



Routledge

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rtrr20

# Influence of charismatic species and conservation engagement on the nature-viewing preferences of wildlife tourists

Dincy Mariyam, Sreedhar Vijayakrishnan & Krithi K. Karanth

To cite this article: Dincy Mariyam, Sreedhar Vijayakrishnan & Krithi K. Karanth (2022): Influence of charismatic species and conservation engagement on the nature-viewing preferences of wildlife tourists, Tourism Recreation Research, DOI: <u>10.1080/02508281.2022.2114746</u>

To link to this article: https://doi.org/10.1080/02508281.2022.2114746

+

View supplementary material 🖸



Published online: 02 Sep 2022.

Г	

Submit your article to this journal 🗹



🖸 View related articles 🗹



View Crossmark data 🗹

# Influence of charismatic species and conservation engagement on the natureviewing preferences of wildlife tourists

Dincy Mariyam <sup>a,b</sup>, Sreedhar Vijayakrishnan <sup>a</sup> and Krithi K. Karanth <sup>a,c</sup>

<sup>a</sup>Centre for Wildlife Studies, Bengaluru, Karnataka, India; <sup>b</sup>Manipal Academy of Higher Education, Manipal, Karnataka, India; <sup>c</sup>Nicholas School of the Environment, Duke University, Durham, NC, USA

#### ABSTRACT

Nature-based tourism is rising in popularity in developing countries. This presents a challenge for protected area (PA) managers forcing them to revisit management strategies to balance revenue generation while maintaining ecological integrity. Identifying tourists' preference for nature-viewing can aid in improved tourism management while simultaneously enhancing visitor experiences. We conducted semi-structured surveys with 516 tourists visiting three popular Indian PAs to understand their nature-viewing preferences. We identified the factors influencing viewing preferences for seven biodiversity categories using recursive partitioning classification trees. We found the biodiversity categories such as charismatic megafauna and landscape to be major tourist-attractants. Despite this, we also found that prior engagement in conservation activities, age, and gender can influence preference for viewing low-profile categories such as herpetofauna and flora. Providing opportunities for people to engage in conservation at different levels of governance and especially for tourists when visiting a PA could increase appreciation for all species and funding available for their conservation.

#### ARTICLE HISTORY Received 28 April 2022 Accepted 2 August 2022

KEYWORDS Biodiversity; India; naturebased tourism; protected area; visitor

# Introduction

Nature-based tourism is often promoted to provide economic incentives to communities, raising public awareness and sustaining biodiversity conservation efforts, although these purported benefits are highly debated (Dickman et al., 2017; Karanth & DeFries, 2011; Macdonald et al., 2017; Mawdsley et al., 2009). Communities' engagement and benefit distribution are particularly poor in biodiversity-rich developing economies (Coria & Calfucura, 2012; Ghosh & Ghosh, 2018; Karanth & DeFries, 2011). Furthermore, increasing unregulated tourism has altered wildlife behaviour through habituation and provisioning, increased physiological stress in wildlife, degraded habitats, and disrupted landscape connectivity (Adriantiono et al., 2018; Higham & Shelton, 2011; Larson et al., 2016; Monti et al., 2018; Shutt et al., 2014; Tyagi et al., 2019). Many protected areas (PA) have already reached or exceeded their tourism carrying capacity and tourist demands are complex and layered. It is challenging for tour operators to balance tourists' needs for comfortable and high-quality experiences with their desire to support local economies and be environmentally conscious (Eagles et al., 2002).

Large, terrestrial mammals often fit the definition of charismatic species which are 'rare', 'endangered', 'cute',

and 'dangerous' (Albert et al., 2018). Publicity driven by social media and media has garnered popularity and interest in these target species (Buckley, 2013; Buckley & Mossaz, 2018). Charismatic species such as the Komodo dragon (Varanus komodoensis) in Indonesia, the Big Five in Africa, and Brown bear (Ursus arctos) in North America and Europe are considered to be the main attractors to PAs as they contribute to tourist satisfaction, and are used in tourism marketing strategies in many regions (Adriantiono et al., 2018; Grünewald et al., 2016; Lindsey et al., 2007; Penteriani et al., 2017). Many protected areas receive significantly more visitors due to such charismatic species (Baum et al., 2017; Karanth et al., 2017). However, conservation practitioners contend that this narrow viewing preference could limit the potential role of tourism in biodiversity conservation (Buckley & Mossaz, 2018). Despite the bias in literature towards tourist preferences for charismatic species, few studies have shown how less high-profile species such as plants and birds may also be of interest (Buckley, 2013; Di Minin et al., 2013; Lindsey et al., 2007). This limited understanding about the type of tourists who prefer different biodiversity groups is often gained from the well-studied western regions (Buckley, 2013; Di Minin et al., 2013; Lindsey et al., 2007).

CONTACT Dincy Mariyam addincy.mariyam@cwsindia.org Centre for Wildlife Studies, Bengaluru, 560042, India Supplemental data for this article can be accessed at https://doi.org/10.1080/02508281.2022.2114746.

 $\ensuremath{\mathbb{C}}$  2022 Informa UK Limited, trading as Taylor & Francis Group

# Routledge Taylor & Francis Group

Check for updates

Emerging economies, like India, contribute millions of visitors and substantial revenue to the worldwide growth of tourism (Karanth et al., 2017). India is a megadiverse country with the second largest (1.38 billion) human population and hosts 7-8% of the world's species (IUCN, 2018; Mittermeier et al., 1997). The country has seen a 171% growth in PA visitation with 1.7 million tourists in 2005 and 4.6 million in 2015 (Karanth et al., 2017). The rising disposable incomes and the profound influence of social media on travel preferences have led to an increase in the demand for nature-based tourism in Indian PAs (Krishnan & Hatekar, 2017; Mawdsley et al., 2009). Nature-based tourism in India is largely domestic, with Indian tourists accounting for 96% of all visitors (Karanth et al., 2012; Karanth et al., 2017). While Indian PAs get over four million tourists annually, only a few fare well in terms of visitation and revenue generation (Karanth et al., 2017). Tiger Reserves, or PAs dedicated to the conservation of the endangered tiger (Panthera tigris), receive substantially more visitors than other PAs (Banerjee, 2010; Karanth et al., 2017). Apart from scenic landscapes and aesthetic appeal, charismatic megafauna, particularly the tiger, are the key attractors to popular Indian PAs (Karanth et al., 2017; Lyngdoh et al., 2017).

