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AVITOURISM OPPORTUNITIES AS A CONTRIBUTION TO CONSERVATION AND RURAL LIVELIHOODS IN THE HINDU KUSH HIMALAYA - A FIELD PERSPECTIVE

Nishikant Gupta¹ , Mark Everard² , Ishaan Kochhar³  & Vinod Kumar Belwal⁴

¹International Centre for Integrated Mountain Development (ICIMOD), Post Box #3226, Kathmandu, Nepal.

²University of the West of England (UWE), Coldharbour Lane, Bristol BS16 1QY, UK.

³Shaping Spaces Consultants Private Limited, Sector 23 B, Dwarka, New Delhi 110077, India.

⁴Balyuli, Sankar, Marchula, Almora, Uttarakhand 244715, India.

¹nishikantgupta@live.in (corresponding author), ²Mark.Everard@uwe.ac.uk, ³ishaankochhar440@gmail.com, ⁴vinodbelwal1986@gmail.com

Abstract: The Hindu Kush Himalaya is a biodiversity hotspot subject to multiple anthropogenic stressors, including hydropower plants, pollution, deforestation and wildlife poaching, in addition to changing climate. Bird photography tourism, as a locally important element of avitourism, has the potential to integrate sustainable development and wildlife conservation. We conducted field surveys around the reaches of four Indian Himalayan rivers—the Kosi, western Ramganga, Khoh, and Song—outside of protected national parks (the Corbett and Rajaji tiger reserves) to ascertain the distribution of bird species along river corridors that could be sites of avitourism. Species richness along the surveyed reaches were: Kosi (79), western Ramganga (91), Khoh (52), and Song (79). This study contributes critical data to the existing baseline information on the avifaunal species of Uttarakhand. It further discusses the possibility of developing avitourism for knowledge generation on species distribution and innovative livelihood options for local communities in Uttarakhand, reinforcing local vested interest in bird conservation. The findings have generic applicability worldwide.

Keywords: Birds, community-led conservation, eco-tourism, India, Khoh, Kosi, Song, Uttarakhand, western Ramganga.

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Author details: NISHIKANT GUPTA is a aquatic ecologist currently working at ICIMOD, Kathmandu, Nepal. MARK EVERARD is a Associate Professor at UWE-Bristol, UK. ISHAAN KOCHHAR is at Shaping Spaces Consultants Private Limited, New Delhi. VINOD K. BELWAL is a field assisant residing in Uttarakhand.

Author contribution: NG designed the work, conducted the fieldwork, analysed the data, and wrote the paper. ME assisted with the writing of the paper. IK assisted with the images in the paper. VKB assisted with the data collection.

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INTRODUCTION

Species conservation in the Hindu Kush Himalaya (HKH henceforth) has often focused on megafauna. The Bengal Tiger *Panthera tigris tigris*, Snow Leopard *Panthera uncia*, Indian Elephant *Elephas maximus indicus*, the Greater One-horned Rhinoceros *Rhinoceros unicornis*, and Red Panda *Ailurus fulgens* are afforded the highest judicial protection, and are the prime recipients of conservation grants. Very little current information is available regarding the distribution in the HKH of previously reported species of birds (based on observations in the wild, visual signs, discussion with communities, unconfirmed reports). It is, however, reasonable to infer that pressures arising from increasing anthropogenic stressors (e.g., hydropower plants, pollution, deforestation, poaching) and changing climatic variables continue to have potentially significant impacts on multiple avian species (INCCA 2010; Shrestha et al. 2015; Alfthan et al. 2018). It is, therefore, critical that information regarding the distribution of birds is made a priority as they play important and diverse roles in the structure, functions and ecosystem services of food webs (Sekercioglu et al. 2004).

Environmental indicators serve important roles in conservation responses and land-use management by constituting simplified summaries synthesising multiple datasets or specific pieces of information within complex systems (Jackson et al. 2000). Birds are perceived as useful environmental quality indicators owing to their conspicuousness and mobility, the scale at which they utilise landscapes, as well as their diversity, roles in food webs, integrated responses to multiple pressures, association with specific habitat types and public appeal (Gregory et al. 2004, 2005). Bird indicators, therefore, provide valuable tools for assessing ecosystem health including in wetland and freshwater systems. One such indicator has been developed for this purpose in Britain (Everard & Noble 2010).

Avitourism, where birdwatching is the primary motivation of a trip, has gained momentum as a niche of nature-based tourism products for birders, conservationists and photographers alike (Connell 2009; Cordell & Herbert 2002). This industry is experiencing a paradigm shift from historically localised birdwatching into a global market, in part due to the increasing affordability of travel (Steven et al. 2014). The avitourists are usually well-off and passionate people willing to travel greater distance just to see endemic and/or endangered species, a significant aspect of societal valuation of species diversity (Sekercioglu 2002).

Avitourism is consequently a rapidly expanding activity, especially in developing countries with high biodiversity. The passion and enthusiasm associated with this recreational pastime have ensured that birders travel to remote locations, bringing along with them livelihood opportunities for local people. There have been previous assessments on the potential development of avitourism globally (Steven et al. 2014). The potential impacts of birdwatching (Biggs et al. 2011; Puhakka et al. 2011), birdwatching destinations, birdwatching festivals, migration events, and their impacts on local people have been examined (Lawton 2009). The social perspective surrounding the activity (Cordell & Herbert 2002; Eubanks et al. 2004; Connell 2009), along with bird species fed artificially for tourism attraction (Jones 2011), have also been studied. As avitourism has huge potential to achieve win-win outcomes for local communities and the objectives of protected area managers, there is a need to establish locally specific interlinkages between birdwatching ecotourism, environmental conservation and economic co-benefits (Vas 2013).

