

## **COYOTE COEXISTENCE MANAGEMENT PROGRAM**

Although the City of Sunset Valley has a long history of environmental stewardship, some wildlife has the potential for conflict with humans. Coyotes (*Canis latrans*) and to some extent raccoons can be considered nuisances and have a higher potential for human-wildlife conflict.

### **COYOTE BIOLOGY**

Coyotes (*Canis latrans*) are one of the most adaptable animals in North America. As a member of the Dog (Canidae) family, they are close relatives of wolves, foxes, and domestic dogs. Coyotes are considered to be medium sized dogs ranging between 20 to 45 pounds. Coyotes are distinguished by their grayish brown coat with tinges of red and bushy tails. Unlike most dogs who have brown eyes coyotes have yellow eyes. In the dog family coyotes are one of its fastest members running up to 65km per hour (Vaught et al, 2000)

One of the reasons coyotes are so adaptable is that they are opportunistic omnivores. From fruits and insects, to rodents and rabbits coyotes will eat what is readily available (MacCracken, 1982; Morey et al., 2007). In urban environments coyotes will adapt to things that are associated with humans, such as dog food, domesticated cats, and even garbage.

### **WHERE ARE COYOTES FOUND**

Unlike most carnivores whose range has decreased over time, coyotes have spread across North and Central America since European settlement (Berkoff, 2001). From the desert southwest to Canada, coyotes are found in almost every habitat. This adaptability has allowed coyotes to enter into the urban landscape successfully. Coyotes have been seen around Sunset Valley for years. Coyotes are commonly found in the City's green spaces and conservation areas.

### **RURAL vs. URBAN/SUBURBAN COYOTES**

Entering into the urban and suburban arena has created opportunities for interactions between humans and coyotes. Although coyotes generally avoid humans and human activity, they can successfully survive in a human dominated landscape. In these areas coyotes generally have smaller home ranges, meaning the area in which an animal lives and travels (Grinder and Krausman, 2001). Suburban and Urban areas generally have adequate food sources requiring less movement. In more wild settings, coyotes are considered to exhibit peak activity is dusk and dawn (Andelt and Mahan, 1980; Grinder and Krausman, 2001). In an effort to avoid humans, coyotes in urban and suburban areas have become more nocturnal, more active during the middle of the night.

## **COYOTES IN THE URBAN ECOSYSTEM**

In urban and suburban areas coyotes are apex predators. There are no natural predators of coyotes in these environments. As such coyotes may be considered a keystone species, an animal that has a crucial role in the function of the ecosystem.

## **ARE COYOTES OVERPOPULATED?**

The question of whether coyotes are overpopulated is often asked. There is not a good method to estimate coyote populations. Camera survey techniques work well on wildlife that has distinctive patterns or individual animals. For example, deer populations can be surveyed because bucks look distinctive. Populations can be estimated from the number of individual bucks in the area. Coyotes generally look similar making it difficult to tell one animal from another. Tracking stations can also give presence absence data, but not population numbers. Coyotes are capable of moving long distances and are good at avoiding people. Coyotes generally have high mortality rates. Large numbers of coyotes die before they are a year old due to a variety of factors. The number of coyotes is not necessarily the problem. The problem occurs when coyotes lose their fear of people.

## **COYOTE BEHAVIOR**

Coyotes are generally territorial animals; these animals are considered to be residential coyotes. However, there are transient coyotes that cover large areas and do not defend particular territories. Coyotes have been known to change from being residential to transient and vice versa. Coyotes usually avoid people and many of their habits demonstrate this. In several studies, coyotes showed preferences for natural areas in urban environments (Gehrt et al, 2009). The change to being nocturnal is also an effort to avoid human interaction. Although coyotes rarely interact with humans, there are times when coyotes begin to lose their wariness of people. By and large this happens when people have created environments that encourage coyotes to come into human dominated landscapes. By allowing coyotes to get close and having food sources on properties, coyotes may begin to habituate to the presence of people.

