



Upper Watershed Beverly Swamp 2019 Management Plan

DRAFT - October 2020



A Healthy Watershed for Everyone



Prepared by: Hamilton Conservation Authority

Photo Credits: HCA Staff



2020-08-27

TABLE OF CONTENTS

1.0	APPROVAL STATEMENT	5
2.0	INTRODUCTION	6
2.1	Area Summary	6
2.2	Key Items	6
2.3	Goals and Objectives	6
3.0	BACKGROUND	8
3.1	Study Area	8
3.2	Property History	8
3.3	Planning and Development Controls	9
3.4	Management Plan Zones	10
4.0	NATURAL AREA INVENTORY	12
4.1	Natural Features	12
4.2	Ecological Land Classification	13
4.3	Terrestrial Inventory Results	21
4.4	Aquatic Inventory	24
4.5	Significant Ecological Features	26
5.0	CONSERVATION AREA MANAGEMENT	29
5.1	Land Management	29
5.2	Fish and Wildlife Management	29
5.3	Cultural Heritage	31
5.4	Agricultural	31
5.5	Managed Forest	31
5.6	Conservation Area Operations	32
5.7	Research	32
6.0	MANAGEMENT PRACTICES	33
6.1	Natural Heritage Conservation	34
6.2	Water Management	34
6.3	Conservation Area Experience	34
6.4	Education and Environmental Awareness	35
6.5	Public Infrastructure – Utilities, Trails and Transportation	35
7.0	SUMMARY	36
7.1	Implementation Priorities	36

List of Tables

Table 1	Summary of Ecological Field Studies.....	12
Table 2	Vegetation Communities.....	14
Table 3	Federal and Provincial Species at Risk	23
Table 4	Fish Species of Beverly Swamp	25

Draft

1.0 APPROVAL STATEMENT

We are pleased to approve the Upper Watershed Beverly Swamp 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 HCA's 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 Upper Watershed Beverly Swamp in support of these goals.

Lisa Burnside
Chief Administrative Officer
Hamilton Conservation Authority

Date

Lloyd Ferguson
Chair, Board of Directors
Hamilton Conservation Authority

Date



2.0 INTRODUCTION

2.1 Area Summary

The Upper Watershed Beverly Swamp (Beverly Swamp) complex owned by HCA spans three watersheds – Fairchild, Spencer, and Bronte Creeks. It offers one of the best and largest lowland swamp forest representations in south central Ontario. Parts of it can be accessed by hiking the Lafarge 2000 Trail in the northwest end of the HCA watershed.

The wetland is located within the source area for Spencer, Grindstone, and Fairchild Creeks and features a rich diversity of plant and animal life, including some that are rare to the Hamilton region. The area functions as a natural sponge, maintaining hydrological balance over a large area and draining into both Lake Ontario and Erie.

HCA acquired these tracts of land to protect them from changes that could be detrimental to their sensitive features and functions. This Management Plan is intended to support that goal by bringing together all available information on file, adding information on current conditions, and recommended best management practices to help guide land management decisions for the next ten years.

2.2 Key Items

Almost half of the 2,400-hectare Beverly Swamp is HCA-owned, these lands were acquired because of their environmental significance and the overall role they play in the health and natural heritage of the watershed.

The majority of the lands are designated by the province or the municipality as Provincially Significant Wetland (PSW), Environmentally Significant Areas (ESAs) or as Areas of Natural and Scientific Interest (ANSIs). The actual designation is determined by many reasons, including significant hydrological function, rare habitat, or species at risk to name a few.

HCA's ownership and management of these lands provides protection of their sensitive features and functions. These lands contribute to the larger natural heritage system in the City of Hamilton and surrounding municipalities, and contribute to the watershed's biodiversity.

2.3 Goals and Objectives

This Management Plan updates previous HCA studies of the Beverly Swamp, supplies current mapping, and provides guidance for HCA management of the lands for the next ten years.

This plan supports the following goals and objectives as outlined in HCA's current strategic plan:

Vision

- A healthy watershed for everyone.

Mission

- To lead in the conservation of our watershed and connect people to nature.

Commitment and Corporate Values

- Provide excellent customer service and a solution-oriented approach.
- Be accountable, transparent, and responsible in the use of resources.
- Embrace new technologies to help develop new ways of doing business and foster innovation.
- Promote teamwork internally and externally to achieve common goals, support existing relationships and build new partnerships.
- Maintain trust, act with integrity, and treat others with respect.
- Value knowledge to continually learn and improve, in an effort to achieve best solutions.

Organizational Excellence

- Ensure corporate and financial viability and the HCA's relevance in the community.
- Identify opportunities to engage the community, adjacent landowners and Indigenous People.

Water Management

- Protect the watershed for people, property, flora and fauna, and natural resources through flood and erosion control, water quality programs, low flow augmentation and adaptation strategies to adapt to changing climatic conditions.

Natural Heritage Conservation

- Conservation, restoration and enhancement of watershed natural areas and ecology.
- Continue on-going ecological restoration projects and monitoring programs.
- Identify invasive species strategies and natural heritage plans in the Master plan.

Conservation Area Experience

- Provide high quality, diverse conservation areas that promote outdoor recreation, health, and well-being and strengthen public awareness of the importance of being in or near our conservation areas.
- Update and develop master and management plans, and implement priorities to further enhance conservation areas for current and future generations.

Education and Environmental Awareness

- Provide outdoor learning experiences for students, teachers and the community, increasing knowledge and awareness of the value of our environment and heritage.
-

3.0 BACKGROUND

3.1 Study Area

The Upper Watershed Beverly Swamp study area is located in the northwestern portion of the Flamborough Plain physiographic region. This area consists of an east to west trending, poorly-drained basin on the bedrock plain located southeast of the Galt and Moffat Moraines. The swamp which formed in this basins extends across the headwaters zone of three stream systems but exhibits very little topographic relief. The area is mostly between 265m and 270m in elevation, with upland drumlins to 305m bordering the study area, and end moraines at 285 to 309m. Resistant bedrock ridges a few metres high form small knolls within the swamp.

The swamp stretches across the rural area east of the City of Cambridge to Highway #6 north of Freelon. Although this extensive forested wetland is considered “pristine” relative to other natural areas in southwestern Ontario, it is subject to a number of land uses which fragment and disrupt the natural conditions of the area. Several roads and utility corridors traverse the area. Many forest tracts are subject to selective or intensive logging.

HCA acquired tracts for natural protection, water conservation, and recreational use. The lands in the study area are both HCA and privately owned, and used for a variety of passive and active recreational activities including walking and horse trails, hunting, fishing, and nature study. Residential land uses in the area consist of scattered rural residences, estates, and trailer parks. Over time disturbances to the lands have been observed. Invasive species, ditching, dumping and the abandoned shallow peat extraction pits along the 8th Concession are some examples.

3.2 Property History

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 1800s but the rocky hills proved difficult for farming. Thin soil and rock necessitated grazing with only small areas of deep soil suitable for tilling. The historical “Beverly Swamp” apparently covered a far greater area than the poorly drained wetland which now remains. Written accounts from the 1800s note that part of the Hamilton and Galt Road (now Highway 8) known as ‘Beverly Swamp Road’ was a terror to travelers and over the years was “*macadamized and improved.*” †

A government survey of the area carried out prior to 1913 noted “*Westover peat bog situated about four miles south of Schaw Station, on the Canadian Pacific Railway in Beverly township, Wentworth county. The area of the bog which is investigated is approximately 1400 acres. The depth of the bog varies from 3 to 5 feet.*” ‡

†Canada Past, Present and Future, W.H. Smith 1851

‡Summary Report, Mines Branch, Dept. of Mines Ottawa 1913 no.285

This survey was also discussed in a subsequent government paper from 1915 noting *“The peat is very well humified and is composed principally of carex, but around the margin the peat is heavily intermixed with hypnum, while the bottom layer is formed almost entirely of aquatic plants.”*‡

A Geological Survey of Canada summary report from 1920 notes the area of the swamp at 1,730 acres and the peat content as 339,000 tons. Around 1940 the Canada Department of Mines and Resources had an interest in the area as a supplier of peat moss. H.A. Leverin examined a small area of the swamp and noted *“No sphagnum moss was noticed, the growth being mainly carex sedges and aquatic plants, with some hypnum moss. The peat is well humified and of granular consistency at the surface under the marsh grass roots. Underneath, it is more coherent and of colloidal consistency and the ash content is high. The peat would be of no value (i.e. as a soil conditioner) were it not for a fairly high nitrogen content, its usually limy ash, and for an underlying marl, which make possible the production of a soil conditioner having the desired proportion of alkaline earths and humus.”* ±

In the summer of 1958, another brief survey of the Beverly Swamp was made by the Department of Commerce and Development* to appraise the area for various possible uses. The survey focused on the nature and extent of the vegetative cover, depth of the peat, and soil reaction (pH) and the underlying mineral soil. Auger sampling was conducted and the core composition analyzed. As well, this survey looked at other areas where peat lands were converted for agricultural use (such as the Alfred Bog in eastern Ontario). The resulting recommendations from this study



were *“that every effort be made to preserve the Beverly Swamp in its natural state in order that it may continue to serve in its pristine role as a natural water storage area for Spencer Creek.”* This report also documents the establishment of the Spencer Creek Conservation Authority (now HCA) on May 8, 1958 and that the authority had acquired 100 acres in the Beverly Swamp to commence establishment of the Beverly Swamp Conservation Area.

3.3 Planning and Development Controls

The Beverly Swamp is located in the former Beverly Township, Town of Flamborough which is now part of the City of Hamilton.

‡ A. Anrep, Investigation of the Peat Bogs and Peat Industry of Canada, 1913-1914, Mines Branch, Canada Dept of Mines, Bul. 11, Report 351, 1915
± H.A. Leverin, Peat Moss Deposits in Canada, Canada Dept of Mines and Resources 1946, no.817

*Nickle, Tyrrell, Richardson, Spencer Creek Conservation Report 1960, Department of Commerce and Development Conservation Branch

The Rural Hamilton Official Plan designates HCA lands as Open Space. (Schedule D). These lands are also identified as part of the Protected Countryside in the Greenbelt Plan, and as Core Areas and Linkages in the Greenbelt Natural Heritage System (Schedules A and B). City Official Plan and provincial policies for these lands are in place for protection of natural features, water features and their associated functions. New development or site alteration is regulated by these policies.

HCA recognizes that certain public infrastructure such as utility corridors, trails or transportation links may be required to cross conservation area lands. HCA policy for planning review and regulation of these features adheres to the Conservation Authority Act, R.S.O. 1990 c.27; see Section 5.5 for more information.

City zoning regulations prescribe permitted uses, setbacks for buildings and parking areas, and the wetland areas as mapped and in the jurisdiction of the Hamilton Conservation Authority.

The Grand River Conservation Authority and Halton Conservation Authority regulate some areas within the Beverly Swamp. These conservation authorities, as well as the City of Hamilton planning department have been consulted in the preparation of this Management Plan.

3.4 Management Plan Zones

The appended map shows the Management Plan zones for HCA lands in the Beverly Swamp.

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 the Upper Watershed Beverly Swamp 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 conservation area, 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.

Four management zones have been identified for the Beverly Swamp: Nature Reserve (wetland), Natural, Access, and Resource Management. Following is a brief description of each zone.

Nature Reserve (wetland) Zones

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. Governance in 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. There is one defined access zone recognized for the HCA lands, a small parking area off Safari Road between Valens Road and Westover Road. Permitted development in access zones include roads, signs, trailheads and parking lots.

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. Beverly Swamp has areas of managed forest, see Section 5.6 and *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

4.1.1 Biophysical Inventory Methodology

The table below summarizes the dates and times for the field inventory.

Table 1: Summary of Ecological Field Studies

Survey Type	Dates	
	Year	Day(s)
Floral Inventory (spring)	2019	April 30
Frog call surveys	2019	April 6, May 16, June 19
Breeding Bird Surveys	2019	May 31, June 6, 11, 12, 25 and July 2 and 3.
Ecological Land Classification	2019	Multiple dates May - September
	2012	Multiple dates
Incidental Wildlife	Recorded when encountered during all visits	
Aquatic surveys	2019*	

*most recent surveys completed

The Beverly Swamp is designated under the OMNR ANSI program as an Life Science Area of Provincial Significance and the wetlands as Provincially Significant. This extensive swamp forms a core natural area across much of the former Flamborough Township and crosses the headwaters zone of three stream systems: Fairchild Creek, Spencer Creek, and Bronte Creek. This natural area serves a vital ecological and hydrological function, contains significant biotic communities, and provides habitat for many significant species.

As noted in Table 1 a variety of biophysical inventories were conducted for the various properties within the Beverly Swamp. 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 Beverly Swamp. The ELC for portions of some properties was completed during the 2012 field season for the 3rd edition of the Natural Areas Inventory. This field information has been used for these properties and was not updated. 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 (Srank) 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 each property to ensure the breeding bird surveys could be repeated accurately in the future. These surveys were conducted in appropriate weather conditions with no rain and low or no wind speed.

Road side point counts were conducted on three separate nights to capture the diversity of amphibians breeding in the Beverly Swamp. This survey methodology followed the Marsh Monitoring Program and 10-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).

4.2 Ecological Land Classification

.1 Biophysical Inventory Results

The ELC survey of HCA properties resulted in the classification of 28 vegetation community polygons (Table 2). Many of these communities occurred on multiple properties due to the uniform nature of some of the swamp communities. A detailed description of each ELC polygon follows; see the appended ELC maps for location. None of the ELC communities

identified are provincially or globally rare. Although there is a degraded alvar (rare vegetation community) identified by Anthony Goodban (1995) on the Safari Road parcel.

