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# Ranger perceptions of the role of local communities in providing actionable information on wildlife crime

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**Abstract**

Wildlife crime in protected areas remains a major challenge to conservation. However, little is known about the role of local communities in providing information on illegal activities to help improve law enforcement efforts in protected areas. As an initial exploration of this complex topic, we aimed to understand the perceptions of law enforcement authorities working directly with local communities on the conditions under which local people provide information to park rangers, using Murchison Falls Protected Area in Uganda as a case study. We used semi-structured interviews and questionnaires to understand the perceptions of staff from the Uganda Wildlife Authority and nongovernmental organizations. There was consensus among participants that people who provide information are those who have trusted relationships with rangers; interact regularly with community outreach rangers (either formally through community programs or informal socializing); and believe that the protected area benefits them and their community. All respondents believed that information provided by local people can enable the success of wildlife crime investigations, but that associated ethical issues must be addressed. This study indicates that engaging communities in protected area conservation is crucial for law enforcement efforts to be effective in addressing wildlife crime.

**KEYWORDS**
bushmeat, community engagement, conservation criminology, environmental crime, informants, law enforcement, Murchison Falls National Park, poaching, protected areas, Uganda

## 1 | INTRODUCTION

Wildlife crime, including the illegal exploitation and trade of wildlife, remains a major challenge for protected area (PA) managers, and neighboring local communities, especially as PAs are often surrounded by rapidly growing human populations and acute poverty (Craigie et al., 2010; Dudley, Stolton, & Elliott, 2013). While law enforcement in PAs is essential for tackling wildlife crime (Moore et al., 2017; Tranquilli et al., 2014), traditional approaches using trained park guards are expensive and not always effective (Plumptre et al., 2014). The most extreme forms of law enforcement, often termed "militarized approaches," can be associated with shoot-to-kill policies, and increased use of technology, which in turn can have collateral and negative impacts on neighboring

rural communities, especially when local people are caught in the crossfire (Challender & MacMillan, 2014; Duffy et al., 2019). Traditional antipoaching law enforcement approaches thus often create hostility between wildlife authorities and communities that can last for decades (Annecke & Masubelele, 2016; Duffy & St John, 2013). For these reasons, there is increasing international momentum to establish more effective antipoaching law enforcement policies that involve and support local communities (e.g., Cooney et al., 2017; Gaodirelwe, Masunga, & Motsholapheko, 2020; Roe & Booker, 2019; IIED and IUCN-SULi, 2019; Skinner, Vishwanath, Dublin, Niskanen, & Roe, 2019).

One way to improve the effectiveness of antipoaching patrols in PAs is by collecting information to inform where park guards should focus their efforts (Fang et al., 2017; Linkie et al., 2015; Moreto, 2015), given that patrols have limited opportunity to detect offenders (Critchlow et al., 2017; Moreto & Lemieux, 2015). The use of community-based information, both paid informants and information that is volunteered, is a widespread element of criminal investigations within law enforcement and intelligence communities (Billingsley, Nemitz, & Bean, 2013). However, offering incentives for reporting information, such as money, or prosecutorial or judicial leniency, is controversial as it can lead to officer misconduct, and may encourage people to report crimes that never occurred or lie about the details for their own benefit (e.g., Boydell, 2017; Dunnighan & Norris, 1999; Harfield, 2012; Turcotte, 2008). Moreover, motivations for reporting crimes can also include revenge or a desire to put competitors out of action, as well as a sense of civic duty, and a desire to work alongside law enforcement (Dabney & Tewksbury, 2016).

In the context of conservation, engaging local communities has been predicted to increase their reports of wildlife crime offenses to PA authorities (UWA, 2017), with a previous study finding that rangers in Uganda often believe information is generated through informal socializing with communities (Moreto, Cowan, & Burton, 2017). However, there has been little research on the role of local communities in providing information on wildlife crime, especially whether conservation outreach programs in communities around PAs encourage local people to provide information, or the ethical issues that arise when local people do report wildlife crime. Consequently, there is a lack of understanding of whether and how to engage local people in providing actionable information. This knowledge gap greatly limits the capacity of wildlife authorities to improve their community engagement approaches for tackling wildlife crime and highlights a critical need for more strategic approaches to planning and undertaking community outreach.

To that end, we explored the perceptions of staff from the Uganda Wildlife Authority (UWA) and its nongovernmental organization (NGO) partners on the conditions under which local communities provide information to rangers on wildlife crime in Uganda. UWA is responsible for managing the country's PA estate and has a tourism revenue sharing scheme, whereby 20% of PA entrance fees support livelihood projects for park-adjacent parishes. UWA rangers in their Community Conservation Unit (hereafter referred to as community outreach rangers) undertake outreach work with communities to strengthen local support for PAs. This includes implementing awareness-raising programs, including speaking on a local radio talk-show; resolving human-wildlife conflict; and facilitating collaborative management so community members can access resources such as water, firewood, medicinal plants, and beehive sites within PAs, under a Memorandum of Understanding (UWA, 2018). UWA and its partners also provide training and equipment for local community members to volunteer as "wildlife scouts," who respond to human-wildlife conflicts. Some of UWA's community programs have been shown to improve park-community relations (e.g., Sandbrook, Cavanag, & Tumusiime, 2018; Travers et al., 2019). However, efforts to understand the role of local communities in reporting information to support law enforcement in PAs have been limited. We aimed to understand perceptions of staff from UWA and NGOs on the factors that influence local communities to provide information on wildlife crimes, and who is involved in this exchange of information.

