

Coyote Response & Coexistence Strategy

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Agencies Consulted:

Coyote Watch Canada
Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMRF)

Legislation:

Ontario Fish and Wildlife Conservation Act
Animal Protection and Services By-law 2018-91

GUIDING PRINCIPLES

The City of Markham is committed to promoting a safe, sustainable and biodiverse community that recognizes the importance of ecosystems and peaceful coexistence between humans and wildlife. This priority is supported by the following:

- Markham's Strategic Plan *Building Markham's Future Together* – one of the Plan's four goals is a "Safe, Sustainable & Complete Community". As part of this goal the City strives to achieve complete communities with an excellent quality of life. We ensure community safety and enhance the natural environment and build through sustainable integrated planning, infrastructure management and services.
- Markham's *Greenprint: Sustainability Plan* – the City's long-term plan to make Markham one of the most sustainable cities in North America. The *Greenprint* features 12 priority areas, including Markham's ecological integrity and the need to protect, restore and enhance biodiversity in the municipality, including wildlife in its natural ecology systems.
- Markham's *Official Plan* – which seeks to protect and sustain Markham's biodiversity and natural heritage for future generations by conserving the necessary natural habitats and corridors required by native plants and animals to move and thrive within the City's Greenway System. Markham seeks to reach a positive balance between natural heritage lands and urban development by establishing environmental buffers through the location of public land uses such as school, roads and parks.
- Markham's development application review process - City staff review opportunities to eliminate or minimize the amount of residential developments backing onto the natural heritage system. This planning practice is primarily aimed at reducing encroachments such as gardens and mowing onto City-owned natural areas, but may also help to minimize the amount of wildlife-human conflict.
- Markham's *Animal Protection and Services By-law 2018-91* – which prohibits the feeding of wildlife in the City in an effort to not create the preconditions that eventually lead to human-wildlife conflicts. In accordance with By-law 2018-19, individuals are not permitted to intentionally feed a wild animal or to leave food or other attractants outside with the intention of attracting wild animals, feral or stray domestic animals.
- Provision of Wildlife Education, Rehabilitation and Rescue Services (including veterinary care and euthanasia for sick wildlife) – the City has been providing these services since 2012 and is one of very few municipalities to do so.

As evidenced above, the City of Markham is committed to ensuring a sustainable and resilient community where residents safely coexist with wildlife and natural ecosystems flourish. Human safety is the City's number one priority in managing any human-wildlife conflicts that may emerge. To achieve this, the City of Markham's *Coyote Response and Coexistence Strategy* has been developed in consultation with animal experts. The Strategy is based on scientific research on coyote ecology and biology in urban settings and established best practices and tools known to the City at this time. The Strategy is a living document and will continue to be updated as more data and best practices become available.

BACKGROUND

Coyotes are integral members of a diversified ecosystem and contribute to a necessary and healthy prey-predator balance. To understand coyote behavior, it is important to understand coyote characteristics and traits.

Appearance: Coyote appearance can be very diverse, ranging from grey to blonde and red to black. Coyote fur is long and coarse, and is generally grizzled buff above and whitish below, reddish on the legs, and bushy on a black-tipped tail. Adult weight ranges on average between 14 to 18 kilograms (field data provided by Coyote Watch Canada). The positioning of a coyote's tail points to the ground when in motion and standing still. This distinction is often used when trying to determine if an animal is a dog or a coyote.

Classification: Coyotes are part of the Family Canidae, which include dogs, wolves, foxes and jackals. The Family Canidae is referred to in general as the canids.

Communication: Coyotes use vocalizations such as howls, barks, throat growls and yips to communicate between related and non-related family members, to defend territory, to express distress, to warn other coyotes, to celebrate, to locate pack members, and during mating and mourning. Together, two coyotes can sound like a chorus – this is known as the '*beau geste*' affect due to the variety of sounds produced by each coyote and how the sound travels.



