

Distribution update

First camera trap record of pack hunting dholes in Chitwan National Park, Nepal

Kanchan Thapa*¹, Marcella J. Kelly¹, Jhamak B. Karki² and Naresh Subedi³



¹ Department of Fish and Wildlife Conservation, Virginia Tech, 318 Cheatham Hall, Blacksburg, Virginia 24061, USA. Email: kanchan1@vt.edu

² Department of National Parks and Wildlife Conservation, Babarmahal, Kathmandu, Nepal

³ Biodiversity Conservation Center, National Trust for Nature Conservation, Kathmandu, Nepal

* Correspondence author

Keywords: Camera trap, Churia habitat, *Cuon alpinus*, pack

Abstract

Intensive camera trapping recorded the presence of dhole *Cuon alpinus* across the churia habitat in Chitwan National Park, Nepal. We amassed 2,145 camera trap nights of effort in a single dry winter season in 2011 that resulted in 22 independent photos containing the dhole, including eight photos containing the species in packs. This is the first camera trap record of the dhole pack hunting ever recorded from Chitwan National Park in Nepal. Dholes were found to be sympatric with tigers *Panthera tigris*, leopards *P. pardus* and golden jackals *Canis aureus*.

Introduction

The Asian wild dog or dhole *Cuon alpinus* (Pallas, 1811) has been listed as Endangered by IUCN (Durbin et al. 2008), with fewer than 2,500 individuals remaining in the wild. In South Asia, they range across the foothills of the Himalayas in India, Bhutan, Bangladesh, and Nepal. In Nepal, there were several unconfirmed reports of their occurrence. With the advancement in the non-invasive techniques such as camera trapping (Karanth et al. 2008, Karanth et al. 2010), it has been possible to confirm the presence of elusive carnivores including the dhole through photographic evidence. Dholes have been widely studied in India and Bhutan (Karanth and Sunquist 1995, Karanth and Sunquist 2000, Wang and Macdonald 2009), but this current study is the first of its kind conducted in the lowland areas of Nepal.

Methods

We deployed camera traps (Karanth and Nichols 2002) across 700km² of foothill habitat known as the churia habitat in Chitwan National

Park from January to March 2011. Cameras were deployed across strategic locations (such as riverbanks, firelines, game trails, etc.) that are likely to be traversed by predators. Strategic locations were chosen after the initial reconnaissance survey. We divided the study area into four blocks of 175km² each and within each block used an average of 40 camera trap stations, which were active for 15 days each. We used a combination of Moultrie D50 (25 sets) and Moultrie D55 (15 sets) passive camera traps. No bait was used during the survey. We conducted the survey in the dry winter season (January-February) in 2011. We completed the survey in a total of 60 days resulting in a sampling effort of 2,145 trap nights from all four blocks combined. We sorted all the camera trap pictures and considered photos as independent events if they were 30 minutes or more apart, as is commonly done in camera trap studies (Silver et al. 2004, Di Bitetti et al. 2006). As it was difficult to individually identify dholes, we used capture events (number of independent photos) per unit effort (per 100 trap nights) to measure the trapping rate or relative activity of the dhole (Karanth and Nichols 2002, Kelly 2008).

The following is the established format for referencing this article:

Thapa, K., Kelly, M. J., Karki, J. B. and Subedi, N. 2013. First camera trap record of pack hunting dholes in Chitwan National Park, Nepal. *Canid Biology & Conservation* 16(2):4-7 [online] URL: http://www.canids.org/CBC/16/Dholes_in_Nepal.pdf

