Potential for informal guardianship in communitybased wildlife crime prevention: Insights from Vietnam

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Abstract

The notion that indigenous people and local communities can effectively prevent conservation crime rests upon the assumption that they are informal guardians of natural resources. Although informal guardianship is a concept typically applied to “traditional” crimes, urban contexts, and the global North, it has great potential to be combined with formal guardianship (such as ranger patrols) to better protect wildlife, incentivize community participation in conservation, and address the limitations of formal enforcement in the global South. Proactive crime prevention is especially important for illegal snare hunting, a practice that has led to pernicious defaunation and which has proved difficult to control due to its broad scope. This paper uses interview data with community members in protected areas in Viet Nam where illegal snare hunting is commonplace to 1) analyze the conditions for informal guardianship in the study locations; 2) explore how community members can become more effective informal guardians; and 3) examine how formal and informal guardianship mechanisms can be linked to maximize deterrence and limit displacement of illegal snaring. Results indicate that conditions for informal guardianship exist but that reNature Conservation spondent willingness to intervene depends upon the location, offender activity, and type of offender (outsider versus community member). While respondents generated numerous strategies for wildlife crime prevention, they also listed crime displacement mechanism offenders used to avoid detection. We discuss

how informal guardianship can be integrated with formal guardianship into an overall model of situational crime prevention to protect wildlife and incentivize community-led deterrence of illegal snaring.

Keywords: conservation crime, defaunation, deterrence, local communities, situational crime revention, snare hunting

Introduction

The diversity, engagement, and inclusion of local stakeholders in community-based conservation is a mainstream practice and proven theory (e.g., Doyle-Capitman et al. 2018). The power of community-based conservation, however, lies in its evolution as a response to the shortcomings of the fortress model of conservation in which governments or other actors created protected areas for wildlife and prohibited their use by indigenous people and local communities, or evicted them (IPLCs) (Turner 2004). These exclusionary forms of conservation often failed to achieve successful preservation of biodiversity due to social resistance or non-cooperation. Community-based conservation reflects participatory approaches that view IPLC forms of knowledge as requisite for resource management (Berkes 2004). Importantly, the mere inclusion of stakeholder involvement in conservation practice does not guarantee positive outcomes for iodiversity or livelihoods. The specific characteristics of stakeholder participation, and their interaction effects, have consequences for efficacy and sustainability (Young et al. 2013). There are also numerous examples of how inattention to community differentiation and attributes like ender, identity, age, ethnicity, and wealth can limit the effectiveness of community-based conservation (e.g., Little 1994; Leach et al. 1999; Alexander and McGregor 2000). In conservation, the notion of community overwhelmingly refers to a group of people who live in spatial proximity to one another and/or share common interests or social identities (Murphree 1994). However, social bonds, or the level of group affiliation, is another factor that is particularly relevant when community-based conservation involves responses to conservation crime (Rizzolo et al. 2017). Conservation crime refers to crime that involves the natural world and its inhabitants, such as illegal logging, illegal or unregulated fishing, illegal pollution, and the illegal trade and consumption of wildlife, among others (Gibbs et al. 2010). The notion that IPLCs (and their knowledge, skills, and relationships) can effectively prevent

conservation crime rests upon the assumption that they are informal guardians of natural resources. Informal guardianship is a concept developed in and typically studied by scholars in the global North, traditional crime contexts, and urban settings (Reynald 2009, 2011a, b; Jacques and Reynald 2012; Hollis-Peel and Welsh 2014; Moir et al. 2017). Informal guardianship may have unrealized potential to be combined with for-mal guardianship (such as ranger patrols) to better protect wildlife, incentivize community participation in conservation, and to address the limitations of formal enforcement in the global South (Kahler 2018). To date, the conservation science literature on informal guardianship is underdeveloped. There is a clear opportunity to synergize these approaches to better understand the potential and limitations of communitybased crime prevention and informal guardians. Informal guardianship

As a field devoted to analyzing the human causes of, and solutions to, crime, criminology can enhance existing conservation-led enforcement work (Gibbs et al. 2010). Crime occurs where a motivated offender, a suitable target (in this case, wildlife), and the absence of a capable guardian intersect (Cohen and Felson 1979). A capable guardian is any person or thing that discourages criminal violations from occurring (Cohen and Felson 1979). Contemporary definitions of capable guardianship focus on the importance of human guardianship rather than the protection provided by objects such as CCTV (Hollis-Peel et al. 2013). The mere presence of a capable guardian can prevent crime through their ability to keep an eye on potential targets (Felson 1995). Empirical research shows that guardians can discourage crimes within their communities through their presence, supervision, and intervention when necessary (Reynald 2011b; Felson and Eckert 2016); guardians can be either formal or informal (Table 1). Thus far, the concept and practical study of informal guardianship has been focused on traditional crimes (e.g., property destruction) in urban environments where population density is high, ownership of property is clear, and offenders are primarily nonlocal (Reynald 2009, 2010, 2011a, b; Jacques and Reynald 2012; Hollis-Peel and Welsh 2014; Moir et al. 2017). This creates a high likelihood that an informal guardian will be present at the same time and place as an offender, can identify an offender, and will intervene. These characteristics are not guaranteed for illegal snare hunting in Viet Nam, where some hunters are outsiders while others are local (Viollaz et al.2021). That “offenders” can

be the neighbors of informal guardians makes it far more complex for them to intervene. There are social costs to policing one's neighbors that could play a role in community members' willingness to act as informal guardians. Further, although some people may know that it is illegal to hunt in a protected area, the offense is not necessarily viewed by communities as deviant since wild meat is readily consumed in their circles (Van Song 2008; Ngoc and Wyatt 2013; Lee et al. 2014). Despite these theoretical and practical complexities, there is the potential and motivation to leverage the concept of informal guardians for more effective conservation practice. Research and field surveys conducted over the past 15 years documented a rapid decline in the fauna and flora of Viet Nam (Wood et al. 2013), challenging policy makers, scientists, and local communities to explore additional options for tackling Viet Nam's illegal snaring problem (Polet and Ling 2004; Zingerli 2005; Ngoc and Wyatt 2013). The close social ties between neighbors and the contextual familiarity they have within these communities, defined geospatially, provides an excellent opportunity for informal guardianship because neighbors are aware of each other's conduct on a daily basis. Community members are aware of each other's conduct on a daily

Table 1. Types of capable guardians.

