

CAVE SPRINGS

MANAGEMENT PLAN 2017–2047

Management Plan
DECEMBER | 2016





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Cave Springs...

A PLACE THAT IS NEVER TWICE THE SAME.

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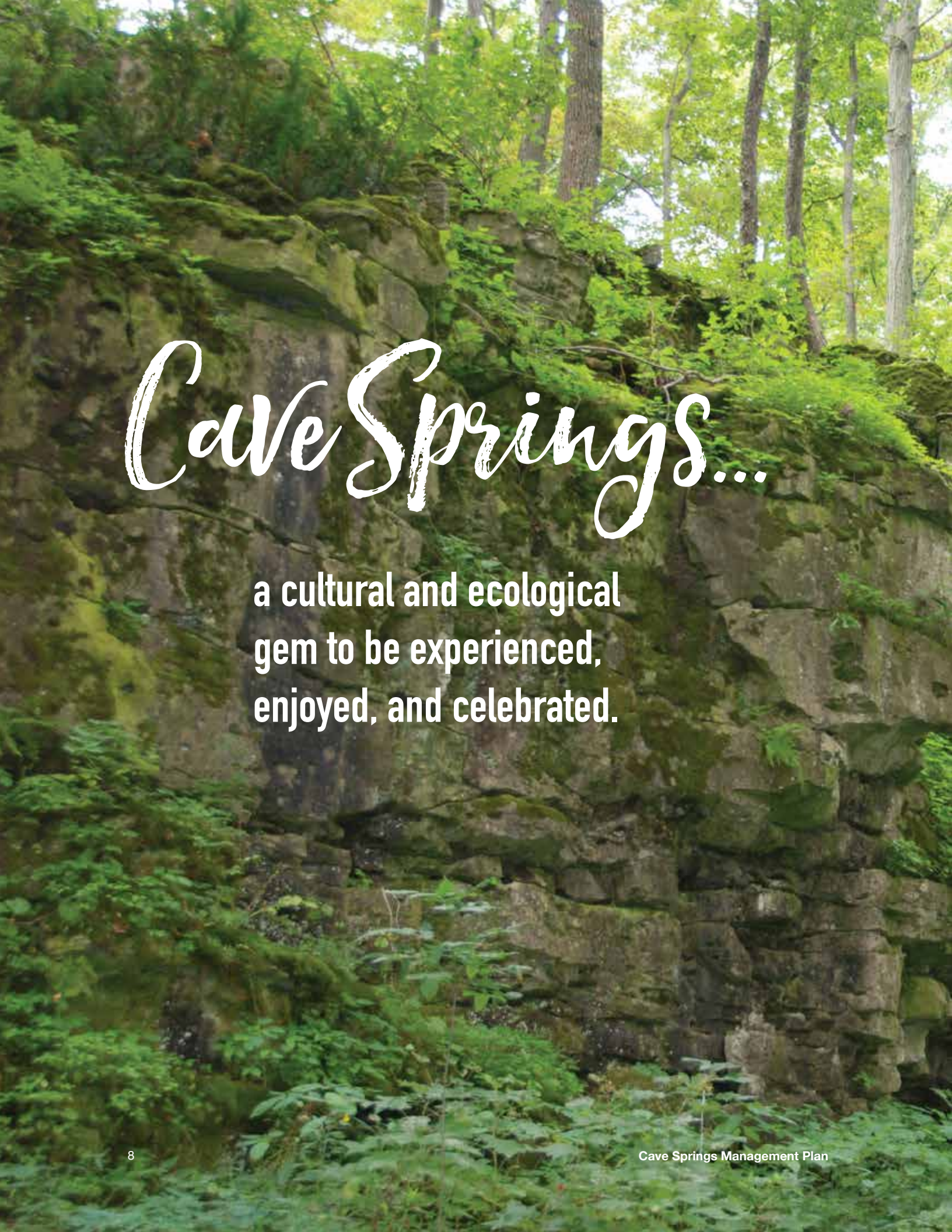
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A photograph of a mossy rock wall in a forest. The wall is made of large, irregular stones covered in green moss and ferns. Tall trees with green leaves are visible in the background.

Cave Springs...

a cultural and ecological
gem to be experienced,
enjoyed, and celebrated.



As you step onto the property,
the stresses and worries of
day-to-day life dissipate.

The senses come alive with wonder, excitement, and anticipation. The property calls to us and draws us in. Close your eyes and you can imagine the Neutral Indians, who set-up camp hereabouts, climbing to the top of the escarpment, taking in the spectacular Lake Ontario, and the forest that was once Niagara. Close your eyes a second time, and you can picture the early European settlers discovering the rich soils below the escarpment, perfect for farming and growing food. Close your eyes yet again, and this time listen. Listen to the chirping birds and rustling trees. Listen to the water trickling through the streams, or to the children laughing at the nearby camp. Listen to the distant but distinct beating of tribal drums. Close your eyes one last time, and you may even hear Margaret Reed passing along stories and legends about the land and the people, embellished to be certain, but always aimed at bringing the property alive and allowing others to feel its heart beat. This is Cave Springs, a cultural and ecological gem to be experienced, enjoyed, and celebrated. It is a place that is never twice the same. Day after day, season after season, Cave Springs reveals itself uniquely and especially for you. We invite you on to this hallowed ground for your own unique encounter with nature, tranquility, and great beauty. May your experience be magical and inspiring and completely respectful of the encounters yet to be enjoyed by others.



Welcome to Cave Springs.



I. INTRODUCTION – A CHANGE IN CLASSIFICATION

A CHANGE IN CLASSIFICATION

The Niagara Escarpment Parks and Open Space System Planning Manual requires lead agencies to confirm or change the park or open space classification each time a Management Plan is prepared or revised, based on inventories undertaken during the research phase of the planning process.

From the beginning of this project, it was made clear to all stakeholders that the recommended classification would be either the existing Nature Reserve classification, or if supported through the research phase, a Natural Environment classification.

The Niagara Escarpment Parks and Open Space System Planning Manual states, “Nature Reserves represent the most significant and distinctive natural areas and landforms found along the Niagara Escarpment. These areas serve to protect selected life science and earth science ANSIs.” The Manual further states, “Natural Environment lands are characterized by the variety and combination of outstanding natural heritage features, cultural heritage features and outstanding landscape.”

Management practices and uses within a Nature Reserve are focused exclusively on the protection of natural heritage features, while Natural Environment lands provide opportunities for the protection of both important natural heritage features and cultural heritage features, and allow for a greater range of compatible activities.

The Niagara Peninsula Conservation Authority proposes that Cave Springs Conservation Area be reclassified from Nature Reserve to Natural Environment. In order to assess the viability of a reclassification, the following research was completed: Natural Heritage Study (Appendix A), a Cultural Heritage Study (Appendix B) conducted by ASI Archaeological & Cultural Heritage Service, a Water Resource Assessment Study (Appendix C), an Asset Condition Report, literature review and public consultation conducted by Niagara Peninsula Conservation Authority staff.

This recommended change in classification has been discussed and supported by the public-at-large, primary stakeholders, the Cave Springs Management Plan Steering Committee and the Niagara Peninsula Conservation Authority Board of Directors.

DISCUSSION

The current Nature Reserve classification gives strong recognition to the natural heritage features and values that exist on this property, and indeed may have been an appropriate classification in the absence of a Management Plan. However, to separate this land from its rich cultural heritage would be a mistake.

Students from the Willowbank School of Restoration Arts who contributed to the writing of this Management Plan concluded, “Today Cave Springs is comprised of sensitive natural environments and cultural landscapes that extend beyond its physical borders. Daily visitors, political bodies, and international agencies all have a vested interest in this Site. Despite sharp contrasts between obvious layers of natural and cultural heritage there are subtle integrations of the two. This results in a sensitive diversity of the natural and cultural elements that informs the recommendations of this Plan.”

One of the benefits of this planning process is the requirement to document all natural heritage features and values, and to establish zones that guide management directions. Thus, Nature Reserve zones may be established, monitored, protected and enhanced over the long term. This is significant. Throughout the planning process, it was always made clear that any site modifications would be subject to the findings of the Natural Heritage Study (Appendix A). This impacted and caused two development concepts to be rejected due to ecological concerns - one being the establishment of a boardwalk along the base of the escarpment rock face, the other being the establishment of a parking area within the existing naturalized thicket. In other words, the establishment of this Management Plan ensures that the sensitive Nature Reserve zones will be properly monitored and protected over time, even if the overall classification is changed.

Turning now to the significance of the cultural heritage features and values that come to life on this property, their importance cannot be overstated and are well documented in the ASI Archaeological & Cultural Heritage Services, Cultural Heritage Inventory and Planning Study (August 5, 2015). Here, there exists a well-documented history of peoples that have traveled through this area and left their mark, including the virtually unknown “Neutral Nation” who set up camp annually during the hunting season, the arrival of European immigrants and United Empire Loyalists, Margaret Reed, the self-described “Witch of Cave Springs”, and so many more. The factual history is greatly enhanced by great legends and colorful folklore. The Site has



inspired the writing of books and other forms of artistic expression including, “Cave Springs in Lore and Legend” by William F. Rannie, “Tempest in a Teacup: the Cave Springs Soap Opera”, and “The Cave Springs Mystique” by Margaret Reed, and “The Spirit of Cave Springs” by Susan Vida Schutten.

The stories of Cave Springs are extraordinary, featuring hidden treasures and artifacts, German spies, claims of an underground lake and magical waters that allow you to live for hundreds of years.

Many of these stories go back several decades or indeed hundreds of years and yet new stories are being created on a daily basis. As the project team took this project out to the public, it was fascinating to experience the need of people to share their personal experiences with this property and the surrounding area – great childhood memories of the adjacent United Church Camp and the exploration and adventures along the Cave Springs trails, personal encounters with Margaret Reed, the early establishment of the Bruce Trail, great rock-climbing adventures, moments of child-like excitement and laughter, and moments of perfect solitude.

In short, this is a special place that draws in thousands of visitors every year and still thrives as an ecological gem. The Management Plan that has been developed for this property will ensure that both its natural and cultural heritage features and values will be protected, enhanced and celebrated over the long term. The modest development proposals put forward in this plan are consistent with these ideals. Each project will enhance the visitor experience – improving access, accessibility and safety while better protecting the natural heritage features of the property.

It is the vision of this Management Plan that Cave Springs be a place:

- Of ecological appreciation and sensitivity
- Where cultural heritage comes alive
- For accessing the Bruce Trail Corridor and UNESCO Biosphere Reserve
- Of learning and research
- Of celebration, joy and laughter
- Of adventures and story-telling
- Of beauty and art in all of its forms
- For hiking and outdoor enthusiasts
- For gathering in small to mid-size groups
- Of discovery and exploration
- Of peacefulness and serenity
- Where people learn how to be on a sensitive ecological property, respectfully

The Niagara Escarpment has been designated as a UNESCO Biosphere Reserve for being an area in the world that is deemed to demonstrate a balanced relationship between humans and the biosphere. Along the escarpment, there are few places like Cave Springs that demonstrate this balance so perfectly. The proposed change in classification, combined with the Management Plan itself will ensure that this balance is sustained and enhanced.

II. EXECUTIVE SUMMARY

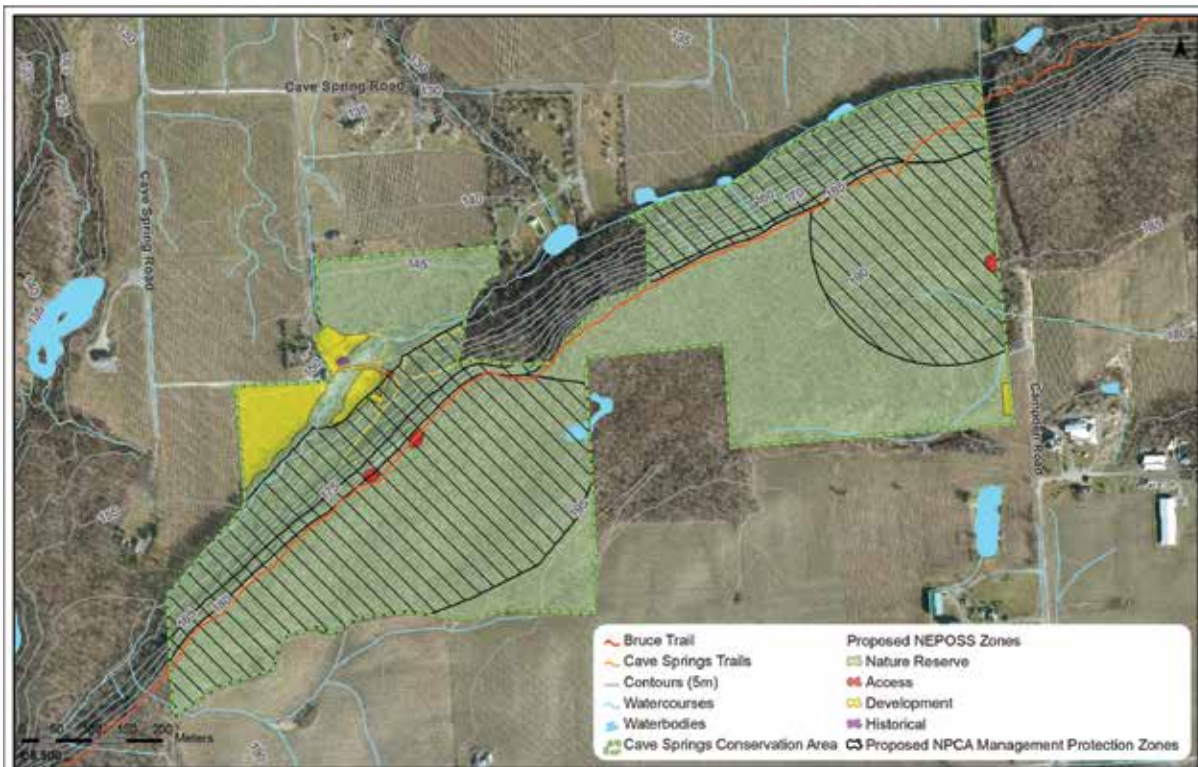
The Cave Springs Conservation Area Management Plan is the principal guiding policy document for the planning, development and management of the Cave Springs Conservation Area.

Cave Springs Conservation Area is owned by the Niagara Peninsula Conservation Authority (NPCA) and consists of a patchwork of parcels obtained since 1981 in an effort to preserve both ecological and cultural history. The Site is nestled along the Niagara Escarpment, near the town of Beamsville, in the municipality of Lincoln, Ontario. This property can be accessed at 3949 Cave Springs Road or via the Bruce Trail Corridor. Cave Springs Conservation Area is over 44 hectares in size including approximately 2 hectares of land, which was farmed by the previous owner of the property, that has been allowed to naturally regenerate since the NPCA acquired the lands.

Cave Springs is part of the Niagara Escarpment Parks and Open Space System (NEPOSS). Upon approval of the Management Plan by the Niagara Peninsula Conservation Authority, submission will be made to the Niagara Escarpment Commission for review and endorsement and then to the Ministry of Natural Resources and Forestry (MNR) for review and approval.

The purpose of the Management Plan is to establish direction for the long-term protection, development and management of the conservation area. This Management Plan is based on site investigations, various studies, public consultation, and meetings undertaken by Niagara Peninsula Conservation Authority staff and hired consultants, between June 2014 and August 2016. A number of background studies and inventories were reviewed or conducted as part of this study. Additional public consultation was generated through a Public Information Workshop, one-on-one interviews and three Open House Forums which were conducted regularly throughout this process.

The Cave Springs Conservation Area Management Plan sets out proposed park zoning and classification as well as development recommendations to guide management over the next 30 years. The Management Plan includes: updating, deconstructing and rebuilding infrastructure within existing footprints on the Site, installing a welcoming entrance and green parking area, reestablishing an existing laneway, installing a constructed wetland and septic system, ensuring that the escarpment trail is in compliance with Accessibility for Ontarians with Disabilities Act (AODA), constructing two small viewing platforms, establishing a new entrance and parking area along Campden Road, and acquiring adjacent land to preserve.



Proposed NEPOSS Zones



III. VISION STATEMENT

The Niagara Peninsula Conservation Authority, through the Cave Springs Conservation Area, will practice conservation leadership by promoting the principles of the Niagara Escarpment's United Nations Educational, Scientific and Cultural Organization (UNESCO) Biosphere Reserve Designation. The key objectives are to protect the Niagara Escarpment's sensitive habitats and to respect the Site's unique cultural landscapes, including the features of the Beamsville and Cave Springs Farms Area(s) of Natural and Scientific Interest (ANSI).

By facilitating public access to Cave Springs Conservation Area, people will be allowed to experience the remarkable wonder of the Niagara Escarpment firsthand.

The Niagara Peninsula Conservation Authority, as stewards of natural and cultural history at Cave Springs, strives to be a regional leader in providing outdoor passive recreational experiences, educational programming, creative engagement and opportunities for scientific research.

Cave Springs, as part of the Niagara Escarpment Parks and Open Space System, is a contributing component within a larger conservation context. The Cave Springs Conservation Area, through a partnership with the Bruce Trail Conservancy, and in collaboration with the local community, can create greater public understanding of ecology, a richer appreciation of the Niagara Escarpment's cultural landscape and improved public access to Niagara's intrinsic awe inspiring beauty.

IV. CHARACTER DEFINING ELEMENTS

Some of the character defining elements of the Site include:

- Trail systems traversing the escarpment totaling 2.3 kilometres in length, including 1.5 kilometres of the Bruce Trail Corridor.
- Two gambrel barns, one of which was formerly the residence of Margaret Reed.
- A historic ice cave – a natural phenomenon known by local inhabitants to retain ice throughout the summer.
- A history of archaeological finds on the Site and potential aboriginal settlement.
- Folklore including rumours of providing refuge for German spies, the legacy of Margaret Reed as “the Witch of Cave Springs”, and a hidden cave that boasts a wealth of Aboriginal artifacts.
- A series of escarpment springs at the Lockport – Decew Formation contact.
- A diverse ecology.
- Some of the best examples of block talus slopes, rock fissures and karst topography on the escarpment in the Niagara Region.
- Spectacular vistas overlooking Lake Ontario.
- The Adam Steps, a historical staircase ascending the Escarpment, which many suspect were used by the Neutral Indians.
- A storied acquisition: Margaret Reed, a natural and cultural heritage steward of the land, who was known to call herself the “Witch of Cave Springs”, sold her property to the NPCA in 1981, but continued to live there through a tenancy agreement with the NPCA until 2005. Reed, known for her eccentric ways and wonderful storytelling, conducted historical walking tours of the area for school groups, the Bruce Trail Club, and other interested parties.

V. POLICY FRAMEWORK

The Cave Springs Management Plan will ensure that the sensitive natural and cultural landscape of the property will be protected and that any proposed development zone considerations are subjected to the recommendations coming out of the Natural Heritage Study (Appendix A), Cultural Heritage Study (Appendix B), and a Water and Resource Assessment Study (Appendix C). Additionally, the property will be developed in ways that support and improve educational, recreational, and research opportunities. The Plan will also ensure that the public has opportunities to enjoy the great beauty of this property while maintaining a deep respect and appreciation for the sensitive ecology of the land.

The Plan is built upon the existing policy framework of the NEP. The area is currently designated as a Nature Reserve through NEPOSS. This designation represents the most significant and distinctive natural areas and landforms along the escarpment. The NEP states that access to these areas is not widely promoted due to the sensitivity of the features in them. The Cave Springs property is designated as an Escarpment Natural Area and Escarpment Protection Area under NEP. It is the intent of this Management Plan to justify a re-classification of the Site from a Nature Reserve to a Natural Environment. This proposed re-classification permits recreational uses and hiking and is a better reflection of the current, and intended future, uses for the Cave Springs Conservation Area.

The Cave Springs Management Plan is based on a Natural Heritage Study (Appendix A), a Cultural Heritage Study (Appendix B), a Water Resource Assessment Study (Appendix C), and a property assessment report identifying current infrastructure. These reports address baseline information highlighting significant and sensitive values. The studies review existing land use and identify constraints, opportunities, issues and risks of proposed land use, including land classification and zoning. Protection and management of natural and cultural heritage features are also addressed.

Additionally, the Management Plan ensures that public consultation has taken place, including hosting several public open houses, creating and engaging a Cave Springs Steering Committee and consulting with all respective stakeholders.

The Management Plan objectives are:

- To protect unique ecological and historical areas
- To provide adequate opportunities for outdoor education and recreation
- To provide adequate public access to the Niagara Escarpment
- To complete a public system of major parks and open space through additional land acquisition and park and open space planning
- To continue the partnership via a Bruce Trail Agreement
- To maintain and enhance the natural environment of the Niagara Escarpment
- To support tourism by providing opportunities on public land for discovery and enjoyment by Ontario residents and visitors
- To provide a common understanding and appreciation of the Niagara Escarpment
- To show leadership in supporting and promoting the principles of the Niagara Escarpment UNESCO World Biosphere Reserve designation through sustainable park planning, ecological management, community involvement, environmental monitoring, research and education. (NEPOSS Planning Manual, March 2012), (NEP, 2005)

The Management Plan objectives will be achieved by:

- Gathering information, undertaking research including conducting inventories and analysis of features and current uses
- Determining classification, zoning and management direction
- Conducting public consultation
- Monitoring and evaluating to ensure goals and objectives are met
- Developing an Implementation Guide that provides direction on how to proceed with the execution of the Management Plan

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summary of the planning area



1.0 SUMMARY OF THE PLANNING AREA

The Cave Springs Management Plan planning area includes the area indicated in Figure 1, comprised of Part Lots 9, 10 and 11 in Concession 5, Town of Lincoln. This property can be accessed at 3949 Cave Springs Road or via the Bruce Trail Corridor. Cave Springs Conservation Area is over 44 hectares in size that includes approximately 2 hectares of land, which was farmed by the previous owner of the property, that has been allowed to naturally regenerate since the NPCA acquired the lands.

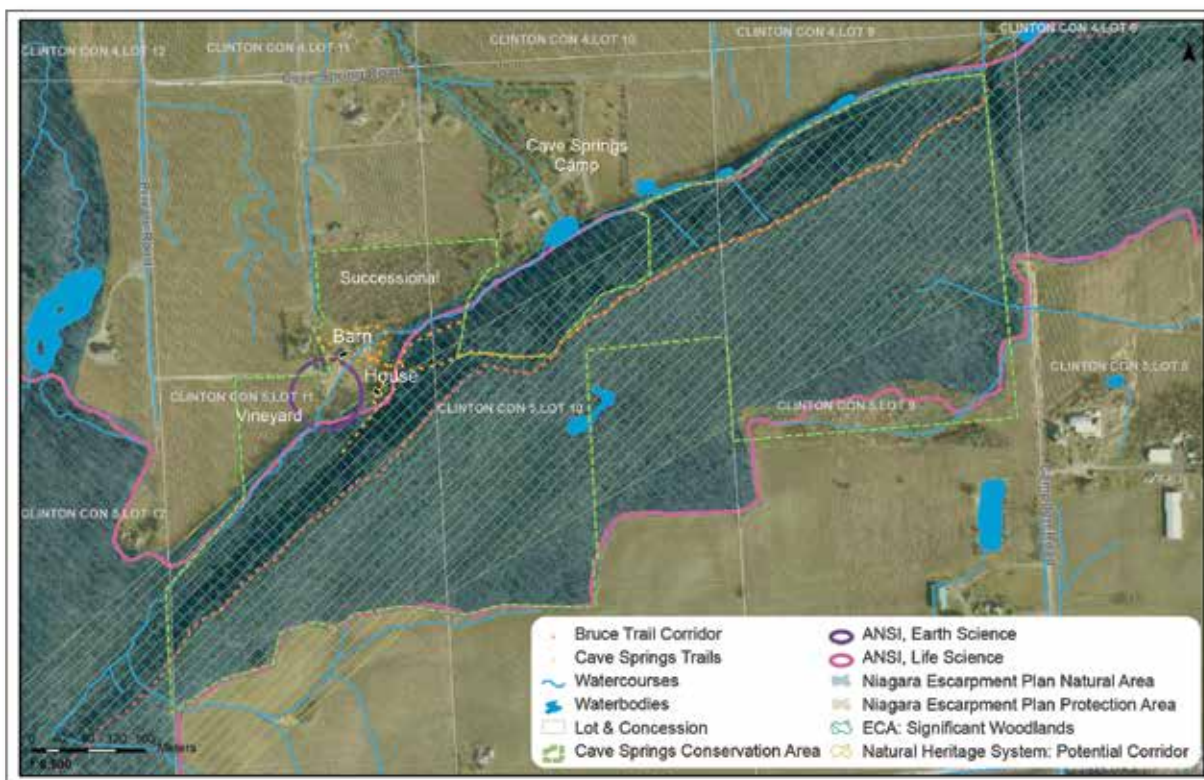


Figure 1: Planning Area



Cave Springs Conservation Area includes a portion of the Niagara Escarpment, the Beamsville Escarpment Provincial Life Science Area of Natural and Scientific Interest (ANSI) and the Cave Springs Farm Earth Science ANSI. This area is within the Niagara Escarpment Plan Natural Area and the Niagara Escarpment Plan Protection Area, and is classified as a Natural Heritage System: Potential Corridor, and includes an Environmental Conservation Area: Significant Woodland. The Site is also designated as a Nature Reserve under the NEPOSS Parks and Open Space Classification.

Traversing the Site, there is an intermittent stream, locally known as Margaret's Creek, which is mapped by the Ministry of Natural Resources and Forestry (MNRF) as Type 3: Marginal Fish habitat. The Site contains habitat for a variety of species including Endangered, Threatened and Special Concern Species. Wildlife habitat can be found throughout the above noted features including interior forest and rare Escarpment Rim habitat.

Current land use includes passive recreational activities on an existing trail system, including a portion of the Bruce Trail Corridor, unsanctioned rock climbing and bouldering, an arboretum, a vacant house, and a barn. Adjacent land use includes residential, farming, a United Church Camp (used by school groups and renters), the Bruce Trail Corridor, and a road network.

Cave Springs Conservation Area has diverse, unique and sensitive vegetative communities, which support a variety of habitats and species.

These communities are composed of treed slopes below the escarpment cliff face, which is littered with boulders and rock fissures, and an interior forest within a mature tableland woodlot that hosts many habitat trees. There are meadows, streams and wetlands throughout the property. These components support combinations of forage, roosts, dens and nests. The overall natural heritage landscape is a well-integrated and balanced ecosystem. The Site has a historic ice cave, a natural phenomenon known by local inhabitants to retain ice throughout the summer, and a history of archaeological finds and potential Aboriginal settlement. The folklore of this Site included rumours of the Niagara Escarpment providing refuge for German spies, the legacy of Margaret Reed as the self-proclaimed "Witch of Cave Springs", and a possible hidden cave. Some hydrologic and geological features include escarpment springs, spectacular vistas overlooking Lake Ontario, and some of the best examples of block talus slopes, rock fissures and karst topography on the



Niagara Escarpment in the Niagara Region. The Adam Steps, which many suspect were used by Neutral Indians, are a historical staircase traversing the Escarpment and can be found immediately adjacent to the Cave Springs property.

