



Stakeholder attitudes toward the incentives used to mitigate human-elephant conflict in southern Africa: A news media content analysis

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ABSTRACT

African elephant populations are under substantial anthropogenic pressure but these are not spatially homogeneous. Elephant densities are high in parts of southern Africa, leading to conflict with human populations. Conservationists working to mitigate impacts of human-elephant conflict (HEC) will turn to mechanisms or incentives to achieve this, mostly financial (such as compensation, or income generation through tourism). Little is known about the attitudes of stakeholders' (such as farmers) toward financial incentives used to mitigate conflict. Here we carried out a content analysis of stakeholder evaluative expression, or valence, using reports from the southern African news media. We sourced 428 separate news articles over the past ten years, and quantitatively assessed stakeholder valence on the financial mechanisms used to mitigate human-elephant conflict. We found that stakeholder attitudes or valence differed across countries and that stakeholders were generally positive, even with regard to controversial mechanisms such as trophy hunting. Our work has some implication for conservation policy.

1. Introduction

African bush elephant (*Loxodonta africana*) populations are in decline across much of the continent, as habitat loss and human-wildlife conflict are compounded by an unprecedented level of poaching (UNEP, CITES, IUCN, & TRAFFIC, 2013). For example, in 2011 alone ~40 000 elephants were killed as part of the illicit ivory trade (Wittemyer et al., 2014), while elephant populations are decreasing across Africa by 8% per annum (Chase et al., 2016). This decline is not spatially homogeneous: central and west African elephant populations have decreased markedly but many southern African subpopulations remain stable or are increasing (Wittemyer et al., 2014).

The localised high densities of elephants in conservation areas in southern Africa, and the consequences for tree community structure (Fisher et al., 2014) are broadly part of what is often referred to as the "elephant problem" (van Aarde & Jackson, 2007). One critical aspect of the elephant problem is the dispersal of animals outside of conservation areas (van Aarde & Jackson, 2007). Historically some elephants dispersed widely across the southern Africa landscape, in response to seasonal shifts in forage and surface water availability (see in Davison, 1977). Indeed, in present-day Hwange National Park in Zimbabwe, individual animals may disperse annu-

ally as far as 260 km away from the park (Tshipa et al., 2017). Elephants require the capacity to disperse following seasonal changes. Still, in the current anthropogenic landscape, the movement and foraging activities of dangerous megafauna will invariably lead to conflict with human populations. Further, some elephants reside outside of formally protected areas (Chase et al., 2016).

Conflict between wildlife and people occurs when "wildlife requirements encroach on those of human populations, with costs both to residents and wild animals..." (IUCN, 2005). Conflict between elephants and people, or human-elephant conflict (HEC) may take several forms, principally through crop depredation, livestock loss, infrastructure damage and human injury or fatality. HEC is a substantial problem in Africa; not only does it drive decline in elephant numbers through retributive killing, but it disrupts food supplies; imposes opportunity costs incurred through crop guarding; undermines livelihoods, and threatens human life (Shaffer, Khadka, Van den Hoek, & Naithani, 2019).

HEC can determine habitat use and movement by elephants, for example, key elephant habitat in Botswana may be only 30–50 km from human settlements (Roever, van Aarde, & Chase, 2013). Still, elephants will fail to use habitat where human densities are 15–20 people/km², or greater (Hoare & Du Toit, 1999). In Botswana, 80 % of elephant deaths occurred within 25 km of people

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(Roever et al., 2013). Large male elephants tend to be crop raiders, and some are repeat offenders, for example, in Amboseli, 12 % of raiders were habitual and accounted for 56 % of raids (Chiyo, Moss, Archie, Hollister-Smith, & Alberts, 2011). In a community adjacent to Meru National Park in Kenya, elephants raided over 140 farms over one year, and farmers lost crops valued at just over 140 000 USD (Sitienei, Jiwon, & Ngene, 2014).