Table 2: Vegetation Communities

ELC Code	Community Description
Coniferous Forest	
FOCM 2-2	Dry-Fresh White Cedar Coniferous Forest Type
FOCS 2-2	Dry White Pine – Red Pine Non-Calcareous Bedrock Coniferous Forest
Deciduous Forest	
FODM 3-1	Dry-Fresh Poplar Deciduous Forest Type
FODM 5-3	Dry-Fresh Sugar Maple-Oak Deciduous Forest
FODM 5-5	Dry-Fresh sugar Maple-hickory Deciduous Forest
FODM 5-6	Dry-Fresh Sugar Maple – Basswood Deciduous Forest Type
FODM 5-10	Dry-Fresh sugar Maple-white birch-poplar Deciduous Forest
FODM 5-11	Dry-Fresh sugar Maple Hardwood Deciduous Forest
FODM 7-2	Fresh Moist Green Ash Hardwood Deciduous Forest
Mixed Forest	
FOMM 5-2	Dry-Fresh poplar mixed forest
Meadow	
MEGM3	Dry-Fresh Graminoid Meadow Ecosite
MEMR2	Dry-Fresh non-Calcareous Bedrock Mixed Meadow
Plantation	
TAGM1	Coniferous Plantation
Treed Wetland	
SWCM1-2	White Cedar – Conifer Mineral Coniferous Swamp Type
SWDM3-1	Red Maple Mineral Deciduous Swamp Type
SWDM4-5	Poplar Mineral Deciduous Swamp Type
SWDM 2-2	Green Ash Mineral Deciduous Swamp
SWDO 1-1	Black Ash Organic Deciduous Swamp
SWDO2	Maple Organic Deciduous Swamp
SWDO2-2	Silver Maple Organic Deciduous Swamp
SWDO 3-2	Yellow Birch Organic Deciduous Swamp
SWMO 1-1	White Cedar – Hardwood Organic Mixed Swamp
Thicket Swamp	
SWTO4-1	Red-osier Dogwood Organic Deciduous Thicket Swamp Type
SWTM5-8	Non-native Mineral Deciduous Thicket Swamp Type
SWTO4-3	Silky Dogwood Organic Deciduous Thicket Swamp
Mineral Meadow Marsh	
MAMM 1-2	Cattail Graminoid Mineral Meadow Marsh
MAMM 1-12	Common Reed Graminoid Mineral Meadow Marsh
Shrub Thicket	
THDM 2-6	Buckthorn Deciduous Shrub Thicket

.2 Coniferous Forest

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

This vegetation type occurs twice in HCA Beverly Swamp properties, once on property 14 (north off of Regional Road 97) and again on property 16 (north off of Concession 8). On property 14 the polygon is a small ridge surrounded by swamp, and on property 16 the Cedar coniferous forest runs along the West edge of the property. On both properties, Eastern White Cedar dominates both the canopy and the subcanopy, with occurrences of other species such as Paper Birch, Red Maple, and Hemlock. Understory is often sparse, containing species such as Prickly Ash, Bracken Fern, and Glossy Buckthorn. Ground layer is a mix of fern and sedge species, such as Lady Fern, Sensitive Fern, *Carex gracillima*, Maidenhair Fern, *Carex intumescence*, and *Carex pennsylvanica*. Other species such as Sarsaparilla, Wild Lily-of-the-valley, Jack-in-the-Pulpit, and Virginia Creeper are also present.

North of Safari Road this vegetation type occurs on shallow rocky soils with a thick canopy cover of Eastern White Cedar. Shrub and ground cover are sparse and include Eastern White Cedar, Common Buckthorn, Silky Dogwood and Small Bur Oak trees.

.2 Dry White Pine–Red Pine Non-Calcareous Bedrock Coniferous Forest (FOCS 2-2– 2012 data)

A shallow soil vegetation community with a 10 – 25 m canopy of White pine and Eastern White Cedar and an understory of White spruce, Black Locust and Sugar Maple. The ground cover was dominated by goldenrods, Red Raspberry and scattered sedges.

.3 Deciduous Forest

.1 Dry-Fresh Poplar Deciduous Forest Type (FODM3-1)

This rocky, upland, deciduous site is located in the Southeast corner of property 91 (south of Highway 97) and is bordered by the mixed swamp that dominates the remainder of the property. Poplar dominates the canopy along with abundant Sugar Maple, as well as rare White Ash, White Pine, and Paper Birch. The subcanopy is a mix of species including Paper Birch, Poplar, Serviceberry, Bitternut Hickory, Hemlock, and Basswood. Understory is mainly a mix of tall Bracken Fern and Northern Bush Honeysuckle, along with Common Buckthorn and White Ash saplings. Northern Bush Honeysuckle is also present in the ground layer, occasional overall but fairly dense and abundant in certain areas such as the rocky slopes. Other species such as Poison Ivy, Goldthread, *Carex pennsylvanica*, grass species, blueberry species, Jack-in-the-Pulpit, and Wild Lily of the Valley also occur over the ground layer of the polygon.

This vegetation community was also recorded in 2012 on the Safari Road Property. A narrow vegetation community located on deeper soils of loam. A full canopy of Trembling Aspen, Freeman's Maple and Green Ash dominate the vegetation community. The understory consists of Freeman's Maple, Basswood and White Elm. Poison ivy occurred in the ground cover along with asters, violets and wild geranium.

.2 Dry-Fresh Sugar Maple-Oak Deciduous forest (FODM 5-3 – 2012 data)

Sugar Maple and Red Oak share a dense canopy with over 60% coverage and over 25 m high along with Black Cherry and White Ash. The subcanopy has a similar composition while the ground cover consists of grass species, Black Raspberry and Aster species

.3 Dry-Fresh Sugar Maple-Hickory Deciduous Forest Type (FODM5-5)

This vegetation type occurs twice on this property adjacent to the Lafarge 2000 trail, once at the far South end and again about 300 meters North. The Southern portion is slightly different from the Northern one in that it is regenerating mainly from a deciduous hedgerow that separates the property from the adjacent farm field. The North section is more natural and is an upland deciduous edge to the main coniferous swamp (19-6). Canopy and subcanopy is mainly Sugar Maple, Ironwood, and Bitternut Hickory, along with Paper Birch, Basswood, and Yellow Birch. The understory is sparse but contains Common Buckthorn, Ash species, and White Pine. The ground layer is a mix of species, but is mainly *Carex pennsylvanica*, Ash seedlings, White Lettuce, and Snakeroot, as well as Bracken Fern, Zig-zag Goldenrod, and Wild Strawberry.

.4 Dry-Fresh Sugar Maple – Basswood Deciduous Forest Type (FODM5-6)

This polygon runs through the Western half of the property, starting at the South edge along Concession 8 and extending north through this property. It is a fairly narrow upland deciduous area for most of the polygon, bordered on one side by coniferous forest and on the other by Yellow Birch Swamp. Canopy and subcanopy in this section contain a mix of species, but is dominated by Sugar Maple with less abundant Basswood, Burr Oak, Hemlock, White Pine, Green Ash, Ironwood, and Large-tooth Aspen mixed in. Prickly Ash is abundant in the shrub layer, along with Alternate-leaved Dogwood, Leatherwood, American Beech, Hemlock, and Eastern White Cedar. Ground layer is dominated by *Carex pennsylvanica*, with occasional Zig-zag Goldenrod, Lady Fern, Giant Blue Cohosh, Large-leaved Aster, and Bracken Fern, along with various other less abundant plants.

.5 Dry-Fresh sugar Maple-white birch-poplar Deciduous Forest (FODM 5-10 – 2012 data)

Small upland forest dominated by Sugar Maple within the larger swamp community. These forests also have components of Large Toothed Aspen and Bitternut Hickory. The canopy and sub canopy are dense leading to a sparse ground cover abundant with grasses, Asters and Blue Cohosh.

.6 Dry-Fresh sugar Maple Hardwood Deciduous Forest (FODM 5-11 – 2012 data)

A small vegetation community on a rocky substrate with a canopy of Sugar Maple mixed with Basswood, Bur Oak, and Ironwood. This dense canopy leads to a sparse subcanopy and a lush ground layer of Zig Zag Goldenrod, Barren Strawberry and Wild Ginger.

.7 Fresh Moist Green Ash Hardwood Deciduous Forest (FODM 7-2 – 2012 data)

Adjacent to Safari Road this small community has likely succeeded over the past 8 years since the 2012 survey. It was dominated by Green Ash with a mix of Trembling Aspen and White Elm. Likely the understory of Common Buckthorn, Red Pine and White Cedar have

taken over this community. Ground cover species found in this community include Goldenrods, Asters, Strawberries and Poison Ivy.

.4 Mixed Forest

.1 Dry-Fresh poplar mixed forest (FOMM 5-2 – 2012 data)

A small community on the edge of the hydro cut. Data from the 2012 ELC indicates that this community was a mix of Large Toothed Aspen, Sugar Maple, White Birch and Eastern White Pine. Grasses are abundant in the ground cover along with the occasional Poison Ivy and Maple Leaved Viburnum.

.5 Meadow

.1 Dry-Fresh Graminoid Meadow Ecosite (MEGM3)

This ecosite is located in the middle of the Southern section of this property. Due to the fact that the property runs alongside the Lafarge 2000 Trail and the open nature of this area, it has become impacted by ATV use throughout the polygon. The soil is fairly shallow, with a sample reaching what was likely bedrock at around 50 cm. Canopy, subcanopy, and understory are all sparse, with rare occurrences of White Ash, Eastern White Cedar and Sweet Cherry in the canopy and subcanopy, and Red Cedar, Alternate-leaved Dogwood, and Russian Olive in the understory. Ground layer is fairly consistent, mainly composed of grass species, Philadelphia Fleabane, Ox-eye Daisy, and Tall Buttercup. Additional species occurring in lower abundance include Common Milkweed, Yellow Lady-slipper, English Plantain, Arrow-leaved Aster, and *Carex flacca*.

.2 Dry-Fresh non-Calcareous Bedrock Mixed Meadow (MEMR2 – 2012 data)

Located along the pipeline corridor this community was a mix of a variety of species. The canopy consisted of scattered trees of white Ash, Trembling Aspen, White Pine, Glossy Buckthorn and Large Toothed Aspen. Common and Glossy Buckthorn occur in the subcanopy and shrub layers along with Silky Dogwood and Multiflora Rose. The ground cover included abundant Bird's Foot Trefoil, Trailing Ground Vetch and Goldenrods

.6 Plantation

.1 Coniferous Plantation (TAGM1)

This coniferous plantation is dominated by Eastern White Cedar and has partially naturalized due to die off of trees and opening of gaps in the canopy. Scots Pine and Sugar Maple occur rarely in the canopy, and Ash, Cedar, grass species, Sugar Maple, Horsetail and Knapweed are the only species present in the very spare ground layer. An unauthorized trail now being used as an unauthorized recreational ATV trail runs through the middle of this plantation, introducing edge species to the habitat.

White Spruce and White Pine plantations also occur on the Safari Road property. These are dense plantations with some White Ash regeneration occurring and a ground cover of mosses and Goldenrods.

.7 Treed Wetland

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

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.

.2 Red Maple Mineral Deciduous Swamp Type (SWDM3-1)

This deciduous swamp sits between cedar swamp and cedar upland in the East half of the property. A slightly thinning canopy allows ample light to support a fairly diverse ground layer of swamp species. Canopy is dominated by Red Maple with abundant Paper Birch, and subcanopy has occasional levels of these two species along with rarer White Pine, Black Cherry, and Balsam Fir. The understory is mostly tall Bracken Ferns, with a rare Eastern White Cedar, Balsam Fir, or Tamarack shrub. The ground layer contains multiple sedge and fern species, as well as Orange Jewelweed, Foam Flower, Sarsaparilla, and Horsetail. A small section of this community type occurs again just South in the property, also surrounded by cedar swamp.



.3 Poplar Mineral Deciduous Swamp Type (SWDM4-5)

This Poplar deciduous swamp is located in the North section of this property which runs along the Lafarge 2000 Trail. Both canopy and subcanopy cover ~30% and contain species such as Trembling Aspen, Black Ash, Freeman’s (Swamp) Maple, Paper Birch, and Eastern White Cedar. Understory contains the invasive species Common and Glossy Buckthorn, as well as Swamp Fly Honeysuckle, American Gooseberry, and Dark-green Bulrush. The ground layer is dominated by grass species, as well as other species such as Sensitive Fern, Spotted Joe-pye-Weed, Carex intumescence, Starflower, Spotted Water-hemlock, and Red-osier Dogwood.

.4 Green Ash Mineral Deciduous Swamp (SWDM 2-2 – 2012 data)

A small Green Ash swamp located along Safari Road. It is likely the Green Ash has died back in recent years leaving the remaining trees to reach the canopy. Those species recorded in 2012 were Willow, Bur Oak and Freeman’s Maple. Common Buckthorn and Silky Dogwood occurring as shrub layer with the ground cover dominated by reed Canary Grass.

.5 Black Ash Organic Deciduous Swamp Type (SWDO 1-1 – 2012 data)

This organic swamp was located north of Concession 8 adjacent to a Sugar Maple forest (FOD 5-6). This area was surveyed in 2012 and not resurveyed for this Management Plan.

It is likely that this community has succeeded from a Black Ash swamp to a mixed swamp of Tamarack, Cedar and Birch due to the impact of Emerald Ash Borer. Other canopy species include White Elm, and Poplar. The ground cover was dominated by Jewel Weed, sedges and ferns.

