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Editorial: Insights in animal conservation: 2021

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Editorial on the Research Topic
Insights in animal conservation: 2021

As might be ascertained from a Research Topic entitled "*Insights in Animal Conservation*," this solicitation yielded a broad portfolio of approaches, topics, methods, and ideas. The term "insights" evokes forward-looking approaches to conservation, and that is certainly a goal: to scan the horizon for new approaches and technologies that will advance conservation—a crisis discipline—more rapidly. Unlike other disciplines, however, animal conservation is not novelty-driven per sé. Innovation and technology are vital for the progression of the discipline, and have opened up exciting new approaches to solving conservation problems. The scale and speed of technological innovation has been game-changing (and bewildering!), allowing the field to ask and answer questions we would not have dreamed possible a generation ago (Lahoz-Monfort and Magrath, 2021). However, tried and true approaches should not disregarded—or difficult to fund or publish—simply because they are not novel. Much is to be gained from developing standard protocols and replicating them across species and systems—for ecological monitoring (Lindenmayer and Likens, 2010), wildlife translocations (IUCN, 2013), emerging pathogen surveillance (Watsa, 2020), and climate change (Halbritter et al., 2020), to name a few. Standardization does not equate with stagnation, as progress is always welcome, but it does improve issues of transparency, consistency, and the inferences that can be drawn from cross-study analysis and synthesis, moving forward the conservation agenda more rapidly.

Two research papers in this collection exemplify this "yin and yang" between new and tried and true approaches to habitat evaluation and species distribution. There can be no doubt as to the continued importance to conservation for studies determining where a species is distributed on the landscape, and the underlying variables that govern that distribution. Using standard and accepted methodology, Wang et al. use camera trap arrays to document the distribution of sambar (*Rusa unicolor*) in Southwest China and evaluate the factors that contribute to habitat suitability for the species. Work like this is among the most common and most useful in animal conservation, providing managers and decision-makers with key information on where to conserve habitat for the species, and how to employ the use of corridors to increase connectivity for this fragmented population. This approach represents in many ways the past, present, and future of animal conservation. By contrast, Zhang et al. identified a conservation question for which current analytical tools

were insufficient, and developed a new model with improved computer code. Their question centered on another age-old challenge facing conservation managers: what is the most defensible management unit? The answer to this question guides decision-making regarding which populations need enhanced connectivity and which populations should be maintained separately in ex situ programs. Zhang et al. used habitat suitability index maps for gray wolves (*Canis lupus*) and giant pandas (*Ailuropoda melanoleuca*) to test their new model (habCluster), which uses algorithms to delineate geographical boundaries by identifying inter-connected nodes within a network of communities. This method has the advantage of not requiring the extensive sampling needed to identify genetic clusters. From their findings, Zhang et al. were able to make improved recommendations for managing conservation units for both wolves and giant pandas (for example, identifying which clusters were separated by anthropogenic disturbance, requiring efforts to restore connectivity, and which clusters were divided by natural barriers).

Conservation translocations—the deliberate movement of organisms for conservation purposes (IUCN, 2013)—have a comparably long history as species distribution and habitat evaluation, but have seen a steep increase in recent years. This reality bears witness to the conservation challenges they are designed to address: small population size, habitat fragmentation and population isolation. All translocations, however, do not necessarily start with a conservation purpose. The impetus for demand-driven translocations is the need to re-establish populations in an area from which the species has been extirpated or decimated. These fall naturally into the category of conservation translocations. However, there are also supply-driven translocations, where source animals are made available through some human activity—frequently development impacts that must be mitigated (Germano et al., 2015). Although these translocations may not start from a conservation need, it is imperative that they be designed and implemented so that they can have a positive conservation impact.

Goldenberg et al. bring to the fore another commonly encountered source of animals for translocation—animal rescues, followed by rehabilitation and release (and as the authors advocate, a fourth "R", research, should also be included). In this Perspective, Goldenberg et al. highlight the real need for intensive human intervention in caring for young ("orphan") or injured rescued animals, the "rehabilitation" of the 4 R's. Of course, there is some relevant history and lessons learned that comes from conservation breeding programs, especially when young are removed from parents and hand-reared. However, rehabilitation is also unique in that the need for hand-rearing is borne out of necessity, and often trauma. Intensive human care, however, may run counter to goals for the third R, release. Goldenberg et al. establish the need for behavioral interventions (e.g., training) in a situation model that delineates the direct and indirect threats giving rise to animal rescues, how life under human care may impede positive post-release outcomes, and establishes the need for research to guide and evaluate interventions to minimize the negative consequences of time in human care. Their approach is then applied to four mammalian species, from which we learn how a single unifying approach can lead to diverse interventions and outcomes across species and contexts.

In a substantially different translocation program, we learn from North et al. a great deal about the nuts and bolts of the translocation process in their case study with the California red-legged frog (*Rana draytonii*). They deliver a strong template for what to consider when planning and implementing a translocation program: the planning process, permitting, selecting source and receiver sites, considering population-genetic differentiation, and carrying out transportation and release. They also document some of the lessons learned, including—importantly—from failures, and provide revised approaches and protocols for future translocations. Although all decisions were not based on strong inference—a rare occurrence in such programs—the outcomes observed did reduce uncertainty regarding what works and what does not, and informed their decisions for future translocations.

This Research Topic is rounded out with two disparate topics addressing anthropogenic impacts on species, an increasingly prevalent challenge in the Anthropocene era in which we now live. Today, many wildlife species must contend with life in a novel ecosystem, one that is so disparate in form and function from its pre-Anthropocene version that there is little hope of turning back the clock and "restoring" the "natural" ecosystem. In their research with Murray cod (*Maccullochella peelii*), Tonkin et al. grapple with the reality of large-scale water control programs in river systems that have changed the flow rate and patterns, as well as water temperature. Some species programs make use of head-start programs to address human-driven threats that increase vulnerability to younger age classes, typically due to invasive or subsidized predators. In a similar vein, Tonkin et al. identified increased cold water pollution as the leading cause of the decline of Murray cod, primarily impacting early life stages and population recruitment. To reverse the major changes made to this river system (removing a dam and restoring natural water flow) is not politically feasible. Their models and monitoring results indicate that interventions including modest alterations of water management decisions and the use of hatchery-produced fish for restocking (aka, head-starting and release) can facilitate species recovery. This work underscores the observation that conservationists must increasingly turn to "gardening" (bold interventions to promote more native representation in novel ecosystems), whereas guardianship (protect it and get out of the way) is increasingly inadequate (Wiederholt et al., 2015).

Our final contribution to this Research Topic addresses the intersection of the consumptive use of wildlife, animal welfare, and species conservation, and therefore directly targets human dimensions of conservation. Green et al. examine the role of bear farming for bile production and use in traditional medicine. Using interviews of Vietnamese bear farmers, they are able to develop more effective strategies for addressing illegal bear farming, underscoring the importance of using the farmers' peers—former bear farmers—as the messengers. This work highlights the recalcitrant nature of issues in wildlife trade, especially when the

use of wildlife products is engrained in traditional belief. Addressing the human dimensions of wildlife conservation is complicated and the cultural sensitivities of the target audience can be challenging, but nonetheless vital if we are to meet many of our conservation goals. The foundation of these interventions is understanding the stakeholders, as ably demonstrated in this paper.

These samples from the frontlines of conservation provide a good introduction to recent progress and future directions in animal conservation.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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