Results

From a total of 35,646 camera trap pictures from 161 camera trap locations we obtained a total of 22 independent pictures of dholes from the churia habitat in Chitwan National Park. We obtained the first picture of dholes in a pack of the five individuals preying upon southern red muntjac or barking deer *Muntiacus muntjak* on 25 January 2011 at 09:15h on the riverbank of Kana Mana Valley, located in the south western most part of Chitwan National Park (Figure 1). This picture confirms the occurrence of dhole in this area (this study, Karki 2011) as well as pack hunting (Johnsingh, 1983). Fresh blood seen flowing down the river in the series of photographs of the incident seem to indicate this was a fresh kill rather than scavenging. The positive identification was further confirmed through comparisons with the photo digital archive of the Smithsonian Institution and expert opinion (A. Johnsingh, pers. comm.). We identified dholes in nine different locations in Chitwan National Park (Figure 2). The majority of observations were recorded in the churia habitat, except in one instance where a dhole was captured in a lowland area in the *Shorea robusta* (sal) forest. Spatially, we identified five potential packs of dholes in the churia habitat of Chitwan National Park. Average pack size ranged from two to seven individuals. Dholes were found to be active during day time (77% of photos). The trapping rate of dholes was 1.02 dhole pictures per 100 trap nights.



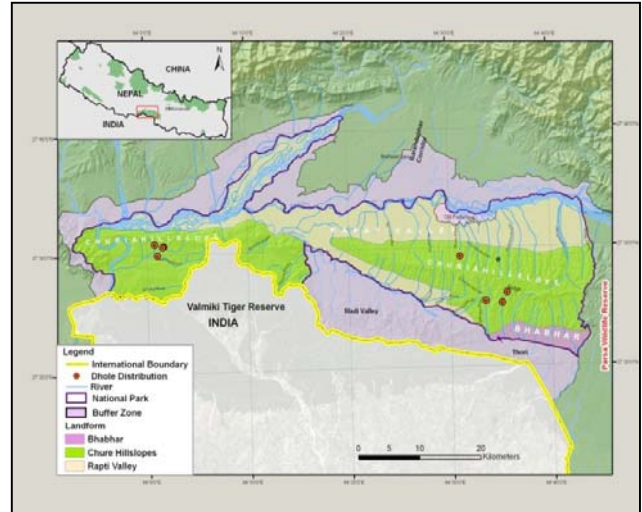
Figure 1. Pack hunting dhole preying upon barking deer in Kana Mana Valley, Chitwan National Park.

Discussion

Dholes are sympatric with other predators like tigers *Panthera tigris*, leopards *P. pardus* and golden jackals *Canis aureus*, potentially playing a major role in shaping prey community dynamics (Karanth et al. 2004). Unlike tigers and leopards, dholes are social hunters, capable of feeding on small to very large prey species (Johnsingh 1983). In our study, dholes were found to prey upon medium-sized ungulates like barking deer based on camera trap photos (Figure 1) and can also potentially scavenge on the remains of the prey of other large predators. Sambar *Rusa unicolor*, chital *Axis axis*, muntjac and wild boar *Sus scrofa* (in no particular order) were the main prey species recorded in the study area. We also observed a few records of four horned antelope *Tetracerus quadricornis* (pellet signs) in the western part, and Himalayan serow *Capricornis thar* (direct observations and camera trap photos) in the eastern part of the study area, although they were not only confined to these areas. In addition, we recorded camera trap photo evidence of

nine small carnivore species: jungle cat *Felis chaus*, fishing cat *Prionailurus viverrinus*, leopard cat *P. bengalensis*, large Indian civet *Viverra zibetha*, small Indian civet *Viverricula indica*, common palm civet *Paradoxurus hermaphroditus*, crab eating mongoose *Herpestes urva*, golden jackal and yellow-throated marten *Martes flavigula*.

Figure 2. Camera trap evidence of dhole presence in Chitwan National Park.



The range of dholes extends across the lowland areas of Nepal; however, due to the lack of photographic evidence their presence could not be confirmed except in Chitwan National Park. In Parsa Wildlife Reserve, which is contiguous to Chitwan to the East, direct sighting of dholes took place but they were not captured during a 2009 camera trap survey. Similarly, direct sighting of seven individuals was reported in the Babai Valley of Bardia National Park in 2008, but no dholes were recorded during a 2009 camera trap survey (N. Subedi, pers. comm.). Dholes have been reported by local communities in Banke National Park in the western lowland area of Nepal (Thapa 2011), but were not confirmed during this study. Dholes have also been reported in Kanchenjunga Conservation Area in the eastern highlands of Nepal (Table 1) (Khatiwada et al. 2011).