Approximately 2/3 of the Cave Springs Conservation Area is located above the Niagara Escarpment. A magnificent vertical bedrock scarp is the dominant feature of the conservation lands and is crossed by the Bruce Trail. There are vineyards and the Cave Springs United Church Camp north of the Site, and agricultural fields for grain production to the south with some forested areas adjacent.

Water at Cave Springs moves into fracture joints in the bedrock above the escarpment, which feed springs on the escarpment face, which then flow to seeps on the talus slope and streams and ponds on the silt and clay below.

1.1 NEP RECOMMENDED CLASSIFICATION

The Niagara Escarpment Parks and Open Space System Planning Manual requires that lead agencies prepare a Management Plan for each park or open space in the NEPOSS. The Cave Springs Management Plan will be based on inventories undertaken during the research phase of the planning process.

Management practices and uses within a Nature Reserve are focused exclusively on the protection of natural heritage features, while Natural Environmental lands provide opportunities for the protection of both important natural heritage features and cultural heritage features, and allow for a greater range of compatible activities.

The Niagara Peninsula Conservation Authority proposes that Cave Springs Conservation Area be reclassified from Nature Reserve to Natural Environment. In order to assess the viability of





a reclassification, the following research was completed: A Natural Heritage Study (Appendix A), a Cultural Heritage Study (Appendix B) conducted by ASI Archaeological & Cultural Heritage Service, a water Resource Assessment Study (Appendix C), an Asset Condition Report, literature review and public consultation conducted by Niagara Peninsula Conservation Authority staff.

This recommended change in classification has been discussed and supported by the public-at-large, primary stakeholders, the Cave Springs Management Plan Steering Committee and the Niagara Peninsula Conservation Authority Board of Directors.

Stakeholder meetings were held as part of the public consultation process for the Cave Springs Conservation Area Management Plan. Each stakeholder was asked a consistent series of questions, one of which was “Given the definitions below for Nature Reserve and Natural Environment (NEPOSS Manual) which one do you think best describes Cave Springs Conservation Area?” Of the 18 stakeholder meetings held, 15 resulted in agreement that a Natural Environment designation would be the best fit, two groups preferred the Nature Reserve designation and the remaining stakeholder did not have a strong opinion either

way. Those that were leaning towards Nature Reserve were doing so because of the concern for some of the permitted uses in the NEPOSS Natural Environment classification definition, especially car-camping. Once it was explained that we had no intention of allowing things like car-camping on the property they were more willing to support the change in classification.

During two Cave Springs, workshops as well as at the second Open House, overwhelming support was given for the proposed change to Natural Environment.

A group of students from Willowbank School of Restoration Arts used the Cave Springs Conservation Area as their research project in 2016. After spending a number of months doing background research on the property and its history they noted that the “patterns of occupation” on the Site were of significance. They noted that the presence of Neutral Indians, beginning approximately 11,000 years ago, followed by the United Empire Loyalists and finally by Margaret Reed until her death in 2005, are integrally important to the history of this Site and are a major part of its significance along the Niagara Escarpment. The Statement of Significance developed by these students for the

Cave Springs Conservation Areas further defines Cave Springs as a cultural landscape: “[A] cultural landscape can be defined as a living site that has retained evidence of its previous communities which provide context for its current state. The Cave Springs Site, as a cultural landscape, is its primary heritage value. Its role as an edge ecosystem provides a bridge to the gap in the perception of natural and cultural heritage”. The significance of this Site as a bridge between the natural and cultural world is important and should be recognized. (Willowbank School of Restoration Arts, 2016)

As a result of the legacy of repeated occupation of the Site, and in combination with the natural ecological value of the Site and the number of cultural heritage features still present today, it is proposed that the Cave Springs Conservation Area be reclassified as a Natural Environment. The significant cultural heritage features identified through the collection of the background information, along with the support for the proposed Natural Environment reclassification by most stakeholder groups are the driving forces behind this proposed change.

1.2 NIAGARA PENINSULA CONSERVATION AUTHORITY: STEWARDS OF OUR ENVIRONMENT

NIAGARA PENINSULA CONSERVATION AUTHORITY

The Niagara Peninsula Conservation Authority (NPCA) is governed by the *Conservation Authorities Act*. Section 19 of the Act states: “The objectives of an Authority are to establish and undertake the area over which it has jurisdiction, a program designed to further the conservation, restoration, development of natural resources other than gas, oil, coal and minerals.”

CONSERVATION AUTHORITIES MANDATE

The legislative mandate of the Conservation Authority, as set out in Section 20 of the *Conservation Authorities Act*, is to establish and undertake programs designed to balance the conservation, restoration, development and management of natural resources. The NPCA fulfills this mandate by implementing programs that:

- Improve the quality of lands and waters
- Contribute to public safety from flooding and erosion
- Provide for the acquisition of conservation and hazard lands

- Enhance the quality of life in its watershed by using its lands for recreation, heritage preservation and conservation education

The Niagara Peninsula Conservation Authority (NPCA) was established on April 30, 1959, under the *Conservation Authorities Act*, and serves approximately half a million people in the Niagara Peninsula Watershed, encompassing the entire Niagara Region and portions of the City of Hamilton and Haldimand County. The NPCA manages the impact of human activities, urban growth and rural activities within the watershed.

With its unique resources, the Niagara Peninsula is one of the most complex watersheds in the Province. It includes lands drained by the Niagara River, Twenty Mile Creek, the Welland River, the Welland Canal, Lake Erie and Lake Ontario. NPCA programs focus on initiatives that help keep people and their property safe from flooding and erosion, while retaining the safety of the drinking water.

The NPCA's ongoing commitment to land stewardship is reflected in the management of over 2870 hectares of some of the most sensitive and unique natural areas in Niagara. These lands are held in public trust, allowing the people of Niagara to enjoy the distinctive natural heritage features at 39 Conservation Areas, each offering diverse recreational and educational opportunities and a place to experience nature's beauty.

The NPCA's Mission is to manage our watershed's natural resources by balancing environmental, community and economic needs.

The NPCA's Vision is to balance conservation and sustainable development for future generations by engaging landowners, stakeholders and communities through collaboration.

The NPCA delivers programs, advises municipalities and regulates land use according to a complex series of legislative mandates.

As stewards of the watershed's natural resources, the NPCA works with landowners, government, conservation clubs, volunteer groups, individuals of all ages, and many other partners to accomplish the work that needs to be done. Each year, thousands of voluntary hours are contributed to help protect the ecological health of Niagara's watershed through public engagement in stewardship activities, all of which plays a vital role in helping achieve the underlying goals of these programs.



2.0 OVERVIEW OF THE PLANNING PROCESS

Cave Springs Conservation Area is one of over 130 parks under the scope of the NEP. It contributes to a rich network of biodiversity associated with this impressive landform. Seven Conservation Authorities, the Ministry of Natural Resources and Forestry, the Ontario Heritage Trust, the federal Department of the Environment - Parks Canada, the St. Lawrence Seaway Management Corporation, the Niagara Parks Commission, the Royal Botanical Gardens, municipalities and other bodies all contribute to this wonderful feature that is also a recognized UNESCO World Biosphere Reserve. The Niagara Escarpment Biosphere Reserve conserves the Province of Ontario's natural and social capital by protecting

prime agricultural lands, forests, wetlands, heritage properties and recreational spaces. Nestled along the Niagara Escarpment, near Beamsville Ontario, Cave Springs Conservation Area is over 44 hectares in size. This conservation area is a beautiful representation of the Escarpment's talus slopes and cliffs. The escarpment rim's beauty, with its sheer face and stunning views, is matched only by the majesty of the bedrock plain forests overhead, which are dominated by old growth Sugar Maple and a wide array of native wildflowers. There is a rich and unique diversity of plants and habitats, some of which are rare escarpment features that provide habitat for many species of wildlife, and some of which are increasingly rare in our highly urbanized environment.

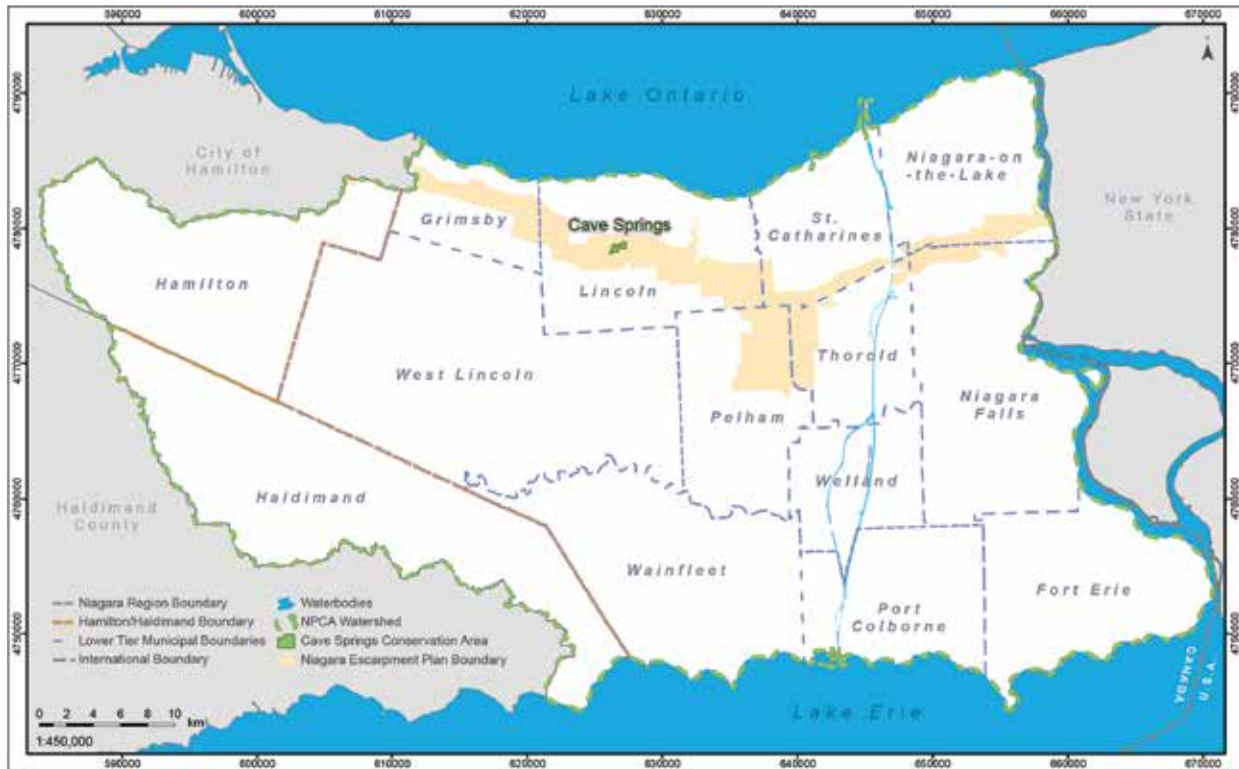


Figure 2: Niagara Escarpment Plan Area

The Cave Springs Management Plan will be the principle guiding policy document for the planning, development and resource management for Cave Springs Conservation Area. This document will be consistent with the requirements of the NEP (2005) and the NPCA Strategic Plan (2014). The NEP states that Management Agencies will prepare Management Plans for each park or open space in the Niagara Escarpment Parks and Open Space System. Each Plan must establish guidelines for long-term protection, development and management of the park or open space area (NEP 2005, section 3.1.6). The NPCA Strategic Plan reinforces these mandates in its pursuit of balancing lifecycle responsibilities against capital budget processes.

The Ontario Ministry of Natural Resources and Forestry (MNRF), in accordance with the NEP, will review this Plan. Upon approval of this document by the Steering Committee and the NPCA Board of Directors, submission will be made to Niagara Escarpment Commission (NEC) for review and endorsement. The Plan will then be submitted to the MNRF. The MNRF makes circulation and final approval. The Cave Springs Management Plan will be the prevailing policy document for the next five to ten years for implementation purposes, with monitoring and recommended uses continuing for the next 30 years from the date of MNRF approval.



3.0 *background*



3.0 BACKGROUND BASELINE AND INVENTORY

3.1 NATURAL HERITAGE

The purpose of the Natural Heritage Study (Appendix A) is to produce a baseline from which the ecological health of the Site can be understood. Plants and animals carrying out any part of their lifecycle, as well as their corresponding ecosystems, were assessed for their provincial and national significance. This work specifically determined:

- Significant wildlife habitat areas (breeding, nursery/rearing, forage, hibernation, migration)
- Species at Risk (SAR) and needs for protection (i.e. habitat, etc.)

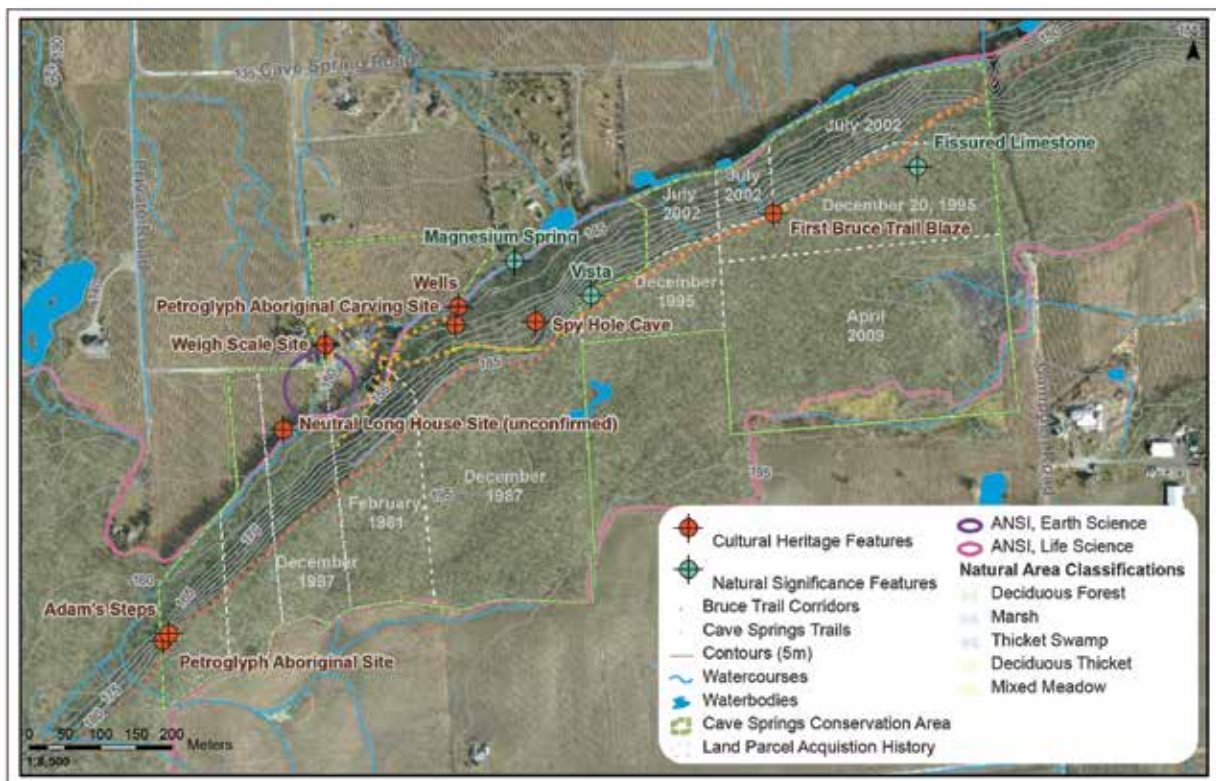


Figure 3: Natural and Cultural Heritage Features



- Significant plant communities in need of protection or maintenance
- Resource information for use in decision making based on best location and types of land use to sustain the resource base.

This baseline provides important information for the protection of the Site's unique natural features (Figure 3: Natural and Cultural Heritage Features). It will be used to achieve the purpose and objectives set out in the Niagara Escarpment Plan (NEP) and NEPOSS as well as the UNESCO World Biosphere Reserve designation based on the *Endangered Species Act*.

This baseline information will be used to challenge the land classification of Nature Reserve that is currently assigned to the Site in the NEP and propose the classification of Natural Environment.

The findings of this study determined the Site-specific protection zones, in accordance with NEPOSS, including the most appropriate areas for programming. These protection zones correspond to the degree of sensitivity of the many ecologies of the Site in conjunction with its hydrology and the existing cultural assets. Using this data, recommendations for ecosystem restoration, environmental maintenance, monitoring, and protection can be established and implemented in conjunction with the implementation of this Plan.

3.2 CULTURAL HERITAGE

Archaeological Services Inc. (ASI) was retained by the NPCA to conduct a Cultural Heritage Inventory and Planning Study (Appendix B) in support of the Cave Springs Conservation Area Management Plan prepared in accordance with the NEPOSS guidelines. In doing so, the following tasks were completed:

TASK 1

Base map preparation

TASK 2

Background research

TASK 3

Stage 1 archaeological resource assessment

TASK 4

Built heritage and cultural heritage landscape assessment

TASK 5

Recommendations based on a heritage impact assessment outlined in the Ontario Heritage tool kit (info sheet #5 Ministry of Culture, 2006) evaluation of site significance Ontario Heritage Act 9/06, Ontario Heritage Standards and Guidelines.

On May 28, 2015, a cultural heritage specialist, a senior archaeologist from ASI, and NPCA staff undertook a field review for the identification of the cultural heritage features.

The primary purpose of this report was to identify potential cultural heritage resources including: an inventory of archaeological sites, built heritage features, cultural landscapes, and the identification of sound planning practices for the management and protection of these resources.

Within the Cave Springs Conservation Area, eight cultural heritage features have been identified, one of which is a registered archaeological site. These features are a combination of built heritage, landmarks, and evidence of human alteration to the natural landscape (Figure 3: Natural and Cultural Heritage Features).

3.3 WATER RESOURCES

The Niagara Peninsula Conservation Authority (NPCA) Special Projects completed a Water Resource Assessment Study (Appendix C) (NPCA, 2016) for the Cave Springs Conservation Area Management Plan, 2016.

The report provides a baseline description of the water resources at the Site to inform the development of water-related policy guidelines. The Niagara Escarpment Parks and Open Space System Planning Manual (MNR, 2012) recommends the development of “policy guidelines for long term protection, development and management of the park or open space area” (Section 3.1.6, Niagara Escarpment Plan, Province of Ontario, 2005). These guidelines should:

- “[S]eek to protect the quality and quantity of the resource...Also...ensuring that hydrologic functions, not only features, are protected” (NEC, 2013)
- “[M]aintain and enhance the quality and character of natural streams and water supplies ” (NEC, 2013)
- “[M]aintain the most natural Escarpment features, stream valleys, wetlands, and related significant natural areas.” (NEC, 2013); and
- “[P]rotect, improve or restore the quality and quantity of water” (Ministry of Municipal Affairs and Housing, 2014)

The Water Resource Assessment includes information from the public, the Cave Springs Steering Committee, the Niagara Escarpment Commission, and NPCA staff. Historical knowledge, or in some cases stories, on topics of interest were included (e.g. the lost treasure cave). This report also addressed and confirmed items of interest expressed by stakeholders.

3.4 CURRENT INFRASTRUCTURE

A NUMBER OF STRUCTURES AND DEVELOPMENT CURRENTLY EXIST ON THE SITE INCLUDING:

An entranceway, which is a single 2.34 metre wide farm gate with a padlock.

An access driveway to the property, which is off of Cave Springs Road. It is approximately 167.64 metres long and 2.43 metres wide and consists of 0.63 centimeters of clear granular stone, and is approximately 2.54 centimeters in depth.

A 30.48 centimeters concrete culvert, which traverses the driveway and is situated approximately 24.99 meters from the Cave Springs Road entrance way.

Networks of trails on the property above, below and transcending the escarpment including the NPCA maintained Cave Springs Trails, unofficial ATV trails and the Bruce Trail Corridor. Most of the maintained trails are in good shape, although not in conformance with the Accessibility for Ontarians with Disabilities Act.

A septic system, which currently is not active or useable. It is a conventional gravity-fed system with an estimated 3,028-litre concrete tank and six rows of septic tile. Each row appears to be approximately 24.38 meters long and made of clay tiles. Clay tiles indicate that the septic system was laid in place prior to 1980.

A septic tile bed, which sits approximately 3.04 meters from the tank and runs east and west in front of the house in the lawn.

A barn dug well that is located on the northwest side of the barn. The well is hand dug, and 4.57 meters deep. It is currently not used, nor is it recommended for use, and is sealed from public access.

An inoperable weigh scale that is recessed into the ground in front of the barn.

A barn that is a two-storey structure approximately 10.66 meters by 7.31 meters and is currently being leased and used for storage.

A main house that is divided into 3 sections: the original Bob Lamont barn, the shed-roofed addition to the south, and the converted trailer to the southwest. The master bedroom is loft-style and located on the top floor. The main house is 4.41 meters by 9.1 meters. The back section, the main entrance, is 2.43 meters by 5.63 meters. Attached to the back entrance is an old shed that was converted into living space that is 4.87 meters by 2.28 meters.

Three small outbuildings including a small wood shed, a peacock/poultry house and a small storage shed have been taken down under an NEC demolition permit and with the permission of the Town of Lincoln Building Department.

Absent on the Site is parking. Vehicles visiting the Site must park in the cul-de-sac outside of the entry gate.

Utilities, including electrical do exist on the Site.

A holding tank for water.

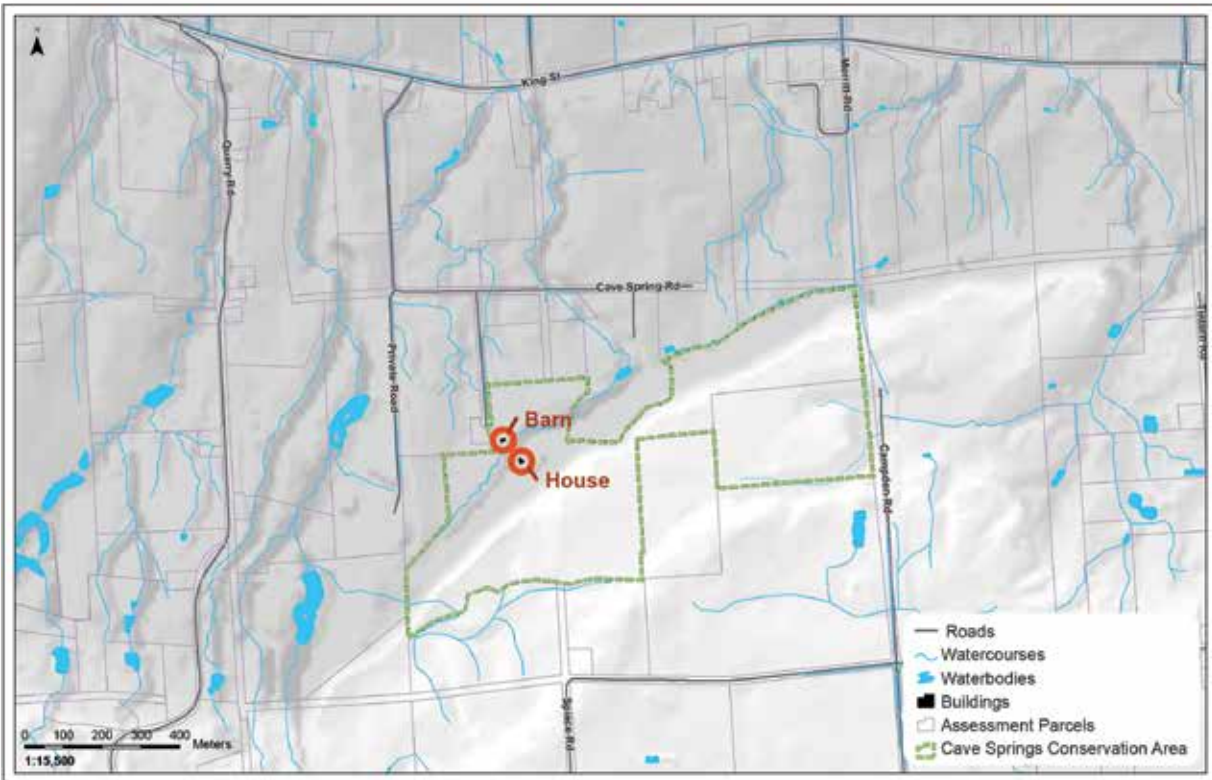


Figure 4: Cave Springs Conservation Area Building Locations

3.5 CURRENT RECREATIONAL USES

Currently, Cave Springs Conservation Area is used for passive recreational activities by the adjacent landowners, the Cave Springs United Church Camp, and the general public, including local and out of town visitors. The 2.3 kilometre Cave Springs Trail includes 1.5 kilometres of the Bruce Trail Corridor. Through the Management Plan process, the NPCA learned that unsanctioned rock climbing and bouldering happen at Cave Springs and that there are 52 climbing routes on the Site. These activities are not currently regulated, approved or monitored by the NPCA. Unofficial ATV and dirt bike trails exist south of the escarpment in the forested area off of Campden Road.

3.6 CURRENT VISITATION

Visitation of the Site varies by season with April through October being the busiest. The current visitation is difficult to determine, as there are no NPCA staff on-site most of the time and therefore no way to record visitors. The NPCA estimates, based on discussions with current users, that there are currently more than 6,000 visitors to the Cave Springs Conservation Area per year. (Table 1: Estimated Annual Visitor Use at Cave Springs Conservation Area)

The adjacent Cave Springs Camp uses the trail system throughout the spring, summer and fall seasons to conduct educational nature walks on a daily basis. Cave Springs Camp estimated that over 2,300 students and teachers use the Site between May and June, and that weekend rentals can account for an additional 15-200 visitors. In July and August, Cave Springs Camp hosts approximately 550 people. In the months of September and October school groups visit the Site and account for approximately 200 students. There are also visitors who rent, which contributes to the overall number of visits.

The Ontario Access Coalition has identified 52 climbing routes on the property with estimated numbers of up to 20 people per week accessing the Site in the spring and fall, and approximately 10 people per week accessing the Site in the summer. Given this estimate, the NPCA anticipates that there are over 375 climbers using the Site per year.

The Niagara Bruce Trail Club estimates that approximately 1,000 visitors each year use the Bruce Trail Corridor. This number includes members of the Niagara Bruce Trail Club, local visitors and visitors from out of town (varying in age) hiking through the Cave Springs Conservation Area.