Diet: Although coyotes are carnivores, their foraging and hunting behaviour is best described as “adaptive” omnivores. The diet of canid species like coyotes consists primarily of small mammals such as rodents, rabbits, fruit, insects and geese eggs. This diet reflects seasonal resource availability as well. While coyotes may not distinguish between a cat or one of their preferred prey species (such as rabbits or voles), domestic dogs are not a common food source for coyotes. In fact, dogs are usually seen by coyotes as potential competition for food resources or as a threat to coyote families. The deliberate or inadvertent feeding of coyotes by humans erodes their natural foraging and hunting behaviour as well as their fear of people. Ironically, this increases the likelihood of a human-wildlife conflict.

Habitat: Like other wild animals, coyotes are most active at dawn and dusk. Seasonal milestones (denning and pup rearing time, winter months) and human activity may impact how and when coyotes travel throughout their territory. Coyotes thrive in naturalized areas and green space because they are rich in food, water and shelter. Coyotes are also skilled at connecting these green spaces through their extensive mobility. Home range sizes vary for each individual coyote. Research has shown that home range sizes for resident urban coyotes average two to 10 square kilometres, while transient coyotes have larger home ranges. The feeding of coyotes by humans can impact coyote travel patterns as well as how coyotes forage for food in their home range.

Social structure: Healthy Eastern coyotes mate for life and form highly social, related family units. Family members share in hunting, pup rearing and territory protection duties. The size of coyote families will differ depending on habitat, food availability and habitat changes. Coyote parents play a key role in teaching their pups how to hunt. Young coyotes often disperse in the Fall to establish their own territory and to find a mate. However, they may remain with the family as a caregiver to help rear next year’s pups. Lone or transient coyotes may also be present in an ecosystem, utilizing buffer areas around an established territory.

COEXISTENCE MEASURES

The City of Markham has developed a number of coexistence measures in an effort to minimize the need to use lethal measures to control coyotes in the City. These measures are also geared towards breaking the cycle of dependency that urban coyotes have developed on human-based resources, which contribute to negative ecological conditions and potentially dangerous conflict.

Increased public education and community outreach

The relationship between humans and coyotes is complex and evolving. It is informed by multiple factors, including the differing attitudes humans have toward coyotes, and by the personality differences between coyotes encountered by humans. Based on research conducted by City staff, there has been an increase in the number of reported coyote sightings and in the number of reported human-coyote conflicts in Ontario in 2021. The wildlife interventions proposed by the City of Markham as part of this Strategy will change over time in response to a variety of factors, such as municipal development patterns and the movement pattern of coyotes.

Ongoing public education and community outreach is an important part of establishing and maintaining a successful coyote response and coexistence plan for the City of Markham. These efforts include: formal programs in Markham schools; informal education sessions at the community level; and communication within neighborhoods experiencing higher volumes of coyote sightings.

City staff are committed to the following additional methods of public education and community outreach:

Tactic	Details
Website	<ul style="list-style-type: none"> • <i>markham.ca/wildlife</i> has been expanded to host the most up-to-date information on Markham’s Coyote Response & Coexistence Strategy and other wildlife co-existence tips in English, Simplified Chinese and Tamil
Social Media	<ul style="list-style-type: none"> • Updates to residents on areas where coyotes are sighted • Provide education on coyote behaviours, habitats and safety tips
Educational Handout	<ul style="list-style-type: none"> • Provide education on coyote behaviours, habitats and safety tips • Who to call to report a sighting
Local Newspapers	<ul style="list-style-type: none"> • Place ads in the local newspaper that outline safety tips
Mail Outs	<ul style="list-style-type: none"> • When a coyote den is located, an educational letter will be sent to all residential addresses within a 100 metre radius of the den (or further if necessary) • Additional mail outs can be issued, if required
In-Person Community Engagement	<ul style="list-style-type: none"> • Officer patrols are increased in areas where coyotes are present (during patrols, officers educate residents on responsible pet ownership and safety tips) • Host public information and education sessions in conjunction with the the Ministry of Northern Development, Mines, Natural Resources and Forestry and Coyote Watch Canada • At the request of a property owner, officers can attend a residential property and provide tips on wildlife proofing their property
Signage	<ul style="list-style-type: none"> • Post additional signage in parks and open spaces where coyotes are present to educate residents • Place mobile signage in areas with high numbers of reported sightings to advise public to be vigilant

