Received: 26 December 2023 | Revised: 3 July 2024 | Accepted: 11 August 2024

DOI: 10.1111/csp2.13245

CONTRIBUTED PAPER

Conservation Science and Practice
A journal of the Society for Conservation Biology
Open Access
WILEY

# Does endemic mammal conservation in Jamaica conflict with maintaining biocultural heritage?

**Samuel T. Turvey**[1,2] | **Orlando F. Robinson**[3] | **Clare Duncan**[1,4] | **Rosalind J. Kennerley**[2,5] | **Susan Otuokon**[3]

[1]Institute of Zoology, Zoological Society of London, London, UK

[2]IUCN Species Survival Commission Small Mammal Specialist Group, Gland, Switzerland

[3]Jamaica Conservation and Development Trust, Kingston, Jamaica

[4]Centre for Ecology & Conservation, Biosciences, College of Life and Environmental Sciences, University of Exeter, Cornwall, UK

[5]Durrell Wildlife Conservation Trust, Les Augrès Manor, Trinity, Jersey, Channel Islands, UK

**Correspondence**
Samuel T. Turvey, Institute of Zoology, Zoological Society of London, Regent's Park, London NW1 4RY, UK.
Email: samuel.turvey@ioz.ac.uk

Susan Otuokon, Jamaica Conservation and Development Trust, 25 Eastwood Park Road, Kingston 10, Jamaica.
Email: susanotuokon@gmail.com

**Funding information**
Research England; Global Environment Facility; AXA Research Fund

**Abstract**

Understanding human–wildlife interactions within biocultural systems is essential to support evidence-based conservation and Indigenous cultural integrity, and to identify inclusive "win-win" options for coexistence with threatened species. Jamaica's Blue and John Crow Mountains contain a population of the Endangered Jamaican hutia or coney (*Geocapromys brownii*), one of the last surviving Caribbean mammals, as well as Maroon communities that practice hunting as a traditional cultural activity. An interview survey was conducted in two Maroon communities within this conservation-priority landscape to understand local knowledge and attitudes toward coneys, and the cultural importance and dynamics of interactions with coneys. Experience of coney consumption is relatively widespread through small-scale local trade in hunted animals, but few respondents consider hunting to be of cultural or economic importance, very few people specifically hunt coneys, and most respondents support coney conservation. Conversely, crop damage caused by coneys is considered a substantial problem and is associated with decreased conservation support. Although we estimate that almost 530 coneys were killed during the previous year by our respondent sample, local perceptions suggest that hunting may not be having a negative impact on the coney population, and coney conservation can hopefully be integrated equitably with Maroon cultural values and needs.

**KEYWORDS**

evidence-based conservation, *Geocapromys*, human–wildlife conflict, hutia, Indigenous knowledge, traditional hunting

## 1 | INTRODUCTION

In social–ecological systems where human communities and threatened species occupy the same landscapes, evidence-based conservation requires an understanding of the dynamics, drivers, and sustainability of human–wildlife interactions (Lishka et al., 2018; Virapongse et al., 2016). Although Indigenous and rural peoples have long histories of coexistence with biodiversity, their activities can become unsustainable through cumulative additional pressures (e.g., wider-scale land clearance, invasive species, climate change), changing local interactions or emerging external drivers (e.g., outside demand for animal products), or because traditional behaviors exert increasing pressure due to population expansion into natural habitats (Esmail et al., 2020; Williams, 2013). However, traditional cultures are also being disrupted by exposure to Western cultural and economic norms, with widespread erosion of languages, heritage, and environmental knowledge and relationships (Harrison, 2007; Tang & McGavin, 2016). The need to maintain the diversity of traditional cultures to support human rights, identities, dignity, and well-being is increasingly recognized, and preservation of biocultural diversity is a key conservation and development goal (Gavin et al., 2015). It is therefore essential to evaluate the relationship between traditional practices and biodiversity management in conservation hotspots, to identify potential "win-win" options for human–wildlife coexistence (König et al., 2020, 2021; Levin et al., 2015).

The insular Caribbean is a global biodiversity hotspot (Myers et al., 2000), and supports numerous rural human communities that traditionally interacted with natural landscapes for food, medicines, other ecosystem goods and services, and as a core component of their cultural identities (Saunders, 2005). This region formerly contained a diverse mammal fauna including many endemic rodents, which have experienced severe population losses and extinctions due to past human activities (Cooke et al., 2017). Most surviving species are threatened (Turvey et al., 2017), and the Caribbean is a global-priority region for rodent conservation (Kennerley et al., 2021), representing substantial at-risk evolutionary history (Collen et al., 2011). One of the few remaining species is the Jamaican hutia or coney (*Geocapromys brownii*), Jamaica's only surviving native rodent. This large-bodied species (1–2 kg; Anderson et al., 1983) was hunted for food by pre-Columbian Amerindian peoples (Wilkins, 2001), and by rural communities following European colonization (Anthony, 1920; Clough, 1976; Gosse, 1851). It is also persecuted as a perceived crop pest in some regions (National Environment and Planning Agency, 2010; Oliver, 1976). The species has been extirpated from parts of its range due to hunting (Turvey et al., 2017; Wilkins, 2001), and is listed as Endangered by IUCN (2023).

Coneys mainly persist in montane forested landscapes that are also home to Maroon communities, the descendants of enslaved Africans who escaped and formed independent communities with the small remaining Indigenous Amerindian population (Kopytoff, 1976), and who are recognized on UNESCO's Representative List of the Intangible Cultural Heritage of Humanity (UNESCO, 2022). Although Maroon subsistence patterns and social–ecological interactions have changed over time (Barker & Spence, 1988), their cultural values and customs are strongly associated with nature and encompass diverse use of natural resources (Picking et al., 2019; Picking & Vandebroek, 2019). Traditional Maroon practices include wild food harvesting, which provides food security and maintains cultural cohesion, knowledge and identity (Campbell et al., 2021; Gibson, 2020). Maroon communities hunt wild pigs and coneys (locally known as "grazies") as a traditional activity (National Environment and Planning Agency, 2010), and relatively limited levels of offtake (for consumption and/or persecution) may be sufficient to drive coney declines (Wilkins, 2001). Conversely, whilst Jamaican landscape conservation has been shaped by the distribution of Maroon communities (Moulton, 2023), tensions exist between traditional Maroon interactions with nature and externally imposed legislation to manage land use for conservation (Douglas, 2013; Favini, 2018). Evidence-based biocultural management is therefore needed to protect both coneys and Maroon cultural needs within Jamaica's social–ecological systems.

To identify management solutions that minimize conflict between conservation, local community values and intangible cultural heritage, we conducted research within a Jamaican landscape that supports a surviving coney population and a regional center of Maroon culture. We aimed to establish a new baseline on community awareness, experience, attitudes, and values associated with coneys and their conservation, and to understand the magnitude, dynamics, and predictors of local behaviors and human–wildlife interactions exhibited in relation to coneys. Our findings can guide conservation planning and development policy that safeguards both coneys and Indigenous values, and provide wider lessons for integrating management of natural and human components of biocultural systems.

## 2 | MATERIALS AND METHODS

### 2.1 | Study site

Fieldwork was conducted within the Blue and John Crow Mountains National Park, a UNESCO World Heritage Site that contains Jamaica's largest contiguous tropical forest (Figure 1). This landscape contains a well-documented coney population (Anthony, 1920; Clough, 1976; National Environment and Planning Agency, 2010; Oliver, 1976, 1982; Oliver &