The mitigation of HEC is obviously of much concern to conservationists and can be broken down into three categories: biological, physical, and governance-based (Hoare, 2015). Biological mitigation may include the removal (culling or translocation) of habitual crop-raiders and the use of deterrents, such as bees (Gordon, 2019; King, Lala, Nzumu, Mwambingu, & Douglas-Hamilton, 2017). Physical mitigation includes barrier fencing and olfactory repellents. Government-based mitigation includes direct compensation and community-based conservation measures. Typically, mitigation will use a combination of these, and community participation is key to success (Hoare, 2015).

Financial mechanisms and incentives may be used to mitigate HEC, principally through government-based approaches. Mechanisms may include direct compensation (Nyhus, Osofsky, Ferraro, Madden, & Fischer, 2005), and incentives may include income generation through photographic tourism and hunting (Taylor, 2009) or sales of meat and hides (Le Bel, Stansfield, La Grange, & Taylor, 2013). Some financial aspects of HEC mitigation are contested, such as hunting (Wanger, Traill, Cooney, Rhodes, & Tscharrntke, 2017) and ivory sales (Harvey, 2016). The southern African media drive some of this debate (Macdonald, Jacobsen, Burnham, Johnson, & Loveridge, 2016), which is significant not only because they have the capacity to shape societal opinion (Rust, 2015), but also because they reflect societal views or state policy where news is partly state-owned. Some insight into societal views in southern Africa and possible government policy on the financial mitigation of HEC may thus be derived from the African media.

Where scientists lack the capacity to survey numerous communities, then content analysis of the news media provides a useful alternative (Houston, Bruskotter, & Fan, 2010). Published attitudes of various stakeholders by the news media can be quantified as *valence*, viz. positive, neutral or negative attitudes toward different aspects of the conflict (Rust, 2015). Although stakeholder views on elephant management in Botswana were the subject of a previous study (Adams, Chase, Attard, & Leggett, 2016), to date there has been no quantitative assessment, through content analysis of the news media, of stakeholder discourse, or attitudes toward the financial mechanisms and incentives used to mitigate HEC. Such an analysis of public discourse across southern African states could be highly informative, given the variation in elephant densities across these countries (Thouless et al., 2016), as well as their different forms of land ownership and approaches to wildlife management.

Considering these differences, we hypothesised that 1) stakeholder attitudes or valence on HEC mitigation would be dissimilar between countries in southern Africa, and 2) stakeholder valence would potentially vary across different financial mechanisms or incentives used to mitigate HEC.

2. Methods

We defined stakeholders as those people affected by HEC or involved in the mitigation of HEC, as well as those people who may benefit from elephant conservation. We could not survey stakeholders ourselves, and so we developed an approach based on content analysis of the news media (Houston et al., 2010). We first sourced all available opinions, or attitudes expressed by stakeholders (in the news media) and then coded their valence toward HEC mitigation. The attitudes of stakeholders may be positive, negative, ambiguous

or neutral. By scoring these, we could then quantify both stakeholder valence across countries and financial incentives used to mitigate HEC. We elaborate further below.

2.1. Sampling design and data collection

Online newspapers were the principal data source. We limited our data collection to news platforms in Botswana, Namibia, South Africa and Zimbabwe only, given that these states commonly use English. We limited our sourced news articles to a ten-year period between 2009 to end 2019, given the likelihood of non-relevant policies before that period (Supplementary Fig. 1) and collated our dataset between late 2019 and February 2020. We use the terms financial 'mechanism' and 'incentive' interchangeably here, as both seek to mitigate HEC.

Content analysis of online newspapers was conducted (for example Rust, 2015), principally by assigning valence to stakeholder views. We chose content analysis because we aimed to objectively describe and analyse attitudes within the southern African media (Nandy & Sarvela, 1997). The approach is common in environment and wildlife studies with similar aims to those here (Houston et al., 2010; Jacobson, Langin, Carlton, & Kaid, 2012; Raghavan, 2008). Following a scoping literature review, we chose 29 keywords pertaining to HEC mitigation (see Supplementary Table 1). We used these keywords to browse relevant articles in the "search" engine on online news platforms. We read articles and discarded those considered irrelevant, for example when there was no mention of HEC or monetary mechanisms to mitigate HEC. Media articles authored by non-journalists, such as academics or conservation practitioners, were also considered. We only used free-access online articles and we selected articles from both the independent and state-owned news media.