## 2 | METHODS

### 2.1 | Study site

Murchison Falls National Park is the largest of Uganda's 10 national parks, covering 3,840 km² (Figure 1). It is contiguous with Karuma and Bugungu Wildlife Reserves, which are collectively referred to as Murchison Falls Protected Area (MFPA). MFPA has a tropical climate and experiences its heaviest rainfalls during two wet seasons (March to May and August to November). The months from December to February are the driest. Poachers from communities neighboring MFPA primarily hunt for bushmeat (Hill, 2018; UWA, 2017). The prevalence of wildlife crime in Uganda (Harrison et al. 2015) and MFPA make it an excellent case study for exploring ranger perceptions on information on wildlife crime provided by local communities. The research team also had existing relationships with UWA and NGO staff, which addressed some of the methodological challenges associated with researching this sensitive topic, including
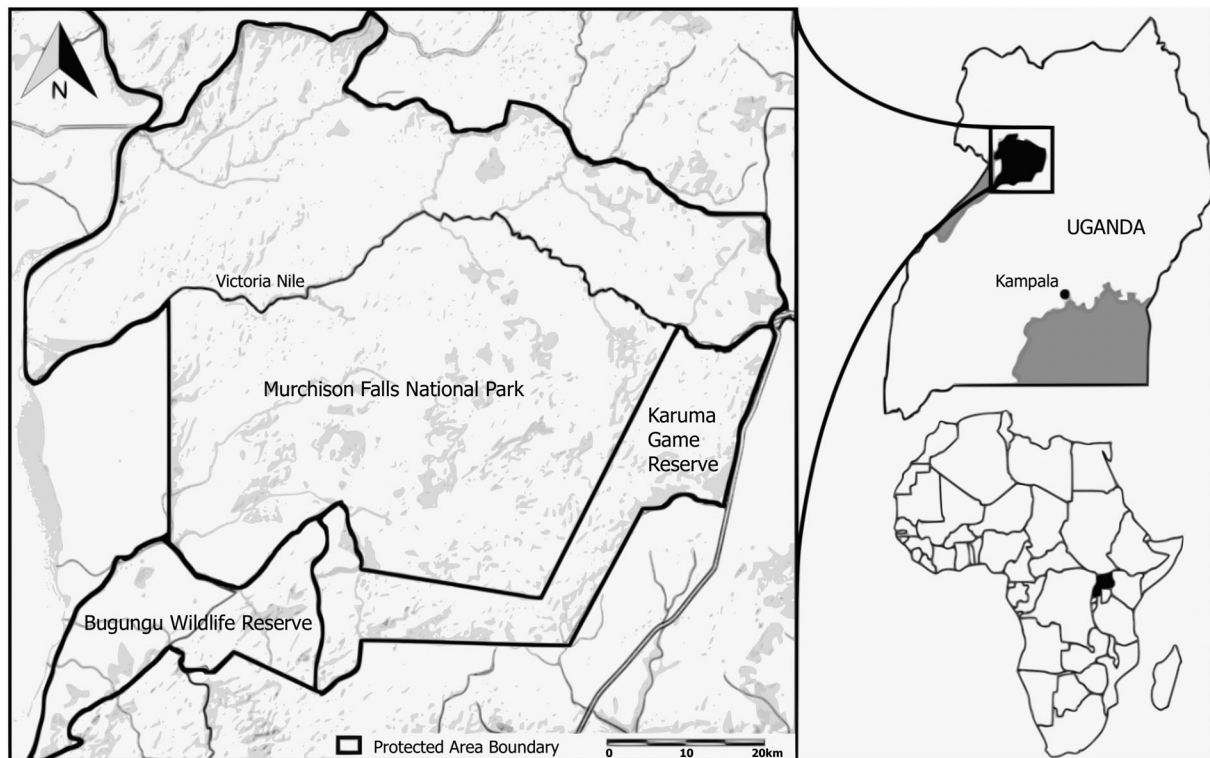
**FIGURE 1** Murchison Falls Protected Area in Uganda (including Murchison Falls National Park, Karuma Game Reserve and Bugungu Wildlife Reserve)

recruiting and establishing rapport with participants (Elmir, Schmied, Jackson, & Wilkes, 2011).

## 2.2 | Data collection and analysis

Data were collected in June and July 2018. We used purposeful, nonrandom sampling (Newing, 2010) to identify the most information-rich key-informants from UWA and NGOs at both headquarters and MFPA. Individuals were identified through existing knowledge of the research team and preliminary meetings before starting fieldwork.