For better tourism management practices to evolve, it is imperative to understand tourist preferences for a range of biodiversity, including lesser-known species, and the associated drivers of these preferences. Therefore, the specific objectives of this study were to (1) understand the nature-viewing preferences of tourists in three highly visited Indian PAs and (2) examine the influence of specific demographic, geographic, visitation-related, and conservation-related factors on these preferences. Tourists who are visiting a PA for the first time and particularly after travelling from afar are more likely to prefer sighting the target/popular species of the area. Similarly, younger tourists or those without much prior experience with wildlife or conservation may not be aware of low-profile biodiversity found in the regions they visit. We hypothesized that first-time visitors, younger individuals, male tourists, those who have travelled long distances, individuals with limited experience in conservation and those unwilling to visit the PA in the absence of charismatic species would prefer to view high-profile biodiversity (Booth et al., 2011; Di Minin et al., 2013; Lindsey et al., 2007). In contrast, we expected that repeat visitors, individuals with some experience in conservation, elderly tourists, those who have travelled from nearby regions and female tourists would have broader nature-viewing preferences (Di Minin et al., 2013; Hausmann et al., 2017; Lindsey et al., 2007).

# **Materials and methods**

#### **Study sites**

The study was conducted in three Indian Protected Areas – Bandipur, Kanha and Sundarbans National Parks (IUCN protected area category II), located in South, Central and Eastern India, respectively (Figure 1). In 1973, India launched its flagship conservation programme, 'Project Tiger' to create inviolate spaces to protect this apex carnivore and maintain viable populations of tigers in their natural habitats. Nine tiger reserves were established in the year of its launch and the three selected PAs were among the first nine (ENVIS, 2021). Please refer to Table 1 for details about each PA.

Bandipur lies in the Western Ghats region which is a UNESCO world heritage site and a biodiversity hotspot. This landscape is home to the largest global populations of tigers and Asian elephants (Jathanna et al., 2015; Karanth et al., 2020). In addition to these large mammals, Bandipur also supports over 280 bird species and 448 floral species (Naithani, 1966). Kanha is the largest National Park in Central India and is one of the most biodiverse areas in India with over 60 mammal and 230 bird species (Ghose, 1995). Both the PAs also support a diverse assemblage of fauna including leopard (Panthera pardus), Asiatic wild dog (Cuon alpinus), gaur (Bos gaurus), sloth bear (Melursus ursinus), sambar (Rusa unicolor), and spotted deer (Axis axis). Sundarbans, a UNESCO world heritage site, is also the world's most extensive mangrove forest spanning over 10,000 km<sup>2</sup> in India and Bangladesh with 40% of the total area in India (Ghosh & Ghosh, 2018; WTTC, 2019). It is home to one-third of India's bird species, and rare and threatened species such as Irrawaddy (Orcaella brevirostris) and Gangetic river dolphins (Platanista gangetica gangetica) (Mitra & Chowdhury, 2018; ZSI, 2021). Sundarbans mangrove forests lie in the Gangetic river delta. In recent years, this region has been facing extreme challenges in the form of cyclones from climate change, taking a toll on the human and wildlife population residing there.

Each of these PAs is visited by more than 100,000 tourists every year (Table 1). In India, tourism in tiger reserves is restricted to 20% of the reserve's core area (TTF, 2005). Unlike the public wildlife reserves in Africa and North America, where one can drive their vehicles for wildlife safari, in India, only government-approved tour operators or drivers are allowed to conduct safaris inside the tiger reserves (Buckley, 2014).

## **Data collection**

The first author along with a team of 11 trained volunteers conducted semi-structured in-person surveys

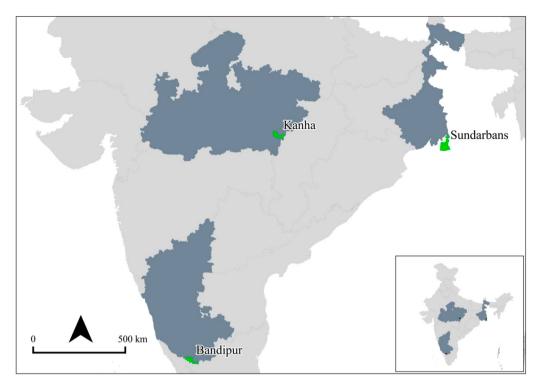


Figure 1. Study sites for examining the nature-viewing preferences of tourists visiting popular Indian protected areas, 2021. The map shows the location of the three protected areas within their respective states (India in inset).

from February to April 2021 at the safari entry points of each PA. The questionnaire and the study design were approved by the human subjects institutional review board of the Centre for Wildlife Studies (approval number: CWS\_IRB\_2020\_03, dated 9 October 2020). The study was piloted with 17 tourists visiting Nagarahole National Park in Karnataka in January 2021. This PA is contiguous with Bandipur. The surveys were conducted with 516 tourists (one individual per tourist group) visiting the PAs after seeking verbal consent. They were conducted in six languages (English, Malayalam, Tamil, Kannada, Hindi, and Bengali) with adult tourists (above 18 years). The survey contained questions about the tourists' (1) demographics, (2) PA visit and nature-viewing preferences, (3) involvement in wildlife conservation, (4) spending economics, and (5) desire to support locally run businesses through alternative lodging. Since the surveys were conducted during the global pandemic, COVID-19 protocols were followed to maintain the safety of the surveyor and those surveyed.

