GNUSLETTER

Volume 39 / Number 1
June 2022

ANTELOPE SPECIALIST GROUP

IUCN Species Survival Commission
Antelope Specialist Group

GNUSLETTER is the biannual newsletter of the IUCN Species Survival Commission Antelope Specialist Group (ASG). First published in 1982 by first ASG Chair, Richard D. Estes, the intent of *GNUSLETTER*, then and today, is the dissemination of reports and information regarding antelopes and their conservation.

ASG Members are an important network of individuals and experts working across disciplines throughout Africa, Asia and America. Contributions (original articles, field notes, other material relevant to antelope biology, ecology, and conservation) are welcomed and should be sent to the editors. Today *GNUSLETTER* is published in English in electronic format and distributed widely to members and non-members, and to the IUCN SSC global conservation network. To be added to the distribution list please contact asgpo@marwell.org.uk.

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Front Cover. *Abbott's duiker (*Cephalophus spadix*) on Mount Kilimanjaro (© Charles Foley)*

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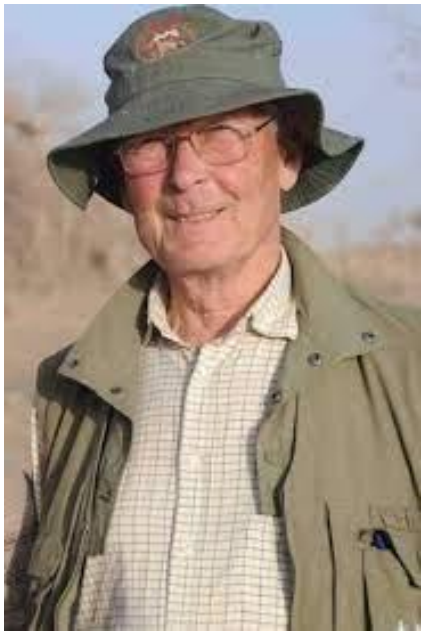
From IUCN and ASG

Obituary: John Hare OBE, 1934-2022



ASG member John Hare who passed away in January 2022 was a pioneer of Wild Camel conservation and co-founder, with Kathryn Rae, of the Wild Camel Protection Foundation (WCPF) in 1997. John's career began as a British civil servant in northern Nigeria, where he learned Hausa and Fulani. From 1989 to 1996 he worked for the United Nations Environment Programme in Nairobi, during which he made several expeditions on camel back into northern Kenya. In 1993, he was invited to join a Russian scientific expedition researching the status of the Wild Camel in Mongolia. His presentation of the findings at an international conference in Ulaanbaatar resulted in an invitation by Professor Yuan Goying to join a 1995 Chinese expedition to the Gashun Gobi to research the status of wild camels in Xinjiang. He followed this up with four more expeditions to the Gashun Gobi, 1995-1999, to research the Wild Camel's migration routes and identify how best to try to save them from extinction. John then dedicated his efforts to the Wild Camel Protection Foundation which became the focus for international efforts to conserve the species in its remaining localities in China and Mongolia. These initiatives included recommendations on the establishment of the Lop Nur Nature Reserve in Xinjiang, a Wild Camel captive breeding centre in Mongolia, and many other educational and fundraising initiatives. His work on Wild Camel was rewarded by the Environmental Award of the State Environment Protection Agency of China (1998), the Mongolian Environmental Protection Medal (2014) and the Mongolian Government's Friendship Medal (2016), the highest award given to foreigners.

Goodbye to the 'Red Gazelle'

Koen de Smet and David Mallon
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The Red Gazelle *Eudorcas rufina* (Thomas 1894) has always been an enigmatic species. It is known only from three male skins and/or skulls that were purchased in local markets in the late 1800s. The precise origin of the specimens is unknown (Kowalski and Rzebik-Kowalska 1991).

One skin and skull was bought by Mr E. Loder in Algiers and donated many years later to the Natural History Museum in London; Loder himself considered that the dark colour of the skin meant it was unlikely to be a desert species (Kowalski and Rzebik-Kowalska 1991). Thomas (1894) named it *Gazella rufina* and described it is bright, rich rufous in colour, very similar to *G. rufifrons,* to which it was closely related, but distinguished by greater size. A skin and skull were bought in Oran in the 1890s and named *Antiliope (dorcas) pallaryi* (Pomel 1895). Joleaud (1929) considered that this was conspecific with *G. rufina*, and that both specimens in fact

belonged to *G. rufifrons*. A third skin, with part of the skull and horns, was bought in France and is now in the Musée d'Histoire Naturelle, Paris (Lavauden 1930).

Lavauden (1930) reported that *G. rufina* was known to the furriers Oran, who differentiated it from *G. cuvieri*, and described its habitat as forests and bushes in the vicinity of Saida. Heim de Balsac (1936) considered that it was probably extinct but possibly survived around the Cheliff river. Both regions are now strongholds of thriving populations of Cuvier's Gazelle *Gazella cuvieri*.

Ellerman and Morrison-Scott (1951) listed *G? rufifrons rufina* and *G.? rufifrons pallyari* among the subspecies of *G. rufifrons*. Gentry (1964) retained *G. rufina* as a separate species, related to *G. cuvieri*, based on skull morphology. Grubb (2005) followed this classification. *G. rufifrons, G. thomsoni* and *G. rufina* were later moved to the genus *Eudorcas*. KdS has examined the London skin and found it bore a close resemblance to *E. rufifrons*.

No live animals have ever been reported, nor any local name. The only evidence for the existence of *E. rufina* consists of these three specimens obtained inmarkets at the northern end of trans-Saharan trade routes. The most likely explanation is that these skins originated from somewhere on the southern side of the Sahara.

The introduction to this genus in *Mammals of Africa* (Groves (2013) considered that *E. rufina* did not represent a valid species and it is not listed on the American Society of Mammalogists' mammal species database. **ASG concurs with the view that *E. rufina* is not a valid species and it is no longer assessed on the IUCN Red List**.

References

Ellerman, J. R. and Morrison-Scott, T. C. S. 1951. *Checklist of Palaearctic and Indian Mammals 1758 to 1946*. British Museum (Natural History), London, UK.

Gentry, A.W. 1964. Skull characters of African gazelles. *Annals and Magazine oi Natural History* (13) 7: 353-382.

Groves, C.P. 2013. *Eudorcas*. Ring-horned gazelles. Pp. 356-357 in: J. Kingdon and M. Hoffmann, eds. *Mammals of Africa. Volume VI. Pigs, Hippopotamuses, Chevrotain, Giraffes, Deer and Bovids*. London: Bloomsbury Publishing.

Grubb, P. 2005. Order Artiodactyla. Pp. 637-722 in: D.E. Wilson and D.M. Reeder, eds. *Mammal species of the world: A taxonomic and geographic reference*. Maryland: John Hopkins University Press.

Heim de Balsac, H. 1936. Biogéographie des mammifères et des oiseaux de l'Afrique du Nord. Bulletin Biologique. France-Belgique. Supplement 21: 1-447.

Kowalski, K and Rzebik-Kowalska., B. 1991. *Mammals of Algeria*. Wroclaw: Polish Academy of Sciences.

Joleaud, L. 1929. Etudes de géographie zoologique sur la Berbérie. Les ruminants. V. Les gazelles. *Bulletin de la Société Zoologique de France* 54: 438-457.

Lavauden, L. 1930.Notes de mammalogie nord-africaine. La gazelle rouge. *Bulletin de la Société Zoologique de France* 55: 327-332.

Thomas, O. 1894. On some gazelles brought by Sir Edmund Loder from Algeria. *Proceedings of the Zoological Society of London* 31: 467-472.

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Research and Reports

Aerial Survey of Wildlife and Human Activity in the BSB Yamoussa Landscape, Cameroon, Dry Season 2018

F. Grossmann F., H. Fopa Kueteyem, A. Vailia Nguertou, S. Marel Madjaye, P. Bour & S.P. Tadjo - *Wildlife Conservation Society (WCS) & Ministry of Forests and Wildlife (MINFOF)*

Fig.1. *A herd of Eastern giant eland (*Tragelaphus derbianus gigas*) spotted from the air in Northern Cameroon (©Faro-Lobeke Cameroun)*

Summary
This technical report presents the results of the 2018 dry season survey conducted in the BSB - Yamoussa landscape (BSB) (Figure 2). This survey was undertaken by the Wildlife Conservation Society (WCS) in partnership with the Ministry of Forestry and Wildlife (MINFOF) between the 4th May and the 12th May 2018.

The BSB landscape boundaries, as defined in the project proposal, were used as the survey zone boundary. The BSB landscape is an integral part of a larger ecological unit and protected area network (PAN) spanning northern Cameroon and Chad. It is composed of four National Parks - Faro, Benue, Bouba Ndjidda in Cameroon and bordering Bouba Ndjidda, on the Chadian side, Sena Oura. The PAN also contains 31 *Zone d'Intérêt Cynégétique* (ZIC), areas managed for hunting tourism. In addition, the ZIC's provide an important buffer and connectivity function between National Parks in this PAN. The BSB landscape covers the

transboundary national parks Bouba Ndjidda and Sena Oura as well as seven ZIC's - approximately 10,500km² in area.

The surveys are part of the WCS monitoring framework. The surveys provide comparable data with surveys conducted in 1977, 2008 and 2015 contributing to understanding of long-term population trends and distribution of wildlife and human activity for this part of the PAN.

Within the BSB landscape a total of 7,455km² was surveyed. Currently accepted methods and associated standards widely used across national monitoring programs across Africa were fully implement. A total of 140 transects were sampled, totalling 3,372 kilometres in length. Average sample intensity was 20% within Bouba Njidda and 12% in the surrounding ZIC's. The nominal flight height was 300 feet with a half strip width of 150 meters.

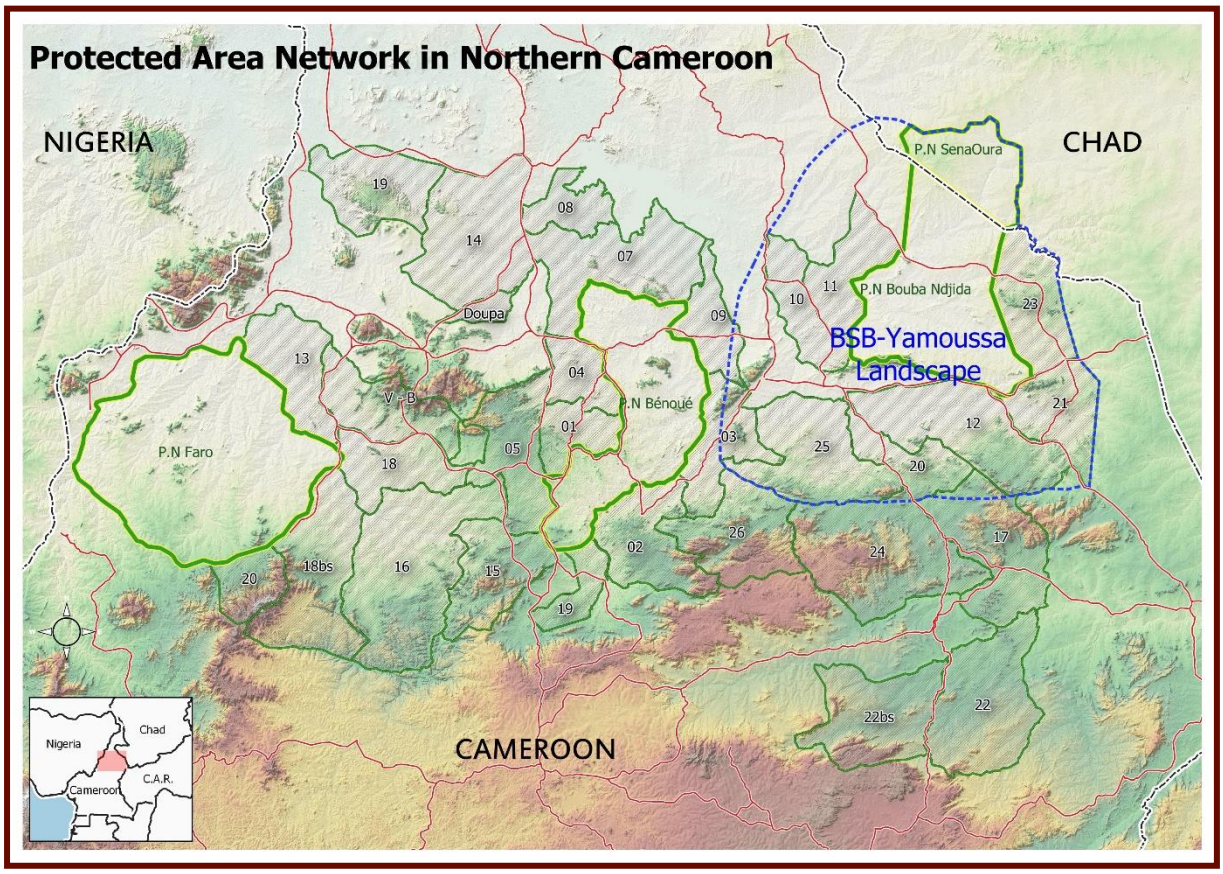

Fig. 2. *The network of Protected Areas (National Parks and Hunting Areas) in Northern Cameroon (study area in blue)*

Wildlife observation

Two prominent spatial wildlife "hotspots" characterize the surveys zone. These have been defined as areas were encounters of wildlife exceeded five animals per kilometer flown. The first hotspot is centered in the southern sector of the Bouba Ndjidda National Park (BNNP). This area of high wildlife encounter rate covers approximately 1,200km². The second hotspot is found in the western and central areas of two Hunting Areas: ZIC 12 as well as ZIC 20. It covers approximately 800km². Figure 3 maps encounter rates (animals per kilometer flown) of wildlife observations with two core areas connected by a narrow corridor. The corridor is traversed by the main road between Koum and Mandi. We believe these two areas are important source population for wildlife presence in ZIC 10 & 11, 23 & 25 and the northern stratum of

BNNP, sustaining any legal and illegal hunting. As such they are critical components in any conservation strategy targeting the recovery of wildlife populations throughout the landscape and in particular to the northern sector of BNNP. Further, we believe the results provide a positive indicator of conservation success for these areas as the result of continues presence and some basic law enforcement despite the large anthropogenic pressures within the landscape. Population densities are significantly lower outside these two areas (< 0.1 animal/km) indicating limited conservation impact and increased threat level to wildlife populations. This includes the northern sector of BNNP.

