

Distribution Update

First camera trap record of pack hunting dhole *Cuon alpinus* in Banke National Park, Nepal



Shyam K. Shah^{1,2}, Rabin Kadariya³, Ajay Karki^{1,4}, Hem R. Acharya¹, Naresh Subedi³, Kanchan Thapa⁵, Bhagwan R. Dahal⁶, Umesh Paudel³, Rabin Bahadur K.C.^{3*}

¹ Department of National Parks and Wildlife Conservation, Babarmahal, Kathmandu, Nepal

² Agriculture and Forestry University, Nepal

³ National Trust for Nature Conservation, Lalitpur, Nepal. Email: rnb.kc80@yahoo.com

⁴ University of Wyoming, USA

⁵ WWF Nepal, Baluwatar, Kathmandu, Nepal

⁶ ZSL Nepal, Gairidhara, Kathmandu, Nepal

* Correspondence author

Keywords: canids, camera trapping, distribution, photographic records.

Abstract

A camera trapping survey has revealed the first photographic record of solitary individuals of the Asiatic wild dog *Cuon alpinus* from Banke National Park, Nepal, in January and February 2022. The presence of dholes here seems to be confined to a relatively small area of the national park. We recorded 11 photos of dholes from three different 2 km x 2 km grid cells as three independent detections from a sampling effort of 7,058 trap nights spread across 375 sampling grid cells between January – March 2022 with the primary goal of estimating tiger abundance and density. More research needs to be focused on dholes in the future to garner knowledge on species ecology and conservation.

Introduction

The Asiatic wild dog (*Cuon alpinus*, Pallas 1811) or dhole, is believed to have a rapidly declining distribution, with its range contracted to less than 25% of the species' former global range in the 20th century (Wolf and Ripple 2017) and listed as Endangered on the IUCN Red List (Kamler et al. 2015) and appendix II species by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Asiatic Wilddog | CITES 2021). The dhole is a medium-sized social canid that lives in packs of 3 – 20 adults (Valkenburgh 1991, Reddy et al. 2019) and once occurred over a wide geographic range from Tian-Shan and Altai Mountains in central Asia and easternmost Siberia to India and Indochina (Durbin et al. 2004). Due to threats mainly comprising natural prey depletion, persecution, habitat loss, increasing habitat fragmentation, disease, and inter-specific competition, the current distribution of dhole is fundamentally restricted in South and South-east Asia (Durbin et al. 2004, Aryal et al. 2015, Kamler et al. 2015).

Globally, the dhole population is estimated to be 949 – 2,215 mature individuals in the wild (Kamler et al. 2015). Despite their wide distribution, dholes are known to occur at low densities (Khatriwada et al. 2011). Though

its endangered status, there have been relatively few quantitative studies throughout its range (Khatriwada et al. 2011, Aryal et al. 2015), and very little is known about its distribution and ecology in Nepal (Thapa et al. 2013). In Nepal, dholes are distributed from southern lowland protected areas of Bardia, Chitwan, and Parsa National Parks (Thapa et al. 2013, Yadav et al. 2019) to the northern high mountain protected areas of Kanchenjunga Conservation Area, Makalu Barun National Park, Annapurna Conservation Area, and Dhorpatan Hunting Reserve (Jha 2003, Ghimirey et al. 2024, Khatriwada et al. 2011, Aryal et al. 2015). Yet, no photographic evidence or record of the dhole has been confirmed in Banke National Park which is contiguous to Bardia National Park where it has been documented (Yadav et al. 2019, BaNP 2022).

Methods

Banke National Park (BaNP; 27°58'13" – 28°21'26" N and 81°39'29" – 82°12'19" E) is located in the southwestern part of Nepal and is contiguous to Bardia National Park (BNP) towards the west and adjoining Kamdi corridor in the south that is connected to Suhelwa Wildlife Sanctuary in India (BaNP 2022). BaNP is among the six protected areas within the Terai Arc

The following is the established format for referencing this article:

Shah, S.K., Kadariya, R., Karki, A., Acharya, H.R., Subedi, N., Thapa, K., Dahal, B.R., Paudel, U. and Bahadur, R. 2025. First camera trap record of pack hunting dhole *Cuon alpinus* in Banke National Park, Nepal. *Canid Biology & Conservation* 28(1): 1-5. URL: http://www.canids.org/CBC/28/Dhole_hunting_Nepal.pdf

Landscape (TAL) of Nepal, where TAL is one of the global priority trans-boundary tiger (*Panthera tigris*) conservation landscapes of grasslands and riparian forests, shared with India (Thapa et al. 2017).