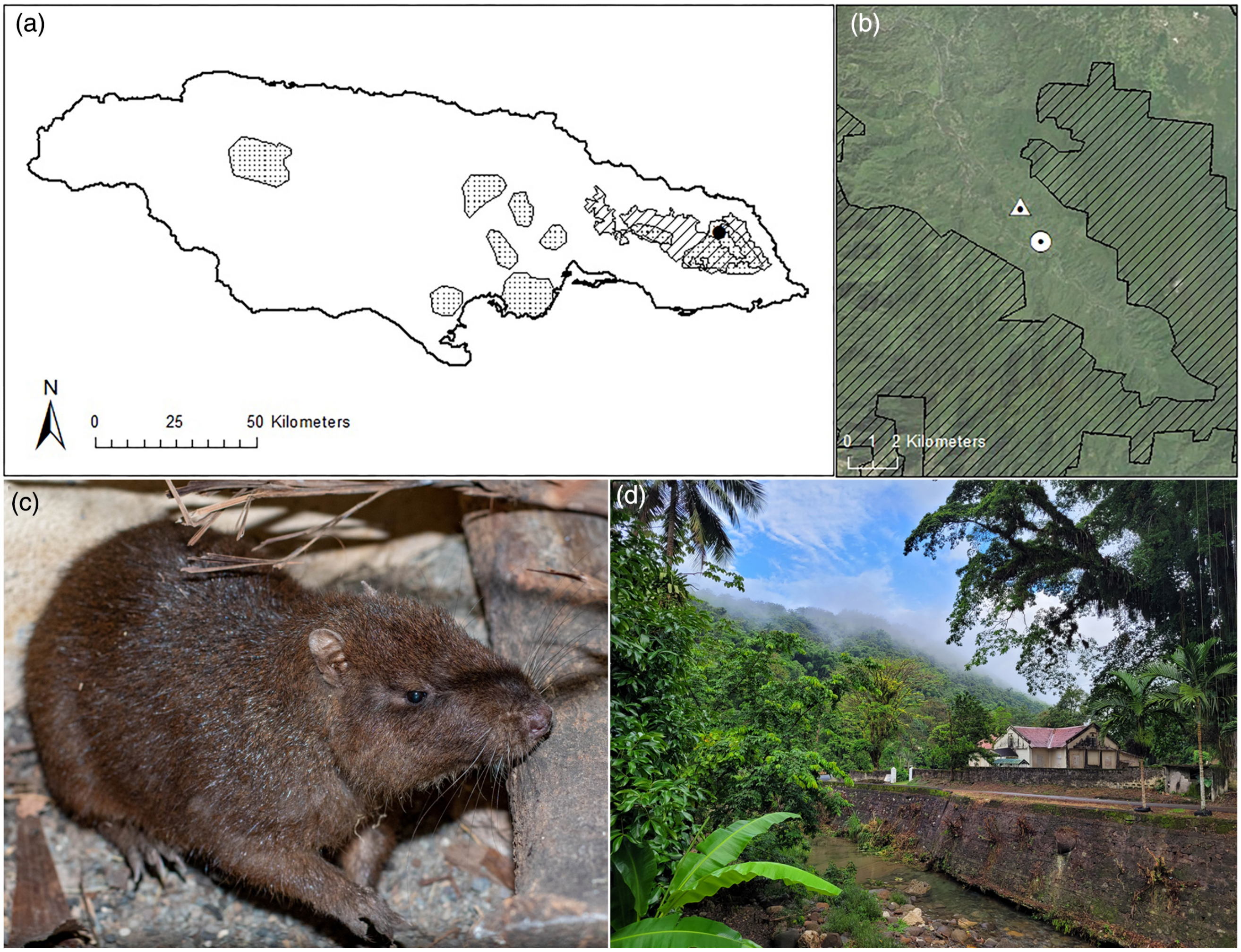


FIGURE 1 (a) Map of Jamaica, showing Jamaican coney distribution (stippled areas; IUCN, 2023), Blue and John Crow Mountains National Park (hatched area), and location of study landscape (circle). (b) Study landscape, showing Blue and John Crow Mountains National Park (hatched area), Moore Town (triangle), and Cornwall Barracks (circle). Map source: Esri, Maxar, Earthstar Geographics, and GIS User Community. (c) Jamaican coney in Hope Zoo, Kingston (photograph copyright Jeremy Wiggan). (d) Moore Town and the Blue Mountains (photograph copyright Samuel Turvey/ZSL).

Wilkins, 1988). It also historically provided refuge for the Windward Maroons, who became Jamaica's first free Maroon nation in 1740. Several Maroon communities are situated within the Community Buffer Zone that extends 1 km around the park's boundary (Otuokon et al., 2012).

Local livelihood systems are based primarily on small-scale agriculture (Campbell et al., 2021). Communities also hunt coneys (Oliver & Wilkins, 1988), although hunting levels may have varied over recent decades, with coneys either hunted deliberately and/or killed incidentally by dogs when hunting wild pigs (Turvey et al., 2017). Agricultural expansion has led to progressive clearance and cultivation of slopes (Oliver, 1976; Oliver & Wilkins, 1988), with a reported increase in local coney encounters and crop damage during the past decade (Turvey et al., 2017).

## 2.2 | Data collection

An interview survey was conducted in July–August 2019 and July 2020 in two major Maroon communities in Portland Parish: Moore Town (population ~ 1060 inhabitants; 2011 census data) and Cornwall Barracks (population ~ 1020 inhabitants; 2011 census data), situated ~1 km apart along the Rio Grande Valley (Figure 1). These communities were selected because of reports from the Moore Town Maroon Council that coneys had locally increased and were becoming crop pests.

The survey consisted of 1-on-1 interviews with local respondents. Interviews were conducted by two Jamaican interviewers employed by the Jamaica Conservation and Development Trust, who had extensive prior experience with conducting engagement activities about environmental topics and sustainable development in both communities. Most respondents were selected opportunistically by walking through each community and asking anyone encountered whether they were happy to participate. This approach has been employed successfully to collect diverse datasets in previous studies of local ecological knowledge, specifically about interactions with threatened species within rural social–ecological systems (e.g., Gleave et al., 2024; Turvey et al., 2014, 2015). A small number of respondents identified locally as coney hunters were also deliberately targeted through snowball sampling (Newing, 2011). Only people aged 18 or above were interviewed, with only one person interviewed per household. Respondents were not selected or excluded on the basis of any other socio-demographic parameters. Participation was voluntary, with potential respondents informed about study aims, that interviews were anonymous, and that they could withdraw at any time or choose not to answer any question. Interviews were only then conducted following verbal consent, with nearly all people agreeing to participate. Study design was approved by the Durrell Wildlife Conservation Trust Ethics Committee (ETH22/04).

Interviews used a standard questionnaire including 49 closed and open questions that took 20–30 min to complete (Data S1, Supporting Information). Following an initial question about informed consent, information was collected on respondents' socio-demographic characteristics and activities (12 questions about age, sex, how long they had lived in their community, monthly household income, occupation, and details of farming activities and forest visits). Respondents were then asked 12 questions about knowledge and experience of coneys. They were asked if they knew what a coney or grazie was, and to describe the animal; if they were unsure, they were shown a coney photograph sourced from the National Environment and Planning Agency, and asked whether they recognized it. They were also asked about attitudes toward coneys (1: dislike, 2: indifferent/no opinion, 3: like); whether they had seen coneys and details of their sightings; their opinion on coney status (1: none, 2: very rare, 3: rare, 4: uncommon, 5: common, 6: very common); and whether the local coney population had changed during their lifetime. Respondents were then asked seven questions about whether and how often coneys and other animals damaged their crops, the extent to which they considered such crop damage a problem, and how they tried to protect their crops, including whether they tried to catch or kill coneys as crop pests. They were next asked nine questions about hunting and wildlife trade, including how important hunting was to them and their community; how often they hunted and whether it provided an income source; which species they targeted; whether they or other people had hunted, sold, and/or eaten coneys; and how coney hunting had changed over time. Finally, respondents were asked eight questions about conservation attitudes, including whether they thought coneys should be protected, even if they damaged crops or it required a restriction on hunting, and whether coney conservation should include compensation for crop damage.

## 2.3 | Data analysis

Analyses were conducted in R v.4.3.1 (R Core Team, 2023). First, we explored demographic factors driving responses about knowledge, experience, hunting and consumption of coneys, and attitudes toward coneys and their conservation (Table 1). Explanatory variables included: (1) sex (male/female); (2) age (years); (3) proportion of lifetime spent in current village (0–1); (4) annual income (five levels, in Jamaican dollars: <25,000; 26,000–50,000; 51,000–75,000; 76,000–100,000; >100,000); (5) whether respondents identified as hunters (binary); (6) whether respondents identified as farmers (binary).

Each survey response variable was explored using Generalised Linear Mixed Models (GLMMs), with appropriate error structures (Brooks et al., 2023) (Table 1). Interviewer identity had a statistically significant influence on some response variables, so this was included as a random effect on the model intercept for all response variable GLMMs. We conducted further GLMMs on the subset of respondents who identified as farmers to explore predictors of human–wildlife conflict, investigating the influence of the same demographic factors above on responses (except farmer identity). Finally, we conducted GLMMs to explore differences in survey response variables between the two communities, with identity of the respondent's village used as an explanatory variable, and interviewer identity again included as a random effect on model intercepts. All reported $R^2$ values are marginal $R^2$, with the delta $R^2$ approximation reported where relevant (i.e., binomial and negative binomial GLMMs) (Bartón, 2023; Nakagawa et al., 2017).

