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The rules we make that coyotes break

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ABSTRACT

We used mixed-methods to explore human experiences and motivations towards co-existence with coyotes in the Foothills Parklands of Alberta, Canada. Traditionally agricultural, this is one of Canada's fastest urbanising landscapes, offering insight into a plurality of viewpoints and feedback loops related to the social construction of and co-existence with coyotes. Invoking theories of place and transgression, we provided a new lens on the problem of human-coyote entanglements. We interviewed 60 respondents (27 males; 33 females) on 48 properties (agricultural = 23; rural residential = 25). We posed closed- and open-ended questions exploring experience, perception, beliefs, sentiments and actions. Selected data were analysed here. Our word analysis neatly depicts the tension surrounding human engagements with coyotes. Respondents articulated critical distances reflecting 'home place'. When coyotes transgressed the boundaries of the latter, respondents considered this un-natural behaviour or a biosecurity threat punishable by death. Landuse type, gender and prior depredation did not predict coyote killing. However, female respondents appeared more likely to view killing as 'OK' after a depredation event. Understanding motivations for killing requires further analysis and is essential to realising co-existence.

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Coyotes among us

The coyote (*Canis latrans*) is a mid-sized carnivore that exists only in North America. Evolution has conferred adaptive resilience to coyotes and, like their ecological counterparts in other regions of the world (e.g. the European jackal) they have the capacity to survive almost anywhere, even the most urban of places; New York City for example. Coyotes have learned to navigate these complex urbanised landscapes. Yet, life with humans is not without harsh consequences. All wild species that live in human-dominated landscapes suffer from novel types of mortality (e.g. cars, poison, disease), loss of critical habitat (e.g. den sites), and dependence on non-natural, often poor quality, foods (e.g. residential garbage). Paquet and Alexander (2018) likened the quality of life of animals like coyotes living in a city to that of humans living in a ghetto; they may be deprived of adequate shelter and food, forced to cope with abrupt loss of habitats, and face persecution (and death) by dogs or people, among other challenges (Figure 1). Still, media and academic publications depict coyotes to be 'thriving' in cities.



Figure 1. Coyote living amidst garbage in Calgary, Alberta.

Beyond peoples' actions, urbanisation brings other ecological challenges to wildlife, including changes in the structure and function of ecosystems that ripple across ecological scales – from the local level of a den or nest, to the larger scale of home range that should include all the resources essential to animal survival. The effects of habitat fragmentation have been well studied (Miller et al., 1998). Among the most prominent effects are the reduction of once large, continuous habitat into smaller patches, and impaired connectivity (or flow) of animals between those patches. Having adequate space that is both connected and diverse is essential to the survival of wildlife: all animals need access to enough food (e.g. deer need grasses) or prey (e.g. coyotes need small mammals). Human disturbance alters both the previous, such that fragmentation of habitat by people is now considered the number one cause of species extinction (Lorimer, 2015).

Within the ecological theory of fragmentation, an attending consequence is 'edge effect'. Edges are ecological transition zones. They can be natural (e.g. a mudslide removes a forest) or human-caused (e.g. a residential development removes a forest); they can be abrupt (e.g. forest adjacent to road) or prolonged (e.g. regenerating clear cut beside original forest). Edges attract 'edge-tolerant' plant and animal species that may outcompete native species. Small mammals like mice, for example, may be found in higher densities on grassy rights-of-ways adjacent to roads than in natural sites nearby. In turn, these small mammals may attract predators like coyotes or birds of prey, changing 'normal' distribution. Meanwhile, a preponderance of human landscaping, like gardens and fruit trees, also may increase the abundance of prey species. Edges caused by human disturbance in cities then, can result in higher numbers of some

species than might otherwise be seen, or a new distribution of existing species. This can be ecologically troublesome, but effects are not limited to wildlife.

