

# Conservation enforcement: Insights from people incarcerated for wildlife crimes in Nepal

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## ABSTRACT

There are long-standing debates about the effectiveness and social impacts of enforcement-based conservation, particularly as investments into enforcement increase in response to growing alarm about Illegal Wildlife Trade (IWT). However, there is little data on the people subject to this enforcement, including prison sentences, species targeted, what motivates and deters them, and the social impacts of enforcement. This study identified 384 individuals across Nepal who were in prison for IWT offences in late 2016, and involved interviews ( $n = 116$ ) focused on respondents' trade practices, economic circumstances and motivations. IWT prisoners represented 10–20% of the total prison populations in two regions and often received stiff sanctions, with a range of downstream impacts on respondents' families. Most respondents were arrested for their involvement in the rhinoceros trade (61%). Most were poor (56%) and from indigenous communities (75%), highlighting potentially inequitable impacts of enforcement. Despite common assumptions about the links between IWT, poverty and organized crime, most respondents were motivated by the desire to earn extra income and by the ease of IWT compared to other employment. IWT was neither a primary livelihood strategy, nor had the attributes for formal organized crime. Respondents, particularly poor respondents, seemed to underestimate the risks of detection and incompletely understood the scale of sanctions. Improved public awareness about the scale and social impacts of sanctions could help increase deterrence effects while reducing unintended social harms of enforcement.

## KEYWORDS

conservation criminology, deterrence, enforcement, wildlife trade

## 1 | INTRODUCTION

Hundreds of millions of dollars have been recently invested to address Illegal Wildlife Trade (IWT) globally,

heavily focused on enforcement-based approaches to conservation in developing countries (Biggs et al., 2017; Duffy & Humphreys, 2014; WB, 2016). This has included investments to arm, train and support park rangers;

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introduction of “shoot on sight” policies in several countries; military and private security deployments to monitor threatened wildlife; efforts to increase fines and prison sentences; and the introduction of new monitoring technologies such as drones and automatic cameras (Biggs et al., 2017; for example, Hanoi Statement, 2016; WCS, 2016; TRAPS, 2017).

These trends have spurred global debate over enforcement-based and militarized conservation (e.g., Biggs et al., 2017; Büscher, 2018; Challender & MacMillan, 2014; Gray & Gauntlett, 2017; McCann, 2017), including their purported effectiveness at protecting biodiversity, and the potential for negative social repercussions, such as the criminalization of local resource users, including poor and indigenous communities (Cooney et al., 2016; Duffy, 2014; Milner-Gulland, Cugniere, Hinsley, Phelps, & Veríssimo, 2018), and potential for facilitating human rights abuses (e.g., Warren & Baker, 2019). There is also mounting interest in the relative benefits of enforcement-based strategies versus alternatives, such as demand reduction, incentives and alternative livelihood development (e.g., Challender & MacMillan, 2014; Holden et al., 2019; Veríssimo & Wan, 2019). While there is uncertainty over the long-term social and environmental outcomes of increased enforcement spending, IWT rates have often remained high even in the context of increased enforcement (e.g., see Biggs, Courchamp, Martin, & Possingham, 2013; Challender & MacMillan, 2014). Evidence from other sectors, notably drug enforcement, highlights the limitations of enforcement-focused approaches, particularly given growing focus on reducing the unintended social impacts of drug enforcement among both producers and consumers (e.g., Blaustein, McLay, & McCulloch, 2017; Poret, 2002; Stevens, 2013). Yet, traditional enforcement remains an important part of conservation that is unlikely to be replaced by other interventions (Phelps, Shepherd, Reeve, Niissalo, & Webb, 2014), although there is a clear need to explore strategies through which to increase its effectiveness and efficiency while also reducing unintentional social harms.

Despite widespread investment effort, data on the people subject to enforcement—including arrest, prosecution and sentencing rates—are often scattered, inaccessible and unanalyzed (if collected at all), while data on demographics, types of offences and motivations are infrequently collected (see Duffy, St John, Büscher, & Brockington, 2016; Kahler & Gore, 2012). These data are not only important to empirically grounding the growing body of scholarship on social dimensions of conservation, but also to designing more nuanced enforcement strategies that target specific drivers and motivations behind participation in IWT (see Phelps, Biggs, & Webb, 2016).

