

Coexisting with Coyotes

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As both a long time resident of Atlanta and now a primate keeper at Zoo Atlanta, I often find myself wanting to engage with my community more. As an environmentalist, I feel responsible for helping educate our community on issues that we are currently facing. In particular, the issue of coyotes. Over the years, I have learned that loving planet earth is mostly just respecting it and its inhabitants. Throughout this page, you will discover how coyotes came to live in the state of Georgia, problems you may face as the coyote population continues to grow and what you can do to make the place we all call home safer for you and the wildlife.

Coyote History

Coyotes originally lived in the plains, but, as humans-eradicated red wolves, coyotes have expanded their range beyond the Mississippi River. Since the 1950's, coyotes have been moving into the southeastern United States. By the 1990's, coyotes were found throughout the state of Georgia, making themselves prevalent in metro-Atlanta (Mowry and Wilson, 2019). In addition to the eradication of red wolves, urbanization and the building of cities across the state likely accelerated coyote migration. This has caused humans and coyotes to encounter each other pretty regularly which has led to an eruption of human-coyote conflict throughout the southeast (Mowry and Wilson, 2019).

There are 19 recognized subspecies of coyote that can be found throughout North and Central America (Project Coyote). Southeastern coyotes (*Canis latrans frustor*) are the larger of these subspecies and reside in the southeastern region of the United States. This includes parts of Texas, Oklahoma, Kansas, Missouri, Kentucky, North Carolina and entirely the states of Louisiana, Mississippi, Alabama, Georgia, Florida, South Carolina, Tennessee, and Arkansas. (Project Coyote) (Etheredge, 2013). Southeastern coyotes are opportunistic foragers, although there have been many reports of predation on small animals as well as livestock (Etheredge, 2013). Though these scenarios of hunting in a pack are rare. Reports of higher levels of predation have been noted in areas with larger white-tailed deer populations (Etheredge, 2013).

There is an ongoing debate about whether coyotes should be considered native or non-native species in the southeastern states, because of how coyotes came to the region. Most people tend to believe that coyotes are not native to the area as it is stated in multiple papers, "coyotes are native to the western two-thirds of North America." Nonetheless, coyotes are in the southeast for good and it is important to gain an understanding of their impacts on our environment. This vicious cycle of apex predators began when humans eradicated red wolves and if we continue to treat coyotes the same way there will be no end to the conflict. Humans must learn to coexist with coyotes in order to support a healthy ecosystem and thus a better environment for everyone living in it.

Coyotes and the Environment

Every animal that lives on this planet has had an impact on the environment; including humans. From the rise of agriculture to the age of technology, our environment has changed drastically and, with it, so has the wildlife. Some animals will not go near cities, while others seem to thrive in these human-dominated areas. Urban environments, such as cities, are unique because small natural habitats, like woodsy forests or grassy plains, are hidden throughout the city. This is especially true for the city of Atlanta. Coyotes have adapted to city life. Studies have reported on the many different types of habitats this species can live in, from forested mountain tops to rolling plains and now urban environments such as our backyards. Coyotes understand that gardens, trash bins and pets can provide them with necessary nutritional resources (Larson et. al., 2020). This has caused coyotes to change their diet to include more human-related options. Some coyote prey populations can be as abundant in urban areas as they are sheltered in nearby forests (Larson et. al., 2020).

Coyotes are opportunistic scavengers, which means they take advantage of carcasses they come across and eat them. This manner of consumption both affects the species they cohabitate with, like foxes, bobcats, birds and amphibians, and shapes the habitat they live in. For example, coyote diets can regulate rodent populations, and aid in the dispersal of seeds from many plant species. Their opportunistic diet speaks to the health of their ecosystem.

Coyotes are a unique species in that they can adapt so easily to new environments. Coyotes have specific responses to changes in foliage, landscapes and environmental corridors. Researchers can determine where issues lie faster with the help of coyotes and their responses to changes in the health of an ecosystem. Beyond that, some coyotes might prefer areas with high resource availability and avoid risky landscapes, such as cliffs or rivers (Ellington, 2020). The difference in how coyotes may interpret the costs and benefits of a risky landscape or food availability can determine why coyotes are in that area. For instance, cities may be considered risky landscapes, but there is such a high availability of their necessary resources that coyotes tend to adapt to urban landscapes. Hence, why coyotes practice temporal avoidance. This means that coyotes pay attention to the density of humans in an area and avoid that area when they understand that there are typically a lot of humans there. Coyotes have an innate carnivore instinct even though they are omnivores. In other words, coyotes will hunt on occasion but typically scavenge for food. This allows them to utilize these different strategies when searching for food (Ellington, 2020). The “riskiness” of any terrain can differ based on the day or the season, but coyotes tend to make it work (Ellington, 2020). To reiterate, coyotes have learned to live in the city and can easily adapt with the evolving environments humans are creating which is pretty neat!