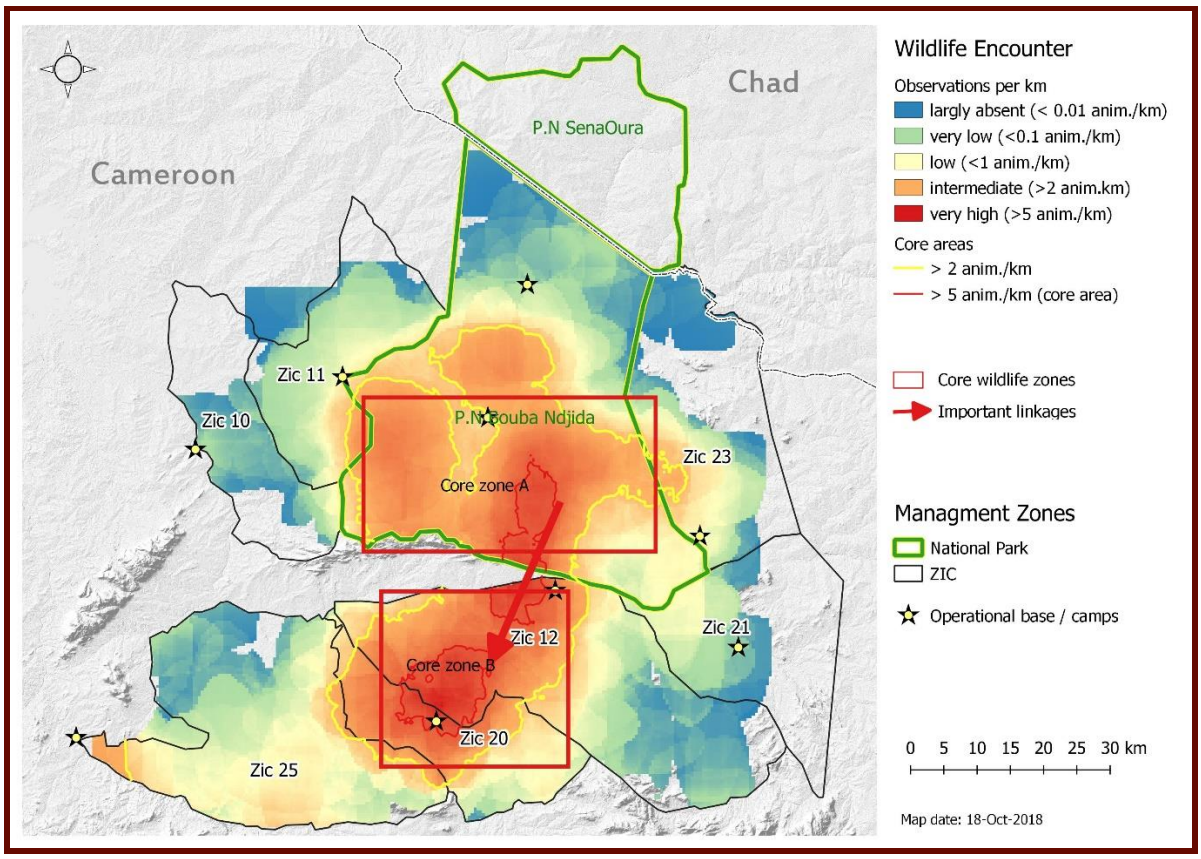

Fig. 3. *Encounter rates (anim./km) of wildlife across the survey zone and core zones*

The 2018 results (Table 1) do not indicate any major declined across most species since 2008, although further regular trend data will be necessary to allow for more detailed analysis. In contrast, wildlife populations in the BNNP were significantly higher in 1977, including wider distribution patterns into the northern sector. Further, visual inspection of distributions between 1977 and 2018 suggests that the carrying capacity for wildlife within these hotspots is likely to be higher than the current numbers, at least for some of the species, indicating the need for further protection efforts in core areas and outwards into the periphery.

An important species, the Eastern giant eland (*Tragelaphus derbianus gigas*), has remained stable within the BNNP at around 800 - 1,000 individuals. This represents an approximate 10% of the current global population estimate of this species.

Two additional species of high conservation interest, the korrigum (*Damaliscus lunatus korrigum*), a western subspecies of the topi cluster and the Kordofan giraffe (*Giraffa camelopardalis antiquorum*) were recorded with estimates of ~390 and ~160 animals respectively.

As reported in 2015 and elsewhere, the elephant (*Loxodonta Africana*) population has been decimated with only 18 confirmed individuals permanently resident within the landscape. Additional observations from aerial and foot patrol, as well as Global Positioning System (GPS) collar monitoring have confirmed that additional ~100 elephants use the landscape occasional, moving in from areas to the west of the landscape. Nevertheless, there is concerning evidence that elephant poaching is still a major threat as indicated by ten confirmed poaching incidences since the 2015 surveys.

Table 1. *Summary table of population estimates for wildlife and livestock in the BSB landscape*

Species	Observed in strip	Pop'l estimate	lower	upper	RPR
Wildlife					
Korrigum	47	389	55	723	86
Kordofan giraffe	24	159	30	289	81
West African savanna buffalo	268	1,471	600	2,342	59
Buffon's kob	381	2,704	1,847	3,562	32
Waterbuck	192	1,309	803	1,816	39
Warthog	131	912	617	1,208	32
Bohor reedbuck	775	4,723	3,470	5,976	27
Oribi	65	385	233	537	40
Western hartebeest	792	4,939	3,642	6,236	26
Eastern Lord Derby's eland	206	1,187	581	1,792	51
Roan	320	1,959	1,305	2,612	33
Total wildlife		*20,137*			
Livestock					
Shoats	2,022	16,245	10,719	21,771	34
Cattle	12,945	100,889	77,004	124,775	24
Total livestock		*117,134*			

Human activity

Figure 4 summarizes the survey findings for the major human activities within the landscape and how these relate to wildlife distributions during the survey period. The landscape is dominated by the high numbers of livestock with over 100,000 head of cattle estimated within the survey zone (nearly 6 times more livestock than wildlife) (Table 1; Figure 5). Bouba Ndjidda remains largely free of cattle with only 3% of one-kilometer transect segments recording the presence of livestock. The ZIC's, in contrast, were heavily affected at the management unit level, with an average of 19% of all one-kilometer transect segments recording cattle (range between 8% - 27%). Overall ZIC's only managed to keep their core operational areas free of cattle, if at all. The aerial surveys indicate a strong negative relationship between the presence of cattle and wildlife encounter rates.

Agricultural activity, measured through the clearing of natural habitat, is closely associated with current settlement patterns. The highest surface area covered by agriculture is found along the eastern strata of the BSB with incipient encroachment along some of the northern-eastern sections of the BNNP. Further agricultural activity was observed within the park along the Chadian border as well as around the mining sites to the west.

