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ANTELOPE SPECIALIST GROUP

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Antelope Specialist Group

GNUSLETTER is the biannual newsletter of the IUCN SSC Antelope Specialist Group (ASG). First published in 1982 by the 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 editor. *GNUSLETTER* is published in English in electronic form 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. Tiang *Damaliscus tiang* in Badingilo National Park, South Sudan (© mclaase – CC BY NC)

GNUSLETTER Volume 41 Number 2, November 2024

Table of contents

FROM IUCN AND ASG 4

Green Status of Species assessments 4

ASG on social media 5

SSC Leader's meeting 6

Dama gazelle III workshop 7

Dama gazelle ID card 8

SSC grant for field survey in Ethiopia 9

ASG member honoured as Kiessling Prize Finalist 9

Bongo Research Project 10

RESEARCH AND NOTES FROM THE FIELD 12

Observations on faux penile tufts in wildebeest females 12

ANTELOPE NEWS 20

Six million antelopes counted in South Sudan 20

GIUM - The Atlas of Ungulate Migration 22

Recovery and Action Plan for the Sable Antelope in Kenya 24

Ragati-Chehe Forest mountain bongo sanctuary 24

Gazelle survey in Siwa, Egypt 25

Morocco National Action Plan published 26

Goitered gazelles in the Caucasus 27

New Protected Areas and a breeding facility for goitered gazelle in Uzbekistan 28

Kazakhstan saiga census results 2024 29

RECENTLY PUBLISHED ARTICLES 30

AFRICA 30

AMERICA 35

ASIA AND MIDDLE EAST 38

AFRICAN BUFFALO 44

WILD CAMEL 45

FROM IUCN AND ASG

Green Status of Species assessments

Since its launch in 2021, the IUCN Green Status of Species has introduced a new way of measuring species recovery, complementing the Red List by providing a tool for assessing the recovery of species' populations and measuring their conservation success. The Green Status assesses species against three essential facets of recovery. A species is **fully recovere**d if it is present in all parts of its range, even those that are no longer occupied but were occupied prior to major human impacts/disruption, AND it is **viable** (i.e., not threatened with extinction) in all parts of the range; AND it is performing its **ecological functions** in all parts of the range. These factors contribute towards a "**Green Score**" ranging from 0–100%, which shows how far a species is from its "fully recovered" state.

The Green Status considers four Conservation Metrics:

- ***Conservation Legacy:*** the impact that past conservation interventions have had on the current status,
- ***Conservation Dependence:*** what is expected to happen over the next 10 years if current conservation actions were to cease,
- ***Conservation Gain:*** the change in status expected within the next 10 years resulting from planned conservation actions,
- ***Recovery Potential***: the goal: across what proportion of historical range can we realistically expect to restore functional populations.

ASG has completed Green Status assessments for four antelope species:

Mountain Nyala *Tragelaphus buxtoni*
Red List Status: Endangered
Green Status Recovery Score: 25% (Largely Depleted)
The recovery score reflects a species still significantly depleted, with only 25% progress toward full recovery. Without current conservation actions, such as enforcement of legal protection and management of protected areas, the species would likely be Critically Endangered today. Projections suggest that with sustained conservation efforts, the Mountain Nyala could achieve a viable status within the next century, reaching a recovery score of 65%.

Dibatag *Ammodorcas clarkei*
Red List Status: Vulnerable
Green Status Recovery Score: 35% (Largely Depleted)
Minimal conservation efforts have been directed toward this species, which is currently listed as Vulnerable. The assessment highlights the potential for significant recovery if initiatives like habitat protection or population management are undertaken.

Speke's Gazelle *Gazella spekei*
Red List Status: Endangered
Green Status Recovery Score: 25% (Largely Depleted)
Speke's Gazelle, like the Dibatag, has received little active conservation interventions, however, this species stands to benefit significantly from even modest measures such as the establishment of protected areas or more targeted research which could increase its recovery score from 25% to 65%.

Heuglin's Gazelle *Eudorcas tilonura*
Red List Status: Endangered
Green Status Recovery Score: 25% (Largely Depleted)
Existing protection in Ethiopia, Sudan, and Eritrea has prevented a steeper decline. Projections suggest that continued and enhanced conservation measures could help this species reach a much-improved status.

The Green Status has given us a clearer picture of not just how close we are to losing these species but how much we can gain by investing in their recovery.

Another set of assessments will be submitted in early 2025 and ASG will continue to assess more species, prioritizing those with high extinction risk.

We will be inviting all members to contribute by providing updates on species' status, sharing information about conservation activities, or reviewing future assessments.

We would like to extend a special thanks to the Reviewers of the recent assessments: Dr Anagaw Atickem (Mountain Nyala), Dr Jens-Ove Heckel (Dibatag), Osman Gedow (Speke's Gazelle), and Dr Futsum Hagos (Heuglin's Gazelle).

