Fletcher Creek Ecological Preserve
2019 Management Plan

FINAL- October 2020

Hamilton Conservation Authority

A Healthy Watershed for Everyone

TABLE OF CONTENTS

List of Tables

1.0 APPROVAL STATEMENT

We are pleased to approve the Fletcher Creek Ecological Preserve - 2019 Management Plan as the official policy document for the Hamilton Region Conservation Authority (HCA).

This management plan supports HCA's current Strategic Plan and reflects our Vision of a healthy watershed for everyone and Mission to lead in the conservation of our watershed and connect people to nature.

Moving forward over the next ten years this plan will provide guidance for HCA management of the Fletcher Creek Ecological Preserve in support of these goals.

Lisa Burnside _____ November 5, 2020 _____

Lisa Burnside
Chief Administrative Officer
Hamilton Conservation Authority

Date

_____ November 5, 2020 _____

Lloyd Ferguson
Chair, Board of Directors
Hamilton Conservation Authority

Date

2.0 INTRODUCTION

2.1 Area Summary

The Fletcher Creek Ecological Preserve (Fletcher Creek) is a unique natural area. The 168 hectares (414 acres) were largely acquired by the Hamilton Region Conservation Authority (HCA) between 1977 and 1987 with funding assistance from the Hamilton Naturalists' Club. These environmentally sensitive lands are at the headwaters of the Spencer Creek Watershed. The site has a long history of recreational activities and in 1999, after public consultation, the HCA approved a Master Plan for this ecological preserve to prohibit swimming in the abandoned quarries, close access points, and develop trails for passive recreational use. Subsequent studies of the lands in 2002 by Harrington and Hoyle consultants resulted in the site rehabilitation and development seen today.

2.2 Key Items

Fletcher Creek is an important groundwater area with a substantial portion classified as provincially significant wetland. Significant amounts of groundwater that flow into the creek support the coldwater fishery. The subwatershed, associated extensive wetlands and shallow bedrock provide an important recharge function.

Multiple quarries operated in the past, visible on the western side near Concession Road 7 and at the eastern side bordered by private land. The eastern quarry was rehabilitated, and environmental improvements to the area resulting from the restoration included the expansion of a fen plant community (rare for southern Ontario), creation of additional habitat for rare plants and animals already in the area, a new breeding area for leopard frogs, snakes, and a variety of small mammals such as groundhogs, foxes, and bats. A mix of coniferous and deciduous trees creates a canopy that provides valuable shelter for wintering birds and mammals.

The ecological preserve offers passive day use recreation opportunities for nature appreciation. Visitor amenities include a small parking lot off Concession Road 7 and granular surfaced and mown recreational trails. The trail system includes a trailhead kiosk near the parking area, and interpretive panels and boardwalks at the rehabilitated quarry.

2.3 Goals and Objectives

This management plan updates previous HCA master plans and management studies for Fletcher Creek, supplies current mapping, and provides guidance for HCA management and operation of the ecological preserve for the next ten years.

3.0 BACKGROUND

3.1 Study Area

Fletcher Creek Ecological Preserve is a 168 hectare environmentally sensitive natural area located in the headwaters of the Spencer Creek Watershed. The ecological preserve can be accessed at Gore Road and Concession Road 7 in Puslinch Township. See appended maps for more information.

3.2 Property History

Fletcher Creek Swamp is an important groundwater area at the headwaters of Fletcher Creek at the foot of the Galt Moraine south slope. The area is considered a provincially significant wetland, with first, second, and third order tributaries flowing through and from this wetland. Coldwater streams support a population of native Brook Trout. Although no bog exists, the area has abandoned quarry pits, and a diversity of ecological communities including sedge meadow, marsh, upland forest, and mixed swamp.

HCA recognizes that First Nations inhabited this area before European contact. Respect for the history and stories of indigenous communities are supported in this management plan.

Non-indigenous settlement of the area began in the 1800's but the rocky hills proved difficult for farming. Thin soil and rock necessitated grazing with only small areas of deep soil suitable for tilling. A farmhouse was once located in the old fields north of the gravel pit but was torn down and the exact location is not determined.

The site has been visited since the 1920's by interested naturalists, primarily from the Hamilton and Guelph naturalist clubs. Naturalist Dr. Robert G. MacLaren pushed for the conservation of nature in Hamilton and other parts of Canada through his work on the Bruce Trail and other projects. Through the efforts of the HCA and Hamilton Naturalists' a memorial rock and plaque dedicated to Dr. MacLaren is placed in a clearing in a forest of hemlock.

The gravel pit, remnants of which are visible east of Concession Road 7, was in operation from the 1930's to the 1970's. It expanded slowly over time and resulted in multiple pits from west to east across the property. Two are visible adjacent to Concession Road 7 and the other two are on the

eastern edge of the property. The quarry pits on the eastern edge of the property were restored into fen and wetland habitats in the 1990's.

Another land disturbance to the area came with construction of the railroad in the past century. The rail bed altered drainage patterns in the area and resulted in the open, wet meadows that occur in the vicinity of the tracks. South of the tracks is a marsh surrounded by sedge meadow.

In 1975 the Hamilton Naturalists' Club petitioned Hamilton-Wentworth Region to undertake an inventory of Environmentally Sensitive Areas in preparation for the new Official Plan then underway. The HCA took the initiative, along with the Grand, Niagara, and Halton Conservation Authorities to fund such a study which was published in 1976 (Ecologistics). This study described the Fletcher Creek Swamp Forest as "a very unique area that contains rare and sensitive herbaceous plants". The South Wellington Environmentally Sensitive Areas Study (Eagles et. Al 1976) provided further documentation on the environmental significance of this area. During this study, Steetly Industries Ltd. was considering establishing a large quarry in a portion of the swamp. The potential impacts of such an enterprise initiated a more detailed report on the affected area (Foster and Eagles, 1976).

The construction of large hydro lines in the area began in 1976 and by 1979 the HCA entered into a lease arrangement with Ontario Hydro to manage portions of the swamp acquired for the construction of the power lines. The line is part of the Ontario grid and runs between Nanticoke on Lake Erie and Pickering on Lake Ontario. It crosses the Beverly Swamp to the south. Two utility corridors cross the Fletcher Creek lands, see *Appendix Map 1* for more information.

The studies, and the threat of quarry development stimulated the Hamilton Naturalists' Club to provide substantial funding for the HCA to purchase these environmentally sensitive lands in 1977, and 1980-1987, comprising the ecological preserve as it is today.

In 1981-82 a comprehensive environmental inventory of the ecological preserve was completed. "The Natural Resources of the Fletcher Creek Swamp Forest Conservation Area" by Eagles and Gewurz provides supplemental ecological information in this management plan. See Section 4 for more information.

In 1987 HCA opened the site to the public and began to prepare a development plan. Until the preferred plan was implemented, a “no trespassing” policy applied to the property to prohibit swimming and close access points. Through the 1990’s HCA planned for capital improvements to add a small parking lot, interpretive/washroom building, and trails for passive recreational use but due to lack of funding these were not implemented.

The hot, dry summer of 1998 stimulated unauthorized use of the ecological preserve for swimming and partying. Several complaints from area residents brought these issues to the forefront. HCA conducted public, stakeholder, and open house meetings to discuss options for the property. Various interest groups including scuba divers, retriever dog trainers, swimmers, and nature enthusiasts voiced their support for differing options but it was generally agreed that the integrity of the environment should be maintained, passive trails could be developed, and that parking was necessary.

Based on background research and public input received, HCA prepared the Fletcher Creek Conservation Area Master Plan. This plan was adopted by the Board of Directors in 1999. Work commenced immediately by HCA in 2000 with the closing of the road access from Gore Road, and construction of the parking lot on the 7th Concession. In 2001 a recreational trail loop was built and the site was re-opened to the public for passive recreation, with swimming not permitted.

In the summer of 2002, due to increased difficulties enforcing the swimming ban and roadside parking restrictions, HCA closed the property to the public and re-examined strategies for dealing with unauthorized activities and the impacts to the natural environment around the quarry. During this time, HCA retained the services of Harrington and Hoyle Ltd., a consulting firm with quarry expertise, to assist in preparing a rehabilitation concept. Their 2002 Concept Brief for site rehabilitation helped kick-start the fundraising efforts needed to realize the development goals for the property seen in place today.

By 2004, HCA, in partnership with the Township of Puslinch, McMaster University and the University of Toronto, received government funding to improve the site and create a calcareous fen, one of the rarest forms of wetlands in Southern Ontario, as well as other habitat improvements.

Additional funding was also received from The Ontario Aggregrate Resources Corporation (TOARC) for wetland rehabilitation, and to support research projects on the site. TOARC initiated an experiment to see if alvar habitats could be replicated on the quarry floor.

The work was mainly completed by the University of Guelph and involved a variety of experiments. Results were mixed and there are still alvar representative plants growing on the property in the old quarry floor.

With these funds, volunteers interested in helping with planting, and donations of granular materials from Lafarge Canada Inc., site work commenced. The wetland rehabilitation, re-vegetation of the site, and trail improvements work were all completed and a two-year monitoring program implemented to ensure the works were installed, maintained, and functioning as intended under the permits obtained for the projects.

In 2006 the interpretive kiosk and entrance sign were in place, and additional trail improvements completed on the trail system by HCA. Since 2006 HCA staff operating out of Valens Lake Conservation Area have been maintaining the property to support the level of recreational use envisioned in the original master and management plans.

3.3 Planning and Development Controls

The ecological preserve is located in the Township of Puslinch, Ward 7 of the County of Wellington and subject to planning and development controls of Wellington County.

3.4 Management Plan Zones

The appended map shows the management plan zones for Fletcher Creek.

HCA has approached this management plan with the mind-set that conservation areas in the HCA portfolio requiring master or management plans and updates follow a consistent methodology. Although Fletcher Creek is not located within the jurisdiction of the Niagara Escarpment Commission, the policies of the Niagara Escarpment Plan and guidelines of the Niagara Escarpment Parks and Open Space System (NEPOSS) planning manual have been observed in the preparation of this management plan.

Zones are intended to fulfill a variety of functions in the ecological preserve, including the following as outlined in the current NEPOSS manual:

- Identification and recognition of the features and attributes.
- Protection of key natural and cultural heritage features and functions.
- Segregation of conflicting recreational activities with higher impacts to the least sensitive areas and low-impact activities to areas that are more sensitive, if appropriate.
- Delineation of areas on the basis of their requirements for management.
- Standardization of the approach to support management objectives and actions, based on a variety of features.
- Balancing of public use with the preservation of the natural environment.

Six management zones have been identified for Fletcher Creek: Nature Reserve (wetland), Natural, Access, Cultural Heritage, Development, and Resource Management. Following is a brief description of each zone.

Nature Reserve (wetland) Zones

Fletcher Creek's nature reserve zones include provincially significant wetlands and watercourses. Nature reserve zones are intended for long-term protection of significant earth and life science features which require management distinct from that of adjacent zones, as well as a protective buffer with an absolute minimum of development. Permitted management for these areas is to protect, preserve and rehabilitate identified natural heritage features. Visitor uses are limited or restricted, and development is generally restricted to trails, necessary signs, interpretive facilities (where warranted), temporary research facilities and conservation practices.

Natural Zones

Natural zones include natural, cultural, and aesthetic landscapes in which minimum development is required to support low-intensity recreational activities. This zone can function

as a buffer between Nature Reserve areas and other zones. Environmentally Significant Areas (ESA) are included in this zone, and the boundary of this zone has taken the ESA mapping into account.

Access Zones

Access zones serve as staging areas to support the use of and access to adjacent zones. Fletcher Creek's access zones are located at the main entrance parking lot as well as the service gate further north on Concession Road 7, as well as the service gated entrance on Gore Road. Permitted development in access zones include roads, signs, trailheads and parking lots.

Cultural Heritage Zones

Cultural Heritage zones are intended to protect significant archaeological or cultural heritage features, or areas that require management that will ensure the long-term protection of these features. Management planning for these features may range from maintaining their present condition to restoring and/or reconstructing the site. Permitted uses include protection and interpretation of archaeological or cultural heritage features. The remnant features from the former quarry operation visible from the trail system are one example noted on the appended map. Should future archaeological investigation reveal features on the property, these zone areas would be added to the management plan mapping.

Development Zones

Development zones provide the main access to the ecological preserve or open space. Development of facilities and services are permitted suited to the recreational opportunities and natural character of the ecological preserve. The development area for Fletcher Creek includes the main parking lot and trail head kiosk from Concession Road 7. Permitted uses in this zone include roads, parking lots, picnic areas, orientation, interpretation, educational, and maintenance facilities. Development in this zone must be planned, designed and undertaken in a way that will be environmentally sustainable and minimize environmental and visual impact.

Resource Management Zones

Resource management zones include areas managed to provide resource-related projects such as forest products, disturbed areas requiring restoration, and land that has a long-term resource agreement such as a managed forest. Fletcher Creek has areas of managed forest, see *Appendix 3* for more information. This zone is to be sustainably managed for many diverse values such as wildlife, fisheries, forestry and outdoor recreation, and may also be used for research and demonstrating ecologically sustainable management practices. Recreation uses in this zone are subject to HCA policies and management planning.

4.0 NATURAL AREA INVENTORY

4.1 Natural Features

The Fletcher Creek Swamp Forest is designated an Environmentally Sensitive Area and Life Science Area of Regional Significance based on the sensitive hydrologic regime, the diverse and unusual biotic communities, cold-water stream habitat, and presence of rare species (Hamilton-Wentworth Natural Areas Inventory). As well, the Fletcher Creek Swamp is classified as a Provincially Significant (Class 1) Wetland. These areas are shown as Nature Reserve (Wetland) zones on the appended Management Plan Map 1.

.1 Fletcher Creek Swamp Forest Environmentally Significant Area (ESA).

The Fletcher Creek Swamp Forest Environmentally Significant Area (FLAM-24) extends across the northern boundary of the City of Hamilton into Wellington County and is 1890 acres. Fletcher Creek is 414 acres encompassing 22% of the ESA. The ecological preserve contains a mix of vegetation including wetlands, forests, plantations and meadows. This ESA was designated because it meets eight of the 2003 ESA criteria including:

1. The riparian area serves as a link between many natural areas
2. Habitat for significant species
3. A wintering area for deer
4. The area contains interior forest habitat (100-200m from forest edge)
5. There are regionally significant plant communities, including extensive, high-quality coniferous swamps in the Hamilton area and a sedge meadow fen community in Wellington County

6. The landforms are representative of features associated with the Horseshoe Moraines and Flamborough Plain physiographic region
7. The natural vegetation of the area helps to maintain water quality in the headwaters of Fletcher Creek
8. The area contains numerous springs and seeps that feed Fletcher Creek, a coldwater stream

.2 Fletcher Creek Swamp Provincially Significant Wetland (PSW) Complex

The Fletcher Creek Swamp Wetland also occurs on all parcels owned by HCA within this area. This is a provincially significant Wetland Complex was evaluated by the MNRF in 1985 and verified in 1998. It is 1,300 acres of which 127 acres is within the HCA ownership. Wetland areas within this complex includes White Cedar, Silver Maple and Black Ash Swamps and fen communities.

.3 Fletcher Creek Swamp Regional Life Science Area of Natural and Scientific Interest (ANSI)

This is a regionally significant ANSI and was designated in the 1980's for its biodiversity, diverse ecological systems (bog, sedge meadows and swamp forest) and rare plant species.

.4 Physiography and Topography

The Fletcher Creek Swamp Forest is situated between the Flamborough Plain and Horseshoe Moraines physiographic regions. The natural area is in a poorly-drained trough between the Galt Moraine to the northwest and the parallel Moffatt Moraine to the southeast. Both of these moraines have a hummocky surface with small ponds in low-lying areas. Gravel outwash is present locally along the margins of these moraines and have been exploited for aggregate products.

Elevations in the inter-moraine trough range generally from 280 to 285m. A few drumlins (290 to 303m high) in the area between the moraines have been cleared for agricultural and residential uses, these drumlins are outside this study area.

.5 Bedrock and Overburden Geology

Bedrock in this area is generally dolostone of the Guelph Formation, at the eastern end it changes to bituminous dolostone of the Eramosa Member of the Lockport Formation. The bedrock surface forms an uneven south –sloping plain (295 to 280m), and the Guelph Formation bedrock outcrops locally along the boundary.

Overburden is highly variable and includes material deposited at various points during the periods of glacial advance, stagnation, and retreat. Coarse sandy till, gravel, and sand can be found in the region.

.6 Soils

Organic soils have accumulated in the large wetlands which form the core of this area. Dumfries loam is present along the well-drained till ridges. Imperfectly drained loams are present locally.

.7 Hydrogeology

Water wells in the area tap an aquifer found at about 274m elevation, from 6 to 9m below the bedrock surface. Groundwater flow is southerly; the piezometric surface is generally coincident with the topographic surface in the inter-moraine basin. In the northern portion of

the area numerous springs discharging groundwater have been observed. The Galt Moraine, and to a lesser extent the Moffatt Moraine function as regional groundwater recharge zones. Recharge of the bedrock aquifer may also occur along fractures within the wetlands developed on generally impermeable bedrock. Due to the shallow sandy soils in the inter-moraine area, the groundwater resource is susceptible to contamination.

The hydrological regime of this natural area is groundwater dependent. Land use changes within or in the vicinity of this area could impact adversely on the hydrological regime.