.6 Maple Organic Deciduous Swamp (SWDO2)

Located in the flood plain of Spencer Creek this is a vegetation community dominated by a mix of Silver and Freeman Maple trees. Other canopy trees include White Elm, Black Ash and Eastern White Cedar. These communities have a rich understory of sedges, Reed Canary Grass and ferns with a variety of herbaceous plants including Canada Mayflower, False Nettle and Swamp Milkweed.

.7 Silver Maple Organic Deciduous Swamp (SWDO2-2)

A large swamp complex located between Concession 8 and Safari Road and at the corner of Concession 8 and Valens Road. This is a diverse intact deciduous swamp with few invasive species. An overstory of Silver Maple, Freeman Maple, Black Ash, White Elm and the occasional Birch tree. The shrub layer and some of the subcanopy and shrub layer had Eastern White Cedar trees, Speckled Alder, Silky Dogwood, Winterberry. There is some Common and Glossy Buckthorn in this shrub layer. Rice Cut Grass, Sensitive Fern, Tall Meadow Rue and Sedge were occasional throughout this diverse ground cover.

.8 Yellow Birch Organic Deciduous Swamp Type (SWDO3-2) (16-3)

This swamp community dominates over half of this property, and is bordered on the South edge by Concession 8. The canopy is mainly Yellow and Paper Birch, along with Eastern White Cedar, Basswood, and Red Maple. Subcanopy is sparser with only Eastern White Cedar and Paper Birch, and understory is mainly Tall Manna Grass with Alder shrubs, Winterberry, Eastern White Cedar, and Common Buckthorn. Some pockets of Alder are quite dense especially closer to the road, but overall in the polygon it only occurs occasionally. The ground layer is dominated by grass species as well as abundant cattail and horsetail species. Sensitive Fern, Tufted Loosestrife, Marsh Bedstraw, Climbing Nightshade, and Marsh Marigold occur occasionally, as well as a mix of additional sedge and fern species.

.9 White Cedar – Hardwood Mineral Mixed Swamp (SWMO1-1)

This vegetation community dominates most of this property, which is bordered by Regional Road 97 along part of the North edge and represents ~115 ha of the East section of the Beverly Swamp Wetland Complex. This community also occurs on the property north of Concession 8 and is a continuation of the community of this swamp complex. The canopy consists of Paper Birch along with White Pine and Black Ash, with a subcanopy of Eastern White Cedar, Black Ash, and Paper Birch, with Cedar being the most abundant. The subcanopy also covers more area than the canopy, with moderate levels of canopy tree die-off and resulting standing snags. Understory is mostly Winterberry, along with Larch, Black Ash, White Elm, and Ribes species. Ground layer is mainly Spotted Water Hemlock,

Horsetail, and Starflower, as well as species such as Carex interior, Dewberry, Wild Lily-of-the-valley, Water Horehound, Sarsaparilla, and Marsh Marigold.

.8 Thicket Swamp

.1 Red-osier Dogwood Organic Deciduous Thicket Swamp Type (SWTO4-1)

This site is located North of the farm fields on this property, and extends partially into the hydro corridor that runs adjacent to the whole property. The canopy is very sparse and contains species such as Tamarack, Trembling Aspen, Silver Maple, and Birch. Subcanopy contains rare occurrences of the same species, as well as more abundant Cattails, Winterberry, Willow, Eastern White Cedar, and Purple Loosestrife. The understory is more dense and is dominated by Red-osier Dogwood.

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

An interesting community dominated in the 2-10m height range by Common Buckthorn. Some Trembling Aspen reached above this canopy but these were scattered individuals with a cover of 10 – 25%. The ground cover included small Common Buckthorn, Winterberry and Poison Ivy.

.3 Silky Dogwood Organic Deciduous Thicket Swamp (SWTO4-3)

A complex wetland community that had deep standing water all summer. The canopy was dominated by Paper Birch, Tamarack and Freeman's Maple. This was a sparse and short canopy that allowed abundant light into the understory and shrub layer. This resulted in a community with a rich shrub layer including Silky Dogwood, Winterberry, Willows, and Eastern White Cedar. There were also sections where cattails filled in these canopy gaps.

.9 Meadow Marsh

.1 Cattail Graminoid Mineral Meadow Marsh (MAMM 1-2 – 2012 data)

A small road side Cattail marsh with a sparse canopy of Green Ash (less than 10%) and very little diversity. Other species recorded include Joe-pye Weed, Goldenrod and Spotted Water Hemlock.

.4 Common Reed Graminoid Mineral Meadow Marsh (MAMM 1-12 – 2012 data)

This small community is located north of Concession 8 around a small pond. The meadow marsh is almost completely dominated by Common Reed. Overhanging this grass are willow trees and there are a few Red osier dogwood shrubs mixed in with the common reed. The Common Reed has begun to grow further north into the main part of the swamp.

.10 Shrub Thicket

.1 Buckthorn Deciduous Shrub Thicket (THDM 2-6 – 2012 data)

This is a moderately large area above the pipeline on the Safari Road property. Once identified by Anthony Goodban as a remnant alvar, this area is now dominated by Common Buckthorn. A mix of other species occur in this thicket including Eastern Red Cedar, Green Ash, White Spruce, Sugar Maple and Grey Dogwood.

4.3 Terrestrial Inventory Results

Over the course of multiple survey dates (2012 and 2019) including ELC surveys, staff identified 399 species of plants. Of these, 281 are considered native plant species (70%) while 64 are non-native species (16%) and 54 were identified to genus only (14%). The Hamilton NAI (HCA 2014) indicates that there are 1496 species of plants in the Hamilton-Wentworth jurisdiction. Of the plant species recorded during surveys, the Beverly swamp contributes/represents 27% of that regional flora. Fourteen species are considered rare in the City of Hamilton while 17 are considered uncommon.

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. Habitats with a mCC greater than five are considered to be of higher ecological integrity whereas those with a mCC below three are considered marginal habitats. A mCC of 4.95 is a high value and indicates that the Beverly Swamp has high ecological integrity.



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 82.92. This is a high value for FQI and indicates the significant natural values of the Beverly Swamp land parcels, making these lands especially worthy of protection.

.1 Breeding Birds

Seven surveys were conducted for breeding birds throughout the Beverly Swamp complex. Many of these were road side point counts. Sixty-three species of birds were identified during these surveys, including six federally and provincially rare species, twenty locally uncommon and three locally rare species. This includes both breeding birds and incidental species (those seen in non-breeding season or as fly-overs). Previous surveys of this area (the ESA as a whole) identified an additional 42 bird species.

.2 Butterflies and Dragonflies

No direct surveys were completed for this Management Plan in relation to these taxa.

Historical information from the Natural Areas Inventory has been used to surmise the species that use the Beverly Swamp properties. Historically 54 butterflies have been recorded here with 2 of these being non-native species. Of these the Monarch Butterfly is provincially rare and federally special concern and the Black Dash is also considered to be provincially rare species. In addition, 45 species of dragonflies were also recorded in Beverly Swamp over the same period (2000-2014). These include five provincially rare species, Great Blue Skimmer, Clamp-tipped Emerald, Swamp Darner, Harlequin Darner, Unicorn Clubtail.

.3 Herpetofauna

Four species of frogs and one species of toad were recorded during MMP point counts, Spring Peeper, Wood Frog, Northern Leopard Frog, Grey Tree Frog and American Toad. Unfortunately, many species were heard at a distance as ideal breeding habitat (larger pools and ponds) were not located close to the road and are locations inaccessible at night. None of the species heard are provincially or locally rare.



Other herpetofauna recorded include Eastern Garter Snake, Smooth Green Snake, Milk Snake, Blue-spotted Salamander, Painted Turtles and Snapping Turtles. Snapping Turtles were nesting and successfully hatched at least 2 nests along Concession 8 at the bridge over Spencer Creek. HCA staff were fairly certain we discovered a number of Eastern Garter Snake hibernacula during our spring flora surveys.

.4 Mammals

Incidental mammal observations include Eastern Chipmunk, Gray Squirrel, and Eastern Cottontail, Porcupine, Star Nosed Mole, Coyote, Beaver, Muskrat, Red Squirrel and White-tailed Deer.

.5 Species at Risk and Locally Rare Species

.1 Significant Flora

Of the plant species recorded on the subject lands through the 2019 field surveys, fourteen species are considered rare in the City of Hamilton while 17 are considered uncommon. All of these species are considered provincially secure. Three provincially rare sedge species were also noted within the master plan properties. These include Carey's Sedge (*Carex careyana*), Ribbed Sedge (*Carex virescens*) and White-tinged Sedge (*Carex albicans* var. *albicans*).

.2 Significant Fauna

The following species recorded were within the Beverly Swamp properties. Those listed in Table 3 are considered species at risk either federally or provincially.

Table 3: Federal and Provincial Species at Risk

Common name	Scientific name	SARA status Schedule 1*	ESA status*
Eastern Wood-pewee	<i>Contopus virens</i>	SC	SC
Barn Swallow	<i>Hirundo rustica</i>	THR	THR
Canada Warbler	<i>Cardellina canadensis</i>	THR	SC
Wood Thrush	<i>Hylocichla mustelina</i>	THR	SC
Eastern Meadowlark	<i>Sturnella magna</i>	THR	THR
Bobolink	<i>Dolichonyx oryzivorus</i>	THR	THR
Snapping Turtle	<i>Chelydra serpentina</i>	SC	SC
Eastern Milksnake	<i>Lampropeltis triangulum</i>	SC	NAR
Monarch	<i>Danaus plexippus</i>	SC	SC

*Species at Risk Act (SARA-federal) and Endangered Species Act (ESA-provincial)

Eastern Wood-pewee and Wood Thrush were recorded throughout the deciduous wooded wetlands and deciduous forests in the Beverly Swamp. These include the wetlands north of Safari Road and the woodland wetland south of Concession 10. Barn Swallows were seen foraging for insects in the open fields and meadows in the Beverly Swamp, particularly the large field off of Concession 8.

A breeding pair of Bobolink were observed on HCA property north of Concession 8. This is a large field connected to the hydro corridor and it is currently farmed for hay. Eastern Meadowlark was heard during breeding season through an incidental survey on the Safari Road property north of Safari Road. Breeding of this species was not confirmed.

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. Nests of this species were also noted along Concession 8 at the bridge where Spencer Creek flows under the road. One juvenile Eastern Milksnake was found on a small property south of Concession 8.



Both Monarch adults nectering on flowering plants and caterpillars feeding on milkweed plants were also observed incidentally on almost every property visited for the Beverly Swamp surveys. This species is considered a species of “Special Concern” on the Species at risk in Ontario (SARO) list. This means that the species lives in the wild in Ontario but

may become threatened or endangered due to a combination of threats and biological characteristics. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recommended that this species be listed as endangered federally. Currently it is a Schedule one species under the Species at Risk Act, but is listed as Special Concern.

Canada Warbler was found on the Lafarge 2000 Trail property. A singing male was observed on territory three times in the breeding season. This bird species is considered nationally threatened and provincially as special concern.

Threatened and endangered species habitat is protected under the Endangered Species Act (provincially) and the Species at Risk Act (federally). Permits maybe required for development within the habitat for threatened and endangered species.

4.4 Aquatic Inventory

The Aquatic Inventory for the Beverly Swamp is conducted as part of the HCA Aquatic Resource Monitoring Program. For Spencer Creek this includes Electrofishing with a backpack electrofisher following HCA ARMP sampling protocol at one Annual sampling site and one that is 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 and kept in shady areas with low densities of fish 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 Upper Spencer Creek: Station ID: USP315-C3 (Annual Site)

The start of this station is located 150 meters downstream of where Spencer Creek crosses Safari Road. The shoreline of this site is densely covered with deciduous trees, herbaceous ground cover, and shrubs. The substrate is made up of muck, silt, and boulders which make it difficult to walk thorough, however, logs, boulders and aquatic vegetation make for good physical habitat for the fish species found. This site is in the historic range of Redside Dace (*Clinostomus elongatus*), however none have been found during our sampling efforts. This reach is heavily impacted by the dam and reservoir just upstream of Safari Rd. and there are

large pieces of garbage strewn throughout the reach. This site scored an IBI of 23, giving it a “Fair” rating. This demonstrates there is good potential for restoration if the dam upstream were to be removed.

.2 Upper Spencer Creek: Station ID: USP315-D2

This station is located on Upper Spencer Creek 1200m downstream of USP315-C3. The shoreline was moderately covered with deciduous trees and shrubs. The substrate was mostly cobble with some silt and sand. There are a lot of logs in the stream, some woody debris, root wads and undercut banks creating good physical habitat for the fish present. This site is in the historic range of Redside dace (*Clinostomus elongatus*), however none have been sampled since 1993. This site scored an IBI of 32, giving it a “Good” rating.