Nepal exemplifies enforcement-based approaches to IWT (McLean & Straede, 2003). Widely recognized for its

collaboratively-managed community forests, Nepal also has strong enforcement-based responses to IWT of charismatic species (Sinha, 2010; Yonzon, 2006). This includes nearly 7,000 military personnel monitoring protected areas (Nepal Army, 2018), automatic cameras to monitor wildlife (BBC, 2015), and a wave of operations by the Central Investigation Bureau and Wildlife Crime Control Bureaus. Between 2009 and 2014, the number of wildlife seizures increased 10 fold, and IWT arrests increased 8.6 fold (Paudel, 2015). Nepalese law also stipulates high prison sentences and fines for people convicted of IWT offences, and recently increased sanctions for involvement in illegal international trade (summary of legislation in Supplementary Table 1). In some cases, enforcement has even involved extralegal violence in the name of conservation (Warren & Baker, 2019). Collectively, these strategies have reportedly improved conservation outcomes, resulting in a “zero poaching year” in Chitwan National Park (Aryal et al., 2017).

These investments demonstrate Nepal's commitment to criminal justice responses to wildlife crime, yet ongoing incidences of domestic and international IWT demonstrate failings in their effectiveness. While punishment is an important part of the overall approach, conservation also relies on preventing offences from happening in the first place. Prevention is partially addressed by situational crime prevention techniques aimed at making it harder for potential motivated offenders to commit crimes in the first place, and this approach has been explored within the context of IWT (e.g., Lemieux, 2014; Moreto & Pires, 2018; Pires & Moreto, 2011). However, prevention also depends on reducing the numbers of potential motivated offenders through the deterrence effect of criminal justice sanctions, which is the focus of this paper. Deterrence theory suggests that the effectiveness of criminalization and enforcement as a deterrent depends on the severity, celerity (swiftness) and certainty of punishment outweighing the motivations for participating in crime. This is also dependent on would-be offenders being aware of the law and the accompanying risk of penalty (Beccaria, 1764; see Nagin, Cullen, & Jonson, 2018 for a thorough discussion of contemporary deterrence theory).

This study considers why people commit IWT, despite the increases in law enforcement activity and criminal sentences in the Nepali context. It draws on in-depth interviews with prisoners ( $n = 116$ ) across seven jails in Nepal. It describes (1) the people subject to enforcement (demographics, roles within IWT); (2) their offences and sentences, including broader social impacts of their imprisonment, and (3) the reasons behind their involvement in IWT (self-reported motivations, knowledge of sanctions, perceptions of risk). It is, to our knowledge, the first large sample study with people jailed for IWT

(although see Hariohay, Ranke, Fyumagwa, Kideghesho, & Røskaft, 2019). We believe that it is also the first large study interviewing people imprisoned for environmental crimes in a developing country (cf. Eliason, 2004; Forsyth & Marckese, 1993; Muth & Bowe, 1998).

## 2 | METHODS

With permission granted by the Department of National Parks and Wildlife Conservation and the Department for Prison Management in Nepal, we contacted the information officers of all prisons in Nepal ( $n = 74$ ) via telephone to identify the number of people currently incarcerated for faunal IWT (Oct. 2016; Supplementary Table 2; a small number of arrests for rosewood trade were not included as these offenders are categorized differently within the Nepalese prison system and it was not possible to easily identify and gain access to these offenders within the research period. As such, we focused on offenders involved in trade in fauna for this project). Of the 74 prisons, 38 sites held people for wildlife crimes, and we conducted interviews with prisoners ( $n = 116$ ) across seven of these during 2016–2017. For purposes of convenience, we targeted the five prisons with the largest IWT prisoner populations and the two prisons in closest proximity to Kathmandu (see Supplementary Figure 1).

Respondents at the largest prison (Chitwan) were selected from a list of people arrested for IWT in that prison, using the “randomize” function in Excel (31.4% of the population). Where a potential respondent opted not to participate, the next person on the list was approached. At the other sites, we sought to interview all prisoners, which was feasible due to the small populations. Of the 109 people approached in the first round of interviews at Chitwan, Kathmandu Central, Kathmandu Jagannath, Bardiya and Parsa prisons (October 2016 to February 2017), 88 participated (19.3% refusal rate). We then conducted a second round of interviews to increase our sample size at Lalitpur, Rasuwa and Chitwan prisons (June–August 2017). In this round 45 people were approached and 28 participated, with the refusal rate (37.8%) climbing following reports that the government was further charging prisoners for their historic involvement in IWT. This happens as new information comes to light, and was not connected to this research, of which we reassured participants prior to gaining consent.

Interviews were conducted in Nepali by the lead author, a male who grew up in rural Nepal and has a personal understanding of wild resource harvest and prior experience conducting interviews in a prison setting (Paudel, 2015). Prior to interviews, we obtained informed oral consent, following established ethical standards for criminological research (BSC, 2006) and institutional

review (Lancaster University FST REC 16045), including explanation that participation was voluntary, anonymous, and would not affect respondents' sentences. Interviews lasted approximately 1 hour, having been granted national permission for extended visiting times (usually 20 minutes), and were conducted in private. As audio-recording was forbidden under prison rules, responses were recorded manually on the research instrument, with more detailed notes written up after each interview.