# Data analysis

We assessed the influence of various socioeconomic, demographic, and conservation factors on different nature-viewing preferences of tourists visiting the three protected areas by constructing recursive partitioning classification trees using the conditional inference method (Hothorn et al., 2006). Recursive partitioning generates a decision tree that splits members of a sample into smaller samples (called nodes) based on several dichotomous independent variables. The algorithm begins by splitting a single node, that contains all of the samples, into two homogeneous groups recursively. The algorithm selects a node at each step and splits it independently of other nodes and any previous splits. The algorithm evaluates all possible splits for all possible independent variables using a significance test and chooses the variable and split that produces the most homogeneous nodes. The splitting occurs only if a specific independent variable has samples over a predetermined cut-off value. The splitting terminates when the leaf nodes are pure or have samples less than the chosen cut-off value (Hothorn et al., 2006). The input independent variables included demographic factors such as (1) age and (2) gender. Age was binarily partitioned based on the average age of the tourist (36 years). Gender was considered as a nominal variable during the survey. However, we obtained only two classes (male and female) after collecting data. Other tourist-related variables used included whether or not the tourist (3) was a first-time visitor, (4) was willing to visit the PA in the absence of charismatic species, (5) supported any conservation institutions in cash or kind, and (6) had participated in or undertaken any conservation projects. Geographic variables

Characteristic	Bandipur	Kanha	Sundarbans
Area (in km²) Habitat type	1456.3 <sup>a</sup> Tropical dry and moist deciduous forests and savannah	2051.8 <sup>b</sup> Sal, bamboo forests, and grasslands	2584.9 Mangroves
Average number of tourists visited (2015– 2020)	169,728	150,611	207,349
% of domestic tourists (2015– 2020)	98	88	98
<sup>c</sup> Human population density in the districts where the PA lie (people per km <sup>2</sup> )	Chamarajanagar (181) Mysore (476)	Mandla (182) Balaghat (184)	North 24 Paragnas (2445) South 24- Paragnas (819)
Tourist season	Throughout the year (except during peak monsoon, i.e. July and August)	Mid October to June	Throughout the year (except during peak monsoon)
Wildlife safari type	Jeeps and buses	Jeeps and buses	Boat
Fee (as of February 2021)	Entry fee for Indian & foreign national – <sup>d</sup> INR 250 (US \$3.4)	Entry fee for Indian & foreign national – INR 250 (US \$3.4) Children between 5 and 12 years – INR 125 (US \$1.7) Entry is free for children below five years	Entry fee for Indian national – INR150 (US \$2) Foreign national – INR 300 (US \$4) Entry is free for children below five years

<sup>a</sup>Devidas and Puyravaud (1995); <sup>b</sup>Ghose (1995); <sup>c</sup>Census (2011); <sup>d</sup>US \$1 = INR 73; The safaris are usually conducted during the day in the core area of the PA. Kanha PA management conducts night safaris and nature walks in the buffer area.

included (7) distance travelled and (8) PA. Haversine distances for each tourist were calculated from their place of origin to the destination PA. Distance was binarily partitioned as 'short' and 'long' based on the median distance (175 km). Although the data were analysed as one data set to examine patterns across PAs, there are certain PA-level variations in terms of the location, habitat, PA administration and resource allocation for tourism. So we included PA as a variable to examine if the PA itself has an impact on viewing preferences. We measured the association between the variables using Goodman-Kruskal Tau ( $\tau$ ). However, none of the variables showed a strong association.

Response variables were measured within seven biodiversity groups representing Indian flora and fauna, namely, (1) birds, (2) herpetofauna, (3) landscape, (4) tiger, (5) other large mammals, (6) plants and trees, and (7) small and medium-sized mammals. Tiger was kept as a separate biodiversity group from large mammals, as previous studies have found a strong preference for tigers for visiting specific PAs (Karanth et al., 2012; Lyngdoh et al., 2017). The seven biodiversity groups were presented to the tourists using visual aids. The tourists were asked to rank the various groups from 1 (most preferred to view) to 7 (least preferred to view). The ranks were assigned without replacement. Out of the 516 surveys conducted, six were removed for the classification tree analysis, as the biodiversity groups were not ranked. We assessed the statistical significance of the differences in viewing preferences in the seven ranks as a function of the varying levels of the above predictor parameters. The recursive partitioning trees were derived using the 'partykit' package (Hothorn et al., 2006; Hothorn & Zeileis, 2015). All analyses were performed in R version 3.6.2.

# Results

# **Tourist characteristics**

Our surveyed samples consisted of one-third female and two-thirds male tourists, with an average age of 36 (Table S1). Almost three-quarters of tourists were employed, with the majority having a college degree. The majority of the tourists were domestic and onefourth of the surveyed tourists were from the middle class. Please see PA-wise statistics in Table S1.

# **Protected area visit**

The majority of tourists travelled in groups and almost two-thirds of the tourists were first-time visitors (Table S2). Forty-three per cent of tourists were day travellers and 13% of tourists reported visiting other PAs in the same trip. However, these tourist characteristics tremendously differed by PAs. In Bandipur, 75% of tourists were day travellers, but 85% and 65% of tourists visiting Kanha and Sundarbans respectively stayed for at least a day near the PA. In Sundarbans, Kanha, and Bandipur, 4%, 10%, and 16% of tourists respectively reported visiting other PAs in the trip. The top three ways tourists learned about the PA were word of mouth, general knowledge, and media (including social media). Further, the top three reasons for visiting a PA included safaris, wildlife (especially tiger), and the wilderness, as well as convenience, and being a recommended destination. Please see PA-wise statistics in Table S2.