GROUP	SPRING	SUMMER	FALL	WINTER	TOTALS
Ontario Access Coalition	120	84	120	48	372
Cave Springs Camp	3,100	550	1,000	0	4,650
Niagara Bruce Trail Club	400	300	200	100	1,000
					6,022

Table 1: Estimated Annual Visitor Use at Cave Springs Conservation Area

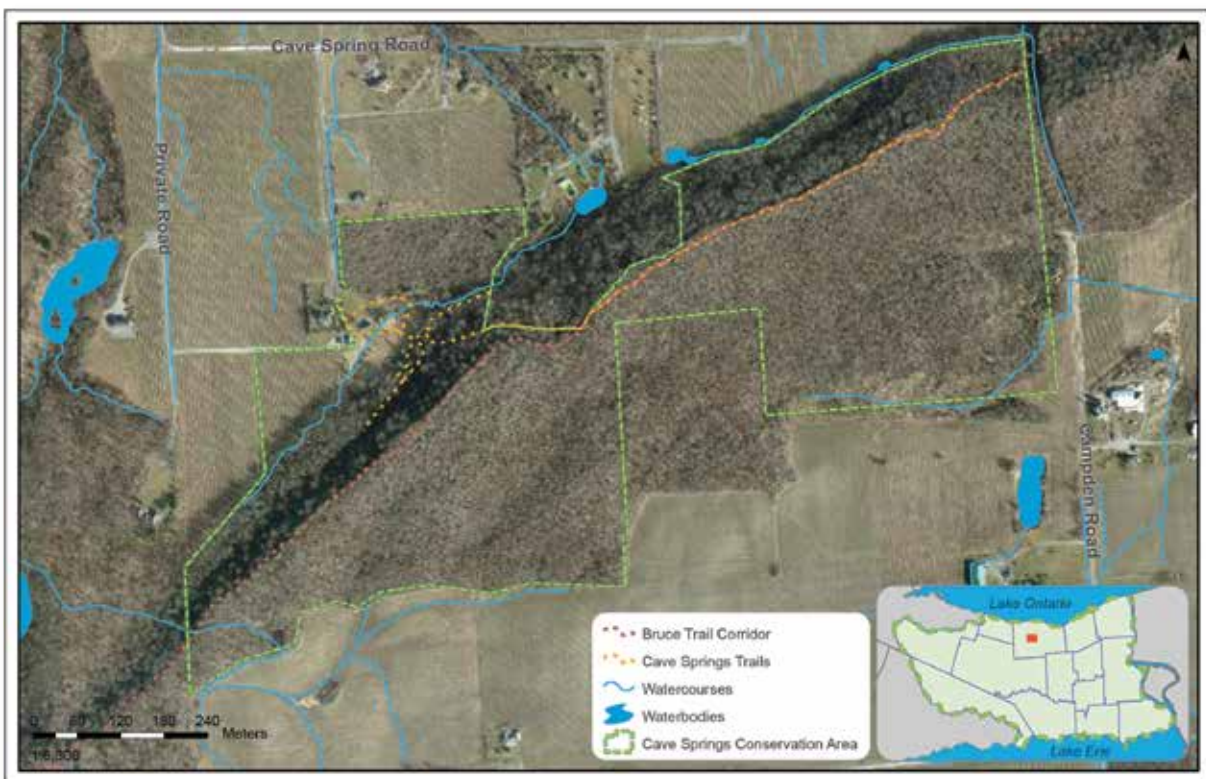


Figure 5: Cave Springs Conservation Area Boundary



4.0

*environmental
considerations and
management issues*

4.0 ENVIRONMENTAL CONSIDERATIONS AND MANAGEMENT ISSUES

4.1 NATURAL HERITAGE FEATURES

The Site's (Figure 5: Cave Springs Conservation Area Boundary) natural heritage features include a portion of the Niagara Escarpment, the Beamsville Escarpment Provincial Life Science Area of Natural and Scientific Interest (ANSI) and the Cave Springs Farm Earth Science ANSI (Figure 6: Cave Springs ANSI and UNESCO Boundaries). Cave Springs has a UNESCO (United Nations Educational, Scientific and Cultural Organization) designation. This designation recognizes the Niagara Escarpment feature internationally as an important ecological area that balances humans and the biosphere

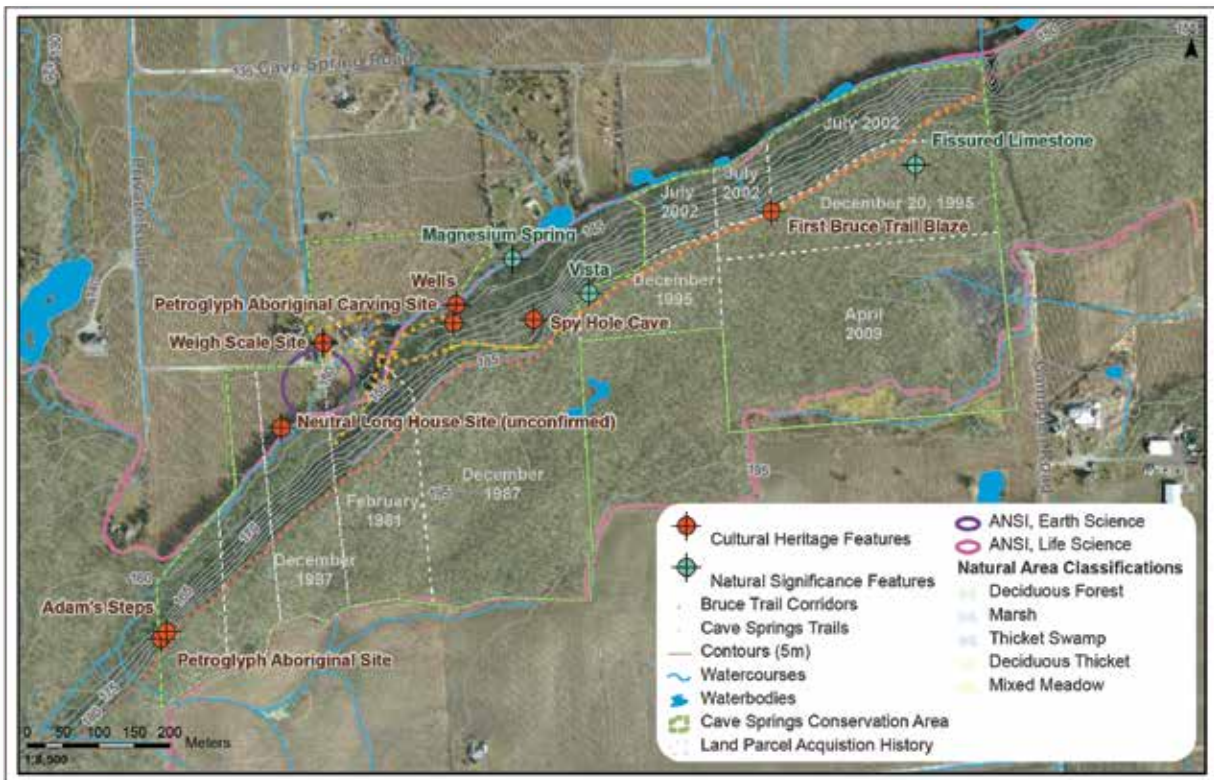


Figure 6: Cave Springs ANSI and UNESCO Boundaries

(i.e. sustainable local economies, community and conservation of terrestrial ecosystems). This area is within the Niagara Escarpment Plan Natural Area and the Niagara Escarpment Plan Protection Area, it is classified as a Natural Heritage System: Potential Corridor and includes an Environmental Conservation Area: Significant Woodland. An intermittent stream that is mapped by the Ministry of Natural Resources and Forestry (MNR) as Type 3: Marginal Fish habitat traverses the Site. The Site contains habitat for a variety of species including Endangered, Threatened and Special

Concern Species. Wildlife habitat can be found throughout the above noted features including interior forest and rare Escarpment Rim habitat.

The 2015 Natural Heritage Study (Appendix A) highlights the Cave Springs Conservation Area as having diverse and unique vegetative communities that support a variety of habitats and species. Its striking compilation ranges from treed, large block talus slopes to rock fissures/grikes. Also contributing to its uniqueness is the Site's escarpment feature consisting of escarpment talus, face and tableland forest.

The Site's life science and geologic features have a provincial and regional designation by the Ontario Ministry of Natural Resources and Forestry, adding to the Site's significance. These include the Provincially Significant Life Science ANSI "Beamsville Escarpment", which identifies diverse vegetative communities and Niagara Escarpment features of plain, rim and cliff, and talus of high provincial representation. Of particular note are the escarpment overhang rubble having produced "some of the most extensive and best large block talus slopes on the Niagara Peninsula" (Jalava et.al. 1992), as well as "some of Niagara's largest exposed grikes/clints" (dolostone exposed and raised blocks (grikes) separated by solution-weathered cracks(clints) (Jalava et.al., 1992)), and a moderate representation of Niagara Escarpment terrace and terrace valley features.

The Regionally Significant Earth Science ANSI "Cave Springs Farm" identifies Lockport caprock crevassing along rock joints, and provide good examples of post-glacial and "perhaps periglacial crevasse development" on the Niagara Escarpment (Cowell, D.W., and Woerns, N., 1976 Earth Science Candidate Nature Reserves in the Niagara Escarpment Planning Area; Ontario Ministry of Natural Resources, Division of Parks, System Planning Section, Park Planning Branch, Environmental Planning Series VII, 2), (Ministry of Natural Resources, Central Region, Parks and Recreation Section, 1983. Regional and Local Earth science Areas of Natural and Scientific Interest In Niagara District).

The Cave Springs Conservation Area is mapped as a Natural Heritage System: Potential Corridor as the corridor supports the movement of wildlife and dispersal of plant material, playing a vital role in maintaining ecosystem health and integrity. This migration corridor also connects other Core Natural Areas.

The area is also mapped as an Environmental Conservation Area: Significant Woodland, which is ecologically important in terms of features such as species composition, age of trees and stand history. This mapping designation is functionally important due to its contribution to the broader landscape because of its location, size, or due to the amount of forest cover in the planning area, or economically important due to site quality, species composition, or past management history.

An intermittent watercourse that traverses the Site is mapped by the Ministry of Natural Resources and Forestry (MNRF) as Type 3: Marginal Fish habitat. Fish habitat includes the spawning grounds and nursery, rearing, food supply, and migration areas, on which fish depend, directly or indirectly, in order to carry out their life processes.

The Site contains habitat for a variety of Species of Concern including Endangered, Threatened and Special Concern Species. Wildlife habitat can be found throughout the above noted features.

4.1.1 NATURAL HERITAGE STUDY PURPOSE

The purpose of the Natural Heritage Study (Appendix A) is to produce a baseline from which the ecological health of the Site can be understood. Plants and animals carrying out any part of their lifecycle as well as their corresponding ecosystems were assessed for their provincial and national significance.

This study identified:

- Significant wildlife habitat areas (breeding, nursery/rearing, forage, hibernation, migration)
- Species at Risk (SAR) and their needs for protection (i.e. habitat etc.)
- Significant plant communities in need of protection/ maintenance
- Resource information necessary for use in decision-making as it pertains to determining best location and types of land use to sustain the resource base

This baseline provides important information for the protection of the Site's unique ecological features. It will be used to achieve the purpose and objectives set out in the Niagara Escarpment Plan (NEP) and NEPOSS as well as the UNESCO World Biosphere Reserve designation based on the *Endangered Species Act*. This baseline information will also be used to challenge the land

classification of Nature Reserve that is currently assigned to the Site in the NEP and propose the classification of Natural Environment.

The findings of the Natural Heritage Study (Appendix A) determined the site-specific protection zones, in accordance with NEPOSS, including the most appropriate areas for programming. These protection zones correspond to the degree of sensitivity of the many ecologies of the Site in conjunction with its hydrology and the existing cultural assets. Using this data, recommendations for ecosystem restoration, environmental maintenance, and monitoring and protection can be established and implemented in conjunction with the implementation of this Plan.

4.1.2 STUDY METHODOLOGY

To accomplish the study purpose, the Natural Heritage Study for Cave Springs Conservation Area involved assessment of the following over a twelve month period:

- Ecological Land Classification
- Vegetative communities/ habitat
- Species At Risk (SAR) (trees, shrubs, groundcover)
- Old Growth/ Snags
- Spring Ephemerals
- Reptiles (snakes and turtles)
- Amphibians (frogs, toads, salamanders)
- Large mammals
- Bird survey (breeding bird, owls, crepuscular, and incidentals)
- Small mammals
- Bats

To maximize the effectiveness of the studies, existing documentation on the Site and surrounding area was reviewed for species and habitat information.

Existing studies, inventories, conservation statements and files, as well as documentation on flora, fauna, ecosystems, soil and Species at Risk were reviewed and study methodologies tailored to the Site for this purpose. This allowed for a thorough and efficient study of the natural heritage of Cave Springs. Throughout the study process, qualified individuals were employed to execute the monitoring tasks.

In combination with these methodologies, each component of the Natural Heritage Study included:

- Identifying habitats to inventory, and accounting for suitable times of day and seasons during which to conduct the observations
- Using appropriate, updated protocols for each category or species.
- Targeting a completion date of 2015, with the exception of the salamander study, which will continue on in order to maximize potential detection of SAR.

4.1.3 NATURAL HERITAGE SITE CHARACTERISTICS

The 2015 four season survey Natural Heritage Study (Appendix A) highlights the Cave Springs Conservation Area as having diverse, unique and sensitive vegetative communities, which support a variety of habitats and species. These communities are composed of treed slopes below the escarpment cliff face that are littered with boulders and include rock fissures found on top of the escarpment. Within a mature tableland woodlot sits an interior forest that hosts many habitat trees. There are meadows, streams and wetlands. These components support combinations of forage, roosts, dens and nests. The overall effect is a well-integrated and balanced ecosystem.

4.1.4 NATURAL HERITAGE STUDIES

VEGETATION SURVEY

In addition to the natural heritage landscape, Cave Springs Conservation Area contains a variety of vegetative communities and unique habitat features making it a quintessential habitat to a variety of flora and fauna.

FINDINGS

The survey of plants was conducted in order to identify Ecological Land Classification types and significance, as well as to identify significant species in need of protection or restoration. To accomplish this, plant inventories were completed at different points in the growing season in order to capture seasonal flora as well as to inventory plants when they were most visible. The studies included:

1. Ecological Land Classification
2. Ephemeral Plant

3. SAR Plant Survey
4. Incidental Observations

Studies of the Ecological Land Classification for Southern Ontario, Ephemeral Plants, and SAR were undertaken to quantify the plant resources of the Site. Surveys producing an inventory of the plant communities were undertaken at various times and seasons to ensure a thorough record of species at the Site.

Throughout the duration of the studies, a total of 198 native plant species were identified on the Site, ten of which qualify as a type of SAR. This is directly related to the rich habitat and biodiversity of species on the Site. In addition, 21 invasive species and ten vegetative communities were recorded.

ECOLOGICAL LAND CLASSIFICATION (ELC)

Ecological Land Classification (ELC) is used to define the geographic limits of certain natural heritage policies. The ELC guides the land use planning process based on ecological factors, which define natural regions. (Ministry of Natural Resources, 2015) The ELC located on the Site were identified as per the “Ecological Land Classification for Southern Ontario First Approximation and Its

Application 1998”, which is used to standardize land unit descriptions and classifications for ecosystem based management in Ontario.

The Cave Springs Site was found to have a total of ten different Ecological Land Classifications (Figure 7: Cave Springs Ecological Land Classification). As a result, the Site habitat is diverse with dense shrub layer, closed canopy and moderate to understory/ground cover, uneven age forest in later successional stages, with a number of snags/cavity trees, and moist, cooler interior forest areas with higher insect diversities, caves/cracks that provide unique and often critical habitat for dependent species such as interior bird species and bats, as well as forage areas, dens and potential hibernacula for a variety of animals. Within these areas, the older more mature trees, mast trees and snags/cavity trees were found in areas with less human disturbance. Other areas of habitat disturbances observed included evidence of rock climbing and site activities along the cliff face and cliff face bottom, lower building activity area, and some unsanctioned ATV/informal trail activity.

AREAS OF NATURAL AND SCIENTIFIC INTEREST

“Areas of Natural and Scientific Interest (ANSIs) are areas of land and water containing unique natural landscapes or features. These features have been scientifically identified as having life

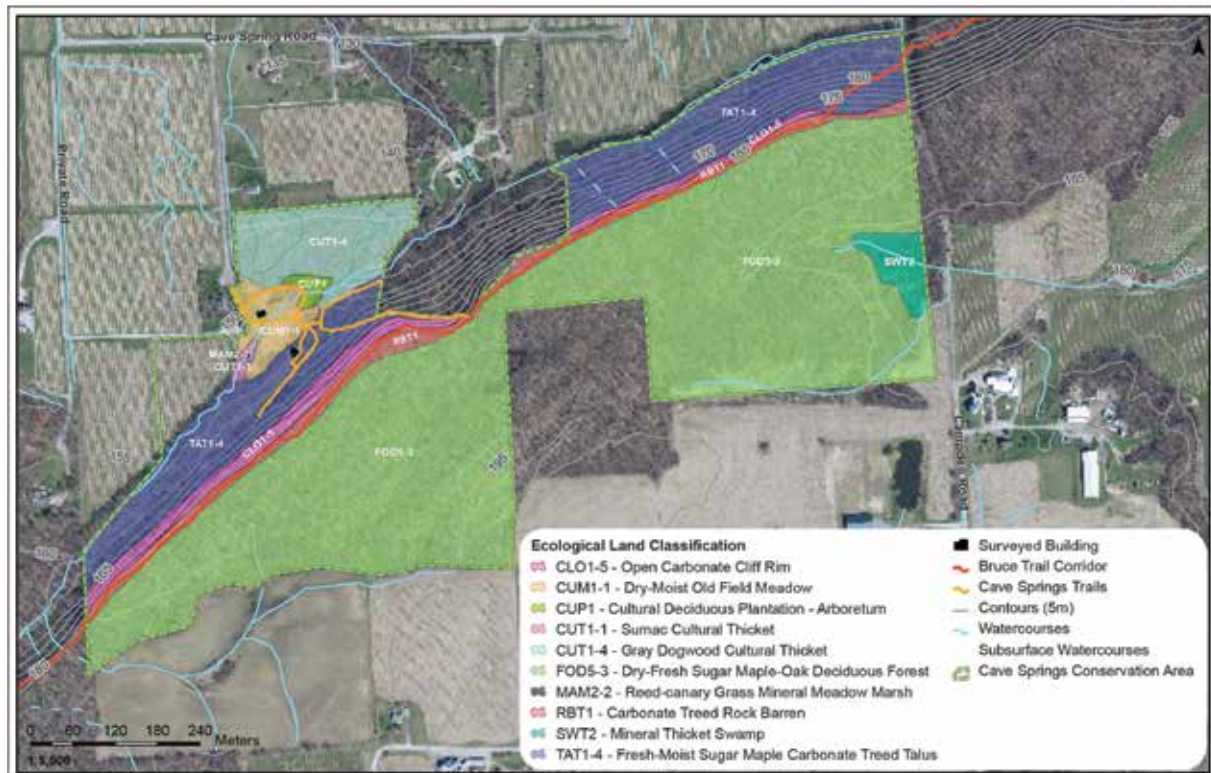


Figure 7: Cave Springs Ecological Land Classification

or earth science values related to protection, scientific study or education.” (MNR 2016)

More than 1,000 ANSIs exist in Ontario. In conjunction with Conservation Authorities, and other government bodies, they are used to conserve significant features. Two types of ANSIs exist:

- Earth Science ANSIs reflect unique geology
- Life Science ANSIs reflect unique biodiversity and natural landscapes

Life science and geologic features that have provincial and regional significance encompass the Site.

The Ontario Ministry of Natural Resources and Forestry has also, as previously indicated, designated two Areas of Natural and Scientific Interest (ANSI), which add to the overall significance of Cave Springs Conservation Area.

Further to these designations, this Site provides rare and healthy habitat components made up of interior forest, a contiguous migratory natural forested corridor and a wide diversity of vegetative communities. Communities of meadow, aquatic stream, marsh, cultural thicket, talus slope, cliff, and escarpment rim exist.

SPECIES AT RISK

Species designated under the legislation of the *Species at Risk Act* (Canada) and *Endangered Species Act* (Ontario) are identified as endangered, threatened or of special concern and require various levels of enhanced protection.

Legislated protection of Species at Risk (SAR) determines the protection required for different species with the goal of preventing wildlife species from being extirpated or becoming extinct. Protection of species at risk and their habitats includes the recovery of species impacted by human activity. Species of special concern are to be prevented from becoming endangered or threatened

No person shall kill, harm, harass, capture or take; possess, collect, buy, sell or trade; or damage or destroy the residence of, an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species. The same also applies under the Species at Risk Act (Canada) if a wildlife species that is not listed federally has been classified as an endangered

species or a threatened species by a provincial or territorial minister, and on federal land in that province or territory.

Ministry of Natural Resources and Forestry, 2016
Endangered Species Act, 2007, S.O. 2007, chapter. 6

A total of ten plant species were observed that fell under the SAR definition. Another two species were unobserved, but have been known to exist based on the historical records of the Site. These species are comprised of the three highest levels of protection required as legislated by the *SAR Act* and *Endangered Species Act*. Acknowledging these findings, there are a number of different species habitats that must be protected to ensure the survival of the various SAR including the trees planted in the Site’s arboretum.

LARGE MAMMAL

Large mammals are a major component of the ecosystem playing an important role as they maintain small mammal populations, modify vegetation structure, alter nutrient pathways and change species composition, and therefore influence ecosystem function and biodiversity.

FINDINGS

To identify the large mammal component of the Cave Springs Conservation Area, a variety of survey methods were used. These methods included:

- A large mammal snow track survey
- A den survey
- A cavity tree/snag survey
- Any incidental observations

As a result of the various survey methodologies, a total of nine species of large mammals were observed, including all historical accounts. Of the nine identified species, two were recognized as domesticated cat and dog. Of the total species identified, there were no endangered, threatened or species of special concern.

BIRDS

Birds are another essential component of the ecosystem, providing various benefits to the ecosystem through methods such as seed dispersal, pollination, insect management, habitat creation for other dwellers, etc. Ideally, supporting a greater number and diversity of bird species will support a more diverse and stable ecosystem.

FINDINGS

The purpose of the bird survey at Cave Springs Conservation Area was to determine the diversity and species of birds present, in addition to any SAR and SAR habitat in need of protection. Three types of Bird Studies were completed at the Site in 2015, including:

- An owl survey
- A crepuscular survey
- A breeding bird survey

The studies resulted in the finding of 46 species of bird.

REPTILES

Snakes comprise the middle-order predator component in the ecosystem. Without them the numbers of prey species would increase to unnatural levels and the predators (birds, etc.) that eat snakes would struggle to find food. Turtles aid seed dispersal, plant and aquatic species population control, nutrient cycling of aquatic systems, and provide food (turtles and eggs) for other species, such as raccoons and coyotes.

FINDINGS

As part of establishing the resource baseline information for the development of the Management Plan, surveys of snake and turtle species were conducted at Cave Springs Conservation Area. These surveys were conducted in order to determine the diversity and presence of snake species, in addition to any SAR and SAR habitat in need of protection. Three different survey methods were used including coverboards, transect searches, and incidental observations resulting in the completion of seven surveys. Turtle species presence at the Site was determined using turtle basking surveys as well as incidental observations resulting in the completion of eight different surveys. Both the snake and the turtle surveys were completed during a wide range of atmospheric conditions.

One species of snake was observed on the Site. Habitat requirements for this species tend to be quite versatile. Historically, another species of snake had also been observed on the Site, but was not found during this study. Similarly, one species of turtle was observed during the study and it is an invasive species. No species of special concern were observed during the study. A historically noted species of special concern was not observed during the study.

AMPHIBIANS

As secondary consumers in many food chains, amphibians provide nutrient cycling, are biological pest controllers (eating both invertebrates and vertebrates), and are a food source for other species in the food chain. They are also indicators of the environment's health due to their dual life forms (aquatic and terrestrial) and the fact that their porous skin has a high degree of sensitivity to environmental changes.

FINDINGS

Four types of surveys were used to assess the species of frogs, toads and salamanders present at the Site. Frog and toad surveys were undertaken using nighttime call monitoring surveys as well as incidental observations culminating in three surveys being completed. Salamanders were monitored through transects (grids), minnow traps in shallow water and incidental observations. Four species of frogs and toads, and five species of salamander were found at the Site. One species of salamander historically observed in the greater area was not observed. Although no SAR were observed, patterns of observed salamanders are indicative of a SAR salamander that was unobserved. As a result further study will be required. Four species of frogs and toads, and 5 species of salamanders were observed. No rare salamanders were found therefore an additional 2 year study is needed to assess presence and absence of any rarer species.

SMALL MAMMALS

Small mammals provide an important food source for snakes, bird/raptors, fox, coyote/other mammals, create habitat for other species, consume and disperse seeds, and maintain plant and insect populations. They are also carriers of diseases and pests, which directly influences population levels of other species.

FINDINGS

A small mammals study was conducted at Cave Springs Conservation Area to inventory the diversity of species, the occurrence of rare species and to determine habitat considerations and/or needed restoration measures for any SAR found. To decrease biases of inventories and improve detectability of species, a variety of inventory methods were used throughout the season including Sherman traps, cavity tree searches, building exit surveys, and incidental observations. The geology of the Site limited the effectiveness of some of the survey typologies requiring an increased dependence on others. This contributes some possibility of bias to the study results. These surveys resulted in the discovery of seven species of small mammal including one species of special concern under COSEWIC. 7 small mammal species were observed at the Site.

BATS

Bats provide high economic value to adjacent farmland and forest industry with the natural removal of insects.

FINDINGS

Species of bat present, including SAR, as well as special Site considerations and management required the study of bats on the Site. These included:

- Bat Acoustic Monitoring
- Interior Building Surveys (daytime)
- Bat Building Exit Surveys (nighttime)
- Incidental Observations

The qualified NPCA Ecologist conducted all surveys. Volunteers also assisted with species existing observation for bat building exit surveys.

Over five species of bats were observed on the Site of which four are endangered and another four are migratory. This uncommon diversity of bat species in Ontario suggests unique and diverse habitats in and around the Site, likely including healthy year round habitat facilitated by hibernation sites. Disturbance during hibernation can be fatal to bats. Elimination or mitigation of disturbances to bat habitat are required on the Site.

4.2 CULTURAL HERITAGE FEATURES (ASI)

4.2.1 HISTORICAL FINDINGS (ASI)

Portions of the following section are taken from the *Cultural Heritage Inventory and Planning Study*, *Cave Springs Conservation Area Management Plan* (Cultural Heritage Study: Appendix B).

The Niagara Peninsula has a cultural history that began approximately 11,000 years ago. At the time of contact with the Europeans, the Niagara Peninsula was populated by the “Neutral Nation”, a term coined by the French, in reference to the fact that this group took no part in the long-term conflicts between the people of the Wendat (Huron) Confederacy of Simcoe County and the Five Nations Iroquois in New York. The Neutral primarily settled along the shore of Lake Ontario between Grimsby and Niagara-on-the-Lake and along Lake Erie. By 1650 the Neutral were involved in a full-scale conflict with the Seneca, who were assisted by the Mohawk, which resulted in the termination of the Neutral occupation of the Niagara Peninsula between the fall of 1650 and the spring of 1651.

European settlement of the Cave Springs Conservation Area began in the late 1780s when the land in the Niagara Peninsula was purchased from the Mississaugas and surveyed into farm lots. These farm lots were first granted to Loyalist families and mainly comprised of the disbanded soldiers from Butler’s Rangers. One building currently on the Site, the brick house, dates from the mid 1880s. Other structures and features on the Site, which include the “quarry” pit and the remnants of a lime kiln, were referred to in documentary sources from the 1870s.