Interviews were structured (full interview schedule in English and Nepali available in Supplementary Materials). They primarily involved closed questions, including multiple response, ranking, Likert-scale and short-answer questions split into eight sections: (1) respondent demographics; (2) employment and income, including household income, economic situation and food security; (3) involvement in IWT, including age and year of first involvement, roles participated in, species hunted and traded; (4) current crime and sentence; (5) motives for participating in IWT; (6) knowledge of IWT laws and regulation; (7) perception of deterrence, including perceptions of the risk of being caught, and; (8) social impacts of their incarceration, including impacts on family. Questions about respondents' knowledge of IWT laws and penalties were informed by a review of wildlife legislation in Nepal and the associated species-wise sanctions (Supplementary Table 1). We included some open questions throughout the interview to follow up on responses to closed questions, including further exploration of respondents' experiences with imprisonment as a result of IWT and the impacts this had on their families. We did not, however, focus on recent reports of human right abuses (see Warren & Baker, 2019), which occurred after our fieldwork.

Data from closed questions were coded and analyzed using SPSS v.24 to generate descriptive statistics and, using Spearman's Rho correlations, to explore the relationships among variables. We specifically looked at what variables would help us understand variation in respondents' awareness of the laws. For this, three interview questions about knowledge of IWT regulations were combined into a single ordinal variable, “Overall awareness of laws” (range 0–4, using the first three variables in Table 4). We then tested what variables might be explanatory, expecting age, education and economic status to be potential predictors of variation in their knowledge of regulations (Supplementary Table 3). We also explored the relationships between reported motives for participating in IWT and demographic variables, again expecting that factors such as economic status would correlate with motivations such as nutritional and basic economic need (Supplementary Table 4). However, quantitative analyses were limited by the sample size and heterogeneity within the dataset (e.g., Chi Square results not valid, sample too small for meaningful Latent Class Analysis), and

those that we could conduct revealed few significant relationships. Qualitative data from our open questions was subject to simple, manual thematic analysis that involved generating initial codes and collecting illustrative quotes, and then searching, reviewing and reducing themes (Braun & Clarke, 2019). For this paper, the only qualitative data we draw on are examples of social impacts of imprisonment (see Section 3.2).

## 2.1 | Collecting data on illegal activity

Researching illegal resource activities can be challenging due to issues such as sensitivity and social desirability (Keane, Jones, Edwards-Jones, & Milner-Gulland, 2008; Ruggiero & Khan, 2006). However, this study employed direct questioning, the validity of which is increasingly recognized in research on illegal drugs (MKG, 2007) and on illegal natural resource use (Gavin & Jennifer, 2010; Hinsley, Nuno, Ridout, St John, & Roberts, 2017). Our interviews occurred in the prison context, which potentially presents fewer concerns about respondent integrity and fewer ethical issues, when compared with research on active offenders.

Our sample is not representative of all IWT offenders in Nepal. The sample has geographic bias (e.g., towards lowlands with the largest IWT prison populations), which may have affected data on species, such as the underrepresentation of high elevation species (e.g., snow leopards). The sample only includes IWT participants who were arrested and jailed for their offences, so excludes IWT participants who were not caught, avoided jail time and/or committed offences not deemed severe enough to receive