Implement domestic pet management and property management education programs

Conflicts between humans and coyotes typically involve resources that coyotes need, such as food. This can result in aggressive behavior by coyotes, including coyotes preying on domestic pets for food, and coyote attacks on domestic pets as perceived competitors for food. On extremely rare occasions (estimated three per year in Canada), coyote attacks can also be directed at humans. Outcomes range from unwelcome nuisances to tragedies. Most can be avoidable through changes adopted by homeowners in their immediate vicinity where coyotes are present. With the help of our proposed backyard survey, residents can learn what elements of their property create the highest risk of coyote nuisance visitation. Some elements are obvious, such as leaving out pet food, human food waste or water. Others may be less obvious to the homeowner, such as food resources that coyotes consume, like fallen fruits from a tree. Removing these resources will dramatically reduce the motivation for coyotes to visit.

Domestic pet management is a critical part of successfully reducing human-coyote conflict in the City. The attitudes of pet owners regarding whether or not their pets are allowed outdoors varies considerably, especially among cat owners. For instance, most owners do not agree with keeping their cats and small dogs indoors. However, there is an undeniable correlation between pet participation in outdoor activities and the risk of a coyote attack. However, this risk is very low and seasonal in nature – peaking during the period of time that adults are trying to provide additional food for their offspring in late spring and early summer.

Markham residents are encouraged to undertake the following actions to help deter coyotes from entering their property:

- **Food** - intentional and unintentional feeding can lead coyotes to associate humans with sources of food. Ultimately, this can eliminate their ingrained fear of humans and result in negative interactions among coyotes, people and household pets. To reduce food attractants:
 - Never feed or leave food out for a coyote or other wildlife.
 - Remove food sources from yards, including birdseed and fruit that has fallen to the ground.
 - Avoid feeding household pets outside.
 - Store garbage, compost and pet food in a place coyotes and other Wildlife cannot access.
 - Keep garbage in containers with tightfitting lids. Place containers curbside on the morning of collection and not before.
 - Do not deposit household waste into waste containers in City parks.
- **Water** - remove outdoor water sources such as water bowls for household pets and watering cans.
- **Shelter** - Spring is denning and pupping season where coyotes concentrate their activities around dens or burrows to shelter their young. To reduce attraction to private property: remove debris, dead brush and wood piles; cut long grass; secure any gaps in fences, sheds, decks, crawl spaces or foundation walls; and, secure any buildings on the property. Motion sensor lights can be helpful to discourage coyotes from entering private property at night.

- **Unattended household pets** - coyotes may consider household pets as potential prey or possible competitors for food sources. To minimize risk to household pets, do not leave them outside unattended. Free-roaming household pets, especially cats, may attract coyotes into residential neighbourhoods. Coyotes may seek out or attack small prey, which could include cats, rabbits and small dogs. This is considered normal coyote behaviour and does not indicate a danger for people. Dogs can be vulnerable if coyotes are accustomed or habituated to people (usually due to feeding) or coyotes who are protecting their territory and pups (usually during breeding season). Attacks on larger dogs are rare, and generally only occurs when dogs are off-leash or coyotes feel their territory or pups are threatened (generally during their breeding season - January to March). Walk dogs on a short (non-retractable) leash and carry a walking stick, plastic bag to make noise, umbrella or noisemaker when walking at night. Keep pets indoors at night and inspect yard before letting pets outside into the yard. Don't let pets interact with coyotes.
- **Aversion Conditioning (Humane hazing)** - if you encounter a coyote, do not turn your back on or run from a coyote. Instead, use proven humane hazing or aversion conditioning techniques. Aversion Conditioning (Humane hazing) is an activity or series of activities meant to re-establish or maintain coyotes' fear of people in an effort to: discourage coyotes from entering areas where people are present (such as parks and yards); discourage coyotes from approaching people and household pets; and, increase awareness about coyote behaviour and involve the community in coyote management efforts. Aversion conditioning (humane hazing) involves generating loud noises, making humans appear big by waving arms over head, spraying water, shining bright lights, using motion sensors, throwing objects near, but not at the animal. Using a variety of different hazing tools is critical because coyotes can become desensitized to the continued use of just one technique, sound or action. It is important to continue hazing the animal until it leaves the area. For more information on aversion conditioning please visit our website at <https://www.markham.ca/wps/portal/home/permits-licenses-taxes/animal-services/Wildlife/04-Markham-Wildlife>