Table 4: Fish Species of Beverly Swamp

COMMON NAME	SCIENTIFIC NAME	LOCATION
Black Crappie	<i>Pomoxis nigromaculatus</i>	USP315-C3
Blacknose Dace	<i>Rhinichthys atratulus</i>	USP315-C3, USP315-D2
Blackside Darter	<i>Percina maculata</i>	USP315-C3, USP315-D2
Bluegill Sunfish	<i>Lepomis macrochirus</i>	USP315-C3
Bluntnose Minnow	<i>Pimephales notatus</i>	USP315-C3, USP315-D2
Brook Stickleback	<i>Culaea inconstans</i>	USP315-C3, USP315-D2
Brown Bullhead	<i>Ameiurus nebulosus</i>	USP315-C3, USP315-D2
Calico Crayfish	<i>Orconectes immunis</i>	USP315-C3
Central Mudminnow	<i>Umbra limi</i>	USP315-C3, USP315-D2
Common Shiner	<i>Luxilus cornutus</i>	USP315-C3, USP315-D2
Creek Chub	<i>Semotilus atromaculatus</i>	USP315-C3, USP315-D2
Emerald Shiner	<i>Notropis atherinoides</i>	USP315-C3
Fathead Minnow	<i>Pimephales promelas</i>	USP315-C3
Golden Shiner	<i>Notemigonus crysoleucas</i>	USP315-C3
Green Sunfish	<i>Lepomis cyanellus</i>	USP315-C3
Honeyhead Chub	<i>Nocomis biguttatus</i>	USP315-C3
Johnny Darter	<i>Etheostoma nigrum</i>	USP315-C3, USP315-D2
Largemouth Bass	<i>Micropterus salmoides</i>	USP315-C3
Mottled Sculpin	<i>Cottus bairdi</i>	USP315-C3, USP315-D2
Northern Hog Sucker	<i>Hypentelium nigricans</i>	USP315-C3
Northern Pike	<i>Esox lucius</i>	USP315-C3, USP315-D2
Pumpkinseed	<i>Lepomis gibbosus</i>	USP315-C3, USP315-D2
Rainbow Darter	<i>Etheostoma caeruleum</i>	USP315-C3, USP315-D2
River Chub	<i>Nocomis micropogon</i>	USP315-C3, USP315-D2
Rock Bass	<i>Ambloplites rupestris</i>	USP315-C3, USP315-D2
Spottail Shiner	<i>Notropis hudsonius</i>	USP315-C3
Virile Crayfish	<i>Orconectes virilis</i>	USP315-C3
White Sucker	<i>Catostomus commersoni</i>	USP315-C3, USP315-D2
Yellow Perch	<i>Perca flavescens</i>	USP315-C3
Blacknose Shiner	<i>Notropis heterolepis</i>	USP315-D2
Longnose Dace	<i>Rhinichthys cataractae</i>	USP315-D2
Northern Clearwater Crayfish	<i>Faxonius propinquus</i>	USP315-D2
Redside Dace	<i>Clinostomus elongatus</i>	USP315-D2 (last record 1993)

4.5 Significant Ecological Features

Policies are in place through the City of Hamilton Rural Official Plan and the Provincial Policy Statement to provide for the protection of significant ecological features from development. This section highlights key features and policies of the study area.

.1 Beverly Swamp Environmentally Significant Area (ESA).

The Beverly Swamp Environmentally Significant Area is 6,055 acres in size and contains a mix of vegetation including wetlands, forests, plantations and meadows. The properties owned by the HCA within this ESA encompass 2,192 acres or 36% of this area. This ESA was designated because it meets eight of the 2003 ESA criteria including:

1. the area contains many significant species
2. the area contains rare biotic communities
3. the area is a large core natural area and contains interior forest habitat (100-200m from forest edge)
4. the area contains a high diversity of native plant species and biotic communities
5. the large natural area serves as a link between many natural areas in Flamborough
6. the area is a good representative of broadleaf swamp, which is poorly represented in Hamilton
7. the area provides habitat for the continuation of species (deer yard and heronry)
8. the area serves as a natural storage reservoir and maintains hydrological balance and surface water quality in the headwaters of three stream systems



.2 Beverly Swamp Provincially Significant Wetland (PSW) Complex

The Beverly Swamp Wetland Complex also occurs on all parcels owned by HCA within this area. This is a Provincially Significant Wetland Complex evaluated by the Ministry of Natural Resources and Forestry (MNR) in 1984 and reconfirmed via air photos in 2012 using 2010 air photos. The designated PSW is 4,635 acres. HCA owns 1,790 acres of this wetland complex or 39%. Wetland areas within this complex includes White Cedar, Silver Maple and Black Ash Swamps and cattail marshes.

.3 Beverly Swamp Life Science Area of Natural and Scientific Interest (ANSI)

This area was designated as a Life Science ANSI by the MNR because it is considered one

of the best representations of swamp forest and associated wetlands in the site district (6-1) and one of the largest swamps in southwestern Ontario. The ANSI is 4,506 acres in size and HCA owns 1,288 acres or 29%.

.4 Significant Woodlands

The majority of the property owned by HCA in this study area is considered by the City of Hamilton to be significant woodland. Significant woodlands for the City of Hamilton mean an area which is ecologically important in terms of features (species composition, age of trees and stand history) and function (contributes to the broader landscape because of its location, size or the amount of forest cover in the planning area) (City of Hamilton, 2019).

.5 Significant Wildlife Habitat 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 Beverly Swamp properties.

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 (MNR 2015). This can include single species concentrations or aggregations of multiple species.

Following are HCA staff observations of the significant wildlife habitat and area sensitive species in the study area:

- a) The historic peat ponds south of Concession 8 has a population of Midland Painted Turtles and Snapping Turtles. Both species have been recorded in these ponds. Therefore, these ponds are 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.



- b) Reptile hibernacula are also considered season concentration areas. Staff noted two hibernacula for Eastern Garter Snake found during April Spring botanical surveys. Both hibernacula contained a congregation of over 5 snakes and occurred in rocky areas. These hibernacula occurred within the hydro cut off of Safari Road and in the woodlot north of Concession 8. In addition, Snapping Turtle nesting has been noted along Concession 8 this would be considered specialized habitat for wildlife. At least two Snapping Turtle nests were noted along the road shoulders along Concession 8 as it bisects through HCA property.
- c) Finally, habitat for species of conservation concern includes wildlife that are listed provincially as rare or declining. Two provincially rare butterfly species have been identified in the Beverly Swamp complex. Monarch Butterflies and caterpillars were noted in open fields and wetland areas throughout the study area. The Black Dash was recorded historically in the NAI and the location of this species and its habitat uses are unknown. Five provincially rare dragonfly species have been identified in the Beverly Swamp complex of properties. These include Great Blue Skimmer, Clamp-tipped Emerald, Swamp Darner, Harlequin Darner, Unicorn Clubtail. As these were not observed by staff the specific location of breeding and feeding habitat cannot be identified at this time.

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. A small alvar community is located within on the Safari Road property. Alvars support small remnant natural grasslands and savannah vegetation on very shallow soils over dolostone bedrock (Goodban 1995). These habitats are rare in Ontario. This particular alvar located at the Safari Road property was identified by Anthony Goodban in his 1995 thesis entitled: *Alvar Vegetation on the Flamborough Plain: Ecological Features, Planning Issues and Conservation Recommendations*. Previous to this these alvars on the Flamborough Plain had not been described in the literature. This vegetation community is degraded with the invasion of Common Lilac, Common Mullein, and Knapweed species.



5.0 CONSERVATION AREA 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, as well as the Significant Ecological Features noted in Section 4.5

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 acceptable HCA 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 conservation area. Introduction of any new plant species by HCA will consider the biodiversity of this site and contiguous surroundings, historical data of the species present in the area, research findings 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 the area. 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 Fish and Wildlife Management

Where applicable on the Beverly Swamp 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.

For the fishery currently, the voluntary catch and release policy for fish caught within Valens CA extends to these properties as well. For bait fish harvest these activities are strictly prohibited with an exception for research. (see Section 5.7)

For fishing bait, MNRF policies in regards to what bait is allowed to be used for fishing apply. The use of lead sinkers is not permitted.



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 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. The HCA Invasive Species Management Strategy is to be followed when considering invasive species management.

.1 Hunting

Hunting and harvesting is permitted on HCA specified properties requiring all participants to follow Ontario Ministry of Natural Resources and Forestry regulations and HCA rules. See Map 6 for permitted hunting areas.

Trapping is strictly prohibited on HCA property with the exception for HCA staff or agents acting under the HCA Wildlife Conflict Management Strategy or for research (see Section 5.7).

HCA rules for hunting in the Beverly Swamp include:

- 1 The provincial Fish and Wildlife Conservation Act and MNRF hunting regulations apply while hunting on HCA lands. Proof of compliance (licences, cards, tags etc.) is to be provided when requested by enforcement staff.
- 2 The City of Hamilton is responsible for prohibiting and regulating the discharge of recreational firearms within the City of Hamilton to ensure the safety and security of the community, as per the *Discharge of Recreational Firearms By-law 19-114*. Recreational firearm discharge for licensed Ministry of Natural Resources and Forestry hunting activities in season is only permitted within the Beverly Swamp Conservation Area lands of the Hamilton Conservation Authority.
- 3 Hunters are to practice no trace hunting and this includes not damaging any of the vegetation and/or ground habitat. Specifically, this means no evidence of hunting should be left on the property including ammunition cartridges, shot gun wads, clay pigeons, deer stands, and trail markers.
- 4 Animal entrails, "gut piles," must be disposed of away from trails and other areas where the public may easily find them.

- 5 Tree stands are not permitted and are subject to removal and disposal by HCA staff.
- 6 Only non-lead ammunition is allowed to be used on HCA properties to protect non-target species from lead poisoning.
- 7 No electronic game calls, game/trail cameras or any covert recording devices are allowed, and if found are subject to removal by HCA staff.
- 8 Bait is strictly prohibited on HCA property.
- 9 Firearm target shooting is prohibited.
- 10 Area closed at sunset.

5.3 Cultural Heritage

Cultural heritage features worthy of interpretation, will be protected from incompatible development in the conservation area.

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 on HCA lands in the Beverly Swamp. 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.

5.4 Agricultural

Some areas 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.

5.5 Managed Forest

Forest plantations will be managed in accordance with the MNRF approved Managed Forestry Plan for the Beverly Swamp. The only property within HCA landholdings within the Beverly Swamp area that are under the managed forest plan include the small property on the

corner of 10th Concession and Lennon Road and a small land locked property off of Safari Road. 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.

5.6 Conservation Area Operations

The HCA will review the operation plan for these lands. This will include providing staff with information and resources as required to manage HCA owned lands in the Beverly Swamp 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.

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

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.

Possible new business practices may be introduced into the conservation area operations in accordance with HCA policy such as:

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

5.7 Research

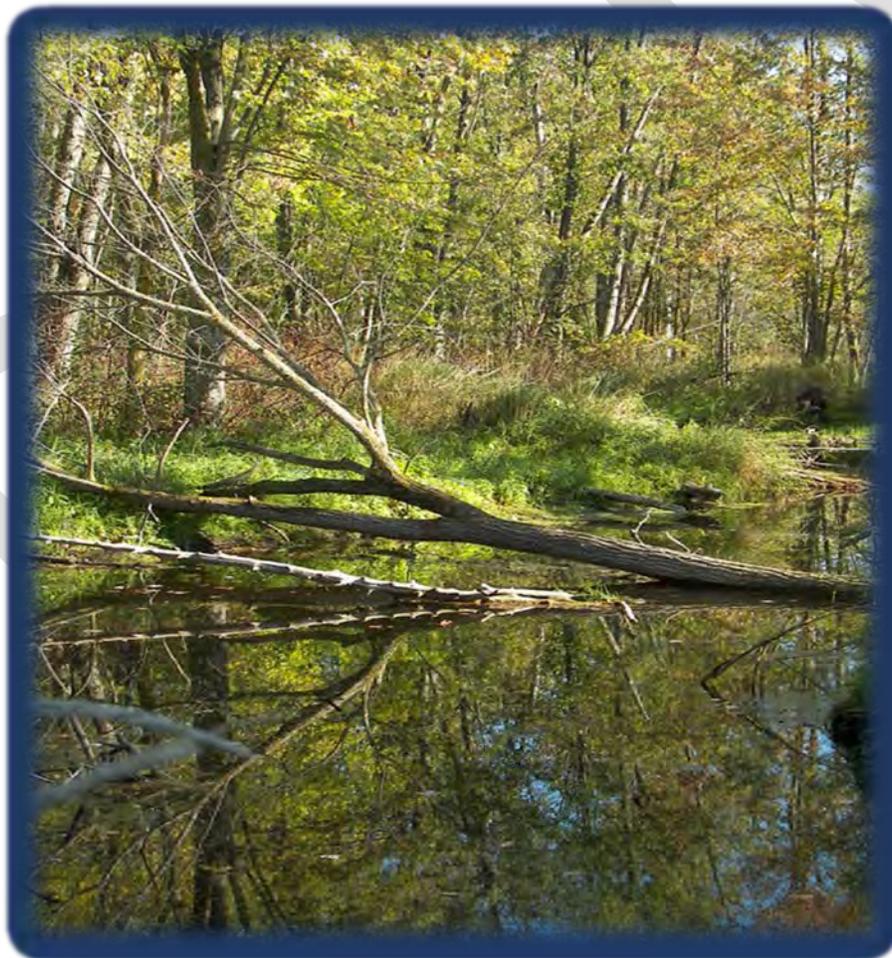
HCA's properties provide, in essence, living laboratories for researchers. HCA staff monitor the health of lands using established protocols as well when needed can develop special research programs to answer resource related questions. Included below are a few potential projects that were identified while writing this plan:

- Research to see if Brook Trout have any remnant populations in the Beverly Swamp and if there are opportunities for expansion.
- Research to see if either of the Endangered Species (Redside Dace and Black Redhorse) listed for this area currently still occupy reaches.
- Staff should look to resurrecting one of the fish stations at Concession 8 west or Westover Rd. given the large amount of HCA land in this reach and the limited sampling.

Outside Research by qualified individuals that contributes to the knowledge of natural and cultural history and to 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

Where active management is required for a particular species, it will be accomplished through an acceptable HCA resource management strategy considering the guidelines outlined in this Management Plan, and in accordance with policies of all governing agencies.

