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Re-Placing Coyote

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It's OK for them [coyotes] to kill a rabbit out in the wild, but we shouldn't have to watch that in the city (Alexander's fieldnotes)

Our human relationship with coyote is old, sometimes magical but lately polarized and complex. Archeological evidence shows coyote (*Canis latrans*) displayed ubiquitous distribution across the continent for over 1 million years (Wang, Tedford & Antón, 2010). Through this, coyote has witnessed the rise and fall of iconic species, such as the woolly mammoth (*Mammuthus primigenius*), dire wolf (*C. dirus*), among others that migrated to this continent during the Pleistocene ice age (Wang, Tedford & Antón, 2010). Given human tenure on the North American continent is commonly believed to be less than 15,000 years, it is not surprising that coyote holds a pivotal and revered, magical role in many aboriginal stories: Coyote is creator, trickster, and shape-shifter (Alexander & Quinn, 2012).

Despite great importance to these early cultures, coyotes were subsequently persecuted by European settlers from the mid-1800s onwards (Alexander, 2015). In fact, the species was systematically killed alongside many other carnivores to make way for land cultivation and stock production. Today, there are few wild animals that polarize Canadians like coyotes (Alexander & Quinn, 2011). People love coyotes, but people also kill coyotes – sometimes in unthinkable ways.

As North America's most persecuted carnivore, coyotes are poisoned, trapped, shot, and wounded at an alarming rate. Culls (i.e., killing indiscriminately in very large numbers) remain commonplace. This "killing paradigm" exists in part because it is an "easy" solution with deep enduring roots. Generally argued to be necessary on human safety, subsistence and economic grounds, such culls are expensive, lack widespread support by North American citizens, are not effective for conflict resolution, and have been argued to be ecologically destructive (Bekoff & Bexell, 2010; Berger et al., 2006; Gehrt, 2004; McManus et al., 2014). To illustrate the scale of the issue in Canada: In 2009, a government-sanctioned bounty in the province of Saskatchewan resulted in 70,000 coyotes being killed in one year alone and at a cost to taxpayers of CND\$1.4 million (Alexander & Quinn, 2011). Likewise, in the US, over 500,000 coyotes are killed annually in that country, amounting to the death of one-coyote-per-minute (Fox & Papouchis, 2005).

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Challenging Human ‘Places’

Our contemporary relationship with coyote is made more challenging because they have learned to live among us in ways that North American’s early colonists could never have imagined. The adaptive resilience conferred through millennia (Wang, Tedford & Antón, 2010) makes them able to exploit many habitats, including cities. While they persist in the city, many coyotes do not thrive in the city – not unlike that of a human forced to live on the street. And, sadly, when confronted with regular human food attractants, individual coyote behavior may change; they can become food conditioned,

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and may then act aggressively towards people (Fox & Papouchis, 2005).

This leads inevitably to the question: “Do coyotes or other carnivores belong in cities?” Embracing life with carnivores in our urban “places” is going to take a paradigm shift – a

“re-wilding” of cities (Emel, Wilbert & Wolch, 2002). For coyotes, we argue this re-wilding will require “re-placing” them in our collective conscience that defines what species belong where and what behaviors of wild species are appropriate in cities. Based on our joint experience studying coyotes, we are not naïve about the challenges such a dream presents. We understand that this will require renegotiating ideas such as humans having pre-eminent importance in urban settings – humans must place other species in more equitable standing with ourselves, and re-envision our expectations, ethics, and politics that entrain the urban spaces we live in. Understanding the unspoken rules of our animal constructs might help people begin to untangle the problem and find solutions.