ASG on social media

ASG's social media platforms continue to grow and reach a broader audience. Across X (formerly Twitter) and Facebook, we are proud to have built a community of over 3,600 followers and reach more than 10,000 accounts monthly. Many members are already part of ASG's follower list, where we share everything from stunning antelope images to the latest conservation efforts. One of our most successful initiatives was #AntelopeMonth in August, which showcased antelope species listed as threatened on the IUCN Red List. The campaign shone a spotlight on the threats they face, as well as the conservation work being carried out to safeguard their futures. We received huge engagement throughout the month, and we will make #AntelopeMonth a regular feature! If you have ideas for next year's edition, please submit them to ASG Programme Officer Sophie Whitemore (asgpo@marwell.ork.uk).

ASG is also committed to amplifying the work of others and we frequently repost and highlight recent research, conservation updates, and antelope sightings from the field. If you have news, images, or videos to share, we'd be thrilled to help you reach a wider audience. Striking visuals have a great impact on our followers—so if you've captured something special, whether it's a new discovery or an everyday moment in the life of these species, we will feature it. Even if you're unable to share content, engaging with our posts and sharing them helps spread the word about antelope conservation far and wide. For those not yet following us, please do follow us on X and Facebook at @AntelopeSG!

SSC Leader’s meeting

The 5th SSC Leaders’ Meeting took place on 25-28 October 2024 in Abu Dhabi, generously hosted and sponsored by the Environment Agency Abu Dhabi. Since the inaugural meeting in 2008, these gatherings have driven advancements in species conservation, making the SSC Leaders' Meeting an indispensable event on the conservation calendar. This year’s event emphasised the regenerative power of nature and the crucial roles of animals, fungi, and plants in sustaining ecosystems, regulating climate, and supporting life. Together, the SSC Network continues to play a pivotal role in halting extinctions, reversing species declines, and driving species recovery efforts worldwide.

The 2024 meeting brought together over 300 conservation experts and leaders to discuss how to protect biodiversity, stabilize the climate, and support human well-being. The meeting concluded with a declaration that "Saving Species Sustains Life". The declaration was issued by SSC members and partners to convey the critical role of species in ensuring clean water, food security, cultural connections, economic stability, and social justice. It calls on all sectors—including governments, businesses, Indigenous peoples and local communities, religious groups, and individuals—to prioritise species conservation, and to recognise that protecting animals, fungi, and plants is fundamental to sustaining life on earth.

ASG was represented by both Co-Chairs, who contributed, alongside three other specialist groups, to a side-event organised by SSC on the experiences and lessons learned from long-established SGs. Other important sessions attended included those on the Green Status of Species, the SSC DATA system, leadership succession, and the pros and cons of establishing an SSC Mammal Subcommittee.

Dama gazelle III workshop

The 3rd Dama gazelle strategy workshop took place in Kerrville, Texas on 17-19 September 2024, hosted by the Second Ark Foundation and Endangered Wildlife Association. The aims of this workshop were to: (i) review progress made by the halfway (5-year) point in the Dama Gazelle Conservation Strategy 2019-2028; (ii) assess progress, amend and update the actions as appropriate and add new actions; (iii) increase contact and collaboration between the Texas rancher community and international dama conservation practitioners. The workshop program consisted of a status update, review of the actions table, plus discussions on three topics: taxonomy, inclusion and networking, and fundraising. A summary of progress since 2021 was drafted, circulated to all participants before the workshop, and revised to include comments.

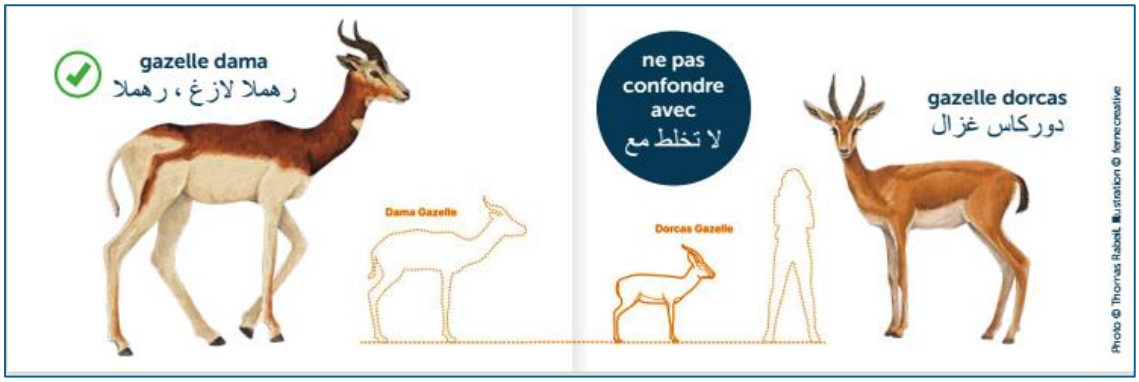
At the time of the last census, there were more than 1500 dama gazelles on Texas ranches, compared to around 930 in zoos and fenced enclosures in the rest of the world. Also in Texas, Dr Elizabeth Mungall has conducted a long-established collaring study to research movement patterns, group dynamics, and habitat use by dama gazelles.