The HKH is the world's most densely populated mountain range (Alfthan et al. 2018), but one that is subject to numerous anthropogenic threats. By the 2050s, temperatures across the region are projected to increase by about 1–2 °C, the monsoon is expected to become longer/more erratic, precipitation is projected to change by 5% on average, and the intensity of extreme rainfall events is likely to increase (Shrestha et al. 2015; Alfthan et al. 2018). These climatic factors are likely to have an adverse impact on the bird habitats across the region (Alfthan et al. 2018).

The HKH region is home to a rich assortment of avifaunal species, and many of these have established an important position in the psyche of local communities through cultural, traditional and religious associations (Singh et al. 2017). It is, therefore, important to involve the public, the private sector, and the government around common interests, which may enable co-creation of solutions to counteract the decline of bird populations, particularly for lesser known avian species (Hausmann et al. 2017; Watts 2018). Nonetheless, it is important to note that unsustainable development, unregulated tourism, and unnecessary feeding may have negative impacts on native bird species.

This study focuses on the current distribution of birds along four river corridors—the Kosi, western Ramganga (henceforth Ramganga River), Khoh, and Song—in Uttarakhand State of the Indian Himalayan region, focusing on river reaches outside protected

areas (i.e., the core areas of Corbett and Rajaji Tiger Reserves). It proceeds to discuss possible management responses to promote immediate protection and long-term conservation of birds in the region, including promotion of bird photography tourism as a potential livelihood option for local communities. Focus group discussions (FGDs) were undertaken to understand any ongoing avitourism efforts and livelihood benefits that occur here.

METHODS

Study area

The field survey of river corridor birds focused on the state of Uttarakhand (30.0668° N, 79.0193° E), lying within the western region of the Indian Himalayan biodiversity hotspot (Gupta et al. 2015). Key characteristics of the four surveyed rivers, described in greater detail by Gupta et al. (2015), are outlined in Table 1 and illustrated in Fig. 1.

Members of communities in this region that engage in aspects of ecotourism provide multiple services such as tour guides, accommodation and food, transportation, and other necessary infrastructure for incoming tourists (Nishikant Gupta, pers. obs. 2010–2019).

Avifaunal survey

Field surveys were conducted by teams of three surveyors, travelling on foot along the banks of each of the four rivers to collect direct and indirect evidence of the presence of birds. Fieldwork was conducted pre- and post-monsoon, and in the winter months of 2018 and 2019. GPS locations of indirect and direct signs were recorded. Avian species were recorded at 20 independent sites using the line transect method (Chettri et al. 2005). Transect locations were selected based on the presence of bird signs (e.g., nesting sites, droppings). Surveyors walked in a transect parallel to the river, recording evidence of birds (seen by naked eye or with 10x50 binoculars or heard) in 500m sections. Each observation session lasted 60–90 minutes, each transect was surveyed three separate times, and the points travelled (and therefore sampled) were in a specific order, i.e., along the downstream of a particular river stretch. Where possible, birds were photographed. Standard published literature was used to identify bird species. Avifaunal surveys were limited by the dynamic and potentially hazardous nature of some study sites, and occurrence and detection of some bird species were constrained by season and time of the day due to variation in activity levels and behaviour among species (Bashir et al. 2012).

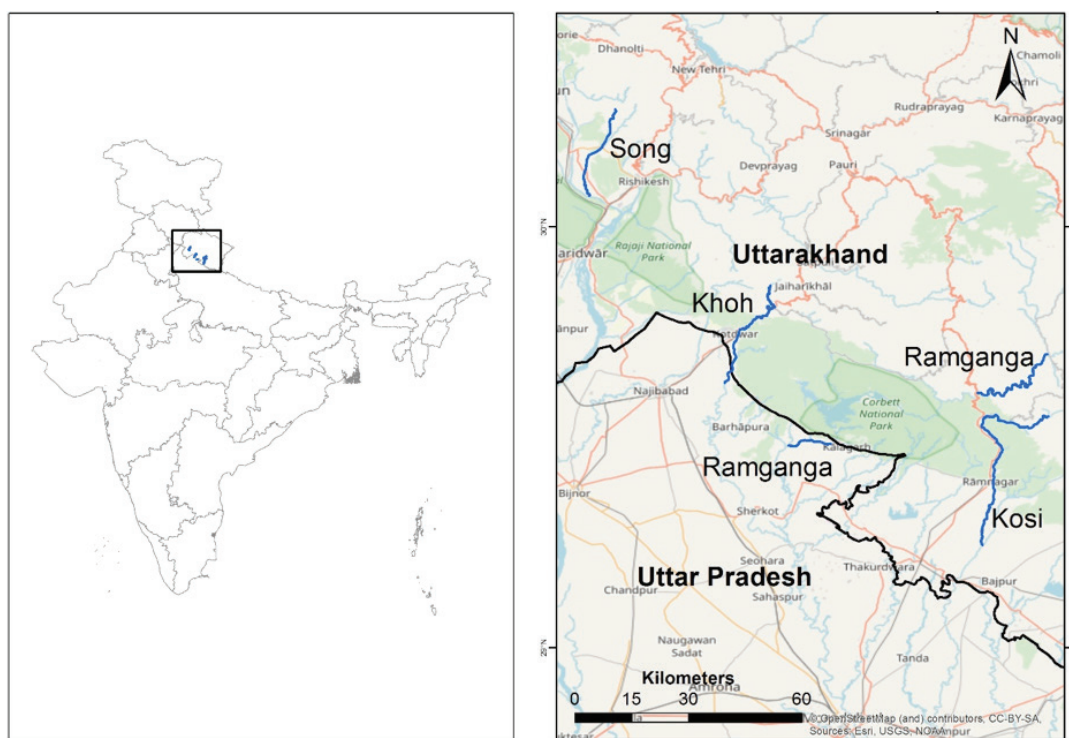


Figure 1. The study area and sampling stations. Each river stretch is labelled in blue, with each transect location spread across at every 500m.