One such construct is presented by Philo and Wilbert (2000), who describe people’s relationship to animals through “zones of human settlement”. Here, specific animals are expected to occur or “belong” in very particular places (n.b., we believe these are largely implicit beliefs surrounding coyotes). With this notion, cities are the correct place for people and their dogs, cats or other animals residing in home, while agricultural and livestock occur around the city perimeter, and wild animals like coyotes – they are to live in the hinterland far away from the urban centre. But coyote confronts that ordered classification by choosing to live in cities and sometimes eating domestic animals or, albeit rare, attacking people. Our coyote research findings show support for this idea, as people expressed to the media they believe coyotes living, hunting, killing or eating in cities have acted in an “un-natural way” (Alexander & Quinn, 2012; Lukasik & Alexander, 2011).

Extending ideas of “place”, we believe that even though humans have converted native coyote habitat into residential developments and displaced the animals, when a coyote returns or exploits these built spaces (that embody constructed rules defining them as human places), it is often considered by people to be “out of place”. More subtly, there appears to be an assumption that coyote aggression towards pets and people (i.e. attacks) is deliberate or wrong (even criminal) (Alexander & Quinn, 2011). Yet, aggression (in almost any animal) is an evolved trait that confers survival. The unwillingness of people to tolerate certain levels of aggressive behavior in coyotes results in routine execution of these animals.

Finally, whether acknowledged or not, human and domestic animal experience takes precedence over wildlife experience in the city. Previous research shows that wildlife managers in Canada “re-move” coyotes that attacks a person (Alexander & Quinn, 2011) and we have observed that coyotes who attack dogs are often flagged for removal. Despite the fact that an analysis of the wounds inflicted by coyotes during such altercations with dogs mimic territorial fights between coyotes, and

so suggest coyotes are protecting themselves from invading dogs – deliberately attacking all dogs as prey. Killing to solve conflict remains firmly entrenched in North American management, despite having been shown for years to be ecologically destructive and ineffective.

Killing indiscriminately has been shown to result in a younger and younger population of coyotes, the breakdown of social structure, loss of cross-generational teaching and finally more attacks on people, pets and livestock (Crabtree & Sheldon, 1998; Fox & Papouchis 2005; Shivik, Treves & Callahan 2003; Treves & Naughton-Treves, 2005), even if it does address human's perceived notions that coyotes are dangerous and risky to live with. Importantly, this perceived risk may be unfounded. Alexander and Quinn (2011) found that, fewer than 3 people are bitten or scratched each year in Canada (Alexander & Quinn, 2011). So, despite the fact that attacks on people or the loss of domestic animals has tangible emotional and economic effects (Treves & Bruskotter, 2014), and evoke grief, anger, and fear in victims (Alexander & Quinn, 2011), it is difficult to reconcile the killing of coyotes to abate risk of human or pet injury.

Implications of Urban Coyote Diet

Having survived a million years on one continent and the arrival of mega-fauna during the Pleistocene, coyotes developed an acute ability to adapt by modifying feeding and breeding behavior. They are highly plastic and can eat almost anything, and repopulate quickly during times of high mortality (Lukasik & Alexander, 2012). Coyotes also can be keystone predators and therefore have a large effect relative to their numbers across the food chain (Crooks & Soule, 1999). They can regulate other species (e.g., white-tailed deer, *Odocoileus virginianus*, Canada geese, *Branta canadensis*, small rodents like ground squirrels, *Spermophilus* spp.) that otherwise overpopulate urban and rural areas, potentially costing crop growers millions of dollars.

Clearly, theories of trophic (food chain) cascades and keystone species (Estes et al., 1996) are important considerations about the role of coyotes in cities and the need to maintain their populations. Also critical, coyote's high adaptability means they can also feed on human garbage or pets. In fact, the availability of such attractants can help them overcome periods of scarcity and promote higher population densities in some areas. However, as the consumption of human source foods can result in food conditioning and habituation, the species can also quickly lose their fear of people (Gehrt, 2004), which in turn may increase the frequency and amplitude of conflict or attacks (Alexander & Quinn, 2012).