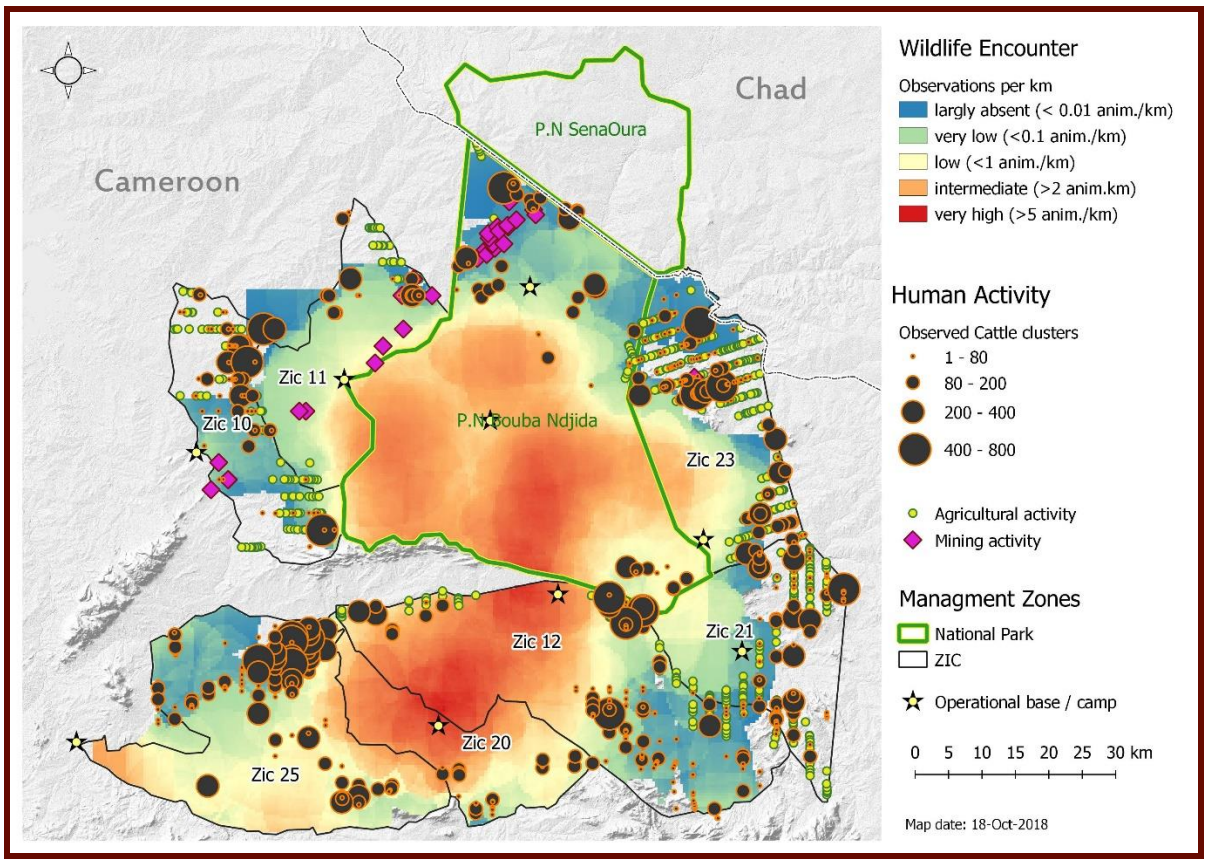

Fig. 4. *Human activity in relation to wildlife encounter rates*

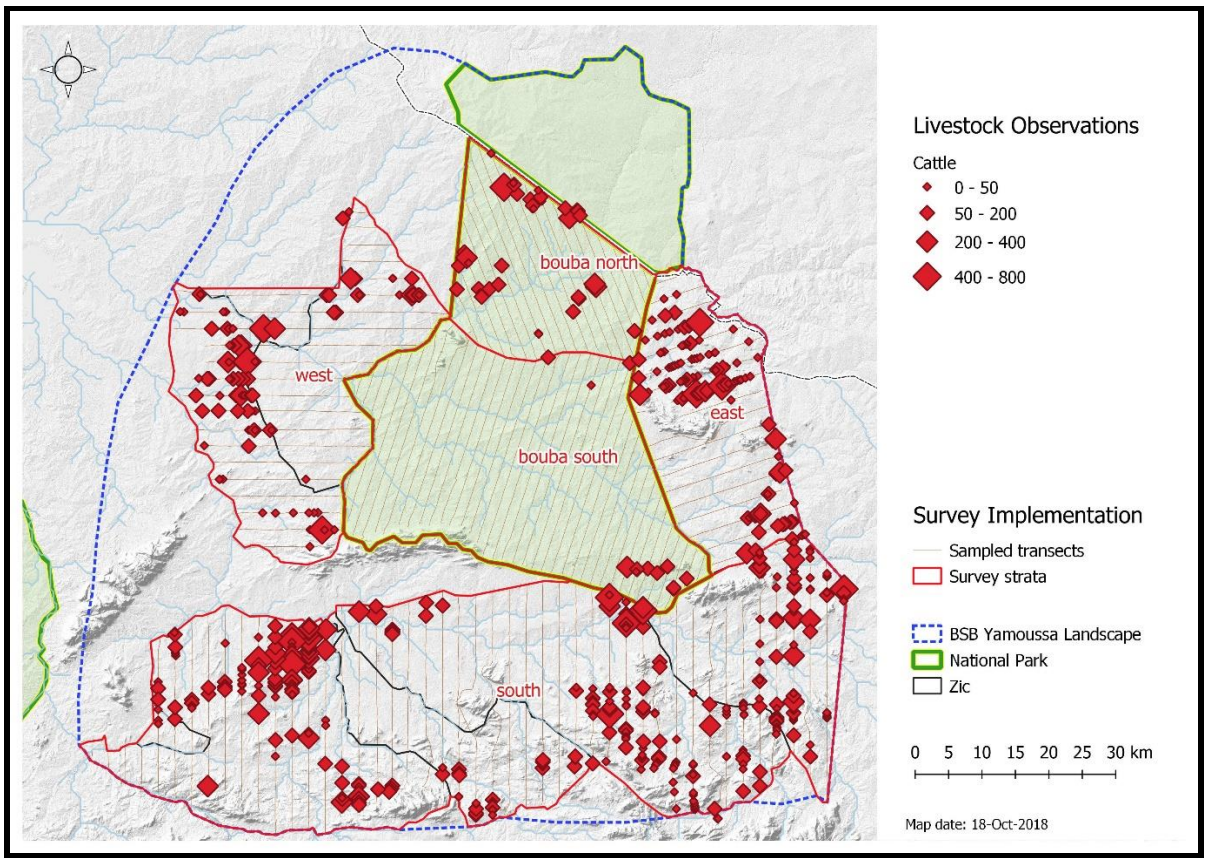

Fig. 5. *Location of cattle sightings*

Key conservation challenges and concerns based on survey observation

Protecting the remaining elephant within BNNP is a major priority. The intensification of protection within BNNP could create safe areas into which groups, currently ranging in periphery unprotected areas could move into. This is supported by recent observations of movements of collared individuals entering BNNP from areas south of Benoue National Park. The elimination of elephant poaching will be determining the survival of this species in the landscape.

Large and increasing numbers of cattle across the landscape are a major challenge to conservation as this activity has led to areas devoid of any wildlife. Although the different sectors across the landscape are connected through intact habitat, functional connectivity is likely limited due to cattle presence. The pressure for grazing access is also very high within the national park, and with lack of ground and aerial patrol incursions are frequent in particular in the northern sector. Cattle will be difficult to manage at the landscape scale, spatial priorities of cattle free zones in particular in ZIC 25, the western section of ZIC 12, ZIC 20 and the southern section for ZIC 23 will need to be the focus of any intervention.

Poaching, as observed by the presence of meat drying racks, is particularly evident within the wildlife-rich southern part of Bouba Ndjidda. It is probable that some of this activity can be explained by the lack of park scouts patrolling during the period preceding the surveys due to insecurity.

Three urgent spatial conservation priorities are identified. The first is the diminishing structural connectivity between the northern parts of the survey zone Bouba Ndjidda and the southern ZIC's. Currently, there is evidence of a functional corridor. Of particular conservation importance, this corridor is likely to facilitate the movement of the korrigum as well as the Kordofan giraffe, both of which are represented of small remaining populations within both sides of this corridor. Aerial surveillance indicates that this corridor is very narrow (<10km) and under high human pressure, primarily through the traversing main road and transhumance pathway. Urgent conservation action and planning is required if this connectivity is to be maintained.

Secondly, efforts need to be increased to expand conservation activity into the northern sector of the BNNP and its continuity into the Sena Oura National Park. Increased level of law enforcement in the northern section of Bouba Ndjidda National Park and targeted intervention of reducing land conversion on the Chadian side is urgent.

Thirdly, further strengthening protection of the southern ZIC, in particular, ZIC 12 & 20 and expanding the effort into ZIC 25.

Mining is identified as a major threat for the BNNP, specifically for the northern sector of BNNP. Although the spatial extent is somewhat limited, the intensity and scale of the mine are attracting a large number of people and as a result present a major threat to the cohesion of the park, the sites security, and law enforcement capacity.

Acknowledgements

The aerial survey was carried out by the Wildlife Conservation Society (WCS) in partnership with Ministry of Forestry and Wildlife (MINFOF) with funding for the survey, analysis and report writing provided by the German Cooperation Bank (*Kreditanstalt für Wiederaufbau*, KfW).

Abbott's duiker sighting on Mount Kilimanjaro, Tanzania

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Lincoln Park Zoo Tanzania Conservation Research Program

In February 2022, the author had a prolonged sighting of an Abbott's duiker (*Cephalophus spadix*) at the Machame Ranger Post on the southern slope of Mount Kilimanjaro, Tanzania. The Abbott's duiker is endemic to Tanzania and is listed as 'Endangered' on the IUCN Red List, with an estimated global population of less than 1,500 individuals (Moyer et al. 2016) making this arguably the rarest duiker in Africa. Former populations in the Usambara Mountains and Nou Forest of Tanzania are now almost certainly extinct (Foley *et al.* 2014), leaving just three main populations on Mt. Kilimanjaro, the Udzungwa Mountains, and Mount Rungwe, as well as a small population discovered in 2006 in the Rubeho mountains (Rovero *et al.* 2008). Because close sightings and photographs of this species are so infrequent, a record of the sighting and the physical characteristics of the animal are described here.

The duiker was seen at 2,834 m (9,300 feet) at the first climbing hut at Machame Ranger Post on the Machame route, located inside Kilimanjaro National Park. The Machame Ranger Post lies in the transition zone between the upper edges of the cloud forest and the start of the heather zone and is surrounded mostly by dense vegetation with some shorter trees and tall heather. The national park rangers said this particular duiker was a frequent visitor to the area and had been coming to this location for several months and feeding on the vegetation in the open area around the ranger post where visitors pitched their tents. The duiker would typically appear during the day, between the time that the overnighting campers left (approximately 10h00) and the new campers arrived (approximately 16h00). The author (who spent six hours total at the Machame Ranger Post) saw the animal enter the ranger post area at 13h14 and observed it feeding for 25 minutes. The duiker was a female, with short horns (estimated at c. 10 cm) and a prominent sub-orbital gland. The back and sides were russet-brown with darker, mostly black, haunches and underside. The tail was black with white at the very tip. The animal had long hair on the back and sides and short hair on the neck and side of the face which were both dark grey. The upper lip was white. There was a vaguely visible dark dorsal stripe about 4cm wide which was more prominent between the shoulders and on the rump than on the back. There was no obvious 'grey patch at the root of the tail' as described in Kingdon (1982) and mentioned by Grubb and Groves (2001), as possible rudiments of the dorsal markings of *C. silvicultor*. The hair on the forehead was russet-brown and there were longer black hairs at the base of the horns. The prominent crest was a deep russet colour and estimated at 10-12 cm in length.

The duiker was feeding exclusively on the leaves of a species of 'dock' (*Rumex* sp.) that was growing extensively around the campsite. The common upper forest species of dock on Mt. Kilimanjaro is *Rumex steudelii*, although the European species, *Rumex crispus*, cannot be ruled out (J. Grimshaw pers. comm.).

While Mt. Kilimanjaro is believed to be one of the last remaining strongholds of the species (Kingdon 1982, Rovero *et al.* 2013), very little is actually known about the species on the mountain (Grimshaw *et al.* 1995). No live specimens were encountered by Charles Foley and John Grimshaw while conducting extensive ecological surveys on the northern and western slopes of the mountain in 1990, nor by John Grimshaw who carried out PhD studies on the mountain between 1991–1994. Similarly, no Abbott's duikers were recorded during a camera

trap survey of the northern and western forests and moorlands in 2004–2005 by the Tanzania Mammal Atlas Project.

In 2005, the management of the natural forest surrounding Mt. Kilimanjaro was transferred from the Tanzanian Forestry Department to Tanzania National Parks, which greatly improved protection levels; as a result, there is now likely to be little poaching on the upper slopes of the mountain. During discussions with the national park rangers at the Machame hut, they mentioned that the biggest threat to wildlife on the mountain was feral dogs that roam in packs throughout the forest, and which are very difficult to eliminate. Indeed, a feral dog was seen running along the main path leading up to the Machame hut on the day of the observation.

***Fig. 1**. Abbott's duiker, Machame Ranger Post, Mount Kilimanjaro in February 2022 (© Charles Foley)*

In 2016, a survey that combined camera trapping and systematic dung monitoring at 66 locations on the mountain, recorded Abbott's duiker at 13 sites (4 in disturbed and 9 in undisturbed habitat, all within the National Park), ranging in altitude from 1,920 to 3,849 m (Gebert et. al. 2019). Of the ungulate species, only the Common duiker (*Sylvicapra grimmia*) was recorded at more sites during the survey (Gebert et. al. 2019). This suggests that the population of Abbott's duiker has rebounded in recent years and that Mount Kilimanjaro is indeed an important stronghold for this species.

References

Foley, C., Foley, L., Lobora, A., De Luca, D., Msuha, M., Davenport, T.R.B. & Durant, S. 2014. *A field guide to the Larger Mammals of Tanzania*. Princeton University Press, Princeton.

Gebert, F., Njovu, H.K., Treydte, A.C., Steffan-Dewenter, I. & Peters, M.K. 2019. Primary productivity and habitat protection predict elevational species richness and community biomass of large mammals on Mt. Kilimanjaro. *Journal of Animal Ecology*. 88(12): 1860-1872.

Grimshaw, J.M., Cordeiro N.J. & Foley, C.A.H. 1995. The mammals of Kilimanjaro. *Journal of East African Natural History* 84: 105-139.

Grubb, P. & Groves, C.P. 2001. Revision and classification of the Cephalophinae. In: *Duikers of Africa: Masters of the African Floor* (ed. V.J. Wilson). Chipingali Wildlife Trust, Bulawayo, Zimbabwe, pp. 703-728.

Kingdon, J. 1982. *East African Mammals: An Atlas of Evolution in Africa. Vol III, Part C: Bovids*. Academic Press, London, 393 pp.

Moyer, D., Jones, T. & Rovero, F. 2016. *Cephalophus spadix. The IUCN Red List of Threatened Species 2016*: e.T4151A50184413. http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T4151A50184413.en

Rovero, F., Menegon, M., Leonard, C., Perkin, A., Doggart, N., Mbilinyi, M. & Mlawila, L. 2008. A previously unsurveyed forest in the Rubeho Mountains of Tanzania reveals new species and range records. Oryx 42(1): 16-17.

Rovero. R., Davenport, T. & Jones, T. 2013. *Cephalophus spadix* Abbott's duiker. Pp 285-288 in Kingdon, J. & Hoffman, M. (eds) 2013. *Mammals of Africa – Volume VI: Pigs, Hippopotamuses, Chevrotain, Giraffes, Deer and Bovids*. Bloomsbury Publishing. London.

First record of Placentophagy in Blackbuck *Antilope cervicapra* at Blackbuck National Park, Velavadar, India

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The Blackbuck antelope is the flagship species of Blackbuck National Park, Velavadar. The species is categorized as Least Concern on the IUCN Red List, listed under Appendix III of CITES, and on Schedule I of the Wildlife Protection Act, 1972, of India. Blackbuck belongs to the monotypic genus *Antilope* and includes two subspecies: *A. c. cervicapra* and *A. c. rajputanae* (Groves 1981; Wilson and Reeder 2005). Blackbuck National Park is located within the distribution of *A. c. rajputanae* (Menon 2014). The wolf is the major predator of blackbucks in Blackbuck National Park (Jhala 1993). Other predators include golden jackals *Canis aureus*, which hunt juveniles, and domestic dogs (Ranjitsinh 1989).

Fig. 1. (© Anuj D. Raina)

The note reports the first record of placentophagy in an antelope from Velavadar Blackbuck National Park. On 20th March 2022 during a visit to Blackbuck N.P., a female blackbuck with a new-born fawn was seen during a morning safari. The female Blackbuck was photographed consuming its placenta, i.e. displaying an act of placentophagy. The female was observed caressing the fawn with an umbilical cord hanging from its back with no presence of the male in close vicinity (Fig. 1).