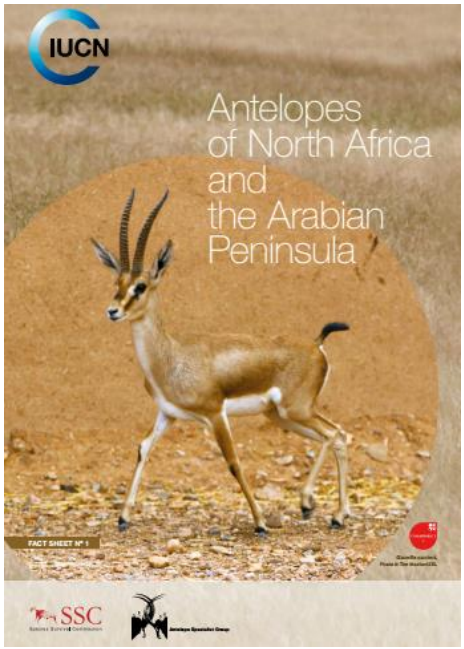
The situation in the wild remains extremely precarious, with perhaps only 100-120 remaining, in three widely separated populations. ASG was formally represented by Dr Helen Senn who facilitated the key session on reviewing and updating the actions table. Several other members of ASG also attended.

In 2014 a decision was made by all stakeholders, based on genetic data (insufficient evidence that the two subspecies are completely different), to begin an experiment on crossbreeding *N. d. mhorr* and *N. d. ruficollis* at Al Ain Zoo (AAZ). The experiment has continued and AAZ currently manages 23 mixed Dama as a fully segregated group. The 2024 meeting recommended that ASG should convene a taxonomic taskforce to consider all the latest evidence and the potential genetic implications of mixing and not mixing the two forms.

Dama gazelle ID card

One of the issues recognized at earlier dama gazelle workshops was the lack of information from remote parts of the species' range where logistics or security make survey work very difficult, for example the Tamesna region in Mali, where the last sightings date from 2005. Therefore, one of the recommended actions in the 2019-2028 conservation strategy was to develop a simple identification card that could be distributed in these areas to collect recent reports and sightings. The ID card has now been produced and is the size of a credit card. It will be distributed across key parts of the range. ASG is very grateful to the Royal Zoological Society of Scotland (RZSS) for providing the costs of design and printing.





Previous ASG identification materials have included a factsheet on the gazelles of North Africa and the Middle East, produced in 2017 in collaboration with the IUCN Mediterranean Regional Office. This factsheet highlighted the species that occur in both regions, and the confusion sometimes caused by use of the same Arabic name for different species and aimed to ensure that appropriate species were used for reintroductions and reinforcement operations. It is available in Arabic, English, and French versions (www.iucn.org/mediterranean).

SSC grant for field survey in Ethiopia

ASG member Dr Anagaw Atickem of Addis Ababa University was awarded an SSC grant in September 2024 to undertake survey work on the Endangered mountain nyala *Tragelaphus buxtoni*. The overall goal of the project is to assess the conservation status of the species in the Bale Mountains National Park. The specific objectives are (1) to reassess the population size of mountain nyala and livestock density in all nine known localities in the Bale mountains and (2) to measure the extent of land cover change during the last 10 years. The results will be used to assist the Ethiopian Wildlife Conservation Authority and the Bale Mountains National Park management in revising and amending conservation actions for this iconic species and to inform the reassessment of the species on the IUCN Red List.

ASG member honoured as Kiessling Prize Finalist

Dr Robert Aruho, a wildlife veterinarian and manager of Mount Kenya Wildlife Conservancy, has been named a finalist for the prestigious Wolfgang Kiessling International Conservation Prize. Hosted by American Humane, the Kiessling International Conservation Prize recognizes individuals who demonstrate extraordinary leadership in preserving endangered species and ecosystems. Robert is the first African to be included as a finalist – a historic milestone. In his native Uganda, Robert was a senior wildlife veterinarian and species conservation expert for the Uganda Wildlife Authority, where he played a pivotal role in species recovery initiatives, including groundbreaking work on the translocation and reintroduction of rare wildlife species.

Now leading Mount Kenya Wildlife Conservancy, he is spearheading the recovery of the mountain bongo, in collaboration with the Kenya Wildlife Service, Chester Zoo and other partners, contributing to the National Bongo Recovery Action Plan. Robert's work exemplifies strong leadership and dedication to fostering coexistence between communities and wildlife. Under his leadership, the conservancy not only advances species recovery but also engages local communities, employing 60% of its staff from nearby areas and hosting tens of thousands of students and pupils annually to raise awareness about conservation. Dr Aruho expressed gratitude for the recognition, saying, "This nomination is a testament to what we can achieve when we work collaboratively to protect our natural heritage. It is not just about saving species; it's about securing the future for wildlife and people alike".

