Biological Conservation 222 (2018) 180–188

Contents lists available at ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

# Conservation conflicts: Behavioural threats, frames, and intervention recommendations

Zachary Baynham-Herd[a,*], Steve Redpath[b], Nils Bunnefeld[c], Thomas Molony[d], Aidan Keane[a]

[a] School of GeoSciences, University of Edinburgh, Edinburgh EH9 3JW, UK
[b] School of Biological Sciences, University of Aberdeen, Zoology Building, Tillydrone Av., Aberdeen AB24 2TZ, UK
[c] Biological and Environmental Sciences, Faculty of Natural Sciences, University of Stirling, Stirling, FK9 4LA, UK
[d] Centre of African Studies, School of Social and Political Science, University of Edinburgh, Edinburgh EH8 9LD, UK

ARTICLE INFO

*Keywords:*
Human-wildlife
Conflict
Interventions
Behavioural change
Evidence

ABSTRACT

Conservation conflicts are widespread and are damaging for biodiversity, livelihoods and human well-being. Conflict management often occurs through interventions targeting human behaviour. Conservation interventions are thought to be made more effective if underpinned by evidence and a Theory of Change – a logical argument outlining the steps required to achieve goals. However, for conservation conflicts, the evidence and logic supporting different types of interventions has received little attention. Using conflict-related keywords, we reviewed trends in behavioural intervention recommendations across conflict contexts globally, as published in peer-reviewed literature. We developed typologies for conflict behaviours, intervention recommendations, and conflict frames and identified associations between them and other geographical variables using Pearson's Chi-squared tests of independence. Analysing 100 recent articles, we found that technical interventions (recommended in 38% of articles) are significantly associated with conflicts involving wildlife control and the human-wildlife conflict frame. Enforcement-based interventions (54% of articles) are significantly associated with conflicts over illegal resource use, while stakeholder-based interventions (37% of articles) are associated with the human-human conflict frame and very highly developed countries. Only 10% of articles offered "strong" evidence from the published scientific literature justifying recommendations, and only 15% outlined Theories of Change. We suggest that intervention recommendations are likely influenced by authors' perceptions of the social basis of conflicts, and possibly also by disciplinary silos.

## 1. Introduction

Conservation conflicts are some of the most intractable problems facing conservation and are increasing in frequency and intensity globally (Young et al., 2010). These conflicts negatively impinge upon biodiversity, livelihoods and human well-being, and therefore considerable effort is put into their management (Redpath et al., 2015b). Conflicts involve situations where multiple stakeholders with strongly held positions clash over conservation objectives, and when one party imposes their interests over another (Redpath et al., 2013). They are hard to define and are often interpreted differently by authors, managers, and stakeholders involved in the conflict. The language used to describe a given interpretation of a conflict can be considered as a "frame" (Peterson et al., 2010; Fisher, 2016), and in the conservation literature conflicts are framed in many different ways (Table 1). Commonly, authors frame conflicts as primarily occurring between wildlife and humans - "human-wildlife conflict" – (Woodroffe et al., 2005). Others, however, posit that underpinning human-wildlife impacts such as crop-raiding are actually conflicts between different human interests, such as between conservation and agriculture (Peterson et al., 2010; Young et al., 2010). Under this interpretation, the umbrella of conservation conflict extends far beyond wildlife impacts on humans and also involves other conflicts such as those over resource-use, land-use or even animal welfare (Redpath et al., 2015a). For example, in many cases conservation rule-breaking, from illegal wildlife killing to resource use, has been identified as representing political protest or resistance to conservation (De Pourcq et al., 2017; Holmes, 2016).

The ultimate drivers of many conservation conflicts may be rooted in larger societal issues, such as poverty and inequality (Czech, 2008; Vedeld et al., 2012), imbalances of power (Raik et al., 2008) and inappropriate governance processes (Lute et al., 2018) (Table 1). However, the majority of interventions aimed at reducing conservation

* Corresponding author.
*E-mail addresses:* z.baynham-herd@ed.ac.uk (Z. Baynham-Herd), s.redpath@abdn.ac.uk (S. Redpath), nils.bunnefeld@stir.ac.uk (N. Bunnefeld), thomas.molony@ed.ac.uk (T. Molony), aidan.keane@ed.ac.uk (A. Keane).

https://doi.org/10.1016/j.biocon.2018.04.012
Received 22 January 2018; Received in revised form 29 March 2018; Accepted 8 April 2018

**Table 1**
A non-exhaustive and non-mutually exclusive list of different conflict drivers and associated frames presented in the literature, based upon our interpretation.