Type*	Definition	Benefits
Formal	Representatives of the state (e.g., police or rangers) with official enforcement powers	Power to enforce legal sanctions Professionally trained in crime detection/prevention
Informal	Non-professionalized (e.g., community-based) protectors of targets such as wildlife	Can serve as force multipliers: can amplify and complement the reach of formal guardians (Carter and Gore 2013) Valuable in rural areas where law enforcement density is lower (Carter and Gore 2013) or where ranger motivation and/or capacity is limited (Spira et al. 2019) Can supervise and protect potential targets during the course of their routine activities (Felson and Boba 2010)

*One actor cannot act both informally and formally at the same time. Conceivably, an off-duty ranger who does not identify herself as such can act as an informal guardian in her community. Then she would be, in role, a formal guardian (because of her job) but, since she wasn't acting as part of her formal duties, would be categorized as an informal guardian in that context.

basis. Community members are therefore in an exceptional position to know when someone is doing something illegal than in cases with outside offenders or when outside authorities monitor a community's behavior. People in these communities can therefore provide guardianship where formal guardianship is not readily available because of low capacity or lack of resources.

Snare hunting

Snaring is one conservation issue to which informal guardianship may be an especially well-suited solution. Snaring is one of the largest contributors to defaunation and a pervasive threat to biodiversity across continents (Watson et al. 2013; Gray et al. 2018; Belecky and Gray 2020). The detriments of snares are challenging for numerous reasons. Snares are cost-effective to construct, clandestinely placed in remote locations, and yield indiscriminate wildlife injury and mortality (MacMillan and Nguyen 2014; Gray et al. 2018). This makes snares both a significant threat to wildlife species and makes them difficult to detect and their users hard to identify and sanction. Snare detection and removal are essential risk mitigation strategies, and there have been important experimental and practical studies of snare detection techniques meant to optimize enforcement resources (e.g., Watson et al. 2013; O'Kelly et al. 2018). However, due to the sheer volume of snares and the ease with which snares can be replaced, snare removal alone is not sufficient to protect wildlife species (Gray et al. 2018).

Snaring in Southeast Asia is a conservation priority (Belecky and Gray 2020) because of the region's large number of threatened wildlife species, its high rates of forest loss, and pervasive road and other infrastructure encroachment on wildlife habitat, which facilitates snare placement. Rapid economic growth in Viet Nam has also contributed to a robust and growing consumer base for wildlife products, particularly wild meat, both locally and when transported to urban areas (Sandalj et al. 2016; Gray et al. 2018). In Viet Nam, trappers with more access to valuable species (such as pangolins) and to wildlife traders tend to participate in commercial trade (MacMillan and Nguyen 2014). Research by MacMillan and Nguyen (2014) suggests that local communities in Viet Nam have the knowledge to manage forests in a sustainable manner and prevent professional hunters from entering reserves where land tenure is clear and could potentially be recruited to deter conservation crimes as informal guardians (MacMillan and Nguyen 2014). However, local participation in such deterrence is dependent upon variables such as the presence of nonlocals (and whether nonlocals are prosecuted for conservation crimes), location, and cultural traditions of wildlife utilization (Rizzolo et al. 2017).

At the same time, larger limitations and issues with enforcement highlight the importance of further work on crime prevention strategies, particularly in the context

of snaring. Rangers often have a large, protected area to cover and are subject to various occupational stressors that can affect motivation and capacity (Moreto 2016). At times, rangers can be subject to larger forces of corruption and can engage in misconduct that limits their effectiveness (Moreto et al. 2015). In locations where there is weak governance and/or the criminal justice system does not function effectively, the conservation impacts of enforcement may be limited (Nijman 2017), making crime prevention even more important. For example, in Viet Nam's Pu Huong Natural Reserve, Wildlife Management Clubs set up by local communities play an important role in wildlife protection and anti-trafficking efforts.

All of these factors suggest that informal guardianship could be a valuable strategy in the prevention of snaring-related conservation crimes. As members of the community, informal guardians have more flexibility to use community social cohesion and social bonds to leverage changes in behavior or promote compliance (Wilcox et al.2007). Therefore, it is possible that community members can better discourage crime than formal guardians, especially in situations where there are tensions between communities and rangers or other conservation stakeholders. This paper uses interview data with community members in protected areas in Viet Nam where illegal snare hunting is commonplace to 1) analyze the conditions for informal guardianship in the study locations; 2) explore how community members can become more effective informal guardians; and 3) examine how formal and informal guardianship mechanisms can be linked to maximize deterrence and limit displacement (the transfer of crime from one location to another, Johnson et al. 2014) of illegal snaring from one protected area to another.