## **COYOTE BEHAVIORAL SCORES**

When coyotes begin to habituate to human behavior, researchers have developed a score that demonstrates increased levels of aggression. The pattern of coyote behavior may show an increased likelihood of aggression against people (Timm et al., 2004). This scale ranges from 0-7, with zero representing a coyote calling at night and seven being aggression against an adult. If behavioral reports go up the scale, this is an indicator that coyotes have begun to lose their fear of humans and encounters are more likely to occur. When coyote behavior begins to go above a four, hazing may no longer be as effective a tool. Hazing coyotes includes throwing

items, making loud noises, and trying to scare the coyote away.

### **LIKELIHOOD OF INJURY OR DEATH FROM A COYOTE**

Although coyotes are predators and wildlife can seem unpredictable, the likelihood of being injured or killed by a coyote is extremely small (White and Gehrt et al., 2009). There have only been two confirmed deaths due to coyotes nationwide and only one unprovoked attack in Travis County. For perspective, 38 people were killed in 2012 alone by domesticated dogs and 4.5 million people are bit each year by domesticated dogs. Nearly 200 people die each year in deer-related automobile accidents. Although the threat coyotes pose to people may be low, dogs and cats are more likely to be killed as coyotes hunt for food and defend territories.

### **MANAGEMENT OPTIONS**

The question of what to do when coyotes begin to lose their fear of humans is not easily answered. There are a variety of options to manage coyotes but no single panacea. There are two extremes to management: eradication and leaving wild areas strictly to wildlife. Neither of these options will likely work for a variety of reasons.

### **COYOTE ERADICATION**

Eradication is incredibly difficult and not cost-effective (Henke, 1995). Coyote populations generally remain stable unless large numbers are removed. Historically, this was attempted for a brief period of time in Central Texas. However, coyotes remain in these areas today. When populations of coyotes are threatened, females may enter estrus at a younger age adding a new generation of coyotes to the population. Eradication options also come with detrimental side effects. As an apex predator, coyotes prey on a variety of smaller predators (mesopredators) including raccoons, skunks, and rodents. When coyotes are removed these mesopredators are no longer under threat of predation and can change the balance of the ecosystem (Prugh et al, 2009). Prey populations could also be affected. Although coyotes will generally not attack adult healthy deer, they will kill fawns. Coyotes also feed heavily on rodents who may be disease vectors. Coyotes help keep these populations in balance (Whitaker and Lindsey, 1999; Henke, 1995).

### **LEAVE WILD AREAS FOR WILDLIFE**

Greenspaces are set aside as habitat for wildlife. However, coyotes are capable of covering large distances. They will not strictly stay in open areas. Restricting human or domesticated dog access to these areas will not necessarily change the behavior of coyotes that have habituated to human presence.

## **OTHER MANAGEMENT OPTIONS**

There are several methods that have been demonstrated to work in managing coyotes. First is aversive conditioning or hazing. This can be done in a variety of ways. When people encounter coyotes they can throw things, yell, and scream. This can also be done on a larger scale with groups of people going out to haze coyotes in a concerted effort to install a wariness of humans. Some researchers believe that once coyotes have begun to habituate to human behavior, hazing may only have a short term effect. If coyotes are just beginning to lose their wariness, hazing is a very effective tool.

In Southern California research demonstrates that the removal of a small number of coyotes can effectively change the behavior of a population. In several locations, trapping and euthanizing as few as two coyotes has stopped aggressive coyote behavior. These results are regardless of whether a particular aggressive coyote was captured (R. Baker 2007; Timm et al, 2004, Timm and Baker, 1998). This small scale lethal control has been used in Travis County in areas where coyotes appear to become more aggressive toward people.

Finally, public education is the most important part of any management plan. Educating the public on how to haze coyotes, to keep pets and their food indoors, and cleaning up yards to remove areas coyotes can hide are all important tools to coexisting with coyotes.

