figure 4. Far less than 1% of the pre-settlement prairie and savannah remains in southern Ontario (Goodban et al. 1997) making it one of the rarest native vegetation communities in the province. The remnant prairie/savannah communities also represent the rarest and most threatened community types within the Cootes Paradise Heritage Lands.

The Cootes Paradise Heritage Lands are 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 qualify as old growth. Principally owing to their size, age and proximity to watercourses much of the forest within the Current EcoPark System Lands would qualify as significant woodland under the policies of the City of Hamilton's Official Plans (urban and rural).

Cootes Paradise Wetland is a provincially significant wetland, which occupies a large proportion of the Cootes Paradise Heritage Lands. As noted earlier, it is the largest wetland on Lake Ontario.

Some of the vegetation communities found within the Current EcoPark System Lands may qualify as Significant Wildlife Habitat, which includes rare vegetation communities or specialized habitat for wildlife including tallgrass prairie, 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. These communities also support species considered Threatened or Endangered, although these are very likely under-reported. The presence of species at risk and/or Significant Wildlife Habitat could have repercussions for any future facility development (including trails and access points), and possibly even restoration initiatives, and is discussed further in the section on Fauna (Section 5.5).

Sources of Information:
Royal Botanical Gardens
Hamilton Conservation Authority
City of Hamilton
Land Information Ontario

Data Disclaimer:
All boundaries on this map should be considered approximate. No responsibility or liability is assumed by the C2E EcoPark System partners or their employees, officers and agents for any errors, omissions or inaccuracies, whether due to their negligence or otherwise. Some data on this map is used under license from the Ministry of Natural Resources. © Queen's Printer for Ontario, 2016. © Teranet Enterprises Inc. and its suppliers. All rights reserved. NOT A PLAN OF SURVEY.

Cootes to Escarpment EcoPark System

Figure 7: Provincially Significant Species and Vegetation Communities

Legend

Significant Vegetation Communities

FOD6-2 - Fresh-Moist Sugar Maple-Black Maple Deciduous Forest
FOD7-4 - Fresh-Moist Black Walnut Lowland Deciduous Forest
FOD8-2 - Fresh-Moist Sassafras Deciduous Forest
SWT3-11 - Spicebush Organic Thicket Swamp
TPO1-1 - Dry Tallgrass Prairie
TPW1-1 - Dry Black Oak-White Oak Tallgrass Woodland

Birds

1 - Acadian Flycatcher
2 - Bald Eagle
3 - Bank Swallow
4 - Barn Swallow
5 - Black Tern (FO)
6 - Black-crowned Night-heron
7 - Canada Warbler
8 - Caspian Tern (FO)
9 - Chimney Swift
10 - Eastern Wood-pewee
11 - Forster's Tern
12 - Great Egret
13 - Least Bittern
14 - Prothonotary Warbler
15 - Red Knot (M)
16 - Red-necked Phalarope (M)
17 - Wood Thrush
18 - Yellow-breasted Chat

Fish and Mussels

1 - American Eel
2 - Eastern Pondmussel
3 - Lake Chubsucker
4 - Lake Sturgeon
5 - Lilliput
6 - Paper Pondshell
7 - Redside Dace

Plants

1 - American Chestnut
2 - Bashful Clubrush
3 - Bowman's-root
4 - Broad Beech Fern
5 - Butternut
6 - Clinton's Clubrush
7 - Eastern Burning Bush
8 - Eastern Flowering Dogwood
9 - Fern-leaved Yellow False Foxglove
10 - Forked Panicgrass
11 - Green Arrow Arum
12 - Pignut Hickory
13 - Slimy Wedge Grass
14 - Spotted Wintergreen
15 - White Wood Aster
16 - White-haired Panicgrass
17 - White-tinged Sedge

Reptiles

1 - Blanding's Turtle
2 - Eastern Milksnake
3 - Eastern Musk Turtle
4 - Eastern Ribbonsnake
5 - Northern Map Turtle
6 - Snapping Turtle

Privately Owned Outreach Area

Heritage Lands Boundary

Management Units

Cootes to Escarpment EcoPark System

March 19, 2018

5.4 Flora

5.4.1 Inventory

A total of 1,197 flora species have been documented in the Cootes Paradise Heritage Lands. Of the 1,197 species, 771 (64%) are native species. A total of 50 Carolinian Zone indicator species (*sensu* Riley *et al.* 1989) and 45 plant species with prairie - savannah affinities (*sensu* Riley *et al.* 1989) have been noted (Appendix 6), which is highly significant. See Appendix 5 for the complete listing of floral species documented in the Cootes Paradise Heritage Lands.

Table 5 provides the number of native floral species, their Floristic Quality Index (FQI), and Native Mean C for the Cootes Paradise Heritage Lands. FQI is a measure of vegetation quality and is based on both the fidelity of each species for a particular habitat (habitat conservatism) and species richness. It is calculated from 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 species' specificity of habitat requirements, with a coefficient of 0 indicating a plant tolerant of a wide range of conditions (typically weedy species) and 10 indicating a plant that has the most specific habitat requirements (typically plants that occur in undisturbed, high-quality native communities). Mean CC is thus also a measure of the quality of the flora but without consideration of the species richness of a community.

The Native FQI of the Cootes Paradise Heritage Lands natural areas is an extremely high value (FQI= 150.9, Mean C= 5.5). 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 Cootes Paradise Heritage Lands

Cootes Paradise Heritage Lands	# Native Flora Species	Native FQI	Native Mean C
Cootes Paradise Heritage Lands: Natural Areas	753	150.9	5.5
Cootes Paradise Heritage Lands: Roadsides	99	31.4	3.2
Cootes Paradise Heritage Lands: Waste Places	14	6.7	1.8

5.4.2 Invasive Floral Species

Invasive species have been identified as one of the greatest threats to the integrity of the ecosystems of the Cootes Paradise Heritage Lands. Table 6 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. Expert knowledge of the characteristics of invasive species was applied to identify the major invasive plant species that are considered high priorities for management.

Table 6. Major invasive floral species found within Cootes Paradise Heritage Lands

Common Name	Scientific Name	Locally Dominant
Herbaceous Plants		
Goutweed	*Aegopodium podagraria*	x
Garlic Mustard	*Alliaria petiolata*	x
Common Burdock	*Arctium minus*	
Dog-strangling Vine	*Cynanchum rossicum*	x
Rough Mannagrass	*Glyceria maxima*	x
English Ivy	*Hedera helix*	
Giant Hogweed	*Heracleum mantegazzianum*	
Purple Loosestrife	*Lythrum salicaria*	
Miscanthus	*Miscanthus* spp.	x
Phragmites	*Phragmites australis*	x
Woodland Speargrass	*Poa nemoralis*	
Japanese Knotweed	*Polygonum cuspidatum*	
Shrubs		
European Alder	*Alnus glutinosa*	
Japanese Barberry	*Berberis thunbergii*	
Common Privet	*Ligustrum vulgare*	
Non-native Honeysuckles	e.g., *Lonicera tatarica*	x
White Mulberry	*Morus alba*	
Common Buckthorn	*Rhamnus cathartica*	x
Multiflora Rose	*Rosa multiflora*	x
Trees		
Norway Maple	*Acer platanoides*	
Manitoba Maple	*Acer negundo*	x
Kobus Magnolia	*Magnolia kobus*	
Black Locust	*Robinia pseudo-acacia*	x

5.4.3 Significant Flora

A total of 348 significant flora species are identified in the Cootes Paradise Heritage Lands, including:

- eight provincially Endangered species (including three planted species);
- four provincially Threatened species (including one historical record and four planted species);
- two provincial species of Special Concern (including one historical record and two planted species;
- 66 provincially rare species (ranked S1-S3) (including eight historical records and 13 planted species);
- 185 regionally rare species in the City of Hamilton (Schwetz 2014); and

- 219 species rare on RBG properties (RBG 2014).

Table 7 lists flora species at risk (provincial) and provincially rare species (S1-S3) noted within the Cootes Paradise Heritage Lands. Figure 7 illustrates the distribution of significant flora within the Cootes Paradise Heritage Lands, where known. RBG has multiple site-specific plans for various endangered plant species.

5.5 Fauna

A total of 426 fauna species have been documented within the Cootes Paradise Heritage Lands, including 405 native species and 21 non-native species (Appendix 7). Figure 7 illustrates the distribution of significant fauna within the Cootes Paradise Heritage Lands. Table 8 summarizes provincially significant fauna species found within the Current EcoPark System Lands. In this report, provincially significant species are those that are identified as Endangered, Threatened, of Special Concern, or ranked S1-S3. Regional rarity and breeding status is also listed and is based on rankings provided by the Hamilton Natural Areas Inventory Project 3rd Edition (Schwetz 2014).

5.5.1 Inventory

Butterflies and Moths (Lepidoptera)

A total of 35 species of butterfly or moth have been recorded within the Cootes Paradise Heritage Lands. All but two of these species are native (Cabbage White (*Pieris rapae*) and European Skipper (*Thymelicus lineola*)) (Appendix 7). This group is very likely under-studied, and these numbers should be considered to be very conservative. Provincially and regionally significant species are listed in Table 8 and Appendix 7, respectively.

- one S2 species (Monarch, *Danaus plexippus*);
- one species of Special Concern (ESA); and
- six species rare in Hamilton.

Dragonflies and Damselflies (Odonata)

A total of 45 species of dragonfly or damselfly have been identified within the Cootes Paradise Heritage Lands, all of which are native (Appendix 7). Provincially rare species are listed in Table 8. Regionally significant species are listed in Appendix 7. These rankings should be considered tentative as this group is not well studied in Ontario and the distributions of some species are probably not fully understood.

- three S1-S3 species; and
- one species rare in Hamilton.

Fish and Mussels

Fish community sampling has been undertaken by RBG, HCA and CH within the main reaches of the Spencer Creek watershed, Grindstone Creek Watershed (Hickory Brook and unnamed tributaries), and within Cootes Paradise since the 1980s. RBG and the City of Hamilton collectively operate the fishway, located on the Desjardins Canal between Hamilton Harbour and Cootes Paradise, under the McQuesten Bridge. The fishway prevents passage (using grates) of all large fish into the marsh and provides information on fish populations, species diversity, and spawning success. A total of 100 fish species have been documented within the Cootes Paradise Heritage Lands, including 12 introduced species. Provincially rare fish species are listed in Table 8, and regionally rare species are listed in Appendix 7.

Table 7. Species at Risk and provincially rare floral species in Cootes Paradise Heritage Lands

Scientific Name	Common Name	S Rank	SARA	COSEWIC	ESA	Historic	Planted
Thelypteridaceae							
Phegopteris hexagonoptera (Michx.) Fée	Broad Beech Fern	S3	SC	SC	SC	Historic	Planted
Azollaceae							
Azolla caroliniana Willd.	Eastern Mosquito Fern	S1S2					
Magnoliaceae							
Magnolia acuminata L. L.	Cucumber Tree	S2	END	END	END		Planted
Annonaceae							
Asimina triloba L. Dunal	Pawpaw	S3					Planted
Nymphaeaceae							
Nuphar advena (Aiton) Aiton f.	Large Yellow Pond-lily	S3					
Ranunculaceae							
Ranunculus hispidus Michx. var. hispidus	Bristly Buttercup	S3					
Thalictrum thalictroides L. A.J. Eames & B. Boivin	Rue-anemone	S3					
Juglandaceae							
Carya glabra (Miller) Sweet	Pignut Hickory	S3					
Juglans cinerea L.	Butternut	S2?	END	END	END		
Fagaceae							
Castanea dentata (Marshall) Borkh.	American Chestnut	S2	END	END	END		
Betulaceae							
Betula lenta L.	Cherry Birch	S1	END	END	END		Planted
Nyctaginaceae							
Mirabilis nyctaginea (Michx.) MacMill.	Wild Four-o'clock	S2					
Polygonaceae							
Persicaria arifolia (L.) Haraldson	Halberd-leaved Tearthumb	S3					
Cistaceae							
Crocanthemum canadense (L.) Britton	Long-branched Frostweed	S3				Historic	
Violaceae							

Scientific Name	Common Name	S Rank	SARA	COSEWIC	ESA	Historic	Planted
Hybanthus concolor (T.F. Forst.) Spreng.	Eastern Green Violet	S2					
Brassicaceae							
Arabis pycnocarpa var. adpressipilis M. Hopkins	Cream-flowered Rockcress	S1					
Rosaceae							
Crataegus beata Sarg.	Dunbar's Hawthorn	S1					
Crataegus brainerdii Sarg.	Brainerd's Hawthorn	S2					
Crataegus coccinea var. fulleriana (Sargent) Kruschke	Fuller's Hawthorn	S2?					
Crataegus formosa Sarg.	Waxy-fruit Hawthorn	S2					
Crataegus magniflora Sargent	Shining-branch Hawthorn	S3					
Crataegus pruinosa (H.L. Wendland) K. Koch var. pruinosa	Matte-black Hawthorn	S1S2					
Crataegus pruinosa var. dissona (Sargent) Eggleston	Northern Hawthorn	S3					
Crataegus scabrida Sargent	Rough Hawthorn	S3					
Potentilla canadensis L.	Canada Cinquefoil	S2?					
Fabaceae							
Desmodium cuspidatum (Muhlenb. ex Willd.) DC. ex Louden var. cuspidatum	Large-bracted Tick-trefoil	S3					
Gleditsia triacanthos L.	Honey Locust	S2					Planted
Gymnocladus dioicus L. K. Koch	Kentucky Coffee-tree	S2	THR	THR	THR		Planted
Vicia caroliniana Walter	Carolina Vetch	S2?				Historic	
Lythraceae							
Lythrum alatum Pursh	Winged Loosestrife	S3					
Onagraceae							
Oenothera pilosella Raf. ssp. pilosella	Meadow Evening Primrose	S2					
Oenothera villosa Thunb. ssp. villosa	Hairy Evening Primrose	S2?					
Cornaceae							
Cornus florida L.	Eastern Flowering Dogwood	S2?	END	END	END		
Celastraceae							

Scientific Name	Common Name	S Rank	SARA	COSEWIC	ESA	Historic	Planted
Euonymus atropurpurea Jacq.	Eastern Burning Bush	S3					Planted
Polygalaceae							
Polygala verticillata L.	Whorled Milkwort	S3?					
Rutaceae							
Ptelea trifoliata L.	Common Hoptree	S3	THR	SC	THR		Planted
Gentianaceae							
Frasera caroliniensis Walter	American Columbo	S2	END	END	END		
Lamiaceae							
Lycopus virginicus L.	Virginia Water-horehound	S3					
Pycnanthemum incanum L. Michx.	Hoary Mountain-mint	S1	END	END	END		Planted
Oleaceae							
Fraxinus quadrangulata Michx.	Blue Ash	S2?	THR	THR	SC		Planted
Scrophulariaceae							
Aureolaria flava L. Farw.	Smooth Yellow False Foxglove	S2?					
Aureolaria pedicularia L. Raf.	Fern-leaved Yellow False Foxglove	S2?					
Aureolaria virginica L. Pennell	Downy Yellow False Foxglove	S1				Historic	
Asteraceae							
Cirsium discolor (Muhlenb. ex Willd.) Spreng.	Field Thistle	S3					
Echinacea pallida (Nutt.) Nutt.	Pale Purple Coneflower	S1					
Eupatorium altissimum L.	Tall Boneset	S1					
Eurybia divaricata L. Nesom	White Wood Aster	S2S3	THR	THR	THR	Historic	Planted
Eurybia schreberi (Nees) Nees	Schreber's Aster	S2					Planted
Hieracium paniculatum L.	Panicled Hawkweed	S2					
Liatris spicata L. Willd.	Dense Blazing Star	S2	THR	THR	THR		Planted
Ratibida pinnata (Vent.) Barnhart	Gray-headed Coneflower	S3					
Solidago rigida L.	Stiff-leaved Goldenrod	S3					
Symphyotrichum lateriflorum var. hirsuticaule (Lindley ex De Candolle) G.L. Nesom	Rough-stemmed Calico Aster	S2?					

Scientific Name	Common Name	S Rank	SARA	COSEWIC	ESA	Historic	Planted
Araceae							
Peltandra virginica L. Schott & Endl. ssp. virginica	Green Arrow Arum	S3				Historic	
Commelinaceae							
Tradescantia ohiensis Raf.	Ohio Spiderwort	S2					
Cyperaceae							
Carex albicans Willd. ex Spreng. var. albicans	White-tinged Sedge	S3					
Carex albicans Willd. ex Spreng. var. emmonsii (Dewey ex Torr.) J. Retting	Emmons' Sedge	S2					
Trichophorum clintonii A. Gray	Clinton's Club-rush	S2S3				Historic	
Trichophorum planifolium (Sprengel) Palla	Few-flowered Club-rush	S1	END	END	END		
Poaceae							
Dichanthelium dichotomum (Linnaeus) Gould subsp. Dichotomum	Forked Panicgrass	S2					
Poa saltuensis subsp. languida (Hitchcock) A. Haines	Drooping Bluegrass	S3					
Sphenopholis nitida (Biehler) Scribn.	Shiny Wedge Grass	S1					
Sporobolus vaginiflorus (Torr. ex A. Gray) Torr. ex Alph. Wood	Sheathed Dropseed	S2S3					
Zizania aquatica L.	Southern Wild Rice	S3					
Liliaceae							
Hypoxis hirsuta L. Covas	Yellow Stargrass	S2S3					
Orchidaceae							
Corallorhiza odontorhiza (Willd.) Nutt.	Autumn Coralroot	S2				Historic	

Historical Records = >20 years old.

- 14 S1-S3 species, including four species with only historical records;
- one Endangered species with only historical records (SARA);
- three Endangered species with only historical records (COSEWIC);
- three Endangered species, including two species with only historical records (ESA);
- three Threatened species, including two species with only historical records (SARA);
- four Threatened species (COSEWIC);
- four Threatened species, including one species with only historical records (ESA);
- six species of Special Concern, including four species with only historical records (SARA);
- three species of Special Concern, including two species with only historical records (COSEWIC);
- four species of Special Concern, including three species with only historical records (ESA);
- one Extirpated species, known to be stocked in Lake Ontario (COSEWIC);
- historical record of one Extinct species; and
- 27 species rare in Hamilton, 11 species Extirpated in Hamilton and one historical record of an Extinct species.

Three mussel species, all identified as provincially rare (S1-S3), two listed by the province and one listed nationally as Endangered, have been identified within the Cootes Paradise Heritage Lands:

- Paper Pondmussel (*Utterbackia imbecillis*) – S2;
- Eastern Pondmussel (*Ligumia nasuta*) – S1, Endangered (SARA, COSEWIC and ESA); and
- Lilliput (*Toxolasma parvus*) – S1, Endangered (SARA, COSEWIC), Threatened (ESA).

Redside Dace (*Clinostomus elongates*) (S2, Endangered nationally and provincially), Grass Pickerel (*Esox americanus vermiculatus*) (S3, Special Concern nationally and provincially) and Northern Brook Lamprey (*Ichthyomyzon fossor*) (S2S3, Special Concern nationally and provincially) were formally known from the area but have not been seen in Cootes Paradise within the last 20 years and are considered to be extirpated (Radassao 2015). Atlantic Salmon (*Salmo salar*) is an important game fish and is stocked in Lake Ontario.

Amphibians

A total of 13 species of amphibians (including one historical record) have been recorded in the Heritage Lands, all of which are native. Provincially rare species are listed in Table 8, and regionally rare species are listed in Appendix 7.

- one S3 species (Western Chorus Frog, *Pseudacris triseriata*);
- one Threatened species (SARA/COSEWIC);
- three species rare in Hamilton (including one historical record); and
- six area-sensitive species (including one historical record).

Reptiles

A total of 17 species of reptiles (including three historical records) have been documented in the Heritage Lands, including two non-native species, Red-eared Slider (*Trachemys scripta elegans*) and Yellow-bellied Slider (*T. scripta scripta*). Provincially rare species are listed in Table 8, and regionally rare species are listed in Appendix 7.

- seven S1-S3 species (including three historical records);
- two Endangered species (historical records) (SARA/COSEWIC/ESA);
- three Threatened species (including one historical record) (SARA);
- two Threatened species (including one historical record) (COSEWIC/ESA);

- four species of Special Concern (SARA/ESA);
- five species of Special Concern (COSEWIC);
- six species rare in Hamilton (including one historical record); and
- three area-sensitive species (including two historical records).

There are only historical records for Eastern Spiny Softshell (*Apalone spinifera*), Blue Racer (*Coluber constrictor foxii*) and Gray Ratsnake (Carolinian population) (*Pantherophis spiloides pop. 2*) in the Cootes Paradise Heritage Lands.

Three turtle nesting beds occur along the Lower Spencer Creek Conservation Area rail trail. Turtle nesting beds have also been constructed in neighbourhood yards adjacent to Lake Jojo (see Section 7.7.1). RBG installed approximately 14 turtle nesting beds at various locations on and adjacent to their lands between 2014 and 2017. For example, five turtle nesting beds are located north of the Desjardins Canal along the marsh perimeter, spread between the hydro station to behind Olympic Arena (Olympic Sports Park). Turtle nesting sites have also been constructed at Princess Point, the RBG boathouse and in the Pinetum Trail area of the Arboretum. RBG has prepared a site-specific plan to guide the recovery of Species at Risk turtles (RBG 2014).

Birds

A total of 185 bird species have been noted within the Cootes Paradise Heritage Lands, including six non-native species. Of these, 144 species have confirmed breeding status in the Hamilton region and are considered to possibly breed within the Current EcoPark System Lands (Hamilton Naturalists' Club 2006). Six of the 144 species are considered historic breeders. Provincially rare species are listed in Table 8, and regionally rare species are listed in Appendix 7.

- 29 S1-S3 species, including 18 breeders (including three historical records);
- eight Endangered species, including six breeders (including four historical records) (SARA);
- ten Endangered species, including eight breeders (including four historical records) (COSEWIC);
- ten Endangered species, including seven breeders (including four historical records) (ESA);
- ten Threatened species, including nine breeders (including one historical record) (SARA);
- 14 Threatened species, including 13 breeders (including one historical record) (COSEWIC);
- nine Threatened species, including eight breeders (including one historical record) (ESA);
- eight species of Special Concern, including six breeders (SARA);
- nine species of Special Concern, including four breeders (COSEWIC);
- 15 species of Special Concern, including 11 breeders (ESA);
- 40 species rare in Hamilton (all breeders);
- 44 area-sensitive species, including 39 breeders (including three historical records).

Five Endangered species known only from historical records from the Cootes Paradise Heritage Lands are King Rail (*Rallus elegans*), Piping Plover (*Charadrius melodus*), Kirtland's Warbler (*Setophaga kirtlandii*), Henslow's Sparrow (*Ammodramus henslowii*) and Loggerhead Shrike (*Lanius ludovicianus*).

Mammals

A total of 29 mammal species have been recorded within the Heritage Lands. Provincially rare species are listed in Table 8, and regionally rare species are listed in Appendix 7. There is one historical record, Least Shrew (*Cryptotis parva*), for the Cootes Paradise Heritage Lands.

- two S3/S3? species;

- three Endangered species (SARA/COSEWIC/ESA);
- one species of Special Concern (SARA);
- three species rare in Hamilton (one historical record); and
- 2 area-sensitive species.

Table 8. Significant faunal species recorded within Cootes Paradise Heritage Lands

	Scientific Name	Common Name	S Rank	SARA	COSEWIC	ESA
	Bird					
	Empidonax virescens	Acadian Flycatcher	S2S3B	END	END	END
	Pelecanus erythrorhynchos	American White Pelican	S2B			THR
	Haliaeetus leucocephalus	Bald Eagle	S2N,S4B			SC
	Riparia riparia	Bank Swallow	S4B		THR	THR
	Hirundo rustica	Barn Swallow	S4B		THR	THR
	Chlidonias niger	Black Tern	S3B			SC
	Nycticorax nycticorax	Black-crowned Night-heron	S3B,S3N			
	Dolichonyx oryzivorus	Bobolink	S4B	THR	THR	THR
	Calidris subruficollis	Buff-breasted Sandpiper	SNA		SC	
	Cardellina canadensis	Canada Warbler	S4B	THR	THR	SC
	Aythya valisineria	Canvasback	S1B,S4N			
	Hydroprogne caspia	Caspian Tern	S3B			
	Setophaga cerulea	Cerulean Warbler	S3B	SC	END	THR
	Chaetura pelagica	Chimney Swift	S4B,S4N	THR	THR	THR
	Chordeiles minor	Common Nighthawk	S4B	THR	THR	SC
	Sturnella magna	Eastern Meadowlark	S4B		THR	THR
#	*Antrostomus vociferus*	Eastern Whip-poor-will	S4B	THR	THR	THR
	Contopus virens	Eastern Wood-pewee	S4B		SC	SC
	Aquila chrysaetos	Golden Eagle	S2B			END
	Vermivora chrysoptera	Golden-winged Warbler	S4B	THR	THR	SC
	Ammodramus savannarum	Grasshopper Sparrow	S4B		SC	
	Larus marinus	Great Black-backed Gull	S2B			
	Ardea alba	Great Egret	S2B			
#	*Ammodramus henslowii*	Henslow's Sparrow	SHB	END	END	END
	Setophaga citrina	Hooded Warbler	S4B	THR		
	Podiceps auritus	Horned Grebe	S1B,S4N		SC	SC
#	*Rallus elegans*	King Rail	S2B	END	END	END
#	*Setophaga kirtlandii*	Kirtland's Warbler	S1B	END	END	END
	Calcarius lapponicus	Lapland Longspur	S3B			
	Ixobrychus exilis	Least Bittern	S4B	THR	THR	THR
#	*Lanius ludovicianus*	Loggerhead Shrike	S2B	END	END	END
	Clangula hyemalis	Long-tailed Duck	S3B			

	Scientific Name	Common Name	S Rank	SARA	COSEWIC	ESA
	Parkesia motacilla	Louisiana Waterthrush	S3B	SC	THR	SC
	Contopus cooperi	Olive-sided Flycatcher	S4B	THR	THR	SC
	Falco peregrinus	Peregrine Falcon	S3B	SC	SC	SC
#	*Charadrius melodus*	Piping Plover	S1B	END	END	END
	Setophaga discolor	Prairie Warbler	S3B			
	Protonotaria citrea	Prothonotary Warbler	S1B	END	END	END
	Calidris canutus rufa	Red Knot rufa subspecies	S1N	END	END	END
	Aythya americana	Redhead	S2B,S4N			
	Melanerpes erythrocephalus	Red-headed Woodpecker	S4B	THR	THR	SC
	Podiceps grisegena	Red-necked Grebe	S3B,S4N			
	Phalaropus lobatus	Red-necked Phalarope	S3S4B		SC	SC
	Buteo lineatus	Red-shouldered Hawk	S4B	SC		
#	*Gavia stellata*	Red-throated Loon	S1N,S3B			
	Euphagus carolinus	Rusty Blackbird	S4B	SC	SC	
	Asio flammeus	Short-eared Owl	S2N,S4B	SC	SC	SC
	Hylocichla mustelina	Wood Thrush	S4B		THR	SC
	Coturnicops noveboracensis	Yellow Rail	S4B	SC	SC	SC
	Icteria virens	Yellow-breasted Chat	S2B	SC	END	END
	Mammal					
	Myotis lucifugus	Little Brown Myotis	S4	END	END	END
	Myotis septentrionalis	Northern Myotis	S3	END	END	END
	Glaucomys volans	Southern Flying Squirrel	S4	SC		
	Perimyotis subflavus	Tricolored Bat	S3?	END	END	END
	Amphibian					
	Pseudacris triseriata	Western Chorus Frog (Great Lakes/ St. Lawrence population)	S3	THR	THR	
	Reptile					
	Emydoidea blandingii	Blanding's Turtle	S3	THR	THR	THR
#	*Coluber constrictor foxii*	Blue Racer	S1	END	END	END
	Lampropeltis triangulum	Eastern Milksnake	S4	SC	SC	
	Sternotherus odoratus	Eastern Musk Turtle	S3	THR	SC	SC
	Thamnophis sauritus	Eastern Ribbonsnake	S4	SC	SC	SC
#	*Apalone spinifera*	Eastern Spiny Softshell	S2	THR	THR	THR
#	*Pantherophis spiloides pop. 2*	Gray Ratsnake (Carolinian population)	S1	END	END	END
	Graptemys geographica	Northern Map Turtle	S3	SC	SC	SC
	Chelydra serpentina	Snapping Turtle	S3	SC	SC	SC
	Fish					
	Lampetra appendix	American Brook Lamprey	S3			

	Scientific Name	Common Name	S Rank	SARA	COSEWIC	ESA
	Anguilla rostrata	American Eel	S1?		THR	END
	Alosa sapidissima	American Shad	S1			
# **	*Salmo salar*	Atlantic Salmon	SX		EXP	
	Moxostoma duquesnei	Black Redhorse	S2		THR	THR
#	*Coregonus nigripinnis*	Blackfin Cisco	SU	THR		
	Ichthyomyzon castaneus	Chestnut Lamprey	S1?			
#	*Esox americanus vermiculatus*	Grass Pickerel	S3	SC	SC	SC
	Moxostoma valenciennesi	Greater Redhorse	S3			
	Coregonus kiyi orientalis	Kiyi	SX	SC	EXT	SC
#	*Acipenser fulvescens*	Lake Sturgeon	S2		END	THR
#	*Coregonus clupeaformis*	Lake Whitefish	S5	THR		
	Lepomis megalotis	Longear Sunfish	S3			
#	*Ichthyomyzon fossor*	Northern Brook Lamprey	S3	SC	SC	SC
#	*Clinostomus elongatus*	Redside Dace	S2	SC	END	END
#	*Coregonus reighardi*	Shortnose Cisco	SH	END	END	END
	Ichthyomyzon unicuspis	Silver Lamprey	S3		SC	SC
	Notropis photogenis	Silver Shiner	S2S3	SC	THR	THR
	Lepisosteus oculatus	Spotted Gar	S1	THR	THR	THR
	Dragonfly/ Damselfly					
	Enallagma basidens	Double-striped Bluet	S3			
	Epiaeschna heros	Swamp Darner	S2S3			
	Arigomphus villosipes	Unicorn Clubtail	S2S3			
	Butterfly/ Moth					
	Danaus plexippus	Monarch	S2N,S4B	SC	END	SC
	Mollusc					
	Ligumia nasuta	Eastern Pondmussel		END	SC	END
	Toxolasma parvum	Lilliput	S1		END	THR
	Quadrula quadrula	Mapleleaf Mussel				

= historical record >20 years old
** = stocked species

5.5.2 Invasive Fauna Species

Invasive species have been identified as one of the greatest threats to the integrity of the ecosystems of the Cootes Paradise Heritage Lands. Common Carp is by far the most significant threat to the aquatic environment within Cootes Paradise and remains the top threat to wetland rehabilitation; exclusion and removal of Common Carp from the marsh area is identified as a key step in achieving wetland sustainability. Table 9 lists the invasive fauna species. This table has been prepared based on several background reports, data sets, and field observations. Priority for management is provided in Table 9 and has been assigned based on expert opinion of the Cootes Paradise Heritage Lands.

Table 9. Some of the invasive fauna species recorded in Cootes Paradise Heritage Lands

Scientific Name	Common Name	Priority
Birds		
Cygnus olor	Mute Swan	Yes
Columba livia	Rock Pigeon	
Sturnus vulgaris	European Starling	
Passer domesticus	House Sparrow	
Reptiles		
Trachemys scripta scripta	Red-eared Slider	Yes
Trachemys scripta elegans	Yellow-bellied Slider	Yes
Fish		
Petromyzon marinus	Sea Lamprey	Yes
Osmerus mordax	Rainbow Smelt	
Alosa pseudoharengus	Alewife	
Carassius auratus	Goldfish	Yes
Cyprinus carpio	Common Carp	Yes
Salmo trutta	Brown Trout	
Morone americana	White Perch	
Neogobius melanostomus	Round Goby	Yes
Scardinius erythrophthalmus	Rudd	Yes
Insects		
Thymelicus lineola	European Skipper	
Pieris rapae	Cabbage White	
Agrilus planipennis	Emerald Ash Borer	Yes
Lymantria dispar	Gypsy Moth	Yes
Molluscs		
Dreissena polymorpha	Zebra Mussel	Yes
Cipangopaludina chinensis	Chinese Mystery Snail	Yes

5.5.3 Significant Wildlife Habitat

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

1. Seasonal Concentration Areas of Animals
    - Waterfowl Stopover and Staging Areas (aquatic)
    - Shorebird Migratory Stopover Area
    - Raptor Wintering Area
    - Bat Hibernacula

- Bat Maternity Colonies
- Turtle Wintering Areas
- Colonially Nesting Bird Breeding Habitat
- Migratory Butterfly Stopover Areas
- Landbird Migratory Stopover Areas
- Deer Winter Congregation Areas

2. Rare Vegetation Communities
    - Tallgrass Prairie
    - Old Growth Forest
    - Savannah
    - Other Rare Vegetation Communities
3. Specialized Habitat for Wildlife
    - Waterfowl Nesting Area
    - Bald Eagle and Osprey Nesting, Foraging and Perching Habitat
    - Woodland Raptor Nesting Habitat
    - Turtle Nesting Areas
    - Seeps and Springs
    - Amphibian Breeding Habitat (Woodland and Wetland)
    - Woodland Area-sensitive Breeding Bird Habitat
    - Marsh Breeding Bird Habitat
    - Shrub/Early Successional Bird Breeding 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 System Lands would qualify as Significant Wildlife Habitat.

5.6 Other Natural Heritage Designations

The following designations apply to lands found within the Cootes Paradise Heritage Lands.

Cootes Paradise Drowned Valley Provincial Life Science ANSI

This ANSI is comprised of a large wetland lagoon and surrounding shoreline habitat separated from Hamilton Harbour and the rest of Lake Ontario by a baymouth gravel bar formed by Lake Iroquois during the last glacial retreat. The area provides habitat for high numbers of rare and significant flora and fauna. Maple and oak hardwood forests cover most of the upland areas and contain trees that are over 100 years of age. Anthropogenic, climatic and edaphic factors contributed to the development of oak savannah communities that supported a rich diversity of species (Goodban et al. 1997). The shallow wetland waters and forests provide significant habitat for staging waterfowl.

Environmentally Significant Areas (ESAs)

The following Environmentally Significant Area (ESA) is found within the Cootes Paradise Heritage Lands:

- Cootes Paradise City of Hamilton ESA (DUND-15).

Provincially Significant Wetlands

The Ontario MNRF has evaluated large portions of Cootes Paradise as Provincially Significant Wetland, providing habitat for significant and rare species. Lake Jojo is included as part of the Provincially Significant Cootes Paradise Wetland Complex.

Other Designations

- The Niagara Escarpment, including portions of the Cootes Paradise Heritage Lands, is designated as a UNESCO MAB Reserve (United Nations Educational, Scientific and Cultural Organization Man and Biosphere Reserve)
- Cootes Paradise is a Nodal Park of the Niagara Escarpment Parks and Open Space System
- Important Bird Area (IBA)
- Important Reptile and Amphibian Area (IMPARA)
- Fish Sanctuary
- National Historic Site

5.7 Natural Heritage Connections and Linkages

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

To the north of the Cootes Paradise Heritage Lands, much of the landscape is open and relatively undeveloped. It thus offers few barriers to movement for most wildlife species. Because of this, there is a high degree of connectivity within Cootes Paradise Heritage Lands and adjacent Heritage Lands, including connectivity between Cootes Paradise and the Niagara Escarpment, which is the core mission of the Cootes to Escarpment EcoPark System. This is addressed further in the Issues and Opportunities Report for the adjacent Borer's Falls – Rock Chapel Heritage Lands. See section 7.1.1 on the critical corridor for connection of Cootes Paradise to the Niagara Escarpment, and section 7.7.1 on wildlife crossing and corridors.

Cootes Paradise is connected via valley corridors and wetlands to Hamilton Harbour and the Lake Ontario shoreline (Varga 1995). In terms of inter-Heritage Land connections, creek valleys provide natural corridors for species moving between Cootes Paradise Heritage Lands and Borer's Falls-Rock Chapel Heritage Lands, and from Lake Ontario to the Niagara Escarpment. Connectivity and linkage opportunities are, however, significantly impeded by the fact that the Cootes to Escarpment EcoPark System is bisected by provincial highways (Highway 403, Highway 6) and many regional highways. For example, York Road limits the connectivity between the Cootes Paradise Heritage Lands and Borer's Falls-Rock Chapel Heritage Lands. Within the Cootes Paradise Heritage Lands, Current EcoPark System Lands are bisected by Olympic Drive and Cootes Drive (Figure 2). The north shore of Cootes Paradise Heritage Lands is well-connected and configured, and forest interior habitat is available for area-sensitive species. However, the remainder of the Cootes Paradise Heritage Lands is fragmented and opportunities for improving the connectivity among areas that contain forest interior habitat are limited by existing infrastructure and development (e.g., along the south shore of Cootes Paradise, and connections to Lower Spencer Creek Conservation Area).

In addition, significant wildlife corridor issues have been identified with major roadways within the Cootes to Escarpment EcoPark System, and within the Cootes Paradise Heritage Lands in particular. Roadside nesting and mortality of turtles is also an issue on several of these roads. A focus of management efforts within the Cootes to Escarpment EcoPark System has been on addressing wildlife corridor issues at Cootes Drive, Olympic Drive and King Street East, with specific focus on turtles. This work includes the ongoing installation of roadside barrier systems to direct wildlife under existing crossing points through tunnels or under bridges, signage and support of a dedicated group of volunteers – Dundas Turtle Watch. Other locations with wildlife corridor issues within the Cootes Paradise Heritage Lands include Macklin Street North, which has no safe wildlife crossing location, Olympic Drive where the at-water crossing point is blocked by a metal barrier (i.e., weir), and York Road at multiple points including at Borer's Creek, Long Valley Brook and Hickory Brook where the existing culverts are undersized relative to wildlife. Additional discussion on wildlife crossing and corridor issues is provided in section 7.7.1.

5.8 Natural Heritage Inventory Summary

The following table includes some natural heritage-related policy designations such as ESA, significant woodland and significant wildlife habitat, as well as strictly natural heritage inventory summary information for Cootes Paradise Heritage Lands.

Table 10. Summary of natural heritage inventory findings for Cootes Paradise Heritage Lands.

Features	Cootes Paradise Heritage Lands
Environmentally Significant Area (ESA)	• City of Hamilton ESA: Cootes Paradise (DUND-15)
Area of Natural and Scientific Interest (ANSI)	• Cootes Paradise Drowned Valley Provincial Life Science ANSI
Provincially Significant Wetland (PSW)	• Cootes Paradise PSW
Species at Risk • based on provincial ESA • excluding historical records, planted species and non-breeding species	• 5 END floral species • 3 END and 7 THR bird species • 1 THR reptile species • 3 END mammal species • 1 END and 3 THR fish species • 1 END and 1 THR mussel species
Significant Wildlife Habitat	Examples of Significant Wildlife Habitat within the Cootes Paradise Heritage Lands include: • Seasonal Concentration Areas of Animals ▪ Waterfowl Stopover and Staging Areas (aquatic) ▪ Turtle Wintering Areas

Features	Cootes Paradise Heritage Lands

	• Rare Vegetation Communities
	  ▪ Old Growth Forest
	  ▪ Other Rare Vegetation Communities
	• Specialized Habitat for Wildlife
	  ▪ Waterfowl Nesting Area
	  ▪ Turtle Nesting Areas
	  ▪ Marsh Breeding Bird Habitat
	• Habitat for Species of Conservation Concern
	• Animal Movement Corridors

Surface water and fisheries resources	• Cootes Paradise Marsh provides important fish habitat • Permanent streams (including ponds) • Cold-water fish habitat
Flora • based on provincial ESA • excluding historical records and planted species	• 1,197 flora species; 771 native flora species • 50 Carolinian Indicators; 45 Prairie-Savannah Indicators • 150.9 FQI; 5.5 Mean C • 5 END species • 47 S1-S3 species • 185 regionally rare species in Hamilton • 219 species rare on RBG properties
Butterflies and Moths • based on provincial ESA • excluding historical records	• 35 species; 33 native species • 1 S2 species • 6 regionally rare species in Hamilton
Dragonflies and Damselflies • based on provincial ESA • excluding historical records	• 45 native species • 3 S1-S3 species • 1 regionally rare species in Hamilton
Fish • based on provincial ESA • excluding historical records and stocked species	• 87 species; 80 native species • 1 END species; 3 THR species • 10 S1-S3 species • 15 regionally rare species Hamilton
Mussels • based on provincial ESA	• 3 native species • 3 S1-S3 species • 1 END species; 1 THR species
Amphibians • based on provincial ESA • excluding historical records	• 12 native species • 1 S3 species • 2 regionally rare species in Hamilton • 5 area-sensitive species
Reptiles • based on provincial ESA • excluding historical records	• 14 species; 12 native species • 4 S1-S3 species • 1 THR species • 5 regionally rare species in Hamilton

Features	Cootes Paradise Heritage Lands
	• 1 area-sensitive species
Birds • based on provincial ESA • based on bird species known to breed in the City of Hamilton • excluding historical records	• 138 species; 132 native species • 3 END species; 7 THR species • 15 S1-S3 species • 38 regionally rare in Hamilton • 36 area-sensitive species
Mammals • based on provincial ESA • excluding historical records	• 28 species • 3 END species • 2 S3/S3? species • 2 regionally rare species in Hamilton • 2 area-sensitive species

6.0 Cultural Heritage Inventory

6.1 Cootes Paradise Cultural Heritage Overview

This section of the report presents an overview of the cultural heritage of the Cootes Paradise Heritage Lands. Early settlement history of the region, including that of First Nations, the British and Loyalist settlers, has been documented in previous reports including Clappison-Grindstone Heritage Lands Management Plan (North-South Environmental Inc. et al. 2016), A Plan for Burlington Heights Heritage Lands (MHBC 2014) and, most recently, the City of Hamilton Archaeology Management Plan (Archaeological Services Inc. 2016). Similar to the other sectors of the Heritage Lands, early cultural activity is reflected in features originating from First Nations use, including trails and archaeological sites, which were then overlaid with the imprints of early military and colonial settlement activity and the grid system of concessions and lots that subdivided the land in the late 1700s.

Dundas is the principal settlement area historically associated with this sector of the Cootes to Escarpment Heritage Lands (Dundas today is part of the City of Hamilton). After the American Revolution, Loyalists moved from the Niagara region up the shores of Lake Ontario to where Dundas is today. The first road in Upper Canada, Dundas Street (also known as Governor's Road), opened in the 1790s, connecting Dundas to York to London. Construction of the Grand Trunk Railway in the 1850s, later to become the Great Western Railway and then the Canadian National Railway, contributed greatly to the growth of Dundas. Dundas was an economic and transportation hub of Lake Ontario until the mid-1800s, when it was surpassed in size and economic activity by the Town of Hamilton, later to become the City of Hamilton.

Cootes Paradise was designated as a nature reserve in 1927 through an act of the Ontario legislature. Hamilton MPP, Thomas McQuesten, proposed a plan to beautify the Burlington Heights sector and to protect the significant heritage lands surrounding Cootes Paradise. This plan lead to conservation of land including Cootes Paradise and surrounding lands, and to development of Westdale Subdivision, the Royal Botanical Gardens and McMaster University.

6.2 Cootes Paradise Cultural Heritage Inventory

The following cultural heritage landscapes have been identified within the Cootes Paradise Heritage Lands.

6.2.1 Indigenous Use of Cootes Paradise Heritage Lands

There is a rich history of indigenous use of the Cootes Paradise Heritage Lands. Local historians suggest that the Hamilton area was once occupied by a group of indigenous peoples that the French, upon contact, called the Neutrals, as they remained neutral between the Iroquois and the Hurons, the two dominant indigenous groups in the southern Ontario area. Many Neutral peoples died of disease and disputes after European contact. Much of the area once travelled by the Neutrals was later occupied by Mississaugas of the Ojibwa Nation, now known as Anishinaabe (Freeman 10, 2006 as cited in the Burlington Heights Management Plan). Cootes Paradise, which is located at the head of Lake Ontario, served as a central node with linking trails radiating from Cootes Paradise out to other locations such as the Grand River, Cambridge, Paris and Guelph (RBG pers. comm. 2018). The Cootes Paradise Heritage Lands were used as seasonal hunting grounds by indigenous peoples. There are documented indigenous archaeological sites around the perimeter of Cootes Paradise Marsh, many of which have not been formally excavated. These sites were identified through test pitting conducted as part of the City of Hamilton Archaeology Management Plan (Archaeological Services Inc. 2012).

6.2.2 Boathouse Community

The boathouse community was described as follows in the Burlington Heights Heritage Lands Inventory and Issues report (MHBC 2013):

> "The boathouse community was located at the foot of Burlington Heights, facing [Cootes Paradise] Marsh. The story of this community and its absence today is inextricable from the story of the northwest entrance improvements and development of Burlington Heights in the 20th century. Highway 403 is a major transportation corridor crossing the Heights, providing a vital link between Hamilton, Burlington and neighbouring communities."
>
> "Photographs suggest that the boathouse colony emerged around the time of the First World War, although there may have been earlier temporary accommodations during the period of canal and railway construction. The increasing industrial profile of Hamilton was attracting thousands of new arrivals to the city every year: doubling the city's population between the turn of the century and World War I. The construction boom before the war had not created enough new dwellings to fill the demand. As a result, some workers began to look elsewhere, renting or squatting on land along Burlington Heights owned by local farmers, the City, and the Toronto Hamilton and Buffalo (TH&B) Railway. Structures in the community varied in size: some were two-storey buildings built on stilts above the water, with room for boats below and residents above; others were much smaller 'shacks'. The number of boathouses by the 1930s numbered over 100. The boathouses provided access to fish and game, either for sustenance or recreation and were located in a natural setting removed from the City's over-crowded working-class neighbourhoods. A strong sense of community developed among those living in the area."
>
> "Fears of transients hopping the railway lines and camping near the boathouse community, the reputation of the nearby Valley Inn, and some rough behaviours (drinking, moderate gambling and fighting) within the boathouse community itself led some Hamilton citizens to become concerned about the existence of the community. Coupled with a belief in the City Beautiful

movement, 'moral reformers' and City planners embarked on a process to transform the boathouse area."

"The first move in reforming the boathouse area were plans for a bird sanctuary proposed by the Hamilton Bird Protection Society (which later became the Hamilton Naturalists' Club), supported by the McQuesten family. Hunting was allowed by property owners along the marsh if they had a special permit allowing them to trap on their own lands. The members of the boathouse community were not considered legitimate property owners and were denied the opportunity to use the lands as they once had."

"Development plans for Burlington Heights grew to include a monumental entrance to the High Level Bridge. The area along the waterfront where the boathouse community was located became the focus of a design competition. City officials decided to evict boathouse dwellers in the late 1920s. The arrival of the depression significantly reduced funding for beautification projects, and the grand designs were scaled back and no longer required removal of the boathouses. Sympathy for retaining the boathouses was felt by other citizens during the troubling depression years. Additional dwellings were located atop the heights between Dundurn and what is now the High Level Bridge, and some beyond the present bridge site towards Aldershot. The houses south of the present bridge site faced Burlington Bay and were numbered 982 to 1104. The Board of Parks Management acquired these properties in 1927 and 1928, and by 1929 had removed them all (Correspondence with Murray Aikman, 2013)."

"A fire in the boathouse community in 1931 resulted in a coroner's jury recommendation to extend fire services to the area, or have it condemned. City officials were reluctant to extend services to the area and decided to have the boathouses removed. About half of the community, those who formally leased their land, took compensation and abandoned their houses. Others floated their boats to other locations around the marsh, engaging in a 'squat-tag' game with local authorities. Yet others resisted eviction and battled the municipality in court, facing expensive litigation costs. Most boathouses were demolished by the late 1930s, though some remained until the late 1950s. Today, none remain (Bouchier and Cruikskank 2016)."

6.2.3 Princess Point

Princess Point is located in the southwest corner of Cootes Paradise Marsh (Cootes Paradise Sanctuary 15, Figure 2), and is a 250 m long 90 m wide sand peninsula rising five metres above the water adjacent to Chedoke Creek (Radassao 2017). This low waterside peninsula made Princess Point a natural gathering place for people dating as far back as 10,000 years ago (Haines et al. 2011 as cited in Radassao 2017). Due to archeological discoveries at the peninsula, this area has been termed the Princess Point Complex, which also refers to the indigenous groups that historically utilized this area. These discoveries indicate that between 500 and 1000 AD the Middle Woodland culture brought agriculture in the form of corn production to the region (Crawford and Smith 1996 as cited in Radassao 2017). Princess Point is also quite likely the 1669 landing location of LaSalle's first exploration into the Great Lakes (Galinee 1670).