.8 Hydrology and Surface Drainage

Fletcher Creek originates along the southeast face of the Galt Moraine to the north, and drains through the wetlands before entering into Spencer Creek downstream. Groundwater discharge from the Galt Moraine, and to a lesser extent the Moffatt Moraine, combined with the moderating effects of the swamp, provide this headwater creek system with a permanent high-quality cold-water regime. Consequently, this area serves two important hydrological functions in maintaining cold-water stream habitat, and in maintaining the regional hydrological balance.

4.2 Biophysical Inventory Methodology

The chart below summarizes the dates and times for the terrestrial and aquatic field inventory.

Table 1: Terrestrial and Aquatic Field Inventory Summary

Survey Type	Dates	
	Year	Day(s)
Floral Inventory	2019	April 30 and various throughout field season
Frog call surveys	2019	April 6, May 16 and June 19
Breeding Bird Surveys	2019	May 31, June, 4,6, 21 and July 3
Ecological Land Classification	2019	Various days throughout the field season
Aquatic Surveys	2019*	
Incidental Wildlife	Recorded when encountered during all visits	

*most recent surveys completed

As noted in the chart above a variety of biophysical inventories were conducted for the various properties within the Fletcher Creek Ecological Preserve (FLAM-24). These included

Ecological Land Classification, botanical inventories, breeding birds, herpetofauna and mammals. No specific surveys were conducted for butterflies or dragonflies for this management plan. Historical information is available and is discussed in the results section.

Ecological Land Classification (ELC) for the majority of properties surveyed was completed by HCA in 2019 using the ELC system for Ontario (Lee et. al. Draft 2009) to describe the vegetation communities within the Fletcher Creek. This is the first time this property has been surveyed using ELC and the first extensive botanical inventory since 1976. Vegetation community boundaries were determined using air photo analysis and further refined in the field. Details on the canopy, sub-canopy, shrub and ground layers of each vegetation community were recorded.

Botanical inventories were conducted as a part of the Ecological Land Classification surveys of the property. Specific floristic inventories also occurred in the spring in hardwood forests within the management plan area. This was to specifically survey for spring ephemerals (early spring flowers) as these can die back throughout the summer and not be identified later in the season. Species nomenclature is based on the Natural Heritage Information Centre vascular plant species list, last updated in 2018 (NHIC 2018). Species and community ranks were determined provincially using the Ministry of Natural Resources and Forestry Natural Heritage Information Center Database (Sranks) and locally via the Hamilton Natural Areas Inventory (Schwetz 2014).

Breeding bird surveys were completed between 5 am and 10 am, with two visits between May 24 and July 10th. The methodology follows the Ontario Breeding Bird Atlas (Cadman 2010), with all species recorded as present, possible, probable, or confirmed depending on the level of breeding activity observed. Point count stations, 10 minutes in duration, were completed for the various vegetation communities found at Fletcher Creek. These surveys were conducted in appropriate weather conditions with no rain and low or no wind speed.

Butterfly observations were gathered from inaturalist (ebutterfly checklist) for the Fletcher Creek property. They range from 2014 – 2019 and include 35 species of butterfly. Monarch butterflies were observed on this property both by local naturalists and by HCA field staff. This species at risk will be discussed further in Section 5.2

Road side point counts were conducted on three separate nights to capture the diversity of amphibians breeding in Fletcher Creek. This survey methodology followed the Marsh Monitoring Program and 8-point count stations were completed. The Marsh Monitoring

Program focuses on the survey of calling amphibians. All other herpetofauna were recorded via incidental observations.

All mammal encounters were recorded while conducting other aspects of field work, there were no specific surveys for these taxa. These surveys involved general coverage recording all species observations and signs (e.g. tracks/trails, scat, burrows, dens, browse, and vocalizations).

4.3 Ecological Land Classification Results

The ELC survey of this HCA property resulted in the classification of 35 vegetation community polygons (Table 2). Many of these communities occurred on multiple portions of the property due to the uniform nature of some of the swamp communities. A detailed description of each ELC polygon follows. None of the ELC communities identified are provincially or globally rare.

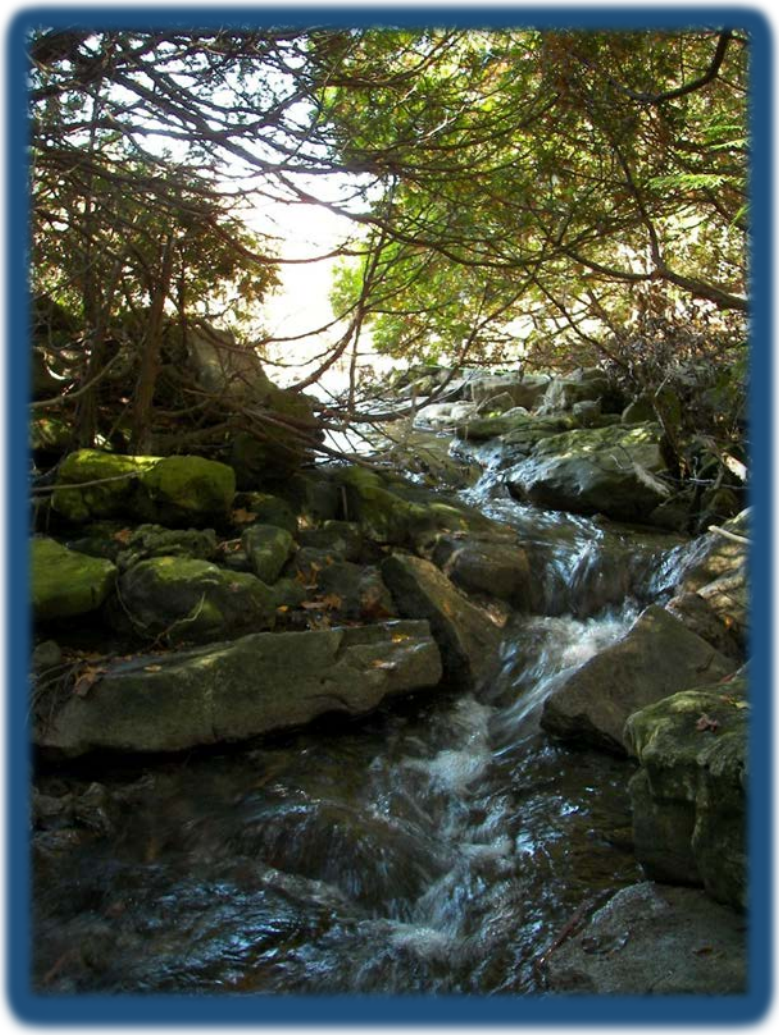

Table 2 ELC Survey Community Types

ELC Code	Community Description
Coniferous forest	
FOCM2-2	Dry-fresh White Cedar Coniferous Forest Type
Deciduous forest	
FODM6-5	Fresh-Moist Sugar Maple – Hardwood Deciduous Forest Type
Mixed forest	
FOMM6-1	Fresh-Moist Sugar Maple – Hemlock Mixed Forest Type
Meadow	
MEG	Graminoid Meadow Series
MEGM3	Dry-fresh Graminoid Meadow Ecosite
MEGM3-9	*Carex flacca* Graminoid Meadow Type
Woodland	
WOCM-1-2	Dry-fresh White Cedar Coniferous Woodland Type
WODM5-1	Fresh-Moist Poplar Deciduous Woodland Type
WODM4-3	Dry-Fresh Sugar Maple Deciduous Woodland Type
WODM4-3	Dry-Fresh Sugar Maple Deciduous Woodland Type
Coniferous swamp	
SWCO1-1	White Cedar Organic Coniferous Swamp Type
SWCO1-2	White Cedar – Conifer Organic Coniferous Swamp Type
SWCM1-2	White Cedar – Conifer Mineral Coniferous Swamp Type
Deciduous swamp	
SWDO3-2	Yellow Birch Organic Deciduous Swamp Type
SWDM3-3	Swamp Maple (Freeman's) Mineral Deciduous Swamp Type
Mixed swamp	
SWMM 1-1	White Cedar- hardwood mineral mixed Swamp
Thicket swamp	
SWTM3	Willow Mineral Deciduous Thicket Swamp Ecosite
SWTM5-8	Non-Native Mineral Deciduous Thicket Swamp Type
Fen	
FE	Fen
FEOG1	Graminoid Open Fen Ecosite
FEOM1-1	Bog Buckbean – Sedge Mixed Open Fen Type
FETC 1-1	Tamarack Treed Fen Type
FETC 1-2	Tamarack – White Cedar Treed Fen Type
Marsh	
MAMM	Meadow Marsh
MAMM2	Forb Mineral Meadow Marsh
MAMM1-2	Cattail Graminoid Mineral Meadow Marsh Type
MASM1-4	Narrow-leaved Sedge Mineral Shallow Marsh Type
Plantation	
FOCM6-1	Dry-fresh White Pine Naturalized Coniferous Plantation Type
TAGM1	Coniferous Plantation Ecosite
Thicket	
THDM2-6	Buckthorn Deciduous Shrub Thicket Type
THDM4-1	Native Deciduous Regeneration Thicket Type
Alvar/Rock barren	
RBS and FOC	Shrub Rock Barren
RBOA1-3	Dry-Fresh Little Bluestem Open Alvar Meadow Type
Aquatic	
OAO	Open Aquatic Pond
SAF_1-4	Pondweed Floating-leaved Shallow Aquatic Type

.1 Coniferous Forest

.1Dry-fresh White Cedar Coniferous Forest Type (FOCM2-2)

This ecosite is a mixture of natural and cultural (partially planted) coniferous forest found in the Northern half of Fletcher Creek (west of Concession Rd 7), and is dominated by Eastern White Cedar. Additional canopy species include White Pine, Trembling Aspen, and White Ash. Ground cover is sparse likely due to dense tree cover, and composed of a mix of Poison Ivy, Prickly Ash, White Bear Sedge, and White Ash. A Graminoid Meadow (hydro corridor) runs North-South through the polygon, with the Western portion containing a recreational ATV trail.

This polygon also occurs on the parcel east of Concession Rd 7 and north of the rail line and is located roughly in the middle of this property. It is, and is a dry-fresh Eastern White Cedar dominated upland area. There are rare occurrences of White Pine, Tamarack, Black Walnut, Red Cedar, Trembling Aspen and Sugar Maple as well. Ground cover is sparse due to the density of the canopy/sub-canopy, and consists of a mix of species such as Common Buckthorn, Alternate-leaved Dogwood, Poison Ivy, Riverbank Grape, Bladder Campion, and Brown Knapweed.

This ecosite covers the majority of the treed area in Fletcher Creek, (east of Concession Rd 7, south of the rail line) and occurs multiple times throughout the property. This polygon starts adjacent to the parking lot off Concession Rd 7 and runs along the main trail into the property. The Eastern White Cedar dominated forest in this section is much denser than in sections further east into the property, the resulting effect being a ground layer that is much sparser (0-10%). The remainder of the polygon spreads into the property and is also dominated by Eastern White Cedar, with rare occurrences of Paper Birch, Poplar, and White Pine. This polygon contains more open spaces, allowing for slightly more diverse and abundant ground cover such as the non-native species Carex flacca and Glossy Buckthorn, White Bear Sedge, Bracken Fern, and Poverty Oatgrass.

.2 Deciduous Forest

.1 Fresh-Moist Sugar Maple – Hardwood Deciduous Forest Type (FODM6-5)

This polygon is located in the Northern forested section of property and surrounds a wetland/swamp. This small upland forest area is impacted on the Northern edge by Concession 10 West, by agricultural fields to the West and South, and by a private residential property in the East. Canopy and subcanopy is composed of species such as Sugar Maple, American Beech, Hemlock, and Basswood. The understory is primarily American Beech and Alternate-leaved Dogwood, along with Chokecherry, Ironwood, and Musclewood. Ground cover is variable and covers less than 60% of the polygon area, and includes species such as Jack-in-the-pulpit, Zig-zag Goldenrod, Wild Ginger, Toothwort, Carex albursina, Bluestem Goldenrod, and Giant Blue Cohosh.

.3 Mixed Forest

.1 Fresh-moist Sugar Maple – Hemlock Mixed Forest Type (FOMM6-1)

This mixed forest dominates the Eastern half of this property (east of Concession Road 7 and north of the rail line) and is one of the larger polygons on the site. Sugar Maple is slightly more dominant of a canopy than Eastern Hemlock, with rare occurrences of Basswood, White Birch, and White Ash scattered throughout. The understory layer is mostly the non-native Common Buckthorn although young regenerating Sugar Maple is fairly abundant as well. White Ash, Basswood, Red Elderberry, Prickly Gooseberry and Alternate-leaved Dogwood are also present in lesser quantities. Ground cover is mainly small Sugar Maple seedlings, mixed with Herb Robert, Yellow Trout Lily, and Alternate-leaved Dogwood as well as a mixture of sedges and ferns.

.4 Meadow

.1 Graminoid Meadow Series (MEG)

This graminoid meadow polygon is the result of the hydro corridor running through the northern half of Fletcher Creek (west of Concession Rd 7). Based on air photo interpretation, this site is likely similar to a Graminoid Meadow polygon with scattered Carex Flacca and planted Scots and Austrian Pine. Ground cover is composed of mixed grasses, sedges, and forbs including Brown –eyed Susan, Crown Vetch, Redtop, Timothy, and Poison Ivy.

There are two more graminoid meadow polygons dominate the Northwest quarter of the property (east of Concession Rd 7 and north of the rail line). The western half is the result of a retired commercial extraction site (quarry) and contains an open aquatic section as a result, but overall the communities are quite similar. The main trail on the property runs North through both these polygons, as well as branching off to the East. Canopy is very sparse, dominated by White Pine in the Eastern half of these communities and transitioning to Birch and Trembling Aspen closer to the old quarry. The understory is also sparse and variable containing Common Buckthorn, Honeysuckle, Willow species, Eastern White Cedar, Grey Dogwood, and White Poplar. Ground cover in both sections is dominated by various grass species, with taller grasses such as Reed Canary and Timothy in east and shorter Panic grass (Dichanthelium sp.) in west. Additional species in the ground layer of these sites include White and Yellow Sweet-clover, Queen Anne’s Lace, Common Milkweed, and English Plantain. The western polygon has very shallow, rocky soil resulting in sparser and shorter vegetation than the eastern polygon.

.2 Dry-fresh Graminoid Meadow Ecosite (MEGM3)

This cultural meadow site is located in the far Southeast corner of Fletcher Creek, east of Concession Rd 7 and north of the rail line. This polygon is mostly an open meadow, with the exception of clusters of planted White and Scots Pine in the Northern third of the property.

The sparse and scattered shrubby understory is dominated by non-native species, mainly Tatarian Honeysuckle but mixed with Russian Olive, Common Buckthorn, and Austrian Pine. Ground cover is dominated by a mixture of grass species and Black Medic, as well as a combination of other species including clover, goldenrod, and asters. The invasive non-native Dog-strangling Vine was also found near the railway tracks on this site and should likely be managed before it spreads to more of the natural area.

.3 *Carex flacca* Graminoid Meadow Type (MEGM3-9)

This open meadow ecosite dominates much of the Southwestern quarter of the Fletcher Creek (east of Concession Rd 7) property, as well as a significant portion of the Southeastern corner. Both the East and West sections are impacted by trail systems running through them, and the East portion is divided by creek headwaters running from the retired quarry area. In both sections, canopy is sparse and composed of Sugar Maple and Trembling Aspen, with a subcanopy of Eastern White Cedar, White Ash, and Apple. The West portion is partially divided by multiple deciduous hedgerows containing species such as Basswood, Sugar Maple, White Ash, White Cedar, and Apple. White Pine, Austrian Pine, and Scots Pine have been planted in both sections and appear sporadically in clusters. The West portion has occurrences of Honeysuckle, where the East has non-native invasive Lilac bushes, especially along the trail. The non-native species Carex flacca dominates much of the ground layer in both sections, and Spotted Knapweed is common along much of the trail system. Other species in the ground layer include Arrow leaved Aster, Chokecherry, Poverty Oatgrass, Tall Goldenrod, and English Plantain.

.5 Woodland

.1 Dry-fresh White Cedar Coniferous Woodland Type (WOCM-1-2)

Located in the Northeastern corner of Fletcher Creek (west of Concession Rd 7), this polygon is dominated by Eastern White Cedar in the canopy, sub-canopy, and understory layers. Red Pine, Austrian pine, Serviceberry and Tartarian Honeysuckle are also present in lesser quantities. Shallow soil with areas of exposed bedrock result in short, thin, and shrubby cover with relatively little ground cover (10-25%) of species such as Poverty Oatgrass and the non-native *Carex flacca*. Recreational use is evidenced through well marked tracks and trails and dumping of rubbish such as used shot-gun shells.

.2 Fresh-Moist Poplar Deciduous Woodland Type (WODM5-1)

This polygon occurs mostly just to the West of the restored quarry site in the Eastern corner, and then again to the Southeast. Soil is very thin with sections of exposed rock, potentially due to past cultural activity associated with the quarry site. Canopy and subcanopy is dominated by Trembling Aspen, with some sections potentially planted due to the liner

layout. Balsam poplar, Basswood, Black Walnut, Sugar Maple, and Ironwood are also present. Understory is abundantly non-native shrub species such as Glossy and Common Buckthorn, Lilac, and Privet as well as Alternate-leaved Dogwood, Willow, and Grey Dogwood. Ground layer is typical for a dry, disturbed habitat with thin soil and contains species such as Panic grass, Carex flacca, Riverbank Grape, Virginia Creeper, Viper's Bugloss, Brown and Spotted Knapweed, Poverty Oatgrass, and Queen-Anne's Lace. There are two inclusions in this polygon, one being a shrub rock barren and the other being a dense cedar patch surrounding the rock barren.