It is important to note that the bird counts may be slightly different during this study, compared to the times that local avitourism operators would take birdwatchers out to look for birds. This could result in the authors missing some of the abundance and diversity of birds at peak dawn and evening hours as we avoided these hours for safety reasons.

RESULTS

The overall avian species richness from the four rivers was 136 (Table 2). Across the individual rivers, the species richness were as follows: Kosi = 79 species, western Ramganga = 91 species, Khoh = 52 species, and Song = 79 species. The data of avian species recorded (overall and from individual rivers) were visualised as a heat map, where the x-axis represented bird population trend, and the y-axis the IUCN Red List Status of Threatened Species. The bars represent the count

of IUCN Red List Status and corresponding population trend (Figures 2 and 3). Of the overall avian species richness (N=136), 89% were seen (detected visually from river banks) within navigable distances from the villages and tourist-access points, characteristics that could make them the most suitable for avitourism and more general ecotourism in the area. In addition, 75% of the species could be photographed by surveyors in this study, adding extra potential avitourism value.

DISCUSSION

Avitourism research is significantly skewed towards the northern hemisphere, and North America in particular, as bird-related activities have constituted significant leisure activities among North Americans over the past century (Connell 2009). Mexico and Colombia, which collectively play host to over 1,900 bird species, are the topmost destinations for US birdwatchers,

Table 1. Key descriptors of the four surveyed rivers in Uttarakhand.

| River | Source and additional notes | Number of transect | Avian species richness (N) |
|------------------|--|--------------------|----------------------------|
| Kosi | Budha Peenath Village in the Kausani area of Almora district, Uttarakhand. The Kosi is an important tributary of the Ramganga River | 20 | 79 |
| Western Ramganga | Shivalik Himalaya at Dudhatoli in Chamoli district, Uttarakhand. The Ramganga is an important tributary of the Ganges River | 20 | 91 |
| Khoh | Langur in Dwarikhal, Uttarakhand. The Khoh is a tributary of the Ramganga | 20 | 52 |
| Song | Spring-fed stream in the southern slopes of the Mussoorie ridge of the Himalayan range. The Song is a tributary of the Suswa River, which in turn is a tributary of the Ganges | 20 | 79 |

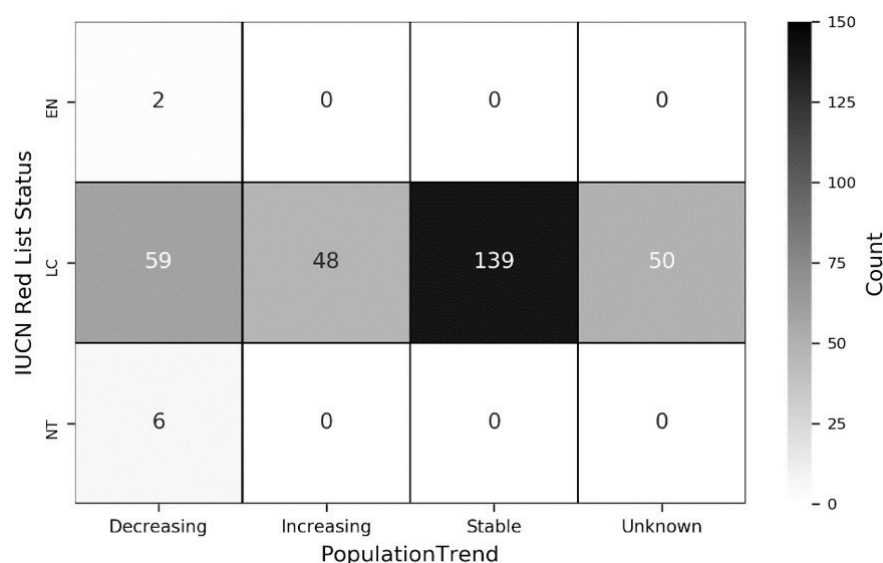


Figure 2. Avian species recorded from all the study sites (the x-axis represents the population trend, the y-axis the IUCN Red List Status, and the bars provide the IUCN Red List Status and their corresponding population trend).