In contemporary social science theory, these edges can be thought of as locations where species interact: spaces where the ‘protean’ relationships amongst humans and wild animals emerge (Collard, 2012; Haraway, 2003). This convergence of human and wild may occur in ways that may not have happened before, perhaps a higher frequency of encounter or include different types of engagements, which may turn these into spaces of conflict (Braverman, 2013; Brighenti & Pavoni, 2018; Ojalammi & Blomley, 2015). Edges also can increase biodiversity, which may be viewed as environmentally desirable (Buller, 2008), but edge biodiversity may include rodents, coyotes, and deer (among other species) that may be perceived as a biosecurity threat (Brighenti & Pavoni, 2018; Buller, 2008). That biosecurity threat may be real (e.g. actual direct physical harm caused to humans or their pets) or it may be imagined. For example, Ojalammi and Blomley (2015) highlighted that negative attitudes about wolves are driven more by indirect than direct human experiences with the species; just the idea of the species being in close geographic proximity creates an imagined geography of risk.

As with Collard’s (2012) cougars, one source of fear about coyotes may derive from the species’ unpredictable nature; we can never be sure where coyotes may ‘pop up’ next. For many people this uncertainty can be unsettling and anxiety provoking (Collard, 2012; Ojalammi & Blomley, 2015). Responses to mediate such anxiety can be dramatic. To exemplify, hundreds-of-thousands of coyotes are still killed every year in North America, primarily in the name of pre-emptive management to protect livestock, and for the purification of space (Trudeau & McMorran, 2011), but also for obtaining fur and for enjoyment (Fox & Papouchis, 2005). Coyotes are leg-hold trapped, snared, shot, aerial gunned, poisoned, confined and killed by hunting dog packs for human entertainment; they are maimed and sometimes hung on fence posts to convey messages to survivors to ‘stay away’ (Alexander & Draper, 2019). All these actions take place despite scientific knowledge that killing coyotes largely fails to solve long-term conflict or to improve co-existence, and damages ecological systems (Fox & Papouchis, 2005; McManus, Dickman, Gaynor, Smutts, & McDonald, 2014; Proulx & Rodtka, 2015). Beyond the ecological factors, there are obvious ethical and animal welfare implications surrounding animals being killed in such great numbers and in so many inhumane ways (Brook, Cattet, Darimont, Paquet, & Proulx, 2015; Dubois et al., 2017).

We believe coyotes may uniquely characterise contemporary tensions surrounding wildlife living alongside humans, and in edges. Because coyotes are so adaptable, they interact with humans more regularly and in more diverse ways than most other mammalian carnivores. In doing so, coyotes run directly into a myriad of assumptions (and rules) that humans make about: where wild animals belong, what behaviours exhibited by those animals are acceptable, and what should happen to individuals or populations of those animals when they break those rules – including being punished by death (Braverman, 2013; Collard, 2012; Ojalammi & Blomley, 2015). For coyotes, the very evolved traits that ensured their survival through millenia simultaneously threaten their daily experience, as well as the social fabric of their lives, in sometimes unimaginable ways. In fact, our research suggests that coyotes illuminate the best and worst ways in which humans mitigate experiences with wildlife that evoke fear and anxiety. The diverse human engagements with coyotes arise, in part, because the species is legally designated as a ‘pest’.

This label identifies coyotes to be of no 'value' and supports widespread killing, but also implicitly denotes a species whose presence may pose a biosecurity threat to humans (Braverman, 2013). We contend that the lack of legal protection for coyotes, combined with the ubiquity of coyotes and human concerns for biosecurity make the coyote a 'sentinel' species: the coyote is emblematic of how humans engage with other species and ecosystems and therefore may be used to characterise co-existence challenges more broadly.

In this manuscript, we identify human constructs (and rules) that describe where coyotes 'should be' and how coyotes 'should act', and how these rules are invoked to decide whether coyotes live or die. We employ contemporary social science theories and mixed-methods, supported by selected findings of our Foothills Coyote Initiative (FCI) research program (see www.ucalgary.ca/canid-lab).

Understanding co-existence in an urbanising landscape

Conservation scientists have called for mixed-methods and human-dimensions research in order to better understand conservation challenges involving human changes to landscape (Nightingale, 2003) and to realise co-existence (Havorka, 2016; Pooley et al., 2017; Treves & Bruskotter, 2014). Others argue for abandoning old conservation models (e.g. National Parks and protected areas) altogether, replacing these with new designs focused on managing encounters in human-dominated landscapes (Lorimer, 2015). In tandem, social scientists contend there is a need to bring animals more explicitly into our contemporary research and practice (Collard, 2012).