Bongo Research Project

A new initiative implemented by Chester Zoo and *in situ* partners is focused on the conservation of the bongo (*Tragelaphus eurycerus*). The project has so far concentrated on two regions: Kenya, and conservation of the Critically Endangered mountain bongo (*Tragelaphus e. isaaci*) since 2014, in collaboration with Kenya Wildlife Service and Mount Kenya Wildlife Conservancy, and Uganda, with research on the only East African population of the Near Threatened lowland bongo (*T. e. eurycerus*), first discovered by a joint survey of Chester Zoo and Uganda Wildlife Authority in Semuliki National Park. The project is evolving into a range-wide, desk-based status assessment of bongo throughout Africa. There are significant gaps in knowledge of lowland bongo populations. Although few studies specifically focus on the bongo, many wildlife surveys have been conducted within its range.

Thus, the project is seeking "bycatch" data to refine our understanding of its current status and population estimates.

The project is seeking to collaborate with individuals and organizations who may have collected relevant data during fieldwork within the lowland bongo's range, especially the western part (Guinea, Sierra Leone and Liberia), specifically data from camera trap surveys. Such data would help us better understand the current status and distribution of this species using methods developed during work on the mountain bongo in Kenya. The goal is to conduct a preliminary, wide-ranging assessment utilizing camera trap bycatch and monitoring data from existing studies. Types of data requested:

Camera Trap Data
GPS coordinates of camera traps deployed within bongo range (preferably in decimal degrees)
Deployment and retrieval dates
Images/footage of bongo detected
Dates of bongo detections
Information (location and habitat type, if available) from sites where no bongos were detected

Direct/Indirect Observation Data
Type of observation (sighting, dung, carcass, etc.)
Date of observation
Location of observation (preferably in decimal degrees)
If exact dates or locations are uncertain, approximate estimates are also welcome

A form is available for interested contributors

Any data shared will be appropriately credited in all resulting outputs and we are open to discussions on involvement in any future publications or analyses. Although not planned at this stage, should we decide to pursue a peer-reviewed publication, we will contact all contributors to discuss the co-authorship.

Please contact Tommy Sandri, Africa Field Programmes at Chester Zoo, t.sandri@chesterzoo.org