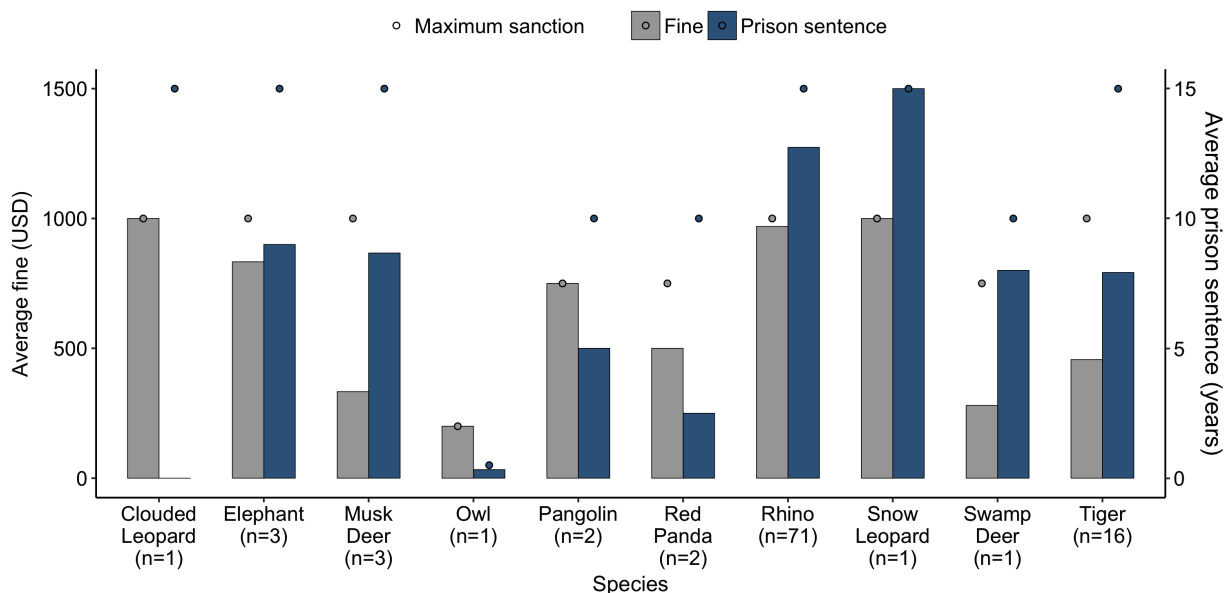
prison sentences. Our sample likely includes a disproportionate number of respondents serving longer sentences. While it is not possible to be sure of the reasons individuals refused to participate, we anticipate that refusals were more likely among offenders involved in organized crime roles. Taken together, our sample is best interpreted as illustrative of people involved in domestic harvest and trade roles who have been subject to arrest and imprisonment and who were willing to participate in interviews.

## 3 | RESULTS

### 3.1 | Respondent IWT roles and demographics

Out of 74 prisons across Nepal, 38 prisons hosted a total of 384 IWT prisoners during the start of research in late 2016 (Figure 1, Supplementary Table 2), although no historical baseline has been compiled to enable comparison. People convicted for IWT represented a small part of the prison population at most sites (0.1–3.3%), but formed 21.1% of the total prison population in Chitwan, 9.6% in Bardia and 6.4% in Rasuwa.

Respondents participated in a range of roles across IWT market chains, including harvest, transport and retail. Harvest was the most common role reported, and only a small number of respondents were involved in international transport (12%, Table 1). Nearly one third of respondents reported involvement in only one role (31.9%), 39.7% participated in two or three different IWT activities, and 15.5% reported having participated in four



**FIGURE 1** Average fine and prison sentence by species ( $n = 99$ ; remaining cases were awaiting sentencing), compared with maximum allowable sanctions (Supplementary Table 1)

**TABLE 1** Reported frequency of participation in different roles in illegal wildlife trade ( $n = 116$ )

| Roles in wildlife trade chain  | Respondents (%) |      |       |
|--|-----------------|------|-------|
|  | ≥10 times       | <10  | Never |
| Harvesting   | 14.7            | 35.3 | 50.0  |
| Transporting domestically  | 9.5             | 12.9 | 77.6  |
| Informing other harvesters about wildlife habitat and movement                   | 4.4             | 17.2 | 78.4  |
| Consuming wildlife at household level  | 4.3             | 4.3  | 91.4  |
| Retailing to intermediaries  | 3.4             | 30.2 | 66.4  |
| Retailing to consumers   | 3.4             | 5.2  | 91.4  |
| Informing other harvesters about conservation enforcement (patrolling, movement) | 3.4             | 7.8  | 88.8  |
| Transporting over an international border  | 1.7             | 10.3 | 87.9  |
| Long-term storage of wildlife  | 0.9             | 17.2 | 81.9  |
| Supplying wildlife to friends and neighbors (e.g., local exchange, gifts)        | 0               | 11.2 | 88.8  |

or more different roles, while 12.9% did not respond to this question. Involvement in IWT was usually part of a group (54.3%) and often in response to a request from a specific customer (47.4%).

The respondents were overwhelmingly male (99.1%), with an average age of 36 at time of arrest (range 17–70). The vast majority were from the Janajati group of castes (75%), which are largely marginalized indigenous communities from the Tamang, Chaudhary and Chepang/Praja castes. Educational levels varied, including numerous illiterate respondents (31.9%; Table 2).

Most respondents self-reported as “poor” across several metrics (Table 3). Self-reported household income at the time of arrest placed most respondents’ households under the World Bank defined poverty line for Nepal (56.0%; approx. US \$ 1.9/person/day). Most respondents also reported that their household income was not enough to survive on (36.2%) or only enough to cover the day-to-day costs of living (47.4%), with >80% of respondents responsible for at least one dependent (Table 2).