# 3 | RESULTS

Details of all significant or near-significant predictors are given in Tables 2 and 3. Results in main text are summarized with *p* values only.

**TABLE 1** Survey response variables explored in generalized linear mixed models, grouped by categories.

| Category | Response variable | Units | GLMM error structure |
|---|---|---|---|
| Local knowledge and experience of coneys | Do you know what a coney is? | Binary (yes = 1) | Binomial |
| | Have you ever seen a coney? | Binary (yes = 1) | Binomial |
| | When did you last see a coney? | Numerical (years) | Negative binomial (responses minus 1) |
| | Do you know the local status of coneys? | Binary (yes = 1) | Binomial |
| | What do you think is the local status of coneys? | Numerical (1 = none, 2 = very rare, 3 = rare, 4 = uncommon, 5 = common, 6 = very common) | Gaussian |
| | If the local coney population has changed during your lifetime, is it increasing? | Binary (yes = 1) | Binomial |
| Local hunting and consumption of coneys | Have you ever hunted coneys? | Binary (yes = 1) | Binomial |
| | Have you ever eaten coney? | Binary (yes = 1) | Binomial |
| Local attitudes toward coneys and their conservation | Is hunting culturally important to people in this community? | Binary (yes = 1) | Binomial |
| | Do you like coneys? | Numerical (1 = no, 2 = indifferent, 3 = yes) | Gaussian |
| | Do you think coneys should be protected? | Binary (yes = 1) | Binomial |
| | Do you think coneys should be protected even if they damage your crops? | Binary (yes = 1) | Binomial |
| | Would you be willing to help protect coneys, even if they damage your crops? | Binary (yes = 1) | Binomial |
| | Would you be willing to help protect coneys, even if it means not hunting them? | Binary (yes = 1) | Binomial |
| Local human–wildlife conflict (farmers only) | Have coneys ever damaged your crops? | Binary (yes = 1) | Binomial |
| | Do you think it's a big problem that coneys damage your crops? | Binary (yes = 1) | Binomial |
| | Have you ever tried to catch or kill coneys to protect your crops? | Binary (yes = 1) | Binomial |

*Note*: Human–wildlife conflict questions analysed only for subset of respondents who identified as farmers.

## 3.1 | Respondent sample

In total, 108 respondents were interviewed (Moore Town, $n = 50$; Cornwall Barracks, $n = 58$; Data S2). Mean age was 40.5; 65.7% were male (mean age: 44.5, range: 18–71) and 34.3% were female (mean age: 32.4, range: 19–62). Most respondents (81.0%) had always lived in the same community, and only 7.6% had lived there for less than half their life. Farming was practiced by 51.9% of respondents; the commonest crops include tubers (taro/dasheen and yam, $n = 33$), banana/plantain ($n = 24$), and pumpkin ($n = 9$). Based on responses to occupation and/or hunting questions, only 13.0% of respondents (all males) reported that they were hunters. Data on forest visits were assigned to two categories (more/less than once every 2 months), as this represented a natural break in the data, and answers could generally be assigned to one of these relatively broad categories. Only 15.7% of respondents reported visiting the nearby forest at least once every 2 months, for reasons including hunting, collecting fruits, roots and other plants, and accessing farm plots. Of the 81 respondents who provided information

**TABLE 2** Significant and near-significant predictors of respondents' awareness, experience, interactions, and attitudes toward coneys in generalized linear mixed models.

| Predictor | Intercept (±1 SE) | Slope (±1 SE) | *t*-value | df | Multiple $R^2$ | Conditional $R^2$ | *p*-value |
|---|---|---|---|---|---|---|---|
| 1. Know what a coney is (0/1) | | | | | | | |
| Male respondents | 3.14 ± 2.56 | 1.48 ± 0.78 | 1.89 | 105 | 0.031 | 0.416 | *0.059* |
| 2. Have seen coney (0/1) | | | | | | | |
| Older respondents | −0.33 ± 0.86 | 0.05 ± 0.02 | 2.58 | 103 | 0.078 | 0.119 | 0.010 |
| Male respondents | 0.92 ± 0.52 | 1.34 ± 0.55 | 2.45 | 105 | 0.053 | 0.087 | 0.014 |
| 3. How long ago coneys were seen (years) | | | | | | | |
| Hunters | 1.57 ± 0.43 | −1.81 ± 0.55 | −3.25 | 76 | 0.148 | 0.245 | 0.001 |
| Older respondents | 0.35 ± 0.73 | 0.02 ± 0.01 | 1.83 | 74 | 0.041 | 0.168 | *0.068* |
| 4. Have knowledge of coney status (0/1) | | | | | | | |
| Older respondents | −2.54 ± 0.67 | 0.07 ± 0.02 | 4.14 | 103 | 0.190 | 0.190 | <0.001 |
| Farmers | −0.90 ± 0.31 | 1.91 ± 0.43 | 4.44 | 105 | 0.186 | 0.186 | <0.001 |
| Hunters | −0.17 ± 0.21 | 2.74 ± 1.06 | 2.59 | 105 | 0.175 | 0.175 | 0.010 |
| 5. Estimate of coney abundance (1–6) | | | | | | | |
| Male respondents | 3.38 ± 0.30 | 1.27 ± 0.34 | 3.70 | 52 | 0.200 | 0.206 | <0.001 |
| Farmers | 3.33 ± 0.30 | 1.30 ± 0.35 | 3.73 | 52 | 0.202 | 0.202 | <0.001 |
| Older respondents | 2.41 ± 0.61 | 0.04 ± 0.01 | 3.20 | 52 | 0.156 | 0.165 | 0.001 |
| Hunters | 4.09 ± 0.21 | 0.82 ± 0.39 | 2.10 | 52 | 0.074 | 0.085 | 0.036 |
| Higher-income respondents | 3.87 ± 0.37 | 0.34 ± 0.20 | 1.71 | 41 | 0.062 | 0.062 | *0.088* |
| 6. Consider that coneys have increased (0/1) | | | | | | | |
| Older respondents | −5.18 ± 1.10 | 0.11 ± 0.02 | 4.94 | 103 | 0.368 | 0.406 | <0.001 |
| Farmers | −1.81 ± 0.52 | 2.24 ± 0.49 | 4.55 | 105 | 0.221 | 0.259 | <0.001 |
| Hunters | −0.83 ± 0.39 | 2.69 ± 0.82 | 3.29 | 105 | 0.157 | 0.195 | 0.001 |
| Male respondents | −1.48 ± 0.48 | 1.42 ± 0.49 | 2.92 | 105 | 0.096 | 0.116 | 0.003 |
| Higher-income respondents | −1.32 ± 0.54 | 0.73 ± 0.31 | 2.32 | 78 | 0.080 | 0.080 | 0.021 |
| Lived longer in same community | 1.35 ± 0.98 | −1.95 ± 1.03 | −1.89 | 102 | 0.037 | 0.045 | *0.059* |
| 7. Think hunting is culturally important (0/1) | | | | | | | |
| Hunters | −2.88 ± 0.46 | 2.59 ± 0.71 | 3.65 | 105 | 0.065 | 0.065 | <0.001 |
| Older respondents | −6.97 ± 1.84 | 0.10 ± 0.03 | 2.97 | 103 | 0.167 | 0.167 | 0.003 |
| 8. Have hunted coneys (0/1) | | | | | | | |
| Hunters | −3.41 ± 0.59 | 4.71 ± 0.88 | 5.37 | 105 | 0.222 | 0.222 | <0.001 |
| Farmers | −2.79 ± 0.59 | 1.38 ± 0.68 | 2.03 | 105 | 0.052 | 0.052 | 0.043 |
| 9. Have eaten coneys (0/1) | | | | | | | |
| Male respondents | −0.47 ± 0.88 | 1.53 ± 0.50 | 3.05 | 105 | 0.089 | 0.299 | 0.002 |
| Older respondents | −1.46 ± 1.11 | 0.05 ± 0.02 | 2.91 | 103 | 0.093 | 0.324 | 0.004 |
| Farmers | −0.21 ± 0.89 | 1.44 ± 0.49 | 2.91 | 105 | 0.086 | 0.312 | 0.004 |
| Hunters | 0.23 ± 0.86 | 2.85 ± 1.11 | 2.56 | 105 | 0.143 | 0.354 | 0.011 |
| 10. Attitude toward coneys (1–3) | | | | | | | |
| Hunters | 2.00 ± 0.08 | 0.84 ± 0.22 | 3.87 | 99 | 0.128 | 0.130 | <0.001 |
| 11. Think coneys should be protected (0/1) | | | | | | | |
| Lived longer in same community | −3.05 ± 1.61 | 3.91 ± 1.45 | 2.69 | 102 | 0.104 | 0.333 | 0.007 |
| Farmers | 0.99 ± 0.95 | −0.77 ± 0.47 | −1.66 | 105 | 0.026 | 0.289 | *0.098* |

*Note*: Near-significant relationships ($p < 0.10$) shown in italics.