BaNP comprises an array of eight ecosystem types as Sal (*Shorea robusta*) forest, deciduous forest, Savannas and grasslands, mixed hardwood forest, flood plain community, Bhabar, and foothills of Churia mountain range (BaNP 2022). It is home to 263 floras, 34 species of mammals, more than 236 species of birds, 24 species of reptiles, nine species of amphibians, and 55 fish species. The 90% natural forest coverage is composed of mainly Sal, Karma (*Adina cordifolia*), Khair (*Acacia catechu*), and Sissoo (*Dalbergia sissoo*). The habitat of the flood plain, foothills, and Churia hill is of prime concern to conserve major focus species such as the Royal Bengal tiger (*P. t. tigris*), wild Asiatic elephant (*Elephas maximus*), and four-horned antelope (*Tetracerus quadricornis*; BaNP 2022).

A camera trapping survey was conducted in 375 (2 km x 2 km) grid cells within BaNP and its adjoining forest patches during the dry and cool season January – March 2022 with the primary goal being to estimate tiger abundance and density (DNPWC and DFSC 2022). Pairs of camera traps were systematically placed covering the entire BaNP and adjoining forests. The camera trap locations were selected based on extensive field surveys for signs of tiger presence such as pugmarks, scats, scrapes, and urination (DNPWC 2017). At each sampling point, a pair of motion-sensitive camera traps (Cuddeback (C1), Panthera (V5 and V6), and Cuddeback Attack) was installed at 45 – 60 cm above the ground on either side of a game trail, forest road, or stream bed, with the primary intention of maximising tiger captures.

Camera traps were checked every alternate day to observe photographs of tigers and other species captured. Cameras were active for 24 hours and installed at each location for at least 15 days in each grid cell. Camera trap photos were given unique identification names, species manually identified, and sorted by species into separate folders. We compared the photos obtained in camera traps with dhole photos of the IUCN Red List of Threatened Species (Kamler et al. 2015) and the National Red List of Mammals of Nepal (Jnawali et al. 2011) to confirm the identification. Photos captured at least 30 minutes apart were considered independent detections and the detection rate (per 100 trap days) was calculated by dividing total trapping efforts in the study area (Silver et al. 2004, Di Bitetti et al. 2006, Thapa et al. 2013). Based on the time of the day captured, activity patterns (diurnal, nocturnal, crepuscular) were defined for each species (Thapa et al. 2022).

Results

From a total of 7,058 trap-nights of camera-trap efforts from 375 sampling grid cells and we obtained a total of 11 photos of dholes from three locations in three independent detections with a trapping rate of 0.042 dhole pictures per 100 trap nights (Figure 1, Figure 2, Table 1). Solitary dholes were captured in all locations, but we could not confirm whether they were multiple individuals or repeated capture of a single individual due to the lack of any identification features.

Discussion

Our study confirms the photographic evidence of dhole in the BaNP. There are total of 34 species of mammals presence along with 15 species of carnivore species in BaNP (BaNP 2022). We observed that dholes were sympatric with other predators like tigers, leopards *P. pardus*, golden jackal *Canis aureus*, and hyaena *Hyaena hyaena* in BaNP. Other sympatric carnivores were also recorded in the same grids where we recorded dhole. With this record, the distribution record of dhole has been updated and it has made its presence along their range in major protected areas except in the Shuklaphanta National Park located in the western part of TAL - Nepal (Table 2).