Methods

From May to August 2018, the research team from Vinh University in Viet Nam conducted 303 semi-structured interviews with community members (both hunters and non-hunters) in 12 villages that surround three protected areas: Quang Nam Saola Reserve, Thua Thien-Hue Saola Reserve, and Pu Mat National Park in the Central Annamites region of Viet Nam (Fig. 1; Table 2). About 30% of the sample was composed of hunters, and approximately 60% of those hunters were self-identified "subsistence hunters" whose livelihoods were dependent on agriculture but hunted in their spare time, mainly for personal con-sumption (Table 3)

The rest were what the researchers termed “inside professional hunters” because they also belonged to the community (rather than coming from outside

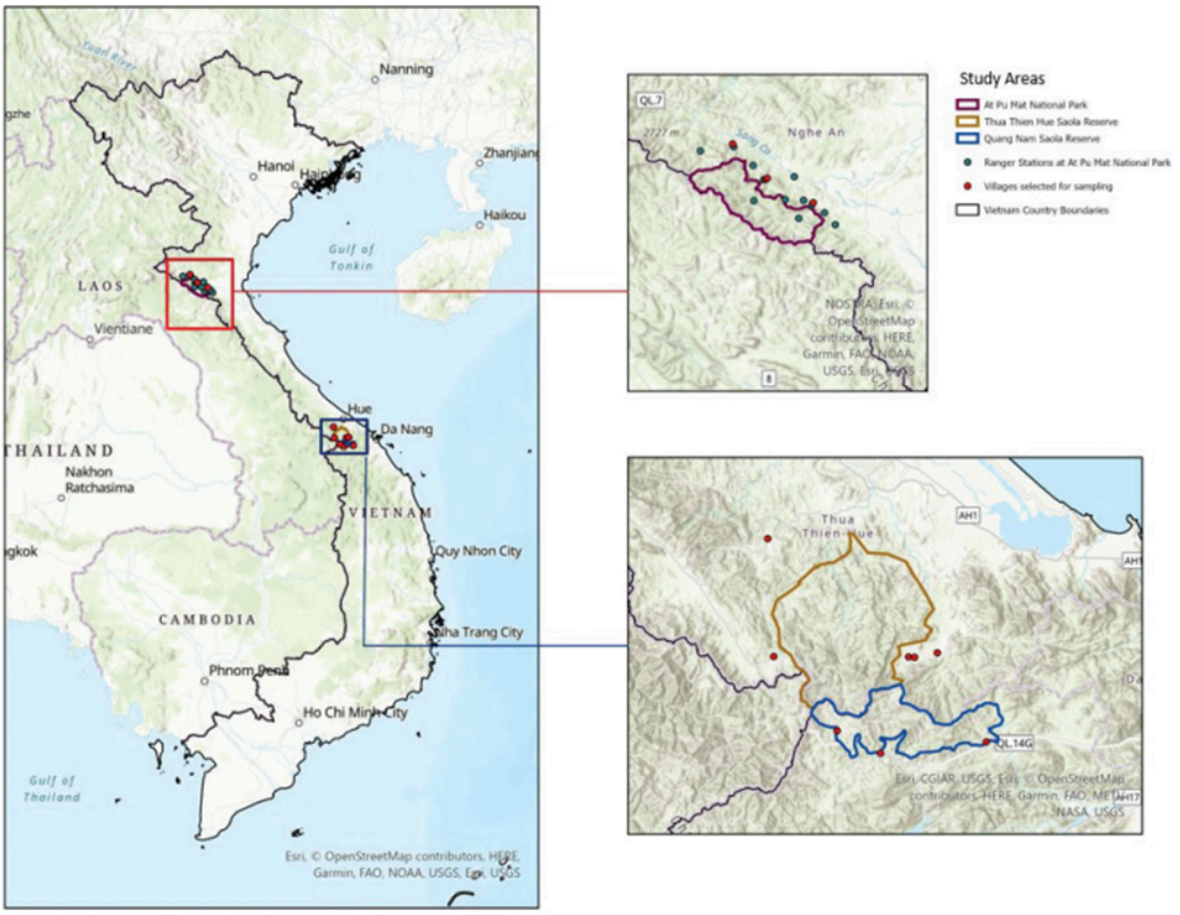

Figure 1. Maps of site locations.

Table 2. Interview locations and number of interviews conducted per site (from Viollaz and Gore 2019).

Quang Nam Saola Reserve				
Arec (A Vuong)		Atep 2 (Bhalee)		But Nga (Song Kon)
25		25		29
Thua Thien Hue Saola Reserve				
A Roang 1 (A Roang)	Village #3 (Thong Quang)	Village #3 (Thuong Long)	Cha Du (Huong Nguyen)	Village #3 (Thuong Nhat)
25	25	25	25	25
Pu Mat				
Xieng (Mon Son)	Na (Chau Khe)	Bu (Chau Khe)		Quang Phuc (Tam Dinh)
23	25	26		25

the province to hunt) but relied mainly on hunting for income and had specialized knowledge and tools for finding the best game (see Viollaz and Gore 2019 for more

details). While an additional category of hunters ("outside professional hunters") was mentioned by respondents, these hunters were not members of the community and were not interviewed for the purpose of this study. An "outside professional hunter" was defined as a hunter who relies mainly on hunting for income, is prolific, has expert knowledge of navigation and best places to hunt using specialized tools and snares but who lives primarily in other Provinces and who travels long distances to hunt in the park or reserve. This research was part of a larger project that looked at both community and ranger perspectives towards wildlife crime prevention in Viet Nam (Viollaz et al. 2021; Rizzolo et al. 2021).

Table 3. Prevalence and characteristics of hunters and non-hunters in the sample (from Viollaz and Gore 2019).

