Hamilton Conservation Authority

Healthy Streams...Healthy Communities!

Hamilton Conservation Authority Wildlife Conflict Management Strategy

November 2015

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Acknowledgements

This document was produced by the Hamilton Conservation Authority Wildlife Management Committee (WMC). The WMC was a special committee of the Hamilton Conservation Authority (HCA) that was established in May 2014 based on HCA staff recommendation and at the direction of the HCA Board of Directors. The purpose of the WMC was to develop best management protocols and practices for the management of wildlife on HCA lands.

The WMC was comprised of staff from different HCA program areas and divisions to provide for varied perspectives and experiences for the WMC to draw on. Members of the WMC were as follows:

Gord Costie – Director of Conservation Area Services
Rob Howe – Manager of Fifty Point Conservation Area
Lisa Jennings – Aquatic Ecologist
Lesley McDonell – Terrestrial Ecologist
Mike Stone – Manager of Watershed Planning Services
Jim Howlett – HCA Board of Directors Chair (December 2014 – May 2015) and Vice-Chair (2001 – 2014)

The WMC met regularly over the 2014 – 2015 period. Key tasks undertaken by the committee during this period in support of the preparation of this document included documentation of wildlife conflicts experienced on HCA lands, evaluation of existing HCA wildlife management practices, and review of the legislative and regulatory framework governing wildlife management in Ontario. The WMC also consulted with the following agencies and organizations that have some responsibility for or interest in wildlife conflict management issues:

- Ministry of Natural Resources and Forestry
- City of Hamilton Animal Services
- Ontario Fur Managers
- Animal Alliance of Canada
- Hamilton/Burlington Society for the Prevention of Cruelty to Animals
- Hamilton Naturalists' Club
- Haudenosaunee Wildlife and Habitat Committee
- Association for the Protection of Fur Bearing Animals

The WMC appreciates the opportunity to have corresponded with these groups. The perspectives and information shared by each on wildlife conflict management has been helpful in the development of this document.

The WMC would also like to thank all the HCA Conservation Area Managers and Superintendents for their time and input in helping to document existing wildlife conflicts and management practices on HCA lands. The WMC further appreciates the support and comments provided by the HCA Conservation Advisory Board and HCA Board of Directors at various junctures throughout the development of this strategy document.

Executive Summary

The Hamilton Conservation Authority (HCA) has a mandate to undertake programs on a watershed basis to further the conservation and sustainable management of natural resources. The HCA implements programs to manage water resources, protect people and property from flooding and erosion hazards, monitor and conserve the natural environment, and provide recreational and educational opportunities. In support of the these programs, the HCA owns and manages a number of Conservation Areas and other conservation lands totalling approximately 4,400 ha.

The HCA faces a number of challenges in carrying out its diverse mandate, including challenges associated with managing wildlife at its Conservation Areas and other conservation lands. Although wildlife conflicts have generally been limited on HCA lands, management actions have been required in some circumstances to ensure human health and safety, to conserve important natural heritage features, and to protect property and infrastructure.

The HCA established a Wildlife Management Committee (WMC) in May 2014 to develop best management protocols and practices for the management of wildlife on HCA lands. The WMC produced the *Hamilton Conservation Authority Wildlife Conflict Management Strategy* ('WCMS' or 'the Strategy') to summarize its work and outline the approaches HCA will use to manage wildlife conflicts at its Conservation Areas and other conservation lands.

The Strategy was developed with the objectives of minimizing the potential for wildlife conflicts on HCA lands, supporting the environmentally sustainable management of HCA lands, providing for the safe enjoyment of HCA's Conservation Areas and the protection of HCA property, and promoting improved understanding of wildlife and wildlife conflict management issues among HCA staff and the public.

Part I of the WCMS reviews and summarizes existing wildlife-related legislation and regulations that govern wildlife management in Ontario, and describes the roles and responsibilities of the various agencies and groups involved in wildlife management. The HCA does not administer or enforce legislation or regulations that relate to the management of wildlife, or have any responsibility for the management of wildlife on property it does not own or manage. However, HCA must adhere to all applicable wildlife management laws when undertaking wildlife management activities on its lands.

Part II of the Strategy defines a wildlife conflict management policy and supporting guiding principles the HCA will use to evaluate and guide the management of wildlife conflicts at its Conservation Areas and other conservation lands. Part II of the Strategy also identifies and describes a range of management approaches and techniques the HCA may use to address wildlife conflict situations, including habitat management and modification, exclusion, harassment, relocation, trapping and education and outreach.

A key principle of the WCMS is that wildlife will be allowed to carry out their life processes without management intervention wherever possible. The focus of HCA's management efforts will be on conflict prevention and reduction through approaches that promote coexistence between people and wildlife. Trapping may be used in circumstances where other management approaches have not been successful or are impractical, or where an animal poses a significant threat to human health and safety or is causing damage to property or significant natural heritage features.

Part III of the Strategy defines a series of animal and conflict situation specific best management protocols and practices that were developed based on wildlife conflicts the HCA has experienced. Each protocol includes a general summary of the animal's biology, describes the conflicts HCA has experienced, and provides direction on how HCA will respond to the identified conflict situation in terms of communications, monitoring and prioritization of management approaches.

The WCMS is intended to be a living document, and may be updated as necessary to reflect new information and evolving best practices.

PART I – Background & General Information

1.0 Introduction

The Hamilton Conservation Authority (HCA) is a watershed-based organization established under the provisions of the *Conservation Authorities Act*. Since 1958 the HCA has dedicated itself to the management and conservation of watershed lands and water resources for the benefit of people, communities and the environment.

The HCA watershed is approximately 568 km^2, and includes a population of over 700,000 residents. There are 6 major watercourse systems within the watershed, which drain from above the Niagara Escarpment, through southern Puslinch Township and the former municipalities of Flamborough, Dundas, Ancaster, Glanbrook, Stoney Creek and Hamilton, and ultimately to Hamilton Harbour and Lake Ontario. The watershed is comprised of both urban and rural lands, and contains a number of significant natural areas which support a rich biodiversity.

Within the watershed the HCA implements programs to manage water resources, protect people and property from flooding and erosion hazards, monitor and conserve the natural environment, and provide recreational and educational opportunities. In support of its mandate, the HCA owns and manages approximately 4,400 ha of land and water.

This includes conservation lands that contain significant Niagara Escarpment properties, extensive wetland areas, and large tracts of forest set aside for the purpose of natural heritage protection and passive recreational use. The HCA also operates a number of Conservation Areas with more significant facility development and infrastructure that support a wide range of recreational uses, activities and events.

The HCA faces a number of challenges in carrying out its diverse mandate. This includes challenges associated with managing wildlife at Conservation Areas and other conservation lands. Wildlife management actions have been required on HCA lands in some circumstances where conflicts have arisen between wildlife and people, Conservation Area activities, and land management and program objectives. In some of these cases, management action has been taken to ensure human health and safety, to conserve important natural heritage features, or to protect infrastructure investment.

Although HCA staff have some experience dealing with a variety of wildlife, including raccoons, skunks, coyotes, Canada Geese, and beavers, overall, wildlife conflicts at HCA's Conservation Areas and other conservation lands have been limited. Where management has been required in the past, HCA has generally relied on trapping and relocation to address wildlife management conflicts.

The purpose of this document is to outline the HCA's strategy for managing wildlife conflicts at HCA's Conservation Areas and other conservation lands. More specifically, the HCA *Wildlife Conflict Management Strategy* ('WCMS' or 'the Strategy') has the following objectives:

- To minimize the potential for wildlife conflicts on HCA lands;
- To support the environmentally sustainable management of HCA lands and conservation of healthy functioning ecosystems;
- To provide for the safe enjoyment of HCA Conservation Areas and protection of HCA property and infrastructure; and
- To promote improved understanding among HCA staff and the public of wildlife, wildlife conflict management, and related legislation, regulations and agency roles and responsibilities.

To achieve these objectives, the WCMS identifies general policy, principles and management approaches the HCA will use to guide the management of wildlife and wildlife conflicts on the lands it owns and manages. The Strategy also establishes best management protocols and practices for dealing with a number of specific wildlife conflict situations.

The development and implementation of the WCMS supports HCA's corporate vision, mission, and strategic goals and objectives, as outlined in *The Hamilton Conservation Authority Strategic Plan, 2014-2018* (HCA, 2014). It is intended that the Strategy will be a living document, which will be updated as necessary to reflect new information and evolving best practices.

2.0 Summary of Wildlife Management Agency Roles and Responsibilities, Legislation and Regulations

The legislative and organizational framework for wildlife management in Ontario is somewhat complex. There are a variety of statues and regulations that guide wildlife management, along with a number of agencies and organizations that have responsibility for or may play a role in managing wildlife. This includes federal, provincial and municipal governments, as well as humane societies, animal control organizations, and private landowners.

This section provides a general overview and summary of the roles and responsibilities of the main groups involved in wildlife management, along with a description of the key laws and regulations administered by each group where applicable. Although not all of the information reviewed here relates specifically to wildlife conflict, having a general understanding of the various statutes and regulations that govern wildlife management more broadly provides useful context for the Strategy.

2.1 Federal Government

2.1.1 Environment Canada

Environment Canada (EC) is the main department within the federal government that deals with wildlife management related matters. EC provides scientific expertise to other federal departments, as well as provincial, territorial and municipal governments. EC has a broad environmental mandate, which includes the preservation and enhancement of the natural environment. With respect to wildlife, EC has responsibility for the protection of migratory birds and species at risk, which is promoted through the management of a network of protected areas and wildlife habitat programs and initiatives. EC administers a number of statutes and regulations to implement its mandate and program areas.

2.1.1.1 Canada Wildlife Act

EC manages a network of National Wildlife Areas (NWA), which are established under the authority of the *Canada Wildlife Act* (CWA) which was passed in 1973. NWA are created and managed to protect wildlife and wildlife habitat for the purposes of conservation, research and interpretation. There are currently 54 NWA across Canada, which protect approximately 1 million hectares of nationally significant lands and waters for wildlife. *Wildlife Area Regulations* administered under the CWA prohibit certain activities that would be harmful to wildlife or their habitat unless a permit has been issued.

2.1.1.2 Migratory Bird Convention Act

EC also administers the *Migratory Bird Convention Act* (MBCA) and its associated regulations to protect migratory birds, including their eggs and nests. The MBCA was first passed in 1917, and was updated in 1994 and 2005. The MBCA and its regulations

generally prohibit the hunting, disturbance, destruction or possession of birds, eggs or nests. Some activities that would otherwise be prohibited may be allowed subject to obtaining a permit. The MBCA also provides for the establishment of Migratory Bird Sanctuaries (MBS) to protect habitat important to migratory birds.

The breeding season is a critical time in the life cycle of migratory birds. During this time, birds and their nests are at greater risk from activities that may disrupt the breeding cycle. The inadvertent harming, disturbance or destruction of birds, nests or eggs is referred to as 'incidental take'. Incidental take can result in investigation and prosecution by EC. The current regulations under the MBCA do not provide for the issuance of permits for incidental take. However, EC does provide general advice and avoidance guidelines and information for the development of beneficial management practices to minimize the risk of incidental take.