Fourteen per cent of the tourists reported supporting wildlife conservation institutions, while 8% reported undertaking/being part of conservation projects. Most of the tourists (70%) reported intent to revisit the PA, while only 61% reported that they would visit the PA even without charismatic species. More than half of the tourists reported they want to support local communities by staying in a facility they manage, while a quarter of the respondents preferred private-run lodges, and 14% preferred any accommodation that is budget friendly, hygienic, safe, with trained staff, that benefits local people, and in natural settings. Some tourists preferred to stay at a local person's house if they are travelling alone, whereas, they prefer to stay at a resort/ lodge if they are travelling in a group (for example, with family). Some tourists had relatives staying close to the PA and thus preferred staying with them. More than half of the tourists spent less than INR 25,000 (US\$ 342) on fees, travel, accommodation, etc. Please see PA-wise statistics in Table S3.

## Nature-viewing preferences

Across all PAs studied, we found that tourists differ in motivations to visit PAs, especially regarding importance of the occurrence of charismatic wildlife species. The difference in preferences is correlated with other tourist characteristics such as willingness to visit a PA without charismatic species, age, gender, distance travelled, and conservation support. The preferences for each biodiversity category are as follows:

#### Tiger

Tiger was the top preference across all PAs (Figure 2). PA was found as a significant determinant of tiger viewing preferences (p < .001, Figure 2(a)). Tourists visiting Kanha preferred to view tigers more than those who visit Bandipur and Sundarbans (Figure 2(a); Node 2). Tourists who reported they would not come to Kanha if it did not include charismatic animals (Figure 2(a); Node 4) were more likely to prefer seeing tigers than those who said they would (Figure 2(a); Node 5).

#### Other large mammals

Across the three PAs, we found that the primary factor influencing preference for other large mammals was the willingness to visit in the absence of charismatic species (p = .005, Figure 2(b)). Furthermore, tourists who reported that they would not visit the PA if charismatic species were not present, as well as those who travelled long distances (Figure 2(b); Node 3) were more likely to prefer viewing other large mammals than those who travelled short distances (Figure 2(b); Node 4) and those who reported intent to visit the PA if charismatic species were not present (Figure 2(b); Node 5).

# Landscape

We found that the willingness to visit if charismatic species were not present was the significant factor influencing viewing preferences for other large mammals across the three PAs (p = .017, Figure 2(c)). Tourists who reported visiting the PA in the absence of charismatic species (Figure 2(c); Node 3) were more likely to prefer viewing the landscape than those who reported visiting the PA otherwise (Figure 2(c); Node 2).

#### **Birds**

Across the studied PAs, no variables had a significant impact on bird viewing preferences. However, 49% of the tourists reported a moderate interest in viewing birds (ranks 3 and 4, Figure 2(d)).

# Small and medium-sized mammals

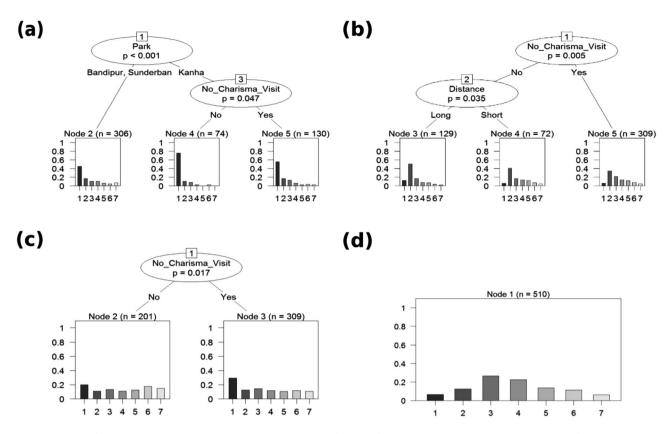
Across the PAs, we found that the primary factor influencing viewing preference for small and medium-sized mammals was the willingness to visit a PA in the absence of charismatic species (p = .009, Figure 3(a)). Tourists who reported interest in visiting the PA in the absence of charismatic species ranked small and medium-sized mammals as their least favourite viewing preference (Figure 3(a); Node 3). Those who reported they would not visit the PA if charismatic species were not present had no strong preferences for or against this biodiversity group (Figure 3(a); Node 2).

#### Plants and trees

The variables that characterized tourists' viewing preference across the three PAs for plants and trees were gender (p = .003, Figure 3(b); Node 1) and willingness to visit in the absence of charismatic species (p = .044, Figure 3(b); Node 3). In the absence of charismatic species, male tourists who indicated no intention to visit ranked plants and trees lower (Figure 3(b); Node 4) than male tourists who reported otherwise (Figure 3 (b); Node 5) and female tourists (Figure 3(b); Node 2).

#### Herpetofauna

We found that age was the primary determinant of herpetofauna viewing preference across PAs (p = .004, Figure 3(c); Node 1). Tourists above 36 years were least likely to prefer viewing herpetofauna (Figure 3(c); Node 2). Tourists under the age of 36 who had undertaken and/or assisted in conservation projects but had not supported any conservation institutions (Figure 3 (c); Node 6) were more likely to rank herpetofauna as least preferred than tourists who had supported (Figure 3(c); Node 7).



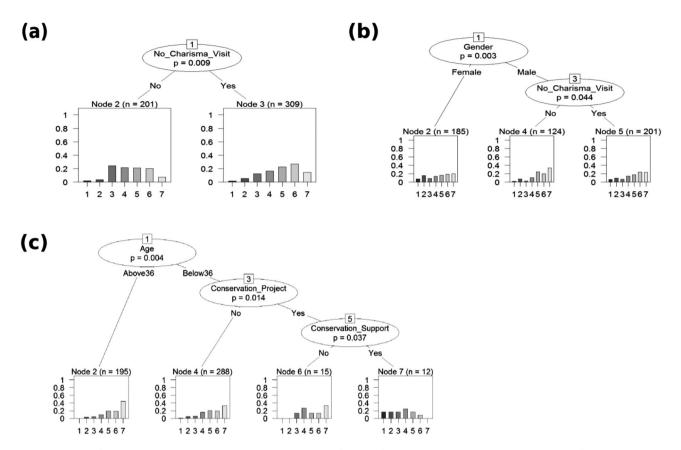
**Figure 2.** Classification tree showing the relative importance of the different covariates, with statistically significant branches at Nodes, in determining the viewing preference for (a) Tiger, (b) Other large mammals, (c) Landscape, (d) Birds, ranking from 1 (most preferred) to 7 (least preferred). Park = Protected Area; No\_Charisma\_Visit = willingness to visit a protected area in the absence of charismatic species; Distance = distance travelled to reach the protected area (Short  $\leq$ 175 km; Long >175 km).