Pu Mat (N = 99)			Quang Nam Saola Reserve/Thua Thien Hue Saola Reserve (N = 204)		
Hunter (%)					
Yes	No		Yes	No	
26% (N = 26)	74% (N = 73)		30% (N = 61)	70% (N = 143)	
Hunter type (%)					
Subsistence	Inside professional	Outside professional	Subsistence	Inside professional	Outside professional
58%	42%	0%	60%	40%	0%
Sex (%)					
Male	Female		Male	Female	
84%	16%		78%	22%	

Interviews focused on involvement in illegal snare hunting, knowledge of hunting practices, potential hunting deterrents, and community members' willingness to intervene to prevent the behavior (two researchers from Vinh University and Michigan State University also conducted exploratory interviews with rangers to get their perspectives on the potential for informal guardians to work in the context of these protected areas, see Rizzolo et al. 2021). The Human Subjects Protection Program at Michigan State University's Institutional Review Board approved the methods and analysis (IRB #00000372). In the analysis phase, the study sites were divided into two categories: Hue-Quang Nam Reserve (henceforth, "HQN") and Pu Mat National Park (henceforth, "Pu Mat"). The quantitative answers from the community interviews were coded in SPSS v25 (IBM Corp 2017). During analysis, the project translator gave regular input and corresponded with the interviewers to guarantee the cultural context of answers was not lost. Descriptive statistics were run on the data once coded. For those answers that could not be quantified, content analysis techniques were used to pull out patterns and trends in answers.

Results

Conditions for informal guardianship

The first aim of this paper was to examine the conditions for informal guardianship. Results indicated that the three conditions necessary for community-based informal guardianship (availability, knowledge of context, and willingness to intervene) are present in our study sites. A large portion of the 303 interviewees (88% in HQN and 81% in Pu Mat) reported being present in their communities for a minimum of 25 days per month, which indicates sufficient time spent there to be available as informal guardians. In terms of knowledge of context, a majority of interviewees (62% in HQN and 54% in Pu Mat) reported that they knew their neighbors well enough to be aware of their habits and to detect when their behavior varied from the norm. The percentage of respondents who knew specifically when their neighbors engaged in hunting was slightly lower, at 36% for HQN and 47% for Pu Mat.

Overall, respondents reported a strong willingness to intervene. When given the example of a general crime being committed in their community (e.g., the crime of “stealing a buffalo”), 92% of interviewees in HQN (and 96% in Pu Mat) noted that they would be very likely or likely to intervene. However, responses varied on how they would intervene. The largest percentage of respondents (41% in HQN and 51% in Pu Mat) said they would “intervene indirectly,” with a smaller portion of interviewees (32% in HQN and 35% in Pu Mat) reporting that they would “intervene directly.” Some community members clarified (27% in HQN and 14% in Pu Mat) that their response would depend upon the situation. There was also a significant interest in the protection of wildlife among respondents. Across all sites, 28% of interviewees noted that it was everyone’s or the community’s responsibility to protect wildlife.

A variety of situational factors impacted respondents’ degree of willingness to intervene. These included their gender and role in the community, the context (the type of crime and the perceived effectiveness of intervention), and the type of offender (whether or not that person is a local or non-local resident). There were pervasive gender differences in willingness to intervene. All the women surveyed in Pu Mat reported that they would respond indirectly (e.g., through requesting help). In HQN, most women favored indirect interventions, although a subset of 28% reported that their response would depend upon the situation. However, for male respondents across sites, direct and indirect interventions were evenly endorsed. Further,

authority figures in the community were more likely to favor direct interventions such as confrontation of the offender.

Approximately one-fifth of respondents in HQN (and 13% in Pu Mat) said they were very likely to intervene if they witnessed an individual snaring in a protected area. However, perceived effectiveness of this intervention was low. Only 35% of community members in HQN and 31% in Pu Mat believed that they could stop a person from snaring inside the protected area. Willingness to intervene was related to the respondent's belief that the intervention would be successful. Almost all the respondents who reported neutral or negative answers to intervention noted that they felt they could not effect change. As with other types of crime, whether the offender was perceived as a local or nonlocal impacted intervention (Table 4). Several interviewees at both sites noted that they would intervene if they saw an outsider laying snares in the protected area. Their rationale was that this land belonged to their community, and thus an outsider should neither be present there nor be allowed to take resources. Several respondents also noted their responsibility to protect their village by intervening. For all three types of transgressions (entering the protected area, laying snares in the protected area, exiting the protected area with bushmeat), a higher percentage of respondents would intervene if the offender was an outsider than if they were a community member. Hunters were Informal guardianship in Vietnam also willing to confront other hunters who laid snares in their own hunting territory, which indicates that the designation of "outsider" is flexible and can occur within a group (a group of hunters) as well as across groups (across geographic communities). Further, respondents' motivation to intervene often hinged on the protection of a fellow community member from detrimental outcomes such as prison time or monetary fines. Several respondents in Pu Mat also stated they would intervene to stop someone from laying snares in the protected area because they feared cattle would accidently be injured in a snare.

Table 4. Respondent willingness to intervene based on location, offender activity, and type of offender.

	HQN		Pu Mat	
	Outsider (% Yes)	Community member (% Yes)	Outsider (% Yes)	Community member (% Yes)
Entering PA	67%	34%	35%	24%
Laying snares in PA	71%	53%	68%	60%
Exiting PA with bushmeat	46%	31%	57%	42%

Enhancement of effective informal guardianship

The second aim of this paper was to examine how community members could be mobilized to become effective informal guardians. In our sample, rationales for non-intervention in the prevention of snaring included “it’s not my job,” “it’s not my duty,” and “I don’t have the authority to act.” Compounding this perceived ineffectiveness of intervention was the fear that confronting a hunter could lead to a) physical injury from an altercation, especially if the guardian was alone and b) social-psychological damage to interpersonal relationships or retaliation (This reason for inaction was confirmed in the interviews we conducted with rangers, see Rizzolo et al. 2021). Further, the condition of the poached animal had an impact; several interviewees mentioned that, when they saw someone exit the protected areas with bushmeat, they were more likely to alert rangers if the animal was alive.