Ultimately, we accessed 480 newspaper articles, of which we used 428. Newspapers included the Botswana *Mmegi*, The *Namibian*, and the Zimbabwean *Herald*. We provide a full list of these in Supplementary Material 2. All articles were read and coded by the lead author. We categorised data by the type of financial mechanism or incentive used to mitigate HEC (Supplementary Table 2) and the nine stakeholder types (Table 1) which included academics, farmers (both communal and commercial farmers were considered), government officials, professional hunters and the general public. We included general conservation NGOs and elephant NGOs (those specifically supporting elephant conservation) as stakeholders. The decision to split these groups was based on the premise that they may have different opinions on these matters. When no stakeholders were in-

Table 1

Frequency of stakeholder responses (and percent value) as used as sources in newspaper articles on financial mechanisms to mitigate HEC in Botswana, Namibia, South Africa and Zimbabwe.

Stakeholder group of respondents	Botswana	Namibia	South Africa	Zimbabwe
Academic	72 (25)	10 (3)	40 (18)	32 (10)
Conservation NGO's	27 (10)	64 (22)	52 (24)	37 (11)
Farmer/farming organisations	30 (11)	39 (13)	5 (2)	9 (3)
General public	5 (2)	3 (1)	8 (4)	28 (8)
Government officials	98 (35)	136 (47)	88 (40)	199 (60)
Hunter/hunting organisations	6 (2)	6 (2)	8 (4)	3 (1)
Journalist	34 (12)	17 (6)	10 (5)	11 (3)
NGO supporting elephants	3 (1)	9 (3)	4 (2)	0 (0)
Tourism operator	8 (3)	5 (2)	4 (2)	11 (3)

interviewed, the author's opinion was used and assigned recorded as 'journalist'.

Each article was assigned either one or multiple stakeholders, as well as one or multiple financial mechanisms. For example, an interview with a stakeholder that included the stakeholder's opinion on three different types of mechanisms was thus recorded as three datapoints (one for each mechanism). Valence was recorded, as was stakeholder type, mechanism, date of publication, news source and country.

2.2. Assessment of valence of frame

We classified a stakeholder's valence as positive, ambivalent, neutral, or negative. To elaborate, an example of positive valence with respect to the financial mechanism for mitigation of HEC is: *"ecotourism is an important solution to control human-elephant conflict"*. An example of an ambivalent valence is *"Botswana's government respectfully provides compensation to affected residents, but this compensation is often described as insufficient"*, while *"the compensation to farmers as a result of elephant damage is not viable"* would be a negative valence.

Although we analysed stakeholder valence, we could not account for possible bias within the media, given that journalists chose stakeholders to interview, and also selected the presentation of these views. We did note journalist valence (where expressed toward incentives) and have presented these in the Supplementary Material.

The third author tested the robustness of the results by independently classifying stakeholder valences in a subsample of 43 articles (10 %). The valence classifications were compared using Cohens weighted Kappa inter-rater reliability index, with the difference between positive and negative stakeholder valences being weighted as twice that of the difference between neutral and positive (or negative) valences (note that a single ambivalently classified valence was removed from this analysis: both raters provided the same assess-

ment and it could not be logically weighted relative to the other categories).

2.3. Statistical analysis

We used contingency tables to interpret valence of each mitigation incentive, and by different countries. Fisher's exact test was used to test whether valences were contingent on country (with Bonferroni correction to allow for multiple tests). We used the R computing language in R-Studio v. 4.02 (R-Core-Team, 2020) for all analyses. There were insufficient data to allow statistical analysis of valence on "conservancies".

3. Results

3.1. Stakeholders

In all four southern African countries, government representatives were the most referenced stakeholders, notably in Zimbabwe (Table 1). Academics were the second most referenced stakeholder in Botswana, while communal farmers were widely referenced in Zimbabwe. Conversely, Namibia and South Africa used conservation NGOs more often as sources of information after the government. Professional hunters and tourism operators were not widely cited as stakeholders, and farmers were relatively highly referenced as stakeholders in Namibia.