Participation in IWT was an additional source of income for the vast majority of our respondents, with only 10.3% reporting IWT as their primary occupation before arrest. Respondents reported primary employment across a range of other sectors, often in insecure jobs within the informal sector, and included agriculture (28.4%), informal wage labour (14.7%), transport (8.6%), skilled trades (8.6%) and mobile traders (e.g., of crops, carpets, 8.6%). Many held jobs that involved moving from place-to-

**TABLE 2** Demographic characteristics of IWT prisoners ( $n = 116$ )

| Characteristics                          | Number (%) |
|--|------------|
| Gender                                   |            |
| Male                                     | 115 (99.1) |
| Education status                         |            |
| Illiterate                               | 37 (31.9)  |
| Primary school                           | 41 (35.3)  |
| Secondary school                         | 33 (28.4)  |
| University                               | 5 (4.3)    |
| Caste group                              |            |
| Janajati                                 | 87 (75)    |
| Brahmin-Kshetri                          | 18 (15.5)  |
| Dalit                                    | 6 (5.2)    |
| Indian and Chinese                       | 5 (4.3)    |
| Number of dependents (aged < 16 or > 58) |            |
| 0  | 22 (19.0)  |
| 1–2                                      | 62 (53.4)  |
| 3–5                                      | 32 (27.6)  |

**TABLE 3** Respondents’ self-reported economic status at the time of their arrest ( $n = 116$ )

| Indicator  | Number (%) |
|--|------------|
| World Bank poverty line (<US\$1.9 per person per day)                |            |
| Households below poverty line (based on reported household income)   | 65 (56.0)  |
| Household economic status  |            |
| Not enough to survive  | 42 (36.2)  |
| Only enough to cover day-to-day costs                                | 55 (47.4)  |
| Comfortable  | 14 (12.1)  |
| Well off   | 5 (4.3)    |
| Household food security  |            |
| Sometimes children and adults in household do not have enough to eat | 7 (6.4)    |
| Sometimes adults in household do not have enough to eat              | 34 (31.2)  |
| More than enough food to eat   | 68 (62.4)  |

place. Notable others included two military officials, two politicians and three secondary school students.

### 3.2 | Offences, penalties and social impacts

Most respondents were convicted for the harvest and trade of a small number of species: *Rhinoceros unicornis* (Greater



One-horned Rhinoceros) (61.2%), *Panthera tigris tigris* (Royal Bengal Tiger) (13.8%) and *Ailurus fulgens* (Red Panda) (12.1%), and were focused in lowland protected areas (Chitwan and Bardia National Parks). Fines and prison sentences varied across cases and taxa (Figure 1; see Supplementary Table 1). Maximum sanctions were imposed in some cases, notably for rhinoceros, including approx. US\$960 fine and > 10 years imprisonment.

Nearly half of respondents described additional negative impacts on their families' livelihoods or children's education as a result of their imprisonment, with 14.5% reporting both. Respondents also described other social impacts, including divorce or estrangement from their wife ( $n = 12$ ); family members having to work harder ( $n = 11$ , including two reports of family members having to take jobs in other countries); having to sell property or close businesses ( $n = 8$ ), and stigma or loss of prestige ( $n = 7$ , including 1 parental suicide, 1 family changing religion, and 1 daughter unable to marry).

### 3.3 | Awareness of law and perceived risk

Most respondents reported that they were aware, prior to their arrest, that IWT was illegal (93.1%), although few knew the scale of related fines and imprisonment (Table 4), and only one third stated concern about the possibility of arrest (34.5%). More than half (52.6%) were convicted within 1 year of their first reported involvement with IWT. Only a minority (8.6%) were repeat offenders, and 16.4% of respondents planned to return to IWT post-release (including 4 of the existing repeat offenders).

Respondent awareness of laws correlated moderately with household economic status ( $r = 0.425$ ;  $p < .01$ , see Table 3) and household food situation ( $r = 0.318$ ;  $p < .01$ ), suggesting that poorer respondents were less likely to be aware of the risks of penalty (although direct economic measures of poverty, such as reported household income, were not significantly related to overall awareness of laws; see Supplementary Table 3).