Earlier, dholes have been reported by local communities in BaNP (Thapa 2011), but no photographs of dholes were captured during the 2013, 2018 national tiger survey. In our study, however, we photographed only solitary dholes, the same case was also observed in BNP (Yadav et al. 2019). Most likely, these dholes are subadult animals looking for a site to create a territory and form a pack. Also, in tropical evergreen forests of south-eastern Asia, dholes appear to persist in small packs, probably due to low prey biomass and the small size of ungulate prey in these habitats (Kawanishi and Sunquist 2008). Thapa et al. (2013) recorded a pack of dholes preying upon

medium-sized prey-barking deer in the Churia habitat of Chitwan National Park. Similarly, Thing et al. (2022) mentioned that the detection probability of dhole was positively associated with the presence of Sambar deer in Parsa National Park.

Dholes are social hunters, capable of feeding on small to very large prey species (Johnsingh 1983). According to the National Tiger Survey Report 2022, the prey base density (per km²) has significantly increased as compared to the past tiger survey in 2018 from 8.1 (SE 1.6) to 32.64 (SE 6.6) in 2022 (DNPWC and DFSC 2018, 2022). Therefore, this might be one of the reasons for the occurrence of dholes in the BaNP and associated forest. More study on dhole ecology is needed to establish the significance of this understudied species in the predator-prey complex in Nepal's lowlands.

One of the major threats to carnivores, including dholes, is the decline in prey base (Karanth et al. 2004, Andheria et al. 2007). Interspecific competition between tigers, leopards, and dholes is almost certainly present (Kamler et al. 2015), but less information is known regarding spatial, temporal, or nutritional partitioning among these top predators to explain coexistence in the study region (Thapa et al. 2013). However, BaNP is experiencing increased tiger populations (DNPWC and DFSC 2022). Steinmetz et al. (2013) recorded that leopard and dhole had low rates of co-occurrence with tiger, and their detection probability were 47 – 52% lower in tiger-occupied open habitats, despite suitable prey availability. However, out of three sites, a tiger was recorded in two sites, and at the other remaining site leopards were recorded. Poaching of prey species has been very high in BaNP which borders Suhelwa Wildlife Sanctuary, India via Kamdi corridors (Koju et al. 2021). In our survey we also recorded images of people with guns and sharp axes.

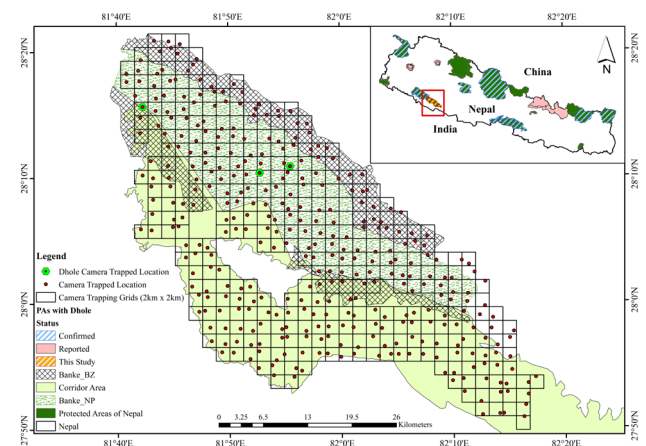


Figure 1. Dhole (*Cuon alpinus*) locations recorded during camera trap survey (2022) in Banke National Park and its associated forest, Nepal.

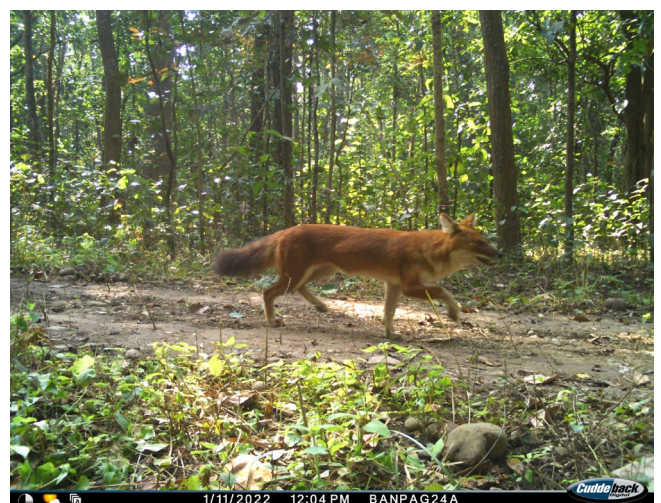


Figure 2. Camera Trap photograph of a Dhole (2022) (©DNPWC/NTNC)

Table 1. Details of the camera trap locations where dholes were captured in Banke National Park.