3.2. Financial incentives to mitigate HEC

Across southern Africa, the most frequently mentioned approach used to address HEC (through income generation) was trophy hunting (Supplementary Table 3). Most notably, it was highly topical in Botswana and widely discussed by stakeholders – mostly in a positive manner (Fig. 1). Income generation through photographic tourism was also commonly mentioned in Botswana, while in Namibia both trophy hunting and conservancies were topical (as a

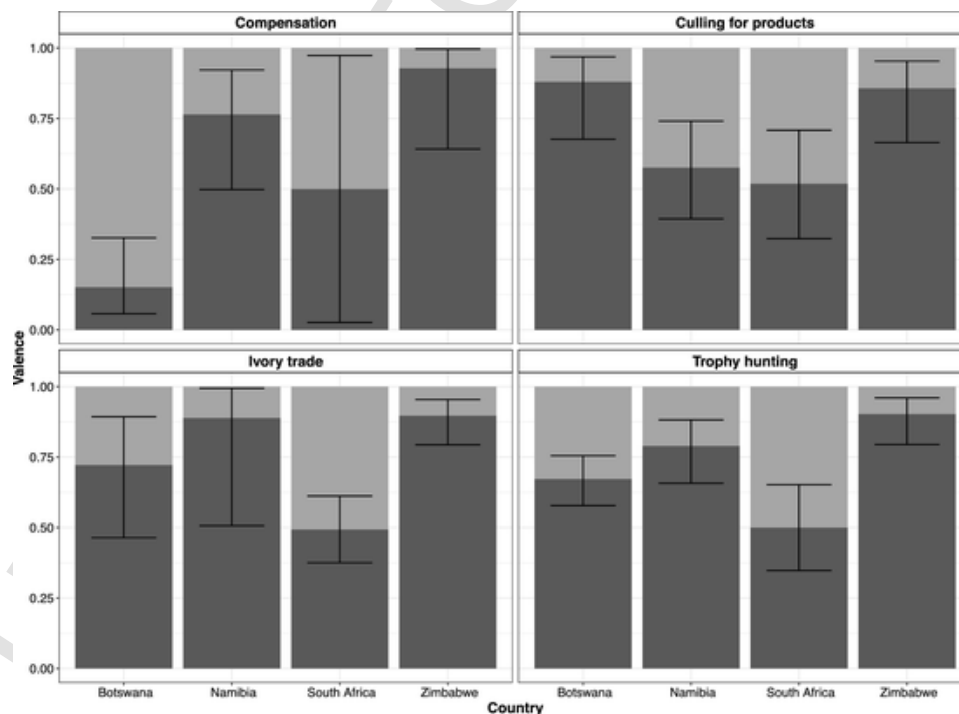


Fig. 1. Stakeholder valence (positive proportions as dark bars, lines represent corresponding 95 % confidence intervals calculated using continuity correction) across countries for the four significant financial mechanisms and incentives used to mitigate HEC, i.e., (a) compensation, (b) culling for products, (c) trade in unworked ivory and (d) trophy hunting. Only positive and negative valences are shown.

means of income generation). In South Africa, the regulated ivory trade was most frequently mentioned by stakeholders followed by trophy hunting and live elephant sales. Stakeholders in Zimbabwe most commonly cited ivory trade followed by trophy hunting and live elephant sales.

Across incentives, compensation and trophy hunting were mentioned almost twice as frequently in Botswana compared with the other three countries. Tourism was discussed more frequently in Botswana. Conservancies, fines and grants, were mentioned within the media in Namibia, while rarely mentioned in the other three countries. Live elephant sales were most frequently mentioned in the Zimbabwean media, while trade in ivory was mentioned most frequently in South Africa.