The gestation stage in blackbucks generally lasts for six months (Holt *et al.* 1988). The blackbuck young are precocial and can stand moments after they are born. (Nowak and Walker 1999). On returning to the same location after approximately 45 minutes, we relocated the same female with two males and one female around and no sighting of the fawn. The mother blackbuck was observed carrying the placenta in her mouth for a few metres before dropping it on open land and consuming it for some time (Fig. 2). Another female approached with curiosity, smelled the placental material and refrained herself from consumption. Then an approaching male started pursuing the mother blackbuck with a Flehmen response. The female was non-responsive. The male made attempted to mount, which drove the non-receptive mother to relinquish the placenta and leave the territory. Males hold territories while females forage between territories. To ensure access to many females, males create a territory in consideration of the local pattern of female distribution, which is influenced by habitat structure (Isvaran 2005). Another male on the opposite side of the grassland trail at about 50 m from the point of observation was seen scent marking using its preorbital glands. The months of August to October and March to April are observed to be peak times for blackbuck reproduction in India (Vats and Bhardwaj, 2009).

Placentophagy has been reported in many placental mammals, but no specific mention of this behaviour by Blackbucks or other antelope species has been found in the published literature. The actual purpose of placentophagy in antelopes and its occurrence demands more scientific study and the potential benefits are only speculative. Studies are also required to find the presence of placentophagy in other antelopes, the benefits, whether factors like abundance of food, predation pressure, and population of species in a specific habitat can impact this phenomenon.

References

Groves, C.P. (1981). A note on geographic variation in the Indian blackbuck (*Antilope cervicapra* Linnaeus, 1758). *Records of the Zoological Survey of India* 79(3-4): 489-503.

Holt, W.V., Moore, H.D.M., North, R.D., Hartman, T.D. & Hodges, J.K. (1988). Hormonal and behavioural detection of oestrus in blackbuck, Antilope cervicapra, and successful artificial insemination with fresh and frozen semen. *Reproduction* 82(2): 717-725.

Isvaran, K. (2005). Female grouping best predicts lekking in blackbuck (*Antilope cervicapra*). *Behavioral Ecology and Sociobiology* 57(3): 283-294.

IUCN SSC Antelope Specialist Group. 2017. *Antilope cervicapra*. *The IUCN Red List of Threatened Species* 2017: e.T1681A50181949. Accessed on 08 May 2022.

Jhala, Y.V. (1993). Predation on blackbuck by wolves in Velavadar National Park, Gujarat, India. *Conservation Biology* 7(4): 874-881.

Menon, V. (2014). *Indian mammals: a field guide*. Hachette India.

Nowak, R. M., & Walker, E. P. (1999). *Walker's Mammals of the World* (Vol. 1). Baltimore: John Hopkins University Press.

Ranjitsinh, M.K. (1989). *The Indian Blackbuck.* Dehradun: Natraj Publishers.

Vats, R. & Bhardwaj, C.S. (2009). A study of reproductive behaviour of Indian black buck (*Antilope cervicapra*) Linn. with reference to courtship, breeding, fawning and colouration. *Current World Environment* 4(1): 121.

Wilson, D.E. & Reeder, D.M. (Eds.). (2005). *Mammal species of the world: a taxonomic and geographic reference* (Vol. 1). Baltimore: John Hopkins University Press.

Fig. 2. (© Anuj D. Raina)

Long-term ecological studies of wildebeest in the Greater Liuwa Ecosystem, Zambia

Matt Becker
Zambian Carnivore Programme

Large herbivores are declining worldwide, and a recent paper in Science chronicled the collapse of the world's largest herbivore populations (Ripple et al. 2015). Nowhere was it more rapid and widespread than in Africa, where burgeoning human populations and resource use threaten the habitat and populations of the continent's unrivaled antelope diversity. Of all the large herbivores, the wildebeest (*Connochaetes taurinus*) perhaps best embodies this plight. Heavily poached for bushmeat and impacted by human encroachment into migration corridors, wildebeest have suffered steep declines throughout Africa. While the great Serengeti-Mara migrations are inextricably linked with most people's image of this iconic species, there are a number of other places, perhaps less dramatic, but still key strongholds for wildebeest. Zambia is one of these areas, and very little is known about these populations. From the small, isolated populations of Cookson's wildebeest in the Luangwa valley (the largest and lightest of the blue wildebeest subspecies), across to the great Busanga Plains of Kafue, and finally to the endless expanses of Liuwa Plain, wildebeest are an important yet imperiled presence throughout Zambia's ecosystems.

The seasonally flooded grasslands of Western Zambia's Liuwa Plain hold what is thought to be Africa's second-largest wildebeest migration and supported rich concentrations of game as a royal game reserve before the decades-long Angolan civil war (1975-2002) decimated the wildlife through poaching and conflict. Wildebeest are believed to have historically migrated between Angola and Zambia, and the estimated wildebeest range helped delineate the boundaries for the proposed Liuwa-Mussuma Transfrontier Conservation Area (LMTFCA) spanning the two countries. With an array of ecological impacts through their grazing and movements, and as the primary food source for all Liuwa's carnivores, the wildebeest is undoubtedly the keystone species for the ecosystem. However, unlike the Serengeti, where studies have occurred for decades, very little is known about Liuwa's wildebeest. In 2003, the Government of Zambia through the Department of National Parks and Wildlife (DNPW, then ZAWA) entered into a private-public partnership with the African Parks Network (APN), and the Barotse Royal Establishment to co-manage Liuwa Plain National Park (LPNP). With the substantial resources and protection afforded by this partnership, wildebeest have rebounded, along with most other species. But like every protected area network, Liuwa is experiencing rapid human and ecological change, particularly as the ecosystem is restored, necessitating accurate and current information to guide and evaluate conservation efforts.

Despite its size and significance, very little is known about the dynamics and factors limiting the Liuwa wildebeest population. Indeed, while it was clear wildebeest were recovering from human-caused reductions, it was completely unclear to what level the herds could recover to. What was the population historically, and at what period of history? Was 20,000 reasonable, or a million, and what could be managed to attain this? Aerial surveys had been conducted since 2003, and some limited satellite collaring of adult cows in 2008-2012 had occurred to evaluate the extent of migratory movements, but was limited by the technology at the time. To address these management and conservation needs, in 2012, together with APN, DNPW and WWF-Netherlands and Zambia, we implemented a long-term wildebeest study aimed at evaluating the factors limiting wildebeest recovery in the ecosystem.

Our work benefitted from the establishment of a long-term ecological study on the entire large carnivore guild beginning in Liuwa in 2010, and from a strong existing focus on predator-prey dynamics as part of our carnivore conservation work, and the study coincided with the initiation of a large-scale study on the relationship between direct predation and predation risk effects. Similarly, we had already begun evaluating environmental and human dynamics in the ecosystem through flooding, fire, encroachment, and vegetation change, such that collectively the ingredients were at hand to develop a long-term study of Liuwa wildebeest. Long-term, individual-based studies of large herbivores are rare, but given these species typically exhibit age and sex-structured rates of survival and reproduction, one key aspect of our study design was to have a core study population centered around known-age adult cows and their calves. To address the question of limiting factors and carrying capacity is very complex, dynamic, and dependent on an array of biological, environmental, and anthropogenic variables. Thus, a focus on an individual-based study would help address as much variation as we could and start building the foundation for answering these larger questions.

In May 2012 we initiated the study with the darting and VHF collaring of adult females across Liuwa Plain, and over the last 10 years we have typically maintained 40-50 radio-collared cows during the study. We attempt to visually locate these cows several times per month and collect data on whether they have a calf, herd size and composition, habitat, and other important variables. Additional animals have been equipped with GPS and Satellite/GPS collars to collect more fine-scale spatial data to complement the locations from VHF collars. Individuals are followed year-round and for the duration of their adult lives.

One big problem however was how to age wildebeest. While adults are relatively easy to identify, there were likely to be differences in survival and reproduction, and subsequent dynamics, depending on whether they were young adults, prime age adults, or senescing adults. Fortunately, as part of our predation work and prior work on other herbivore species we had already been collecting incisors from every wildebeest carcass that we found, which allowed us to take measurements of the crown height and labio-lingual width of these teeth before

analyzing them using cementum annuli techniques to estimate their age. From the relationship between these teeth measurements and the cementum annuli age estimate we then developed a means of predicting age based on the tooth measurements of live animals, specifically each cow that we collared as part of the study (Christianson et al. 2018).

While we accumulated data on wildebeest demography, migration, and spatial dynamics—getting a wide range of variation in such drivers as rainfall, flooding, and fire–we focused our first research products on predator-prey dynamics. We already had a head-start with studies of the carnivore populations in Liuwa, and these studies focused on the relationship between direct predation and predation risk effects. While the act of a predator killing and eating a prey animal has always been recognized as one of the most fundamental interactions in ecosystems, the mere presence of a predator on the landscape – and its impacts on prey behavior, habitat selection, nutrition, reproduction and ultimately fitness – has received far less attention. These predation risk effects, as they are known, have been shown to be increasingly important by an array of scientific studies, but given the complexity of these interactions it is extremely difficult to evaluate in natural settings, particularly with multiple predators and prey species characteristic of most ecosystems.

Nevertheless, Liuwa was a perfect setting to evaluate this, with a homogenous landscape and a prey base dominated by wildebeest, and a relatively tractable group of study animals. And combining our wildebeest, carnivore and predator-prey work provided an array of insights. Firstly, we evaluated the relationship between direct predation and the strength of anti-predator responses in the entire large carnivore community (spotted hyena, African wild dog, cheetah, and lion)—as well as the three primary prey species of wildebeest, zebra and oribi (Creel et al. 2017). We then looked at this broadly across Liuwa and two other ecosystems, with multiple herbivore species and multiple predators (Creel et al. 2019). No detectable relationship was found between the amount of direct predation a prey species experienced and the amount of anti-predator behavior they exhibited, and there were significant differences in vigilance correlated with an herbivore species' feeding preference (i.e., browser vs grazer) and body size. Consequently, this indicates that direct predation is an incomplete measure for assessing the impacts of predators on antelope, as traditionally it has been assumed there is no cost to avoiding being eaten.

Secondly, we evaluated the response of wildebeest to spotted hyena, cheetah, wild dog and lion, both in the immediate response to the presence of a predator, and to the long-term risk of predation on the landscape (Droge 2017, 2019). We found wildebeest behavior and movements to be sensitive to both the long-term and short-term risks of predation, indicating that neither should be evaluated in isolation, and both must be considered. And lastly, from this work and prior work led by Dr. Scott Creel, we developed a new hypothesis on predation risk effects, the Control of Risk Hypothesis (Creel 2018). This hypothesis predicts that proactive responses to predictable and controllable aspects of predation risk generally have costs that relate to nutrition and access to food, while reactive responses to predation risk generally have costs related to stress.

Understanding risk effects and how they impact ecosystems, particularly in large mammal communities, has considerable conservation and management significance. At the same time a global carnivore decline is occurring we are continuing to learn just how much of an impact these species—and their loss—has on ecosystems. Understanding the importance of risk effects not only demonstrates how carnivores are much more important to ecosystems than we previously thought, but also that losing these species will have a far greater impact than we

know. And of course, given that human exploitation is the biggest driver of global herbivore declines (Ripple et al. 2015), predation risk effects can easily be applied to evaluate and understand human impacts on antelope.

But while direct predation and predation risk effects are clearly acting on the Liuwa wildebeest population, how important would they be in impacting the recovery of the species in this ecosystem? Using seven years of intensive studies, we evaluated survival and reproduction of wildebeest across 107 collared cows and their calves, and over 7,500 herd observations to estimate vital rates (Watson et al. in review). We then compared these rates to population estimates from 12 aerial surveys. Adult survival was strongly age-dependent, with older animals being much more susceptible to predation, primarily by the most abundant carnivore, the spotted hyena (Droge et al. 2019). Not surprisingly, predation was the primary cause of death for wildebeest, with very few animals dying from other causes, and virtually none from resource-related mortality such as starvation. In addition, mortality risk had a strong temporal and spatial component, with a significant increase in mortality risk during the wet season as well as in the southern portion of the wildebeest migratory range. This southern area comprised the highest density of predators in the ecosystem and was strikingly different in predator density from the dry season northern range.

While the strong impact of predators in Liuwa is perhaps not ideal from a wildebeest perspective, it is a significant management success for AP and DNPW in restoring the ecosystem. Migration is typically thought to be driven by either resources, or predation, or a combination of both. In Liuwa it appears that migration and movements are at least partially driven by a recovering predator population. In addition, if predation risk is not considered in an ecosystem, it can easily be mistaken for resource limitation if prey select lower quality habitats in response to predation risk (Droge et al. 2017). While these are important insights, there are many more factors to evaluate and assess in understanding wildebeest dynamics in a changing environment. Liuwa undergoes dramatic seasonal flooding, and the impact of nutrient deposition, vegetation changes, fires, poaching, migratory restrictions and climate change are likely additional drivers of wildebeest dynamics in the system. Understanding the impacts of these drivers has clear conservation implications: for several months of the year nearly the entire winter range for the Liuwa wildebeest herd is outside of the park in the unprotected Upper West Zambezi Game Management Area. This area is therefore vitally important as a winter range and also as connectivity between Zambia and Angola in the proposed TFCA. However, this area is currently vulnerable to various human impacts that could severely impact the migration. When wildebeest migrations are disrupted, this is typically followed by severe population declines or even collapses. Given Liuwa wildebeest likely migrate in part to escape high predation pressure in the southern portion of the ecosystem, disruption of migration could result in the herds spending most of the year under very high predation pressure, and likely in areas that are not as preferred for forage and nutrients. Consequently, protection of the winter range outside Liuwa Plain National Park should be viewed as the highest priority for this keystone antelope species.