"…after five days voyage, arrived at the end of Lake Ontario, where there is a fine sandy bay, the bottom of which is the outlet of another little lake discharging itself. This guide made us enter about have a league and then onload our canoes at the place nearest the village…"

Due to its popularity, over sixty years of significant modifications have occurred at Princess Point (Radassao 2017). This includes the use of fill in the 1950s on the upper portion of the point and in the marsh south of the point (currently the parking lot), bulldozer activity to level the fill, intentional and accidental introduction of non-native species, and frequent moving to maintain fields for recreational activities. Beginning in 2003, the mowed fields were left to naturalize and the current walking trail along the perimeter was formalized. Remediating these disturbances has and continues to guide restoration activities carried out by RBG at Princess Point which aim to restore and maintain remnant tallgrass prairie and oak savannah habitats (Radassao 2017).

6.2.4 RBG Desjardins Trail

Located on fill resulting from the construction of Highway 403, Bayfront Trail was opened in 1996 (Figure 8 – Desjardins Trail). The City of Hamilton refers to this trail as part of the Desjardins Recreation Trail (Trails Listing, 2017). It connects Princess Point to Hamilton Harbour and the Hamilton Harbour Waterfront Trail. In the vicinity of Desjardins Trail, several landscape features are associated with the history of Cootes Paradise, which include:

- Princess Point, described in detail in 6.2.3 above, is an important archaeological site that today provides parking and access to trails (Figure 8 – RBG Princess Point);
- proximity to the area once occupied by the Boathouse Community that existed from the time of the First World War to the 1930s (for details refer to Chapter 5, *The People and the Bay,* Boucher and Cruikshank 2016 and Section 3.2, *A Plan for Burlington Heights Heritage Lands*, MHBC 2014);
- the fishway, opened in 1996 as a barrier to prevent non-native fish from entering Cootes Paradise Marsh; and
- proximity to the Canadian National and Canadian Pacific Railways and the T. B. McQuesten High Level Bridge which the trail passes under before joining the main Waterfront Trail.

6.2.5 Westdale Teaching Garden

The Westdale Teaching Garden first opened in 1948. As described in the *Churchill Park Management Plan* (Dillon 2014, pp. 4-7; 30-31):

> "As the former RBG Westdale Teaching Gardens, the north-west corner of Churchill Park adjacent to Oak Knoll Drive is a unique heritage landscape area within Churchill Park. The Teaching Garden was first opened in 1948, moving to the RBG Centre in 1995 as part of a programme of centralization. In 1996 the aviary from Dundurn Castle was relocated to the site, occupying the vacant garden outbuildings. The area contains Lavatories and Dressing Room (1934), a collection of ornamental trees including cherry trees that were a gift from Hamilton's sister city, Fukuyama, Japan."
>
> "In June 1996, the City took over the Teaching Gardens (sometimes called the Children's Gardens) from the Royal Botanical Gardens and established community garden plots which are rented seasonally. The greenhouses and ancillary buildings of the former Teaching Gardens were redeployed as an aviary with the relocation of birds from the Dundurn Park Aviary. The Aviary is operated by a volunteer organization called 'The Friends of the Aviary'."

Extant features of the Westdale Teaching Garden (Cootes Paradise Sanctuary 14, Figure 2) include the main building and walkway, the herb garden and teaching garden area now converted to community

Sources of Information:
Royal Botanical Gardens
Hamilton Conservation Authority
City of Hamilton
Land Information Ontario

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Cootes to Escarpment EcoPark System

Figure 8: Cultural Heritage Resources in Cootes Paradise Heritage Lands

Legend

- ① Boathouse Community
- Desjardin and Bayfront Trails
- Westdale Teaching Garden
- Desjardins Canal
- Former TH&B Rail Line
- RBG-Churchill Park
- RBG-Princess Point
- Rasberry Farm
- Heritage Lands Boundary

N
W E
S

0 250 500 1,000
Meters

Cootes to Escarpment EcoPark System

April 4, 2018

garden plots, and ornamental trees. The Westdale Teaching Garden is referred to as the 'Churchill Garden Aviary' in the City of Hamilton Inventory of Cultural Heritage Landscapes and is included as a listed property (Figure 8 – Churchill Gardens Aviary).

6.2.6 Coldwater Creek (Ancaster Creek)

Coldwater Creek has been identified as an evolved cultural heritage landscape valued for its "prehistoric and historical associations with human history that [are] representative of cultural processes in the settlement, development and use of land in the City" (p. 77, Ecoplans Limited 2012).

This property includes two campsites, one containing artifacts from the Late Woodland Period, and the other from the Middle Woodland Period (City of Hamilton 2004).

Coldwater Creek is not listed on the City of Hamilton Inventory of Cultural Heritage Landscapes. It is located adjacent to Lower Spencer Creek Conservation Area, outside the Heritage Lands (Figure 8 – Coldwater Creek).

6.2.7 Desjardins Canal

As described in Request to Designate the Desjardins Canal, Dundas, Under Part IV of the Ontario Heritage Act (PED09314) (City of Hamilton 2009), the heritage values of the Desjardins Canal are as follows:

1. Design value or physical value:
   "As the only canal in Hamilton, Desjardins Canal is a rare and unique example of a water-borne transportation route. Representative of a degree of technical achievement not seen in Hamilton before 1827, the canal property contains substantial remnants of the channel and traces of the turning basin, which has been filled and developed as park space, as well as a few remaining piers, marking the dredged channel, visible in Cootes Paradise in periods of low water. The channel exists at its original length; however, the extension through Cootes Paradise is not as easily visible due to deterioration of the piers that once marked the canal. The landscape originally created by the canal is an important community landmark, but is somewhat compromised by the lack of substantial canal-related remains. The Desjardins Canal still represents a high degree of technical achievement in Hamilton. The Desjardins Canal is easily traced through the landscape, and forms a significant cultural heritage feature having design and physical value."

2. Historical value or associative value:
   "Desjardins Canal, in association with the Burlington Canal, was the leading water-borne transportation route for local industry at the "Head-of-the-Lake", until the introduction of rail transport in the 1850's. The association between the canal and the growth and decline of Dundas as a commercial hub, in conjunction with the Desjardins Canal Disaster, is a significant aspect of local history. The canal also demonstrates the work and ideas of local businessman Peter Desjardins, who planned and designed the transportation route. The Canal has historical and associative value."

3. Contextual value:
   "The Desjardins Canal remains in its original location and its context has remained

> substantially unchanged. Due to rapid decay, and in an effort to conserve this prominent landmark, the turning basin was converted into Centennial Park in 1967. This important landscape feature greatly contributes to the area character of Dundas as a community within Hamilton. The property at Desjardins Canal is visually and historically linked to its surroundings, and displays contextual value, with nearby Cootes Paradise contributing to this contextual value. As the only canal in Hamilton, Desjardins Canal is a rare and unique example of a water-borne transportation route. Representative of a degree of technical achievement not seen in Hamilton before 1827, the canal property contains substantial remnants of the channel and its context has remained substantially unchanged."

The Desjardins Canal is listed on the City of Hamilton Inventory of Cultural Heritage Landscapes (Figure 2 – Desjardins Canal Pond, Figure 8 – Desjardins Canal).

6.2.8 McMaster University

McMaster University was established as a Baptist institution in 1887. The original campus was on Bloor Street in Toronto. In 1930, as part of the McQuesten improvement plans, McMaster University was granted its present location on the southern edge of Cootes Paradise (Figure 8 – McMaster University).

The campus of McMaster University is listed on the City of Hamilton Inventory of Cultural Heritage Landscapes.

6.2.9 McMaster Historic Core

As described in the City of Hamilton Register of Property of Cultural Heritage Value or Interest:

> "The historic core of the main campus of the present-day McMaster University comprises a cluster of five Collegiate Gothic brick sandstone buildings opened in 1930 (University Hall, Hamilton Hall, the Refectory, Wallingford Hall, Edwards Hall)."

McMaster Historic Core is a designated heritage property and is listed on the City of Hamilton Inventory of Cultural Heritage Landscapes (Figure 8 – McMaster Historic Core).

Designated properties on the campus of McMaster include: Wallingford Hall, Edwards Hall, McMaster Hamilton Hall, McMaster Refectory, McMaster University Hall and McMaster Scholars Road.

6.2.10 RBG Churchill Park

As described in the *Churchill Park Management Plan* (Dillon 2014, pp. 4-7):

> "Initial work [on Churchill Park] began in 1934 by the Hamilton Parks Board. Churchill Park was then designed as a park in the 1940's by Mathew Broman, Landscape Architect, with construction occurring in 1945. The park, while in ownership of the RBG, was maintained by the Hamilton Parks Board until incorporated into the City of Hamilton…"
>
> "In 1945, Westdale Park was renamed Churchill Park in honour of Sir Winston S. Churchill."

Heritage features include the lawn bowling green and fieldhouse.

Churchill Park is listed on the City of Hamilton Inventory of Cultural Heritage Landscapes (Figure 8 – RBG Churchill Park).

6.2.11 RBG Princess Point

Princess Point has a long history of cultural activity from early historic times to the present. Haines et al. (2011, p. 233) have described the promontory as "the site of human activity during the Middle Woodland (400 B.C.-A.D. 500), the Early Late Woodland (A.D. 500-1000), the entire span of the Ontario Iroquoian tradition (A.D. 1000-1500), and the post-contact period (A.D. 1650 to the present day). During these periods, Haines et al. describe the site as remaining open and used for crop cultivation.

In the more recent past, the site was used for hunting until Cootes Paradise and surrounding lands were protected as a nature reserve, although Haines et al. note that poaching continued until the early 1950s (2011, p. 233). Over the past decades, the promontory has been used for various recreational activities and to provide access for skating on Cootes Paradise Marsh. The site was modified during the construction of Highway 403 and now accommodates car parking and provides access to numerous trails (Figure 3). RBG is currently working to restore the native prairie ecosystem on Princess Point through the use of prescribed burns and re-introduction of prairie plants through seeding and planting (RBG website). Princess Point is listed on the City of Hamilton Inventory of Cultural Heritage Landscapes (Figure 8 – RBG Princess Point).

6.2.12 Westdale Original Subdivision

As described in the *Churchill Park Management Plan* (Dillon 2014, pp. 28-29):

> "The Westdale area is an early Canadian example of a planned community and is associated with a leading design movement. In the early 1920s landscape architect Robert Anderson Pope laid out the larger Westdale community with a unique pattern of concentric circles creating one of Canada's first planned communities. Featuring arts and crafts style architecture, walkable streets, a village-like shopping district and with easy proximity to McMaster University, the Westdale area has long been one of Hamilton's desirable neighbourhoods to live in."

Westdale Original Subdivision is identified as a cultural heritage landscape in the Ainslie Woods Secondary Plan and is listed on the City of Hamilton Inventory of Cultural Heritage Landscapes (Figure 8 – Westdale Original Subdivision).

6.2.13 100 Macklin Street North

This property is identified by the City of Hamilton as a Cultural Heritage Landscape (Figure 8 – 100 Macklin St N). It is not on the list of Protected or Non-Designated Properties or in the City of Hamilton Inventory of Cultural Heritage Landscapes.

6.2.14 Rasberry Farm

The land known as Rasberry Farm includes Concession 10, Lot 26 and part of Lot 25, Flamborough Township (Figure 8 – Rasberry Farm). An 1859 Wentworth County map shows 'Mrs. Rasberry' as the owner of the west half of Lot 26 (Gregory 1859). The 1875 Wentworth County Atlas indicates Charles Rasberry, a dairy farmer, as the owner of the part of Lot 25 south of the Great Western Railway. Jno (John) and R. Rasberry are shown on the same map as owners of all of Lot 26 (Page and Smith 1875).

As described in Laking's history of the Royal Botanical Gardens (2006), in 1941 the Government of Ontario purchased the Rasberry Farm and adjacent sensitive lands. The Ontario Department of Highways established its regional headquarters on the Rasberry Farm property, later moving to a new headquarters in Burlington. Through a land trade with McMaster University, Rasberry Farm became part of RBG in 1949. The RBG Propagation Department was established at Rasberry Farm, with the extant house accommodating an office, workspace for propagation staff, a second-floor laboratory and living quarters for the head propagator). The house was used as an administrative center for the Bruce Trail Conservancy. More recently, it has provided office space for RBG staff. Several greenhouses (now unused) and an RBG maintenance building are located to the east of the Rasberry house.

The southern part of the original farmland is now the site of The Arboretum, designed by RBG superintendent, James Redman in 1953 (Figure 2, Cootes Paradise Sanctuary 3). Redman's design proposal included the extant access road, circular road and parking system, with radiating allées of trees intended to entice visitors to explore the plantings (Laking 2006, p. 112). The Lilac Dell was established on this part of the Rasberry Farm site.

Extant features associated with the Rasberry Farm include the house and a stone silo, restored in 1985. The Dell is comprised of numerous lilac species, an allée of deciduous trees, and other specimen tree planting on rolling land that also provides access to Captain Cootes Trail and Hickory Valley Trail (Figure 3). This property is not listed on the City of Hamilton Inventory of Cultural Heritage Landscapes.

6.2.15 Toronto Hamilton & Buffalo Railway

The Toronto Hamilton & Buffalo Railway (TH&B) was described as follows in the Burlington Heights Heritage Lands Inventory and Issues report (MHBC 2013):

> "The acquisitions of the Grand Trunk Railway in the 1880s of the Great Western and North Western Railway Companies led a group of Hamiltonians to establish plans for a new railroad line between Toronto, Hamilton and Buffalo, incorporated in 1884 as the Toronto, Hamilton and Buffalo Railway (Toronto, Hamilton and Buffalo Railway Historical Society 2011). The line was desired to prevent the Grand Trunk from having such a strong monopoly in the area. The industrial centre of Hamilton also needed access to the nearby US market through Buffalo. In 1884, construction for the line was authorized, but a clause was stipulated that the proposed railway company could not be sold or amalgamated with any other company, and this hindered investors from financing the project. By 1890 the agreement had been changed, permitting amalgamation with other companies, just not the Grand Trunk or Canadian Pacific Railway companies. In 1892 the company amalgamated with the Brantford, Waterloo and Lake Erie Railway and lines were built through Hamilton in the following years. The TH&B continued to operate in Hamilton as a separate entity when purchased by Canadian Pacific Railways in the 1970s, but in the late 1980s after court settlements (resulting from violating the early clauses) it was amalgamated with the C.P.R. (Hamilton Public Library 2013 D, Toronto Hamilton & Burlington Railway Historical Society 2011)."

Between Ancaster and West Flamborough, the Spencer Creek Channel was ditched to create a berm that was suitable for constructing the TH&B railway into the concession allowance. Within the Cootes Paradise Heritage Lands, the Spencer Creek Rail Trail occupies the former location of the TH&B railway.

6.2.16 St. Augustine Roman Catholic Cemetery

As stated in *Hamilton's Heritage, Volume 6, Inventory of Cemeteries and Burial Grounds* (2005):

> "St. Augustine Roman Catholic Church, was the first established Catholic Church at the Head-of-the-Lake. The site on Upper East Street was purchased and opened for burials in 1896, replacing two earlier cemeteries. 1858 is stated as the 'date of opening'."

The cemetery is listed in the City of Hamilton Inventory of Cemeteries and Burial Grounds. St. Augustine Roman Catholic Cemetery is located south of Lower Spencer Creek Conservation Area, adjacent to the Heritage Lands (Figure 8 – St. Augustine Roman Catholic Church Cemetery).

7.0 Management Issues and Opportunities

Generally, the natural features within the Cootes Paradise Heritage Lands are in good condition. They support a diverse assemblage of flora, fauna and vegetation communities, including many significant species. However, the Current EcoPark System Lands are used for passive recreation, and this is a source of impact to natural and cultural heritage features. Given the popularity of several of the management units (e.g., Cootes Paradise Sanctuary 1-15, Lake Jojo, Lower Spencer Creek Conservation Area, Churchill Park, etc.), and anticipated increased use in the future, it is important to identify sources of impact, and initiate management prescriptions to prevent further impact, and hopefully reverse current impacts through restoration. Similarly, and concurrently, it is important to recognize where there is an opportunity to provide recreation opportunities and ensure they are realized for the benefit of the public.

Current use is impacting natural features and functions of the Cootes Paradise Heritage Lands, although there are several impacts that have resulted from influences beyond the EcoPark System boundaries (e.g, stormwater runoff, stormwater management, etc.). Impacts have been noted from the existing extent of use and given that considerably greater use of the Heritage Lands is anticipated, these impacts could increase if left unmanaged. This section provides a summary of the identified management issues, with a focus on highlighting overlap between and among recreational resources, natural heritage resources and cultural heritage resources to assist in identifying integrated options and solutions. These items are set out below and will guide the development of recommendations in the management plan. This section also identifies preliminary management opportunities. Although this is not a required component of the Inventory and Issues report, ideas and solutions that have been identified thus far are presented for preliminary discussion and feedback.

This management plan is being developed predicated on the expectation that use is going to increase in the Current EcoPark System Lands. The Project Team believes the Cootes to Escarpment EcoPark System as a whole, including Cootes Paradise Heritage Lands are at a critical juncture. Recent and on-going land acquisitions, current management and restoration initiatives by the partner agencies, recognition of the need for protection in policy documents and the development of these management plans are all positive steps that, if continued and focused on potential problem areas, will ensure the long-term integrity of the Cootes Paradise Heritage Lands. If management is not implemented where needed, current and anticipated increases in impacts will result in eventual degradation of the natural, recreational and cultural value of the area. Prioritizing management of these lands is extremely

important and timely to preserve the condition of the existing natural features and instigate management practices to accommodate future use.

Although the management plan will focus on Current EcoPark System Lands within the Cootes Paradise Heritage Lands, there are also pressures being placed on Stewardship Lands within the Heritage Lands, and adjacent privately-owned lands. In some instances, management issues on these lands affect the Current EcoPark System 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 Cootes Paradise Heritage Lands. This table organizes the identified management issues under the following headings:

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

Many of these issues are inter-related and, in many cases, management issues cannot be addressed individually. For example, over-use of trails from hiking and/or cycling has in places resulted in erosion issues, which can lead to ecological management issues. The organization of issues under the headings provided above provides a framework for the development of management recommendations 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 9 illustrates known locations for management issues within the Cootes Paradise 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.

7.1 Overarching Cootes to Escarpment EcoPark System Management Issues

Several management issues are not specific to the Cootes Paradise Heritage Lands and span the entire Cootes to Escarpment EcoPark System. Although strictly beyond the mandate of this management plan (which is restricted to Current EcoPark System Lands in the Cootes Paradise Heritage Lands), it was deemed important to bring them forward for consideration, as they have for previous Management Plans (Waterdown-Sassafras Woods Management Plan and Clappison-Grindstone Management Plan). 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 7.1.1.

Sources of Information:
Royal Botanical Gardens
Hamilton Conservation Authority
City of Hamilton
Land Information Ontario

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Cootes to Escarpment EcoPark System

Figure 9: Management Issues in Cootes Paradise Heritage Lands

Legend

Management Issues

- Access Issues
- Contaminated Sediment
- Cultural Heritage Issue
- Ditched Tributary
- Dumping
- Encroachment
- Invasive Species
- Lack of March Vegetation
- Old Infrastructure/Trail Structures
- Parking Issues
- Party Spot/Fire Pit
- Squating
- Trail/Road Issues
- Unsanctioned Use
- Water Quality Issue
- Water Quantity Issue
- Wildlife Crossing
- Shoreline Erosion and Gabion Baskets
- Watercourse Erosion Sensitivity
- Heritage Lands Boundary

Note:
Not all management issues and locations are mapped

Cootes to Escarpment EcoPark System

March 20, 2018

Highway 6
Olympic Drive
Cootes Drive
Dundas
McMaster University
Main Street
Highway 403
0 250 500 1,000
Meters

7.1.1 Issues

Awareness of the Cootes to Escarpment EcoPark System

The Cootes to Escarpment EcoPark System is a relatively recent initiative and is novel in its concept. Each of the partner agencies operate under their own policies and protocols in response to their individual mandates and governance. However, there are commonalities among the partners with respect to natural heritage, recreation and cultural heritage. In particular is the desire to facilitate connections between Lake Ontario and the Escarpment, which was the impetus for the C2E EcoPark System. One challenge in implementing the initiative is achieving recognition of these commonalities without impinging on the identity or mandate of the individual partners. Establishing a distinct identity for the EcoPark System and raising its profile would benefit the overall intent, however achieving this cannot compromise the mandates and branding of the land-owning partners.

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

Delineation of Current EcoPark System Lands

It is often difficult to determine when EcoPark System users are within Current EcoPark System Lands, or within Privately Owned Outreach Areas, as signage is often limited, the natural areas (woodlands, open lands, etc.) that compose the majority of the Heritage Lands extend well beyond individual property boundaries, and the Current EcoPark System Lands are owned by multiple agencies. This makes it practically impossible to enforce policies regarding use and encroachment in areas around the periphery of Current EcoPark System Lands. This creates issues for both adjacent landowners (e.g., trespassing and privacy issues) and Current EcoPark System Lands (e.g., encroachment of manicured areas and structures from adjoining lands). Furthermore, when property ownership is unknown, users are unable to determine to whom issues should be reported.

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

Each partner agency has their own set of policies and rules that respond to their individual mandates. As noted above, this creates a challenge to communicate the structure of the EcoPark System to the public, since the varying permitted land uses, signage, branding, etc. of the individual owners does not convey the traditional notion of a single park, and nor is this the intent of the EcoPark System mandate. For example, the Bruce Trail Conservancy and RBG allow only pedestrian traffic on their trails; however, cycling is permitted by other partner agencies. Not only is this mixture of permitted uses confusing to EcoPark System users, but users are generally not aware of the relevant rules and regulations of use. Different rules and permitted uses will continue to apply to different properties, depending on who owns the land and the sensitivity of the property. However, partner agency rules and policies need to

be more clearly communicated along with the unique structure of the EcoPark System. Also, to the extent that it is possible within their individual mandates, the partner agencies for each of the Current EcoPark System Lands should identify and build on commonalities to better promote the overall connection between Lake Ontario and The Niagara Escarpment that is achieved through theEcoPark System.

Population and Use

A major overarching management issue is the anticipated increase in use that will result from future development adjacent to all the Heritage Lands and the associated population growth. This particular issue is of less importance for Cootes Paradise Heritage Lands than some other Heritage Lands, owing to the limited opportunity for major development on adjacent lands, but it is retained here as an over-arching issue, as well for the few areas adjacent to the Current EcoPark System Lands with development potential. A population increase and an increase in use have the potential to degrade the natural, recreational and cultural resources unless mitigation in the way of increased management initiatives is implemented.

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

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

Owing to the multi-agency agreement to implement the EcoPark System and the public resources that have already been spent on the acquisition and management of the Heritage Lands, potential population-induced negative impacts from development should be mitigated through conditions of the approval process wherever possible. More generally, the partner agencies that are directly involved in the development approval process (in the case of the Cootes Paradise Heritage Lands these are the City of Hamilton, Hamilton Conservation Authority and Conservation Halton), should continue to consider and incorporate the significance of the Heritage Lands in their reviews and the subsequent conditions

they impose on development applications. This is viewed as part of their commitment to implementing the Vision of the Cootes to Escarpment EcoPark System. Partner agencies that are not directly involved in the development approval process should be encouraged to comment as landowners on development applications that may impact their lands. Where a public or private development proposal may exacerbate existing management issues and/or create new ones, adjacent landowners should make such concerns known so they may be addressed accordingly through the development approval process.

Funding

There are differences in approach to management by the partner agencies. Individual partners manage lands in a variety of models, from pay to use to free to use. This reflects the fact that Cootes to Escarpment EcoPark System includes two distinct organizational types: government and not-for-profit. Future operating and capital costs associated with the Cootes to Escarpment EcoPark System will be high and no clear or uniform model for allocating these and financing them has been proposed. Funding estimates will not be included in the management plan; however, funding as a broad management issue is included as the Cootes to Escarpment EcoPark System creates both challenges and opportunities in this regard.

Trail/Railway Crossings

A key overarching issue for the Cootes to Escarpment EcoPark System is the need for trail crossings of railways. There is a need for a formal discussion with railway companies to engage in a conversation about trail crossings at key locations in the Cootes to Escarpment EcoPark System.

Critical Corridor for Connection of Cootes Paradise to the Niagara Escarpment

A critical privately-owned corridor remains through Borer's Falls-Rock Chapel Heritage Lands to complete the connection of Cootes Paradise to the Niagara Escarpment. This corridor is key to the success of the Cootes to Escarpment EcoPark System in achieving the goal of connecting and restoring natural lands and open space between the Niagara Escarpment and Cootes Paradise in Hamilton Harbour and should thus be a focus of land acquisition efforts.

Desire and Need for Trail Connections and Recreation Plan

Pedestrian and cycling use of York Road has been described as the top recreation issue facing the Cootes Paradise and Borer's Falls-Rock Chapel Heritage Lands, due to major safety concerns. York Road is an old, narrow and winding road without a shoulder. It is used as a commuter route, but it is also desired by recreational cyclists. The desire for trail connections between Cootes Paradise, Borer's Falls-Rock Chapel, and Clappison-Grindstone Heritage Lands is well-documented. In particular, trail connections to the Pleasant View Natural Areas (Cartwright, Nicholson and Hopkins Tracts) and cycling access to Clappison Woods has been emphasized. There is the potential for a trail connection through the pipeline/utility line, extending from Cootes Paradise Sanctuary 9 through Borer's Falls Conservation Area 3, Pleasant View Natural Area – Cartwright Tract and Nicholson Tracts to Old Guelph Road, just south of the Bruce Trail crossing of Highway 6. The Cootes to Escarpment EcoPark System does not currently have a recreation plan in place to provide guidance on trail-related issues that span individual Heritage Lands boundaries and land-owning partners. This task would require a separate funding arrangement.

7.1.2 Opportunities

Preliminary management opportunities to be explored include the following:

- while recognizing the identity of the partner agencies, standardize elements of signage used in

the Cootes to Escarpment EcoPark System. Signage, promotional material, advertising, educational material, etc. should include the Cootes to Escarpment EcoPark System and Heritage Lands. This will raise the EcoPark System profile, contribute to name-recognition and promote the EcoPark System as a collaborative initiative;

- encourage partners to collaborate on standardizing signage within the EcoPark System. For example, standardization of colour, size, messaging, graphics, font, AODA compliance, placement and size of EcoPark System and partner logos, etc. could be established;
- develop and implement a consistent system to locate and mark boundaries of Current EcoPark System Lands within the Cootes to Escarpment EcoPark System. This includes the posting of signage to indicate when users are entering and leaving the Cootes to Escarpment EcoPark System;
- permitted uses for each of the land-owning partners should be clearly communicated throughout the Current EcoPark System Lands. Permitted uses do not have to be consistent throughout all properties or areas, and should be established based on the sensitivity of the area and the mandate of the landowning agency. Current EcoPark System Lands may also have specific uses/restrictions applied as a result of NEPOSS classification and zoning (to be provided in future reporting);
- there is currently no clear policy direction for planning authorities to consider Heritage Lands Management Plan recommendations. Consideration could be given to encouraging recognition of the Cootes to Escarpment EcoPark System in Official Plans as part of the next round of Official Plan Reviews. It would also be beneficial to identify the Cootes to Escarpment EcoPark System on Official Plan mapping;
- per the Greenbelt Plan 2017, municipalities, agencies and other levels of government must consider the Cootes Paradise Heritage Lands Management Plan when making decisions on land use or infrastructure proposals;
- Consider updating the funding formula for the Cootes to Escarpment EcoPark System;
- continue to purchase or receive donations of lands within the Cootes to Escarpment EcoPark System, as they become available through the Land Securement Strategy, with a priority placed on “joining” existing EcoPark System Lands and lands located with the critical corridor that provides the connection between Cootes Paradise and the Niagara Escarpment;
- opportunities to develop connecting nature trails as well as multi-use trails on roadside shoulders, in rights-of-way and/or utility corridors to create these much-needed trail connections, will be explored in more detail as part of the management plan. In addition, Consideration should also be given to incorporating multiuse trails in future planned road works such as potential re-alignment, widening or geometric improvements within the surrounding road network;
- explore the potential for a trail connection through the pipeline/utility line, extending from Cootes Paradise Sanctuary 9 through Borer’s Falls Conservation Area 3, Pleasant View Natural Area - Cartwright Tract and Nicholson Tracts to Old Guelph Road, just south of the Bruce Trail crossing of Highway 6; and
- prepare a recreation plan for the Cootes to Escarpment EcoPark System to provide guidance on trail-related issues that span individual Heritage Lands boundaries, with an emphasis placed on addressing the need for trail connections throughout the EcoPark System. The Hamilton Burlington Trail Council should be engaged to provide comment and review of the recreation plan, and the City of Burlington Community Trails Strategy (2015) and the City of Hamilton Recreational Trails Master Plan (2016) should be referenced.

7.2 Land Use Planning Issues

7.2.1 Issues

West End of Cootes Paradise and the "Dundas Gateway"

The west end of Cootes Paradise is a complicated area where the overall land use direction is not clear. This area is referred to as the "Dundas Gateway". RBG identified the need for some major planning in the area in a 2015 project proposal:

> "The west end of Cootes Paradise Marsh (an area roughly bounded by West Pond in the east and the termination of the Desjardins Canal in the west) is a particularly complex area within the overall Cootes to Escarpment EcoPark System. It is also an area identified as an important visitor node within the EcoPark System and transition area between the urban environment of Dundas and wild areas of Cootes Paradise Nature Reserve. In addition to many private land owners, a large Hydro One installation, a municipal sewage treatment plant, sports fields, landfills and other waste management facilities, and numerous roads, the area includes lands owned by three EcoPark System partner agencies (City of Hamilton, Hamilton Conservation Authority, and Royal Botanical Gardens). It is also an area of both considerable ecological important and sensitivity and contamination from industrial pollutants.
>
> The complexity of the area is due to more than the number of landowners in the area. Historical confusion about land ownership and resulting encroachment, concerns over the area as wildlife habitat and a wildlife corridor (particularly as an area of turtle nesting, meadow birds, and mammal movement), aspirations for the area to serve as a "gateway to the EcoPark System", and conflicting ideas about trails in the area, have all led to a set of present circumstances that call for a thorough, detailed and open planning process involving the partner agencies, to achieve clarity about the issues and the intentions of the land owning agencies in the immediate area, and to seek resolutions to the present issues."

RBG originally proposed that this planning project be completed by 2016, in advance of the management plan prepared for the Cootes Paradise Heritage Lands, due to the urgency of issues and need for planning in this area. This project was not completed, and will thus be commented on, where appropriate, through the current management plan process. Per the six Heritage Lands management plan projects under the Cootes to Escarpment EcoPark System program of work, the definitions and principles of planning as used under the Niagara Escarpment Parks and Open Space System (NEPOSS) will be applied throughout the Cootes Paradise Heritage Lands, including the "Dundas Gateway" area. This approach is not a proposal for a review of or changes to municipal land use planning or zoning and will be completed only for Currently EcoPark Lands, which are owned by partner agencies (i.e., lands not owned by partner agencies will not be subject to any review or discussion). NEPOSS classification and zoning will assist with providing general direction on permitted uses.

7.2.2 Opportunities

Preliminary management opportunities to be explored include:

- complete a comprehensive site-specific study of the "Dundas Gateway" at the west end of Cootes Paradise Marsh to investigate the area's possible role as a gateway to the Cootes to Escarpment EcoPark System;
- as part of the site-specific study of the "Dundas Gateway" include a review of parking to improve access the Cootes Paradise Heritage Lands from the "Dundas Gateway" area and address current issues related to parking; and
- investigate opportunity to expand parking options adjacent to the Cootes Paradise Heritage Lands. For example, Canadian Tire recently announced that they will be moving from their current location. There may be an opportunity to expand parking in this location, or in other locations adjacent to Centennial Park and Canal Park.

7.3 Access, Parking and Infrastructure Issues

Issues and opportunities related to access, parking and infrastructure are described below. It is acknowledged that transportation is an important issue, but beyond the scope of the management plan.

7.3.1 Issues

Parking and Access Issues

Several issues related to parking have been identified in association with the Cootes Paradise Heritage Lands:

- York Road Parking Issue: The parking lot at the York Road access point was closed down in 2016 by RBG. Signs have been posted with information on three alternative parking locations. Despite this, people choose to park on the shoulder of York Road. Roadside parking in this location is unsafe due to the narrow width of the road, 60 km/hour speed limit coupled with poor sightlines.
- Old Guelph Road Parking Issue: People park on the shoulder of Old Guelph Road, north of the Arboretum Access, despite there being ample parking available at the Arboretum. It is suspected that people choose to park in this location to avoid having to pay admission fees. Parking on the shoulder of Old Guelph Road is potentially dangerous owing to the 60 km/hour speed limit coupled with poor sightlines.
- Canadian Tire-owned Parking Lot Issue: The Canadian Tire-owned parking lot located at the southeast corner of the intersection of Dundas Street and Cootes Drive is used to access Lower Spencer Creek Conservation Area. Existing signage indicates "Canadian Tire Employee Parking" and "Canadian Tire Customer Parking", however it continues to be used by the public ro access the adjacent Heritage Lands. HCA does not endorse parking on private property.
- Cootes Drive Access to Spencer Creek Trail Issue: Parking is available on the south side of Cootes Drive at the Spencer Creek Trail. Users must cross the four-lane road to access Spencer Creek Trail. The speed limit is 80 km/hour in this location. Neither a crosswalk nor a flashing light are present to assist pedestrians with safe crossing. This lack of connectivity is considered a major trail and safety issue.
- Unsanctioned Access through Road Allowance: Unsanctioned access to the Heritage Lands is known to occur through a road allowance that runs south from York Road, through Borer's Falls Conservation Area 2 of Borer's Falls-Rock Chapel Heritage Lands, and into Cootes Paradise Sanctuary 6 and 7. This access requires crossing of the CNR railway, which is a major safety concern (see section 7.3).

- Unsanctioned Access from Parkview Avenue: Unsanctioned access to Cootes Paradise Sanctuary 5 occurs from the dead-end of Parkview Avenue. Unsanctioned trails lead from this location through the utility corridor to Cootes Paradise Sanctuary 5, eventually reaching the footbridge over the CNR railway and into Cootes Paradise Sanctuary 3 by the Rasberry House in the Arboretum (Figure 3).
- Unsanctioned Access from McMaster University: Unsanctioned access from McMaster University occurs into Cootes Paradise 12 off of Stearn Drive, and into Cootes Paradise 13 from the east end of the sportsfield, located opposite McMaster Stadium Parking Area H (across Michell Crescent) (Figure 3). Various management approaches have been used in attempt to limit unsanctioned access points from McMaster University, including the construction of Chegwin Trail, to offer a sanctioned trail experience in the area. Lands adjacent to McMaster University are highly sensitive natural areas, and include habitat for Species at Risk and rare species. Impacts to these features have been noted (Section 7.7.1).

Boat Access to Marsh

Sanctioned boat access to Cootes Paradise is currently limited. However, the public access the marsh "unofficially" from a number of locations: (1) Spencer Creek south of Cootes Drive; (2) Desjardins Canal east of Olympic Drive; and (3) from Hamilton Harbour at the fishway. RBG maintains two formal boat launches as public access points at Princess Point (Figure 3). There is a desire to access the marsh at the top of the Desjardins Canal, but an existing metal barrier (the weir) upstream of Olympic Drive prevents this from occurring on public lands. Instead, people currently access the marsh through private lands to launch boats (east of Olympic Drive). Formal access needs to be provided in this location, and there is an opportunity to provide s a style, or similar structure, to improve access to the EcoPark System. RBG would like to formalize a canoe/kayak route through the Cootes Paradise Marsh. Signage of a proposed route has been posted at RBG's boathouse, but the boathouse is not where most people access the water. The closest parking to the boathouse is currently 300-400 m away from the water's edge and there are no options available to move it closer. RBG may move their boathouse to another location to improve boat access to the marsh, with Princess Point being a possibility.

Lack of Defined Access Points

The management plan prepared for Churchill Park highlighted a fragmented visitor experience associated with a lack of defined access points to the five connecting nature trails (Dillon Consulting 2014). Access points are poorly marked, and as a result several other unsanctioned footpaths have been established (Figure 9). Some attempts at restoration along the forest edge were noted, although the plantings are not thriving.

CNR Safety Issue

EcoPark System users currently cross the CNR railway to connect to unsanctioned trails in both the Cootes Paradise and Borer's Falls-Rock Chapel Heritage Lands. Users may also walk along the railway to access unsanctioned trails. This is a safety issue and is discussed further in section 7.3.1.

Lack of Facilities

A larger facility for education is needed at RBG because the demand for educational programing at RBG far exceeds the existing space and schedule. In addition, the current septic system is near capacity on busy days and, as such, portable toilets are brought in during larger events. The general lack of facilities at RBG limits the ability to offer programs.

Trespassing

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 EcoPark System users have been noted. This issue ties into the need to identify and mark boundaries of the Current EcoPark System Lands. Trespassing also includes unsanctioned trail construction on Current EcoPark System Lands and encroachment from adjacent private properties; however, these topics are covered in sections 7.1.1 and 7.5.1).

Old Infrastructure and Trail Structures

Staircases are incorporated into trail design where needed to address steep terrain. Several staircases in the Cootes Paradise Heritage Lands are in poor condition and require repair/replacement. A collapsed structure located in Cootes Paradise Sanctuary 12, off Ravine Road Trail, is in need of removal. The boardwalk along Chegwin Trail is in poor condition and is in need of replacement. Four areas within Cootes Paradise Marsh contain elements of old restoration projects or degraded infrastructure. These items are the old Aquadam, logs and chains, concrete slabs, concrete-filled garbage can, a concrete pipe and two rusty culverts (Theysmeyer et al. 2016). Figure 9 illustrates the known locations of old infrastructure and trail structures, and Appendix 9 provides photographs.

Lack of Public Transportation

There is currently a general lack of public transportation options to access points within the Cootes Paradise Heritage Lands. For example, there is no public bus service from Hamilton to the RBG Arboretum.

7.3.2 Opportunities

Preliminary management opportunities to be explored include:

- all proposed access points, parking areas and trail linkages should be reviewed in the context of the Cootes to Escarpment EcoPark System management plans and the City of Hamilton's Recreational Trails Master Plan;
- enter into discussion with owners of the Canadian Tire to seek permission for parking in their parking lot as an access point to the Heritage Lands. If permission was obtained, signage should acknowledge Canadian Tire's contribution. Parking options adjacent to Centennial Park and Canal Park could also be explored;
- determine how to best mesh the current management plan study with the upcoming RBG land use planning process;
- explore options for addressing the York Road access point parking issue and consider (1) sealing off the trail so that there is no connecting trail to the Bruce Trail; (2) posting "No Parking" signs on York Road; or (3) re-opening the parking lot;
- explore options for addressing the Old Guelph Road parking issue and consider (1) posting "No Parking" signs on Old Guelph Road; and (2) increasing enforcement;
- consider the potential for Princess Point to be used to expand RBG programming and access to the Cootes Paradise Heritage Lands;
- initiate discussions with the City of Hamilton traffic department regarding the installation of a pedestrian crossing on Cootes Drive and the Spencer Creek Trail;
- the current Spencer Creek Bridge at Cootes Drive is undersized. Consideration should be given to rebuilding the Spencer Creek Trail underneath the road when the bridge is scheduled for

replacement. Consideration should also be given to establishing a canoe launch at the Spencer Creek bridge;
- consider installing a fence to provide a physical barrier to access where unsanctioned access has been a continual management issue along the outer perimeter of Cootes Paradise Sanctuary 12. Consider impacts to wildlife when evaluating options for fencing;
- repair or replace failing staircases, structures and boardwalks;
- repair dock at Princess Point, formalize the sand beach on the west side of Princess Point as a boat launch, improve directional signage to water access points and look for additional opportunities to improve boat access to the marsh;
- remove the metal weir at Desjardins Canal Pond by Olympic Drive and look for opportunities to formalize a boat launch and access point as the gateway to the EcoPark System;
- remove elements of old restoration projects and degraded infrastructure in Cootes Paradise Marsh, including the old Aquadam, logs and chains, concrete slabs, concrete-filled garbage can, concrete pipe and two rusty culverts;
- there is an opportunity to develop a tourism bus route system to move people around the entrances of the Cootes to Escarpment EcoPark System. This would also assist in addressing parking issues and the lack of public transportation; and
- there is potential to develop programming to interpret the significance of Princess Point and which could generate revenue.

7.4 Recreation Issues

Through the review of background information, conversations with key stakeholders, and fieldwork, it has become clear that the management plans are as much about managing people as they are about managing the natural environment. In fact, people management is key to effective management of the Heritage Lands/Cootes to Escarpment EcoPark System. An enormous impact is associated with the approximately 20,000 people that live adjacent to the south shore lands of RBG. Managing impacts that result from recreation must carefully balance the provision of recreational opportunities with natural and cultural heritage protection. The current management planning process provides an excellent opportunity to take a holistic approach to addressing recreational impacts with multiple stakeholders. Issues and opportunities related to recreation are described below.

7.4.1 Issues

Trail Overuse and Erosion

South shore trails are heavily used by McMaster University Students. Some impact from trail use is inevitable and acceptable, however there are portions of the trail system that show signs of overuse, including excessive exposure of tree roots, unacceptable impacts to ground flora, soil compaction and widening of the trails. Trail overuse has resulted in soil erosion in places. Some erosion, compaction, and water ponding is considered acceptable on trails within natural areas and as long as it is sustainable (i.e., not expanding) and not impacting significant species, habitats or hydrological functions, it is considered to be part of the trail experience. Unacceptable erosion on trails was noted, and can be attributed to overuse, improper trail construction, poor trail alignment and/or drainage issues. In a few locations, water ponding has led to trail widening or braiding to avoid wet patches on trails (Figure 9). Significant rill erosion caused by cycling activity is evident on steep sections of south shore trails (Figure 9). Ravine Road Trail has the capacity to host cycling traffic (although not sanctioned); however, some

cyclists use Ravine Road Trail to access unsuitable adjoining trails (e.g., Ginger Valley Trail). It is the deviation of cycling onto smaller trails that has occurred historically which caused heavy erosion and trail overuse.

Unsanctioned Cycling Use

RBG and the Bruce Trail Conservancy manage their trails and do not permit cycling on them. However, cycling inevitably and unavoidably continues on RBG and Bruce Trail Conservancy trails. Many cyclists cut through the top of RBG lands, using the Pinetum/Ray Lowes Bruce Side Trail as a shortcut to Old Guelph Road, and to (understandably) avoid York Road. Cycling use continues despite there being signage posted that indicates that cycling is not permitted. RBG identifies the need to apply fines to people who chose to cycle on RBG lands to resolve unsanctioned cycling activity. The cycling community is eager to work with RBG to identify appropriate places where cycling may be permitted.

Cycling Route Connectivity

There is a very difficult issue with the cycling, overall, insofar that cycling should be encouraged as a healthy, energy-efficient activity, but that the location of desirable cycling locations and existing road infrastructure makes it impossible to fully realize cycling opportunities. It would be irresponsible to encourage cycling and/or identify cycling routes on roads that are unsafe. The City of Hamilton's Cycling Master Plan addresses cycling route connectivity (City of Hamilton 2017). The recommendations made in the Master Plan will assist in improving connectivity and opportunities for safe cycling in the City of Hamilton and the western portion of the Cootes to Escarpment EcoPark System. For example, recommendations include road repair and retrofit initiatives to create safe and functional cycling routes, including connections to the entrances of the Cootes Paradise Heritage Lands and the Cootes to Escarpment EcoPark System. The Management Plan should encourage the implementation of the Cycling Master Plan.

Unsanctioned Trails

Unsanctioned trails are occasionally constructed and used within the Heritage Lands without consultation or authorization from the land-owning agency. RBG routinely closes unsanctioned trails on their properties by posting signage, placing brush and planting vegetation that deters access (e.g., Prickly Ash, *Xanthoxylum americanum*). RBG has completed a great number of trail closures on the south shore, and all but two unsanctioned trails have been resolved. Single track cycling trails have been constructed on lands south of Spencer Creek at Lower Spencer Creek Conservation Area (extending from the dead end at Meadow Lane). These trails appear to be used by BMX and mountain bikers. Small footpaths leading from sanctioned trails to the water's edge of Cootes Paradise and Lake Jojo are prevalent in areas where fishing access is desired. The management plan prepared for Churchill Park highlighted that a formal pathway system is lacking at the park (Dillon Consulting 2014). A strong desire line, evidenced by a worn footpath in the turf, extends diagonally through the baseball diamond from Marion Avenue to Parkside Drive. An additional unsanctioned trail occurs along the westerly perimeter of the sports fields at Churchill Park, adjacent to the forest edge (Figure 9). Signs of water runoff and erosion were noted on the adjacent ravine slopes. This trail is regularly used by local schools for cross-country runs (Dillon Consulting 2014). Behind the Olympic Sports Park Arena is a gateway for several unsanctioned trails into the Heritage Lands. Use of unsanctioned trails is exacerbated by the fact that unsanctioned and closed trails have been posted on Google Maps.

Trail Proliferation

Over the years, RBG has done an excellent job of decommissioning many sanctioned and unsanctioned trails, for reasons related to high maintenance requirements and impacts to the natural environment. For example, RBG has taken over 20 km of trail out of circulation in the south shore area. There was previously a trail along the entire shoreline. Through these efforts, the issue of trail proliferation has been greatly reduced in the Cootes Paradise Heritage Lands. One issue related to trail proliferation has been identified: a small loop has formed at the terminus of the dead end trail that comes off the Chegwin Trail. There is confusion as to where the main trail leads at the open water. As a result, trail forking is occurring (which also appears to be a result of circumventing a steep section of trail with heavy root exposure). Trail closure is recommended to create a linear trail that travels to and from the lookout, rather than a small loop that more than doubles the impact.

Signage

In general, the Cootes Paradise Heritage Lands are heavily signed. One exception was noted on the Chegwin Trail. The east access of Chegwin Trail is well-signed with a kiosk, but the west access is almost not apparent at all. Signage of the west access could be improved to appropriately direct users to the trailhead.

User Conflicts

Potential conflicts between different trail user groups can impact the enjoyment and safety of EcoPark System users. Principal trail user groups include hikers, on- and off-leash dog walkers, and cyclists. Off-leash dog use is not permitted within Current EcoPark System Lands, and cycling is not permitted on RBG trails. Conflicts among hikers, dog walkers and cyclists arise on occasion, and are often related to fast-moving bicycles or runners and off-leash dogs. Some cyclists and dog walkers do not respect that you must remain in control of your bicycle or dog at all times. Additional education is needed regarding the appropriate use of trails and trail etiquette.

Off-leash Dogs

Off-leash dog use on RBG property has been reported as a major problem, especially at the Arboretum where users essentially use the area as an off-leash dog park. This use is unsanctioned, but enforcement of this unsanctioned use is often lacking. Off-leash dog use can negatively impact natural areas by causing erosion, soil compaction, water quality impacts, and effects on vegetation and wildlife. Several municipalities require that an Environmental Impact Study be completed when off-leash dog parks are proposed adjacent to natural areas in order to assess impacts and mitigate the effects, given that they could be significant. Off-leash dog use may be deterred by the increasing number of ticks in the area. Additional off-leash dog parks may provide an opportunity for these users to focus this recreational use outside sensitive natural areas. Traditionally, municipalities offer the service of dog parks as part of their tax-supported Parks and Recreation programs and facilities. It is recommended that off-leash dog parks are located away from environmentally sensitive areas.

RBG Arboretum Issues

RBG has identified several issues with the Arboretum (Cootes Paradise Sanctuary 3, Figure 2), which include:

- the current layout of the Arboretum does not facilitate larger-scale visitor events or festivals;
- the Arboretum does not have sewer support infrastructure nearby to assist with larger-scale events or festivals;

- the Arboretum does not have an outdoor shelter area for events of school group/children's programming;
- the boathouse is old and insufficient to support RBG's summer camps and school group/children's programming;
- Old Guelph Road does not facilitate cycling or walking access to the Arboretum as it is in poor repair and lacks shoulders in the vicinity of the Arboretum entrance;
- various plant collections at the Arboretum are subject to herbivory from wildlife (e.g., deer, rabbits, voles); and
- Cootes Paradise is identified as a Nodal Park within the Niagara Escarpment Parks and Open Space System. The Arboretum is located within the Cootes Paradise NEPOSS Nodal Park and is where the majority of school programs and summer camps are offered; however, Cootes Paradise NEPOSS Nodal Park does not contain geology conducive to facilitating escarpment education/learning on site. Programming on the geology of the Niagara Escarpment is currently offered in the neighbouring Borer's Falls-Rock Chapel Heritage Lands at RBG's Rock Chapel property.