EC has also published a handbook that provides general information and outlines strategies and techniques specific to the management of Canada Geese and Cackling Geese, which are protected under the MBCA (Environment Canada, 2010).

In addition to federal law and regulations, birds in Canada are also protected under provincial and territorial statute. In Ontario, this includes the *Fish and Wildlife Conservation Act*, which is reviewed in more detail below.

2.1.1.3 Species at Risk Act

The federal *Species at Risk Act* (SARA) was passed in December 2002 and came into full effect in June 2004. The purpose of SARA is to prevent 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. Under the Act, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was established as an independent body of experts responsible for identifying and assessing wildlife species considered to be at risk.

SARA prohibits the killing, harming, harassing and possession of any species listed as extirpated, endangered or threatened, as well as the damage or destruction of a listed species residence. The destruction of 'critical habitat' is also prohibited under the Act, where critical habitat is identified as the habitat necessary for the survival or recovery of a listed species.

SARA requires the preparation of recovery strategies and action plans for species listed as extirpated, endangered or threatened, and management plans for species of special concern. Recovery strategies are prepared by recovery teams that are comprised of individuals from universities, conservation groups, industry and government that have specialized expertise and knowledge. In some cases, recovery strategies may be expanded to address entire ecosystems and not just individual species.

The Act also provides for the issuance of permits and agreements for activities that would otherwise be prohibited subject to meeting certain conditions.

For most extirpated, endangered and threatened species the provisions of SARA apply automatically only on federal lands. However, for aquatic species at risk and at risk birds listed under the MBCA, SARA also applies on private lands. Although EC is the lead federal ministry responsible for administering SARA, both Fisheries and Oceans Canada (DFO) and Parks Canada also play important roles in the implementation of the Act. Cooperation with other levels of government is also required. Provincial and territorial governments play an important role in the protection of species at risk on non-federal lands.

2.1.2 Fisheries and Oceans Canada

Fisheries and Oceans Canada (DFO) has the lead responsibility for managing Canada's fisheries and protecting its waters. DFO administers a number of acts and regulations for these purposes, including the *Fisheries Act*.

2.1.2.1 Fisheries Act

The *Fisheries Act* was first passed in 1868, making it one of Canada's oldest laws. Habitat protection and pollution prevention provisions were added to the Act in the 1970s. Amendments made to the *Fisheries Act* in November 2013 refocused the purpose and protection provisions of the Act to provide for the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries. The Act's supporting regulatory framework is focused on managing significant threats to fisheries and the habitat that supports them.

A key provision of the Act is the prohibition of work that would result in 'serious harm' to fish that are part of a commercial, recreational or Aboriginal fishery, where serious harm to fish is defined as the death of fish or any permanent alteration to, or destruction of, fish habitat. It is a project proponent's responsibility to ensure serious harm to fish is avoided. The DFO website provides advice and recommended measures for helping to avoid causing harm and complying with the Act. DFO has also established a self-assessment process for determining whether or not serious harm to fish may result and if a review of a project is required by DFO.

The Act provides that the Minister of Fisheries and Oceans may issue an authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in serious harm to fish. Where it has been determined that serious harm to fish will result from a proposed project, proponents must apply to DFO for a project authorization. As part of this application, proponents must describe how impacts will be avoided and/or mitigated. Where residual impacts remain, impact offsetting is required.

2.2 Government of Ontario

2.2.1 Ministry of Natural Resources and Forestry

The Ministry of Natural Resources and Forestry (MNRF) has a broad mandate to conserve and manage Ontario's natural resources in a sustainable manner. Areas of responsibility include Crown lands and waters, provincial parks, forests, fisheries, wildlife, mineral aggregates and petroleum resources. MNRF administers numerous statutes and regulations, and also conducts scientific research in support of its mandate and to inform the development of policies and guidelines and implementation of programs.

MNRF is the primary provincial agency responsible for wildlife, and administers the main statutes and regulations that govern wildlife management in Ontario.

2.2.1.1 Fish and Wildlife Conservation Act

The *Fish and Wildlife Conservation Act* (FWCA) provides the main legislative framework for the conservation and management of wildlife and fish in Ontario. The FWCA provides for and regulates hunting, trapping, fishing and related activities, including the capture, release, sale, purchase and transport of fish and wildlife. The Act also addresses hunting and trapping safety and methods, licensing and the protection of property. The FWCA establishes penalties for offences, which are enforced by Conservation Officers. The FWCA does not apply to migratory birds and species at risk, which are addressed under different legislation.

The FWCA is a lengthy and comprehensive statute. Some of the key provisions of the Act include:

Hunting, Fishing & Trapping

- Hunting and trapping generally require a licence and must be conducted in accordance with all applicable regulations.
- The damage or destruction of the dens of furbearing mammals, other than fox or skunk, is prohibited unless the person holds a licence to trap furbearing mammals.
- The damage or destruction of a beaver dam is prohibited unless the person holds a licence to trap furbearing mammals or is required to protect a person's property.
- Interfering with lawful hunting, trapping or fishing is prohibited.
- Hunting with a firearm is prohibited in some areas prescribed by regulation.
- To obtain a trapping licence a person must have completed an MNRF approved course in fur harvest, management and conservation, which includes training on the safe and humane use of certified traps.
- Licensed trappers may only use traps approved and certified by the regulations.
- Poisons and adhesives may not be used to kill, injure or trap wildlife, unless permitted by regulation or allowed under the *Pesticides Act.*

- A person shall not keep wildlife in captivity except under the authority of a licence or in accordance with the regulations of the Act.
- A person may keep injured, sick or immature wildlife in captivity if it is transferred to a veterinarian for treatment or to a wildlife custodian for the purpose of rehabilitation or care within 24 hours.

Protection of Property

- A person, or an agent (as authorized under the Act) on their behalf, may harass, capture or kill wildlife if they have reasonable grounds to believe that wildlife is damaging or about to damage their property. This does not apply to some species, including moose and caribou. The control of other species, including white-tailed deer, may require a specific authorization under the Act.
- In protecting property, a person may not harass, capture or kill more wildlife than is necessary, and may not cause any unnecessary suffering of wildlife.
- A person who captures but does not kill wildlife in the protection of property must release the wildlife as soon as possible, and within 24 hours after capture, in an area in close proximity to the capture site (generally within one kilometer) unless otherwise authorized by MNRF. Wildlife may not be released on private property without permission of the owner.

Agents

- A person may use an agent to assist in the protection of property if the agent has the authorization of the Minister or belongs to a class of agents prescribed by the regulations.
- Regulations under the Act identify the following classes of agents:
  - Licensed trappers;
  - Employees or agents of a municipality whose responsibilities relate to wildlife control;
  - Employees or agents of a member of the Ontario Society for the Prevention of Cruelty to Animals under the *Ontario Society for the Prevention of Cruelty to Animals Act*;
  - Persons whose business is primarily the business of removing nuisance wildlife if they harass wildlife or if they capture and release it if it is capable of being released;
  - Members of a landowner's immediate family;
  - Persons who hold a valid class H1 outdoors card, for purposes of killing or harassing the wildlife but not capturing it.
- The Minister may revoke an agent's authorization if the Minister is of the opinion that a person is not harassing, capturing or killing wildlife in a humane way or in accordance with the regulations.

2.2.1.2 Endangered Species Act

The *Endangered Species Act* (ESA) was originally passed in 1971. The Act was reviewed and updated in 2007 to provide stronger protection for species at risk and their habitat in Ontario. The purposes of the Act are to identify species at risk based on the best available scientific information, to protect species that are at risk and their habitats, and to promote the recovery of species that are at risk. The ESA includes a variety of provisions and tools to achieve these purposes.

The Committee on the Status of Species at Risk in Ontario (COSSARO) is the independent expert body responsible for reviewing the status of species in Ontario. COSSARO uses a science-based assessment process to classify species into categories based on the degree of risk faced by a species. Species may be identified as not at risk, data deficient (not enough information to determine status) or placed into one of four categories of at risk status – extirpated, endangered, threatened or special concern. Once a species is identified as being at risk it is added to the official list of Species at Risk in Ontario (SARO List), which is a formal regulation under the Act. Species classified as endangered or threatened automatically receive legal protection under the species and habitat protection provisions of the Act.

The ESA prohibits the harm and harassment of protected species, and the damage or destruction of their habitat. However, the Act and its associated general regulation (O. Reg. 242/08) also include provisions that allow for activities that may impact a species at risk or its habitat in some circumstances. One of the key tools provided for by the ESA in this regard are permits. Permits may be issued by the Minister for activities that are intended to promote the protection or recovery of a species, activities that are necessary for the protection of human health and safety, activities that will result in a significant social or economic benefit to Ontario, and for activities where an overall benefit to the impacted species will be achieved.

An overall benefit permit authorizes an individual or organization to undertake an activity that is not otherwise allowed under the ESA. ‘Overall benefit’ is generally interpreted to mean actions that contribute to improving the circumstances for the species in the province. To receive an overall benefit permit it must be demonstrated that an overall benefit to the species in Ontario will be achieved within a reasonable time frame through the requirements imposed by the conditions of the permit, that reasonable alternatives have been considered, including alternatives that would not adversely affect the species, and that reasonable steps to minimize adverse effects on the species are required by the conditions of the permit.

The ESA requires the preparation of recovery strategies for species listed as endangered or threatened on the SARO List, and the preparation of management plans for species listed as special concern. The ESA sets out timelines for producing recovery strategies and management plans. Strategies and plans may be produced on an ecosystem basis and to address more than one species.

2.3 City of Hamilton

2.3.1 Public Health

City of Hamilton Public Health administers a broad variety of programs and services related to health promotion and disease prevention. Health Units in Ontario are governed by a board of health, which is an autonomous corporation under the *Health Protection and Promotion Act*, and which is administered by the medical officer of health who reports to the local board of health. Funding for a health unit is shared by the municipality and the Ministry of Health and Long-Term Care.

With respect to wildlife, Hamilton Public Health responds to calls where people suspect or have a concern related to diseases that can be spread through contact with wildlife, including rabies and Lyme disease. In responding to such calls, Public Health helps to assess risks and provide information and advice regarding prevention and treatment. Hamilton Public Health also administers a West Nile virus control program, including the provision of information, monitoring of standing water (breeding areas) and conducting larvicide treatment of high-risk areas.

2.3.2 Animal Services

City of Hamilton Animal Services performs a range of functions and services related to the care and management of domestic pets and animals, and wildlife. This includes running an animal shelter, receiving and responding to calls regarding lost and found pets and stray animals, dog licensing and delivering education programs on responsible pet ownership. Animal Services works closely with the Hamilton/Burlington Society for the Prevention of Cruelty to Animals (SPCA).

With respect to non-domestic, wild animals, Animal Services main responsibilities are to respond to reports of dead, injured or sick wildlife, and where there is an imminent danger to the public from wildlife. Animal Services advises residents to contact Public Health if there is a perceived health risk from an animal.

Animal Services does not rehabilitate wild animals, but will hold them for up to 24 hours before handing them over to a veterinarian or other wildlife care provider, in accordance with provincial regulations. Animal Services also provides general information and advice for residents on how to protect their property from nuisance wildlife and to limit negative interactions.