References

Ripple, W.J., Newsome, T.M., Wolf, C. , Dirzo, R., Everatt, K.T., Galetti, M., Hayward, M.W., Kerley, G.I.H., Levi, T., Lindsey, P.A., Macdonald, D.W., Malhi, Y., Painter, L.E., Sandom, C.J., Terborgh, J. & Van Valkenburgh, B. 2015. Collapse of the world's largest herbivores. *Science Advances* 1: e1400103.

Christianson, D., Becker, M.S., Creel, S., Brennan, A., Droge, E., M'soka, J., Mukula, T., Schuette, P., Smit, D. & Watson, F. 2018. Foraging investment in a long-lived herbivore

and vulnerability to coursing and stalking predators. *Ecology and Evolution* 8: 10147-10155.
Creel, S., Droge, E., M'soka, J., Smit, D., Becker, M.S., Christianson, D. & Schuette, P. 2017. The relationship between direct predation and antipredator responses: a test with multiple predators and multiple prey. *Ecology* 98: 2081-2092.
Creel, S., Becker, M.S., Droge, E., M'soka, J., Matandiko, W., Rosenblatt, E., Mweetwa, T., Mwape, H., Vinks, M., Goodheart, B., Merkle, J., Mukula, T., Smit, D., Sanguinetti, C., Dart, D., Christianson, C. & Schuette, P. 2019. What explains variation in the strength of behavioral responses to predation risk? A standardized test with large carnivore and ungulate guilds in three ecosystems. *Biological Conservation* 232: 164-172.
Droge, E., Creel, S., Becker, M.S., & M'soka, J. 2017. Risky times and risky places interact to affect response of prey. *Nature Ecology and Evolution* 1: 123-128.
Droge, E., Creel, S., Becker, M.S., Christianson, D. & M'soka, J. 2019. Response of wildebeests (*Connochaetes taurinus*) movements to spatial variation in long term risks from a complete predator guild. *Biological Conservation* 233: 139-151.
Creel, S. 2018. The Control of Risk hypothesis: Reactive vs. proactive anti-predator responses and stress-mediated vs. food-mediated costs of response. Ecology Letters 21: 947-956.
Watson, F., Becker, M.S., Smit, D., Droge, E., Mukula, T., Martens, S., Mwaba, S., Christianson, D., Creel, S., Brennan, A., M'soka, J., Gaylard, A., Simukonda, C., Nyirenda, M. & Mayani, B. In Review. Predation drives demography of a keystone migratory herbivore in a recovering transfrontier ecosystem. *Ecology and Evolution*.

(© Daan Smit)

Kenya National Wildlife Census 2021

Summarized from: Kenya National Wildlife Census Report 2021
https://kws.go.ke/content/national-wildlife-census-2021-report

The Ministry of Tourism and Wildlife (MoT&W), Kenya Wildlife Service (KWS) and the Wildlife Research and Training Institute (WRTI) undertook the first ever national wildlife census over 3 months, from April to July 2021and a report presenting an overview of the results (132 pp) was published on 31 August 2021.

Aerial censuses have been carried out in some years in the larger ecosystems including Tsavo, Amboseli, Maasai Mara and Laikipia-Samburu-Marsabit but Kenya has never undertaken a one-off national census to establish a baseline of the wildlife population status and distribution

across the country. The objective of the national census was to establish a National baseline of key species of mammals, birds, and reptiles. The results will form the basis for future wildlife population monitoring, support development and implementation of sound wildlife conservation policies, and increase understanding of connectivity and animal movements in key landscapes, e.g. between the Amboseli and Tsavo; Meru and Laikipia, and Laikipia and Marsabit.

The census was carried out in the following ecosystems, protected areas, wetlands and counties: Tsavo ecosystem; Amboseli–Magadi ecosystem; Athi-Kapiti ecosystem; Naivasha-Nakuru ranches ecosystem; Laikipia-Samburu-Marsabit-Meru- ecosystem; Nasalot-South Turkana-Rimoi ecosystem; Shimba Hills-Mwaluganje ecosystem; Lamu-Lower Garissa and Tana River ecosystem, Mwea National Reserve; Ruma National Park; Lake Nakuru National Park; Nairobi National Park; Rift Valley Lakes; Sitatunga range in wetlands within Western and Central Rift Conservation Areas; Garissa County; Wajir County; Mandera County; Turkana County. In total, these areas cover 343,380 km^2 constituting 59% of Kenya's land mass.

***Fig. 1**. Common Eland (*Tragelaphus oryx*), Nairobi N.P. (© ASG)*

Over 30 species of mammals, birds and marine species were counted. The census employed a range of methods: total aerial counts, sample aerial counts, ground counts, individual identification, indirect methods such as dung counts and use of camera traps and desktop review of previous census. The surveys involved the use of aircraft (fixed-winged and helicopters), boats, vehicles, cameras, camera traps and used Geographic Information Systems

(GIS) to record and analyse observations. Different methods were applied depending on the species and habitat type. Aerial census techniques were used to count large mammals in savannah, arid, and semi-arid regions while dung count methods were used in forested ecosystems. For wetlands, both aerial and ground counts were applied. Existing data were also collated from different conservation institutions and synthesized.

The census recorded an increase in some charismatic species such as elephants, rhinos, lions, giraffe, Grevy's zebra, and hirola, but lower numbers of plains game species. Anthropogenic activities such as livestock incursions, logging, charcoal burning, settlements and fires were observed in conservation areas. The report identifies some challenges such as habitat loss, land use and land tenure systems change, exponential human population growth, and accompanying demand for land for settlement and infrastructure as the likely reasons for low densities of plain game. The NWC reported population figures for 16 antelopes and African Buffalo (Table 1).

Table 1: Antelopes recorded on the Kenya NWC

Species		Total
Common Eland	*Tragelaphus oryx*	13,581
Mountain Bongo	*Tragelaphus eurycerus isaaci*	*150
Sitatunga	*Tragelaphus spekii*	471
Lesser Kudu	*Tragelaphus imberbis*	2,529
Blue Wildebeest	*Connochaetes taurinus*	57,613
Hartebeest	*Alcelaphus buselaphus*	7,344
Topi	*Damaliscus lunatus*	8,627
Hirola	*Beatragus hunteri*	497
Sable	*Hippotragus niger*	51
Roan	*Hippotragus equinus*	15
Beisa Oryx	*Oryx beisa*	11,767
Thomson's Gazelle	*Eudorcas thomsonii*	18,277
Grant's Gazelle	*Nanger granti*	66,709
Impala	*Aepyceros melampus*	26,541
Gerenuk	*Litocranius walleri*	13,400
Waterbuck	*Kobus ellipsiprymnus*	1,071
African Buffalo	*Syncerus caffer*	41,659
** includes 54 animals at Mount Kenya Wildlife Conservancy*		

The Critically Endangered **Hirola** now occurs only in Ijara and Fafi sub-counties of Garissa County, between the Tana River and the Kenya–Somalia border, an area of c.1,500 km^2, plus a small, translocated population in Tsavo East National Park, established in 1963. The current population estimate (497) is taken from a total aerial count on the National Wildlife Census 2021, the Northern Rangelands Trust (NRT) Ishaqbini hirola status report 2020, and Hirola Conservation Program (HCP) hirola monitoring data 2020. The Ishaqbini community

conservancy scouts use the Wildlife-CoMMS monitoring system to collect data. HCP also has a network of community scouts who collect monitoring data in community areas.

Mountain Bongos are elusive, preferring thick forests where they are difficult to see and count. Camera trap images and individual ID were used to estimate the wild populations in Masai Mau, South-West Mau, Eburru, Aberdare NP, and Ragati in Mount Kenya NP. For the captive population in Mount Kenya Wildlife Conservancy physical sightings and individual ID were used. The total Mountain Bongo population was estimated at 150 (96 in the wild and 54 in MKWC). The 1st National Recovery and Action Plan for The Mountain Bongo (*Tragelaphus eurycerus isaaci*) in Kenya (2019-2023) contains the following Vision: "*We envisage viable, free-ranging and genetically representative populations of mountain bongo, thriving across intact historic mountain ecosystem ranges, cherished by the Kenyan people and the global community"* and Goal: "*To secure minimum population size for mountain bongo within their ranges in Kenya, to achieve a national population of 730 individuals over the next 50 years"*.

Fig. 2. *Coastal Top (*D. l. topi), *Masalani (© ASG)*

Beisa Oryx numbers (11,767) are encouraging, but populations of **Roan** and **Sable** remain small, at 15 and 51 respectively. The figures for **Topi** appear to confirm a continuing decline in this species. Of the total 8,627 counted, 2,448 were in the Lamu-Lower Garissa Ecosystem which corresponds to the range of the isolated subspecies Coastal Topi *D. l. topi* (Figure 2), underlining its Endangered status on the IUCN Red List. The remaining 6,179 topi represent *D. l. jimela*.

Giant Sable update

Summarized from Pedro Vaz Pinto: Palanca Report 2021.01

In 2020-2021 planning of activities and movements were hampered by covid restrictions. Monitoring trips were postponed or cancelled, and an aerial survey was also postponed to 2022. In Cangandala the giant sable population has increased steadily over the past 10 years. When the breeding program began in 2009, there were only old females with impaired reproductive potential and one single bull. Six young females were brought in in 2011, which made a huge impact and prove decisive in driving the increase in herd size. Annual growth was for several years much higher than in most wild populations, and one of the main reasons was the relatively low number of males present, as most of these tend to be superfluous and do not contribute to breeding. The number of surplus males has also increased to the point that several bachelor groups are now present in the camp. These are a welcome sight, especially as some of these bulls look really impressive. With numerous large males wandering about, social interactions among sables in the camp have become more complex and agonistic behaviour and fights are inevitable. However, fierce competition is likely the best way to keep the breeding bulls in constant check, and might be the optimal way to select the fittest breeders. We estimate the herd has now exceeded 100 sables in Cangandala, after what appears to have been a very successful breeding season in 2021, with plenty of calves.

The Cangandala herd in the dry season (© Palanca 2021.01)

In Luando Reserve there was a second consecutive drought, and rainstorms were few and far apart. The dry season of 2021 was by far the most extreme drought witnessed by Pedro vaz Pinto in 20 years. This created a major problem for the crucial advanced ranger post in the heart of the reserve. Fortunately, the rainy season of 2021/22 started and early, and before the end of August the ranger post was hit by two massive rainstorms that immediately restored minimum

water levels. This was also the second year in a row in which a proper assessment of the sable herds in Luando was not possible. Two herds could not be located as the GPS collars had and stopped transmitting data. Drone flights over two herds were inconclusive. One herd split and could not be counted fully. The other herd had 15 animals (adults and young) plus two calves, the same as the previous year (but no calves). The low number of calves suggests that the herd may also have split and the nursery was likely elsewhere, although the possibility that the consecutive droughts is affecting the breeding rate locally can't be ruled out. In any case numbers seem stable. A more ambitious survey during the early rainy season turned out to be impractical because the unusual and persistent heavy rains throughout September and early October made it impossible to drive across country.

In February one of the leading rangers, Morais Júlio Fonseca, was bitten twice by a snake and sadly died: this can only be attributed to the infamous black mamba. 2021 also saw many poaching incidents. The covid-related crisis has had an indirect devastating effect through restrictions and economic squeezing of livelihoods in poor rural areas, and this has translated into a sudden increase in poaching pressure. Higher unemployment at the regional level attracted new poachers to the reserve, while some local residents also saw an incentive in resorting to poaching and commercializing bushmeat as a valid alternative. However, the rangers have increased their effectiveness, with better training, experience, new equipment such as GPS, satellite phones, and well-maintained motor bikes, a couple of undercover informants, and overall high morale. Several poachers were arrested during the year and several poaching camps destroyed. One particularly serious poaching incident occurred in December when a ranger patrol tracked down a party of armed poachers, who, opened fire. A firefight took place which resulted in one of the poachers being killed.

Bachelor bull, Cangandala (© Palanca 2021 01)

Antelope News

West and Central Africa

Dama Gazelle updates

Dama gazelle (*Nanger dama*) Conservation Strategy 2019-2028
A review of progress on implementation was conducted via an online process last year, one-quarter way through the strategy's timeframe. The table of recommended actions was circulated in April 2021 with a request for updates. Further updates were also gathered during the virtual Sahelo-Saharan Interest Group meeting, from presentations delivered there and from a short session dedicated to dama gazelle on 19th May 2021, where participants were able to provide feedback verbally. A final draft was circulated to all stakeholders on 10th August 2021. In all, 30 dama gazelle experts contributed. Information on status was updated, progress on objectives was reviewed, and some actions were adapted or deemed no longer necessary.