Impacts to Wildlife resulting from Recreational Activities

Canoeists and kayakers can impact sensitive nesting marsh birds in Cootes Paradise during certain times of the year (e.g., early spring-early summer). Because of this, canoeists and kayakers are encouraged to avoid paddling in areas that support sensitive water bird nesting habitat. RBG has posted a boat route through the marsh on signage at the boathouse, however, the number of people that see this signage or follow the suggested route is unknown. In addition, there is an educational opportunity to convey the importance of Cootes Paradise for water bird nesting habitat protection and migratory bird protection.

Cycliing occasionally harms (i.e., injure and/or kill) reptile and amphibian species. For example, on Spencer Creek Rail Trail, hatchling turtles are frequently run over by cyclists as the rail trail is a major nesting area for the turtles of Cootes Paradise. Wildlife corridor work completed in the area may increase the number of turtles nesting in the area in the future. There is an existing multiuse pathway on the south shoulder of Cootes Drive, running parallel to the Spencer Creek Rail Trail, which currently provides a safe route for cyclists and would avoid the area used by reptiles and amphibians. The Spencer Creek Rail Trail, which closely parallels the multi-use path associated with Cootes Drive, may be considered redundant in terms of cycling connectivity in the area. The Spencer Creek Trail is not identified under the preferred cycling network strategy in the Hamilton's Cycling Master Plan (City of Hamilton 2017).

Motorized Vehicle Use

Use of motorized vehicles (including boats) is prohibited throughout the Current EcoPark System Lands. ATV, dirt bike and e-bike activity has been noted in various locations on the north shore, and on the Lower Spencer Creek Rail Trail. Motorized vehicles disproportionately impact trails and the natural environment due to aggressive tire treads and ability to travel through muddy site conditions. Motor boats disturb bottom sediments in Cootes Paradise and exacerbate an already serious problem with turbidity.

Hunting/Fishing/Poaching

Hunters use utility corridors and unopened road allowances to access the Heritage Lands to hunt wildlife using bow and arrow, and firearms. This poses obvious issues for wildlife and can also pose safety issues

for other users. Poaching of turtles and spawning fish has been reported to be an issue. Ease of access to Spencer Creek makes spawning fish an easy target of poaching activities. RBG recommends that Spencer Creek and Cootes Paradise be turned into a seasonal fish sanctuary. They cumulative impact of poaching activities has a negative impact on fish and wildlife populations, and also has potential human health impacts due to the high heavy metal content found in larger fish in Lake Ontario (MNRF 2017). Issues with fishing line and hooks impacting wildlife have also been reported (e.g., turtles found with hooks in their stomachs).

Foraging

Wild plant and mushroom foraging takes place within the Heritage Lands. Issues associated with over-harvesting have been reported (e.g., plummeted Wild Leek (*Allium tricoccum*) populations). Over-harvesting can lead to the direct loss of biodiversity and can also cause other indirect impacts such as the spread of invasive species and trampling. The impacts of this activity are largely anecdotal, and some quantification of the impact would be helpful to enable prioritization of a management response. This could be accomplished through the establishment of a monitoring program.

Wildlife Feeding

Feeding ducks and geese is a popular activity along the Desjardins Canal Pond. This is a contentious issue, as some residents are very opposed to this activity, while others enjoy the up-close interaction with wildlife. Feeding wildlife large volumes of food (e.g., loaves of bread) causes wildlife to become habituated, losing their ability to find food independently, and becoming reliant upon this food source. There may also be questions about how this affects the health of wildlife. Some adjacent landowners also feed birds, White-tailed Deer and other wildlife.

Use of Drones

Drones have recently increased in popularity, and there is a desire to use drones to view secluded natural spaces. Drones have been noted to have a negative impact on wildlife in the Heritage Lands. In addition, Transport Canada regulations preclude the use of drones in certain areas based on proximity to hospitals and local airports, such as the emergency helicopter pad at McMaster University. RBG has created a drone policy to address the use of drones, and other Cootes to Escarpment EcoPark System partners are interested in created a policy as well. For example, HCA does not currently have a policy on drones, but does not permit the use of drones on HCA-owned property for commercial use or in environmentally sensitive areas.

Fire Pits/Party Spots/Camping Locations

Party spots and camping 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 signs, and can lead to the introduction and spread of invasive species. Drug abuse may also be part of the bush party culture with some groups. Fire pits, party spots and camping locations occur at Princess Point, Sassafras Point, Kingfisher Point, Cootes Paradise Sanctuary 7 and 8, Lake Jojo and behind the Olympic Sports Park Arena (Figure 9). Camping varies from single night stays carried out by McMaster University students and youth, to more permanent camps and prolonged stays by homeless individuals.

7.4.2 Opportunities

Preliminary management opportunities to be explored include:

- McMaster University is a principal user of the EcoPark System, both with respect to students using the area informally and for education and research. RBG and McMaster University have a Memorandum of Understanding Committee on property line issues. There is an opportunity for broader engagement with McMaster University students and staff with respect to research, as well as stewardship;
- consider creating a Memorandum of Understanding Committee on property line issues between HCA and McMaster University;
- explore opportunities to facilitate programming and larger-scale events at RBG's Arboretum, including but not limited to the following:
    - outdoor shelter or outdoor teaching classroom;
    - larger canoe/marsh program facilities;
    - constructed escarpment feature to showcase geology of the Niagara Escarpment and provide learning opportunities that are accessible for school programs and summer camps;
    - possible community garden site; and
    - potential of shifting focus to Princess Point/Westdale for some of RBG's programming, such as boat/water-based activities and relocation of the boathouse.
- there is a need for improved public education and awareness of trail use by user groups (e.g., dog walkers and mountain bikers). There is an opportunity to work with bike shops in the area to educate cyclists about appropriate trail use and trail etiquette. Hamilton Burlington Mountain Biking Association has embarked on this task. Consideration could be given to including a trail use pamphlet with the sale/maintenance of bicycles in area cycling shops. HCA has pamphlets for the different user groups that could provide a useful starting point;
- create an EcoPark System-wide Recreation Plan, including a plan for cycling use. This plan could build on the recommendations made in existing trail and/or cycling plans such as the City of Hamilton's Cycling Master Plan (2017) and the City of Burlington's Trail Plan;
- install signage at secondary boat launch at Princess Point and clean up asphalt and T-bars that are located in the vicinity of this access point;
- create a trails map for Cootes to Escarpment EcoPark System. Need for a trail rationalization plan spanning the Cootes to Escarpment EcoPark System. Show all trails, identify problems/issues and prioritize management issues. For example, in the Cootes Paradise Heritage Lands, the McMaster/Westdale area and the area west of Olympic Drive would benefit from this exercise and should be identified as focus areas for future management efforts;
- opportunity to collaborate with the Hamilton Burlington Mountain Biking Association to develop a functional trail network for mountain biking that respects the area's natural and cultural heritage while providing safe passage among cycling destinations;
- complete trail connections throughout the EcoPark System through a comprehensive trail plan. Consider using utility corridors and/or unopened road allowances as additional access points or trail connections;
- consider the following principles when assessing options for trail closure, 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 communities;
    - as an alternative to permanent trail closure, consider seasonal trail closure where the limitation is to keep users out of seasonally wet parts of the trail system;
    - improve signage, trail marking (e.g., blazes) and implement measures to assess and close redundant trails;
    - when trail closure is undertaken, post signage to communicate reasons why the closure was necessary as people are more apt to respect the trail closure if they know why it has occurred;
    - construct bridges and boardwalks to address erosion and wet trail conditions where they are resulting in unacceptable impacts;
    - 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.
- install a buoy system to restrict canoe and kayak access to sensitive water bird nesting habitat in Cootes Paradise Marsh;
- consider discouraging cycling on Spencer Creek Rail Trail to minimize impacts to nesting turtles and turtle hatchlings. At a minimum provide substantial signage and/or structures to force bikes to slow down in critical crossing areas;
- initiate a survey to determine the awareness of the EcoPark System, how the area is currently being used, what the desires of the EcoPark System users are, etc.;
- provide consistent signage that clearly explains permitted uses (e.g., cycling permitted, off-leash dog area), or conversely, uses that are prohibited (e.g., dogs must be on-leash, no cycling);
- monitor cycling activity and take appropriate action to address management concerns such as closing unauthorized trails and notifying individuals that cycling is not permitted on RBG trails;
- improve signage and entrance area at west access to Chegwin Trail;
- 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 for activites that are inappropriate in ecologically significant/sensitive lands. For example, lands that are dominated by non-native invasive species would be better suited for dog walking, mountain biking or other forms of more intensive recreation than ecologically significant/sensitive lands;
- look for suitable locations for intensive off-leash dog activities to occur, preferably within disturbed open space areas with low natural heritage value. 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;
- continue to monitor for trail erosion and implement appropriate trail construction and remediation measures on steeper slopes where warranted;
- the impacts of wild plant and mushroom foraging are largely anecdotal and some quantification of the impact would be helpful to enable prioritization of a management response. This could be accomplished through the establishment of a monitoring program;
- encourage partners in the Cootes to Escarpment EcoPark System to collaborate on creating a policy on the use of drones. Lessons learned by RBG through the creation of their drone policy

may benefit other partners interested in creating a similar policy;
- encourage increased dialogue with all trail user groups to ensure that all opinions and users' needs are being heard and incorporated into trail management considerations;
- engage cyclists in the ongoing monitoring and management of the trail system, in collaboration with and with approval from the landowner;
- close the steep section of small loop trail with heavy root exposure that has formed at the terminus of the dead-end trail that comes off the Chegwin Trail. Consider formalizing a seating area or lookout at the terminus of this dead-end trail;
- evalaute the potential to close the Chegwin Trail based on damage caused to endangered species in its vicinity and limited funding for trail maintenance;
- offer bike parking racks at trail heads, especially at access points to trails where cycling is not permitted;
- an internal park pathway system at Churchill Park would improve connections between facilities, and facilitate access into/through Churchill Park (Churchill Park Management Plan, Dillon Consulting 2014);
- the forest adjacent to Churchill Park creates an attractive backdrop to the open space of the park and is highly valued by users and residents. Direct access to the Cootes Paradise Heritage Lands is a unique attribute, but one that needs to be controlled and managed carefully to avert increasing and potentially irreversible environmental impacts. Defining additional trailheads and establishing directional and educational signage would assist with this (Churchill Park Management Plan, Dillon Consulting 2014);
- consider alternatives to traditional signs. Signs are not always effective tools for informing trail users and are often targeted for vandalism/removal. Suggestions will be provided in the management plan;
- formalize recreational uses at Lake Jojo (trail system, signage, skating, fishing, platform for wildlife viewing);
- post signage indicating permitted uses and impacts associated with unsanctioned uses stating fines for illicit uses;
- ensure local ordinances and by-law policies are updated to include prohibition of unsanctioned uses in natural areas. This is necessary to be able to engage by-law enforcement officers if and when needed;
- develop a protocol for reporting illegal activities to law enforcement;
- identify locations of dumped garbage and yard waste, and facilitate clean up.
- close and restore unsanctioned party spots;
- look for appropriate locations for additional benches and picnic tables to facilitate small social gatherings in desired locations;and
- lmprove 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.

7.5 Encroachment Issues

Adjacent land uses can create issues for natural areas. The Cootes Paradise Heritage Lands are surrounded by more than one hundred neighbours (refer to Section 2.1). Various impacts associated with encroachment have been noted on Current EcoPark System Lands, particularly from residences

abutting the northwest shore and along the south shore of Cootes Paradise Marsh. Many by-laws exist to address encroachment; however, due to the lack of staffing resources, municipalities are often unable to enforce them and are thus unable to address encroachment issues through this approach.

7.5.1 Issues

Private Unsanctioned Trails

Unsanctioned trails are occasionally created from private residences to an adjacent sanctioned (or widely used unsanctioned) trail. Sometimes, gates are installed into rear-lot fencing to facilitate access. This speaks to the frequency of use that some of these trails experience. When combined, this can have an impact on the quality of the natural area and can also impact wildlife through an increased level of disturbance.

Structures and "Yard Extension"

Structures such as retaining walls, picnic tables, small sheds, and household objects such as lounge chairs and composters were noted within the Current EcoPark System Lands, adjacent to residential properties. Also, yards are occasionally extended by mowing, and by the placement of flowerbeds within the natural area boundary (also referred to as property creep). This has an impact on edge vegetation and reduces the overall size of the natural area.

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. Dumping of garbage was frequently noted in many places within the Current EcoPark System Lands (Figure 6), for example:

- adjacent to parking lots located at the end of Presidents Drive near McMaster University Alumni House;
- various locations along shared boundary of the Heritage Lands and McMaster University campus;
- from east boundary of Churchill Park into the edge of Cootes Paradise Sanctuary 13; and
- from Olympic Drive into Lake Jojo and Olympic Sports Park (potentially associated with transfer station off-hours).

As of January 1st, 2018, McMaster University became a Tabacco and Smoke-free campus. This has resulted in an increase in the accumulation of cigarette butts on Cootes Paradise Heritage Lands (Cootes Paradise Sanctuary 12), which is presumed to be associated with an increase in those seeking an off-campus location to smoke.

Vegetation Removal/Trampling

Removal of vegetation occasionally occurs along the edges of natural areas. For example, tree cutting of both dead and living 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. Specific examples of vegetation removal and trampling at Cootes Paradise Heritage Lands including the following:

- A portion of HCA lands along the east edge of Lower Spencer Creek CA, adjacent to the baseball diamond, is frequently mowed;

- Mowing in the hydro corridor and from the hydro corridor to the Hopkins Trail (Figure 9) occurs on a regular basis;
- A putting green has been created by mowing in the hydro corridor, south of Hopkins Court/Willowglen Court;
- A portion of the hydro corridor and Cootes Paradise Sanctuary 9 is currently being maintained as a community garden with the permission of RBG (Figure 9). Removal of natural vegetation in the vicinity of the community gardens appears to occur on a regular basis; and
- A major issue with vegetation tramping occurs in the ravines behind McMaster University campus (Cootes Paradise Sanctuary 12) (Figure 9). Critical habitat for Species At Risk occurs in this general area and McMaster University students have trampled Species at Risk populations. RBG has completed a great deal of trail closure in the area, and have provided an appropriate trail loop (i.e., Chegwin Trail) to provide access, but sensitive areas are still being trampled. It may be necessary to install a fence to keep people out of this area.

Pool Drainage

Evidence of swimming pool drainage into the ravines of the south shore was noted from the Westdale North neighbourhood. Erosion gullies beginning at the rear of residential yards with swimming pools were noted in several locations (Figure 9).

Semi-permanent Camps (Squatting)

Several semi-permanent camps have been set up in several locations within the Heritage Lands to provide shelter for homeless people (Figure 9). This is an unsanctioned use, and is considered trespassing. Management issues, including trampling vegetation and dumping, occur in the vicinity of these semi-permanent camps.

Cats/Domestic Pets

Domestic pets, in particular cats, many of which 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).

7.5.2 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 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;
- consider installing a fence to provide a physical barrier to access at the interface of McMaster University and the Heritage Lands, extending from Cootes Drive to the west access of the Chegwin Trail;
- increase awareness of the McMaster University student population with respect the significance and sensitivity of the Heritage Lands, including the importance of protecting species at risk populations;
- continue to remove garbage and dumped refuse from the Current EcoPark System Lands;
- continue conversations with McMaster University in order to address and manage increased

cigarette butt litter within the lands adjacent to the campus;and

- the landfill at Lake Jojo is capped, but wire, metal pipe, tires and construction debris protrude in many places. There is an opportunity to clean up this debris. This might need to be part of an overall long-term management plan for Lake Jojo that addresses all of the issues noted there.

7.6 Hydrologic Impacts

Prior to the anthropogenic influences within, adjacent to, and upstream of, the Cootes Paradise Heritage Lands, forested and grassland communities would have served a number of functions in controlling the movement of water in the landscape through the attenuation of surface flows from precipitation, slow release over time, evapotranspiration, erosion control, etc. These, among other services provided by vegetation, would have contributed to reducing the overall volume of water directed to watercourses feeding into Lake Ontario and metering it out over longer periods of time, reducing the "peakiness" of hydrographs. For all but the most extreme precipitation events. it would also have minimized (perhaps even eliminated) flood events. With the advent of land clearing for agriculture, industrialization and urbanization, the widespread removal of vegetation and alteration of surface water features has resulted in a number of hydrologic issues within the Cootes Paradise Heritage Lands – largely related to erosion, sedimentation and reduced water quality. These issues are described with site-specific examples in section 7.6.1.

7.6.1 Issues

Run-off and Peak Flows

There is an overarching issue of increased rates of run-off and peak flows as a result of past land clearing for agricultural purposes (e.g., vegetation removal, draining of wetlands to increase quantity of arable lands, etc.), industrialization, and the continued urbanization resulting in an increase in impervious surfaces associated with development (e.g., buildings and asphalt restrict the ability of precipitation to infiltrate in the ground and focus precipitation into watercourses rapidly). High run-off rates and peak flows has caused massive erosion of streams and a decrease in groundwater infiltration. Any steps possible to mitigate run-off through Low Impact Development (LID) techniques would benefit the Spencer Creek watershed and Hamilton Harbour.

Erosion and Sedimentation

The tributaries draining to Cootes Paradise historically had natural erosion rates, which slowly increased the incised nature of the valleys. However, changes in land use in recent history have accelerated the rate of erosion considerably in some areas. Impacts resulting from erosion and sedimentation can significantly damage vegetation. In many areas within the Current EcoPark System Lands, bank erosion has exposed tree roots and has resulted in deadfall. Some fallen trees have blocked the creek, which in turn may impact the hydrology and fluvial geomorphology of the watercourse (recognizing that in some cases, woody materials can enhance the stream ecosystem but in more extreme cases can contribute to bank-cutting, channel braiding, steep gradients, and create barriers to fish passage). Habitat for herbaceous plants is also impacted. In some places where creek banks would have naturally sloped gently toward the creek, soil has been washed away until the banks have become almost vertical or even under-cut (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 in creek systems and Cootes Paradise Marsh has resulted

in some destruction of habitat for aquatic vegetation. Reduction of light penetration from increased water turbidity (suspended fines as a result of erosion of clay and silt-laden soils) impacts the aquatic life living in creek systems and Cootes Paradise Marsh. Increased turbidity also impacts germination of emergent vegetation and has been identified as one of the factors that led to the demise of the emergent marsh that once characterized Cootes Paradise. 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 sand and shales that occur within the Heritage Lands. Undercut banks caused by erosion also pose a concern for the safety of trail users.

Surface run-off over impermeable surfaces (e.g., asphalt, concrete, stone-chip paths, compacted soils, etc.) promotes the formation of rills and gullys where the water leaves these areas (e.g., outfalls, where curbs end, etc.). Ravines are particularly susceptible (also as a result from adjacent sheet flow) as are areas adjacent to stone-chip paths on slopes.

Specific examples of erosion caused by unmitigated stormwater run-off noted in the Heritage Lands include:

- erosion resulting from stormwater run-off is occurring from McMaster University lands that drain into the valley in Cootes Paradise Sanctuary 12 (Figure 9). There is a need to relocate the outfall that discharges into the valley; and
- erosion resulting from a curb-cut on Mayfair Crescent on McMaster University campus, causing gullying into the adjacent ravine in Cootes Paradise Sanctuary 13 (Figure 9).

Water Quality

The Hamilton Harbour RAP released two reports in 2016 addressing point-source and non point-sources of pollution in Hamilton Harbour and the resulting impact (Hamilton Harbour RAP 2016a and 2016b). Run-off from cleared areas (e.g., agriculture) from the upper watershed, rural and urban runoff, sediment from current ravine and valley erosion along the creek systems, total suspended solids, and phosphorus loadings into Hamilton Harbour are a major watershed concern related to the delisting of Hamilton Harbour as an Area of Concern. A number of water quality issues have been identified as major impacts to the Cootes Paradise Heritage Lands, as listed below.

- there is a major water quality issue associated with sewer cross connections. There are four Combined Sewer Overflows (CSO) that discharge to Cootes Paradise Marsh. One CSO on Chedoke Creek is completely unmitigated and overflows every time it rains. Chedoke Creek Flows through Cootes Paradise Sanctuary 15, discharging highly polluted water (Theysmeyer 2017) into Cootes Paradise Sanctuary 1 to the east of Princess Point. Water quality issues include water flows and overflows, which bring garbage and contaminated water (sewage) to Cootes Paradise Marsh;
- there are major water quality issues associated with leachate discharging from the old landfill site at Kay Drage Park (located across Chedoke Creek/Highway 403 from Coronation Park). Slope reconstruction is currently underway along the banks of Chedoke Creek/Highway 403 to address leachate issues;
- residential properties located to the north of the Cootes Paradise Heritage Lands are unserviced and rely on septic systems. Water quality monitoring at the creek mouth of Hickory Brook has found that septic systems located upstream are negatively impacting water qualityin the creek;
- the Dundas Wastewater Treatment Plant is scheduled for upgrades to improve operational efficiency in the near future. The plant is built on top of an old landfill. Leachate and associated

water management issues are a concern in the surrounding area;
- there is the potential for a large amount of chloride from de-icing agents, used widely to improve road safety, discharging into creek systems, Cootes Paradise, and migrating to the groundwater during snowmelt in the spring;
- the Desjardins Canal is subject to frequent algae blooms due to phosphorus contamination in the sediment. Environment Canada has never authorized a clean up nor do they have any intention to. Opportunities for provincial or federal funding are not available; therefore, clean up is entirely up to the landowner, which is the City of Hamilton; and
- turbidity and warmed water caused by stormwater runoff, erosion, siltation, the invasive non-native Common Carp (*Cyprinus carpio*), limited vegetative buffer on coldwater streams, etc.

Fluctuating Water Levels in Cootes Paradise Marsh

Water levels in the lower Great Lakes were very high in 2017 which had a significant effect on Cootes Paradise Marsh and the neighbouring community. This was exacerbated by periods of heavy rainfall in the spring, resulting in major flooding events. Whereas high water is a normal event depending on the timescale that is examined, an increase in intensity and frequency of severe weather events is an anticipated outcome of climate change and is expected to continue to impact the hydrology of Cootes Paradise Marsh over the long term.

Churchill Park Drainage

Several hydrologic impacts have been identified associated with the drainage from Churchill Park (Churchill Park Management Plan, Dillon Consulting 2014). Churchill Park presently drains to the west and northwest through a number of distributed outlets which convey runoff from the park to Cootes Paradise. Runoff has eroded ravine slopes adjacent to Churchill Park. Surface runoff from the Westdale North neighbourhood enters Churchill Park in some locations, while runoff from the park enters the neighbourhood in other locations. Issues associated with runoff from the park to the neighbourhood include basement flooding and water quantity issues with the neighbourhood CSO which contributes to sewer overflows into Cootes Paradise Marsh. There is a predominance of poorly draining silt-clay subsoils at Churchill Park, which is at least part of the cause for the ponding of water that occurs regularly. The City of Hamilton plans to implement Low Impact Development features, such as rain gardens, to mitigate the poor drainage at Churchill Park, address flooding in local areas of the neighbourhood, and to improve the water quality at Cootes Paradise Marsh. Construction of the first phase of this project is scheduled to begin in 2018.

Polluting Spills

The roadways, pipelines and railway lines within the Heritage Lands are a potential source of chemical and fuel spills. Spill prevention plans, contingency plans and emergency response plans should aim to protect natural features along roads, railway lines and pipelines, as well as human safety. Spill prevention and response plans are prepared and updated by individual utility companies. In addition, the City of Hamilton has an Emergency Preparedness service, and the Ontario Ministry of Environment and Climate Change has a Public Pollution Reporting Hotline (Toll-free: 1-866-MOE-TIPS (663-8477) and Spills Action Centre.

7.6.2 Opportunities

Preliminary management opportunities to be explored include the following:
- continue to engage in discussion and initiatives to improve urban infrastructure to mitigate

stormwater management, high run-off and peak flows. Hamilton RAP released a report in 2016 about urban runoff in Hamilton which touches on opportunities for Low Impact Development (LID) (Hamilton Harbour Remedial Action Plan 2016b);

- any impervious surfaces created as part of the future park infrastructure should be accompanied by Low Impact Development initiatives;
- undertake a community communications campaign to highlight the importance of implementing Low Impact Development to the health of the Cootes Paradise Marsh and its tributaries;
- implement the Bay Area Implementation Team's recommendations for 2017-2021 to continue improving the water quality of Hamilton Harbour;
- relocate the stormwater outfall draining to Cootes Paradise Sanctuary 12 to mitigate erosion. A Light Rail Transit hub will be constructed in this general area, and there may be an opportunity to relocate this stormwater outfall at the time of construction;
- support RBG in continuing monitoring programs that focus on understanding water quality in Cootes Paradise Marsh;
- consider developing a septic system improvement program targeted for the watersheds that drain the northern portion of the Cootes Paradise Heritage Lands;
- there is an opportunity to improve water quality in the Desjardins Canal which involves dredging, however, there are several issues to resolve associated with this huge undertaking including the difficulty of obtaining funding for sediment remediation. Other opportunities to improve water quality should be considered in preference to the dredging option for pragmatic reasons;
- look for opportunities to improve vegetated buffers on coldwater streams;
- there is an opportunity to improve climate change resiliency in the area through the creation of a comprehensive and long-term plan for climate change mitigation and adaptation, with particular attention paid to impacts resulting from spring flooding; and
- incorporate measures to redirect and infiltrate on-site drainage to reduce ponding in Churchill Park and run-off that is contributing to erosion of the forested slope. Opportunities include development of 'rain gardens' and the incorporation of other LID measures into new park development (e.g., permeable pavement surfaces).

7.7 Ecosystem Management

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 Heritage Lands. 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.

7.7.1 Issues

Forest Fragmentation

The forest edge of the south shore of Cootes Paradise is very fragmented and poorly configured, reducing opportunities for increasing forest interior habitat. The width of the easement for managing hydro-corridors was increased by approximately five metres on either side in 2017. This increases the extent of forest fragmentation and the overall impact of the hydro-cut. Approximately 75% of Cootes Paradise Heritage Lands are surrounded by urban development and are fragmented from other natural

areas in the landscape. Opportunities for making ecological connections are limited due to adjacent urban land uses and major transportation corridors. See section 7.1.1 on the critical corridor for connection of Cootes Paradise to the Niagara Escarpment.

Decline in Natural Feature Quality

An overall decline in the quality of natural features, including biodiversity, has resulted from increased pressures from adjacent lands, and intensification of recreational uses (see section 7.1.1 on accommodating stresses from increased use, and section 7.6.1 on hydrologic impacts). A key theme in the Management Plan will be how the Current EcoPark System Lands can be managed for biodiversity values in the face of habitat fragmentation, climate change, human uses, etc.

Forest Health Decline

Several factors are currently impacting the health of forests in southern Ontario. Climate change and extreme weather events, such as prolonged periods of drought, can significantly impact the health of forests and can lead to the death of trees. Tree blowdowns and slope erosion resulting from the death of trees can also impact the health of forests by creating large gaps in forest canopy.

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 another potential threat. Many of the forests pests, such as Emerald Ash Borer, are killing trees or causing significant dieback of trees, resulting in hazard tree and safety issues. Gaining access to and managing the dead trees creates a secondary management issue, along with invasive species management. Fortunately, ash is a relatively minor component of the forest ecosystem within the Heritage Lands. Stands of ash trees previously occurred on clay extraction sites in Cootes Paradise Sanctuary 6. These areas are now dominated by Common Buckthorn. RBG targets a few areas of heavy ash decline each year to focus replacement plantings and invasive species removal. Also, RBG injects some ash trees along Ravine Road Trail and at the base of Hickory Valley Trail to protect them from Emerald Ash Borer.

Non-native earthworms also appear to be contributing to the decline of forest health, particularly impacting the diversity of the ground flora and soil micro-invertebrate 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.

Urban-adapted Wildlife

Some wildlife species benefited from the forest cutting and agricultural intensification that followed European settlement in North America, resulting in an increase in their population sizes and ranges (Naughton 2012, p. 517). Some of these species have also become well-adapted to urban life. Within the Cootes Paradise Heritage Lands, urban-adapted wildlife species include squirrels, racoons, skunks and deer. Over-population of meso-predators, such as raccoons and skunks, impact other wildlife through predation, resource depletion and by dominating habitat. Their ability to capitalize on urban land use provides them with a competitive advantage over other wildlife.

Fragmented landscapes favour White-tailed Deer, a species which prefers forest edge. In addition, in urban areas the added complexity of intense highway development interrupts natural wildlife

movement patterns. Urban areas also have few natural predators and no hunting. MNRF completed a wintering deer survey in the Ancaster Area in 2009. This study concluded that "concerns regarding health, public safety, vehicle collisions, impacts to forest ecosystems, biodiversity, conservation of species at risk, damage to ornamental plants, landscaping, agricultural crops and nursery stocks indicate that in some areas deer populations have exceeded society's tolerance levels", and "in areas where normal deer movement behaviours are impaired, and there is no predation, deer populations have likely exceeded the carrying capacity of their habitat".

RBG has taken some steps to control deer populations on their lands and has partnered with local indigenous communities to organize a cull which resulted in the removal of seven deer. Although controversial, deer management of some kind must continue within the Current EcoPark System Lands in order to address impacts to natural heritage and human safety. Deer exclusion fencing has also been used to reduce rubbing against, and the consumption of, lilac shrubs; however, exclusion fencing is not long enough to impact deer travel patterns.

In addition, a major management issue associated with Canada Goose populations (an urban-adapted species) is the difficulty in getting restoration plantings to establish (e.g., RBG has had to install one fence to keep geese away from marsh restoration plantings, and another fence to keep people out). There are also water quality repercussions resulting from excrement of Canada Geese. Maintenance of large expanses of lawns contributes to concentrations of Canada Geese, and ought to be considered when reviewing management protocols.

Loss of Open Woodland/Prairie/Savannah Habitat

There is significant literature noting the vast open oak woodland and grassland understory within and around the Cootes to Escarpment EcoPark System 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 presence of prairie indicators in the Heritage Lands (Appendix 6), it is likely that pre-contact vegetation communities would have been comprised of a substantially greater area and coverage of open oak woodland, prairie and savannah habitats. Where possible, open oak woodland, prairie and savannah should be incorporated into restoration targets.

Over time, these habitats have been lost or diminished within the Heritage Lands due to the loss of disturbances, probably including fire, which would have maintained a more open landscape 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 at Princess Point and Sassafras Point that is maintained as open habitat through prescribed burns. RBG conducted a controlled burn at Princess Point on April 13, 2017.

Conservation and Recovery of Species at Risk

The conservation and recovery of Species at Risk in the Cootes Paradise Heritage Lands is largely associated with conserving and restoring marsh and open woodland habitat. Management of habitat in and adjacent to 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 suppressed (i.e., open oak woodlands historically maintained their open character due to

disturbance caused 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.

Cootes Paradise Outlet to Lake Ontario

The outlet of Cootes Paradise to Lake Ontario is undersized, which causes a bottleneck and currently contributes to back-flooding in the former Town of Dundas after large rain events. Frazile ice (soft or amorphous ice formed by the accumulation of ice crystals in water that is too turbulent to freeze solid) that collects at the outlet contributes to the severity of back-flooding. In addition, the main channel of Spencer Creek is constrained by the old railway berm, which complicates options for restoration to improve in-stream habitat and efforts to slow the flow of water.

Stream Habitat Improvement

Stream habitat improvement is a central restoration goal for Cootes Paradise Heritage Lands (Theysmeyer et al. 2016). Spencer Creek, Ancaster Creek and Chedoke Creek are all trenched and disconnected from their floodplains. Spencer Creek was channelized to facilitate the construction of the now abandoned rail line and canal. Ancaster Creek and Delsey Creek have been impacted through various infilling and Delsey Creek is blocked at Olympic Drive by a grate. Chedoke Creek was modified through the infilling of the marsh for the closed Kay Drage Landfill and construction of Highway 403. These impacts pose major issues for fisheries, stormwater management, and water quantity and quality.

Many stream habitat improvements are currently underway and/or planned in the Cootes Paradise Heritage Lands. In-stream fish habitat rehabilitation works are planned for Spencer Creek in 2018 to create pools and riffles to slow the flow of water and improve fish habitat. As part of the wetland restoration plan, RBG has proposed restoration projects to improve water quality and stream habitat within the Heritage Lands. Multiple north shore tributaries of Cootes Paradise Marsh, including Mink Brook, Long Valley Brook and Hickory Brook, are the target of RBG's in-stream habitat restoration efforts. The Hickory Brook project focuses on un-ditching the lower 150 m of stream and recreating a natural channel. The Mink Brook and Long Valley Brook projects focus on agricultural stream buffering and riparian habitat re-establishment projects (Theysmeyer et al. 2016).

Immediately adjacent to Cootes Paradise Heritage Lands, upstream of the limit of the lands at Ancaster Creek, McMaster University operates the "McMarsh", an on-campus ecosystem restoration facility used for teaching and research. Groundwater and stream stage wells have been installed to assess flowpaths and stream responsiveness to precipitation.

Cootes Paradise Fishway and Management of Fish Communities

The Cootes Paradise fishway is a barrier designed to keep non-native carp out of the marsh. The fishway has been effective, and is also a useful tool for obtaining data about the populations of other fish species (e.g., pike and trout) that utilize the marsh. The fishway is a key invasive species management tool, and the number one restoration tool used to improve the quaity the Cootes Paradise Marsh. It is also an important public education tool. A session is planned for 2018 to review the efficacy and long-term use of the fishway. The Ministry of Natural Resources and Forestry (MNRF) is concerned with how long the fishway will operate and the associated costs. RBG would like environmental conditions to be improved to the point where carp are no longer favoured and the fishway is no longer required. Canadian and American experts will participate in discussions to determine what is best for the fish community and recommend how long the fishway will operate and in what capacity.

Invasive Species

Tables 6 and 9 summarize the major invasive species noted within the Current EcoPark System Lands. Invasive species tend to spread aggressively and out-compete native species with resulting losses in species diversity and ecosystem function. Invasive species management is a major priority requiring considerable management effort as many invasive species occur in the Heritage Lands, including: Garlic Mustard, Lesser Celandine, Dog-strangling Vine, English Ivy, Periwinkle, Himalayan Balsam, Japanese Knotweed, Phragmites, Miscanthus, Purple Loosestrife, White Mulberry, Common Buckthorn, non-native honeysuckles, Multiflora Rose, Kobus Magnolia, Japanese Barberry, Norway Maple, Manitoba Maple, Tree-of-Heaven, and Black Locust. Some of these are very difficult and/or resource-intensive to eradicate. Woodland Speargrass (*Poa nemoralis*), a non-native invasive grass, is prevalent in some areas (forest adjacent to Churchill Park). Various plant taxa have escaped from horticultural gardens at the Arboretum into surrounding natural areas, indicating that the botanical gardens are a source of some invasive species. RBG is in the process of creating an organization-wide policy on invasive species. High-profile Invasive fauna noted within the Current EcoPark System Lands include, Common Carp, Gypsy Moth and Emerald Ash Borer.

Site-specific examples of invasive species issues include the following:

- Dog-strangling Vine is particularly prevalent within hydro-corridors, adjacent to railways and at Lake Jojo (Figure 9);
- Lake Jojo has many invasive non-native species including: Japanese Knotweed, Dog-strangling Vine, Garlic Mustard, and Black Locust;
- Japanese Knotweed and Lesser Celandine are currently spreading into Cootes Paradise Sanctuary 13 and Cootes Paradise Sanctuary 15, which includes Princess Point, from neighbouring residential neighbourhoods (Figure 9);
- The Arboretum (Cootes Paradise Sanctuary 3) has a Magnolia collection. One species, *Magnolia kobus*, appears to be escaping into adjacent natural areas. Magnolia propagate by seed, which are eaten and dispersed by birds into natural areas. RBG removes a few thousand individuals annually as part of invasive species management efforts (Figure 9);
- Phragmites, Miscanthus, Tree-of-Heaven and Japanese Knotweed are very prevalent at Lower Spencer Creek Conservation Area (Figure 9);
- An extensive area of Eurasian Manna Grass (*Glyceria maxima*) is present in the Cootes Paradise Marsh, which is a focus of extensive meadow marsh restoration identified in RBG's Wetlands Conservation Plan 2016-2021 (Theysmeyer et al. 2016) (Figure 9);
- Invasive species management on the north shore of Cootes Paradise is a primary focus of invasive species management efforts carried out by RBG, requiring a great deal of time and resources; and
- The management of hydro-corridors through the Heritage Lands, including the access roads used by utility companies to access these corridors through the Heritage Lands' steep ravines, creates vectors for the spread of invasive species.

Noxious Plants

Poison ivy and other noxious plants pose health and safety issues for park users. Poison ivy is found throughout the Current EcoPark System Lands in various concentrations, with particularly vigorous populations occurring around Lake Jojo, where massive vines have climbed into the canopy and leaves

and fruit are sometimes at head-height. Giant Hogweed has been noted within the Current EcoPark System Lands (Appendix 5).

Wildlife Crossing/Corridors

The lack of wildlife crossings has been identified as a major issue of concern for the Cootes to Escarpment EcoPark System, especially within the Cootes Paradise Heritage Lands. The existing assemblage of land parcels that comprise the Current EcoPark System Lands are fragmented across the landscape, as a result wildlife are forced to cross roads, hydro-corridors and railways to access lands that are required for fulfilling their various life processes (e.g., nesting, foraging, over-wintering). Vehicular speed and wildlife collision on roads severely impacts the safe passage of wildlife, and ultimately wildlife populations. For example, road mortality is a large contributor to declines in amphibian and reptile populations. The City of Hamilton has established a wildlife corridors committee to examine key wildlife crossings and movement as they relate to the City of Hamilton's Natural Heritage Plan. Several issues related to wildlife crossing and corridors have been identified for the Cootes Paradise Heritage Lands, including the following:

- there is a large population of White-tailed Deer within the Cootes Paradise Heritage Lands and adjoining Borer's Falls-Rock Chapel Heritage Lands. Crossing of urban and rural roads by White-tailed Deer poses issues for wildlife and for the safety of the public. Deer and other wildlife crossing hotspots have been identified in several locations on York Road:
    - at Hickory Brook through the valley system extending from Cootes Paradise Lands to Borer's Falls-Rock Chapel Heritage Lands;
    - through stream valley east of Valley Road, across York Road; and
    - from Cootes Paradise Sanctuary 9, across York Road and into the bottom end of Borer's Falls Conservation Area (Figures 2 and 9).
- a metal sheet piling wall is located at the east end of the Desjardins Canal Pond. This metal wall creates a barrier to wildlife movement between Desjardins Canal Pond and Cootes Paradise Marsh (e.g., turtle movement). However, the water and sediment in the Desjardins Canal Pond are highly contaminated and it is considered an ecological trap for wildlife. This currently poses a health concern for Black-crowned Night-heron, which frequently perch on the metal sheet piling wall and feed in the canal;
- a major wildlife crossing issue, associated with turtle and snake mortality, has been identified along Cootes Drive and Olympic Drive along the south and west shores of Cootes Paradise. The following management activities have been implemented in response to this issue:
    - yellow, flashing turtle signs has been installed on Cootes Drive to alert drivers of the possibility for turtle crossing. The flashing lights associated with the signage are activated seasonally, coincident with peak movement periods of turtles in the area;
    - in 2016, approximately 400 m of Animex fencing was installed by HCA along the south side of Cootes Drive, starting just west of Spencer Creek where it passes below Cootes Drive extending west to a concrete culvert that connects the wetlands on either side of Cootes Drive (approximately 175 m east from the intersection of Cootes Drive and Olympic Drive). RBG has installed chain link fencing with a sheet metal skirt on the north side of Cootes Drive, west of Spencer Creek. Anecdotally (Dundas Turtle Watch), fewer turtles were killed on the road in 2017. This was attributed to the presence of the newly installed wildlife fencing. Notably, turtles have been observed circumventing the fencing – particularly in association with the terminus of the chain link fence on RBG property. This indicates that Cootes Drive bisects habitat types that are important to

turtles at different times of the year, which subsequently points to the need for an assessment of available habitat types and limitations including a critical assessment of barriers to turtles along the corridor. RBG and HCA have put in nesting piles to increase the amount of suitable nesting habitat available on the south side of Cootes Drive along Spencer Creek Trail. The City of Hamilton has agreed to cease grass cutting within the median during peak movement peiods (spring and fall) to avoid killing turtles that may be crossing through the vegetated median. RBG has tagged several turtles using radio telemetry to track turtle movement in the area;

  - in order to continue to improve the survivorship of turtles and other wildlife along the corridor, the extent of fence must be sufficient to direct wildlife within their typical movement corridors. Absence of fencing from key parts (e.g., south of existing animex where turtles cross between the Desjardins canal and the wetland on the south side of Cootes Drive) could contribute to on-going road mortality in these locations; and
  - Dundas Turtle Watch is an independent group that monitors the roads running through the wetland area at the west end of Dundas. Monitoring occurs each morning and evening during the turtle nesting season. Turtle sightings are recorded (including both live and dead turtles), along with other wildlife sightings (e.g., frogs, toads, birds, snakes). In addition to monitoring, turtles that are in danger of being killed on roads are rescued, and turtles that have been struck by a vehicle are taken to appropriate veterinary care.
- there is a need for an appropriate wildlife crossing on the west side of Chedoke Creek, along Macklin Avenue from the bridge leading to Kay Drage Park, to Longwood Road North. Turtles currently cross Macklin Street North to reach sandy soils within the wooded area enclosed by Macklin Street North and Longwood Road North Point (Cootes Paradise Sanctuary 15) for nesting (Figure 9);
- Midland Painted Turtles and Snapping Turtles from Lake Jojo currently climb the westerly bank and nest in the centre of Sleepy Hollow Court and neighbouring front yards. HCA have been actively involved in stewardship programs to protect turtle nesting locations, and are working with local landowners backing onto Lake Jojo to create nesting habitat for turtles;

See section 7.1.1 on the critical corridor for connection of Cootes Paradise to the Niagara Escarpment, and the need for an appropriate wildlife corridor and forest connectivity through the north shore of Cootes Paradise Heritage Lands and Borer's Falls-Rock Chapel Heritage Lands to the Niagara Escarpment.

Noise

Noise (or sound) pollution probably impact the Cootes Paradise Heritage Lands in one or more ways:

- highway noise associated with Highway 403 travels across the marsh, and may negatively affect sensitive wildlife species. As a result some species may be constrained to the west end of the marsh (i.e., away from Highway 403);
- McMaster University occasionally hosts major events that can be extremely loud and may result inmajor impacts along the south shore of Cootes Paradise Marsh and extending across the marsh to the north side of the Cootes Paradise Heritage Lands. Wildlife sensitive to noise may be impacted by these events;
- the helicopters landing at the Air Ambulance Helicopter Pad, located east of Cootes Paradise on McMaster University campus, can be extremely loud and may impact wildlife sensitive to noise;

- road noise produced by traffic on Cootes Drivemay be significant for wildife. In addition, the death of the adjacent ash forest, which had buffered sound from the road, may be resulting in a higher level of noise in the Heritage Lands; and
- some flights from the Canadian Warplane Heritage Museum fly over the Cootes Paradise Heritage Lands. These aircraft fly at a relatively low altitudes compared to commercial flights and the resulting noise may impact sensitive wildlife species.

Removal of Plantings due to Vegetation Maintenance of Pipelines

Rehabilitation plantings within the right-of-way of the Union Gas pipeline area completed by RBG were removed as part of routine vegetation maintenance of the pipeline. Currently, RGB has not acquired the Union Gas maintenance guidelines for their pipeline rights-of-way. Since Union Gas typically restores disturbed areas to a condition that is as good or better than the pre-disturbance condition, This may simply be an isolated example of miscommunication. None-the-less, it is illustrative of the how a relatively small issue (communication) can result in an impact to restoration initiatives.

Establishment of Marsh Restoration Plantings

Several barriers to the establishment of marsh restoration plantings have been identified: turbidity and uprooting of vegetation caused by Common Carp, erosion and stormwater impacts, trampling caused by people, grazing and trampling cause by Canada Geese. Post installation, RBG has had to erect fencing on both sides of marsh restoration plantings to keep people and Canada Geese out (see Unbalanced Wildlife Populations issue above).

Shoreline Erosion/Stabilization in Cootes Paradise Marsh

Erosion from wave action, has severely undercut several areas of natural sand shoreline within the Heritage Lands. This issue has complex causes that include a slow deepening of the water level from plate movement, the destructive impact of invasive carp, and increased turbidity from run-off, all of which contributes to the loss of native emergent vegetation. The scale and significance of this issue is considerable. The photograph below illustrates an example of shoreline erosion in Cootes Paradise Marsh. The terrestrial vegetation found upslope on the shores is a significant representation of the remnant native plant communities along the shores of Lake Ontario and the Cootes Paradise ANSI. Lack of vegetation recovery is a result of inappropriate historical shoreline wave protection (such as gabion baskets), unmitigated erosion sites, and water level regulation in the Great Lakes (Theysmeyer et al. 2016). RBG's Wetlands Conservation Plan 2016-2021 states that the shoreline stabilization goal is, in combination with encouraging regeneration of submergent vegetation, to restore undercut eroding shorelines by (1) removing gabion baskets and armour stone where they occur along formerly wind-blown shores; and (2) planting a four-metre-wide band of emergent marsh and shrub thicket to jump start plant re-establishment (Theysmeyer et al. 2016).

Watershed/Sub-watershed Boundary Issues

In reviewing background information and mapping for the Cootes Paradise Heritage Lands Management plan, discrepancies in watershed boundary mapping were encountered. The watershed boundary available from Land Information Ontario (LIO) differed from watershed boundary information provided by Conservation Halton and Hamilton Conservation Authority. Issues with consistency in the mapping of sub-watershed boundaries were also encountered. According to some map layers, a portion of Conservation Halton appears to be within Hamilton Conservation Authority's watershed/drainage. In

addition, Hamilton Conservation Authority owns lands within Conservation Halton's jurisdiction (Borer's Falls Conservation Area 2 and 3), which is confusing.

Example photographs of shoreline erosion around the perimeter of Cootes Paradise Marsh in Cootes Paradise Heritage Lands (Photographs taken by Tys Theysmeyer, RBG)

7.7.2 Opportunities

Preliminary management opportunities to be explored include:

Ecosystem Rehabilitation, Restoration, and Naturalization

- increase interior forest cover and promote the natural succession of a native forest community;
- promote the succession of forest habitat and decrease the length of forest edge;
- expand Cootes Paradise Heritage Lands to develop interior forest and improve the buffer along the forest edge at Churchill Park by reducing mowing and completing reforestation plantings. Remove invasive, non-native species along the forest edge and remove existing westerly soccer field to accommodate reforestation (Dillon Consulting 2014);
- develop a plan for identifying ecosystem targets for the Heritage Lands, based on historical and current composition:
    - include guidelines for local prairie restoration, including target amount, patch size, and best management practices; and
    - include recommendations for the use of prescribed burns, which are considered the best means of managing prairie, savannah and open woodland habitats.
- improve the condition of rare and uncommon ecosystems, such as prairie, savannah and open oak woodlands;
- continue management for tallgrass prairie and oak savannah habitat at Princess Point, including invasive species control, prescribed burns, planting and seeding;
- restore degraded woodlands and plantations;
- conduct research into the ecological disturbances that maintained the original forest ecosystems, including the feasibility of re-introducing or emulating such disturbances, including fire/prescribed burning;
- reforestation and naturalization of depauperate lands;

- enhance buffers along Heritage Lands boundaries bordered by residential development;
- wherever possible, retain mature trees and snags for cavity nesting birds, and fallen logs for salamander and other wildlife habitat;
- continue to manage off trail use and disturbance to bolster establishment of a native ground vegetation layer and understory;
- 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);
- continue prescribed burns at Princess Point, and consider prescribed burns as a management option for restoring areas to native-plant dominated meadows/prairies elsewhere;
- remove old concrete headwalls present at Lower Spencer Creek Conservation Area.
- improve buffers on coldwater streams;
- engage the Ministry of Transportation in discussing the possibility of increasing the capacity of the floodway between Cootes Paradise and Lake Ontario as part of future bridge reconstruction;
- work with Union Gas on communication and on maintenance guidelines/schedule to ensure restoration plantings are planned appropriately, and not damaged by routing maintenance;
- partner with Hydro One to manage the hydro-corridor as thicket habitat or meadow habitat, wherever appropriate;
- plantations of non-native species should be removed over time and plantations of native species should be managed to encourage healthy trees and understory growth;
- work with utility companies to control invasive species in utility corridors, possibly through a management plan for utility corridors prepared jointly by RBG and Hydro One;
- in areas where there is a high presence of ash, the encouragement of other native species through planting may be necessary to mitigate some of the impacts of Emerald Ash Borer. Trees may also be planted in the woodlands and thickets to encourage succession of native species;
- habitat creation for amphibians may be possible through pond construction in some areas of the Heritage Lands;
- follow management recommendations provided in RBG's Ecological Land Classification Report (Barr 2014);
- look for opportunities to enhance wildlife habitat (e.g., pit and mound restoration, ephemeral pond creation, addition of woody debris);
- manage Black Locust plantations through a selective thinning regime and under-planting with native species, and promoting the growth of a native understory;
- there is the possibility to enlarge the floodway/outlet of Cootes Paradise Marsh to Lake Ontario when a new bridge for Highway 403 is constructed. The potential natural heritage benefits of this should be explored; and
- engage with the operators of the McMarsh and explore opportunities for information sharing.