With the previous points in mind, we explored human relationships with coyotes. We used purposive snowballing (Morgan, 2008) and conducted 48 in person, in-situ interviews from October 2015 to July 2017 in the Foothills Parkland Natural Region (FPR). Situated near the City of Calgary in southern Alberta (Canada) (Figure 2), the FPR is one of the smallest natural areas of Alberta. The agricultural mosaic remains the dominant land use, but the region is now one of the fastest-urbanising areas in Canada, characterised largely by 'urbanites' moving into this area. We focused our interviews on agricultural (i.e. >20 acres with livestock – sheep, cattle) and rural residential (i.e. <20 acres and/or no livestock) land-owners to capture a breadth of experiences, as well as the intersections and discourse that may emerge by the mixing of these groups on the landscape.

The data we discuss herein comes from respondents 23 agricultural and 25 rural residential properties. Our sample included 48 properties, with 60 individuals (n.b. on some properties we unexpectedly interviewed 2 individuals), comprised of 27 males and 33 females. We posed closed- and open-ended questions that were customised for the region and aimed at understanding experience, perceptions, beliefs, sentiments and actions. We asked questions covering concepts such as perceived risk posed by coyotes, fear of coyotes, and basic demographic data (e.g. landowner type, gender, time in situ, place of birth). To illustrate, we asked questions such as: Have you experienced depredation or loss of domestic animals? What behaviours would require you to kill a coyote? If you had to kill a coyote, how would it make you feel? Income levels were not collected as part of our demographic data, but the respondents reflected a wide range of affluence and living conditions. The median age was >25 years, with only two subjects <25 years of age. Time in situ (of self or family) ranged from 2 to >100 years. Only a subset

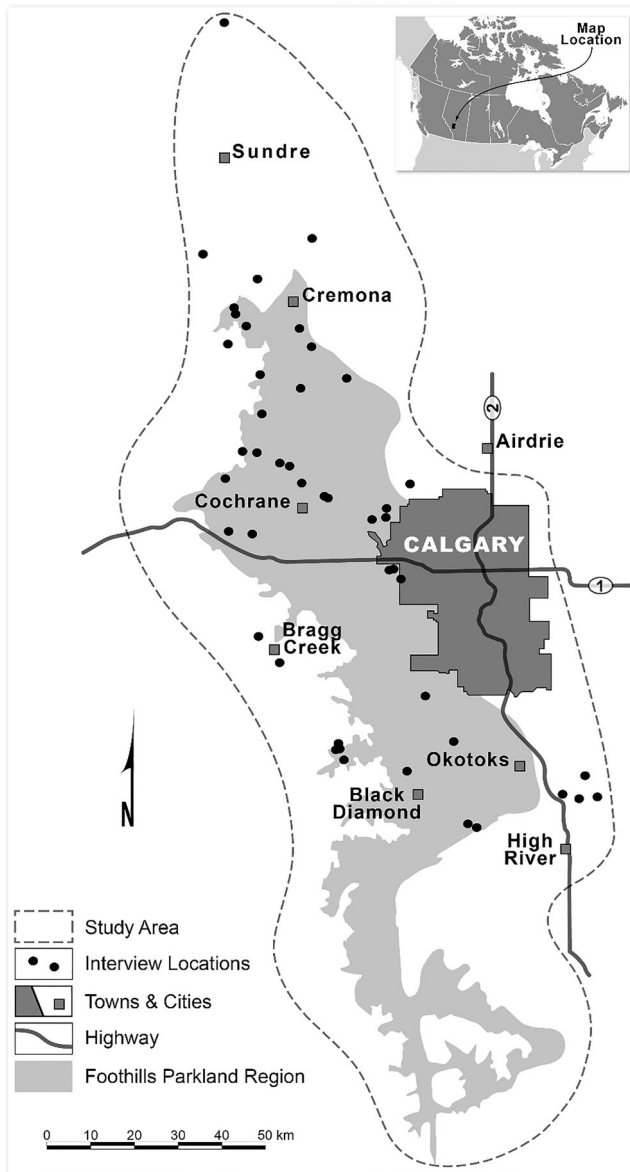


Figure 2. Foothills coyote initiative study area.

of demographic and quantitative data are presented here due to the focused scope of this paper.