Ouadi Rimé-Ouadi Achim Faunal Reserve, Chad (OROA)
Aerial surveys conducted by Wings for Conservation counted 47 and 45 dama gazelles, respectively, in March and April 2022. All groups were photographed, and analysis of sex/age composition is ongoing.

Oryx Base Camp (OROA)
5 female dama gazelles were transferred from the UAE in March 2022 by Environment Agency Abu Dhabi to increase numbers and genetic diversity in the breeding herd which currently numbers 16 animals (3 males, 13 females.

Cameroon
Assiduous research in old books and journals by Arnd Schreiber has demonstrated that dama gazelles once occurred in the far north of the country (see **Recently Published**).

Termit Tin Toumma National Nature Reserve, Niger

The reserve management team is now installed in the new HQ 'Camp Ména' (left). Six camels have been purchased to enhance monitoring capacity. Four vehicle patrols were conducted comprising 236 person/days and covering 2,239 km. A 13-day mission was carried out to check camera traps and instal 25 new cameras for use in distance sampling. Discussions were held with the Zoological Society of London about using the reserve as a pilot site for 'Instant Detect' a technology allowing camera traps to connect via satellite and provide images in real time. Two vaccination campaigns were completed, during which 38,073 head of livestock (camels, cattle, sheep and goats) were vaccinated and 19,124 were deparasitized.
Source: *Parcs de Noé - Lettre d'Informations janvier 2022 - mars 2022*

Zah Soo National Park established in Chad

Zah Soo N.P. was established on 15 March 2022 and is Chad's 4th national park. It covers 815 km^2 of the core zone of Binder-Léré Faunal Reserve in south-west Chad. Zah Soo lies in the Sudanian savanna ecosystem, and its diverse habitats include savannas, gallery forests and wetlands. Antelopes present include roan *Hippotragus equinus*, red-fronted gazelle *Eudorcas rufifrons*, and bushbuck *Tragelaphus scriptus*.
Source: *Parcs de Noé - Press release 15/3/2022*

East Africa

Mountain Bongo released

At the Mount Kenya Wildlife Conservancy, a record 15 bongos were born in 2021 to the 21 females and the total Mountain Bongo population in the Conservancy reached 60 at the end of the year. The Mawingu Mountain Bongo Sanctuary project has been completed, with 10 km of perimeter fence erected to create separate paddocks within 776 ha of pristine bongo habitat. This new sanctuary will play a vital role in rewilding the Mountain Bongo, helping them to re-learn behaviours needed to survive in their natural habitat without supplementary feeding and care, with the long-term aim of re-establishing a healthy wild Mountain Bongo population. The Conservancy, working with KWS has removed 11 elephants and 12 buffalos from the sanctuary area to reduce competition for space and food. Five cameras have been installed at strategic locations around the sanctuary to monitor the presence of any predators that may need to be relocated. The Mawingu Sanctuary was officially opened on 5 March 2022 when the first five bongos were released.
Source: *info@mountkenyawildlifeconservancy.org*

Mountain bongo at Mount Kenya Wildlife Conservancy (© ASG)

Roan antelope translocation

In December 2021, the Tanzanian wildlife authorities captured 20 roan antelopes in Rungwa Game Reserve for translocation to Ruma Reserve in Kenya, where the population has dwindled to only 12 animals. In Return, KWS will send 2 female black rhinos to Tanzania where they will be sent to Serengeti National Park and the Ngorongoro Conservation Area.
Source: *https://gazettengr.com/tanzania-kenya-to-exchange-wild-animals-to-boost-reproduction/*

Lesser Kudu Studbook 2021

The latest edition of the Lesser Kudu Studbook has been compiled by Beatrice Steck and published by Zoo Basel. The information is updated to 31 December 2021.

Middle East and Asia

Goitered gazelles in Central Asia

In Uzbekistan, two new protected areas have been declared in the Kyzylkum desert. The Central Kyzylkum National Park (1200 km^2) is located Uchkuduk district, Navoi region, and the Aktau-Tamdy State Nature Reserve (400 km^2) in Tamdy district. Both sites provide habitat for Goitered Gazelles and other threatened species and will be administered by the State Committee on Ecology and Environmental Protection. In Kazakhstan, experts from the Ecobioproject reported that the density of Goitered Gazelles in the migration corridor between two protected areas Altyn-Emel N.P. and Ile-Balhash in the east of the country has increased from 0.24 to 0.85 individuals per 10 km^2 since measures were taken to enhance protection from poaching and to facilitate access to drinking places. Another project funded by the IUCN's Save Our Species Central Asia initiative surveyed key transboundary habitats of goitered Gazelles along the southwestern border of Kazakhstan. The survey covered more than 2000 km, stretching from the Caspian Sea in the west to the Syr-Darya River in the east. Goitered gazelle presence was confirmed at 184 localities through direct sightings or field signs. The survey confirmed two transboundary habitats of key importance for goitered gazelle: 1) the southern part of the Ustyurt plateau (Mangistau region), where Kazakhstan borders Turkmenistan and Uzbekistan; 2) the Kyzylkum desert in Kyzylorda region near the Uzbekistan-Kazakhstan border which extends to the northern part of Kazakhstan's Turkestan region. Border fences cross both these areas and it was recommended to modify them in order allow gazelles to pass. With respect to obstacles for transboundary movements of ungulates, the entire surveyed state border of 1400 km is fenced on the Kazakhstan side, presenting a nearly complete obstacle for gazelles, except in places where there are special wildlife passages. On the border of Kazakhstan with Turkmenistan, fences are present on both sides and form a complete barrier for ungulates. On the Kazakhstan-Uzbekistan border, wire fencing is present only on the Kazakhstan side.
Source: Newsletter of the CMS Central Asian mammals Initiative - Spring 2022

Saiga News 27

SN 27 has been published by the Saiga Conservation Alliance.
Available from*:*
https://www.saigaresourcecentre.com/newsletter/saiga-news-issue-27-winter-20212022

Wild Camel breeding centre

The Wild Camel Protection Foundation (WCPF) established a wild camel captive breeding programme in Mongolia in 2003 with full support from the Ministry of Nature, Environment and Tourism (MNET) which made land available for a breeding centre at Zakhyn Us in the buffer zone of the Great Gobi 'A' Strictly Protected Area, the only remaining habitat of the species in Mongolia. Buildings and a 10-km fence were erected in 2003. WCPF transferred management of the programme to the MNET in 2011. The breeding centre provided a valuable opportunity to carry out studies on wild camels as well as increasing the numbers in captivity. Two bull camels were released from the breeding centre into the Great Gobi SPA in September 2013 followed by of six more bull camels in October 2015. Prague Zoo (Zoo Praha) is assisting WCPF to design a proposed new wild camel breeding centre at Toli Bulag in Govi-Altay province which will allow expansion of the captive breeding programme and in summer 2021, the zoo offered a very generous financial donation to help WCPF construct the enclosure and buildings at the new centre.
Source: *https://www.wildcamels.com*

Recently published articles

West Africa

Medium-to-large mammal diversity and status of forest antelopes in the Sapo National Park, Liberia

Rajan Amin, Tim Wacher, Shadrach Kerwillain, Malavika Narayana & Constant Ndjassi (2022)

African Journal of Ecology March 2022 https://doi.org/10.1111/aje.12990

Abstract

Sapo National Park, Liberia's largest protected area, comprises an area of 1804 km^2 within the Upper Guinea forest ecosystem, a global biodiversity hot spot. Our baseline camera-trap study revealed 32 medium-to-large mammal species, including ten Upper Guinea forest endemics, within the park. Results show important populations of threatened antelopes, particularly zebra duiker and Jentink's duiker, along with bay duiker, black duiker, Ogilby's duiker and Maxwell's duiker. Water chevrotain and lowland bongo were also recorded. Camera-trap images of giant and white-bellied pangolins, western chimpanzee, pygmy hippopotamus and forest elephant collected during this study further confirm the high conservation value of the site. The ecology of the antelope community is investigated, noting the diurnal activity pattern of zebra duiker and the nocturnal activity of Jentink's duiker, in contrast to previous studies. Both species preferred lower altitude primary forest. Ogilby's duiker was the only antelope that showed a preference for higher altitude forest and was found to be more common than the similar-sized black duiker and bay duiker. Sapo National Park faces many threats including habitat degradation, poaching for bushmeat and animal parts, and illicit gold mining. Commercial logging and agriculture in the buffer and surrounding forested areas threatens connectivity and increases human–wildlife conflict.

Integrating traditional knowledge when it appears to conflict with conservation: lessons from the discovery and protection of sitatunga in Ghana

Jana M. McPherson, Joy Sammy, Donna J. Sheppard, John J. Mason, Typhenn A. Brichieri, Colombi & Axel Moehrenschlager (2021)

Ecology and Society 21(1): 24.

Abstract

Cultural traditions can conflict with modern conservation goals when they promote damage to fragile environments or the harvest of imperilled species. We explore whether and how traditional, culturally motivated species exploitation can nonetheless aid conservation by examining the recent “discovery” in Avu Lagoon, Ghana, of sitatunga (*Tragelaphus spekii gratus*), a species familiar to locals, but not previously scientifically recorded in Ghana and regionally assumed extinct. Specifically, we investigate what role traditional beliefs, allied hunting practices, and the associated traditional ecological knowledge have played in the species’ discovery and subsequent community-based conservation; how they might influence future conservation outcomes; and how they may themselves be shaped by conservation efforts. Our study serves to exemplify the complexities, risks, and benefits associated with building conservation efforts around traditional ecological knowledge and beliefs. Complexities arise from localized variation in beliefs (with cultural significance of sitatunga much stronger in one village than others), progressive dilution of traditional worldviews by mainstream religions,

and the context dependence, both culturally and geographically, of the reliability of traditional ecological knowledge. Among the benefits, we highlight (1) information on the distribution and habitat needs of species that can help to discover, rediscover, or manage imperilled taxa if appropriately paired with scientific data collection; and (2) enhanced sustainability of conservation efforts given the cultivation of mutual trust, respect, and understanding between researchers and local communities. In turn, conservation attention to traditional ecological knowledge and traditionally important species can help reinvigorate cultural diversity by promoting the persistence of traditional belief and knowledge systems alongside mainstream worldviews and religions.

Determining the composition and structure of antelope communities in three study sites within the Niger Delta (Nigeria) based on bushmeat market data

I. Georgewill, I., G.C. Akani, L. Luiselli, L. et al. (2022)
Tropical Ecology 63: 145–150. https://doi.org/10.1007/s42965-021-00180-3

Abstract
The composition and structure of antelope assemblages were analyzed by using data from wild meat markets in three distinct study stations in the southern Niger Delta, Nigeria. The relative abundance of the different species coming into the markets was analyzed, and various diversity metrics were used to describe the different antelope communities. Sex ratios of these populations as well as the effect of season on the abundance of the various species in the markets were examined. It was observed that a single recently described species (*Philantomba walteri*) was the dominant species in the three localities, contributing about 70% of all the antelope individuals. The relatively low number of antelope carcasses observed in this study (less than the number of carcasses of small carnivores in the same sites) suggests that the ungulate fauna is already very depleted in the eastern Niger Delta region, with these mammals being hunted more intensely in the wet season.

Central Africa

Cameroon as a historical range country of the dama gazelle (Mammalia, Bovidae)

Arnd Schreiber (2021)
Annali del Museo Civico di Storia Naturale "G. Doria" 114: 329-347.

Abstract
Cameroon is reported as a historical range country of the dama gazelle (*Nanger dama*), which has been overlooked by recent authors. Three historical literature records of 1852, 1854 and probably 1903-1904 reported dama gazelles at sites which later became incorporated into the historical German colony Deutsch-Kamerun, and the two more recent ones might refer to territories within the current Republic of Cameroon. Various museum specimens and sight records from border zones in adjacent Nigeria and Chad indirectly also support a historical population in Cameroon. This country seems to have lost this species earlier than the adjacent nations Nigeria and Chad. The possibility of reintroducing dama gazelles in the northern Sahelian zone of Cameroon is discussed.