Although coyotes in Calgary consume a mostly natural diet of small mammals, fruit and other vegetation, we found that 1 in 6 scats contained human food (e.g. bird seed, crabapples, *Malus* spp., and garbage), which may be cause for concern (Lukasik & Alexander, 2011). Minimizing conflict with urban coyotes (along with other carnivores) most certainly will require reducing access to such attractants. It may be also be wise to implement policy or law requiring the removal of attractants (i.e. even planted trees).

Climatic regimes may also be implicated in conflict with coyotes, as it can impact food availability (Crooks & Soule, 1999). In previous regional research, we observed Saskatoon berries (*Amelanchier alnifolia*) to be a critical part of urban coyote diet in 2006 (Lukasik & Alexander, 2012), but in 2009 the plant was almost absent in coyote scat (Fortin-McCuaig, 2012). We later found that an early spring frost in 2009 resulted in the collapse of the Saskatoon berry crop. Coyotes ate more garbage in that year (Fortin-McCuaig, 2012), so it is possible this was a result of the reduced availability of berries. Understanding and acknowledging larger climatic and ecological regimes that are not directly relevant to the day to day experience of people, and determining the implication for urban wildlife will be critical to maintaining positive relationships.

Re-placing Coyotes?

If we hope to co-flourish with coyotes, it will be up to humans to change our collective behaviors and become willing to share our space with coyote and others. Unfortunately, this might be tough to realize. Our research to date has shown a dissonance in human's choices to move towards "greener cities" (Alexander & Draper, personal communication, 2016). While some people desire green spaces in order to experience nature, many of those same individuals do not welcome coyotes – describing their presence at times as "un-natural" (Alexander & Quinn, 2011).

More critically, wild behavior is misunderstood and portrayed as incorrect because of the "place" it is happening. To change, we will have to answer tough questions, such as: Which behaviors and species are we willing to tolerate in the city? Are we willing to accept that when my domestic animals wanders at large outside my house it is prey and part of the ecosystem? Who should decides this? Our existing ethical frameworks do not appear adequate to answer these questions – we likely need to refurbish them.

In tandem with natural causes of landscape change by people, or fragmentation (Forman & Godron, 1986; Turner, 2005), urban design affects wildlife and biodiversity. We need to better understand the consequences of our design and where coyotes can be placed in that schema. For example, what do large right-of-ways next to roads do to small mammal density (given the habitat it creates is good for them), or what happens to den site habitat for a species like coyote that is legally designated a pest? And, how are all these changes implicated in the species' quality of life, or the maintenance of biodiversity? And, if we have altered the habitat and created an urban dependent coyote – are we then beholden to protect that animal?

It is increasingly apparent that a positive shared future requires understanding coyote ecology as well as human attitudes, beliefs and behavior towards the species (Treves & Bruskotter, 2014). Alexander and Draper (personal communication, 2016) are addressing some of these deficiencies in a new study evaluating human dimensions of coyote encounters in urban and peri-urban landscapes. We challenge readers, managers, and scientists to envision the mechanisms and practices by which we all benefit or co-flourish (not simply co-exist in space).

We have argued that challenges to co-flourishing are founded on often unarticulated or disregarded concepts of place, which can then inform our beliefs and behaviours towards coyotes. Moreover, the de-facto use of killing as a management tool needs scrutiny based on the available science and multiple public's experiences. Changing this paradigm will likely require recasting laws that govern how we are allowed to relate to wildlife (in particular laws that designate species as pests need scrutiny and revision – placing species like coyotes into a contemporary context of it's role in ecosystems).

To truly recognize our ideal of "re-placing" coyotes (and any other wild animals) in the city, we know people will need to dream big. We need to reconcile that we have borrowed habitat from our wild counterparts – maybe even acknowledging that, based on our short tenure here, we are living (and perhaps only temporarily) on a Coyote Continent. In turn, this may require accepting we and our pets are part of, and not the most important thing in coyote's world. We know people and coyotes can co-flourish. The choice is up to us.

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