A foundational premise of our FCI research is that people hold worldviews (Hulme, 2008). Generally, worldviews are understood to represent the multiple ‘truths’ or ways of knowing and understanding the world – human belief systems that also inform action (Hulme, 2008; Proctor, 1998; Teddlie & Tashakkori, 2009). Importantly, worldviews are thought to entrain human behaviour towards nature (Koltko-Rivera, 2004) and to be resistant to new information (regardless of the rigour of that new information) (Hulme,

2008). Joyce (2010) suggested that this resistance manifests because alternative truths tend to threaten an individual's sense of self. We characterised worldviews for the study area in a previous publication (Alexander & Draper, 2019), which laid the foundation for the more nuanced evaluation of associated rules of engagement presented here.

Our theoretical framework also rested on the intersection of Cresswell's (1996) theory of *place and transgression* with Philo and Wilbert's (2000) concept of animal belonging. Philo and Wilbert's (2000) often cited work posits that people (in western cultures at least) understand their relationship to animals through 'zones of human settlement': cities have household pets like dogs, the city perimeter is where livestock live, and the hinterland – farthest from the city – is where wild animals like coyotes occur. Cresswell (1996) articulated how humans ascribe specific value and attachment to geographic locations, differentiating *space* and *place*. Space refers to the geographic location of something and may be best defined by a geographic co-ordinate (e.g. a GPS point). The unique sentiment, meaning and affinity a person may ascribe to a given space is called place. For example, a zoo exists in a spatial location (space) but may have special meaning to a person because it has positive memories of childhood (place). This sense of place may be thought of as being 'layered on top of' the geographic location.

Cresswell (1996) argued that *place* informs who we believe should use these spaces, and what is appropriate behaviour in these spaces. Brighenti and Pavoni (2018) linked the previous to human engagements with animals, describing *critical distances* or 'the zones in which wild animals may encounter human spaces and be deemed appropriate – and in contrast where they become inappropriate'. The home or yard, for example may be considered a place of security and humans tend to enforce this sentiment by hardening the boundaries of that territory (e.g. by building a fence around a yard) (Ojalammi & Blomley, 2015). When certain wild animals breach this boundary, it is theorised to threaten their personal safety, which can translate into killing the intruding animal in order to re-establish equilibrium. Understanding how people identify with space, their sense of place that follows from this, and the rules humans make are important then; they have tangible consequences for animals – especially coyotes and other 'pest' species. Moreover, ideas about transgression of space and place also inform policy and law (Ojalammi & Blomley, 2015) and may condone killing transgressors for simply being present (Braverman, 2013).

We extended the above concepts to entanglements (Collard, 2012) with coyotes, with a specific intent to identify the 'rules people make that coyotes break'. We were particularly keen to understand the plurality of ways people articulate that a coyote is 'out of place', has 'transgressed boundaries', 'what those boundaries are', or when it has 'acted in an un-natural way' and needs to be killed. As contemporary social scientists, we believe that the goal of co-existence with wildlife can be enhanced by a better understanding of such constructs about coyotes.

Coyote constructs

One powerful way humans articulate beliefs, perceptions and values towards objects is through the words and phrases of our language (Rolston, 1997). Arguably, that language (or word choice) might entrain actions (Thibault, 2006). To begin to characterise how people in our study area constructed the species coyote, we asked respondents to list

The words used to describe coyotes may be classified into positive and negative valences. Examples of negative valence include 'mangy, frightening' while positive valence examples include 'intelligent, beautiful'. We coded words by their valence (positive = 1, negative = 0) and related these to whether a respondent said they would kill a coyote 'if needed' – they defined the conditions of 'need'. Overall, coyotes were described in positive terms, which was unexpected given the numbers of coyotes killed annually in the study area and in North America. Moreover, respondents used predominantly positive language whether they would or would not kill coyotes: Kill = 67% had a positive valence, and No kill = 78% had positive valence. These findings highlight ambiguity between how people feel (if we can measure that by what they express) about the species' beauty or importance in the ecosystem versus how people act.

[illegible]

The rules coyotes break

To characterise the rules ‘coyotes break’, we examined whether and how respondents invoked notions of place and transgression, as related to their perception of the boundaries of their ‘home’. We asked people to describe ‘what behaviours would require that you kill a coyote’, whether they felt ‘it was normal behaviour for a coyote to eat a cat or a dog’, and if they considered ‘a coyote on their property, close to the home to be trespassing’. Responses that described spaces (e.g. a yard) and behaviours (e.g. stalking a pet) that justified killing the coyote were coded to be ‘implied transgression’ in order to compare with responses about ‘trespass’.