Status and ecology of forest ungulates in the Dja Faunal Reserve, Cameroon

Rajan Amin, Tim Wacher, Oliver Fankem, Oum Ndjock Gilbert, Malenoh Sewuh Ndimbe & Andrew Fowler (2022)

Mammalia 2022 https://doi.org/10.1515/mammalia-2021-0175

Abstract

Ungulates have undergone major declines in Central and West African forests as a result of bushmeat trade and habitat loss. Monitoring forest ungulate status is a critical conservation need. We undertook a systematic camera-trap survey of the 5260 km² Dja Faunal Reserve, Cameroon's largest protected area. We deployed cameras at 305 sites in eight grids across the reserve over 28,277 camera trap days. We recorded 30,601 independent detections of 12 species of forest ungulate. The blue and Peters' duikers were the most abundant, accounting for 82% of all ungulate detections, both with occupancy >85%in all survey grids. The black-fronted duiker was relatively widespread but rare. The white-bellied duiker and water chevrotain were found mostly in the southern part of the reserve. There were very few detections of sitatunga, forest buffalo and bongo. Our results suggest ecological partitioning among the more abundant duikers based on activity pattern and body size. The reserve faces many pressures including illegal subsistence and commercial hunting. Community surveillance and partnerships, with improved law enforcement are among measures being implemented by the Cameroon government to enhance security and ensure retention of the reserve's World Heritage status.

A sparse observation model to quantify species distributions and their overlap in space and time

Sadoune Ait Kaci Azzou, Liam Singer, Thierry Aebischer, Madleina Caduff, Beat Wolf & Daniel Wegmann (2021)

Ecography 44: 1-13. doi: 10.1111/ecog.05411

Abstract

Camera traps and acoustic recording devices are essential tools to quantify the distribution, abundance and behavior of mobile species. Varying detection probabilities among device locations must be accounted for when analyzing such data, which is generally done using occupancy models. We introduce a Bayesian time-dependent observation model for camera trap data (Tomcat), suited to estimate relative event densities in space and time. Tomcat allows to learn about the environmental requirements and daily activity patterns of species while accounting for imperfect detection. It further implements a sparse model that deals well will a large number of potentially highly correlated environmental variables. By integrating both spatial and temporal information, we extend the notation of overlap coefficient between species to time and space to study niche partitioning. We illustrate the power of Tomcat through an application to camera trap data of eight sympatrically occurring duiker *Cephalophinae* species in the savanna – rainforest ecotone in the Central African Republic and show that most species pairs show little overlap. Exceptions are those for which one species is very rare, likely as a result of direct competition.

East Africa

Swayne's hartebeest in Ethiopia: population estimate, genetic variability and competition with livestock

Misganaw Tamrat, Anagaw Atickem, Oystein Flagstad, Martha Fischer, Christian Roos, Paul Evangelsita, Afework Bekele, Nils Chr Stenseth & Dietmar Zinner (2022)
Oryx 56: 336-344.

Abstract

Swayne's hartebeest in Senkele Swayne's Hartebeest Sanctuary (© ASG)

Swayne's hartebeest (*Alcelaphus buselaphus swaynei*) was once widely distributed in the Horn of Africa. By the early 20th century, however, it was extirpated across most of its range and is now limited to two relict populations in the Ethiopian Rift Valley and categorized as Endangered on the IUCN Red List. In this study, we estimated the size and genetic diversity of these two remaining populations, with a particular focus on competition with livestock. We used a total block count method for both Swayne's hartebeest and livestock population counts, and faecal samples for a population genetic analysis. We estimated the total population of Swayne's hartebeest to be 1,528 with 518 individuals in Senkele Swayne's Hartebeest Sanctuary and 1,010 individuals in Maze National Park. Livestock densities were 212 and 153 times those of Swayne's hartebeest in Senkele Swayne's Hartebeest Sanctuary and Maze National Park, respectively. Among 73 mitochondrial D-loop sequences (34 from Senkele Swayne's Hartebeest Sanctuary and 39 from Maze National Park), we found 22 haplotypes (Senkele 12, Maze 16, shared 6). Population genetic parameters suggest only weak sub-structuring between the two populations (FST = 0.164). Despite the positive population trends in both protected areas, the spatial overlap with livestock may lead to future population decline as a result of resource competition and disease transmission. We therefore recommend further translocation to other protected areas within the species' former range.

Assessment of medium and large-sized mammals and their behavioral response toward anthropogenic activities in Jorgo-Wato Protected Forest, Western Ethiopia

Mosissa Geleta Erena (2022)
Ecology and Evolution 12(2): e289. https://doi.org/10.1002/ece3.8529

Abstract

Medium and large-sized mammals of Jorgo-Wato Protected Forest have not yet been documented though the forest established before four decades. Hence, this study aims to document medium and large mammals and the behavioral responses of selected mammals

toward anthropogenic activities in the study area. The study was conducted from February 2015 to June 2016, encompassing the wet and dry seasons. Data were collected mainly through camera traps, indirect and direct evidence. The study revealed about 23 medium and large-sized mammals that belong to seven orders namely Bovidae, Carnivora, Primates, Rodentia, Tubulidentata, Lagomorpha, and Hyracoidea. *Papio anubis*, *Colobus guereza*, and *Cercopithecus aethiops* were the most abundant large mammals in JWPF. Because of high anthropogenic activities, African buffalo (*Syncerus caffer*) shifted its activity period from diurnal into crepuscular and nocturnal. African buffalo travelled longer distances during the wet season (mean = 14.33 km, SD = 1.25 km) than during the dry season (mean = 9.00 km, SD = 2.16 km). This could be due to the fact that the local people were less likely to go to the forest for resource exploitation during the wet season as they are fully engaged in agricultural activities. However, low agricultural activities during the dry season allow the local people to extract resources and involve in bushmeat hunting which could limit the movement of mammals to their refugia. African buffalo preferred to rest on and adjacent to a gravel road (22.1%) in the forest, followed by on open rocky hilltops (14.7%) at night time, but rest in the bottomland thicket vegetation during the dry daytime. Regardless of high human pressure in the area, this study has revealed a good number of medium and large-sized mammals that could be used as baseline information to design a sound conservation and management action plan of large mammals and their habitat in Jorgo-Wato Protected Forest.

Diet composition and preferences of Bohor reedbuck (*Redunca redunca*) in the compound of Alage College, Central Rift Valley of Ethiopia

Yonas Derebe & Zerihun Girma (2020)
Ecology and Evolution 10: 13370-13381

Abstract

Numerous indices have been developed to compare use and availability of foods in field diets of wild ungulates. However, little attention has been given to laboratory analysis for comparing food preferences. To this end, a study aimed at investigating the diet composition and preference of Bohor reedbuck was conducted in the compound of Alage Agricultural College, Central Rift Valley of Ethiopia from 2017 to 2018 encompassing both dry and wet seasons. Bohor reedbuck is a medium sized horned antelope species endemic to Africa. Continuous focal animal observation was used to collect the data on plant species included in the diet of Bohor reedbuck. Focal individuals' observation was carried out for 30 min in 10 min sampling interval during their active feeding period (early morning and late afternoon) over four different habitat types. The nutrient composition of plants consumed was determined using wet chemistry laboratory analysis. Bohor reedbucks consumed 15 species of plants; herbs comprised 94.3% of the foods they consumed. *Digitaria abyssinica* was the most preferred plant species with highest crude protein (23.75%) and less fiber (61.8% nitrogen detergent fiber and 27.8% acid detergent fiber). These findings suggest that food preference of Bohor reedbuck is determined by the nutritional content of the plant it consumed, since the area is more or less natural habitat in terms of plant species composition. For sustainable conservation of the species, there is a need to actively promote management of the plant species most preferred by the reedbuck to feed on.

Comparing law enforcement monitoring data and research data suggests an underestimation of bushmeat poaching through snaring in a Kenyan World Heritage Site

Henk Harmsen, Judith Syombua Mbau, John Nzioka Muthama & Virginia Wangechi Wang'ondu (2021)

African Journal of Zoology 59(4): 922-923.

Abstract

Rangers collect law enforcement monitoring (LEM) data during their patrols in protected areas. These data are increasingly used to interpret patrolling effectiveness and to predict poaching activity. However, LEM data can contain biases that may weaken the conclusions derived from such analyses. Research data, collected from 82 km of desnaring transects and interviews with 31 rangers, were compared with recorded LEM data. The latter included a logbook in which poacher sightings were documented, desnaring reports containing the locations of known snaring hotspots, and patrol strategies, containing the allocation of ranger patrols within the conservancy. Our findings suggest that the poaching prevalence reported through the LEM data is likely to constitute an underestimation of the true prevalence. Patrolling strategies were found to be predictable, allowing poachers to evade detection. One-third of the interviewed rangers admitted to not reporting sighted poachers. We conclude that the use of LEM data for analysis or poaching prediction by managers of protected areas or researchers requires careful consideration of patrol predictability, possible displacement of poaching activity, and ranger culture and morale in order to avoid underestimation of true poaching prevalence.

When ecological analysis reveals hidden human dimensions: building on long-term community participation to enable a conservation translocation of Mountain Bongo in Kenya

Donna J. Sheppard, Typhenn A. Brichieri-Colombi, Danica J. Stark, Christian Lambrechts, Axel Moehrenschlager & Jana M. McPherson (2022)

Frontiers in Conservation Science doi: 10.3381/fcosc.2021.788267

Abstract

Conservation translocations have traditionally focused on ecological aspects while overlooking or underestimating the importance of human dimensions. Here, we present a feasibility analysis for a conservation translocation that up front took a holistic approach by investigating both ecological and socio-economic suitability of reinforcing mountain bongo in Eburu National Forest, Kenya. From 2018 to 2019, we set up 50 cameras to detect mountain bongo and searched for secondary signs in a grid overlaying Eburu. We also conducted surveys with 200 households surrounding the forest and interviewed 300 students to understand local perceptions of and interactions with Eburu Forest and their desire for a mountain bongo translocation. We used data from camera trapping and secondary signs in a MaxEnt model to determine the amount and location of available habitat for a bongo conservation translocation. Camera traps recorded only five bongo events in the 2-year study, and MaxEnt models revealed that these antelopes were relegated to less than 2.5 km of available habitat. Socio-economic surveys indicated local support for the conservation of bongo and their habitat, and yet our camera traps uncovered threatening illicit activities that could jeopardize both bongo survival and any attempt at boosting the remnant population with captive-bred individuals. We report how we built on long-term community and stakeholder engagement to mitigate these threats and provide concrete recommendations for how to proceed with a conservation translocation in terms of both the biological aspects and continued efforts to integrate socio-economic needs and community engagement.

Southern Africa

When blue turns to grey - Paleogenomic insights into the evolutionary history and extinction of the blue antelope (*Hippotragus leucophaeus*)

Elisabeth Hempel, Faysal Bibi, J. Tyler Faith, Klaus-Peter Koepfli, Achim M. Klittich, David A. Duchêne, James S. Brink, Daniela C. Kalthoff, Love Dalén, Michael Hofreiter & Michael V. Westbury (2022)

bioRxiv 2022.04.12.487785; doi: https://doi.org/10.1101/2022.04.12.487785

Abstract

The blue antelope (*Hippotragus leucophaeus*) is the only large African mammal to have become extinct in historical times, yet no nuclear genomic information is available for this species. A recent study showed that many alleged blue antelope museum specimens are either roan (*H. equinus*) or sable (*H. niger*) antelopes, further reducing the possibilities for obtaining genomic information for this extinct species. While the blue antelope has a rich fossil record from South Africa, climatic conditions in the region are unfavourable to the preservation of ancient DNA. Nevertheless, we recovered two blue antelope draft genomes, one at 3.4x coverage from a historical specimen (~19th century) and one at 2.1x coverage from a fossil specimen dating to 9,800–9,300 cal BP, making it currently the oldest paleogenome from Africa. Phylogenomics show that blue and sable antelope are sister species, confirming previous mitogenomic results, and demonstrate ancient gene flow from roan into blue antelope. We show that blue antelope genomic diversity was much lower than in roan and sable antelopes, indicative of a low population size since at least the early Holocene. This supports observations from the fossil record documenting major decreases in the abundance of blue antelope after the Pleistocene-Holocene transition. Finally, the persistence of this species throughout the Holocene despite low population size suggests that colonial-era human impact was likely a major factor in the blue antelope's extinction.

Home range and habitat use of roan antelope (*Hippotragus equinus*) in Northern Botswana

C.P. Havemann, T.A. Retief, K. Collins, R.W.S. Fynn, C.A. Tosh & P.J.N. de Bruyn (2022)

Journal of Arid Environments 196: 104648.

https://doi.org/10.1016/j.jaridenv.2021.104648

Abstract

Studies investigating animal movement and habitat use are essential for wildlife management and conservation. Northern Botswana represents some of the least modified landscapes in Africa. Studying the seasonal habitat use of herbivores in these landscapes provides important baseline information with which to compare the behavioural responses of similar species occurring in anthropogenically modified landscapes. We report on the home range extent and habitat use of roan antelope (*Hippotragus equinus*) in a region of northern Botswana unaffected by artificial water and fences. We deployed Global Positioning System (GPS) collars on individuals in four roan antelope herds in northern Botswana, three herds in the drier northern section of Botswana and one herd in the wetter Okavango Delta. Herds in the drier northern section occupied larger home ranges (>50 km^2) than did herds in the wetter Okavango Delta (<50 km^2). All herds preferred specific core areas (all smaller than 20 km^2) within their home ranges. All herds had similar location and size of home range between the wet and dry season (non-migratory). All herds occurred in back-country sandveld areas dominated by either Kalahari apple-leaf (*Philenoptera nelsii*) or silver cluster-leaf (*Terminalia sericea*) woodlands

with low densities of competitors and predators. In Botswana, the long-term persistence of free-roaming roan antelope herds likely depends on the preservation of these unmodified back-country habitats away from permanent water.