**TABLE 3** Significant and near-significant differences in response variables from generalized linear mixed models when comparing respondent samples from Moore Town (MT) against Cornwall Barracks (CB).

| Response | Intercept (CB: ±1 SE) | Slope (MT: ±1 SE) | t-value | df | Multiple $R^2$ | Conditional $R^2$ | p-value |
|---|---|---|---|---|---|---|---|
| Have seen coney (0/1) | 2.41 ± 0.60 | −1.30 ± 0.58 | −2.26 | 105 | 0.055 | 0.089 | 0.024 |
| Have knowledge of coney status (0/1) | −0.57 ± 0.27 | 1.41 ± 0.41 | 3.43 | 105 | 0.111 | 0.111 | <0.001 |
| Estimate of coney abundance (1–6) | 4.71 ± 0.29 | −0.68 ± 0.34 | −1.98 | 52 | 0.066 | 0.078 | 0.047 |
| Attitude toward coneys (1–3) | 2.26 ± 0.10 | −0.33 ± 0.15 | −2.15 | 99 | 0.043 | 0.043 | 0.032 |
| Think hunting is culturally important (0/1) | −1.69 ± 0.36 | −1.48 ± 0.81 | −1.84 | 105 | 0.048 | 0.048 | *0.066* |

*Note*: Near-significant model differences ($p < 0.10$) shown in italics.

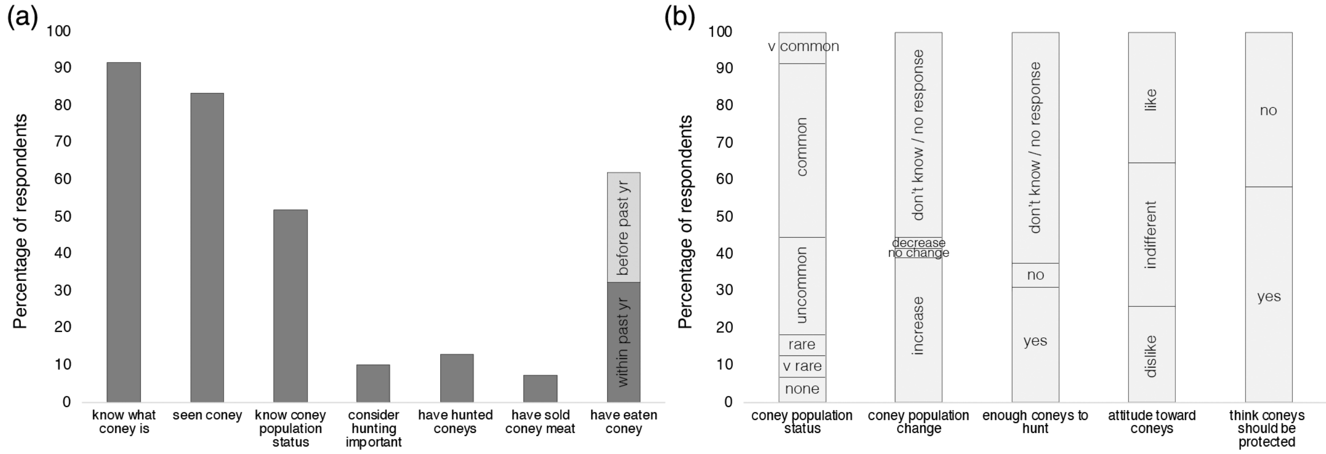


**FIGURE 2** (a) Percentages of respondents with awareness and experience of coneys (including their hunting, trade and consumption), and who consider hunting in general to be important. (b) Percentages of respondents with different opinions about coney population parameters, attitudes toward coneys, and opinions on coney conservation.

about annual income, over half (58.0%) earned below 25,000 Jamaican dollars, with progressively fewer respondents in the four progressively higher income categories (Data S2).

## 3.2 | Knowledge and experience of coneys

In total, 91.7% of respondents knew what a coney was (Figure 2a), with a near-significant trend toward male respondents being more likely than female respondents to know about them (95.8% vs. 83.8%; $p = 0.059$). Most respondents (83.3%) had seen coneys during their lifetimes (Figure 2a), with older respondents more likely to have seen them ($p = 0.010$), and male respondents more likely than female respondents to have seen them (90.1% vs. 70.3%; $p = 0.014$). Mean reported last-sighting date was 3.9 ± 0.8 years earlier ($n = 80$), with a modal last-sighting date of the same year that interviews were conducted ($n = 30$). Hunters were more likely to have seen coneys more recently than non-hunters (*hunters*: 1.0 ± 0.6 years ago, $n = 13$; *non-hunters*: 4.5 ± 0.4 years ago, $n = 67$; $p = 0.001$), although not all hunters had seen coneys. Conversely, there was a near-significant trend toward older respondents having seen coneys longer ago ($p = 0.068$).

Overall, 51.9% of respondents reported knowledge of local coney population status (Figure 2a), with knowledge more likely to be reported by older respondents ($p < 0.001$); by farmers compared to non-farmers (73.2% vs. 28.9%; $p < 0.001$); and by hunters compared to non-hunters (92.9% vs. 45.7%; $p = 0.010$). Respondents provided a range of coney abundance estimates (none, $n = 4$; very rare, $n = 3$; rare, $n = 3$; uncommon, $n = 14$; common, $n = 27$; very common, $n = 5$), with a mean abundance ranking of 4.29 ± 0.04/6 (Figure 2b). Greater abundance was more likely to be reported by male respondents (4.65 ± 0.34/6, $n = 40$) compared to female respondents (3.38 ± 0.30/6, $n = 16$) ($p < 0.001$); by farmers ($4.63 \pm 0.35/6$, $n = 41$) compared to non-farmers ($3.33 \pm 0.30/6$, $n = 15$) ($p < 0.001$); by older respondents ($p = 0.001$); and by hunters ($4.92 \pm 0.21/6$, $n = 13$) compared to non-hunters ($4.09 \pm 0.21/6$, $n = 43$) ($p = 0.036$). There was a near-significant trend that greater abundance was more likely to be reported by respondents with higher incomes ($p = 0.088$).

When asked about perceptions of population trends, 38.9% of respondents thought coneys had increased during their lifetime, with only 2.8% thinking coneys had declined and 1.9% thinking there was no change; other respondents did not know (41.6%) or gave no response (14.8%) (Figure 2b). Population increase was more likely to be reported by older respondents ($p < 0.001$); by farmers compared to non-farmers (60.7% vs. 15.4%; $p < 0.001$); by hunters compared to non-hunters (85.7% vs. 31.8%; $p = 0.001$); by male respondents compared to female respondents (49.3% vs. 18.9%; $p = 0.003$); and by respondents with higher incomes ($p = 0.021$). Conversely, there was a near-significant trend that respondents who had spent more of their lives in their local community were less likely to report population increase ($p = 0.059$).

## 3.3 | Hunting and consumption of coneys

Only 10.2% of respondents, all males, felt that hunting in general was important (Figure 2a). Importance of hunting was more likely to be reported by hunters compared to non-hunters (42.9% vs. 5.3%; $p < 0.001$), and by older respondents ($p = 0.003$). Only six respondents (5.6% of sample; mean age = 56, age range = 47–66) said hunting was a culturally important tradition when asked specifically about its cultural significance: four respondents considered it a very important Maroon tradition or "practice of our ancestors," one considered it important in general, and one considered it important for some people but not others. Other respondents who felt it was important stated this was because it represented a source of meat or income. Eight other respondents who identified as hunters specifically said they did not consider hunting to be an important activity (e.g., they only hunted for sport). Four other respondents stated it had been important in the past, either culturally or for food, but was not now (or not to young people). Only six respondents said they obtained income from hunting.