Considering ‘trespass’ by coyotes, respondents did not explicitly think of themselves as constructing rules about transgression or invoking the notion of trespass. However, 75% (45/60) of respondents implicitly described situations in which coyotes were thought to be transgressing (details below). Most respondents were unwilling to apply the label ‘trespass’ to describe the coyote’s transgression, and some articulated that the word does not ‘really apply to [non-human] animals’ but is about the ‘rule of law’. Yet, the same respondents presented scenarios with coyotes that were punishable by death.

Coyotes were reportedly in need of being killed not only when they occurred in a specific place, but also when they exhibited unacceptable behaviours in that place or beyond. The need to kill a coyote also was related to health – for example, if the coyote showed signs of mange or rabies. Examples of boundary transgression included ‘on the porch, in yard, within 30 feet of house, closer than 50 yards, closer than 200 metres’. Here, it could be argued that coyotes are perceived to have transgressed, not just because of the spatial location, but due to the unique value respondents give to those spaces – i.e. they are, as Ojalammi and Blomley (2015) described, human places and not the domain of wild animals. Arguably, in our study coyotes manifest to many as the ‘barbarian’ (Brighenti & Pavoni, 2018) that ‘keeps erupting’ in civilised human zones. Moreover, by situating themselves in the human commons, or on private property (the specification of which is variable here), coyotes appear to have broken an implicit contract about space use (Ojalammi & Blomley, 2015) – one that the coyote, of course, cannot know exists. Our respondents implied that the breaking of the rules required a re-establishment of domestic order over the wild. This notion may be influenced, in part, by a domestic paradigm, described by Brighenti and Pavoni (2018), in which the administration of the house/home (*oikos*) is extended to ‘every level of urban management’. In fact, our data yielded additional evidence that the perceived boundary of a person’s home dictates tolerance towards coyotes more extensively across space (i.e. even in the wild).

The boundaries identified above emerged from the descriptions of situations in which coyotes might ‘need to be killed’. They varied by context and reflected physical features (e.g. a fence or hedge), as well as conceptual ones (e.g. a distance where a coyote is ‘just too close’). Brighenti and Pavoni (2018) described these *critical distances* in which species are felt to belong, or not. Similarly, our respondents articulated that when a coyote crossed the physical or conceptual boundaries, they were in the ‘wrong place’. Interestingly, while there is a tendency to assume urban values might more closely track with the perception of a coyote being in the ‘right’ or ‘wrong’ place, we did not find any clear distinction by rural residential or agricultural landowner type. Furthermore, respondents did not aggregate by landowner type in their view of the ‘private’, domestic,

or 'home' place. Instead, based on our related analyses, the perception of coyotes as being in the 'right' or 'wrong' place and the decision to re-establish power over the wild appears to follow from individual worldviews (Alexander & Draper, 2019).

We aggregated the perceived behavioural transgressions by coyotes into two categories, including: behaviour towards people and behaviour towards domestic animals. Examples included, respectively: 'acting brazen or not scared, habituated – shows no fear, one breaks away from pack when it comes near yard, makes repeat visits close to the home, more than 3 coyotes together, defecating in the yard (presumed territorial)', and 'in with livestock, chasing calves, killing cats or dogs'. Our results support the idea that coyotes – specifically those that adapt to 'edges' (perhaps by killing a beloved pet or living under a deck) – are not behaving in a way that is consistent with our prior expectations of 'what a wild coyote should do' (Braverman, 2013). Such coyotes are even defined as 'rogues' (Braverman, 2013) and forcibly removed or killed. Ironically however, while killing pets in human spaces was identified as 'problem' coyote behaviour that is 'punishable by death', just over 99% (47/48) of respondents said it was 'natural' for a coyote to kill or eat a cat and almost 92% (44/48) said it was natural for a coyote to kill or eat a dog.

Finally, respondents identified 'health transgressions', and these included evidence of mange or rabies. The incidence of the disease was seen to be abnormal. The sentiment to kill sick animals was expressed in concern for animal suffering, but mostly out of fear of transmission to humans/domestics. Notably, mange is endemic in the population and technically is not a sign of a variation from wild, and we found no evidence of rabies occurring in coyotes for this portion of the continent. The previous points highlight how coyotes, despite information to the contrary, live in the collective human imagination as potential disease vectors (i.e. vermin) that can pose a significant health risk to people and pets.

