

Distribution Update

First camera trap record of dholes in Banke National Park, Nepal



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Abstract

A camera trapping survey has revealed the first photographic record of solitary individuals of the Asiatic wild dog or dhole *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 (Khatiwada et al. 2011). Though its endangered status, there have been relatively few quantitative studies

throughout its range (Khatiwada 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, Khatiwada 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

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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, Savannahs 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.

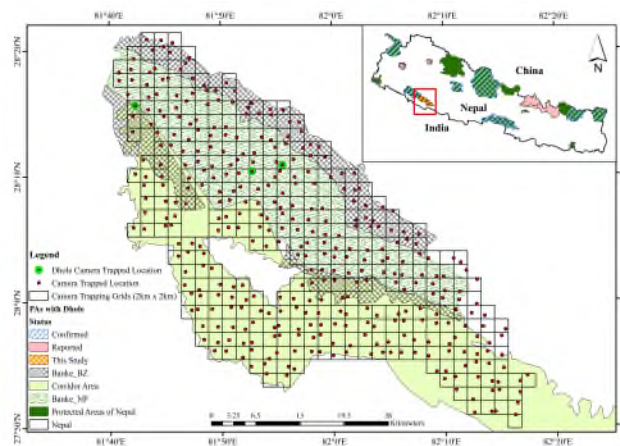


Figure 1. Dhole locations recorded during camera trap survey (2022) in Banke National Park and its associated forest, Nepal.



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	Khatiwada 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 implications

Our result confirms the presence of a dhole in Banke National Park. 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.

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