Implementation of an Incident Escalation Framework

The City of Markham has developed the Incident Escalation Framework below to guide the City's response to reported coyote interactions. Each type of interaction is outlined and categorized based on its severity, and includes the steps the City's trained Animal Care staff will take in each reported case.

With all points considered, the lethal removal (killing) of coyotes is a last resort for the City. Other interventions will be attempted and the overall management response will be scaled to meet the degree of severity and risk experienced by humans. Overall, the presence of coyotes in urbanized areas is generally a positive ecosystem service and likely serves to reduce human risk to zoonotic disease (disease that can jump from a non-human animal to humans). Therefore, the management interventions need to strike a balance so that the positive benefits of resident coyotes can be enjoyed by the human community, with the negative aspects managed appropriately.

Coyote Behaviour	Classification	Animal Care Services Action
Coyote vocalizations; scat or prints seen	Observation	Distribute educational material and information on normal coyote behaviour.
Coyote seen moving through area (day or night)	Sighting	Distribute educational material and information on normal coyote behaviour.
Coyote seen resting in area (day or night)	Sighting	If area is frequented by people (e.g. park or playground), educate on normal coyote behaviour and provide aversion conditioning (humane hazing) information. Look for and eliminate any attractants in area where sighting occurred, if possible.
Coyote entering a yard (no person present outside)	Sighting	Educate on normal coyote behaviour and provide aversion conditioning (humane hazing) information. Complete yard audit.
Coyote following or approaching a person with no incident	Encounter	Assess and educate on normal coyote behaviour and provide aversion conditioning (humane hazing) information. Look for and eliminate any attractants in area where encounter occurred, if possible.
Coyote following or approaching a person with pet with no incident	Encounter	Assess and provide information on aversion conditioning (humane hazing) techniques and encourage responsible pet ownership. In an open area, post coyote sign(s) to alert other residents. If it is pup season and there is a known den nearby, consider blocking off the path or area (den) until pup season is over or confirmation that the family has moved on is achieved.
Coyote entering a yard with pets, no incident	Encounter	Assess and educate on wildlife attractants and responsible pet ownership. Provide information on aversion conditioning (humane hazing) techniques and complete yard audit.
Coyote entering a yard with people and pets (no pet attack occurring)	Encounter	Assess and educate on wildlife attractants and responsible pet ownership. Provide information on aversion conditioning (humane hazing) techniques and complete yard audit.

Coyote Behaviour	Classification	Animal Care Services Action
Coyote injures or kills unattended pet in back yard (distance greater than 6' from human)	Unattended Pet Attack	<p>Gather information including a historical overview of area and human-wildlife activity and the animals involved and reported circumstances.</p> <p>Assess and educate on wildlife attractants and responsible pet tion on aversion conditioning (humane hazing) techniques and complete yard audit.</p>
Coyote injures or kills pet off-leash in open space area	Unattended Pet Attack	<p>Gather information including a historical overview of area and human-wildlife activity and the animals involved and reported circumstances. Assess and educate on responsible pet ownership and aversion conditioning (humane hazing). Look for and eliminate any attractants in area where incident occurred, if possible.</p> <p>Post coyote sign(s) in open area to alert other residents. If it is pup season and there is a known den nearby, consider blocking off the path or area until pup season is over or confirmation that the family has moved on is achieved. Zero tolerance approach for leash law violations.</p>
Suspected coyote injures or kills livestock	Livestock Loss/ Depredation	<p>Legislation under Ontario Ministry of Agriculture, Food and Rural Affairs governs livestock valuation and handling of deadstock. Gather information on specific animals involved and reported circumstances. Assist livestock investigator where necessary.</p>
Coyote injures or kills pet off leash with human nearby (within six feet)	Attended Pet Attack	<p>Gather information including a historical overview of area and human-wildlife activity and the animals involved and reported circumstances. Assess and educate on responsible pet ownership, coyote attractants, and aversion conditioning (humane hazing).</p> <p>Perform yard/neighborhood/public area audit. Post coyote sign(s) and/or send educational materials to residents in the area (100m radius).</p> <p>Implement high intensity aversion conditioning (humane hazing) techniques by Markham's Animal Care Officers.</p> <p>If multiple confirmed incidents have occurred in the same vicinity within a short amount of time, further action may be required.</p>