Urban development has accounted for a lot of the world’s habitat loss and fragmentation. The excessive cutback of natural habitat related to human development has become an issue for larger carnivores such as wolves or cougars (Parsons, 2019). Now, these large animals elude human-populated areas allowing coyotes to confidently roam cities without major competition (Parsons, 2019). Coyotes have conquered the role as apex predators in the southeastern United States since the eradication of red wolves. Eastern coyotes moving into the cities of the region, such as Atlanta, have had an impact on foxes that have also learned how to live in the city. Researchers compared two coyote residents in two different cities and discovered some positive and some negative interactions among coyotes and foxes (Parsons, 2019). These interactions between coyotes and foxes are reliant on green space availability, which suggests, “that fragmentation concentrates carnivores into remaining green space, leading to higher levels of

spatial interaction between some species,” (Parsons, 2019). This study brings to light the idea that urban development has a considerable impact on coyotes’ relationships with other species. In short, fragmentation at the hand of urban development is forcing coyotes to interact more than they normally would, driving coyotes and foxes to interact more with a few positive occurrences (Parsons, 2019). To reiterate, large carnivores, such as wolves or cougars, usually avoid humans, and smaller carnivores, such as coyotes or foxes, have adapted to living in closer proximity to one another while also adapting to densely human-populated areas. This is known as the “human shield effect”. Coyotes and foxes are able to do this because humans are providing such an availability of resources. Both species can survive and thrive within city limits. If foxes can learn to live with coyotes, so can we!

The Issue

As coyotes continue to show off their intelligence and adaptability, and as the extensive urbanization and the decline of large predators continue to decline in urban areas, coyotes expand their range through North America. It is important to remember that coyotes have been adapting to humans and human behavior for at least the last century (Humane Society). Coyotes have adapted to cities because there is an abundance of food, plenty of water, and access to shelter. However, as a result of coyotes moving next door to us, human-coyote conflict has increased. While coyotes act as pest control and provide good things for our ecosystems, humans don’t think so highly of the species. Coyotes have attacked livestock, killed pets, and damaged property.

The most costly of these issues is attacking livestock. Coyotes are the number one cause of death for predator-related deaths of livestock. Ninety-eight percent of deaths in livestock were non-predator related causes while the last 2% was predator related. Of that 2% predator related deaths, about 40% of the deaths were due to coyote attacks (USDA, 2017). The benefits of managing coyotes is determined by the value of protected livestock subtracted by the actual costs of the management practices. For instance, if the value of the protected livestock is \$5,000, but it cost us \$3,500 to put coyote deterrents into place, then the benefits of using those management practices is only \$1,500. Based on this, it is worth it to put these management practices into action. The National Agricultural Statistics Service (NASS) reported that the number of livestock deaths due to coyotes has increased considerably over the last two decades (Brewster, 2019). Coyotes are consistently portrayed as the single largest cause of death in livestock but as stated earlier, this is just not true. The damage caused by coyotes is significantly less than the hundreds of other causes of death for cattle, such as respiratory issues, digestive problems, calving mishaps, weather-related disturbances, and the list goes on (Brewster, 2019). The USDA reported that the non-predator deaths accounted for 98 percent of deaths in adult cows and 89 percent of deaths in calves. That means almost 100% of the deaths of adult cows was not caused by a coyote (USDA, 2017). However, one interesting discovery through this research was that coyote behavior plays a major role in these livestock attacks and they seem to not always be a means to relieve hunger.

Coyote hunting is not necessarily always associated with eating. Coyotes are innately predators, yet they build their skills of identifying, capturing, killing and consuming prey through experience. For example, the coyote is born with the ability to understand the relationship between different stimuli, such as seeing a cow in a field, and the possible outcomes if they act

on that visual. The responses to new stimuli are modified and the effects of old stimuli are adjusted as coyotes continue to grow and learn. Recently, the focus of predator deterrents has been the coyote's ability to learn and attempts at inhibiting coyotes altercations with livestock have used aversive conditioning. With the increased interaction with humans in urban landscapes, coyotes have learned to change from diurnal activity to nocturnal activity. In cities, coyotes are more active at night while coyotes in rural areas are more active at dusk and dawn. This has put sheep at greater risk as they are more noticeable to a coyote at night due to their white wool that shines in the moonlight (Lehner, 1976). Coyotes tend to use their vision first when searching for food rather than olfactory cues like a dog would. Every change in coyote behavior has been an adaptation to increased interactions with humans.