3.3. Proportion of positive or negative valence by state

Inter-rater reliability of classification was high, with Cohen's weighted kappa (\pm S.E.) found to be close to one: 0.980 ± 0.0199 ; indicating almost perfect agreement between the observers who independently classified the stakeholder valences.

We found that stakeholder valence for incentive was significantly contingent on country for four financial mechanisms after Bonferroni correction (see Table 2), namely compensation, culling, trade in ivory and trophy hunting. We further plotted these mechanisms (Fig. 1) where only the proportion of positive or negative valence was shown (across all stakeholders) by financial incentive, and by country. Opinions of stakeholders concerning direct compensation as a mechanism to mitigate HEC were markedly more negative in Botswana and South Africa relative to other countries (Fig. 1a). Conversely, stakeholders in Zimbabwe were almost entirely positive about this. Stakeholder valence in Botswana and Zimbabwe was mostly positive regarding the culling of elephants (which included subsequent meat allocation). In contrast, stakeholder valence on this topic was largely split in the Namibian and South African media (Fig. 1b). Use of monetary gains from the ivory trade as a mechanism to mitigate HEC was reported positively by stakeholders in all countries other than South Africa, where valence was more split (Fig. 1c). Notably, this pattern was duplicated for trophy hunting, which was also the most topical incentive with regard to HEC mitigation (Fig. 1d).

Farmers, government representatives, hunters and journalists showed strong positive valence towards trophy hunting when this was broken down by stakeholder, and across states (Supplementary Fig. 2). Academics were split, as were tourism operators, but there was no support among elephant-focused NGOs. These NGOs, the

general public and tourism operators, showed greatest support for direct compensation, with some help from farmers and government officials. Support for direct compensation was weaker among journalists, academics and conservation NGOs (Supplementary Fig. 2). Culling (which included meat provision) was not supported by tourism operators or professional hunters, but broadly supported by the public, farmers and government officials. The sale of ivory stockpiles was broadly supported by government officials, the public and tourism operators, but opposed by conservation NGOs and professional hunters (Supplementary Fig. 2). Some further breakdown of valence within countries has been provided in Supplementary Table 4.

4. Discussion

Our work provides useful insight into stakeholder attitudes toward the financial mechanisms and incentives used to mitigate HEC across southern Africa. The work is timely given the growing elephant numbers in many parts of southern Africa (Chase et al., 2016), and the "wicked problem" that this presents to wildlife management authorities (Owen-Smith, Slotow, Kerley, Van Aarde, & Page, 2006).

We obtained some interesting findings. First, African stakeholders are generally positive about contested monetary mechanisms and incentives such as ivory sales, culling and hunting (with some variance between countries). Stakeholders that are mostly positive about these incentives are the general public, communal farmers and government representatives. Stakeholder support for direct compensation (for damage through HEC) was divided. Second, trophy hunting is relatively more topical among stakeholders and within the media across southern Africa. Third, stakeholder valence in Zimbabwe is positive with regard to use of trophy hunting as an incentive to mitigate HEC, and this is the very country that generated the recent and ongoing debate around trophy hunting (Macdonald et al., 2016).

Of the significant financial incentives and mechanisms, three of these are controversial: culling (which included meat provision), ivory sales and hunting. All three were framed somewhat positively across southern Africa, with some variance (Fig. 1). Positive sentiment was notable in Botswana and Zimbabwe, but not South Africa or Namibia. This may be in part due to the high numbers of elephants in Botswana and Zimbabwe (Chase, et al., 2016), coupled with the relatively high likelihood of conflict given that many people in those countries live in rural areas (Hoare & Du Toit, 1999; Taylor, 2009). Culling may include the simple removal of a problem animal, which is a direct form of biological mitigation (Hoare, 2015). Alternatively, it may contain a financial component with opportunity for meat supplementation and the commercial sale of hides (Le Bel et al., 2013). The opportunities for meat may have determined, to some extent, the positive views of stakeholders in Botswana and Zimbabwe, and this may be why the public and communal farmers support culling. Elephants are not widely distributed across South Africa, and the populace there is mostly urban-based. So, culling may be perceived negatively by stakeholders who don't incur the costs of HEC.