The early period of Loyalist settlement at Cave Springs was quickly superseded by a long period of land ownership by an influx of Mennonite settlers at the turn of the nineteenth century. Mixed agricultural pursuits were carried out at Cave Springs and records show that between 1861 and 1871 there was a wide variety of cereal, root and vegetable crops being grown. The number of large livestock (horses, cattle, sheep and pigs) was recorded in these official returns, although other animals, such as the numbers and type of poultry, were not noted. Fruit production was restricted to apples, pears, plums and grapes. There was no evidence that stone was used for houses, with the exception of it being employed in the construction of cellars and foundations. The first system of spring fed ponds or reservoirs, and piping, date from this second period of occupation.

During the early twentieth century, urban dwellers that wished to have a rural retreat began to buy up property at Cave Springs.

Their lands were managed for them during their absence from the premises by hired help.

Cave Springs entered a period of slow decline from the 1920s until the 1960s. Attempts were made by purchasers such as Louis Lahay to subdivide the Site into smaller units, but the property retained its agrarian character. The land appears to have been primarily used for fruit growing by owners who did not all live on the Site. The United Church developed the neighbouring Cave Springs “Camp” during this period.

Between the 1960s and 1980s, the Cave Springs property attracted buyers who wished to subdivide the Site into smaller parcels of land in order to provide attractive sites for housing.

The 1970s through the 1990s witnessed the development of Cave Springs as a Conservation Area, largely through the efforts of Margaret Reed, the self-proclaimed “Witch of Cave Springs”.

Margaret Reed was born in England in 1918. She moved from Toronto to Cave Springs as an unpaid caretaker. At this time, the buildings had no plumbing or heat. She became the owner of the property in the 1970s and then sold the property to the NPCA in 1981 with the stipulation that she could remain as a tenant on the property until she died. Margaret Reed passed away on August 29th, 2005. She was known for telling school children that she was over 300 years old and that she stayed so young by drinking the magnesium water of the springs on the property. She chased away trespassers and people riding recreational vehicles with passion and determination. Reed felt that it was her moral obligation to preserve the Cave Springs property and that she had been drawn to live there (Reed, 1998). Her fight to preserve the area has been documented in over 250 newspaper articles, video productions and radio broadcasts (Reed, 1998). Reed received the Calypso Orchid Award in 2002 in recognition of her 30 plus years spent passionately protecting the Cave Springs area of the Niagara Escarpment. She spent many years giving tours of the property, educating people about the history of the land and its special ecological value. People tell stories of Reed’s “magic circle” where children would have to be a part of the circle before going on a tour. In her time as an owner and tenant, she wrote six books about Cave Springs, most of which can be found at the local library.

It was due to Reed’s stewardship that the remaining natural and historical features were preserved for future generations, and interpreted for visitors through her popular lectures, series of publications, and walking tours.

4.2.2 ARCHAEOLOGICAL SITES

Portions of the following section are taken from the *Cultural Heritage Inventory and Planning Study, Cave Springs Conservation Area Management Plan* (Cultural Heritage Study: Appendix B).

One archaeological site has been registered within the Conservation Area, and there are reports of several other potential sites, the veracity or location of which cannot be confirmed on the basis of the present evidence, but which should not be discounted (Figure 8: Cultural Heritage Inventory). Moreover, the entire conservation area is generally considered to have potential for the presence of hitherto undocumented archaeological resources.



The registered archaeological site within the study area is at The Adam Steps, which was registered by Ian Kenyon and William Fox, who at the time were Regional Archaeologists with the Ontario Ministry of Culture, as a small number of chert flakes were found eroding from a hiking trail along the base of the escarpment near the extreme southwest corner of the Conservation Area property. This locale had attracted the attention of archaeologists several decades earlier. In 1948, Kenneth Kidd, then of the Royal Ontario Museum, documented carvings of two human heads cut into the face of the escarpment at The Adam Steps, rendered in the round and in frontal view. Another head, reportedly from the Site, was found in a private collection that now apparently resides at the Ontario Museum of Archaeology at the University of Western Ontario. It is unclear how many such carvings were originally present however, Kenyon and Fox found no



Figure 8: Cultural Heritage Inventory

traces at the site, due to the activities of looters. The carvings, which reportedly measured 16-20 centimetres high, have no known counterparts in the archaeological record of Southern Ontario. This has led to some uncertainty as to their age and cultural affiliation, however, it may be noted that the limited documentation available suggests that the heads share many stylistic similarities with human faces found on many Late Woodland ceramic and ground stone “effigy” smoking pipes.

4.2.3 OTHER POTENTIAL ABORIGINAL ARCHAEOLOGICAL SITES

There are reports of two or three other potential Aboriginal archaeological sites within the Cave Springs Conservation Area (Figure 10: Potential Archaeological Sites) lands that are not formally registered within the Ontario Archaeological Sites Database (OASD). The first is a complete Late Woodland ceramic vessel, discovered by accident at the turn of the nineteenth-century by a local farmer in a cave, or fissure, along the face of the escarpment. The specimen, which is now in the collection of the Royal Ontario Museum, is an example of a Lawson Incised/Opposed vessel, a very common ancestral Neutral type circa A.D. 1350-1550. The discovery of the vessel at Cave Springs points to the archaeological potential of the Site.

The second site is a reputed “Neutral long house,” located below the escarpment. The reports of this site are presumably based on collections of Dewitt Fleming (Reed 2001:12) who farmed the property in the 1890s and/or Robert Lamont, who occupied the land during the 1930s and 1940s. The whereabouts of these collections, or precise details of their contents, are not known. Fleming is said to have amassed a collection of “several hundred” artifacts, while Lamont’s hired hand supposedly uncovered a large number of native artifacts when an old apple tree was dynamited in order to clear a site for a new vineyard. The site, if any portion still survives, is likely to be located in the agricultural field(s) north of the escarpment. The date of the site, and its function/character are unknown.

Finally, there is an account of a possible Aboriginal grave, known to the Allen and Ball families, discovered in a “cave”, or wide fissure in the rock, at the brow of the escarpment near the road leading up the mountain (Reed 2001:13). The veracity of this story is unclear, however the burial of individuals in such locations, during the Early Iroquoian period in particular, has been documented elsewhere along the Niagara Escarpment at Winona and at Chedoke Falls in Hamilton (ASI 1989; Spence and Fox 1992). Such practices are also consistent with other Aboriginal beliefs related to



the spiritual significance of specific locales and landscape features along the length of the Niagara Escarpment, such as documented at, for example, Niagara Falls (Revel 1965; Hunter 1985; Fox 2004) and in the Collingwood area (Garraad 2010).

There is also the potential for archaeological resources related to the nineteenth-century use of the lands within the Cave Springs Conservation Authority property. These include the potential remains of the lime kiln established near the base of the escarpment, as well as sites associated with other resource extraction activities related to quarrying, etc.

4.2.4 SURROUNDING STUDY AREA

Two sites have been registered approximately 1.5 kilometres southeast of the Conservation Area. The Stanley site (AgGu-2), a probable sixteenth-century A.D. ancestral “Neutral” village and the Stanley Ossuary (AgGu-1), what is assumed to be the village’s associated cemetery.

Three sites have been registered approximately 1.5 kilometres northwest of the Conservation Area as a result of a 1998 archaeological assessment undertaken for a subdivision development. These include isolated finds of either a Middle Archaic or Early Woodland side-notched projectile point

(AgGu-60), and a Late Archaic Lamoka projectile point (AgGu-61) and the remains of a late nineteenth-century Euro-Canadian farmstead (AgGu-62).

Given the diversity of this inventory, and the general character of the study area, the entire Cave Springs Conservation Area is deemed to exhibit potential for the presence of archaeological resources related to Aboriginal and European occupations and activities.

4.2.5 CULTURAL HERITAGE LANDSCAPES

Portions of the following section are taken from the *Cultural Heritage Inventory and Planning Study, Cave Springs Conservation Area Management Plan* (Cultural Heritage Study: Appendix B).

A minimum of eight cultural heritage landscapes, comprised of combinations of built heritage features and other forms of landmarks or human alterations to the natural landscape serve to shape the conservation area as it exists and is understood today (Figure 9: Cave Springs Cultural Heritage Landscapes).

(ASI Archaeological & Cultural Heritage Service, 2015)

I. REMNANT FARMSTEAD (CHL1)

There are two gambrel barns on the Site, one that is often referred to as the “winery building” was built in the 1930s and was home to Margaret Reed until her death in 2005. The other barn, also built in the 1930s, may rest on the stone foundations of the original homesteading cabin.

Several other outbuildings existed on the Site from the Margaret Reed era for the purpose of housing animals. These buildings were deemed safety hazards and were subsequently demolished in the fall of 2015.

On the adjacent property sits a two-storey brick farmhouse that was originally constructed in the 1880s along with another gambrel outbuilding.

The surrounding agricultural landscape is predominantly used for grape production, however there are several mature apple trees.

II. REMNANT HISTORIC ROADSCAPES (CHL2)

The Site features at least two segments of historical track/roadway that were built or improved by

past property owners. One road travels to the ice cave, while the other leads up the escarpment face and was constructed by Bob Lamont in the 1920s. In the late 1940s an additional road was constructed to access the Cave Springs Camp. Today all three roadways are used as hiking trails.

III. BRUCE TRAIL (CHL3)

Currently, the only official access to the Cave Springs Conservation Area is through the Bruce Trail. The Bruce Trail runs along the escarpment and boasts many scenic views of Lake Ontario. The Bruce Trail is Canada’s oldest and largest marked footpath. It provides the only continuous access to the Niagara Escarpment and spans more than 890 kilometres of main trail and over 400 kilometres of associated trails (brucetrail.org).

In 1962, the first trail marker of what was to become the Bruce Trail was placed on the Cave Springs Site.

IV. SPYHOLE CAVE (CHL4)

The spyhole cave is located in the escarpment face. It was rumored that during the First



Figure 9: Cave Springs Cultural Heritage Landscapes

World War it provided a sanctuary for German spies. The cave is a good example of the folklore that is integral to the Site.

V. THE ADAM STEPS AND THE PETROGLYPH SITE (CHL5)

The Adam Steps is the only registered archaeological site at the Cave Springs Conservation Area. It consists of a series of irregular stone steps and is currently used as a contemporary trail. Indian head carvings existed on the cliff face in this location until their removal by looters. On the rock face west of the steps are a series of expertly carved initials. Some of these carvings may be attributed to local late 19th century stonemasons. Other evidence of early quarrying exists in this area.

VI. PETROGLYPH ABORIGINAL SITE (CHL6)

A 1960s carving of an Aboriginal man wearing a Great Plains style ceremonial headdress acts as a landmark for the trail that leads up the escarpment to connect with the Bruce Trail. There is a step stone with remnants of quarrying marks in close proximity to the carving.

VII. ICE CAVE (CHL7)

Once a natural phenomenon and tourist attraction during the late Victorian Era, the Ice Cave is known for its properties of preserving ice though the summer months. Bob Lamont attempted to expand the Cave by using dynamite, which resulted in a blocked entrance due to a rock fall.

VIII. WELLS AND INFRASTRUCTURE ASSOCIATED WITH WATER COLLECTION (CHL8)

A number of wells and water collecting infrastructure have been identified on the Site. These wells are physically, functionally, and historically linked to the escarpment with many historical references to various property owners collecting water from them.

(ASI Archaeological & Cultural Heritage Service, 2015)



Figure 10: Potential Archaeological Sites

4.2.6 THREATS TO CULTURAL HERITAGE RESOURCES

Cultural Heritage Resources are generally scarce, fragile, and non-renewable. Two major factors pose threats to these resources:

- Cultural and heritage resources can degrade when left to natural forces such as: flooding and erosion of archaeological sites by watercourses, or disturbances and displacements caused by tree growth or burrowing rodent activities
- Human activity, which may also result in adverse effects. Looting and imprudent planning can be highly detrimental to a cultural heritage landscape.

(ASI Archaeological & Cultural Heritage Service, 2015)

4.3 GEOLOGICAL AND WATER RESOURCE FEATURES

The Cave Springs property is both typical, and simultaneously a unique example of the Niagara Escarpment in Southern Ontario (Figure 11: Geological Overview). The escarpment itself is an erosional feature which extends from near Rochester, New York, through southern Ontario to the Bruce Peninsula and then across Manitoulin and St. Joseph Islands and finally into the Door Peninsula of Michigan (Murphy, 2016). It is typical in its abrupt break in the landscape and height above sea level. The uppermost Gasport and Decew formations form a vertical face, which terminates in a scree slope that covers the remaining members of this feature. The steep, north-facing face results from a resistant caprock of the Decew and Gasport Dolostones, which overlay softer Rochester Shales. Erosion of the shale undercuts the dolostone and results in large blocks breaking off due to the effect of gravity. The beds of the Gasport Dolostone are massive while the “Decew” Formation shows thinner beds. There is evidence of continued weathering and erosion of the face in the form of exfoliation and recent minor rock falls. In some spots it is obvious that continued rock falls are imminent.



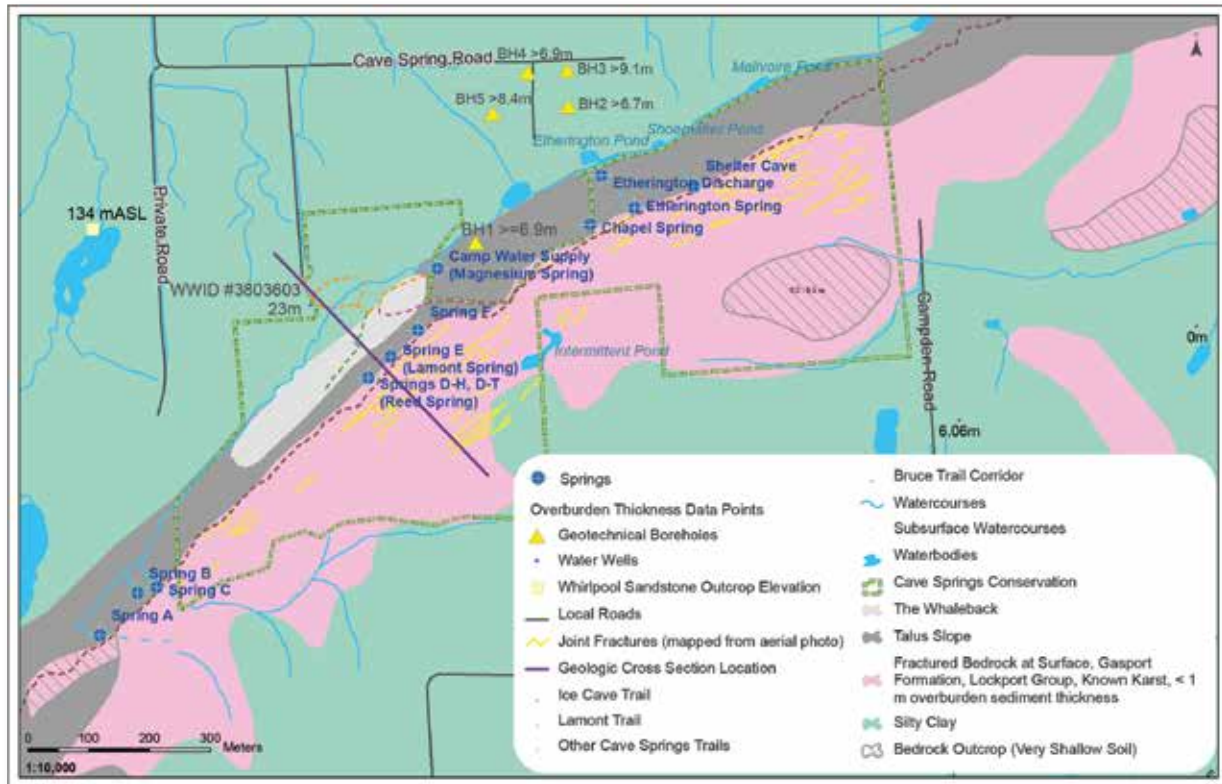


Figure 11: Geological Overview

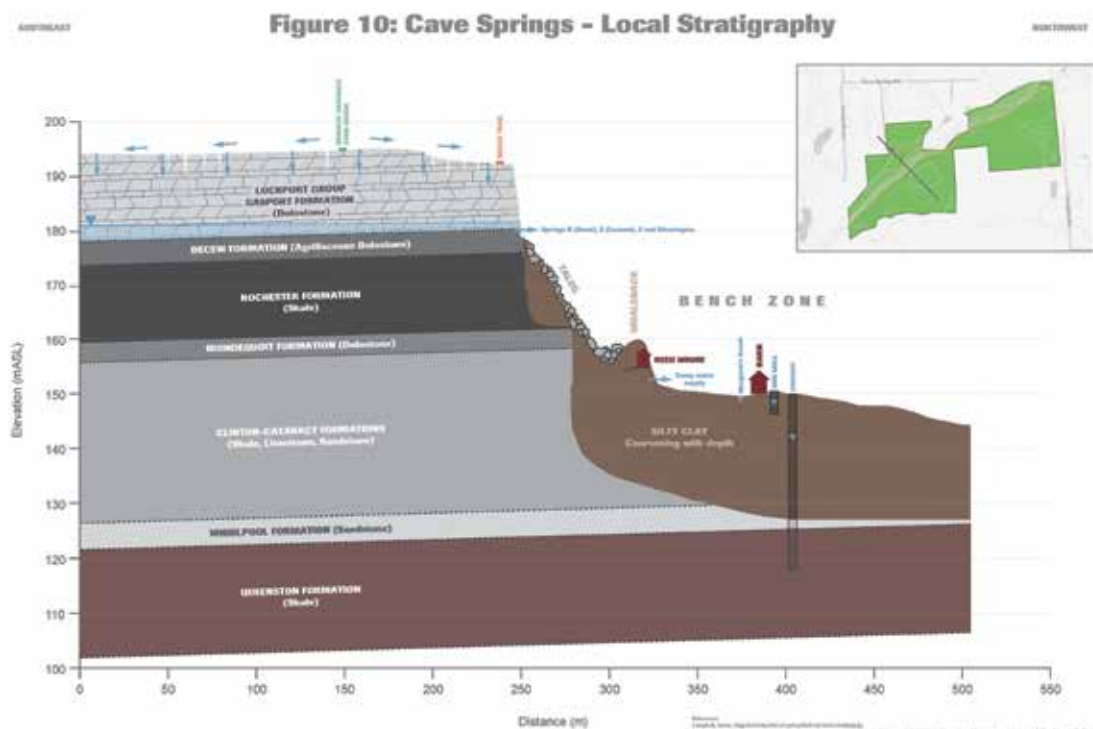


Figure 12: Cave Springs Local Stratigraphy

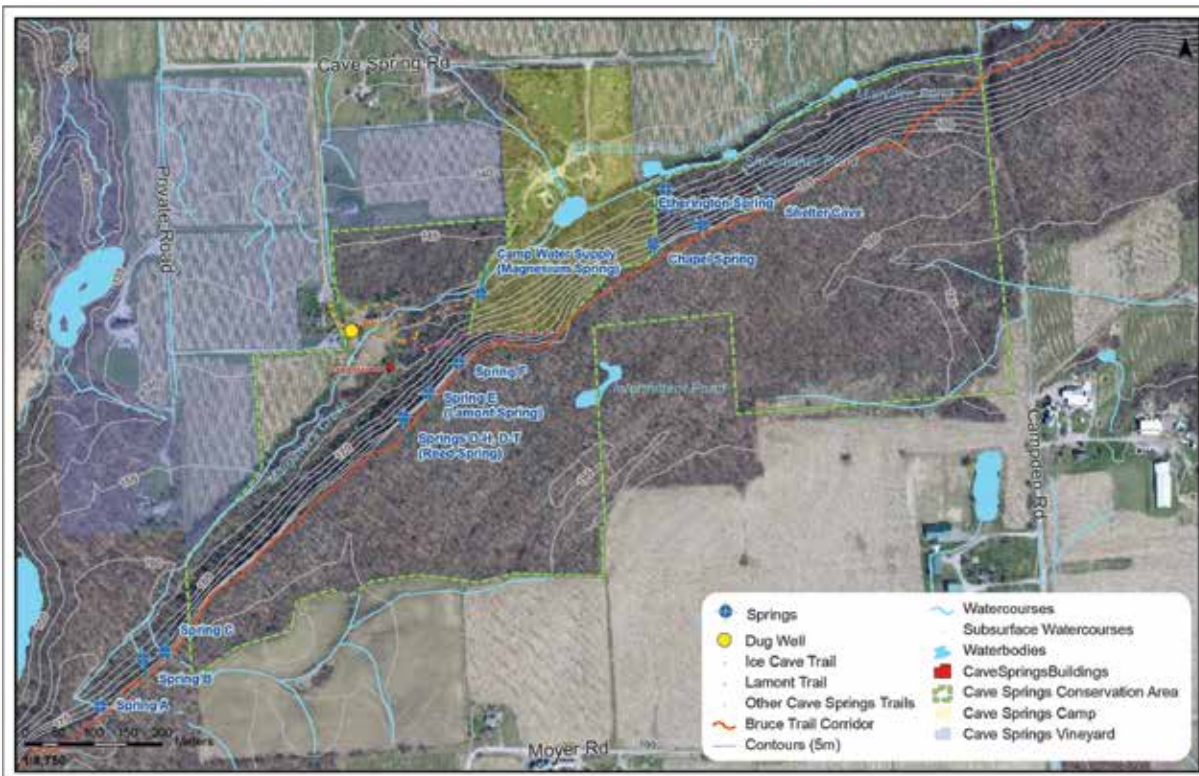


Figure 13: Water Resource Site Layout

The vegetation cover on the talus slope indicates that it has been stable for an extended period of time and has developed a stable angle of repose of about 45 degrees. Some trees are obviously over a hundred years in age. There is neither indication of downslope creep affecting the shape of their trunks, nor is there indication of recent local soil slips (Figure 12: Cave Springs Local Stratigraphy).

Solution weathering has created karst topography on the upper surface along the escarpment crest. Widening up to half a metre of some of the joints extends several metres horizontally and downward into the Gasport Formation. The dissolved calcium magnesium carbonate in the groundwater no doubt gave rise to local names such as the Magnesium Spring. The surface cover of postglacial till deepens southward away from the crest of the escarpment. There is some evidence of ice wedging of dolostone blocks along the crest.

A northwest to southeast trough (the Whaleback) several metres wide extends for a considerable distance near the crest of the escarpment. It is no doubt glacial in origin. Solution weathering of the rocks has removed any indication of striae marks or other physical evidence of the movement of the ice. There was little indication of glacial erratics of igneous or metamorphic origin, but it is assumed

that many of the detached blocks of dolostone were transported short distances by the ice. The groundwater produces several springs at the contact between the Decew Formation and the overlying Gasport Formation Dolostone. Each spring is associated with an intersecting vertical system of cracks called joints in the overlying dolostone on the overlying dolostone. Chemical weathering along the edges of the joints has resulted in wide cracks up to one metre in width developing on the upper surface of the dolostone. This is known as karst topography. Surface water infiltrates these cracks and emerges as springs at the top of the Decew Formation. Several springs occur on the Cave Springs property, and to the west. At these points there is localized erosion of the Decew Formation to produce shallow hollows. There is little indication of redepositing of calcium or aragonite at these points except for the one that was tapped to formerly supply water to the house. At this site there was a redeposit of aragonite to a depth of a few centimetres over about a half square metre on the face. The natural process is for the talus slope to reabsorb the springs and discharge the water again at a lower point.

A footpath climbs the escarpment in a northwest to southeast alignment. There are indications that this footpath follows the course of a former manmade incline up the slope. Today the footpath

is paved with pieces of dolostone up to a half metre in diameter, which form a rough cobbled surface. In the past this was probably covered with earth. Large dolostone blocks up to one metre in width line both sides of the path. Near the base of incline it is obvious that fill was used to modify the slope.

The uniqueness of this Site is found in the western section of the property. Here, immense dolostone blocks form the base of the talus slope, some of which are over ten metres in length and weigh tens of tonnes. It is doubtful that the few thousand years since the last retreat of the glacial ice would suffice for this amount of material to erode from a freshly scoured escarpment face. Many of these blocks must have been buried beneath the ice, having eroded from the escarpment face over a long period. The tumbled nature of the blocks form numerous shallow caves. One of the caves, known as the Ice Cave, was deep enough to shelter a winter's accumulation of ice well into the summer. Unfortunately, the entrance to this cave was destroyed in a dynamite blast and today there is no way to truly identify it. The most likely location is near the extreme west edge of the property.

There is a ridge of material trending east west just to the north of the boulders which at first glance might appear to be a roadway to the ice cave, called a Whaleback. However, numerous large blocks protruding from its sides would indicate that it is a postglacial feature.

The boulder talus slope described here eventually transitions into a feature of mixed materials and vegetation more characteristic of the escarpment as one moves eastward.

The area where the house, barn and other structures are located is part of the Lake Iroquois Bench. An intermittent stream, Margaret's Creek, originates on this surface and drains eastward, down-cutting into the deposits of the bench (Figure 13: Water Resource Site Layout).

4.4 NATURAL HERITAGE CONSIDERATIONS

Below are the recommendations that have emerged from the background reports. Collectively, they comprise the foundational information that informs the development proposals put forth within this Plan (Figure 14: Cave Springs EPA layers and Figure 15: Cave Springs ECA layers).

NATURAL HERITAGE RECOMMENDATIONS

Plant inventories of the Site highlighted some sensitive species in threat of higher losses and require protection to assist in recovering the species and help prevent risks of extinction and further biodiversity loss. In light of such protection, the following is recommended for incorporation into any Site plans, activity or management:

- Two of the Ecological Land Classification(s) (ELC) are considered provincially significant and therefore require protection. Protection of provincially rare ELC classes of CLO1-5 Open Carbonate Cliff Rim Type (S2 rank) and TAT 1-4 Sugar Maple Moist Treed Limestone Talus Type (S3 rank) due to their rarity and unique habitat contributions for a number of habitat dependent species. Maintaining the integrity and function of these vegetative communities is important for birds and potential bat and snake habitats.
- All S1, S2, endangered, threatened Species at Risk (SAR) and their habitats should be protected, with no cutting, soil/root disturbance within the dripline, and no alteration of hydrology or shading/sun affect the area habitat site conditions.
- All S3, special concern should receive the same level of protection/consideration to help prevent the species from becoming more threatened.
- The forest should be maintained from further loss/fragmentation, and augmentation with additional plantings at the edge, where possible, to support the interior forest and its dependent species.
- Should activities be considered, surveys with safety equipment should be conducted on those areas to evaluate suitable/potential impacts related to existing vegetation.
- The ecosystems on the cliff face of the escarpment could not be accessed for these surveys and will require further study before activities would be allowed.
- Invasive plant species are to be addressed on a case-by-case basis. Removal of any invasive plants will be required where they are affecting the survival of a Species at Risk plant or animal.