.3 Dry-Fresh Sugar Maple Deciduous Woodland Type (WODM4-3)

This runs alongside some of the coniferous plantations in the Northeastern corner of the Fletcher Creek property, acting as a kind of deciduous hedgerow between the plantation and the Eastern quarry site. This site is not overly diverse, with Sugar Maple and Black Cherry mainly in the canopy, as well as Bitternut Hickory and Basswood. Subcanopy contains White Ash, Musclewood, and White Pine, and shrub layer is predominately Common Buckthorn and Black Locust. Ground layer is also not diverse, mainly composed of Carex flacca, Tall Goldenrod, Riverbank Grape, and Virginia Creeper.

.4 Dry-Fresh Sugar Maple Deciduous Woodland Type (WODM4-3) and Dry-fresh Graminoid Meadow Ecosite (MEGM3) complex

This portion of Fletcher Creek was not formally surveyed due to its location across rail-road tracks and therefore unable to be accessed. Based on air-photo interpretation, this site is likely similar to polygon a mix of Graminoid Meadow Type with grasses and sedges located to the south as a meadow that is dominated by the non-native sedge Carex with scattered planted Scots and Austrian Pines. The middle portion of this northern parcel is potentially a deciduous hedgerow/woodland similar to WODM4-3 with a possible mix of Sugar Maple, Basswood, and Black Cherry in the canopy.

.6 Coniferous Swamp

.1 White Cedar Organic Coniferous Swamp Type (SWCO1-1)

This organic white cedar swamp is located on the Eastern edge of Fletcher Creek (west of Concession Rd 7 where a portion of Fletcher Creek originates from natural springs. The area was determined to be organic due to the presence of 55 cm of organic, fibric material. The canopy and sub-canopy is dominated by Eastern White Cedar with rare occurrences of White Birch and Black Spruce. The understorey is a combination of Glossy Buckthorn and Labrador Tea, with lesser occurrences of Huckleberry, Red-Osier Dogwood, and Winterberry. Ground cover is diverse swamp vegetation such as Blue-Bead Lily, Sensitive Fern, Sphagnum Moss, Starflower, Gold Thread, and Round-leaved Sundew.

.2 White Cedar – Conifer Organic Coniferous Swamp Type (SWCO1-2)

This organic conifer swamp covers most of the Northwestern and central portions Fletcher Creek (west of Concession Rd 7). Canopy and sub-canopy are more mixed than in SWCO1-1, but still dominant in Eastern White Cedar with Tamarack, White Pine, Yellow Birch and Green Ash mixed in. Glossy Buckthorn is abundant in the understorey, with occasional Tamarack shrubs and rare occurrences of deciduous species such as Freeman's Maple, Black and Green Ash, and Red-osier Dogwood. Multiple springs and watercourses cross through the polygon, creating areas of varying vegetation. Overall, ground cover in the Northern portion is dominated by Carex interior, transitioning to another sedge species (likely C. pennsylvanica) in the most Southern section. Additional vegetation is mixed overall, including Marsh Marigold, Wild Llily of the Valley, Starflower, Gold Thread, Dewberry, Sarsaparilla, and Partridge Berry. This vegetation community also occurs across Concession Road 7 north of the rail line. It is a dense vegetation community with many of the same attributes of the polygon to the west.

.3 White Cedar – Conifer Mineral Coniferous Swamp Type (SWCM1-2)

This ecosite is located in the Northwest corner of the property and is divided by polygon a cattail shallow mineral marsh (MAMM 1-2). One section is impacted by the railway running along the North edge of the property, and the other section is impacted by Concession Rd 7 on the West edge. Both sections contain a mix of variable canopy, subcanopy, and understory such as Eastern White Cedar, Tamarack, Paper Birch, Black Spruce, and Glossy Buckthorn. Ground cover is composed of a variety of typical coniferous swamp species, mainly American Water-horehound, Sensitive Fern, Tussock Sedge, Graceful Sedge, Yellow Sedge, Water Horsetail, and Dewberry.

Located on a narrow property adjacent to the Lafarge 2000 Trail this vegetation community was a mix of Eastern White Cedar, White Birch, Freeman's Maple and Black Ash. The majority of the cover for these trees was sparse leading to a moderate canopy cover at a height between 2 and 10 m. Winterberry shrubs are abundant as was a diverse ground cover of Star Flower, Wild Lily of the Valley, Dwarf Raspberry and sedges.

.7 Deciduous Swamp

.1 Yellow Birch Organic Deciduous Swamp Type (SWDO3-2)

This ecosite is in the Southwestern corner of Fletcher Creek (west of Concession Rd 7), and is dominated by a canopy of Yellow Birch, with White Birch, White Elm, and Tamarack in lesser amounts. Glossy Buckthorn is occasional in the understory, with rare amounts of Red-osier Dogwood, Eastern White Cedar, Huckleberry, and Yellow Birch. The ground layer is dominated by Dewberry with abundant Aquatic Horsetail, and occasional Showy Lady's Slipper, Sensitive Fern,

Tufted-Loosestrife, Marsh Fern, Carex comosa and Glossy Buckthorn. The Southern edge of this polygon is impacted by the presence of the rail line.

.2 Swamp Maple (Freeman's) Mineral Deciduous Swamp Type (SWDM 3-3)

This swamp type is located off of Lennon road on two parcels, north and south of 10th Concession. Both have a canopy of Freemans Maple. The northern parcel is more diverse with Trembling Aspen, Balsam, Poplar and Black Ash also in the subcanopy. The southern parcel is very open with standing water for the majority of the spring whereas the northern parcel is saturated all year. Sedges dominated the ground cover in both polygons with the southern one also having a variety of herbaceous plants such as dwarf raspberry, marginal wood fern, water hemlock and jewel weed.

.8 Mixed Swamp

.1 White Cedar- hardwood mineral mixed Swamp (SWMM 1-1)

This is a mixed deciduous and coniferous swamp with few invasive species. The canopy was a mix of White Cedar, Yellow Birch and Freeman Maple with an understory and shrub layer of White Cedar. The ground cover was diverse and more abundant in the sections dominated more by deciduous trees. Jewel Weed, Common Water Hemlock, and various sedge species dominated the ground cover. This is a small pond also located on the eastern edge of this community and was surrounded by willows and Reed Canary Grass.

.9 Thicket Swamp

.1 Willow Mineral Deciduous Thicket Swamp Ecosite (SWTM3)

This thicket swamp polygon is located near the middle of the property (east of Concession Rd 7) and surrounded by dry cedar forest. Canopy and subcanopy both consist of stunted willow shrubs, with cattails, Glossy Buckthorn, and Red-osier Dogwood in the understory. Standing water was still present in late July, as well as a resident snapping turtle and approximately 10 monarch caterpillars feeding on Swamp Milkweed. Floating-leaved Pondweed was present in the flooded areas, with wetland vegetation such as Spotted Joe-pye-weed, Little Green Sedge, Canada Rush, Reed Canary Grass, and Yellow Sedge around the edges.

.2 Non-Native Mineral Deciduous Thicket Swamp Type (SWTM5-8)

This polygon is predominantly Eastern White Cedar in the canopy but is rapidly regenerating into a Glossy Buckthorn thicket swamp. Understory also contains Narrow-leaved Cattail, Willow sp., Tamarack, and Reed Canary Grass. The ground layer is variable wetland species such as sedges, Bulbous Water hemlock, Canada Rush, Red-osier Dogwood, and Spotted Joe-pye-weed.

.10 Fen

.1 Fen (FE)

This fen polygon is unique due to the high level of cultural impact and disturbance that resulted in the creation of the site. Because of this, although the soil is organic it is not found

at a depth of greater than 40 cm before reaching bedrock underneath. Due to the unique conditions surrounding this site, it is difficult to find a fitting ecosite type in the current ELC classification system. The canopy, subcanopy, and understory layers are all very sparse, containing mainly Paper Birch, Glossy Buckthorn, and Eastern White Cedar respectively. Needle Beaksedge dominates the ground layer along with abundant Scouring Rush, and rare occurrences of other species such as Hooded Ladies-tresses, Goldenrod and aster species, Soft-stemmed Bulrush, Bittersweet Nightshade, and Canada Rush.

.2 Graminoid Open Fen Ecosite (FEOG1)

Sedges dominate this fen polygon in the central portion of Fletcher Creek. It is an open community with little tree cover. Other species that occur include Marsh Bedstraw, Boneset, Marsh Bellflower, and Tufted Loosestrife, all of these are rare. There is a small patch of invasive *Phragmites australis* growing around the edges of this fen.

.3 Bog Buckbean – Sedge Mixed Open Fen Type (FEOM1-1)

This fen is just north of the FEOG1 and was also dominated by sedges, but was wetter, with a thin cover of water and distinctly different species including Bog Goldenrod, Bog Buckbean, Two Beaked Sedge, Spike Rush and Hard-stemmed Bulrush.

.4 Tamarack Treed Fen Type (FETC 1-1)

This polygon runs from the Southern edge to the Eastern edge of Fletcher Creek (west of Concession Rd 7), with the Southern edge being impacted by the presence of the rail line. The sparse canopy and sub-canopy consists only of tamarack, with the dominant understory vegetation being Common and Narrow-leaved Cattail. Willow, Huckleberry, and Glossy Buckthorn are also present, as well as the non-native Phragmites australis. Sphagnum Moss, Carex flava, and Carex interior are occasional in the ground layer, as well as rare levels of Dewberry, Round-leaved Sundew, and Snowberry. This polygon becomes more open towards Concession Road 7 and changes slightly to having more Narrow-leaved Cattail combined with rare sections of the non-native, invasive Phragmites australis. An open water aquatic portion lies between the corner of the property and this polygon

.5 Tamarack-White Cedar Treed Fen Type (FETC 1-2)

A complex vegetation community with a canopy of sparse Tamarack and Black Spruce. White Cedar, but in a stunted format was more dominant in the shrub layer at an overall canopy cover of about 40%. Many fen indicators were found in this community including Labrador Tea, Huckleberry, Velvet-leaved Blueberry, Round-leaved Sundew, Sphagnum Moss and Creeping Snowberry. The ground layer was diverse with a wide variety of sedges

along with the herbaceous plants mentioned above. Glossy Buckthorn in scattered throughout this community where as Phragmites australis occurred in a few clumps.

.11 Marsh

.1 Meadow Marsh (MAMM)

This was a small marsh community surrounding an open water area near the rail line. Soil samples were not taken, but based on the vegetation this community might be on organic soils. Standing water occurred throughout the polygon with Tamarack providing sparse canopy cover of 20%. Cattails and soft stemmed bulrush were abundant throughout the shrub and ground layers. Other species noted included Canada Blue Joint Grass, Tussock Sedge and Porcupine Sedge. It is likely this water is backed up at the rail line creating this vegetation community.

.2 Cattail Graminoid Mineral Meadow Marsh Type (MAMM1-2)

This meadow marsh polygon is located in the Southwest corner of the property, and is impacted by both Concession Road 7 on the West border and the railway tracks along its South border. The sparse canopy and sub-canopy is composed of Tamarack, White Pine, White Birch, and Glossy Buckthorn. Understorey is dominated by Narrow-leaved Cattail with occasional Eastern White Cedar shrubs and Glossy Buckthorn. The non-native invasive species Phragmites australis is also present on this site running alongside the railway tracks. Ground layer consists mostly of native wetland species such as Carex flava, Carex hystericina, Carex aurea, Boneset, Marsh Fern, Labrador Tea, Pitcher Plant, and Water-horehound. This community also occurs on the east side of Concession Road 7, in the central portion of Fletcher Creek north of the trail and on the eastern side of the property adjacent to Gore Road, all of these have a similar vegetation composition. A small occurrence of this wetland is in a small polygon off of Lennon Road. It is partly dominated by Phragmites as well as cattails.

.3 Forb Mineral Meadow Marsh (MAMM2)

White Cedars occurred rarely in the canopy of this polygon along with White Birch, Balsam Poplar and willow species. The ground cover was diverse and abundant species included New England Aster, Field Sow Thistle, Queen Ann’s lace and grasses.

.4 Narrow-leaved Sedge Mineral Shallow Marsh Type (MASM1-4)

This polygon is located in the West half of the Fletcher Creek property east of Concession Road 7, and is an open shallow marsh ringed by a combination of dry Cedar upland and coniferous Cedar swamp. An old, disused boardwalk runs through most of the polygon, but is not connected to any maintained or active trail. Canopy and subcanopy are both sparse and contain Tamarack, Paper Birch, and Eastern White Cedar. Cattails are present in the understory but do not dominate the site, with variable ground cover being most abundant overall. Ground layer species present include Tussock sedge, Red-osier Dogwood, Marsh Fern, Sensitive Fern, Joe-pye-weed, and Canada Blue-joint.

.12 Plantation

.1 Dry-fresh White Pine Naturalized Coniferous Plantation Type (FOCM6-1)

This plantation site is more naturalized due to the die-off of multiple White Pine, creating a more diverse understory and ground cover than most dark, dense plantation sites. It is located in the northeast corner of the property parcel east of Concession Road 7and north of the railway. The canopy still covers most of the polygon, and is composed of White Pine, Norway Spruce and White Spruce, with rare instances of Red Pine and Basswood. The understory consists of Common Buckthorn, Goldenrod, and Black Walnut saplings, as well as Black Raspberry, Russian Olive, Bristly Green Briar, and Rose. Poison Ivy, Knapweed, and Common St. John's-wort are most abundant in the ground layer, as well as Clover, Aster, Strawberry, Orange-fruited Horse-gentian, and Hawkweed to a lesser extent.

.2 Coniferous Plantation Ecosite (TAGM1)

This plantation site is located in the Northeast corner of the property (east of Concession Road 7, north of the railway) and runs along the North edge about halfway into the property. Canopy and sub-canopy are dominated by Eastern White Cedar, with occasional White Spruce and rare occurrences of Red Pine. Understory is sparse but mainly non-native species such as Common Buckthorn and Tatarian Honeysuckle. Ground cover is not highly diverse, mainly consisting of Sugar Maple seedlings and multiple grass species, as well as Common Buckthorn, Poison Ivy, White Sweet-clover, Vetch, goldenrod, and Wild Grape.

The second plantation starts at the main parking lot for the property, running South to the edge of the property (east of Concession Rd 7, south of the railway) and then East along Gore Road for approximately 500 meters. Cover of canopy is variable throughout the polygon, with the densest section being in the Southwest corner of the property. The canopy is dominated by Norway Spruce, with rare occurrences of Eastern White Cedar and Red Pine. White Ash, Serviceberry, and Chokecherry appear in the subcanopy and understory layers, with a ground layer of Blackberry and the non-native sedge Carex flacca. The third plantation area can be found on the Eastern side of the property (south of Concession Rd 7), mainly running along the edge of the property line as well as in the Northeastern corner, divided by a hydro corridor. These plantation sections are fairly dense and contain a mix of White Pine, Red Pine, White Spruce, and Norway Spruce.

.13 Thicket

.1 Buckthorn Deciduous Shrub Thicket Type (THDM2-6)

This polygon is a thin, hedgerow-like thicket located along the North edge on the Western half of the property (east of Concession Rd 7, north of the rail line). Canopy is mainly Basswood with occasional Black Cherry and rare instances of Sugar Maple and Balsam Poplar. Sub-canopy is similar, as well as Eastern White Cedar, Crabapple, Scots Pine and White Pine. The understory and shrub-layer is fairly diverse, with Common Buckthorn being most abundant. Chokecherry, Russian Olive, Honeysuckle, Glossy Buckthorn, Red-

osier Dogwood, Prickly Ash, Fragrant Sumac and Staghorn Sumac also occur rarely throughout the polygon. The ground layer is a mix of native and non-native species typical of cultural field edges such as Wild Grape, Butter and Eggs, Queen Anne's Lace, Poison Ivy, Hawkweed, Thicket Creeper, White Sweet-clover, Yarrow, Redtop and Wild Basil. A deep ditch running through the middle of this polygon for most of the length indicates some possible agricultural/cultural disturbance or use in the past.

This ecosite occurs again through the middle of the property, running alongside the main trail into the site. This section is similar to the one detailed above, but the canopy is less diverse containing mainly Trembling Aspen and Eastern White Cedar, with some denser pockets of Common Buckthorn. Ground cover consists of similar species, although this site is less diverse than the section on the Northern edge of the property.

This polygon type is also found close to the eastern property boundary, between the coniferous plantations along the East edge of the property and the quarry/fen/alvar. A flagged and well used ATV trail runs through much of this polygon, potentially being accessed from the adjacent property. It contains a small pocket of graminoid meadow (polygon 116-13) but is mostly regenerating into a Common Buckthorn thicket. Canopy and subcanopy is sparse and mostly White Ash, with rare Sugar Maple, Paper Birch, Alternate-leave Dogwood, Scots Pine, and Basswood. Shrub layer is a mixture of species but is dominated by Common Buckthorn, with occasional Chokecherry and Privet species, as well as more rare occurrences of species such as Russian Olive, Honeysuckle, Hawthorn, Black Cherry, and Apple. Ground layer is mostly a mix of Aster and Goldenrod species, as well as species such as Carex flacca, Queen Anne's Lace, Riverbank Grape, and Poverty Oatgrass.

.2 Native Deciduous Regeneration Thicket Type (THDM4-1)

This polygon sits in the most Northeastern corner of the property, and is partially divided by the hydro corridor that runs almost perpendicular to the railway. Cover of canopy, subcanopy, and understory is variable throughout the polygon, with a higher concentration of trees near the middle and more open/shrubbier on the edges. Canopy and subcanopy is mostly Trembling Aspen, but with rare occurrences of Green Ash, White Cedar, and White Elm as well. Shrub layer is abundantly Red-osier Dogwood and Willow species, with occasional Eastern White Cedar as well. The ground cover is variable and includes species such as Redtop, Carex flacca, Riverbank Grape, Red-osier Dogwood, and aster and goldenrod species. Some ditches caused by disturbance or possibly hydro corridor clearing contain more marsh/wetland species than the more upland areas. The ATV trail also runs through a small portion of this polygon, mostly contained to the more open edges in the hydro corridor.