### 3.4 | Motives for participating in IWT

Respondents reported diverse motivations for participation in IWT (Table 5). Few relied on it as a primary livelihood, and direct household need was not a leading reported motivation (e.g., money to meet basic needs, 11.2%; IWT to meet nutritional needs, 6.0%). Instead, IWT served primarily to earn extra money (87.9%) and represented a less tiring job than alternative sources of income (37.1%). Family food situation was weakly

**TABLE 4** Respondent awareness of sanctions for IWT crimes ( $n = 116$ )

| Prior to arrest, were respondents:                   | Responses (%) |      |
|--|---------------|------|
|  | Yes           | No   |
| Aware that IWT is illegal?                           | 93.1          | 6.9  |
| Aware of the penalties connected to IWT?             | 30.2          | 69.8 |
| Aware of species-wise provisions of those penalties? | 86.2          | 13.8 |
| All species-wise provisions:                         | 75.9          |      |
| Some species-wise provisions:                        |               |      |
| Concerned about the possibility of arrest?           | 34.5          | 65.5 |
| Will you return to IWT after your release?           | 16.4          | 83.6 |

**TABLE 5** Reported motivations for participating in IWT ( $n = 116$ )

| Motives                                | Responses (%)  |                  |              |
|--|----------------|------------------|--------------|
|  | Primary reason | Secondary reason | Not a reason |
| To make extra money                    | 87.9           | 6.9              | 5.2          |
| Less tiring job than alternatives      | 37.1           | 26.7             | 36.2         |
| Money to meet basic household needs    | 11.2           | 26.7             | 62.1         |
| Peer pressure                          | 10.3           | 25.9             | 63.8         |
| Household nutritional needs            | 6              | 6.9              | 87.1         |
| For entertainment                      | 4.3            | 3.4              | 92.2         |
| Preference for wild meat               | 0              | 6                | 94.0         |
| To show-off                            | 0              | 5.2              | 94.8         |
| In response to human-wildlife conflict | 0.9            | 3.4              | 95.7         |
| To rebel against government authority  | 0              | 1.7              | 98.3         |
| For cultural & religious reasons       | 0              | 0.9              | 99.1         |
| For ornamental household use           | 0              | 0.9              | 99.1         |

correlated to the motivation of nutritional need ( $r = 0.249$ ;  $p < .01$ ) and moderately correlated to the motivation of needing money to meet basic household needs, and household economic status was moderately related to needing money to meet basic household needs ( $r = .452$ ;  $p < .01$ ). We also identified a weak correlation

between age of first involvement in IWT and the motivation of finding IWT easier than other work options ( $r = .286$ ;  $p < .01$ ). No significant relationships were found between reported motivations and demographic variables (Supplementary Table 4).

## 4 | DISCUSSION

Amidst widespread calls for strengthened enforcement to protect biodiversity from IWT, we know very little about the people being imprisoned for these crimes. This study provides unique demographic and motivational data necessary for developing effective and equitable conservation policies. There were clear patterns in respondent demographics; many people were poor, illiterate, and 75% come from historically-marginalized indigenous communities (Table 2), although these groups make up only 35.8% of Nepal's population (CBS, 2011). However, when considering other variables (e.g., awareness of rules, employment, motivations), our sample was very heterogeneous. The sample size, while large by the standards of prison interview research, was too small to make meaningful attempts at using statistical analysis techniques to develop a typology based on cluster analysis (e.g., via Latent Class Analysis). Nevertheless, the descriptive data illustrates the diversity of IWT involvement.

Our findings highlight robust conservation enforcement, particularly for charismatic species (tigers, rhinoceros) around lowland protected areas, where as much as 10–20% of the overall local prison populations were people convicted for wildlife crimes. These imprisonment rates illustrate not only the scale of enforcement, but also the scope for additional interventions that aim to help reduce offence rates. On the one hand, penal sanctions can play an important role in individual and general deterrence. On the other hand, high numbers of incarcerated offenders, particularly at the local scale in regions such as Chitwan, suggests that the deterrence role could be more effective. This is especially true given our findings about the lack of awareness of penalties and the risk of arrest associated with IWT among our sample. While punishment and other enforcement activity shows a strong response to IWT, that so many people are still ending up in prison leads us to ask why these people have remained undeterred from participating in IWT offences.

Criminology offers insights into how to increase the effectiveness of enforcement-based conservation approaches in ways that also help to address social equity. In particular, rational actor perspectives posit that the decision whether or not to commit a crime will depend on the balance between the perceived associated risks and rewards. Classic

theory argues that the deterrence effect of a punishment depends on the severity, celerity (swiftness of enforcement) and certainty of punishment following a crime, weighed against the motivation to commit the crime in the first place (Nagin et al., 2018). In the context of this sample, punishment turned out to be certain, severe and swift. All of our respondents were convicted offenders who were imprisoned (certainty) and experienced considerable sanctions (severity): not only were there 384 people identified as imprisoned for IWT, but we found significant fines and imprisonment (often >5 years, Figure 1). Moreover, verdicts indicated the use of judicial discretion to apply high sanctions, particularly for rhinoceros trade (Figure 1). The results also highlighted a range of downstream social impacts on respondents and respondents' families. In addition, most respondents were arrested shortly after their first involvement in IWT (high celerity). The persistence of IWT under this enforcement context suggest failing in its deterrence effects, which may be explained perpetrators' motives for participating in IWT and the associated risk–reward calculations.