Habitat areas should be considered in any Site development to ensure a maintained healthy ecosystem. To achieve this, the following is suggested:

- Maintain the west and east sections of the Site as no activity/disturbance zones to ensure continuity of the present species and their role on the Site.
- Maintain the snags/cavity trees. Continue no forest harvest practices to maintain an old growth, mature forest with continual snag and cavity tree replenishment to provide wildlife shelter, in addition to food source for mature mast producing trees.
- Maintain the observed turkey vulture roost, west of the house. As turkey vultures maintain fidelity to their roosts, passing such sites from generation to generation, this habitat feature should ideally be considered for protection from any Site activity.
- Year-round habitation was observed for some species requiring forest management practices to be minimal to limit impacts. Domestic cats and dogs could be impacting the natural predation cycles. It is recommended that pets be leashed and that signage be posted.
- Consideration of critical habitat needs of birds in all Site development and activities is recommended. Specifically, nesting areas should be protected from disturbance while food and forage areas are maintained.
- Maintain the CUT 1-4 Gray dogwood thicket and TAT1-4 talus slopes for critical habitat of the Wood thrush, Hooded Warbler and Eastern Wood Pewee, all preferring shrubby denser, interior forest areas. In addition, potential nesting areas of CLO 1-5 Open Carbonate Cliff Rim and RBT1 Carbonate Treed Rock Barren vegetative communities should be protected from disturbance, and the continuance of the CUM 1-1 Dry-Moist Old Field Meadow; CUT 1-1 Sumac Cultural Thicket and MAM 2-2 Reed-canary Grass Mineral Meadow Marsh communities should ideally be maintained as a forage/food source area. This is consistent with other species needs, such as bats, at the Site.
- Forests should not be managed in critical habitat zones of birds to protect mature trees and canopy openings.
- Maintain no forest cutting practices at the Site to ensure older growth forest and continuance

of cavity and snag trees, as diameter-limit tree harvesting, development for housing or agricultural purposes, and other activities that are detrimental to the retention of mature trees and canopy openings in critical habitat locations. These activities destroy Hooded Warbler critical habitat, which consists of mature trees, contiguous forest and small canopy gaps. Additionally, such practices can increase brood parasitism and nest predation rates. (Environment Canada 2012)

- Maintain contiguous forest and no further fragmentation to support interior forest dwelling species (such as SAR birds species).
- Encourage integrated pest management and environmentally benign pesticides at the Site to support food sources for the avian species, as well as other species.
- Ensure any new activities maintain existing water and moisture regimes in the woodlands.
- Activities that alter watercourses or encourage erosion and compaction of soil should be avoided, such as the use of motorized vehicles (e.g., snowmobiles, all-terrain vehicles), in critical habitat areas as they can result in the destruction of critical habitat by introducing invasive species and destroying the native understory required by the species.

Maintaining potential habitat for existing species is recommended to accommodate the life cycles of the native species. Much of the necessary protections are covered under other recommendations of the study as follows:

- An additional two years of salamander surveys, until 2017, are required to confirm whether the unobserved SAR inhabits the Site. Protection of identified habitat requires the continuity of these ecosystems and should not be disturbed by Site activities.
- While the garter snake is a common species, the protection of the marsh pond near the barn/house and the meadow community should be considered in order to maintain the only snake community observed. Protecting the pond and meadow community will also ensure that the historically observed Eastern Milksnake would be protected as well. This area contributes significantly to other species via insects and food sources for the bats and SAR, aerial insectivores of birds (Common Nighthawk- SAR). Providing food sources

for the birds and other species is part of the interconnection of a healthy food chain.

- Protect the marsh community at the end of Campden Road, ensure continuity and no activity or disturbance, or area activities which would alter its hydrological connections. This area provides diversity of vegetative community in the area, is a long-term water source, and has linkages and habitat for a variety of species. This area could also be a breeding habitat for rarer species should the Jefferson Salamander be detected to exist at the Site. Protection of the vegetative community would therefore ensure continuance of other species as well as be proactive in probable habitat protection of the Jefferson salamander.
- Protect the lower area marsh/stream, maintaining their location and vegetative buffer, as this area provides a diverse component to the area landscape with essential food sources for area bats and SAR, as well as the snake community. Its related food contribution to other components of the food chain is also importantly interconnected as a field/meadow vegetative buffer and habitat for the small mammals, which supply food for snakes and large mammals.
- Maintain snag trees and undisturbed forests for mature stands/ maintained and continual snags/cavity trees, and contiguous forest with no fragmentations. As a guide, a density of 6.5-9 trees with cavities per hectare is recommended for Southern Flying Squirrel habitat (Steinhoff, 2012).

Any reconstruction or activity proposed for the Site barn should allow consideration for the Flying Squirrel and should not take place during parturition time (April through August), or during winter (less active time/topor) when there can be large aggregations for thermal regulation. (Environment Canada 2012). There should be no activity during winter months (November through April) if Southern Flying Squirrels are present in the barn. Also, if present, several Flying Squirrel cavity boxes should be established near the barn one year in advance of any barn activity in order to allow the squirrels to familiarize themselves with the boxes, which would promote them possibly selecting the boxes during any building activity.

Special consideration of the bat species is noted for incorporation in the Management Plan. These include components of hibernacula, forage and maternity, and seasonal roosts. Without further research, it is to be assumed that bat habitats

are present and should be preserved. Additional research should be considered. Site-specific policies should be adopted regarding the protection of the bat populations during the development and subsequent activities at the Site. These policies are outlined in the Natural Heritage Study (Appendix A). The following policies are recommended:

Preserve/Refuge

- The Site's rock face, talus and fissures above (east to mid property) should be protected as potential hibernacula for SAR and other bat species
- The high density snag area (west upper escarpment) should be protected from disturbance (forest stage disturbance/ cutting and human disturbances)
- Alternatively, additional research using several more acoustic monitors in other areas of the Site could be used to determine hibernacula presence in one year
- Consider the protection of areas 300 metres from the forest edge from high use and noise during the spring, summer and fall. These areas are used as roosts by the Eastern Red Bats. This area will be simultaneously covered within interior forest recommendations for bird species.

Site policies should also be included to protect the SAR bats at the Site:

- **Protect Riparian Areas Along The Existing Site Stream and Wetland:** Provide limited and diverse forage/feeding areas for bats. Maintain meadows to encourage insect population/ forage base diversity.
- **Protect Snags (Dead and Dying Trees Standing):** Maintain the northwest corner above the escarpment for roosting and maternity roost areas of the Northern Long-Eared bat roosts, Big Brown bat, and Silver Haired bats.
- **Protect and Encourage Old Growth Trees:** Through no forest harvesting, and with cutting only permitted for hazard trees. Forest stage is important, with older forest stages having greater bat species diversity. This will ensure long term supply of larger diameter trees and snags for wildlife.
- **Protection of Marginal Hibernacula:** Marginal hibernacula should be protected in case primary habitat elsewhere is lost.

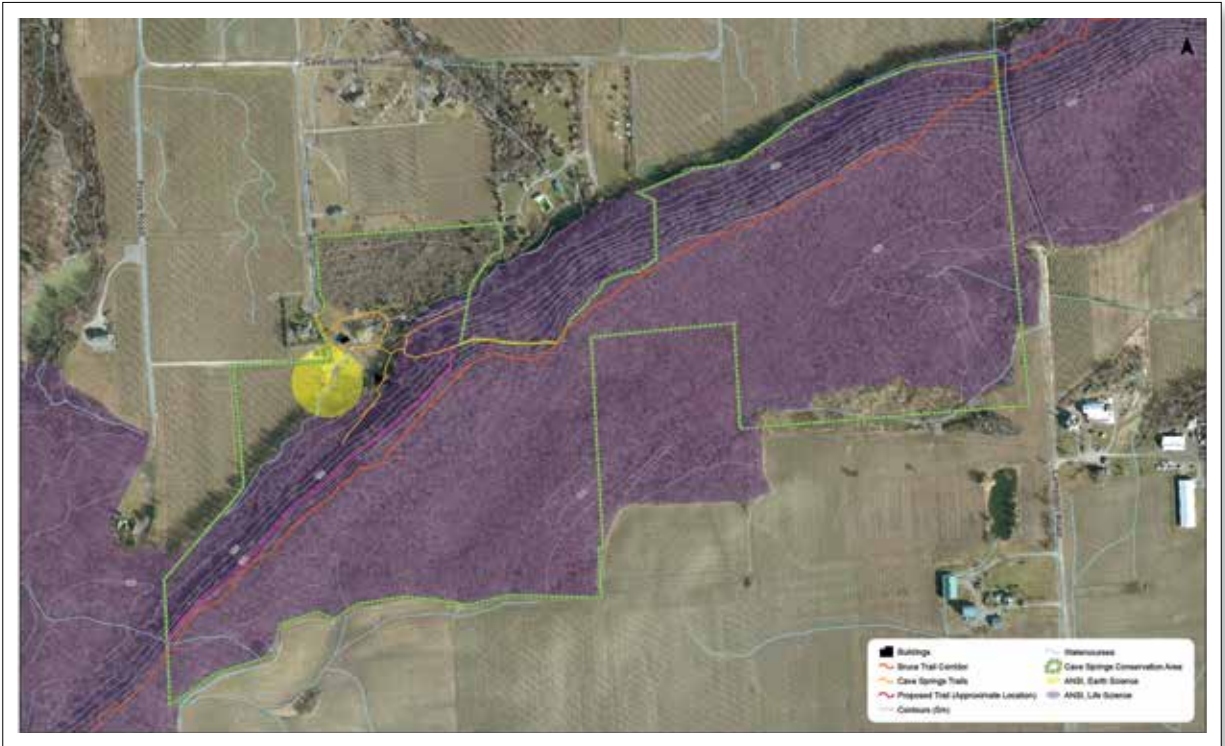


Figure 14: Cave Springs EPA layers

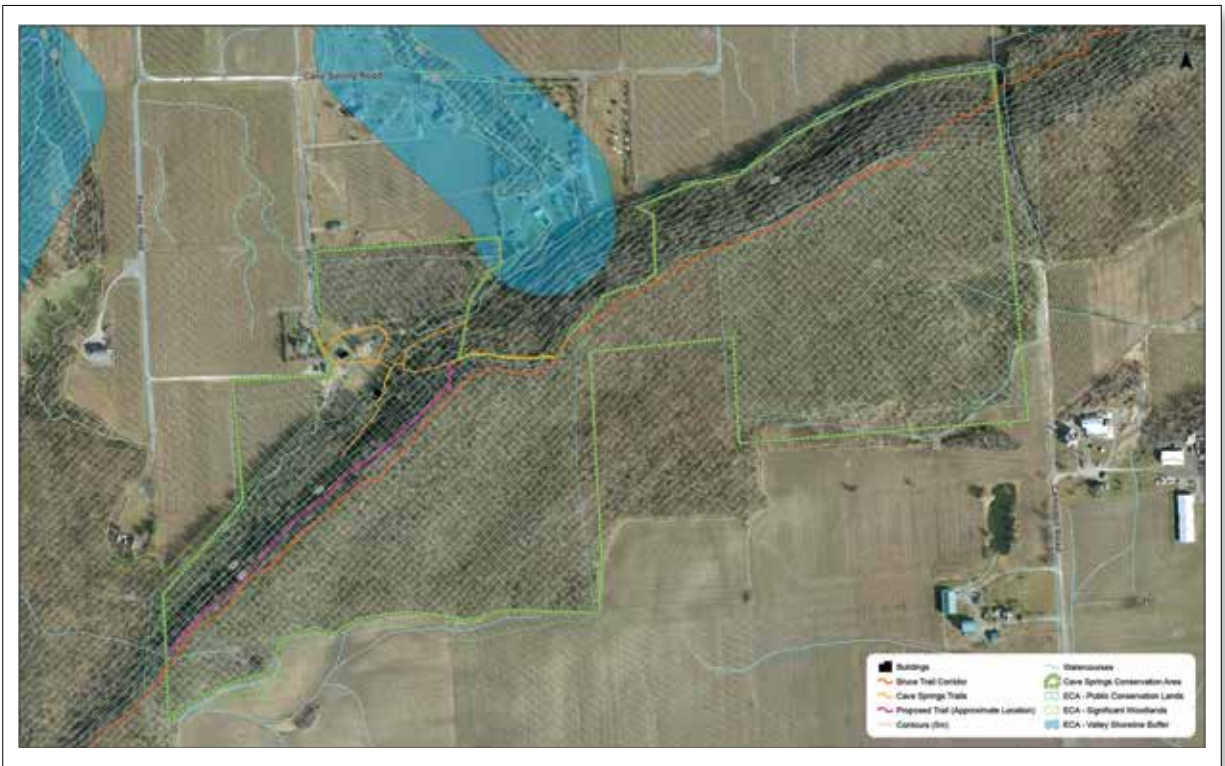


Figure 15: Cave Springs ECA layers

- **Do Not Disturb Hibernating Bats:** No entry of caves.
- **No Use of Pesticides in Area:** Pesticides can enter a bat's system through their insect diet.
- **No Gates on Cave Openings:** Gates can change airflows and internal temperatures. A few degrees can make the hibernacula unsuitable for hibernating bats.
- **Install Bat Boxes for Lost Buildings Times (for little and brown bats):** Dead and dying trees are usually not left standing, so trees suitable for roosting may be in short supply and bat boxes may provide additional roost sites. Bat boxes are especially needed between April and August when females look for safe and quiet places to give birth and raise their pups.
- **No Gear/Equipment Which Has Previously Been Used in A Cave Infected With 'White Nosed Syndrome' Fungus (*Geomyces destructans* (G.d.)).** Discovered in New York in 2007, White Nosed Syndrome spread through northeastern, mid-Atlantic, and Midwest states and eastern Canada. It continues to threaten bat populations across the continent.

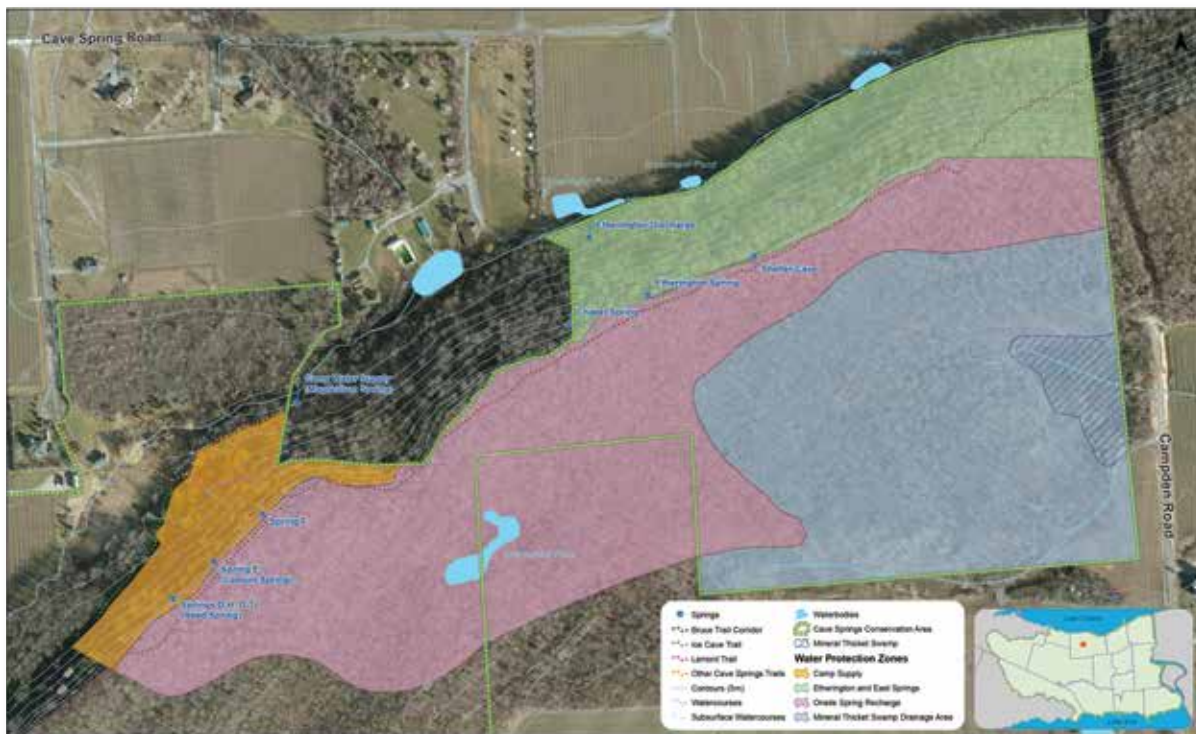
4.5 CULTURAL HERITAGE CONSIDERATIONS

The following general planning and managements policies are recommendations for known and potential archaeological sites at Cave Spring Conservation Area:

- Recognize the fragile nature of archaeological sites and enhance opportunities for their protection and management.
- Preservation must be recognized as the preferred option for mitigation if any archaeological assessment conducted in advance of any land disturbing activities associated with the development or maintenance of Cave Springs Conservation Area results in the documentation of a significant archaeological resource. Preservation may involve long-term protective measures such as project design changes (site avoidance). To further avoid both accidental impact and intentional vandalism and looting, additional protective measures may be required. Stabilization may be required in the case of eroding archaeological deposits.
- Where preservation of a significant archaeological site is not feasible, it must

be salvaged, excavated and documentation must be conducted according to the requirements of the Ministry of Tourism, Culture, and Sport's Standards and Guidelines for Consultant Archaeologists and, in appropriate circumstances, engagement with relevant First Nations as required by the Ministry's Draft Technical Bulletin on Engaging Aboriginal Communities in Archaeology.

- All identified cultural heritage resources associated with the Cave Springs Conservation Area should be retained in situ. In particular, the existing buildings and cultural heritage landscape features identified should be preserved. It is the intent of this Plan to enhance opportunities for protection and management of cultural heritage resources.
- Performance of a heritage impact assessment should precede any land disturbing activities associated with the development or maintenance of Cave Springs Conservation Area within or adjacent to an identified cultural heritage feature and be conducted according to the requirements of the Ministry of Tourism, Culture and Sport's Heritage Tool Kit.
- Every effort should be made to ensure that the significance and character of the Cave Springs Conservation Area is protected and conserved in the long term through informed management. The goal is to retain the identified heritage values, attributes and integrity of the resource in any future use, alteration, repair or development.
- The developed policies will satisfy conservation objectives as proposed by Parks Canada's Standards and Guidelines for the Conservation of Historic Places in Canada and the Ministry of Culture's Eight Guiding Principles in the Conservation of Built Heritage Properties should be adopted.
- Where conservation of the cultural heritage resources identified within the Cave Springs Conservation Area is not feasible, the resource must first be considered for relocation to an appropriate site for reuse through the development and implementation of a relocation plan. Where this option is not feasible, the resource must be documented and salvaged in accordance with provincial standards. For identified built heritage resources, consideration should be given to maintaining or selecting an appropriate and sustainable use that is compatible with its heritage value.



4.6 LITERATURE AND FOLKLORE RECOMMENDATIONS

In keeping with the mystique of Cave Springs and its legacy of oral storytelling it is recommended that programming incorporate this tradition through guided walks, storytelling around a campfire and story making.

Educational programming should be developed in a manner that embraces the natural, cultural and intangible elements present throughout the Site.

The Site has inspired many creative expressions, such as carvings and paintings, and so it is recommended that opportunity for artistic expression is promoted.

4.7 WATER RESOURCES CONSIDERATIONS

Key hydrologic features, which should not be negatively impacted (quantity or quality), include the Cave Springs Camp Water Supply, the Escarpment Springs (D-Reed, E-Lamont and F), Etherington Spring/Pond and Shoemaker Pond. Future design options should be evaluated with respect to protection of this water.

The water protection zones are most vulnerable to impact (Figure 16: Water Protection Zones). The on-site Spring Recharge zone is vulnerable to both quantity and quality impacts. The Camp Supply, Etherington and East Springs zones are vulnerable to quality impacts. The Mineral Thicket Swamp Drainage Area is vulnerable to quantity impacts, and potentially to quality impacts.

Margaret's Creek is an intermittent stream sustained by offsite contact springs influenced by up-gradient agricultural land uses. Any future private sewage system design should prevent impacts to the creek (NEC Policy 2.6(2)). A water monitoring program of Margaret's Creek and the Camp Water Supply is also recommended if a private sewage system is reestablished. Monitoring would include flow, bacteriological, general chemistry, nutrient and field parameters at SW-DP1, SW-DP2, SW-DP3 and the Camp Water Supply. Three times a year monitoring (spring, summer, fall) should begin at least a year before initiation of the system to develop baseline criteria, and continue for five years following system establishment, at which time the program should be reevaluated. It is also recommended that a sample

from the Camp Water Supply be tested for nitrogen isotopes to determine the source of the nitrate.

The Reed Spring (D-T/D-H) is a potential source of potable water for users of the former Reed home. The spring will require a GUDI level of treatment and approval by Niagara Region Public Health. If the spring is put into use as a potable supply, signage on the Bruce Trail is recommended that educate the public they are in a “Spring Drinking Water Protection Zone”.

Any works on, at, or immediately below the escarpment brow should be governed by a geotechnical assessment of the escarpment stability. This should be done in consultation with the local rock climbing association and Bruce Trail Conservancy.

A geomorphic assessment should be completed of Margaret’s Creek for design input into restoration efforts along the creek. This would also include collection of crest-gauge flow measurements to inform future re-design of the access road and culvert for Margaret’s Creek.

Cave Springs Conservation Area is one of the better examples of karst processes in the Niagara Region. Future work at the Site could include an inventory of karst features to improve the hydrogeological understanding and inform potential hibernacula.

The barn dug well should be decommissioned by a water well contractor licensed in the province of Ontario as it is a vulnerable groundwater supply.

4.8 INFRASTRUCTURE CONSIDERATIONS

In order to accommodate future development, the driveway will need to be upgraded and widened. Subject to approval, a new parking area will need to be set off from the main arterial with its own entranceway and signage.

A new entranceway leading into the new parking area is recommended as a site improvement feature.

Any overgrowth will need to be cut back on either side of the trails. The trails should be widened and capped with gravel. With increased traffic, regular inspection and maintenance will be necessary to ensure the safety of the trails.



Cave Springs Masterplan | Entrance Concept
October 2016 Prepared by Sun Harbour Studio



Cave Springs Masterplan | House Concept
October 2016 Prepared by Sun Harbour Studio



A new septic system will need to be installed, in keeping with Section 8 of the Building Code, once permits are attained from the Niagara Escarpment Commission as well as the Niagara Regional Public Health Department. A conventional septic system can be installed, however it would require a raised tile bed, which is often unaesthetic. This Plan recommends using the sustainable technology of a constructed biofilter system to deal with sewage. A constructed biofilter system incorporates plant material and mimics natural filtering processes to cleanse wastewater. This septic system would be capable of servicing all proposed facilities with an estimated peak usage of 5,000 litres per day.

A thorough water quality assessment will be required in accordance with the Niagara Region Public Health Department for a new potable water system.

Clean up and removal of the existing heating and cooling system will be required and a new system will be necessary.

Repair of the foundation, and replacement of the barn roof, are required to allow for the future use of this structure.

It is recommended that the Margaret Reed house be deconstructed. The Niagara Escarpment Development Control area is the area covered by the Niagara Escarpment Plan.

Furthermore, proposals for development within approved/endorsed Management Plans may be exempted from development control.

The cumulative information collected in order to make these recommendations has reinforced the significance of the natural heritage features of the Site as well as revealed an existing significance of the cultural heritage features. The classification, development zones and specific development proposals draw on the fastidiousness of these recommendations to accommodate the requirements of the NPCA and NEPOSS in the most thorough and sustainable manner possible.





5.0

management policies



5.0 MANAGEMENT POLICIES

5.1 NEPOSS CURRENT AND PROPOSED CLASSIFICATION

NIAGARA ESCARPMENT PLAN

The *Niagara Escarpment Planning and Development Act* established a planning process to ensure that areas within its jurisdiction would be protected. From this emerged the Niagara Escarpment Plan (NEP), which serves as a framework of objectives and policies to strike a balance between development, preservation and enjoyment of this important resource. The NEP is the principal provincial planning document to which the Cave Springs Conservation Area Management Plan must conform.

Cave Springs Conservation Area is designated as an Escarpment Natural Area and an Escarpment Protection Area within the NEP. For each of its land use designations, the Niagara Escarpment Plan outlines the objectives, permitted uses, and policies.

ESCARPMENT NATURAL AREAS

Included within this designation are Niagara Escarpment features, which are in a relatively natural and undisturbed state.

The three main objectives of these areas are:

1. To maintain the most natural escarpment features, stream valleys, wetlands and related significant natural areas and associated cultural heritage features.
2. To encourage compatible recreation, conservation and educational activities.
3. To maintain and enhance the landscape quality of escarpment features.

(NEP Policy 1.3).

Within this designation, non-intrusive recreational uses are permitted, such as nature viewing and trail activities (except motorized vehicle trails or the use of motorized trail vehicles), archaeological activities, un-serviced camping sites and other trail-related construction (i.e. bridges, boardwalks) necessary for the use of the Bruce Trail. Further, other uses permitted in Park or Open Space Master/Management Plans that are not in conflict with the NEP are also permitted.

ESCARPMENT PROTECTION AREAS

Included within this designation are escarpment features that have been significantly modified by land use activities such as agricultural or residential development; lands needed to buffer Escarpment Natural Areas; and natural areas of Regional Significance.

The main objectives of these areas are:

1. To maintain and enhance the open landscape character of escarpment features.
2. To provide a buffer to prominent escarpment features.
3. To maintain natural areas of regional significance and cultural heritage features.
4. To encourage agriculture, forestry, and recreation.

(NEP Policy 1.4)

Within this designation, recreational uses oriented towards lands which require minimal modification of the existing natural, topographic and landscape features and which do not require the building of major structures (i.e. picnic sites, day use sites, unserviced camp sites, trails) as well as archaeological activities are permitted. Also permitted are any Bruce Trail related constructions that are necessary for the use of the Bruce Trail. Other uses are permitted in Park or Open Space Master/Management Plans provided they are not in conflict with the NEP.

HERITAGE

In addition to the importance of the natural and agricultural features of this Site there are many significant heritage features such as the petroglyphs, archaeological potential, and the folklore surrounding the Site. Section 2.12 of the NEP sets out policies for heritage with the “objective to inventory, interpret, evaluate, maintain and conserve the cultural heritage features of the Niagara Escarpment Plan Area”. Policies relevant to the Site include the following:

1. Care should be taken to discover unknown, and to preserve known, archaeological sites (especially native burial sites) and areas where such sites might reasonably be expected to exist.
2. Existing heritage features: areas and properties should be retained and re-used. To determine whether such actions are feasible,

consideration shall be given to both economic and social benefits, as well as costs.

3. New development, including reconstruction, alterations and consideration of a second dwelling under Part 2.2.7.b) should be in harmony with the area’s character and the existing heritage features and building(s) in general mass, height and setback, and in the treatment of architectural details, especially on building facades.
4. Where new development involves a heritage feature, it should express the feature in some way. This may include one or more of the following:
 - Preservation and display of fragments of the former building’s features and landscaping
 - Marking the traces of former locations, shapes and circulation lines
 - Displaying graphic verbal descriptions of the former use
 - Reflection of the former architecture and use in the new development
5. Where development will destroy, or significantly alter, cultural landscapes or heritage features, actions should be taken to salvage information on the features being lost. Such actions could include archaeological salvage and excavation, and the recording of buildings or structures through measured drawings or photogrammetry, or their physical removal to a different location.