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;
- encourage management efforts that follow an ecosystem-based approach to Species at Risk recovery. By considering the ecosystem and all of its components (e.g., species, habitats, interactions and processes) in an individual-species strategy, broader and more synergistic ecological protection and conservation outcomes can usually be achieved;
- continue ongoing monitoring of the populations of significant plants and wildlife found in the

Heritage Lands;
- develop and implement Species at Risk recovery strategies applicable to the Heritage Lands;
- watch for the presence of Species at Risk and rare species, and report locations to Conservation Halton/Hamilton Conservation Authority and NHIC;
- ensure that trails and recreational uses are not impacting Species at Risk and rare species habitat. Continue efforts to improve wildlife crossings in the Heritage Lands;
- look into management options for reducing existing recreational impacts on Species at Risk and species at risk habitat;
- public education and awareness about issues caused by feeding birds and wildlife;
- continue species-specific wildlife conservation work; and
- address connectivity/wildlife crossing of Cootes Drive and consider constructing dedicated crossing structures along the length of Cootes Drive to allow safe movement corridors for wildlife, while also attempting to reduce the risk that comes along with isolating populations (e.g., loss of genetic diversity).

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;
- monitor and control the spread of invasive plant species;
- rebuild forest edge and improve forest interior to build a better buffer to provide screen for invasive species;
- design buffer plantings and zones to manage the interface between horticultural areas and natural areas (e.g., RBG Arboretum and Cootes Paradise Sanctuary 6); and
- continue to work with and engage relevant agencies, experts and stakeholders to address concerns with respect to the continued operation of the fishway.

Management of Noxious Plants

- post educational signage noting the identification and toxic properties of Poison Ivy in a few key trailhead locations within the Heritage Lands; and
- continue to monitor and remove populations of Giant Hogweed as they are encountered.

Wildlife Crossing

- continue to look for opportunities to enhance the continuity and integrity of natural corridors connecting the Niagara Escarpment and Cootes Paradise through the Cootes Paradise Heritage Lands, particularly across York Road;
- investigate the need for and feasibility of implementing wildlife corridors and eco-passages, especially in turtle crossing hotspots;
- dedicated crossing structures and permanent exclusionary/directional barriers should be considered along the length of Cootes Drive in order to allow safe movement corridors for wildlife. Care should be taken to consider design features (e.g., distance between crossing structures, type of structure and sizing) in order to attempt to mitigate the risk of inadvertently isolating populations (e.g., creating barriers to gene flow). Structures should be considered that maximize longevity and minimize on-going maintenance;
- 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. Continue to support Dundas Turtle Watch in their monitoring efforts.

Noise

- collect data and create a map of noise levels within Cootes Paradise Heritage Lands (e.g., decibels);
- determine if wildlife present in the Cootes Paradise Heritage Lands are susceptible to impacts from noise, and if so, consider implementing noise mitigation measures in areas where noise effect levels are high;
- based on the outcome of the noise investigations and sensitivity of wildlife explore the following possible mitigation measures:
    - investigate the possibility of adjusting the flight path of air ambulance helicopters to minimize noise impacts to Cootes Paradise Heritage Lands;
    - reducing the speed limit along relevant sections of Cootes Drive; and
    - contact the Canadian Warplane Heritage Museum to discuss adjusting aircraft flight paths to avoid/minimize flying over Cootes Paradise Heritage Lands.

7.8 Cultural Heritage Issues

7.8.1 Issues

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

Communication of Cultural Heritage Importance of Cootes Paradise

The cultural heritage resources documented in this report include a wide range of typologies originating from the Middle Woodland period (400 B.C.-A.D. 500) to the late twentieth century. Collectively, these typologies have the potential to communicate the importance of Cootes Paradise in the cultural development of the area known as the Cootes to Escarpment EcoPark System.

Connection between Cultural and Natural Resources at Princess Point

Princess Point stands out as a place that provides a strong connection between the natural and cultural resources of the Heritage Lands. It also provides public access to the water's edge and notable views of Cootes Paradise Marsh. As such, it has the potential to provide an important, if not unique interpretive opportunity, as well as serve as an important entry and destination for visitors to the Cootes to Escarpment EcoPark System.

Identity of Rasberry Farm

The Rasberry Farm site lacks a distinct identity. At present it includes two distinct landscapes: extant features from farming and plant propagation activity and the features arising from the 1953 Redman plan.

Cultural Heritage Interpretation of Desjardins Canal

Despite physical deterioration, the context of the Desjardins Canal remains unchanged. The canal provides the opportunity to convey a unique story of technical achievement and water-borne transportation in the nineteenth century, as well as being a cultural feature that had a major influence on the development of the area, in particular the former Town of Dundas.

Low Profile of Early Settlement History

There are a number of early surveys and other historical documents that provide a picture of the early settlement around Cootes Paradise. These show the holdings of several of the prominent first settlers whose names are commemorated in the Heritage Lands today. The early surveys also show the historic road patterns and watercourse alignments, including the original connection between Cootes Paradise and Hamilton Harbour (then also known as "Lake Geneva").

Need for Corresponding Management Expertise

The large number and differing types of cultural heritage resources in the Cootes Paradise Heritage Lands requires corresponding range of management expertise to ensure conservation and sustainability.

7.8.2 Opportunities

Preliminary management opportunities to be explored include:

- look for opportunities to communicate the importance of Cootes Paradise in the cultural development of the Cootes to Escarpment EcoPark System;
- continue to highlight the strong connection between the natural and cultural resources of Princess Point through educational signage, interpretation, and management of natural heritage resources;
- explore the potential for Princess Point to serve as an important entry and destination for visitors to the Cootes to Escarpment EcoPark System, including its potential as a site for relocating RBG's boathouse;
- consider options for developing a distinct identity of the Rasberry Farm site;
- explore opportunities for cultural interpretation of the Desjardins Canal;
- assemble copies of early surveys, maps, paintings and other documentation to construct and interpret the early settlement history to draw connections with the current geography of the Heritage Lands and flag important historic features for consideration in developing other management initiatives; and
- emphasize the importance of corresponding management expertise to ensure conservation and sustainability of cultural heritage resources.

8.0 Next Steps

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

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

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Appendix 1: Data Sources Referenced to Prepare the Inventory, Issues and Opportunities Report for Cootes Paradise Heritage Lands

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

NAME OF RECEIVED GIS LAYER	SOURCE
Approx_Reg_Limit_CH_20120514	Conservation Halton
C2E_HeritageSystemBoundary	Conservation Halton
C2E_PartnerLandHoldings	Conservation Halton
C2E_RoadEcology	Conservation Halton
CH_Ponds	Conservation Halton
CH_SubwatershedBoundary	Conservation Halton
CONS_AUTH_ADMIN_AREA	Conservation Halton?
ELC_CH_20090903	Conservation Halton
ELC_CH_Updates_2016	Conservation Halton
HWFP_Haz_PO_CH_20120514	Conservation Halton
JurisdictionBoundary_CH	Conservation Halton
MBelt_Haz_PO_CH_20120514	Conservation Halton
Privately_Owned_Outreach_Area	Conservation Halton
SL_100yr_Flood_Elev_Haz_PO_CH	Conservation Halton
SL_Haz_PO_CH_20120514	Conservation Halton
STOB_Haz_PO_CH_20120514	Conservation Halton
Waterflow_CH	Conservation Halton
Wetland_Haz_PO_CH_20120514	Conservation Halton
ASSET_BRIDGES	City of Hamilton
BIKEWAYS	City of Hamilton
BUILDINGS	City of Hamilton
C2E_ANSI	City of Hamilton
C2E_CArea	City of Hamilton
C2E_ESA	City of Hamilton
C2E_LandUse	City of Hamilton
C2E_NECdes	City of Hamilton
C2E_Parks	City of Hamilton
C2E_Shore	City of Hamilton
C2E_Streets2	City of Hamilton
C2E_Trails	City of Hamilton
C2E_Watercourse	City of Hamilton
C2E_Zoning	City of Hamilton
C2Econtour02	City of Hamilton
C2EcultHeritage	City of Hamilton
C2EDevAppsRec	City of Hamilton
C2EsewerMain	City of Hamilton
C2Eutpipe	City of Hamilton
C2EwildlifeIncidents	City of Hamilton
C2EwildlifeIncidentsSR	City of Hamilton
C2Ewoodlands	City of Hamilton
CootesEcoParkStudy	City of Hamilton
PARK_AMENITIES	City of Hamilton
PARKS	City of Hamilton

NAME OF RECEIVED GIS LAYER	SOURCE
PLANNING_UNITS	City of Hamilton
RIVERS	City of Hamilton
Trails_HCA_updated	Hamilton Conservation Authority
Contours	Hamilton Conservation Authority
data_clip	Hamilton Conservation Authority
Elc_areas	Hamilton Conservation Authority
C2E Species List_DUND16 and DUND15	Hamilton Conservation Authority
Flood_screening	Hamilton Conservation Authority
Trails_HCA	Hamilton Conservation Authority
Waterbody	Hamilton Conservation Authority
Waterflow	Hamilton Conservation Authority
2010_turtlewatch	Hamilton Conservation Authority
Common Carp	Royal Botanical Gardens
CP Groundwater Sites	Royal Botanical Gardens
DTW_Turtles	Royal Botanical Gardens
DTW2013	Royal Botanical Gardens
MarshVegetation2016	Royal Botanical Gardens
Physiography_RBG	Royal Botanical Gardens
RBG_ELC_1	Royal Botanical Gardens
RBG_Infrastructure	Royal Botanical Gardens
RBG_Interior_Forest	Royal Botanical Gardens
RBG_Parkinglots	Royal Botanical Gardens
RBG_Property	Royal Botanical Gardens
RBG_property_outline	Royal Botanical Gardens
RBG_SemiAccessible_Trails	Royal Botanical Gardens
RBG_Signs	Royal Botanical Gardens
RBG_Site_ammenities	Royal Botanical Gardens
RBG_Special_Management_Areas	Royal Botanical Gardens
RBG_Structures	Royal Botanical Gardens
RBG_trailsystem	Royal Botanical Gardens
RBG_water	Royal Botanical Gardens
RBGroadmonitoring2015	Royal Botanical Gardens
Service_Roads_RBG	Royal Botanical Gardens
Streams_RBG	Royal Botanical Gardens
Borers_AMP_HistoricaRailway	City of Hamilton
Cootes_AMP_HIstoricActivity	City of Hamilton
Cootes_AMP_HistoricRailway	City of Hamilton
Cootes_AMP_HistoricRoad	City of Hamilton
Cootes_HistoricSettlement	City of Hamilton
Cootes_ArchSites	City of Hamilton
Cootes_Cemeteries	City of Hamilton
Cootes_CHL	City of Hamilton
Cootes_HeritageProperties	City of Hamilton
NEPOSS	Niagara Escarpment Commission

REPORTS	SOURCE/REFERENCE	FORMAT	RECEIVED
Hamilton Natural Areas Inventory Project 3rd Edition – Site Summaries Document (2014)	Hamilton Conservation Authority, City of Hamilton, Hamilton Naturalists' Club	Digital Copy	x
Lower Grindstone Creek, Borer's Creek and North Cootes Paradise Subwatersheds. Preliminary Geomorphological Assessment (2016)	GEO Morphix Ltd.	Digital Copy	X
Hamilton Harbour and Watershed Fisheries Management Plan (2010)	Ontario Ministry of Natural Resources, Royal Botanical Gardens	Digital Copy	X
Report on Lake JoJo (York Road Pond) (1990)	Hamilton Region Conservation Authority	Digital Copy	X
Lower Spencer Creek Subwatershed Stewardship Action Plan (2010)	Hamilton Conservation Authority	Digital Copy	X
Ainslie Wood/Westdale Neighbourhood – Background Report 2002	City of Hamilton	Digital Copy	X
Preliminary Report – McMaster University – Cootes Paradise, Site I, Hamilton, Ontario	McMaster University	Digital Copy	X
Cootes to Escarpment Park System Land Securement Strategy 2011	ORLAND Conservation	Digital Copy	X
Dundas Business Park Self Storage Facility Scoped EIS (2008)	Dougan & Associates	Digital Copy	X
Hamilton Harbour and Watershed Fisheries Management Plan (2009)	Ontario Ministry of Natural Resources, Royal Botanical Gardens	Digital Copy	X
Niagara Escarpment Parks and Open Space System Planning Manual (2012)	Ontario Ministry of Natural Resources	Digital Copy	X
The Nursery (AhGx-8) Site: 2006 Stage 4 Archaeological Field School Excavations in Cootes Paradise, Hamilton, Ontario (2008)	Scott Martin	Digital Copy	X
Stage 2 Archaeological Assessment, Valley Inn Road, Hamilton, Ontario (2008)	Jacques Whitford Stantec Limited	Digital Copy	X
Stage 1 Archaeological Assessment and Archaeological Monitoring of the Proposed Soccer Pitch, Churchill Park, Part of Lot 60, Concession 1, Former Township of Ancaster, Wentworth County, Now the City of Hamilton (2010)	Archaeological Services Inc.	Digital Copy	X
Stage 1 Archaeological Assessment Valley Inn Road Bridge Class Environmental Assessment City of Hamilton, Ontario (2007)	Archaeological Services Inc.	Digital Copy	X
The Historical and Present Extent and Floristic Composition of Prairie and Savanna Vegetation in the Vicinity of Hamilton, Ontario (1997)	Proceedings of the 15th North American Prairie Conference	Digital Copy	X
An Archaeological Survey of Cootes Paradise Hamilton, Ontario (1969)	David Stothers	Digital Copy	X
A Vision for an Urban Eco Park, Hamilton, Ontario (2009)	Urban Strategies Inc.	Digital Copy	x
Wetlands Conservation Plan 2016 – 2021 (2016)	Royal Botanical Gardens	Digital Copy	X
Analysis of Soil Cores in Cootes Paradise North Shore Using Ecological Land Classification Protocols (2014)	Royal Botanical Gardens	Digital Copy	X

REPORTS	SOURCE/REFERENCE	FORMAT	RECEIVED
Churchill Park Management Plan (2014)	City of Hamilton, Dillon Consulting	Digital Copy	X
Project Paradise 2015	Royal Botanical Gardens	Digital Copy	X
Floristic Inventory of Rock Chapel Nature Sanctuary (2014)	Royal Botanical Gardens	Digital Copy	X
Checklist of the Spontaneous Flora of Royal Botanical Gardens' Nature Sanctuaries (2003)	Royal Botanical Gardens	Digital Copy	X
20 Year Trends in Water Quality: Cootes Paradise and Grindstone Creek Marsh (2011)	Royal Botanical Gardens	Digital Copy	X
Emergent and Meadow Marsh Vegetation Summary (2012)	Royal Botanical Gardens	Digital Copy	X
Western Desjardins Canal and West Pond Conditions Summary Report (2017)	Royal Botanical Gardens	Digital Copy	X
Royal Botanical Gardens' Red Mulberry *Morus rubra* Site Specific Recovery Plan (2016)	Royal Botanical Gardens	Digital Copy	X
Royal Botanical Gardens' Few-flowered Club-rush *Trichophorum planifolium* Site Specific Recovery Plan (2015)	Royal Botanical Gardens	Digital Copy	X
Turtles of Royal Botanical Gardens Site Specific Recovery Plan (2014)	Royal Botanical Gardens	Digital Copy	X
Butternut Compensation Project: 2015 Annual Progress Report (2015)	Royal Botanical Gardens	Digital Copy	X
Royal Botanical Gardens' Species at Risk Annual Summary Report (1st edition) (2014)	Royal Botanical Gardens	Digital Copy	X
An Invasive Plant Strategy for Royal Botanical Gardens' Terrestrial Lands (2016)	Royal Botanical Gardens	Digital Copy	X
Royal Botanical Gardens Emerald Ash Borer Management Strategy (2010)	Royal Botanical Gardens	Digital Copy	X
Management Strategy for Phragmites on RBG Property 2014 - 2018	Royal Botanical Gardens	Digital Copy	X
Invasive Potential of *Magnolia kobus* as Demonstrated by Seedling Establishment in Natural Lands Adjacent to a Horticultural Collection (2016)	Royal Botanical Gardens	Digital Copy	X
Assessment of Deer Browse in Cootes Paradise and the Implications for Restoration Projects (2015)	Royal Botanical Gardens	Digital Copy	X
Ancaster Wintering Deer Survey 2009 – with Management Recommendations March 2010	Ontario Ministry of Natural Resources	Digital Copy	X
Arboretum White-tailed Deer Survey Report: Browse and Rub Surveys	Royal Botanical Gardens	Digital Copy	X
Impact Assessment of Deer Exclosures on Few-flowered Club-rush (*Trichophorum planifolium*) and Deer Count of Cootes Paradise (2013)	Royal Botanical Gardens	Digital Copy	X
Forest Monitoring Report 2010	Royal Botanical Gardens	Digital Copy	X
Status Report on Princess Point: Prescribed Burn Monitoring and Restoration Initiatives (2017)	Royal Botanical Gardens	Digital Copy	X
Prescribed Burn Monitoring Report: 2003 – 2010 (2011)	Royal Botanical Gardens	Digital Copy	X

REPORTS	SOURCE/REFERENCE	FORMAT	RECEIVED
Ecological Land Classification of Royal Botanical Gardens' Natural Lands (2014)	Royal Botanical Gardens	Digital Copy	X
Hamilton Natural Areas Inventory Project, 3rd Edition – Species Checklist Document (2014)	Hamilton Conservation Authority, City of Hamilton, Hamilton Naturalists' Club	Digital Copy	X
Ecological Survey of the Niagara Escarpment Biosphere Reserve. Volume I: Significant Natural Areas (1996)	Ontario Ministry of Natural Resources	Paper Copy	X
City of Hamilton Archaeology Management Plan, 2016	City of Hamilton	Digital Copy	X
Test Excavations at the Lilac Gardens Site (1984)	Archaeological Research Associates Ltd	Digital Copy	X

MAPS	SOURCE	RECEIVED
Cootes to Escarpment EcoPark System Heritage Lands (2017)	Conservation Halton	X
Hydro Corridors 120 and 140 passing through Royal Botanical Gardens Property – Sections for Vegetation Control Recommendations (no year)	Royal Botanical Gardens	X
Map 1: Ecological Land Classification of Royal Botanical Garden Nature Sanctuaries	Royal Botanical Gardens	X
Map 2: Historical Land Use of Cootes Paradise North Shore ELC Polygons	Royal Botanical Gardens	X
Map 3: Historical Land Use of Cootes Paradise South Shore ELC Polygons	Royal Botanical Gardens	X
Map 6: Cootes Paradise North Shore ELC Polygons by Habitat Type	Royal Botanical Gardens	X
Map 7: Cootes Paradise South Shore ELC Polygons by Habitat Type	Royal Botanical Gardens	X
Map 10: Cootes Paradise North Shore Land Management Units	Royal Botanical Gardens	X
Map 11: Cootes Paradise North Shore Land Management Units and ELC Polygons	Royal Botanical Gardens	X
Map 12: Cootes Paradise North Shore Land Management Units and Soil Polygons	Royal Botanical Gardens	X
Map 13: Cootes Paradise North Shore Coefficient of Conservatism	Royal Botanical Gardens	X
Map 14: Cootes Paradise North Shore Floristic Quality Index	Royal Botanical Gardens	X
Map 15: Cootes Paradise North Shore Common Buckthorn Abundance	Royal Botanical Gardens	X
Map 16: Cootes Paradise North Shore Invasive Honeysuckle Abundance	Royal Botanical Gardens	X
Map 17: Cootes Paradise North Shore Garlic Mustard Abundance	Royal Botanical Gardens	X
Map 18: Cootes Paradise North Shore Dog Strangling Vine Abundance	Royal Botanical Gardens	X
Map 19: Cootes Paradise South Shore Land Management Units	Royal Botanical Gardens	X
Map 21: Cootes Paradise South Shore Land Management Units and Soil Polygons	Royal Botanical Gardens	X
Map 22: Cootes Paradise South Shore Coefficient of Conservatism	Royal Botanical Gardens	X

Map 23: Cootes Paradise South Shore Floristic Quality Index	Royal Botanical Gardens	X
Map 24: Cootes Paradise South Shore Common Buckthorn Abundance	Royal Botanical Gardens	X
Map 25: Cootes Paradise South Shore Invasive Honeysuckle Abundance	Royal Botanical Gardens	X
Map 26: Cootes Paradise South Shore Garlic Mustard Abundance	Royal Botanical Gardens	X
Map 27: Cootes Paradise South Shore Dog Strangling Vine Abundance	Royal Botanical Gardens	X
SAR Location Map (2017)	Royal Botanical Gardens	X

Appendix 2: Planning Characterization Matrix and Detailed Review of Planning Policy and Regulatory Framework

Appendix 2. Cootes Paradise Heritage Lands Characterization Matrix

PROPERTY NAME	OWNERSHIP	CURRENT LANDUSE	AREA (ha)	Conservation Authority REGULATED AREA	PROVINCIAL		CITY OF HAMILTON OFFICIAL PLAN		
					NEP/GREENBELT	NEC DEV CONTROL REG	PLAN	LANDUSE DESIGNATION	ZONING
Canal Park	Hamilton Conservation Authority	Manicured grass, recreation, field	0.17	Yes (100%) HCA	N/A	No	Urban (August 2013)	Open Space	Conservation/Hazard P5
Centennial Park	City of Hamilton	Manicured, gardens, grass	0.88	Yes (100%) HCA	N/A	No	Urban (August 2013)	Open Space	Neighbourhood Park P1
Churchill Park	Royal Botanical Gardens	Manicured, recreation, grass	12.20	Partial (5%) HCA	NEP 2017 (Urban Area, Escarpment Natural Area)	Yes	Urban (August 2013)	Open Space	N/A
City of Hamilton Public Works	City of Hamilton	Forest, stormwater facility, grass, industrial (utility?)	2.42	Partial (50%) HCA	N/A	No	Urban (August 2013)	Institutional, Utility	Utilities U zone FP suffix
Cootes Paradise Sanctuary 1	Royal Botanical Gardens	Watercourse, marsh/lagoon, open water	126.06	Yes (100%) HCA and CH	NEP 2017 (Escarpment Natural Area)	Yes	Rural (March 2012), Urban (August 2013)	Open Space	N/A
Cootes Paradise Sanctuary 2	Royal Botanical Gardens	Watercourse, marsh/lagoon, open water	92.68	Yes (100%) HCA	NEP 2017 (Escarpment Natural Area)	Yes	Rural (March 2012), Urban (August 2013)	Open Space	N/A
Cootes Paradise Sanctuary 3	Royal Botanical Gardens	Manicured, gardens, grass, forest, park amenities	26.85	Partial (50%) CH	NEP 2017 (Escarpment Protection Area, Escarpment Natural Area)	Yes	Rural (March 2012)	Open Space	N/A
Cootes Paradise Sanctuary 4	Royal Botanical Gardens	Forest, park amenities	21.03	Partial (95%) CH	NEP 2017 (Escarpment Protection Area, Escarpment Natural Area)	Yes	Rural (March 2012)	Open Space	N/A
Cootes Paradise Sanctuary 5	Royal Botanical Gardens	Field, forest, utility	9.96	Yes (100%) CH	NEP 2017 (Escarpment Protection Area, Escarpment Natural Area)	No	Rural (March 2012)	Open Space	Open Space OS, Special Policy Area 1 Parkway Belt West Plan SP2
Cootes Paradise Sanctuary 6	Royal Botanical Gardens	Forest, utility, field	66.53	Partial (90%) CH	NEP 2017 (Escarpment Natural Area)	Yes	Rural (March 2012)	Open Space	N/A
Cootes Paradise Sanctuary 7	Royal Botanical Gardens	Forest, plantation, field, utility	41.80	Partial (50%) CH	NEP 2017 (Escarpment Protection Area, Escarpment Natural Area)	Yes	Rural (March 2012)	Open Space, Rural Area	N/A
Cootes Paradise Sanctuary 8	Royal Botanical Gardens	Forest, plantation, utility, field	75.07	Partial (50%) CH	NEP 2017 (Escarpment Protection Area, Escarpment Natural Area)	Yes	Rural (March 2012)	Open Space, Rural Area	N/A

PROPERTY NAME	OWNERSHIP	CURRENT LANDUSE	AREA (ha)	Conservation Authority REGULATED AREA	PROVINCIAL NEP/GREENBELT	NEC DEV CONTROL REG	CITY OF HAMILTON OFFICIAL PLAN PLAN	LANDUSE DESIGNATION	ZONING
Cootes Paradise Sanctuary 9	Royal Botanical Gardens	Forest, plantation, field, utility, community gardens?	13.96	Yes (100%) HCA	NEP 2017 (Escarpment Protection Area, Escarpment Natural Area)	Yes	Rural (March 2012)	Open Space, Rural Area	Open Space OS, Temporary Open Space O1
Cootes Paradise Sanctuary 10	Royal Botanical Gardens	Forest, marsh, watercourse, open water	32.33	Yes (100%) HCA	NEP 2017 (Escarpment Natural Area)	Yes	Rural (March 2012)	Open Space	N/A
Cootes Paradise Sanctuary 11	Royal Botanical Gardens	Forest, marsh, open water	31.55	Yes (100%) HCA	NEP 2017 (Escarpment Natural Area)	Yes	Rural (March 2012), Urban (August 2013)	Open Space	N/A
Cootes Paradise Sanctuary 12	Royal Botanical Gardens	Forest	26.70	Yes (100%) HCA	NEP 2017 (Escarpment Natural Area)	Yes	Rural (March 2012), Urban (August 2013)	Open Space	N/A
Cootes Paradise Sanctuary 13	Royal Botanical Gardens	Forest, grass, recreational	34.95	Partial (80%) HCA	NEP 2017 (Escarpment Natural Area)	Yes	Rural (March 2012), Urban (August 2013)	Open Space	N/A
Cootes Paradise Sanctuary 14	Royal Botanical Gardens	Park amenities, gardens	2.74	No	NEP 2017 (Urban Area, Escarpment Natural Area)	Yes	Rural (March 2012), Urban (August 2013)	Open Space	N/A
Cootes Paradise Sanctuary 15	Royal Botanical Gardens	Forest, manicured, park amenities	18.48	Partial (50%) HCA	NEP 2017 (Escarpment Protection Area, Escarpment Natural Area)	Yes	Rural (March 2012), Urban (August 2013)	Open Space	N/A
Cootes Paradise Sanctuary 16	Royal Botanical Gardens	Forested islands	0.68	Yes (100%) CH and HCA	N/A	Yes	Rural (March 2012)	Open Space	N/A
Coronation Park	City of Hamilton	Forest, field, recreation, manicured	8.22	Partial (75%) HCA	NEP 2017 (Escarpment Natural Area)	Partial; Yes	Urban (August 2013)	Open Space	Community Park P2, Open Space P4
Desjardins Canal Pond	City of Hamilton	Open water	2.06	Yes (100%) HCA	N/A	No	Urban (August 2013)	Open Space	Open Space OS, Temporary Open Space O1
Dundas Transfer Station	City of Hamilton	Forest, field, manicured, transportation	13.58	Partial (80%) HCA	N/A	No	Urban (August 2013)	Open Space, Utility	Utilities U zone FP suffix
Dundas Wastewater Treatment Plant	City of Hamilton	Utility, manicured	2.47	Partial (50%) HCA	N/A	No	Urban (August 2013)	Utility	Utilities U zone FP suffix, Park and Recreational PR1
Lake Jojo	City of Hamilton	Open water, forest	12.83	Yes (100%) HCA	N/A	No	Urban (August 2013)	Open Space	Utilities U zone FP suffix
Lower Spencer Creek Conservation Area	Hamilton Conservation Authority	Forest, marsh, open water	28.93	Yes (100%) HCA	N/A	No	Urban (August 2013)	Open Space	Open Space OS, Select Industrial M2, Temporary Open Space O1, Suburban Agriculture and Residential B
Martino Memorial Park	City of Hamilton	Recreation, manicured	1.06	Partial (75%) HCA	N/A	No	Urban (August 2013)	Open Space	Community Park P2
Olympic Sports Park	City of Hamilton	Manicured, recreation, forest	9.74	Partial (25%) HCA	NEP 2017 (Escarpment Rural Area)	No	Rural (March 2012), Urban (August 2013)	Open Space	Community Park P2

PROPERTY NAME	OWNERSHIP	CURRENT LANDUSE	AREA (ha)	Conservation Authority REGULATED AREA	PROVINCIAL NEP/GREENBELT	NEC DEV CONTROL REG	CITY OF HAMILTON OFFICIAL PLAN PLAN	LANDUSE DESIGNATION	ZONING
Volunteer Field Park	City of Hamilton	Recreation, manicured	1.95	Partial (20%) HCA	N/A	NO	Urban (August 2013)	Utility	Utilities U zone FP suffix

Appendix 2. Detailed Planning Policy and Regulatory Framework

1. Planning Policy

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

Provincial Policy Statement 2014

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

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

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

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

Greenbelt Plan 2017

As amended through the Coordinated Provincial Plan Review, the updated Greenbelt Plan became effective on July 1, 2017. The Greenbelt Plan complements the Growth Plan for the Greater Golden Horseshoe 2017 which manages and guides urban growth. The Greenbelt Plan provides permanent agricultural and environmental protection in areas where urban growth is not intended to occur. The Niagara Escarpment Plan 2017 and the Parkway Belt West Plan 1978 both form part of the Greenbelt Plan, and continue to apply where they exist. Most of the Cootes Paradise Heritage Lands are within the jurisdiction of the Niagara Escarpment Plan 2017 except the Heritage Lands south of Cootes Drive and west of Olympic Drive, and Coronation Park, west of Highway 403 which is within the Parkway Belt West Plan. In the Greenbelt Plan, these same areas are designated as “Settlement Areas Outside of the Greenbelt”.

Where the Niagara Escarpment Plan jurisdiction exists, the policies of the Niagara Escarpment Plan apply and the Protected Countryside policies of the Greenbelt Plan do not apply except Section 3.3. None of the Greenbelt Plan policies apply to the portion of Coronation Park within the Parkway Belt West Plan because that portion is outside of the Greenbelt as noted above.

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

Parkway Belt West Plan 1978

The 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 public needs, and preserve prominent natural features.

The extent of the Parkway Belt West Plan has been reduced by jurisdictional transfer of areas to the Niagara Escarpment Plan. As it relates to the Cootes Paradise Heritage Lands, the only areas it applies to are portions of Coronation Park designated as Public Open Space and Buffer on both sides of Macklin Street. The Parkway Belt West Plan also continues to apply to Burlington Heights and the Highway 403 corridor.

The permitted uses in the Public Open Space and Buffer Area are limited to existing uses, linear facilities for transportation, communication and utilities, public open space and buffers, related incidental uses, other open space uses provided that they are available to the public and other (unanticipated) public uses. These use permissions are subject to criteria with the intent of protecting natural features, maintaining open space character and minimizing building height, bulk and coverage.

The Parkway Belt West Plan is implemented by the City Official Plan and Zoning Bylaws.

Niagara Escarpment Plan 2017

As amended through the Coordinated Provincial Plans Review, the updated Niagara Escarpment Plan became effective June 1, 2017. The essential 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 that only such development occurs as is compatible with that natural environment.

The Niagara Escarpment Plan sets out seven land use designations which define how land shall be used including permitted land uses and lot creation. Development criteria applicable to all land use designations determine how a proposed use of land 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 Cootes Paradise Heritage Lands within the Niagara Escarpment Plan are designated as follows:

- Urban Area
    - Churchill Park
    - Cootes Paradise Sanctuary 14

- Escarpment Rural Area
  - Olympic Sports Park

- Escarpment Protection Area
  - Cootes Paradise Sanctuary 3
  - Cootes Paradise Sanctuary 4
  - Cootes Paradise Sanctuary 5
  - Cootes Paradise Sanctuary 7
  - Cootes Paradise Sanctuary 8
  - Cootes Paradise Sanctuary 9
  - Cootes Paradise Sanctuary 15

- Escarpment Natural Area
  - Cootes Paradise Sanctuary 1 to 15
  - Coronation Park (north end)
  - Churchill Park (small area)

Escarpment Natural Area is the most restrictive designation, followed by Escarpment Protection Area, Escarpment Rural Area and Urban Area which is the least restrictive. Some properties within the Heritage Lands bear more than one land use designation depending on the physical conditions and property context.

Generally, Escarpment Natural Areas consist of escarpment features in a relatively natural state, related woodlands, valleylands and wetlands that are relatively undisturbed, and Provincially Significant Areas of Natural and Scientific Interest. Escarpment Protection Areas are similar slopes, landforms and features but where existing land uses have altered the natural environment, areas in proximity to and needed to buffer Escarpment Natural Areas, and natural areas of Regional significance. Escarpment Rural Areas are generally open areas in the escarpment vicinity needed to buffer more ecologically sensitive areas and complete the escarpment corridor. Urban Areas are designated municipally for urban serviced uses where escarpment and closely related lands are located.

Land use permissions in these land use designations are progressive in structure, that is, uses permitted in the most restrictive designation are permitted in the next least restrictive plus other uses. All permitted land uses and lot creation are subject to the applicable Development Criteria of the Plan.

A partial list of permitted uses in the Escarpment Natural Area designation includes existing uses, non-motorized trail uses, forestry, fish and wildlife management, flood and erosion control carried out or supervised by public authority, licensed archaeology, infrastructure, accessory uses except ponds, unserviced camping on public or institutional land, the Bruce Trail including overnight rest areas and access points, uses permitted in parks and open space master/management plans not in conflict with the Niagara Escarpment Plan and nature preserves owned, and managed by a conservation organization. In the Escarpment Protection Area designation, these same Escarpment Natural Area uses are permitted plus agricultural uses and agricultural-related uses, institutional uses and non-motorized trail activities, and snowmobiling. Similarly, in the Escarpment Rural Area

designation, the Escarpment Protection Area uses are permitted plus recreational uses. Finally, in Urban Areas, permitted uses are subject to the Development Objectives (for the Urban Area land use designation), the Development Criteria and where applicable, Zoning Bylaws not in conflict with the Niagara Escarpment Plan.

In the Escarpment Rural Area designation, Amendment 176 to the Niagara Escarpment Plan recognized the permitted uses within Olympic Park as recreational uses such as sports fields, a community centre, an arena or similar indoor sports facility, expansions of these facilities and facilities accessory to these permitted uses including servicing, parking lots, and related signage.

The Development Criteria set out performance standards to be implemented with all permitted uses depending on the site conditions. Since the criteria deal with a variety of conditions, all criteria will not apply to every circumstance. The criteria address matters of site capacity, servicing and design, and specific matters of steep slopes and ravines, wooded areas, water resources, wildlife habitat, forestry, cultural heritage, recreation, Areas of Natural and Scientific Interest, and the Bruce Trail.

The Niagara Escarpment Plan sets out the policy framework for the Niagara Escarpment Parks and Open Space System (NEPOSS) including an overall park system concept, a system of park and open space classification, and a park zoning, and master/management planning policy. The Cootes Paradise Heritage Lands are located within the Halton Escarpment/Caledon Hills segment of NEPOSS with the following classified properties:

- Cootes Paradise Sanctuary (Natural Environment Park 131 and Nodal Park)
    - Cootes Paradise Sanctuary 1 to 15 (portions only of Cootes Paradise Sanctuary 9, east of Olympic Drive and owned by RBG)
- Churchill Park (Recreation Park 132)
    - Churchill Park

Lands acquired and to be managed as part of an existing park in the NEPOSS system can be added to the Niagara Escarpment Plan maps without a Plan amendment.

Natural Environment Parks are characterized by a variety of natural heritage resources, cultural heritage resources and scenic landscapes. Activities range from trail uses to car camping and day use activities in more developed or accessible areas.

Recreation Parks as applied here can be developed to provide a variety of outdoor recreation opportunities in Escarpment surroundings including day use activities, athletic fields and supporting infrastructure. Special purpose buildings that include overnight accommodations and meals for guests may also be permitted in accordance with NEPOSS use policy 3.1.6.4.

Nodal parks are designed to provide destination and starting points within the Niagara Escarpment Parks and Open Space System, and to promote the Escarpment's diverse environment. Functionally, nodal parks provide visitors with orientation, education, interpretation and information on nearby escarpment recreational activities. Nodal parks may contain buildings or facilities scaled for the site to support uses directly related to its administrative and educational role in NEPOSS. These parks may also include special purpose buildings with overnight accommodations and meals for guests in accordance with NEPOSS policy 3.1.6.4.

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

On the Cootes Paradise Heritage Lands, the general intent of the City Official Plan is to implement the requirements of the Niagara Escarpment Plan and the Parkway Belt West Plan where it applies, the Provincial Policy Statement and local land use objectives.

Most of the Cootes Paradise Heritage Lands are located within the Rural Planning Area of the City Official Plan. Generally, the boundary separating the Rural and Urban Planning Areas follows Olympic Drive and Cootes Drive, and through Cootes Paradise, the boundary between the former area municipalities of Dundas and Hamilton. This latter section of the Urban/Rural Planning Area boundary follows no identifiable feature.

The following Cootes Paradise Heritage Lands are substantially within the Urban Planning Area, all others are within the Rural Planning Area. Within the Urban Area, development generally requires full municipal services, subject to all other policy requirements.

- Coronation Park
- Churchill Park
- Lower Spencer Creek Conservation Area
- Centennial Park
- Canal Park
- Desjardins Canal Pond
- Dundas Waste Water Treatment Plant
- Martino Memorial Park
- Volunteer Field
- City of Hamilton Public Works
- Dundas Transfer Station
- Lake Jojo
- Olympic Sports Park (west of Olympic Drive)
- Cootes Paradise Sanctuary 9 (west of Olympic Drive)
- Cootes Paradise Sanctuary 1, 2 and 11 to 15 (each in part)

For all of the Heritage Lands, Schedule A – Provincial Plans to the Rural and Urban Official Plans recognizes the jurisdiction of the Niagara Escarpment Plan and the small jurisdictional area of the Parkway Belt West Plan on Coronation Park.

In addition to Provincial Plan designation, the Cootes Paradise Heritage Lands are variously designated in the City Official Plan on Schedule D (Rural Area) and Schedule E-1 (Urban Area) for land use as follows:

- Open Space (Rural Plan and Urban Plan)
    - Cootes Paradise Sanctuary 1 to 16
    - Coronation Park
    - Churchill Park
    - Lower Spencer Creek Conservation Area
    - Centennial Park
    - Canal Park
    - Desjardins Canal Pond

    - Martino Memorial Field
    - Lake Jojo
    - Dundas Transfer Station (west portion only)
    - Olympic Sports Park
- Rural Area (Rural Plan)
    - Cootes Paradise Sanctuary 7, 8 and 9 (parts only)
- Institutional (Urban Plan)
    - City of Hamilton Public Works (south portion only)
- Utility (Urban Plan)
    - Dundas Waste Water Treatment Plant
    - Volunteer Field
    - Dundas Transfer Station
    - City of Hamilton Public Works (north portion only)

The Open Space System as designated in the City Official Plan includes the natural and open space features including the Niagara Escarpment and Cootes Paradise. 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, trails, bikeways and walkways, forestry, fish 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 in 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 are not in a natural 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 servicing the rural community, all subject to specific requirements.

Lands within the Institutional designation are generally greater than 4 ha in size with permitted uses including education, religious, cultural, health care, long term care and day care facilities. Other permitted uses include parks and open space, and community facilities and services subject to compatibility with adjacent land uses. This land use designation appears to reflect the current and previous use of existing buildings on these lands for municipal purposes.

The Utility designation similarly applies to lands greater than 4 ha in size with permitted uses including major facilities, easements and corridors for utilities and services, municipal works yards, solid waste management, water and waste water services, open space uses and parking lots for these uses. Additional uses may be permitted on Public Utility designated lands such as hydro transmission corridors where deemed by the City to be compatible with adjacent land uses.

The City Official Plan sets out a Natural Heritage System which consists of the Greenbelt Natural Heritage System where applicable, the Niagara Escarpment Plan and the City Natural Heritage System Core Areas, and Linkages identified by the City based on the Provincial Plans and 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 on 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.

Within the Natural Heritage System, the Cootes Paradise Heritage Lands are variously identified on Schedule B to the City Official Plan as follows:

- Core Areas (Rural Plan and Urban Plan)
  - Cootes Paradise Sanctuary 1 to 13 and 15 to 16
  - Coronation Park (north portion)
  - Lower Spencer Creek Conservation Area
  - Dundas Transfer Station
  - Lake Jojo
- Linkages (Rural Plan and Urban Plan)
  - Olympic Sports Park (west of Olympic Drive)
- Parks & General Open Space (Urban Plan)
  - Coronation Park
  - Churchill Park
  - Cootes Paradise Sanctuary 14
  - Olympic Sports Park (west of Olympic Drive)
  - Martino Memorial Park
  - Volunteer Field
  - Centennial Park
  - Canal Park
- Streams (Urban Plan)
  - Coronation Park
  - Desjardins Canal Pond
  - Lake Jojo
  - Lower Spencer Creek Conservation Area
  - Cootes Paradise Sanctuary 12 and 13

Schedule B to the Rural Plan also shows the Greenbelt Natural Heritage System on some of the Cootes Paradise Heritage Lands. At the appropriate time, this designation will change when the City Official Plan is updated to reflect the Niagara Escarpment Plan jurisdiction.

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

- Life Science ANSI (Rural Plan and Urban Plan)
  - Cootes Paradise Sanctuary 1, 2, 4, 6 and 8 to 13
- Significant Woodlands
  - Cootes Paradise Sanctuary 3 to 13, 15 and 16
  - Coronation Park
  - Lower Spencer Creek Conservation Area
  - Dundas Transfer Station (in part)
  - Lake Jojo
  - Olympic Sports Park (in part)
- Wetlands (Rural Plan and Urban Plan)
  - Cootes Paradise Sanctuary 1, 2, 6, 8 to 11 and 13

    - Dundas Transfer Station
    - Lake Jojo
    - Lower Spencer Creek Conservation Area
- Lakes and Littoral Zones (Rural Plan and Urban Plan)
    - Cootes Paradise Sanctuary 1, 2, 10, 11 and 16
    - Dundas Transfer Station
    - Lake Jojo
- Environmentally Significant Areas (Rural Plan and Urban Plan)
    - Cootes Paradise Sanctuary 1 to 13, 15 and 16
    - Coronation Park (in part)
    - Lower Spencer Creek Conservation Area
    - Dundas Transfer Station
    - Lake Jojo
- Streams (Rural Plan and Urban Plan)
    - Cootes Paradise Sanctuary 4, 6 to 9, 11 to 13 and 15
    - Coronation Park
    - Lower Spencer Creek Conservation Area
    - Desjardins Canal Pond
    - Lake Jojo

For lands outside of the Greenbelt Natural Heritage System (i.e., within the Niagara Escarpment Plan and City Official Plan Urban Area), permitted uses within Core Areas, including associated vegetation protection zones, are existing uses including agricultural uses, forest, fish and wildlife management, conservation and flood, and erosion control by public authority, passive recreation, and infrastructure projects. New development is not permitted within or adjacent to a key natural heritage feature unless evaluated through an Environmental Impact Statement (EIS) and demonstrated that there will be no negative impacts to natural features, and ecological functions, that connectivity between Core Areas is maintained or where possible, enhanced and removal of other natural features is avoided or minimized.

The EIS 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 vegetation protection zone objectives are to be considered by the EIS:

- 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
- Designated Valleylands: 15 m from top of bank

Linkages are remnant natural features within the landscape that connect Core Areas. On Schedule B, a linkage is shown between the Olympic Sports Park and Dundas Transfer along Olympic Drive in association with the stream/road ditch that drains Lake Jojo. 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.

The City Official Plan identifies and sets out policies for Cultural Heritage Resources. On Appendix F-2, Area Specific Cultural Heritage Resources, the Princess Point area of Cootes Paradise is identified as a Cultural Heritage Landscape, affecting Cootes Paradise Sanctuary 15, adjacent parts of Cootes Paradise Sanctuary 13 and Coronation Park. Cultural heritage landscapes are defined geographical areas characterized by human settlement activities that have resulted in changes to the environment which is now considered to be of heritage value. The associated policies indicate that the City may inventory these areas for inclusion on the municipal heritage registry or may designate these areas under the Ontario Heritage Act. Development in these areas may be required to address impacts on the cultural heritage values for which the area is identified.

The City Official Plan sets out area-specific policies that recognize unique circumstances encompassing multiple properties or that span multiple land use designations. Map D-1 to Volume 3 of the Urban Official Plan identifies lands in Dundas within Area Specific Policy UD-3 which is subject to a special floodplain policy on Lower Spencer Creek under the Provincial Policy Statement. In the vicinity of the Cootes Paradise Heritage Lands, the affected area is located generally along the north side of Cootes Drive and includes the following management units:

- Centennial Park
- Canal Park
- Dundas Wastewater Treatment Plant
- Martino Memorial Park
- City of Hamilton Public Works (south portion)
- Volunteer Field (south portion)
- Dundas Transfer Station (south portion)

Within the Special Policy Area, all development must be floodproofed to the regulatory flood level but where this is not feasible or practical, a lower level of floodproofing may be considered but in no case shall the minimum acceptable level be less than 1.1m below the regulatory flood level. The policies set out technical requirements and criteria for buildings, and structures and prohibit certain uses including uses which could pose an unacceptable threat to public safety due to flooding such as the manufacture/storage of chemical, hazardous or toxic substances, and uses for which flooding could pose a danger to inhabitants such as hospitals, long term care facilities, seniors apartments, etc.

2. Planning Regulation

<u>Niagara Escarpment Development Control</u>

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 sole effect. Some sections of the Plan Area have not been included in the area of Development Control so that local Zoning Bylaws maintain sole effect.

An example of the latter is Cootes Paradise Sanctuary 5 which, along with the entire Pleasantview Area, was transferred from the Parkway Belt West Plan to the Niagara Escarpment Plan jurisdiction before the Coordinated Provincial Plan Review.

Current areas of Development Control are shown schematically on maps available from the Niagara Escarpment Commission. At the time of any proposed development on the Cootes Paradise Heritage Lands, it is important to confirm whether Development Control or local Zoning Bylaws apply.

Generally, Development Control applies to the following Cootes Paradise Heritage Lands:

- Cootes Paradise Sanctuary 1 to 4, 6 to 16
- Coronation Park (north section)
- Churchill Park

All other Cootes Paradise Heritage Lands are subject to City of Hamilton Zoning Bylaws as outlined in section 3.2.3 below.

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. The list of exemptions is numerous and, by way of example, includes:

- 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.

- 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 Cootes Paradise Heritage Lands should be reviewed against the exemption list.

<u>City of Hamilton Zoning Bylaws</u>

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

The Cootes Paradise Heritage Lands not subject to Niagara Escarpment Development Control are subject to Zoning Bylaw 05-200 of the City of Hamilton, Zoning Bylaw 6593 of the former City of Hamilton, Zoning Bylaw 3581-86 and Zoning Bylaw 1964 of the former Town of Dundas. Where Development Control operates, the underlying zoning in these Zoning Bylaws has no effect and the details of zoning are not reported here. Reference can be made to the Zoning Bylaws should non-operative zoning be of interest. This includes most of the Cootes Paradise Heritage Lands as outlined in the preceding report section.

Under Zoning Bylaw 05-200, the affected Cootes Paradise Heritage Lands management units are zoned as follows:

- Coronation Park – zoned Community Park P2 zone and Open Space P4 zone
- Centennial Park – zoned Neighbourhood Park P1 zone
- Canal Park – zoned Conservation/Hazard P5 zone
- Martino Memorial Park – zoned Community Park P2 zone
- Olympic Sports Park – zoned Community Park P2 zone

Under Zoning Bylaw 3581-86, the affected Heritage Lands are zoned in part as follows:

- Cootes Paradise Sanctuary 9 – zoned Open Space OS zone
- Desjardins Canal Pond – zoned Open Space OS zone
- Lower Spencer Creek Conservation Area – zoned Open Space OS zone
- Volunteer Field – zoned Utilities U zone FP suffix
- City of Hamilton Public Works – zoned Utilities U zone FP suffix
- Dundas Transfer Station – zoned Utilities U zone FP suffix
- Lake Jojo –zoned Utilities U zone FP suffix
- Dundas Wastewater Treatment Plant – zoned Utilities U zone FP suffix and Park and Recreational PR1 zone
- Cootes Paradise Sanctuary 5 – zoned Open Space OS zone and Special Policy Area 2 Parkway Belt West Plan SP2 zone

Under Zoning Bylaw 1964, the affected Heritage lands are zoned in part as follows:

- Cootes Paradise Sanctuary 9 – zoned Temporary Open Space O1 zone
- Desjardins Canal Pond – zoned Temporary Open Space O1 zone
- Lower Spencer Creek Conservation Area – zoned Select Industrial M2 zone, Temporary Open Space O1 zone and Open Space O2 zone

Under Zoning Bylaw 6593, the affected Heritage Lands are zoned in part as follows:

- Lower Spencer Creek Conservation Area – zoned Suburban Agriculture and Residential B zone Exception 395

Generally, these zones reflect constraints to development, parkland or public uses. Permitted uses are subject to all requirements of the applicable Zoning Bylaws and site plan control, where applicable. Multiple Open Space zones apply to the Cootes Paradise Heritage Lands in east Dundas due to the jurisdiction of four different Zoning By-laws at specific locations. Zoning such as the Select Industrial M2 zone applicable to parts of Lower Spencer Creek Conservation Area, is old and does not reflect current land use policy, land ownership and use. As comprehensive Zoning Bylaw 05-200 is progressively amended to implement the City Official Plan, this zoning will be updated and simplified.

