Do you Speak Lion? To be effective, conservation decisions must be transparent and based on diverse views

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Problems in biodiversity conservation tend to be highly complex, embracing both biological and social systems and their interactions (1). Many have argued for multidisciplinary research in conservation, particularly a more effective engagement of the human sciences (2). But even when multidisciplinary, research may not be able to deliver the insights needed to solve a conservation problem. Recent studies help to understand these challenges and show how research can be effective in underpinning conservation decisions (2,3,4,5).

A typical example of a complex conservation problem is crop raiding by wild elephants in countries such as Kenya. Efforts to address crop raiding in Laikipia, Kenya, have included study of elephant ecology and movement, development of on-farm deterrence techniques, and research with the local community (6). An 80-km electric fence constructed in 2007 raised hopes that a more permanent solution to the problem had been found, but the fence was poorly maintained and repeatedly broken and crossed by elephants (7). Elephants learned how to break the fence and taught each other how to do so, and no local actor was willing to maintain the fence. Smallholders welcomed the protection against crop raiding, but also wanted to cross the fence to water their cattle. Ranch managers welcomed elephants and hoped that an official boundary fence would help secure their land rights, but were reluctant to pay to maintain the fence, and did not trust smallholders enough to permit access to their land to maintain it. Pastoralists whose animals were denied passage opposed the fence (7). The fence is now being rebuilt to a new design, with improved monitoring and management protocols in place. It remains to be seen whether this new system is more effective.

Experts and expertise

Faced with such complexity, conservation decisions increasingly rely on the knowledge and advice of experts, particularly scientists. However, faced with complex social-ecological systems, expert may vary markedly in their ideas and conclusions. For example, Stier et al. recently analyzed expert perceptions of ecosystem interactions in the Northeast Pacific Ocean (5). They invited individual experts to describe the number, direction, and strength of food web interactions connected directly or indirectly to populations of Pacific herring (Clupea pallasii), a fish of ecological, cultural and economic importance. They then used fuzzy cognitive maps to compare each expert’s understanding of the herring ecosystem. The perception of individual experts of the herring food web varied in terms of number of ecological connections, the influence of focal functional groups and their interaction strengths in the herring food web. These differences in perceptions of ecosystem structure affected expert responses to hypothetical scenarios in which either herring predators or prey increase.

Protocols for evidence-based conservation suggest ways to capture and clarify expertise, for example through a hierarchical approach of progressive synthesis through scientific investigations, systematic reviews, summaries and decision-support systems (6). However, Stier et al.’s study shows how experts can differ in their understanding of the interaction of natural and social systems, or if in the knowledge they draw on (scientific, local or traditional ecological knowledge and/or practical experience) (5). Differences in expert views did not reflect conventional knowledge categories such as local, scientific, and traditional (5). This
would make it difficult to construct a representative panel of experts based on their backgrounds. In these circumstances, three things can contribute to making expertise an effective basis for conservation: transdisciplinarity, diversity and transparency.

**Transdisciplinarity.**

It is almost a truism in conservation that complex contemporary problems demand an interdisciplinary approach (9). Yet interdisciplinary projects pose substantial demands on the people involved (10), exposing them to unfamiliar facts and arguments and to different ontologies and epistemologies (11). Early-career researchers involved in work outside their discipline (in fields with different conventions) can worry about implications for future careers. Moreover, empirical research on funding by the Australian Research Council’s Discovery Programme shows that more interdisciplinary proposals are less likely to be funded (12). Interdisciplinary research can seem like an impractical and risky idea.

To overcome these constraints, conservation research, like other fields, must overcome the constraints of specialization and the compartmentalization of knowledge and seek transdisciplinarity, that is, learning that operates independently of disciplinary boundaries (13). The challenge for conservation education and training, both in formal university courses and in professional and lifelong learning, is to create conservationists who are unconstrained by the disciplinary boundaries familiar to academic researchers. Conservationists must become familiar with the ways in which diverse disciplines think, talk, and write, and must recognise their strengths and weaknesses (2).

**Diversity of knowledge.**

Successful responses to complex problems also require openness to diverse inputs, discussion and dissent, and a willingness to entertain competing and creative options and to disrupt existing behaviors. Such ‘participatory’ openness is commonly proposed, but is hard to deliver in the face of constraints on budgets and time. Game et al. emphasise the need to harness creativity in planning, suggest that conservationists should learn from new thinking in military planning and emphasise distributed leadership and a decentralized approach to strategic analysis, listening to the voice of people outside the established decision making hierarchy (1).

One type of knowledge about social-ecological systems is informal and local (14). Such knowledge is embedded in culture practice and place, and often reflects observation of system dynamics over long periods of time. As Stier et al. show in their study of the Pacific herring food web, the insights of local, indigenous and scientific experts overlapped. Indeed, these categories are not discrete. They suggest that uncertainty would be best reduced by embracing a diversity of knowledge and encouraging dialog about alternative management actions (5). Nursey-Bray et al. suggest that the terms ‘scientific knowledge’ and ‘local knowledge’ imply a crude and unhelpful binary distinction in the context of coastal zone management. Both local and scientific expertise have contributions to make to coastal planning, both in terms of understanding system change and in building mutual trust: Effective coastal management demands fluidity of response, and this is often best enabled by local innovation and commitment (4).
**Transparency**

The third challenge is to make the process of reaching conservation decisions more transparent. Individual experts often disagree; their knowledge may be substantial but not necessarily objective, and uncertainties may be created by the challenges of knowledge integration, not least among different disciplines. The logical chain of reasoning that underpins the expert views is an essential element in their legitimacy and usefulness (5). One practical strategy is to publish the evidence used to reach conservation decisions to provide an evidence audit trail that can be followed and understood by later planners, and by anyone sceptical of the validity of the decisions taken, for example, stakeholders suspicious of scientific methods or analysis (3).

**Speaking Lion.**

Conservation decisions affect numerous stakeholders, and conflicts are all too common. The complexities of social-ecological systems and the contested politics of conservation decisions place great demands on expertise. Conservation success could be improved by effective interdisciplinarity, openness to new and contrasting ideas, and a commitment to transparency about conservation decisions to encourage dialog about alternative management actions.

Such a transition will not be easy. Inter-disciplinary collaboration is profoundly challenging, and opening up expert decision systems to local and indigenous knowledge is difficult to achieve in practice. For example, critics note the continuing under-representation of the humanities and social sciences in the work of the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) (15).

Wittgenstein famously observed that “if a lion could speak, we couldn't understand it” (16). But the barriers between disciplines and between experts and the public surely offer a lesser challenge. Such conversations will never be easy, but it is important to get them right.

**References**