In total, we conducted 30 in-depth semi-structured interviews to gather perceptions on who primarily provides and receives information on wildlife crimes, which factors motivate and discourage local communities to provide information, and the conditions under which local people provide information. We excluded informants formally hired by UWA to provide information, instead focusing on anecdotal and voluntary information reported by local communities to UWA staff, as we aimed to address this key knowledge gap. Ethical approval for this study was granted by the School of Anthropology and Conservation Research and Research Ethics Committee, University of Kent.

We interviewed staff from UWA, the Uganda Conservation Foundation, the Uganda Wildlife Conservation Society, the African Wildlife Foundation, the Natural Resource Conservation Network, the Jane Goodall Institute, and an independent contractor. Staff from these organizations were sampled because every individual interviewed has previously received community information on wildlife crimes; has worked extensively on Ugandan wildlife conservation and with UWA; and their responses provided a wider context from which to understand the relationship between UWA and local communities. The UWA staff interviewed included staff at UWA's Kampala headquarters to explore information sources at all of Uganda's PAs, and at MFPA (community outreach, law enforcement, and intelligence) to explore the situation specific to MFPA. The numbers of individuals interviewed from each organization have been omitted to protect the anonymity of study participants.

We developed one set of interview questions, then adapted these to ensure our questions were specific to an individual's role and experiences. MFPA staff also completed a questionnaire to assess their perceptions further, as they directly interact with and receive information from local communities. Our questionnaire design used Likert-type scale, dichotomous questions, and ranking questions (Newing, 2010). The interview and questionnaire responses were triangulated as a validation strategy (Flick, 2004) and to provide a central narrative about perceptions on local communities who provide information on wildlife crime at

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MFPA and more broadly within Uganda. Between-method triangulation also allowed us to capture different aspects of the same issue (Flick, 2004; e.g., rangers were able to provide a concrete ranked list of all community sources of information in the questionnaire, as well as orally explain the placement of each item and elaborate with examples through the semi-structured interviews). A sample set of interview questions and questionnaire are included in the Supporting Information.

As the aims of this study were exploratory, themes were generated based on a preliminary assessment of the content of the interview transcripts, with no predefined concepts of what to look for (Charmaz, 2006). We used QSR NVivo11, a qualitative data analysis software package, to identify the main patterns emerging from the interviews for thematic analysis (Newing, 2010). We first analyzed interviews through initial/open coding to identify emergent ideas in the data (Saldaña, 2015; Strauss & Corbin, 1998). These were labeled with nodes in NVivo, and the full transcripts were examined to group opinions on the same topics. All opinions on the same topic were combined where possible for descriptive analysis. We assigned multiple codes to responses if answers addressed several themes. We then used focused coding to label similarly coded data (e.g., from "poacher retaliation" and "community stigmatization," the code "fear as a preventing factor" emerged; Saldaña, 2015; Strauss & Corbin, 1998). We then used axial coding (Saldaña, 2015; Strauss & Corbin, 1998) to identify relationships between the themes that emerged (e.g., to connect "timely human-wildlife conflict interventions" to "rangers perceived as trustworthy"). Lastly, we used theoretical coding to construct our central narrative on the provision of information by local communities for wildlife crime enforcement. Results are presented with quotations and in descriptive terms to show the trends in viewpoints.

The results solely reflect the beliefs and perceptions of individuals working for UWA and NGOs as an initial exploration into this topic. The small sample size reflected the logistical constraints of interviewing rangers around MFPA. We considered it large enough for data saturation to occur, in that new interviews ceased to generate new information and no further coding was possible (Fusch & Ness, 2015).

# 3 | RESULTS

## 3.1 | Which wildlife crimes do local communities report information on?

All questionnaire respondents stated that bushmeat hunting was the most common wildlife crime that local

people provided information on. This bushmeat hunting was for both commercial purposes (i.e., selling meat to local traders) and for subsistence (i.e., domestic use). One interviewee stated that, because their organization investigates high-value wildlife crime, they primarily sought and received information on such high-value crimes (e.g., trafficking of ivory, pangolin scales, live pangolins, and big cat trophies). Rangers in MFPA stated that local people were less likely to report high-value crimes, but occasionally provided information on people hunting animals for hides, horns, and claws for "witchcraft," and on illegal possession of wildlife and trophies. Rangers also reported receiving information from local people on other environmental crimes including illegal charcoal burning, cattle grazing, timber harvesting, collecting non-timber forest products, and habitat encroachment. Rangers' responses indicated that the frequency of reporting information on each wildlife crime differed between geographic areas around MFPA and the neighboring communities.

## 3.2 | What time of year is information most likely to be reported?

Rangers believed that as poaching increased, so did the frequency of reporting. They described receiving more information on wildlife crime from local people during the dry season (Figure 2) when, according to them, hunting was more frequent because people were less occupied with farming and wanted to supplement their diet and income with bushmeat. Furthermore, the grass was shorter, enabling increased visibility of people entering the park. Around MFPA, major festive events such as Christmas coincide with the dry season. Rangers explained that these events increased poaching because people poached to supply meat for celebrations and to sell at local markets so that they could buy gifts for relatives. Eighty percent of questionnaire respondents said that they received information at least a few times a week during periods immediately before festive events (Figure 2). During the wet season, only 67% said that they received information at this frequency. However, one respondent in a supervisory role explained that they personally received information less than once a month in the dry and festive seasons, yet monthly in the wet season, because they lacked motivation to visit communities in extremely hot weather. Some interviewees believed that poaching (and therefore reporting), increased in the weeks approaching deadlines for local people to pay school fees, so the profits obtained could cover their children' tuition.