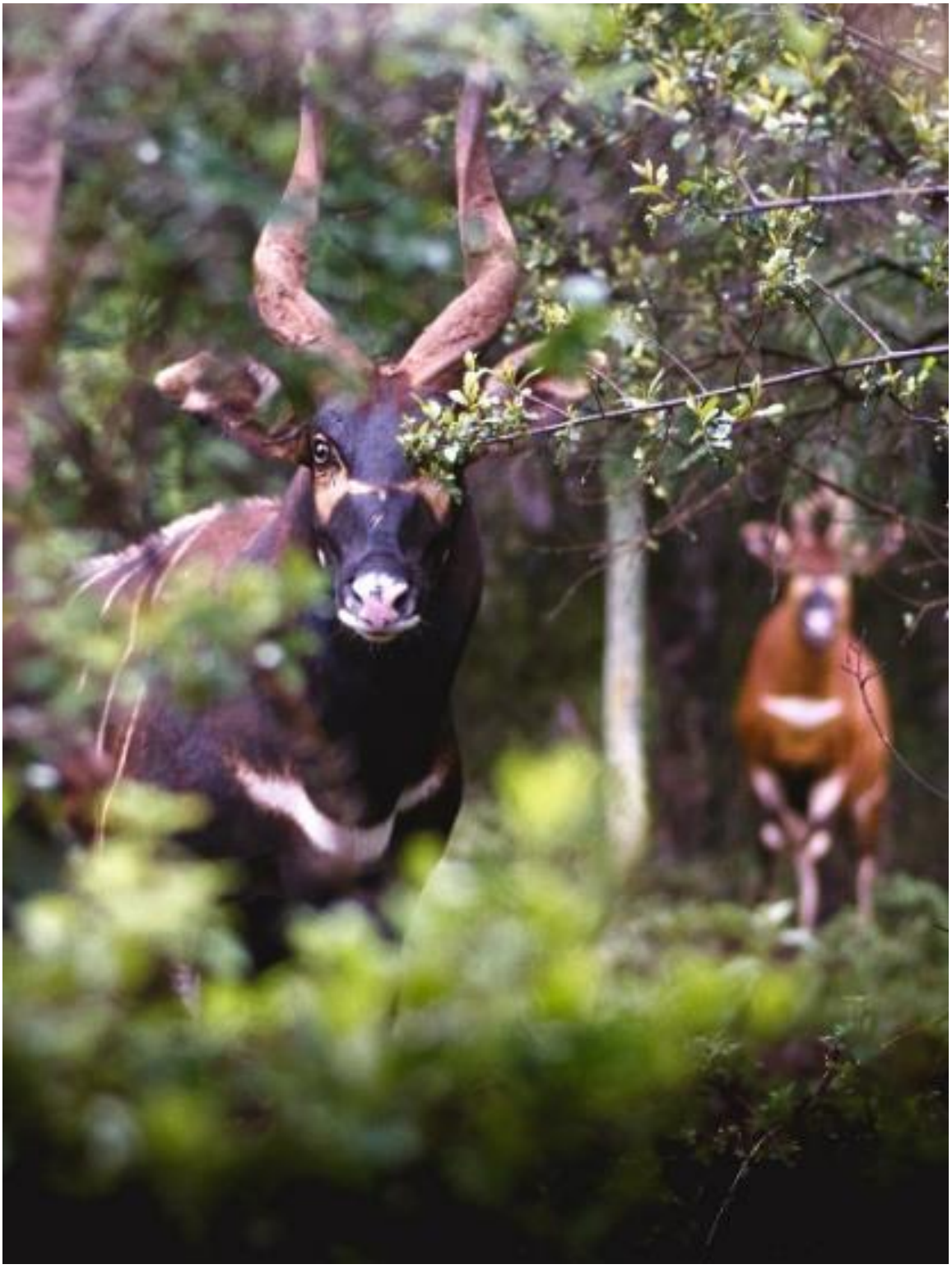


Photo © T. Sandri

RESEARCH AND NOTES FROM THE FIELD

Observations on faux penile tufts in wildebeest females

Kenneth K. Coe

Figure 1. *Male common western white-bearded wildebeest (*Connochaetus taurinus mearnsi*), Olare Motorogi Conservancy, Kenya (© Kenneth K. Coe)*

Antelope species with minimal sexual dimorphism (SD) to the point of confusing even a well-trained eye include common wildebeest (*Connochaetus taurinus*), black wildebeest (*Connochaetus gnou*), gemsbok (*Oryx gazella*), beisa oryx (*Oryx beisa*), scimitar-horned oryx (*Oryx dammah*), and addax (*Addax nasomaculatus*). Richard Estes observed that minimal SD correlated with gregarious, nomadic species that form mixed-sex herds (Estes 2014). He theorized that minimal SD confuses the older males and thus reduces incidents of their harassment of younger males, thereby extending the younger males' tenure within the mixed-sex herds. The implications are that for nomadic species, (1) early despotic eviction of young males is too costly, as evicted young males become subject to the vicissitudes of unfamiliar surroundings, and (2) perhaps larger herds are inherently advantageous (i.e., safety in numbers) for species not bound by space. Interestingly, common wildebeest and black wildebeest elevate minimal SD to an entirely different level, as the females sport a "faux penile tuft", which mimics the male's real tuft.

Estes stated that western white-bearded wildebeest (*C. t. mearnsi*) is the only subspecies of common wildebeest in which he observed a faux penile tuft in females (Estes 2014) (He did not comment on this matter with respect to black wildebeest) While recently glancing through

some of the common wildebeest and black wildebeest photos I have taken over the years, I discovered that Estes appears to have been incorrect: it turns out that females of all common wildebeest subspecies, as well as females of black wildebeest, sport such tufts. He may not have looked carefully under the hood! No need to fret, however. Our old friend Dick Estes might ultimately be pleased.

In a sampling of 81 *C. t. mearnsi* females in 1973, Estes found 69 of them (85%) with faux penile tufts (Estes 2014). In sampling my photographs, I was, whenever the camera angle allowed *and* I could positively determine the sex of the animal, able to detect the tufts in the majority of the females of all common wildebeest subspecies as well as in the one black wildebeest that I could positively determine as being female. In a subjective ranking of female tuft conspicuousness among just the common wildebeest subspecies, *C. t. mearnsi* would indeed rank first, followed equally by eastern white-bearded wildebeest (*C. t. albojubatus*) and blue wildebeest (*C. t. taurinus*). Cookson's wildebeest (*C. t. cooksoni*) and Nyassa wildebeest (*C. t. johnstoni*) would together rank last. Obviously, there is a range of morphological characteristics within any group of animals. I present my findings here in generalities and with photographs of archetypal specimens.

In the females of *C. t. mearnsi*, the tuft hairs are relatively long and dense (Figs. 2–4). The density is especially noticeable at the proximal end of the tuft and serves to mimic the male's penile sheath (Fig. 1). In the females of *C. t. albojubatus* and *C. t. taurinus*, the tuft hairs are relatively short and thin, but in most cases the density at the proximal end of the tuft is still discernible (Figs. 5–8). In the females of *C. t. cooksoni* and *C. t. johsnstoni*, the tuft hairs are hardly noticeable, and neither is the density at the proximal end of the tuft (Figs. 9–11).