Grid ID	AG24	AP29	AR28
GPS coordinates	28.26057°N, 81.7055°E	28.17241°N, 81.87967°E	28.18098°N, 81.92515°E
Elevation (m)	186	273	310
No. of photo captures	2	5	4
No. of individuals	1	1	1
Duration of camera trap deployment	2022/01/07 – 2022/01/25	2022/01/30 – 2022/02/15	2022/01/29 – 2022/02/15
Date and time	2022/01/11 12:04	2022/02/12 13:13	2022/02/09 16:18
Terrain	Flat	Streambed	Flat
Activity pattern	Diurnal	Diurnal	Diurnal
Habitat type	Mixed Forest	Mixed Forest	Mixed Forest
Other Mammal species captured in the same station	<i>Muntiacus muntjak</i> <i>Panthera pardus</i> <i>Tetracerus quadricornis</i> , <i>Canis aureus</i> , <i>Mellivora capensis</i> , <i>Hyaena hyaena</i> , <i>Viverra zibetha</i> , <i>Prionailurus bengalensis</i> , <i>rhesus macaque</i> , <i>Sus scrofa</i>	<i>Panthera tigris tigris</i>	<i>Muntiacus muntjak</i> , <i>Panthera tigris tigris</i>

Table 2. Confirmed presence of the dhole, *Cuon alpinus*, across the protected areas of Nepal.

Protected area	Dhole presence	Record type	Source
Kanchenjunga Conservation Area	Confirmed	Camera trap	Khatiwa et al. (2011)
Sagarmatha National Park	Not reported		
Makalu Barun National Park	Confirmed	Park record	Jha (2003)
Koshi Tappu Wildlife Reserve	Not reported		
Lamtang National Park	Reported	Park record	LNP (2020)
Gaurishankar Conservation Area	Reported but not confirmed		
Manaslu Conservation Area	Not reported		
Parsa National Park	Confirmed	Camera trap	Thing et al. (2022)
Chitwan National Park	Confirmed	Camera trap	Thapa et al. (2013)
Shivapuri National Park	Not reported		
Annapurna Conservation Area	Confirmed	Camera trap	Ghimirey et al. (2024)
Dhorpatan Hunting Reserve	Confirmed	Survey	Aryal et al. (2015)
Shey Poksundo National Park	Not reported		
Banke National Park	Confirmed	Camera trap	This Study
Krishnasar Conservation Area	Not reported		
Bardia National Park	Confirmed	Camera trap	Yadav et al. (2019)
Rara National Park	Reported	Park record	RNP (2019)
Khaptad National Park	Reported but not confirmed	Park record (possibly absent; Ghimirey et al. 2024)	Khaptad National Park (2019)
Shuklaphanta National Park	Not reported		
Api Nampa Conservation Area	Confirmed	Camera trap and sign survey	Neupane (2017), Khanal et al. (2020)

Conservation implication

Our result confirms the presence of a dhole in BaNP. The dhole has been recorded in eight protected areas of Nepal (Table 2). Therefore, the occurrence of dholes in their defined range is increasing. Unlike tigers and leopards, dholes are not involved in significant levels of conflict with humans (Karanth et al. 2013) or targeted for the illegal trade of body parts (Velho et al. 2012). However, their presence outside protected areas can be problematic, because of depleted prey densities (Karanth et al. 2004, Karanth et al. 2009) and the potential risk of disease from large populations of semi-feral dogs and cats (Woodroffe et al. 2004). Also, local people exhibit resentment towards dholes and their conservation due to persistent dhole related livestock predation (Katel et al. 2014). As such, there is a likelihood of retaliation against dholes reminiscent of historic poisoning in 1970-80s in Bhutan (Wangchuk 2004), and similar retaliation cases have been recorded from BNP (Yadav et al. 2019). Therefore, dhole conservation efforts both within and outside of protected areas need to incorporate improving livestock husbandry like grazing livestock in and around the village, including stall-feeding, and cooperative herding of livestock in forests during the day (Katel et al. 2014). Local people should also be educated about the positive impacts that dhole have on ecosystems, including suppression of major crop-raiding species such as wild boars. Despite the increasing prey abundance in BaNP in comparison to a 2018 survey, it is still low in comparison to other national park where the high density of carnivores is present (DNPWC and DFSC 2018, 2022). Therefore, management practices like habitat management, including the establishment of water holes, and artificially increasing forage availability to increase herbivore populations should be enhanced. Importantly, more research needs to be focused on the species in the future to garner knowledge on species ecology and conservation. To ensure the long-term conservation of dholes, it is imperative to develop and implement a comprehensive action plan.