2.3.3 *Wildlife Feeding By-Law*

The City of Hamilton passed a by-law under the *Municipal Act* on June 13, 2012 to regulate the feeding of wildlife in the City (By-Law No. 12-130). The by-law was passed to help reduce undesirable interactions between wildlife and humans, pets and property. It was developed in recognition that there are proven negative effects when wild animals are attracted to areas where people reside through the feeding of animals, and that

unsafe conditions have been experienced in Hamilton as a result of feeding wildlife, including deer and coyotes.

The by-law prohibits the feeding of wildlife, which is defined as any animal that belongs to a species that is wild by nature. The by-law includes some exceptions for the feeding of birds on private property, but not including waterfowl such as ducks and geese which are considered to be wildlife. Fines range from up to $10,000 on a first conviction, and up to $25,000 on any subsequent conviction.

2.3.4 *Discharge of Firearms By-Law*

The City of Hamilton also maintains a by-law related to the discharge of firearms within the City (By-Law No. 05-114). The by-law generally prohibits the discharge of a firearm or bow, except in areas identified in the map schedules to the by-law. The by-law provides exception for the use of a firearm on privately owned agricultural land for the purpose of protecting livestock or produce from imminent danger from an animal.

2.4 Ontario Society for the Prevention of Cruelty to Animals (OSPCA)

The Ontario Society for the Prevention of Cruelty to Animals (OSPCA) is a non-profit charitable animal welfare organization. The OSPCA's mission is to facilitate and provide for province-wide leadership on matters relating to the prevention of cruelty to animals and the promotion of animal welfare. The OSPCA operates through a province-wide network of community affiliate SPCA organizations that provide programs and services for the protection and care of animals, including cruelty investigations, emergency rescue and treatment, sheltering and adoptions, and advocacy and education.

The *Ontario Society for the Prevention of Cruelty to Animals Act* (OSPCA Act) mandates SPCA organizations to enforce animal cruelty laws, and provides SPCA inspectors with police powers to do so. The Act prohibits any person to cause an animal to be in distress, or an owner or custodian of an animal to permit the animal to be in distress. The Act also requires that every person who owns or has custody or care of an animal shall comply with basic standards of care relating to nutrition, medical attention, living conditions, safety and general welfare. These requirements are defined in the Standards of Care regulation under the Act (O. Reg. 60/09). The provisions of the OSPCA Act are generally not applicable where an activity is regulated by the *Fish and Wildlife Conservation Act*.

2.4.1 Hamilton/Burlington SPCA

The Hamilton/Burlington SPCA (HBSPCA) is the local OSPCA affiliate operating in the City of Hamilton. In keeping with the mandate and mission of the OSPCA, the HBSPCA implements a variety of programs and services to promote responsible pet ownership. The HBSPCA also employs Protection Officers (inspectors under the OSPCA Act) to investigate reports of animal cruelty, neglect and distress. The HBSPCA works closely

with a variety of community groups and agencies in its work, including the City of Hamilton Animal Services and Hamilton Police Services.

With respect to wildlife services, the HBSPCA works in partnership with Skedaddle Humane Wildlife Control, a private wildlife control company, to offer services that aim to minimize conflicts between wildlife and humans.

2.5 Hamilton Conservation Authority

The HCA is a watershed and community-based public sector organization, established under the provisions of the *Conservation Authorities Act*. The HCA is governed by a Board of Directors, which consists of members appointed by the City of Hamilton (10 members) and the Township of Puslinch (1 member). Approximately half of the HCA Board of Directors are elected municipal council representatives. Funding for HCA's programs comes primarily from municipal levy and revenues that are self-generated.

The HCA undertakes programs on a watershed basis to further the conservation and management of natural resources. This includes programs to manage water resources, protect people and property from flooding and erosion hazards, monitor and conserve the natural environment, and provide recreational and educational opportunities.

In support of its mandate, the HCA owns and manages approximately 4,400 ha of land and water. This includes large areas of conservation land that support important natural heritage features and ecosystem functions, and which provide for passive recreational use. The HCA also operates a number of Conservation Areas and parks with facilities and infrastructure that provide for a wide range of recreational uses, educational programming and events.

HCA does not administer legislation or regulations that directly relate to the management of wildlife, nor does HCA have any responsibility for the enforcement of such legislation/regulations or the management of wildlife on property it does not own or manage. HCA's responsibilities for wildlife management are limited to the properties it owns and manages. As a landowner, HCA has all the same rights and obligations as any other property owner. HCA must adhere to all legislation and regulations that govern wildlife management in Ontario.

The focus of this Strategy is on how HCA will manage wildlife conflict at its Conservation Areas and other conservation lands. The development of the WCMS and the best management protocols and practices it includes is intended to further HCA's strategic goals and objectives, and to support HCA's vision and mission to be a leader in the conservation and sustainable management of the watershed's natural environment.

PART II – HCA Policy, Principles & Management Approaches

3.0 HCA Wildlife Conflict Management Policy and Guiding Principles

As a watershed management agency the HCA is dedicated to the management and conservation of watershed lands and water resources for the benefit of people, communities and the environment. In keeping with its established vision and mission, the HCA works to ensure healthy streams and communities, in which human needs are met in balance with the needs of the natural environment. The HCA strives to be a leader in the conservation and sustainable management of the watershed's natural environment.

The WMC used HCA's vision, mission and strategic objectives as a guidepost throughout its review process and in the development of this Strategy. The committee recognized the Strategy and the management protocols and practices to be developed must reflect and be consistent with HCA's diverse mandate and strategic objectives. With this in mind, the WMC undertook to adapt HCA's broad vision and mission to develop policy and principles specific to the WCMS.

3.1 Wildlife Conflict Management Policy

In keeping with HCA's vision and mission, the WMC developed the following policy to inform the development of the best management protocols included in this Strategy and to guide future wildlife conflict management actions on HCA lands:

> *The HCA will work to minimize human-wildlife conflicts by employing a range of best management practices that are humane and respect the biological requirements of wildlife, while also ensuring the protection of human health and safety, property and the conservation of important natural heritage features and ecosystems managed by the HCA.*

3.2 Guiding Principles

HCA's wildlife conflict management policy has been further translated into a series of guiding principles. Some of these principles have been adapted from MNRF's *Strategy for Preventing and Managing Human Wildlife Conflicts* (Ministry of Natural Resources, 2008). The principles identified below will be used to help HCA staff evaluate conflict scenarios and in determining appropriate courses of action when the need to address a wildlife conflict arises.

- **Wildlife has intrinsic, ecological, social, economic, and cultural value**
  There are a variety of perspectives and values that people and organizations may associate with or assign to wildlife. This diversity in values and perspectives can make wildlife conflict management a challenging and sometimes contentious matter.

HCA recognizes there are a wide range of values associated with wildlife and will endeavor to consider diverse perspectives when determining appropriate wildlife conflict management actions.

- **Wildlife should be left to carry out their life processes without intervention wherever possible**
  In support of its mandate to protect and conserve the natural environment, HCA will allow wildlife and the environments they occupy to function naturally wherever possible. HCA recognizes management intervention can involve invasive actions, which may have undesirable and/or unintended impacts on targeted wildlife and the broader natural environment. In determining if management intervention is required to address a wildlife conflict, it will be important to evaluate the severity of the conflict in relation to the potential benefits and costs (impacts) associated with any proposed management action.

- **The protection of native flora and fauna is necessary for the conservation of healthy functioning ecosystems and the maintenance of biodiversity**
  The protection of native wildlife and their habitats is integral to the maintenance of healthy functioning ecosystems and the conservation of biodiversity. In evaluating wildlife conflicts and determining appropriate management actions HCA will consider the ecosystem context of the subject area and the potential impacts of management approaches on native wildlife and ecosystem functions.

- **HCA will respond where there is threat to human health and safety, property or significant natural heritage features**
  HCA has a mandate to protect people and property from hazards associated with flooding and erosion, and to provide for the safe use and enjoyment of the lands it owns where public access and use is supported. HCA also works to conserve the natural environment and manages a number of significant natural areas in support of this mandate. HCA has a responsibility to take appropriate actions where the behaviours or activities of wildlife pose a threat to the health or safety of people on HCA lands or threatens to damage valued natural features.

- **Management actions must be ecologically appropriate, and based on the best available information and science**
  HCA will assess and evaluate wildlife conflict situations as they arise, prior to undertaking any management action. This may require a period of monitoring in order to adequately understand site conditions and the extent of the conflict. HCA staff will also review the salient scientific literature and other relevant information sources as required when evaluating management options for addressing wildlife conflicts. Consultation with colleagues, peers and others with relevant expertise will also be helpful in some cases for determining best management practices and ensuring approaches are ecologically appropriate.

- **Management of wildlife conflicts must be adaptive, and based on HCA experience and use of successful approaches elsewhere**
  HCA will monitor the effectiveness of conflict management actions implemented to allow for adaptation and adjustment in approaches as required, and to achieve desired outcomes and minimize negative impacts. HCA will draw on past conflict management experience to learn from successes and challenges encountered. HCA also recognizes there are other agencies and organizations, both within and surrounding the HCA watershed, that face similar challenges associated with managing wildlife conflict. HCA will review conflict management approaches used successfully elsewhere and will adopt new approaches as appropriate to promote continuous improvement in the application of best management practices.

- **Wildlife management must be conducted in accordance with existing legislation and regulations**
  HCA recognizes there are a number of laws and regulations that govern wildlife management in Ontario. Prior to undertaking any wildlife conflict management activities or actions, HCA will review applicable laws and regulations as necessary, and will adhere to all requirements.

- **Communication and education can help to prevent and mitigate conflicts with wildlife**
  Effective communications will be important towards understanding and managing wildlife conflicts on HCA lands. The maintenance of open communications among staff across HCA divisions and office locations will help to ensure staff with the appropriate knowledge and expertise are included in the assessment of wildlife conflicts as they arise and in determining suitable management actions. Making information available to the public regarding wildlife and human-wildlife interactions may also help to improve understanding of wildlife conflict issues and to promote appropriate behaviours for preventing wildlife conflicts on HCA lands.

- **Preventing and managing wildlife conflict is a shared responsibility**
  Both HCA and visitors to HCA's Conservation Areas and other conservation lands have a role to play in helping to avoid and minimize wildlife conflicts. The successful management of wildlife conflict may not require managing wildlife in some cases, but rather managing the expectations and behaviours of visitors to the parks and natural areas managed by HCA. HCA will work to promote understanding among park visitors and recreational users of appropriate behaviours in the presence of wildlife that may be present on HCA lands.

4.0 Wildlife Conflict Management Approaches

Wildlife conflicts result when the actions of people or wildlife have an adverse impact on the other (Ministry of Natural Resources, 2008). A number of factors may affect the type and severity of conflict, including location, time of year, species, land use and environmental conditions, and the particular activities, actions or behaviours involved. Common examples of conflicts associated with wildlife include damage to buildings and landscaping, loss of agricultural crops and livestock predation, fouling of public spaces, vehicle-wildlife collisions and wildlife road mortality, disease transmission, and impacts on ecosystems and biodiversity.

The HCA watershed is characterized as a settled landscape, with both urban and rural areas where there are a relatively large number of people living close to a diversity of natural areas. With these conditions comes the potential for wildlife conflict. Although wildlife conflicts on HCA lands have been fairly uncommon, HCA Conservation Area Superintendents and Managers have experience dealing with some types of wildlife conflict.

