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Editorial

Cross-Landscape Approaches to Human Wildlife Conflicts—Naïve or Necessary?

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When I was approached to edit a Special Issue (SI) on "Human wildlife conflicts across landscapes", I was particularly interested in the unprejudiced, not to say near-naïve approach to the subject. In today's scientific landscape, however, there is a tendency towards ultra-specialization, implying the danger of missing the big picture [1,2]. This can lead to very small-scale approaches with, in my opinion, methodical issues seeming to become almost as important as the actual scientific problem. Thus, the idea behind the present SI was to enable genuine transdisciplinary and transboundary considerations. However, one thing quickly became apparent during the preparation and the attempt to interest colleagues in participating: many scientists seem to have very definite ideas and follow static concepts when it comes to human–wildlife conflict—namely wildlife being "inconvenient to humans". Well-known examples are carnivore-induced losses of livestock, crop raiding elephants, and so-called "problematic" wildlife or pest rodents, to mention only a few [3–8].

Nicole Starik and I tried to show that this is only one side of the medal [9]. Probably owing to its origins in the field of traditional wildlife management, the common application of the term human–wildlife conflict has usually been strongly influenced by this anthropocentric perspective towards inconvenient wildlife. However, we wanted to foster a more symmetrical view that also investigates cases where human activities impact non-human species. We even argue that the debate as to whether the term "co-existence" might be more appropriate than the term "conflict" is little more than an indicator of the anthropocentric nature of most considerations. To represent the traditional view we used mammalian predators (members of the taxon Carnivora) preying upon livestock as an example, and we discussed the impacts of wind turbines on bats to illustrate a more wildlife-oriented perspective. There is an undisputable amount of similarity in how current research describes the challenges and solutions in very disparate locations and on various spatial scales. Perhaps the extension of a less anthropocentric view of the universe could be a useful philosophical underpinning not only for conservation-related disciplines, but also for traditional wildlife managers? In addition, a rather eco-centric view could improve the bridging of landscape conservation efforts from natural habitats towards urban areas through shifting geographic scales and perspectives to include wildlife's behavioral innovation potential in the process of colonizing novel or changing environments [10,11].

Speaking of novel environments, Ioana Coman and others have contributed a piece of work entitled "It is a wild world in the city: urban wildlife conservation and communication in the age of COVID-19" [12]. This interesting paper reviews current research topics associated with urban wildlife and briefly examines the indirect effects of the COVID-19 pandemic on aspects of urban wildlife. Adopting a holistic approach by reviewing not only studies on vertebrates, but also invertebrates and vegetation, the authors highlight an often-overlooked issue. Furthermore, the paper deals with the lack of interest in large parts of the scientific community in using rather new communication tools. I am convinced that this article will receive much attention, not only among the scientific community but also concerning a broader public readership. To quote one of the reviewers of this contribution,

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this paper "opens the door for future more detailed social studies and their undeniable importance to be included in urban wildlife research".

The SI features another article that focuses on urban wildlife: a paper by Loren Fardell and others dealing with public awareness of wildlife and the extent to which it affects the protection of biodiversity and natural resources in times of increasing urbanization [13]. By combining a social science approach (yard owner surveys) with the assessment of biodiversity parameters using a non-invasive method (camera traps), the study addresses the anthropogenic as well as the wildlife perspective. As one reviewer noted, this is "An ingenious study that provides information that we increasingly need as humans and wildlife live in close proximity". The importance of "backyard biomes" as refuges for wildlife, as well as the importance of wildlife as a source of enjoyment and recreation for humans, will probably play an increasingly important role in the future (Figure 1). At the same time, it is also important to keep an eye on the potential for possible conflicts, e.g., vectors carrying zoonosis or risks to human property and infrastructure [14,15].

Figure 1. Common redstart male (*Phoenicurus phoenicurus*) found in an urban green space in the city of Berlin, Germany. This species is a typical representative of urban wildlife. Given that over half the human population lives in cities [16], the issue of human–"urban wildlife" conflicts might receive increasing awareness in the future. Photo: T. Göttert.

Two research articles focus on the species *Canis lupus*, albeit in very different ways. Romaan Hayat Khattak and others contribute "A perspective of the human–grey wolf (*Canis lupus*) conflicts in Kumrat Valley, Northern Pakistan" [17]. A special value of this study results from its remote and relatively rarely studied area. Accordingly, one reviewer pointed out that the social, cultural, and economic contexts of North Pakistan are "very different from the European or North American contexts, where hundreds of studies of large carnivore-human conflicts have been carried out." Therefore, this paper adds important additional knowledge of a species of importance in a rather under-represented area.

Canis lupus is also the target species of the study by Louise Boronyak and colleagues [18]. These authors, however, do not focus on the species in its naturally evolved state, but the result of a process of domestication and subsequent feralization: the authors investigate the barriers to the uptake of non-lethal control methods with regard to dingoes in Australia. To quote one of the reviewers of this interesting contribution: "The study has merit in providing an understanding of and pathways to the resolution of human–wildlife conflict". This is especially important, since the dingo example is extremely complex in several ways: firstly, owing to the nature of natural and cultural influences concerning the processes (domestication, feralization) leading to the development of this entity [19]; secondly, owing

to the relatively short temporal dimension of the existence of dingo–prey relationships and the fact that the dingo most likely affected the disappearance of an endemic carnivorous mammal, the thylacine (*Thylacinus cynocephalus*) [20,21]; and finally because not only the dingo but also the prey targets of concern (sheep, goats and cattle) are introduced, non-native faunal elements that do represent domesticated forms—they are the result of a human-controlled process that differs from natural evolution in many regards [22,23].