Acknowledgements

The camera trap survey was a collaborative effort of the Government of Nepal, the Department of National Parks and Wildlife Conservation, the Department of Forests and Soil Conservation, the National Trust for Nature Conservation (NTNC), the World Wide Fund for Nature (WWF) Nepal and ZSL Nepal. We would like to acknowledge the hard work of wildlife technicians of NTNC, staff of national parks and DFOs, students, volunteers and local communities in the field for installing camera.

References

- Andheria, A.P., Karanth, K.U. and Kumar, N.S. 2007. Diet and prey profiles of three sympatric large carnivores in Bandipur Tiger Reserve, India. *Journal of Zoology* 273: 169-175. [10.1111/j.1469-7998.2007.00310.x](https://doi.org/10.1111/j.1469-7998.2007.00310.x)
- Aryal, A., Panthi, S., Barraclough, R.K., Bencini, R., Adhikari, B., Ji, W. and Raubenheimer, D. 2015. Habitat selection and feeding ecology of dhole (*Cuon alpinus*) in the Himalayas. *Journal of Mammalogy* 96: 47-53. [10.1093/jmammal/gyu001](https://doi.org/10.1093/jmammal/gyu001)
- Asiatic Wilddog | CITES (2021). Convention on International Trade in Endangered Species of Wild Fauna and Flora. https://cites.org/eng/gallery/species/mammal/Asiatic_wilddog.html
- BaNP 2022. Banke National Park and its Buffer Zone Management Plan 2080/81-2084/85.
- Di Bitetti, M.S., Paviolo, A. and De Angelo, C. 2006. Density, habitat use and activity patterns of ocelots (*Leopardus pardalis*) in the Atlantic Forest of Misiones, Argentina. *Journal of Zoology* 270: 153-163. [10.1111/j.1469-7998.2006.00102.x](https://doi.org/10.1111/j.1469-7998.2006.00102.x)
- DNPWC. 2017. *Tiger and prey base monitoring protocol 2017 (Nepal)*. Department of National Parks and Wildlife Conservation, Department of Forests and Soil Conservation.
- DNPWC and DFSC. 2018. Status of Tigers and Prey in Nepal. In *Department of National Parks and Wildlife Conservation & Department of Forests and Soil Conservation. Ministry of Forest and Environment, Kathmandu, Nepal*.
- DNPWC and DFSC. 2022. *Status of Tigers and Prey in Nepal 2022*. Department of National Parks and Wildlife Conservation, Department of Forests and Soil Conservation.
- Durbin, L.S., Venkataraman, A., Hedges, S. and Duckworth, W. 2004. Dhole. In: Sillero-Zubiri, C., Hoffman, M., and Macdonald, D.W., eds.) *Canids: foxes, wolves, jackals and dogs – 2004 Status Survey and Conservation Action Plan*. IUCN/SSC Canid Specialist Group, Gland, Switzerland.
- Ghimirey, Y., Acharya, R., Yadav, K., Rai, J., Baral, R., Neupane, U., Basnet, B., Gilbert, M., Poudel, S. and van Rensburg, B.J. 2024. Challenges and possible conservation implications of recolonizing dholes *Cuon alpinus* in Nepal. *Oryx* Y: 1-9. [10.1017/S003060532300073x](https://doi.org/10.1017/S003060532300073x)
- Jha, S.G. 2003. *Linkage Between Biological and Cultural Diversity for Participatory Management: Nepal's Experiences with Makalu-Barun National Park and Bufferzone*. 31: 41-56.
- Jnawali, S.R., Baral, H.S., Lee, S., Acharya, K.P., Upadhyay, G., Pandey, M., Shrestha, R., Joshi, D., Lamichhane, B.R., Griffiths, J., Khatiwada, A. P., Subedi, N. and Amin, R. 2011. *The Status of Nepal's Mammals: The National Red List Series*.
