



What Works and What Doesn't Work? The Challenges of Doing Effective Applied Conservation Research in Human-Modified Habitats

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Is conservation working? The number of researchers and conservationists working on primates, and the amount of data available, has grown dramatically over the past decades (Wich & Marshall, 2016), but so have the number of species of primate now listed as threatened with extinction (Estrada et al., 2017). As conservation scientists we may be largely powerless to influence some of the key drivers of change impacting primate populations, such as socio-economic factors, increasing human population density, and/or national and local political factors (Estrada et al., 2012; Laurance et al., 2012a; Schwitzer et al., 2014). Since many of the world's primate populations are now living in increasingly modified habitats, one of the main goals of research is to improve conservation outcomes in these areas to facilitate long-term co-occupancy of humans and nonhuman primates (Gould et al., 2020; Marsh & Chapman, 2013; McLennan et al., 2017). However, our growing understanding of primates in these modified ecosystems does not always appear to be having the desired effect (Chapman & Peres, 2021; Marsh & Chapman, 2013). Why is this? Are we asking the wrong questions? Are we not communicating our results effectively and to the right people? Do those working directly in conservation on the ground simply not need or use our data?

This special issue follows a symposium and roundtable discussion we organised at the European Federation of Primatology/Primate Society of Great Britain joint conference in 2019 entitled “What Works, and What Doesn't Work? The Challenges of Creating Effective Applied Conservation Research in Human-Modified Habitats.” The symposium heard from primate researchers and conservation practitioners

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working across a wide range of species and locations, using natural and social science methods, to gain a better understanding of primates in human-modified habitats. The research presented was of applied relevance as well as academic value, raising several points and themes that we discussed more fully in the roundtable event that was open to all conference delegates. The primary goals were 1) to identify common obstacles and challenges faced by researchers and conservation practitioners, 2) to facilitate an open and honest conversation among participants about where we think we might be going wrong, and 3) to identify potential ways forward.

Three main themes emerged from the roundtable discussion:

1. **Thinking outside of the box.** Do we collect data at the right temporal and spatial scale to be useful to conservation practitioners? Do we need more interdisciplinarity? Do we have examples of novel or unconventional strategies, based on data and/or practice that provide potentially successful approaches to conserve primates in human-modified habitats?
2. **When do we call a project a “success?”** Are there tipping points, with “failures” along the way? What is needed to keep projects sustainable and successful? Issues discussed include building local capacity and nurturing local leadership, the duration of research relationships and funding issues. Lastly, can—or should—we publish failures?
3. **The need for better communication and positional sensitivity.** This includes the interface between academics and local people, policy makers, and within our own community. It also includes range-state NGO workers and their interactions with local and indigenous peoples in their own countries.

In this special issue, the contributors explore selected themes highlighted in the roundtable discussions in more detail and provide recommendations for primate researchers and conservation practitioners for future practice. In this Introduction, we highlight how the various co-authors contribute to these themes and briefly discuss them in the context of the wider literature.

Need to Address Issues from Different Angles in an Ever-Changing World

Do decision-makers need or use results from conservation research? While some have suggested that those in conservation management roles do not find refereed journal articles translatable for real-world conservation issues (Laurance et al., 2012b), others have found the contrary (Cook et al., 2012). In the latter study, conservation managers reported that they used a variety of resources including evidence based on experience and syntheses, although they found empirical research most valuable. Corroborating this, a recent study showed that the traits of individual conservation managers have a significant impact on the success of a conservation project, including the number of information sources they consult to help make their decisions (Sher et al., 2020).

Reflecting the need to use different angles and scales to fully understand conservation challenges, two articles in this issue examined the use of utilitarian plants by people and primates in Madagascar. Konersmann et al. (2021) used semistructured interviews and group discussions to ascertain which plant species people use as crops, medicinal plants, wood resources, and nonwood products of the forest, and which are unwanted weeds. They conducted their study in multiple villages in three different regions in Madagascar, representing a variety of forest types, and explored existing literature to assess which vertebrate species, including lemurs, use the various plants in these different habitats. This multiregional, large-scale comparison provides key information on the type of plants that can be used for habitat restoration to meet both people's and animals' needs. In their study in two villages in the littoral forest of southeast Madagascar Račevska et al. (2022) also used semistructured interviews to investigate which species people used as medicinal plants, for construction and for firewood, and assessed which of those species were also important food species for Endangered red-collared brown lemurs (*Eulemur collaris*). This latter work offers a rich description of the plants and plant parts people use locally and provides insights into how people value different plant species relative to each other. Realizing the extent to which people and wildlife overlap in their use of wild resources, and the likely value of those resources to all species involved, provides information that can help to direct future conservation efforts to support wildlife populations and human wellbeing within these shared landscapes. Studies of human-primate resource overlap include a variety of species (Hockings et al., 2020; Kazaba et al., 2020; Kinnaird, 1992; Miller et al., 2017; Riley, 2007) to explore the degree to which humans and their primate neighbors share, or compete for, wild and cultivated resources and what that might mean for future conservation practice at these sites.