The fact that respondents identified numerous rules that coyotes must follow to avoid punishment or death by humans, speaks to the challenges inherent in calls for re-wilding (Wolch & Emel, 1995). If on the one hand, we seek to re-wild a city, but then deem adaptive wildlife behaviours to be 'punishable' or have laws that do not support co-existence (Braverman, 2013), then the animals we invite in will always be in a no-win situation. Confounding this situation are biological and behavioural facts: coyotes are inherently fearful of and live/move in ways to avoid encounters with people, and therefore, if a coyote uses areas close to a house or feels comfortable killing a pet when people are present, this can signal habituation and food conditioning by humans (resulting in undesirable coyote behaviour). Hence, many of the 'rules coyotes break' that respondents identified to be 'a cause for concern' may actually highlight a conflict. However, because coyotes are naturally curious these same transgressions may mean nothing at all. Clearly, inconsistencies abound, and as Brighenti and Pavoni (2018) aptly stated: a world 'held together by contradictions is bound to erupt sooner or later', and for coyotes that usually means death.

Killing coyotes that break rules

In describing coyotes as *breaking rules* we are attempting to upend the way people think about what is happening when we punish animals like coyotes by death. Our interviews revealed a discourse among many respondents that suggested coyotes might understand our spatial constructs and thus actually 'choose' to break the rules. Similarly, a common

way of characterising coyotes is to criminalise the behaviour, using words such as murderers, thieves, villains, and assailants to describe the presence and actions of coyotes (Alexander & Quinn, 2011).

When asked ‘what behaviours would warrant killing a coyote’, almost 65% of respondents articulated circumstances in which they would have to kill a coyote (see examples above); 35% indicated no situation would warrant killing a coyote. Interestingly, while there is a division around killing or not killing, as a rule, respondents articulated how important it was that coyotes did not suffer when they were killed. Respondents largely viewed shooting as the only humane way to kill coyotes (77%). We were intrigued by whether prior experience might affect choices to kill coyotes, as early life experiences are believed to be very influential in how humans construct and relate to their world (Herrmann et al., 2013; Tyborowska et al., 2018). None-the-less, we found that while 58% of respondents reported depredation experiences including attacks on cats, dogs, lambs, calves, horses, cows, alpacas, and chickens, this prior experience was not enough to predict how people responded to coyotes. Considering sentiments about killing, almost 52% (31/60) of respondents said they would feel badly if they had to kill a coyote, and the remainder expressed they would ‘feel OK’. We were surprised to find no strong gender difference in either (i.e. feel OK or feel badly), which points to our own inherent biases about human attitudes towards animals. However, we found evidence that females may be more influenced than males by a prior depredation – in terms of understanding and encouraging co-existence it may be important to explore whether females are more wedded to notions of boundaries and transgression than are males.

Conclusion

Extensive urbanisation is blurring the divide between urban and wild spaces at a global scale and upsetting historical ways of conserving wildlife. While it once was possible to study human and wild systems in isolation and speculate on their interactions, our hopes for conservation now rest on understanding the zone of intersection and human motivations for co-existence. Ecologists have recognised the critical need to integrate human dimensions and social sciences (politics, economics, geography, psychology, etc.) into conservation research and practice. Regrettably, the various theoretical frameworks, methods, and languages tend to remain divided. The Social Sciences, because of their breadth of engagement of all studies related to space (physical, human, non-human, legal, political, cultural, and more) provide fertile ground to tackle the challenge of finding a synthesised path. In this spirit of consilience, we examined an age-old problem of human–coyote conflict through a different lens. We explored coyotes’ entanglements with humans, believing them to be a good sentinel species to gauge the plethora of ways humans engage with wild animals in urbanising settings. Our results showed that constructed notions of belonging, and trespass, guide human behaviour towards animals regardless of the ecological or evidential ‘truth’ of those notions.