Figure 2. C. t. mearnsi *female, Serengeti National Park, Tanzania (© Kenneth K. Coe)*

Figure 3. C. t. mearnsi *female, Serengeti National Park, Tanzania (© Kenneth K. Coe)*

Figure 4. C. t. mearnsi *females, Serengeti National Park, Tanzania (© Kenneth K. Coe)*

Figure 5. C. t. albojubatus *females, Amboseli National Park, Kenya (© Kenneth K. Coe)*

Figure 6. C. t. albojubatus *female, Amboseli National Park, Kenya (© Kenneth K. Coe)*

Figure 7. C. t. taurinus *female. Hwange National Park, Zimbabwe (© Kenneth K. Coe)*

Figure 8. C. t. taurinus *female, the Savuti region of Chobe National Park, Botswana (© Kenneth K. Coe)*

Figure 9. C. t. cooksoni *female, South Luangwa National Park, Zambia (© Kenneth K. Coe)*

Figure 10. C. t. cooksoni *female. South Luangwa National Park, Zambia (© Kenneth K. Coe)*

Figure 11. C. t. johnstoni *female, Nyerere National Park, Tanzania (© Kenneth K. Coe)*

At first glance, the degree of conspicuousness of the faux penile tufts appears to correlate positively to the degree of gregariousness and nomadism in the common wildebeest subspecies. *C. t. mearnsi* is the most gregarious subspecies and partakes in the largest extant wildebeest migration, "the Great Wildebeest Migration", in the Serengeti–Mara region of East Africa (Estes 2014). Historically, *C. t. albojubatus* and *C. t. taurinus* took part in sizable migrations (e.g., the Nairobi National Park–Athi-Kapiti Plains migration for the former (Ogutu et al. 2013) and the Kalahari–Boteti River migration for the latter (Williamson et al. 1988)) in countless thousands. On the other hand, *C. t. cooksoni* and *C. t. johnstoni* have never been known for forming mega-herds or engaging in large-scale migrations, at least in recent history (R. Tether, personal communication, July 7, 2024; C. Foley, personal communication, July 16, 2024). Their home ranges are relatively wooded (Estes 2013), which is not conducive for forming large herds, and they make only small seasonal movements based on local forage and surface water availability. Is it simply convenient fortuity that *C. t. cooksoni* and *C. t. johnstoni* females have the least developed tufts? Or are these two subspecies, range-confined for hundreds if not thousands of years, in the process of shedding the vestiges of their migratory past? Incidentally, as for *C. gnou*, which also displays conspicuous faux penile tufts in the females, it took part in sizable migrations in the Karoo–Highveld region of South Africa before its persecution by the pelt trade in the 19th century (Richter 1971) (Fig. 12).

The small sample sizes, not having conducted actual physical examinations, and the inherent limitations of photo interpretations render as mere initial hypothesis that there is ordinal minimal SD in wildebeests according to gregariousness and nomadism. In any case, Dick Estes, hovering somewhere over the Serengeti I presume, would be intrigued and well pleased.

Figure 12. C. gnou *female, Golden Gate Highlands National Park, South Africa (© Kenneth K. Coe)*

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ANTELOPE NEWS

Six million antelopes counted in South Sudan

In August 2022, African Parks signed a 10-year renewable management agreement for Boma and Badingilo National Parks with the Government of the Republic of South Sudan (as reported in an earlier issue of *Gnusletter*). In 2023, a Systematic Reconnaissance Survey of wildlife, livestock and human activity across the Boma-Badingilo-Jonglei Landscape (BBJL) was conducted by African Parks, in partnership with the South Sudanese Ministry of Wildlife Conservation and Tourism.

The BBJL forms an integral part of a larger 200,000 km^2 ecosystem extending east of the Nile, covering Central Equatoria State, Eastern Equatoria State, Jonglei State and the Greater Pibor Administrative Area, extending into the Gambella region of Ethiopia. The Juom Swamp in the park's northern sector supports high-value green biomass during the dry season, and is an important dry-season range for wildlife, including Nile Lechwe *Kobus megaceros*.

The survey ran from 28 April to 15 May 2023 and covered an area of 122,774 km^2, encompassing the entire known range of the four main migratory antelope species in the BBJL, including areas to the northeast of Akobo which had never been surveyed before, and which showed huge numbers of white-eared kob. Two planes were used, each fitted with two cameras programmed to take a photo every two seconds, in addition to records from a team of observers in the aircraft. In total, 330,000 images were taken. A team of seven graduates from the University of Juba were trained in the use of specialised software to count and analyse 59,718 photos taken across 64 transects. The survey results were peer-reviewed by Dr Kevin Dunham.

The remarkable results were announced on 25 June 2024. The survey recorded almost 6,000,000 antelopes, making this the largest land mammal migration in the world and revealing wildlife in numbers far greater than previously predicted. Estimated numbers of the four main species are: white-eared kob *Kobus kob leucotis* 5,089,421 (± 882,775); tiang *Damaliscus lunatus tiang* 298,776 (± 179,937); Mongalla gazelle *Eudorcas albonotata* 346,273 (± 87,265), and bohor reedbuck *Redunca redunca* 161,903 (± 88,863). In total these four species amounted to 5,896,373 ± 909,495 individuals.

In addition, over 2023 and 2024, 251 animals from 13 species were fitted with GPS tracking collars, including 8 antelopes (white-eared kob, tiang, Mongalla gazelle, bohor reedbuck, common eland *Tragelaphus oryx*, Nile lechwe, beisa oryx *Oryx beisa*, and roan antelope *Hippotragus eqinus*). The data from these collars were also integrated into the assessment, providing holistic understanding of the region's ecological dynamics.