### 4.1 | Motives for IWT participation

A range of economic and non-economic factors shape evaluations of the costs and benefits associated with IWT participation (Cooney et al., 2016). The results demonstrate the role of poverty in driving some offenders into IWT, as indicated by the relationship between reported indicators of poverty (food situation, household economic status) and motivations associated with basic household economic and nutritional needs. Yet, despite high poverty rates among respondents, most did not report basic household needs—either economic or nutritional—as their primary motivations for participating in IWT (Table 5). Making *extra* money was overwhelmingly the most common primary motive, followed by the perception that IWT is a less tiring job than its alternatives. This mirrors our finding that IWT was not pursued as a primary employment by the vast majority of respondents, and that often aspiration (rather than desperation) may be an important IWT driver in some contexts. Peer pressure was also a commonly reported motive (36.2%), which mirrors findings elsewhere that IWT crimes were associated with belonging to a particular social or cultural group (e.g., Nurse, 2011, 2013; Rytterstedt, 2016). Other anticipated motivations such as IWT in response to human-wildlife conflict, for cultural reasons, and for household use were little reported by the respondents.

These findings reflect growing awareness of the diversity and complexity of IWT motives (Cooney et al., 2016; Duffy et al., 2016; Kahler & Gore, 2012), and the need for

more specific terminology to distinguish among the diverse roles in and motivations for IWT participants (e.g., Tables 1, 5; cf. Phelps et al., 2016). These findings also suggest the need to further interrogate the types and perceptions of need, even within poor communities, and in the context of how respondents view themselves (e.g., Mbeti, Banga-Mboko, & Racey, 2011; see Duffy et al., 2016). It supports existing research arguing that poverty reduction alone is unlikely to reduce IWT (TRAFFIC, 2008), and suggests the need for a more nuanced understanding of motives, so that targeted interventions can respond to specific drivers.

Significantly, reported motives were not explicitly linked to organized crime, which is a leading narrative in some parts of the conservation community (e.g., London Conference, 2018). In fact, while respondents reported that IWT was often coordinated with others (54.3%), this seems to more closely resemble “crime that is organized”, rather than participation in organized crime as popularly conceptualized (see Pires, Schneider, & Herrera 2016). Nevertheless, some respondents were involved in international trafficking (12%) and nearly half were responding to requests from specific customers for high-value wildlife products in demand by international markets, which suggests possible involvement with formal networks. While these individuals may represent bottlenecks for strategic conservation interventions to disrupt organized networks (see Phelps et al., 2016), efforts to curb IWT should avoid blindly following logical, but weakly supported narratives, and ensure that they reflect the diversity of reported motivations. Importantly, while there are clearly motivations to participate in IWT, these alone do a poor job at explaining the high rates observed in our dataset.

## 4.2 | Low awareness of rules, risks and consequences

The conditions laid out by classical criminological theory have been largely met for most respondents in our sample, the results suggest that other, important underlying conditions were not met. Notably, deterrence relies not only on the intensity of conservation enforcement (see Holden et al., 2019), but also relies on people's awareness of the rules and the consequences of noncompliance, and the resulting sense of risk. There was a minority of respondents who, by virtue of their imprisonment, understood these risks, but who were nevertheless repeat offenders and/or reported an intention to return to IWT after their release. For these individuals, existing enforcement strategies, combined with their risk/reward ratios and underlying motivations, were inadequate to shift behavior. However, this was the exception among the respondents.

For most respondents, our results suggest information asymmetries in perpetrators' knowledge about rules, and possible miscalculations in their perceptions of risk (Table 4). Despite high sanctions (Figure 1, Supplementary Table 1), respondents reported low understanding of these rules (Table 4) and limited concern that they might be arrested, alongside low economic reliance on IWT (Table 2). As most respondents were arrested shortly after their reported first participation in IWT, their involvement was also unlikely deeply informed by prior experience or involvement in professionalized IWT and organized crime. This suggests skewed risk–reward calculations among many IWT perpetrators, (although this interpretation does not apply to the minority of repeat offenders). Despite critiques of the “knowledge deficit model” (e.g., Heberlein, 2012), it is clear that people can only comply with rules about which they have knowledge (cf. Ostrom, 1990), and can only evaluate them if they understand the risk associated with detection, prosecution and sanctions.