The most commons species encountered on HCA lands have included Canada Geese, beaver, and raccoon. Conflicts have arisen with these species related to human health and safety, protection of property and enjoyment of Conservation Area facilities. In some cases these conflicts have been recurring. HCA has generally relied on live trapping and relocation, and lethal trapping in some cases to address wildlife management conflicts.

As part of the development of this Strategy, the WMC undertook to review and identify a broad range of management approaches and techniques that HCA might potentially employ depending on specific circumstances. In conducting this review, it became evident that all wildlife conflict management approaches have both strengths and weaknesses, and that management approaches are most appropriately determined based on specific circumstances.

While this Strategy outlines a number of animal and conflict situation specific management protocols and practices in Section 5, the purpose of this section is to describe the general range of management approaches and techniques that may be employed by the HCA to address wildlife conflict.

4.1 Habitat Management and Modification

Habitat management and modification is the process of altering environmental conditions or habitat characteristics for the purpose of removing wildlife attractants and effecting a change in animal behaviour. Habitat modification aims to make a site unwelcoming or unsuitable for an animal, thereby deterring occupation or use of the targeted area(s).

Modifications typically target habitat features that an animal relies on to meet its basic needs for food, water or shelter, and may be designed to limit or reduce occupation or use of an area, transfer use to a different area, or to eliminate use all together. Examples of habitat management techniques include the selective planting or removal of vegetation and altering landscape maintenance regimes.

Habitat modification approaches do not directly target wildlife, and as such are among the less intrusive management techniques available to address wildlife conflict. Such approaches are also generally environmentally friendly, relatively easy to implement and are non-lethal (Environment Canada, 2010). While addressing wildlife conflicts, habitat modification may also provide opportunity to improve site conditions for native species and desired habitat types through ecological restoration techniques and/or to improve conditions for human enjoyment of the natural environment (Duncaster and Keller).

Habitat modification may be impractical or ineffective in some cases, including where a large number of animals or large area of land is involved, and where other suitable alternative habitat areas for wildlife exist in the immediate area. The modification of habitat in one area may also only serve to transfer animals and the associated conflict to other sites on the targeted property.

4.2 Exclusion

Exclusion is the process of physically preventing wildlife from accessing certain areas, buildings or facilities. This technique is sometimes referred to as wildlife-proofing, and can be an effective strategy for reducing or eliminating wildlife conflicts. Examples of exclusion methods include repairing cracks and holes in buildings, installing one-way access openings in buildings, and installation of fencing to prevent access to certain area(s) or features.

HCA has some experience using this approach to prevent small mammals, such as raccoons, from occupying Conservation Area buildings where there would be human health and safety concerns (e.g. facilities where food is stored or prepared) and other facilities where animal presence and use may represent a nuisance (e.g. waste transfer stations at campgrounds).

Exclusion techniques are a less intrusive approach to managing conflict as they do not target animals directly. Exclusion measures can be relatively easy to implement, but may be ineffective where the scale of the problem is significant or the area/facilities being targeted are large. Exclusion of wildlife may also result in transferring the conflict to other locations in the immediate area.

4.3 Harassment

Harassment is the process of disrupting an animal’s life processes and activities, causing it discomfort, or disturbing its sense of security to such a degree that the animal

eventually leaves the targeted area. Harassment can take different forms, including visual (e.g. altering light exposure), audible (e.g. loud or foreign noises) and physical/ tactile (e.g. hazing/chasing, use of repellants and changes in temperature).

Harassment approaches can be labour intensive and time consuming. They can also be damaging to non-targeted wildlife, disruptful to people, and may have public health and safety considerations. Further, where harassment successfully causes an animal to leave an area it may result in transferring the problem to another area or neighbouring property.

Harassing wildlife in some cases may require a permit(s) from regulatory agencies, including Environment Canada or the Ministry of Natural Resources and Forestry.

4.4 Relocation

The relocation of wildlife involves moving an animal(s) from one location to another. Wildlife relocation is regulated in Ontario under the *Fish and Wildlife Conservation Act*, which generally requires captured animals to be released in suitable habitat in close proximity (less than 1km) to the capture site within 24 hours. Landowner permission must be obtained prior to relocating wildlife on private property. HCA has used wildlife relocation as a component of its approach to managing Canada Geese populations at some Conservation Areas.

While the relocation of wildlife may be effective under some circumstances, this approach can have undesirable consequences for wildlife. The potential negative impacts associated with live capture and relocation are widely acknowledged among wildlife management agencies and organizations, wildlife researchers, and animal welfare groups.

The live capture, transport and introduction of an animal into an unfamiliar area can cause the animal stress, may result in separation of adults from young, and lead to territorial disputes and conflict between animals where resources (shelter, food, etc.) are limited. Relocation can also facilitate the spread of animal sickness and disease. Animals attempting to return to their home territory may also be exposed to greater risk of injury or death from natural predators and anthropogenic causes (e.g. roads).

Relocation in some cases may only result in transferring the problem to another location. Further, if conditions remain suitable at the targeted site, animals will often return or new animals will move in from other locations, which can establish a self-perpetuating cycle of conflict.

4.5 Trapping

The trapping of wildlife is regulated in Ontario under the *Fish and Wildlife Conservation Act*, which is administered by the Ministry of Natural Resources and Forestry. Trapping may only be carried out by licensed individuals, who must adhere to a variety of

requirements and standards as prescribed by the *Fish and Wildlife Conservation Act* and its regulations. HCA has utilized the services of licensed trappers in the past to help address wildlife conflict situations. This has included the live trapping of raccoons and lethal trapping of beaver.

Trapping can be an effective technique for relatively quickly removing an animal from a site that is causing damage or risk to public health and safety or property. HCA recognizes that trapping is an invasive management approach, and that some groups are opposed to trapping as a wildlife management strategy.

4.6 Education and Outreach

Some wildlife conflicts have the potential to be addressed by managing people, and their expectations and behaviours. The provision of information regarding wildlife, wildlife conflict and appropriate behaviours in the presence of wildlife can serve as a useful strategy for helping to improve understanding of wildlife conflict issues and to avoid or minimize the potential for conflicts.

Education and outreach approaches do not affect wildlife directly, and may be relatively easy to implement. However, the effectiveness of such approaches are in part dependent on public uptake and willingness to adapt behaviours and actions.

4.7 Summary – HCA's Wildlife Management Approach

In reviewing the range of wildlife conflict management approaches available it is evident that no single approach can be defined to address all wildlife conflicts. Each approach outlined has strengths and weaknesses. Further, not every approach will be appropriate in every conflict situation. HCA must remain open to considering a variety of approaches, and to be adaptable based on the careful evaluation of case specific circumstances and the best available information, and in consideration of the policy and guiding principles that have been defined in this Strategy.

Notwithstanding this, HCA's preferred approach will be to allow wildlife to carry out their life processes and ecosystems to function naturally without management intervention wherever possible. HCA will work to avoid and minimize wildlife conflicts, and to promote conditions that support coexistence, where people and wildlife can be present in the same area, and may potentially interact, without significant conflict or problem.

While leaving wildlife and ecosystems to function naturally has certainly proven to be easier on HCA's conservation lands where there are no facilities and limited public use, this approach has also been employed successfully at HCA's more developed and actively used Conservation Areas. HCA's Conservation Areas include diverse natural areas, which support a variety of wildlife. In most cases, coexistence between wildlife and people, wildlife and property, and wildlife and land management and program objectives has been possible without any or limited management intervention.

In those cases where conflicts arise, management approaches that promote continued coexistence will be considered and implemented as a first priority. Coexistence can occur where there is no conflict, but may also be possible in cases where conflicts are minor or have little impact and can therefore be tolerated. Where conflict persists or represents a significant threat, and coexistence is determined not to be possible, management actions that reduce or eliminate the conflict may be required. Figure 1 provides a conceptual illustration of HCA's general approach to wildlife conflict management.

Figure 1: Conflict – Management Continuum

Figure 1 is intended to reflect that there are a wide range of conflict scenarios possible. In general, as the degree or severity of conflict increases, the corresponding level of management response potentially required will also increase. In cases where there is no conflict, or conflict is tolerable, management will generally not be required. As conflict increases or becomes intolerable, management action will be required to reduce the conflict and promote coexistence, or to eliminate the conflict if coexistence is not possible.

Although the focus of HCA's management efforts will be on conflict prevention and reduction through approaches that promote coexistence wherever feasible, trapping will continue to be used in circumstances where other approaches have not been successful or are impractical, or where an animal poses a significant threat to health and safety or is causing damage to property or significant natural heritage features. Where trapping is determined to be necessary, HCA will consider if live trapping (and relocation) is possible and appropriate. The use of lethal trapping will be a last resort, and may only be used with the support and approval of the HCA Senior Management Team and Chief Administrative Officer.

PART III – Wildlife Conflict Management Protocols

5.0 Wildlife Conflict Management Protocols

The WMC undertook to develop a series of animal and conflict situation specific best management protocols and practices. These were developed based on wildlife conflicts that HCA has experienced at its Conservation Areas (CA) and which have the potential to reoccur. The purpose in developing these protocols was to provide HCA staff with direction on current best management practices and approaches for dealing with a number of specific wildlife conflicts. The protocols were developed in consideration of the policy and principles defined in this Strategy, and are intended to be consistent with the general approach to wildlife management described in Section 4.7.

Each protocol deals with a specific animal and conflict situation(s), and is intended to provide HCA staff with direction on how to respond, in terms of communications, monitoring and prioritization of management approaches. Each protocol provides a general summary of the animal's biology, describes HCA experience and outlines current and/or recommended best management practices for dealing with the identified conflict.

Protocols will be reviewed and updated, and new protocols may be established as necessary to reflect and adapt to new information, experience and evolving best practices.

5.1 Beaver

5.1.1 Biology

- The beaver (*Castor canadensis*) is the largest rodent in North America.
- Beavers most commonly inhabit forested areas, but will also expand into other habitats where watercourses are bordered by deciduous trees or shrubs.
- Beaver typically build two main types of lodges (or den). The most common is a conical shaped lodge that is surrounded by water. Conical lodges are constructed with sticks, mud and rocks. One major reason why beavers build a dam is to surround the lodge with water to protect against predators. The other type of lodge is known as a bank lodge. This type is often built on the bank of a large stream, river or lake where the water levels are too deep to build a colonial lodge.
- During the fall, beavers construct food caches (or piles) in water close to their lodge or bank den. Each cache contains woody food items, which sustain the beavers during the winter months when food availability is low.
- All winter the beavers bring sticks from their underwater cache into the feeding chamber of the lodge to feed. Beaver prefer trembling aspen, poplar, willow, and birch. During mild winters and warm days in March and early April, you can see adult beavers emerge to feed on fresh woody stems along the shore or woodland.
- Approximately half a hectare of poplar will support one beaver for a year.
- Beavers shift from a woody diet to an herbaceous diet in the spring. During summer, beavers will eat grasses, herbs, leaves of woody plants, fruits, and aquatic plants.
- Beaver are monogamous, with mating occurring in January and February. One litter averages three or four kits, which are born each year in May or June. Although kits have fur, teeth already cut, and can see, walk, and swim when born, they will not leave the lodge for a month after birth.
- The kits disperse from the lodge around 11 months to 2 years old and migrate to find mates and suitable sites to establish their dam and lodge. These dispersal migrations can vary from just a few kilometers to 250 km.