**FIGURE 2** The proportion of questionnaire respondents who ranked how often they receive information reports on wildlife crime based on a 5-point ranking-scale (daily, a few times a week, a few times a month, monthly, or less than once a month) during the following times of the year: the dry season, wet season, and leading up to festive seasons
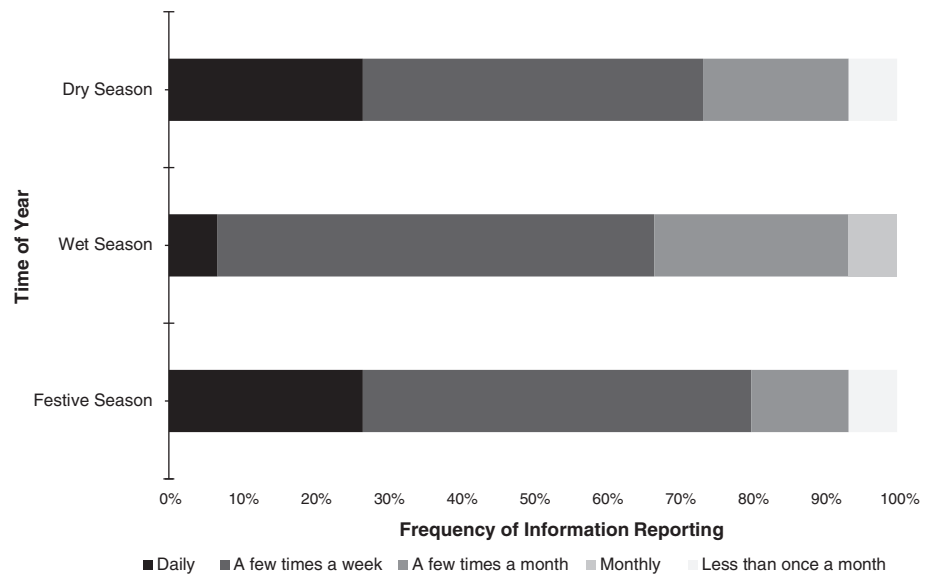


## 3.3 | Who is reporting information and why?

Many interviewees explained that communities around MFPA were "close-knit" and knew who undertakes wildlife crime, especially when outsiders were involved. Subsequently, local people were more likely to report information on outsiders because the probability of retaliation or being stigmatized by their own community was lower. Interviewees reported that outsiders often planned hunting trips with local community members to know where to enter the PA undetected, and to transport animal parts. One interviewee explained:

> "It's that sense of we're [local people] not benefitting from this [illegal activity] and someone higher up the chain is. You know if gangs come in from a nearby town, maybe they'll have some sort of affinity with them—But definitely with different tribes and outsiders coming from far. Although, it's not that common because people know to employ the locals to do it."

Poachers from another village or country often hired local people to poach for them, or required accommodation in a local village. Hence, interviewees believed that rangers who build trust with local communities could access information about outsider poachers.

Sixty seven percent of questionnaire respondents listed resource access groups as a major source of actionable information across MFPA (Figure 3). They explained that these groups reported those who used natural resources illegally because they feared losing their access

to MFPA. Rangers explained that resource access groups saw wildlife crimes by fellow community members as threatening their relationship with UWA and worried that UWA may subsequently administer punishments at the community-level, such as denying future requests to access park resources. Highly motivated groups even organized their own patrols and detained suspects. Within these highly motivated groups, sometimes many residents knew who was undertaking wildlife crime. If these individuals repeatedly ignored their neighbors' requests to quit, the community exposes them during meetings with community outreach rangers. Thus, some respondents felt that the people most likely to report wildlife crime were those with legitimate claim to park resources who felt disenfranchised, or fearful that their access may be restricted.

Rangers identified that the next group of people most likely to report information were those who believed that they benefit from MFPA. These included people connected to MFPA by being wildlife scouts, and relatives and friends of UWA staff. Rangers also believed that people of all ages with a basic level of education were likely to be aware of the possible advantages from living next to the PA (Figure 3). However, interviewees stated that many local people were unaware of the benefits from PAs, UWA's revenue-sharing scheme, or ecotourism.