The permitted uses in the Neighbourhood Park P1 zone (Bylaw 05-200) are restricted to recreation, community gardens and urban farms but prohibited are major structures such as arenas, community centres, swimming pools etc. This zone category is for local level park space.

The permitted uses in the Community Park P2 zone (Bylaw 05-200) are recreation, community gardens, urban farms and urban farmers market but without the prohibition on major structures.

The permitted uses in the Open Space P4 zone (Bylaw 05-200) are structured forms including botanical gardens, golf courses, recreation, seasonal campgrounds, marinas and urban farms as well as community garden, conservation and nature centres.

The permitted uses in the Conservation/Hazard P5 zone (Bylaw 05-200) are restricted to conservation, flood and erosion control facilities, and passive recreation.

The permitted uses in the Open Space OS zone (Bylaw 3581-86) are botanical gardens, outdoor recreation, nature centres and wildlife sanctuaries.

The permitted uses in the Temporary Open Space O1 zone (Bylaw 1964) are open air recreational uses.

The permitted uses in the Open Space O2 zone (Bylaw 1964) are parks and recreational uses including buildings, and accessory commercial, or other accessory uses.

The permitted uses in the Park and Recreational PR1 zone (Bylaw 3581-86) are parks and playgrounds, picnic areas, park maintenance, storage and administration facilities, golf courses, and other recreational uses such as arenas, swimming pools and similar built forms of recreation (this zone applies to a small portion of the Dundas Wastewater Treatment Plant along the mutual boundary with Martino Memorial Park).

The permitted uses in the Select Industrial M2 zone (Bylaw 1964) are warehouses and wholesale uses, manufacturing and industrial uses within enclosed buildings and which by nature are not obnoxious, open storage, and open air industrial operations (this zoning applies to the western end of the Lower Spencer Creek Conservation Area and reflects the original intent of the former Town of Dundas planning documents for an industrial area on the south side of Spencer Creek).

The Suburban Agricultural and Residential B zone Exception 395 (Bylaw 6593) applies to a small area at the eastern end of the Lower Spencer Creek Conservation Area and appears to be remnant zoning related to the adjacent McMaster University institutional use.

The Special Policy Area 2 – Parkway Belt West Plan SP2 zone (Bylaw 3581-86) reflects the former Parkway Belt West Plan jurisdiction on the Pleasant View Area of Dundas. This zoning was established as a result of an OMB decision in 1995 referenced in the summary of City Official Plan policies. The permitted uses are limited to buildings, structures and uses legally existing on the date the bylaw was passed.

The permitted uses in the Public Utilities U zone (Bylaw 3581-86) are public utility installations, maintenance and equipment storage facilities, public works yards including administration offices, waste processing and waste processing facilities. This zone permits the Dundas Transfer Station waste management facility by site-specific regulation. The FP suffix denotes that the affected lands are susceptible to flooding and/or erosion, and subject to Conservation Authority regulation. Under zoning Bylaw 3581-86, parks are a permitted use in all zones including the Public Utilities U zone.

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

The Cootes Paradise Heritage Lands straddle the watershed jurisdictions of two Conservation Authorities: Hamilton Conservation Authority and Conservation Halton. As it affects the Heritage Lands, the jurisdictional boundary between the two Conservation Authorities is defined by the watershed limits of Borer's Creek and Spencer Creek with an arbitrary division line through the open water area of Cootes Paradise.

The Cootes Paradise Heritage Lands within the watershed limits of Conservation Halton are generally the north half of Cootes Paradise consisting of Cootes Paradise Sanctuary 1, 3 and 4 to 8. All other Cootes Paradise Heritage Lands are located within the watershed jurisdiction of Hamilton Conservation Authority.

On portions of the Cootes Paradise Heritage Lands within their watershed jurisdictions, each Conservation Authority administers Development, Interference with Wetland and Alteration to Shorelines, and Watercourses regulations made under the Conservation Authorities Act s.28, specifically Ontario Regulation 161/06 and Ontario Regulation 162/06 for the Hamilton Conservation Authority and Conservation Halton respectively. Generally, the regulation area to which the regulations apply are defined as follows:

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

The regulations of each Conservation Authority are administered based on guidelines which reflect local watershed conditions and objectives, and account for circumstances such as existing land uses and development, additions and accessory structures, and public uses. Under its regulation, the Hamilton Conservation Authority administers the Special Floodplain Policy Area on Lower Spencer Creek referenced under the summary of City Official Plan policies. Permits are required for any building, structure or site alteration within any regulated area, unless exempted.

3. Additional Natural Heritage Legislation and Policy

Federal Legislation

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

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

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

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

Species at Risk Act (2002)
Enacted in 2002, the Species at Risk Act (SARA) provides legal protection for federally-listed species at risk (i.e., listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)) on federal lands. The Act helps to protect sensitive species from becoming extinct by securing actions for their recovery. Several federal species at risk have been noted within the Cootes Paradise Heritage Lands, including vascular plants, birds and reptiles.

Provincial Legislation

Ontario Endangered Species Act (2007)
This legislation provides science-based assessment whereby species are assessed by an independent body based on the best-available science and Aboriginal Traditional Knowledge.

Species classified as endangered or threatened automatically receive legal protection. Furthmore, when a species is classified as endangered or threatened, its habitat is also protected. This legislation sets out timesline in the law for producing strategies and plans to recover at-risk species, tools to help reduce the impact of human activity on species and their habitats, and tools to encourage protection and recovery activities.

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

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

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

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

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

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

protection committee for each area. The committees identify significant existing and future risks to their municipal drinking water sources and develop plans to address these risks.

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.

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.

Provincial Plans and Strategies

Hamilton Harbour Remedial Action Plan (2003)
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 stages 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.

Strategic Plan for Ontario Fisheries (2015)
This strategic plan is intended 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.

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

Ontario's Great Lakes Strategy (2012)
This document details the vision, goals and priorities for restoring, protecting and conserving the Great Lakes. The strategy focuses on providing support for actions of partners on the Great Lakes and aims to conserve biodiversity, manage invasive species and address climate change needs.

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

Lake Ontario Lakewide Action and Management Plan (2017)
The Lake Ontario Lakewide Action and Management Plan (LAMP) is a bi-national action plan focused on restoring and protecting the Lake Ontario ecosystem. This document is developed by the Lake Ontario partnership including the United States Environmental Protection Agency and Environment and Climate Change Canada.

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

Lake Ontario-St. Lawrence River Plan (2014)
This plan discusses regulating the Lake Ontario-St. Lawrence River water levels and flows. This plan follows significant decreases in ecosystem and shoreline health in hopes of minimizing future damage and maintaining natural water levels.

Great Lakes Conservation Blueprint (2005)
Nature Conservancy of Canada (2005) has produced two documents, the Great Lakes Conservation Blueprint for Terrestrial Biodiversity and the Great Lakes Conservation Blueprint for Aquatic Biodiversity, which summarize terrestrial and aquatic biodiversity of the Canadian portion of the Great Lakes ecoregion (excluding the Great Lakes themselves). This follows documentation of the U.S. Nature Conservancy. These documents assemble, catalogue, classify, map and analyze all

available information on biological diversity within this ecoregion and identify representative areas across the ecoregion necessary to conserve this biodiversity.

Great Lake Wetlands Conservation Action Plan (2006)
Great Lake Wetlands Conservation Action Plan (GLWCAP) is a cooperative program involving government and non-government organizations that aims to establish a comprehensive wetland conservation program for Ontario wetlands on the Great Lakes. Goals of this plan are to create, reclaim, rehabilitate and protect wetland habitat in this area.

North American Waterfowl Management Plan (1986)
Following the Convention for the Protection of Migratory Birds, this document outlines the importance of conservation of habitat, reducing environmental pollution and harvest management in protecting waterfowl populations. This document discusses 29 species of waterfowl that are dependent on both Canada and the U.S. and guides organizations in the management and conservation of waterfowl.

Canadian Shorebird Conservation Plan (2000)
The Canadian Shorebird Conservation Plan outlines goals to fulfill research, monitoring, evaluation, conservation, communication and international linkage needs:

1. *"Sustain the distribution, diversity, and abundance of shorebird populations within Canada and restore populations of declining, threatened, and endangered species;*
2. *Secure and enhance sufficient high-quality habitat to support healthy populations of shorebirds throughout their ranges in Canada;*
3. *Ensure that information on shorebird conservation needs and practices is widely available to decision makers, land managers, and the public;*
4. *Ensure that coordinated shorebird conservation efforts are in place, on the ground, throughout the range of Canadian shorebird species;*
5. *Ensure that shorebird conservation efforts are guided by common principles throughout the Western Hemisphere."*

<u>Lower Spencer Creek Integrated Subwatershed Study (ongoing)</u>
The Hamilton Conservation Authority is undertaking an Integrated Subwatershed Study for Lower Spencer Creek in accordance with subwatershed study requirements and Conservation Ontario, and the Municipal Class Environmental Assessment Schedule C process. Completion of the study in accordance with Class EA requirements will facilitate future implementation of recommended remedial works.

The purpose of the subwatershed study is to protect, maintain and enhance the ecological processes, functions and significant natural features in the Lower Spencer Creek study area in light of existing and changing land use, and watershed stressors. The study area extends on Lower Spencer Creek through the Dundas urban area from the CN Embankment to the creek outlet at West Pond in Cootes Paradise. The study area encompasses all of the Cootes Paradise Heritage Lands west of Cootes Paradise Sanctuary 10 and 11.

The science-based study has investigated the function of the watershed through assessment of hydrology, hydraulics, hydrogeology, water quality, aquatic ecology, terrestrial ecology and fluvial geomorphology in the study area. Among other things, this has included assessments of flood and

erosion control, water quality and targets for improvements, fish passage barriers and plans for their removal, and updated floodplain mapping for the Lower Spencer Creek area.

To-date, the subwatershed study has advanced through the technical and public consultation stages with preparation of draft Phase 1 characterization reports for the technical subjects referenced above. The draft Phase 2 Impact Scenario reports and Phase 3 Implementation report are in preparatory stages with the final report expected to be publicly available in early to mid-2018 following review by the City of Hamilton.

Appendix 3: Natural Heritage Data Gap Analysis

Appendix 3. Cootes Paradise Data Gap Analysis

PROPERTY NAME	ANSI	ESA	Wetland	Landcover	ELC	Plants	Birds	Amphibians	Reptiles	Mammals	Fish
Canal Park	No	No	No	Manicured grass, recreation, field	No	No	No	No	No	No	No
Centennial Park	No	Cootes Paradise	No	Manicured, gardens, grass	Complete (HC)	No	No	No	No	No	No
Churchill Park	No	No	No	Manicured, recreation, grass	Complete (RBG)	No	No	No	No	No	No
City of Hamilton Public Works	No	Partial (Cootes Paradise)	No	Forest, stormwater facility, grass, industrial (utility?)	No	No	No	No	No	No	No
Cootes Paradise Sanctuary 1	Cootes Paradise Drowned Valley Provincial Life Science ANSI	Cootes Paradise	Yes	Watercourse, marsh/lagoon, open water	Complete (RBG)	Hamilton NAI Species Checklist Document (2014), Checklist of the spontaneous flora of RBG's nature sanctuaries (2003)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Turtles of RBG Site Specific Recovery Plan, 2014, Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	C2E-BFRC Fish Data, Hamilton NAI Species Checklist Document (2014)
Cootes Paradise Sanctuary 2	Cootes Paradise Drowned Valley Provincial Life Science ANSI	Cootes Paradise	Yes	Watercourse, marsh/lagoon, open water	Complete (RBG)	Emergent and Meadow Marsh Vegetation Summary (RBG) 2012, RBG ELC Report 2014, Hamilton NAI Species Checklist Document (2014), Checklist of the spontaneous flora of RBG's nature sanctuaries (2003)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Turtles of RBG Site Specific Recovery Plan, 2014, Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Cootes Paradise Sanctuary 3	Cootes Paradise Drowned Valley Provincial Life Science ANSI	Cootes Paradise	No	Manicured, gardens, grass, forest, park amenities	Complete (RBG)	Hamilton NAI Species Checklist Document (2014), Checklist of the spontaneous flora of RBG's nature sanctuaries (2003)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Cootes Paradise Sanctuary 4	Cootes Paradise Drowned Valley Provincial Life Science ANSI	Cootes Paradise	Yes	Forest, park amenities	Complete (RBG)	RBG ELC Report 2014, Hamilton NAI Species Checklist Document (2014), Checklist of the spontaneous flora of RBG's nature sanctuaries (2003)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	C2E-BFRC Fish Data, Hamilton NAI Species Checklist Document (2014)
Cootes Paradise Sanctuary 5	No	Cootes Paradise	No	Field, forest, utility	Complete (RBG)	Hamilton NAI Species Checklist Document (2014), Checklist of the spontaneous flora of RBG's nature sanctuaries (2003)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)

PROPERTY NAME	ANSI	ESA	Wetland	Landcover	ELC	Plants	Birds	Amphibians	Reptiles	Mammals	Fish
Cootes Paradise Sanctuary 6	Cootes Paradise Drowned Valley Provincial Life Science ANSI	Cootes Paradise	Yes	Forest, utility, field	Complete (RBG)	Prescribed Burn Monitoring Report (2011), RBG ELC Report 2014, Hamilton NAI Species Checklist Document (2014), Checklist of the spontaneous flora of RBG's nature sanctuaries (2003)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Cootes Paradise Sanctuary 7	No	Cootes Paradise	Yes	Forest, plantation, field, utility	Complete (RBG)	Checklist of the spontaneous flora of RBG's nature sanctuaries (2003), Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Cootes Paradise Sanctuary 8	Cootes Paradise Drowned Valley Provincial Life Science ANSI	Cootes Paradise	Yes	Forest, plantation, utility, field	Complete (RBG)	Checklist of the spontaneous flora of RBG's nature sanctuaries (2003), Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Cootes Paradise Sanctuary 9	Partial (Cootes Paradise Drowned Valley Provincial Life Science ANSI)	Cootes Paradise	No	Forest, plantation, field, utility, community gardens?	Complete (RBG)	Checklist of the spontaneous flora of RBG's nature sanctuaries (2003), Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Borer's Creek Fisheries Data, Hamilton NAI Species Checklist Document (2014)
Cootes Paradise Sanctuary 10	Cootes Paradise Drowned Valley Provincial Life Science ANSI	Cootes Paradise	Yes	Forest, marsh, watercourse, open water	Complete (RBG)	Checklist of the spontaneous flora of RBG's nature sanctuaries (2003), Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Turtles of RBG Site Specific Recovery Plan (2014), Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Cootes Paradise Sanctuary 11	Cootes Paradise Drowned Valley Provincial Life Science ANSI	Cootes Paradise	Yes	Forest, marsh, open water	Complete (RBG)	Checklist of the spontaneous flora of RBG's nature sanctuaries (2003), Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Lower Spencer Creek (LSP) Fisher Data, Hamilton NAI Species Checklist Document (2014)
Cootes Paradise Sanctuary 12	Cootes Paradise Drowned Valley Provincial Life Science ANSI	Cootes Paradise	Yes	Forest	Complete (RBG)	Checklist of the spontaneous flora of RBG's nature sanctuaries (2003), Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Cootes Paradise Sanctuary 13	Cootes Paradise Drowned Valley Provincial Life Science ANSI	Cootes Paradise	No	Forest, grass, recreational	Complete (RBG)	Prescribed Burn Monitoring Report (2011), Checklist of the spontaneous flora of RBG's nature sanctuaries (2003), Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)

PROPERTY NAME	ANSI	ESA	Wetland	Landcover	ELC	Plants	Birds	Amphibians	Reptiles	Mammals	Fish
Cootes Paradise Sanctuary 14	No	Cootes Paradise	No	Park amenities, gardens	Complete (RBG)	Checklist of the spontaneous flora of RBG's nature sanctuaries (2003), Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Cootes Paradise Sanctuary 15	No	Cootes Paradise	Yes	Forest, manicured, park amenities	Complete (RBG)	Prescribed Burn Monitoring Report (2011), Checklist of the spontaneous flora of RBG's nature sanctuaries (2003), Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Cootes Paradise Sanctuary 16	Cootes Paradise Drowned Valley Provincial Life Science ANSI	Cootes Paradise	No	Forested islands	Complete (RBG)	Status Report on Princess Point (2017), Checklist of the spontaneous flora of RBG's nature sanctuaries (2003), Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014) Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Coronation Park	No	Partial (Cootes Paradise)	No	Forest, field, recreation, manicured	Partial (HC)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Desjardins Canal Pond	No	Cootes Paradise	No	Open water	Complete (RBG)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Dundas Transfer Station	No	Cootes Paradise	Yes	Forest, field, manicured, transportation	Complete (HC)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Dundas Wastewater Treatment Plant	No	No	No	Utility, manicured	No	No	No	No	No	No	No
Lower Spencer Creek Conservation Area	No	Cootes Paradise	Yes	Forest, marsh, open water	Complete (HC)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)	Hamilton NAI Species Checklist Document (2014)
Martino Memorial Park	No	No	No	Recreation, manicured	No	No	No	No	No	No	No

PROPERTY NAME	ANSI	ESA	Wetland	Landcover	ELC	Plants	Birds	Amphibians	Reptiles	Mammals	Fish
Olympic Sports Park	No	Partial (Cootes Paradise)	No	Manicured, recreation, forest	Partial (HC)	No	No	No	No	No	No
Volunteer Field Park	No	No	No	Recreation, manicured	No	No	No	No	No	No	No

Appendix 4: Information Gathering Session Participants

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

Information Gathering Sessions

Group A: Environmental, Recreation and Education – 12 July 2017, 9:30am – 12:00pm

- Bryan Czerneda, Hamilton Burlington Mountain Biking Association/Hamilton Burlington Trails Council
- Kristin O'Conner, Hamilton Harbour Remedial Action Plan (RAP)
- Lesley McDonnell, Hamilton Conservation Authority
- Lisa Grbinicek, Ministry or Natural Resources and Forestry/Niagara Escarpment Commission
- Terry Henderson, City of Hamilton Parks and Recreation
- Dr. David Galbraith, Royal Botanical Gardens
- Peter Kelly, Cootes to Escarpment EcoPark System
- Felicia Radassao, Royal Botanical Gardens
- Barb McKean, Royal Botanical Gardens
- Lyndsay Barr, Royal Botanical Gardens
- Mirek Sharp, North-South Environmental Inc.
- Holly Dodds, North-South Environmental Inc.
- Markus Hillar, Schollen & Company Inc.
- Lily D'Souza, Lura Consulting

Group B: Utilities – 12 July 2017, 1:00pm – 3:00pm

- Isabel Vautour-Larabee, Union Gas
- Mirek Sharp, North-South Environmental Inc.
- Holly Dodds, North-South Environmental Inc.
- Markus Hillar, Schollen & Company Inc.
- Lily D'Souza, Lura Consulting

Group C: Cultural Heritage – 12 July 2017, 3:30pm – 5:00 pm

- Alissa Golden, City of Hamilton
- Chelsey Tyers, City of Hamilton
- Olivia Falcone, City of Hamilton
- Sandra Kiemele, Dundas Historical Society/Dundas Museum
- Dr. David Galbraith, Royal Botanical Gardens
- Peter Kelly, Cootes to Escarpment EcoPark System
- Mirek Sharp, North-South Environmental Inc.
- Holly Dodds, North-South Environmental Inc.
- Cecelia Paine, University of Guelph
- Lily D'Souza, Lura Consulting

Group D: Community Groups – 12 July 2017, 7:00pm – 9:00pm

- Rosemary Horsewood, Dundas Turtle Watch
- Bill Nanskeville, Dundas Turtle Watch
- Janet Nanskeville, Dundas Turtle Watch

- Chris Boothe, Stewards of Cootes Watershed
- Alan Hansell, Stewards of Cootes Watershed
- Mary Lyn Brown, RBG Auxiliary
- Mirek Sharp, North-South Environmental Inc.
- Holly Dodds, North-South Environmental Inc.
- Lily D'Souza, Lura Consulting

Appendix 5: Flora Species Observed at Cootes Paradise Heritage Lands

Appendix 5. Flora species observed at Cootes Paradise Heritage Lands. * indicates a non-native species

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	RBG Status 2014	Cootes Paradise	Waste Places	Roadsides	Historical Record	Planted
	Lycopodiaceae													
	Dendrolycopodium dendroideum (Michx.) A. Haines	Round-branched Tree-clubmoss	G5	S5				H	X	x				
	Diphasiastrum digitatum (Dill. ex A. Braun) Holub	Southern Ground-cedar	G5	S5					X	x				
	Huperzia lucidula (Michx.) Trevis.	Shining Firmoss	G5	S5					X	x				
	Lycopodium obscurum L.	Ground-pine	G5	S4				h		x				
	Selaginellaceae													
	Selaginella apoda	Northern Meadow Spikemoss								x				
	Selaginella eclipes W.R. Buck	Hidden Spikemoss	G4	S4				H	X	x				
	Equisetaceae													
	Equisetum arvense L.	Field Horsetail	G5	S5						x		x		
	Equisetum fluviatile L.	Water Horsetail	G5	S5						x				
	Equisetum hyemale	Common Scouring-rush	G5	S5						x				
	Equisetum palustre L.	Marsh Horsetail	G5	S5				H		x				
	Equisetum scirpoides Michx.	Dwarf Scouring-rush	G5	S5				h	XP	x				
	Equisetum sylvaticum L.	Woodland Horsetail	G5	S5					XP	x				
	Equisetum variegatum Schleich. ex Fried., Weber & Mohr ssp. variegatum	Variegated Horsetail	G5	S5					XP	x				
	Equisetum x litorale Kuhl. ex Rupr.	Hybrid Horsetail	GNA	SNA					XP	x				
	Ophioglossaceae													
	Botrypus virginianus L. Michaux	Rattlesnake Fern	G5	S5					X	x				
	Sceptridium dissectum (Sprengel) Lyon	Cut-leaved Grapefern	G5	S5				h	X	x				
	Osmundaceae													
	Osmunda claytoniana L.	Interrupted Fern	G5	S5						x				
	Osmunda regalis L. var. spectabilis (Willd.) A. Gray	Royal Fern	G5	S5					X	x				
	Pteridaceae													
	Adiantum pedatum L.	Northern Maidenhair Fern	G5	S5						x				
	Dennstaedtiaceae													
	Dennstaedtia punctilobula (Michx.) T. Moore	Eastern Hay-scented Fern	G5	S5				H	*	x				
	Pteridium aquilinum L. Kuhn var. latiusculum (Desv.) L. Underw. ex A. Heller	Bracken Fern	G5	S5						x				
	Thelypteridaceae													
	Phegopteris connectilis (Michx.) Watt	Northern Beech Fern	G5	S5				H	X	x				
	Phegopteris hexagonoptera (Michx.) Fée	Broad Beech Fern	G5	S3	SC	SC	SC	H	X	x			1956 (historical)	2009 (dead)
	Thelypteris noveboracensis L. Nieuwl.	New York Fern	G5	S4S5					*	x				
	Thelypteris palustris Schott	Marsh Fern	G5	S5						x				
	Aspleniaceae													
	Asplenium platyneuron L. Oakes ex Eaton	Ebony Spleenwort	G5	S4				h	N	x				
	Asplenium trichomanes L.	Maidenhair Spleenwort	G5	S4						x				

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	RBG Status 2014	Cootes Paradise	Waste Places	Roadsides	Historical Record	Planted
	Dryopteridaceae													
	Athyrium filix-femina L. Roth ex Mert. var. angustum (Willd.) G. Lawson	Northeastern Lady Fern	G5T5	S5						x				
	Cystopteris bulbifera L. Bernh.	Bulblet Bladder Fern	G5	S5						x				
	Cystopteris tenuis (Michx.) Desv.	Mackay's Brittle Fern	G5	S5						x				
	Deparia acrostichoides (Swartz) M. Kato	Silvery Spleenwort	G5	S4				h	H	x				
	Dryopteris carthusiana (Vill.) H.P. Fuchs	Spinulose Wood Fern	G5	S5						x				
	Dryopteris clintoniana (D.C. Eaton) Dowell	Clinton's Wood Fern	G5	S4					*	x				
	Dryopteris cristata L. A. Gray	Crested Wood Fern	G5	S5					XP	x				
	Dryopteris intermedia (Muhlenb. ex Willd.) A. Gray	Evergreen Wood Fern	G5	S5						x				
	Dryopteris marginalis L. A. Gray	Marginal Wood Fern	G5	S5						x				
	Dryopteris x triploidea Wherry	Hybrid Wood Fern	GNA	SNA					*	x				
	Gymnocarpium dryopteris L. Newman	Common Oak Fern	G5	S5					X	x				
	Matteuccia struthiopteris var. pensylvanica (Willd.) C.V. Morton	Ostrich Fern	G5	S5						x				
	Onoclea sensibilis L.	Sensitive Fern	G5	S5						x				
	Polystichum acrostichoides (Michx.) Schott	Christmas Fern	G5	S5						x				
	Polypodiaceae													
	Polypodium virginianum L.	Rock Polypody	G5	S5				h	?*	x				
	Azollaceae													
	Azolla caroliniana Willd.	Eastern Mosquito Fern	G5	S1S2				H	N	x				
	Pinaceae													
	Abies balsamea L. Miller	Balsam Fir	G5	S5						x				
	Larix laricina (Du Roi) K. Koch	American Larch	G5	S5						x				
	Pinus strobus L.	White Pine	G5	S5						x				
*	Pinus sylvestris L.	Scots Pine	GNR	SNA				I	P	x				
	Tsuga canadensis L. Carrière	Eastern Hemlock	G5	S5						x				
	Cupressaceae													
	Juniperus virginiana L.	Eastern Red Cedar	G5	S5						x				
	Thuja occidentalis L.	Eastern White Cedar	G5	S5						x				
	Taxaceae													
	Taxus canadensis Marshall	Canadian Yew	G5	S4					*	x				
	Magnoliaceae													
	Liriodendron tulipifera L.	Tulip Tree	G5	S4				H		x				
	Magnolia acuminata L. L.	Cucumber Tree	G5	S2	END	END	END			x				2017 (planted)
	Annonaceae													
	Asimina triloba L. Dunal	Pawpaw	G5	S3				N/I?		x				
	Lauraceae													
	Lindera benzoin L. Blume	Spicebush	G5	S5					XP	x				

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	RBG Status 2014	Cootes Paradise	Waste Places	Roadsides	Historical Record	Planted
	Sassafras albidum (Nutt.) Nees	Sassafras	G5	S4						x				
	Aristolochiaceae													
	Asarum canadense L.	Canada Wild Ginger	G5	S5						x				
	Nymphaeaceae													
	Nuphar advena (Aiton) Aiton f.	Large Yellow Pond-lily	G5T5	S3				H	*	x				
	Nuphar variegata Durand in Clinton	Variegated Pond-lily	G5T5	S5					*	x				
	Nymphaea odorata Ait. spp. odorata	Fragrant Water-lily	G5T5	S5?				H		x				
	Ceratophyllaceae													
	Ceratophyllum demersum L.	Common Hornwort	G5	S5				h	*	x				
	Ranunculaceae													
	Actaea pachypoda Elliott	White Baneberry	G5	S5						x				
	Actaea rubra (Aiton) Willd.	Red Baneberry	G5	S5						x				
	Actaea x ludovicii B. Boivin	Hybrid Baneberry	GNA	SNA					?*	x				
	Anemone acutiloba (DC.) G. Lawson	Sharp-lobed Hepatica	G5	S5						x				
	Anemone americana (DC.) H. Hara	Round-lobed Hepatica	G5	S5						x				
	Anemone canadensis L.	Canada Anemone	G5	S5						x				
	Anemone cylindrica A. Gray	Long-headed Anemone	G5	S4				h		x				
	Anemone quinquefolia L.	Wood Anemone	G5	S5						x				
	Anemone virginiana L. var virginiana	Tall Anemone	G5T5	S5						x		x		
	Aquilegia canadensis L.	Wild Columbine	G5	S5						x				
	Caltha palustris L.	Yellow Marsh Marigold	G5	S5						x				
	Clematis occidentalis (Hornem.) DC.	Purple Clematis	G5	S4S5				h		x				
	Clematis virginiana L.	Virginia Virgin's-bower	G5	S5						x				
*	Ficaria verna Hudson	Fig-root Buttercup	GNR	SNA					N	x				
	Ranunculus abortivus L.	Kidney-leaved Buttercup	G5	S5						x				
*	Ranunculus acris L.	Tall Buttercup	G5	SNA				I		x		x		
	Ranunculus fascicularis Muhlenb. ex Bigelow	Early Buttercup	G5	S4				H	*	x				
	Ranunculus flabellaris Raf.	Yellow Water Buttercup	G5	S4?				h		x				
	Ranunculus hispidus Michx. var. caricetorum (Greene) T. Duncan	Swamp Buttercup	G5T5	S5						x				
	Ranunculus hispidus Michx. var. hispidus	Bristly Buttercup	G5T5	S3				H	*	x				
	Ranunculus pensylvanicus L. f.	Pennsylvania Buttercup	G5	S5						x				
	Ranunculus recurvatus Poir.	Hooked Buttercup	G5	S5						x				
*	Ranunculus repens L.	Creeping Buttercup	GNR	SNA				I		x				
	Ranunculus sceleratus L. var. sceleratus	Cursed Buttercup	G5T5	SNA						x				
	Thalictrum dioicum L.	Early Meadow-rue	G5	S5						x				
	Thalictrum pubescens Pursh	Tall Meadow-rue	G5	S5						x				
	Thalictrum thalictroides L. A.J. Eames & B. Boivin	Rue-anemone	G5	S3				H		x				
	Berberidaceae													

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	Berberis thunbergii DC.	Japanese Barberry	G5	S5				I		x				
	Berberis vulgaris L.	European Barberry	G5T5	S4?				I		x		x		
	Caulophyllum giganteum (Farw.) Leconte & Blackwell	Giant Blue Cohosh	G4G5Q	S4?						x				
	Caulophyllum thalictroides L. Michx.	Blue Cohosh	G4G5	S5						x				
	Podophyllum peltatum L.	May-apple	G5	S5						x				
	Menispermaceae													
	Menispermum canadense L.	Canada Moonseed	G5	S4						x				
	Papaveraceae													
*	Chelidonium majus L.	Greater Celadine	GNR	SNA				I		x				
*	Macleaya cordata (Willd.) R. Br.	Plume-poppy	GNR	SNA				I		x				
*	Papaver dubium L.	Long-pod Poppy	GNR	SNA				I		x				
*	Papaver rhoeas L.	Corn Poppy	GNR	SNA				I				x		
*	Papaver somniferum L.	Opium Poppy	GNR	SNA				I	N	x	x			
	Sanguinaria canadensis L.	Bloodroot	G5	S5						x				
	Platanaceae													
	Platanus occidentalis L.	Sycamore	G5	S4				H		x				
	Hamamelidaceae													
	Hamamelis virginiana L.	American Witch-hazel	G5	S5						x				
	Ulmaceae													
	Celtis occidentalis L.	Common Hackberry	G5	S4				h	N*	x				
	Ulmus americana L.	American Elm	G5?	S5						x		x		
*	Ulmus pumila L.	Siberian Elm	GNR	SNA				I		x				
	Ulmus rubra Muhlenb.	Slippery Elm	G5	S5						x				
	Cannabaceae													
*	Cannabis sativa L.	Marijuana	GNR	SNA					P	x				
*	Humulus japonicus Siebold & Zucc.	Japanese Hop	GNR	SNA				I	N		x			
	Moraceae													
*	Morus alba L.	White Mulberry	GNR	SNA				I		x		x		
	Urticaceae													
	Boehmeria cylindrica L. Sw.	False Nettle	G5	S5						x				
	Laportea canadensis L. Wedd.	Wood Nettle	G5	S5						x				
	Pilea fontana (Lunnell) Rydb.	Springs Clearweed	G5	S4					*	x				
	Pilea pumila L. A. Gray	Canada Clearweed	G5	S5						x				
*	Urtica dioica L. ssp. dioica	European Stinging Nettle	G5T5?	SNA				I		x				
	Urtica dioica L. ssp. gracilis (Aiton) Selander	Slender Stinging Nettle	G5T5	S5						x				
	Juglandaceae													
	Carya cordiformis (Wangenh.) K. Koch	Bitternut Hickory	G5	S5						x		x		
	Carya glabra (Miller) Sweet	Pignut Hickory	G5	S3				H	*	x		x		

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	Carya ovata (Miller) K. Koch	Shagbark Hickory	G5	S5						x		x		
	Juglans cinerea L.	Butternut	G4	S2?	END	END	END			x				
	Juglans nigra L.	Black Walnut	G5	S4?						x				
	Fagaceae													
	Castanea dentata (Marshall) Borkh.	American Chestnut	G4	S2	END	END	END	h	*	x				
	Fagus grandifolia Ehrh.	American Beech	G5	S4						x				
	Fagus sylvatica L.	European Beech								x				
	Quercus alba L.	White Oak	G5	S5						x				
	Quercus macrocarpa Michx.	Bur Oak	G5	S5						x				
	Quercus muehlenbergii Engelm.	Chinquapin Oak	G5	S4						x				
	Quercus rubra L.	Northern Red Oak	G5	S5						x				
	Quercus velutina Lam.	Black Oak	G5	S4						x				
	Betulaceae													
*	Alnus glutinosa L. Gaertn.	European Alder	GNR	SNA				I	N	x				
	Alnus incana L. Moench spp. rugosa (Du Roi) Clausen	Speckled Alder	G5	S5					*	x				
	Betula alleghaniensis Britton	Yellow Birch	G5	S5						x				
	Betula lenta L.	Cherry Birch	G5	S1	END	END	END			x				2017 (planted)
	Betula papyrifera Marshall	Paper Birch	G5	S5						x				
	Carpinus caroliniana Walter ssp. virginiana (Marshall) Furlow	Blue-beech	G5	S5				H		x				
	Corylus americana Walter	American Hazelnut	G5	S5						x				
	Corylus cornuta Marshall	Beaked Hazel	G5	S5						x				
	Ostrya virginiana (Miller) K. Koch	Eastern Hop-hornbeam	G5	S5						x				
	Phytolaccaceae													
	Phytolacca americana L.	Common Pokeweed	G5	S4				h		x				
	Nyctaginaceae													
	Mirabilis nyctaginea (Michx.) MacMill.	Wild Four-o'clock	G5	S2				I				x		
	Chenopodiaceae													
*	Atriplex patula L.	Spear Saltbush	G5	SNA				h		x	x	x		
*	Atriplex prostrata Boucher ex DC.	Creeping Saltbush	G5	SNA				H		x	x	x		
*	Bassia scoparia (L.) Voss	Common Kochia	GNR	SNA				I				x		
	Blitum capitatum L.	Strawberry-blite	G5	S5				h	N	x				
	Chenopodiastrum simplex (Torrey) S. Fuentes, Uotila & Borsch	Maple-leaved Goosefoot	G5	S5				h		x		x		
*	Chenopodium album L.	Common Lamb's Quarters	G5	SNA				I		x	x	x		
*	Dysphania botrys (L.) Mosyakin & Clemants	Jerusalem-oak	GNR	SNA				I	H		x			
*	Lipandra polysperma (L.) S. Fuentes, Uotila & Borsch var. polysperma	Many-seeded Goosefoot	GNRTNR	SNA				I		x	x			
*	Oxybasis glauca (L.) S. Fuentes, Uotila & Borsch ssp. Glauca	Oak-leaved Goosefoot	G5	SNA				I		x	x	x		
*	Oxybasis urbica (L.) S. Fuentes, Uotila & Borsch	City Goosefoot	GNR	SNA						x				
*	Salsola kali L.	Prickly Russian Thistle	GNRTNR	SNA				I		x				

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*	Salsola tragus Linnaeus	Prickly Russian Thistle	GNRTNR	SNA				I				x		
	Amaranthaceae													
*	Amaranthus albus L.	White Amaranth	GNR	SNA				I		x		x		
*	Amaranthus blitoides S. Watson	Prostrate Amaranth	GNR	SNA				I		x	x	x		
	Amaranthus blitum L. subsp. blitum Costea & Tardif	Purple Amaranth									x			
*	Amaranthus powellii S. Watson	Powell's Amaranth	G5T5	SNA				I			x	x		
*	Amaranthus retroflexus L.	Redroot Amaranth	G5	SNA				I			x	x		
	Portulacaceae													
	Claytonia virginica L.	Narrow-leaved Spring Beauty	G5	S5						x				
*	Portulaca oleracea L.	Common Purslane	GU	SNA				I			x	x		
	Caryophyllaceae													
*	Arenaria serpyllifolia L.	Thyme-leaf Sandwort	GNR	SNA				I		x		x		
	Cerastium arvense L. ssp. strictum (Haenke) Gaudin	Matted Field Chickweed	G5T5	S4								x		
*	Cerastium fontanum Baumg.	Common Mouse-ear Chickweed	GNR	SNA				I		x		x		
	Cerastium nutans Raf.	Nodding Chickweed	G5	S4				H		x				
*	Cerastium pumilum Curtis	Curtis' Mouse-ear Chickweed	GNR	SNA				I	N	x	x			
*	Cerastium semidecandrum L.	Five-stamen Mouse-ear Chickweed	GNR	SNA				I	N		x	x		
*	Cerastium tomentosum L.	Snow-in-summer	GNR	SNA				I				x		
*	Dianthus armeria L.	Deptford Pink	GNR	SNA				I		x		x		
	Moehringia lateriflora L. Fenzl	Grove Sandwort	G5	S5				h	*	x				
*	Sagina procumbens L.	Procumbent Pearlwort	G5	SNA				I	N		x			
*	Saponaria officinalis L.	Bouncing-bet	GNR	SNA				I		x		x		
	Silene antirrhina L.	Sleepy Catchfly	G5	S5				H		x		x		
*	Silene coronaria (L.) Clairville	Rose Campion	GNR	SNA						x				
*	Silene dioica (Linnaeus) Clairville	Red Catchfly	GNA	SNA						x				
*	Silene latifolia Poir.	White Campion	GNR	SNA				I		x		x		
*	Silene noctiflora L.	Night-flowering Catchfly	GNR	SNA				I	N	x				
*	Silene vulgaris (Moench) Garcke	Bladder Campion	GNR	SNA				I				x		
*	Spergularia media L. C. Presl ex Griseb.	Greater Sea-spurrey	GNR	SNA				I		x				
*	Spergularia rubra L. J. & C. Presl	Red Sand-spurrey	G5	SNA				I	*		x			
*	Stellaria graminea L.	Grass-leaved Starwort	GNR	SNA				I		x				
	Stellaria longifolia Muhlenb. ex Willd.	Long-leaved Starwort	G5	S5						x				
	Stellaria longipes Goldie	Long-stalked Starwort	G5	S5				H		x				
*	Stellaria media L. Vill.	Common Chickweed	GNR	SNA				I	N	x	x	x		
	Polygonaceae													
*	Fagopyrum esculentum Moench	Buckwheat	GNR	SNA				I		x				
*	Fallopia convolvulus (L.) A. Löve	Black Bindweed	GNR	SNA				I		x		x		
*	Fallopia japonica (Houttuyun) Ronse-Decraene	Japanese Knotweed	GNR	SNA				I	N	x				

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	Fallopia scandens (L.) Holub	Climbing False Buckwheat	G5	S4S5				H		x				
	Persicaria amphibia var. emersa (Michx.) J.C. Hickman	Scarlet Smartweed								x				
	Persicaria amphibia var. stipulacea (N. Coleman) H. Hara	Flanged Smartweed	G5T5	S5						x				
	Persicaria arifolia (L.) Haraldson	Halberd-leaved Tearthumb	G5	S3				H	H	x				
*	Persicaria hydropiper (L.) Delarbre	Marshpepper Smartweed	GNR	SNA				I		x				
	Persicaria hydropiperoides (Michaux) Small	False Water-pepper	G5	S5						x				
	Persicaria lapathifolia (L.) Delarbre	Pale Smartweed	G5	S5				I		x		x		
*	Persicaria maculosa Gray	Spotted Lady's Thumb	G3G5	SNA				I		x		x		
	Persicaria pensylvanica (L.) M. Gomez de la Maza	Pennsylvania Smartweed	G5	S5						x				
	Persicaria punctata (Elliott) Small	Dotted Smartweed	G5	S5						x				
	Persicaria sagittata (L.) H. Gross	Arrow-leaved Smartweed	G5	S4						x				
	Persicaria virginiana (L.) Gaertner	Virginia Knotweed	G5	S4						x				
	Polygonum achoreum Blake	Leathery Knotweed	G5	S5				H		x		x		
*	Polygonum aviculare L. ssp. aviculare	Prostrate Knotweed	GNRTNR	SNA				h		x	x	x		
	Polygonum ramosissimum Michx. ssp. ramosissimum	Bushy Knotweed	G5T5	S4				H	H		x	x		
*	Rumex acetosella L.	Sheep Sorrel	GNR	SNA				I		x	x	x		
	Rumex britannica Linnaeus	Water Dock	G5	S5				I		x				
*	Rumex crispus L.	Curly Dock	GNR	SNA				I		x		x		
*	Rumex obtusifolius L.	Bitter Dock	GNR	SNA				I		x				
	Rumex verticillatus L.	Swamp Dock	G5	S4						x				
	Guttiferae													
*	Hypericum perforatum L.	Common St. John's-wort	GNR	SNA				I		x		x		
	Hypericum punctatum Lam.	Common St. John's-wort	G5	S5						x				
	Tiliaceae													
	Tilia americana L.	American Basswood	G5	S5						x				
	Malvaceae													
*	Abutilon theophrasti Medik.	Velvet-leaf	GNR	SNA				I		x		x		
*	Alcea rosea L.	Hollyhock	GU	SNA				I				x		
*	Hibiscus trionum L.	Flower-of-an-hour	GNR	SNA				I		x	x			
*	Malva neglecta Wallr.	Dwarf Cheeseweed	GNR	SNA				I			x	x		
	Cistaceae													
	Crocanthemum canadense (L.) Britton	Long-branched Frostweed	G5	S3				H	X	x			historical	
	Lechea intermedia Legg.	Large-pod Pinweed	G5	S4				H	*	x				
	Violaceae													
	Hybanthus concolor (T.F. Forst.) Spreng.	Eastern Green Violet	G5	S2				h		x				
	Viola affinis J. Le Conte	Le Conte's Violet	G5	S4?						x				
	Viola blanda Willd.	Sweet White Violet	G4G5	S5				h		x				
	Viola cucullata Aiton	Marsh Blue Violet	G4G5	S5					*	x				

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	Viola labradorica Schrank	Labrador Violet	G5	S5						x				
	Viola macloskeyi F.E. Lloyd	Smooth White Violet	G5	S5				h	H	x				
	Viola nephrophylla Greene	Northern Bog Violet	G5	S5				H	*	x				
*	Viola odorata L.	English Violet	GNR	SNA				I		x				
	Viola pubescens Aiton	Downy Yellow Violet	G5T5	S5					*	x				
	Viola rostrata Pursh	Long-spur Violet	G5	S5					*	x				
	Viola sagittata Aiton var. ovata (Nutt.) Torr. & A. Gray	Sand Violet	G5T5	S4				H	*	x				
	Viola sororia Willd.	Woolly Blue Violet	G5	S5				H	*	x				
*	Viola tricolor L.	Johnny-jump-up	GNR	SNA				I				x		
	Cucurbitaceae													
*	Cucurbita pepo L.	Field Pumpkin	G4G5	SNA					?	x	x			
	Echinocystis lobata (Michx.) Torr. & A. Gray	Wild Mock-cucumber	G5	S5						x				
	Sicyos angulatus L.	One-seed Bur-cucumber	G5	S5				h		x				
	Salicaceae													
*	Populus alba L.	White Poplar	G5	SNA				I		x		x		
	Populus balsamifera L.	Balsam Poplar	G5	S5						x		x		
	Populus deltoides Bartram ex Marshall ssp. deltoides	Eastern Cottonwood	G5T5	S5						x		x		
	Populus grandidentata Michx.	Large-tooth Aspen	G5	S5						x		x		
*	Populus nigra L.	Black Poplar	G5	SNA				I				x		
	Populus tremuloides Michx.	Trembling Aspen	G5	S5						x		x		
*	Populus x canescens (Aiton) Sm.	Gray Poplar	GNA	SNA								x		
*	Salix alba L.	White Willow	G5	SNA				I		x		x		
	Salix amygdaloides Anderss.	Peach-leaved Willow	G5	S5						x				
	Salix bebbiana Sarg.	Bebb's Willow	G5	S5						x				
	Salix candida Flüegge ex Willd.	Hoary Willow	G5	S5				H		x				
	Salix cordata Michx.	Sand Dune Willow	G4	S4				H	H	x				
	Salix discolor Muhlenb.	Pussy Willow	G5	S5						x		x		
	Salix eriocephala Michx.	Heart-leaved Willow	G5	S5						x		x		
	Salix humilis Marshall	Prairie Willow	G5	S5				H	*	x				
	Salix interior Rowlee	Sandbar Willow	G5	S5						x		x		
	Salix lucida Muhlenb.	Shining Willow	G5	S5					*			x		
	Salix myricoides Muhlenb.	Blue-leaved Willow	G4	S4					H	x				
	Salix nigra Marshall	Black Willow	G5	S4					*	x		x		
*	Salix pentandra L.	Laurel Willow	GNR	SNA				I		x				
	Salix petiolaris Sm.	Meadow Willow	G5	S5						x				
*	Salix purpurea L.	Basket Willow	G5	SNA				I	H	x				
*	Salix x fragilis L.	Hybrid White Willow	GNA	SNA				I		x		x		
*	Salix x sepulcralis Simonk.	Hybrid Willow	GNA	SNA				I	H	x				

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	Capparidaceae													
	Polanisia dodecandra L. DC.	Common Clammyweed	G5T5?	S4				H	*	x		x		
*	Tarenaya hassleriana (Chodat) Iltis	Pink-queen	GNR	SNA				I			x			
	Brassicaceae													
*	Alliaria petiolata (M. Bieb.) Cavara & Grande	Garlic Mustard	GNR	SNA				I		x				
*	Alyssum alyssoides L. L.	Pale Alyssum	GNR	SNA				I				x		
*	Arabidopsis thaliana L. Heynh.	Mouse-ear cress	GNR	SNA				I			x			
	Arabis pycnocarpa M. Hopkins var. pycnocarpa	Cream-flowered Rockcress	G5T5	S5				H		x				
	Arabis pycnocarpa var. adpressipilis M. Hopkins	Cream-flowered Rockcress	G5T4Q	S1				H	*	x				
*	Armoracia rusticana (Lam.) P. Gaertn., Meyer & Scherb.	Horseradish	GNR	SNA							x			
*	Aurinia saxatilis L. Desv.	Basket-of-gold	GNR	SNA						x				
*	Barbarea vulgaris R. Br.	Bitter Wintercress	GNR	SNA				I		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	*	x				
	Borodinia laevigata (Muhlenberg ex Willdenow) P.J. Alexander & Windham	Smooth Rockcress	G5	S5				h	N*	x				
*	Brassica juncea L. Czern.	Chinese Mustard	GNR	SNA				I		x	x			
*	Brassica napus L.	Rapeseed	GNR	SNA				I				x		
*	Brassica nigra L. Koch	Black Mustard	GNR	SNA				I		x				
*	Brassica rapa L.	Field Mustard	GNR	SNA				I		x		x		
*	Camelina microcarpa Andrz. ex DC.	Small-seed False-flax	GNR	SNA				I		x	x	x		
*	Camelina sativa L. Crantz	Large-seed False-flax	GNR	SNA				I		x				
*	Capsella bursa-pastoris L. Medik.	Common Shepherd's Purse	GNR	SNA						x	x	x		
	Cardamine concatenata (Michx.) Schwein.	Cut-leaved Toothwort	G5	S5						x				
	Cardamine diphylla (Michx.) Alph. Wood	Two-leaved Toothwort	G5	S5						x				
	Cardamine douglassii Britton	Limestone Bittercress	G5	S4						x				
*	Cardamine hirsuta L.	Hairy Bittercress	GNR	SNA				I	N		x			
*	Cardamine impatiens L.	Narrow-leaved Bittercress	GNR	SNA				I	N	x				
	Cardamine pensylvanica Muhlenb. ex Willd.	Pensylvania Bittercress	G5	S5						x				
*	Descurainia sophia L. Webb ex Prantl	Flixweed	GNR	SNA				I	N		x			
*	Diplotaxis muralis L. DC.	Stinking Wallrocket	GNR	SNA				I	H	x	x			
*	Diplotaxis tenuifolia L. DC.	Slim-leaf Wallrocket	GNR	SNA				I		x		x		
*	Draba verna L.	Spring Draba	GNR	SNA				I			x			
*	Eruca vesicaria L.	Garden Rocket	GNR	SNA				I			x			
*	Erucastrum gallicum (Willd.) O. Schulz	Common Dogmustard	G5	SNA				I				x		
*	Erysimum cheiranthoides L. ssp. cheiranthoides	Wormseed Wallflower	G5	SNA				I		x	x	x		
*	Hesperis matronalis L.	Dame's Rocket	G4G5	SNA				I		x				
*	Lepidium campestre L. R. Br.	Field Peppergrass	GNR	SNA				I		x	x	x		
*	Lepidium densiflorum Schrad.	Dense-flower Peppergrass	G5	SNA				I				x		