The term "ivory sales" is used here to refer to the potential international trade in government-registered stockpiled ivory, through the Convention on International Trade in Endangered Species (CITES). This is currently prohibited, and the last sale (in 2009) was that of stockpiles from Botswana, Namibia, South Africa and Zimbabwe to China and Japan (Stiles, 2008). Southern African countries have large stores of ivory, and the substantial funds generated from the sale of these would ostensibly be used for conservation. The trade in animals and animal products remains a key threat to species, and regulation in this trade is why CITES was founded. Nevertheless, the listing of African elephant under CITES has made little

Table 2

Tests of the contingencies of valence about incentive on country. P-values were obtained from Fisher's exact tests, with significance determined at a Bonferroni-corrected 5% significance level i.e., $*p < 0.005$.

Incentive	p-value (df = 9)
Conservancies	N/A
Compensation	<0.00001*
Culling for products	0.00103*
Diversification of incomes	0.06715
Fines	0.25000
Grants	0.30556
Ivory trade	<0.00001*
Sell live elephants	0.05736
Trophy hunting	0.00007*
Tourism	0.01009
Other	0.39991

or no difference to very high levels of poaching in recent years (Challender, Harrop, & MacMillan, 2015), nor has the one-off sale of ivory (in 2009) led to reduced demand for this illegal product. There are valid concerns that corruption will undermine any attempt at legalised trade in ivory (Bennett, 2015). Nonetheless, the support among stakeholders for ivory sales may be due to the possible release of substantial funds, which may then be used to mitigate HEC.

It is interesting to note that trophy hunting was topical in the media. Some of this may be linked to the hunting ban, and subsequent suspension of the ban in Botswana, which became politicised (Mmeso, 2019). Attitudes were expressed positively by stakeholders, with South Africa again being the outlier (Fig. 1). For some time, trophy hunting has been used to mitigate HEC through the generation of funds (Taylor, 2009). It is generally supported by impoverished communities living alongside wildlife (Angula et al., 2018), although communities may also be opposed to hunting, where concessions lead to conflict over access (Jew & Bonnington, 2011). Trophy hunting has become a contested form of wildlife management in recent times (Macdonald et al., 2016), and arguments for-and-against the practice have been widely discussed (Di Minin, Leader-Williams, & Bradshaw, 2016; Ripple, Newsome, & Kerley, 2016). Some conservationists argue in favour of the potential for income generation and use of marginal land through hunting (Dickman, Cooney, Johnson, Louis, & Roe, 2019; Lindsey, Roulet, & Romanach, 2007). While other conservationists indicate that funds do not always go back into conservation (Nelson, Lindsey, & Balme, 2013) and point out the potential for loss of genetic diversity and localised extinction events (Packer et al., 2011). Trophy hunting alone will not fund Africa's vast conservation areas, and the debate provides a distraction from the main question of how these will be financed in the future (Lindsey, Balme, Funston, Henschel, & Hunter, 2016).

There has been some concern recently that the hunting debate does not appear to account for African views (Mkono, 2019; Wanger, Tschardtke, Uiseb, & Traill, 2019). Calls for bans may not consider the rights, or opinions of impoverished communities who incur the costs of human-wildlife conflict, and African wildlife management authorities have pleaded that they are the decision-makers with regard to hunting (Chaukura, Sata, Lubilo, & Nathing, 2019). Frustrations borne from being overlooked by the west, as well as a desire to maintain the funds generated by hunting of elephant may explain why this practice is perceived positively by stakeholders across southern Africa that experience HEC (Fig. 1), and why the general public, communal farmers and government officials support trophy hunting (Supplementary Fig. 2). Hunting can also provide meat (Le Bel et al., 2013), and the value of this to poor communities, which may be protein-deprived, cannot be overlooked. There is little support for this in South Africa, but elephants are not widespread in that country (Thouless et al., 2016), and stakeholders may be relatively unconcerned about HEC. South Africa has a predominately urban-based populace and this, coupled with a vibrant civil society, may be why there is more diversity of opinion regards hunting. Moreover, recent opposition towards "canned hunting" in South Africa may be driving negative perceptions (Schroeder, 2018).