Forest plantations will be managed in accordance with the MNRF approved forestry management plan for Beverly Swamp. See *Appendix 3*.

6.2 Water Management

Flows in Spencer Creek through the Beverly Swamp are partially regulated by the reservoir at the Valens Lake Conservation Area. The swamp itself acts like a large sponge absorbing and then slowly releasing the water it receives. The action also helps the transfer of some of the water to the ground water table.

6.3 Conservation Area Experience

HCA acquired lands in the Beverly Swamp because of their environmental significance and the overall role they play in the health and natural heritage of the watershed. These properties will continue to remain protected natural areas under HCA control and management.

Access to HCA lands is permitted for approved research, see Section 5.7 for more information.

Historically, hunting has also been allowed on the lands, see Section 5.2 and the appended hunting map for more information.

HCA controls access to the conservation area lands. Public access is permitted from the small parking area located on Safari Road. HCA may consider restricting or closing this parking area as indicated in Section 5.6. Off-site parking as well as traffic and safety concerns should this lot be closed, will be considered by HCA in consultation with the municipality.

Due to the sensitive nature of the lands, motorized recreational activities are not permitted on HCA owned lands. This includes use of all-terrain vehicles (ATV), motor bikes, snowmobiles, and recreational unmanned aerial vehicles (UAV-drones). HCA staff conducting ecological land classification surveys in the summer of 2019 observed degradation of the ecological integrity of several properties from ATV's accessing HCA lands. See Section 7.1.2 for more information.

6.4 Education and Environmental Awareness

HCA encourages research activities that provide educational and environmental awareness value. Developing visitors' awareness and appreciation of Ontario's natural and cultural heritage, and fostering a commitment to protect that heritage for all generations is supported in the goals and objectives of this plan, see Section 2.2 for more information

6.5 Public Infrastructure – Utilities, Trails and Transportation

It is recognized that public infrastructure exists and has historically altered lands in the study area. This section is intended to provide guidance for future HCA management of this land use.

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 conservation area 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 conservation area.

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



7.0 SUMMARY

7.1 Implementation Priorities

The Beverly Swamp 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 opportunities for nature appreciation.

Conservation of the lands will require some management to protect the resource. At a minimum, monthly HCA staff visits to the lands are recommended to monitor the resource, and yearly operational reviews conducted to evaluate implementation of items noted in this management plan.

The following items are also recommended to be implemented in order of priority to achieve this goal:

.1 Environmental Management

.1 Invasive Species

Although the Beverly swamp properties may seem remote and well removed from the urban environment HCA field staff found a variety of invasive species on these properties. These include Glossy Buckthorn, Common Buckthorn, Garlic Mustard, Knapweed sp., Phragmites and Multiflora Rose. Details in regards to the locations of these species and management options are presented below.

.1 Common and Glossy 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). 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. Sensitive areas within the HCA owned Beverly swamp properties should be targeted first or those with a small amount of this plant. 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.

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 many of the Beverly Swamp properties. 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.

.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 species quickly and out competes other native species in wetland habitats. It forms large mono cultures that decrease plant biodiversity and create poor habitat for wildlife. Large patches of this species were found within the Beverly swamp properties. Some deep within the swamp along small streams.. A strategy for the removal of this invasive species will need to be developed. There is an extensive patch within the wetland communities north and south of the 8th Concession. This is a large patch that should be a priority for removal. Effective control strategies would likely include drowning of stems when water levels are high or pesticide application in dry periods for these wetland communities. 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

Black, Brown and Spotted Knapweeds were found in the open fields on HCA properties. 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. This species is growing along the sides of authorized and unauthorized trails within these Beverly Swamp properties. 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 Garlic Mustard

This species was introduced in the 1800's from Europe as an edible herb for early pioneers in the spring. It is a biennial plant that produces seed in its second year. It can grow in a variety of conditions making it a very good invader in a variety of habitats. It easily outcompetes other native ground cover and can change the soil environments to favour its growth over others. There is very little Garlic Mustard within the Beverly swamp properties. It is a rare to occasional occurrence in the drier upland forest ELC polygons. Active removal of this species is fairly straight forward with hand picking between April and June, before the plant goes to seed. With a dedicated effort over 5 years removal of this species can be achieved.

.5 Privet, Russian Olive and Lilac

Privet, Russian Olive and Lilac were introduced as landscape plants and escaped cultivation. Each of these species is capable of growing into thickets that shade out other native plant species and reduce biodiversity. These species were recorded during the Natural Areas Inventory on the Beverly Swamp property north of Safari Road. This is a

very mixed cultural community that has a large component of Lilac invading the unauthorized trails and throughout the vegetation communities on the southern portion of this property. This is the location of the degraded Flamborough Alvar. Restoration of this area should be a high priority.

.2 Natural Area Restoration Recommendations

The existing natural habitat features within the Beverly Swamp 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 conservation area, with the impacts of visitor use.

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

1. Work with the City of Hamilton to control invasive Phragmites within the wetlands along Concession 8 and within our properties that border this road.
2. Work with Ontario Hydro to control and remove Phragmites from the Hydro Right of Way between Safari Road and 8th Concession. Control small patch of Phragmites found within the Safari Road property (northeast side).
3. Develop a plan to mitigate the impact of ATV and truck use on the Safari Road parcels.
4. Removal of unattended deer stands as noted in Section 5.2 Remove ATV access to the deciduous forest north of the 8th Concession and east of the hydro cut. A rare sedge species has been recorded growing along the ATV track.
5. Common and Glossy Buckthorn were rare across the landscape, but found in almost every polygon surveyed. It is important to target these species along the trails and accessible wetland parcels.
6. Focused removals of Common Buckthorn should occur in the small deciduous forest parcels south of Highway 97 and the parcel north of the 8th Concession east of the hydro cut. Also, the parcel south of 10th Concession contains a larger patch of Common Buckthorn at the southern end. Removal of this thicket would improve the local ecology and help control the spread of this species further.
7. The degraded alvar off the Safari Road should be surveyed in detail to better inform restoration decisions. The level of invasive species and existing alvar community requires study to scope a restoration plan.
8. Consideration should be given to connecting these landscapes together via targeted land acquisition. Protected connections could be secured and restored between Valens Lake Conservation Area and the Beverly Swamp parcels.
9. Enhancement of Bobolink habitat should be considered within the farm parcels north of Concession 8.

10. A hedgerow planting to provide a wildlife linkage along the eastern edge of this farm parcel should also be considered.

.3 Site Infrastructure – Fencing

Conduct more detailed site reviews and report on capital replacement and maintenance requirements for boundary fencing to protect natural areas.

.4 Unauthorized Trails and Property Access

Conduct a more detailed inventory of unauthorized trails, site conditions, and priorities for restoration. Evaluate possible restoration, design and maintenance strategies to help set annual management targets. Unauthorized property access and encroachment are not permitted and will be addressed by the HCA on a case by case basis.

.5 Signage Replacements

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



8.0 APPENDIX CONTENTS

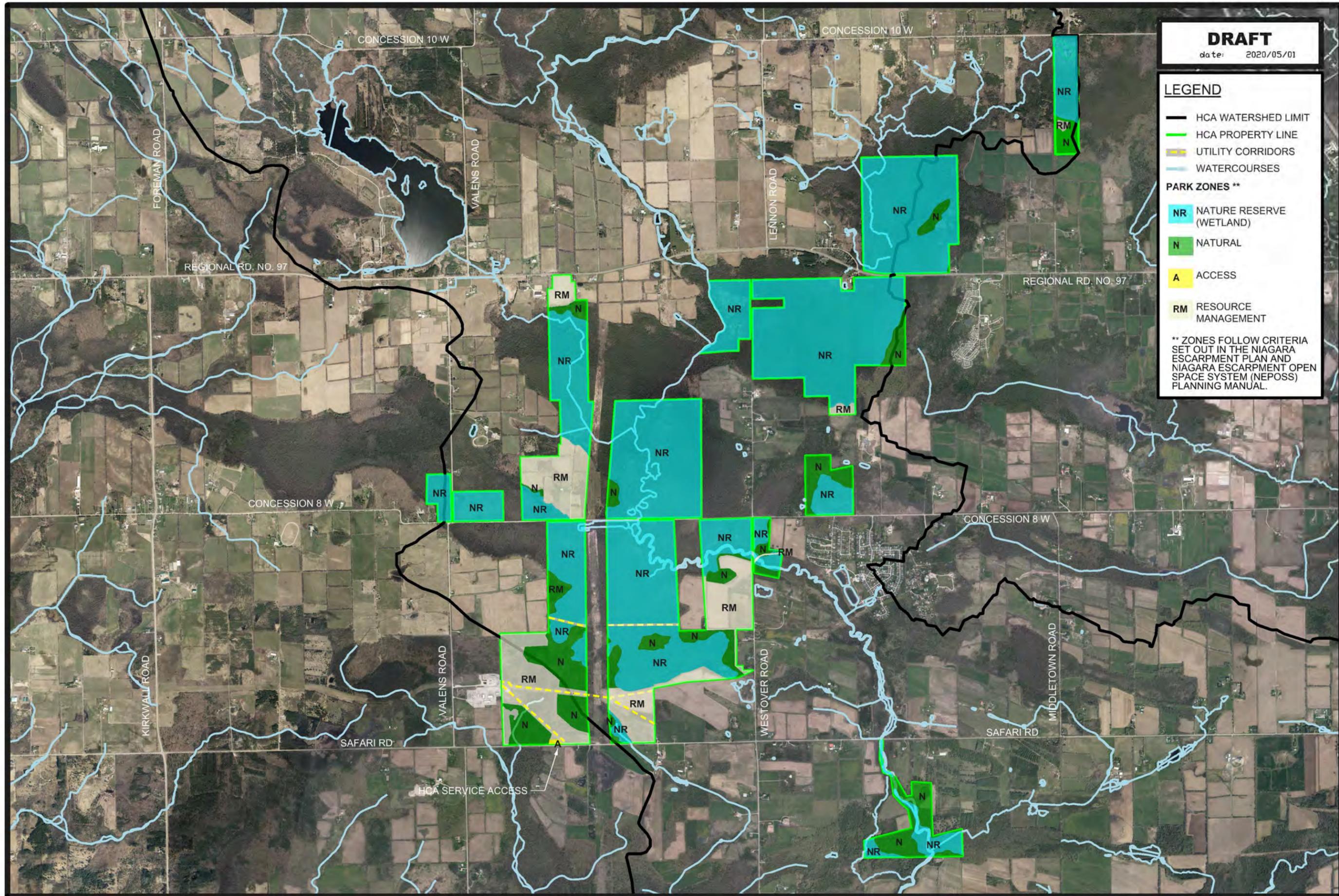
APPENDIX 1	Mapping.....	41
APPENDIX 2	Capital Development Priorities.....	48
APPENDIX 3	Trail and Vehicle Counter Data.....	50
APPENDIX 4	Managed Forest Plan Recommendations 2018-2027.....	52

Draft

APPENDIX 1

Map 1	Management Zones
Map 2	Ecological Land Classification
Map 3	Ecological Land Classification
Map 4	Ecological Land Classification
Map 5	Ecological Land Classification
Map 6	Hunting Areas, Beverly Swamp

Draft



DRAFT
date: 2020/05/01

LEGEND

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

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 (NEOSS) PLANNING MANUAL.



DATE: 2020/04/09

MANAGEMENT PLAN ZONE MAP UPPER WATERSHED BEVERLY SWAMP



A Healthy Watershed for Everyone

DRAFT

date: 2019/05/01

LEGEND

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

ECOLOGICAL LAND CLASSIFICATION:

- FOCM2-2** DRY-FRESH WHITE CEDAR CONIFEROUS FOREST
- TAGM1** CONIFEROUS PLANTATION
- FODM5-5** DRY-FRESH SUGAR MAPLE-HICKORY DECIDUOUS FOREST
- MEGM3** DRY-FRESH GRAMINOID MEADOW
- SWCM1-2** WHITE CEDAR-CONIFER MINERAL CONIFEROUS SWAMP
- SWDM3-1** RED MAPLE MINERAL DECIDUOUS SWAMP
- SWDM4-5** POPLAR MINERAL DECIDUOUS SWAMP
- SWTM5-8** NON-NATIVE MINERAL DECIDUOUS THICKET SWAMP
- NS** NOT SURVEYED