Responses described how local politicians influenced levels of reporting wildlife crime (Figure 3). Rangers believed that when local leaders understood that wildlife conservation generates local benefits, they encouraged their communities to report wildlife crime to rangers. Twenty seven percent of questionnaire respondents listed local leaders as the first or second most common source of information. They explained that often people reported
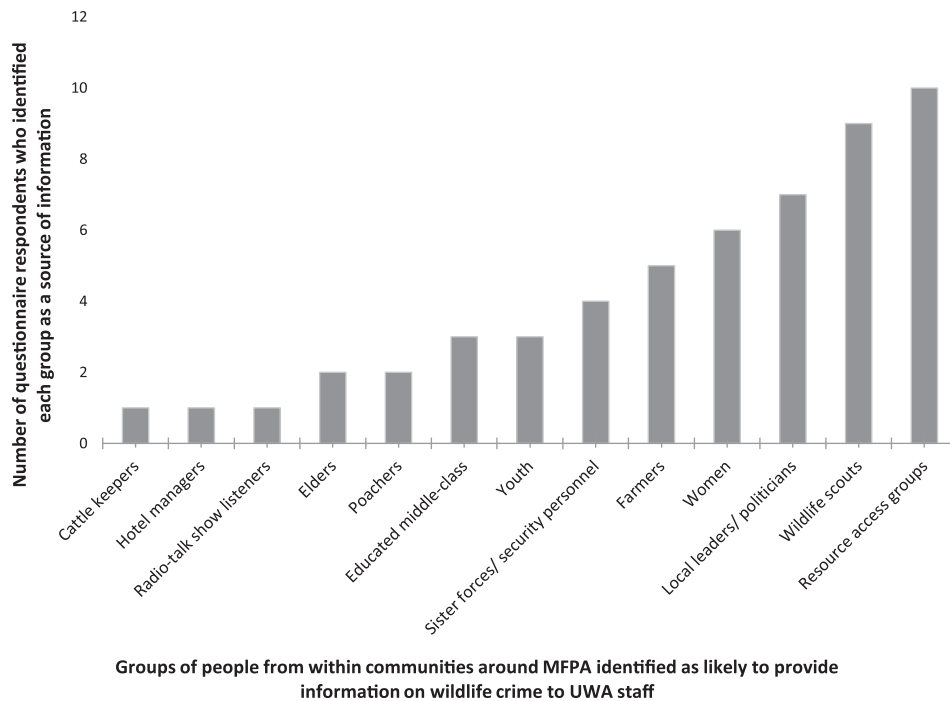
**FIGURE 3** Groups of people from communities around Murchison Falls Protected Area that were identified by UWA staff as the most likely to report information on wildlife crime. This excludes informants who are formally hired by UWA to provide information. Participants could list as many sources of information as they wanted and the number of answers per individual ranged from 2 to 7

information to their local chairperson who then passed it to UWA because they were an easier point of contact.

Most interviewees believed that men were more likely to report wildlife crime to rangers than women, although 40% of questionnaire respondents listed women as a major source of information. Rangers thought that was because women may be less "confident to go and know who to report to, and to go and do that," and may be more fearful of the repercussions. However, many felt that women reported information more often when communities were frequently visited by community outreach rangers. All interviewees stated that the difference in men and women in reporting wildlife crime was not because men possessed more information. Rather, women often knew about, and participated in, wildlife crimes because they were less likely to be suspected. Rangers said that women checked snares set in the PA by their husbands, carried bushmeat out by hiding it among plant materials, and prepared and cooked the bushmeat.

Rangers said that people who reported information spanned all ages including young college graduates, adults, and the elderly. As young people were more active and likely to be recruited as wildlife scouts, they were more likely to witness wildlife crimes. Youth were also often targeted by UWA for recruitment as informants. Elders provided information if they felt that cultural traditions were being disrespected. For example, in some cultures around MFPA it is taboo to hunt young or pregnant animals, or during certain times of the year. There were also adults who simply did not want wildlife crime in their area. However, rangers stated that this was only

in villages where they engaged local people and where local people were aware which activities were considered illegal.

Rangers identified that poachers reported on fellow poachers if a hunting trip ended in unequal sharing of the meat. Also, if poachers had been, or were worried about being arrested, they offered information on other poachers in return for a pardon.

Finally, rangers said that individuals reported wildlife crime when they were envious of those who were profiting substantially from wildlife crime. Others offered rangers information on wildlife crimes in exchange for payment to offset the cost of reporting (such as using a phone, traveling to meet a ranger, or buying a meal). Interviewees felt that financial rewards for providing good information should be given at the community level, not individual level.

## 3.4 | What inhibits local people from reporting information?

Interviewees stated that sometimes when rangers did not offer payment, people either remained quiet, or gave false information and then told poachers to hunt elsewhere. Rangers believed that people were reluctant to report wildlife crime if they harbored anger toward MFPA because of human-wildlife conflict and felt UWA ignored their reports on human-wildlife conflict. Rangers explained that people experiencing frequent human-wildlife conflict assumed it was caused by species overpopulation and thus

were not interested in stopping poaching. A common perception among all interviewees was that local communities were more likely to report wildlife crime when they knew they would receive timely interventions to human-wildlife conflict, or funds to repair property damage caused by wildlife.

Each interviewee highlighted people's fear of poacher retaliation as a significant barrier that prevented information reporting. Respondents explained that around MFPA, people reporting information on wildlife crime have been beaten, had their farmland and houses burned, and have even been tortured and killed. People also feared being cursed, which was a major disincentive in some areas. This could occur years after the information was given once the person persecuted was released from prison.