A comparison with surveys done in the 1980s shows a large decline in sedentary mammals that need year-round access to water. The aerial survey was also a comprehensive assessment of wildlife, livestock, and human activity, to provide a clear picture of the health of the local ecosystem. The data collected during the survey will be instrumental in developing strategic plans for management of wildlife, natural resources and development of protected areas.

In addition to the astonishing ecological diversity, Boma-Badingilo also harbours a rich and ancient human culture. Inside the parks, thousands of people from various ethnic groups, including the Murle, Jie, Anuyak, and Nuer, tend cattle, hunt and forage as the seasons change.

Implementing positive community relationships is crucial for this project to succeed and has been a priority for African Parks during the past six months.

Rangers have been recruited from local communities, and have undergone the Basic Field Rangers course as well as specialised training to ensure the parks' wildlife and ecosystems are protected. A control room has been established in Juba to monitor all movements throughout the parks. Communications have been set up in key locations, ensuring regular contact across the area.

The survey was undertaken through a collaboration between the Government of South Sudan, the Ministry of Wildlife Conservation and Tourism and African Parks with support from The Wilderness Project. Our donors include Elephant Crisis Fund (ECF), Fondation Segré, Hempel Foundation, Rainforest Trust, Wildlife Conservation Network's Lion Recovery Fund (LRF), Wyss Foundation, and the European Union

White-eared kob in Boma National Park, South Sudan (© Matthias d'Haen - CC BY-NC-ND)

Sources:
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https://www.africanparks.org/building-new-frontier-conservation
https://www.africanparks.org/campaign/great-nile-migration

GIUM - The Atlas of Ungulate Migration

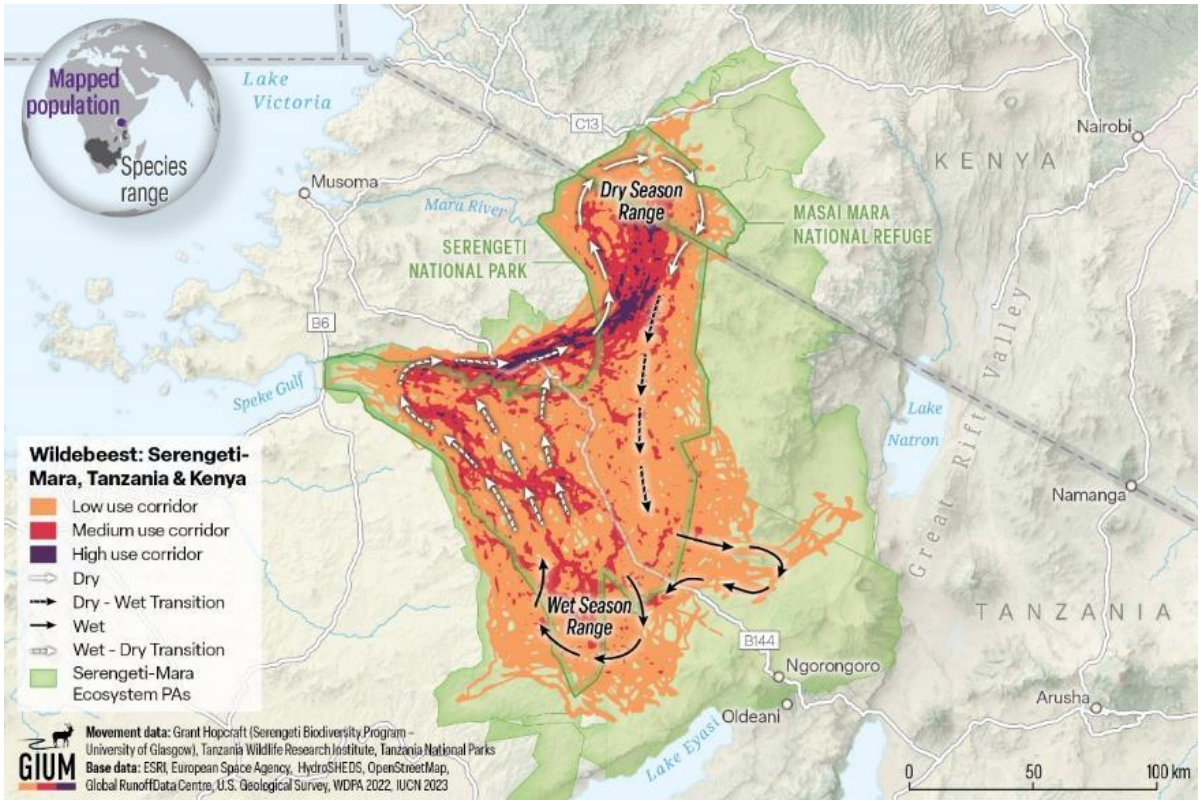
The Convention on the Conservation of Migratory Species of Wild Animals (CMS) and the Global Initiative on Ungulate Migration (GIUM) launched the world's first online Atlas of Ungulate Migrations on 4 September 2024.