An inventory and an analysis and assessment of the inventory of cultural heritage features of the property are an integral part of the Management Plan. The NEPOSS Planning Manual lists the following as examples of cultural heritage features:

Archaeological resources which may include:

- Indigenous settlers
- Indigenous people’s farming societies
- Places with ceremonial or cultural significance
- Indigenous people’s burial, hunting and gathering areas
- Cultural landscapes
- Built Heritage Resources
- Industrial and domestic heritage structures

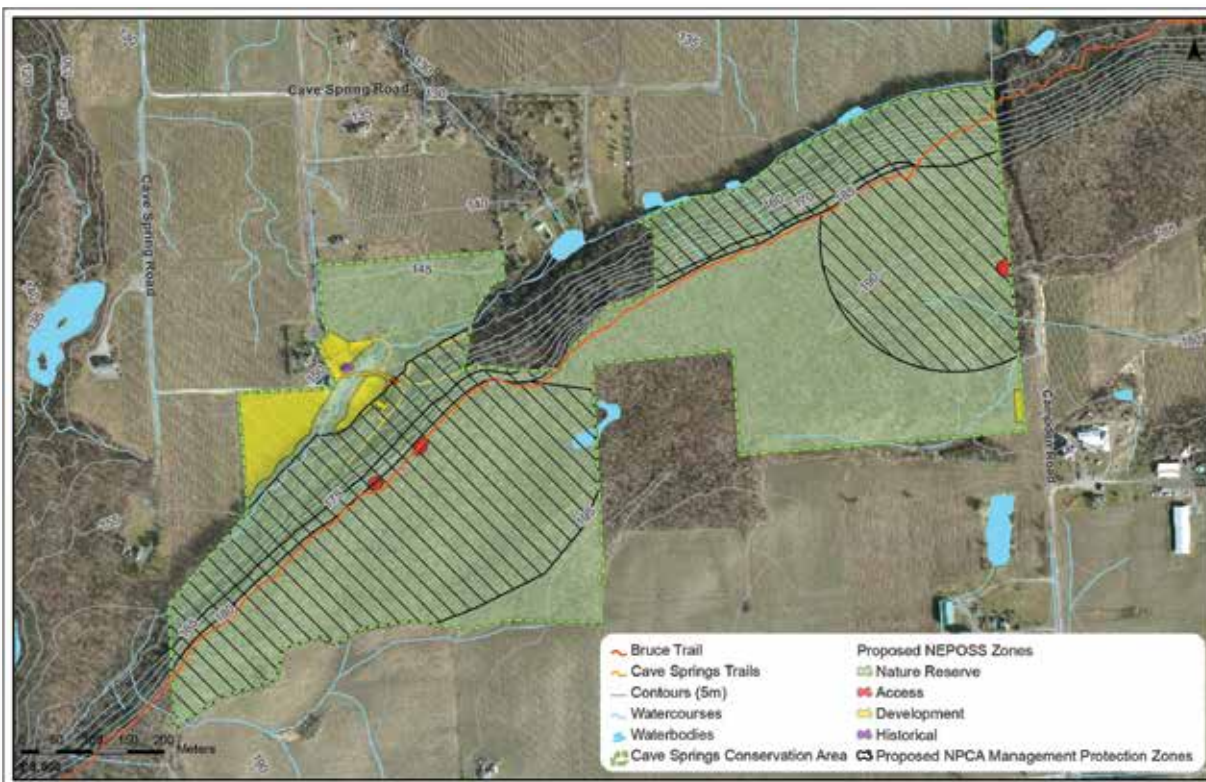


Figure 17: Proposed NEPOSS Zones

The NEP also provides the framework for the establishment and coordination of a system of publicly owned lands along the Escarpment known as the Niagara Escarpment Parks and Open Space System (NEPOSS).

The policies and objectives of the Niagara Escarpment and the following objectives and policies of NEPOSS apply to these areas.

5.2 NEPOSS ZONES

The Cave Springs Conservation Area has been divided into four primary zones (Figure 17: Proposed NEPOSS Zones).

These are based upon the NEPOSS zoning system as defined by the NEP. Each zone has been designated according to the criteria of values for preservation, conservation and recreational uses. Further, an NPCA Protection Zone is used as an overlay for additional requirements. The four zones are Nature Reserve, Access, Historical and Development.

NATURE RESERVE

The Nature Reserve zone is defined under NEPOSS as an area of significant natural heritage features or areas that require careful management to ensure long-term protection. This zone makes up a substantial majority of the park space totaling 42.88 hectares of the 44 plus hectare site. This allows for the continuity of sensitive wetlands, cliffs, slopes, interior forests and edge conditions to be conserved along with the wealth of biodiversity that these ecosystems support. Permitted uses within this zone are low to moderate intensity recreational activities and minimal development in support of low intensity recreational activities (i.e. trails, signs and interpretive facilities).



ACCESS ZONE

The Access Zones serve as staging areas and are intended to support the use of, and access to, adjacent zones. These zones are small and scattered throughout the park totaling 0.11 hectares. These zones are intended to accommodate viewing platforms and parking lots that abut Nature Reserve zones.

HISTORICAL ZONE

The Historical Zone includes significant archaeological or cultural heritage features that require careful management to ensure long-term protection. This zone will occupy 0.01 hectares of the Site. Permitted uses in this zone include the protection of the historic farmstead, encouraging the restoration and subsequent conservation of the barn in a manner compatible with continued use.



DEVELOPMENT ZONE

The Development Zone provides the main access to the Conservation Area as well as facilities and ancillary services to support the recreational activities. The zones are to be integrated into the Site in a sustainable way that allows for programming to have minimal negative impacts on the landscapes and watersheds that contain natural and cultural heritage features of the Site. These zones will occupy 1.65 hectares of the Site and be comprised of five areas of development. Permitted uses within these zones include roads, parking lots, gates, picnic areas, campgrounds, commercial service facilities, orientation, interpretive and educational research, and maintenance facilities. Development of facilities must be designed in a way that minimizes their environmental and visual impact. The house, the barn, the roadway entrance/parking, trails and the septic system make up the five areas of development.

NPCA PROTECTION ZONE

The NPCA Protection Zone is intended to overlay parts of the conservation area that require special protection. In accordance with the Strategic Plan of the NPCA, this zone will provide a framework for continued protection and enhancement of the Site's most sensitive natural heritage features.



62 public engagement



6.0 PUBLIC ENGAGEMENT

Public consultation began with the onset of the Management Plan process and has continued throughout the development of the Management Plan. The NPCA gathered information and input from members of the general public and relevant stakeholder groups on the natural heritage features, cultural features, and issues of interest. This input will help to shape the future of the Site. Public consultation has been used to explain the process of the Management Plan development, confirm natural heritage and cultural features of the Site, and to determine where there may be concerns with proposed management direction.

One of the first steps of public consultation was the development of a list of project stakeholders. This list grew as the public consultation process continued throughout the project, and included neighbours, parties who use the Conservation Area, local school boards, Brock University, Niagara College, the Niagara Bruce Trail Club, local politicians, municipalities, and decision makers, First Nations and Métis, acquaintances of Margaret Reed, local tourism associations and businesses, the Niagara Escarpment Biosphere Fund, local nature clubs, the Ministry of Natural Resources and Forestry, the Niagara Escarpment Commission and many others. The Niagara Escarpment Commission (NEC) and Ministry of Natural Resources and Forestry (MNRF) were included via conference call throughout the planning process and attended some of the Technical Advisory Committee meetings.

Public consultation and communication took place using a variety of public consultation techniques including mail/email notices, newspaper ads, website postings, social media, open houses, workshops, requests for comment/input online, one-on-one discussions, and Site visits. By using a variety of methods, the NPCA ensured that the public consultation process was transparent, accessible, and accountable. The NPCA also invited the public to sign-up for the Cave Springs Management Plan Newsletter to receive notifications of meetings, project updates and other important information with regards to the Management Plan. The NPCA consulted with the public and stakeholder groups at key points throughout the Management Plan process. The NPCA gathered public input and explored different viewpoints in order to make balanced planning decisions that support the long-term planning direction for the Cave Springs Conservation Area.

In addition to meetings, public open houses, and workshops, the NPCA also had members of the public on the Cave Springs Management Plan





Brock Earth Science student training in hydrogeology at Cave Springs

Steering Committee. The composition of the Steering Committee allowed for two members of the NPCA's Community Liaison Advisory Committee (CLAC), a multi-stakeholder public engagement committee, to sit on the Cave Springs Committee and report back to the CLAC throughout the project. Steering Committee meetings were held monthly throughout the Management Plan process. At various times throughout the development of the Management Plan, Project Lead Mark Brickell presented the project status and next steps to the CLAC group and asked for feedback/comments.

OPEN HOUSE #1

Open House #1 was held April 29th 2015 at the Ball's Falls Centre for Conservation in order to inform the public of the commencement of the Management Plan process and of the NEPOSS guidelines for the process. A general questionnaire was distributed that allowed participants to comment during, and following, the meeting to share: their knowledge of the past, their vision for the Cave Springs Conservation Area, and to comment on any concerns they had with the Management Plan process. Those that were unable to attend the meeting were provided with the opportunity to review the material online at the project webpage and were invited to submit their comments through the webpage.

Niagara Escarpment Biosphere Reserve Fund led a presentation at which they explained the UNESCO designation and positioned it both in a local and global context. The NPCA Ecologist presented the Natural Heritage Study of the Cave Springs Conservation Area accomplishments to date and next steps. The NPCA Project Lead gave a presentation about Cave Springs Conservation Area and explained NEPOSS (Niagara Escarpment Parks and Open Space System) and how the NPCA

would be moving forward with the Management Plan process. The meeting was attended by more than 100 people including NPCA Board Members, neighbouring property owners, First Nations representatives, Ontario Access Coalition, local politicians, members of the tourism sector and local wineries, acquaintances of Margaret Reed, Niagara Land Trust, Cave Springs Camp, Niagara Bruce Trail Club, Niagara Escarpment Biosphere Fund, Nature Clubs, and members of the Niagara Landowners Association.

PUBLIC WORKSHOPS

The second public consultation and engagement opportunity was a workshop held on June 16th 2015 at 1PM and 7PM at the Ball's Falls Centre for Conservation. The afternoon workshop was intended for professionals and the evening session was open to the general public. Attendees were put into small groups of three to six people and were asked to complete a survey and provide comments. The groups were also asked to brainstorm and discuss opportunities for future uses of the Site with consideration being given to the sensitive ecology of the Site. Mark Brickell, the Project Lead, gave a presentation to update the groups on the status of the Management Plan and to remind attendees about the NEPOSS guidelines. At the end of the workshop there was an open discussion about the opportunities for future use presented by each group. The surveys handed out at the workshops were put online shortly after to allow the public opportunity to comment and fill out the survey online if they were unable to attend the workshop.

A total of 70 people participated in these workshops. There was professional representation from the Niagara Escarpment Biosphere Fund, District School Board of Niagara consultant on First Nations and Métis Education, Town of Lincoln's Jordan Historical Museum, Brock University, Niagara Falls Nature Club, Bert Miller Nature Club, Friends of Short Hills, Peninsula Field Naturalists, the Mayor of the Town of Lincoln, Niagara Region planner, Mississaugas of the New Credit First Nation, Twenty Valley Tourism and Ontario Access Coalition. The evening session was attended by neighbouring property owners, Niagara Landowners Association, acquaintances of Margaret Reed, local wineries, nature clubs, Ontario Access Coalition, and NPCA Board members.

OPEN HOUSE #2

The second Open House, hosted on November 24th 2015 at Ball's Falls Conservation Area, was held in order to introduce the public to the conceptual design phase and to provide a project update. The

NPCA Project Lead introduced watercolour drawings of eight proposed concepts to the public in the form of a slideshow presentation. Following this, guests were invited to walk around the room to review the presentation boards of the drawings and discuss their ideas and comments with NPCA staff. Staff recorded comments and suggestions on easels set up around the room. Many guests stayed for quite a



while after the meeting to continue discussions with staff, and to comment on the conceptual drawings. After the meeting, the drawings were posted on the Cave Springs webpage at npca.ca where attendees and those that were not able to attend could provide feedback online. Approximately 40 people attended the second Open House, including neighbouring property owners, winery staff, Niagara Bruce Trail Club, nature club members, tourism associations, Willowbank School of Restoration Arts, Ontario Access Coalition, the Mayor of the Town of Lincoln and members of the NPCA Board of Directors.

INDIVIDUAL STAKEHOLDER MEETINGS

Individual stakeholder meetings were held between the summer and fall of 2015 with Mark Brickell, Project Lead, and Kerry Royer, Community Outreach Coordinator. The Cave Springs Steering Committee approved a list of questions that were to be used during these meetings to ensure consistency. Through each stakeholder meeting, opportunities for future partnerships were discovered. These meetings helped to bring focus to the finer details regarding different aspects of the Management Plan and how the NPCA could best work with these groups to achieve common goals. Stakeholders were asked about specific elements of the Management Plan, including the deconstruction of the Margaret Reed house, and how it would be used in the future. These meetings were held specifically with representatives from the following groups, organizations, etc.: Brock University, Niagara

College, Niagara Catholic District School Board, District School Board of Niagara, Niagara Bruce Trail Club, Niagara Escarpment Biosphere Reserve Fund, Giant's Rib Escarpment Education Network, Cave Spring Cellars, Cave Springs Church Camp, Willowbank School of Restoration Arts, neighbouring property owners, acquaintances of Margaret Reed, Niagara Nature Tours, Twenty Valley Tourism, Town of Lincoln – Mayor Sandra Easton, Town of Lincoln – Manager of Roads and Transportation, Peninsula Field Naturalists, Niagara Falls Nature Club, Bert Miller Nature Club, Ontario Access Coalition.

OPEN HOUSE #3

A third Open House was held on November 8th 2016 at Ball's Falls Centre for Conservation in order to present the Management Plan to the public.

ABORIGINAL COMMUNITY ENGAGEMENT/ DUTY TO CONSULT

From the beginning of the Management Plan process, the NPCA included First Nation and Métis as part of the key stakeholder contact list. The NPCA staff contacted ASI, the consultant conducting the Archaeological Study, in early February 2015 and was given a list of important contacts for the project area. These contacts were added to the project stakeholder list. Letters were mailed to all Aboriginal contacts with the initiation of the project, including: Métis Nation of Ontario, Mississaugas of the New Credit First Nation, Six Nations Lands and Resources Department, Six Nations of the Grand River Territory, Ministry of Aboriginal Affairs, Ministry of the Environment and Climate Change.

These letters indicated the commencement of the Management Plan process and included an invitation to the April 29th 2015 Open House at Ball's Falls.

Prior to the April 29th 2015 Open House, follow-up phone calls were placed with each of the above groups. Only one phone call was returned, the Mississaugas of the New Credit First Nation. NPCA staff met with two individuals from the Mississaugas of the New Credit First Nation Department of Consultation and Accommodation at the Cave Springs Conservation Area to discuss the project on April 20th 2015, a week before the first Open House. NPCA staff gave a tour of the property and identified next steps in the development of the Management Plan. The two women representing the Mississaugas of the New Credit First Nation noted that they would attend the April 29th 2015 Open House and would make every effort to attend future public sessions. Both women also attended the June 16th 2015 workshop in the afternoon session.

Another contact, Haudenosaunee Confederacy Chiefs Council, was added to the stakeholder list after a May 15th 2015 letter from the Ministry of Aboriginal Affairs identified this group as possibly having rights or interests in the project area.

The District School Board of Niagara - First Nation, Métis and Inuit Education Consultant K-12 attended the June 16th 2015 workshop and indicated that there was opportunity for partnerships with the school board at the Cave Springs property.

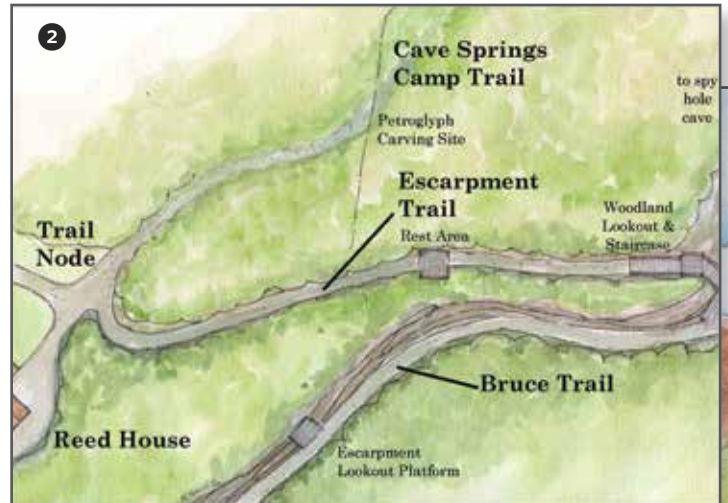
The NPCA's Community Outreach Coordinator had a phone conversation with Métis Nation of Ontario in January 2015. The NPCA was asked to forward additional project details. The NPCA followed-up this conversation with an email and the Terms of Reference for the Cave Springs Management Plan was attached. An invitation to meet to discuss the project was extended at this point. A follow-up email was sent in June 2015 by the NPCA, prior to the workshop, to see if a Métis representative could attend the June 16 workshop. No clear response was received and no representative attended the workshop.

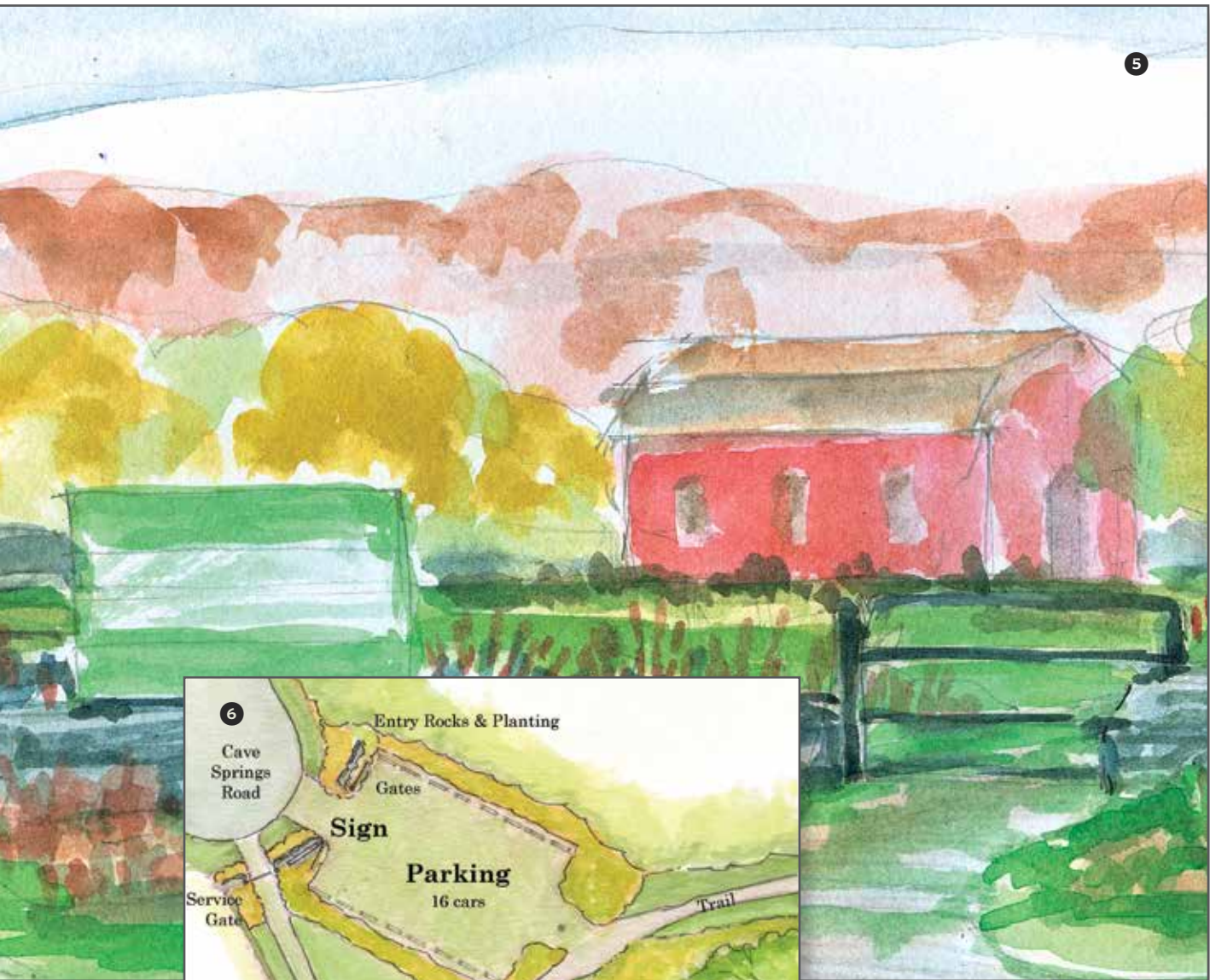
All Indigenous contacts were invited, by email, to all of the public consultation opportunities throughout the development of the Management Plan.

OTHER OPPORTUNITIES FOR PUBLIC ENGAGEMENT/COMMENT

Along with the three public engagement sessions held in 2015, Project Lead Mark Brickell invited anyone to submit up to 2,000 words to the NPCA. This opportunity was highlighted at each meeting. The NPCA did receive a small number of submissions. In addition, the public could sign-up for the Cave Springs Management Plan Newsletter to receive notifications of meetings, project updates and other important information regarding to the Management Plan.

- ① Cave Springs Masterplan | House Concept
October 2016 Prepared by Sun Harbour Studio
- ② Cave Springs Masterplan | Trail Concept
October 2016 Prepared by Sun Harbour Studio
- ③ Cave Springs Masterplan | Entrance Concept
October 2016 Prepared by Sun Harbour Studio
- ④ Cave Springs Masterplan | Campden Entry Concept
October 2016 Prepared by Sun Harbour Studio
- ⑤ Cave Springs | Entrance Impression
2015 Prepared by K. Smith
- ⑥ Cave Springs Masterplan | Entrance Concept
October 2016 Prepared by Sun Harbour Studio





*cave springs
concepts*



6.1 KEY ISSUES ARISING FROM PUBLIC CONSULTATION

Based on the public consultation, community engagement and stakeholder meetings, the team made a list of key issues arising:

- The deconstruction of the former Margaret Reed house
- Increased use of the property – concerns about increased noise for neighbours
- Recognition of Margaret Reed
- Bouldering and rock climbing
- Naturalized approximately 2 hectares of property (previously used for grape growing)
- Use of recreation/all-terrain vehicles on the property
- Safety concerns on the trails
- Make sure buildings are up to code (fire and electrical, etc.)

- Protection of significant natural features/species
- Maintain cultural significance of the Site
- Concerns about the staircase
- Funding of Management Plan implementation
- The need for better signage throughout the property

Each key issue that arose as a result of the public consultation is addressed below:

FORMER MARGARET REED HOUSE

The former Margaret Reed House was evaluated and found to be uninhabitable for safety and health concerns. There would be enormous liability concerns with leaving the house in its current state. The decision was made that the house would be deconstructed. After explaining this at the stakeholder meetings it was agreed that it was the appropriate decision. A design competition will be held to get public input on the design of a new building.



INCREASED NOISE

The increased noise will be addressed by having appropriate park hours that may fluctuate based on the seasons. Any events occurring on the property will be permitted. This should help to mitigate some of the noise issues. A Committee will be created, possibly including members from the Management Plan Steering Committee, as well as members of the public and interested parties. This Committee will bring forward issues or concerns from the public, neighbouring properties and businesses. This will help to address on-going issues and continue the dialogue that began with the Management Plan process.

RECOGNITION OF MARGARET REED

Margaret Reed will be given appropriate recognition on one of the interpretive signs on the Cave Springs property. In addition, it has been proposed that the Carolinian Forest be named after her.

BOULDERING AND ROCK CLIMBING

Bouldering will not be permitted on the property as it was found to be an inappropriate use of a sensitive property. The NPCA continues to have dialogue with the Ontario Access Coalition with regards to possibly allowing rock climbing. This will not be permitted until a detailed geotechnical and ecological assessment is completed to determine the feasibility of this activity and to scope out appropriate climbing routes.

NATURALIZED PIECE OF PROPERTY

The naturalized piece of property (approximately 2 hectares) that was previously used as grape-growing lands will not be sold based on the results of the ecological study. Instead, there is potential for this site to be the topic of a research project or other scientific pursuit.

USE OF ALL-TERRAIN VEHICLES

Neither all-terrain vehicles nor other motorized vehicles will be permitted on the Site. It is anticipated that increased activity on the Site will reduce the use of these vehicles on the premises. This activity will be monitored and discussed by the Committee accordingly and as necessary.

SAFETY CONCERNS ON THE TRAILS

As part of the Management Plan all new trails will be required to comply with the Accessibility for Ontarians with Disabilities Act (AODA). This measure should address all safety concerns, as it will increase both safety and accessibility of the Site. The trail at the base of the escarpment presented at the November 24th 2015 Open House was rejected based on safety concerns and the ecological assessment.

BUILDINGS UP TO CODE

The barn and former Margaret Reed House will be brought up to code for fire and electrical and any other building code requirements prior to being used for any events, gatherings, etc.

PROTECTION OF SENSITIVE NATURAL HERITAGE FEATURES/SPECIES

A long list of recommendations to protect the sensitive habitats and features on the Site, and specific recommendations to protect any species at risk are found in the Management Plan. These recommendations can be found in section 4.4 Natural Heritage Considerations. It will be made a priority by the NCPA to teach visitors how to be on an ecologically sensitive site through explicit language use on the interpretive signage as well as on any tours, etc., on the property.

MAINTAIN CULTURAL SIGNIFICANCE

The cultural significance of the Site was found to be a very important feature. The cultural significance of the Site will be protected based on the considerations outlined in section 4.5 Cultural Heritage Considerations. Additional suggestions have been to host campfire story-telling events to share the stories of Cave Springs' history. The NCPA aims to continue to recognize and elaborate on the history of all the people who have occupied the Cave Springs property over the years. A regular event to celebrate this is being planned to work towards this objective.



STAIRCASE

The staircase raised some concerns at the Open House #2 because many felt it was not necessary and that it looked too industrial based on the photo that was shown during the meeting. It was determined that the staircase would balance safety concerns and ecological concerns by forcing the public to avoid sensitive areas and improving overall access to the Site. The staircase will be built with safety as a priority and will also address aesthetic concerns while being Accessibility for Ontarians with Disabilities Act (AODA) compliant.

PROJECT FUNDING

Concerns surrounding project funding and implementation of recommendations of the Management Plan, are addressed in a detailed project budget, including potential funding sources and can be found in section 9.1 Costs of Development.

SIGNAGE

A need for better signage was continually brought up throughout the development of the Management Plan. A number of interpretive signs will be developed for the property and will include the following themes: ecological sensitivity, cultural heritage, Niagara Escarpment, Bruce Trail, UNESCO Biosphere designation, and folklore.