Interviewees explained that high value wildlife crimes were reported less, not only because they occurred less often in MFPA than subsistence-driven wildlife crimes, but also because any retaliation would have been severe as the poachers were perceived to be connected to organized crime syndicates. Moreover, as punishment for high-value crimes is more severe, interviewees believed that people did not want to inflict severe punishments on their neighbors or be seen by their community as causing an individual to serve a long prison sentence.

## 3.5 | What is the role of community outreach staff?

According to MFPA rangers, regardless of the time of year, local provision of information on wildlife crime largely depended on: the availability of a ranger to report to; the frequency of interactions between rangers and local communities; and the nature of these interactions. One interviewee stated that when rangers first introduced conservation outreach within a community, locals claimed, "We have had so much information, yet no one to talk to." Interviewees emphasized that regularly interacting with local people was necessary to elicit reports on wildlife crime, especially to mend historical ill-feelings toward UWA which were worsened by occasional shootouts between rangers and poachers. Most questionnaire participants (87%) strongly agreed people must first trust a ranger to report information. Thus, a major perceived prerequisite among study participants for reporting was that local people perceived rangers as trustworthy, available, and visible. This trust could take years to establish and be fragile. One respondent explained that when a community member reports information by phone, they almost always asked to confirm who they were speaking with before they disclosed their identity. Several rangers

stated that they did not receive any information when first stationed at an outpost until they spent time with community members and demonstrated that they care through their actions, such as responding to human-wildlife conflict incidents throughout the day and night, and supporting communities in applying for funding for livelihood projects. Rangers began receiving information once they proved to be friendly, listening, and helpful. For example, one interviewee described how one community outreach ranger arranged a music competition in the dry season so that local communities were busy competing rather than poaching and that:

> "They were getting jealous of him in the law enforcement [department] because people were reporting to him more information [on wildlife crime] than even law enforcement people."

Information was reported to either law enforcement or community outreach rangers, so long as they were known and trusted by the person providing the information. However, interviewees explained that communities around MFPA clearly distinguished the two departments, with law enforcement staff being perceived negatively as rarely visiting communities, always armed, and having a history of behaving aggressively. One law enforcement ranger stated that "people will not want to approach me in my uniform." Similarly, a community outreach ranger stated that:

> "We gather a lot more [information]. The public fears UWA's law enforcement. Community rangers aim to be more reachable, so people are at ease. Those combat dresses are scary! Even our vehicle, the moment they see the car, their heart goes—Children run away, yelling 'a ranger is coming!' People know they are only seeing them because someone is going to be arrested."

Community outreach rangers said that they typically wore casual clothes, aimed to be approachable, and that their activities allowed them to understand community dynamics and how best to connect with people.

## 3.6 | Do community sources of information enhance law enforcement?

All interviewees thought that community sources of information increased chances of successfully finding, arresting, and prosecuting people undertaking wildlife

crime. A senior director within UWA stated utilizing community sources of information "is the most successful! Because the local people can tell you that somebody is planning to do A, B and C. 70% of successful operations depend on tip-offs." The director further described that not only would law enforcement staff know the details of the wildlife crime such as the location and people involved, but they would also be better equipped for prosecuting the poachers in court. One interviewee said this was "because if somebody reported a case that is quickly followed up, chances are some evidence will be recovered—whether skins or tools or whatever." Therefore, interviewees believed that when local communities provided information on wildlife crimes, chances of recovering evidence for successful prosecutions was high.

# 4 | DISCUSSION

Efforts for more effective approaches to tackling wildlife crime where community engagement is a strategic complement to law enforcement are impeded by limited understanding of why communities voluntarily report wildlife crime to rangers. We illustrate the perceptions of a small number of UWA and NGO staff, yet given the extremely limited research on this topic, this provides important insights from which to build on. The main themes that emerged included the immense value of community sources of information for successful law enforcement, and that rangers must build trust and respect among local communities to engender local reports of wildlife crime in an appropriate and sensitive way that ensures the confidentiality of the people who provide information.

## 4.1 | Factors that affect information reporting

Our results indicated there are a variety of strategies to increase crime reporting by local communities. An important approach is for rangers to maintain an open dialogue through regular interaction with communities. Firstly, this engenders positive park-community relationships whereby communities are more likely to report wildlife crime. Secondly, it can increase local awareness of threats facing wildlife populations, which is important as research indicates that community perspectives on the condition and stability of nature influences illegal biodiversity exploitation (Gore, Lute, Ratsimbazafy, & Rajaonson, 2016). Furthermore, studies have emphasized the critical role that awareness of rules plays in compliance with environmental regulations (e.g., Hodgetts et al., 2018;

Winter & May, 2001), with research showing that local people who knew about the existence of seasonal restrictions extracted significantly less (Velez & Lopez, 2013). Thirdly, rangers that build trusted relationships with local people may empower communities to take responsibility for crime control and generate collective efficacy—or the willingness of community members to intervene for the common good (Gill, Weisburd, Telep, Vitter, & Bennett, 2017). Lastly, an open dialogue approach is required, as factors that motivate people to report wildlife crime may be unique to a specific community, even at different locations around the same PA. Spending time to understand the priorities, needs and concerns of local communities ultimately aids in their stronger acceptance of and increased support for the PA and not to support wildlife crime (Biggs et al., 2019). This is especially true given the historical ill-feelings toward UWA, but is challenging for wildlife authorities whose community outreach programs cover large geographic areas and who operate with limited financial and human resources.