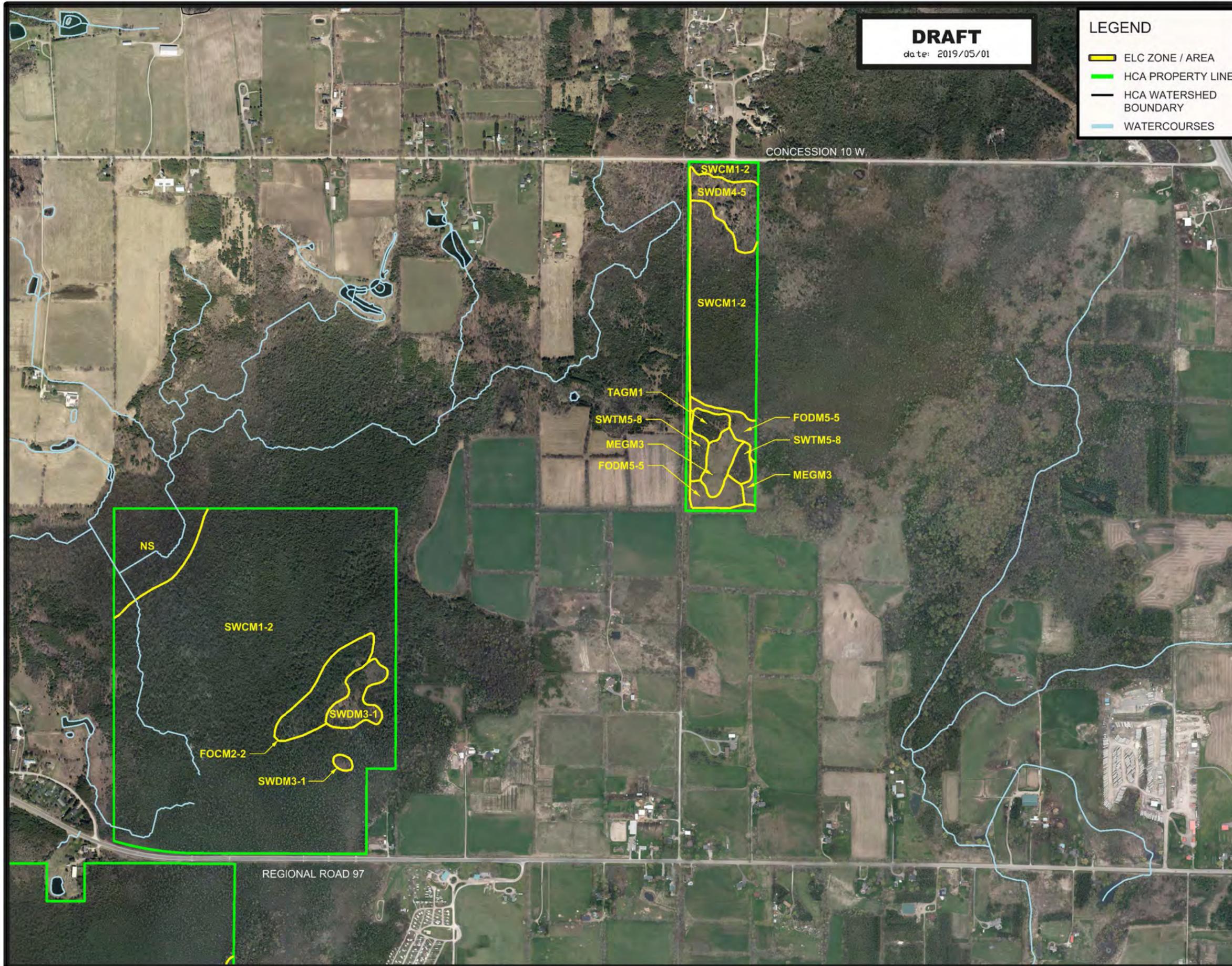
DATE: 2019/05/01

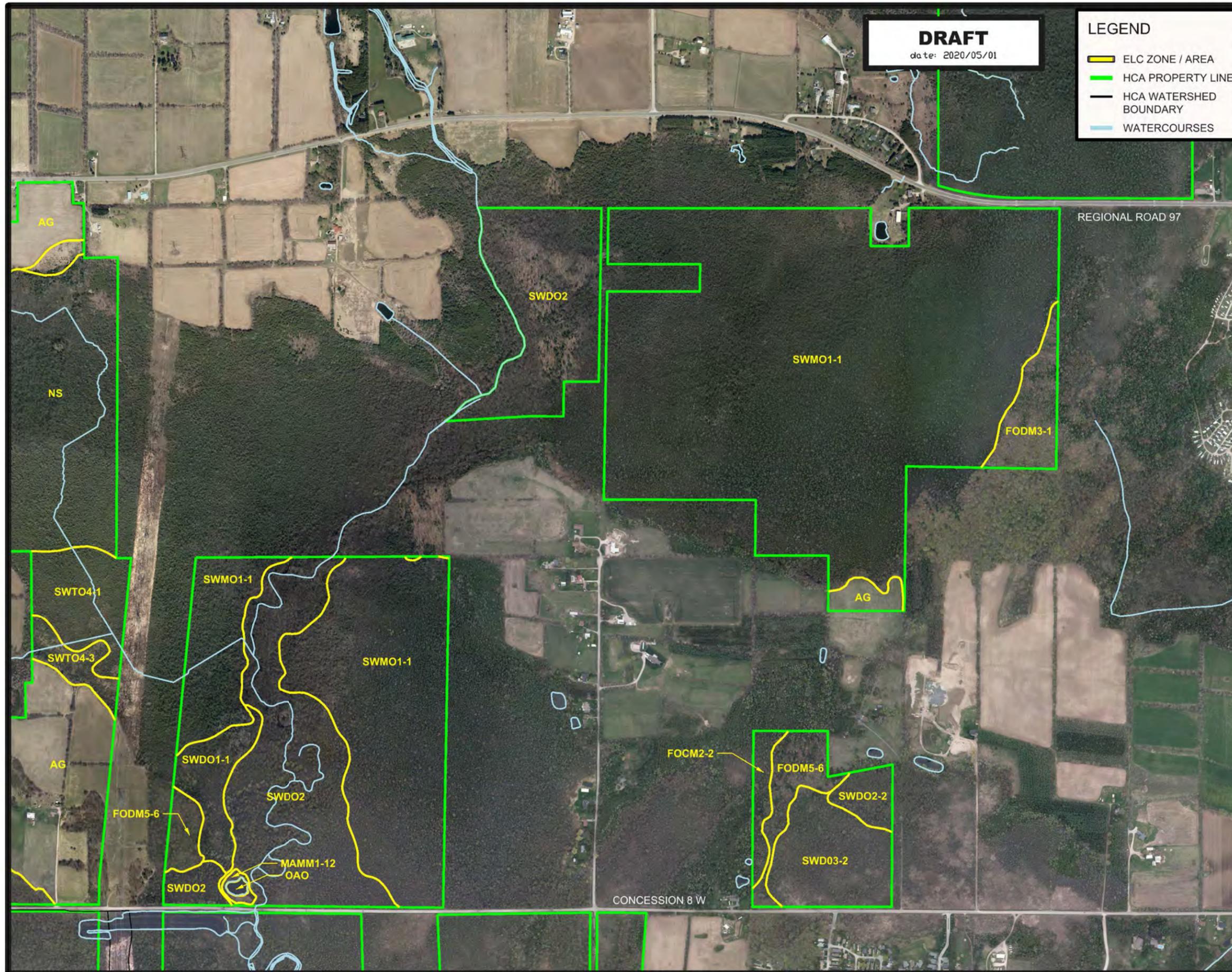
**ECOLOGICAL LAND CLASSIFICATION MAP
UPPER WATERSHED BEVERLY SWAMP**

Hamilton
Conservation
Authority



A Healthy Watershed for Everyone





DRAFT
date: 2020/05/01

LEGEND

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

ECOLOGICAL LAND CLASSIFICATION:

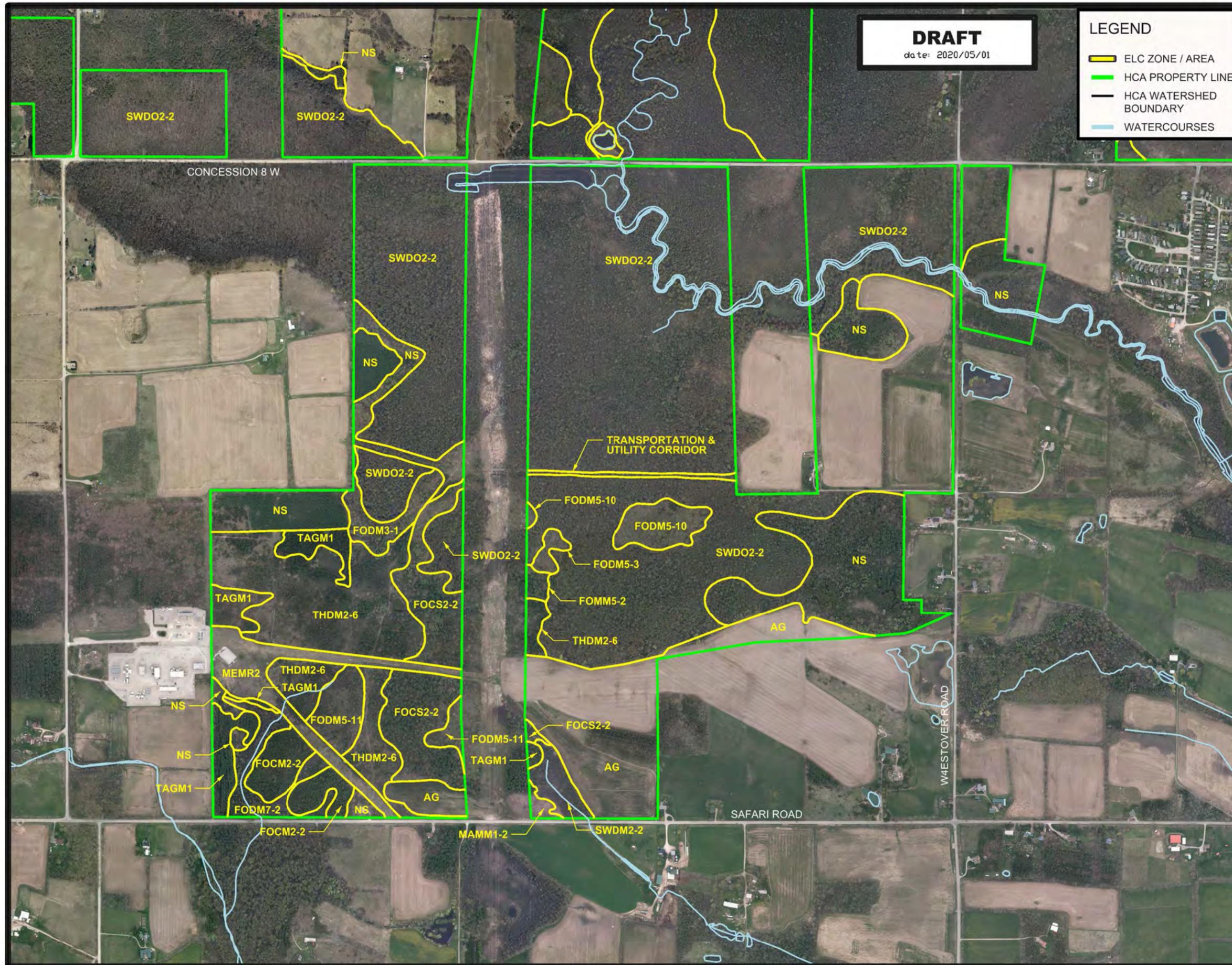
AG	AGRICULTURE
FOCM2-2	DRY-FRESH WHITE CEDAR CONIFEROUS FOREST
FODM3-1	DRY-FRESH POPLAR DECIDUOUS FOREST
FODM5-6	DRY-FRESH SUGAR MAPLE-BASSWOOD DECIDUOUS FOREST
MAMM1-12	COMMON REED GRAMINOID MINERAL MEADOW MARSH
OAO	OPEN AQUATIC
SWD03-2	YELLOW BIRCH ORGANIC DECIDUOUS SWAMP
SWD01-1	BLACK ASH ORGANIC DECIDUOUS SWAMP
SWD02	MAPLE ORGANIC DECIDUOUS SWAMP
SWMO1-1	WHITE CEDAR - HARDWOOD ORGANIC MIXED SWAMP
SWTM04-1	RED-OSIER DOGWOOD ORGANIC DECIDUOUS THICKET SWAMP
SWTO4-3	SILKY DOGWOOD ORGANIC DECIDUOUS THICKET SWAMP
NS	NOT SURVEYED