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*	Lepidium didymum L.	Wartcress	GNR	SNA				I	N		x			
*	Lepidium ruderale L.	Roadside Peppergrass	GNR	SNA				I				x		
	Lepidium virginicum L.	Poor-man's Peppergrass	G5	S5				h	*	x	x	x		
*	Lobularia maritima L. Desv.	Sweet Alyssum	GNR	SNA				I		x				
*	Nasturtium microphyllum (Boenn.) Reichb.	Small-leaved Watercress	GNR	SNA				I		x				
*	Nasturtium officinale R. Br.	Watercress	GNR	SNA						x				
	Rorippa palustris L. Besser ssp. hispida (Desv.) Jonsell	Hispid Marsh Yellowcress	G5T5	S5						x				
	Rorippa palustris L. Besser ssp. palustris	Marsh Yellowcress	G5T5	S5?						x				
*	Rorippa sylvestris L. Besser	Creeping Yellowcress	G5	SNA				I		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 loeselii L.	Loesel's Tumble Mustard	GNR	SNA				I				x		
*	Sisymbrium officinale L. Scop.	Common Tumble Mustard	GNR	SNA				I		x	x	x		
*	Thlaspi arvense L.	Field Penny-cress	GNR	SNA				I		x	x	x		
	Ericaceae													
	Gaultheria procumbens L.	Eastern Teaberry	G5	S5					*	x				
	Gaylussacia baccata (Wangenh.) K. Koch	Black Huckleberry	G5	S4				h	*	x				
	Vaccinium angustifolium Aiton	Late Lowbush Blueberry	G5	S5					*	x				
	Vaccinium pallidum Aiton	Early Lowbush Blueberry	G5	S4					*	x				
	Pyrolaceae													
	Pyrola chlorantha Sw.	Green-flowered Pyrola	G5	S4S5				H	X	x				
	Pyrola elliptica Nutt.	Shinleaf	G5	S5					*	x				
	Monotropaceae													
	Hypopitys monotropa Crantz	American Pinesap	G5	S4						x				
	Monotropa uniflora L.	Indian Pipe	G5	S5					*	x				
	Primulaceae													
*	Lysimachia arvensis (L.) U. Manns & Anderberg	Scarlet Pimpernel	GNR	SNA				I		x				
	Lysimachia borealis (Rafinesque) U. Manns & Anderberg	Northern Starflower	G5	S5					*	x				
	Lysimachia ciliata L.	Fringed Loosestrife	G5	S5						x				
*	Lysimachia nummularia L.	Creeping Jennie	GNR	SNA				I		x				
	Lysimachia quadriflora Sims	Four-flowered Loosestrife	G5?	S4						x				
	Lysimachia quadrifolia L.	Whorled Loosestrife	G5	S4				H	*	x				
	Lysimachia terrestris L. B.S.P.	Swamp Loosestrife	G5	S5				h	*	x				
	Lysimachia thyrsiflora L.	Water Loosestrife	G5	S5					*	x				
	Samolus parviflorus Raf.	Seaside Brookweed	G5T5	S4					*N	x				
	Hydrangeaceae													
*	Philadelphus pubescens Loisel.	Hoary Mock Orange	G5?	SNA				I		x				
	Grossulariaceae													

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	Ribes americanum Miller	Wild Black Currant	G5	S5						x				
*	Ribes aureum var. villosum D.C.	Buffalo Currant	G5T4T5	SNA				I				x		
	Ribes cynosbati L.	Prickly Gooseberry	G5	S5						x				
	Ribes hirtellum Michx.	Smooth Gooseberry	G5	S5				h	*	x				
	Ribes lacustre (Pers.) Poir.	Bristly Black Currant	G5	S5				H	*	x				
*	Ribes rubrum L.	European Red Currant	G4G5	SNA				I	*	x				
	Ribes triste Pall.	Swamp Red Currant	G5	S5					H	x				
	Crassulaceae													
*	Sedum acre L.	Mossy Stonecrop	GNR	SNA				I				x		
*	Sedum sarmentosum Bunge	Stringy Stonecrop	GNR	SNA				I			x			
	Saxifragaceae													
	Chrysosplenium americanum Schwein.	American Golden Saxifrage	G5	S5				h	*	x				
	Micranthes virginiensis (Michx) Small	Early Saxifrage	G5	S5						x				
	Mitella diphylla L.	Two-leaf Bishop's-cap	G5	S5					*	x				
	Parnassia glauca Raf.	Carolina Grass-of-parnassus	G5	S5				H	X	x				
	Penthorum sedoides L.	Ditch-stonecrop	G5	S5					*	x				
	Tiarella cordifolia L.	Heart-leaved Foam-flower	G5	S5					*	x				
	Rosaceae													
	Agrimonia gryposepala Wallr.	Hooked Agrimony	G5	S5						x				
	Agrimonia parviflora Aiton	Swamp Agrimony	G5	S4				H	*			x		
	Agrimonia pubescens Wallr.	Soft Agrimony	G5	S4				h	*	x				
	Agrimonia striata Michx.	Woodland Agrimony	G5	S4						x				
	Amelanchier alnifolia (Nutt.) Nutt. ex R. Roem.	Saskatoon	G5	S4?				H	*	x				
	Amelanchier arborea (Michx. f.) Fern.	Downy Serviceberry	G5	S5						x				
	Amelanchier laevis Wiegand	Smooth Serviceberry	G5	S5						x				
	Amelanchier sanguinea (Pursh) DC.	Round-leaved Serviceberry	G5	S5				h	*	x				
	Amelanchier x weigandii	Weigand's Serviceberry								x				
	Comarum palustre L.	Marsh Cinquefoil	G5	S5				H	*	x				
	Crataegus beata Sarg.	Dunbar's Hawthorn	G2G4	S1						x				
	Crataegus brainerdii Sarg.	Brainerd's Hawthorn	G5	S2				H		x				
	Crataegus calpodendron (Ehrh.) Medik.	Pear Hawthorn	G5	S4				h		x				
	Crataegus chrysocarpa Ashe	Fireberry Hawthorn	G5TNR	S5				h		x				
	Crataegus coccinea L. var. coccinea	Scarlet Hawthorn	GNR	S4				H		x				
	Crataegus coccinea var. fulleriana (Sargent) Kruschke	Fuller's Hawthorn	G5T3T5Q	S2?				H		x				
	Crataegus compacta Sarg.	Clustered Hawthorn	G5	S4				H		x				
	Crataegus crus-galli L.	Cockspur Hawthorn	G5	S5				H		x				
	Crataegus dodgei Ashe	Dodge's Hawthorn	G4	S4				h		x				
	Crataegus formosa Sarg.	Waxy-fruit Hawthorn	G2G3Q	S2				H		x				

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	Crataegus holmesiana Ashe	Holmes' Hawthorn	G5	S4S5				h		x				
	Crataegus macracantha Lodd.	Large-thorn Hawthorn	GNRTNR	SU				h		x				
	Crataegus macrosperma Ashe	Big-fruit Hawthorn	G5	S5						x				
	Crataegus magniflora Sargent	Shining-branch Hawthorn	G3G5	S3				H		x				
*	Crataegus monogyna Jacq.	English Hawthorn	G5	SNA				I		x				
	Crataegus populnea Ashe	Poplar Hawthorn	GNRQ	S4				H		x				
	Crataegus pruinosa (H.L. Wendland) K. Koch var. pruinosa	Matte-black Hawthorn	G2G4Q	S1S2						x				
	Crataegus pruinosa (Wendl. f.) K. Koch	Frosted Hawthorn	G5T5	S4S5				h		x				
	Crataegus pruinosa var. dissona (Sargent) Eggleston	Northern Hawthorn	G4G5	S3				H		x				
	Crataegus punctata Jacq.	Dotted Hawthorn	G5	S5						x				
	Crataegus scabrida Sargent	Rough Hawthorn	G5?	S3						x				
	Crataegus schuettei Ashe	Schuette's Hawthorn	G5?	S4				H		x				
	Crataegus succulenta Schrad. ex Link	Fleshy Hawthorn	G4G5	S5						x				
	Crataegus x disperma Ashe	Grand Hawthorn	GNR	SNA					?	x				
	Fragaria vesca L.	Woodland Strawberry	G5	S5						x		x		
	Fragaria virginiana Miller	Wild Strawberry	G5	S5						x		x		
	Geum aleppicum Jacq.	Yellow Avens	G5	S5						x				
	Geum canadense Jacq.	White Avens	G5	S5						x				
	Geum fragarioides (Michx.) Smedmark	Barren Strawberry	G5	S5					*	x				
	Geum laciniatum Murray	Rough Avens	G5	S4						x		x		
	Geum macrophyllum Willd.	Large-leaved Avens	G5	S5						x				
*	Geum urbanum L.	Wood Avens	G5	SNA				I	N	x		x		
*	Geum x catlingii J.-P. Bernard & Gaut.	Catling's Avens	GNA	SNA				I		x				
	Gillenia trifoliata (L.) Moench	Bowman's-root	G4G5	SX				H	X	x				
	Malus coronaria L. Miller	Sweet Crabapple	G5	S4					*	x		x		
*	Malus pumila Miller	Common Apple	G5	SNA				I		x		x		
	Physocarpus opulifolius L. Maxim.	Eastern Ninebark	GNR	S5						x				
	Potentilla anserina L. ssp. anserina	Common Silverweed	GNR	S5				h		x				
*	Potentilla argentea L.	Silvery Cinquefoil	GNR	SNA				I		x	x	x		
	Potentilla canadensis L.	Canada Cinquefoil	G5	S2?						x				
*	Potentilla inclinata Villars	Ashy Cinquefoil	GNR	SNA					H	x	x			
*	Potentilla indica (Andrews) Th. Wolf	Mock Strawberry	G5	SNA						x				
	Potentilla norvegica L.	Rough Cinquefoil	G5	S5				I		x		x		
*	Potentilla recta L.	Sulphur Cinquefoil	GNR	SNA				I		x		x		
	Potentilla simplex Michaux	Old-field Cinquefoil	G5	S5						x				
	Potentilla supina ssp. paradoxa (Nuttall) Sojak	Bushy Cinquefoil	G5	S4				H		x				
	Prunus americana Pursh	American Plum	G5	S4				h	*	x		x		
*	Prunus avium L. L.	Sweet Cherry	GNR	SNA				I		x				

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*	Prunus cerasus L.	Sour Cherry	GNR	SNA				I				x		
*	Prunus domestica L.	Damson Plum	GNR	SNA				I				x		
	Prunus nigra Aiton	Canada Plum	G4G5	S4					*	x		x		
	Prunus pensylvanica L. f.	Pin Cherry	G5	S5					*	x				
	Prunus serotina Ehrh.	Black Cherry	G5	S5						x				
*	Prunus spinosa L.	Blackthorn	G5	SNA				I				x		
	Prunus virginiana L.	Choke Cherry	G5	S5						x				
*	Pyrus communis L.	Common Pear	G5	SNA				I		x		x		
	Rosa acicularis Lindl. ssp. sayi (Schwein.) W. Lewis	Prickly Rose	G5	S5				H	*	x				
	Rosa blanda Aiton	Smooth Rose	G5	S5						x				
*	Rosa canina L.	Dog Rose	GNR	SNA				I		x				
	Rosa carolina L.	Carolina Rose	GNR	S4					*	x				
*	Rosa multiflora Thunb. ex Murray	Multiflora Rose	GNR	SNA				I		x				
	Rosa palustris Marshall	Swamp Rose	G5	S5					*	x				
*	Rosa rubiginosa L.	Sweetbrier Rose	GNR	SNA				I		x				
	Rubus allegheniensis Porter	Allegheny Blackberry	G5	S5						x				
	Rubus flagellaris Willd.	Northern Dewberry	G5	S4				h	*	x				
	Rubus hispidus L.	Bristly Dewberry	G5	S4				h	*	x				
*	Rubus idaeus L. ssp. idaeus	Common Red Raspberry	G5T5	SNA				I		x				
	Rubus idaeus L. ssp. strigosus (Michx.) Focke	Wild Red Raspberry	G5T5	S5						x				
	Rubus occidentalis L.	Black Raspberry	G5	S5						x				
	Rubus odoratus L.	Purple-flowering Raspberry	G5	S5						x				
	Rubus pensilvanicus Poir.	Pennsylvania Blackberry	G5	SU				H		x				
	Rubus pubescens Raf.	Dwarf Raspberry	G5	S5						x				
	Rubus setosus Bigelow	Bristly Blackberry	G5	S4				H	*	x				
*	Sorbus aucuparia L.	European Mountain-ash	G5	SNA				I		x				
	Sorbus decora (Sarg.) C.K. Schneid.	Northern Mountain-ash	G4G5	S5				H	*	x				
	Spiraea alba DuRoi var. alba	White Meadowsweet	G5T5	S5					*	x				
*	Spiraea x vanhouttei (Briot) Zabel	Hybrid Spiraea	GNA	SNA					H	x		x		
	Fabaceae													
	Amphicarpaea bracteata L. Fern.	American Hog-peanut	G5	S5						x				
	Apios americana Medik.	American Groundnut	G5	S5				h	*	x				
	Astragalus canadensis L.	Canadian Milk-vetch	G5	S4				H	*	x				
*	Colutea arborescens L.	Bladder Senna	GNR	SNA				I				x		
	Desmodium canadense L. DC.	Showy Tick-trefoil	G5	S4						x				
	Desmodium cuspidatum (Muhlenb. ex Willd.) DC. ex Louden var. cuspidatum	Large-bracted Tick-trefoil	G5	S3				H	*	x				
	Desmodium paniculatum (Linnaeus) de Candolle var. paniculatum	Narrow-leaved Tick-trefoil	G5	S4				H	*	x				
	Gleditsia triacanthos L.	Honey Locust	G5	S2				I	P	x				

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	Gymnocladus dioicus L. K. Koch	Kentucky Coffee-tree	G5	S2	THR	THR	THR	I		x				2017 (planted)
	Hylodesmum glutinosum (Muhlenb. Ex Willdenow) H. Ohashi & R.R. Mill	Large Tick-trefoil	G5	S4						x				
	Hylodesmum nudiflorum (L.) H. Ohashi & R.R. Mill	Bare-stemmed Tick-trefoil	G5	S4				H	*	x				
*	Lathyrus latifolius L.	Everlasting Pea	GNR	SNA				I		x				
	Lathyrus palustris L.	Vetchling Peavine	G5	S5				H	*	x				
	Lespedeza capitata Michx.	Round-head Bush-clover	G5	S4						x				
	Lespedeza hirta L. Hornem.	Hairy Bush-clover	G5	S4				h	*	x				
*	Lotus corniculatus L.	Garden Birds-foot Trefoil	GNR	SNA				I	N	x				
*	Medicago lupulina L.	Black Medic	GNR	SNA				I		x		x		
*	Medicago sativa L.	Alfalfa	GNR	SNA				I		x		x		
*	Melilotus albus Medik.	White Sweet-clover	G5	SNA				I		x		x		
*	Melilotus officinalis L. Pall.	Yellow Sweet Clover	GNR	SNA				I		x		x		
*	Robinia pseudoacacia L.	Black Locust	G5	SNA				I	H	x				
*	Securigera varia (L.) Lassen	Purple Crown-vetch	GNR	SNA				I	N	x	x			
	Strophostyles helvola L. Elliott	Trailing Wild Bean	G5	S4				H		x				
*	Trifolium arvense L.	Rabbit-foot Clover	GNR	SNA				I		x				
*	Trifolium aureum Pollich	Yellow Clover	GNR	SNA				I		x		x		
*	Trifolium campestre Schreb.	Low Hop Clover	GNR	SNA				I		x	x			
*	Trifolium hybridum L.	Alsike Clover	GNR	SNA				I		x		x		
*	Trifolium pratense L.	Red Clover	GNR	SNA				I		x		x		
*	Trifolium repens L.	White Clover	GNR	SNA				I		x		x		
	Vicia caroliniana Walter	Carolina Vetch	G5	S2?				H	H*	x				
*	Vicia cracca L.	Tufted Vetch	GNR	SNA				I		x		x		
*	Vicia sativa L	Common Vetch	GNR	SNA				I		x				
*	Vicia tetrasperma L. Schreb.	Slender Vetch	GNR	SNA				I		x				
*	Vicia villosa Roth	Hairy Vetch	G5	SNA				I		x		x		
	Elaeagnaceae													
*	Elaeagnus angustifolia L.	Russian Olive	GNR	SNA				I		x				
*	Elaeagnus umbellata Thunb.	Autum Olive	GNR	SNA				I		x				
	Haloragaceae													
	Myriophyllum sibiricum Kom.	Siberian Water-milfoil	G5	S5				H	H	x				
*	Myriophyllum spicatum L.	Eurasian Water-milfoil	GNR	SNA				I		x				
	Myriophyllum verticillatum L.	Whorled Water-milfoil	G5	S5				H	*	x				
	Lythraceae													
	Decodon verticillatus L. Elliott	Hairy Swamp Loosestrife	G5	S5				H	*	x				
	Lythrum alatum Pursh	Winged Loosestrife	G5	S3				H		x				
*	Lythrum salicaria L.	Purple Loosestrife	G5	SNA				I		x				

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	Onagraceae													
	Chamaenerion angustifolium L. Scop.	Fireweed	G5T5	S5?				h	*	x				
	Circaea alpina L.	Small Enchanter's Nightshade	G5	S5						x				
	Circaea canadensis (L.) Hill	Broad-leaved Enchanter's Nightshade	G5T5	S5						x				
	Epilobium ciliatum Raf. subsp. ciliatum	Northern Willowherb	G5	S5						x				
	Epilobium ciliatum subsp. glandulosum (Lehm.) Hoch & P.H. Raven	Glandular Willowherb								x				
	Epilobium coloratum Biehler	Purple-veined Willowherb	G5	S5						x				
*	Epilobium hirsutum L.	Hairy Willowherb	GNR	SNA				I		x				
	Epilobium leptophyllum Raf.	Linear-leaved Willowherb	G5	S5					*	x				
*	Epilobium parviflorum Schreb.	Small-flowered Willowherb	GNR	SNA				I	N	x				
	Ludwigia palustris L. Elliott	Marsh Seedbox	G5	S5					*	x				
	Oenothera biennis L.	Common Evening Primrose	G5	S5						x		x		
*	Oenothera filiformis (Small) W.L. Wagner & Hoch	Long-flower Gaura	G4G5	SNA				I		x	x			
	Oenothera parviflora L.	Small-flowered Evening Primrose	G4?	S5					*	x		x		
	Oenothera perennis L.	Perennial Evening Primrose	G5	S5					*	x				
	Oenothera pilosella Raf. ssp. pilosella	Meadow Evening Primrose	G5	S2				H	H	x				
	Oenothera villosa Thunb. ssp. villosa	Hairy Evening Primrose	G5T5?	S2?				H		x				
	Cornaceae													
	Cornus alternifolia L. f.	Alternate-leaf Dogwood	G5	S5						x				
	Cornus amomum Miller ssp. obliqua (Raf.) J.S. Wilson	Silky Dogwood	G5	S5						x				
	Cornus canadensis L.	Bunchberry	G5	S5				h		x				
	Cornus florida L.	Eastern Flowering Dogwood	G5	S2?	END	END	END	h	*	x				
	Cornus officinalis Torr. Ex Dur.	Japanese Cornelian Cherry								x				
	Cornus racemosa Lamarck	Grey Dogwood	G5	S5						x				
	Cornus rugosa Lam.	Round-leaved Dogwood	G5	S5						x				
	Cornus stolonifera Michx.	Red-osier Dogwood	G5	S5						x				
	Cornus x arnoldiana Rehder	Arnold's Dogwood								x				
	Santalaceae													
	Comandra umbellata L. Nutt.	Umbellate Bastard Toad-flax	G5	S5					*	x				
	Celastraceae													
*	Celastrus orbiculatus Thunb.	Oriental Bittersweet	GNR	SNA				I	P?	x				
	Celastrus scandens L.	Climbing Bittersweet	G5	S5					*	x				
	Euonymus atropurpurea Jacq.	Eastern Burning Bush	G5	S3				H	P?*	x				
*	Euonymus europaea L.	European Euonymus	GNR	SNA					N	x				
*	Euonymus fortunei (Turcz.) Hand.-Mazz.	Climbing Euonymus	GNR	SNA				I	N	x				
	Euonymus obovata Nutt.	Running Strawberry Bush	G5	S5					*	x				
	Euonymus planipes Koehne	Flat-stalked Spindle Tree							N	x				
	Aquifoliaceae													

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	Ilex verticillata L. A. Gray	Black Holly	G5	S5					*	x				
	Euphorbiaceae													
	Acalypha rhomboidea Raf.	Common Three-seed Mercury	G5	S5					*	x	x			
*	Euphorbia dentata Michx.	Toothed Spurge	G5	SNA				I				x		
*	Euphorbia glyptosperma Engelmann	Ridge-seed Spurge	G5	SNA				I				x		
*	Euphorbia helioscopia L.	Summer Spurge	G5	SNA				I		x		x		
*	Euphorbia maculata L.	Spotted Spurge	G5?	SNA				I		x		x		
*	Euphorbia marginata Pursh	Snow-on-the-mountain	G5	SNA				I		x	x			
	Euphorbia nutans Lagasca	Nodding Spurge	G5	S4S5				h	*		x	x		
*	Euphorbia peplus L.	Petty Spurge	GNR	SNA				I				x		
*	Euphorbia platyphyllos L.	Broad-leaf Spurge	GNR	SNA				I				x		
	Euphorbia vermiculata Raf.	Worm Seeded Spurge	G5	S5				H	H		x			
*	Mercurialis annua L.	Herb-mercury	GNR	SNA				I		x	x			
	Ricinus communis L.	Castor-oil Plant								x	x			
	Rhamnaceae													
	Ceanothus americanus L.	New Jersey Tea	G5	S4				h	*	x				
	Ceanothus herbaceus Raf.	Prairie Redroot	G5	S4				H		x				
*	Frangula alnus	Glossy Buckthorn	GNR	SNA				I		x				
*	Rhamnus cathartica L.	European Buckthorn	GNR	SNA				I		x		x		
	Vitaceae													
	Parthenocissus quinquefolia (L.) Planchon ex de Candolle	Virginia Creeper	G5	S5						x				
	Parthenocissus vitacea (Knerr) Hitchcock	Thicket Creeper	G5	S5						x				
	Vitis aestivalis Michx.	Summer Grape	G5	S4					*	x				
	Vitis riparia Michx.	Riverbank Grape	G5	S5						x		x		
	Linaceae													
*	Linum perenne L.	Blue Flax	GNR	SNA				I		x				
*	Linum usitatissimum L.	Common Flax	GNR	SNA				I		x		x		
	Polygalaceae													
	Polygala senega L.	Seneca Snakeroot	G4G5	S4				h	*	x				
	Polygala verticillata L.	Whorled Milkwort	G5	S3?				H	*	x	x			
	Staphyleaceae													
	Staphylea trifolia L.	American Bladdernut	G5	S4						x				
	Hippocastanaceae													
*	Aesculus hippocastanum L.	Horse Chestnut	GNR	SNA				I	N	x				
	Aceraceae													
*	Acer campestre L.	Hedge Maple	GNR	SNA					P	x				
	Acer negundo L.	Manitoba Maple	G5	S5						x		x		
	Acer nigrum F. Michaux	Black Maple	G5	S4?						x				

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*	Acer platanoides L.	Norway Maple	GNR	SNA				I	N	x		x		
	Acer rubrum L.	Red Maple	G5	S5						x				
	Acer saccharinum L.	Silver Maple	G5	S5						x				
	Acer saccharum Marshall	Sugar Maple	G5	S5						x				
	Acer spicatum Lam.	Mountain Maple	G5	S5						x				
	Acer x freemanii E. Murr.	Freeman's Maple	GNA	SNA						x				
	Anacardiaceae													
*	Cotinus coggygria Scop.	European Smoketree	GNR	SNA				I	N	x				
	Rhus typhina L.	Staghorn Sumac	G5	S5						x		x		
	Toxicodendron radicans L. Kuntze var. radicans	Eastern Poison-ivy	G5	S5						x				
	Toxicodendron radicans L. Kuntze var. rydbergii (Small ex Rydberg) A. Love & D. Love	Western Poison-ivy	G5	S5						x		x		
	Toxicodendron vernix L. Kuntze	Poison Sumac	G5	S4				H	X	x				
	Simaroubaceae													
*	Ailanthus altissima (Miller) Swingle	Tree-of-heaven	GNR	SNA				I				x		
	Rutaceae													
	Phellodendron amurense	Amur Corktree								x				
	Ptelea trifoliata L.	Common Hoptree	G5	S3	THR	SC	THR	I		x				2017 (planted)
	Zanthoxylum americanum Miller	Northern Prickly Ash	G5	S5						x				
	Oxalidaceae													
*	Oxalis corniculata L.	Creeping Wood-sorrel	GNR	SNA				I	N	x	x			
	Oxalis dillenii Jacq.	Slender Yellow Wood-sorrel	G5	S5?						x	x	x		
	Oxalis stricta L.	European Wood-sorrel	G5	S5						x				
	Geraniaceae													
*	Erodium cicutarium L. L'Hér.	Common Storksbill	GNR	SNA				I			x	x		
	Geranium maculatum L.	Spotted Geranium	G5	S5						x				
*	Geranium pusillum L.	Small-flower Geranium	GNR	SNA				I	N		x			
*	Geranium robertianum L.	Herb-Robert	G5	S5				I		x				
	Limnanthaceae													
	Floerkea proserpinacoides Willd.	False Mermaid	G5	S4	NAR	NAR		h	XP	x				
	Balsaminaceae													
	Impatiens capensis Meerb.	Spotted Jewel-weed	G5	S5						x				
	Impatiens pallida Nutt.	Pale Jewelweed	G5	S4						x				
	Araliaceae													
	Aralia nudicaulis L.	Wild Sarsaparilla	G5	S5						x				
	Aralia racemosa L.	American Spikenard	G4G5	S5					*	x				
	Aralia spinosa	Devil's Walking Stick								x				
*	Hedera helix L.	English Ivy	GNR	SNA				I		x				

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	RBG Status 2014	Cootes Paradise	Waste Places	Roadsides	Historical Record	Planted
	Panax trifolius L.	Dwarf Ginseng	G5	S4				H	XH	x				
	Apiaceae													
*	Aegopodium podagraria L.	Goutweed	GNR	SNA				I		x				
*	Anethum graveolens L.	Dill	GNR	SNA				I		x	x			
	Angelica atropurpurea L.	Great Angelica	G5	S5				h	*	x				
	Anthriscus caucalis M. Bieb	Burr Chevril										x		
	Cicuta bulbifera L.	Bulb-bearing Water-hemlock	G5	S5					*	x				
	Cicuta maculata L. var. maculata	Spotted Water-hemlock	G5T5	S5					*	x				
*	Conium maculatum L.	Poison-hemlock	G5	SNA				I		x	x			
	Cryptotaenia canadensis L. DC.	Canada Honewort	G5	S5						x				
*	Daucus carota L.	Wild Carrot	GNR	SNA				I		x				
*	Heracleum mantegazzianum Sommier & Levier	Giant Hogweed	GNR	SNA				I		x				
	Heracleum maximum W. Bartram	Cow-parsnip	G5	S5						x				
	Hydrocotyle americana L.	American Water-pennywort	G5	S5					XP	x				
	Osmorhiza claytonii (Michx.) C.B. Clarke	Hairy Sweet Cicely	G5	S5						x				
	Osmorhiza longistylis (Torr.) DC.	Smooth Sweet Cicely	G5	S5				h	*	x				
*	Pastinaca sativa L.	Wild Parsnip	GNR	SNA						x		x		
	Sanicula marilandica L.	Maryland Sanicle	G5	S5						x				
	Sanicula odorata (Raf.) Pryer & Phillippe	Clustered Sanicle	G5	S5				h	H	x				
	Sium suave Walter	Hemlock Water-parsnip	G5	S5						x				
	Taenidia integerrima L. Drude	Yellow Pimpernell	G5	S4				h		x				
*	Torilis japonica (Houtt.) DC.	Erect Hedge-parsley	GNR	SNA				I		x				
	Gentianaceae													
*	Centaurium pulchellum (Sw.) Druce	Branching Centaury	GNR	SNA				I		x				
	Frasera caroliniensis Walter	American Columbo	G5	S2	END	END	END	H		x				
	Gentiana andrewsii Griseb.	Bottle Gentian	G5?	S4					X	x				
	Gentianopsis crinita (Froel.) Ma	Fringed Gentian	G5	S5				H	X	x				
	Apocynaceae													
	Apocynum androsaemifolium L.	Spreading Dogbane	G5	S5						x				
	Apocynum cannabinum L. var. cannabinum	Hemp Dogbane	G5T5	S5						x				
	Apocynum cannabinum L. var. hypericifolium A. Gray	Clasping-leaved Indian Hemp	G5?	SU					H	x		x		
	Apocynum x floribundum Greene	Hybrid Dogbane	GNA	SNA						x				
*	Vinca minor L.	Periwinkle	GNR	SNA				I		x				
	Asclepiadaceae													
	Asclepias exaltata L.	Poke Milkweed	G5	S4					*	x				
	Asclepias incarnata L.	Swamp Milkweed	G5	S5						x				
	Asclepias syriaca L.	Common Milkweed	G5	S5						x		x		
	Asclepias tuberosa L.	Butterfly Milkweed	G5?	S4				h	*	x		x		

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*	Vincetoxicum nigrum L. Moench	Black Swallowwort	GNR	SNA				I		x	x			
*	Vincetoxicum rossicum (Kleopov) Borhidi	European Swallowwort	GNR	SNA				I		x				
	Solanaceae													
*	Datura stramonium L.	Jimson Weed	GU	SNA				I	N		x			
	Datura wrightii Miller	Western Jimson Weed								x	x			
*	Hyoscyamus albus Linnaeus	White Henbane	GNR	SNA						x	x			
*	Nicandra physalodes L. Gaertn.	Apple-of-Peru	GNR	SNA				I		x		x		
*	Nicotiana rustica L.	Wild Tobacco	GU	SNA						x	x			
	Petunia x atkinsiana (Sweet) D. Don ex W.H. Baxter	Common Garden Petunia									x			
*	Petunia x hybrida Hort.	Garden Petunia	GNA	SNA						x				
	Physalis heterophylla Nees	Clammy Ground-cherry	G5	S4						x		x		
*	Solanum dulcamara L.	Climbing Nightshade	GNR	SNA				I		x				
*	Solanum lycopersicum L.	Garden Tomato	GNR	SNA						x	x			
*	Solanum nigrum L.	Black Nightshade	GNR	SNA				I		x				
	Solanum ptychanthum Dunal ex DC.	Black Nightshade	G5	S5						x	x	x		
*	Solanum rostratum Dunal	Buffalo Bur	G5?	SNA						x	x			
	Convolvulaceae													
	Calystegia sepium L. R. Br.	Hedge False Bindweed	G5	S5						x				
*	Convolvulus arvensis L.	Field Bindweed	GNR	SNA				I		x	x	x		
	Cuscuta gronovii Willd. ex Schultz	Swamp Dodder	G5T5	S5?						x				
*	Ipomoea purpurea L. Roth	Common Morning Glory	GNR	SNA				I			x	x		
	Menyanthaceae													
	Nymphoides peltata (S.G. Gmelin) Kuntze	Yellow Floatingheart							N	x				
	Polemoniaceae													
	Phlox divaricata L.	Wild Blue Phlox	G5	S4					*	x				
*	Phlox subulata L. ssp. subulata	Mountain Phlox	G5	SNA				I	H	x		x		
	Hydrophyllaceae													
	Hydrophyllum virginianum L.	Virginia Waterleaf	G5	S5						x				
	Boraginaceae													
*	Anchusa arvensis L. M. Bieb.	Small Bugloss	GNR	SNA				I			x	x		
	Anchusa azurea Mill.	Italian Bugloss							N		x			
*	Anchusa officinalis L.	Common Bugloss	GNR	SNA								x		
*	Buglossoides arvensis L. I.M. Johnston	Corn-gromwell	GNR	SNA				I		x	x	x		
*	Cynoglossum officinale L.	Common Hound's-tongue	GNR	SNA				I		x	x	x		
*	Echium vulgare L.	Common Viper's-bugloss	GNR	SNA				I		x		x		
	Hackelia deflexa (Wahlenb.) Opiz	Northern Stickseed	G5	S5				H		x				
	Hackelia virginiana L. I.M. Johnston	Virginia Stickseed	G5	S5						x				
	Lappula squarrosa (Retz.) Dumort. ssp. squarrosa	Bristly Stickseed	GNR	SNA				I	H	x				

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*	Lithospermum officinale L.	European Gromwell	GNR	SNA				I		x				
*	Myosotis arvensis L. Hill	Rough Forget-me-not	GNR	SNA				I			x			
*	Myosotis discolor Pers.	Yellow-and-blue Forget-me-not	G5	SNA				I		x				
	Myosotis laxa Lehm.	Small Forget-me-not	G5	S5						x				
*	Myosotis scorpioides L.	True Forget-me-not	G5	SNA				I		x				
*	Myosotis stricta Link	Small-flowered Forget-me-not	GNR	SNA				I	N	x	x			
*	Myosotis sylvatica H. Hoffm.	Woodland Forget-me-not	G5	SNA				I		x		x		
	Myosotis verna Nutt.	Spring Forget-me-not	G5	S4?				H	N	x				
	Phrymaceae													
	Phryma leptostachya L.	Lopseed	G5	S4S5						x				
	Verbenaceae													
	Verbena bonariensis L.	Purple-top Vervain								x				
	Verbena hastata L.	Blue Vervain	G5	S5						x				
	Verbena incompta P.W. Michael	Common Clasping Vervain							N		x			
	Verbena stricta Vent.	Hoary Vervain	G5	S4						x				
	Verbena urticifolia L.	White Vervain	G5	S5						x				
	Lamiaceae													
	Agastache nepetoides L. Kuntze	Yellow Giant Hyssop	G5	S4				H	*	x				
*	Ballota nigra L. ssp. nigra	Black Horehound	GNR	SNA						x				
	Clinopodium vulgare L.	Field Basil	G5	S5						x				
	Collinsonia canadensis L.	Canada Horse-balm	G5	S4						x				
*	Glechoma hederacea L.	Ground Ivy	GNR	SNA				I		x	x	x		
	Hedeoma pulegioides L. Pers.	American Pennyroyal	G5	S4						x				
*	Lamium amplexicaule L.	Common Dead-nettle	GNR	SNA				I			x			
*	Lamium purpureum L.	Purple Dead-nettle	GNR	SNA				I	N	x				
*	Leonurus cardiaca L.	Common Motherwort	GNR	SNA				I		x	x	x		
	Lycopus americanus Muhlenb. ex Bartram	American Water-horehound	G5	S5						x				
	Lycopus asper Greene	Rough Water-horehound	G5	S4				H		x				
*	Lycopus europaeus L.	European Water-horehound	GNR	SNA				I		x				
	Lycopus uniflorus Michx.	Northern Water-horehound	G5	S5						x				
	Lycopus virginicus L.	Virginia Water-horehound	G5	S3				H	N	x				
*	Melissa officinalis L. ssp. officinalis	Lemon Balm	GNR	SNA				I		x				
*	Mentha aquatica Linnaeus	Aquatic Mint	GNA	SNA				I		x				
	Mentha arvensis L.	Field Mint	G5	S5						x				
	Mentha canadensis Linnaeus	Canada Mint	G5T5	S5						x				
*	Mentha spicata L.	Spearmint	GNR	SNA				I		x				
*	Mentha x piperita L.	Pepper Mint	GNA	SNA				I		x				
	Monarda fistulosa L. var. fistulosa	Wild Bergamot	G5T5?	S5						x		x		

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*	Nepeta cataria L.	Catnip	GNR	SNA				I		x	x	x		
*	Origanum vulgare L.	Wild Marjoram	GNR	SNA				I		x				
	Prunella vulgaris L. ssp. lanceolata (W.C. Barton) Hultén	Lance-leaved Self-heal	G5T5	S5						x		x		
*	Prunella vulgaris L. ssp. vulgaris	Common Self-heal	G5TU	SNA				I		x		x		
	Pycnanthemum incanum L. Michx.	Hoary Mountain-mint	G5	S1	END	END	END	H		x				2017 (planted)
	Pycnanthemum virginianum (L.) B.L. Robinson & Fernald	Virginia Mountain-mint	G5	S4				h		x				
*	Salvia pratensis L.	Meadow Sage	GNR	SNA				I				x		
*	Salvia reflexa Hornem.	Lance-leaved Sage	G5	SNA				I	N	x		x		
	Scutellaria galericulata L.	Hooded Skullcap	G5	S5				I	*	x				
	Scutellaria lateriflora L.	Mad Dog Skullcap	G5	S5					*	x				
	Stachys hispida Pursh	Hispid Hedge-nettle	G5T4Q	S4				H	*	x				
*	Stachys palustris L.	Marsh Hedge-nettle	G5	SNA				I		x		x		
	Teucrium canadense L. ssp. canadense	Canada Germander	G5T5	SU				h	*	x				
	Teucrium canadense L. ssp. viscidum (Piper) R.L. Taylor & Macbryde	Western Germander	GNR	SU				H	*	x				
	Callitrichaceae													
	Callitriche hermaphroditica L.	Autumnal Water-starwort	G5	S5				H	H	x				
	Plantaginaceae													
*	Plantago lanceolata L.	English Plantain	G5	SNA				I		x	x	x		
*	Plantago major L.	Common Plantain	G5	SNA				I		x	x	x		
	Plantago rugelii Decne.	Rugel's Plantain	G5	S5						x				
	Oleaceae													
	Fraxinus americana L.	White Ash	G5	S4						x		x		
	Fraxinus nigra Marshall	Black Ash	G5	S4						x				
	Fraxinus pennsylvanica Marshall	Green Ash	G5	S4						x				
	Fraxinus quadrangulata Michx.	Blue Ash	G5	S2?	THR	THR	SC			x				2017 (planted)
*	Ligustrum vulgare L.	European Privet	GNR	SNA				I		x				
	Syringa reticulata subsp. Pekinensis (Rupr.) P.S. Green & M.C. Chang	Peking Tree Lilac								x				
*	Syringa vulgaris L.	Common Lilac	GNR	SNA				I		x		x		
	Scrophulariaceae													
*	Antirrhinum majus L.	Garden Snapdragon	GNR	SNA				I			x			
	Aureolaria flava L. Farw.	Smooth Yellow False Foxglove	G5	S2?				H	*	x				
	Aureolaria pedicularia L. Raf.	Fern-leaved Yellow False Foxglove	G5	S2?				H	XP	x				
	Aureolaria virginica L. Pennell	Downy Yellow False Foxglove	G5	S1				H	H	x			historical	
	Castilleja coccinea L. Spreng.	Scarlet Indian-paintbrush	G5	S5				H	H	x				
*	Chaenorrhinum minus L. Lange	Dwarf Snapdragon	GNR	SNA				I		x		x		
	Chelone glabra L.	White Turtlehead	G5	S5						x				
*	Kickxia spuria L. Dumort.	Round-leaved Cancerwort	GNR	SNA				I		x				

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*	Linaria dalmatica (L.) Miller subsp. dalmatica	Dalmatian Toadflax	G5T5?	SNA				I				x		
*	Linaria vulgaris Miller	Butter-and-eggs	GNR	SNA				I		x		x		
	Lindernia dubia L.	Yellow-seed False Pimpernel	G5T5	S4				H		x				
	Melampyrum lineare Desr.	American Cow-wheat	G5	S4S5				H	*	x				
	Mimulus ringens L.	Square-stemmed Monkeyflower	G5	S5					*	x				
	Pedicularis canadensis L.	Canada Lousewort	G5	S5				h	*	x				
	Penstemon digitalis Nutt. ex Sims	Foxglove Beardtongue	G5	S4S5						x				
	Penstemon hirsutus L. Willd.	Hairy Beardtongue	G4	S4					*	x				
	Scrophularia marilandica L.	Carpenter's Square Figwort	G5	S4				h		x				
*	Verbascum blattaria L.	White Moth Mullein	GNR	SNA				I		x	x	x		
*	Verbascum nigrum L.	Black Mullein	GNR	SNA				I		x				
*	Verbascum phlomoides L.	Clasping-leaved Mullein	GNR	SNA						x	x			
	Verbascum phoeniceum L.	Purple Mullein							H	x				
*	Verbascum thapsus L.	Great Mullein	GNR	SNA				I		x		x		
	Veronica americana (Raf.) Schwein. ex Benth.	American Speedwell	G5	S5					*	x				
*	Veronica anagallis-aquatica L.	Water Speedwell	G5	SNA				I		x				
*	Veronica arvensis L.	Corn Speedwell	GNR	SNA				I		x	x	x		
*	Veronica austriaca L. ssp. teucrium L. D. Webb	Broad-leaved Speedwell	G5T3T5	SNA					H	x		x		
*	Veronica beccabunga L.	European Speedwell	GNR	SNA				I		x				
*	Veronica filiformis Sm.	Slender Speedwell	GNR	SNA				I		x				
*	Veronica longifolia L.	Long-leaved Speedwell	GNR	SNA				I	N	x				
*	Veronica officinalis L.	Common Speedwell	G5	SNA				I		x				
	Veronica peregrina L. ssp. peregrina	Purslane Speedwell	G5T5	S5				h	*	x	x	x		
*	Veronica persica Poir.	Bird's-eye Speedwell	GNR	SNA				I			x			
*	Veronica polita Fr.	Wayside Speedwell	GNR	SNA				I	N		x			
	Veronica scutellata L.	Marsh Speedwell	G5	S5					*	x				
*	Veronica serpyllifolia L.	Thyme-leaved Speedwell	G5	SNA				I		x	x			
	Orobanchaceae													
	Epifagus virginiana L. Barton	Beechdrops	G5	S5					*	x				
	Orobanche uniflora L.	One-flowered Broomrape	G5	S4				H	*	x				
	Bignoniaceae													
*	Catalpa ovata G. Don	Chinese Catalpa	GNR	SNA				I	H	x				
*	Catalpa speciosa Warder ex Engelm.	Northern Catalpa	G4?	SNA				I	N	x	x			
	Lentibulariaceae													
	Utricularia vulgaris L.	Greater Bladderwort	G5	S5				h	*	x				
	Campanulaceae													
	Campanula americana L.	Tall Bellflower	G5	S4				h	*	x				
	Campanula aparinoides Pursh	Marsh Bellflower	G5	S5				H	*	x				

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	Campanula gieseckeana Vest	Giesecke's Bellflower	G5	S5				h		x				
*	Campanula persicifolia L.	Peach-leaf Bellflower	GNR	SNA						x				
*	Campanula rapunculoides L.	Creeping Bellflower	GNR	SNA				I		x				
	Campanula rotundifolia L.	Harebell	GNR	SNA				h		x				
	Lobelia inflata L.	Indian-tobacco	G5	S5						x				
	Lobelia kalmii L.	Kalm's Lobelia	G5	S5				H	H	x				
	Lobelia siphilitica L.	Great Blue Lobelia	G5	S5						x				
	Lobelia spicata Lam.	Pale-spiked Lobelia	G5	S4				h	*	x				
	Rubiaceae													
	Cephalanthus occidentalis L.	Buttonbush	G5	S5					*	x				
	Galium aparine L.	Cleavers	G5	S5						x				
	Galium asprellum Michx.	Rough Bedstraw	G5	S5						x				
	Galium boreale L.	Northern Bedstraw	G5	S5						x				
	Galium circaezans Michx.	Wild Licorice	G5	S5						x				
	Galium lanceolatum Torr.	Lanceleaf Wild Licorice	G5	S5				h	*	x				
*	Galium mollugo L.	Smooth Bedstraw	GNR	SNA				I		x		x		
	Galium palustre L.	Marsh Bedstraw	G5	S5					*	x				
	Galium tinctorium L.	Stiff Marsh Bedstraw	G5	S5					*	x				
	Galium trifidum L.	Three-petalled Bedstraw	G5	S5						x				
	Galium triflorum Michx.	Three-flowered Bedstraw	G5	S5						x				
	Galium verum L.	Yellow Bedstraw	GNR	SNA				I		x				
	Mitchella repens L.	Partridge-berry	G5	S5					*	x				
	Caprifoliaceae													
	Diervilla lonicera Miller	Northern Bush-honeysuckle	G5	S5						x				
	Lonicera canadensis Bartram	Canada Fly-honeysuckle	G5	S5						x				
	Lonicera dioica L.	Limber Honeysuckle	G5	S5						x				
*	Lonicera maackii (Rupr.) Maxim.	Amur Honeysuckle	GNR	SNA				I	N	x				
*	Lonicera morrowii A. Gray	Morrow Honeysuckle	GNR	SNA				I		x				
*	Lonicera tatarica L.	Tartarian Honeysuckle	GNR	SNA				I		x				
*	Lonicera x bella Zabel	Hybrid Honeysuckle	GNA	SNA				I		x				
*	Lonicera xylosteum L.	Dwarf Honeysuckle	GNR	SNA				I		x				
	Sambucus canadensis L.	Common Elderberry	G5T5	S5						x				
	Sambucus racemosa L. (Michx.)	Red Elderberry	G5	S5						x				
	Symphoricarpos albus (Linnaeus) S.F. Blake var. albus	Snowberry	G5T5	S5						x		x		
	Triosteum aurantiacum E.P. Bicknell	Orange-fruited Horse-gentian	G5	S4S5					*	x				
	Viburnum acerifolium L.	Maple-leaved Viburnum	G5	S5						x				
*	Viburnum lantana L.	Wayfaring Tree	GNR	SNA				I	N	x				
	Viburnum lentago L.	Nannyberry	G5	S5						x				