Given that local people had diverse interests and motivations to report wildlife crime, efforts to engage communities could transcend various social groups. For example, MFPA rangers stated they primarily focus on engaging youth for providing information. However, Dodge (2006) outlined that there were unique ethical challenges associated with engaging youth as police informants. These included youth feeling encouraged to participate in risk-taking behaviors, or youth bragging about being an informant to gain status among their peers, as they were less likely to understand the importance of anonymity. In addition, age is predicted to have a nonlinear effect on noncompliance and resource extraction (Shirley & Gore, 2019; Velez & Lopez, 2013). Given the array of factors that motivate people to report wildlife crime, rangers would likely benefit from gaining a deeper understanding of community dynamics and vested interests, and not solely targeting youth for information. This especially regards women who may know a lot about bushmeat hunting (Lowassa, Tadie, & Fischer, 2012) and organized crime (Hübschle, 2014) in their communities.

Clearly communicating local benefits from supporting PA conservation can encourage cooperation and therefore information provisioning (e.g., Matseketsa, Chibememe, Muboko, Gandiwa, & Takarinda, 2018). However, implementing community outreach programs effectively depends on the knowledge and experience of rangers. A rangers' ability to foster trust and collaboration will largely depend on their professionalism, ability to empathize with the specific local situation, and their ability to choose and implement conflict management strategies (Soliku & Schraml, 2018). Mazerolle, Antrobus, Bennett,

and Tyler (2013) illustrated how police benefitted from interacting positively with the public, and by acting fairly, even in a single encounter. Given our finding that local people often fear UWA law enforcement rangers, incorporating these skills in the training and ongoing mentoring and professional development for rangers working with local communities is vital. Another consequence of inexperience and limited training is that law enforcement staff may be underqualified to assess the importance of community information before they submit it for processing into intelligence (Bullock, 2013). This can lead to valuable information on wildlife crime being dismissed, or "information overload" when there is too much information to be analyzed into intelligence (Bullock, 2013).

The question of how to incentivize compliance with PA conservation is complicated (Keane, Jones, Edwards-Jones, & Milner-Gulland, 2008), as is deciding whether to pay local people to report wildlife crime. There is currently no formal system in Uganda to reward people for reporting wildlife crimes. However, owning a phone and using it to report information can be too expensive for local people around PAs. Our findings suggest that wildlife authorities could motivate community members to provide information by reimbursing the costs incurred for reporting, such as food, mobile fees, and fuel. Incentives for reporting wildlife crime must be administered with strict protocols to minimize risk of corruption of informants, rangers, or situations when only elites within local communities benefit.

The importance of developing strict protocols for receiving wildlife crime information is especially true for information given by offenders. The possibility of having the threat of incarceration removed is a strong motivator to report information and gives law enforcement considerable control over whether an individual chooses to cooperate (Ucak, 2012). However, these same motivations lead to ethical breaches among law enforcement officers, who let crimes go unpunished or dismiss serious offenses in order to cultivate informants (Haggerty, 2012). In addition, offenders who offer information to police may feel like they have little to lose and be more willing to accuse innocent people in hopes of a reduced sentence (Haggerty, 2012). Some participants in our study felt that the rewards for providing accurate information should instead be given at the community level. This may engender a sense of community ownership of their neighboring PA and encourage their genuine support to tackle poaching (e.g., Eshoo, Johnson, Duangdala, & Hansel, 2018). This approach may also help protect an individual who reported information from being identified, retaliated against, or stigmatized by their community.

An approach to tackle wildlife crime is increasing the penalties to deter potential offenders (Biggs et al., 2017; Moreto & Gau, 2017). However, our research indicates that increasing penalties may have unintended consequences, as rangers believed that people are less likely to report an individual they know if the resulting punishment will be severe. Potential offenders can be discouraged without high levels of enforcement when informal sanctions arise based on collective moral judgments (Keane et al., 2008; Moreto & Gau, 2017; St John, Mai, & Pei, 2015). Individuals who do not conform may be shamed or criticized by their communities if their actions confer unfair advantages. This is exemplified in our finding that during meetings with UWA, rangers described that local people openly report the names of poachers who have continued to poach despite their communities' disapproval. Travers, Mwedde, et al. (2017) identified the antiwildlife crime interventions that were most likely to be accepted by local communities around MFPA, and therefore likely to influence social norms for communities to support conservation. These included wildlife-friendly enterprises, human-wildlife conflict scouts, and using revenue-sharing funds to address human-wildlife conflict. We also posit that scouts and resource access groups can serve a similar function to what are referred to as the "managers" in informal guardianship for crime prevention, whose simple presence and alertness, even unknowingly, can discourage crime from happening there (Hollis-Peel, Reynald, Van Bavel, Elffers, & Welsh, 2011).