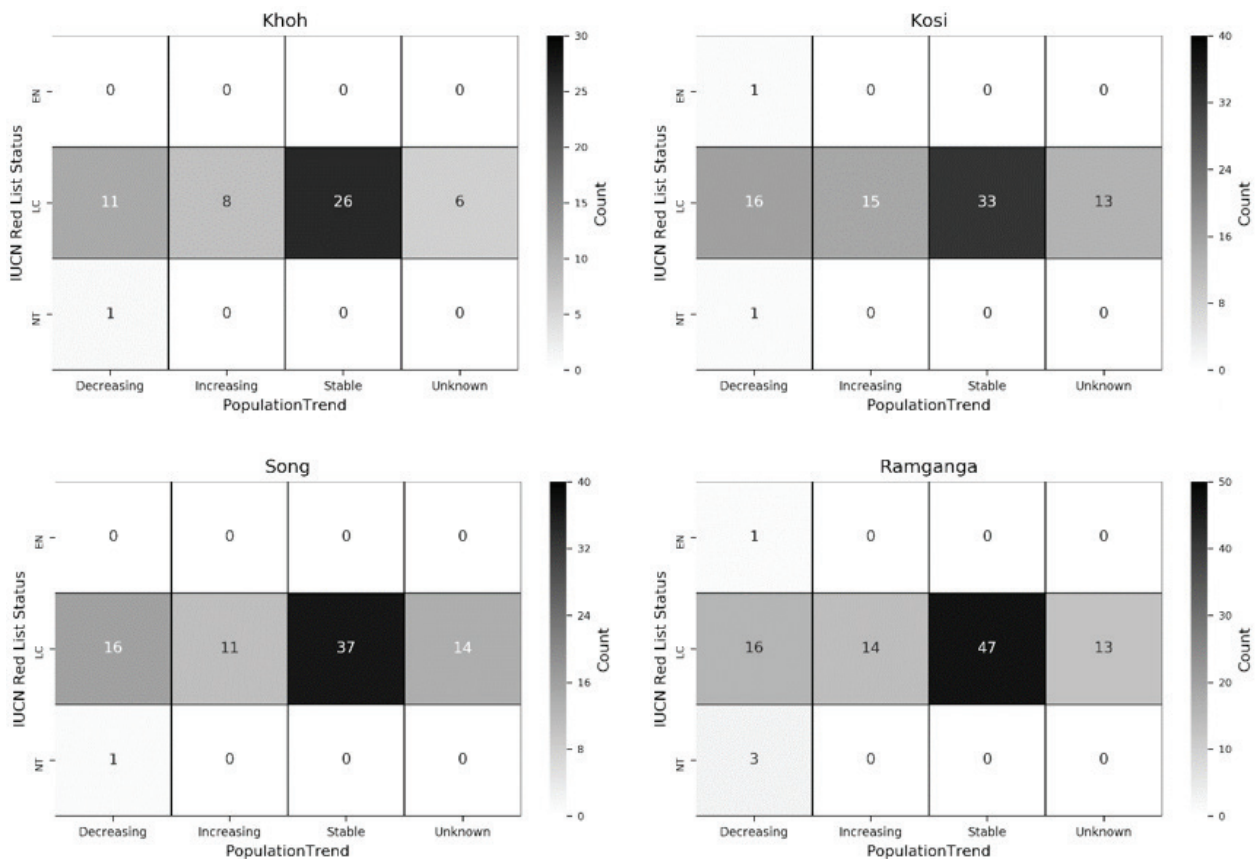


Figure 3. Avian species recorded from the individual rivers (the x-axis represents the population trend, the y-axis the IUCN Red List Status, and the bars provide the IUCN Red List Status and their corresponding population trend). The unit here is the number of species rather than count of individuals.

followed by Venezuela, Costa Rica and Panama (Maldonado et al. 2018). Many countries have thriving bird watching societies, which promote and sponsor trips to destinations where there is an abundance of bird life (Serkercioglu 2003). The socio-economic, ecological, gender and governance dimensions of the birdwatching tourism have been recorded previously (Callaghan et al. 2017). The values that people ascribe to rare or infrequently encountered species, however, have been studied to a lesser extent (Booth et al. 2011).

Avitourism is an important tool with the potential to influence the psyche of local, rural communities and individuals towards a bird species. And it is important that these local communities continue to sustainably work towards increasing the experience of tourists visiting the area. This is because what attracts the birders' 'gaze' and explains the rationale behind their long-distance travel decisions are abundant bird species and good ecological conditions. In addition, reasonable cost, good hospitality of local villagers, and easy approval procedures for entry into birdwatching areas are also important determinants.

Focus group discussions (FGDs) undertaken with village members (N=126), ornithologists (N=5), conservationists (N=10) and bird guides (N=15) in the surveyed areas of Uttarakhand (Nishikant Gupta, per. obs. 2019) revealed that a total of 76% of local households (N=156; 15–65 years; 125 males, 31 females) showed interest in participation in one or more forms of avitourism services if they strengthened livelihood opportunities (when asked regarding the potential applicability of avitourism in their area). Respondents were informed that it is essential to: (a) understand the ecological impacts of feeding to attract birds for tourists, (b) promote organic farming in order to minimise the use of pesticides and fertilisers, (c) regulate the tourist conduct, (d) enhance local environments, and (e) improve the services provided by homestay entrepreneurs (accommodation providers). Ninety-six percent of the respondents revealed that, if sustainably managed, the tourism revenue generated through this activity could protect critical species, economically help the local communities, and potentially lessen the outmigration of men from rural to urban areas seeking

Table 2. Avian species recorded from all the study sites in alphabetical order.