- Johnsingh, A.J.T. 1983. Large mammalian prey and predators in Bandipur India. *The Journal of the Bombay Natural History Society* 80: 1-57.
- Kamler, J.F., Songsasen, N., Jenks, K., Srivathsa, A., Sheng, L. and Kunkel, K. 2015. *Cuon alpinus*. *The IUCN Red List of Threatened Species 2015*: [e.T5953A72477893.8235](https://doi.org/10.2305/IUCN-2015-003060532300073x). Accessed on 15th January 2023.
- Karanth, K.K., Gopalaswamy, A.M., Prasad, P.K. and Dasgupta, S. 2013. Patterns of human-wildlife conflicts and compensation: Insights from Western Ghats protected areas. *Biological Conservation* 166: 175-185. [10.1016/j.biocon.2013.06.027](https://doi.org/10.1016/j.biocon.2013.06.027)
- Karanth, K.K., Nichols, J.D., Hines, J.E., Karanth, K.U. and Christensen, N.L. 2009. Patterns and determinants of mammal species occurrence in India. *Journal of Applied Ecology* 46: 1189-1200. [10.1111/j.1365-2664.2009.01710.x](https://doi.org/10.1111/j.1365-2664.2009.01710.x)
- Karanth, K.U., Nichols, J.D., Kumar, N.S., Link, W.A. and Hines, J.E. 2004. Tigers and their prey: Predicting carnivore densities from prey abundance. *Proceedings of the National Academy of Sciences of the United States of America* 101: 4854-4858. [10.1073/pnas.0306210101](https://doi.org/10.1073/pnas.0306210101)
- Katel, O.N., Pradhan, S. and Schmidt-Vogt, D. 2014. A survey of livestock losses caused by Asiatic wild dogs, leopards and tigers, and of the impact of predation on the livelihood of farmers in Bhutan. *Wildlife Research* 41: 300-310. [10.1071/WR14013](https://doi.org/10.1071/WR14013)
- Kawanishi, K. and Sunquist, M.E. (2008). Food habits and activity patterns of the Asiatic golden cat (*Catopuma temminckii*) and dhole (*Cuon alpinus*) in a primary rainforest of peninsular Malaysia. *Mammal Study* 33: 173-177. [10.3106/1348-6160-33.4.173](https://doi.org/10.3106/1348-6160-33.4.173)
- Khanal, G., Poudyal, L.P., Devkota, B.P., Ranabhat, R. and Wegge, P., 2020. Status and conservation of the snow leopard *Panthera uncia* in Api Nampa Conservation Area, Nepal. *Oryx* 54: 421-428. [10.1017/S0030605318000145](https://doi.org/10.1017/S0030605318000145)
- Khaptad National Park. 2019. *Khaptad National Park and its Buffer Zone Management Plan Fiscal Year 2076/77 – 2080/81*. Department of National Parks and Wildlife Conservation, Babarmahal, Kathmandu, Nepal. <https://dnppwc.gov.np/en/conservation-area-detail/77/>
- Khatiwada, A.P., Awasthi, K., Gautam, N.P., Jnawali, S.R., Subedi, N. and Aryal, A. 2011. The pack hunter (dhole): received little scientific attention. *The Initiation* 4: 8-13. [10.3126/init.v4i0.5531](https://doi.org/10.3126/init.v4i0.5531)
- Koju, N.P., Kandel, R.C., Acharya, H.B., Dhakal, B.K. and Bhujju, D.R. 2021. COVID-19 lockdown frees wildlife to roam but increases poaching threats in Nepal. *Ecology and Evolution* 11: 9198-9205. [10.1002/ece3.7778](https://doi.org/10.1002/ece3.7778)
- LNP. 2020. *Management Plan of Lamtang National Park and its Buffer Zone (2077/78-2081/82)*. Lamtang National Park Office, Dhunche, Rasuwa.