Direct compensation for damage incurred through HEC was not perceived positively by stakeholders in Botswana or South Africa. The sample size was fairly small, but perhaps a perceived loss of autonomy in decision making may have driven this, as funds for compensation may come from sources outside of communities. Government officials may be mindful of the potential for false claims with respect to elephant damage. The mechanism was framed positively in Zimbabwe, notably, as two out of five newspapers used were

state-owned, and relatively few farmers were interviewed in the articles (Supplementary Table 5). There is no doubt compensation will continue to play an important role as a direct financial mechanism to mitigate HEC (Hoare, 2015).

Of the financial mechanisms and incentives used to mitigate HEC, diversification of incomes, culling for products, live elephant sales, and funds through tourism were not significant (Table 2). However, these were framed positively by the media through stakeholder interviews. There was relatively little support in South Africa for live elephant sales or culling, but this was framed somewhat positively in other African states. Again, countries with a widespread rural populace that may experience elevated levels of HEC may be supportive of measures perceived negatively outside of these countries.

There was underreporting by the media on the use of fines and grants to mitigate HEC (Supplementary Table 4). This could arise because they are overridden by more topical debates like trophy hunting. A previous study has shown that the use of fines can cause locals to perceive elephants negatively (Kamau, 2017). In contrast, grants could help local communities implement defences against HEC (Hoare, 2012).

Conservancies were only widely mentioned in the Namibian media. There has been some contestation around land ownership and access rights with regards to these conservancies, particularly in Zimbabwe (Muboko & Murindagomo, 2014). Nonetheless, conservancies have proved to be successful in elephant conservation (Druce, Pretorius, & Slotow, 2008; Selier, Slotow, & Di Minin, 2015).

A further non-monetary coexistence scheme is being attempted through current Trans-Frontier programs. These aim to facilitate animal dispersal across states, and reduce conflict through corridor creation (Stoldt, Göttert, Mann, & Zeller, 2020), and appear to be an optimal strategy for elephant conservation (Di Minin et al., 2013; Galanti, Preatoni, Martinoli, Wauter, & Tosi, 2006).

As a caveat on our work, we could not account for any bias inherent within the media, as the journalists themselves selected stakeholders for interviews and also selected which stakeholder views were published. Public opinion is, however, both shaped and reflected through the media (Bengston, Potts, Fan, & Goetz, 2005). Hence our study, even though only a small sample of all the media in southern Africa, does provide some insight into views that are aligned with African stakeholder views on topical issues such as culling and hunting.

A further caveat is that we were restricted to English language papers and free online news articles, and so the work is not exhaustive or entirely representative. Nonetheless, English is widely spoken across southern Africa, except for Mozambique, which was not included in the study. Moreover, most journalists would have been able to interview stakeholders in the regional Indigenous language, such as Shona in Mashonaland (Zimbabwe).

Our study may further provide a useful starting point for use of algorithms that track online sentiment about HEC expressed by the media across African countries (Fink, Hausmann, & Di Minin, 2020). There is increasing use of this automated approach to identify photographic images and text concerning human-nature relations for example (Di Minin, Fink, Tenkanen, & Hiippala, 2018).

In summary, our work provides useful insights into the thinking of stakeholders in southern Africa with regards to financial incentives and mechanisms used to mitigate HEC. The work provides potential insights into government decision making, given the dominance of state-owned media in countries like Zimbabwe. Our work does indicate that contested measures are not perceived negatively in African states that experience high levels of HEC, such as Botswana and Zimbabwe. Our data also suggest that the general public and government are supportive of these measures. Conserva-

tion policymakers may need to consider these views in future decision-making with regard to HEC in southern Africa.

Disclosure statement

We did not receive any funding for this work. We abided by the Journal for Nature Conservation guidelines on ethical standards. No study animals or human subjects were surveyed or interviewed. There were no competing or conflicting interests.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.jnc.2021.125982>.

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