.14 Alvar/ Rock Barren

.1 Shrub Rock Barren (Inclusion – RBS and FOC)

This inclusion in WODM 5-1 is a Common/Glossy Buckthorn shrub rock barren that is

likely resulting from extraction of materials from the site. Areas of exposed “bedrock” appear to be pavement, but the resulting shallow soil site mimics an alvar community. Ground vegetation is sparse and contains species such as Yellow Sedge, Little Green Sedge, Panic Grass, Water Horehound, Ragweed, Moss, and Grass-leaved Goldenrod. A dense eastern white cedar forest surrounds this polygon.

.2 Dry-Fresh Little Bluestem Open Alvar Meadow Type (RBOA1-3)

This alvar community is unique and is dominated by Little Bluestem and Stunted Eastern White Cedar trees. This vegetation community was created under the Quarry to Alvar Initiative that used experimental design to research whether alvars could be restored in old quarry floors. Therefore, it is not a true natural alvar. This restored alvar has elements of both southern and northern alvars. It hosts a population of Lakeside Daisy a globally rare plant species known from alvars on the Bruce Peninsula as well as Nodding Wild Onion and Side Oats Gamma species more indicative of southern alvars. Glossy Buckthorn is slowly moving into this community and becoming the dominant shrub. People are also impacting this area by creating fire pits and trails throughout the area.

.15 Aquatic

.1 Open Aquatic Pond (OAO)

The restored quarry site on the western side of the northern Fletcher Creek property contains two open aquatic pond inclusion sites. The North pond is smaller and is surrounded by species such as Eastern White Cedar, the invasive *Phragmites australis*, Horsetail, Boneset, and Red-osier Dogwood. The South pond contains multiple islands and is ringed by vegetation such as Eastern White Cedar, Austrian Pine, Tamarack, Cattail, Willow, Canada Rush, and Sage Leaved Willow.

.2 Pondweed Floating-leaved Shallow Aquatic Type (SAF_1-4)

This open water pond is located in the Southeast corner of the property, adjacent to the trail leading from the gated entrance off of Gore Road. An island close to the shore allows for a canopy of single willow tree, otherwise subcanopy is composed of cattails (in the water) and Silky Dogwood (along the trail and water edges). Shrub layer includes Glossy Buckthorn, Red-osier Dogwood, and Paper Birch. Most abundant ground cover is Floating-leaved Pondweed (in the water), as well as boneset, Rough-leaved Goldenrod, Carex flava, and Canada Rush.

4.4 Terrestrial Inventory

.1 Vascular Plants

Over the course of multiple survey dates including ELC surveys, staff (and other researchers) identified 323 species of plants. Of these, 219 are considered native plant species (68%) while 73 are non-native species (23%). Two hundred and ninety-two were identified to species level and 31 identified to genus only (10%). The Wellington County Vascular Plant List Update (2018) indicates that there are 1362 species of plants in the County. Of the plant species recorded during surveys, the Fletcher Creek Ecological Preserve contributes/represents 21% of that regional flora.

The Floristic Quality Index (FQI) and the Native Mean Coefficient of Conservatism (mCC) have been calculated for the entire property. The 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 and 10 indicating a plant that has the most specific habitat requirements. Native plant species with higher CC values tend to be those that are restricted to higher quality natural areas. Those with a low CC value have a wider range of acceptable habitats and therefore could "grow anywhere". Therefore, the higher the mCC the higher number of plant species that prefer high quality habitats. The mean CC value for all properties combined is 4.95. This is a good value for the mCC and indicates that Fletcher Creek has high ecological value.

FQI is a measure of vegetation quality and influence of human disturbance on the natural habitats surveyed. The FQI for all of the Beverly swamp properties is 73.25. This is a high value for FQI and indicates that there are high vegetation values within the Fletcher Creek.

.2 Breeding Birds

Five surveys were conducted for breeding birds throughout the Fletcher Creek property. Sixty-five species of birds were identified during these surveys. Historical surveys record 31 additional bird species on the Ecological Preserve. Current and historical surveys resulted in nine provincially and federally rare species, thirty-four locally uncommon and fifteen locally rare species. This includes both breeding birds and incidental species (those seen in non-breeding season or as fly-overs).

.3 Butterflies and Dragonflies

Species list for these taxa are considered historic and originate from the Natural Areas Inventory's completed over the last 20 years. The Toronto Entomologists' Association Butterfly Atlas was used along with the NAI data to produce a current list of butterflies for the area. A total of 72 butterflies have been recorded within FLAM-24, the natural area associated with Fletcher Creek. Two butterfly species are considered provincially rare with Sranks between S2 and S3 (20-80 populations in the province). This includes the federally

endangered Monarch Butterfly. Six butterflies are also considered locally rare within the City of Hamilton and an additional 20 are uncommon. A total of 102 dragonfly species were recorded within the FLAM-24, the natural area associated with Fletcher Creek. Of the 102-dragonfly species, 21 (20%) are considered provincially rare with an Srank of S2 or S3 (20-80 populations in the province). These and butterfly species need to be considered when trail or infrastructure upgrades are planned, in order to ensure their habitats are conserved.

.4 Herpetofauna and Mammals

Four species of frog and one species of toad were recorded during MMP point counts. Spring peepers, American toads and grey tree frogs were heard in full chorus during the surveys on this property. This means there were so many frogs calling that the calls could not be distinguished. None of these species heard are provincially or locally rare.

Snake species recorded included Eastern Garter Snake, Northern Watersnake and Milksnake. Snapping Turtles and Painted Turtles were recorded in various locations on the property as well. mammal observations include Eastern Chipmunk, Gray Squirrel, and Eastern Cottontail, Coyote, Red Squirrel and White-tailed Deer. Bats were also seen flying over the Gore Road pond on the east side of Fletcher Creek. These were not identified to species.

4.5 Aquatic Inventory

The Aquatic Inventory for Fletcher Creek is conducted as part of the HCA Aquatic Resource Monitoring Program. For Fletcher Creek this includes Electrofishing with a backpack electrofisher following HCA ARMP sampling protocol at one annual sampling site and two that are visited every three years. There are also a number of additional sites for which we have information which is included in this report. The HCA ARMP follows the Ontario Stream Assessment Protocol for electrofishing. A Halltech Model# HT-2000B electrofishing unit was used for single pass presence/absence surveys. The crew was made of two or three members, one using the electrofishing unit and one or two netters. Fish were placed in buckets with low densities of fish and kept in shady areas to ensure oxygen levels stayed high and avoid mortality. After collection fish were quickly counted, measured (lengths and weight) and identified before being released back into the stream. During processing one voucher photo was taken of each species collected.

Habitat features such as riparian cover, substrate, presence of invasive species and descriptions of in stream habitat (physical habitat) for fish were recorded. Station length, wetted width and hydraulic head were also recorded.

An Index of Biotic Integrity (IBI) was calculated for each site. This rates sites based on the fish community present from Poor to Very Good.

.1 Fletcher Creek: Station ID: FLE307-A2 (Annual)

This station is located on Fletcher Creek on the south side of Gore Rd, east of Lennon Rd. within the Fletcher Creek Ecological Preserve. It is a groundwater fed, cold water stream. The shoreline cover is dense with mixed trees and herbaceous groundcover, on the right bank looking downstream of the station is a cedar swamp. The substrate is mostly silt with root wads and logs within the stream providing good physical habitat for the fish present. This site is in the historic range of Redside Dace (*Clinostomus elongatus*), however none have been caught since the last record in 1995.

Eastern Blacknose Dace tends to be the dominant species at this site. This stream reach is Brook trout habitat and site scored an IBI of 36, a very high score for HCA sites surveyed, giving it a “Good” rating. This again highlights how ecologically important this area is to protect the highly valuable Brook Trout population for the entire watershed

.2 Fletcher Creek: Station ID: FLE308-C1

This station is located on the property at CON 10 PT LOTS 25 TO 27 RP;62R16586 PART 2 RP 62R5813; PART 3 RP 62R16443 PART 1. It is located south of the Maple Grove Campground on Gore Road. Specifically, it is downstream of the online pond that is there. The shoreline cover is dense with mixed trees and herbaceous groundcover and it is transitioning back to a treed swamp creek. The reach is heavily impacted by the pond upstream. The water control structure within the earthen mounds has failed in the past and the pond level is now maintained by a family of beaver who have constructed a beaver dam in its place. This property is covered by several agreements with the campground owner but HCA should none the less explore the idea of taking it offline to improve the watercourses health.

.3 Fletcher Creek: Station ID: FLE312-B2

This station is on Fletcher Creek downstream of the culvert on Regional Rd 97 and has in the past received stream rehabilitation efforts. The shoreline of this site was dominated by coniferous trees and a patch of Phragmites australis australis near the culvert. The substrate was mostly cobble and gravel with lots of woody debris providing good physical habitat for the fish species present. This site is in the historic range of Redside dace (*Clinostomus 31longates*), however none were found.

Eastern Blacknose Dace tends to dominant species collected and Brook Trout are caught in some years as well. This site scored an IBI of 24, giving it a “Fair” rating. This fair rating probably indicates the need to revisit some of the restoration efforts to further improve the reach health for the Brook Trout

Table 3: Fish Species of Fletcher Creek Ecological Preserve

COMMON NAME	SCIENTIFIC NAME	LOCATION
Blacknose Dace	Rhinichthys atratulus	FLE307-A2, FLE308-C1, FLE312-B2
Blacknose Shiner	Notropis heterolepis	FLE312-B2
Bluntnose Minnow	Pimephales notatus	FLE307-A2, FLE308-C1, FLE312-B2
Brook Stickleback	Culaea inconstans	FLE307-A2, FLE308-C1, FLE312-B2
Brook Trout	Salvelinus fontinalis	FLE307-A2, FLE308-C1, FLE312-B2
Central Mudminnow	Umbra limi	FLE307-A2, FLE308-C1, FLE312-B2
Common Shiner	Luxilus cornutus	FLE312-B2
Creek Chub	Semotilus atromaculatus	FLE307-A2, FLE308-C1, FLE312-B2
Fathead Minnow	Pimephales promelas	FLE308-C1, FLE312-B2
Finescale Dace	Phoxinus neogaeus	FLE312-B2
Golden Shiner	Notemigonus crysoleucas	FLE312-B2
Green Sunfish	Lepomis cyanellus	FLE308-C1
Johnny Darter	Etheostoma nigrum	FLE308-C1, FLE312-B2
Largemouth Bass	Micropterus salmoides	FLE308-C1
Longnose Dace	Rhinichthys cataractae	FLE312-B2
Mottled Sculpin	Cottus bairdi	FLE307-A2, FLE308-C1, FLE312-B2
Northern Hog Sucker	Hypentelium nigricans	FLE307-A2, FLE308-C1
Northern Pike	Esox lucius	FLE308-C1, FLE312-B2
Northern Redbelly Dace	Phoxinus eos	FLE307-A2, FLE308-C1, FLE312-B2
Pearl Dace	Margariscus margarita	FLE312-B2
Pumpkinseed	Lepomis gibbosus	FLE307-A2
Redside Dace	Clinostomus elongatus	FLE307-A2 (last record 1995)
Spottail Shiner	Notropis hudsonius	FLE307-A2, FLE312-B2
White Sucker	Catostomus commersoni	FLE307-A2, FLE308-C1, FLE312-B2
Yellow Perch	Perca flavescens	FLE307-A2

5.0 ECOLOGICAL PRESERVE MANAGEMENT

5.1 Land Management

Land management planning will be accomplished through adherence to the guidelines of the management zones noted in this plan, and through additional resource management plans developed by HCA as necessary. The overall intent will be to ensure protection and conservation of the significant natural areas noted as Nature Reserve (Wetland) and Natural Zones on Map 1. appended.

The ecological mapping and species data documented within this plan are provided as a baseline inventory to help guide future land management decisions and project planning. Where active management is required for a particular species, it will be accomplished through an HCA approved resource management strategy considering the guidelines outlined in this plan, and in accordance with policies of all governing agencies.

Additional non-native plant species will not be deliberately introduced into the ecological preserve. Introduction of any new plant species by HCA will consider the biodiversity of this site, historical data of species present in the area, research, and additional relevant species inventories and contiguous surroundings within an approved restoration and stewardship strategy. In this plan “non-native” means species not native to Ontario as well as species native to Ontario but not to Fletcher Creek. If established non-native plant species threaten natural heritage values, a program for their eradication will be developed subject to specific guidelines noted in the natural heritage inventory of this plan.

5.2 Significant Species

.1 Significant Flora

Of the plant species recorded on the subject lands through the 2018 field surveys, four plant species were found to be provincially rare (Side-oats Grama, Nodding Onion and Rough-stemmed Calico Aster) in all S2,20 or fewer location in the province. Lakeside Daisey was also recorded on site and it is provincially and globally ranked S3/G3, 80 or fewer occurrences in the province. All of these other than the Rough-stemmed Calico Aster are considered adventive at Fletcher Creek. They were introduced through experiments (alvar restoration) done on this property in the 1980’s. These are now growing without assistance. Eight species are considered rare in the County of Wellington, Fragrant Sumac, Round-leaved Goldenrod,

Capillary Beakrush, Little Bluestem, Harebell, Marsh Horsetail, Bog Buckbean and Gay-wing Milkwort. These species mainly occur in the wetlands onsite or in the large open meadows.

.2 Significant Fauna

Table 4 below lists the nine birds, one butterfly and one reptile federal and provincial species at risk recorded at Fletcher Creek. In addition to these there was also one more provincially rare butterfly and 21 provincially rare dragonflies with SRanks between S2 -S3 (20 – 80 populations in the province).

Table 4: Federal and Provincial Species at Risk

Common Name	**Scientific Name**	**SARA status (Schedule 1)** **COSEWIC**	**ESA status (COSSARO)**
Eastern Wood-Pewee	*Contopus virens*	SC	SC
Grasshopper Sparrow	*Ammodramus savannarum*	SC	SC
Wood Thrush	*Hylocichla mustelina*	THR	SC
Canada Warbler	*Cardellina canadensis*	THR	SC
Bank Swallow*	*Riparia riparia*	THR	THR
Barn Swallow*	*Hirundo rustica*	THR	THR
Bobolink*	*Dolichonyx oryzivorus*	THR	THR
Eastern Meadowlark*	*Sturnella magna*	THR	THR
Red-headed Woodpecker*	*Melanerpes erythrocephalus*	THR	SC
Snapping Turtle	*Chelydra serpentina*	SC	SC
Monarch Butterfly	*Danaus plexippus*	SC	SC

*NAI Record (prior to 2014)

Eastern Wood-pewee and Wood Thrush were recorded throughout the deciduous and mixed forests in Fletcher Creek. These species were also noted in the properties adjacent to 10 Concession and Lennon Road. The Grasshopper Sparrow was heard in the large open fields on the eastern side of the Fletcher Creek. The Canada Warbler was recorded on the narrow HCA property on Lennon Road. The other species noted above are historic records from the NAI and therefore their specific breeding locations are not known.

Snapping Turtles were noted throughout the properties and were often encountered just hiding in the muck of the wetlands or within shallow open ponds within the larger wetland complex. These turtles along with Painted Turtles were noted in the large wetland pond on the eastern side of Fletcher Creek in the pond at Gore Road. Both Monarch adults nectering on flowering plants and caterpillars feeding on milkweed plants were also observed incidentally in the open fields at Fletcher Creek.

5.3 Fish and Wildlife Management

Where applicable on the Fletcher Creek area properties, fisheries management will seek to maintain and enhance native, self-sustaining fish populations. Where applicable, waters may be closed to angling temporarily or permanently for fisheries or wildlife research or management purposes.

Currently, the voluntary catch and release policy for fish caught within Valens CA extends to these properties as well. This is specifically to protect the highly valuable Brook Trout population which for our entire watershed is restricted to this small northern area. For bait fish harvest these activities are strictly prohibited on HCA properties in the Fletcher Creek Ecological Preserve, with an exception for research or permitted use. (see Section 5.8).

For fishing bait currently, MNRF policies in regards to what bait is allowed to be used for fishing apply. The use of lead-sinkers is not allowed as well to protect the fishery and non-target species.

Wildlife, hunting and harvest are not permitted within the ecological preserve north of Gore Road to protect the populations and people, with an exception for Research (see Section 5.8). For lands south of Gore Road see the Upper Watershed Beverly Swamp Management Plan for more information.

For wildlife/human conflict HCA has developed the Hamilton Conservation Authority Wildlife Conflict Management Strategy. This strategy outlines the process and methods staff are to follow when dealing with any animal related issues within all conservation areas. This document was produced by the Hamilton Conservation Authority Wildlife Management Committee (WMC). The WMC was a special committee of the Hamilton Conservation Authority (HCA) that was established in May 2014 based on HCA staff recommendation and at the direction of the HCA Board of Directors. The purpose of the WMC was to develop best management protocols and practices for the management of wildlife on HCA lands.

If already established non-native species threaten the conservation area values, a program for their eradication may be developed if feasible and practical. Missing native species may be re-introduced, and existing populations replenished if feasible and acceptable to HCA.

5.4 Cultural Heritage

Cultural heritage features, such as historic remnants of the farming and quarry operation

worthy of interpretation, will be protected from incompatible development in the ecological preserve.