# Discussion

Nature-based tourism is gaining popularity with an increasing number of target species and diversification of types of tours and "experiences". Thus, evaluating tourist preferences is critical for tourism policies and practices to enable this conservation enterprise to effectively manage the associated opportunities and challenges and help achieve biodiversity goals. Our study classified biodiversity encountered more frequently while visiting PAs into different categories (including charismatic and lesser-known species) to focus on each category and investigate what factors influenced tourists' stated preferences for each.

Domestic tourists in India largely drive nature-based tourism, and this was particularly apparent during the study period owing to the restrictions on international travel due to the COVID-19 pandemic. The restrictions severely affected the arrival of foreign nationals to India. While the pandemic took a significant toll on the visits to African PAs as they catered mainly to international tourists (Balmford et al., 2009, 2015), developing economies like India were at an advantage as they relied upon domestic tourists. Before the second wave-induced lockdown in India, certain travel restrictions were still in place. Despite this, there were several first-time visitors to the PAs. Recently, the tourism literature has seen a new phenomenon termed 'revenge tourism' as a form of travel in the post-pandemic phase. Given these circumstances and people's continued willingness and active desire to travel, there is an added need to understand tourists' motivations and preferences.

Similar to studies in Africa, our study also shows the higher affinity of tourists for charismatic megafauna, especially tigers (Di Minin et al., 2013; Lindsey et al., 2007). PAs such as Kanha are popular for frequent tiger sightings and tourists travel to this PA with the main aim of seeing the tiger and its habitat (Karanth et al., 2017; Lyngdoh et al., 2017). This is evident in the choice to go on multiple safaris in Kanha, as opposed to tourists visiting Bandipur and the Sundarbans, who often only go on one safari. Tourists also travel long distances (>175 km) with a stronger desire to see the key attraction of the PA, often large mammals, which could be attributed to a desire in maximizing the experience after investing time, money and effort. These very specific viewing interests can have both positive and



**Figure 3.** Classification tree showing the relative importance of the different covariates, with statistically significant branches at Nodes, in determining the viewing preference for (a) Small Mammals, (b) Plants & Trees, (c) Herpetofauna, ranking from 1 (most preferred) to 7 (least preferred). No\_Charisma\_Visit = willingness to visit a protected area in the absence of charismatic species; Gender = Male/Female; Age = Below 36 years/Above 36 years; Conservation\_Project = whether the respondent had undertaken/been part of a conservation project or not; Conservation\_Support = whether the respondent had supported any conservation institutions or not.

negative consequences for PAs running their tourism centred on charismatic species. While increased footfall generates revenue and improves the local economy, loss of tigers or difficulty with sighting tigers in the future can decrease tourism in such PAs. Charismatic large mammals including tiger significantly influence the willingness to visit a PA. However, compared to a decade ago, the percentage of tourists willing to visit Kanha in the absence of charismatic species has nearly doubled (Karanth et al., 2012) reflecting a shift in interest that goes beyond charismatic species.

While tigers attract tourists to Kanha, tiger sightings are relatively infrequent on safaris in Bandipur and Sundarbans, indicating that not all popular PAs require charismatic species to sustain tourism. The most common reason for visiting Bandipur was travel convenience. Bandipur is contiguous with many other PAs in the same state and neighbouring states, and there are two national highways passing through the forest. Infrastructure and accessibility can have tremendous positive influence on visitation (Echeverri et al., 2022; Hausmann et al., 2017). The mangrove forests and the associated sense of serenity were the draws in Sundarbans. Landscapes are a huge attractor even in the absence of charismatic species for tourists and this has been identified in previous research from South Asian, European, and South African national parks as well (Buckley et al., 2017; Hausmann et al., 2017; Karanth et al., 2012; Lyngdoh et al., 2017; Muñoz et al., 2019). Interacting with nature in various capacities can positively impact people's mental and physical health (Bratman et al., 2019). This knowledge is critical for developing and/or marketing regions with scenic beauty that lack charismatic megafauna.

Along with large mammals and landscape, birds are also a favoured biodiversity group. Willingness to visit PAs increases with increasing number of bird species, especially those that are endemic, rare, and threatened (Booth et al., 2011; Naidoo & Adamowicz, 2005). There is considerable potential for birds to act as flagship species for tourism in areas that lack charismatic megafauna (Veríssimo et al., 2009). For example, in Bugun tribal community in India's North-eastern state Arunachal Pradesh, bird-based tourism provides direct economic incentives for community welfare (Mohan & Athreya, 2011). Additionally, two Indian PAs, Ranganathittu and Keoladeo Ghana Bharatpur get more than 100,000 visitors annually where the main tourist attractions are birds (Karanth et al., 2017). Protected area managers must recognize and capitalize on these opportunities.

We find the influence of demographic features such as gender and age on the viewing preferences for lesserknown species. Female tourists, unlike male tourists, did not have a strong disinclination towards flora. Studies have demonstrated women's affinity for flora and the impact of nature on mental health recovery (Buckley & Westaway OAM, 2021; Philpott et al., 2020). Further, our results indicate that there is potential to encourage younger tourists to value lesser-known species by involving them in conservation efforts such as project participation or financial assistance. Our evidence suggests that tourists' actions such as engaging in conservation can drive their stated preferences for biodiversity.