A decline in the prey base is the major threat to carnivore species including the dhole (Karanth et al. 2004, Andheria et al. 2007). Poaching of prey species was found to be high in the western section of Chitwan National Park which borders the Valmiki Tiger Reserve in India. During the survey, we heard gun shots that we assumed were from hunters. This highlights the major threat to the survival of large carnivores through the decline in their prey base. Interestingly, there have been no reported cases of human-wildlife conflict with dholes (e.g. livestock depredation), perhaps implying an intact population in protected wild areas and sufficient prey for this predator. So far there have been no cases of disease prevalence reported from domestic dogs to dholes and jackals. Narayani River in the western part of National Park may act as a buffer to domestic-wildlife species interactions. Even though the dhole is listed as Endangered, there is less information available on its ecology and distribution compared to other sympatric carnivore species across the lowlands of Nepal. Interspecific competition among tigers, leopards and dholes most likely occurs, but there is little information about spatial, temporal, or dietary partitioning among these top predators to explain coexistence in the study area. More research is needed on dhole ecology to determine the role this understudied species has on the predator and prey community of lowland Nepal.

Protected Area	Dhole Presence	Type of Record	Habitat Type	Source
Chitwan National Park	Confirmed	Camera traps	Churia sal forest	This study
Parsa Wildlife Reserve	Confirmed	Direct sighting	Churia sal forest	First author
Bardia National Park	Reported but not confirmed	Direct sighting	Lowland forest	(Odden and Wegge 2009); N. Subedi (pers. obs.)
Banke National Park	Reported but not confirmed	Local people	Lowland forest	(Thapa 2011)
Suklaphanta Wildlife Reserve	Not reported			
Koshi Tappu Wildlife Reserve	Not reported			
Makalu Barun National Park	Confirmed	Park record	Temperate forest	(Jha 2003)
Dorpatan Hunting Reserve	Confirmed	Park record	Temperate forest	DNPWC
Rara National Park	Reported	Park record	Temperate forest	(DNPWC 2010)
Sagarmatha National Park	Not reported			
Kanchenjunga Conservation Area	Confirmed	Camera traps	Temperate forest	(Khatiwada et al. 2011)
Annapurna Conservation Area	Not reported			
Gaurishankar Conservation Area	Reported but not confirmed		Temperate and Sub Alpine forest	
Manaslu Conservation Area	Not reported			
Sheypoksundo National Park	Not reported			
Shivapuri National Park	Not reported			
Langtang National Park	Reported	N/A	Temperate forest	(FRA 2000)
Khaptad National Park	Reported	N/A	Temperate forest	(DNPWC 2012)

Table 1. Occurrence of the dhole across Protected Areas of Nepal.

Acknowledgements

We would like to thank the Department of National Parks and Wildlife Conservation for granting us permission to carry out this study. We would like to thank Chitwan National Park, Biodiversity Conservation Centre (BCC), Terai Arc Landscape office for the necessary support for the project. Special thanks go to protected area staff, and to National Trust for Nature Conservation (NTNC) and BCC staff and volunteers for their hard work in the field. KT was supported by Kathryn Fuller Fellowship-World Wildlife Fund (WWF) US, Critical Ecosystem Partnership Fund, National Geographic Waitt Grant, Idea Wild and Virginia Tech for funding the field work. We would like to thank Gokarna Jung Thapa for helping in the preparation of the map, and WWF Nepal and NTNC for providing the institutional support for the project.