| | Family | Order | Common name | Scientific name | IUCN Red List Status ^a | Population trend ^a |
|----|------------------|------------------|----------------------------------|---------------------------------|-----------------------------------|-------------------------------|
| 1 | Cisticolidae | Passeriformes | Ashy Prinia | <i>Prinia socialis</i> | LC | Stable |
| 2 | Meropidae | Coraciiformes | Asian Green Bee-eater | <i>Merops orientalis</i> | | Increasing |
| 3 | Ploceidae | Passeriformes | Baya Weaver | <i>Ploceus philippinus</i> | | Stable |
| 4 | Pycnonotidae | | Black Bulbul | <i>Hypsipetes leucocephalus</i> | | |
| 5 | Timaliidae | | Black-chinned Babbler | <i>Cyanoderma pyrrhops</i> | | |
| 6 | Dicruridae | | Black Drongo | <i>Dicrurus macrocercus</i> | | Unknown |
| 7 | Accipitridae | Accipitriformes | Black Kite | <i>Milvus migrans</i> | | |
| 8 | Paridae | Passeriformes | Black-lored Tit | <i>Machlolophus xanthogenys</i> | | Stable |
| 9 | Muscicapidae | | Black Redstart | <i>Phoenicurus ochrurus</i> | | Increasing |
| 10 | Accipitridae | Accipitriformes | Black-shouldered Kite | <i>Elanus caeruleus</i> | | Stable |
| 11 | Recurvirostridae | Charadriiformes | Black-winged Stilt | <i>Himantopus himantopus</i> | | Increasing |
| 12 | Muscicapidae | Passeriformes | Blue Rock-thrush | <i>Monticola solitarius</i> | | Stable |
| 13 | Megalaimidae | Piciformes | Blue-throated Barbet | <i>Psilopogon asiaticus</i> | | |
| 14 | Muscicapidae | Passeriformes | Blue-throated Blue-flycatcher | <i>Cyornis rubeculoides</i> | | |
| 15 | | | Blue Whistling-thrush | <i>Myophonus caeruleus</i> | | Unknown |
| 16 | Sturnidae | | Brahminy Starling | <i>Sturnia pagodarum</i> | | |
| 17 | Cinclidae | | Brown Dipper | <i>Cinclus pallasi</i> | | Stable |
| 18 | Strigidae | Strigiformes | Brown Fish-owl | <i>Ketupa zeylonensis</i> | | Decreasing |
| 19 | Muscicapidae | Passeriformes | Brown Rockchat | <i>Oenanthe fusca</i> | | Stable |
| 20 | Ardeidae | Pelecaniformes | Cattle Egret | <i>Bubulcus ibis</i> | | Increasing |
| 21 | Accipitridae | Accipitriformes | Changeable Hawk-eagle | <i>Nisaetus cirrhatus</i> | | Decreasing |
| 22 | Sittidae | Passeriformes | Chestnut-bellied Nuthatch | <i>Sitta cinnamoventris</i> | | Unknown |
| 23 | Meropidae | Coraciiformes | Chestnut-headed Bee-eater | <i>Merops leschenaulti</i> | | Increasing |
| 24 | Passeridae | Passeriformes | Chestnut-shouldered Bush-sparrow | <i>Gymnoris xanthocollis</i> | | Stable |
| 25 | Sturnidae | | Chestnut-tailed Starling | <i>Sturnia malabarica</i> | | Unknown |
| 26 | Hirundinidae | | Collared Sand Martin | <i>Riparia riparia</i> | | Decreasing |
| 27 | Leiostrichidae | | Common Babbler | <i>Argya caudata</i> | | Stable |
| 28 | Upupidae | Bucerotiformes | Common Hoopoe | <i>Upupa epops</i> | | Decreasing |
| 29 | Aegithinidae | Passeriformes | Common Iora | <i>Aegithina tiphia</i> | | Unknown |
| 30 | Alcedinidae | Coraciiformes | Common Kingfisher | <i>Alcedo atthis</i> | | |
| 31 | Sturnidae | Passeriformes | Common Myna | <i>Acridotheres tristis</i> | | Increasing |
| 32 | Scolopacidae | Charadriiformes | Common Sandpiper | <i>Actitis hypoleucos</i> | | Decreasing |
| 33 | Muscicapidae | Passeriformes | Common Stonechat | <i>Saxicola torquatus</i> | | Stable |
| 34 | Cisticolidae | | Common Tailorbird | <i>Orthotomus sutorius</i> | | |
| 35 | Megalaimidae | Piciformes | Coppersmith Barbet | <i>Psilopogon haemacephalus</i> | | Increasing |
| 36 | Emberizidae | Passeriformes | Crested Bunting | <i>Emberiza lathami</i> | | Stable |
| 37 | Alcedinidae | Coraciiformes | Crested Kingfisher | <i>Megaceryle lugubris</i> | | Decreasing |
| 38 | Accipitridae | Accipitriformes | Crested Serpent-eagle | <i>Spilornis cheela</i> | | Stable |
| 39 | Hemiprocnidae | Caprimulgiformes | Crested Treeswift | <i>Hemiprocne coronata</i> | | |
| 40 | Nectariniidae | Passeriformes | Crimson Sunbird | <i>Aethopyga siparaja</i> | | |
| 41 | Columbidae | Columbiformes | Eastern Spotted Dove | <i>Spilopelia chinensis</i> | | Increasing |
| 42 | Columbidae | | Eurasian Collared-dove | <i>Streptopelia decaocto</i> | | |
| 43 | Picidae | Piciformes | Fulvous-breasted Woodpecker | <i>Dendrocopos macei</i> | | Stable |