# Conclusion

While charismatic species, like the tiger, could act as flagship species for PAs, there is undeniable potential to garner further attention for lesser-known species, like herpetofauna. This potential can be especially leveraged for PAs that attract a large number of domestic tourists and first-time visitors, who may be presented with several opportunities to engage with conservation. Most domestic tourists' behaviour and attitudes may be incompatible with the goal of responsible tourism due to their lack of knowledge about the local culture and biodiversity, as well as the PAs they visit (Mawdsley et al., 2009). Therefore, PAs should provide an educational experience that goes beyond the bare minimum exposure to wildlife through guided tours or walks with trained naturalists, well-curated and engaging interpretation centres, and updated resources about the area's cultural and natural history, including the PA's conservation challenges (Banerjee, 2012; Mawdsley et al., 2009). An elevated conservationoriented ethic instilled through these experiences could broaden nature-viewing preferences, resulting in greater interest in viewing lesser-known species and wealthy tourists choosing to align themselves with opportunities to contribute to species conservation. Tourists who seek lodging near PAs provide opportunities for tourism management to design different activities based on the diverse preferences of tourists, as well as engage communities in providing hospitality. We emphasize the need to recognize traveller profiles, motivations, and specific interests to help increase and strengthen tourists' interest in and support for lesserknown wildlife and wild spaces.

# **Acknowledgements**

We are thankful to all the tourists who participated in the study. We thank Karnataka, Madhya Pradesh, and West Bengal Forest Departments for providing necessary permissions and the following individuals A. Mishra (IFS), H. S. Negi (IFS), S. R. Natesha (IFS), S. Shukla (IFS), B. Khayal, D. Makhija, and V. Kumar who facilitated the study. We would like to thank A. Halder, A. Patil, D. Mahapatra, H. B. Sachin, R. Khan, M. S. Das, S. Das, S. Gupta, S. Sharma, Simran Singh, and Srishti Singh for their assistance with fieldwork. We thank E. Di Minin and A. Harihar for providing valuable feedback at various phases. We thank I. Ramakrishna, K. Sampath, P. Ranganathan, and S. Basrur for important discussions on the study's various aspects.

#### **Disclosure statement**

No potential conflict of interest was reported by the author(s).

## Funding

This work was supported by Idea Wild; Centre for Wildlife Studies; Indian Council of Social Science Research; Rufford Foundation [grant number 31938-1].

#### **Notes on contributors**

*Dincy Mariyam* is a PhD candidate at the Centre for Wildlife Studies, Bengaluru and the Manipal Academy of Higher Education. Her current research focuses on opportunities for nature-based tourism beyond protected areas.

*Sreedhar Vijayakrishnan* is a principal scientist at the Centre for Wildlife Studies, Bengaluru. His research focuses on Asian elephant ecology and behaviour, with particular focus on populations that extensively use human-modified landscapes. He uses multi-disciplinary approaches to understand how elephants respond to conflict with humans.

*Krithi K. Karanth* is the chief conservation scientist at the Centre for Wildlife Studies, and adjunct faculty at Duke. Her 24-year-long research in India and Asia encompasses many issues in human dimensions of wildlife conservation. Her research has assessed patterns of species distributions and extinctions, impacts of wildlife tourism, understanding voluntary resettlement, land-use change, and understanding human–wildlife interactions. She created award winning *Wild Seve*, *Wild Shaale*, *Wild Surakshe* and Adopt a PHC conservation programmes.

#### ORCID

Dincy Mariyam b http://orcid.org/0000-0001-8075-4141 Sreedhar Vijayakrishnan b http://orcid.org/0000-0001-9988-3007

Krithi K. Karanth D http://orcid.org/0000-0003-4614-2648

#### References

Adriantiono, Jessop, T. S., Purwandana, D., Ciofi, C., Imansyah, M. J., Panggur, M. R., & Ariefiandy, A. (2018). Effects of human activities on Komodo dragons in Komodo National Park. *Biodiversity and Conservation*, 27(13), 3329–3347. https://doi.org/10.1007/s10531-018-1601-3 Albert, C., Luque, G. M., & Courchamp, F. (2018). The twenty most charismatic species. *PLoS ONE*, *13*(7), e0199149. https://doi.org/10.1371/journal.pone.0199149

Balmford, A., Beresford, J., Green, J., Naidoo, R., Walpole, M., & Manica, A. (2009). A global perspective on trends in naturebased tourism. *PLoS Biology*, 7(6), e1000144. https://doi.org/ 10.1371/journal.pbio.1000144

Balmford, A., Green, J. M. H., Anderson, M., Beresford, J., Huang, C., Naidoo, R., Walpole, M., & Manica, A. (2015). Walk on the wild side: Estimating the global magnitude of visits to protected areas. *PLoS Biology*, *13*(2), e1002074. https://doi.org/ 10.1371/journal.pbio.1002074

Banerjee, A. (2010). Tourism in protected areas: Worsening prospects for tigers? *Economic and Political Weekly*, XLV (10), 27–29.

Banerjee, A. (2012). Is wildlife tourism benefiting Indian protected areas? A Survey. Current Issues in Tourism, 15(3), 211–227. https://doi.org/10.1080/13683500.2011.599367

Baum, J., Cumming, G. S., & De Vos, A. (2017). Understanding spatial variation in the drivers of nature-based tourism and their influence on the sustainability of private land conservation. *Ecological Economics*, 140, 225–234. https://doi.org/10. 1016/j.ecolecon.2017.05.005

Booth, J. E., Gaston, K. J., Evans, K. L., & Armsworth, P. R. (2011). The value of species rarity in biodiversity recreation: A birdwatching example. *Biological Conservation*, 144(11), 2728– 2732. https://doi.org/10.1016/j.biocon.2011.02.018

Bratman, G. N., Anderson, C. B., Berman, M. G., Cochran, B., de Vries, S., Flanders, J., Folke, C., Frumkin, H., Gross, J. J., Hartig, T., Kahn, P. H., Kuo, M., Lawler, J. J., Levin, P. S., Lindahl, T., Meyer-Lindenberg, A., Mitchell, R., Ouyang, Z., Roe, J., ... Daily, G. C. (2019). Nature and mental health: An ecosystem service perspective. *Science Advances*, *5*(7), eaax0903. https://doi.org/10.1126/sciadv.aax0903