Another dynamic that influenced inaction was that communities overall did not have a sense of ownership over the wildlife in the protected areas; most respondents reported that wildlife belonged to the park/reserve and the rangers who patrolled the protected area. Only 3% of interviewees in HQN (and 5% in Pu Mat) reported that wildlife belonged to community members. A belief that wildlife ownership lay with reserves/rangers rather than communities also appeared in perceptions of responsibility to act. At both locations, approximately 60% of respondents said that the protection of wildlife was the responsibility of the reserves and the rangers. In contrast, about 20% of interviewees noted that the community was responsible for wildlife protection.

When asked for potential solutions to reduce illegal snare hunting, community members had multiple suggestions. The integration of these strategies may be particularly valuable for the enhancement of community ownership over wildlife and wildlife crime prevention since they emerged from the perspective of potential informal guardians themselves. Several strategies mentioned are already well-established in community-based conservation: these included awareness-raising, building infrastructure for communities, improving enforcement, increasing penalties for non-compliance, and providing resources (such as technical

expertise and funding) for alternative livelihoods. However, there were also unique responses that could inform site-specific solutions. These strategies are congruent with principles of situational crime prevention, or SCP (Table 5), which indicates that they could be integrated with informal guardianship into a comprehensive SCP framework.

Table 5. Community-generated wildlife crime prevention strategies by situational crime prevention principle.

Increase incentives for informal guardianship
• Provide community loans to develop non-forest-based economic opportunities
• Provide opportunities for communities to learn forest protection
Increase risks for offenders
• Conduct focused surveillance of suspected hunters
• Establish a "quick reaction" team composed of community members and people from other provinces
• Focus enforcement on middlemen (include investigations of restaurants)
• Install cameras to monitor the forest
Remove excuses for offenders
• Alert conscience: have officials criticize offenders
• Establish village-chosen rules about hunting punishments
• Integrate a hunting prohibition into village conventions
• Make ownership of snares (and/or precursor materials) a strict liability offense
Reduce rewards for offenders
• Deny benefits: refuse identification papers to people caught hunting
• Focus fines on recidivists

Integrating formal and informal guardianship to maximize deterrence and limit displacement

The final aim of this research was to gain information on how formal and informal guardianship can be combined to maximize deterrence of illegal snaring. Most interviewees reported that they would only be deterred by harsher punishments that were likely or very likely to occur within one week of the crime. About half of the respondents (57% in HQN and 45% in Pu Mat) reported that it was likely or very likely that they would be apprehended if they snare hunted in the protected area. However, the likelihood of being caught was seen as having an element of randomness rather than certainty; comments such as “only the unlucky ones get caught” were not uncommon.

When asked what factors would deter them most from snare hunting, participants mentioned both people and punishment. The strongest potential deterrent on snare hunting was rangers (i.e., formal guardians) with 81% of interviewees in HQN (and 96% in Pu Mat) noting that being caught by rangers would deter them most from snare hunting. However, when asked about what currently stops them from snare hunting (in reality rather than theory), responses were different. Although rangers had a strong deterrent effect, with 49 to 59% of respondents listing them as a current deterrent, these numbers were not as high as the percentage of interviewees who said they “would” be deterred by rangers. In Pu Mat, approximately one-fifth of respondents noted that the Frontier Army currently stops them from snare hunting, but that number was much lower in HQN.

In terms of punishment, legal sanctions, rather than extralegal sanctions, were viewed as most effective. Extralegal sanctions such as social shame (e.g., officials criticizing offenders) and confiscations of hunting tools did not seem to deter respondents much. However, in HQN only, the economic-based sanction of withholding shared village economic benefits, such as funds received from the PFES program (see Viollaz and Gore 2019), was ranked as the most efficient deterrent after prison sentences and fines. In both HQN and Pu Mat, the most persuasive punishments were prison sentences and then fines. In HQN, fines that ranged from 500,000 to 10,000,000 VND were mentioned as strong deterrents (mode: 11,000,000; mean: about 8,900,000). For Pu Mat, the suggested value of these fines was higher and ranged from 1,000,000 to 21,000,000 VND (mode: 4,000,000; mean: about 4,700,000).

Respondents were asked about relationships between rangers/other formal guardians and communities, with the results suggesting that tensions are mild. 20% of interviewees in HQN (27% in Pu Mat) reported tension between community members (including hunters) and rangers. In HQN, 8% of respondents reported tension between communities and forest guards, with no such tensions in Pu Mat. Although there were a few instances where hunters reported resentment of rangers for the confiscation of bushmeat or snares, overall, there was respect for rangers as well as a healthy amount of fear of ranger authority, a good sign for deterrence. Community members did note strategies of crime displacement in which they avoided rangers through displacing their hunting activities either temporally or geographically (Table 6).

Table 6. Strategies used for displacement of snare hunting.

Displacement strategy	HQN (% responded in affirmative)	Pu Mat (% responded in affirmative)
Avoid ranger stations/send spotters ahead to gauge ranger presence/gain advance information on ranger patrols	22	45
Go to the forest late at night or in the early morning when rangers do not patrol	21	17
Go to the forest secretly and actively hide any trace of their presence	30	5
Use alternative paths not used by rangers	16	23

These displacement strategies differed between sites, with avoidance of ranger stations the most frequent in Pu Mat and hiding traces of one's presence the most common in HQN. In HQN, 42% of respondents (and 39% in Pu Mat) had knowledge of where and/or when rangers patrolled on a regular basis.