Coyote Behaviour	Classification	Animal Care Services Action
<p>Coyote approaches a person, showing teeth, back fur raised, vocalizing, lunging, nipping without contact</p>	<p>Incident</p>	<p>Gather information including a historical overview of area and human-wildlife activity and the animals involved and reported circumstances.</p> <p>Educate on responsible pet ownership (if applicable), coyote attractants, and aversion conditioning (humane hazing). Perform yard/neighborhood/public area audit. Post coyote sign(s) and/or send educational materials to residents in the area.</p> <p>Implement high-intensity aversion conditioning (humane hazing) techniques by Markham’s Animal Care Officers. If confirmed multiple incidents have occurred in the same vicinity within a short amount of time, further action may be required.</p>
<p>Coyote has bitten human (an attack where the involved human does not encourage the coyote to engage)</p>	<p>Unprovoked Human Attack</p>	<p>Identify and gather information on all details of attack (including action of victim before and after attack, action of victim towards coyote, and how incident was resolved).</p> <p>Any human bitten by a coyote(s) will need to seek the advice of their physician concerning the administration of a post exposure rabies vaccination.</p> <p>Animal Care Staff will notify the City Clerk and/or CAO, York Regional Police (YRP), York Region Public Health, and the Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMRF).</p> <p>City staff will work with the YRP and/or MNDMRF and Ministry regulated licensed trappers to locate and eliminate the responsible coyote, which will be tested for rabies, and also be given a full necropsy to determine general health and whether feeding was involved.</p> <p>City staff will educate residents on coyote attractants, aversion conditioning (humane hazing), and responsible pet ownership. City staff will also perform yard/neighborhood/public area audit. Implement high-intensity aversion conditioning (humane hazing) techniques by Animal Care Officers.</p>

Coyote Behaviour	Classification	Animal Care Services Action
<p>Coyote has bitten human (human encouraged coyote to engage by hand feeding, approaching coyote with pups, intervening during pet attack, etc.)</p>	<p>Provoked Human Attack</p>	<p>Identify and gather information on all details of attack (including actions of victim before and after attack, whether feeding or pets were involved, actions of victim towards coyote, and how incident was resolved).</p> <p>Any human bitten by a coyote(s) will need to seek the advice of their physician concerning the administration of a post exposure rabies vaccination.</p> <p>When known, animal care staff will notify the City Clerk and/or CAO, York Regional Police (YRP), York Region Public Health, and Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMRF).</p> <p>City staff will work with YRP and/or MNDMRF and ministry regulated licensed trappers to locate and eliminate the responsible coyote, which will be tested for rabies, and also be given a full necropsy to determine general health and whether feeding was involved.</p> <p>City staff will educate residents on coyote attractants, aversion conditioning (humane hazing), and responsible pet ownership. City staff will also perform yard/neighborhood/public area audit. Fines (for wildlife feeding and/or leash law violations) when appropriate. Implement high-intensity aversion conditioning (humane hazing) techniques by Animal Care Officers.</p>

CHART LEGEND:

ATTENDED PET: A pet that is on a leash less than six feet in length or is in the presence of a person less than six feet away.

ENCOUNTER: A direct meeting between humans and coyotes with no physical contact and no incident has occurred.