Buckley, R. (2013). To use tourism as a conservation tool, first study tourists. Animal Conservation, 16(3), 259–260. https:// doi.org/10.1111/acv.12057

Buckley, R. (2014). Tiger tourism: Critical issues. General lessons. *Tourism Recreation Research*, 38(1), 101–103. https://doi.org/ 10.1080/02508281.2013.11081733

Buckley, R., & Mossaz, A. (2018). Private conservation funding from wildlife tourism enterprises in sub-Saharan Africa: Conservation marketing beliefs and practices. *Biological Conservation*, 218, 57–63. https://doi.org/10.1016/j.biocon. 2017.12.001

Buckley, R., & Westaway OAM, D. (2021). Women report that nature tourism provides recovery from psychological trauma. *Tourism Recreation Research*, 47(4), 443–447. https://doi.org/10.1080/02508281.2021.1917892

Buckley, R., Zhong, L., & Ma, X. (2017). Visitors to protected areas in China. *Biological Conservation*, 209, 83–88. https:// doi.org/10.1016/j.biocon.2017.01.024

Census. (2011). Census of India 2011. https://censusindia.gov. in/2011census/

Coria, J., & Calfucura, E. (2012). Ecotourism and the development of indigenous communities: The good, the bad, and the ugly. *Ecological Economics*, *73*, 47–55. https://doi.org/ 10.1016/j.ecolecon.2011.10.024

Devidas, S., & Puyravaud, J.-P. (1995). Primary productivity of the herbaceous layer in a grazed savanna woodland, Bandipur National Park, southern India. *Acta Oecologica*, *16*(4), 491–505. Di Minin, E., Fraser, I., Slotow, R., & Macmillan, D. C. (2013). Understanding heterogeneous preference of tourists for big game species: Implications for conservation and management. *Animal Conservation*, *16*(3), 249–258. https://doi. org/10.1111/j.1469-1795.2012.00595.x

Dickman, A., Packer, C., Johnson, P. J., & Macdonald, D. W. (2017). A sideways look at conservation and consistency in tourism policy. *Conservation Biology*, 32(3), 744–746. https://doi.org/10.1111/cobi.13066

Eagles, P. F. J., McCool, S. F., & Haynes, C. D. (2002). Sustainable tourism in protected areas: Guidelines for planning and management. IUCN Gland, Switzerland and Cambridge, UK.

Echeverri, A., Smith, J. R., Macarthur-waltz, D., Lauck, K. S., Anderson, C. B., Vargas, R. M., Quesada, I. A., Wood, S. A., Chaplin-Kramer, R., & Daily, G. C. (2022). Biodiversity and infrastructure interact to drive tourism to and within Costa Rica. *Proceedings of the National Academy of Sciences*, *119*(11), e2107662119. https://doi.org/10.1073/ pnas.2107662119

ENVIS. (2021). Tiger reserves. http://www.wiienvis.nic.in/ Database/trd\_8222.aspx

Ghose, R. K. (1995). Fauna of Kanha Tiger Reserve Madhya Pradesh. In *Fauna of Conservation Areas No. 7*.

Ghosh, P., & Ghosh, A. (2018). Is ecotourism a panacea? Political ecology perspectives from the Sundarban Biosphere Reserve, India. *GeoJournal*, *84*(2), 345–366. https://doi.org/10.1007/s10708-018-9862-7

Grünewald, C., Schleuning, M., & Böhning-Gaese, K. (2016). Biodiversity, scenery and infrastructure: Factors driving wildlife tourism in an African savannah national park. *Biological Conservation*, 201, 60–68. https://doi.org/10.1016/j.biocon. 2016.05.036

Hausmann, A., Slotow, R., Fraser, I., & Di Minin, E. (2017). Ecotourism marketing alternative to charismatic megafauna can also support biodiversity conservation. *Animal Conservation*, 20(1), 91–100. https://doi.org/10.1111/acv.12292

Higham, J. E. S., & Shelton, E. J. (2011). Tourism and wildlife habituation: Reduced population fitness or cessation of impact? *Tourism Management*, 32(6), 1290–1298. https:// doi.org/10.1016/j.tourman.2010.12.006

Hothorn, T., Hornik, K., & Zeileis, A. (2006). Unbiased recursive partitioning: A conditional inference framework. *Journal of Computational and Graphical Statistics*, *15*(3), 651–674. https://doi.org/10.1198/106186006X133933

Hothorn, T., & Zeileis, A. (2015). Partykit: A modular toolkit for recursive partitioning in R. *Journal of Machine Learning Research*, *16*(1), 3905–3909. https://jmlr.org/papers/v16/ hothorn15a.html

IUCN. (2018). India – Asia. https://www.iucn.org/asia/countries/ india

Jathanna, D., Karanth, K. U., Kumar, N. S., & Karanth, K. K. (2015). Patterns and determinants of habitat occupancy by the Asian elephant in the Western Ghats of Karnataka, India. *PLoS ONE*, *10*(7), e0133233. https://doi.org/10.1371/journal.pone.0133233

Karanth, K. K., & DeFries, R. (2011). Nature-based tourism in Indian protected areas: New challenges for park management. *Conservation Letters*, 4(2), 137–149. https://doi.org/ 10.1111/j.1755-263X.2010.00154.x

Karanth, K. K., DeFries, R., Srivathsa, A., & Sankaraman, V. (2012). Wildlife tourists in India's emerging economy: Potential for a conservation constituency? *Oryx*, *46*(3), 382–390. https://doi. org/10.1017/S003060531100086X