5.1.2 HCA Experience and Potential Conflicts

Beavers reside in park-like and naturalized areas throughout the Hamilton area. Beaver have been found at a number of HCA's Conservation Areas, including Confederation Park, Dundas Valley CA, Fifty Point CA and both Fletcher and Beverly Swamps.

Beaver dams and lodges can have positive effects on the surrounding environment, including the creation of wetland habitat, which is beneficial to a variety of other wildlife, and the reduction of downstream bank erosion along watercourses.

However, the presence of beavers in urban and natural areas can also lead to negative impacts including, flooding of roads, trails or private property, as well as damage to

engineered structures. Furthermore, felled trees may cause damage to public or private property.

Beaver have been found at a number of HCA's properties. In some cases, beaver activity on HCA lands has not resulted in any problems or conflict, and no management activity has been required. However, HCA has had experience with beaver within its Conservation Areas where obstruction of a watercourse has been a concern due to potential flooding and property damage. HCA has also experienced beaver activity causing unsafe areas (felling trees) and changes to the natural environment. In response to these experiences, specific conflict management protocols have been developed for the following scenarios:

- Beaver activity obstructing a watercourse (potential flooding concern)
- Beaver activity not obstructing a watercourse
- Beaver activity damaging trees/natural environment

In considering and implementing management action it is important to note that beaver are subject to certain protections and special provisions under the *Fish and Wildlife Conservation Act*, 1997.

5.1.2.1 Beaver Activity Obstructing a Watercourse

In the event that beaver activity obstructs the flow of a watercourse which results in flooding or changes in flow patterns that could potentially cause damage to property or create a threat to human safety on HCA property or adjacent public/private property, HCA will take appropriate management action to reduce or eliminate the flooding concern.

Where beaver activity is observed, the first step will be for the CA Superintendent/ Manager to contact the Director of CA Services and Watershed Planning and Engineering Department staff for further review. This will include inspection of the site to determine the extent of the problem and if immediate management action is required. Where immediate action is not required, monitoring of the site will continue to ensure conditions do not change such that management action becomes necessary.

Where water levels rise to the point that flooding of park property or infrastructure, or threat to public safety becomes a concern, HCA will consider management options appropriate for the site and particular conditions. Consideration will first be given to habitat management approaches. For example, flow devices can be implemented in some cases to help decrease the flooding concern with little disturbance to beaver or dam structure. Flow devices such as a water level control pipe allow water to move through the dam structure to lower and regulate water levels with little impact on the actual dam structure. Flow devices may not be suitable in all circumstances (e.g. on watercourses where fish migration is a concern).

If it is determined the dam must be removed to adequately control water levels, HCA will give careful consideration to the timing of when the dam can be safely removed or dismantled within the watercourse. Timing restrictions for in-water works to protect the sensitive life cycle period of fish will need to be applied prior to any works being commenced.

In conjunction with any management action undertaken, HCA will also consider whether it would be appropriate to implement any preventative measures to limit beaver activity and prevent the problem from reoccurring. Potential preventive measures are discussed further below.

Where habitat management approaches have proven unsuccessful or determined to be impractical, or where there is an imminent threat due to flooding, HCA will employ the services of a licensed trapper to remove the beaver. HCA will consider live trapping and relocation if conditions allow, however HCA recognizes there are regulatory limitations to relocation, as well as a variety of potential negative impacts to the animal(s) associated with this approach. Lethal trapping will be used as a last resort.

Management Protocols:

- CA Manager notifies Director of CA Services and Manager of WPS
- Inspection/monitoring of beaver activity and water levels
- Apply habitat management/modification measures as appropriate to situation in consideration of location, season, severity of flooding, fisheries, etc.
    - Flow devices
    - Dam removal
- Implement preventative measures to try and prevent recurrence (see preventive measures described further below).
    - Culvert protection, vegetation management, etc.
- Where other management approaches are unsuccessful or impractical the services of a licensed trapper may be used

5.1.2.2 Beaver Activity Not Obstructing a Watercourse

Where beaver are present on HCA lands but there is no obstruction occurring within a watercourse, the beaver will be left in place with periodic monitoring of site conditions and beaver activity. Dam structures will be left in place if there is no risk to safety or property. In conjunction with monitoring, HCA will consider if prevention measures should be implemented to help regulate beaver activity and to address potential future flooding concerns.

Management Protocols:

- CA Manager notifies Director of CA Services and Manager of WPS
- Inspection/monitoring of beaver activity
- Consider if habitat management/modification or preventative measures are appropriate (see preventative measures described further below)
    - Culvert protection, vegetation management, etc.

5.1.2.3 Beaver Activity Damaging Trees/Natural Environment

HCA's Conservation Areas and other conservation lands offer a wide range of recreational opportunities with a large natural environment component. Within natural areas, beaver activity may cause safety hazards when trees are left damaged and/or partially felled. HCA will monitor beaver activity and identify potential hazard trees based on hazard tree evaluation carried out by qualified staff. HCA staff will remove trees deemed unsafe and that present a threat to park users and public safety (e.g. near recreational trail or picnic area, or adjacent to private property). Hazard trees on private property adjacent to HCA lands are the responsibility of the property owner.

HCA Conservation Areas and other conservation lands include significant natural areas. The protection and sustainable management of ecosystems is high priority for HCA. As noted above, beavers play an important role within the environment and HCA has a responsibility to create a balance between management of the natural environment and recreational activities within its landholdings. Where monitoring of beaver activity indicates a significant negative impact on valued ecosystems or important natural features, HCA will take appropriate management action to address the situation. This may include habitat management and/or preventative measures (e.g. tree protection). The services of a licensed trapper will be used where impacts are significant and other management approaches have been unsuccessful or are impractical.

Management Protocols:

- CA Manager notifies Director of CA Services and Manager of WPS
- Inspection/monitoring of beaver activity and extent of damage
- Remove hazard trees as required
- Apply habitat management/modification and preventative measures appropriate for the situation
    - Tree protection
    - Selective vegetation removal/planting
- Where other management approaches are unsuccessful or impractical the services of a licensed trapper may be used

5.1.3 Preventative Measures

Prevention measures can be an effective management option for limiting or preventing beaver activity and reducing or eliminating associated conflicts. Prevention measures can be applied preemptively to deter beaver activity where beaver are not currently present but have occurred in the past, or in association with other management approaches where beaver are present in a CA and causing flooding or damage to the environment to help prevent the same area from being occupied by another beaver in the future. Potential prevention measures are described further below.

Tree Protection: The use of fencing or other structures to protect trees is a relatively easy method to implement. If a beaver is unable to use the tree supply in an area the animal will be forced to move on to another source of building material and food. Tree protection may help to limit damage to the environment and/or help in preventing the construction of dams. This prevention measure is a suitable first step when trying to manage an area where beaver are present and causing conflict.

Selective Landscaping: The preferred trees of beaver include willow, aspen, cottonwood and alder species. They are also known to feed on birch, oak, maple and highbush blueberries. Beavers will typically take trees within 100 feet of the shore or creek bank. The selective removal and/or planting of trees based on the beaver's preferred species listed above may help to reduce the occurrence of tree damage as well as make targeted area(s) less attractive to beaver. Shrubs and evergreens can be planted to help discourage beavers from inhabiting an area. When considering a selective planting plan, the species identified should be native and mimic the adjacent natural area to maintain ecological function and services.

Fencing: Beavers are not considered to be good climbers; therefore a low fence around a designated area may be effective at blocking access. Beavers do not like being separated from water, so the entire treed area may not need to be fenced. When considering fencing it is important to consider other species and any concerns in regards to impacting habitat or migration activities.

Tubular Culvert Protectors: Culvert protectors are designed to prevent beaver from creating a dam near or in a culvert. A protector is often constructed using concrete reinforced with wire that extends from the outside of a culvert and rounded closed at least 2.5m from the end of the culvert. Culvert protectors can act as a barrier to fish movement and/or cause debris jams, and are therefore not suitable in all circumstances. Such devices are generally suitable in ponds (offline) and wetlands. Although culvert protectors can be costly, once installed they typically only require minimal maintenance.

Trapezoidal Fence: Trapezoidal fences prevent construction of a beaver dam near a culvert based on their shape. The narrow end of the trapezoid is formed by the culvert; the sides extending outward from the culvert at a 45-60 degree angle. The last side of the trapezoid runs parallel to the culvert and connects the two sides extending outward

from the culvert. The three sides of the fence should be constructed of heavy gauge wire fencing supported by cedar posts (which beavers will not chew). The trapezoidal fence should be buried at least 30 cm into the ground to prevent beavers from digging underneath, and should be at least 30 cm higher than the water level. The downstream end of the culvert should also be covered with wire mesh to prevent beavers from entering downstream. Such fences may act as a barrier to fish movement and/or cause debris jams, and may therefore not be suitable in some situations. The trapezoidal fence is costly, and may require regular maintenance where debris jams are a concern.

Additional Resources

Beaver Solutions – *Working with Nature, Resolve Flooding Problems*
http://www.beaversolutions.com/

Hood, G. A. and Bayley, S. E. (2008). *Beaver mitigate the effects of climate on the area of open water in boreal wetlands in western Canada*. Biological Conservation, 141 (2008) pp.556-567.

Internet Center for Wildlife Damage Management – *Beaver Pipes & Beaver Flow Control Devices*
http://icwdm.org/wildlife/beaver/BeaverPipes.aspx

Massachusetts Division of Fisheries and Wildlife (2004). *The Use of Water Flow Devices in Addressing Problems Caused by Beaver in Massachusetts*.
http://www.mass.gov/eea/docs/dfg/dfw/wildlife/wildlife-facts-pubs/beaver-water-flow-devices.pdf

Ministry of Natural Resources and Forestry - *Preventing conflicts with Beavers*
http://www.ontario.ca/environment-and-energy/preventing-conflicts-beavers

5.2 Canada Goose

5.2.1 *Biology*

- Canada Geese (*Branta Canadensis*) are native to North America.
- Over hunting and loss of habitat caused a major decline in the species during the 20th century. Currently population numbers are up and this species can be found throughout Ontario.
- Canada Geese can breed within a wide range of habitats.
- Canada Geese typically find a mate during their second year and will remain together for life.
- Geese can breed when they are one years old and female geese will return to the same nest site each year.
- Nest sites are usually located in low lying areas (protected from wind and predators) like a wetland, but nests have also been found in golf courses and urban parks.
- Many species prey on the eggs and young of geese including, fox, coyote and predatory birds.
- Unlike other waterfowl species that feed primarily in aquatic environments, Canada Geese feed on land. They consume grassy plants, seeds and roots during the spring and summer and during the winter months switch to agricultural fields (corn, soya crops).
- Some Canada Geese population migrate south for the winter, while other populations (considered resident species) will remain in Ontario all year round.

