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Opportunities and challenges of human–python conflict intervention in local communities adjacent to Nyanga National Park, Zimbabwe

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Abstract

Conservation of wildlife often results in the protection of endangered species, like the Southern African python (*Python natalensis*). However, wildlife tends to occur both in protected areas and human settlements and the latter results in human–wildlife conflict (HWC). Often when the species involved threaten human life and/or livestock, wildlife authorities react through Problem Animal Control (PAC). The successes and challenges of this practice often vary. We present opportunities and challenges in the practical interventions to minimize human–python conflict by the Zimbabwe Parks and Wildlife Management Authority (ZPWMA) in communities adjacent to Nyanga National Park (NNP). We draw on station reports and reactions of human–python conflicts (2013–2020), our involvement with communities when human–python interactions occur, and discussions with stakeholders, extension officers, and wildlife rangers and managers responsible for coordinating PAC programs. We observed that the number of human–python conflict reports have decreased in the past 5 years. Furthermore, ZPWMA's efforts to resolve HWC through PAC reactions in concert with education and awareness, as well as collaborating with stakeholders, contributed to addressing the conflict. We propose four key action areas to strengthen intervention plans and procedures. The action areas involve (i) establishing the population and distribution structure of *P. natalensis*, (ii) evaluation of successes of capture and release, (iii) establishing the link between python age and involvement in human–python conflicts, and (iv) assessing community perceptions towards human–python conflict reports and interventions by the ZPWMA.

KEYWORDS

human–wildlife conflict, human–python coexistence, Problem Animal Control, wildlife conservation

Wildlife populations often increase as a result of effective conservation strategies, especially in protected areas and adjacent wildlife dispersal areas (Geldmann et al., 2018). Despite this, some wildlife species can pose a threat to adjacent communities (Tyrrell et al., 2017). Human–wildlife conflicts (HWCs) often occur when such threats affect human lives and livelihoods. In response, wildlife may face human threats such as retaliatory killing and poaching as some communities consider wildlife a threat to their livestock (Matseketsa et al., 2019). The Southern African (*Python natalensis*) hereafter python, has been implicated in numerous HWC incidents in Zimbabwe. The species is listed locally as specially protected due to its vulnerability to human exploitation (Parks and Wildlife Act Chapter 20:14 of Zimbabwe). This listing aids in protecting the species from illegal trade, persecution, and retaliatory killings after a human–python conflict.

Wildlife managers and rangers have been instrumental in intervening in HWC conflicts through Problem Animal Control (PAC; Gandiwa et al., 2012). PAC is a process whereby wildlife officers and rangers react to reports of wildlife threatening human life, destroying crops, and killing livestock in communities and households to protect both human life and wildlife as guided by the Parks and Wildlife Act. PAC has often been coupled with community awareness outreach programs to impart knowledge on how communities can react to HWC events and best practices to adapt and coexist with wildlife. PAC has been one of the key conservation practices carried out by the Zimbabwe Parks and Wildlife Management Authority (ZPWMA), especially in Nyanga National Park (NNP). Methods used for PAC include invasive practices such as poisoning, shooting or scaring (Gandiwa et al., 2012). However, among the species listed as problem animals and protected by law, invasive control methods are not usually advisable, instead, capture and releasing back into protected areas has often been employed in human–python conflicts.

In the past decade, there was an alarming increase in human–python conflict in communities around NNP. The increase in the number of settlers adjacent to the park manifests as a potential threat to python population and other wildlife that constitute their prey base. Human life, community livelihoods and wildlife conservation are crucial to consider. Thus, strategies were put in place to strengthen PAC reactions and community awareness programs. We assessed the opportunities and challenges of human–python conflict interventions in communities adjacent to NNP, Zimbabwe (Figure S1).

Observations show that the number of human–python conflict incidents has fluctuated during the period 2013–2020 (Figure S2). A total of 123 incidents were recorded during the period between 2013 and 2020 (8 years). Most of the incidents were recorded during the period 2013–2015 (Figure S2). Thereafter, the numbers decreased for 5 years up to the year 2020. Most reports were received when a python was found attempting and/or in the process of killing livestock (Figure S3).

The period before 2015 was mostly associated with loss of livestock from communities due to python attacks especially goats (44%; Figure S4). This period was associated with increased killing of pythons by communities in attempts to protect their livestock. Although reports say the main purpose was just to protect livestock, there were indications from stakeholders and community members which show that most killings were due to persecution of snakes in general, retaliatory killings and lack of awareness on the ecological role and conservation of pythons in some communities.