Coyotes have been able to adjust their behavior and move into cities because humans eradicated red wolves in the wild about 40 years ago. Red wolves were the reason coyotes could not migrate to the southeast as they were the coyote's primary competitor. Hunting by humans has had a major effect on our surroundings. This inevitably created the current vicious cycle of human-coyote conflict. The conflict between humans and coyotes is in turn causing continued vulnerability for wolves even though wolves are now a protected species. Wolves are illegally shot by hunters because they are often mistaken for coyotes. In certain states there are coyote hunting seasons which puts wolves and other animals at greater risk. In Georgia, coyotes are not legally protected and every year the Georgia Department of Natural Resources holds an event called the "Georgia Coyote Challenge". Georgia residents are allowed to hunt coyotes year round and between the months of March and September the number of coyotes killed is much higher due to the competition. The concern for mistakenly shooting a wolf is nonexistent in Georgia since red wolves were killed off in the 1980's, but hunting coyotes still comes with complications. Many rural residents and farmers believe that lethal action is the only answer to handling coyotes, but they do not understand that coyotes actually are vital for the health of our environments. Coyotes are crucial for maintaining balance by regulating rodent populations and aiding in seed dispersal (Atlanta Coyote Project, 2019). Currently, researchers are trying to determine which nonlethal-management practice works best.

A recent study looked at fladry which is a nonlethal device that was created to protect livestock such as sheep and was originally developed to deter wolves. Fladry elicits a flight response in wolves by scaring them. Researchers decided to test this deterrent on coyotes. The study found that the fladry straight from manufacturing was not scary enough for coyotes and they adjusted to it (Young, 2019). It was determined that the best way to deter coyotes would be to incorporate more than one repellent or deterrent along with fladry i.e. electrifying the fladry or raise donkey alongside your herd for extra protection. As they are such adaptable animals, Coyotes may require multiple layers of repellents to keep them away. Though, research has shown the difficulties we face while coexisting with coyotes, it has also shown how vital this species is to the environment. As we continue to learn, there is more certainty in learning how to live with them and less support in killing them.

Learning to Coexist

Here in Georgia, there is an organization dedicated to researching and understanding these intelligent mammals as well as providing educational information to citizens of the state. The Atlanta Coyote Project (ACP) has a citizen science project where people can report their coyote sightings and encounters with coyotes. This project began in 2014 and each year gains

more participants (Atlanta Coyote Project, 2019). Coyotes that reside in urban settings help maintain species diversity through hunting, scavenging, or foraging which is important for ecosystem development (Humane Society). Through the extinction of red wolves in the wild and the creation of urban landscapes, humans have allowed coyotes to enter an evolutionary period where they are adapting to these environmental changes.

Greater recognition for the ecology of current coyote populations is important for predicting future coyote dynamics and predicting the negatives of increasing coyote populations on other taxa and habitats (Gompper, 2002). As mentioned earlier, humans caused red wolves to become extinct in the wild and thus coyotes were able to move into the eastern region of the United States. Over the past 200 years, the coyote has slowly expanded its range all the way to the eastern coast. (Hody & Kays, 2018). Coyotes were reported in Michigan around 1900 . There are three reasons why coyotes were able to expand their geographical range. The first, again, is the eradication of wolves by humans that allowed coyotes to move into new territory without competition . Wolves are coyotes' only natural predators. Second, the common movement of coyotes at the hands of humans brought the species to a new region and it thrived. Humans have captured, moved and released coyotes into regions they were not originally found. And third, new coyote habitats opened up when humans later altered structures and environments (Gompper, 2002). The building of cities and suburbs presented the coyote with a whole new challenge. As you can see, there is a trend or a connection between what humans do and how it affects the way coyotes live.

Coyotes have evolved while moving throughout the continent and there are several that we can discuss here. For instance, coyotes began moving into cities and suburbs all while also expanding to the east coast. In doing all of this, the coyote has adapted its diet as well as its activity time. Coyotes around the eastern part of the United States are mostly scavengers and foragers rather than hunters and foragers. These coyotes have also gone from being mostly active during the daylight hours to being mostly active just after sunset. These changes in behavior have an impact on our environments, so it is important to have an understanding of coyote ecology.

Now that the coyote has moved in, it is near impossible for wolves to be reintroduced. The number of coyotes limits the resources for smaller predator populations making it difficult for them to thrive (Gompper, 2002). However, based on the fact that coyotes can now be found throughout the continent, it is safe to assume that eradicating coyotes will not be the answer. Either more coyotes or a new apex predator will come strolling to call this region home one day. Since coyotes are continuing to thrive in the region though, that have learned to adapt to urban landscapes. Coyotes in these areas have evolved to scavenge for their food instead of hunting (though it has recently been seen that coyotes are also hunting). Coyotes are also most active after sunset, again, instead of being nocturnal. Each of these adaptations contributes to the role coyotes play in our ecosystems. Coyotes put into perspective why it is important for us humans to think of the big picture and think about how all these actions have benefits, but they also reap many consequences.

Resources

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