These two studies emphasise the value of exploring issues and phenomena at multiple scales and integrating qualitative interview approaches with quantitative biological information to facilitate the development of detail-rich data sets. As primatology embraces the use of interdisciplinary methods and analytical frameworks, this requires an increasing level of collaboration with those outside primatologists' area of expertise (Cardinal et al., 2022; Setchell et al., 2017).

Just as wildlife population monitoring requires long-term data to assess trends over time, research assessing changes in human and primate behaviour also needs to include a temporal element. Primate behavior is highly flexible and only repeated or long-term data collection can encompass their full response to habitat change (Corrêa et al., 2000; Donati et al., 2020; Melin et al., 2020). Furthermore, as human societies change over time, so do the anthropogenic threats facing primates. Two papers in this issue show the importance of monitoring primate behavioral responses over an individual scale and different time periods to understand their full, sometimes unexpected, flexibility. In the first of these, Bracken et al. (2021) used direct observations and spatial data from an urban-dwelling group of chacma baboons (*Papio cynocephalus*) to investigate individual differences in space use. The group was managed by a team of rangers who influenced the movement of the group, and particularly of males, to minimize negative interactions with humans in the urban centre. The study revealed the influence this management has on the group, with

fascinating results showing responses by low-ranking female baboons who moved alone or in small groups into the urban areas as a direct result of the management of the males. This study is one of few showing fine-grained, interindividual variations as a response to management interventions (but see Davison et al., 2009) and highlights the importance of conducting behavioral studies in conjunction with conservation interventions.

The second article shows the need to repeat a study to confirm the conclusions. Hawkins and Papworth (2022) investigated behavioural responses of pygmy marmosets (*Cebuella pygmaea*) in Peru to human speech and propose mitigation strategies to minimize disturbance in the context of wildlife tourism. Their research follows a previous study on the same species (Sheenan & Papworth, 2019) where animals responded to anthropogenic sounds by moving out of sight and reducing their time spent feeding and resting. The results were not replicated in the study presented in this special issue, suggesting the management recommendations from the original work may need more in depth, long-term assessment before their application.

These two studies highlight the variability of wildlife behaviour under different conditions and the need for repeated data collection: animals respond to humans in different and often unpredictable ways, showing variation in both interindividual and inter-group responses. The same is true for humans: two individuals or communities will not necessarily respond in the same way toward wildlife, and differences in traditions, culture, and knowledge can be seen within the same locale or community (Knight, 2003; Riley & Priston, 2010; Skogen, 2017). This implies a need to triangulate results where possible and investigate a topic from multiple angles, providing conservation managers with a variety of different resources and perspectives to inform their decisions and actions (Cook et al., 2012; Sher et al., 2020).

In addition to publications, constant dialogue is needed between those making conservation decisions and those conducting research. Oram et al.'s contribution to this special issue exemplifies this (Oram et al., 2022). The authors conducted a study using a mixed methods approach, combining field survey techniques to determine signs of orangutan in forest patches, interviews with field laborers and supervisors, and with the help of oil palm growers via a citizen science approach, reports of orangutan sightings, to determine orangutan (*Pongo pygmaeus*) habitat use in oil palm plantations and forest patches within them in. Additionally, the authors explored local reports of, and responses to, orangutan sightings by plantation workers. Oram et al. provide evidence that orangutans persist in forest patches in the Kinabatangan region of Malaysia. The authors point out that while these forest patches contribute to landscape connectivity for orangutans, there are long-standing obstacles to in situ conservation in the study area because of various misunderstandings within the sector about how, whether, and should these animals inhabit production landscapes (Oram et al., 2022). The long-standing conservation management response in this region has been to capture and translocate orangutans, which is problematic for multiple reasons (Meijaard et al., 2012; Santika et al., 2017; Sherman et al., 2020). Oram et al. promote an alternative strategy that supports and facilitates landowners and plantation personnel in their role as co-conservationists, working to maintain and strengthen existing landscape connectivity, promoting a counter-narrative to

the current dominant reaction that orangutan translocation is the automatic “go-to” response for managers.