## **COYOTE COEXISTENCE MANAGEMENT PLAN**

Coyotes are an important part of the ecosystem; however they do have the potential for conflicts with humans in specific situations. Since it is impossible and undesirable to completely remove coyotes from the environment, the best practice to manage wildlife through a coyote coexistence program. This program is a multi-faceted approach to balance respect and protection of wildlife and their habitats with concerns regarding public safety. The program will include the following:

- Public Education and Outreach
  - Human Behavior Modification
- Hazing Program
  - Coyote Behavior Modification
- Response Plan for Wildlife Incidents

## **PUBLIC EDUCATION AND OUTREACH**

Public Education and Outreach are key to helping residents and visitors within the City's greenspaces to make responsible decisions near wildlife. Public education will focus on providing residents with accurate information regarding wildlife and what they can do to

reduce opportunities for conflicts. This will include decreasing wildlife attractants, safeguarding children and pets, and creating reasonable expectations of normal wildlife behavior. Table 1 has a list of normal and inappropriate coyote behavior.

Table : 1 Normal and Inappropriate Coyote Behavior

Normal Coyote Behavior	Inappropriate Coyote Behavior
Coyotes heard howling, yipping, or barking.	Coyote actively approaching a person, with no attractants as incentive.
Coyotes seen at a distance, resting or moving at dawn, dusk or at night.	Coyote stalking a person or pet under direct control of its owner.
Coyotes preying on small mammals such as rats, mice and domestic cats.	Coyote being aggressive toward a person, showing teeth, lunging or nipping.
Coyote entering a yard that is open, unfenced near, greenspaces, and/or has attractants such as pet food.	Coyote enters an area where humans and are pets are present and does not leave when hazed.
Coyotes crossing streets and sidewalks.	Coyote biting a person or pet on a leash.

Human behavior modification can have a major influence on wildlife behavior. Providing information to residents that allows them to make responsible choices to stop attracting coyotes into the human landscape will reduce human-wildlife conflicts.

Public education and outreach will primarily include dissemination of information through the following:

- Interpretive signs in parks, green spaces, and conservation areas.
- Periodic newsletter articles.
- Information bulletins at City Hall and on the website.
- Mailings and/or door hangers when human-wildlife conflicts occur.
- Public presentations as necessary.
- Hazing training to volunteers.

**HAZING PROGRAM-COYOTE BEHAVIOR MODIFICATION**

When urban wildlife becomes habituated to human presence, it may be necessary to modify the behavior of the animals. Hazing is a process that employs a use of deterrents to move an animal out of an area or to discourage inappropriate or undesirable behavior. Deterrents include noise-making tools such as whistles and horns, items such as spray bottles and bright lights, or simply yelling and throwing objects. Hazing helps to maintain animals' fear of humans and discourages them from entering into more residential areas. Hazing should never cause harm or injure an animal. If an animal is injured by hazing it may become more aggressive and unpredictable. Hazing should not be used if an animal is trying to avoid humans or is concealed at a distance in its natural habitat.

It is not possible to remove coyotes from the urban ecosystem. Studies have shown that large scale removal of coyotes from an area may invite transient coyotes to remain or increase breeding within the existing population. Hazing is an essential part of the plan to create a safe environment of coexistence and reduce conflicts between humans and coyotes.

### **GOALS OF THE HAZING TRAINING PROGRAM**

1. To change coyote behavior in order to avoid human conflicts. Human behavior has a strong influence on animal behavior. People living in areas where coyotes are present can remove items that attract coyotes to their yards, identify dangerous situations, and respond appropriately to wildlife interactions.
2. To provide residents with educational material and tools to actively participate in reshaping coyote behavior. This will help residents feel safe in their yards, as well as the greenspace and conservation areas.
3. To model hazing behavior and share information about coyotes and their behavior.
4. To develop a long-term community-based hazing program to shape coyote behavior.

### **HAZING PROGRAM GUIDELINES**

1. Levels of hazing need to target coyote activity appropriately.
  - a. Coyotes live within the green spaces and conservation areas. If coyotes are demonstrating avoidance behavior, hazing is not necessary.
  - b. If coyotes are seen at night or near dusk or dawn, hazing may not be necessary.
  - c. Coyotes that do not demonstrate appropriate avoidance behavior in all circumstances should be hazed.
2. Hazing must be exaggerated, aggressive and consistent when first beginning a program. As coyotes learn appropriate responses, it will take less to make them avoid humans. Early in the process, it is common for coyotes not to respond to hazing techniques. Without a history of hostility, they do not have the context to create the desired outcome.