References

- Andheria, A.P., Karanth, U.K. 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.
- 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.
- DNPWC. 2010. Management Plan of Rara National Park. Department of National Park and Wildlife Conservation, Kathmandu, Nepal.
- DNPWC. 2012. Khaptad National Park. Department of National Park and Wildlife Conservation, Babarmahal, Kathmandu, Nepal [online]. URL: <http://www.dnpwc.gov.np/protected-areas/national-parks/item/24-khaptad-national-park>.
- Durbin, L.S., Hedges, S., Duckworth, J.W., Tyson, M., Lyenga, A. and Venkataraman, A. (IUCN SSC Canid Specialist Group - Dhole Working Group) 2008. *Cuon alpinus*. In: IUCN 2012. IUCN Red List of Threatened Species, Gland, Switzerland. Version 2012.2. <www.iucnredlist.org>. Downloaded on 26 October 2012.
- FRA. 2000. Forest Resource Assessment of Nepal, Country Report. FAO.
- Jha, S.G. 2003. Linkages between Biological and Cultural Diversity for Participatory Management: Nepal's experiences with Makalu-Barun National Park and Buffer Zone. *Journal of National Science Foundation Sri Lanka*, 31:41-56.
- Johnsingh, A.J.T. 1983. Large mammalian prey-predators in Bandipur. *Journal of Bombay Natural History Society*, 80:1-49.
- Karki, J.B. 2011. Occupancy and abundance of tigers and their prey in the Terai Arc Landscape, Nepal. PhD Thesis, Wildlife Institute of India, Dehradun, India. URL: <http://www.forestrynepal.org/publications/thesis/5719>
- Karanth, K.U., Nichols, J.D., Kumal, S., Link, W.A. and Hines, J.E. 2004. Tigers and their prey: Predicting carnivore densities from prey abundance. *PNAS*, 101:4854-4858.
- Karanth, K.U. and Nichols, J.D. (eds.). 2002. Monitoring tigers and their prey: A manual for researchers, managers and conservationists in Tropical Asia. Center for Wildlife Studies. Bangalore, India.
- Karanth, K.U. and Sunquist, M.E. 1995. Prey selection by tiger, leopard and dhole in tropical forests. *Journal of Animal Ecology*, 64:439-450.
- Karanth, K.U. and Sunquist, M.E. 2000. Behavioural correlates of predation by tiger *Panthera tigris*, leopard *Panthera pardus* and dhole *Cuon alpinus* in Nagarahole, India. *Journal of Zoology*, 250:255-265.
- Kelly, M.J. 2008. Design, evaluate, refine: camera trap studies for elusive species. *Animal Conservation*, 11:182-184.
- Khatiwada, A.P., Awasthi, K.D., Gautam, N.P., Inawali, S.R., Subedhi, N. and Aryal, A. 2011. The pack hunter (dhole): Received little scientific attention. *The Initiation*, 4:8-13. <http://nepjol.info/index.php/INIT/article/view/5531>

Odden, M. and Wegge, P. 2009. Kill rates and food consumption of leopards in Bardia National Park, Nepal. *Acta Theriologica*, 54:23-30.

Silver, S.C., Ostro, L.E.T., Marsh, L.K., Maffei, L., Noss, A.J., Kelly, M.J., Wallace, R.B., Gomez, H. and Ayala, G. 2004. The use of camera traps for estimating jaguar abundance and density using capture/recapture analysis. *Oryx*, 38:148-154.

Thapa, K. 2011. Status of big cats and their conservation in newly declared extension areas of Bardia National Park, Nepal. Final Report to the Rufford Small Grants Foundation.
http://www.ruffordsmallgrants.org/rsg/projects/kanchan_thapa

Wang, S.W. and Macdonald, D.W. 2009. Feeding habits and niche partitioning in a predator guild composed of tigers, leopards and dholes in a temperate ecosystem in central Bhutan. *Journal of Zoology*, 277:275-283.

Biographical sketches

Kanchan Thapa is a doctoral student at Virginia Tech studying tigers in Nepal.

Marcella J. Kelly is an associate professor at Virginia Tech specializing in carnivore population dynamics, and has studied large carnivores including Bengal and Sumatran tigers, cheetahs and jaguars.

Jhamak B. Karki is a government employee at the Department of National Parks and Wildlife Conservation and currently serves as Chief Warden at Chitwan National Park. He specializes in grassland management and carnivore ecology with a focus on tigers.

Naresh Subedi is a doctoral student at Wildlife Institute of India and is currently pursuing his studies on the greater one horned rhinoceros.