Incompatible resource uses and recreational activities will be restricted or prohibited where necessary to protect cultural heritage resources.

Archaeological and historical artifacts may only be removed, and heritage landscapes altered, as part of an HCA approved cultural heritage research or management plan.

Archaeological studies have not been completed at Fletcher Creek. Further historic research and archaeological study is encouraged. Management strategies for any archaeological sites found in the future may range from allowing the sites to remain without interference, to research, excavation, and rehabilitation. Protection and management will be undertaken in consultation with all governing agencies and first nations.

5.5 Agricultural

Three small fields are actively farmed under lease agreements with HCA. See appended maps for agricultural locations. HCA's long-term vision for active agricultural fields is to see the land revert back to natural area. Active management to remove invasive species, along with restoration planting to enhance these lands is recommended once farming stops. More detailed restoration plans will be required to implement restoration of these lands. HCA will consider restoration strategies when evaluating agricultural lease renewals.

5.6 Managed Forest

Forest plantations will be managed in accordance with the MNRF approved forestry management plan for Fletcher Creek. The majority of Fletcher Creek conifer forests are registered under the Managed Forest Plan. The long-term objective of this plan is to have a healthy forest. Invasive species management and restoration projects to help naturalize these areas will also be required to help support this objective. See *Appendix 3* for more information.

5.7 Ecological Preserve Operations

The HCA will review the operation plan for these lands. HCA will provide staff with information and resources as required to operate the ecological preserve on a day to day basis. This will include specific direction for the management and operation of all facilities and activities and address such topics as budgets, staffing, maintenance, enforcement and emergency services. The operation plan will be reviewed annually and updated as required.

Self-serve facilities may be developed, and individual volunteers and partner organizations may be involved in programs as approved by the HCA, within the ecological preserve.

The HCA has the right to suspend operations of any facilities or services due to funding limitations, but in so doing will ensure that heritage values are not impaired and customer service standards are affected as little as possible.

New business practices may be introduced into the ecological preserve operations in accordance with HCA policy such as:

- Improving operating efficiency and controlling costs.
- Contracting out some operating functions.
- Improving customer service standards.

5.8 Research

All of HCA's properties, provides an opportunity for living laboratories. HCA ecologists monitor the health of lands using established protocols. They can also develop special research programs to answer resource related questions as needed. Included below are a few potential projects that were identified while writing this plan:

- Research the extent of the Brook Trout Reach within Fletchers Creek and if there are opportunities for expansion.
- Brook Trout spawning habitat locations should be explored and mapped so they can be protected.
- Research if there is an impact from sport fishing on the Brook Trout Fishery.
- Outside research by qualified individuals that contributes to the knowledge of natural and cultural history and environmental and recreational management will be encouraged by HCA staff.

- Additional watercourse reaches and springs were identified by terrestrial staff during their surveys for this Management Plan. These should be delineated by staff and added to our mapping.

All research projects will require authorization from HCA. Authorization is obtained by contacting the staff ecologists who administer the process and issue letters of permission. This process would also extend to any other activities that could impact the ecological integrity of these lands.

6.0 MANAGEMENT PRACTICES

6.1 Natural Heritage Conservation

.1 SWH and Area Sensitive Species

The significant Wildlife Habitat Technical manual (OMNR 2000) along with the Eco regional criteria tables for ecoregion 6E (OMNR 2015) were used to determine and define significant wildlife habitat (SWH) on the Fletcher Creek Ecological Preserve. Significant wildlife habitat includes broad categories of habitats for flora and fauna. SWH has been identified under the provincial policy statement for Ontario. No new development is allowed within identified portions of significant wildlife habitat unless there will be no negative impact to the form and function of this habitat type. The broad categories for significant wildlife habitat include seasonal concentration areas of animals, rare vegetation communities or specialized habitat for wildlife, habitats for species of conservation concern and animal movement corridors.

Seasonal concentration areas of animals are areas where wildlife species occur annually in aggregations (groups) at certain times of the year (MNRF 2015). This can include single species concentrations or aggregations of multiple species.

The open wetland/pond the south east corner of the Fletcher Creek has both Snapping Turtles and Midland Painted Turtles (more than 11 individuals) These turtles were noted throughout the field season basking in this pond. Therefore, this pond is considered a Turtle Wintering Area. Generally wintering areas are contained within a turtle's core habitat and consists of soft mud substrates where the water is deep enough not to freeze.

Rare vegetation communities often contain rare flora and fauna that are specific to the habitat features within these rare communities. These vegetation communities are ranked in a similar fashion to provincially rare species. Although it cannot be designated SWH because it was created at Fletcher Creek, there is small alvar community in the quarry bottom. Research was completed in this location in the 1980's to test if quarry floors could be restored into Alvars, a rare vegetation community in Ontario. Many different alvar associated species were planted south of the quarry. Some of these species survived and have become adventive at Fletcher Creek. It is a unique ecosystem and should be conserved and managed as such.

Specialized habitat for wildlife can become fragmented and reduced in size due to development. Many species need specific habitats for successful breeding. The following four specialized habitats for wildlife were recorded, Seeps and Springs, Significant Breeding Habitat for Amphibians, Area-sensitive Bird Breeding Habitat and Shrub/Early Successional Bird Breeding habitat. Springs were noted at three locations in the Fletcher Creek. Springs are important for wildlife, especially in winter and often support important feeding and drinking areas. They are also typically the headwaters for cold water streams. The majority of wetland pockets other than the central quarry pond (north east corner) would qualify as significant breeding habitat for amphibians. These wetlands had populations of a variety of amphibian species with moderate to strong call codes, meaning 10 – 30+ individuals. The wooded wetlands on both sides of Concession Road 7 at Fletcher Creek also fall within the category of Area-Sensitive Bird Breeding Habitat. Veery, Blue-headed Vireo, Black-throated Green Warbler, Ovenbird, Scarlet Tanager and Canada Warbler were recorded during breeding bird surveys throughout these habitat types. The shrub thickets on the eastern side of the Fletcher Creek breeding Brown Thrasher were recorded along with breeding pairs of Field Sparrows, Black-billed Cuckoos, Eastern Towhee and Willow Flycatchers. This qualifies this area as significant Shrub/Early Successional Bird Breeding Habitat. Finally, Fletcher Creek would also be Significant Habitat for Special Concern and Rare Wildlife Species. These are species that are rare in Ontario but nor listed under the provincial Endangered Species Act. This is due to the diversity of Sranked Dragonfly species as well as the provincially rare plant and butterfly species recorded.

.2 Invasive Species

Although the Fletcher Creek has a diversity of native habitats and is well removed from the urban environment HCA field staff found a variety of invasive species on these properties. These include Glossy Buckthorn, Common Buckthorn, Phragmities, Knapweed sp. Dog-strangling vine and Blue sedge (*Carex flacca*).

.1 Glossy and Common Buckthorn

Glossy Buckthorn is a member of the buckthorn family that grows in wetlands and in moist woods. This is a non-native tree species introduced from Eurasia about 100 years ago (NCC 2019). This species forms dense thickets that shade out native species. Field staff did not find large thickets of Glossy Buckthorn, rather it was scattered throughout the majority of wetland polygons that were surveyed. They produce a dark berry that ripens in late summer and is eaten by birds. The birds disperse the seeds. It is very invasive due to its high seed production and tolerance for varied growing conditions. It will be important to begin the removal process for this species. It tends to be a weak plant and is easily pulled. A high priority is the restored fen within the old quarry. Small areas of Glossy Buckthorn are developing which are small and easily removed by hand. A second priority is within the fen community on the west side of Concession Road 7 where there is a scattered occurrence of this species. These habitats are rare within the Fletcher Creek and the HCA watershed and this species should be removed to conserve the biodiversity of this area.

Common Buckthorn is a small tree or shrub that was introduced to Ontario from Eurasia. It was widely planted in farm hedgerows and fencerows as a wind break. It can survive in a wide range of conditions making it very good at invading a variety of habitats (Invading species centre 2019). Birds and small mammals feed on the berries of this plant and have spread it across Fletcher Creek. Field staff found this species on drier hummocks in the wetland communities and in the forest and meadow communities we surveyed. Fruiting female plants should be targeted for pulling or herbicide treatment. These are scattered throughout the Fletcher Creek. Efforts should target the old field complex off of Concession Road 7 and within old quarry production areas. The quarry areas are highly prone to invasion due to the distributed nature of this particular polygon.

.2 Phragmites

This species of common reed from Eurasia is a perennial grass. It is not clear how it was transported to North America. It is an aggressive plant that spreads quickly and out competes other native species in wetland habitats. It forms large monocultures that decrease plant biodiversity and create poor habitat for wildlife.

Small patches of this species were found at Fletcher Creek. These patches were disturbed on both the eastern and western parcels of this property. Some locations are along creek corridors far back from the road. The restored quarry area has a large population growing in the quarry ponds. A small patch also occurs in one of the fen communities. Field staff encountered this species in areas that were far from roads and trails.

A strategy for the removal of this invasive species will need to be developed. Patches within the fen and the restored quarry should be priorities for removal as they are in sensitive habitats and easy to access. A plan will need to be created for patches within larger wetland areas that are more remote and difficult to access. Effective control strategies would likely include drowning of stems when water levels are high (June) or pesticide application in dry periods for these wetland communities (September/October). Continued monitoring of research in regards to control methods for this species will be important as many of the stands are in shallow water which is unsuitable for drowning (too shallow) or pesticide application (too wet).

.3 Black, Brown and Spotted knapweeds

Knapweeds were found along the trail edges at Fletcher Creek. Their main distribution was from the parking lot at Concession Road 7, where they grow along the trail until the cedar forest thickens along the trail edges. The access off Gore Road also has knapweeds along the trail edges until the old quarry site. The large meadow system within Fletcher Creek had an occasional occurrence of knapweed throughout the polygons.

This species was introduced to North America over 100 years ago in contaminated agricultural seed and soil in discarded ballast water. It spreads easily by seed. This species forms a tap root and can be controlled with cultivation to a depth of 18 cm or hand removal. Persistent hand removal (pulling or digging) can control this species if the upper 7.5 cm of

the crown portion of the plant are removed before it produces seeds. A targeted mowing in early august could prevent seed production and keep the knapweed from spreading further. This species could be removed from these properties with a combined effort of mowing and hand pulling in early august.

.4 Dog-strangling Vine

This species is a member of the milkweed family. It was introduced from Eastern Europe about 120 years ago with European settlers. It is a prolific seeder and produces light seeds with a feathery parachute that makes wind dispersal easy. It twines around plants and can become a thick dense mat of plants that smother other species. Monarch butterflies mistake this plant for milkweed and deposit their eggs on them, which when they hatch starve. There was only a small patch of this plant found at Fletcher Creek along the rail line in an open field on the eastern edge of the property.

.5 Blue Sedge (*Carex Flacca*)

Blue Sedge was found throughout Fletcher Creek in the gaps in the dry cedar forests and in the old field meadow communities. This species has the ability to be the dominant ground cover and in some areas is the only ground cover species. It is a horticultural plant sold mainly in nursery environments and is promoted as a species that can grow in a wide variety of habitats. There is no literature on this plant species control. Staff may need to experiment with different control methods as this species is contributing to a reduction in biodiversity of the Fletcher Creek and may become the dominant plant in many communities if left uncontrolled.

.3 Natural Area Restoration Recommendations

The existing natural habitat features within the Fletcher Creek parcels have been evaluated for restoration opportunities and invasive species removals. Restoration in certain parts of the site can assist with buffering the natural habitats of the ecological preserve, with the impacts of visitor use.

Priorities for natural areas restoration and invasive species removal in this Management Plan are as follows:

1. The far eastern cultural meadow has a few Dog-strangling Vine plants. This is an aggressive invasive species that seems to have been introduced along the railway corridor. Removal of this species should be a high priority. It is an ecological threat to all vegetation communities at Fletcher Creek. There are also a few DSV plants on the HCA property adjacent to Maple Grove campground. These should also have a high priority for control.

2. The restored fen and research alvar are a complex of communities on the eastern side of Fletcher Creek. This area should be a target for invasive species removals including Phragmites, Glossy Buckthorn and Knapweed. All of these species are just starting to impact the ecology of these features.

3. The small natural fen community located south of the rail tracks on the western side of Fletcher Creek also has Phragmites. This stand is currently small and chemical removal should be considered in the next few years.

4. Blue Sedge and Knapweeds are currently reducing the biodiversity of the large open meadows at Fletcher Creek. These are habitat for a wide variety of bird species and Significant Wildlife Habitat for shrub bird species. Focus for this work should be on the main trail into the preserve. Hand pulling of these species maybe able to achieve control. Mowing should also be focused during late July to reduce seed dispersal of these species. Cutting before these species go to seed will reduce their spread.

5. The fen and wetland communities that occur west of Concession Road 7 contain high biodiversity. Removal of Glossy Buckthorn and the small patched of Phragmites from these areas should be a priority. The Glossy Buckthorn is widely distributed and this removal maybe difficult.

6. Glossy Buckthorn and Phragmites should be controlled along the roadside of the Lennon road parcel. This parcel contains breeding pairs of Canada Warblers, a species at risk bird.

7. Planting of the current agricultural fields under lease in this management plan should be considered to add connectivity to the landscape and enhance the biodiversity.

8. Non-native fish should be removed from the pond in the gravel pit north of the train tracks on the east side of Concession Road 7.

6.2 Water Management

HCA will continue to maintain and enhance the natural movement of water through this landscape with priority for maintaining the coldwater nature of the watercourses. No reservoirs or bedrock extraction will be permitted on HCA Land.

6.3 Ecological Preserve Experience

The HCA controls access to this area which includes the collection of entrance fees from visitors. Activities are managed to protect the natural areas and improve the experience for visitors enjoying the area. Day use parking spaces are provided on a first come, first serve basis and visitors may be restricted from entering Fletcher Creek when the parking areas are full. When offsite parking at the preserve is determined to be causing traffic and safety issues, HCA will enlist the assistance of municipal agencies for traffic control. Traffic control will be evaluated on a case by case basis by all agencies involved, should this be a persistent problem HCA will work with municipal partners on traffic and visitor management strategies and solutions.

Recreational activities are monitored by HCA and activities may be restricted or prohibited to protect the property, natural resources, and for public safety. During the preparation of this plan HCA and the Township of Puslinch received public comments of safety issues from dog owners walking their dogs leash free in the ecological preserve. Written comments of dog attacks, dog bites, and verbal conflicts between visitors were received and HCA increased staff enforcement patrols in response. Consequently, for improved public safety moving forward, HCA is considering making the entire Fletcher Creek Ecological Preserve a Dog Free area and directing dog walkers to other HCA areas which permit on leash activity. A strategy for implementing this approach is recommended to include presentations to the HCA Conservation Advisory Board and Board of Directors for approval, a public marketing and education campaign, installing new signage, and enforcement and education partnership efforts with the City of Hamilton Animal Control in the annual operation plan.

The following recreational activities are currently permitted in the ecological preserve:

- Hiking
- Cycling
- Winter Snowshoeing
- Cross Country Skiing
- Geocaching

To protect the resource and provide a safe recreational experience for all visitors, the following motorized recreational activities will not be permitted in the ecological preserve:

- All-terrain vehicle
- Motor bikes
- Snowmobiling
- Unmanned Aerial Vehicle (Drones)

Approved research activities may be exempt from these restrictions, see section 5.8

6.4 Education and Environmental Awareness

Education in the ecological preserve is intended to develop visitors' awareness and appreciation of Ontario's natural and cultural heritage, fostering a commitment to protect that heritage for all generations. Education opportunities are meant to be educational and recreational, formal and informal, and accessible to all. Information, education, and outdoor recreation are the three main components of education in the ecological preserve. The level of service provided at Fletcher Creek will be determined by its significance and visitation.

6.5 Public Infrastructure – Utilities, Trails and Transportation

Public infrastructure such as utility corridors (watermains, storm and sanitary sewers, natural gas or oil pipelines, hydro and communication corridors), trails (footpaths, boardwalks) and transportation links may cross conservation area lands. These uses may also have associated rights-of-way, land use agreements, licenses of occupation, permits etc. that are to be considered in the management of the ecological preserve and when implementing items from this management plan.

When new public infrastructure projects are proposed within conservation area owned lands, such uses will be subject, but not limited to, the following criteria:

- The need for the project, area of construction disturbance, and potential site disruption such as soil erosion, flooding, and vegetation loss.
- To maintain or where possible improve or restore key ecological linkages, habitat, and wildlife movement corridors.
- The potential public benefits of the project for research, education, or recreation in the ecological preserve.

HCA may require detailed environmental assessments, studies, and resource management plans in order to support such land uses.

6.6 Management Guidelines

.1 Permitted Uses

In addition to Section 6.3, passive recreation activities such as walking, hiking, and bicycling are permitted on designated trails..

.2 Restricted Uses

Dogs may not be permitted on the property subject to further review as noted in Section 6.3. Public swimming is not permitted. The use of motorized vehicles, with the exception of maintenance and emergency vehicles, is not permitted on the trails. No open fires or camping are permitted. Hunting and trapping are not permitted.

.3 Agreements

The HCA may enter into management agreements to assist with specific management items in the ecological preserve. HCA values the community support from area residents and landowners, businesses, service clubs, and volunteer organizations that currently or could contribute in a variety of ways. The HCA will continue to nurture existing support and will seek out new opportunities for partnership. Current support provided by the Hamilton Naturalists' Club is appreciated and welcomed.