Ethical practices are also crucial for this, as perceived legitimacy and trust of law enforcement is thought to be essential to the development of shared norms and social controls in communities (e.g., Kochel, 2012; Moreto & Gau, 2017). Our participants also believed local leaders greatly influence levels of wildlife crime reporting. This highlights the importance of engaging community leaders in PA conservation to stigmatize poaching, especially as most beneficiaries of benefit-sharing programs rely on local leaders for information (Franks & Twinamatsiko, 2017). Wildlife crime levels may be lower where local leaders perceive higher benefits from the PA (MacKenzie, 2012).

## Ethical Considerations

Major ethical issues that must be addressed when receiving information included local people's concerns for anonymity and fear of confidentiality breaches. This emphasizes the importance for wildlife authorities to create a safe environment that facilitates reporting. Information is often shared between departments and given to

law enforcement staff to investigate. Even among law enforcement and community outreach rangers, UWA's intelligence staff are often met with uneasiness and suspicion (Cowan, Burton, & Moreto, 2019). The fear of poacher retaliation and community stigmatization might reduce if local communities were confident that their information was handled discretely and with care. Wildlife authorities should seek to eliminate corruption to improve their respect and perceived legitimacy, and to encourage compliance (Boakye, 2018). They should also act immediately on complaints of unethical practices. This is important as perceived legitimacy relates to citizen compliance and cooperation, and to crime reductions (Gill et al., 2017). Musavengane and Simatele (2017) highlighted that levels of trust and fairness of rules are major factors that positively affect local communities' willingness to participate in collaborative management of wildlife. Establishing protocols for gathering and recording information is vital to address ethical issues and ensure that rangers respond to factors that motivate locals to report information as these differ between PAs (e.g., Blomley et al., 2010).

In UWA, local information reports are rarely documented by community outreach rangers. Consequently, there are only anecdotal data on the contribution that community outreach rangers make to law enforcement efforts through information gathering. If wildlife authorities record the sources and recipients of information, they can target community programs to elicit information reporting in a sensitive and appropriate way and balance this with community programs to support local livelihoods.

## Future Research

Our study provides a starting point for further research, including the potential use of applying concepts from criminology to improving PA conservation. For example, intelligence-led policing is an approach to reducing crime wherein information is collected, evaluated, and analyzed to inform decision-making (Ratcliffe, 2016). It allows law enforcement agencies to allocate resources more efficiently for crime prevention, reduction and disruption, including by targeting investigations toward serious offenders (Maguire & John, 2006). In fact, intelligence-led policing has been successfully applied to address wildlife crime in Uganda (e.g., Moreto, 2015; Moreto et al., 2017), as well as other environmental crimes, such as the illegal export of hazardous waste in the United Kingdom (Gibbs, McGarrell, & Sullivan, 2015).

We consider that other key research topics include: understanding perceptions directly from local communities on the conditions for reporting wildlife crime information; investigating the role of women in both contributing to and reporting wildlife crime; quantifying the contribution that community outreach rangers make toward tackling wildlife crime; and comparing the quality of information that can be gained from voluntary and anecdotal reports of wildlife crime, with formal networks of informants, to ascertain how both can support enforcement activities for PA conservation.

## 5 | CONCLUSIONS

Respondents in our study all described that community engagement can elicit actionable information to reduce wildlife crime. This is critical for effective enforcement because solely relying on harsh fear-based deterrence approaches will not change the underlying conditions to reduce crime in the long-term (Weisburd, Davis, & Gill, 2015). Overall, we suggest that communities will be more motivated to support wildlife crime enforcement through the combination of developing strict ethical protocols to ensure trust and confidentiality; and implementing community outreach strategies that prioritize addressing local concerns such as maintaining an open dialogue, training community scouts for resolving human-wildlife conflict, and facilitating collaborative management and access to park resources.

### AUTHORS' CONTRIBUTIONS
Michelle Anagnostou carried out the fieldwork and led on analyzing the data and writing the manuscript. Robert J. Smith and Julia Baker helped design the study and analyze the results, Geoffrey Mwedde facilitated fieldwork logistics and introductions to the study participants. All authors helped conceive the study and interpret the results and contributed to the writing and editing of the manuscript.

## CONFLICT OF INTEREST
The authors declare no conflict of interest.

## DATA ACCESSIBILITY STATEMENT
To protect the anonymity of study participants under the terms of our ethics approval we cannot share the raw data which may contain identifiable information.

## ARTICLE IMPACT STATEMENT
Engaging local communities in conservation enhances law enforcement efforts to stop wildlife crime through the provision of information.

## TARGET AUDIENCE
The target audience for this manuscript includes other conservation researchers, policy-makers for wildlife authorities, and practitioners who are working to reduce wildlife crime in protected areas.

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## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.