Being Open About Lessons Learned

Failures are reported much less frequently than successes in the conservation literature (Catalano et al., 2019), although it is now increasingly recognised that sharing failure is an important way to improve conservation efforts, including communicating these through peer-reviewed literature (Balme et al., 2014). It is as important to identify and report the actions and circumstances that result in “failures” or difficulties in attaining successful conservation outcomes as it is the successes. In this special issue, Webber et al. (2022) explore the importance of sharing failures in detail, providing a commentary on the psychology of sharing failures and examining the term “fail.” They discuss key barriers hindering better reporting and engagement with “failure” in primate conservation and conservation more generally. They illustrate their arguments using two case studies of project failures, or “First Attempts In Learning,” and recommend that reporting failure should be more accepted by funders and publishers alike but recognize that any requirement or encouragement to share or report on failure needs to be handled in a culturally sensitive and situation-appropriate way. Because there are a great number of benefits to sharing failure, doing so will almost certainly enhance primate conservation knowledge, if not outcomes.

The Conservation Evidence Project is an important approach and a progressive step forward in working to collate a usable evidence-based guide to what does and does not work in conservation, based on an assessment of published research (Sutherland et al., 2021). However, there are limits to its functionality because of the relative lack of evaluation of conservation strategies and interventions in the existing literature (Junker et al., 2020) and the need for regular, systematic updating of the information. In more than 5,000 articles analysed for the Primate Synopsis, only 80 contained an evaluation of a conservation intervention or action (Junker et al., 2017). This highlights the need for a greater focus on candid evaluation in our scientific communications but also suggests that such assessments might only be useful in this context if published in peer-reviewed journals, again raising an obstacle to conservation success commonly described in narratives on the research-implementation gap (Knight et al., 2008; Toomey et al., 2017). It is therefore not only essential that research includes evaluations of the efficacy of different conservation strategies, reporting both progress and lessons learned but also that it is made available to conservation decision-makers in an accessible format (Pullin & Knight, 2003).

What an accessible format might look like may vary; one approach is simply for researchers, conservation practitioners, and policymakers to form more effective working relationships. Gibbons et al. (2008) recommend secondments and sabbaticals, fellowships, and “buddy” schemes as ways to normalize forming these relationships within people’s careers. Alternatively, Laurance et al. (2012b) suggest that instead of reporting our findings when we have conducted

our research, we should approach the relevant conservation practitioners and decision-makers to ask what questions need answering and form partnerships from the outset. Pullin and Knight (2003) propose a “decision support system” tool kit, adapted from an evidence-based framework used in medicine and public health, to promote more effective exchange of information between researchers and conservation practitioners and managers, thereby facilitating evidence-based conservation action planning.

Several of the contributions to this special issue (Oram et al., 2022; Rodrigues et al., 2022; Waters et al., 2021) demonstrate the clear and pressing need for much more inclusive and supportive processes and structures to ensure that conservation agendas, practices, and research engage with, and put center stage, the voices of local researchers, local conservation practitioners and local people. Much conservation research, while sensitive to the idea of including local voices, only presents or engages with outsider interpretations of insider voices. Therefore, a key issue that conservation research and practice need to address urgently is how to ensure much greater equity of power among the different stakeholder groups in identifying, prioritizing, and implementing conservation agendas (Datta, 2018; Dawson et al., 2021; Dominguez & Luoma, 2020; Rubis, 2020).

Communicate Effectively and Reflect on Your Positionality

Meaningful and reflective engagement is a common theme in this issue and is explored in several contexts: first, when reflecting on how one’s own culture and existing views on conservation impact working relationships with colleagues in the field (Rodrigues et al., 2022) and those in communities where researchers or conservationists are working (Cardinal et al., 2022; Waters et al., 2021); and second, in the importance of understanding local knowledge and investigating uses of natural resources that may be essential in developing landscapes that can work for people and primates (Konersmann et al., 2021; Račevska et al., 2022).