6.7 Maintenance Guidelines

.1 Vegetation Clearing

The existing trails are intended to have a clearing width of 2.4m. Vegetation is to be removed within this clearing width as necessary to ensure safe sight lines, reduce hazards, and prevent encroachment of vegetation onto the trail. Any vegetation clearing beyond this should only be done on a site-specific basis subject to review by HCA. Best management practices are to be followed so that maintenance activities, equipment, and tools do not spread invasive species.

Vegetation may be mowed by HCA staff along the ecological preserve boundary, but only to the extent where this would assist in clearer boundary identification. Mowing may also be done in the ecological preserve, where warranted, to assist in the control of invasive species.

Trees and brush may be cut and pruned only to enable resource management as supported by this plan, to ensure public safety, and service easements (utility corridors) subject to specific service agreements. Trees and brush cut in nature reserve and natural zones noted in this plan, will be left to deteriorate naturally as close as possible to where they have been felled, or if that is not feasible, may be chipped and used (not on the trails) in ecological preserve.

Chemical fertilizers, herbicides, pesticides and suppressants will not be used for any vegetation management purpose except: insect and disease control under conditions set out in this plan; eradication of non-native species where it has been demonstrated other methods are not feasible; and for control of Poison Ivy in access and development zones noted in this plan.

.2 Fencing

Boundary fencing will be maintained by HCA, along with appropriate signage, to mark the boundary of this ecological preserve. Additional fencing within the ecological preserve may be considered to protect sensitive ecological areas from public access, for research purposes, or for public safety.

.3 Lighting

The site will not be lit and is intended to only be open sunrise to sunset.

.4 Garbage Collection

Garbage cans will not be provided. Trail users will be expected to practice “pack in-pack out” trail etiquette.

.5 Washrooms

No washrooms are currently provided in this ecological preserve. Portable washrooms are permitted in the access and development zones noted in this plan.

.6 Winter Maintenance

There will be no snow removal along the trail.

.7 Signage

Five types of signs are permitted in the ecological preserve: information, designation/direction, regulatory, warning, and interpretive. All signs are to follow HCA's sign standards.

Information signs are intended to provide general information about the ecological preserve and educational information on the site features and history of the area. Interpretive signs are one example of this type of signage.

Designation/direction signs are for wayfinding and may include maps for orientation. These signs are to be placed at the main entrance, trail head and trail nodes. Entrance signs, map boards, and trail post markers are some examples of this type of signage.

Regulatory signs are to be placed at roads. Warning signs will be placed where there are anticipated safety concerns.

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7.0 SUMMARY

7.1 Implementation Priorities

Fletcher Creek is a unique natural area with environmentally sensitive lands. The overall intent of this management plan is to ensure protection and conservation of the natural areas while managing passive day use recreation opportunities for nature appreciation.

Continued safe enjoyment of the property will require some capital work to be completed to replace aging infrastructure. The following items are recommended to be implemented in order of priority to achieve this goal:

.**1 Environmental Management**:

See Section 6.1.3 Natural Area Restoration for more information

.2 Site Infrastructure – Bridges and Boardwalks:

Conduct structural review and report on capital replacement and maintenance requirements for all bridges and boardwalks.

.3 Trail Maintenance:

Conduct maintenance inventory to assess annual requirements for trail clearing, surfacing and condition reviews. Provide design and maintenance recommendations to staff.

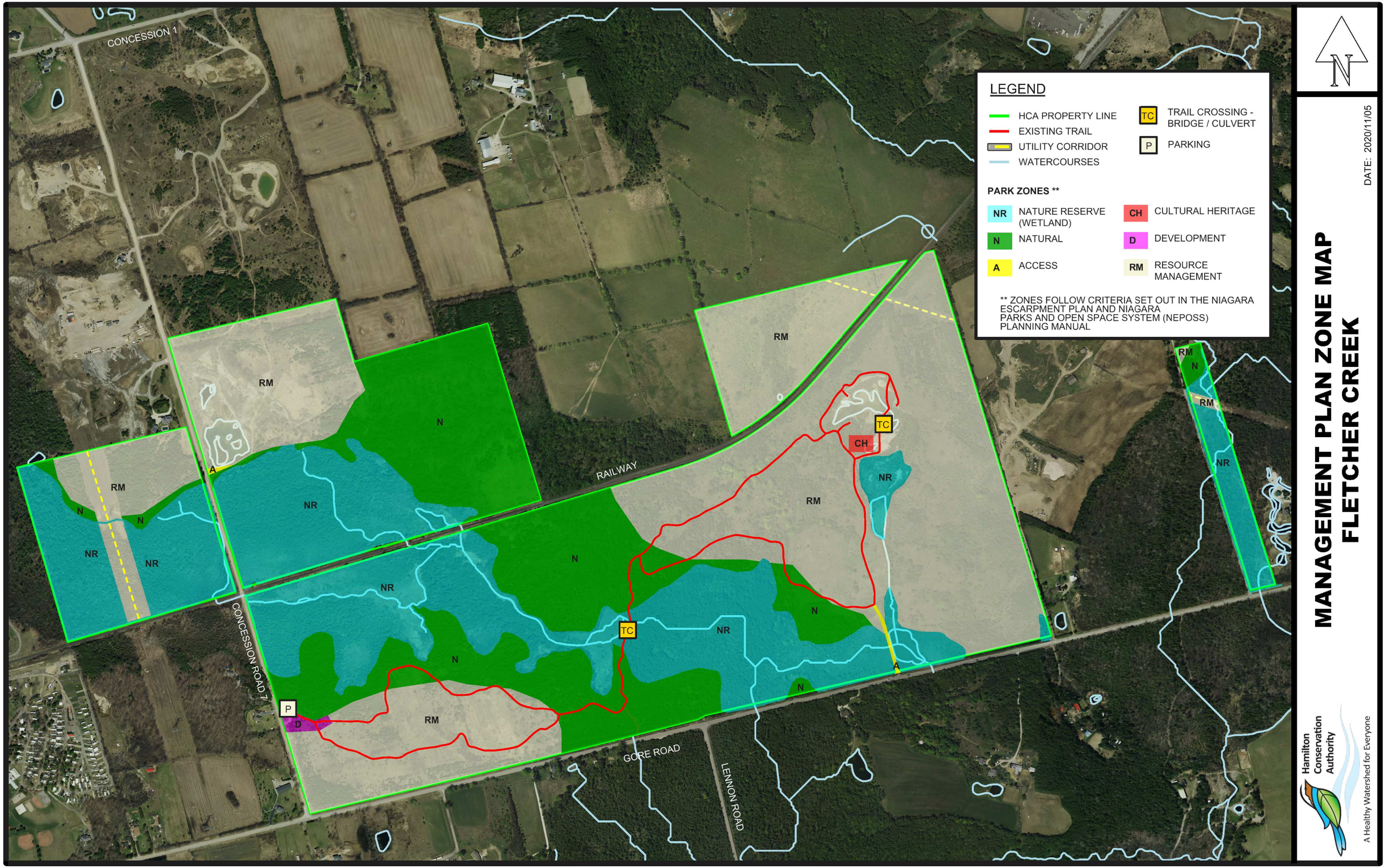
.**4 Signage Replacements**:

Information, designation/direction, regulatory, warning, and interpretive signs are to be replaced in priority sequence and to ensure public safety.

8.0 APPENDIX CONTENTS

APPENDIX 1

MAP 1 Management Plan Zone Map 1
MAP 2 Management Plan Zone Map 2
MAP 3 Ecological Land Classification
MAP 4 Ecological Land Classification



LEGEND

- HCA PROPERTY LINE
- EXISTING TRAIL
- UTILITY CORRIDOR
- WATERCOURSES
- TC — TRAIL CROSSING - BRIDGE / CULVERT
- P — PARKING

PARK ZONES **

- NR — NATURE RESERVE (WETLAND)
- CH — CULTURAL HERITAGE
- N — NATURAL
- D — DEVELOPMENT
- A — ACCESS
- RM — RESOURCE MANAGEMENT

** ZONES FOLLOW CRITERIA SET OUT IN THE NIAGARA ESCARPMENT PLAN AND NIAGARA PARKS AND OPEN SPACE SYSTEM (NEPOSS) PLANNING MANUAL

N

DATE: 2020/11/05

MANAGEMENT PLAN ZONE MAP
FLETCHER CREEK

Hamilton Conservation Authority

A Healthy Watershed for Everyone

MANAGEMENT PLAN ZONE MAP - MAP 2.

GORE ROAD

VALENS ROAD

LENNON ROAD

CONCESSION 10 W

BROCK ROAD

VALENS ROAD

NR

RM

N

NR

N

NR

N

NR

N

NR

RM

N

RM

NR

N

NR

N

NR

N

NR

RM

N

NR

LEGEND

- HCA WATERSHED LIMIT
- HCA PROPERTY LINE
- UTILITY CORRIDORS
- WATERCOURSE

PARK ZONES **

- NR — NATURE RESERVE (WETLAND)
- N — NATURAL
- A — ACCESS
- RM — RESOURCE MANAGEMENT

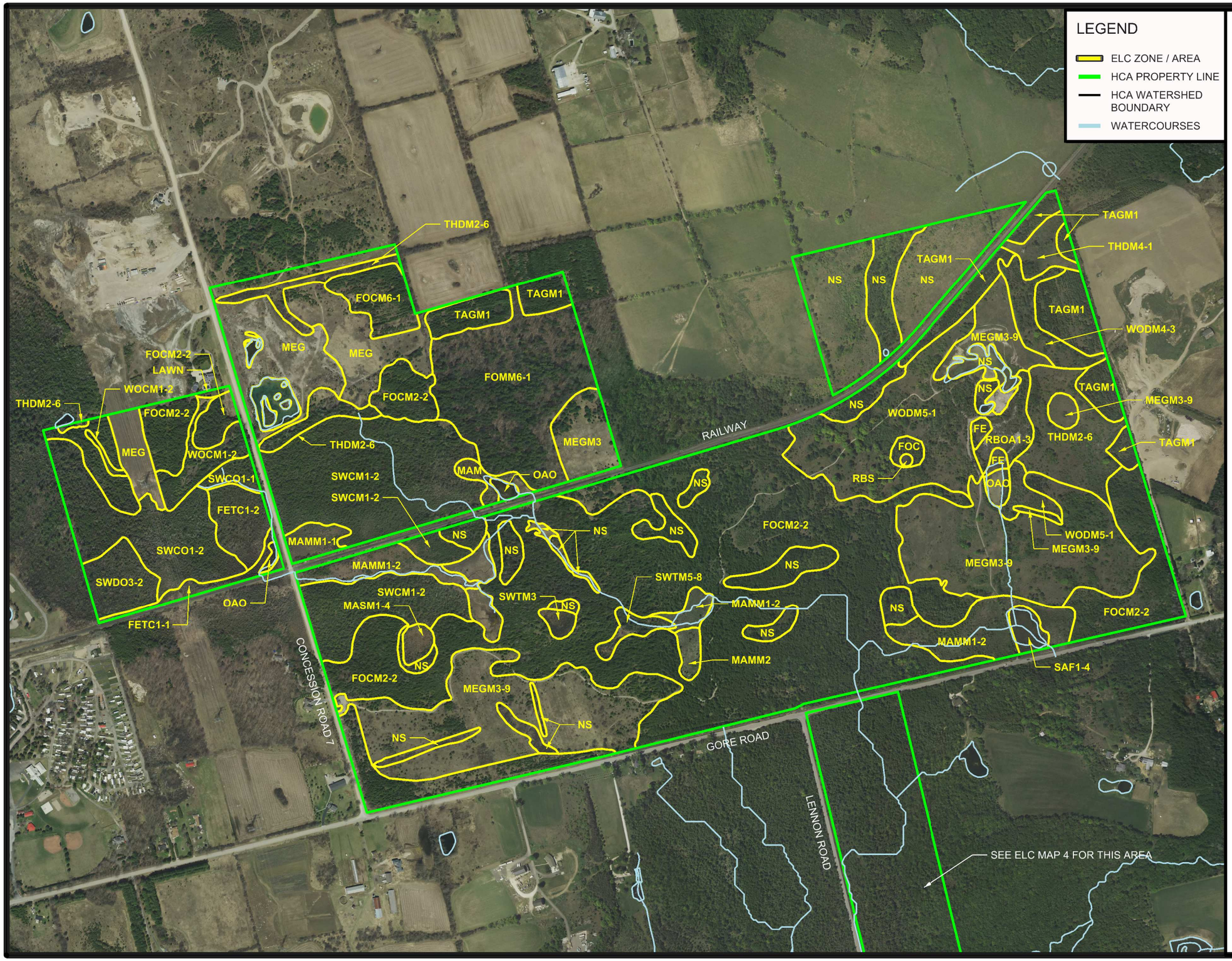
** ZONES FOLLOW CRITERIA SET OUT IN THE NIAGARA ESCARPMENT PLAN AND NIAGARA ESCARPMENT OPEN SPACE SYSTEM (NEPOSS) PLANNING MANUAL.

DATE: 2020/11/05

MANAGEMENT PLAN ZONE MAP
FLETCHER CREEK

Hamilton Conservation Authority

A Healthy Watershed for Everyone



LEGEND

- ELC ZONE / AREA
- HCA PROPERTY LINE
- HCA WATERSHED BOUNDARY
- WATERCOURSES

ECOLOGICAL LAND CLASSIFICATION:

FOCM2-2	DRY-FRESH WHITE CEDAR CONIFEROUS FOREST
FODM6-5	FRESH-MOIST SUGAR MAPLE HARDWOOD DECIDUOUS FOREST
FOMM6-1	FRESH-MOIST SUGAR MAPLE-HEMLOCK MIXED FOREST
MEG	GRAMINOID MEADOW SERIES
MEMG3	DRY-FRESH GRAMINOID MEADOW
MEGM3-9	*CAREX FLACCA* GRAMINOID MEADOW
WOCM1-2	DRY-FRESH WHITE CEDAR CONIFEROUS WOODLAND TYPE
WODM4-3	DRY-FRESH SUGAR MAPLE DECIDUOUS WOODLAND
WODM5-1	FRESH-MOIST POPLAR DECIDUOUS WOODLAND
SWCO1-1	WHITE CEDAR ORGANIC CONIFEROUS SWAMP
SWCO1-2	WHITE CEDAR - CONIFER ORGANIC CONIFEROUS SWAMP
SWCM1-2	WHITE CEDAR - CONIFER MINERAL CONIFEROUS SWAMP
SWDO3-2	YELLOW BIRCH ORGANIC DECIDUOUS SWAMP
SWDM3-3	SWAMP MAPLE (FREEMAN'S) MINERAL DECIDUOUS SWAMP
SWMM1-1	WHITE CEDAR - HARDWOOD MINERAL MIXED SWAMP
SWTM3	WILLOW MINERAL DECIDUOUS THICKET SWAMP
SWTM5-8	NON-NATIVE MINERAL DECIDUOUS THICKET SWAMP
FETC1-1	TAMARACK TREED FEN
FETC1-2	TAMARACK - WHITE CEDAR TREED FEN
FEOG1	GRAMINOID OPEN FEN
FEOM1-1	BOG BUCKBEAN - SEDGE MIXED OPEN FEN
FE	FEN
MAM	MEADOW MARSH
OAO	OPEN AQUATIC
MAMM1-2	CATTAIL GRAMINOID MINERAL MEADOW MARSH
MASM1-4	NARROW-LEAVED SEDGE MINERAL SHALLOW MARSH
FOCM6-1	DRY-FRESH WHITE PINE NATURALIZED CONIFEROUS PLANTATION
TAGM1	FINE MINERAL CONIFEROUS PLANTATION
THDM2-6	BUCKTHORN DECIDUOUS SHRUB THICKET
THDM4-1	NATIVE DECIDUOUS REGENERATION THICKET
SAF1-4	PONDWEED FLOATING-LEAVED SHALLOW AQUATIC
RBS	SHRUB ROCK BARREN
RBOA1-3	DRY-FRESH LITTLE BLUESTEM OPEN ALVAR MEADOW
NS	NOT SURVEYED

N

ECOLOGICAL LAND CLASSIFICATION MAP
FLETCHER CREEK

DATE: 2020/11/05

Hamilton Conservation Authority

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GORE ROAD
VALENS ROAD
LENNON ROAD
CON. 10 W
CONCESSION 10 W.
VALENS ROAD

NS
SWCM1-2
SWDM3-3
FODM6-5
AG
SWMM1-1
OAO
MAMM1-2

LEGEND

- ELC ZONE / AREA
- HCA PROPERTY LINE
- HCA WATERSHED BOUNDARY
- WATERCOURSES

ECOLOGICAL LAND CLASSIFICATION:

AG	AGRICULTURE
FODM6-5	FRESH-MOIST SUGAR MAPLE HARDWOOD DECIDUOUS FOREST
MAMM1-2	CATTAIL GRAMINOID MINDERAL MEADOW MARSH
OAO	OPEN AQUATIC
SWCM1-2	WHITE CEDAR-CONIFER MINERAL CONIFEROUS SWAMP
SWDM3-3	SWAMP MAPLE (FREEMAN'S) MINERAL DECIDUOUS SWAMP
SWMM1-1	WHITE CEDAR - HARDWOOD MINERAL MIXED SWAMP
NS	NOT SURVEYED