HUMAN ATTACK: A human is bitten by a coyote.

INCIDENT: A conflict between a human and a coyote where the coyote exhibits any of the following behaviors: growling, baring teeth, lunging or making physical contact with the person without biting.

OBSERVATION: The act of noticing signs of coyotes, such as tracks, scat, or vocalizations, but without visual observation of the coyotes.

PET ATTACK: A coyote kills or injures a domestic pet.

PROVOKED ATTACK: An attack where the involved human encourages the coyote to engage (Examples include a human hand-feeding a coyote, approaching a coyote with pups or intervening in a physical dog-coyote encounter).

SIGHTING: A visual observation of a coyote (day or night).

UNATTENDED PET: A pet that is roaming free, walking off-leash more than six feet from a person, or on a leash longer than six feet (e.g. a retractable leash).

UNPROVOKED ATTACK: An attack where the involved human does not encourage the coyote to engage.

Human Intervention Strategies to Reduce or Mitigate Interactions with Coyotes

Individual management of human-coyote risk remains one of the most effective tools in improving coyote aggressive behavior around Markham's residential properties and activity areas like parks and playgrounds.

Human Interventions include:

- Removing food resources from coyote foraging areas.
- Isolating domestic pets from areas of coyote activity.
- Actively using aversion conditioning (humane hazing) techniques when a coyotes is observed.
- Carefully recording and reporting all coyote sightings to Markham Animal Services via telephone by calling 905 415 7531

Promote a Provincial approach to Managing Human-Wildlife Conflicts

The issue of human-wildlife conflicts is complex and Ontario municipalities are generally ill-equipped to deal with this issue. Further, the nature of this issue is such that it must be dealt with as part of the broader issue of environmental sustainability and habitat preservation. Markham City staff encourage the Province of Ontario to take a leadership role in addressing this emerging public policy issue with input from stakeholders, including municipalities.

Investigate Partnering with a Local University to Conduct Research on Human-Coyote Conflicts and the Effects of Urbanization on Coyotes

In 2021 there has been a notable increase in the number of reported coyote sightings in Canadian urban centres. More often than not, residents are reporting the same coyote family and there are not multiple coyote families in one area. Sensational news stories regarding rare attacks by coyotes on domestic pets and/or on humans have increased the concern residents have regarding coyotes and has distorted the risk posed to human by coyotes. Despite this, there seems to be little academic research or formal studies of human-coyote conflicts in Canada. Without this data, municipal efforts for mitigate human-coyote conflicts will not be successful in the long. As such, Markham City staff are committed to forming a partnership with a university or academic group to expand local knowledge of coyote behaviour, better understand the elements of effective human-coyote coexistence programs, monitor trending wildlife conflict management, and further investigate the correlation between habitat degradation and human-wildlife conflict.

SUMMARY

To be effective, the City of Markham's response to human-coyote conflict must be ongoing and dynamic. Coyote ecology changes rapidly. Ongoing studies on this, as well as the effectiveness of aversion conditioning (humane hazing), coyote foraging behavior, domestic animal behavior in the presence of coyotes, and alternative methods of discouraging coyotes will all assist City staff with continued development of a successful Coyote Response & Coexistence Strategy in Markham. A collaborative approach among Canadian cities and research teams will result in more effective overview and a better plan for generalizing municipal responses to the human- coyote conflict. Staff will continue to collaborate with organizations and other municipalities to review current practices and determine if the approach outlined in this strategy requires updating. Staff will also continue to take an evidence-based approach to coyote response while keeping human safety at the forefront of the response.

REFERENCES

- Coyote Watch Canada: <https://www.coyotewatchcanada.com>
- Centre for Urban Resilience Loyola Marymount University: <https://bellarmine.lmu.edu/urev/beyondtheclassroom/centerforurbanresilience/>
- City of Collingwood: <https://www.collingwood.ca/town-services/documents/coyote-management-plan>
- City of Burlington: <https://www.burlington.ca/en/services-for-you/coyotes.asp?links=false>



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