In their contribution entitled "Space use and movements of southeastern breeding double-crested cormorants (*Nannopterum auritum*) in the United States", Leah Moran and others estimated the home range and core area sizes of breeding cormorants using GPS telemetry data [24]. The authors compared their data with the literature information available on the activity areas of birds breeding further north, and reported clear differences in the space use of animals in different breeding grounds. Not only does this study provide an important reference basis for the conservation of the species in the southeastern USA, it furthermore reveals apparent biological and behavioral differences in cohorts of populations occurring in different parts of this species' distribution range. There is a clear connection to the overall topic, since populations continue to grow and ranges expand and it is not unlikely that growing populations may negatively impact aquaculture and other forms of land use, as it has been observed for other cormorant species (Figure 2). Thus, the paper provides an important basis for understanding ecological phenomena by examining biological parameters.

Figure 2. Cormorants, like the species *Phalacrocorax carbo* shown here, can cause significant damage to the fishing industry and thus induce a classic human–wildlife conflict [25,26]. Moran and others studied movement patterns of the cormorant species *Nannopterum auritum* [24]. Such studies of the behavior and ecology of animals are an important basis for a better understanding of the conflicts that can be induced by the animals. Photo: T. Göttert, Lake Müggelsee, Berlin, Germany.

Often overlooked factors that can induce or exacerbate human–wildlife conflicts arise from successful conservation efforts that result in increasing populations of wildlife species [27]. Namibia is a classic example of such successful nature conservation programs in recent decades [28–30]. In contrast to most African countries, in Namibia we can see positive developments in the population demographics of numerous wildlife species, including those with a high conservation status (Figure 3). However, alongside this positive development, high levels of human–wildlife conflicts do occur [30]. The contribution of Robert Luetkemeier and others can be seen against this background [31]. The authors summarize results gained from a workshop and expert interviews with relevant stakeholders in the Kunene region, south of Etosha National Park (ENP) in north-central Namibia. One of

their main findings is that the concept of ecosystem services and disservices may provide an appropriate framework to contextualize activities of actors in the region and detect inter-individual conflicts among stakeholders. The authors examined conflicts between different stakeholders resulting from different individual "ecosystem services–disservices ratios". The realization that human–wildlife conflicts can often be traced back to human–human conflicts is almost a truism that has been taken up and reflected in numerous publications [32,33]. A great value of the study by Luetkemeier and others, however, is that they underpin this idea of human–human conflict with a valid and useful concept.

Figure 3. The Kunene region, south of the ENP in Namibia, is a prime example of successful nature and species conservation. Luetkemeier and others interviewed various stakeholders in this region for a better understanding of the conflicts between stakeholders over biodiversity [31]. This photo shows a black rhino (*Diceros bicornis*) cow with her few-weeks-old calf. The photo was taken in 2005 on private land in the Kunene region by T. Göttert. The adult animal was part of a founder group reintroduced from ENP onto private land. Obvious successful reproduction post-release is an unmistakable indicator for the success of this reintroduction [34]. Such range expansions of species, however, can also induce human–wildlife conflicts.

In summary, the following aspects have emerged as important take-home messages from this SI:

- Adopting a more balanced view and a stronger involvement of previously underrepresented organismic groups: As shown above, approaching the topic from a wildlife perspective seems promising. Although there is a large amount of literature on the overall topic of human–wildlife conflicts, certain organismic groups, such as invertebrates or plants, need more attention.
- Transdisciplinary and interdisciplinary approaches are needed: It is possibly a result of the above-mentioned anthropocentric view that many studies dealing with human–wildlife conflicts look at how people perceive the conflicts rather than the potential threats arising for wildlife. Additionally, this SI features more contributions based on social scientific approaches when compared to classic ecological studies. However, a genuine combination of methods and approaches from different disciplines seems favorable.
- Urbanization and successful nature conservation could become even more important facilitators of conflicts in the future: The traditional perception sees wildlife as a threat or as a competitor concerning human land or resource requirements (e.g., wildlife as a threat to agricultural production systems or infrastructure). With a view to current

developments and a greater awareness of the idea of the co-existence of humans and wildlife, the subject of human–wildlife conflict could be given more attention in the future in connection with urbanization or the successful further development of nature reserves.

In accordance with the global relevance of the topic, almost every investigation of this SI represents a different region of the world or even a different continent; the Special Issue features research articles with a focus on Australia, North America, Sub-Sahara Africa, and southern Asia. The topic affects countries of the Global North as well as countries of the Global South, and it applies to metropolitan areas as well as sparsely populated regions of the world. I truly hope that this SI provides some impulses and food for thought so that the existing human–wildlife conflicts, which will certainly not decrease in the future, can be adequately addressed and mitigated. In view of globally valid phenomena (e.g., the spreading of modern communication technologies, urbanization tendencies, ubiquitous species, zoonoses, the alienation from nature of broad sections of society, biodiversity crises, the near-extinction of species, habitat losses, the intensification of agricultural practices, etc.), it seems likely that the need for addressing human–wildlife conflicts across regions will increase rather than decrease in the future.

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