Discussion

Conditions for informal guardianship

Crime prevention is essential for addressing the severe defaunation impacts of snares in Viet Nam. Informal guardianship is one underutilized technique to enhance communities' participation in crime prevention and build upon and complement existing formal guardianship. Our results indicate both the detriments and benefits of

social bonds in terms of illegal snaring prevention. The informal guardian's role in the community, and whether the offender was a member of the community, both had a strong effect on willingness to intervene. Although social bonds between an informal guardian and offender can serve as an obstacle to intervention, as close community bonds mean that there are social costs to reporting each other, they can also function as an incentive. Respondents' motivation to intervene often hinged on the protection of a fellow community member from detrimental outcomes such as prison time or monetary fines. This indicates a level of care for neighbors (but is not necessarily a sign of homogeneity between villagers, as care for community members can extend across diverse populations within the village). This community-mindedness implies a will to leverage social capital to ensure better outcomes for the village as a whole. Thus, "protection" of the offender from the potential outcomes of his crime could be a mechanism for informal guardianship.

These data also reveal important factors in willingness to intervene in wildlife crime. The presence of marked gender effects in intervention preferences (e.g., women in the sample preferred indirect intervention) indicates how gender might structure willingness to intervene. Women were less likely to say they would intervene directly, which suggests a need for gender-specific training and roles within the sphere of informal guardianship. Further, if intervention did not jeopardize the respondent's safety, the threshold for action seemed to be lower for non-local offenders.

Locus of control, or perceived power to effect change in a situation, also constrained informal guardianship. Almost all the respondents who reported neutral or negative answers to intervention noted that they felt they could not effect change. Thus, these respondents might be willing to intervene if they had a stronger belief in their ability to effect change (i.e., a stronger locus of control over crime prevention). Mechanisms to increase locus of control could include an anonymous village reporting system with regular feedback on actions taken in response to tips, or the requirement to return village development fund money publicly if community members are caught hunting (Viollaz and Gore 2019). Both provide a mechanism for reporting and transparency about the enforcement consequences. There are precedents for anonymous reporting systems such as these (e.g., one run by

Education for Nature Vietnam) and, in our study areas, the A Roang Community Conservation Group should help facilitate the implementation of this system. Currently, this group is an informal reporting system, as villagers report to group members when hunters are going hunting so that this information can be passed on to rangers (therefore, the desire to report already exists). To avoid having communities associate these groups with enforcement, an anonymous reporting systemwould not require their direct involvement. There could be anonymous mechanisms for rangers to receive this information, such as a number to text that rangers routinely check before designing their patrols.

Locus of control could also be enhanced through increasing the community's sense of "ownership" of wildlife (which was low in the sample) and promoting a sense of effectiveness in the prevention of wildlife crime. There appears to be room to enhance internal motivation to develop ownership as, across all sites, 28% of interviewees indicate that it was everyone's or the community's responsibility to protect wildlife. Therefore, there is a baseline level of interest in wildlife (or stake in wildlife) that could be further explored and fostered. This could occur by ensuring that communities receive benefits from wildlife-based activities and/or through implementing wildlife crime prevention strategies that have been generated by community members themselves (see Table 5).

Enhancement of effective informal guardianship

Informal guardianship can be enhanced by leveraging peoples' sense of empowerment, ownership, and their perception of a responsibility to act. Empowerment relates to the belief that one has the capacity and resources to effect change. Alack of ownership can be an obstacle to empowerment, as people often have less incentive to protect what is not "theirs" and in which they do not have a stake. Our results indicate several challenges for enhancement of informal guardianship; several respondents noted reasons for non-intervention such as "it's not my job," "it's not my duty," or "I don't have the authority to act." These answers are congruent with a larger focus in Vietnamese society on collective rather than individual action (Van Dao 2020). However, this also seemed related to a "laissez-faire" orientation towards non-compliant community members. If a community member attended awareness-raising meetings about not hunting

protected wildlife and yet continued to hunt, there was little that other members of the community felt they could do to change this behavior. Further, while approximately 60% of respondents said that the protection of wildlife was the responsibility of the reserves and the rangers, a lower percentage (20%) of interviewees noted that the community was responsible for wildlife protection. If there is a widespread belief that responsibility for wildlife protection only lies with formal guardians, this might diffuse the responsibility that residents feel and could lead to the assumption that informal guardianship is unnecessary. However, while 20% is lower than the percentage who cited reserves/ rangers as responsible, it represents the potential for growth of informal guardianship.

Since the results indicated that respondents were more likely to intervene when the offender was non-local, it is important to consider the process of labeling someone as an outsider or "othering" (in the cultural-political context of Viet Nam, a Communist country, this may occur through viewing others as acting contrary to the good of Viet Nam, see Van Dao 2020). While, ethically, this process cannot be introduced externally (by conservation organizations, etc.), it is important to be aware of this social process. The designation of "other" is flexible and people within the community can also be "othered." For example, the results indicate "othering" between hunters. This could potentially be leveraged to defend against outside hunters or even hunters perceived as not needing the income, as several respondents indicated they would be more lenient to hunters they felt lived off the forest and therefore "needed" to hunt compared to others that were not "poor." However, this may only be accomplished if community members buy in to the notion that illegal snare hunting is harmful to the community. Regulations generated by the community may help accomplish this, as these can be more influential than statebased laws on beliefs about the human consequences of poaching (Rizzolo et al. 2017). Although stigmatization can be harmful in certain contexts, it can also have a protective function that promotes conservation and community norms (Rizzolo 2020). In cases where the offender is a community member, there is potential to build on the strong social bonds within the villages to encourage community members to report hunters "for their own good," particularly if the penalties were mild for first offenses but incrementally stronger for repeat offenders.