5.2.2 HCA Experience and Potential Conflicts

Canada Geese can be found throughout Hamilton in a wide range of habitat types and settings, including wetlands, lakes, ponds, parks and naturalized areas, as well as farm fields and golf courses. Geese are capable of travelling great distances, and will occupy, nest and rear young in almost any area where food, shelter and open water are available. Geese are present at a number of HCA Conservation Areas, including Confederation Park, Valens Lake CA and Christie Lake CA. Canada Geese regularly nest in Valens Lake CA, Lower Spencer and Cootes Paradise as well as Van Wagner's Pond (part of Confederation Park lands).

HCA has experienced conflicts and challenges with Canada Geese at some of its Conservation Areas. Conflict management protocols have been developed to address the following situations:

- Canada Geese exhibiting aggressive behaviour
- Goose activity resulting in fouling of public spaces, recreational areas and beaches
- Feeding Canada Geese on HCA property

HCA is a member of the Goose Management Sub-Committee to the Hamilton Harbour Remedial Action Plan (HHRAP) which was assembled in 2003 to help address a number of beneficial use impairments (BUI) identified within the plan that are attributed to large populations of resident and migrant Canada Geese living year-round or seasonally within the Hamilton Harbour basin. Some of these BUI's include beach closings and degradation of land aesthetics within the Harbour basin resulting from extensive geese defecation on beaches and manicured parklands.

Goose management activities in the Harbour Basin are guided by a document produced by Gartner Lee Ltd. (2003) entitled *A Strategy for the Management of Canada Goose in the Hamilton Basin*. This strategy makes five recommendations to manage goose populations in the Harbour basin: habitat modification, population management, use of deterrents, education and communication, and monitoring. HCA has been actively involved in carrying out two of these recommendations – population management and monitoring, which has included egg and nest surveys, winter population surveys and annual egg oiling and goose transfer management.

Moving forward, HCA will need to look at habitat modification as a management tool on properties affected by Canada Geese. The oiling and transferring of geese is a short term solution and other approaches should be considered within long term management plans for the Conservation Areas. Environment Canada has developed a handbook on management techniques to avoid conflicts and help control goose populations in southern Canada (Environment Canada, 2010), which HCA will consult to help determine long term management of geese at its Conservation Areas and other conservation lands.

Any activity carried out for Canada Geese (e.g. oiling or transfer) requires a permit from Environment Canada as Canada Geese are protected under the *Migratory Birds Convention Act*, 1994.

5.2.2.1 Canada Geese Exhibiting Aggressive Behaviour

HCA has had experience with Canada Geese exhibiting aggressive behaviour towards park users along the beach strip at Confederation Park. Aggressive behaviour is often associated with nesting or young protection, but may also result from regular feeding of geese. HCA will not intervene if geese are acting aggressive. HCA will monitor goose activity and behaviour on its properties and if aggressive behaviour persists and is causing conflict HCA will contact Environment Canada for further direction.

To help avoid conflicts, all pets should be kept on a leash when on HCA lands and visitors should remain on designated trails and public spaces. HCA will make information available to park visitors and users regarding Canada Geese and how to avoid potential conflict situations.

HCA notes the City of Hamilton enacted a By-law on June 13, 2012 that states no person shall feed or permit the feeding of wildlife. If aggressive behaviour is the result of

the feeding of geese, City of Hamilton Municipal Law (by-law) Enforcement would also be contacted.

Management Protocols:

- CA Manager notifies Director of CA Services and Manager of WPS
- Inspection/monitoring of goose activity and extent of problem
- Contact Environment Canada for further direction as necessary
- Contact City of Hamilton Municipal Law Enforcement as necessary
- Make information available to park visitors regarding Canada Geese and appropriate behaviours where geese are present

5.2.2.2 Fouling of Public Spaces, Recreational Areas and Beaches

HCA has experienced fouling issues for many years at a number of its properties. Geese are attracted to mowed grassed areas, as they typically feed on young grass shoots. This ultimately results in many individuals within one area. Fouling in open areas is a nuisance and health concern, especially at swimming beach areas. Goose feces have been directly linked to E.coli level increases within inland lakes and Lake Ontario. This is of concern to HCA, as this type of fouling activity can result in closure of beach areas and recreational swimming activities.

HCA has conducted goose population management activities in accordance with the recommendations and strategies outlined in *A Strategy for the Management of Canada Goose in the Hamilton Basin* (Gartner Lee, 2003). This has included annual spring nesting surveys, annual spring egg oiling and early summer goose transfer on designated HCA properties (Valens CA, Fifty Point CA). HCA also conducts harassment (chasing) as necessary to help move geese temporarily out of problem areas (picnic and beach areas). HCA also conducts late summer and winter surveys to help determine the migrant population and resident populations.

Management Protocols:

- CA Manager notifies Director of CA Services and Manager of WPS
- Inspection/monitoring of goose activity and extent of problem
- Annual spring egg oiling in support of HHRAP subject to continued support and permitting from the Environment Canada
- Annual early summer goose transfer/relocation subject to continued support and permitting from the Environment Canada
- Regular harassment (chasing) to move geese temporarily out of problem areas
- Develop and implement habitat management plan/initiatives appropriate for the CA/situation

5.2.2.3 Feeding Canada Geese on HCA property

HCA does not support feeding any wildlife at its Conservation Areas or other conservation lands. When wildlife is fed by humans it habituates them to people and encourages animals to approach humans in search of food. Therefore feeding has the potential to increase human and wildlife conflicts. Feeding of wildlife may also increase health risks to animals.

The City of Hamilton Wildlife Feeding By-Law states no person shall feed or permit the feeding of wildlife. Wildlife is defined to include waterfowl, including Canada Geese. The by-law and its prohibitions on feeding wildlife applies to HCA's Conservation Areas and other conservation lands. HCA will contact City of Hamilton Municipal Law Enforcement staff where the feeding of geese is observed to be occurring on HCA lands.

HCA will also work to make available to the public and park visitors, information resources regarding the feeding of wildlife and wildlife conflict.

Management Protocols:

- CA Manager notifies Director of CA Services and Manager of WPS
- Inspection/monitoring of feeding activity and extent of problem
- Feeding activity reported to City Municipal Law Enforcement as necessary
- Implement educational program regarding issues and concerns with feeding wildlife

5.2.3 Preventative Measures

Prevention measures can be an effective management option for limiting or preventing Canada goose activity and reducing or eliminating associated conflicts. Prevention measures can be applied preemptively to deter geese activity where they are not currently present, or in association with the current management methods being implemented by HCA where geese are present in a CA and causing conflict. There are different prevention measures that can be applied based on the function or use of the Conservation Area. Potential prevention measures are described further below.

Habitat modification: Habitat modification is a potentially effective option to help keep geese from accessing targeted areas (e.g. beach and picnic areas). Planting dense tall grasses, shrubs or trees in an area will help to keep geese away from a protected area. Geese require open site lines when in an area feeding or nesting to help guard against predators. When a site line is closed, geese will move on to a more suitable area. Costs associated with habitat modification may be high initially, but generally only require minimal maintenance longer-term.

Lawn Grass Modification: There are several lawn management techniques that may help discourage geese from occupying an area. Mowing grass less frequently will help to deter geese from feeding in the area. Geese prefer tender young grass and longer grass tends to be coarse and fibrous which is not as appetizing to geese. Depending on the area, all of the lawn area or just portions of the lawn area that borders a body of water (lake or stream) can be mowed less. Also changing the type of grass can be a natural deterrent to geese. Seeding with coarse native grass species can help to discourage geese. This option can be costly and may only be suitable for smaller areas.

Fence Barriers: Geese prefer large open areas to take off and land, and to have clear sight lines to see predators. When these habitat conditions are disrupted geese typically move to a more suitable area. Fences can be used to block access to water and block walking routes preferred by geese. The fence can be erected using multiple materials including woven wire, plastic netting or snow fencing. Fences should be placed at typical adult height, and should be erected to prevent geese from walking underneath or through. This is a cost effective option, although may not be appropriate for all HCA Conservation Areas. Routine maintenance and annual installation of fence barriers needs to be conducted to ensure on-going effectiveness.

Additional Resources

City of Hamilton – *Wildlife Feeding By-law*
https://www.hamilton.ca/animals-pets/wildlife/feeding-wildlife

Deborah Duncaster & Jeff Keller, Funded by Animal Alliance of Canada. *A Source Book – Habitat Modification & Canada Geese: Techniques for Mitigating Human/Goose Conflicts in Urban & Suburban Environments*.
http://www.animalalliance.ca/wp-content/uploads/2011/07/Goose_Manual-Habitat-Modification.pdf

Environment Canada (2010). *Handbook, Canada and Cackling Geese: Management and Population Control in Southern Canada*.
https://www.ec.gc.ca/mbc-com/6D2B893B-C671-41AF-8439-713305DB384C/Handbook_Canada_Cackling_Geese_e[1].pdf

Gartner Lee Ltd. (2003). *A Strategy for the Management of Canada Goose in the Hamilton Basin*.

Ministry of Natural Resources and Forestry – *Preventing and Managing Conflicts with Birds*
http://www.ontario.ca/environment-and-energy/preventing-and-managing-conflicts-birds

Ministry of Natural Resources and Forestry – *Feeding Wildlife Do s and Don'ts*
https://www.ontario.ca/environment-and-energy/feeding-wildlife-dos-and-donts

5.3 Small Mammals

5.3.1 Background

Small mammals such as raccoons, skunks, rabbits and squirrels have adapted well to humans and our lifestyle. These animals utilize a variety of areas for nesting, feeding and overwintering. Generally these species are considered to be a nuisance issue since they can cause property damage, create health concerns from deposited feces and may become aggressive. Although these species have adapted well to our surroundings, it is important to remember they still play an important role within the environment.

5.3.2 HCA Experience and Potential Conflicts

Small mammals are present throughout the City of Hamilton, in urban, rural and natural settings. HCA's landholdings include diverse habitat types, which provide habitat for a wide variety of wildlife including many small mammal species. HCA has had experience with small mammal nuisance and other conflict issues at a number of its Conservation Areas. Conflicts have included the following:

- Nuisance issues
- Animal exhibiting erratic behavior
- Animal is sick or injured

5.3.2.1 Nuisance Issues

HCA has experience dealing with small mammals within buildings and facilities at a number of its Conservation Areas, including Wild Water Works, Valens CA and Christie Lake CA food concessions. Nesting activity, feces and property damage have been the main concerns within these areas. In order to ensure health and safety standards are being met, HCA has normally trapped the nuisance species to be relocated (typically raccoon, squirrel). This practice will need to be maintained where nuisance issues arise, along with monitoring to determine major entry points of accesses and other modifications to deter nuisance species from utilizing buildings and facilities.

Annual inspections should be conducted where food and beverages are being sold or stored to determine new entry points and repair existing ones to exclude nuisance animals and help decrease the need for trapping. It is also important to inspect an area when trapping is most favorable for the species (before nesting and rearing of young occurs), as the family unit should not be moved until young or the family unit have left the nest. HCA is not a wildlife management agency, and therefore depends on licensed trappers or certified wildlife control agencies to remove animals from its properties.