| | Family | Order | Common name | Scientific name | IUCN Red List Status [#] | Population trend [#] |
|----|-------------------|-----------------|-------------------------------|------------------------------------|-----------------------------------|-------------------------------|
| 44 | Megalaimidae | | Great Barbet | <i>Psilopogon virens</i> | | |
| 45 | Phalacrocoracidae | Suliformes | Great Cormorant | <i>Phalacrocorax carbo</i> | | Increasing |
| 46 | Ardeidae | Pelecaniformes | Great Egret | <i>Ardea alba</i> | | Unknown |
| 47 | Paridae | Passeriformes | Great Tit | <i>Parus major</i> | | |
| 48 | Cuculidae | Cuculiformes | Greater Coucal | <i>Centropus sinensis</i> | | Stable |
| 49 | Picidae | Piciformes | Greater Yellownappe | <i>Chrysophlegma flavinucha</i> | | |
| 50 | Nectariniidae | Passeriformes | Green-tailed Sunbird | <i>Aethopyga nipalensis</i> | | |
| 51 | Cisticolidae | | Grey-breasted Prinia | <i>Prinia hodgsonii</i> | | |
| 52 | Columbidae | Columbiformes | Grey-capped Emerald Dove | <i>Chalcophaps indica</i> | | Decreasing |
| 53 | Picidae | Piciformes | Grey-capped Woodpecker | <i>Picoides canicapillus</i> | | Stable |
| 54 | | | Grey-faced Woodpecker | <i>Picus canus</i> | | Increasing |
| 55 | Stenostiridae | Passeriformes | Grey-headed Canary-flycatcher | <i>Culicicapa ceylonensis</i> | | Stable |
| 56 | Timaliidae | | Grey-hooded Babbler | <i>Cyanoderma bicolor</i> | | Decreasing |
| 57 | Phylloscopidae | | Grey-hooded Warbler | <i>Phylloscopus xanthoschistos</i> | | Stable |
| 58 | Corvidae | | Grey Treepie | <i>Dendrocitta formosae</i> | | Decreasing |
| 59 | Motacillidae | | Grey Wagtail | <i>Motacilla cinerea</i> | | Stable |
| 60 | Pycnonotidae | | Himalayan Bulbul | <i>Pycnonotus leucogenys</i> | | Increasing |
| 61 | Corvidae | | House Crow | <i>Corvus splendens</i> | | Stable |
| 62 | Passeridae | | House Sparrow | <i>Passer domesticus</i> | | Decreasing |
| 63 | Phalacrocoracidae | Suliformes | Indian Cormorant | <i>Phalacrocorax fuscicollis</i> | | Unknown |
| 64 | Muscicapidae | Passeriformes | Indian Robin | <i>Saxicoloides fulicatus</i> | | Stable |
| 65 | Bucerotidae | Bucerotiformes | Indian Grey Hornbill | <i>Ocyroceros birostris</i> | | |
| 66 | Monarchidae | Passeriformes | Indian Paradise-flycatcher | <i>Terpsiphone paradisi</i> | | |
| 67 | Phasianidae | Galliformes | Indian Peafowl | <i>Pavo cristatus</i> | | |
| 68 | Picidae | Piciformes | Indian Pygmy Woodpecker | <i>Picoides nanus</i> | | Increasing |
| 69 | Ardeidae | Pelecaniformes | Indian Pond-heron | <i>Ardeola grayii</i> | | Unknown |
| 70 | Coraciidae | Coraciiformes | Indian Roller | <i>Coracias benghalensis</i> | | Increasing |
| 71 | Ardeidae | Pelecaniformes | Intermediate Egret | <i>Ardea intermedia</i> | | Decreasing |
| 72 | Leiotrichidae | Passeriformes | Jungle Babbler | <i>Turdoides striata</i> | | Stable |
| 73 | Sturnidae | | Jungle Myna | <i>Acridotheres fuscus</i> | | Decreasing |
| 74 | Strigidae | Strigiformes | Jungle Owlet | <i>Glauclidium radiatum</i> | | Stable |
| 75 | Phasianidae | Galliformes | Kalij Pheasant | <i>Lophura leucomelanos</i> | | Decreasing |
| 76 | Corvidae | Passeriformes | Large-billed Crow | <i>Corvus macrorhynchos</i> | | Stable |
| 77 | Accipitridae | Accipitriformes | Lesser Fish-eagle | <i>Ichthyophaga humilis</i> | NT | Decreasing |
| 78 | Picidae | Piciformes | Lesser Yellownappe | <i>Picus chlorolophus</i> | LC | Stable |
| 79 | Megalaimidae | | Lineated Barbet | <i>Psilopogon lineatus</i> | | |
| 80 | Phalacrocoracidae | Suliformes | Little Cormorant | <i>Microcarbo niger</i> | | Unknown |
| 81 | Ardeidae | Pelecaniformes | Little Egret | <i>Egretta garzetta</i> | | Increasing |
| 82 | Campephagidae | Passeriformes | Long-tailed Minivet | <i>Pericrocotus ethologus</i> | | Stable |
| 83 | Laniidae | | Long-tailed Shrike | <i>Lanius schach</i> | | Unknown |
| 84 | Accipitridae | Accipitriformes | Mountain Hawk-eagle | <i>Nisaetus nipalensis</i> | | Decreasing |
| 85 | Hirundinidae | Passeriformes | Nepal House Martin | <i>Delichon nipalense</i> | | Stable |
| 86 | Turdidae | | Orange-headed Thrush | <i>Geokichla citrina</i> | | Decreasing |
| 87 | Accipitridae | Accipitriformes | Oriental Honey-buzzard | <i>Pernis ptilorhynchus</i> | | Stable |
| 88 | Muscicapidae | Passeriformes | Oriental Magpie-robin | <i>Copsychus saularis</i> | | |