A decline in the number of reports which came during the post-2015 period, could be due to a decrease in the number of python killings and people calling the ZPWMA staff for PAC as a result of numerous reasons. Possible reasons include decline in demand and market value of python meat and fat in illegal markets, or decreased local populations of pythons. However, indications from field staff attributes that to improvements in the following areas:

a. Strengthening of PAC response units—Human–python conflict interventions were upscaled through improving ranger welfare and training, increasing the number of staff dedicated to PAC reactions, provision of resources such as vehicles and fuels to mobilize support.
b. Improved environmental awareness programs to communities—Each PAC reaction was coupled with education and awareness programs that were delivered to affected communities. This was mostly prioritized during the wet season which is commonly associated with most human–python conflict incidents (Figure S5). Topics covered during awareness programs focused on methods of strengthening livestock security, python behavior, and how to adapt and coexist with them as they traverse across human settlements, growing of snake deterring plants, and the benefits of conserving pythons.
c. Collaborations with stakeholders and law enforcement agents—The involvement of stakeholders such as the Zimbabwe Republic Police (ZRP) and Rural District Council (RDC) facilitated improved communication strategies and prompt reaction to human–python conflict reports. The main advantage of these improvements is that communities now have a different perspective of python and no longer report every python found traversing through their settlements,

instead, they now have mechanisms to avoid and deter pythons from their homesteads and secure their livestock. Should there be a python threatening livestock or human life, existing systems of communication now allow prompt reaction through stakeholder support and local authorities.

The post-2015 period showed that wildlife authorities play a pivotal role in addressing human–python conflict. However, other factors that may impede consistency in their operations cannot be overlooked. Rangers react to human–python conflict reports in some constrained environments where proper equipment or transportation can be scarce. Additionally, capture and release of pythons into protected areas is the common practice which is conducted by rangers (Figure S6), however, researchers find it difficult to assess and monitor the success of release programs due to a lack of tracking and monitoring resources. Studies have reported that translocated snakes have low to very low survival rates compared to non-translocated snakes and that moving a snake drastically reduces its chance of survival (Wolfe et al., 2018). On the other hand, some studies argue that if the snake is not removed from human settlements, it has a 100% chance of dying because humans will kill it (Plummer & Mills, 2000). While it is crucial to assess survival rates of translocated pythons against leaving pythons in communal areas, current practices are based on the assumption that capture and release exercises of pythons are often successful without paying attention to the aftermath of the operation.

To ensure sustainable conservation of python we propose the following key action areas:

1. Establish the population of python in a protected area—While we acknowledge that it is difficult to arrive at an estimate of the population of pythons, we suggest establishing mechanisms that can gather long-term data on the population and spatial distribution of python.
2. Evaluate the effectiveness of capture and release—There is a need to acquire resources (a minimum of 10 radio tracks) to investigate the capture and release success of pythons through tracking and constant monitoring of released individuals. Guidance of researchers in the identification of release sites is crucial as the procedure is currently being done at rangers' discretion.
3. Establish the link between python age/size and involvement in the human–python conflict—Pictures provided (Figure S6) show large sizes (approximately

FIGURE 1 Communities posing for a picture with a python after a successful reaction and capture by Zimbabwe Parks and Wildlife Management Authority (ZPWMA) staff

3.2 m) of python captured. However, actual length and weight data were not being captured. The lengths of python need to be captured in future to establish the link between length and/or age of python commonly involved in human–python conflicts.

4. Assess community perceptions on human–python conflict intervention—Although communities seem to be happy with successful PAC reactions and python captures (Figure 1), there is a paucity of detailed information on perceptions of the affected communities with regards to human–python conflict reporting and interventions. An assessment of community perception towards that should be carried out to ensure more success.

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CONFLICT OF INTEREST

The authors declare that there exists no competing financial interests or personal relationships that could have appeared to influence the work reported in this study.

AUTHOR CONTRIBUTIONS

Kundai R. Dube and Blessing Kavhu conceived the idea and designed methodology; Kundai R. Dube collected the data, Kundai R. Dube and Blessing Kavhu analyzed the data; Kundai R. Dube and Blessing Kavhu led the writing of the manuscript. All authors contributed critically to the drafts and gave final approval for publication.

DATA AVAILABILITY STATEMENT

Interview responses cannot be made public due to agreed procedures under the ethical conditions provided for this research (ZIMPARKS research policy).

ETHICS STATEMENT

The research presented in this article was approved by the directorate at the authors' organization.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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