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*	Viburnum opulus L. ssp. opulus	Cranberry Viburnum	GNR	SNA				I		x				
	Viburnum opulus ssp. trilobum	Highbush Cranberry	GNR	S5					XP*	x				
	Viburnum rafinesquianum Schult.	Downy Arrowwood	G5	S5					*	x				
	Viburnum recognitum Fern	Southern Arrowwood	G4G5	S4					*	x				
	Valerianaceae													
*	Valeriana officinalis L.	Common Valerian	GNR	SNA				I		x				
	Dipsacaceae													
*	Dipsacus fullonum L.	Common Teasel	GNR	SNA				I		x		x		
	Asteraceae													
	Achillea borealis Bongard var. borealis	Woolly Yarrow	GNR	S5						x		x		
*	Achillea millefolium L.	Common Yarrow	G5	SNA				I		x		x		
	Ageratina altissima L. R.M. King & H. Robinson	White Snakeroot	G5	S5						x				
	Ambrosia artemisiifolia L.	Annual Ragweed	G5	S5						x		x		
	Ambrosia trifida L.	Great Ragweed	G5	S5				h		x		x		
	Antennaria howellii Greene ssp. canadensis (Greene) R.J. Bayer	Canadian Pussytoes	G5T5?	S4S5				H				x		
	Antennaria howellii Greene ssp. neodioica (Greene) R.J. Bayer	Northern Pussytoes	G5T5	S5?				H		x		x		
	Antennaria neglecta Greene	Field Pussytoes	G5	S5						x		x		
	Antennaria parlinii Fern. ssp. fallax (E. Greene) R.J. Bayer & Stebb.	Deceitful Pussytoes	G5T4T5	S5						x				
*	Anthemis arvensis L.	Corn Camomile	GNR	SNA				I		x				
*	Anthemis cotula L.	Stinking Chamomile	G5	SNA				I		x				
*	Arctium lappa L.	Greater Burdock	GNR	SNA				I		x				
*	Arctium minus (Hill) Bernh.	Common Burdock	GNR	SNA				I		x		x		
*	Artemisia absinthium L.	Absinthe Wormwood	GNR	SNA				I		x	x			
*	Artemisia annua L.	Annual Wormwood	GNR	SNA						x	x			
*	Artemisia biennis Willd.	Biennial Wormwood	G5	SNA				I		x		x		
	Artemisia ludoviciana Nutt.	Silver Wormwood	G5	SU								x		
*	Artemisia vulgaris L.	Common Wormwood	GU	SNA				I	N	x	x			
*	Bellis perennis L.	Lawn Daisy	GNR	SNA				I				x		
	Bidens beckii Torrey ex Sprengel	Water-marigold	G4G5	S5				H	X	x				
	Bidens cernua L.	Nodding Beggarticks	G5	S5						x		x		
	Bidens discoidea (Torr. & A. Gray) Britton	Small Beggarticks	G5	S4				H		x				
	Bidens frondosa L.	Devil's Beggarticks	G5	S5						x				
	Bidens tripartita L.	Three-parted Beggarticks	GNR	S5						x				
	Bidens vulgata Greene	Tall Beggarticks	G5	S5						x				
*	Carduus nutans L. ssp. leiophyllus (Petrovic) Stoy. & Stef.	Smooth-leaved Nodding Thistle	GNRTNR	SNA						x				
*	Centaurea cyanus L.	Bachelor's Button	GNR	SNA				I				x		
*	Centaurea jacea L.	Brown Knapweed	GNR	SNA				I		x	x			
*	Centaurea nigra L.	Black Knapweed	GNR	SNA				I		x	x			

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*	Centaurea nigrescens Willd. ssp. nigrescens	Short-fringed Knapweed	GNR	SNA				I		x				
*	Centaurea stoebe subsp. micranthos (S. G. Gmelin ex Gugler) Hayek	Spotted Knapweed	GNR	SNA				I		x	x			
*	Cichorium intybus L.	Chicory	GNR	SNA				I		x		x		
*	Cirsium arvense L. Scop.	Canada Thistle	GNR	SNA				I		x		x		
	Cirsium discolor (Muhlenb. ex Willd.) Spreng.	Field Thistle	G5	S3				H		x				
*	Cirsium vulgare (Savi) Ten.	Bull Thistle	GNR	SNA				I		x		x		
	Coreopsis lanceolata L.	Lance-leaved Tickseed	G5	S4?				I		x				
	Cosmos sulphureus Cav.	Sulphur Cosmos									x			
*	Cota tinctoria L. J. Gay1	Golden Camomile	GNR	SNA				I				x		
*	Crepis tectorum L.	Narrow-leaf Hawksbeard	GNR	SNA				I			x			
*	Cyclachaena xanthiifolia (Nuttall) Fresenius	False Ragweed	G5	SNA				I		x	x			
	Doellingeria umbellata Miller var. umbellata	Flat-top White Aster	G5T5	S5				H		x				
	Echinacea pallida (Nutt.) Nutt.	Pale Purple Coneflower	G4	S1						x				
	Erechtites hieracifolia L. Raf. ex DC.	Eastern Burnweed	G5	S5				h		x				
	Erigeron annuus L. Pers.	Annual Fleabane	G5	S5						x		x		
	Erigeron canadensis L.	Canada Horseweed	G5	S5						x	x	x		
	Erigeron philadelphicus L.	Philadelphia Fleabane	G5	S5						x		x		
	Erigeron pulchellus Michx.	Robin's Plantain	G5	S5					*	x		x		
	Erigeron strigosus Muhlenb. ex Willd.	Rough Fleabane	G5	S5						x		x		
	Eupatorium altissimum L.	Tall Boneset	G5	S1				I	N	x				
	Eupatorium perfoliatum L.	Common Boneset	G5	S5						x				
	Eurybia divaricata L. Nesom	White Wood Aster	G5	S2S3	THR	THR	THR	H	XH	x			1955 (historical)	2017 (planted)
	Eurybia macrophylla L. Cass in Cuvier	Large-leaved Aster	G5	S5						x				
	Eurybia schreberi (Nees) Nees	Schreber's Aster	G4	S2				H	XP*	x				
	Euthamia graminifolia L. Nutt.	Grass-leaved Goldenrod	G5	S5						x		x		
	Eutrochium maculatum L. E.E. Lammont var. maculatum	Spotted Joe Pye Weed	G5T5	S5						x				
	Eutrochium purpureum L. E.E. Lamont	Purple Joe Pye Weed	G5	S4				H		x				
*	Gaillardia aristata Pursh	Great Blanket-flower	G5	SNA				I				x		
*	Galinsoga parviflora Cav.	Small-flower Quickweed	GNR	SNA				I	N	x				
*	Galinsoga quadriradiata Rúiz, Lopez & Pavón	Hairy Galinsoga	GNR	SNA				I		x	x	x		
*	Gnaphalium uliginosum L.	Low Cudweed	G5	SNA				I		x				
*	Helianthus annuus L. ssp. annuus	Common Sunflower	G5	SNA						x				
	Helianthus decapetalus L.	Thin-leaved Sunflower	G5	S5				H	*	x				
	Helianthus divaricatus L.	Woodland Sunflower	G5	S5				h		x				
	Helianthus giganteus L.	Tall Sunflower	G5	S5				H		x				
*	Helianthus petiolaris Nutt. ssp. petiolaris	Prairie Sunflower	G5	SNA				I		x				
	Helianthus strumosus L.	Pale-leaf Sunflower	G5	S5				h	*	x		x		
	Helianthus tuberosus L.	Jerusalem Artichoke	G5	SU				I				x		

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	Heliopsis helianthoides L. Sweet	False Sunflower	G5	S5				H	H	x				
*	Hieracium murorum L.	Wall Hawkweed	GNR	SNA				I				x		
	Hieracium paniculatum L.	Panicled Hawkweed	G5	S2				H	*	x				
*	Hieracium umbellatum L.	Umbellate Hawkweed	G5	S4S5				H		x				
*	Inula helenium L.	Elecampane	GNR	SNA				I		x				
*	Jacobaea vulgaris Gaertner	Tansy Ragwort	GNR	SNA				I				x		
	Lactuca biennis (Moench) Fern.	Tall Blue Lettuce	G5	S5				h		x				
	Lactuca canadensis L.	Canada Lettuce	G5	S5						x		x		
*	Lactuca serriola L.	Prickly Lettuce	GNR	SNA				I		x		x		
*	Lapsana communis L.	Common Nipplewort	GNR	SNA				I		x				
*	Leucanthemum vulgare Lamarck	Oxeye Daisy	GNR	SNA				I		x		x		
	Liatris spicata L. Willd.	Dense Blazing Star	G5	S2	THR	THR	THR			x				2009 (planted)
*	Matricaria chamomilla L.	German Mayweed	GNR	SNA				I			x	x		
*	Matricaria discoidea de Candolle	Pineappleweed	G5	SNA				I			x			
	Nabalus alatus (L.) Hooker	White Rattlesnakeroot	G5	S5					*	x	x			
	Nabalus altissimus (L.) Hooker	Tall Rattlesnakeroot	G5?	S5						x				
*	Onopordum acanthium L.	Scotch Thistle	GNR	SNA				I				x		
*	Picris hieracioides L. ssp. hieracioides	Hawkweed Oxtongue	G5	SNA				I		x				
*	Pilosella aurantiaca (L.) F.W. Shultz & Schultz Bipontinus	Orange Hawkweed	GNR	SNA				I		x		x		
*	Pilosella caespitosa (Dumortier) P.D. Sell & C. West	Meadow Hawkweed	GNR	SNA				I		x	x	x		
*	Pilosella piloselloides (Villars) Soják ssp. Piloselloides	Tall Hawkweed	GNR	SNA				I		x				
*	Pilosella piloselloides ssp. praealta (Gochnat) S. Bräutigam & Greuter	King Devil Hawkweed	GNR	SNA				I		x		x		
	Pseudognaphalium obtusifolium (L.) Hilliard & B.L. Burtt	Fragrant Cudweed	G5	S5				H	*	x				
	Ratibida pinnata (Vent.) Barnhart	Gray-headed Coneflower	G5	S3						x				
	Rudbeckia hirta L.	Black-eyed Susan	G5	S5						x		x		
	Rudbeckia laciniata L.	Cut-leaved Coneflower	G5	S5				h	*	x				
*	Rudbeckia triloba L.	Brown-eyed Susan	G5	SNA				I				x		
*	Scorzoneroides autumnalis (L.) Moench	Autumn Hawkbit	GNR	SNA					H		x			
*	Senecio viscosus L.	Sticky Groundsel	GNR	SNA				I		x				
*	Senecio vulgaris L.	Common Ragwort	GNR	SNA				I		x	x	x		
	Solidago altissima L. var. altissima	Tall Goldenrod	G5T5	S5						x				
	Solidago arguta Aiton var. arguta	Cut-leaved Goldenrod	G5	S4				H	*	x				
	Solidago bicolor L.	White Goldenrod	G5	S4?				h	*	x				
	Solidago caesia L.	Blue-stemmed Goldenrod	G5	S5						x				
	Solidago caesia L. x Solidago canadensis L.	Hybrid Goldenrod								x				
	Solidago canadensis L. var. canadensis	Canada Goldenrod	G5T5	S5						x		x		
	Solidago flexicaulis L.	Zigzag Goldenrod	G5	S5						x				
	Solidago gigantea Aiton	Smooth Goldenrod	G5	S5						x		x		

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	Solidago hispida Muhlenb. Ex Willd.	Hairy Goldenrod	G5	S5				h	*	x				
	Solidago juncea Aiton	Early Goldenrod	G5	S5						x		x		
	Solidago nemoralis Aiton ssp. nemoralis	Gray-stemmed Goldenrod	G5T5	S5						x		x		
	Solidago patula Muhlenb. ex Willd.	Northern Round-leved Goldenrod	G5	S5						x				
	Solidago ptarmicoides (Nees) B. Boivin	Upland White Goldenrod	G5	S5				H		x				
	Solidago rigida L.	Stiff-leaved Goldenrod	G5T5	S3				H		x		x		
	Solidago rugosa Miller ssp. rugosa	Northern Rough-leaved Goldenrod	G5T5	S5					H	x				
	Solidago squarrosa Muhlenb. ex Nutt.	Squarrose Goldenrod	G4?	S4				H	X	x				
*	Sonchus arvensis L. ssp. arvensis	Field Sow-thistle	GNRTNR	SNA				I		x		x		
*	Sonchus asper L. Hill ssp. asper	Prickly Sow-thistle	GNR	SNA				I		x		x		
*	Sonchus oleraceus L.	Common Sow-thistle	GNR	SNA				I		x				
	Symphyotrichum ciliolatum (Lindl. in Hook) Löve & Löve	Lindley's Aster	G5	S5				H	H	x				
	Symphyotrichum cordifolium L. Nesom	Heart-leaved Aster	G5	S5						x				
	Symphyotrichum ericoides L. Nesom var. ericoides	White Heath Aster	G5T5	S5						x		x		
	Symphyotrichum laeve L. Löve & Löve var. laeve	Smooth Aster	G5T5	S5						x				
	Symphyotrichum lanceolatum (Willd.) G.L. Nesom	White Panicled Aster	G5T5	S5						x				
	Symphyotrichum lateriflorum (L.F) Löve & Löve	Calico Aster	G5	S5						x		x		
	Symphyotrichum lateriflorum var. hirsuticaule (Lindley ex De Candolle) G.L. Nesom	Rough-stemmed Calico Aster	GNR	S2?						x				
	Symphyotrichum novae-angliae L. Nesom	New England Aster	G5	S5						x		x		
	Symphyotrichum oolentangiense (Riddell) Nesom	Sky-blue Aster	G5	S4						x		x		
	Symphyotrichum pilosum (Willd.) Nesom var. pilosum	Old Field Aster	G5T5	S5						x				
	Symphyotrichum puniceum L. Love & Love	Purple-stemmed Aster	G5	S5					*	x				
	Symphyotrichum urophyllum (Lindl. in DC.) Nesom	Arrow-leaved Aster	G4G5	S4						x				
	Symphyotrichum x amethystinum (Nutt.) Nesom	Amethyst Aster	GNA	SNA						x				
*	Tanacetum parthenium L. Schultz-Bip.	Common Feverfew	GNR	SNA						x				
*	Tanacetum vulgare L.	Common Tansy	GNR	SNA				I		x		x		
*	Taraxacum erythrospermum Andrz. ex Besser	Red-seeded Dandelion	GNR	SNA				I		x		x		
*	Taraxacum officinale G. Weber	Common Dandelion	G5	SNA						x	x	x		
*	Taraxacum palustre (Lyons) Symons	Marsh Dandelion	GNR	SNA				I			x			
*	Tragopogon dubius Scop.	Meadow Goat's-beard	GNR	SNA				I				x		
*	Tragopogon porrifolius L.	Purple Goat's-beard	GNR	SNA				I				x		
*	Tragopogon pratensis L.	Meadow Goat's-beard	GNR	SNA				I		x		x		
*	Tripleurospermum inodorum (L.) Schultz-Bipontinus	Scentless Chamomile	GNR	SNA				I			x	x		
*	Tussilago farfara L.	Colt's-foot	GNR	SNA				I		x				
	Xanthium strumarium L.	Rough Cocklebur	G5	S5						x				
	Butomaceae													
*	Butomus umbellatus L.	Flowering-rush	G5	SNA				I	N	x				
	Alismataceae													

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	Alisma plantago-aquatica L.	European Water-plantain	G5	S5						x				
	Alisma triviale Pursh	Northern Water-plantain	G5	S5						x				
	Pursh													
	Sagittaria cuneata E. Sheld.	Northern Arrowhead	G5	S5				H	H	x				
	Sagittaria latifolia Willd.	Broad-leaved Arrowhead	G5	S5						x				
	Hydrocharitaceae													
	Elodea canadensis Rich. ex Michx.	Broad Waterweed	G5	S5						x				
	Vallisneria americana Michx.	Eel-grass	G5	S5				H	*	x				
	Asteraceae													
	Pilosella x floribunda	King-devil Hawkweed										x		
	Potamogetonaceae													
	Potamogeton berchtoldii Fieber	Berchtold's Pondweed							*	x				
*	Potamogeton crispus L.	Curly-leaved Pondweed	G5	SNA				I		x	x			
	Potamogeton foliosus Raf.	Leafy Pondweed	G5	S5				H	?	x				
	Potamogeton friesii Rupr.	Fries' Pondweed	G4	S4				H	H	x				
	Potamogeton natans L.	Floating Pondweed	G5	S5						x				
	Potamogeton nodosus Poir.	Long-leaved Pondweed	G5	S5				H		x				
	Potamogeton perfoliatus L.	Clasping-leaf Pondweed	G5	S4				H		x				
	Potamogeton pusillus L. ssp. pusillus	Small Pondweed	G5T5	SU					?	x				
	Potamogeton strictifolius A. Bennett	Straight-leaved Pondweed	G5	S4				H		x				
	Potamogeton zosteriformis Fern.	Flatstem Pondweed	G5	S5				H		x				
	Stuckenia pectinata (Linnaeus) Börner	Clasping-leaved Pondweed	G5	S5						x				
	Najadaceae													
	Najas flexilis (Willd.) Rost. & W. Schmidt	Slender Naiad	G5	S5				H	X	x				
*	Najas minor All.	Brittle Naiad	GNR	SNA				I	N	x				
	Zannichelliaceae													
	Zannichellia palustris L.	Horned Pondweed	G5	S4				H	*	x				
	Araceae													
	Acorus americanus (Raf.) Raf.	American Sweetflag	G5	S4				H	*	x				
*	Acorus calamus L.	European Sweetflag	G4?	SNA						x				
	Arisaema triphyllum L. Schott	Jack-in-the-pulpit	G5	S5						x				
	Calla palustris L.	Wild Calla	G5	S5						x				
	Peltandra virginica L. Schott & Endl. ssp. virginica	Green Arrow Arum	G5	S3				H	?*	x				
	Symplocarpus foetidus L. Salisb. ex Nutt.	Skunk Cabbage	G5	S5						x				
	Lemnaceae													
	Lemna minor L.	Lesser Duckweed	G5	S5						x				
	Lemna trisulca L.	Star Duckweed	G5	S5					*	x				
	Spirodela polyrhiza L. Schleid.	Greater Duckweed	G5	S5					*	x				

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	Wolffia arrhiza (L.) Horkel x Wimmer	Spotless Duckweed								x				
	Wolffia borealis (Engelmann) Landolt & Wildi ex Gandhi, Wiersema & Brouillet	Northern Watermeal	G5	S4S5				H	*	x				
	Wolffia columbiana H. Karst.	Columbia Watermeal	G5	S4S5				H	*	x				
	Commelinaceae													
*	Commelina communis L.	Asiatic Dayflower	G5	SNA								x		
	Tradescantia ohiensis Raf.	Ohio Spiderwort	G5	S2						x				
*	Tradescantia virginiana L.	Virginia Spiderwort	G5	SNA				I		x		x		
	Juncaceae													
	Juncus articulatus L.	Jointed Rush	G5	S5						x				
	Juncus bufonius L.	Toad Rush	GNR	S5					*	x		x		
	Juncus canadensis J. Gay ex Laharpe	Canada Rush	G5	S5				H		x				
*	Juncus compressus Jacq.	Flattened Rush	G5	SNA				I		x				
	Juncus dudleyi Wiegelb	Dudley's Rush	G5	S5						x		x		
*	Juncus effusus Linnaeus subsp. Effusus	Soft Rush	GNR	SNA						x				
	Juncus effusus Linnaeus subsp. solutus	Common Rush								x				
*	Juncus gerardii Loisel.	Blackgrass Rush	G5	SNA				I	N	x		x		
	Juncus nodosus L.	Knotted Rush	G5	S5				H		x				
	Juncus tenuis Willd.	Path Rush	G5	S5						x		x		
	Juncus torreyi Coville	Torrey's Rush	G5	S5						x		x		
	Luzula acuminata Raf.	Hairy Woodrush	G5	S5						x				
	Luzula multiflora (Retz.) Lej. ssp. multiflora	Many-flowered Woodrush	G5T5	S5						x				
	Cyperaceae													
	Bolboschoenus fluviatilis (Torrey) Soják	River Bulrush	G5	S4S5				H	N	x				
	Carex albicans Willd. ex Spreng. var. albicans	White-tinged Sedge	G5T4T5	S3				H	*	x				
	Carex albicans Willd. ex Spreng. var. emmonsii (Dewey ex Torr.) J. Retting	Emmons' Sedge	G5T5	S2						x				
	Carex albursina E. Sheld.	White Bear Sedge	G5	S5						x				
	Carex alopecoidea Tuckerm.	Foxtail Sedge	G5	S5				h	*	x				
	Carex aquatilis Wahlenb.	Water Sedge	G5T5	S5				h	*	x				
	Carex arctata Boott	Drooping Woodland Sedge	G5	S5						x				
	Carex atherodes Spreng.	Wheat Sedge	G5	S4S5				H	*	x				
	Carex aurea Nutt.	Golden Sedge	G5	S5					*	x		x		
	Carex bebbii (L.H. Bailey) Olney ex Fern.	Bebb's Sedge	G5	S5						x				
	Carex blanda Dewey	Woodland Sedge	G5?	S5						x				
	Carex cephaloidea (Dewey) Dewey	Thin-leaved Sedge	G5	S5				H		x				
	Carex cephalophora Muhlenb. ex Willd.	Oval-headed Sedge	G5	S5					*	x				
	Carex communis L.H. Bailey	Fibrous-root Sedge	G5	S5						x				
	Carex comosa Boott	Bearded Sedge	G5	S5					*	x				

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	Carex crinita Lam.	Fringed Sedge	G5	S5					*	x				
	Carex cristatella Britton	Crested Sedge	G5	S5						x				
	Carex deweyana Schwein.	Dewey's Sedge	G5	S5					*	x				
	Carex diandra Schrank	Lesser Panicled Sedge	G5	S5				H	*	x				
	Carex digitalis Willd.	Slender Wood Sedge	G5	S4S5						x				
	Carex gracillima Schwein.	Graceful Sedge	G5	S5						x				
	Carex granularis Muhlenb. ex Willd.	Limestone Meadow Sedge	G5	S5					*	x				
	Carex grisea Wahlenb.	Grey Sedge	G5?	S4				h		x				
	Carex hystericina Muhlenb. ex Willd.	Porcupine Sedge	G5	S5						x				
	Carex interior L.H. Bailey	Inland Sedge	G5	S5				h	*	x				
	Carex jamesii Schwein.	James' Sedge	G5	S4				H	N	x				
	Carex lacustris Willd.	Lake Sedge	G5	S5						x				
	Carex laevivaginata (Kükenth.) Mack.	Smooth-sheath Sedge	G5	S4				h		x				
	Carex laxiculmis Schwein.	Spreading Sedge	G5T3T5	S4?					*	x				
	Carex laxiflora Lam.	Loose-flowered Sedge	G5	S5						x				
	Carex leptalea Wahlenberg	Bristle-stalked Sedge	G5	S5					N*	x				
	Carex leptonervia (Fern.) Fern.	Finely-nerved Sedge	G4	S4						x				
	Carex lupulina Muhlenb. ex Willd.	Hop Sedge	G5	S5					*	x				
	Carex molesta Mack.	Troublesome Sedge	G4	S4?					*			x		
	Carex normalis Mack.	Larger Straw Sedge	G5	S4				h		x				
	Carex pedunculata Muhlenb. ex Willd.	Long-stalk Sedge	G5	S5						x				
	Carex pellita Willd.	Woolly Sedge	G5	S5						x				
	Carex pensylvanica Lam.	Pennsylvania Sedge	G5	S5						x				
	Carex plantaginea Lam.	Plantain-leaved Sedge	G5	S5						x				
	Carex platyphylla J. Carey	Broad-leaved Sedge	G5	S5						x				
	Carex prasina Wahlenb.	Drooping Sedge	G4	S4				h	*	x				
	Carex pseudocyperus L.	Cyperus-like Sedge	G5	S5						x				
	Carex radiata (Wahlenb.) Small	Eastern Star Sedge	G4	S4						x				
	Carex retrorsa Schwein.	Retrorse Sedge	G5	S5						x				
	Carex rosea Schkuhr ex Willd.	Rosy Sedge	G5	S5						x				
	Carex scabrata Schwein.	Rough Sedge	G5	S5				h	*	x				
	Carex scoparia Schkuhr ex Willd.	Pointed Broom Sedge	G5	S5				h		x				
	Carex sparganioides Muhlenb. ex Willd.	Burreed Sedge	G5	S5						x				
*	Carex spicata Hudson	Spiked Sedge	GNR	SNA				I		x				
	Carex stipata Muhlenb. ex Willd.	Awl-fruited Sedge	G5	S5						x				
	Carex stricta Lam.	Tussock Sedge	G5	S5						x				
	Carex tenera Dewey	Tender Sedge	G5	S5						x		x		
	Carex umbellata Schkuhr ex Willd.	Umbellate Sedge	G5	S5				H	N*	x				

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	RBG Status 2014	Cootes Paradise	Waste Places	Roadsides	Historical Record	Planted
	Carex utriculata Boott	Northern Beaked Sedge	G5	S5				h		x				
	Carex vesicaria L.	Inflated Sedge	G5	S5						x				
	Carex vulpinoidea Michx.	Fox Sedge	G5	S5						x				
	Cyperus bipartitus Torr.	Shining Flatsedge	G5	S5				H	*	x		x		
	Cyperus diandrus Torr.	Umbrella Flatsedge	G5	S4				H		x				
	Cyperus erythrorhizos Muhlenb.	Red-rooted Flatsedge	G5	S4				H	N	x				
	Cyperus esculentus L.	Perennial Yellow Flatsedge	G5	S5						x				
	Cyperus lupulinus (Spreng.) Marcks ssp. macilentus (Fern.) Marcks	Slender Flatsedge	G5T5?	S4				H	*			x		
	Cyperus odoratus L.	Rusty Flatsedge	G5	S4				H	*	x				
	Cyperus strigosus L.	Straw-colored Flatsedge	G5	S5				h	*	x				
	Eleocharis acicularis L. Roem. & Schult.	Needle Spike-rush	G5	S5				h	*	x				
	Eleocharis erythropoda Steud.	Red-stemmed Spike-rush	G5	S5					*	x				
	Eleocharis intermedia Schult.	Matted Spike-rush	G5	S4				H	*	x				
	Eleocharis obtusa (Willd.) Schult.	Blunt Spike-rush	G5	S5					*	x				
	Eleocharis palustris (L.) Roemer & Schultes	Creeping Spike-rush	G5?	S5				H	*	x				
	Schoenoplectus acutus (Muhl. Ex Bigelow) A.& D. Love	Hard-stemmed Bulrush	G5	S5				H	P?	x				
	Schoenoplectus pungens (Vahl) Palla	Common Three-square Bulrush	G5	S5				H	H	x				
	Schoenoplectus tabernaemontani (C.C. Gmelin) Pall.	Soft-stemmed Bulrush	G5	S5						x				
	Scirpus atrovirens Willd.	Dark-green Bulrush	G5?	S5						x				
	Scirpus cyperinus L. Kunth	Cottongrass Bulrush	G5	S5						x				
	Scirpus microcarpus C. Presl	Red-tinge Bulrush	G5	S5				H		x				
	Trichophorum clintonii A. Gray	Clinton's Club-rush	G4	S2S3				H	X*	x				
	Trichophorum planifolium (Sprengel) Palla	Few-flowered Clubrush	G4G5	S1	END	END	END	H	*	x				
	Poaceae													
*	Agropyron cristatum L. Gaertn. ssp. pectinatum (M. Bieb.) Tzvelev	Crested Wheatgrass	G5	SNA				I				x		
*	Agrostis capillaris L.	Colonial Bentgrass	GNR	SNA						x				
*	Agrostis gigantea Roth	Redtop	G4G5	SNA				I		x				
	Agrostis perennans (Walter) Tuckerm.	Upland Bentgrass	G5	S4?						x				
	Agrostis scabra Willd.	Rough Bentgrass	G5	S5						x				
*	Agrostis stolonifera L.	Creeping Bentgrass	G5	SNA						x				
	Alopecurus aequalis Sobol.	Short-awned Foxtail	G5	S4				H	*	x				
	Andropogon gerardii Vitman	Big Bluestem	G5	S4				h		x		x		
*	Apera interrupta L. P. Beauv.	Dense Silky Bentgrass	GNR	SNA				I		x				
*	Arrhenatherum elatius L. P. Beauv. ex Presl	Tall Oatgrass	GNR	SNA				I		x		x		
*	Avena sativa L.	Cultivated Oat	GNR	SNA				I		x				
	Brachyelytrum erectum (Schreb.) P. Beauv.	Bearded Shorthusk	G5T4T5	S4?				h	*	x				
*	Bromus arvensis L.	Field Brome	GNR	SNA				I				x		
	Bromus ciliatus L.	Fringed Brome	G5	S5				h	*	x				

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	RBG Status 2014	Cootes Paradise	Waste Places	Roadsides	Historical Record	Planted
*	Bromus commutatus Schrad.	Hairy Brome	GNR	SNA				I		x		x		
*	Bromus hordeaceus L. ssp. hordeaceus	Soft Brome	GNR	SNA				I		x		x		
*	Bromus inermis Leyss.	Smooth Brome	G5TNR	SNA				I		x		x		
*	Bromus japonicus Thunb. ex Murray	Japanese Brome	GNR	SNA				I			x			
	Bromus kalmii A. Gray	Kalm's Brome	G5	S4				H		x				
	Bromus latiglumis (Shear) Hitchc.	Broad-glumed Brome	G5	S4				H		x				
	Bromus pubescens Muhl. ex Willd.	Hairy Woodland Brome	G5	S4				h		x				
*	Bromus secalinus L. ssp. secalinus	Rye Brome	GNR	SNA				I				x		
*	Bromus tectorum L.	Downy Brome	GNR	SNA				I		x	x	x		
*	Bromus x pseudothominii P.M. Sm. emend. H. Scholz	Hybrid Brome	GNA	SNA				I		x				
	Calamagrostis canadensis (Michx.) Beauv.	Bluejoint Reedgrass	G5	S5						x				
*	Calamagrostis epigejos L. Roth	Feathertop	G5	SNA				I	N		x			
	Calamagrostis stricta subsp. inexpansa (A. Gray) Greene	Northern Reedgrass	G5T5	S5				H	N	x				
	Cenchrus longispinus (Hack.) Fern.	Long-spined Sandbur	G5	S4				I	*			x		
	Cinna arundinacea L.	Stout Wood Reedgrass	G5	S4						x				
*	Dactylis glomerata L.	Orchard Grass	GNR	SNA				I		x		x		
	Danthonia spicata L. P. Beauv. ex Roem. & Schult.	Poverty Oatgrass	G5	S5						x				
	Dichanthelium acuminatum (Swartz) Gould & C.A. Clark subsp. Acuminatum	Hairy Panic Grass	G5T5	S5						x				
	Dichanthelium acuminatum subsp. fasciculatum (Torrey) Freckmann & Lelong	Western Panic Grass	G5T5	S5						x		x		
	Dichanthelium depauperatum (Muhlenberg) Gould	Starved Panicgrass	G5	S4						x				
	Dichanthelium dichotomum (Linnaeus) Gould subsp. Dichotomum	Forked Panicgrass	G5	S2				H		x				
	Dichanthelium implicatum (Scribner) Kerguelen	Slender-stemmed Panicgrass								x				
	Dichanthelium latifolium (Linnaeus) Harvill	Broad-leaf Panicgrass	G5	S4				H	*	x				
	Dichanthelium linearifolium (Scribner) Gould	Linear-leaved Panicgrass	GNR	S5				h	*	x				
*	Digitaria ischaemum (Schreb. ex Schwein.) Schreb. ex Muhlenb.	Smooth Crabgrass	GNR	SNA						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			
	Echinochloa muricata (Palisot de Beauvois) Fernald var. muricata	Rough Barnyard Grass	G5T5	S4?				H		x				
	Echinochloa muricata var. microstachya Wiegand	Western Barnyard Grass	G5T5	S5				h		x				
	Elymus canadensis L.	Canada Wildrye	G5	S4S5				H		x		x		
	Elymus hystrix L.	Bottlebrush Grass	G5	S5						x				
*	Elymus repens L. Gould	Creeping Wildrye	GNR	SNA				I		x		x		
	Elymus riparius Wiegand	Eastern Riverbank Wildrye	G5	S4?				h		x				
	Elymus trachycaulus (Link) Gould in Shinn. ssp. trachycaulus	Slender Wildrye	G5T5	S5				H		x				
	Elymus villosus Muhlenb. ex Willd.	Hairy Wildrye	G5	S4				H	*	x				
	Elymus virginicus L.	Virginia Wildrye	G5T5	S5						x				
*	Eragrostis cilianensis (All.) Lutati ex Hubb.	Stinkgrass	GNR	SNA				I			x			

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	RBG Status 2014	Cootes Paradise	Waste Places	Roadsides	Historical Record	Planted
	Eragrostis hypnoides (Lam.) B.S.P.	Teal Lovegrass	G5	S4				H		x				
*	Eragrostis minor Host	Little Lovegrass	GNR	SNA				I		x		x		
	Eragrostis pectinacea (Michx.) Nees ex Steud. var. pectinacea	Tufted Love Grass	G5T5	S5				h		x		x		
	Festuca rubra L. ssp. rubra	Red Fescue	G5T5	SNA				I		x		x		
	Festuca subverticillata (Pers.) Alexeev	Nodding Fescue	G5	S4				h		x				
*	Festuca trachyphylla (Hack.) Krajina	Hard Fescue	GNR	SNA				I		x	x	x		
	Glyceria borealis (Nash) Batch.	Boreal Mannagrass	G5	S5				h	*	x				
	Glyceria canadensis (Michx.) Trin.	Canada Mannagrass	G5TNR	S4S5				H	*	x				
	Glyceria grandis S. Watson	Tall Mannagrass	G5	S4S5						x				
*	Glyceria maxima (Hartm.) F.O. Holmb.	Rough Mannagrass	GNR	SNA				I		x				
	Glyceria striata (Lam.) A. Hitchc.	Fowl Mannagrass	G5	S5						x				
	Graphephorum melicoides (Michaux) Desvaux	Purple False Oats	G4	S4				H	*	x				
*	Hordeum jubatum L.	Foxtail Barley	G5T5	S5				I				x		
*	Hordeum vulgare L.	Common Barley	GNR	SNA							x			
	Leersia oryzoides L. Sw.	Rice Cutgrass	G5	S5						x				
	Leersia virginica Willd.	Virginia Cutgrass	G5	S4						x				
*	Lolium arundinaceum (Schreber) Darbyshire	Tall Fescue	GNR	SNA				I		x				
*	Lolium perenne L.	Perennial Ryegrass	GNR	SNA				I		x				
*	Lolium pratense (Hudson) Darbyshire	Meadow Ryegrass	G5	SNA				I		x				
	Milium effusum L.	Wood Millet	G5	S4S5				H	*	x				
*	Miscanthus sinensis Anderss.	Chinese Silver Grass	GNR	SNA				I		x				
	Muhlenbergia frondosa (Poir. in Lam.) Fern.	Wirestem Muhly	G5	S4				h		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		x				
	Muhlenbergia schreberi J. Gmel.	Schreber Muhly	G5	S4				H	*	x				
	Oryzopsis asperifolia Michx.	White-grained Mountain-ricegrass	G5	S5					*	x				
	Panicum capillare L.	Common Panicgrass	G5	S5						x	x	x		
*	Panicum miliaceum L.	Proso Millet	GNR	SNA				I		x				
	Panicum virgatum L.	Old Switch Panicgrass	G5	S4				H	N	x				
	Phalaris arundinacea L.	Reed Canary Grass	G5	S5						x	x			
*	Phleum pratense L.	Common Timothy	GNR	SNA				I		x		x		
	Phragmites australis (Cav.) Trin. ex Steud. ssp. australis	European Reed	G5T5	SNA				I		x				
	Poa alsodes A. Gray	Grove Meadow Grass	G4G5	S4				h		x				
*	Poa annua L.	Annual Bluegrass	GNR	SNA				I		x	x			
*	Poa bulbosa L.	Bulbous Bluegrass	GNR	SNA				I		x				
*	Poa bulbosa subsp. vivipara (Koeler) Arcangeli	Bulbous Bluegrass	GNR	SNA				I	N		x			
*	Poa compressa L.	Canada Bluegrass	GNR	SNA						x	x	x		
*	Poa nemoralis L.	Woods Bluegrass	G5	SNA				I		x				

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	RBG Status 2014	Cootes Paradise	Waste Places	Roadsides	Historical Record	Planted
	Poa palustris L.	Fowl Bluegrass	G5	S5				I		x				
	Poa pratensis L. ssp. pratensis	Kentucky Bluegrass	G5T5	S5				I		x				
	Poa saltuensis Fern. & Wiegand	Drooping Bluegrass	G5T5	S4				H	*	x				
	Poa saltuensis subsp. languida (Hitchcock) A. Haines	Drooping Bluegrass	G5T3T4Q	S3				H	*	x				
*	Poa trivialis L.	Rough Bluegrass	GNR	SNA				I		x				
	Schizachne purpurascens (Torr.) Swallen ssp. purpurascens	Purple False Melic	G5	S5						x				
	Schizachyrium scoparium (Michx.) Nees	Little Bluestem	G5T5	S4				H		x		x		
*	Secale cereale L.	Cultivated Rye	GNR	SNA				I			x			
*	Setaria faberi R.A.W. Herrm.	Giant Foxtail	GNR	SNA				I		x	x			
*	Setaria pumila (Poir.) Schult.	Yellow Foxtail	GNR	SNA				I		x		x		
*	Setaria verticillata L. P. Beauv.	Bristly Foxtail	GNR	SNA				I			x			
*	Setaria viridis L. P. Beauv.	Green Foxtail	GNR	SNA				I	H	x	x			
	Sorghastrum nutans L. Nash	Yellow Indian-grass	G5	S4				H		x		x		
*	Sorghum bicolor L. Moench ssp. bicolor	Sorghum	GNRTNR	SNA				I	N		x			
	Spartina pectinata Link	Fresh Water Cordgrass	G5	S4				H	H*	x				
	Sphenopholis intermedia (Rydb.) Rydb.	Slender Wedge Grass	G5	S4S5					*	x		x		
	Sphenopholis nitida (Biehler) Scribn.	Shiny Wedge Grass	G5	S1				H	*	x				
	Sporobolus cryptandrus (Torr.) A. Gray	Sand Dropseed	G5	S4				H	*	x		x		
	Sporobolus neglectus Nash	Small Dropseed	G5	S4					*	x		x		
	Sporobolus vaginiflorus (Torr. ex A. Gray) Torr. ex Alph. Wood	Sheathed Dropseed	G5T5	S2S3					N		x			
*	Thinopyrum ponticum (Podpera) Barkworth & D.R. Dewey	Tall Wheat Grass	GNR	SNA						x				
*	Triticum aestivum L.	Common Wheat	GNR	SNA				I			x	x		
	Zizania aquatica L.	Southern Wild Rice	G5T5	S3				H	*	x				
	Zizania palustris L.	Northern Wild Rice	G4G5T4T5	S4				H	*	x				
	Sparganiaceae													
	Sparganium americanum Nutt.	American Burreed	G5	S5				H		x				
	Sparganium emersum Rehmann ssp. emersum	Green-fruited Burreed	G5	S5					X	x				
	Sparganium eurycarpum Engelm. ex A. Gray	Broad-fruited Burreed	G5	S5						x				
	Typhaceae													
*	Typha angustifolia L.	Narrow-leaved Cattail	G5	SNA						x				
	Typha latifolia L.	Broad-leaved Cattail	G5	S5						x				
*	Typha x glauca Godron	Blue Cattail	GNA	SNA						x				
	Pontederiaceae													
	Heteranthera dubia (Jacq.) MacMill.	Grassleaf Mud-plantain	G5	S5				H	H	x				
	Pontederia cordata L.	Pickerel Weed	G5	S5					PH	x				
	Liliaceae													
	Allium canadense L.	Canada Garlic	G5	S5					*	x				
*	Allium sativum L.	Cultivated Garlic	GNR	SNA				I		x				

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	RBG Status 2014	Cootes Paradise	Waste Places	Roadsides	Historical Record	Planted
*	Asparagus officinalis L.	Garden Asparagus	G5?	SNA				I		x				
	Clintonia borealis (Aiton) Raf.	Blue Bead-lily	G5	S5					*	x				
*	Convallaria majalis L.	European Lily-of-the-valley	G5	SNA				I	H	x				
	Erythronium americanum Ker Gawl.	Yellow Trout-lily	G5	S5						x				
*	Galanthus nivalis L.	Snowdrop	GNR	SNA						x				
*	Hemerocallis fulva L. L.	Orange Daylily	GNA	SNA				I		x		x		
	Hypoxis hirsuta L. Covas	Yellow Stargrass	G5	S2S3				H	XH	x				
	Lilium michiganense Farw.	Michigan Lily	G5	S4					*	x				
	Lilium philadelphicum L.	Wood Lily	G5	S5				H	*	x				
	Maianthemum canadense Desf.	Wild-lily-of-the-valley	G5	S5						x				
	Maianthemum racemosum L. Link	False Solomon's Seal	G5	S5						x				
	Maianthemum stellatum L. Link	Star-flower False Solomon's-seal	G5	S5						x				
	Medeola virginiana L.	Indian Cucumber-root	G5	S5					*	x				
*	Ornithogalum umbellatum L.	Common Star-of-bethlehem	G3G5	SNA				I		x				
	Polygonatum biflorum (Walter) Ell.	Giant Solomon's Seal	G5T5	S4				H	*	x				
	Polygonatum pubescens (Willd.) Pursh	Downy Solomon's Seal	G5	S5						x				
	Prosartes lanuginosa (Michaux) D. Don	Yellow Mandarin	G5	S4					*	x				
	Streptopus lanceolatus (Aiton) Reveal var. lanceolatus	Eastern Rose Twisted-stalk	G5	S5					*	x				
	Trillium erectum L.	Red Trillium	G5	S5					*	x				
	Trillium grandiflorum (Michx.) Salisb.	White Trillium	G5	S5						x				
	Uvularia grandiflora Sm.	Large-flowered Bellwort	G5	S5					*	x				
	Iridaceae													
*	Iris pseudacorus L.	Yellow Iris	GNR	SNA				I		x				
	Iris versicolor L.	Harlequin Blue Flag	G5	S5						x				
	Iris virginica L.	Southern Blue Flag	G5	S5				H	XP*	x				
	Sisyrinchium montanum Greene	Strict Blue-eyed-grass	G5T4T5	S5						x				
	Smilacaceae													
	Smilax herbacea L.	Herbaceous Carrionflower	G5	S4						x				
	Smilax tamnoides L.	Hispid Greenbrier	G5	S4						x				
	Dioscoreaceae													
	Dioscorea villosa L.	Wild Yam	G4G5	S4						x				
	Orchidaceae													
	Corallorhiza maculata (Raf.) Raf. var. maculata	Spotted Coralroot	G5T3T5	S5				H	XP*	x				
	Corallorhiza odontorhiza (Willd.) Nutt.	Autumn Coralroot	G5	S2					XP*	x				
	Cypripedium parviflorum var. makasin (Farwell) Sheviak	Small Yellow Lady's Slipper	G5T4T5	S4S5					+	x				
*	Epipactis helleborine L. Crantz	Eastern Helleborine	GNR	SNA				I		x				
	Liparis loeselii L. Rich. ex Lindl.	Loesel's Twayblade	G5	S4S5					X	x				
	Spiranthes cernua L. Rich.	Nodding Ladies'-tresses	G5	S5				h	XH	x				

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	RBG Status 2014	Cootes Paradise	Waste Places	Roadsides	Historical Record	Planted
	Lardizabalaceae													
*	Akebia quinata (Houtt.) Decne.	Chocolate Vine	GNR	SNA							x			
	Cercidiphyllum													
*	Cercidiphyllum japonicum Siebold& Zucc.	Katsura	GNR	SNA						x				
	Ginkgoaceae													
*	Ginko biloba L.	Gingko	GNR	SNA						x				

Hamilton NAI:
H=rare
h=uncommon

RBG Status 2014:
+=Exotic Species
X=Extirpated Species
*=Rare on RBG Properties
N=New since 1969
P=Planted
?=Uncertain
H=Historical Records – species documented prior to 1969 but not included in Pringle (1969)

Appendix 6: Carolinian, Prairie and Savannah Indicators Observed at Cootes Paradise Heritage Lands

Appendix 6. Carolinian Zone and Prairie and Savannah Indicator species observed at Cootes Paradise Heritage Lands.