6.2 PARTNERSHIP OPPORTUNITIES

Throughout the development of the Cave Springs Management Plan the NPCA has been consulting and engaging its stakeholders. Over the course of many months, the Project Lead, Mark Brickell, and Coordinator of Community Outreach, Kerry Royer, met one-on-one with many NPCA stakeholders. In each of these meetings an opportunity for further partnership with the Cave Springs Conservation Area emerged. Each of these proposed partnerships presents a unique opportunity to further the goals of the Management Plan. The Niagara Peninsula Conservation Authority is committed to an evolving model of partnerships with those that are interested in the Cave Springs Conservation Area. The NPCA realizes that these partnerships will change and develop over time. The NPCA is committed to working with its stakeholders, community partners, local businesses and government organizations to ensure that the beauty, magic and ecology of the Cave Springs Conservation Area is preserved for years to come. This section of the Management Plan highlights the robust partnership opportunities identified in stakeholder meetings. The partnership opportunities have been put

into four different categories, tourism, education, conservation/science and recreation, but many of the opportunities can fit into multiple categories.

TOURISM

The Town of Lincoln, Twenty Valley Tourism, and private nature operators have identified the Cave Springs Conservation Area as a historical, cultural and natural gem in Lincoln. This property provides another story to tell tourists, and perhaps a lesser-known story compared with Ball's Falls Conservation Area. Opportunities for education, exploration, weddings, day trips and corporate team building sessions were identified as areas of interest to be explored. The Town of Lincoln, Twenty Valley Tourism and private operators are willing to be partners with the NPCA because they see this area as the next corridor of interest in Niagara, providing a different and completely authentic experience for visitors. Each of the stakeholders represented different aspects of tourism, wineries, eco-tourism, farming, but each fit into the goals of the Management Plan.



EDUCATION

The NPCA met with representatives from two Niagara school boards, the Niagara Catholic District School Board (NCDSB) and the District School Board of Niagara (DSBN). Representatives from Brock University, Niagara College and Willowbank School of Restoration Arts were also consulted. Other education representatives that the NPCA met with included the Niagara Escarpment Biosphere Fund (NEBF) and the Giant's Rib Escarpment Education Network (GREEN). Many of these representatives identified ways of partnering with the NPCA at the Cave Springs Conservation Area. The post-secondary institutions identified many ways in which students could engage with the property, including research opportunities, co-op/ internship opportunities and using the property for field trips to further student understanding of Niagara geography, geology, the Niagara Escarpment, biodiversity, culture, history, etc. Specifically, the Sustainability Science and Society Masters of Sustainability programs at Brock University mentioned a UNESCO field course called "Biodiversity in the Biosphere Reserve" These

groups mostly viewed the approximately 2 hectares of abandoned vineyard as an educational and research opportunity for students. The NCDSB and the DSBN both stated that they would be interested in site-specific curriculum for the Cave Springs Conservation Area. The NCDSB indicated that many of their technical programs work on projects outside of the school and that perhaps there would be an opportunity for their students to be involved in the deconstruction and rebuild of the Margaret Reed house. In 2015/2016, a group of three students from Willowbank School of Restoration Arts took on aspects of the Cave Springs Management Plan as their school project. The students participated in background research, including the development of a statement of significance for the Site, and assisted in writing the Management Plan. GREEN noted a need for office space for their organization, as did NEBF, and suggested that the top floor of the new building might be used as rental space for similar groups or organization. A representative from DSBN, the Curriculum Consultant for First Nation, Métis and Inuit Education K-12, agreed that Site-specific curriculum would be important to them.



CONSERVATION

The NPCA met with members of the Bert Miller Nature Club, Niagara Falls Nature Club, and Peninsula Field Naturalists. The main partnership opportunity with these nature clubs is to continue to assist with research and monitoring of the property. Many nature clubs have experts in different areas, including botany, bird studies, herpetofaunal studies, etc. Going forward, these partnerships will be extremely valuable as the NPCA implements the long-term monitoring plan for the Cave Springs property. These groups also proposed having a small rental space for their meetings. They also supported the idea of hosting educational hikes on the property and could likely provide some volunteers to lead hikes.

RECREATION

The two main stakeholders interested in recreation opportunities at Cave Springs include the Ontario Access Coalition (OAC) and the Bruce Trail Conservancy (BTC). The OAC expressed an interest in entering into an agreement with the NPCA regarding use of, and access to, the Cave Springs Conservation Area. They have entered into similar agreements with Grey Sauble Conservation, Hamilton Conservation Authorities and Niagara Parks. The OAC has submitted a proposal to the NPCA for consideration. They have identified Cave Springs as a unique climbing area in Niagara and suggested that it is the only dolostone area in Niagara fit for climbing. Bruce Trail Conservancy members predominantly use the site to walk the Bruce Trail. The Bruce Trail Conservancy proposed working with the NPCA to create a switch back trail, or a loop trail, at the Campden Road entrance. They also indicated that they would be interested in partnering with the NPCA to lead guided hikes, etc.



7.0

*development
of the park*



7.0 DEVELOPMENT OF THE PARK

7.1 PROPOSED VISITOR SUPPORT INFRASTRUCTURE

Two vehicular access points will be provided to the Site. The Site's western access and lower escarpment area is come upon from the north via Cave Springs Road. The Cave Springs entrance is intended to be the primary access point and will be landscaped accordingly. It will be shifted to the east from its current location while the previous location will be retained for emergency and service access. Located between the two entrance points, defined by gates and fencing, will be a sign announcing arrival to the Cave Springs Conservations Area. This sign will be set up in a landscaped setting of natural stone and native plants. There have been discussions with the Town of Lincoln to accommodate overflow of parking at this entrance onto Cave Springs Road.

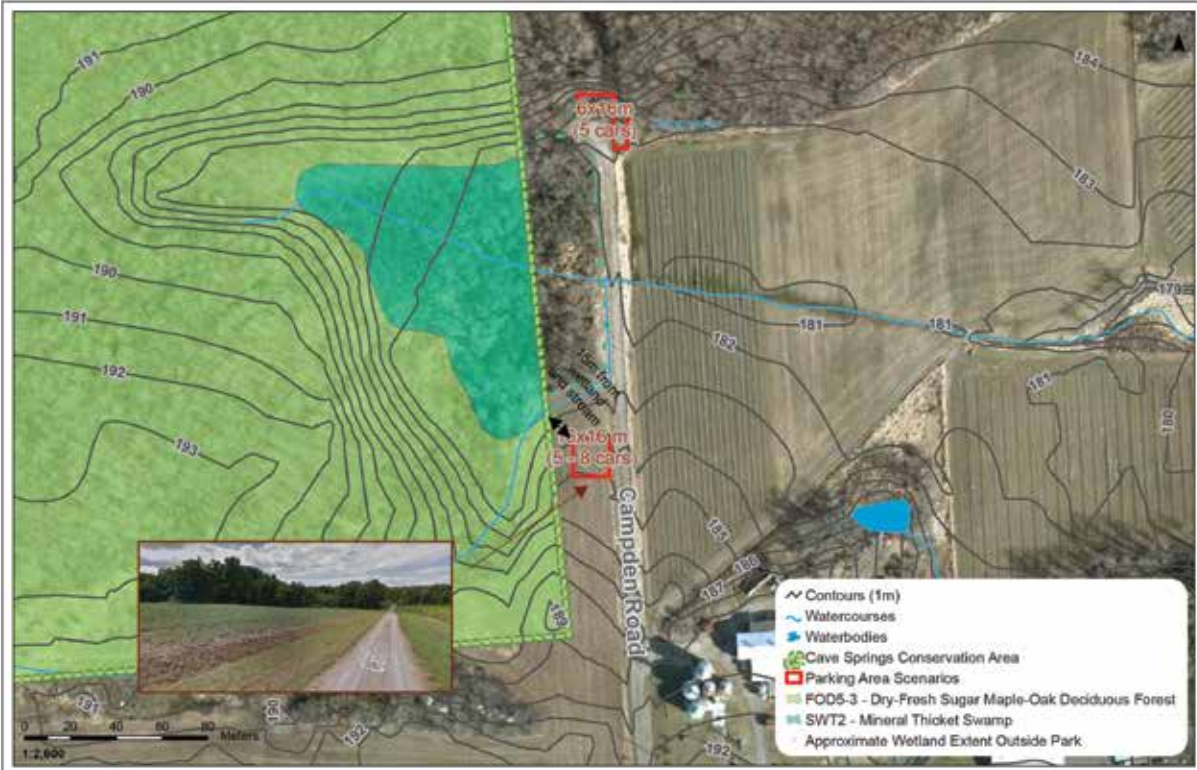


Figure 18: Campden Road Entrance Concept

Cave Springs Road Entrance Concept (Figure 18: Campden Road Entrance Concept): Features include Cave Springs Conservation Area sign, Small Armour Stone rock wall, native plantings, gates and fencing.

Green Parking Lot (Figure 19: Cave Springs Parking Lot Concept): A permeable “green” parking lot is proposed for the property. Features include





Figure 19: Cave Springs Parking Lot Concept

a permeable surface (allowing grass to grow), parking for 16-20 cars, plus handicapped parking spaces. Native plantings would also be included.

Existing Barn: It is proposed that the barn be retrofitted to allow for special events and meetings while preserving the aesthetic character of the rural landscape. The foundation is in serious need of repair and requires stabilization. Repairs to the roof will also be required. Improvements will be made to the building to meet with special event standards and regulations as well as AODA guidelines. Infrastructure required to support the event space, such as restrooms and fire suppression systems, will be installed. Design considerations will be made to improve north/south views from the venue. Exterior landscaping, including fencing, will encourage gathering points for the purposes of facilitating event programming.

Gravel Laneway: The gravel laneway from the main entrance to the former Reed house is recommended to be reestablished including replacing the deteriorating culvert under the laneway. The updated laneway would allow emergency and service vehicle access, as requested by the Town of Lincoln.

Reed House Deconstruction: Deconstruction would include trying to salvage as much of the building as possible. A detailed plan will provide an inventory of re-usable items.

Reed House Rebuild: The Reed house would be demolished and replaced by an interpretive building of the same size that will provide opportunities for educational facilities, artist studios and office spaces. A design competition would be held in order to achieve the highest level of aesthetic approval by the public. The building would be designed for a capacity of approximately 30-40 people and include restroom facilities. Key design elements for the building would include a wrap-around viewing platform with interpretive signage to engage its natural surroundings and benches, both in an effort to maximize a sustainable design and technological opportunities. The distinctive gable end of the house would also be included as part of the design features.

Constructed Wetland and Septic System: It is proposed that a wetland and septic system be established on the Cave Springs property to serve both the house and barn structures.

Escarpment Trail: Features may include stairs and/or alternative trail improvements and will be AODA compliant, as per a local AODA committee, with two to three platform/rest areas including benches, interpretive signage, garbage bins, improved safety, and ecological protection.

Two Small Viewing Platforms: The two viewing platforms will be built on top of the escarpment, along the Bruce Trail allowing for safe viewing of the vistas. There will also be interpretative signage. The two viewing platforms would be constructed to the west of the intersection of the Escarpment Trail and the Bruce Trail.

Campden Road New Entrance and Signage: Campden Road approaches the eastern access on the top of the escarpment from the south. Ideally, the Campden Road access point will shift from its location at the end of the road farther to the south. A new entrance and parking area would be established. Features would include: room for five to six cars, a rock wall, native plantings, signage (i.e. no illegal dumping), and access to the Bruce Trail.

Water System: It is recommended that installation of a new water system to provide water for drinking and the restrooms be completed.

LAND ACQUISITION

For the purpose of ecological unification of the Site, 6.07 to 8.09 hectares of adjacent land have been identified for future land acquisitions. Should these lands become available, attempts to acquire this land will be made at fair market value.

SIGNAGE

There will be informational, directional, interpretive and regulatory signage throughout the Site. Signs will be located in strategic areas. Trail routing signs will educate people on how to interact properly within the Site as well as provide information about lengths, times and degree of difficulty of each trail. As education is a key component of the Site, interpretive signage will be used to identify unique natural, geological, and cultural features. Regulatory signage will outline permitted uses for the Site. The NPCA, NEPOSS and World Biosphere Reserve logos will be identified on trailhead signage and in other appropriate places.

ACCESSIBILITY

Infrastructure included in the Plan will meet AODA standards. Due to the topographic extremes of the Site, allowances will have to be made. The substantial grade of the Site may be challenging in terms of accessibility, all design is intended to maximize full accessibility of the Site. All building and vehicular infrastructure will be made fully accessible.

TRAILS

Currently, the predominant activity at Cave Springs is hiking. An extensive network of trails already exists on the property and will require augmentation as outlined in the recommendations of this Plan. A series of trails will require closing and re-naturalization. Remaining trails will be assessed and realigned based on recommendations and further study. When a final alignment has been decided, trails will be upgraded in the necessary manners including: removal of overgrowth, refinement of surfaces, and installations of infrastructure for the purpose of reducing impact on sensitive ecosystems.

REST AREAS

Rest areas will be located in strategic locations and will provide a comfortable space to enjoy the beautiful vistas. The rest areas will take into consideration natural opportunities for shading and accessibility.



8.0

*monitoring
and review*



8.0 MONITORING AND REVIEW

The monitoring and implementation section of this Plan establishes the NPCA's requirement to prove that it is meeting all of its recommendations and development proposals that were established in the NEPOSS planning process and the NPCA Strategic Plan. Further, this section will provide the baseline to determine the effectiveness of actions taken to date and whether priorities and/or context have changed over time. Monitoring priorities will continue to be revised and reestablished through ongoing studies such as: natural heritage studies and review, archaeological assessments, and geotechnical assessments. This Plan will be reviewed every five years to determine risk to natural and cultural heritage assets from visitor impacts. User impact will be assessed through levels and types of use, user behavior and perception of resource quality. Regular feedback of cultural programming will ensure that educational activities remain relevant to the Site and community.

OPERATIONS AND MAINTENANCE EXPECTATIONS

Cave Springs Conservation Area will continue to be managed and operated by the Niagara Peninsula Conservation Authority.

All facilities and open spaces will require a level of maintenance consistent with the NPCA's operational standards that ensures that the park is usable, clean, and safe. As existing facilities are updated or new facilities are added, there is an expectation that the levels of maintenance and the operational budget will be correspondingly increased.

General management and maintenance of the park will typically include mowing, waste management, tree pruning and care and routine trail maintenance.

Broken or vandalized features and graffiti will be repaired as soon as possible. Increased public use, community involvement, education, monitoring and enforcement will aid in discouraging vandalism in the park.

Hazard trees, which are located near the parking lot, trailheads, or the perimeter trail will need to be pruned or felled.

MONITORING

Monitoring and evaluation of the implementation of the Management Plan will be completed in order to ascertain that the baseline determined by the studies which were completed are either maintained or improved upon.

To be compliant with the requirements of the Niagara Escarpment Plan and NEPOSS Planning Manual, the primary focus of the monitoring efforts in Cave Springs Conservation Area should be on protection of the natural heritage and cultural heritage features within the park.

Monitoring programs will be completed by, or overseen by, the NPCA and monitoring activities will address the key concerns outlined by the Natural Heritage Study (Appendix A), the Cultural Heritage Study (Appendix B), the Water Resource Assessment Study (Appendix C) and include any direction from applicable policies and plans. All mitigation measures will be followed accordingly.



FURTHER STUDIES AND APPROVALS

Following approval of the Cave Springs Management Plan, an Implementation Plan will be developed.

It is recognized that the NPCA is responsible for obtaining any internal and external approvals before proceeding with any planned improvements to Cave Springs Conservation Area.

Further studies and approvals may require involvement from, but are not limited to, the following:

NIAGARA ESCARPMENT PLAN

The Niagara Escarpment Plan (NEP) is the principal provincial planning document to which the Cave Springs Conservation Area Management Plan must conform. The Cave Springs Property is designated as Escarpment Natural Area and Escarpment Protection Area within the NEP. For each of its land use designations, the Niagara Escarpment Plan outlines the objectives, permitted uses and policies. If an agency is proposing a development within the Niagara Escarpment Development Control Area, a Development Permit will be required unless specifically exempted under Ontario Regulation 828/90. With a few exceptions, the Niagara Escarpment Development Control area is the area covered by the Niagara Escarpment Plan. Obtaining any needed approvals and permits under the Niagara Escarpment Planning and Development Act (NEPDA), e.g. a Development Permit may be required for grading and site alteration activities. The Conservation Authorities Act provides the means to implement programs to manage natural resources, and to own and manage lands for parks and recreation purposes. The act also governs activities undertaken by a conservation authority as well as the general public within regulated areas. Obtaining any needed approvals and permits related hydrological and ecological features from the Niagara Peninsula Conservation Authority.

TOWN OF LINCOLN OFFICIAL PLAN

The Town of Lincoln's Official Plan identifies the Cave Springs property as being a part of Niagara Escarpment Parks System. Policies within the Official Plan support the development of the Niagara Escarpment Park System in this area. Obtaining any necessary site plan approvals, building permits, and approvals from utility companies, as required for conservation area development may also require involvement from the Town of Lincoln.



ONTARIO HERITAGE ACT

Fulfilling any requirements for archaeological assessments under the Ontario Heritage Act as the purpose of this act is to give municipalities and the provincial government powers to preserve the heritage of Ontario and to protect heritage properties and archaeological sites.

ENDANGERED SPECIES ACT

The *Endangered Species Act* identifies species that are at risk in Ontario, provides the tools and mechanisms to protect those species and their habitats, and promotes stewardship activities to assist in their recovery. Species at risk and their habitats have been identified within the Cave Springs property.

NIAGARA REGION OFFICIAL PLAN

The Policy Framework of the Niagara Region's Official Plan is committed to maintaining a Healthy Landscape throughout Niagara, while giving particular attention to natural features of special significance within the broader landscape (such as the Provincial Life ANSI impacting parts of the Cave Springs property which is associated with this section of the Escarpment). In addition, the Niagara Region recognizes that public and private

stewardship is a key component in the protection of natural heritage features that will help achieve long-term ecosystem health and a Healthy Landscape. The Greenbelt Plan identifies areas where urban development should not occur to ensure permanent protection to the Province's agricultural land and ecological features and their functions. The Greenbelt Plan covers a large area of land that includes the Niagara Escarpment, and the Oak Ridges Moraine. The Cave Springs property falls within the Niagara Escarpment Plan (NEP) area of the Greenbelt. Within the NEP area of the Greenbelt, the policies of the NEP supersede the policies of the Greenbelt with the exception of the Greenbelt's policies for Parkland, Open Space and Trails, which are relevant to the Cave Springs property.

PROVINCIAL POLICY STATEMENT

The Provincial Policy Statement (PPS) provides policy direction on matters of provincial interest related to land use planning and development. It also emphasizes the importance of parks, trails, recreation, and open spaces for strong and healthy communities. It also recognizes that negative impacts on protected areas should be minimized. While all other legislations and plans shall be consistent with the PPS, the NEP takes precedence over the PPS in the event of a conflict.

**OTHER MONITORING AND REVIEW TASKS WILL
INCLUDE THE DEVELOPMENT OF THE FOLLOWING:**

A fundraising plan with the Niagara Peninsula Conservation Foundation

An interpretive program

The identification of Site-specific natural and cultural heritage features to include on interpretive signage

The commencement of monitoring visitor impacts

Creating an Invasive Species Management Plan

The monitoring of the natural heritage areas of off-trail use to determine whether additional trails or other management measures are needed

The monitoring and review of incidents of encroachment to determine if the approach to enforcement is achieving compliance

The monitoring of the natural systems to determine if there is overall improvement or losses

Ensuring that natural, cultural and water resource considerations are followed

**CAVE SPRINGS STEERING COMMITTEE
FINAL RECOMMENDATIONS**

- 1 That the Cave Springs Management Plan Charter be received.
- 2 That the Cave Springs Management Plan Background report be received.
- 3 That the Cave Springs Management Plan be approved and the recommendations therein be adopted.
- 4 That an Open House be convened to share the Final Cave Springs Management Plan with key stakeholders and the public-at-large.
- 5 That the Cave Springs Management Plan Charter, Background Report, and Final Management Plan be forwarded to the Niagara Peninsula Conservation Authority Board of Directors for approval and submission to the Niagara Escarpment Commission.
- 6 That a Cave Springs Management Plan Advisory Monitoring Committee be established.
- 7 That a “Friends of Cave Springs” group be established.

NEXT STEPS

.....

The Management Plan will be submitted to Niagara Peninsula Conservation Authority Board of Directors for approval and endorsement in December 2016.

.....

The NPCA-approved Management Plan will then be submitted, in January 2017, to the Niagara Escarpment Commission for its review and endorsement. The Management Plan will then be submitted to the Ministry of Natural Resources and Forestry for final approval.

.....

The NPCA will develop an Implementation Plan.

.....

A Cave Springs Management Plan Advisory Monitoring Committee will be established (meetings to be held quarterly).

.....

A Friends of Cave Springs group will be established.

.....





9.0 financial considerations

9.0 FINANCIAL CONSIDERATIONS

Currently, three phases have been identified that take into consideration characteristics of the Site and development budget. Phase One denotes the highest priority of development, and will address issues of access to the Site's primary entrance as well as safety concerns associated with the Margaret Reed House. Phase two will entail stabilization of the barn and beautification of the Site as well as the re-establishment of the laneway to allow for emergency access. Phase Three will be the final stage of development and will enhance access to the Site through the improvement of trail infrastructure.

It is the mandate of the NPCA to acquire adjacent properties for the purpose of enhancing the cultural and natural heritage of Cave Springs. Traditional sources of NPCA funding will be used to generate the bulk of required revenue for redevelopment, augmented by senior government programs and community based fundraising.

Human resources and cost considerations include maintenance, further ecological, water resource, geotechnical and archaeological studies. NPCA staff and contractors will be used to implement this Plan. Staffing requirements will be based on levels of activity, programming, and use of the Site.

9.1 COSTS OF DEVELOPMENT

CAVE SPRINGS DRAFT DEVELOPMENT BUDGET

PROJECT DESCRIPTION	BUDGET
Demolition/Deconstruction of Existing House (Confirm stability of culvert)	\$20,000
Construction of Main Parking Area/Staging Area	\$105,000
Installation of Services (water, waste-water, electrical)	\$50,000
Constructed Wetland	\$150,000
Construction of New Building on Former House Site	\$800,000
Barn Improvements (Foundation, AODA, Fire Code, Structure)	\$450,000
Barn Yard Outdoor Event Space	\$50,000
Re-establish laneway	\$100,000
Main Entrance Enhancements	\$45,000
Campden Road Entrance Enhancements	\$40,000
Signs and Benches	\$30,000
Escarpment Stairs and Rest Areas	\$400,000
2 Viewing Platforms along Bruce Trail	\$120,000
Burying of Hydro Lines	\$50,000
Archaeological Consulting Services	\$30,000
Contingency	\$244,000
TOTAL	\$2,684,000

POTENTIAL CAVE SPRINGS SOURCES OF REVENUE

SOURCE	AMOUNT
NPCA Funding Sources	\$1,401,000
Friends of Cave Springs (Community Fundraising)	\$500,000
Senior Government Programs	\$433,000
In-kind Contributions	\$200,000
Sale of Land	\$150,000
TOTAL	\$2,684,000

Table 2: Draft Development Budget



10.0 CONCLUSION AND SUMMARY

The Cave Springs Conservation Area Management Plan is the result of multiple years of studies and public consultation that will ensure protection of the natural beauty of Cave Springs. This Management Plan will also support and protect the conservation area's cultural heritage features. Additionally, the property will be developed in such a way as to support and improve educational, recreational, and research opportunities. The Management Plan will also ensure that the public has opportunities to enjoy the great beauty of this property, while maintaining the sensitive cultural and ecological integrity of the land.



glossary

GLOSSARY

AGRARIAN

Relating to cultivated land or the cultivation of land.

AQUITARD

A layer of low permeability that can store groundwater and also transmit it slowly from one aquifer to another.

AREA OF NATURAL AND SCIENTIFIC INTEREST (ANSI)

Areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education.

BIODIVERSITY

The variety of life in the world or in a particular habitat or ecosystem.

BIOMES

Are very large ecological areas on the earth's surface, with fauna and flora (animals and plants) adapting to their environment. Biomes are often defined by abiotic factors such as climate, relief, geology, soils and vegetation. A biome is NOT an ecosystem, although in a way it can look like a massive ecosystem.

BORROW PITTING

An excavated area where material has been dug for use as fill at another location.

BOULDERING

A form of rock climbing that is performed without the use of ropes or harnesses. While it can be done without any equipment whatsoever, most climbers use climbing shoes to help secure footholds and chalk to keep their hands dry.

BRUCE TRAIL CORRIDOR

The Bruce Trail Conservancy is committed to establish a public footpath along the Niagara Escarpment in order to protect its natural ecosystems and to promote environmentally responsible public access to this UNESCO World Biosphere Reserve. The corridor includes Main and Side Bruce Trails as well as the optimum route.

CATCHMENT

The land area over which rains falls.
Clint: a slab of limestone/dolostone pavement that is separated from adjacent clints by solutional activity along joints.

CHERT FLAKES

A hard, dark, opaque rock composed of silica (chalcedony) with an amorphous or microscopically fine-grained texture. It occurs as nodules (flint) or, less often, in massive beds.

DEVELOPMENT

As it pertains to the Planning Act, Provincial Policy Statement, Greenbelt Plan and Land Use Planning Policies.

DEVELOPMENT

As it pertains to the Conservation Authorities Act, is defined as:

- The construction, reconstruction, erection or placing of a building or structure of any kind,
- Any change to a building or structure that would have the effect of altering the use or potential use of the building or structure, increasing the size of the building or structure or increasing the number of dwelling units in the building or structure, site grading, or
- The temporary or permanent placing, dumping or removal of any material, originating on the site or elsewhere.

DOLOMITE

A translucent mineral consisting of a carbonate of calcium and magnesium (a sedimentary rock formed chiefly of dolomite).

ECOLOGICAL FUNCTION

The natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes. These may include hydrological, biological, physical, chemical and socio-economic interactions.

ECOLOGICAL LAND CLASSIFICATION (ELC)

The Ontario Ministry of Natural Resources and Forestry defines ecological units based on bedrock, climate (temperature, precipitation), physiography (soils, slope, and aspect) and corresponding vegetation, creating an Ecological Land Classification (ELC) system. This classification of the landscape enables planners and ecologists to organize ecological information into logical integrated units to enable landscape planning and monitoring.

ENDANGERED SPECIES

Species listed or categorized as an “Endangered Species” on the Ontario Ministry of Natural Resources and Forestry’s official species at risk list or on the COSEWIC list of endangered species, as updated and amended periodically.

ENDANGERED SPECIES ACT

A provincial Act with three distinct purposes including: to identify species at risk based on the best available scientific information, including information obtained from community knowledge and aboriginal traditional knowledge; protect species that are at risk and their habitats, and to promote the recovery of species that are at risk; and to promote stewardship activities to assist in the protection and recovery of species that are at risk in Ontario.

EPHEMERAL STREAMS

Flow only during and after large precipitation event or snowmelt for a period of a few days to a few weeks. A water “flow path” occurs on top of the forest floor, rarely scouring a distinct channel except on steep slopes.