- Karanth, K. K., Jain, S., & Mariyam, D. (2017). Emerging trends in wildlife and tiger tourism in India. In J. S. Chen & N. K. Prebensen (Eds.), *Nature tourism* (pp. 159–171). Routledge.
- Karanth, K. U., Kumar, N. S., & Karanth, K. K. (2020). Tigers against the odds: Applying macro-ecology to species recovery in India. *Biological Conservation*, *252*, Article 108846. https://doi.org/10.1016/j.biocon.2020.108846
- Krishnan, S., & Hatekar, N. (2017). Rise of the new middle class in India and its changing structure. *Economic and Political Weekly*, LII(22), 40–48.
- Larson, C. L., Reed, S. E., Merenlender, A. M., & Crooks, K. R. (2016). Effects of recreation on animals revealed as widespread through a global systematic review. *PLoS ONE*, *11*(12), e0167259. https://doi.org/10.1371/journal.pone.0167259
- Lindsey, P. A., Alexander, R., Mills, M. G. L., Romanach, S., & Woodroffe, R. (2007). Wildlife viewing preferences of visitors to protected areas in South Africa: Implications for the role of ecotourism in conservation. *Journal of Ecotourism*, 6(1), 19–33. https://doi.org/10.2167/joe133.0
- Lyngdoh, S., Mathur, V. B., & Sinha, B. C. (2017). Tigers, tourists and wildlife: Visitor demographics and experience in three Indian Tiger Reserves. *Biodiversity and Conservation*, 26(9), 2187–2204. https://doi.org/10.1007/s10531-017-1352-6
- Macdonald, C., Gallagher, A. J., Barnett, A., Brunnschweiler, J., Shi, D. S., & Hammerschlag, N. (2017). Conservation potential of apex predator tourism. *Biological Conservation 215*(July), 132–141. https://doi.org/10.1016/j.biocon.2017.07.013
- Mawdsley, E., Mehra, D., & Beazley, K. (2009). Nature lovers, picnickers and bourgeois environmentalism. *Economic and Political Weekly*, 44(11), 49–59. https://doi.org/10.2307/ 40278614
- Mitra, S., & Chowdhury, M. R. (2018). Possible range decline of Ganges River Dolphin Platanista gangetica (Mammalia: Cetartiodactyla: Platanistidae) in Indian Sundarban. *Journal* of Threatened Taxa, 10(13), 12738–12748. https://doi.org/ 10.11609/jot.3746.10.13.12738-12748
- Mittermeier, R., Robles, P., & Goettsch-Mittermeier, C. (1997). Megadiversity: Earth's biologically wealthiest nations.
- Mohan, D., & Athreya, R. (2011). Sustainable bird based tourism in India's remote north-east frontier. *International Journal of Innovation Science*, 3(1), 23–28. https://doi.org/10.1260/ 1757-2223.3.1.23
- Monti, F., Duriez, O., Dominici, J. M., Sforzi, A., Robert, A., Fusani, L., & Grémillet, D. (2018). The price of success: Integrative long-term study reveals ecotourism impacts on a flagship species at a UNESCO site. *Animal Conservation*, 21(6), 448– 458. https://doi.org/10.1111/acv.12407

- Muñoz, L., Hausner, V., Brown, G., Runge, C., & Fauchald, P. (2019). Identifying spatial overlap in the values of locals, domestic- and international tourists to protected areas. *Tourism Management*, 71, 259–271. https://doi.org/10. 1016/j.tourman.2018.07.015
- Naidoo, R., & Adamowicz, W. L. (2005). Biodiversity and naturebased tourism at forest reserves in Uganda. *Environment and Development Economics*, 10(2), 159–178. https://doi.org/10. 1017/S1355770X0400186X
- Naithani, B. D. (1966). Studies on the flora of Bandipur Reserve Forest Mysore state. *Bulletin Botany Survey India*, 8(3-4), 252– 263. https://doi.org/10.20324/nelumbo/v8/1966/76199
- Penteriani, V., López-Bao, J. V., Bettega, C., Dalerum, F., Delgado, M., Jerina, K., Kojola, I., Krofel, M., & Ordiz, A. (2017). Consequences of brown bear viewing tourism: A review. *Biological Conservation*, 206, 169–180. https://doi. org/10.1016/j.biocon.2016.12.035
- Philpott, S. M., Egerer, M. H., Bichier, P., Cohen, H., Cohen, R., Liere, H., Jha, S., & Lin, B. B. (2020). Gardener demographics, experience, and motivations drive differences in plant species richness and composition in urban gardens. *Ecology and Society*, 25(4), 1–27. https://doi.org/10.5751/ ES-11666-250408
- Shutt, K., Heistermann, M., Kasim, A., Todd, A., Kalousova, B., Profosouva, I., Petrzelkova, K., Fuh, T., Dicky, J., Bopalanzognako, J., & Setchell, J. M. (2014). Effects of habituation, research and ecotourism on faecal glucocorticoid metabolites in wild western lowland gorillas: Implications for conservation management. *Biological Conservation*, 172, 72–79. https://doi.org/10.1016/j.biocon.2014.02.014
- TTF. (2005). The report of the Tiger Task Force: Joining the dots. In Project Tiger, The Ministry of Environment and Forests, Government of India, New Delhi.
- Tyagi, A., Kumar, V., Kittur, S., Reddy, M., Naidenko, S., Ganswindt, A., & Umapathy, G. (2019). Physiological stress responses of tigers due to anthropogenic disturbance especially tourism in two central Indian tiger reserves. *Conservation Physiology*, 7(1), coz045. https://doi.org/10. 1093/conphys/coz045
- Veríssimo, D., Fraser, I., Groombridge, J., Bristol, R., & MacMillan, D. C. (2009). Birds as tourism flagship species: A case study of tropical islands. *Animal Conservation*, 12(6), 549–558. https:// doi.org/10.1111/j.1469-1795.2009.00282.x
- WTTC. (2019). The economic impact of global wildlife tourism. WTTC.
- ZSI. (2021). Birds of the Sunderban Biosphere Reserve. Zoological Survey of India.