



Review

Key factors driving attitudes towards large mammals in conflict with humans

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ARTICLE INFO

Article history:

Received 12 February 2014

Received in revised form 18 August 2014

Accepted 5 September 2014

Available online 1 October 2014

Keywords:

Carnivores

Conservation psychology

Elephant

Human–wildlife conflict

Meta-analysis

Primates

Tolerance

Ungulates

ABSTRACT

Biodiversity conflicts, and human–wildlife conflicts (HWC) in particular, are predicted to increase. Understanding drivers of these conflicts is a prerequisite for developing strategies to achieve conservation goals. People are a part of all HWC problems meaning social research methods are essential for finding solutions. We conducted a meta-analysis of the variables predicted to drive attitudes of people living in areas with damage causing carnivores, ungulates, elephants and primates so as to determine if common patterns of variables are present across a wide range of contexts. We categorized variables reported in publications into main and sub-categories and developed three indexes to describe relative frequency of category use, relative significance of categories and degree of accuracy between use and significance. From 45 suitable publications, 16 main categories and 17 sub-categories were identified. The majority of publications measured variables with a low likelihood of explaining drivers of HWC, or did not quantify variables of generally high utility. For example, only four categories (25%) were applied in over 50% of publications, and two thirds were mostly not significant in explaining attitudes. *Tangible costs* and *tangible benefits* thought to be the main drivers of attitudes were respectively, two and three times more non-significant than significant. *Intangible costs* however were the most important category to explain attitudes but was under represented in publications. *Intangible benefits* were mostly not important in explaining attitudes. *Costs* were more significant than *benefits* suggesting negative perceptions more strongly determine attitudes. Other important categories were exposure and experience with a species, stakeholder types and legal status of land. Socio-demographic variables commonly used in published studies such as gender, education and wealth, poorly explained attitudes. We conclude that greater conceptual clarity is urgently required to guide future attitude studies so that research can reliably inform the development of species management plans and policies.

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1. Introduction

Human–wildlife conflicts (HWC) are defined as occurring whenever an action by humans or wildlife has an adverse effect on the other (Conover, 2002). However since conflicts cannot occur between people and animals as animals cannot consciously engage in such conflicts (Peterson et al., 2010) suggestions have been made to define HWC more broadly and consisting of two components: (i) impacts that deal with direct interactions between humans and wildlife; and (ii) conflicts that centre on human interactions between those seeking to conserve species and those with other goals (i.e. biodiversity conflicts) (Redpath et al., 2013; Young et al., 2010).

Biodiversity conflicts and HWC are predicted to increase globally (Balmford et al., 2001; Henle et al., 2008; Pettigrew et al., 2012; Redpath et al., 2013) and pose a challenge for conservation managers, particularly in light of the rapid rate of biodiversity loss and the political consequences of failing to achieve Millennium Development Goals (Millennium Ecosystem Assessment, 2005). The drivers of these conflicts are well recognized (Balmford et al., 2001, 2012; Woodroffe et al., 2005; Young et al., 2010), however the solutions are less apparent and depend on disciplinary focus areas and the methods used within frameworks. For example ecologists and wildlife managers typically prioritize management of wildlife populations and their impacts using scientific knowledge and ecological principles rather than focusing on the human dimensions (Messmer, 2009; Young et al., 2010). They generally make three assumptions when managing HWC impacts: (i) the level of wildlife damage is directly related to the level of conflict, (ii) the level of conflict elicits a response proportional to the level of damage, (iii) mitigation activities appropriate to the level of conflict and damage will result in proportional support for conservation (Dickman, 2010). Under these assumptions, an obvious solution to HWC is to reduce the levels of damage through implementing technical mitigation measures, of which a wide variety exist (e.g. Breitenmoser et al., 2005; Lamarque et al., 2008; Linnell et al., 1996; Pettigrew et al., 2012). In contrast, a development paradigm that typically prioritizes human well-being highlights the costs associated with conserving biodiversity (Brockington, 2002; Neumann, 1998; Sundberg, 1998; West et al., 2006) and emphasizes solutions that primarily focus on increasing human well-being. More recently, inter-disciplinary and transdisciplinary approaches, which recognize the complexity of social–ecological systems (SES) (Berkes and Folke, 1998), have been proposed (Decker et al., 2012; Dickman, 2010; Messmer,

2009; Redpath et al., 2013; White et al., 2009). These approaches typically highlight the need to integrate ecological, economic and social perspectives using concepts and methods from a range of disciplines (e.g. conservation biology, anthropology, social psychology, economics and development studies). Within this approach effective solutions are not the preserve of any one discipline and focus equally on wildlife management as well as human dimensions.

Understanding the attitudes of stakeholders living in proximity to wildlife are recognized as essential for informing the design of wildlife management and HWC interventions (Decker et al., 2012; Manfredo et al., 2009). Attitudes can be defined as dispositions or tendencies to respond with some degree of favourableness, or not, to a psychological object, the psychological object being any discernable aspect of an individual's world, including an object, a person, an issue or a behaviour (Fishbein and Ajzen, 2010). The attitude construct is prominent in social psychology (Allport, 1935; Fiske and Taylor, 2013) as well as environmental psychology (Clayton, 2012; Heberlein, 2012), as the ability to evaluate one's environment is key to human existence. Without such evaluations we would be unable to make daily choices about how to behave (Fazio and Olson, 2012). Accordingly, the attitude concept has been at the centre of attempts to predict and explain human behaviour (Fishbein and Ajzen, 2010; Heberlein, 2012). Although attitudes do not always predict behaviour because an attitude seldom includes all the specific characteristics of a specific situation (Heberlein, 2012), positive attitudes towards an object or behaviour are necessary conditions for behaviour. For example, people who have a positive attitude towards hunting may not always partake in hunting but people with a negative attitude towards hunting will never hunt (Heberlein, 2012). In HWC attitude research provides insight on stakeholder preferences for diverse management options, indicate support for desired population sizes for a species, the extent of damage stakeholders are willing to tolerate and the desirability of different species on private or communal land (Kansky et al., 2014; Manfredo et al., 2009). With such information conservation managers can predict and design interventions more likely to be supported by stakeholders thereby preventing or reducing the emergence of potential conflicts. In addition, when the drivers of these preferences are understood, interventions can be more appropriately designed (Heberlein, 2012).

Although many HWC attitude studies have been conducted, most are site and species specific and no systematic quantitative reviews have been conducted which identify the drivers of attitudes across a broad range of species and societies (but see

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