Management Protocols:

- CA Manager notifies Director of CA Services and Manager of WPS
- Inspection/monitoring of activity and extent of problem/damage
- Implement exclusion measures to secure/seal building openings where animal(s) accessing
- Live trapping by licensed trapper/authorized agent if exclusion measures have been exhausted or if problems persist

5.3.2.2 Animal Exhibiting Erratic Behavior

HCA has received calls in regards to skunks and raccoons acting strange or exhibiting erratic behaviour on HCA lands. HCA will not intervene if an animal is exhibiting the following behavioral symptoms: extreme agitation, disorientation, a loss of fear of people, paralysis of limbs, or the animal gnawing or biting its own limbs. All of the symptoms listed above are indicators of rabies. Raccoons are common rabies carriers, and should therefore be reported to the Ministry of Natural Resources and Forestry and Public Health Unit where erratic behaviour is observed. HCA will use the services of licensed trappers or certified wildlife control agencies to remove animals from its properties.

Management Protocols:

- CA Manager notifies Director of CA Services and Manager of WPS
- Monitoring for signs of erratic behavior
- Contact Public Health and Ministry of Natural Resources and Forestry (see Rabies information in additional resources)
- CA staff contacts City of Hamilton Animal Services or authorized wildlife control agency to have the animal removed

5.3.2.3 Animal is Sick or Injured

HCA has received calls in regards to sick and injured raccoons at its Conservation Areas. If an animal is sick or injured and is not exhibiting any of the above symptoms of erratic behaviour, HCA staff should contact Animal Services so that the animal can be safely removed from the property.

Management Protocols:

- CA Manager notifies Director of CA Services and Manager of WPS
- Monitoring for signs of injury, illness or erratic behavior
- Contact Public Health and Ministry of Natural Resources and Forestry as appropriate
- CA staff contacts City of Hamilton Animal Services to have the animal removed

5.3.3 Preventative Measures

Prevention measures can be an effective management option for deterring small mammals from occupying buildings and facilities, and for limiting nuisance conflict issues. The following prevention measures may be applied based on the function or use of the Conservation Area.

Annual Building Inspections: Inspections of Conservation Area buildings and facilities can help to determine where an animal(s) is entering a building and how best to mitigate impacts. Once all possible entry points are located (holes, cracks, warped siding, etc.) the proper sealing/maintenance can be implemented to try and exclude the animal(s).

Food, Waste and Land Management: Proper management of food and waste to ensure storage in areas where it is difficult for small mammals to enter can be effective towards reducing the potential for nuisance conflict issues. Land (grounds) maintenance practices can also help to manage nuisance issues. This could include keeping potential animal shelter areas (e.g. brush piles, rock piles) away from buildings and facilities where animals would potentially be a nuisance. Keeping grasses around building areas low may also help to discourage animals from accessing buildings and facilities. HCA employs such practices throughout all of its Conservation Areas.

Additional Resources

Ministry of Natural Resources and Forestry - *Preventing and Managing conflicts with small mammals*
http://www.ontario.ca/environment-and-energy/preventing-and-managing-conflicts-small-animals

Ministry of Natural Resources and Forestry – Rabies
http://www.ontario.ca/page/rabies

Skedaddle Humane Wildlife Control – Partner with Hamilton/Burlington SPCA
Small mammal fact sheets:
http://www.skedaddlewildlife.com/services/squirrels/
http://www.skedaddlewildlife.com/services/skunk/
http://www.skedaddlewildlife.com/services/raccoons/

5.4 Coyote

5.4.1 Biology

- Coyote (*Canis latrans*) prefer to find secluded locations for den sites, and often choose areas that are near stream banks.
- Coyotes typically breed in February and March, and about 60 to 63 days later in April or May a litter is produced.
- Coyotes are considered to be opportunistic feeders that often consume a variety of foods, including fallen fruit, birdfeeder seed, garden crops, garbage and pet food.
- However the coyote's main diet (making up 80%) consists of small mammals, including rats, mice, shrews, squirrels and rabbits. This natural rodent control is beneficial to both city and rural dwellers. Coyote also readily consume carrion, which is a benefit to help keep the environment and watershed clean and free of disease.
- In rural areas, coyotes prey upon poultry, sheep, and calves. Although very uncommon, some urban coyote will prey on domestic cats and small dogs probably due to the fact they closely resemble their natural prey source.

5.4.2 HCA Experience and Potential Conflicts

Coyotes typically reside in park-like and naturalized areas and are capable of travelling great distances, commonly utilizing ravines, hydro corridors and highway thoroughfares. Coyotes occur throughout many if not all HCA's Conservation Areas and other conservation lands, and typically have not caused any issues or concerns as they tend to keep to themselves and are usually very cautious. Conflict management protocols have been defined for the following scenarios:

- Coyote identified as exhibiting aggressive behavior
- Coyote observed on HCA property
- Coyote observed on adjacent private property
- Coyote has attacked a family pet
- Sick or injured Coyote

It is important to note that coyote are subject to certain protections and special provisions under the *Fish and Wildlife Conservation Act*, 1997.

5.4.2.1 Coyote Exhibiting Aggressive Behavior

HCA has had experience with coyote exhibiting aggressive behavior along the beach strip at Confederation Park, where a coyote was acting strange and approaching park users. In such situations it is important to distinguish between normal coyote behavior and aggressive behavior. Aggressive behavior includes actions like stalking, growling, biting, etc., directed towards humans or in the presence of humans. As noted above, it is rare for coyote to be aggressive, and such behavior is typically related to humans

feeding coyotes. When a wild animal is fed by humans it habituates them to people and encourages the animal to approach humans in search of food.

HCA's approach to dealing with aggressive behaviour will be to monitor the situation and report such behaviour to the City of Hamilton Animal Services where there is a concern for public safety. Feeding activity will be reported to City of Hamilton Municipal Law Enforcement.

HCA will undertake to make information available to the public and park visitors regarding coyotes and potential conflict situations.

Management Protocols:

- CA Manager to notify Director of CA Services and Manager of WPS
- Monitor Coyote activity and extent of interactions with people, but no active intervention by HCA
- HCA to notify City of Hamilton Animal Services if behavior considered a public health/safety concern
- Feeding activity reported to City Municipal Law Enforcement as necessary
- Make information available to park visitors regarding Coyote, potential conflict situations, etc.

5.4.2.2 Coyote Observed on HCA Property

HCA will not intervene if coyote are observed in close proximity to a trail or other public space on HCA lands unless aggressive behavior is reported. HCA will monitor the activity and behaviour of coyotes at its Conservation Areas and other conservation lands where observations are reported. If coyote have been exhibiting aggressive behavior that presents a threat to the public HCA will contact City of Hamilton Animal Services.

There is a large variety of wildlife that occurs throughout HCA's Conservation Areas and other conservation lands. It is important for park visitors to respect and understand how to co-exist with wildlife peacefully. HCA will make information available to park users about coyotes, potential conflicts, and appropriate behaviour for visitors in natural areas where wildlife may be present.

Management Protocols:

- CA Manager to notify Director of CA Services and Manager of WPS for further direction
- Monitor coyote activity and extent of interactions with people, but no active intervention by HCA
- HCA to notify City of Hamilton Animal Services if behaviour considered a public health/safety concern
- Make information available to the public and park visitors regarding coyote, potential conflict situations, etc.

5.4.2.3 Coyote Observed on Adjacent Private Property

There are many residences/communities adjacent to natural areas that HCA owns and manages. HCA has received calls regarding coyote seen on private property. Although a sighting can be disconcerting, it is important to remember coyotes are part of the natural environment.

HCA has no management responsibility for wildlife on lands it does not own, and will therefore direct public calls about coyote on private lands to the appropriate responsible agency.

Management Protocols:

- CA Manager to notify Director of CA Services and Manager of WPS
- Residents reporting coyote sightings will be directed to City of Hamilton Animal Services
- Monitor coyote activity on HCA lands as necessary, but no active intervention by HCA
- Make information available to the public regarding coyote, potential conflict situations, preventative measures that a landowner can undertake to help discourage coyotes from their property, etc.

5.4.2.4 Coyote Has Attacked a Family Pet

It is rare for a coyote to attack a family pet. However it is important to remember coyote do not distinguish between their natural prey and a family pet (e.g. small dog or cat). Therefore to help avoid a conflict, pets should never be left unattended outside, either at private residences adjacent to natural areas or left off leash while visiting HCA's Conservation Areas and trails. The HCA dog on leash policy is one of the best preventative measures a trail user can follow. Since small dogs closely resemble a coyote's typical prey, it is important to keep all pets on leash to help discourage any conflicts.

If a coyote attack on a pet occurs on HCA property, HCA will monitor the situation and behaviour of the coyote and contact the responsible agency if it is determined the coyote is exhibiting unusual or aggressive behaviour and there is a concern for human health and safety.

Management Protocols:

- CA Manager to notify Director of CA Services and Manager of WPS
- Monitor coyote activity on HCA lands as necessary, but no active intervention by HCA
- HCA to notify City of Hamilton Animal Services if behavior considered a public health/safety concern
- HCA to enforce dog on leash policy at its Conservation Areas as necessary
- Make information available to the public regarding coyote, potential conflict situations, etc.

5.4.2.5 Sick or Injured Coyote

HCA has received calls in regards to sick and injured coyotes on HCA lands. HCA will only intervene if a coyote is exhibiting the following behavioral symptoms: extreme agitation, disorientation, a loss of fear of people, paralysis of limbs, or the animal gnawing or biting its own limbs. All of the symptoms listed above are indicators of rabies. Although coyotes are generally considered low risk for carrying rabies, it is important to report potential cases to lead agencies (Ministry of Natural Resources and Forestry and Public Health Unit) if any of the behavioral symptoms are observed.

Another disease that can be prevalent within coyotes is Sarcoptic Mange. Mange is typically observed when coyote population trends increase. There is no management action for mange observations. HCA staff will however contact the Ministry of Natural Resources and Forestry if the number of observations increases within an area.

Management Protocols:

- CA Manager to notify Director of CA Services and Manager of WPS
- Monitor coyote activity on HCA lands as necessary, but no active intervention by HCA
- HCA will contact lead agencies as appropriate – Ministry of Natural Resources and Forestry, Public Health Unit, and/or City of Hamilton Animal Services

5.4.3 Preventative Measures

Prevention measures can be an effective management option for limiting the potential for conflicts associated with coyotes. There are several measures that can be applied based on the function or use of the Conservation Area, as described further below.

Education: Providing information to the public about coyote and their habitat, and regarding appropriate behaviours for people visiting HCA's Conservation Areas may help minimize the potential for coyote conflicts.

Pets and Conservation Areas: When visiting a Conservation Area dogs should always remain on leash to limit the potential for negative interaction and conflict with wildlife. HCA has an on-leash policy throughout its Conservation Areas and other conservation lands.

Food and Waste Management: Proper management of food and waste to ensure storage in areas where it will not attract coyotes will be helpful towards reducing the potential for nuisance conflict issues. HCA employs such practices throughout all of its Conservation Areas.

Additional Resources

City of Hamilton - *Living with Coyotes Fact sheet*
http://www2.hamilton.ca/NR/rdonlyres/8BE9AF98-7D00-4214-AC55-91B3775FE614/0/AnimalControlCoyoteInformationpamphlet.pdf

Gehrt, Stanley D. (2006). School of Environment and Natural Resources, Ohio State University. *Urban Coyote Ecology and Management, The Cook County, Illinois, Coyote Project. Bulletin 929*.