FISSURE

A long, narrow opening or line of breakage made by cracking or splitting, especially in rock or earth.

GAMBREL BARN

Is a barn that has the roof built with double slope on each side of the roof, with lower slope having steeper roof pitch than the upper slope.

GRIKE

A solutional, vertical fissure developed along a joint, separating dolostone/limestone pavement into clints.

HERPETOFAUNAL

The reptiles and amphibians of a particular region, habitat, or geological period.

HYDRAULIC CONDUCTIVITY

The rate of flow of water under a unit hydraulic gradient.

HYDROLOGIC FEATURES

Permanent and intermittent streams, wetlands, lakes (and their littoral zones), seepage areas and springs, and aquifers and groundwater recharge areas.

HYDROLOGIC FUNCTION

The functions of the hydrologic cycle that include occurrence, circulation, distribution, and chemical and physical properties of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere, and water’s interaction with the environment including its relation to living things.

INTERMITTENT STREAMS

Usually flow during wet seasons and in the summer after a major rain event. Non-permanent flowing drainage feature having a definable channel and evidence of annual scour or deposition.

JOINT

A surface of a fracture, or parting of a rock, without displacement, and the surface is usually plane and often occurs with parallel joints.

KARST

Topography formed over limestone, dolostone or gypsum and characterized by sinkholes, caverns and lack of surface streams.

LITHOLOGIC

The gross physical character of a rock or rock formation.

NATURAL HERITAGE FEATURES

These features and areas, including significant wetlands, significant coastal wetlands, fish habitat, significant woodlands, significant valleylands, significant habitat of endangered species and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest, which are important for their environmental and social values as a legacy of the natural landscape of the area.

NATURAL HERITAGE SYSTEM

A system made up of natural heritage features and areas, linked by natural corridors necessary to maintain biological and geological diversity, natural functions, viable populations and indigenous species and ecosystems. These systems include lands that have been restored and areas with the potential to be restored to a natural state.

NEGATIVE IMPACTS

In regard to natural heritage features and areas, degradation that threatens the health and integrity of the natural features or ecological functions for which and areas is identified due to single, multiple or successive development or site alteration activities.

NEPOSS

The Niagara Escarpment Parks and Open Space System is a linear system of over 140 parks and open spaces owned / managed by public agencies or conservation authorities. The System is based on public lands acquired to protect significant areas and features along the Niagara Escarpment, the majority of which are linked by the Bruce Trail. Park managers are required to develop management / master plans that are not in conflict with the objectives and policies of the NEP.

NIAGARA ESCARPMENT COMMISSION (NEC)

An agency of Ontario's Ministry of Natural Resources, the NEC works to preserve the Niagara Escarpment as a continuous natural landscape and a vital corridor of green space through south-central Ontario.

ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY (MNR)

This Ministry manages and protects Ontario's natural resources for wise use across the province, contributing to the environmental, social and economic well-being of Ontario.

OVERBURDEN

The loose soil, silt, sand, gravel or other unconsolidated material overlying bedrock.

PERMANENT STREAMS

Usually flow for most of the year but can run dry during drought conditions. The stream bed is typically located below the water table and groundwater or a permanent water feature is the primary source of flow.

PETROGLYPH

A rock carving, especially a prehistoric one.

PROVINCIALY SIGNIFICANT WETLANDS (PSW)

Provincially Significant Wetlands are wetlands that, in the opinion of the Ontario Ministry of Natural Resources and Forestry contain habitats of critical importance to fish or wildlife, have a significant hydrologic role in the watershed in which they exist, provide significant social or economic benefits and have unique or provincially significant features. Development is not permitted in Provincially Significant Wetlands.

SPECIES AT RISK (SAR)

A federal Act for the purposes of preventing wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened. Threatened Species: As defined by the Ontario Ministry of Natural Resources and Forestry, a species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.

TABLELAND

A broad, high, level region; a plateau.

TALUS SLOPE

Geologists define talus as the pile of rocks that accumulates at the base of a cliff, chute, or slope. The formation of a talus slope results from the talus accumulation.

WATERSHED

The land area that contributes surface runoff to any point of interest.

WETLAND

As defined in the Provincial Policy Statement (2005) are lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants. The four major types of wetlands are swamps, marshes, bogs and fens.

WHALEBACK

A large mound having the general shape of a whale's back, smooth elongated ridge having a rounded crest.

WILDLIFE

All wild mammals, birds, reptiles, amphibians, fish, invertebrates, plants, fungi, algae, bacteria and other wild organisms.

WILDLIFE HABITAT

Areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas important to migratory or non-migratory

WOODLANDS

Treed areas that provide environmental and economic benefits to both private landowners and the public, such as erosion protection, hydrological and nutrient cycling, provision of clean air, provision of wildlife habitat, outdoor recreational opportunities and the sustainable harvest of a wide range of woodland products. These include treed areas, woodlots or forested areas and can vary in their level of significance at the local, regional and provincial levels.

REFERENCES

Archaeological Services Inc (ASI: Archaeological & Cultural Heritage Services), August 2015, Cultural Heritage Inventory and Planning Study, 72pp

Brunton, F.R., and Dodge, J.E.P., 2008. Karst of Southern Ontario and Manitoulin Island. Ontario Geological Survey Groundwater Resources, Study 5.

Chapman, L.J. and Putnam, D.F., 1984. The Physiography of Southern Ontario. Ontario Geological Survey, Special Volume 2, 270 p.

Fetter, C.W., 1994. Applied Hydrogeology, 3rd Edition. Prentice Hall, University of Wisconsin – Oshkosh.

Gale, J.E., Nadon, R.L., Mackay, D.A. and Swezey, R.A., 1983. Impact of Groundwater on Surface and Subsurface Mining Activities in the Niagara Escarpment. Ontario Geological Survey Miscellaneous Paper 113, Geoscience Research Grant Program, Summary of Research 1982-1983.

Haynes, S.J., 1994. Geology, Scenery and Wines of the Niagara Escarpment. Field Trip A3: Guidebook, Geological Association of Canada, Mineralogical Association of Canada.

Ministry of Municipal Affairs and Housing, 2014. 2014 Provincial Policy Statement under the Planning Act.

Ministry of Natural Resources, 2012. Niagara Escarpment Parks and Open Space System Planning Manual.

Murphy, B., 2015 Cave Springs, A Geologic Description. Prepared for the Cave Springs Management Plan.

Niagara Escarpment Commission, 2013. Niagara Escarpment Plan Review 2015, Discussion Paper, Topic 5, Niagara Escarpment Plan Water Policies.

Niagara Peninsula Conservation Authority, 2016. Water Resource Assessment Study for the Cave Springs Conservation Area Management Plan.

Reed, M., 1998. The Cave Springs Mystique.

Steele, K.G., and Haynes, S.J., 2000. Mines and Wines: Industrial Minerals, Geology and Wineries of the Niagara Region – Field Trip Guidebook. Ontario Geological Survey, Open File Report 6029.

ECOLOGICAL REFERENCES

Arizona-Sonora Desert Museum. Animal Fact Sheet. Mexican Free-tailed Bat. November. (Accessed 6, 2015). https://www.desertmuseum.org/kids/bats/mexican_free_tailed_bat.php

Bennett, Karen P. editor. 2010. Good Forestry in the Granite State: Recommended Voluntary Forest Management Practices for New Hampshire (second edition). University of New Hampshire Cooperative Extension, Durham, New Hampshire “Cavity Trees, Dens and Snags”. (Assessed September 8 2015). <https://extension.unh.edu/goodforestry/html/6-2.htm>

Berger, Rebekah. 2006. Fall Den Site Selection of Southern Flying Squirrels in Schmeekle Reserve. Wildlife Ecology University of Wisconsin-Stevens Point.

British Bryological Society. October 2013. BBS Field Guide. Mosses *Tortula muralis* Factsheet. (Accessed November 24, 2015). www.bbsfieldguide.org.uk/sites/default/files/pdfs/mosses/Tortula_muralis.pdf *tortula muralis*

British Bryological Society. October 2013. BBS Field Guide. Mosses *Conardia compacta* *Amblystegium compactum*. Compact Feather-moss. (Accessed November 24, 2015).

COSEWIC. 2013. COSEWIC assessment and status report on the Little Brown Myotis *Myotis lucifugus*, Northern Myotis *Myotis septentrionalis* and Tri-colored Bat *Perimyotis subflavus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxiv + 93 pp

COSEWIC. 2012. COSEWIC assessment and status report on the Wood Thrush *Hylocichla ustulata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 46 pp

Cornell University. 2015. The Cornell Lab of Ornithology All About Birds. Barn Swallow. (Accessed November 5, 2015). https://www.allaboutbirds.org/guide/Barn_Swallow/id

Cornell University. 2015. The Cornell Lab of Ornithology All About Birds. Common Nighthawk. (Accessed November 5, 2015). https://www.allaboutbirds.org/guide/Common_Nighthawk/id

Cornell University. 2015. The Cornell Lab of Ornithology All About Birds. Eastern Phoebe. (Accessed November 5, 2015). https://www.allaboutbirds.org/guide/Eastern_Phoebe/id

Cornell University. 2015. The Cornell Lab of Ornithology All About Birds. Eastern Wood Pewee. (Accessed November 5, 2015). https://www.allaboutbirds.org/guide/Eastern_Wood-Pewee/id

Cornell University. 2015. The Cornell Lab of Ornithology All About Birds. Great Crested Flycatcher. (Accessed November 5, 2015). https://www.allaboutbirds.org/guide/Great_Crested_Flycatcher/id

Cornell University. 2015. The Cornell Lab of Ornithology All About Birds. Hooded Warbler. (Accessed November 5, 2015). https://www.allaboutbirds.org/guide/Hooded_Warbler/id

Cornell University. 2015. The Cornell Lab of Ornithology All About Birds. Red-eyed Vireo. (Accessed November 5, 2015). https://www.allaboutbirds.org/guide/Red-eyed_Vireo/id

Cornell University. 2015. The Cornell Lab of Ornithology All About Birds. Virginia Rail. (Accessed November 5, 2015). https://www.allaboutbirds.org/guide/virginia_rail/lifehistory

Cornell University. 2015. The Cornell Lab of Ornithology All About Birds. Wood Thrush. (Accessed November 5, 2015). https://www.allaboutbirds.org/guide/wood_thrush/lifehistory

Crum, Howard. 1983. Mosses of the Great Lakes Forest. Third Edition. University Herbarium, University of Michigan. Ann Arbor Michigan

Discover Southern Ontario. Ontario Wildlife. Coyotes (*Canis latrans*). (Accessed November 17, 2015). <http://www.discover-southern-ontario.com/coyotes.html>

Environment Canada and Canadian Wildlife Federation. Hinterland Who's Who. Little Brown Bat. (Accessed November 5, 2015). <http://www.hww.ca/en/wildlife/mammals/little-brown-bat.html>

Environment Canada. 2014. Recovery Strategy for the Eastern Flowering Dogwood (*Cornus florida*) in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. 16 pp. + Appendices.

Environment Canada. Species at Risk Public Registry. August 14, 2015. American Chestnut. (Accessed August 14, 2015). http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=205

Environment Canada. Species at Risk Public Registry. August 14, 2015. Southern Flying Squirrel (*Glaucomys Volans*). (Accessed November 18, 2015). <http://www.sararegistry.gc.ca/default.asp?lang=En&n=E0C39EEE-1&offset=8&toc=show>

Environment Canada. Species at Risk Public Registry. August 14, 2015. Species Profile Hooded Warbler. (Accessed November 5, 2015). http://www.registrelep-sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=37

Environment Canada. Species at Risk Public Registry. August 14, 2015. Species Profile Wood Thrush. (Accessed November 5, 2015). Wood Thrush November 5, 2015. http://www.registrelep-sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=1197

Environment Canada. Species at Risk Public Registry. August 14, 2015. Species Profile. Kentucky Coffee tree. (Accessed November 24, 2015). http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=222

Environment Canada. Canadian Wildlife Service. July 2014. Consultation on the Impacts of Adding Three Bat Species to the List of Species under the Species at Risk Act – July 2014. Species at Risk Public Registry

Environment Canada. 2012. Recovery strategy for the Acadian Flycatcher (*Empidonax virescens*) and the Hooded Warbler (*Wilsonia citrina*) in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa, Ontario. viii + 32 pp.

Environment Canada. 2015. Recovery Strategy for the Common Nighthawk (*Chordeiles minor*) in Canada [Proposed]. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. vi + 48 pp.

Gerson, Helen. August 1984. Habitat Management Guidelines for Bats of Ontario. Ontario Ministry of Natural Resources. Ontario Ministry of Natural Resources.

Idaho Museum of Natural History. *Lasiurus cinereus* (Hoary Bat). Accessed November 17, 2015. <http://www.imnh.isu.edu/digitalatlas/bio/mammal/Bats/hoba/hobat.htm>

Jalava, J.V., B. Larson, C.A. Schaefer and S. Varga. 1992. Biological Inventory and Evaluation of the Beamsville Escarpment Area of Natural and Scientific Interest, Ontario Ministry of Natural Resources, Southern Region, Aurora, Ontario; Open File Ecological Report 9203. V+80 pages +3 folded maps

Mark Browning, OMNRF. Personal communication November 4, 5 and 25, 2015.

Ministry of Environment, Lands and Parks. Resources Inventory Branch for the Terrestrial Ecosystems Task Force Resources Inventory Committee. March 13, 1998. Inventory Methods for Pond-breeding Amphibians and Painted Turtle. Standards for Components of British Columbia's Biodiversity No. 37. Version: 2.0

NatureServe Explorer. An Online Encyclopedia of Life. *Desmatodon porter*. January 2015. (Accessed November 21, 2015). <http://explorer.natureserve.org/servlet/NatureServe?searchName=Desmatodon+porteri>

New England Wild Flower Society. 2011-2015. Go Botany. *Carex oligocarpa*. Rich Woods Sedge. (Accessed November 26, 2015). <https://gobotany.newenglandwild.org/species/carex/oligocarpa/>

Ohio Moss & Lichen Association. *Tortula porter*. (Accessed November 24, 2015). <http://ohiomosslichen.org/moss-tortula-porteri/>

Ontario Fur Managers Federation. 2012. Coyote. (Accessed November 17, 2015). <http://www.furmanagers.com/#!/coyote/c1rpu>

Ontario Fur Managers Federation. 2012. Red Fox. (Accessed November 17, 2015). <http://www.furmanagers.com/#!/red-fox/c1z94>

Ontario Nature. Bats Chiroptera. (Accessed November 6, 2015). http://www.ontarionature.org/discover/resources/PDFs/atlas/mammal_atlas_bats.pdf

Ontario Ministry of Natural Resources. 2011. A Land Manager's Guide to Conserving Habitat for Forest Birds in Southern Ontario. Queen's Printer for Ontario, Toronto.

Ontario Ministry of Natural Resources. Schaefer et al. 1992. Biological Inventory and Evaluation of Jordan Valley Area of natural and Scientific Interest

Ontario Ministry of Natural Resources and Forestry. Common Nighthawk. Scientific name: *Chordeiles minor* (Accessed November 17, 2015). <http://www.ontario.ca/page/common-nighthawk>

Ontario Ministry of Natural Resources. Kor, PSG. 1991. Earth Science Inventory and Evaluation of the Jordan Harbour Area of Natural and Scientific Interest. Aurora. Ontario Heritage Foundation Niagara Escarpment Heritage Protection and Land Stewardship Program

Ontario Ministry of Natural Resources and Forestry. Eastern small-footed bat Scientific name: *Myotis leibii*. (Accessed November 5, 2015). <http://www.ontario.ca/page/eastern-small-footed-bat#!/>

Ontario Ministry of Natural Resources. 2000. Extension Notes. Conserving The Forest Interior: a Threatened Wildlife Habitat. Queen's Printer for Ontario. Toronto.

Ontario Ministry of Natural Resources and Forestry. 'Little Brown Bat'. (Accessed November 5, 2015). <http://www.ontario.ca/page/little-brown-bat>

Ontario Ministry of Natural Resources and Forestry. Little brown bat. Scientific name: *Myotis lucifugus*. (Accessed November 17, 2015). <http://www.ontario.ca/page/little-brown-bat#!/>

Ontario Ministry of Natural Resources and Forest. Ontario. Mammals at risk in Ontario. A list of species at risk for the selected Ontario Region. (Accessed November 6, 2015). <http://www.ontario.ca/environment-and-energy/species-risk-type?name=Mammals>

Ontario Ministry of Natural Resources and Forestry. Natural Heritage Information Centre. Species List. (Accessed November 6, 13, 2015). www.ontario.ca/page/get-natural-heritage-information#1

Ontario Ministry of Natural Resources and Forestry. Northern long-eared bat. Scientific name: *Myotis septentrionalis*. (Accessed November 17, 2015). <http://www.ontario.ca/page/northern-long-eared-bat#!/>

Ontario Ministry of Natural Resources, Parks and Recreation Section, Central Region. February 1983. Regional and Local Earth Science Areas of Natural and Scientific Interest in Niagara District.

Ontario Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. OMNR. Fish and Wildlife Branch Wildlife Section. Science Development and Transfer Branch Southcentral Sciences Section

Ontario Ministry of Natural Resources. Karine Berault. Personal Communication. All Species Occurrence for Site and Area.

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

Stantec, Pre-Construction Monitoring Report Niagara Region Wind Farm File No. 160950269. July 23, 2014. Stantec. Kitchener, ON

State University of New York College of Environmental Science and Forestry, ESF. Adirondack Ecological Centre. ESF Newcomb Camps. Small-footed Bat (*Myotis leibii* Audubon and Bachman. (Accessed November 5, 2015). http://www.esf.edu/aec/adks/mammals/smallfooted_bat.htm

State University of New York College of Environmental Science and Forestry, ESF. Adirondack Ecological Centre. ESF Newcomb Camps. Silver-haired Bat

(*Lasiurus noctivagus* Leconte). (Accessed November 17, 2015). http://www.esf.edu/aec/adks/mammals/silverhaired_bat.htm

State University of New York College of Environmental Science and Forestry, ESF. Adirondack Ecological Centre. ESF Newcomb Camps. Southern Flying Squirrel (*Glaucomys volans* Linnaeus). From Saunders, D. A. 1988. Adirondack Mammals. State University of New York, College of Environmental Science and Forestry. 216pp. (Accessed November 21, 2015). http://www.esf.edu/aec/adks/mammals/southern_flying_squirrel.htm

Steinhoff, G. et.al. 2012 Nesting Patterns of Southern Flying Squirrels in Managed Northern Hardwoods. . Journal of Mammalogy . Vol. 93. Issue 2. Pg. 532-539.

Taylor, Daniel A.R., 2006. Forest Management & Bats. Bat Conservation International

United States Fish and Wildlife, 'Northern Long-Eared Bat (*Myotis septentrionalis*) Fact Sheet'. (Accessed November 5, 2015). https://www.whitenosesyndrome.org/sites/default/files/resource/national_wns_revise_final_6.25.12.pdf

USGS National Wildlife Health Centre. White-Nosed Syndrome.org A Coordinated Response to the Devastating Bat Disease. Decontamination. Current Decontamination Protocols. (Accessed November 5, 2015.). https://www.whitenosesyndrome.org/sites/default/files/resource/national_wns_revise_final_6.25.12.pdf

University of Michigan. BioKids. Kids' Inquiry of Diverse Species. Hoary Bat. *Lasiurus cinereus*. (Accessed November 17, 2015). http://www.biokids.umich.edu/critters/Lasiurus_cinereus

University of Michigan. BioKids. Kids' Inquiry of Diverse Species. Silver-haired bat *Lasiurus noctivagus* (Accessed November 17, 2015). http://www.biokids.umich.edu/critters/Lasiurus_noctivagus/

University of Michigan. BioKids. Kids' Inquiry of Diverse Species big brown bat. *Eptesicus fuscus*. (Accessed November 17, 2015). http://www.biokids.umich.edu/critters/Eptesicus_fuscus/

USDA Forest Service. Eastern Region. September 2001. Revised Biological Assessment for Threatened and Endangered Species on the Monongahela National Forest West Virginia. September 2001. USDA Forest Service. Milwaukee, WI

WATER RESOURCE REFERENCES

- AMEC Environment & Infrastructure, 2012.
Groundwater and Surface Water Impact
Assessment Cave Springs Camp.
- Appelo, C.A.J. and Postma, D., 1999.
Geochemistry, Groundwater and Pollution.
Published by A.A. Balkema.
- American Geological Institute, 1974.
Glossary of Geology.
- Armstrong, D.K. and Carter, T.R., 2010.
The subsurface Paleozoic stratigraphy
of southern Ontario; Ontario Geological
Survey, Special Volume 7, 301p.
- Brown, D.M., McKay, G.A. and Chapman, L.J., 1980.
The Climate of Southern Ontario. Climatological
Studies number 5, Environment Canada,
Atmospheric Environment Service.
- Brunton, F.R., and Dodge, J.E.P., 2008.
Karst of Southern Ontario and Manitoulin
Island. Ontario Geological Survey
Groundwater Resources, Study 5.
- Chapman, L.J., and Putnam, D.F., 1984.
The Physiography of Southern Ontario. Ontario
Geological Survey, special Volume 2, 270 p.
- Cowell, D.W., 2012.
Opportunistic Capture in Speleogenesis on
Ontario's Niagara Escarpment. Presentation at
39th IAH Congress, Niagara Falls, Ontario.
- Cowell, D.W. and Woerns, N., 1976.
Earth Science Candidate Nature Reserves in
the Niagara Escarpment Planning Area; Ontario
Ministry of Natural Resources, Division of Parks,
Systems Planning Section, Park Planning
Branch, Environmental Planning Series VII, 2.
- Fetter, C.W., 1994.
Applied Hydrogeology, 3rd Edition. Prentice
Hall, University of Wisconsin – Oshkosh.
- Gale, J.E., Nadon, R.L., Mackay, D.A.
and Swezey, R.A., 1983.
Impact of Groundwater on Surface and Subsurface
Mining Activities in the Niagara Escarpment.
Ontario Geological Survey Miscellaneous
Paper 113, Geoscience Research Grant
Program, Summary of Research 1982-1983.
- Hartwig, E., 2015.
DRAFT Water Servicing Assessment.
Prepared for Cave Springs Management
Plan, Water Resources Assessment.
- Haynes, S.J., 1994.
Geology, Scenery and Wines of the Niagara
Escarpment. Field Trip A3: Guidebook,
Geological Association of Canada,
Mineralogical Association of Canada.
- Haynes, S.J., 2000.
Geology and Wine 2. A geological foundation for
terroirs and potential sub-appellations of Niagara
Peninsula wines, Ontario, Canada; Geoscience
Canada, Volume 27, Number 2, June 2000, p.67-87.
- Irwin, K., Bergmann, B. and Boos, J., 2013.
The Stream Permanency Handbook for
South-Central Ontario. Prepared for the
Ontario Ministry of Natural Resources.
- Jagger Hims Limited, 1999.
Detailed Hydrogeologic Study, Vineland
Quarries Expansion. Prepared for Vineland
Quarries and Crushed Stone Limited.
- Johnston, R.H., 1964.
Groundwater in the Niagara Falls Area, New York.
Prepared for State of New York Conservation
Department Water Resources Commission, U.S.
Geological Survey Groundwater Bulletin 53.
- Kingston, M.S. and Presant, E.W., 1989.
The Soils of the Regional Municipality of Niagara,
Volume 1. Report No. 60 of the Ontario Institute of
Pedology. Ontario Ministry of Agriculture and Food.
- Kitchen, R., 2015.
Channel Structure Assessment of Margaret's
Creek 2015. Prepared for the Cave Springs
Management Plan, Water Resources Assessment.
- Menzies, J. and Taylor, E.M., 1988.
Urban Geology of St. Catharines-Niagara Falls,
Niagara Region. Urban Geology of Canadian Cities
Geological Association of Canada Special Paper 42.
- Ministry of Municipal Affairs and Housing, 2014.
2014 Provincial Policy Statement
under the Planning Act.
- Ministry of Natural Resources, 2012.
Niagara Escarpment Parks and Open
Space System Planning Manual.

Ministry of Natural Resources, Central Region,
Parks and Recreation Section, 1983.
Regional and Local Earth Science Areas of Natural
and Scientific Interest in Niagara District.

Murphy, B, 2015.
Cave Springs, A Geologic Description. Prepared
for the Cave Springs Management Plan.

Niagara Escarpment Commission, 2013.
Niagara Escarpment Plan Review 2015,
Discussion Paper, Topic 5, Niagara
Escarpment Plan Water Policies.

Novakowski, K.S. and Lapcevic, P.A., 1988.
Regional Hydrogeology of the Silurian and
Ordovician Sedimentary Rock Underling
Niagara Falls, Ontario, Canada. *Journal
of Hydrology*, vol 104, p.211-236.

Ontario Geological Survey, 2003.
Surficial geology of southern Ontario.
Miscellaneous Release Data – 128. Project
Summary and Technical Document, 53 pp.

Province of Ontario, 2005.
Niagara Escarpment Plan.

Rannie, W.F., 1976.
Cave Springs Camp.

Rannie, W.F., 1968.
Cave Springs Farm.

Reed, M., 1998.
The Cave Springs Mystique.

Schubert, R.H.W, 1975.
The detection of spores of the *Bacillus* Species
within the Scope of the Hygienic Control of Water
Pollution. *Zbl.Bakt.Hyg., I.Abt. Orig. B* 160, 155-162.

Schroeter & Associates, 2007.
Meteorological Data Missing-Value Fill-
in Study for Ontario. Memo to the Grand
River Conservation Authority.

Shaw, A.B.
Diagrams and Technical Information
for the Niagara Peninsula.

Steele, K.G., and Haynes, S.J., 2000.
Mines and Wines: Industrial Minerals,
Geology and Wineries of the Niagara Region
– Field Trip Guidebook. Ontario Geological
Survey, Open File Report 6029.

Tchobanoglous, G. and Schroeder, E.D, 1987
Water Quality. Published by Addison-
Wesley Publishing Company.

Terra-Dynamics Consulting Inc., 2006.
Geologic Hazard Mapping Study, Karst Topography,
Phase I, NPCA Watershed Area. Prepared for
the Niagara Peninsula Conservation Authority.

Turner, 1978.
Major Aquifers in Ontario, Guelph-Lockport Aquifer.
Prepared for the Ontario Ministry of the Environment,
Water Resources Branch, Hydrogeologic Map 78-6.

Viessman, W. Jr. and Lewis, G.L., 1996.
Introduction to Hydrology, 4th Edition.
Harper Collins College Publishers.

Walling, D.E., 1980.
Water in the catchment ecosystem. In A.M.
Gower (ed.), *Water quality in catchment
ecosystems*. Wiley & Sons, New York. 1-48.

Waterloo Hydrogeologic Inc., 2005.
NPCA Groundwater Study.

WSP Canada Inc., 2015.
Vineland Quarry, 2014 Water Monitoring Program
Report. Prepared for Walker Aggregates Inc.

WSP Canada Inc., 2014.
Quarry Road Landfill Site, Town of Lincoln,
2013 Annual Monitoring Report. Prepared
for the Regional Municipality of Niagara.



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