N

ECOLOGICAL LAND CLASSIFICATION MAP
FLETCHER CREEK

DATE: 2020/11/05

Hamilton Conservation Authority
A Healthy Watershed for Everyone

APPENDIX 2

Capital Development Priorities

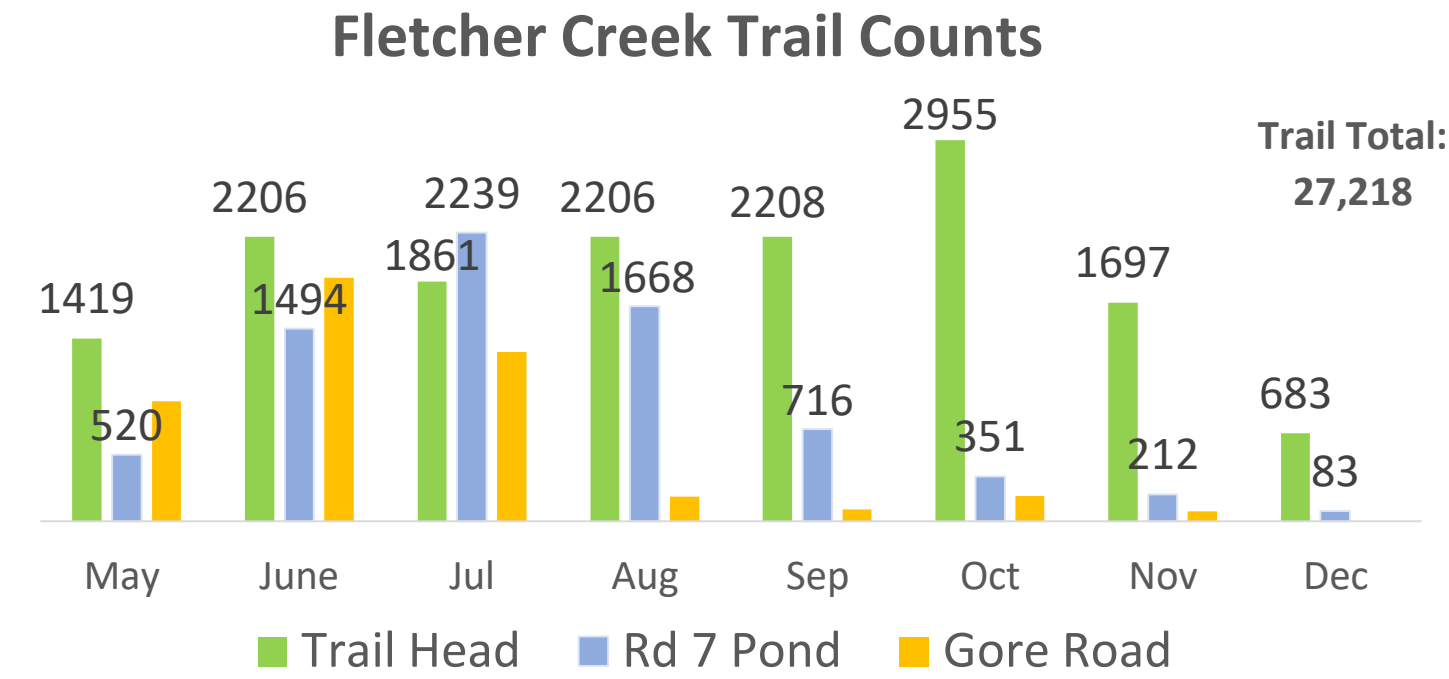
FLETCHER CREEK CAPITAL DEVELOPMENT PRIORITIES: 2020 - 2030

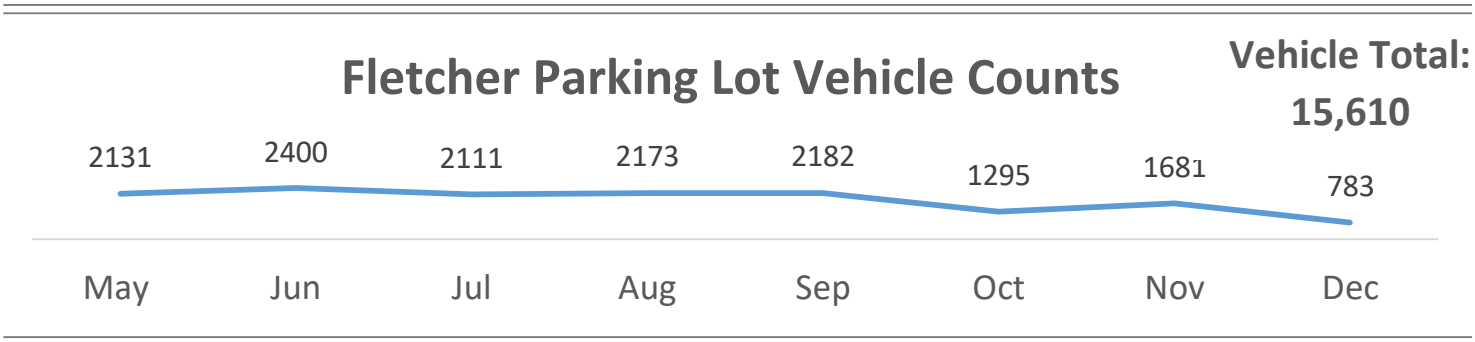
A. Conservation Area Improvements		***Budget (270K)**
A1	Perimeter Fencing	$ 20,000
A2	Bridge Replacement	$ 10,000
A3	Boardwalks Replacement	$ 50,000
A4	Trail Formalization	$ 25,000
A5	Parking Lot Improvements	$ 20,000
A6	Site Signage	$ 15,000
A7	Trail Head Kiosk Improvements	$ 10,000
A8	Interpretive Features (Benches, Signs)	$ 20,000
**A9	Invasive Species Management	$ 50,000
**A10	Natural Area Restoration	$ 50,000

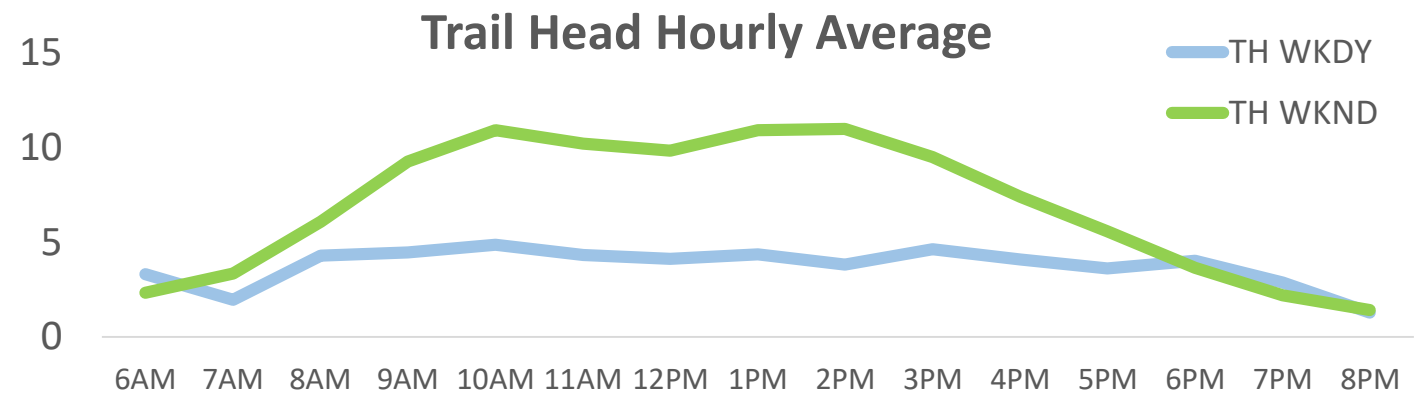
* Budget costs are in 2020 dollars, projects and budgets to be reviewed annually.
** Costs subject to ecological findings and recommendations.

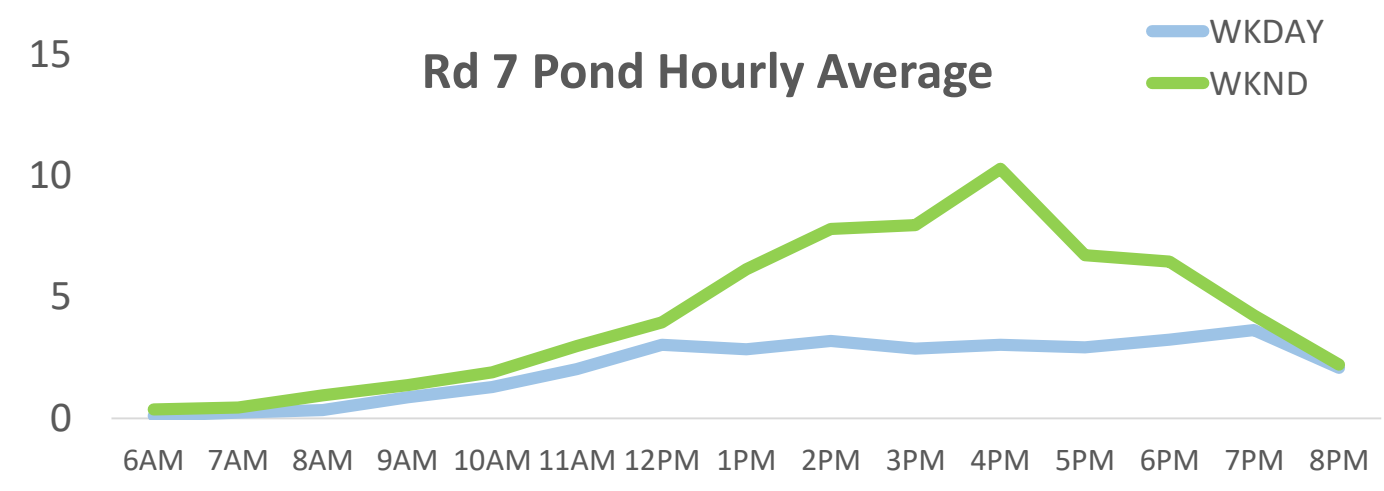
APPENDIX 3

Trail and Vehicle Counter Data


Fletcher Creek Trail Counts
Trail Total:
27,218
1419
520
2206
1494
2239
1861
2206
1668
2208
716
2955
351
1697
212
683
83
May
June
Jul
Aug
Sep
Oct
Nov
Dec
Trail Head
Rd 7 Pond
Gore Road


Fletcher Parking Lot Vehicle Counts
Vehicle Total:
15,610
2131
2400
2111
2173
2182
1295
1681
783
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Trail Head Hourly Average
TH WKDY
TH WKND
15
10
5
0
6AM
7AM
8AM
9AM
10AM
11AM
12PM
1PM
2PM
3PM
4PM
5PM
6PM
7PM
8PM


Rd 7 Pond Hourly Average
WKDAY
WKND
15
10
5
0
6AM
7AM
8AM
9AM
10AM
11AM
12PM
1PM
2PM
3PM
4PM
5PM
6PM
7PM
8PM

APPENDIX 4

Managed Forest Plan Recommendations 2018-2027

6.8 Fletcher Creek Ecological Reserve

The Fletcher Creek Ecological Preserve is a unique natural area. An abandoned quarry at the site was rehabilitated, resulting in the creation of a rare type of wetland. Environmental improvements to the area resulting from the restoration are significant and include the expansion of a fen plant community — the rarest form of wetland in Ontario — creation of additional habitat for rare plants and animals already in the area, a new breeding area for leopard frogs, snakes, and a variety of small mammals, such as groundhogs, foxes and bats. A mix of coniferous and deciduous trees will create a canopy that, over time, will provide valuable shelter for wintering birds and mammals. The area contains a trail system and interpretive panels. *Source: https://conservationhamilton.ca/passive-areas/*

Managed Forest Summary

Roll Number (5-digit)	Forest Type 1	Area1 (ac)	Forest Type 2	Area2 (ac)	Forest Type 3	Area 3 (ac)	Forest Type 4	Area 4 (ac)	Forest Type 5	Area 5 (ac)	Total Area (ac)
01100	Conifer Plantation	11.23									**11.23**
00700	Conifer Plantation	34.46	Mixedwoods	24.24	Afforestation	0.25	Open	5.34	Pond	1.73	**66.02**
00400	Conifer Plantation	112.03	Upland Hardwoods	10.96	Cedar Mixedwoods	64.52	Afforestation	36.13	Open Pond	3.24 1.94	**228.82**

Other Vegetation Observed	Invasive Species Observed	Wildlife Habitat Features			
		Snags	**Cavities**	**Coarse Woody Debris**	**Mast Species**
Honeysuckle Virginia creeper Wild red raspberry	European honeysuckle Buckthorn Manitoba maple	Few	Non observed	Few	None observed

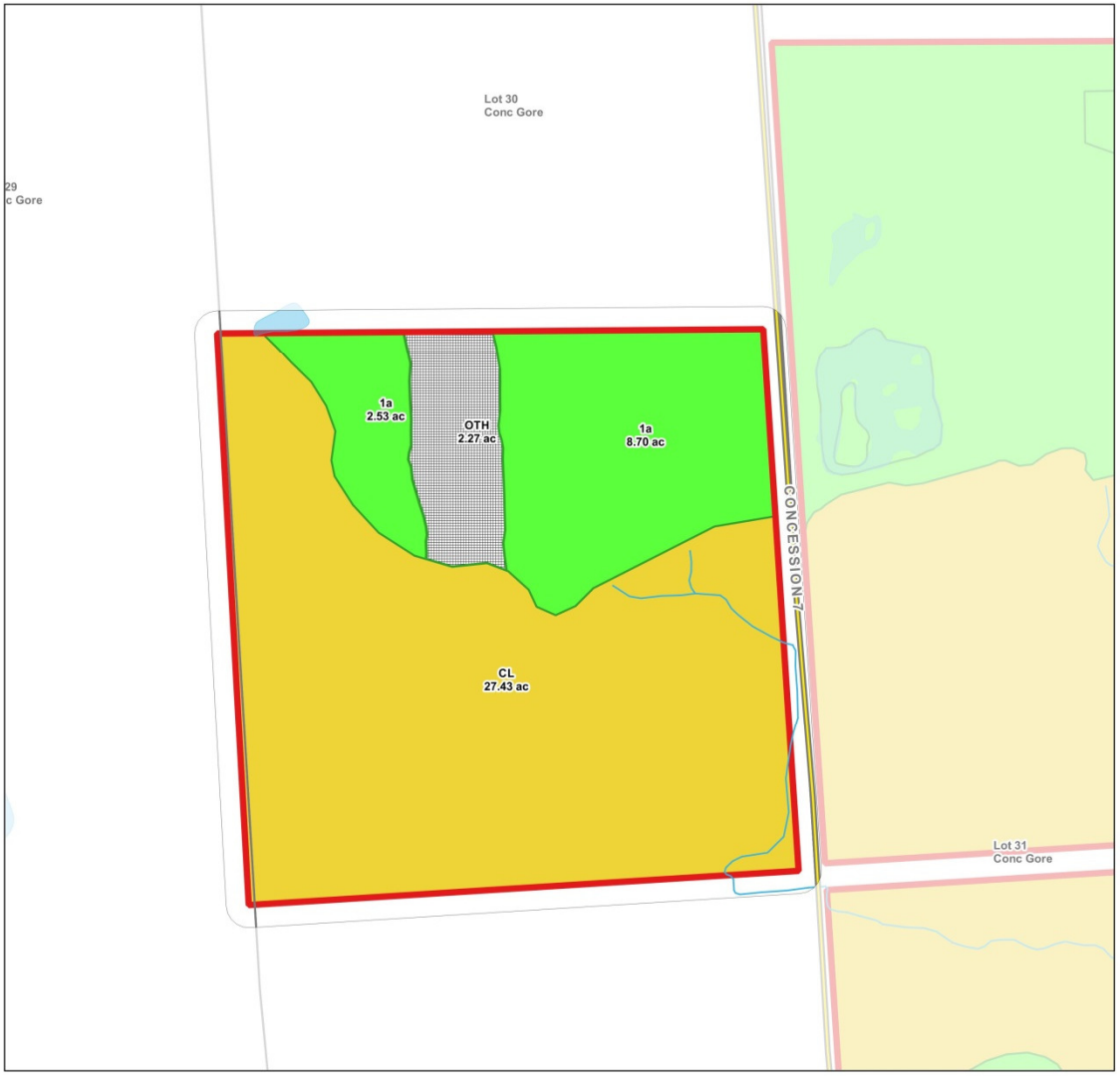
Forest Inventory

			Trees ≥ 10 cm DBH						Regeneration (advanced > 1m)	
Comp	**Area (ac)**	**Forest Type**	**Species Composition[1]**	**Age (yrs)**	**Height (m)**	**Avg. DBH[2] (cm)**	**Density (stems/ha)**	**Basal Area[3] (m2/ha)**	**Species Composition**	**Density (stems/ha)**
1a (2)	11.23	Conifer Plantation	Pw6 Sw4	35	15	12	2212	38	none	0
1b	27.49	Conifer Plantation	Ce9 Ps1	10	17	6	322	7	Ce5 Ps2 Pw2	2000
1c	2.12	Conifer Plantation	Pw7 Sw2 Aw1	35	15	12	1734	32	Bt5 El5	2000
1d	0.25	Afforestation	Regenerating naturally or through planting to mixed species. Most common species are White cedar, Scots pine, Cherry sp., & Ash sp. Stand density > 400 stems/ ac based on visual observations.						Ce5 Po5	530
1e	4.85	Conifer Plantation	Pw3 Sw3 Ce2 Pr2 (Aw)	38	15	13	2322	39	Wn2 Pw2 Aw2 Mh2	2000
1f	24.24	Mixedwoods	He7 Mh2 (Ce Pw)1	80	46	29	299	50	Aw10	2000
1g	5.34	Open							Ps10	270
Pond	1.73	Pond								
1h	10.06	Afforestation	Ap10	20	14	5	130	2	Wi8 Po1 Aw1	730
1i	3.96	Upland Hardwoods	Po9 El1	40	29	26	411	28	Aw9 Po1	4000
1j	7.00	Upland Hardwoods	Aw10	15	12	6	177	2	Aw8 Po2	2000
1k	34.01	Cedar Mixedwoods	Ce9 (Aw Bw Mh)1	37	17	14	2203	48.7	Ce10	3333