| | Family | Order | Common name | Scientific name | IUCN Red List Status [#] | Population trend [#] |
|-----|----------------|------------------|--------------------------------|----------------------------------|-----------------------------------|-------------------------------|
| 89 | Columbidae | Columbiformes | Oriental Turtle-dove | <i>Streptopelia orientalis</i> | | |
| 90 | Zosteropidae | Passeriformes | Oriental White-eye | <i>Zosterops palpebrosus</i> | | Decreasing |
| 91 | Accipitridae | Accipitriformes | Pallas's Fish-eagle | <i>Haliaeetus leucoryphus</i> | EN | |
| 92 | Muscicapidae | Passeriformes | Pied Bushchat | <i>Saxicola caprata</i> | LC | Stable |
| 93 | Alcedinidae | Coraciiformes | Pied Kingfisher | <i>Ceryle rudis</i> | | Unknown |
| 94 | Muscicapidae | Passeriformes | Plumbeous Water-redstart | <i>Phoenicurus fuliginosus</i> | | Stable |
| 95 | Psittacidae | Psittaciformes | Plum-headed Parakeet | <i>Psittacula cyanocephala</i> | | Decreasing |
| 96 | Nectariniidae | Passeriformes | Purple Sunbird | <i>Cinnyris asiaticus</i> | | Stable |
| 97 | Corvidae | | Red-billed Blue Magpie | <i>Urocissa erythroryncha</i> | | Increasing |
| 98 | Leiostrichidae | Passeriformes | Red-billed Leiostrich | <i>Leiostrichus lutea</i> | | Decreasing |
| 99 | Psittacidae | Psittaciformes | Red-breasted Parakeet | <i>Psittacula alexandri</i> | NT | |
| 100 | Phasianidae | Galliformes | Red Junglefowl | <i>Gallus gallus</i> | LC | |
| 101 | Hirundinidae | Passeriformes | Red-rumped Swallow | <i>Cecropis daurica</i> | | Stable |
| 102 | Pycnonotidae | | Red-vented Bulbul | <i>Pycnonotus cafer</i> | | Increasing |
| 103 | Charadriidae | Charadriiformes | Red-wattled Lapwing | <i>Vanellus indicus</i> | | Unknown |
| 104 | Pycnonotidae | Passeriformes | Red-whiskered Bulbul | <i>Pycnonotus jocosus</i> | | Decreasing |
| 105 | Charadriidae | Charadriiformes | River Lapwing | <i>Vanellus duvaucelii</i> | NT | |
| 106 | Columbidae | Columbiformes | Rock Dove | <i>Columba livia</i> | LC | |
| 107 | Sturnidae | Passeriformes | Rosy Starling | <i>Pastor roseus</i> | | Unknown |
| 108 | Muscicapidae | | Rufous-bellied Niltava | <i>Niltava sundara</i> | | Stable |
| 109 | Leiostrichidae | | Rufous Sibia | <i>Heterophasia capistrata</i> | | Unknown |
| 110 | Anatidae | Anseriformes | Ruddy Shelduck | <i>Tadorna ferruginea</i> | | |
| 111 | Corvidae | Passeriformes | Rufous Treepie | <i>Dendrocitta vagabunda</i> | | Stable |
| 112 | Passeridae | | Russet Sparrow | <i>Passer cinnamomeus</i> | | |
| 113 | Timaliidae | | Rusty-cheeked Scimitar-babbler | <i>Erythrogonys erythrogonys</i> | | |
| 114 | Caprimulgidae | Caprimulgiformes | Savanna Nightjar | <i>Caprimulgus affinis</i> | | |
| 115 | Accipitridae | Accipitriformes | Shikra | <i>Accipiter badius</i> | | |
| 116 | Muscicapidae | Passeriformes | Slaty-blue Flycatcher | <i>Ficedula tricolor</i> | | |
| 117 | Psittacidae | Psittaciformes | Slaty-headed Parakeet | <i>Psittacula himalayana</i> | | |
| 118 | Dicruridae | Passeriformes | Spangled Drongo | <i>Dicrurus bracteatus</i> | | |
| 119 | Muscicapidae | | Spotted Forktail | <i>Enicurus maculatus</i> | | |
| 120 | Accipitridae | Accipitriformes | Steppe Eagle | <i>Aquila nipalensis</i> | EN | Decreasing |
| 121 | Ardeidae | Pelecaniformes | Striated Heron | <i>Butorides striata</i> | LC | |
| 122 | Leiostrichidae | Passeriformes | Striated Laughingthrush | <i>Grammatoptila striata</i> | | |
| 123 | Accipitridae | Accipitriformes | Tawny Eagle | <i>Aquila rapax</i> | | |
| 124 | Strigidae | Strigiformes | Tawny Fish-owl | <i>Ketupa flavipes</i> | | Stable |
| 125 | Sittidae | Passeriformes | Velvet-fronted Nuthatch | <i>Sitta frontalis</i> | | |
| 126 | Columbidae | Columbiformes | Western Spotted Dove | <i>Spilopelia suratensis</i> | | Increasing |
| 127 | Alcedinidae | Coraciiformes | White-breasted Kingfisher | <i>Halcyon smyrnensis</i> | | |
| 128 | Rallidae | Gruiformes | White-breasted Waterhen | <i>Amaurornis phoenicurus</i> | | Unknown |
| 129 | Motacillidae | Passeriformes | White-browed Wagtail | <i>Motacilla maderaspatensis</i> | | Stable |
| 130 | Muscicapidae | | White-capped Water-redstart | <i>Phoenicurus leucocephalus</i> | | |
| 131 | Leiostrichidae | | White-crested Laughingthrush | <i>Garrulax leucolophus</i> | | Decreasing |
| 132 | Rhipiduridae | | White-throated Fantail | <i>Rhipidura albicollis</i> | | Stable |

| | Family | Order | Common name | Scientific name | IUCN Red List Status [#] | Population trend [#] |
|-----|-------------|---------------|----------------------------|------------------------------|-----------------------------------|-------------------------------|
| 133 | Tyrannidae | | White-throated Flycatcher | <i>Empidonax albigularis</i> | | |
| 134 | Alcedinidae | Coraciiformes | White-throated Kingfisher | <i>Halcyon smyrnensis</i> | | Increasing |
| 135 | Sylviidae | Passeriformes | Yellow-eyed Babbler | <i>Chrysomma sinense</i> | | Stable |
| 136 | Columbidae | Columbiformes | Yellow-footed Green-pigeon | <i>Treron phoenicopterus</i> | | Increasing |

[#]The IUCN Red List of Threatened Species 2019 | LC—Least Concern | NT—Near Threatened | EN—Endangered.

better employment opportunities (see Everard et al. 2019 for discussion of outmigration pressures in the Indian Himalaya).

Avitourism can be a cost-effective way to simultaneously create jobs whilst delivering conservation and human development benefits (Biggs et al. 2011), as birdwatchers are willing to travel to remote and less-developed locations, providing livelihood opportunities to areas that hold unique or locally characteristic bird resources. Increasing the number of tourists and the socio-economic and ecological benefits they create also raise associated ecological challenges that will require sensitive management. It is also important to ensure that benefits accrue to local communities in addition to tour operators, if incentives for local conservation action are to be guaranteed (Everard & Kataria 2011). A comprehensive management plan (CMP) including avitourism, with support from local government for developing more scientific and sustainable approaches will become essential in the coming years.

CONCLUSION

One of the key highlights of this work was that it was undertaken outside of the two critical protected areas of the region: Corbett and Rajaji tiger reserves (Figure 1). Avitourism performed outside of protected areas has the potential to assist in protecting bird habitats that are not subject to such a high level of statutory protection, and spreading societal benefits and tourism pressures including reducing disturbance to threatened species within the protected areas (Basnet et al. 2019). Such supportive benefits have also been previously reported from southern Poland, where riverine habitats constitute biodiversity hotspots for migratory birds (Figarski & Kajtoch 2015). It is important to note that birdwatching tourism is dependent upon the diversity and visibility of species in the target destination, with sightings of migratory birds, songbirds and birds of prey also in popular demand from avitourists (Maldonado et al. 2018). This fundamental requirement is compatible

with conservation goals. Birdwatching activities at the study sites can not only boost the economic potential of the local community, but also help in the gathering of information on little known/Data Deficient species. Avitourism can, thus, make a significant contribution to the growing need for knowledge-gathering to support the conservation of species other than those with specific conservation designations or in formally protected areas (Whitelaw et al. 2014).