The enhancement of informal guardianship can also be achieved through the social leverage model suggested in Viollaz and Gore (2019). In this model (Fig. 2), communities include hunting regulations and sanctions in village conventions, including specific actions individuals need to take to stop hunters when they see them. This links to enforcement because fines doled out to hunters are paid from the village development fund like those under PFES. This “stick” (the use of financial fines) has to affect all community members as equally as possible so that an individual’s transgressions have consequences for the entire group. Since the consequences affect the group, this can produce social pressure and leverage community social cohesion to force hunters to stop snare hunting, since offenders will lose face in front of other members. The more hunters are sanctioned from the community (and the more that are caught), the more depleted those common development funds become. Community members noted that more development aid and improvements to their standard of living (e.g., vocational training, technical farming assistance, infrastructure like roads and irrigation systems, etc.) were a priority. The aim would be to link a reduction in snaring to better standards of living and increased snaring to visible and practical communal losses.

This “stick” could be combined with a “carrot” or soft approach such as the work of the A Roang Community Conservation Group near Thua Tien Hue Saola Reserve. This group’s youth identified hunters who were not dissuaded by general awareness raising efforts and enforcement, then built relationships with them by helping with key needs like seed acquisition and planting or fixing up their houses. During these regular interactions with hunters and their families, the youths talked about their conservation work and beliefs. After four to six months of regular interaction, the hunters felt uncomfortable continuing to hunt whilst receiving help from group members. They tended to gradually stop hunting, with group members continuing to check in on them after they had done so (Viollaz and Gore 2019).

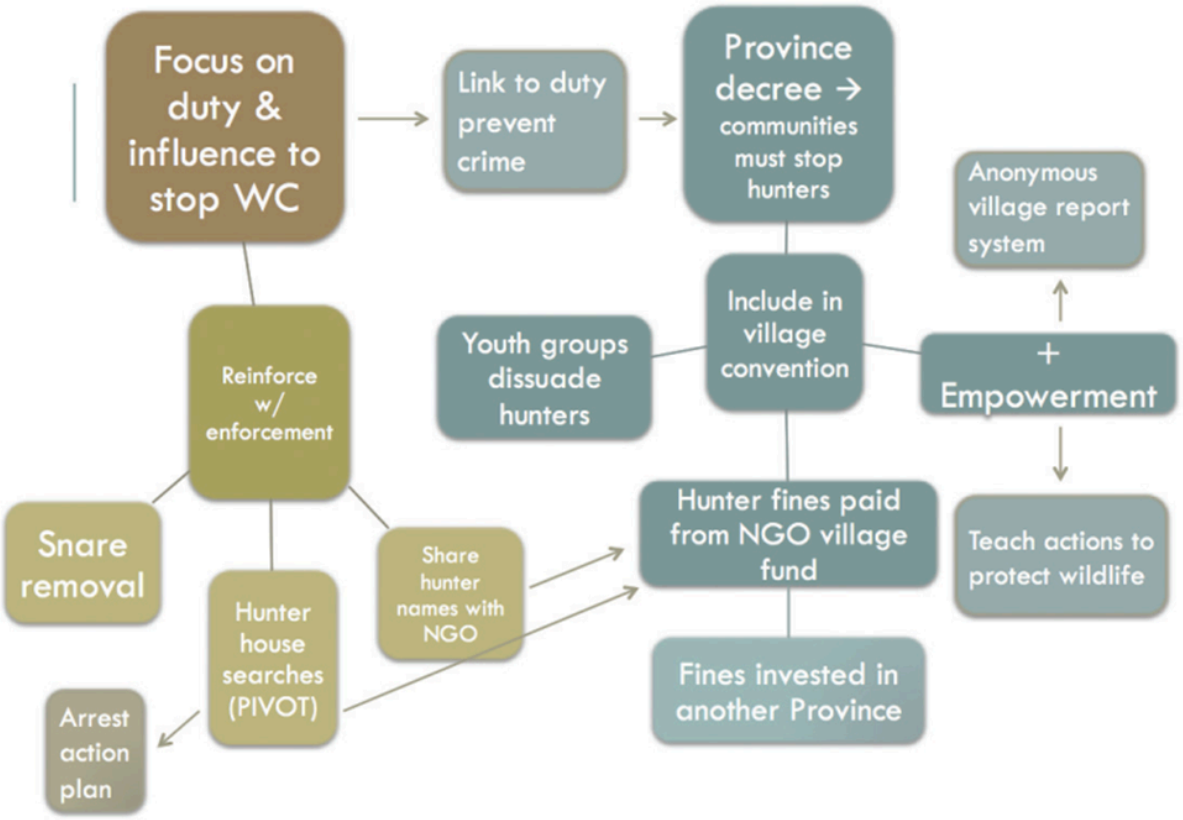

Figure 2. Model of how the formal guardianship (left/yellow) and informal guardianship (right/green) techniques discussed complement one another.

Integrating formal and informal guardianship to maximize deterrence and limit displacement

This paper has also illustrated the challenges and opportunities for integrating formal and informal guardianship. Formal patrols are conducted by conservation organizations near HQN and Pu Mat. However, for punishment to function as a crime deterrent, it must be swift, certain, and severe (Moreto and Gau 2017). Since prison sentences in these areas tend not be certain or swift (Young 2017), immediate fines are perhaps the more effective on-the-ground deterrent.