Only 13.0% of respondents, all males, reported having hunted coneys (*Moore Town*, $n = 4$; *Cornwall Barracks*, $n = 10$; Figure 2a), with 7.4% reporting they still hunted coneys (*Moore Town*, $n = 1$; *Cornwall Barracks*, $n = 7$). Coneys were reportedly hunted to eat and/or sell. Only two hunters said coneys were their main target; three said they targeted both coneys and pigs, five said pigs were their main target, and three said they tried to hunt anything. These hunters reported catching a mean of four coneys per hunting trip, with hunting trips occurring every other week or every month. Based on reported hunting data, seven of the eight hunters who still caught coneys killed an estimated combined total of 424 coneys/year (mean total per hunter: 60.6 coneys/year), with one hunter providing no information on hunting amount or frequency. Respondents who identified as hunters were more likely to have hunted coneys compared to other respondents (78.6% vs. 3.2%; $p < 0.001$), although not all hunters had hunted them. Farmers were also more likely to have hunted coneys compared to non-farmers (19.6% vs. 5.8%; $p = 0.043$), although 81.8% of farmers who had hunted coneys also identified as hunters.

Respondents considered that a mean of 4.0 other people in their community hunted coneys (*Moore Town*, range = 1–6; *Cornwall Barracks*, range = 3–8; $n = 32$). In addition, 40.7% of respondents considered that people from other communities around the Blue and John Crow Mountains National Park came to hunt coneys in the forest near their village (mean = 5.4 non-local hunters, $n = 12$). When asked about amounts of coney hunting 10 and 20 years ago, 18 of 21 respondents who provided answers about past hunting by local people reported a progressive decline across both time periods to the present (*Moore Town*: 10 years ago = 7.8 hunters, 20 years ago = 13.2; *Cornwall Barracks*: 10 years ago = 12.0, 20 years ago = 15.8). Similar declines were reported in numbers of non-local hunters (10 years ago, mean = 6.9 additional hunters visiting each area, $n = 13$; 20 years ago, mean = 11.5 additional hunters; $n = 13$). This change was mainly attributed to former hunters becoming old or moving away, although two respondents considered it was because people no longer depended upon hunting for food, or because hunting was now restricted.

Eight respondents (including six of the eight who still hunted coneys) reported having sold coney meat (Figure 2a). All sales took place within their community, with sales reported from the previous 18 months by all respondents who provided information on sale frequency. Coneys were sold for a mean of c.5000 dollars (equivalent to c.$33 USD; reported range: 500–10,000 dollars; $n = 6$), whereas wild pig was sold for a mean of c.560 dollars per pound (equivalent to c.$3.7 USD; reported range: 500–700 dollars; $n = 8$).

Almost two-thirds of respondents (62.0%) reported having eaten coney, with 32.4% having eaten it within the previous year (Figure 2a). Of the respondents who provided information on consumption frequency ($n = 44$), 50.0% ate it "not often" or "rarely." Respondents were more likely to have eaten coney if they were hunters rather than non-hunters (92.9% vs. 56.4%; $p = 0.011$); if they were male rather than female (71.8% vs. 40.5%; $p = 0.002$); if they were older ($p = 0.004$); and if they were farmers rather than non-farmers (73.2% vs. 48.1%; $p = 0.004$).

When asked whether there were enough coneys to hunt, 30.6% of respondents agreed, 6.5% disagreed, and 62.9% did not know or respond (Figure 2b). Most respondents who agreed provided one of two explanations for their opinion: the population had increased because hunting had decreased (15/33), and/or because farmers complained about crop damage (10/33).

## 3.4 | Conflict between farmers and coneys

In total, 75.0% of farmers reported crop damage by coneys. Numerous crops (banana, carrot, coconut, corn, fruit trees, ganja, plantain, pumpkin, taro, tomato, yam, other vegetables) reportedly suffered damage, typically to roots or lower parts of plants. All farmers who reported coney crop damage considered it a substantial problem, and 50.0% of this subset considered that damage had increased (with most reporting an increase within the past decade). Only 17.9% of farmers reported trying to catch or kill coneys to protect crops, almost always using dogs (with one respondent using traps); 14.3% said they had tried during the previous year, with a total of 42 coneys reportedly caught as crop pests and eaten or sold by these respondents during this period. No factors in our models explained variation in responses about crop damage or catching coneys. Crop damage by other animals was also reported by 30.4% of farmers (wild pigs, $n = 12$; cows and goats, $n = 3$; rats, $n = 1$), with these respondents mostly considering that ungulates caused much more damage than coneys, and with 10.7% of farmers protecting their plots with fencing from these animals.

## 3.5 | Attitudes toward coneys and their conservation

When asked about attitudes, 25.2% of respondents said they disliked coneys, 37.9% were indifferent or had no opinion, and 36.9% liked them, with a mean attitude ranking of $2.12 \pm 0.08/3$ ($n = 103$; Figure 2b). Hunters had more positive attitudes toward coneys ($2.85 \pm 0.22$, $n = 13$) compared to non-hunters ($2.01 \pm 0.08$, $n = 90$) ($p < 0.001$).

Overall, 58.3% thought coneys should be protected (with justification often based upon the species' unique national or cultural significance), whereas 41.7% disagreed, with 20/45 stating they should not be protected because they are crop pests (Figure 2b). Only one respondent did not want to protect them because this would restrict hunting. Respondents who had spent more of their lives in their local community were more likely to support coney protection ($p = 0.007$). Conversely, there was a near-significant trend that farmers were less likely to support coney protection compared to non-farmers (51.8% vs. 65.4%; $p = 0.098$).

Nearly all respondents (88.9%) agreed that people should be reimbursed for damages if a protected animal caused crop damage. However, 55.6% specifically thought coneys should be protected even if they damaged their crops, and 48.1% said they would be willing to help protect coneys despite crop damage. In contrast, only 43.2% said they would be willing to help protect coneys if this meant not hunting them. No factors in our models explained variation in these attitudes. Few respondents ($n = 7$) offered practical suggestions to protect both coneys and crops and/or hunting traditions; possible solutions included a set hunting season, better fencing of crops, and relocation of animals to different areas.

## 3.6 | Between-community differences in awareness, experience, and attitudes

All respondents from Cornwall Barracks knew what coneys were, compared to only 82.0% from Moore Town, and fewer respondents from Moore Town had seen coneys (74.0% vs. 91.4%; $p = 0.024$). Respondents from Moore Town were more likely to report knowledge of coney population status (70.0% vs. 36.2%; $p < 0.001$), but reported lower coney abundance estimates (*Moore Town*: $4.03 \pm 0.34/6$, $n = 35$; *Cornwall Barracks*: $4.71 \pm 0.29/6$, $n = 21$; $p = 0.047$). Respondents from Moore Town also had lower attitudes toward coneys (*Moore Town*: 1.93 $\pm 0.15/3$, $n = 45$; *Cornwall Barracks*: $2.26 \pm 0.10/3$, $n = 58$; $p = 0.032$), and showed a near-significant trend toward fewer respondents thinking that hunting in general was important (4.0% vs. 15.5%; $p = 0.066$). There were no other significant between-community differences in coney perceptions, experiences, interactions or attitudes.

## 4 | DISCUSSION

Our study provides a new baseline on local knowledge and attitudes toward a threatened island mammal, and the cultural importance and dynamics of human–wildlife interactions in a Jamaican biocultural landscape where evidence is needed to guide inclusive management decision-making. Most respondents in our study knew about and had seen coneys, and could provide conservation-relevant information on the local coney population and on people's interactions with the species. Our results thus demonstrate that Indigenous knowledge can constitute an important source of information on the status and potential threats to small mammals, especially when these species constitute culturally or economically significant components of biodiversity, and occur in faunally depauperate island ecosystems that contain few similar taxa (Turvey et al., 2014). Our engagement with local respondents who shared this knowledge also enables us to understand the relative importance of coney hunting and persecution of coneys as crop pests across Maroon communities, and the extent to which coney conservation might conflict or align with traditional cultural values and modern socio-economic and livelihood needs.

### 4.1 | Cultural importance of coney hunting

Hunting by traditional and Indigenous communities, for subsistence, trade, and defining societal and cosmological identities and relationships, can involve complex and sometimes unsustainable interactions with biodiversity (Berkes, 2018). Native rodents are hunted in many Indigenous social–ecological systems, and such hunting can potentially exceed sustainable levels due to factors such as a lack of local awareness that wild meat sources are not inexhaustible, changing external demand and erosion of traditional hunting knowledge associated with increasing globalization, or other escalating external pressures (D'Cruze et al., 2021; Zapata-Ríos et al., 2009). Understanding the cultural significance and ecological impacts of coney hunting by Maroon communities is therefore a crucial step needed for biocultural management planning.