- Neupane, B. 2017. Status and distribution of *Cuon alpinus* in Api Nampa Conservation Area, Darchula, Nepal (A case study from Tinker of Byas V.D.C.). *Unpublished Thesis*, Tribhuvan University.
- Reddy, C.S., Yosef, R., Calvi, G. and Fornasari, L. 2019. Inter-specific competition influences apex predator-prey populations. *Wildlife Research* 46: 628-638. [10.1071/WR19011](https://doi.org/10.1071/WR19011)
- RNP. 2019. *Rara National Park and its Buffer Zone Management Plan 2076/77-2080/81* (Vol. 81). Rara National Park Office, Hutu Mugu.
- Silver, S.C., Ostro, L.E.T., Marsh, L.K., Maffei, L., Noss, A.J., Kelly, M.J., Wallace, R.B., Gómez, H. and Ayala, G. 2004. The use of camera traps for estimating jaguar *Panthera onca* abundance and density using capture/recapture analysis. *Oryx* 38: 148-154. [10.1017/S0030605304000286](https://doi.org/10.1017/S0030605304000286)
- Steinmetz, R., Seuaturien, N. and Chutipong, W. 2013. Tigers, leopards, and dholes in a half-empty forest: Assessing species interactions in a guild of threatened carnivores. *Biological Conservation* 163: 68-78. [10.1016/j.biocon.2012.12.016](https://doi.org/10.1016/j.biocon.2012.12.016)
- Thapa, K. 2011. *Status of big cats and their conservation in newly declared extension areas of Bardia National Park, Nepal* (Issue November). <https://www.rufford.org/projects/kanchan-thapa/status-of-big-cats-and-their-conservation-in-newly-declared-extension-areas-of-banke-national-park-nepal/>
- Thapa, K., Kelly, M.J., Karki, J.B. and Sub, N. 2013. Distribution update First camera trap record of pack hunting dholes in Chitwan National Park, Nepal. *Canid Biology & Conservation* 16: 4-7. https://www.canids.org/app/images/journal/16/Dholes_in_Nepal.pdf
- Thapa, K., Subba, S.A., Thapa, G.J., Dewan, K., Acharya, B.P., Bohara, D., Subedi, S., Karki, M.T., Gotame, B., Paudel, G., Bhatta, S.R., Jnawali, S.R. and Malla, S. 2022. Wildlife in climate refugia: Mammalian diversity, occupancy, and tiger distribution in the Western Himalayas, Nepal. *Ecology and Evolution* 12: e9600. [10.1002/ece3.9600](https://doi.org/10.1002/ece3.9600)
- Thapa, K., Wikramanayake, E., Malla, S., Acharya, K.P., Lamichhane, B.R., Subedi, N., Pokharel, C.P., Thapa, G.J., Dhakal, M., Bista, A., Borah, J., Gupta, M., Maurya, K.K., Gurung, G.S., Jnawali, S.R., Pradhan, N.M.B., Bhata, S.R., Koirala, S., Ghose, D. and Vattakaven, J. 2017. Tigers in the Terai: Strong evidence for meta-population dynamics contributing to tiger recovery and conservation in the Terai Arc landscape. *PLoS ONE* 12: e0177548. [10.1371/journal.pone.0177548](https://doi.org/10.1371/journal.pone.0177548)
- Thing, S.B., Karki, J.B., Lamichhane, B.R., Shrestha, S., Regmi, U.R. and Ranabhat, R. 2022. Distribution and habitat-use of dhole *Cuon alpinus* (Mammalia: Carnivora: Canidae) in Parsa National Park. *Journal of Threatened Taxa* 14: 20703-20712. [10.11609/jott.6178.14.3.20703-20712](https://doi.org/10.11609/jott.6178.14.3.20703-20712)
- Valkenburgh, B. Van. 1991. Iterative evolution of hypercarnivory in canids (Mammalia: Carnivora): Evolutionary interactions among sympatric predators. *Paleobiology* 17: 340-362. [10.1017/S0094837300010691](https://doi.org/10.1017/S0094837300010691)
- Velho, N., Karanth, K.K., and Laurance, W.F. 2012. Hunting: A serious and understudied threat in India, a globally significant conservation region. *Biological Conservation* 148: 210-215. [10.1016/j.biocon.2012.01.022](https://doi.org/10.1016/j.biocon.2012.01.022)
- Wangchuk, T. 2004. Predator-Prey Dynamics: The Role of Predators in the Control of Problem Species. *Journal of Bhutan Studies* 0: 68-89.
- Wolf, C. and Ripple, W.J. 2017. Range contractions of the world's large carnivores. *Royal Society Open Science* 4: 1-11. [10.1098/rsos.170052](https://doi.org/10.1098/rsos.170052)
- Woodroffe, R., Cleaveland, S., Courtenay, O., Laurenson, M.K. and Artois, M. 2004. Infectious disease: Infectious disease in the management and conservation of wild canids. In Macdonald, D.W. and Sillero-Zubiri, C. (Eds.), *The Biology and Conservation of Wild Canids* (pp. 123-142). Oxford University Press.
- Yadav, S.K., Lamichhane, B.R., Subedi, N., Thapa, R.K., Poudyal, L.P. and Dahal, B.R. 2019. Dhole *Cuon alpinus* (Mammalia: Carnivora: Canidae) re-discovered in Bardia National Park, Nepal. *Journal of Threatened Taxa* 11: 14582-14586. [10.11609/jott.4714.11.12.14582-14586](https://doi.org/10.11609/jott.4714.11.12.14582-14586)