There appears to be an "opening" for informal guardians to add to formal guardianship, as the number of respondents who listed rangers as a current deterrent was not as high as the percentage of interviewees who said they "would" be deterred by rangers. It may be that the perceived threat of rangers is larger than their actual effect, if, for example, rangers regularly let offenders off with a warning instead of arrest. While there are laws that indicate when an arrest should be made, some rangers use a large degree of discretion on when to apply the rules. This tends

to be due to the numerous obstacles that rangers experience in their vocation, which can lead to low motivation and/or capacity to enforce regulations (see Rizzolo et al. 2021). In these situations, informal guardians could step in and deter possible offenders in alternative ways to complement rangers' efforts or both types of guardians could work together to target specific threats, like middlemen or wildlife traffickers/traders. This makes sense given rangers tended not to blame communities for snaring but rather found middlemen culpable for provoking tensions between them and communities (Rizzolo et al. 2021) and focusing enforcement on middlemen was also a community-generated crime prevention strategy (Table 5). Such integration would also counterbalance conservation's focus on formal guardianship (e.g., state/ranger "ownership" of wildlife and the responsibilities of rangers to protect wildlife), which, for some respondents, served as an impediment to the notion that they should protect wildlife themselves as informal guardians. Further, our results indicate that displacement is possible to achieve with minimal effort, particularly if community members share this knowledge with one another openly and hunters use this information to facilitate illicit behavior. The prevalence of displacement strategies suggests the utility of complementing formal guardianship (e.g., ranger patrols) with informal guardianship, as the latter is particularly effective at combatting displacement (Hollis-Peel et al. 2011).

One of the challenges of formal guardianship is lack of ranger motivation. For formal and informal guardianship to be well-integrated, both "prongs" must function effectively (see Fig. 2). One way to strengthen formal guardianship in low-motivation environments is to target key crime facilitation locations that are easier to access and more geographically circumscribed than the forest itself, a technique known as Place Network Investigations (PNI) in criminology (see Madensen et al. 2017; Hammer 2020, and for its application to wildlife crime Viollaz and Gore 2019). For example, rangers could visit key storage locations like hunters' homes to catch them as they return from hunting or could regularly visit "bia hois" and other corrupting spots that encourage illegal behavior like bushmeat consumption. Through making rangers' work less resource-intensive by focusing their efforts on specific locations, yet more visible and efficient, you encourage willingness to intervene to prevent wildlife crime on the part of communities (Viollaz and Gore 2019). Demonstrations that wildlife crime is taken seriously by formal guardians can enhance informal guardianship

because community members often want to protect their neighbors from serious consequences of poaching such as fines and prison sentences (Viollaz and Gore 2019).

Despite the contributions in this paper, it has inevitable limitations that leave open avenues for future research. The generalizability of the results is constrained by the relatively small sample size and geographical similarities between the study sites. As mentioned, research on informal guardianship in Southeast Asia is nascent, and future research could expand this work to other sites in this geographic region. Further, in studies of illegal behavior, there is always the risk of bias in answers due to social desirability bias or other factors (Rizzolo 2020). In this work, there was the additional hurdle of cultural barriers, such as the need to translate interviewees' responses into English and the potential presence of specialized language (or argot) among snare hunters. While it is important to acknowledge these factors as potential limitations, the researchers attempted to minimize the effects of these obstacles through the creation of a cross-cultural research team, the use of best practice survey research methods, and the triangulation of community interview data with other sources of data within the larger project (such as ranger interviews, see Rizzolo et al. 2021).

Conclusion

The potential of informal guardianship is still under-utilized in the context of wildlife crime (UNODC 2020) but presents an opportunity for addressing the issue of illegal snaring. Snares are a pervasive contributor to defaunation yet the volume of snares, the often-anonymous nature of the offense, and the ease by which snares can be replaced means that the effects of formal detection and enforcement are often limited. The number of snares in protected areas in South-East Asia is staggering (Belecky and Gray 2020) and their removal occurs at high cost and with limited results. Combined with the additional challenges of ranger resources and motivation, there is a lack of capacity to address snaring.

Informal guardianship is part of a larger focus on wildlife crime prevention. This is particularly valuable in the context of snares because, once the animal has been killed or maimed, there are negative conservation ramifications regardless of

whether or not the offender is apprehended (Gray et al. 2018). Our results confirmed the importance of intervention prior to when wildlife is killed. If the animal had already been killed, there was the perception that there was less rationale to intervene (e.g., the hunter may as well keep the animal) and that, since the animal could not be salvaged, the witness might as well ask for some meat and share in the benefits.

This emphasizes the need for frameworks, such as situational crime prevention or SCP (Clarke 1997), that discourage the decision to offend through escalation of the costs and reduction of the benefits of crime. SCP fits within the larger approach of problem-oriented policing, which is crime and place specific, encourages prevention, and promotes combinations of strategies (Lemieux and Pickles 2020). The wildlife crime prevention strategies generated by the interviewees corresponded to principles of SCP, which demonstrates how an integrated approach that utilizes informal guardianship and various deterrence strategies could be successful within Viet Nam's cultural and geographic context.

While informal guardianship is an important tool for increasing risks to offenders, and preventing crime before it occurs, research on this approach has focused on traditional crime (e.g., property theft) in an urban and Western context (Hollis-Peel et al. 2013). This paper has applied informal guardianship to a new context: illegal wildlife snaring in Viet Nam. Our results indicate that the conditions for informal guardianship exist in our study sites. Further, this work has helped map the potential and the obstacles for the use of informal guardianship and the integration of formal and informal guardianship. Such information is essential for both the protection of wildlife and the enhancement of community involvement in the prevention of illegal snare hunting and conservation initiatives in Viet Nam.

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