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Editorial

**Wildlife's Wonder Woman—Sally Raulston Walker
(12 October 1944–22 August 2019)**

– Sanjay Molur, Pp. 14247–14248

Communications

Species diversity and spatial distribution of amphibian fauna along the altitudinal gradients in Jigme Dorji National Park, western Bhutan

– Bal Krishna Koirala, Karma Cheda & Tshering Penjor, Pp. 14249–14258

The soft-release of captive-born Kaiser's Mountain Newt *Neurergus kaiseri* (Amphibia: Caudata) into a highland stream, western Iran

– Tayebe Salehi, Vahid Akmal & Mozafar Sharifi, Pp. 14259–14267

The status of waterbird populations of Chhaya Rann Wetland Complex in Porbandar, Gujarat, India

– Dhavalkumar Vargiya & Anita Chakraborty, Pp. 14268–14278

Diversity and temporal variation of the bird community in paddy fields of Kadharamangalam, Tamil Nadu, India

– Chaitra Shree Jayasimhan & Padmanabhan Pramod, Pp. 14279–14291

First videos of endemic Zanzibar Servaline Genet *Genetta servalina archeri*, African Palm Civet *Nandinia binotata* (Mammalia: Carnivora: Viverridae) and other small carnivores on Unguja Island, Tanzania

– Helle V. Goldman & Martin T. Walsh, Pp. 14292–14300

The identification of pika and hare through tricho-taxonomy (Mammalia: Lagomorpha)

– Manokaran Kamalakannan, Kailash Chandra, Joy Krishna De & Chinnadurai Venkatraman, Pp. 14301–14308

Palynological analysis of faecal matter in African Forest Elephants *Loxodonta cyclotis* (Mammalia: Proboscidea: Elephantidae) at Omo Forest Reserve, Nigeria

– Okwong John Walter, Olusola Helen Adekanmbi & Omonu Clifford, Pp. 14309–14317

Avitourism opportunities as a contribution to conservation and rural livelihoods in the Hindu Kush Himalaya - a field perspective

– Nishikant Gupta, Mark Everard, Ishaan Kochhar & Vinod Kumar Belwal, Pp. 14318–14327

Pollination in an endemic and threatened monoecious herb *Begonia satrapis* C.B. Clarke (Begoniaceae) in the eastern Himalaya, India

– Subhankar Gurung, Aditya Pradhan & Arun Chettri, Pp. 14328–14333

Multivariate analysis of elements from the microhabitats of selected plateaus in the Western Ghats, Maharashtra, India

– Priti Vinayak Aphale, Dhananjay C. Meshram, Dyanesh M. Mahajan, Prasad Anil Kulkarni & Shraddha Prasad Kulkarni, Pp. 14334–14348

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Short Communications

Diversity of butterflies of the Shettihalli Wildlife Sanctuary, Shivamogga District, Karnataka, India

– M.N. Harisha, Harish Prakash, B.B. Hosetti & Vijaya Kumara, Pp. 14349–14357

First record of two rare brachyuran crabs: *Drachiella morum* Alcock, 1896 and *Quadrella maculosa* Alcock, 1898 along the Tamil Nadu coast, India

– Chinnathambi Viswanathan, Sampath Goutham, Vijay Kumar Deepak Samuel, Pandian Krishnan, Ramachandran Purvaja & Ramachandran Ramesh, Pp. 14358–14362

Records of the Marbled Cat *Pardofelis marmorata* and the Asiatic Golden Cat *Catopuma temminckii* (Mammalia: Carnivora: Felidae) from the community forests surrounding the Dzükou Valley in Nagaland, India

– Bhavendu Joshi, Biang La Nam Syiem, Rokohebi Kuotsu, Arjun Menon, Jayanta Gogoi, Varun Rshav Goswami & Divya Vasudev, Pp. 14363–14367

Rediscovery of *Calanthe davidii* (Orchidaceae) after 11 decades in the western Himalaya, India

– Ashutosh Sharma, Nidhan Singh & Pankaj Kumar, Pp. 14368–14372

Notes

Range extension of the Gooty Tarantula *Poecilotheria metallica* (Araneae: Theraphosidae) in the Eastern Ghats of Tamil Nadu, India

– Kothandapani Raman, Sivangnanaboopathidoss Vimalraj, Bawa Mothilal Krishnakumar, Natesan Balachandran & Abhishek Tomar, Pp. 14373–14376

Some recent evidence of the presence of the Critically Endangered *Gyps* vulture populations in northern Shan State, Myanmar

– Sai Sein Lin Oo, Nang Lao Kham, Kyaw Myo Naing & Swen C. Renner, Pp. 14377–14380

Two new locations for the Vulnerable Black-necked Crane *Grus nigricollis* (Przhevalsky, 1876) (Aves: Gruiformes: Gruidae) in Arunachal Pradesh, India

– Rohan Krish Menzies, Megha Rao & Abhinav Kumar, Pp. 14381–14384

***Aquilaria malaccensis* (Malvales: Thymelaeaceae): a new host plant record for *Deudorix epijarbas cinnabarus* (Lepidoptera: Lycaenidae) in Malaysia**

– Kah Hoo Lau & Su Ping Ong, Pp. 14385–14387

Rediscovery of Nilgiri Mallow *Abutilon neelgerrense* var. *fischeri* T.K. Paul & M.P. Nayar (Malvaceae) after a century from southern India

– Varsha Vilasrao Nimbalkar, Arun Prasanth Ravichandran & Milind Madhav Sardesai, Pp. 14388–14390

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