| Conflict drivers | Otherwise framed as |
|---|---|
| Wildlife impacts<br>Including livestock depredation or crop-raiding and/or human injury, with associated retaliatory killing or persecution of wildlife and/or active opposition to conservation efforts trying to prevent this. Similar conflicts surround proposed reintroductions, or predator management on recreational hunting estates. | Human-wildlife conflict (HWC), (Woodroffe et al., 2005) coexistence (Rust and Marker, 2014), human-wildlife relations/interactions (Pooley et al., 2016) stakeholder conflict (Redpath et al., 2015a) persecution (Whitfield et al., 2004), pest-control (Delibes-Mateos et al., 2013) |
| Resource-use and restrictions<br>Including unsustainable or illegal harvest of fauna and flora and associated efforts to prevent/reduce such harvest. This includes commercial activities (e.g. logging, fisheries, wildlife trade, recreational hunting) and non-commercial activities (e.g. subsistence hunting or foraging). | Natural resource related conflict (NRRC) (De Pourcq et al., 2017), Illegal wildlife trade (Nijman, 2010), logging, poaching, unsustainable use, encroachment (Mackenzie et al., 2012) fisheries management (Marzano et al., 2013), common-pool resource conflict (Adams et al., 2003) |
| Land-use decisions<br>Including protected area establishment, land-use change, relocations and/or associated loss of livelihoods, traditions identity. Associated behaviours may include "encroachment" and local (or international) opposition to conservation regulations and organisations | People-park conflict (Stern, 2008), environmental justice, indigenous rights, land-use conflict (West et al., 2006) |
| Conservation governance<br>Lack of transparency in decision-making process, lack of trust, unequal power dynamics, ineffective governance | Stakeholder conflict (Young et al., 2016), conservation governance (Lute et al., 2018; Peterson et al., 2005; Stern and Coleman, 2015), natural-resource management (Raik et al., 2008) |
| Development and economics<br>Including conflicts between poverty and/or economic growth and conservation, commercial or state-sanctioned development in "green" spaces or protected areas, and associated civic and organisational protest/opposition | Development conflict, Natural resource management, (Bockstael et al., 2016; Hopcraft et al., 2015), poverty traps (Vedeld et al., 2012), Environmental Kuznets Curve (Czech, 2008) |
| Clashing of values<br>Including animal-rights campaigns against lethal control, or trophy hunting. Also includes conflicts over different approaches, philosophies or ethics | Animal welfare (Crowley et al., 2017), human-human conflict (Redpath et al., 2015a), conservation values (Holmes et al., 2017), conflict over stakeholder participation (López-Bao et al., 2017) |

conflicts focus on the proximate human behaviours which impinge upon conservation interests (Schultz, 2011). These proximate behaviours are often referred to as behavioural "threats" (Salafsky et al., 2008) and interventions commonly target their proximate drivers. For instance, the retaliatory killing of wildlife is often addressed by attempts to reduce wildlife impacts (Nyhus, 2016), deforestation by stronger enforcement (Duffy et al., 2014) and active opposition to conservation by efforts to improve stakeholder trust (Young et al., 2016) – though other social outcomes may also be targeted independently of conservation.

Following Heberlein (2012), human behavioural interventions can be categorised into "technical", "cognitive" and "structural" fixes. Technical fixes attempt to change the external environment and commonly target wildlife impacts such as crop-raiding and livestock depredation. These may include the erection of fences, provision of deterrents, the encouragement of wildlife-friendly products or the diversionary feeding of wildlife (Nyhus, 2016; Sutherland et al., 2017). These interventions operate under the assumption that retaliatory killing of wildlife, or active opposition to conservation, is directly related to human-wildlife impacts (Pooley et al., 2016). Cognitive fixes instead attempt to change behaviour through information dissemination. Examples include conservation or livelihood education and conservation awareness campaigns (Baruch-Mordo et al., 2011; Holmes, 2003). Structural interventions attempt to change the context itself. Examples include financial instruments (such as incentives, insurance or compensation) or alternative livelihoods to reduce the physical or opportunity costs incurred by wildlife or conservation-related resource restrictions, or to discourage certain resource use (Kremen et al., 2000; Ravenelle and Nyhus, 2017). Likewise, structural fixes include the creation or enforcement of new rules aiming to increase compliance or discourage certain behaviours such as illegal resource use (Agrawal et al., 2014; Arias, 2015). Contrastingly, stakeholder engagement, mediation programmes and conflict transformation efforts are structural fixes which target the social dimensions of conflicts. These operate under a range of rationales, from engendering greater support for conservation, to championing environmental justice (Madden and McQuinn, 2014; Redpath et al., 2017).

Like other types of conservation, conflict interventions are expected to be more effective if they are informed by evidence – from scientific evidence (Sutherland et al., 2017) to local ecological knowledge (Sterling et al., 2017) – and underpinned by a valid Theory of Change (ToC) (Biggs et al., 2017; Margoluis et al., 2013), which describes the logical and ordered sequence of interventions, actions, perturbations and outcomes identified during the planning process (Qiu et al., 2018). However, the evidence underpinning interventions is often lacking (Eklund et al., 2017; Treves et al., 2016), and the extent to which recommended conflict interventions are supported by ToC has not been assessed. Nor has there has been much consideration of the reasons underpinning different conflict interventions.

The purpose of this review is to contribute towards informed conservation conflict management by exploring, across a range of conflict contexts globally, behavioural intervention recommendations as presented in peer-reviewed academic journal articles. We aim to scrutinize how the types of behavioural intervention recommendations differ across these contexts and to inform researchers and decision-makers, particularly those acting at the local scale. To generate a sample of conservation conflict case-studies and intervention recommendations for comparison, we conducted a sampled literature review, and analysed 100 recent articles from the published conservation literature related to conflicts. To identify the prevailing intervention types, we first developed conflict typologies from directed content analysis and then highlighted the most common intervention types recommended by authors in different contexts. To further understand why certain types of intervention are recommended in certain contexts, we explored associations between the recommended interventions, different behavioural threats and conflict frames. We hypothesised that authors who frame conflicts as primarily occurring between humans, would be more likely to recommend stakeholder-based interventions. As some conflict interventions, such as compensation (Ravenelle and Nyhus, 2017) and militarized enforcement (Duffy et al., 2014), appear to vary regionally, we also considered whether different types of interventions correlate with other geographical factors, such as the development status of nations and the conservation status of species and areas. To identify any possible gaps in the intervention evidence-base, we assessed the extent to which intervention recommendations are supported by scientific evidence and ToC. Lastly, we also estimated the proportion of articles that focus on other forms of evidence (e.g. stakeholder knowledge), and explored whether intervention recommendations and framing could be