3. Techniques and tools can be used in the same manner for one or multiple animals. Usually there is a dominant animal in the group who will respond and the others will follow. DO NOT ignore, turn away, or avoid hazing because there are multiple animals.
4. The more often a coyote is hazed by a variety of tools, techniques, and people, the more effective the hazing will be in changing the animal's behavior.
5. Hazing must be associated with the person doing the actions. The coyote must be aware of where the potential threat is coming from.
6. Coyotes can and do recognize individual people and animals in their territory. They can learn to avoid or harass specific individuals.
7. Coyotes are creatures of habit. Identifying the habits can help target which behaviors to change. For example if a coyote is reported in the same area at the same time several days in a row, hazers can target their efforts to change the animal's future behavior.
8. Regular hazing can insure that future generations of coyotes learn acceptable behavior.
9. Once hazing begins it must continue until the animal leaves, otherwise the coyote will wait until the person gives up and the coyote will be more resistant to additional hazing.
10. Hazing uses a variety of tools for deterrent. This is critical as coyotes get used to individual items and sounds.
  - a. Noisemakers such as voice, whistles, air horns, shaker cans, pots, and pans.
  - b. Projectiles such as sticks, small rocks, tennis balls, rubber balls.
  - c. Other deterrents include hoses, spray bottles with vinegar, pepper spray, bear repellent, walking sticks, pop up umbrellas.
11. Human behavior must change to support hazing.
12. Education about exclusion techniques, removing attractants, and personal responsibility regarding pet safety are critical parts of a coyote hazing plan.
13. Coyotes are skittish by nature. Habituated behavior is learned and reinforced by human behavior. Coyotes as a rule DO NOT act aggressively toward aggressive people. The one exception is if the coyote is sick or injured. In this case the animal's behavior may be unpredictable. If a sick or injured animal is suspected the City should be contacted immediately.
14. Individuals involved in hazing need to be trained to explain hazing to residents who witness the process. They also need to explain the difference between hazing and harassment of wildlife and goals of appropriate behavior for coexistence.

### **HAZING TRAINING PROGRAM**

Coexisting with wildlife requires a community approach. Hazing activities will need to be conducted by City staff and trained volunteers. Without community support, the program will not succeed and the likelihood of human-wildlife conflict will increase. The Hazing Training Program will include information on coyote ecology, current research, and an overview of

hazing techniques. Volunteers will learn about the Coyote Coexistence Management Program, normal and abnormal coyote behavior, and how to respond to questions in the community regarding coyote management. Resident volunteers are the best equipped to respond consistently and at the opportune times in their own neighborhoods, parks, and open spaces. The Hazing Training Program will empower residents to aid in changing coyote behavior in a safe and consistent manner.

Topics included in the Hazing Training Program will include:

1. Coyote behavior and ecology.
2. Why coyotes are in urban areas, specifically Sunset Valley.
3. Normal and abnormal coyote behavior.
4. Seasonal behavior changes, breeding, pup rearing, and denning behavior.
5. Reality of danger toward people vs. pets
6. Children and coyotes.
7. How human behavior influences coyote behavior.
8. Attractants.
9. Tips on deterring animals from entering private property.
10. Appropriate response when encountering a coyote.
11. What is hazing, including goals, and how to engage.
12. Appropriate hazing techniques
13. Pet safety tips.
14. Lethal control options.

Volunteers shall send detailed accounts to City staff to help track hazing activities. This will help the City determine what has been successful, techniques used and tools needed. The accounts will include the following,

1. Date, time, location, and number of animals hazed.
2. Initial coyote behavior, hazing technique, and coyote response.

Volunteers will also be notified of coyote hot spots and asked to haze in those areas. The Hazing Training Program is essential to coyote co-existence.