Our results show that coney meat is more valuable than pig meat, and its consumption is relatively widespread across Maroon communities. However, reported trade in coney meat is local-scale only, and the species is not consumed regularly, with over two-thirds of respondents not having eaten it within the past year. The significant positive relationship between likelihood of having eaten coney and respondent age in our models suggests a decrease in coney consumption amongst younger community members. Furthermore, few respondents from these communities (mostly self-identified hunters or older community members) consider that hunting in general is of cultural or economic importance, with local recognition that hunting has become less important over time, and with most hunters not regarding it as an "important" activity. Based upon respondents' direct reporting and knowledge of other people's activities, our results show that even fewer local people still specifically hunt coneys, with a widespread perception that coney hunting has decreased over recent decades. Even though our interview sampling approach aimed to preferentially target community members who were known to hunt, only two respondents identified specifically as coney hunters.

Efforts to reduce hunting pressure and support sustainable human–wildlife interactions can lead to conservation conflict in social–ecological systems where marginalized communities require access to wild protein, and where hunting of threatened species has important cultural roles and values (Blanc, 2022; Sylvester et al., 2016). The low amount of targeted coney hunting practiced by Maroon communities in the Blue and John Crow Mountains, and the limited importance attached to hunting by nearly all respondents, suggests that serious conflict around this topic is unlikely to be a major concern, and that it should be possible to develop equitable policies for coney conservation whilst supporting Maroon cultural values and needs. Indeed, our data show that hunters in Maroon communities not only have greater awareness and experience of coneys compared to other respondents, but are also the only demographic group in our models to hold more positive attitudes about the species, indicating the potential for hunters to support conservation actions to maintain coney populations.

However, although very few respondents regard hunting as important or practice it themselves, less than half of respondents said they would be supportive of coney protection if this required hunting to stop. In comparison, respondents had greater support for coney conservation despite the economic losses incurred from crop damage. Such damage directly affects a considerable number of people, is perceived as a substantial problem within the region's subsistence agriculturalist communities, and is associated with a decreased likelihood of farmers wanting to protect coneys in general. This result suggests that there may be greater implicit support amongst Maroon communities for maintaining coney hunting as a traditional activity.

## 4.2 | Impact of coney hunting

Although coney hunting is now only practiced by a few people in the Blue and John Crow Mountains, these individuals kill a substantial number of coneys each year. Based on a mean annual total of 60.6 coneys killed by each of the eight hunters we interviewed from Moore Town and Cornwall Barracks, combined with 42 additional coneys killed by farmers in these communities to protect their crops, we estimate that ∼527 coneys were killed during the previous year alone by our respondents.

No population estimates are available for Jamaican coneys, either at the island-wide level or for specific landscapes, making it difficult to determine whether estimated annual offtake in our study region is sustainable. Wilkins (2001) modeled the sustainability of coney hunting in the Blue and John Crow Mountains, and provided a range of potential offtake threshold estimates for this wider region based on differing assumptions of coney density, landscape carrying capacity and habitat availability, and sex ratio of hunted individuals. The lowest sustainability thresholds for the entire Blue and John Crow Mountains region estimated by Wilkins (2001), annual offtake levels of 10,190 or 13,460 individuals/year, are substantially higher than the reported number of coneys killed per year in Moore Town and Cornwall Barracks. However, our figure does not include additional animals killed by other people who we did not interview in these communities, or by hunters from other communities who were reported to visit the same local landscape. The actual level of coney offtake even within this restricted area may thus be substantially greater than our interview-based estimate, raising concerns about the potential impacts on coney population viability from even a small number of hunters. Conversely, there may not be many active coney hunters elsewhere across the Blue and John Crow Mountains, with only communities in the Ecclesdown and Reach Falls area also still known to practice coney hunting.

Other interview data provide conflicting evidence on potential impacts of local hunting. Few respondents thought coneys were rare or very rare, and most respondents who provided an opinion about population trends thought coneys had increased during their lifetime. Greater coney abundance and increase were also reported by several respondent groups (hunters, farmers, males, older respondents) who might be expected to have greater knowledge of local environmental conditions, due to their increased activities in the natural landscape or greater time to accumulate local knowledge (Kai et al., 2014; Nyhus & Sumianto, 2003; Turvey et al., 2015). Although these interview baselines cannot be verified as no independent ecological data are available on coney population trends, they suggest that hunting may not be impacting coney populations, especially if hunting has decreased. However, we also note that respondents who had lived locally for a longer period, and thus might have greater direct longitudinal knowledge of environmental conditions, were less likely to think coneys had increased. Furthermore, farmers are known to provide differing estimates of the population status of various species that are viewed as "pests" in other systems (Katuwal et al., 2021; Paddle, 2000; Silva-Andrade et al., 2016). Farmers' perceptions of coney increase in the Blue and John Crow Mountains might also be associated with agricultural encroachment into coney habitat (Otuokon et al., 2012) and/or increased local use of forest resources (Campbell et al., 2021). They might thus reflect greater chance of coney encounters and crop damage (e.g., due to reduction in forest habitat forcing coneys to utilize agricultural areas and come into greater contact with people) rather than genuine population change (Turvey et al., 2017). We therefore recommend that future research should attempt to quantify population-level pressures on coneys in the Blue and John Crow Mountains using models used to assess sustainability of rodent and other bushmeat offtake in other Indigenous social–ecological systems (Kümpel et al., 2010; Shaffer et al., 2018; Zapata-Ríos et al., 2009).

## 4.3 | Coney conservation and future actions

Most respondents had neutral or positive attitudes toward coneys, and the majority were in support of coney conservation, with considerable recognition of the species' unique national and cultural significance. This provides a strong starting point for community-based conservation activities. The main driver of negative local attitudes toward coneys was their perceived role as crop pests, with farmers constituting the only stakeholder group in our models who were less likely to support coney conservation. Other hutia species across the Caribbean are also known to damage crops (Turvey et al., 2008, 2014). However, other mammals (wild pigs, cows, goats) were considered to cause greater damage than coneys in our study region, with farmers being no less likely to have positive attitudes toward coneys in our models, and with over half of farmers in our respondent sample still supportive of coney conservation. We recommend that comprehensive follow-up engagement and consultation is conducted with farmers across the Blue and John Crow Mountains, with an aim to: (1) better understand perceptions of crop damage and losses from coneys, and how this species has been identified as a culprit; and (2) remove participatory barriers to coney conservation by identifying and trialing possible solutions for increasing food security and reducing human–wildlife conflict. Such approaches might involve compensation schemes or local modifications to farming practices (Campbell-Smith et al., 2012; Hill & Wallace, 2012). In particular, agricultural encroachment into coney habitat in the Blue and John Crow Mountains is associated with poor soil quality close to Maroon communities, highlighting the need to explore strategies for improving local soil condition and productivity (Wallace et al., 2020).

More widely, our models show considerable variation in knowledge, behaviors, perceptions, and attitudes about coneys across multiple different actors and stakeholders within Maroon communities: not only hunters and farmers, but also older versus younger respondents, male versus female respondents, and respondents with varying incomes and local lived experiences. These results indicate that further community engagement and participation is needed to gain a deeper understanding of local viewpoints, establish mechanisms for effective communication of diverse voices, and build trust between different players who might be impacted by future coney conservation activities. Indeed, although coney hunting may no longer be important at a community level, it remains important to some individuals within Maroon communities, raising questions about whose voice matters most or should be considered representative in conservation decision-making and "ecological democracy" (Takacs, 2020). Our models also demonstrate that respondents from two adjacent Maroon communities show substantial differences in awareness, experience, and attitudes about coneys, indicating that community-based conservation must be both evidence-based and suitable for differing local situations, with nuanced and bespoke activities potentially required within different community contexts.

Future research should address remaining knowledge-gaps about hunting in this social–ecological system, such as what factors determine its selectivity, effort, and area (Bachmann et al., 2020; Dobson et al., 2019). Future work should also assess coney population densities and landscape use (using camera trapping and/or GPS collaring; Kennerley et al., 2019), sustainable offtake, and potential long-term anthropogenic impacts on coney populations through comparison with historical baselines (e.g., comparative genetic analysis of modern samples and museum specimens). Our interview-based approach could be replicated in other landscapes to investigate the relative status of coney populations across Jamaica, and the dynamics and potential sustainability of different community interactions with coneys (cf., Turvey et al., 2015). We emphasize the importance of using standardized interview methods to reduce the potential for an interviewer effect that can confound results or complicate analysis (Reyes-García et al., 2005), highlighting the need for local training in social-science research methods and culturally sensitive approaches such as consideration of interviewer positionality (Newing, 2011).

Traditional knowledge has previously been integrated with formal science for environmental management of the biodiversity-rich Blue and John Crow Mountains (Fuentes-George, 2019). We hope to continue this approach, to establish an interdisciplinary evidence-led framework for adaptive collaborative management of coney conservation in Jamaica. Ultimately, we hope that societal perceptions of potential conflicts and management solutions can be embedded alongside ecological baselines within environmental planning for Jamaica's last surviving land mammal, to support conservation success, sustainable development goals, and integrity of community values and interactions with nature.