**ECOLOGICAL LAND CLASSIFICATION MAP
UPPER WATERSHED BEVERLY SWAMP**

DATE: 2020/05/01





DRAFT
date: 2020/05/01

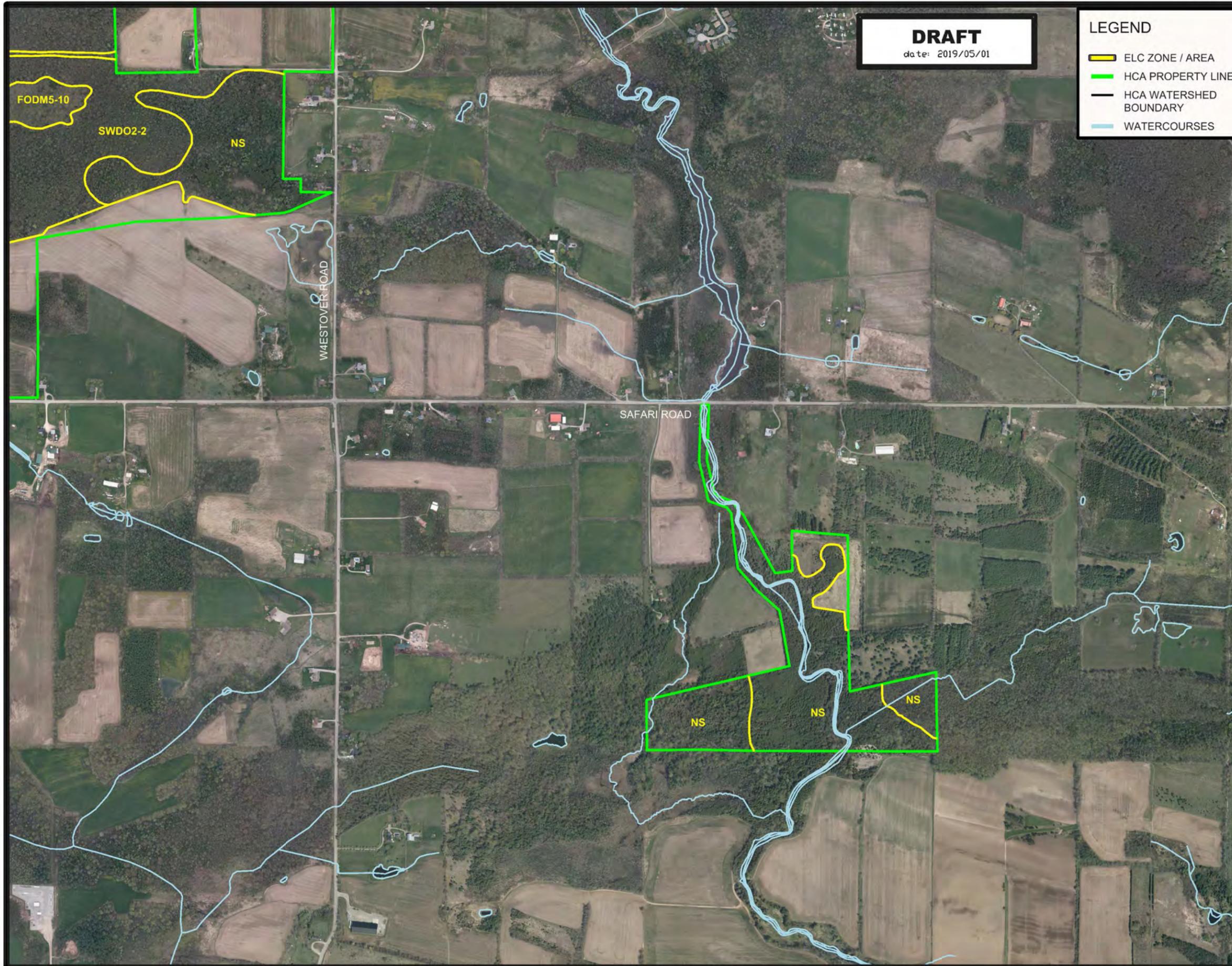
- LEGEND**
- ELC ZONE / AREA
 - HCA PROPERTY LINE
 - HCA WATERSHED BOUNDARY
 - WATERCOURSES

- ECOLOGICAL LAND CLASSIFICATION:**
- AG** AGRICULTURE
 - FOCM2-2** DRY-FRESH WHITE CEDAR CONIFEROUS FOREST
 - FOCS2-2** DRY WHITE PINE-RED PINE NON-CALCAREOUS BEDROCK CONIFEROUS FOREST
 - FODM3-1** DRY-FRESH POPLAR DECIDUOUS FOREST
 - FODM5-3** DRY-FRESH SUGAR MAPLE-OAK DECIDUOUS FOREST
 - FODM5-10** DRY-FRESH SUGAR MAPLE-WHITE BIRCH POPLAR DECIDUOUS FOREST
 - FODM5-11** DRY-FRESH SUGAR MAPLE HARDWOOD DECIDUOUS FOREST
 - FODM7-2** FRESH MOIST GREEN ASH HARDWOOD LOWLAND DECIDUOUS FOREST
 - FOMM5-2** DRY-FRESH POPLAR MIXED FOREST
 - MAMM1-2** CATTAIL GRAMINOID MINERAL MEADOW MARSH
 - MEMR2** DRY-FRESH NON-CALCAREOUS BEDROCK MIXED MEADOW
 - SWDM2-2** GREEN ASH MINERAL DECIDUOUS SWAMP
 - SWDO2-2** SILVER MAPLE ORGANIC DECIDUOUS SWAMP
 - TAGM1** CONIFEROUS PLANTATION
 - THDM2-6** BUCKTHORN DECIDUOUS SHRUB THICKET
 - NS** NOT SURVEYED



**ECOLOGICAL LAND CLASSIFICATION MAP
UPPER WATERSHED BEVERLY SWAMP**

DATE: 2020/05/01



DRAFT
date: 2019/05/01

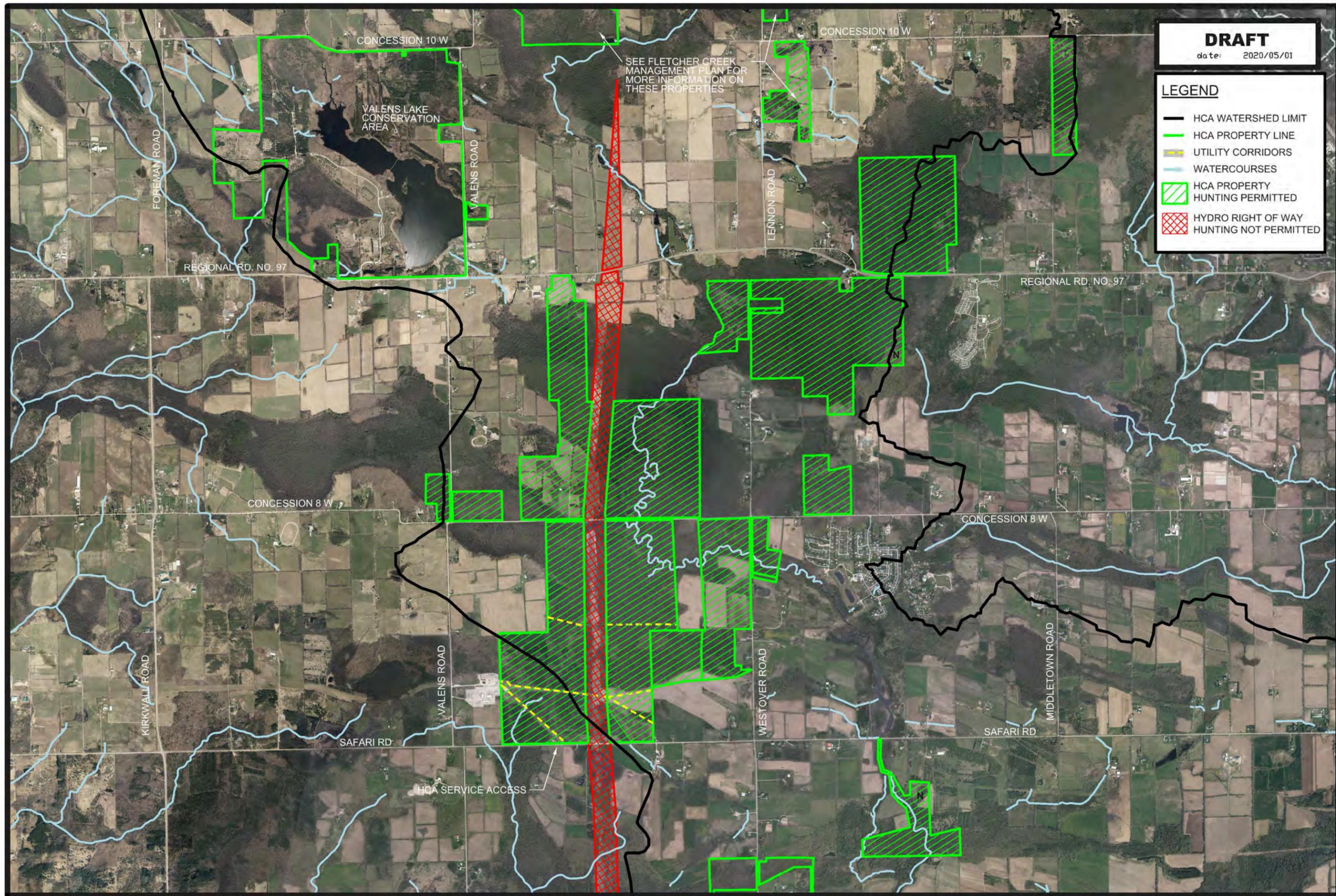
- LEGEND**
- ELC ZONE / AREA
 - HCA PROPERTY LINE
 - HCA WATERSHED BOUNDARY
 - WATERCOURSES

- ECOLOGICAL LAND CLASSIFICATION:**
- FODM5-10** DRY-FRESH SUGAR MAPLE-WHITE BIRCH POPLAR DECIDUOUS FOREST
 - SWDO2-2** SILVER MAPLE ORGANIC DECIDUOUS SWAMP
 - NS** NOT SURVEYED



ECOLOGICAL LAND CLASSIFICATION MAP
UPPER WATERSHED BEVERLY SWAMP

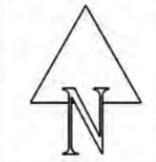
DATE: 2019/05/01



DRAFT
date: 2020/05/01

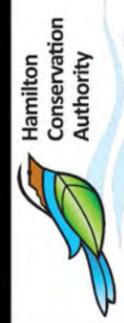
LEGEND

- HCA WATERSHED LIMIT
- HCA PROPERTY LINE
- UTILITY CORRIDORS
- WATERCOURSES
- HCA PROPERTY HUNTING PERMITTED
- HYDRO RIGHT OF WAY HUNTING NOT PERMITTED



DATE: 2020/05/01

HUNTING AREAS MAP UPPER WATERSHED BEVERLY SWAMP



A Healthy Watershed for Everyone

APPENDIX 2

Capital Development Priorities

DRAFT - BEVERLY SWAMP CAPITAL DEVELOPMENT PRIORITIES: 2020 - 2030

<u>A. Conservation Area Improvements</u>		*Budget (180K)
A1	Perimeter Fencing & Gates	\$ 75,000
A2	Site Signage	\$ 10,000
A3	Trail closures (unauthorized trails)	\$ 20,000
**A4	Invasive Species Management	\$ 50,000
**A5	Natural Area Restoration	\$ 25,000

* Budget costs are in 2020 dollars, projects and budgets to be reviewed annually.

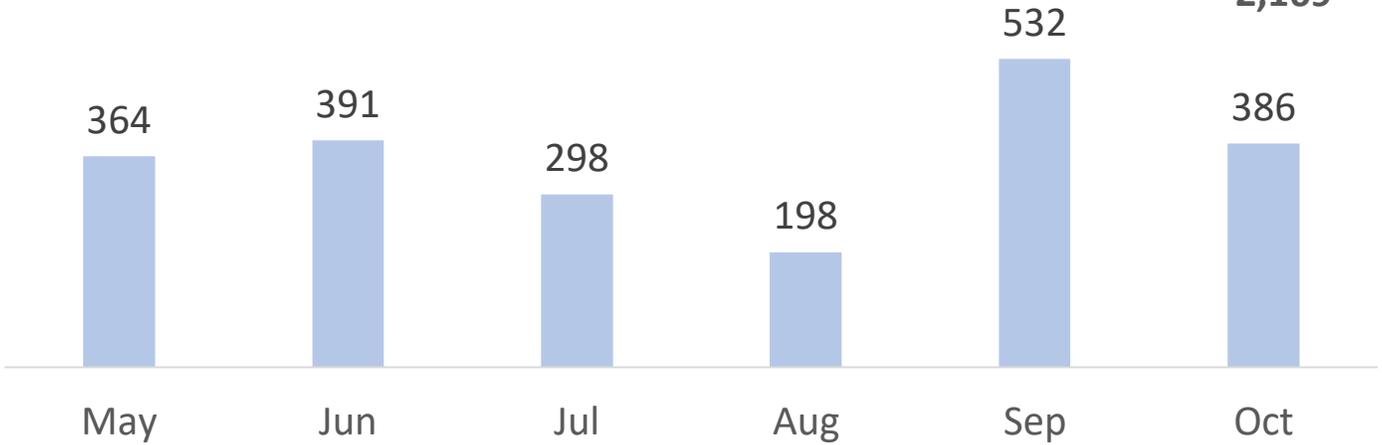
** Costs subject to ecological findings and recommendations.

APPENDIX 3

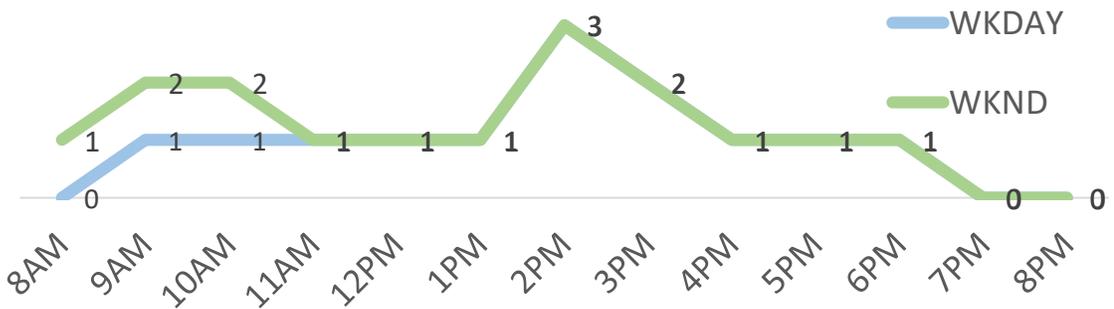
Trail and Vehicle Counter Data

Beverly Swamp Trail Counts

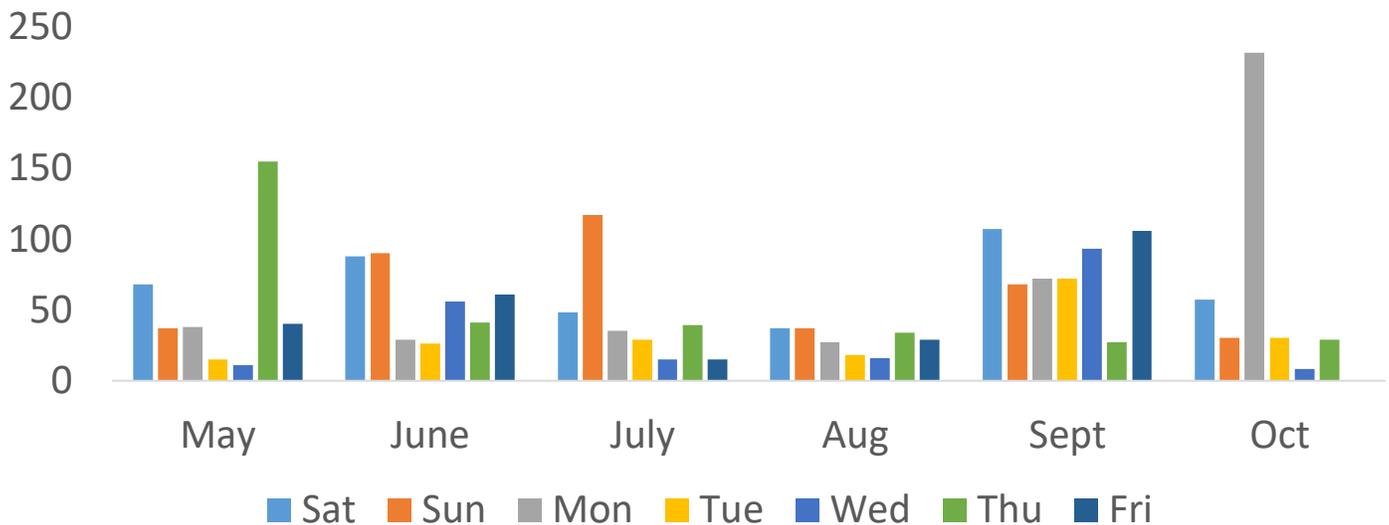
*Trail Total:
2,169



Beverly Swamp Hourly Average



Beverly Swamp Daily Trail Counts



* Counter located north of Safari Road parking lot.