Animals, like coyotes living in cities, thread together spaces used by people with remnant natural areas: they try to construct a life, take care of their families, and they are bound by the rules of ecology to reproduce and survive. Some coyotes make choices that, while ecologically sensible (e.g. protect themselves or their pups from dogs) are believed by many humans to be inappropriate. Worse, many humans imagine

an expansive geography of risk posed by coyotes; leading to the indiscriminate killing of the species. Understanding the situations in which no reason to kill is confused for a reason to kill may identify critical information that could help relax our boundaries in relation to coyote occurrence and behaviour. Embracing such ‘riskier’ (Ojalammii & Blomley, 2015) way of interacting may hinge upon revision to laws about coyotes. For the latter, Braverman’s (2013) exploration of how laws entrain human entanglements with the wild may be an important starting point, because these laws exacerbate negative encounters and outcomes for coyotes by defining the species as a ‘pest’ (i.e. having no value and no ‘place’).

Ojalammii and Blomley (2015) stated that ‘it is hard to say how the wolves think about ... space’; It is the same for coyotes. But in a ‘more than human world’, it imperative we do think about this very fact. As Paquet and Alexander (2018) articulated, evidence suggests that animals do have a sense of place – a world imbued with memories, cultures, and emotions. Therefore, our actions against coyotes (and all wildlife) need to be evaluated differently, and in ways we have not yet been able to or perhaps have not been brave enough to conceive. What is sure is that a consilience of disciplines is an essential part for this journey. We hope that our findings and thoughts encourage a deeper discussion that might illuminate that path to change.

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Dianne L. Draper is a Full Professor in the Department of Geography at the University of Calgary, Alberta. She is recognised for her research in sustainable tourism, ecotourism, tourism growth management, and Arctic cruise tourism, as well as planning and policy in water resources management. Recent research has focused on sustainability, planning for parks and protected areas, and human–wildlife interactions.

References

- Alexander, S. M., & Draper, D. L. (2019). Worldviews and co-existence with coyotes. In B. Frank (Ed.), *Rethinking co-existence* (pp. 311–334). Oxford: Oxford Press.
- Alexander, S. M., & Quinn, M. S. (2011). Coyote (*Canis latrans*) interactions with humans and pets reported in the Canadian print media (1995–2010). *Human Dimensions of Wildlife*, 16(5), 345–359.
- Braverman, I. (2013). Animal mobilelegalities: The regulation of animal movement in the American city. *Humanimalia: A Journal of Human/Animal Interface Studies*, 5(1), 104–135.
- Brighenti, A. M., & Pavoni, A. (2018). Urban animals – domestic, stray, and wild: Notes from a bear repopulation project in the Alps. *Society & Animals*, 26(6), 551–575.
- Brook, R., Cattet, M., Darimont, C., Paquet, P., & Proulx, G. (2015). Maintaining ethical standards during a conservation crisis. *Journal of Canadian Wildlife Biology & Management*, 4(1), 72–79.
- Buller, H. (2008). Safe from the wolf: Biodiversity, biosecurity and competing philosophies of nature. *Environment and Planning A: Economy and Space*, 40(7), 1583–1597.
- Collard, R. C. (2012). Cougar—human entanglements and the biopolitical un/making of safe space. *Environment and Planning D: Society and Space*, 30(1), 23–42.
- Cresswell, T. (1996). *In place, out of place: Geography, ideology and transgression*. Minneapolis, MN: University of Minnesota Press.
- Dubois, A., Fenwick, N., Ryan, E., Baker, L., Baker, S., Beausoleil, N., ... Fraser, D. (2017). International consensus principles for ethical wildlife control. *Conservation Biology*, 31(4), 753–760.
- Foothills Coyote Initiative. Retrieved from www.ucalgary.ca/canid-lab
- Fox, C. H., & Papouchis, C. M. (2005). *Coyotes in our midst: Co-existing with an adaptable and resilient carnivore*. Sacramento, CA: Animal Protection Institute.
- Haraway, D. J. (2003). *The companion species manifesto: Dogs, people, and significant otherness*. Chicago, IL: Prickly Paradigm Press.
- Havorka, A. (2016). Animal geographies: Globalizing and decolonizing. *Progress in Geography*, 41(3), 1–13.
- Herrmann, T. M., Schüttler, E., Benavides, P., Gálvez, N., Söhn, L., & Palomo, N. (2013). Values, animal symbolism, and human–animal relationships associated to two threatened felids in Mapuche and Chilean local narratives. *Journal of Ethnobiology and Ethnomedicine*, 9(41), 1–15.
- Hulme, M. (2008). Geographical work at the boundaries of climate change. *Transactions of the Institute of British Geographers*, 33, 5–11.
- Joyce, P. (2010). *Belief in climate change hinges on worldview*. Retrieved from <http://www.npr.org/templates/story/story.php?storyId=124008307>
- Koltko-Rivera, M. (2004). The psychology of worldviews. *Review of General Psychology*, 8(1), 3–58.
- Lorimer, J. (2015). *Wildlife in the anthropocene: Conservation after nature*. Minneapolis, MN: University of Minnesota Press.
- McManus, J. S., Dickman, A. J., Gaynor, D., Smutts, B. H., & McDonald, D. W. (2014). Dead or alive? Comparing costs and benefits of lethal and non-lethal human–wildlife conflict mitigation on live-stock farms. *Oryx*, 49(4), 687–695.
- Miller, B., Reading, R., Strittholt, J., Carroll, C., Noss, R., Soulé, M., ... Foreman, D. (1998). Using focal species in the design of nature reserve networks. *Wild Earth Special Issues*, Winter 1998/1999, 81–92.
- Morgan, D. L. (2008). Snowball sampling. In L. M. Given (Ed.), *The SAGE encyclopedia of qualitative research methods* (pp. 816–817). Thousand Oaks, CA: Sage.
- Nightingale, A. (2003). A feminist in the forest: Situated knowledges and mixing methods in natural resource management. *ACME: An International E-Journal for Critical Geographies*, 2(1), 77–90.
- Ojalammi, S., & Blomley, N. (2015). Dancing with wolves: Making legal territory in a more-than-human world. *Geoform; Journal of Physical, Human, and Regional Geosciences*, 62, 51–60.
- Paquet, P. C., & Alexander, S. M. (2018). Habitat loss: Changing what animals think? In A. Butterworth (Ed.), *Animal welfare in a changing world* (pp. 4–13). Oxfordshire: CABI Press.
- Philo, C., & Wilbert, C. (2000). *Animal spaces, beastly places: New geographies of human–animal relations*. London: Routledge.