Scientific Name	Common Name	Prairie/ Savannah	Carolinian Zone	Comments
Azolla caroliniana Willd.	Eastern Mosquito Fern		Yes	
Magnolia acuminata L. L.	Cucumber Tree		Yes	Planted
Liriodendron tulipifera L.	Tulip Tree		Yes	
Asimina triloba L. Dunal	Pawpaw		Yes	Planted
Nuphar advena (Aiton) Aiton f.	Large Yellow Pond-lily		Yes	
Thalictrum thalictroides L. A.J. Eames & B. Boivin	Rue-anemone		Yes	
Ranunculus fascicularis Muhlenb. ex Bigelow	Early Buttercup	Yes		
Anemone cylindrica A. Gray	Long-headed Anemone	Yes		
Platanus occidentalis L.	Sycamore		Yes	
Juglans nigra L.	Black Walnut		Yes	
Carya glabra (Miller) Sweet	Pignut Hickory		Yes	
Castanea dentata (Marshall) Borkh.	American Chestnut		Yes	
Quercus velutina Lam.	Black Oak		Yes	
Betula lenta L.	Cherry Birch		Yes	Planted
Corylus americana Walter	American Hazelnut	Yes		
Persicaria virginiana (L.) Gaertner	Virginia Knotweed		Yes	
Lechea intermedia Legg.	Large-pod Pinweed	Yes		
Crocanthemum canadense (L.) Britton	Long-branched Frostweed	Yes		Historical
Viola sagittata Aiton var. ovata (Nutt.) Torr. & A. Gray	Sand Violet	Yes		
Vaccinium pallidum Aiton	Early Lowbush Blueberry	Yes		
Lysimachia quadrifolia L.	Whorled Loosestrife	Yes		
Crataegus dodgei Ashe	Dodge's Hawthorn		Yes	
Crataegus beata Sarg.	Dunbar's Hawthorn		Yes	
Crataegus pruinosa (Wendl. f.) K. Koch	Frosted Hawthorn		Yes	
Agrimonia parviflora Aiton	Swamp Agrimony		Yes	
Malus coronaria L. Miller	Sweet Crabapple		Yes	
Crataegus formosa Sarg.	Waxy-fruit Hawthorn		Yes	
Rosa carolina L.	Carolina Rose	Yes		
Amelanchier alnifolia (Nutt.) Nutt. ex R. Roem.	Saskatoon	Yes		
Vicia caroliniana Walter	Carolina Vetch		Yes	
Gleditsia triacanthos L.	Honey Locust		Yes	
Strophostyles helvola L. Elliott	Trailing Wild Bean		Yes	
Lespedeza capitata Michx.	Round-head Bush-clover	Yes		
Desmodium canadense L. DC.	Showy Tick-trefoil	Yes		

Scientific Name	Common Name	Prairie/ Savannah	Carolinian Zone	Comments
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	
Oenothera villosa Thunb. ssp. villosa	Hairy Evening Primrose		Yes	
Oenothera pilosella Raf. ssp. pilosella	Meadow Evening Primrose		Yes	
Cornus florida L.	Eastern Flowering Dogwood		Yes	
Comandra umbellata L. Nutt.	Umbellate Bastard Toad-flax	Yes		
Euonymus atropurpurea Jacq.	Eastern Burning Bush		Yes	
Euonymus obovata Nutt.	Running Strawberry Bush		Yes	
Ceanothus americanus L.	New Jersey Tea	Yes		
Ceanothus herbaceus Raf.	Prairie Redroot	Yes		
Vitis aestivalis Michx.	Summer Grape		Yes	
Polygala senega L.	Seneca Snakeroot	Yes		
Polygala verticillata L.	Whorled Milkwort	Yes		
Ptelea trifoliata L.	Common Hoptree		Yes	Planted
Frasera caroliniensis Walter	American Columbo		Yes	
Asclepias tuberosa L.	Butterfly Milkweed	Yes		
Collinsonia canadensis L.	Canada Horse-balm		Yes	
Pycnanthemum virginianum (L.) B.L. Robinson & Fernald	Virginia Mountain-mint	Yes		
Pycnanthemum incanum L. Michx.	Hoary Mountain-mint	Yes	Yes	
Aureolaria virginica L. Pennell	Downy Yellow False Foxglove		Yes	Historic
Aureolaria flava L. Farw.	Smooth Yellow False Foxglove		Yes	
Aureolaria pedicularia L. Raf.	Fern-leaved Yellow False Foxglove	Yes	Yes	
Campanula gieseckeana Vest	Giesecke's Bellflower	Yes		
Campanula rotundifolia L.	Harebell	Yes		
Eurybia schreberi (Nees) Nees	Schreber's Aster		Yes	
Helianthus decapetalus L.	Thin-leaved Sunflower		Yes	
Eurybia divaricata L. Nesom	White Wood Aster		Yes	1955 (Historic); 2017 (Planted)
Symphyotrichum urophyllum (Lindl. in DC.) Nesom	Arrow-leaved Aster	Yes		
Liatris spicata L. Willd.	Dense Blazing Star	Yes		Planted
Cirsium discolor (Muhlenb. ex Willd.) Spreng.	Field Thistle	Yes		
Helianthus strumosus L.	Pale-leaf Sunflower	Yes		

Scientific Name	Common Name	Prairie/ Savannah	Carolinian Zone	Comments
Erigeron pulchellus Michx.	Robin's Plantain	Yes		
Symphyotrichum oolentangiense (Riddell) Nesom	Sky-blue Aster	Yes		
Symphyotrichum laeve L. Löve & Löve var. laeve	Smooth Aster	Yes		
Trichophorum planifolium (Sprengel) Palla	Bashful Clubrush		Yes	
Carex albicans Willd. ex Spreng. var. emmonsii (Dewey ex Torr.) J. Retting	Emmons' Sedge		Yes	
Carex jamesii Schwein.	James' Sedge		Yes	
Carex albicans Willd. ex Spreng. var. albicans	White-tinged Sedge		Yes	
Sphenopholis nitida (Biehler) Scribn.	Shiny Wedge Grass		Yes	
Andropogon gerardii Vitman	Big Bluestem	Yes		
Elymus canadensis L.	Canada Wildrye	Yes		
Dichanthelium dichotomum (Linnaeus) Gould subsp. Dichotomum	Forked Panicgrass	Yes		
Spartina pectinata Link	Fresh Water Cordgrass	Yes		
Dichanthelium acuminatum (Swartz) Gould & C.A. Clark subsp. Acuminatum	Hairy Panic Grass	Yes		
Bromus kalmii A. Gray	Kalm's Brome	Yes		
Schizachyrium scoparium (Michx.) Nees	Little Bluestem	Yes		
Panicum virgatum L.	Old Switch Panicgrass	Yes		
Sporobolus cryptandrus (Torr.) A. Gray	Sand Dropseed	Yes		
Sporobolus vaginiflorus (Torr. ex A. Gray) Torr. ex Alph. Wood	Sheathed Dropseed	Yes		
Sporobolus neglectus Nash	Small Dropseed	Yes		
Sorghastrum nutans L. Nash	Yellow Indian-grass	Yes		
Polygonatum biflorum (Walter) Ell.	Giant Solomon's Seal		Yes	
Prosartes lanuginosa (Michaux) D. Don	Yellow Mandarin		Yes	
Hypoxis hirsuta L. Covas	Yellow Stargrass	Yes	Yes	
Dioscorea villosa L.	Wild Yam		Yes	
Corallorhiza odontorhiza (Willd.) Nutt.	Autumn Coralroot		Yes	

Appendix 7: Fauna Species Observed at Cootes Paradise Heritage Lands

Appendix 7. Fauna species observed at Cootes Paradise Heritage Lands. * indicates a non-native species

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	Hamilton Breeding Status	Area Sensitive	Comments
	Bird										
	Chen caerulescens	Snow Goose	G5	S5B							
	Branta canadensis	Canada Goose	G5	S5					Breeding		
	Branta bernicla	Brant	G5	S4N							
*	*Cygnus olor*	Mute Swan	G5	SNA					Breeding		
	Cygnus buccinator	Trumpeter Swan	G4	S4					Breeding		
	Cygnus columbianus	Tundra Swan	G5	S4							
	Aix sponsa	Wood Duck	G5	S5					Breeding		
	Anas strepera	Gadwall	G5	S4				Rare	Breeding		
	Anas americana	American Wigeon	G5	S4				Rare	Breeding		
	Anas rubripes	American Black Duck	G5	S4				Rare	Breeding		
	Anas platyrhynchos	Mallard	G5	S5					Breeding		
	Anas discors	Blue-winged Teal	G5	S4				Rare	Breeding		
	Anas clypeata	Northern Shoveler	G5	S4				Rare	Breeding		
	Anas acuta	Northern Pintail	G5	S5				Rare	Breeding	Yes	
	Anas crecca	Green-winged Teal	G5	S4				Rare	Breeding		
	Aythya valisineria	Canvasback	G5	S1B,S4N						Yes	
	Aythya americana	Redhead	G5	S2B,S4N				Rare	Breeding	Yes	
	Aythya collaris	Ring-necked Duck	G5	S5							
	Aythya marila	Greater Scaup	G5	S4							
	Aythya affinis	Lesser Scaup	G5	S4							
	Melanitta fusca	White-winged Scoter	G5	S4B,S4N							1987 (historic)
	Melanitta americana	Black Scoter	G5	S4B,S4N							
	Clangula hyemalis	Long-tailed Duck	G5	S3B							
	Bucephala albeola	Bufflehead	G5	S4							
	Bucephala islandica	Barrow's Goldeneye	G5	SNA							
	Lophodytes cucullatus	Hooded Merganser	G5	S5B,S5N				Rare	Breeding		
	Mergus merganser	Common Merganser	G5	S5B,S5N						Yes	
	Mergus serrator	Red-breasted Merganser	G5	S4B,S5N						Yes	
	Oxyura jamaicensis	Ruddy Duck	G5	S4B,S4N							
*	*Phasianus colchicus*	Ring-necked Pheasant	G5	SNA					Breeding		
	Bonasa umbellus	Ruffed Grouse	G5	S4					Breeding		
	Meleagris gallopavo	Wild Turkey	G5	S5					Breeding		
	Gavia stellata	Red-throated Loon	G5	S1N,S3B							1989 (historic)
	Gavia immer	Common Loon	G5	S5B,S5N						Yes	
	Podilymbus podiceps	Pied-billed Grebe	G5	S4B,S4N				Rare	Breeding		
	Podiceps auritus	Horned Grebe	G5	S1B,S4N		SC	SC				

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	Hamilton Breeding Status	Area Sensitive	Comments
	Podiceps grisegena	Red-necked Grebe	G5	S3B,S4N					Breeding	Yes	
	Pelecanus erythrorhynchos	American White Pelican	G4	S2B			THR		Rare		
	Phalacrocorax auritus	Double-crested Cormorant	G5	S5B					Breeding		
	Botaurus lentiginosus	American Bittern	G4	S4B				Rare	Breeding	Yes	
	Ixobrychus exilis	Least Bittern	G5	S4B	THR	THR	THR	Rare	Breeding	Yes	
	Ardea herodias	Great Blue Heron	G5	S4					Breeding		
	Ardea alba	Great Egret	G5	S2B							
	Butorides virescens	Green Heron	G5	S4B					Breeding		
	Nycticorax nycticorax	Black-crowned Night-heron	G5	S3B,S3N				Rare	Breeding		
	Cathartes aura	Turkey Vulture	G5	S5B					Breeding		
	Pandion haliaetus	Osprey	G5	S5B				Rare	Breeding		
	Haliaeetus leucocephalus	Bald Eagle	G5	S2N,S4B			SC		Breeding	Yes	
	Circus cyaneus	Northern Harrier	G5	S4B				Rare	Breeding	Yes	
	Accipiter striatus	Sharp-shinned Hawk	G5	S5				Rare	Breeding	Yes	
	Accipiter cooperii	Cooper's Hawk	G5	S4				Rare	Breeding	Yes	
	Buteo lineatus	Red-shouldered Hawk	G5	S4B	SC			Rare	Breeding	Yes	
	Buteo jamaicensis	Red-tailed Hawk	G5	S5					Breeding		
	Aquila chrysaetos	Golden Eagle	G5	S2B			END				
	Falco columbarius	Merlin	G5	S5B							
	Falco peregrinus	Peregrine Falcon	G4	S3B	SC	SC	SC	Rare	Breeding		
	Coturnicops noveboracensis	Yellow Rail	G4	S4B	SC	SC	SC		Rare	Yes	
	Rallus elegans	King Rail	G4	S2B	END	END	END		Breeding/Rare	Yes	1964 (historic)
	Rallus limicola	Virginia Rail	G5	S5B					Breeding		
	Porzana carolina	Sora	G5	S4B					Breeding		
	Gallinula galeata	Common Gallinule	G5	S4B				Rare	Breeding		
	Fulica americana	American Coot	G5	S4B					Breeding	Yes	
	Charadrius melodus	Piping Plover	G3	S1B	END	END	END		Breeding/Rare		1964 (historic)
	Charadrius vociferus	Killdeer	G5	S5B,S5N					Breeding		
	Calidris subruficollis	Buff-breasted Sandpiper	G4	SNA		SC					
	Tringa melanoleuca	Greater Yellowlegs	G5	S4B,S4N							
	Tringa flavipes	Lesser Yellowlegs	G5	S4B,S4N							1967 (historic)
	Tringa solitaria	Solitary Sandpiper	G5	S4B							
	Actitis macularia	Spotted Sandpiper	G5	S5					Breeding		
	Calidris canutus rufa	Red Knot rufa subspecies	G4T2	S1N	END	END	END				
	Scolopax minor	American Woodcock	G5	S4B					Breeding		
	Phalaropus lobatus	Red-necked Phalarope	G4G5	S3S4B		SC	SC				
	Larus fuscus	Lesser Black-backed Gull	G5	SNA							
	Larus marinus	Great Black-backed Gull	G5	S2B				Rare	Breeding		
	Larus delawarensis	Ring-billed Gull	G5	S5B,S4N					Breeding		

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	Hamilton Breeding Status	Area Sensitive	Comments
	Larus argentatus	Herring Gull	G5	S5B,S5N					Breeding		
	Hydroprogne caspia	Caspian Tern	G5	S3B					Breeding		
	Sterna hirundo	Common Tern	G5	S4B					Breeding		
	Chlidonias niger	Black Tern	G4	S3B			SC		Breeding	Yes	
*	*Columba livia*	Rock Pigeon	G5	SNA					Breeding		
	Zenaida macroura	Mourning Dove	G5	S5					Breeding		
	Coccyzus erythropthalmus	Black-billed Cuckoo	G5	S5B				Rare	Breeding		
	Megascops asio	Eastern Screech-owl	G5	S4					Breeding		
	Bubo virginianus	Great Horned Owl	G5	S4					Breeding		
	Asio flammeus	Short-eared Owl	G5	S2N,S4B	SC	SC	SC	Rare	Breeding	Yes	
	Chordeiles minor	Common Nighthawk	G5	S4B	THR	THR	SC	Rare	Breeding		
	Antrostomus vociferus	Eastern Whip-poor-will	G5	S4B	THR	THR	THR	Rare	Breeding	Yes	1997 (historic)
	Chaetura pelagica	Chimney Swift	G5	S4B,S4N	THR	THR	THR		Breeding		
	Archilochus colubris	Ruby-throated Hummingbird	G5	S5B					Breeding		
	Megaceryle alcyon	Belted Kingfisher	G5	S4B							
	Melanerpes erythrocephalus	Red-headed Woodpecker	G5	S4B	THR	THR	SC	Rare	Breeding		
	Melanerpes carolinus	Red-bellied Woodpecker	G5	S4					Breeding		
	Picoides pubescens	Downy Woodpecker	G5	S5					Breeding		
	Picoides villosus	Hairy Woodpecker	G5	S5					Breeding	Yes	
	Colaptes auratus	Northern Flicker	G5	S4B					Breeding		
	Dryocopus pileatus	Pileated Woodpecker	G5	S5					Breeding	Yes	
	Contopus cooperi	Olive-sided Flycatcher	G4	S4B	THR	THR	SC				
	Contopus virens	Eastern Wood-pewee	G5	S4B		SC	SC		Breeding		
	Empidonax flaviventris	Yellow-bellied Flycatcher	G5	S5B							
	Empidonax virescens	Acadian Flycatcher	G5	S2S3B	END	END	END	Rare	Breeding/Rare		
	Empidonax alnorum	Alder Flycatcher	G5	S5B					Breeding	Yes	
	Empidonax traillii	Willow Flycatcher	G5	S5B					Breeding		
	Empidonax minimus	Least Flycatcher	G5	S4B					Breeding	Yes	
	Sayornis phoebe	Eastern Phoebe	G5	S5B					Breeding		
	Tyrannus tyrannus	Eastern Kingbird	G5	S4B					Breeding		
	Myiarchus crinitus	Great Crested Flycatcher	G5	S4B					Breeding		
	Lanius ludovicianus	Loggerhead Shrike	G4	S2B	END	END	END		Breeding/Rare		1985 (historic)
	Lanius excubitor	Northern Shrike	G5	SNA							1976 (historic)
	Vireo flavifrons	Yellow-throated Vireo	G5	S4B					Breeding	Yes	
	Vireo gilvus	Warbling Vireo	G5	S5B					Breeding		
	Vireo olivaceus	Red-eyed Vireo	G5	S5B					Breeding		
	Cyanocitta cristata	Blue Jay	G5	S5					Breeding		
	Corvus brachyrhynchos	American Crow	G5	S5B					Breeding		
	Tachycineta bicolor	Tree Swallow	G5	S4B					Breeding		

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	Hamilton Breeding Status	Area Sensitive	Comments
	Stelgidopteryx serripennis	Northern Rough-winged Swallow	G5	S4B					Breeding		
	Riparia riparia	Bank Swallow	G5	S4B		THR	THR		Breeding		
	Hirundo rustica	Barn Swallow	G5	S4B		THR	THR		Breeding		
	Poecile atricapillus	Black-capped Chickadee	G5	S5					Breeding		
	Baeolophus bicolor	Tufted Titmouse	G5	S4				Rare	Breeding	Yes	
	Sitta carolinensis	White-breasted Nuthatch	G5	S5					Breeding	Yes	
	Certhia americana	Brown Creeper	G5	S5B					Breeding	Yes	
	Thryothorus ludovicianus	Carolina Wren	G5	S4				Rare	Breeding		
	Troglodytes aedon	House Wren	G5	S5B					Breeding		
	Troglodytes hiemalis	Winter Wren	G5	S5B					Breeding	Yes	
	Cistothorus platensis	Sedge Wren	G5	S4B				Rare	Breeding		1966 (historic)
	Cistothorus palustris	Marsh Wren	G5	S4B				Rare	Breeding		
	Polioptila caerulea	Blue-gray Gnatcatcher	G5	S4B					Breeding	Yes	
	Sialia sialis	Eastern Bluebird	G5	S5B					Breeding		
	Catharus fuscescens	Veery	G5	S4B					Breeding	Yes	
	Hylocichla mustelina	Wood Thrush	G5	S4B		THR	SC		Breeding		
	Turdus migratorius	American Robin	G5	S5B					Breeding		
	Dumetella carolinensis	Gray Catbird	G5	S4B					Breeding		
	Mimus polyglottos	Northern Mockingbird	G5	S4					Breeding		
	Toxostoma rufum	Brown Thrasher	G5	S4B					Breeding		
*	*Sturnus vulgaris*	European Starling	G5	SNA					Breeding		
	Anthus rubescens	American Pipit	G5	S4							
	Bombycilla cedrorum	Cedar Waxwing	G5	S5B					Breeding		
	Vermivora cyanoptera	Blue-winged Warbler	G5	S4B					Breeding		
	Vermivora chrysoptera	Golden-winged Warbler	G4	S4B	THR	THR	SC	Rare	Breeding		
	Oreothlypis celata	Orange-crowned Warbler	G5	S4B							
	Setophaga petechia	Yellow Warbler	G5	S5B					Breeding		
	Setophaga pensylvanica	Chestnut-sided Warbler	G5	S5B					Breeding		
	Setophaga coronata	Yellow-rumped Warbler	G5	S5B				Rare	Breeding		
	Setophaga virens	Black-throated Green Warbler	G5	S5B				Rare	Breeding	Yes	
	Setophaga pinus	Pine Warbler	G5	S5B					Breeding	Yes	
	Setophaga kirtlandii	Kirtland's Warbler	G3G4	S1B	END	END	END		Rare		1969 (historic)
	Setophaga discolor	Prairie Warbler	G5	S3B				Rare	Breeding/Rare		
	Setophaga cerulea	Cerulean Warbler	G4	S3B	SC	END	THR	Rare	Breeding	Yes	
	Setophaga ruticilla	American Redstart	G5	S5B					Breeding	Yes	
	Protonotaria citrea	Prothonotary Warbler	G5	S1B	END	END	END	Rare	Breeding	Yes	
	Seiurus aurocapilla	Ovenbird	G5	S4B					Breeding	Yes	
	Parkesia noveboracensis	Northern Waterthrush	G5	S5B					Breeding		
	Parkesia motacilla	Louisiana Waterthrush	G5	S3B	SC	THR	SC	Rare	Breeding		

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	Hamilton Breeding Status	Area Sensitive	Comments
	Geothlypis trichas	Common Yellowthroat	G5	S5B					Breeding		
	Setophaga citrina	Hooded Warbler	G5	S4B	THR			Rare	Breeding		
	Cardellina canadensis	Canada Warbler	G5	S4B	THR	THR	SC		Breeding	Yes	
	Icteria virens	Yellow-breasted Chat	G5	S2B	SC	END	END	Rare	Breeding/Rare		
	Piranga olivacea	Scarlet Tanager	G5	S4B					Breeding	Yes	
	Calcarius lapponicus	Lapland Longspur	G5	S3B							
	Pipilo erythrophthalmus	Eastern Towhee	G5	S4B					Breeding		
	Spizella passerina	Chipping Sparrow	G5	S5B					Breeding		
	Spizella pusilla	Field Sparrow	G5	S4B					Breeding		
	Pooecetes gramineus	Vesper Sparrow	G5	S4B					Breeding		
	Passerculus sandwichensis	Savannah Sparrow	G5	S4B					Breeding	Yes	
	Ammodramus savannarum	Grasshopper Sparrow	G5	S4B		SC			Breeding	Yes	
	Ammodramus henslowii	Henslow's Sparrow	G4	SHB	END	END	END		Breeding/Rare	Yes	1974 (historic)
	Melospiza melodia	Song Sparrow	G5	S5B					Breeding		
	Melospiza georgiana	Swamp Sparrow	G5	S5B					Breeding		
	Plectrophenax nivalis	Snow Bunting	G5	SNA							
	Cardinalis cardinalis	Northern Cardinal	G5	S5					Breeding		
	Pheucticus ludovicianus	Rose-breasted Grosbeak	G5	S4B					Breeding		
	Passerina cyanea	Indigo Bunting	G5	S4B					Breeding		
	Dolichonyx oryzivorus	Bobolink	G5	S4B	THR	THR	THR		Breeding	Yes	
	Agelaius phoeniceus	Red-winged Blackbird	G5	S4					Breeding		
	Sturnella magna	Eastern Meadowlark	G5	S4B		THR	THR		Breeding	Yes	
	Euphagus carolinus	Rusty Blackbird	G4	S4B	SC	SC					
	Quiscalus quiscula	Common Grackle	G5	S5B					Breeding		
	Molothrus ater	Brown-headed Cowbird	G5	S4B					Breeding		
	Icterus spurius	Orchard Oriole	G5	S4B					Breeding		
	Icterus galbula	Baltimore Oriole	G5	S4B					Breeding		
*	*Haemorhous mexicanus*	House Finch	G5	SNA					Breeding		
	Spinus pinus	Pine Siskin	G5	S4B					Breeding		
	Spinus tristis	American Goldfinch	G5	S5B					Breeding		
	Coccothraustes vespertinus	Evening Grosbeak	G5	S4B							
*	*Passer domesticus*	House Sparrow	G5	SNA					Breeding		
	Mammal										
	Blarina brevicauda	Northern Short-tailed Shrew	G5	S5							
	Cryptotis parva	Least Shrew	G5	SH				Rare			1947 (historic)
	Condylura cristata	Star-nosed Mole	G5	S5							
	Eptesicus fuscus	Big Brown Bat	G5	S4							
	Lasionycteris noctivagans	Silver-haired Bat	G3G4	S4							
	Lasiurus borealis	Eastern Red Bat	G3G4	S4							

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	Hamilton Breeding Status	Area Sensitive	Comments
	Lasiurus cinereus	Hoary Bat	G3G4	S4							
	Myotis lucifugus	Little Brown Myotis	G3	S4	END	END	END				
	Myotis septentrionalis	Northern Myotis	G1G2	S3	END	END	END				
	Perimyotis subflavus	Tricolored Bat	G2G3	S3?	END	END	END				
	Sylvilagus floridanus	Eastern Cottontail	G5	S5							
	Glaucomys sabrinus	Northern Flying Squirrel	G5	S5				Rare		Yes	
	Glaucomys volans	Southern Flying Squirrel	G5	S4	SC					Yes	
	Marmota monax	Groundhog (Woodchuck)	G5	S5							
	Sciurus carolinensis	Eastern Gray Squirrel	G5	S5							
	Tamias striatus	Eastern Chipmunk	G5	S5							
	Tamiasciurus hudsonicus	Red Squirrel	G5	S5							
	Castor canadensis	Beaver	G5	S5							
	Microtus pennsylvanicus	Meadow Vole	G5	S5							
	Ondatra zibethicus	Muskrat	G5	S5							
	Peromyscus leucopus	White-footed Mouse	G5	S5							
	Peromyscus maniculatus	Deer Mouse	G5	S5							
	Vulpes vulpes	Red Fox	G5	S5							
	Procyon lotor	Raccoon	G5	S5							
	Mephitis mephitis	Striped Skunk	G5	S5							
	Mustela erminea	Ermine	G5	S5				Rare?			
	Mustela frenata	Long-tailed Weasel	G5	S4							
	Neovison vison	American Mink	G5	S4							
	Odocoileus virginianus	White-tailed Deer	G5	S5							
	Amphibian										
	Necturus maculosus	Mudpuppy	G5	S4				Rare		Yes	1989 (historic)
	Notophthalmus viridescens viridescens	Red-spotted Newt	G5T5	S5							
	Ambystoma maculatum	Spotted Salamander	G5	S4						Yes	
	Hemidactylium scutatum	Four-toed Salamander	G5	S4				Rare			
	Plethodon cinereus	Eastern Red-backed Salamander	G5	S5							
	Pseudacris crucifer	Spring Peeper	G5	S5							
	Anaxyrus americanus	American Toad	G5	S5							
	Hyla versicolor	Gray Treefrog	G5	S5							
	Pseudacris triseriata	Western Chorus Frog (Great Lakes/ St. Lawrence population)	G5TNR	S3	THR	THR				Yes	
	Lithobates clamitans	Green Frog	G5	S5							
	Lithobates palustris	Pickerel Frog	G5	S4				Rare		Yes	
	Lithobates pipiens	Northern Leopard Frog	G5	S5						Yes	
	Lithobates sylvaticus	Wood Frog	G5	S5						Yes	
	Reptile										
	Chelydra serpentina	Snapping Turtle	G5	S3	SC	SC	SC				

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	Hamilton Breeding Status	Area Sensitive	Comments
	Sternotherus odoratus	Eastern Musk Turtle	G5	S3	THR	SC	SC	Rare			
	Chrysemys picta marginata	Midland Painted Turtle	G5T5	S4							
	Emydoidea blandingii	Blanding's Turtle	G4	S3	THR	THR	THR	Rare			
	Graptemys geographica	Northern Map Turtle	G5	S3	SC	SC	SC	Rare		Yes	
*	*Trachemys scripta elegans*	Red-eared Slider	G5	SNA							
*	*Trachemys scripta scripta*	Yellow-bellied Slider	G5	SNA							
	Apalone spinifera	Eastern Spiny Softshell	G5	S2	THR	THR	THR	Rare		Yes	1999 (historic)
	Coluber constrictor foxii	Blue Racer	G5T5	S1	END	END	END				historic
	Diadophis punctatus	Ring-necked Snake	G5	S4				Rare			
	Lampropeltis triangulum	Eastern Milksnake	G5	S4	SC	SC					
	Nerodia sipedon sipedon	Northern Watersnake	G5T5	S5							
	Pantherophis spiloides pop. 2	Gray Ratsnake (Carolinian population)	G5T1	S1	END	END	END			Yes	historic
	Storeria dekayi	DeKay's Brownsnake	G5	S5							
	Storeria occipitomaculata	Red-bellied Snake	G5	S5							
	Thamnophis sauritus	Eastern Ribbonsnake	G5	S4	SC	SC	SC	Rare			
	Thamnophis sirtalis sirtalis	Eastern Gartersnake	G5T5	S5							
	Fish										
	Ichthyomyzon castaneus	Chestnut Lamprey	G4	S1?							
	Ichthyomyzon fossor	Northern Brook Lamprey	G4	S3	SC	SC	SC				1997 (historic)
	Ichthyomyzon unicuspis	Silver Lamprey	G5	S3		SC	SC				
	Lampetra appendix	American Brook Lamprey	G4	S3							
*	*Petromyzon marinus*	Sea Lamprey	G5	SNA							
	Acipenser fulvescens	Lake Sturgeon	G3G4TNR	S2		END	THR				historic
	Lepisosteus oculatus	Spotted Gar	G5	S1	THR	THR	THR				
	Lepisosteus osseus	Longnose Gar	G5	S4							
*	*Osmerus mordax*	Rainbow Smelt	G5	S5							
	Amia calva	Bowfin	G5	S4							
	Anguilla rostrata	American Eel	G4	S1?		THR	END				
*	*Alosa pseudoharengus*	Alewife	G5	SNA							
	Alosa sapidissima	American Shad	G5	S1							
	Dorosoma cepedianum	Gizzard Shad	G5	S4							
*	*Carassius auratus*	Goldfish	G5	SNA							
	Clinostomus elongatus	Redside Dace	G3G4	S2	SC	END	END				1950 (historic)
	Cyprinella spiloptera	Spotfin Shiner	G5	S4							
*	*Cyprinus carpio*	Common Carp	G5	SNA							
	Hybognathus hankinsoni	Brassy Minnow	G5	S5							
	Luxilus chrysocephalus	Striped Shiner	G5	S4							
	Margariscus margarita	Pearl Dace	G5	S5							
	Nocomis biguttatus	Hornyhead Chub	G5	S4							

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	Hamilton Breeding Status	Area Sensitive	Comments
	Nocomis micropogon	River Chub	G5	S4							
	Notemigonus crysoleucas	Golden Shiner	G5	S5							
	Notropis atherinoides	Emerald Shiner	G5	S5							
	Notropis cornutus	Common Shiner	G5	S5							
	Notropis heterodon	Blackchin Shiner	G5	S4							
	Notropis photogenis	Silver Shiner	G5	S2S3	SC	THR	THR				
	Notropis rubellus	Rosyface Shiner	G5	S4							
	Notropis stramineus	Sand Shiner	G5	S4							
	Notropis volucellus	Mimic Shiner	G5	S5							
	Phoxinus eos	Northern Redbelly Dace	G5	S5							
	Phoxinus neogaeus	Finescale Dace	G5	S5							
	Pimephales notatus	Bluntnose Minnow	G5	S5							
	Pimephales promelas	Fathead Minnow	G5	S5							
	Rhinichthys atratulus	Blacknose Dace	G5	S5							
	Rhinichthys cataractae	Longnose Dace	G5	S5							
	Semotilus atromaculatus	Creek Chub	G5	S5							
	Carpiodes cyprinus	Quillback	G5	S4							
	Catostomus catostomus	Longnose Sucker	G5	S5							
	Catostomus commersoni	White Sucker	G5	S5							
	Hypentelium nigricans	Northern Hog Sucker	G5	S4							
	Ictiobus cyprinellus	Bigmouth Buffalo	G5	SU	SC						
	Moxostoma anisurum	Silver Redhorse	G5	S4							
	Moxostoma duquesnei	Black Redhorse	G5	S2		THR	THR				
	Moxostoma erythrurum	Golden Redhorse	G5	S4							
	Moxostoma macrolepidotum	Shorthead Redhorse	G5	S5							
	Moxostoma valenciennesi	Greater Redhorse	G4	S3							
	Ameiurus melas	Black Bullhead	G5	S4							
	Ameiurus natalis	Yellow Bullhead	G5	S4							
	Ameiurus nebulosus	Brown Bullhead	G5	S5							
	Ictalurus punctatus	Channel Catfish	G5	S4							
	Noturus flavus	Stonecat	G5	S4							
	Noturus gyrinus	Tadpole Madtom	G5	S4							
	Esox americanus vermiculatus	Grass Pickerel	G5T5	S3	SC	SC	SC				historic
	Esox lucius	Northern Pike	G5	S5							
	Esox masquinongy	Muskellunge	G5	S4							
	Umbra limi	Central Mudminnow	G5	S5							
	Coregonus clupeaformis	Lake Whitefish	G5	S5	THR						historic
	Coregonus hoyi	Bloater	G4	S4							
	Coregonus kiyi orientalis	Kiyi	G3TX	SX	SC	EXT	SC				

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	Hamilton Breeding Status	Area Sensitive	Comments
	Coregonus nigripinnis	Blackfin Cisco	G1Q	SU	THR						historic
	Coregonus reighardi	Shortnose Cisco	GH	SH	END	END	END				historic
*	*Oncorhynchus keta*	Chum Salmon	G5	SNA							stocked
*	*Oncorhynchus kisutch*	Coho Salmon	G4	SNA							stocked
*	*Oncorhynchus mykiss*	Rainbow Trout	G5	SNA							stocked
*	*Oncorhynchus tshawytscha*	Chinook Salmon	G5	SNA							stocked
	Prosopium cylindraceum	Round Whitefish	G5	S4							
	Salmo salar	Atlantic Salmon	G5TX	SX		EXP					historic; stocked
*	*Salmo trutta*	Brown Trout	G5	SNA							stocked
	Salvelinus fontinalis	Brook Trout	G5T5	S5							
	Salvelinus namaycush	Lake Trout	G5	S5							
	Percopsis omiscomaycus	Trout-perch	G5	S5							
	Culaea inconstans	Brook Stickleback	G5	S5							
	Gasterosteus aculeatus	Threespine Stickleback	G5	S4							
	Cottus bairdi	Mottled Sculpin	G5	S5							
	Ambloplites rupestris	Rock Bass	G5	S5							
	Lepomis cyanellus	Green Sunfish	G5	S4							
	Lepomis gibbosus	Pumpkinseed	G5	S5							
	Lepomis macrochirus	Bluegill	G5	S5							
	Lepomis megalotis	Longear Sunfish	G5	S3							
	Lepomis peltastes	Northern Sunfish									
	Micropterus dolomieu	Smallmouth Bass	G5	S5							
	Micropterus salmoides	Largemouth Bass	G5	S5							
*	*Morone americana*	White Perch	G5	SNA							
	Morone chrysops	White Bass	G5	S4							
	Pomoxis annularis	White Crappie	G5	S4							
	Pomoxis nigromaculatus	Black Crappie	G5	S4							
	Etheostoma caeruleum	Rainbow Darter	G5	S4							
	Etheostoma exile	Iowa Darter	G5	S5							
	Etheostoma flabellare	Fantail Darter	G5	S4							
	Etheostoma microperca	Least Darter	G5	S4							
	Etheostoma nigrum	Johnny Darter	G5	S5							
	Perca flavescens	Yellow Perch	G5	S5							
	Percina caprodes	Logperch	G5	S5							
	Percina maculata	Blackside Darter	G5	S4							
	Stizostedion canadense	Sauger	G5	S4							
	Stizostedion vitreum vitreum	Walleye	G5T5	S5							
	Aplodinotus grunniens	Freshwater Drum	G5	S5							
*	*Neogobius melanostomus*	Round Goby	G5	SNA							

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	Hamilton Breeding Status	Area Sensitive	Comments
	Dragonfly/ Damselfly										
	Arigomphus villosipes	Unicorn Clubtail	G5	S2S3							
	Gomphus exilis	Lancet Clubtail	G5	S5							
	Aeshna canadensis	Canada Darner	G5	S5							
	Aeshna constricta	Lance-tipped Darner	G5	S5							
	Aeshna umbrosa	Shadow Darner	G5	S5							
	Anax junius	Common Green Darner	G5	S5							
	Epiaeschna heros	Swamp Darner	G5	S2S3							
	Epitheca cynosura	Common Baskettail	G5	S5							
	Epitheca princeps	Prince Baskettail	G5	S5							
	Celithemis elisa	Calico Pennant	G5	S5							
	Celithemis eponina	Halloween Pennant	G5	S4							
	Erythemis simplicicollis	Eastern Pondhawk	G5	S5							
	Leucorrhinia intacta	Dot-tailed Whiteface	G5	S5							
	Libellula luctuosa	Widow Skimmer	G5	S5							
	Libellula pulchella	Twelve-spotted Skimmer	G5	S5							
	Libellula quadrimaculata	Four-spotted Skimmer	G5	S5							
	Pachydiplax longipennis	Blue Dasher	G5	S5							
	Pantala flavescens	Wandering Glider	G5	S4							
	Pantala hymenaea	Spot-winged Glider	G5	S4							
	Perithemis tenera	Eastern Amberwing	G5	S4							
	Plathemis lydia	Common Whitetail	G5	S5							
	Sympetrum obtrusum	White-faced Meadowhawk	G5	S5							
	Sympetrum rubicundulum	Ruby Meadowhawk	G5	S5							
	Sympetrum semicinctum	Band-winged Meadowhawk	G5	S4							
	Sympetrum vicinum	Autumn Meadowhawk	G5	S5							
	Tramea lacerata	Black Saddlebags	G5	S4							
	Calopteryx maculata	Ebony Jewelwing	G5	S5							
	Lestes congener	Spotted Spreadwing	G5	S5							
	Lestes dryas	Emerald Spreadwing	G5	S5							
	Lestes rectangularis	Slender Spreadwing	G5	S5							
	Lestes unguiculatus	Lyre-tipped Spreadwing	G5	S5							
	Lestes vigilax	Swamp Spreadwing	G5	S4							
	Amphiagrion saucium	Eastern Red Damsel	G5	S4							
	Argia apicalis	Blue-fronted Dancer	G5	S4							
	Enallagma antennatum	Rainbow Bluet	G5	S4							
	Enallagma basidens	Double-striped Bluet	G5	S3				Rare			
	Enallagma carunculatum	Tule Bluet	G5	S5							
	Enallagma civile	Familiar Bluet	G5	S5							

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	Hamilton Breeding Status	Area Sensitive	Comments
	Enallagma ebrium	Marsh Bluet	G5	S5							
	Enallagma exsulans	Stream Bluet	G5	S5							
	Enallagma geminatum	Skimming Bluet	G5	S4							
	Enallagma signatum	Orange Bluet	G5	S4							
	Ischnura posita	Fragile Forktail	G5	S4							
	Ischnura verticalis	Eastern Forktail	G5	S5							
	Nehalennia irene	Sedge Sprite	G5	S5							
	Butterfly/ Moth										
	Ancyloxypha numitor	Least Skipper	G5	S5							
	Epargyreus clarus	Silver-spotted Skipper	G5	S4							
	Hylephila phyleus	Fiery Skipper	G5	SNA				Rare			
	Panoquina ocola	Ocola Skipper	G5	SNA				Rare			
	Poanes hobomok	Hobomok Skipper	G5	S5							
	Poanes viator	Broad-winged Skipper	G5	S4							
	Polites origenes	Crossline Skipper	G4G5	S4							
	Polites peckius	Peck's Skipper	G5	S5							
	Thorybes pylades	Northern Cloudywing	G5	S5				Rare			
*	*Thymelicus lineola*	European Skipper	G5	SNA							
	Urbanus proteus	Long-tailed Skipper	G5	SNA				Rare			
	Wallengrenia egeremet	Northern Broken-Dash	G5	S5							
	Papilio glaucus	Eastern Tiger Swallowtail	G5	S5							
	Papilio polyxenes	Black Swallowtail	G5	S5							
	Colias philodice	Clouded Sulphur	G5	S5							
*	*Pieris rapae*	Cabbage White	G5	SNA							
	Callophrys niphon	Eastern Pine Elfin	G5	S5				Rare			
	Cupido comyntas	Eastern Tailed Blue	G5	S5							
	Feniseca tarquinius	Harvester	G5	S4				Rare			
	Lycaena hyllus	Bronze Copper	G5	S5							
	Satyrium calanus	Banded Hairstreak	G5	S4							
	Cercyonis pegala	Common Wood-Nymph	G5	S5							
	Danaus plexippus	Monarch	G4	S2N,S4B	SC	SC	SC				
	Lethe anthedon	Northern Pearly-Eye	G5	S5							
	Lethe eurydice	Eyed Brown	G5	S5							
	Limenitis archippus	Viceroy	G5	S5							
	Limenitis arthemis astyanax	Red-spotted Purple	G5T5	S5							
	Megisto cymela	Little Wood-Satyr	G5	S5							
	Nymphalis antiopa	Mourning Cloak	G5	S5							
	Nymphalis l-album	Compton Tortoiseshell	G5	S5							
	Phyciodes tharos	Pearl Crescent	G5	S4							

	Scientific Name	Common Name	G Rank	S Rank	SARA	COSEWIC	ESA	Hamilton NAI	Hamilton Breeding Status	Area Sensitive	Comments
	Polygonia comma	Eastern Comma	G5	S5							
	Speyeria cybele	Great Spangled Fritillary	G5	S5							
	Vanessa atalanta	Red Admiral	G5	S5							
	Vanessa virginiensis	American Lady	G5	S5							
	Mollusc										
	Ligumia nasuta	Eastern Pondmussel			END	SC	END				
	Quadrula quadrula	Mapleleaf Mussel									
	Toxolasma parvum	Lilliput				END	THR				

Appendix 8: Summary of Management Issues and Preliminary Opportunities

Appendix 8. Inventory of management issues per management unit in the Cootes Paradise Heritage Lands.

MANAGEMENT ISSUE	Canal Park	Centennial Park	Churchill Park	Public Works	CPS1	CPS2	CPS3	CPS4	CPS5	CPS6	CPS7	CPS8	CPS9	CPS10	CPS11	CPS12	CPS13	CPS14	CPS15	CPS16	Coronation Park	Desjardins Canal	Transfer Station	WWTP	Lake Jojo	LSCCA	Martino	Olympic Sports	Volunteer Field
Overarching Cootes to Escarpment EcoPark System Management Issues																													
Awareness of Cootes to Escarpment EcoPark System	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Delineation of Current EcoPark System Lands	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Lack of Uniform Set of Rules for EcoPark System	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Accommodating Stresses from Increased Use	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Funding	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Trail/Rail Line Crossings							x	X	x	x	x																		
Critical Corridor for Connection of Cootes Paradise to the Niagara Escarpment	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Desire and Need for Trail Connections and Recreation Plan	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Land Use Planning Issues																													
West End of Cootes Paradise and the "Dundas Gateway"	x	x		x									x	x								x	x	x	x	x	x	x	x
Access, Parking and Infrastructure Issues																													
RBG Master Plan			x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									
Parking and Access Issues	x	x			x						x	x	x	x	x	x	x											x	
Lack of Public Transportation	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Boat Access to Marsh								x						x	x				x										
Lack of Defined Access Points			x																						x				
CNR Safety Issue							x		x	x	x																		
Lack of Facilities							x	x											x										
Trespassing														x									x						
Old Infrastructure and Trail Structures					x			x				x				x										x			
Recreation Issues																													
Trail Overuse and Erosion			x					x		x	x	x	x			x	x			x									
Unsanctioned Cycling Use							x	x		x	x	x				x	x			x						x			
Cycling Route Connectivity							x	x	x	x	x	x	x						x										
Unsanctioned Trails			x					x	x	x	x	x	x			x	x		x					x	x	x			

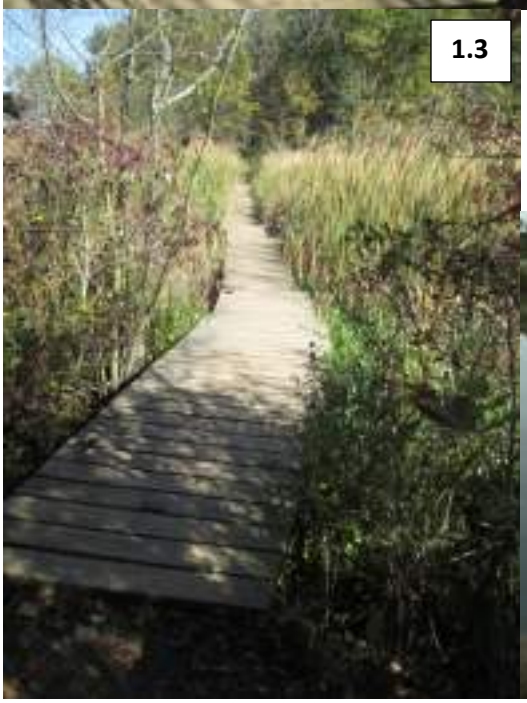
MANAGEMENT ISSUE	Canal Park	Centennial Park	Churchill Park	Public Works	CPS1	CPS2	CPS3	CPS4	CPS5	CPS6	CPS7	CPS8	CPS9	CPS10	CPS11	CPS12	CPS13	CPS14	CPS15	CPS16	Coronation Park	Desjardins Canal	Transfer Station	WWTP	Lake Jojo	LSCCA	Martino	Olympic Sports	Volunteer Field
Trail Proliferation			x										x			x									x				
Signage			x																						x	x			
User Conflicts	x	x	x				x	x		x	x	x				x	x	x	x		x				x	x	x	x	x
Off-leash Dogs	x	x	x				x	x		x	x	x	x			x	x	x	x		x				x	x	x	x	x
Disruption to Wildlife resulting from Recreational Activities	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x			x	x			
Motorized Vehicle Use	x									x	x	x														x			
Hunting/Fishing/Poaching					x	x				x	x	x		x	x	x	x		x			x			x	x			
Foraging								x	x	x	x	x	x			x	x												
Wildlife Feeding	x													x					x			x			x	x			
Use of Drones					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	X									
Fire Pits/Party Spots/Camping Locations											x	x				x	x		x						x				
Encroachment Issues																													
Private Unsanctioned Trails											x		x			x	x		x						x				
Structures and “Yard Extension”											x		x			x	x		x						x	x			
Dumping	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	
Vegetation Removal/Trampling											x		x			x	x		x						x	x			
Pool Drainage																	x		x										
Semi-permanent Camps												x				x			x										
Cats/Domestic Pets	x	x	x	x			x	x	x		x	x	x			x	x	x	x		x		x	x	x	x	x	x	x
Hydrologic Impact Issues																													
High Run-off and Peak Flows	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	X
Drainage and Erosion	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Water Quality	x	x			x	x								x	x					x		x		x	x	x			
Fluctuating Water Levels in Cootes Paradise Marsh					x	x								x	x					x		x		x		x			
Churchill Park Drainage			x																										
Polluting Spills	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Ecosystem Management Issues																													

MANAGEMENT ISSUE	Canal Park	Centennial Park	Churchill Park	Public Works	CPS1	CPS2	CPS3	CPS4	CPS5	CPS6	CPS7	CPS8	CPS9	CPS10	CPS11	CPS12	CPS13	CPS14	CPS15	CPS16	Coronation Park	Desjardins Canal	Transfer Station	WWTP	Lake Jojo	LSCCA	Martino	Olympic Sports	Volunteer Field
Fragmentation							x	x	x	x	x	x	x	x	x	x	x	x	x			x			x	x			
Decline in Environmental Quality and Biodiversity	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Forest Health Decline								x	x	x	x	x	x			x	x		x						x	x			
Unbalanced Wildlife Populations	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Loss of Open Woodland/Prairie/Savannah Habitat										x	x	x					x	x		x									
Conservation and Recovery of Species at Risk					x	x		x		x	x	x	x	x	x	x	x		x	x		x			x	x		x	
Cootes Paradise Outlet to Lake Ontario					x																								
Stream Habitat Improvement					x									x	x				x							x			
Cootes Paradise Fishway and Management of Fish Communities					x	x								x	x							x		x	x	x			
Invasive Species	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Noxious Plants								x	x	x	x	x	x			x	x		x				x	x	x	x			
Wildlife Crossing/Corridors	x										x		x	x	x				x			x	x		x	x			
Noise	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Removal of Plantings due to Vegetation Maintenance of Pipelines										x	x	x	x																
Establishment of Marsh Restoration Plantings					x	x								x	x					x		x							
Shoreline Erosion/Stabilization in Cootes Paradise Marsh					x	x		x		x						x	x		x	x									
Watershed/Sub-watershed Boundary Issues							x	x	x	x																			
Cultural Heritage Issues																													
Communication of Cultural Heritage Importance of Cootes Paradise	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Connection between Cultural and Natural Heritage Resources at Princess Point																			x										
Identity of Rasberry Farm							x																						
Cultural Heritage Interpretation of Desjardins Canal	x																					x							
Need for Corresponding Management Expertise	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Appendix 9: Management Issue Photographs and Index

Appendix 9. Management issue photographs and index (photographs taken by Holly Dodds, Leah Lefler and Markus Hillar, 2017)

Issue 1: Old Infrastructure and Trail Structures

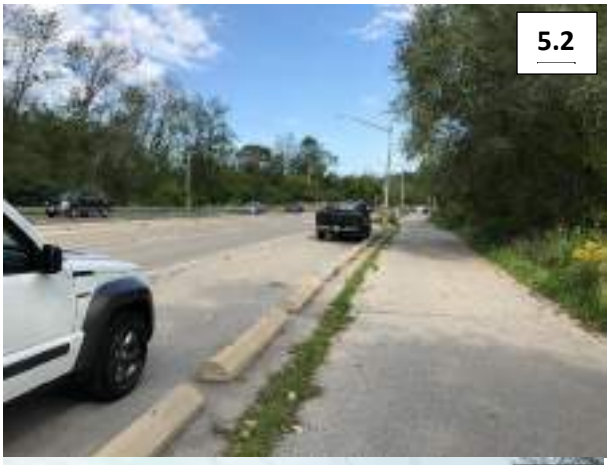


Issue 2: Trail Overuse and Erosion

Issue 3: Trail Proliferation

Issue 4: Lack of Defined Access Points

5. Parking and Access Issue



6. Off-leash Dogs

7. Unsanctioned Trails


7.1


7.2


7.3


7.4


7.5

8. Dumping / Structures and "Yard Extension"

9. Motorized Vehicle Use

10. Drainage and Erosion

11. Fire Pits/Party Spots/Camping Locations

12. Unsanctioned Cycling Use

13. Boat Access to Marsh

14. Forest Health Decline

15. Invasive Species

Girdled Norway Maple (*Acer platanoides*) in foreground, Lily-of-the-Valley (*Convallaria majalis*) in background

Rough Mannagrass (*Glyceria maxima*) and Purple Loosestrife (*Lythrum salicaria*)

European Swallowwort (*Vincetoxicum rossicum*)

Emerald Ash Borer (*Agrilus planipennis*) devastation

European Swallowwort (*Vincetoxicum rossicum*) at Lake Jojo

16. Wildlife Crossing/Corridors

16.1

16.2

17. Stream Habitat Improvement

18. Vegetation Trampling/Removal

Issue #	Management Issue	UTM Location		Management Unit
		Easting	Northing	
1.1	Old Infrastructure and Trail Structures	587651	4791187	CPS11
1.2	Old Infrastructure and Trail Structures	587651	4791187	CPS11
1.3	Old Infrastructure and Trail Structures	587651	4791187	CPS11
1.4	Old Infrastructure and Trail Structures	589555	4791858	CPS15
2.1	Trail Overuse and Erosion	587712	4791227	CPS12
2.2	Trail Overuse and Erosion	587101	4792696	CPS7
2.3	Trail Overuse and Erosion	588769	4791369	CPS15
2.4	Trail Overuse and Erosion	589210	4791760	CPS13
3.1	Trail Proliferation	587711	4791271	CPS12
4.1	Lack of Defined Access Points	587822	4791031	CPS12
5.1	Parking Access Issues	586960	4792916	CPS7
5.2	Parking Access Issues	586340	4791279	CPS10
5.3	Parking Access Issues	585601	4790808	LSCCA
5.4	Parking Access Issues	588531	4793550	CPS5
6.1	Off-leash Dogs	587171	4792821	CPS7
7.1	Unsanctioned Trails	587101	4792696	CPS7
7.2	Unsanctioned Trails	587100	4792749	CPS7
7.3	Unsanctioned Trails	587124	4792637	CPS7
7.4	Unsanctioned Trails	586768	4792458	CPS9
7.5	Unsanctioned Trails	589119	4791784	CPS13
7.6	Unsanctioned Trails	586891	4790991	LSCCA
8.1	Dumping / Yard Extension	587587	4792709	CPS6
8.2	Dumping / Yard Extension	589121	4791983	CPS13
8.3	Dumping / Yard Extension	588519	4790887	CPS13
9.1	Motorized Vehicle Use	587153	4792319	CPS8
9.2	Motorized Vehicle Use	588402	4791338	CPS12
10.1	Drainage and Erosion	587468	4792878	CPS6
10.2	Drainage and Erosion	587778	4793005	CPS6
10.3	Drainage and Erosion	588627	4792425	CPS4
10.4	Drainage and Erosion	588832	4790974	CPS13
11.1	Fire Pits / Party Spots	588682	4791369	CPS13
11.2	Fire Pits / Party Spots	589220	4791704	CPS15
11.3	Fire Pits / Party Spots	586714	4790827	LSCCA
11.4	Fire Pits / Party Spots	586118	4791661	Lake Jojo
11.5	Fire Pits / Party Spots	586210	4791628	Lake Jojo
12.1	Unsanctioned Cycling Use	588772	4791408	CPS13
12.2	Unsanctioned Cycling Use	588459	4791123	CPS13
13.1	Boat Access to Marsh	589543	4791857	CPS15

Issue #	Management Issue	UTM Location		Management Unit
		Easting	Northing	
14.1	Forest Health Decline	589750	4793833	CPS4
15.1	Invasive Species	589200	4791684	CPS15
15.2	Invasive Species	586925	4791967	CPS8
15.3	Invasive Species	586390	4791255	CPS10
15.4	Invasive Species	586729	4791103	LSCCA
15.5	Invasive Species	586052	4791625	Lake Jojo
16.1	Wildlife Crossing / Corridors	586955	4791099	CPS11
16.2	Wildlife Crossing / Corridors	586558	4791061	LSCCA
17.1	Stream Habitat Improvement	586806	4791055	LSCCA
18.1	Vegetation Trampling	589568	4792028	CPS15