### **RESPONSE PLAN FOR HUMAN-COYOTE CONFLICT**

The following charts detail the response plan for various types of human-coyote conflicts. These are the guidelines the City will follow in responding to conflicts. The Hazing Training Program will be offered throughout the year regardless of the conflicts that occur.



### SIGHTING/OBSERVATION

Coyotes demonstrating normal coyote behavior.

1. The City will assess the situation and provide necessary training to the residents concerning interaction with wildlife.
2. The City will provide hazing training as requested.

### ENCOUNTER

Interaction between wild animals and people that negatively impacts people or their resources or pets, or wild animals and their habitat.

1. The City will assess the situation and provide necessary training to the residents concerning interaction with wildlife.
2. The City will provide hazing training as requested.

### INCIDENT

A conflict between a human and a coyote where the animal approaches a human and growls, bares, teeth, or lunges; or injures or kills pets under direct control (leash) of a pet, but no human injury occurs.

1. The Sunset Valley Police Department in cooperation with the Public Works and Environmental Services Department will investigate all aspects of the incident, determine possible causes, and enforce all applicable city regulations.
2. All residents within 500' of the incident will be notified.
3. Information will be placed on the Sunset Valley website and in the monthly newsletter.
4. The City will offer hazing training to all residents within 500' of the incident.
5. If there are more than two documented incidents within a six week period the City may consider lethal control to remove aggressive coyotes.

### ATTACK

An aggressive action by a coyote that results in physical contact and injury to a human.

1. The Sunset Valley Police Department in cooperation with the Public Works and Environmental Services Department will investigate all aspects of the attack, determine possible causes, and enforce all applicable city regulations.
2. Texas Parks and Wildlife Department and the Texas Department of State Health Services will be notified of the attack.

3. The City will mail all residents information regarding the attack and will provide educational material regarding wildlife.
4. If the attack occurred within the greenspaces and conservation areas, they may be closed until the investigation has been completed.
5. Depending on the circumstances of the attack, lethal control may be considered to remove aggressive coyotes. Any coyote euthanized will be tested for rabies.
6. The City will offer hazing training to all interested residents and neighboring residential areas.

**COYOTE BEHAVIOR and RESPONSE CLASSIFICATION**

Coyote Behavior	Classification
Coyote heard howling, yipping, and/or barking.	Observation
Coyote seen moving in green spaces, conservation areas, and crossing streets at dawn, dusk, or at night.	Sighting
Coyote seen resting in green spaces or conservation areas.	Sighting
Coyote following or approaching a person and pet.	Sighting/Encounter
Coyote entering a yard without pets.	Sighting/Encounter
Coyote seen in residential or commercial areas during the middle of the day.	Encounter
Coyote entering a yard with pets.	Encounter
Coyote entering a yard and injuring or killing a pet (witnessed).	Encounter
Coyote entering a yard with people and pets, no injuries occurring.	Encounter
Coyote biting or injuring a pet in the green spaces and conservation areas while pet is not on leash.	Encounter/Incident

Coyote entering a yard and injuring or killing a pet with people present.	Incident
Coyote biting or injuring a pet on leash.	Incident
Coyote approaching a person without a pet.	Incident
Coyote demonstrating aggressive behavior such as baring teeth, lunging, or nipping and no injuries occur.	Incident
Coyote biting or injuring a person.	Attack

These are samples of the types of conflicts that occur and their response classification. Depending on the circumstances of a human-wildlife conflict the City may change conflict classifications to fit the situation. The goal of the Coyote Coexistence Management Program is to reduce human-wildlife conflict to sighting, observations, and minimal encounters. However, if coyote behavior escalates to a point where there are an increasing number of incidents or an attack, the City may take appropriate action. The City has the responsibility to protect public safety. Neighboring cities, such as Westlake Hills, (pers. comm., R. Wood 2013 ) have had success in curbing aggressive behavior in coyote populations by small-scale lethal removal. Before this occurs, the City will make efforts to modify human and coyote behavior. The Hazing Training Program is an essential part of the plan to create a safe environment and reduce conflicts between humans and coyotes.