Forest Inventory

			Trees ≥ 10 cm DBH						Regeneration (advanced > 1m)	
Comp	**Area (ac)**	**Forest Type**	**Species Composition[1]**	**Age (yrs)**	**Height (m)**	**Avg. DBH[2] (cm)**	**Density (stems/ha)**	**Basal Area[3] (m2/ha)**	**Species Composition**	**Density (stems/ha)**
1l	15.15	Cedar Mixedwoods	Ps4 Ce3 Ap1 Mh1	12	16	8	454	9	Po8 Ps2	2500
1m	12.75	Conifer Plantation	Ps5 Ap2 Ce2	18	13	5	284	4	Ce7 Haw3	3000
1n	3.24	Open								
1o	0.41	Cedar Mixedwoods	Ce9 Bw1	30	14	13	2829	46	Ce10	6000
1p	77.29	Conifer Plantation	Sw4 Aw1 Cb1 Ce1 Pr1 Ps1 Pw1	18	14	9	412	6.7	Aw4 Cb4 Ap1 Ps1	2667
1q	1.81	Conifer Plantation	Ps8 Pw2	20	15	8	445	8	Ps10	3000
1r	14.40	Afforestation	Po6 Ps4	25	16	14	802	16	Bt4 Ps4 Ce2	5000
1s	9.68	Conifer Plantation	Pw7 Sw3	60	26	16	219	12	none	0
1t	10.50	Conifer Plantation	Pw6 Mh4	50	39	10	84	10	Aw5 Iw5	2000
1u	11.67	Afforestation		15					Pw5 Ce2 Cb2 Bt1	2350
1v	14.95	Cedar Mixedwoods	Ce9 Pw1	30	16	11	1604	32	Ce10	7000
Pond	1.94	Pond								

Detailed Property Maps



Detailed Property Map and Surrounding Area
Fletcher Creek

Roll Number: 23 01 000 004 00110 0000

Owner: Hamilton Region Conservation Authority
Conservation Area: Fletcher Creek Ecological Preserve
Location: CON GORE; PT LOT 30
Municipality: Wellington County
Township: Puslinch

Total Property Area: 40.93 ac
Total Eligible MFTIP Area: 11.23 ac

Legend

- Property Boundary
- **Compartment**
- MFP - Eligible
- CL - Ineligible
- OTHER - Ineligible
- Building
- Road / Driveway
- Lot / Concession
- Watercourse
- Water body / River

CL = Conservation Land

A/R = Agricultural/Residential

OTH = Other (recreation, hydro lands, parking, misc.)

Forest Resource Mapping from Silv-Econ Ltd.

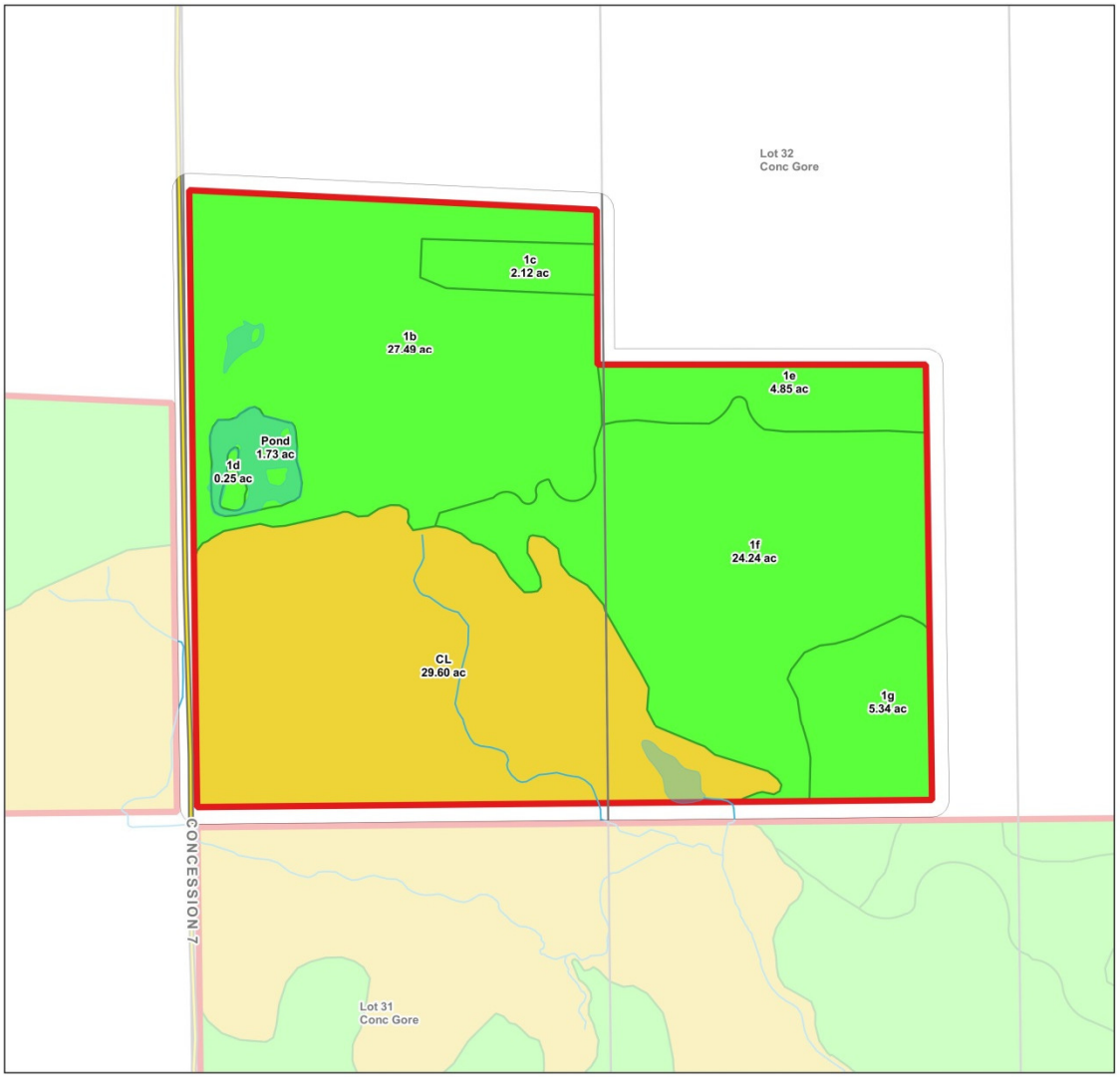
Base Mapping supplied by the Ontario Ministry of Natural Resources and Forestry, and The City of Hamilton

N

0 100 200 m

Date: July 04, 2017

Projection/Datum: UTM 17N NAD83



Detailed Property Map and Surrounding Area
Fletcher Creek

Roll Number: 23 01 000 005 00700 0000

Owner: Hamilton Region Conservation Authority
Conservation Area: Fletcher Creek Ecological Preserve
Location: CON GORE; PT LOT 31 TO 32
Municipality: Wellington County
Township: Puslinch

Total Property Area: 95.62 ac
Total Eligible MFTIP Area: 66.02 ac

Legend

- Property Boundary
- Building
- **Compartment**
- Road / Driveway
- MFP - Eligible
- Lot / Concession
- CL - Ineligible
- Watercourse
- OTHER - Ineligible
- Water body / River

CL = Conservation Land

A/R = Agricultural/Residential

OTH = Other (recreation, hydro lands, parking, misc.)

Forest Resource Mapping from Silv-Econ Ltd.

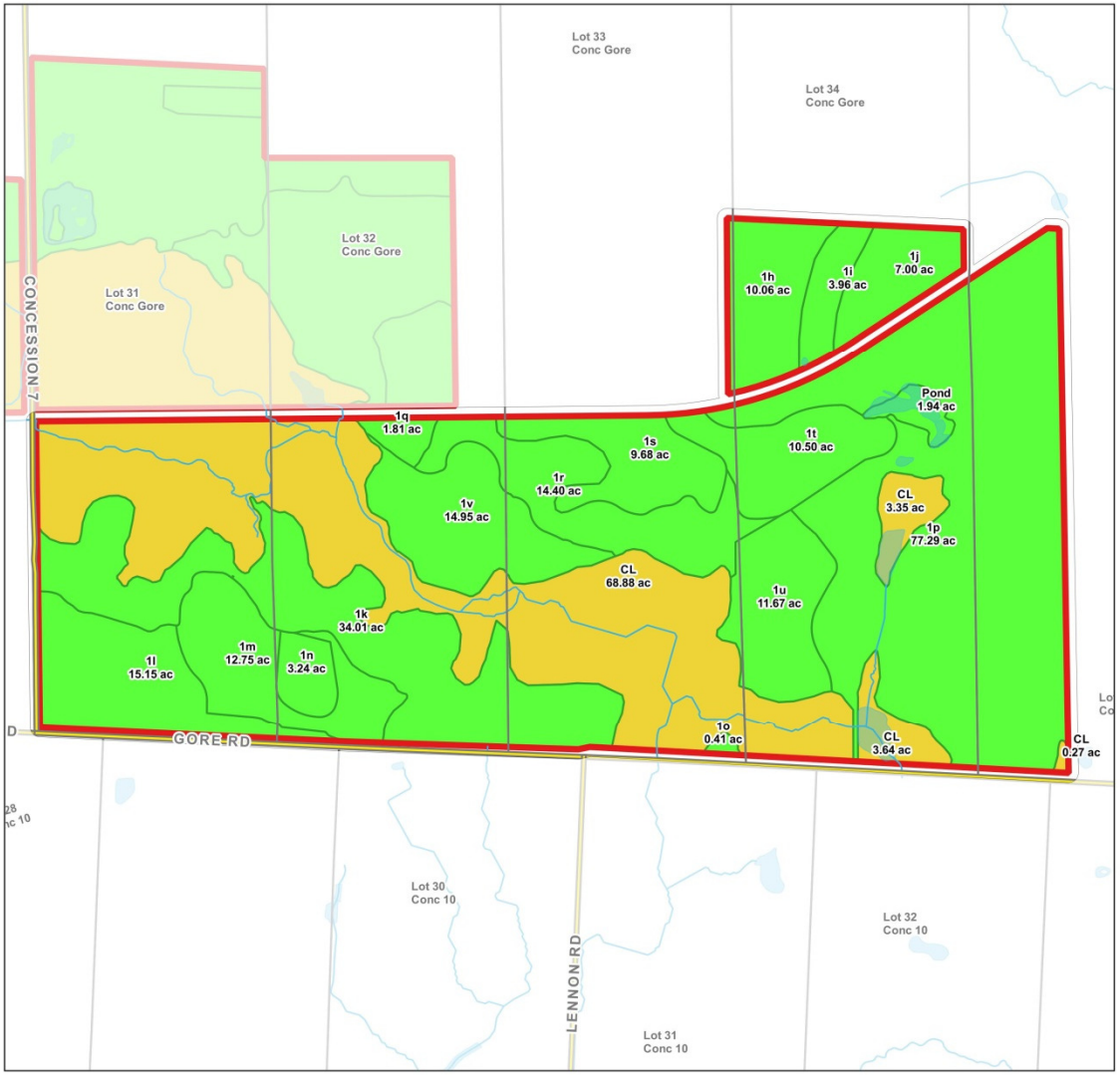
Base Mapping supplied by the Ontario Ministry of Natural Resources and Forestry, and The City of Hamilton

N

0 100 200 m

Date: July 04, 2017

Projection/Datum: UTM 17N NAD83



Detailed Property Map and Surrounding Area
Fletcher Creek

Roll Number: 23 01 000 005 00400 0000

Owner: Hamilton Region Conservation Authority
Conservation Area: Fletcher Creek Ecological Preserve
Location: CON GORE; PT LOT 31 TO 35
Municipality: Wellington County
Township: Puslinch

Total Property Area: 304.96 ac
Total Eligible MFTIP Area: 228.82 ac

Legend

- Property Boundary
- **Compartment**
- MFP - Eligible
- CL - Ineligible
- OTHER - Ineligible
- Building
- Road / Driveway
- Lot / Concession
- Watercourse
- Water body / River

CL = Conservation Land

A/R = Agricultural/Residential

OTH = Other (recreation, hydro lands, parking, misc.)

Forest Resource Mapping from Silv-Econ Ltd.

Base Mapping supplied by the Ontario Ministry of Natural Resources and Forestry, and The City of Hamilton

N

0 100 200 m

Date: July 04, 2017

Projection/Datum: UTM 17N NAD83

Forest Inventory

			Trees ≥ 10 cm DBH						Regeneration (advanced > 1m)	
Comp	**Area (ac)**	**Forest Type**	**Species Composition[1]**	**Age (yrs)**	**Height (m)**	**Avg. DBH[2] (cm)**	**Density (stems/ha)**	**Basal Area[3] (m2/ha)**	**Species Composition**	**Density (stems/ha)**
19a	28.10	Lowland Hardwoods	Ag4 Ab3 Haw1 Ow1 Wn1	32	14	11	799	12.4	Bt6 Ab2 Ag1	1600
19b	13.30	Lowland Hardwoods	Ag3 Wn3 Haw2 Mh2 (Ow)	90	19	17	753	22	none	0
19c	18.78	Lowland Hardwoods	Ab5 Hi5	28	14	8	138	2	Bt10	3000
19d	23.49	Upland Hardwoods	Mh2 Wn2 Ag1 Ap1 Cb1 Iw1 Pw1 (Bd Be Haw Hi Or)1	34	21	12	493	16.5	Bt8 Mh2	1250

Section 7 : Ten Year Activity Summary 2018-2027

The following management activities are recommended for the 2018-2027 operating period.

Forest Health & Ecological Diversity

Control Invasive plants

- The Ontario Invasive Plant Council recommends creating a feasible, long-term strategy for managing invasive species. Many of the managed forest compartments have been colonized by buckthorn and other invasive plant species. Buckthorn is particularly problematic because it is the dominant species in the regeneration of a number of the compartments. Managing the buckthorn is an important silvicultural objective in maintaining a healthy and productive forest.

Manage Red Pine Decline

- A number of the red pine plantations are declining as a result of root diseases. The HCA has been thinning these plantations to mitigate the effects of the decline in the overstory and promote natural regeneration. Many of the plantations also lack desirable regeneration and some are heavily colonized by buckthorn. Controlling the buckthorn and restoring regeneration through underplanting is highly recommended.

Monitor Invasive Insects

- Many, if not all, of the mature ash in the managed forest have been affected by Emerald Ash Borer. Fortunately ash is commonly found in the regeneration of many stands and it is unlikely that ash species will disappear from the managed forest.

- Hemlock stands are at risk from Hemlock woolly adelgid (HWA). Hemlock is dominant/co-dominant in Fletcher compartment 1f and Beverly Swamp compartment 4b and is a minor species in several other compartments. These stands should be monitored for signs of HWA and report infected stands to the Canadian Food Inspection Agency (CFIA). Silv-Econ is coordinating a working group of forest managers/owners who have hemlock stands on their properties. The HCA may wish to participate in this working group.

Wildlife & Nature Appreciation

Conserve Habitat Features

- Wildlife habitats can be conserved or enhanced by retaining snags, fallen trees and logs, and trees with cavities.

- Mitigating the impacts from management activities on Species At Risk and other wildlife may require modifications to conventional silvicultural activities, establishing buffers around critical habitat, and seasonal restrictions for undertaking management activities, among other mitigation measures.

Recreation

- There in an extensive network of recreational trails throughout most of the managed forest. Maintaining the trails by trimming vegetation, removing fallen logs and hazard trees, and making repairs when required is recommended.

Forest Products

- A second thinning of the conifer plantations at Christie, Dundas Valley, Mt. Albion, Valens, and Westfield Heritage Village can be considered during the 2018-2027 operating period.

- There are approximately 115 acres of conifer plantations at Fletcher Creek that could also be considered for thinning during the 2018-2027 operating period.

Section 11 : Tree Species & Species Abbreviations

Abbreviation	Species	Abbreviation	Species
Ag	green ash	Mst	Striped maple
Ap	apple	Nb	Nannyberry
Aw	white ash	Ob	bur oak
Bd	basswood	OC	other conifers
Be	American beech	OH	other hardwood
Bf	balsam fir	Or	red oak
Bn	butternut	Ow	white oak
Bt	European buckthorn	Pa	Austrian pine
Bw	white birch	Pb	balsam poplar
By	yellow birch	Pg	large tooth aspen
Cb	black cherry	Ph	hybrid poplar
Cc	choke cherry	Pj	jack pine
Ce	white cedar	Po	poplar species
El	elm	Pr	red pine
Ha	hawthorn	Ps	Scots pine
Hac	hackberry	Pt	trembling aspen
He	eastern hemlock	Pw	white pine
Hi	bitternut hickory	Sas	sassafras
Hs	shagbark hickory	Sb	black spruce
Iw	ironwood	Sc	blue spruce
La	European larch	Sn	Norway spruce
Lb	black locust	Sw	white spruce
Lh	Honey locust	Syc	American sycamore
Mash	mountain ash	Ta	tamarack
Mb	black maple	Tu	tulip tree
Mh	sugar maple	Wi	willow
Mm	Manitoba maple	Wn	black walnut
Mr	red maple		
Ms	silver maple		

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Ancaster, Ontario L9G 4X1
905-525-2181 www.conservatiohamilton.ca

Hamilton Conservation Authority

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