APPENDIX 4

Managed Forest Plan Recommendations 2018-2027

Section 6 : Property Details

6.1 Beverly Swamp

The 2,400-hectare Beverly Swamp spans three watersheds - Fairchild, Spencer and Bronte creeks - and offers one of the best and largest lowland swamp forest representations in south central Ontario. Almost half of it is HCA-owned. Parts of it can be accessed by hiking the Lafarge 2000 Trail in the northwest end of the watershed. This wetland is the source area for Spencer, Grindstone and Fairchild creeks and features a rich diversity of plant and animal life, including some that are rare to the Hamilton region. There are several hiking trails within the HCA-owned property. *Source: <https://conservationhamilton.ca/beverly-swamp/>*

Managed Forest Summary

Roll Number (5-digit)	Forest Type 1	Area 1 (ac)	Forest Type 2	Area 2 (ac)	Total Area (ac)
30300	Upland Hardwoods	3.31	Mixedwoods	19.72	23.03
61900	Mixedwoods	23.27	Cedar	16.00	39.27

Other Vegetation Observed	Invasive Species Observed	Wildlife Habitat Features			
		Snags	Cavities	Coarse Woody Debris	Mast Species
Duckweed Cattail Virginia creeper	Buckthorn	Abundant	None Observed	Few	American beech

Forest Inventory										
Comp	Area (ac)	Forest Type	Trees ≥ 10 cm DBH						Regeneration (advanced > 1.4m tall)	
			Species Composition ¹	Age (yrs)	Avg. DBH ² (cm)	Height (m)	Density (stems/ha)	Basal Area ³ (m ² /ha)	Species Composition	Density ⁴ (stems/ha)
4a (2)	3.02	Upland Hardwoods	Be4 Mh4 Bd2 (He Ms)	67	23	24	728	30	Be5 Mh5	3333
4b	0.29	Upland Hardwoods	Mh3 Be2 He2 Bd1 Ms1	50	22	22	458	18	Be5 Mh5	2000
4c	16.91	Mixedwoods	Ce6 Ab1 Aw1 Bd1 By1 (El)	62	24	21	851	37	Cb5 Bt5	1000
4d	2.81	Mixedwoods	Bd2 By2 Ce2 El2 Ab1	60	22	23	752	28	none	0
9a	21.23	Mixedwoods	Ce8 (Ap Aw Bt By Cb Po)2	33	21	13	817	27	Ce8 Aw2	1667
9b	16.00	Cedar	Ce10	40	13	15	3727	52	none	0
9c	2.04	Mixedwoods	Ce6 Aw2 Cb1 Po1	50	19	18	792	22	Ce8 Aw2	5000

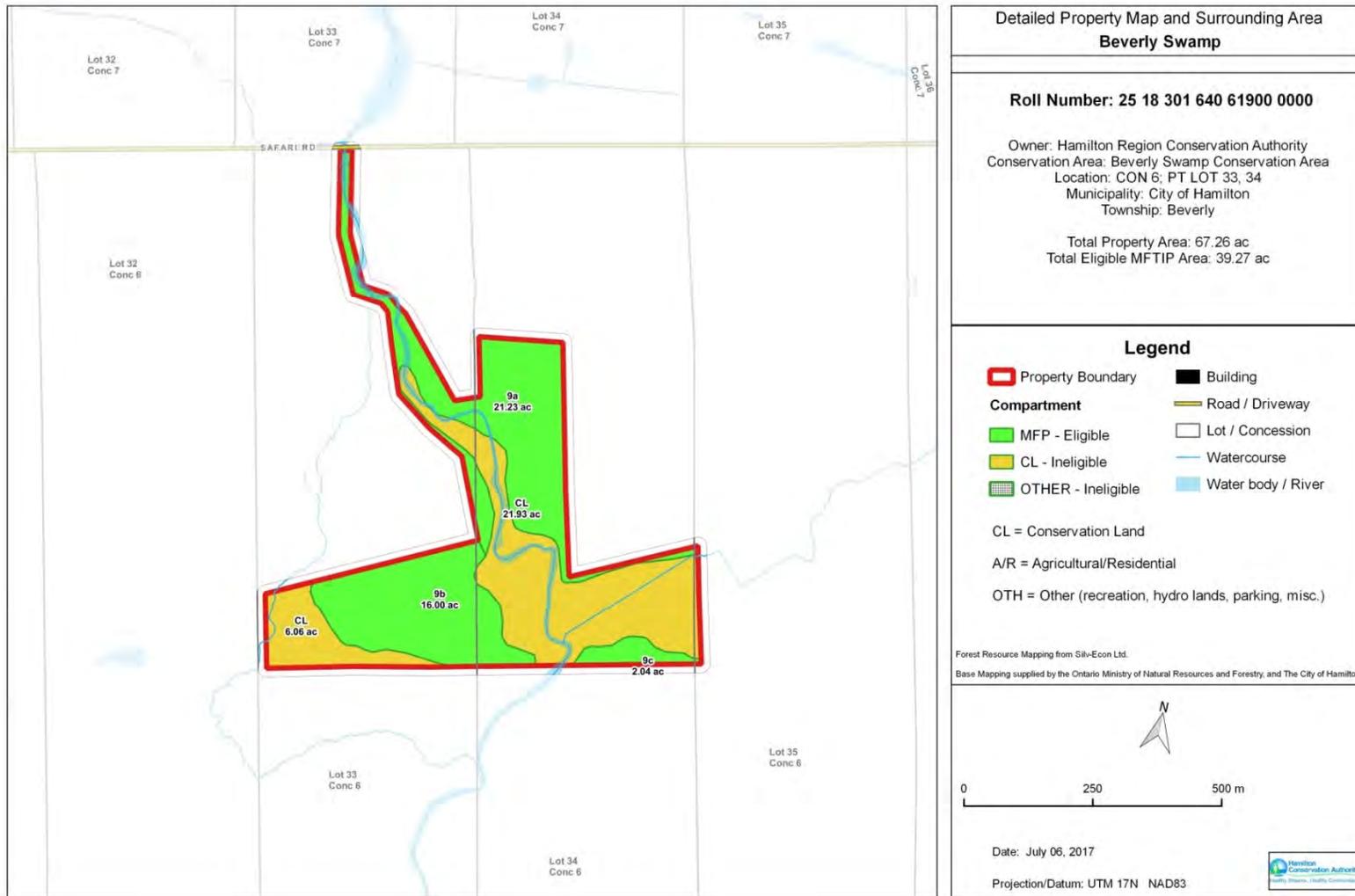
¹ Species Composition: For example comp. 4a : Be4 Mh4 Bd2 (He Ms) = Stand contains 40% American beech, 40% sugar maple, 20% basswood by basal area. Eastern hemlock and silver maple are also present. Section 11 contains a list of species abbreviations.

² DBH. Diameter at breast height, i.e. 1.3 m above ground.

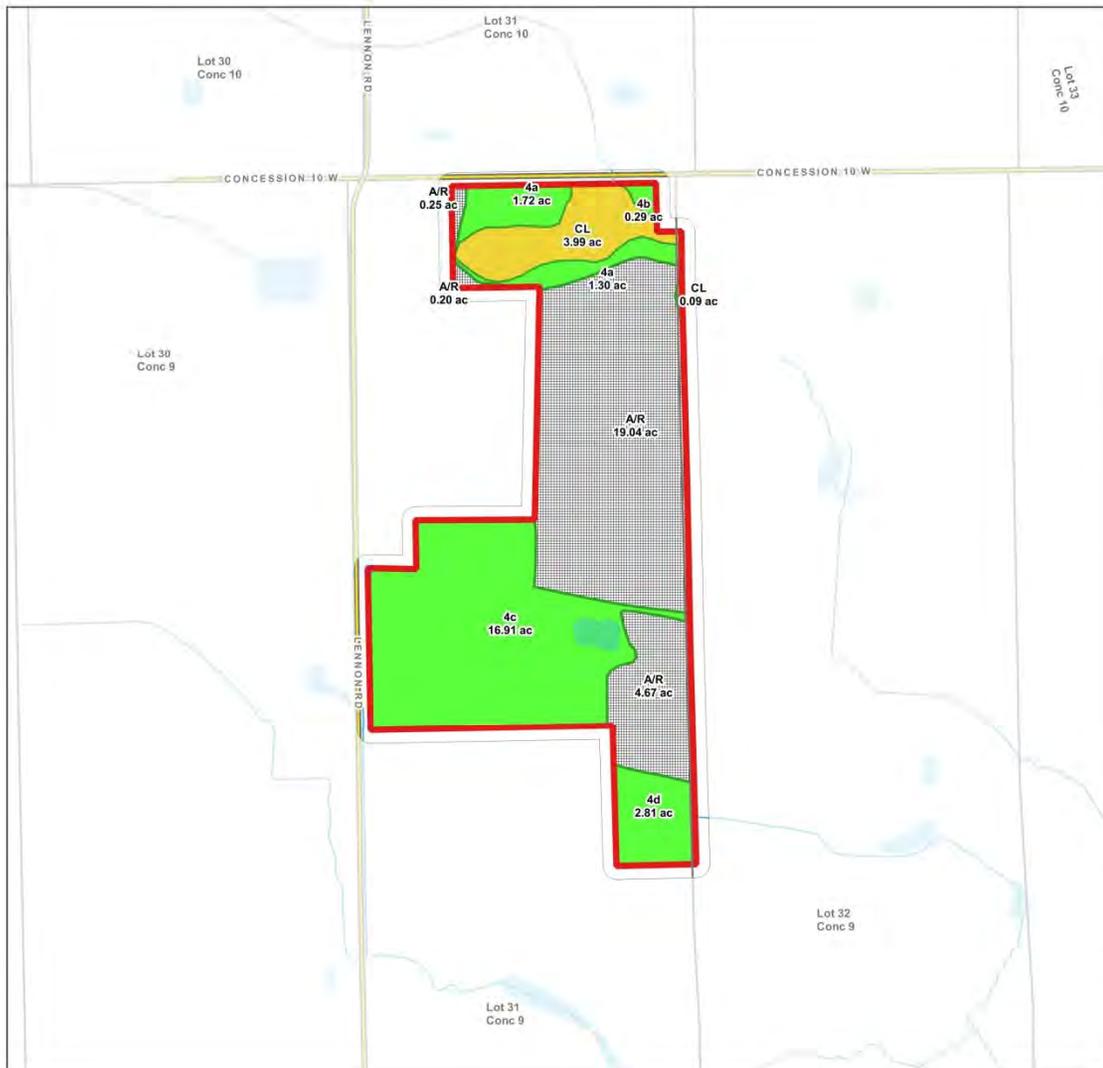
³ Basal Area. The cross-sectional area of all stems 10 cm or greater in diameter measured at breast height and expressed in square metres per hectare (m²/ha).

⁴ Regeneration density. <3000 understocked; 3000-5000 adequately stocked; > 5000 overstocked. Density includes desirable and undesirable species (Bt = buckthorn).

Detailed Property Maps



HAMILTON CONSERVATION AUTHORITY MANAGED FOREST PLAN



**Detailed Property Map and Surrounding Area
Beverly Swamp**

Roll Number: 25 18 301 910 30300 0000

Owner: Hamilton Region Conservation Authority
 Conservation Area: Beverly Swamp Conservation Area
 Location: CON 9; PT LOT 31
 Municipality: City of Hamilton
 Township: Beverly

Total Property Area: 51.27 ac
 Total Eligible MFTIP Area: 23.03 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

0 250 500 m

Date: July 06, 2017
 Projection/Datum: UTM 17N NAD83

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 is 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		



Hamilton Conservation Authority

838 Mineral Springs Road, P.O. Box 81067,
Ancaster, Ontario L9G 4X1

905-525-2181 www.conservationhamilton.ca



A Healthy Watershed for Everyone