In this special issue, Cardinal et al. (2022) explore the importance of fostering intrinsic motivation when working with local people in conservation as key to developing genuinely bottom-up approaches. They argue that reflecting on one’s positionality as a researcher or conservation practitioner is essential to communicate and work sensitively with the different stakeholder groups involved and, in the way, “success” is framed. Whether researchers adopt a reflexive approach is influenced by researcher and practitioner training, which for many is based in either the natural or social sciences, although conservationists training today are increasingly encouraged to adopt interdisciplinary approaches. A crucial element of practising reflexivity is exploring and appreciating different kinds of knowledge other than the “scientific” knowledge many of those trained within a western science paradigm have been taught to seek out. Doing so will not only build better, long-lasting, and more equal partnerships between researchers, practitioners and local counterparts but will likely reveal the factors that drive intrinsic motivation.

Importantly, the needs of local people must be listened to, understood, and not defined by outsiders. What community participation and engagement looks like will

influence the long-term success and sustainability of conservation strategies. In protected areas, for example, opportunities for “participation” in conservation strategies often are passive, include material incentives, or are offered as a token afterthought in lower and middle-income countries (Cetas and Yasué, 2017; Mbanze et al., 2019; Waylen et al., 2010). In the study by Cetas and Yasué (2017), self-mobilization accounted for less than 10% of all participation types, yet projects that fostered people’s intrinsic motivation (e.g., by providing opportunities for individual choice, substantive participation, and autonomy) were most effective at achieving successful ecological and socioeconomic outcomes.

Inherent differences in worldviews and potential preexisting judgements of culture or character are not attributes solely reserved for foreign researchers. In this special issue, Waters et al. interviewed villagers and city-dwellers in Morocco, as well as representatives of governmental and nongovernmental organisations, to gauge the perspectives of these different groups on conservation and on each other. They found that villagers in their study site were perceived as “backwards” by those in urban areas and that villagers have been consistently excluded from meaningful participation in conservation. The authors explore the influence of colonialism on building and reinforcing these values, including the prioritization of university-educated individuals’ knowledge over that of local people. The authors use their findings to reflect on how to decolonize their own practice. They encourage all researchers to conduct similar investigations to understand the historical, political, and social contexts that influence the status quo, because these will affect the levels of involvement local stakeholders have in conservation management decisions (Waters et al., 2021).

Researchers and conservation practitioners also can work to decolonize their practice by reflecting on their positionality in terms of the relationships that they have with those they work with. The contribution from Rodrigues et al. (2022) explores narratives from foreign researchers and their local collaborators, illustrating issues around cross-cultural communication and imbalances of knowledge and power. The authors highlight the importance of nurturing local leadership as a means of fostering ownership of projects in people working and living alongside primates. Two recent, extensive meta-analyses support this view, and in particular stress that indigenous and local community engagement, and their greater involvement in conservation governance, are central to effecting successful biodiversity conservation while supporting and enhancing human wellbeing (Dawson et al., 2021; Giakoumi et al., 2018).

The Way Ahead

Because no one solution will “fix” all conservation issues, as researchers and conservation practitioners, we need a toolbox from which we can select the appropriate tool for the specific issue we are working on. In many cases, the tools in our box can be identified through assessing the effectiveness of previous approaches, actions, or interventions, in other words, through evidence-based conservation (Salafsky et al., 2019; Sutherland et al., 2004). While evidence is important, we also may be required to think outside the box and be creative in adopting new approaches to suit the

specific situation on hand. Joerg Ganzhorn summed this up perfectly in the roundtable discussion, saying “we cannot solve today’s problems with yesterday’s solutions.” We also must be flexible and, as Cardinal et al. conclude in their paper in this issue, we must accept compromises in adjusting our original expectations of conservation “success” to align with the wants and needs of the local people we work with. Decolonizing primatology—and indeed conservation as a whole—is integral to making local participation meaningful. Ensuring local knowledge and perspectives receive equal attention and credence as that given to “scientific” knowledge is imperative for fostering equitable and effective conservation outcomes (Ampumuza, 2022; Dominguez & Luoma, 2020). Importantly, this involves empowering people to take ownership of the projects that they work with and manage the habitats they live in by building, acknowledging, and supporting existing local capacity (Brooks et al., 2012). The long-term sustainability of conservation projects absolutely depends on this.

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Declarations

Conflict of interests The authors declare that there are no conflicts of interest.

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