## AUTHOR CONTRIBUTIONS

**Samuel T. Turvey**: Conceptualization (equal); data curation (supporting); methodology (equal); supervision; visualization; writing – original draft preparation; writing – review & editing. **Orlando F. Robinson**: Conceptualization (equal); data curation (lead); investigation; project administration (equal). **Clare Duncan**: Formal analysis; methodology (equal); validation. **Rosalind J. Kennerley**: Conceptualization (supporting); methodology (supporting). **Susan Otuokon**: Funding acquisition; project administration (equal).

## ACKNOWLEDGMENTS

We thank the Maroon communities of Moore Town and Cornwall Barracks for sharing their knowledge, and Colonel Wallace Sterling for allowing us to work in these communities. Data collection was assisted by Wellington Taylor and Austin Thompson, and feedback and images were provided by David Walters and Joey Brown. Funding was provided by the Global Environment Facility Small Grants Programme, the AXA Research Fund, and Research England.

## CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

## DATA AVAILABILITY STATEMENT

Data are available in Supporting Information.

## ORCID

*Samuel T. Turvey* https://orcid.org/0000-0002-3717-4800

## REFERENCES

Anderson, S., Woods, C. A., Morgan, G. S., & Oliver, W. L. R. (1983). Geocapromys brownii. *Mammalian Species*, *201*, 1–5.

Anthony, H. E. (1920). A zoölogist in Jamaica. *Natural History*, *20*, 156–168.

Bachmann, M. E., Nielsen, M. R., Cohen, H., Haase, D., Kouassi, J. A. K., Mundry, R., & Kuehl, H. S. (2020). Saving rodents, losing primates—Why we need tailored bushmeat management strategies. *People and Nature*, *2*, 889–902.

Barker, D., & Spence, B. (1988). Afro-Caribbean agriculture: A Jamaican Maroon community in transition. *Geographical Journal*, *154*, 198–208.

Bartón, K. (2023). MuMIn: multi-model inference. R package v.1.47.5. Retrieved from www.cran.r-project.org/web/packages/MuMIn/

Berkes, F. (2018). *Sacred ecology* (4th ed.). Routledge.

Blanc, G. (2022). *The invention of green colonialism*. Polity Press.

Brooks, M., Bolker, B., Kristensen, K., Maechler, M., Magnusson, A., McGillycuddy, M., Skaug, H., Nielsen, A., Berg, C., van Bentham, K., Sadat, N., Lüdecke, D., Lenth, R., O'Brien, J., Geyer, C. J., Jagan, M., Wiernik, B., & Stouffer, D. B. (2023). glmmTMB: Generalised linear mixed models using template model builder. R package v.1.1.8. Retrieved from www.cran.r-project.org/web/packages/glmmTMB/index.html

Campbell, D., Moulton, A. A., Barker, D., Malcolm, T., Scott, L., Spence, A., Tomlinson, J., & Wallace, T. (2021). Wild food harvest, food security, and biodiversity conservation in Jamaica: A case study of the Millbank farming region. *Frontiers in Sustainable Food Systems*, *5*, 663863.

Campbell-Smith, G., Sembiring, R., & Linkie, M. (2012). Evaluating the effectiveness of human–orangutan conflict mitigation strategies in Sumatra. *Journal of Applied Ecology*, *49*, 367–375.

Clough, G. C. (1976). Current status of two endangered Caribbean rodents. *Biological Conservation*, *10*, 43–47.

Collen, B., Turvey, S. T., Waterman, C., Meredith, H. M. R., Kuhn, T., Baillie, J. E. M., & Isaac, N. J. B. (2011). Investing in evolutionary history: Implementing a phylogenetic approach for mammal conservation. *Philosophical Transactions of the Royal Society B*, *366*, 2611–2622.

Cooke, S. B., Dávalos, L. M., Mychajliw, A. M., Turvey, S. T., & Upham, N. S. (2017). Anthropogenic extinction dominates Holocene declines of West Indian mammals. *Annual Review of Ecology, Evolution, and Systematics*, *48*, 301–327.

D'Cruze, N., Galarza, F. E. R., Broche, O., El Bizri, H. R., Megson, S., Elwin, A., Machado, F. C., Norrey, J., Coulthard, E., & Megson, D. (2021). Characterizing trade at the largest wildlife market of Amazonian Peru. *Global Ecology and Conservation*, *28*, e01631.

Dobson, A. D. M., Milner-Gulland, E. J., Ingram, D. J., & Keane, A. (2019). A framework for assessing impacts of wild meat hunting practices in the tropics. *Human Ecology*, *47*, 449–464.

Douglas, J. A. (2013). *In the Cockpit: The political ecology of integrated conservation and development in Cockpit Country, Jamaica* (PhD thesis), City University of New York.

Esmail, N., Wintle, B. C., 't Sas-Rolfes, M., Athanas, A., Beale, C. M., Bending, Z., Dai, R., Fabinyi, M., Gluszek, S., Haenlein, C., Harrington, L. A., Hinsley, A., Kariuki, K., Lam, J., Markus, M., Paudel, K., Shukhova, S., Sutherland, W. J., Verissimo, D., … Milner-Gulland, E. J. (2020). Emerging illegal wildlife trade issues: A global horizon scan. *Conservation Letters*, *13*, e12715.

Favini, J. (2018). Caring for nature: Anonymity, conservation, and Jamaican Maroons. *Social and Economic Studies*, *67*, 7–31.

Fuentes-George, K. (2019). Global conservation and local lore in a post-colonial society: How traditional environmental knowledge shapes the implementation of international environmental agreements on protected areas. In M. J. Peterson (Ed.), *Contesting global environmental knowledge, norms and governance* (pp. 144–166). Routledge.

Gavin, M. C., McCarter, J., Mead, A., Berkes, F., Stepp, J. R., Peterson, D., & Tang, R. (2015). Defining biocultural approaches to conservation. *Trends in Ecology & Evolution*, *30*, 140–145.

Gibson, L. (2020). Bycatch of the day: Wild meat consumption, ecological knowledge, and symbolic capital among Indigenous Maroon parrot hunters of Jamaica. *Journal of Ethnobiology*, *40*, 167–182.

Gleave, A. R., Papworth, S. K., Bauman, D., Portugal, S. K., Zhang, W., Liu, Y., Cao, Z., Cheng, X., & Turvey, S. T. (2024). Local ecological knowledge can establish ecological baselines and identify threats for the Critically Endangered blue-crowned laughingthrush *Pterorhinus courtoisi*. *People and Nature*, *6*, 1262–1276.

Gosse, P. H. (1851). *A naturalist's sojourn in Jamaica*. Longman, Brown, Green, and Longmans.

Harrison, K. D. (2007). *When languages die: The extinction of the world's languages and the erosion of human knowledge*. Oxford University Press.

Hill, C. M., & Wallace, G. E. (2012). Crop protection and conflict mitigation: Reducing the costs of living alongside non-human primates. *Biodiversity and Conservation*, *21*, 2569–2587.

IUCN. (2023). The IUCN Red List of Threatened Species, version 2023-1. Retrieved from https://www.iucnredlist.org

Kai, Z., Woan, T. S., Jie, L., Goodale, E., Kitajima, K., Bagchi, R., & Harrison, R. D. (2014). Shifting baselines on a tropical forest frontier: Extirpations drive declines in local ecological knowledge. *PLoS ONE*, *9*, e86598.

Katuwal, H. B., Zhang, M., Baral, H. S., Sharma, H. P., & Quan, R. (2021). Assessment of farmers' knowledge and perceptions towards farmland birds show the need of conservation interventions. *Global Ecology and Conservation*, *27*, e01563.

Kennerley, R. J., Lacher, T. E., Hudson, M. A., Long, B., McCay, S. D., Roach, N. S., Turvey, S. T., & Young, R. P. (2021). Global patterns of extinction risk and conservation needs for Rodentia and Eulipotyphla. *Diversity and Distributions*, *27*, 1792–1806.

Kennerley, R. J., Nicoll, M. A. C., Butler, S. J., Young, R. P., Nuñez-Miño, J. M., Brocca, J. L., & Turvey, S. T. (2019). Home range and habitat data for Hispaniolan mammals challenge assumptions for conservation management. *Global Ecology and Conservation*, *18*, e00640.