Biographical sketch

Shyam Kumar Shah is the senior ecologist at the Department of National Parks and Wildlife Conservation, Nepal. He is currently pursuing his PhD studies at the University of Agriculture and Forestry, Nepal on ecology of Bengal Tiger. He has interests in the conservation and research of carnivores. He has been actively involved in the conservation field since early 2004.

Rabin Kadariya is Chief at Annapurna Conservation Area Project (ACAP) of National Trust for Nature Conservation. He has achieved his PhD degree from Hokkaido University in 2019. He has been working for wildlife conservation since last 17 years. He is mostly engaging in big mammal conservation, especially tigers, bears, elephants, snow leopard and rhinos.

Ajay Karki is the Deputy Director General at the Department of National Parks and Wildlife Conservation, Nepal. He is currently pursuing his PhD studies at the University of Wyoming in the United States, focusing on the interaction between tigers and leopards. His areas of expertise and interest include big carnivore ecology, conservation policy, and the impact of climate change on biodiversity.

Hem Raj Acharya is a conservation officer in the Department of National Parks and Wildlife Conservation, Nepal. Presently, he is pursuing PhD at Inland Norway University of Applied Science, Norway on distribution, population dynamics and ecology of tiger in Terai Arc Landscape of Nepal. He has been working for wildlife conservation since 2012. He has interests in population ecology, GIS, conservation policy and CITES.

Nareesh Subedi is the conservation Program Director at the National Trust for Nature Conservation, Nepal. He has interests on mega herbivores, large carnivores and illegal wildlife trade issues. He has been working in the conservation field for three decades in Nepal.

Kanchan Thapa, presently serving as the Deputy Conservation Program Director at WWF Nepal, earned his PhD in wildlife science from Virginia Tech, USA. With a keen interest in the conservation and research of large carnivores, he utilizes cutting-edge technology for monitoring and research. He has been actively involved in the conservation field since the early 2000s.

Bhagwan Raj Dahal is the Country Representative at the Zoological Society of London (ZSL)- Nepal He has achieved his PhD study on landscape ecology from the University of Queensland, Australia. He has interests in large carnivores, landscape ecology and illegal wildlife trade issues He has been working in conservation field since 1990.

Umesh Paudel has an interest in Human-Wildlife Conflict and currently working towards co-existence in the Bardia-Banke Complex.

Rabin Bahadur K.C has an interest in large carnivores and mega herbivores, and currently working in the Bardia-Banke Complex using camera traps.