During a period of grow investment into IWT enforcement, public awareness campaigns about IWT enforcement might increase the deterrence effects of existing enforcement. Such efforts might address information deficits about regulations and sanctions, noting judicial discretion in imposing high fines and imprisonment terms, including for taxa that might not be widely considered conservation priorities likely to face stiff sanctions (e.g., common leopard, owl, pangolin; Figure 1).

Deterrence aims might also be served by publicizing the broader non-legal, often unrecorded, social impacts of enforcement, including on children, marriages and family prestige. These types of elements have proven important to, for example, reducing driving under the influence of alcohol, including through highlighting social sanctions and stigma via media campaigns (Davey & Freeman, 2011; Elder et al., 2004). Such approaches would need to take account of relatively low education levels in some target communities, but use of personal stories might be an effective alternative to simply communicating technical legal details.

Such expanded public engagement about IWT sanctions is particularly important in the context of new, often strengthened conservation rules, as are emerging in Nepal and some other countries (Supplementary Table 1). Awareness might increase not only the efficiency of existing enforcement investments but also their undesirable social impacts, where it reduces the imposition of severe sanctions on marginalized communities. Importantly, it is a comparatively affordable “add-on” to existing, often high-cost enforcement actions. In September 2019, the lead author used data from this project to inform a public awareness campaign in key IWT hotspots in Nepal. That effort used



traditional folk music to communicate the severity of IWT sanctions and share stories about the downstream social impacts of IWT imprisonment (<http://www.greenhood.org.np/2019/09/03/bangkokatha/>). There is a clear need to evaluate the costs and effectiveness of such education-based interventions targeting potential IWT participants, as has started to happen with education programs that target consumers (Holden et al., 2019; Verissimo & Wan, 2019).

### 4.3 | Unintended social impacts of enforcement

Getting the balance between enforcement and deterrence right is important not only because for the effectiveness and efficiency of conservation, but also because our dataset highlights some key social equity outcomes. These are particularly salient in the context of this study, given the marginalized cultural, economic and educational status of many of the respondents, and recent reports of human rights abuses by park rangers (see Warren & Baker, 2019). Moreover, poorer respondents were significantly less likely to know the rules. Indeed, IWT often involves poor local residents, the “small fish and scapegoats” who are most easily subject to enforcement, while higher-level “intellectual actors” are infrequently arrested (Ghale, 2017; see Phelps et al., 2016).

While the results cannot explain why these populations are so disproportionately represented in our dataset, this skew has significant implications for social equity dimensions of enforcement-based conservation. This apparent targeting exemplifies the differentiated, inequitable social impacts that can arise from enforcement-based conservation (see West, Igoe, & Brockington, 2006), which are not a mainstream part of conservation dialogues in Nepal (see Greenhood Nepal, 2018). Moreover, the imprisonment of indigenous people around Chitwan District Prison overlaps with a region where thousands of people were previously resettled outside of Chitwan National Park (McLean & Straede, 2003); 16 respondents reported that they were born within the park—potentially highlighting how current IWT policies may compound the impacts of historical expropriation of indigenous lands.

While enforcement resulting in imprisonment does not appear to be heavily targeting traditional or subsistence IWT activities (e.g., bushmeat harvest), or trade driven primarily by basic household needs, enforcement burdens are still disproportionately borne by some of Nepal's most marginalized people. Moreover, many appear to be systematically underestimating the risks associated with IWT, particularly in the context of increasingly enforcement-based responses to IWT.

This has profound implications for the efficiency of conservation investments and for unintended social outcomes.

## 5 | CONCLUSION

Much of the debate over enforcement-based conservation is occurring within a fairly data-poor context. Analyses of prison trends and prison-based interviews offer insights for conservation practice and research, and data on enforcement, arrests, sentences and perpetrator profiles (as well as supplementary data about species, roles, destinations, etc.) should become a routine part of interventions that promote conservation enforcement.

This is meaningful not only because reducing imprisonment is important to individual perpetrators and their communities, but also because it reflects whether enforcement investments are resulting in meaningful change. Indeed, there is a need to better reflect on the intended outcomes that conservation agencies expect will arise from increased enforcement, and there is concern that many interventions may not be accounting for the causal chains linking actions to outcomes (see Biggs et al., 2017). In this case, conservation may best be achieved not through strengthened enforcement alone, but also by accounting for perpetrator knowledge, motives and perceptions of risk, as well as enforcement biases towards certain taxa and types of perpetrators. Strategic modifications might help ensure that enforcement actions are both more effective and equitable.

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### CONFLICT OF INTEREST

The authors declare there is no conflict of interest associated with this publication.

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## SUPPORTING INFORMATION

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

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