- Pooley, S., Barua, M., Beinart, W., Dickman, A., Holmes, G., Lorimer, J., ... Milner-Gulland, E. J. (2017). An interdisciplinary review of current and future approaches to improving human–predator relations. *Conservation Biology*, 31(3), 513–523.
- Proctor, J. D. (1998). The social construction of nature: Relativist accusations, pragmatist and critical realist responses. *Annals of the Association of American Geographers*, 88(3), 352–376.
- Proulx, G., & Rodtka, D. (2015). Predator bounties in western Canada cause animal suffering and compromise wildlife conservation efforts. *Animals*, 5(4), 1034–1046.
- Rolston IIIH. (1997). Nature for real: Is nature a social construct? In T. D. J. Chappell (Ed.), *The philosophy of the environment* (pp. 38–63). Edinburgh: Edinburgh University Press.
- Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioural sciences*. Los Angeles, CA: Sage.
- Thibault, P. J. (2006). Agency, individuation and meaning-making: Reflections on an episode of Bonobo-human interaction. In G. Williams & A. Lukin (Eds.), *The development of language: Functional perspectives on species and individuals (chapter 5)* (pp. 112–137). London: Continuum.
- Treves, A., & Bruskotter, J. T. (2014). Tolerance for predatory wildlife. *Science*, 344(476), 476–477.
- Trudeau, D., & McMorran, C. (2011). The geographies of marginalization. In V. J. Del Casino Jr, M. E. Thomas, P. Cloke, & R. Panelli (Eds.), *A companion to social and cultural geography, Chapter 25* (pp. 437–453). Malden, MA: Blackwell.
- Tyborowska, A., Volman, I., Niermann, H. C. M., Loes Pouwels, J., Smeekens, S., Cillessen, K., ... Roelofs. (2018). Early-life and pubertal stress differentially modulate grey matter development in human adolescents. *Nature*, 8, 1–11. Scientific Reports.
- Urbanik, J. (2012). *Placing animals, an introduction to the geography of human–animal relations*. Lanham, MD: Rowman & Littlefield.
- Wolch, J., & Emel, J. (1995). Bringing the animals back in. *Environment and Planning D: Society and Space*, 13(6), 632–636.