Asia and the Middle East

Gazella arabica dareshurii: a remarkable relict population on Farur Island, Iran

Davoud Fadakar, Mojdeh Raam, Hannes Lerp, Ali Ostovar, Hamid Reza Rezaei & Eva V. Bärmann (2021)
BMC Ecology and Evolution 21: 213. doi.org/10.1186/s12862-021-01943-1

Abstract

Background:
The islands in the Persian Gulf are home to several species of gazelles, i.e., *Gazella bennettii*, *G. subgutturosa*, and a new subspecies of Mountain gazelles which was discovered on Farur Island and described for the first time in 1993 as *Gazella gazella dareshurii*. Later, phylogenetic analyses showed that the Mountain gazelles consist of two species: *G. gazella* and *G. arabica*. As the Farur gazelles are more closely related to the Arabian forms of the Mountain gazelles, this subspecies is regarded to be *G. arabica dareshurii*. Until now, the origin of this subspecies has been an enigma. Results: Here, we used mitochondrial cyt *b*, two nuclear introns (CHD2 and ZNF618), and morphological data to address this question by investigating the taxonomic position of the Farur gazelles. The results show that this population is monophyletic and split from other *G. arabica* populations, probably 10,000 BP.
Conclusions:
It is a natural relict population that was trapped on the island due to the rising sea levels of the Persian Gulf after the Last Glacial Maximum. Intermittent drought and flooding are suggested to be the main factors balancing population growth in the absence of natural predators on this monsoon-influenced island. Conservation actions should focus on preserving the natural situation of the island (cease introducing mesquite tree and other invasive species, stop building new construction and roads, and caution in providing water sources and forage), and possibly introducing individuals to other islands (not inhabited by gazelles) or to fenced areas on the Iranian mainland (strictly isolated from other gazelle populations) when the population reaches the carrying capacity of the island.

Detection of fraudulent in contraband Shahtoosh trade: Unfair deal in illicit wildlife market

Sandeep Kumar Gupta, Chandra Prakash Sharma, Bhim Singh & Ajit Kumar (2022)
Forensic Science International 59: 102713. https://doi.org/10.1016/j.fsigen.2022.102713

Abstract

Hair from the Tibetan antelope (*Pantholops hogdsonii*), or Chiru, is used to create one of the world's finest wool, hence termed 'Shahtoosh'. Chiru is a protected species and is illegally hunted for the mass-scale collection of its wool. Another fine quality wool hair derived from Pashmina goat (*Capra hircus*) is farmed in and around Ladakh, Jammu and Kashmir's Union Territories in India. Shahtoosh has been considered a status symbol that has led to high global demand, leading to the severe depletion of Chiru in the wild. We examined the guard and wool hairs from the confiscated Shahtoosh shawl to identify its origin. We used a combination of microscopic and molecular techniques to determine the source of the guard hair collected from

five shawls. The microscopic test confirmed the presence of Chiru's guard hair in every shawl. Molecular test using DNA sequencing of a partial fragment of mitochondrial DNA cytochrome *b* (cyt *b*) gene from these guard hair positive shahtoosh shawls confirmed fibers of Chiru from only two samples. Remaining three guard hair positive shahtoosh shawls failed in DNA extraction. Hence, molecular testing yielded only a 2/5 success rate, but morphological features detected the fiber of prohibited species from 100% of articles.

Experimental observation and analysis of traffic impact on Tibetan Antelopes on the Qinghai-Tibet highway

Han Ru, Jinliang Xu & Shoufang Jiang (2022)
Advances in Civil Engineering 2022: 1226781. https://doi.org/10.1155/2022/1226781

Abstract
Highways that cross natural reserves are an intrusion with a nonnegligible negative impact on the behavior of wild animals and have numerous and diverse ecological impacts on wildlife near road areas. Field experiments were carried out to collect traffic flow data on the Qinghai-Tibet Highway on the Qinghai-Tibet Plateau, China, and the behavior of the Tibetan antelope crossing the highway was observed. The relationships between the percentage of antelopes successfully crossing the highway and the different traffic flows were analyzed. The results demonstrate that the traffic volume is the main factor affecting the success rate of Tibetan antelopes when crossing the highway, displaying a nonlinear negative correlation. Furthermore, the behavioral responses of the Tibetan antelopes within 500 m of the Qinghai-Tibet Highway before and after different parking behaviors were observed and the proportions of the different behaviors exhibited by the Tibetan antelopes affected by different driver parking behaviors were analyzed. Parking behaviors were found to have the most significant effect on Tibetan antelope behavior within 400 m of the highway, where parking with somebody getting out having the most prominent impact. The results of this study can guide engineering measures to protect wildlife in the plateau region.

Ensuring recovery for the Przewalkski's gazelle

Dongni Liang, Yaxin Liu, Xiaoge Ping, Zhigang Jiang & Chunwang Li (2022)
Science 37: 6564. doi 10.1126/science.abm2865

Abstract
Numbers of *Procapra przewalskii* were estimated at c. 300 in the 1990s. Following an International Workshop held in Xining, Qinghai, in 2004, multiple conservation efforts were implemented and the population reached 2,700 in 2020. Many threats remain: subpopulations are small, and fragmented by roads and grassland fences, limiting genetic exchange, and disturbance and competition with livestock are important factors. There is still no nature reserve dedicated to the conservation of this species. In July 2021, the first corridor was established to ensure safe passage across a highway.

Genetic diversity and phylogenetic analysis of blackbuck (*Antilope cervicapra*) in southern India

Ranjana Bhaskar, Praveen Kanaparthi, & Rengasamy Sakthivel (2021)
Molecular Biology Reports 48(2): 1255-1268. doi: 10.1007/s11033-021-06180-9

Abstract
Blackbuck (*Antilope cervicapra*) is a threatened species endemic to the Indian subcontinent. Many populations of blackbuck are found in southern India. Populations of blackbuck are negatively affected in many places for various reasons, such as habitat destruction and poaching. Their range decreased sharply during the 20th century. There is very limited

information available on the population dynamics of blackbuck in southern India. For the phylogenetic and genetic diversity analyses of blackbuck populations among different distribution ranges in southern India, we sequenced mtDNA of cytochrome b (Cyt b) for 120, cytochrome c oxidase subunit-1 (COI) for 137 and the control region (CR) for 137 fecal pellets from eleven different locations in southern India. We analyzed the genetic structure of three mitochondrial markers, the CR, Cyt b and the COI region, separately and in a combined dataset. The haplotype diversity and nucleotide diversity of CR were 0.969 and 0.047, respectively, and were higher than those of Cyt b and COI. A Bayesian phylogeny and an MJ network based on the CR and combined dataset (105 sequences) signified several distinct haplotype clusters within blackbuck, whereas no clusters were identified with the Cyt b and COI phylogenetic analyses. The analysis of molecular variance of the combined data set revealed 52.46% genetic variation within the population. Mismatch distribution analysis revealed that blackbuck populations underwent complex changes with analysis of the combined dataset in each population and analysis of each marker separately in the overall population. The results provide evidence that blackbuck in different geographic locations has a distinct population structure due to habitat fragmentation after the formation of the Western and Eastern Ghats.

Geophagy by Blackbucks on termite mounds: Unveiling a new aspect of dietary predilection by antelopes

B.K. Majhi, R. Lenka, A.K. Das & B.A. Kumar Prusty (2022)
Proceedings of the Zoological Society 75: 139-142. https://doi.org/10.1007/s12595-021-00366-6

Abstract

A routine survey in blackbuck habitats in Bhetnoi region of Ganjam district in Odisha, India revealed an interesting behaviour of blackbucks, with a sub-adult male blackbuck licking and consuming the termite mound's soils. To the best of our knowledge, this phenomenon has never been observed for blackbucks. This finding was reconfirmed on subsequent visits, with this behaviour being observed in 30% of total survey periods. This phenomenon is seen in a variety of mammals, birds, reptiles, butterflies, and isopods, especially herbivorous isopods. It serves as a mineral supplement for the animal, as well as providing gastrointestinal relief and lowering gut toxicity. This observation provides impetus to articulate research questions regarding blackbucks' dietary habits in relation to termite mounds, and any knowledge on the nutrient/element composition of such termite mounds will reveal interesting facts and information that will help in a better understanding of the function of termite mounds in the diet of antelopes, especially blackbucks.

Investigating parasite dynamics of migratory ungulates for sustaining healthy populations: Application to critically endangered saiga antelopes *Saiga tatarica*

Munib Khanyari, E.J. Milner-Gulland, Rodrigo Oyanedel, Hannah Rose Vineer, Navinder Singh, Sarah Robinson, Albert Salemgareyev & Eric R. Morgan (2022)
Biological Conservation 266: 109465. https://doi.org/10.1016/j.biocon.2022.109465

Abstract

Contact between wild and domestic ungulates is increasing across rangelands, enabling disease co-transmission. Disease management is difficult given uncertainties in complex system behavior, limited empirical data, and logistical obstacles to interventions. We studied gastrointestinal nematode (GIN) transmission in a rangeland shared by both livestock and the critically-endangered migratory saiga antelope (*Saiga tatarica*) in order to model infection dynamics under current and plausible future scenarios of increasing livestock numbers, climate

change and anti-helminth treatments. Our model was parameterised for trichostrongylid GIN – a cause of mortality and morbidity in ungulates globally - using data on observed faecal nematode egg output and host numbers and distribution. Results showed that seasonal saiga migration leads to asymmetry in parasite transmission, with the majority of GIN acquired by saigas in their autumn and winter range through prior pasture contamination from livestock. Consequently, reducing parasite burdens in livestock early in the season in these areas could disproportionately reduce cross-transmission to saigas. Early-season GIN suppression in livestock in the saiga's spring and summer range was predicted to have weaker effect on parasite transmission to saigas but reduces infections during the calving period, potentially increasing population health and resilience at this critical time. Optimally timed treatments could offset the effects of increasing livestock numbers on GIN infection pressure, while climate warming had only marginal impacts on GIN transmission under all scenarios. Our findings could support better understanding and mitigation of factors affecting saiga health and rural livelihoods. Our approach is transferable to other systems, particularly those with migratory hosts.

Predictors of the behavioral intention to participate in Saiga Antelope conservation among Chinese young residents

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Diversity 14(5): 411. https://doi.org/10.3390/d14050411

Abstract

Promoting public participation is a practical move to strengthen wildlife conservation. This study focuses on saiga antelope (*Saiga tatarica*), an endangered species which has received international concern. Based on an extended version of the Theory of Planned Behavior and a sample of 536 Chinese residents aged 16–40 collected through an online survey, we applied Partial Least Squares Structural Equation Modeling to explore the predictors of the behavioral intention to participate in saiga antelope conservation. The results show that perceived behavioral control is the most influential predictor that contributes to the value of the behavioral intention, followed by injunctive norm, attitude to participation, knowledge of saiga antelope, experience of wildlife conservation, and attitude to saiga antelope, altogether explaining 48.4% of the variance of the behavioral intention. To promote public participation in saiga antelope conservation, strengthening science popularization and broadening the channels of participation are suggested.

A systematic survey of online trade: trade in Saiga antelope horn on Russian-language websites

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Oryx 56(3): 352-359. doi:10.1017/S0030605320001313

Abstract

Trade in wildlife is increasingly moving online, which creates significant challenges for monitoring. Numerous reports have highlighted the extent of the trade but they rarely present a methodology to facilitate replication or any form of meta-analysis. Here we present a systematic approach to surveying online trade in wildlife that builds on the well-established systematic evidence review approach. We apply this approach to investigate the online trade in saiga antelope (*Saiga tatarica*) horns on Russian-language websites. Of the 419 advertisements, the majority (217, 52%) were from Ukraine, followed by Russia (122, 29%), and were largely offers to sell (254, 61%), and represented one-off advertisements. Trade was identified on 89 websites, with the majority being on classified ads websites (68, 76%),

auction.violity.com being the most popular site (156, 37%). Prices varied significantly depending on the country and how the horn was being offered (i.e., by weight or length). It is clear that saiga horn is being traded over the internet, with Ukraine and Russia comprising c. 80% of advertisements on Russian-language websites. Individuals with single advertisements dominate, suggesting website fidelity, although website usage is country-specific, potentially reflecting domestic trade. This suggests country-specific interventions could be particularly effective. A systematic approach for investigating online wildlife trade provides a clear and transparent methodology, and, given data collection is resource-intensive, allows studies to be replicated so that trends can be identified. However, this is only possible if published studies report the methodology used.