Hamilton Conservation Authority - *Coyote Fact Sheet*
http://www.conservationhamilton.ca/images/PDFs/Ecology_Environment/HCA_Coyote_factsheet_2013.pdf

Ministry of Natural Resources and Forestry - *Preventing and Managing Conflicts with Coyotes*
http://www.ontario.ca/environment-and-energy/preventing-and-managing-conflicts-coyotes-wolves-and-foxes

5.5 Bats

5.5.1 Biology

- There are eight (8) species of bats that occur in Ontario.
- The Little Brown Bat (*Myotis lucifugus*), Keen's Myotis (*M. keenii*), Least or Small-footed Bat (*M. leibii*), Eastern Pipistrelle (*Pipstrellus subflavus*), and Big Brown Bat *(Eptesicus fuscus*) hibernate in Ontario during the winter.
- When food sources start to decline in autumn, the above bat species search for cool and humid sites such as caves and abandoned mines. In these hibernacula, the bats enter a state of torpor (allowing their body temperatures to drop to the temperature of their surroundings).
- They are often found roosting in man-made structures such as buildings, bridges, and decks both during winter and summer months.
- Man-made structures provide ideal roosting areas because they often have openings larger than 5 mm (a hole the size of a finger that bats can access). These structures provide protection from predators, shelter, are generally located close to food and water, and the temperatures are ideal for the birth and rearing of young bats.
- The Silver-haired Bat (*Lasionycteris noctivagans*), Red Bat (*Lasiurus borealis*), and Hoary Bat (*L. cinereus*) spend only the summers in Ontario; they avoid winter conditions by migrating south in the autumn. Unfortunately there is little is known about these migratory bats, as they are solitary tree dwelling species that are rarely observed.
- Bats are the only mammals that can fly; their wings are actually folds of skin that stretch between their extended finger bones, sides of their body, back limbs and the tail.
- Typically the lifespan of a bat is six or seven years, although one little brown bat in Ontario was documented at 31 years old.

5.5.2 HCA Experience and Potential Conflicts

Relatively little is known about bats in the watershed, including population densities and distribution, migration routes and overwintering (hibernacula) locations. Big Brown Bat, Little Brown Bat, Silver-haired Bat and Eastern Pipistrelle have been confirmed on HCA lands. Hoary Bat has been recorded in the watershed, but not on HCA lands to date. HCA has some experience with bats occupying buildings and facilities at its Conservation Areas. Conflict management protocols have been defined for the following scenarios:

- Bat droppings found in buildings or public areas
- Bats found sick, injured or dead

All eight species of bats occurring in Ontario are listed as specially protected mammals under the *Fish and Wildlife Conservation Act* (FWCA). The FWCA prohibits bats from being hunted or trapped in Ontario. Little Brown bat is listed under the *Endangered Species Act* as Endangered. Therefore both the species and its general habitat are protected. Based on this, before any work is undertaken that may impact this species the MNRF Guelph District office is to be contacted to confirm any restrictions or requirements under the *Endangered Species Act*.

White-nose syndrome (a fungus) plays a major role in the decline of bat populations, which has led to a number of bat species currently under consideration for listing under both the provincial *Endangered Species Act* and federal *Species at Risk Act*. When a bat is infected by white-nose syndrome, they emerge from torpor more frequently during winter hibernation, which makes them exhausted before food sources become readily available in the spring. This exhaustion often leads to death.

5.5.2.1 Bat Droppings Found in Buildings or Public Areas

Since bats typically seek refuge, roost and hibernate in buildings, guano (feces) droppings can become a concern. Although the risk is very minimal, bat droppings may carry histoplasmosis, a fungus that can lead to infectious disease affecting the lungs and in some cases other areas of the body such as eyes, skin and liver. HCA has had bats roosting in buildings and where guano has been a health and safety concern.

Many species of bats have both summer and winter roosts. Roosts have different uses for the different times of year. During the summer months, bats use these spaces to rear their young, also called maternity roosts. Bats should not be excluded from buildings between May and August as there may be young or pups (non-flighted young) inside the structure that will become trapped inside when the adults leave.

During autumn leading into winter months, bats will use man-made structures for hibernating habitat. Bats should not be excluded after they have begun hibernating as they do not normally leave the structure during this time. This will cause stress on the species as it is in a state of torpor.

Where bats are observed to be occupying HCA buildings or facilities, monitoring of bat activity and reporting of any guano sightings immediately will be important so that proper cleaning and disinfecting protocols can be implemented to ensure safe conditions for the public and HCA staff. HCA will consider if building modifications to exclude bats is feasible to reduce or eliminate the potential for continued occupation and health and safety concerns. HCA will not initiate any action where there is no conflict associated with bats occupying buildings/structures.

The best time to exclude bats is during the spring or early fall, when they are observed leaving their roosts nightly. Where exclusion is required, HCA will use the services of a professional and experienced removal agency to organize bat exclusion jobs as they can be quite difficult.

Management Protocols:

- CA Manager to notify Director of CA Services and Manager of WPS
- Monitoring of bat activity and use of buildings
- HCA to implement proper disinfecting protocols to clean buildings as required
- Consider if building/structure modification or exclusion measures are appropriate
  - Consultation with Ministry of Natural Resources and Forestry regarding ESA requirements
- Consider other preventative measures as appropriate (e.g. alternative roosting structures)

5.5.2.2 Bats Found Sick, Injured or Dead

If a bat is found dead or injured or exhibiting unusual behavior, it may be a result of white-nose syndrome or rabies. Often when bats are affected with white-nose syndrome, they display unusual behavior like flying outside during the daytime. Affected bats may also have visible rings of white fungus around their face and/or white, fuzzy appearance on their muzzle, wings and ears. Bats are also affected by rabies, which may lead to unusual and erratic behaviour.

Where a bat is found dead, injured, sick or exhibiting unusual behaviour, HCA will report such findings to the appropriate authorities. This may include the Ministry of Natural Resources and Forestry if white-nose syndrome is suspected and/or City of Hamilton Animal Services or other licensed wildlife control company if removal or exclusion of bats is required.

Management Protocols:

- CA Manager to notify Director of CA Services and Manager of WPS
- Monitoring of bat activity
- HCA to notify Ministry of Natural Resources and Forestry, Public Health Unit, City of Hamilton Animal Services and/or wildlife control company as appropriate
- Consider if building/structure modification or exclusion measures are appropriate
- Consider other preventative measures as appropriate (e.g. alternative roosting structures)

5.5.3 Preventative Measures

Prevention measures can be an effective management option for limiting or preventing bats from entering a building. The following prevention measures may be applied based on the function or use of the Conservation Area to help limit the potential for conflict issues associated with bats.

Annual Building Inspections: Regular building/facility inspection is an effective approach for determining if bats are present and where bats are entering a building, and for evaluating mitigation options. Once all possible entry points are located (holes, cracks, warped siding) the proper sealing/maintenance can be applied.

Providing Alternative Housing/Roosting Sites: To help deter bats from utilizing a building for maternity roosts or hibernating, artificial structures can be constructed near the targeted area(s). Bat boxes are commonly erected near buildings where bats typically feed to help keep them away from buildings. This option can be costly, but maintenance requirements once constructed are generally minimal.

Additional Resources

Canadian Centre for Occupational Health and Safety - Histoplasmosis
http://www.ccohs.ca/oshanswers/diseases/histopla.html

Ministry of Natural Resources and Forestry - *Prevent conflicts with Bats*
http://www.ontario.ca/page/prevent-conflicts-bats

Ministry of Natural Resources and Forestry – *Little Brown Bat Species at Risk*
http://www.ontario.ca/page/little-brown-bat

References

Beaver solutions – Working with Nature, Resolve Flooding Problems
http://www.beaversolutions.com/

Boyles, S. L. and Savitzky, B. A. (2008). *An Analysis of the Efficacy and Comparative Costs of Using Flow Devices to Resolve Conflicts with North American Beavers Along Roadways in the Coastal Plains of Virginia.* Proceedings of the 23rd Vertebrate Pests Conference, Published at University of California, Davis. (2008) pp.47-52.

Canadian Centre for Occupational Health and Safety website for more information on histoplasmosis in Ontario. http://www.ccohs.ca/oshanswers/diseases/histopla.html

City of Hamilton Wildlife Feeding By-law. https://www.hamilton.ca/animals-pets/wildlife/feeding-wildlife

City of Hamilton - *Living with Coyotes Fact Sheet.*
http://www.hamilton.ca/CityDepartments/PlanningEcDev/Divisions/ParkingBylawServices/AnimalControl/Education/LivingwithCoyotes.htm

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Internet Center for Wildlife Damage Management – *Beaver Pipes & Beaver Flow Control Devices.* http://icwdm.org/wildlife/beaver/BeaverPipes.aspx

Massachusetts Division of Fisheries and Wildlife (2004). *The Use of Water Flow Devices in Addressing Problems Caused by Beaver in Massachusetts*. http://www.mass.gov/eea/docs/dfg/dfw/wildlife/wildlife-facts-pubs/beaver-water-flow-devices.pdf

Ministry of Natural Resources (2008). *Strategy for Preventing and Managing Human-Wildlife Conflicts in Ontario*.

Ministry of Natural Resources and Forestry – *Preventing Conflicts with Beavers* http://www.ontario.ca/environment-and-energy/preventing-conflicts-beavers

Ministry of Natural Resources and Forestry – *Preventing and Managing Conflicts with Birds.* http://www.ontario.ca/environment-and-energy/preventing-and-managing-conflicts-birds

Ministry of Natural Resources and Forestry – *Preventing and Managing Conflicts with Coyotes.* http://www.ontario.ca/environment-and-energy/preventing-and-managing-conflicts-coyotes-wolves-and-foxes

Ministry of Natural Resources and Forestry – *Prevent conflicts with Bats.* http://www.ontario.ca/page/prevent-conflicts-bats

Ministry of Natural Resources and Forestry - *Preventing and Managing Conflicts with Small Mammals.* http://www.ontario.ca/environment-and-energy/preventing-and-managing-conflicts-small-animals

Ministry of Natural Resources and Forestry – *Feeding Wildlife Do s and Don'ts* https://www.ontario.ca/environment-and-energy/feeding-wildlife-dos-and-donts

Ministry of Natural Resources and Forestry – Rabies. http://www.ontario.ca/page/rabies

Ministry of Natural Resources and Forestry – Little Brown Bat Species at Risk. http://www.ontario.ca/page/little-brown-bat

Ontario SPCA. Animal Care Fact Sheets – *Why Live Trapping and Relocation Don't Work.* http://www.ontariospca.ca/images/factsheets/why%20live%20trapping%20doesnt%20work.pdf

Skedaddle Humane Wildlife Control – Partner with Burlington/Hamilton SPCA
Small mammal fact sheets:
http://www.skedaddlewildlife.com/services/squirrels/
http://www.skedaddlewildlife.com/services/skunk/
http://www.skedaddlewildlife.com/services/raccoons/

Town of Oakville. (2012). *Oakville Wildlife Strategy (OWLS) and Wildlife Conflict Protocols.*