König, H. J., Carter, N., Ceaușu, S., Lamb, C., Ford, A. T., & Kiffner, C. (2021). Human–wildlife coexistence in science and practice. *Conservation Science and Practice*, *3*, e401.

König, H. J., Kiffner, C., Kramer-Schadt, S., Fürst, C., Keuling, O., & Ford, A. T. (2020). Human–wildlife coexistence in a changing world. *Conservation Biology*, *34*, 786–794.

Kopytoff, B. (1976). The development of Jamaican Maroon ethnicity. *Caribbean Quarterly*, *22*, 33–50.

Kümpel, N. F., Milner-Gulland, E. J., Cowlishaw, G., & Rowcliffe, J. M. (2010). Assessing sustainability at multiple scales in a rotational bushmeat hunting system. *Conservation Biology*, *24*, 861–871.

Levin, P. S., Williams, G. D., Rehr, A., Norman, K. C., & Harvey, C. J. (2015). Developing conservation targets in social-ecological systems. *Ecology and Society*, *20*(4), 6.

Lishka, S. A., Teel, T. L., Johnson, H. E., Reed, S. E., Breck, S., Don Carlos, A., & Crooks, K. R. (2018). A conceptual model for the integration of social and ecological information to understand human–wildlife interactions. *Biological Conservation*, *225*, 80–87.

Moulton, A. A. (2023). Towards the arboreal side-effects of marronage: Black geographies and ecologies of the Jamaican forest. *Environment and Planning E*, *6*, 3–23.

Myers, N., Mittermeier, R. A., Mittermeier, C. G., da Fonseca, G. A. B., & Kent, J. (2000). Biodiversity hotspots for conservation priorities. *Nature*, *403*, 853–858.

Nakagawa, S., Johnson, P. C. D., & Schielzeth, H. (2017). The coefficient of determination $R^2$ and intra-class correlation coefficient from generalized linear mixed effect models revisited and expanded. *Journal of the Royal Society Interface*, *14*, 20170213.

National Environment and Planning Agency. (2010). *Jamaica hutia management plan*. Ecosystems Management Branch, National Environment and Planning Agency.

Newing, H. (2011). *Conducting research in conservation: A social science perspective*. Routledge.

Nyhus, P. J., & Sumianto, T. R. (2003). Wildlife knowledge among migrants in southern Sumatra, Indonesia: Implications for conservation. *Environmental Conservation*, *30*, 192–199.

Oliver, W. L. R. (1976). The Jamaican hutia *Geocapromys brownii*. *Reports of Jersey Building Preservation Trust*, *12*, 10–17.

Oliver, W. L. R. (1982). The coney and the yellow snake: The distribution and status of the Jamaican hutia *Geocapromys brownii* and the Jamaican boa *Epicrates subflavus*. *Dodo*, *19*, 6–33.

Oliver, W. L. R., & Wilkins, L. (1988). The current status of the Jamaican hutia *Geocapromys brownii*: A preliminary report on the 1988 field survey. *Dodo*, *25*, 7–15.

Otuokon, S., Chai, S. L., & Beale, M. (2012). Using tourism to conserve the mist forests and mysterious cultural heritage of the Blue and John Crow Mountains National Park, Jamaica. *Parks*, *18*, 144–153.

Paddle, R. (2000). *The last Tasmanian tiger: The history and extinction of the thylacine*. Cambridge University Press.

Picking, D., Delgoda, R., & Vandebroek, I. (2019). Traditional knowledge systems and the role of traditional medicine in Jamaica. *CAB Reviews*, *14*, 045.

Picking, D., & Vandebroek, I. (2019). Traditional and local knowledge systems in the Caribbean: Jamaica as a case study. In D. R. Katerere, W. Applequist, O. M. Aboyade, & C. Togo (Eds.), *Tribal and Indigenous knowledge for the modern era: A natural and applied science perspective* (pp. 89–116). CRC Press.

R Core Team. (2023). *R: A language and environment for statistical computing, v.4.3.1*. R Foundation for Statistical Computing. Retrieved from www.cran.r-project.org

Reyes-García, V., Vadez, V., Godoy, R., Byron, B., Huanca, T., & Leonard, W. R. (2005). Interviewer bias: Lessons from panel and cross-sectional surveys from a native Amazonian society. *Tsimane' Amazonian Panel Study Working Paper*, *15*, 1–26.

Saunders, N. J. (2005). *The peoples of the Caribbean: An encyclopedia of archaeology and traditional culture*. ABC-CLIO.

Shaffer, C. A., Yukuma, C., Marawanaru, E., & Suse, P. (2018). Assessing the sustainability of Waiwai subsistence hunting in Guyana by comparison of static indices and spatially explicit, biodemographic models. *Animal Conservation*, *21*, 148–158.

Silva-Andrade, H. L., de Andrade, L. P., Muniz, L. S., Telino-Júnior, W. R., Albuquerque, U. P., & Lyra-Neves, R. M. (2016). Do farmers using conventional and non-conventional systems of agriculture have different perceptions of the diversity of wild birds? Implications for conservation. *PLoS ONE*, *11*, e0156307.

Sylvester, O., Segura, A. G., & Davidson-Hunt, I. J. (2016). The protection of forest biodiversity can conflict with food access for Indigenous people. *Conservation and Society*, *14*, 279–290.

Takacs, D. (2020). Whose voices count in biodiversity conservation? Ecological democracy in biodiversity offsetting, REDD+, and rewilding. *Journal of Environmental Policy and Planning*, *22*, 43–58.

Tang, R., & McGavin, M. C. (2016). A classification of threats to traditional ecological knowledge and conservation responses. *Conservation and Society*, *14*, 57–70.

Turvey, S. T., Fernández-Secades, C., Nuñez-Miño, J. M., Hart, T., Martinez, P., Brocca, J. L., & Young, R. P. (2014). Is local ecological knowledge a useful conservation tool for small mammals in a Caribbean multicultural landscape? *Biological Conservation*, *169*, 189–197.

Turvey, S. T., Kennerley, R. J., Nuñez-Miño, J. M., & Young, R. P. (2017). The last survivors: Current status and conservation of the non-volant land mammals of the insular Caribbean. *Journal of Mammalogy*, *98*, 918–936.

Turvey, S. T., Meredith, H. M. R., & Scofield, R. P. (2008). Continued survival of Hispaniolan solenodon (*Solenodon paradoxus*) in Haiti. *Oryx*, *42*, 611–614.

Turvey, S. T., Trung, C. T., Quyet, V. D., Nhu, H. V., Thoai, D. V., Tuan, V. C. A., Hoa, D. T., Kacha, K., Sysomphone, T., Wallate, S., Hai, C. T. T., Thanh, N. V., & Wilkinson, N. M. (2015). Interview-based sighting histories can inform regional conservation prioritization for highly threatened cryptic species. *Journal of Applied Ecology*, *52*, 422–433.

UNESCO. (2022). Maroon heritage of Moore Town. Retrieved from https://ich.unesco.org/en/RL/maroon-heritage-of-moore-town-00053

Virapongse, A., Brooks, S., Covelli Metcalf, E., Zedalis, M., Gosz, J., Kliskey, A., & Alessa, L. (2016). A social-ecological systems approach for environmental management. *Journal of Environmental Management*, *178*, 83–91.

Wallace, T., Spence, A., Campbell, D., & Barker, D. (2020). *Impact of erosion on the nutrient and chemical profiles of agricultural* *soil in the Upper Rio Grande Valley, Jamaica*. Paper presented at Goldschmidt Virtual Conference, June 21–26, 2020. https://doi.org/10.46427/gold2020.2703

Wilkins, L. (2001). Impact of hunting on Jamaican hutia (*Geocapromys brownii*) populations: Evidence from zooarchaeology and hunter surveys. In C. A. Woods & F. E. Sergile (Eds.), *Biogeography of the West Indies: Patterns and perspectives* (pp. 529–545). CRC Press.

Williams, J. N. (2013). Humans and biodiversity: Population and demographic trends in the hotspots. *Population and Environment*, *34*, 510–523.

Zapata-Ríos, G., Urgilés, C., & Suárez, E. (2009). Mammal hunting by the Shuar of the Ecuadorian Amazon: Is it sustainable? *Oryx*, *43*, 375–385.

## SUPPORTING INFORMATION

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

**How to cite this article:** Turvey, S. T., Robinson, O. F., Duncan, C., Kennerley, R. J., & Otuokon, S. (2024). Does endemic mammal conservation in Jamaica conflict with maintaining biocultural heritage? *Conservation Science and Practice*, *6*(12), e13245. https://doi.org/10.1111/csp2.13245