The Global Initiative on Ungulate Migration was created in 2020. The main aim is to work collaboratively to: 1) create a Global Atlas of Ungulate Migration (an inventory) using tracking data and expert knowledge; and 2) stimulate research on the drivers, mechanisms, threats and conservation solutions common to ungulate migration worldwide. Participants include global experts representing the world's major terrestrial regions and most if not all of its longest migrations. Four ASG members are among the contributors.

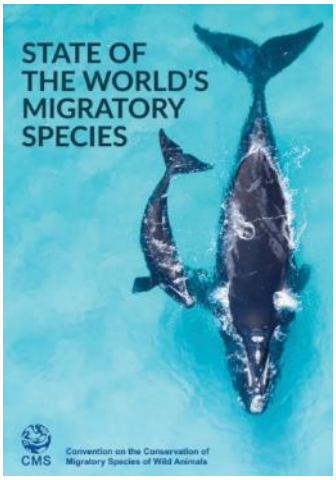
The Atlas of Ungulate Migration is a repository for up-to-date migration maps, driven by tracking data, that can inform conservation planning, infrastructure development and policy making. The maps detail high, medium and low-use migration corridors for a diversity of species. Most importantly, the maps illustrate where critical migration routes intersect with linear barriers like roads or railways. This atlas represents the best available science for extant migrations, with downloadable maps, each accompanied by a factsheet describing the migration in detail, the data analysis, and its specific threats. The atlas is living, and continually updated.

The online atlas is a brilliant new resource and currently features 12 ungulate species. These include Tibetan antelope *Pantholops hodgsoni* in Xox Xil, Qinghai, China; Mongolian gazelle *Procapra gutturosa*; saiga *Saiga tatarica* on the Ustyurt plateau in Kazakhstan, and the African buffalo *Syncerus caffer* in the Okavango, Botswana. More species will be added soon, as data become available.

The example of the western white-bearded wildebeest *Connochaetes taurinus mearnsi* migration in the Serengeti-Mara ecosystem is shown below.



Data for the project was collected through the efforts of Grant Hopcraft (Serengeti Biodiversity Programme – University of Glasgow), Jared Stabach (Smithsonian Conservation Biology Institute), as well as the Tanzania Wildlife Research Institute, the Kenya Department of Resource Surveys and Remote Sensing, Tanzania National Parks and Kenya Wildlife Services.

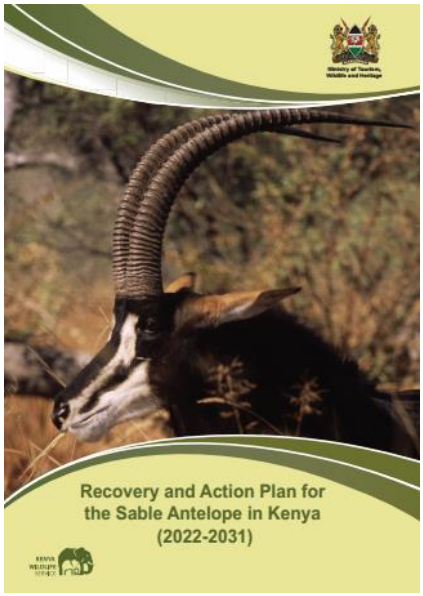


The *State of the World's Migratory Species* a report commissioned by CMS was launched during CMS CoP14 in Samarkand in February 2024. It is available in English, French and Spanish. The report provides a comprehensive overview and analysis of the conservation status of migratory species, summarizes their current status and trends, identifies the key pressures they face, and highlights examples of efforts to conserve and promote the recovery of these species. The report was produced in response to a decision adopted at COP13 in 2020, which mandated that work be undertaken to further develop the preliminary review of conservation status submitted to COP13. The focus of this report is on those species listed in the CMS Appendices; however, as other migratory species may benefit from protection under CMS, it also provides information on the wider group of all migratory species.

Sources: www.cms.int/gium
https://www.cms.int/en/publication/state-worlds-migratory-species-report

Recovery and Action Plan for the Sable Antelope in Kenya

The Kenyan government has launched the Sable Antelope Recovery and Action Plan 2024-34 to protect this rare species from becoming extinct. The plan was launched by Tourism and Wildlife Cabinet Secretary Alfred Mutua during World Wildlife Day at Shimba Hills National Reserve.



The plan provides a legal framework to ensure the endangered sable antelope is protected. On 4 March 2024 the cabinet Secretary for Tourism and Wildlife, Dr Alfred Mutua, launched the second edition of the Kenya *Sable Antelopes Recovery Action Plan* at Shimba Hills National Reserve headquarters in Kwale county, demonstrating the government's renewed commitment to Sable conservation. Key objectives of the recovery action plan focus on preserving and restoring sable antelope habitats, strengthening anti-poaching measures, promoting sustainable land use practices, and engaging local communities in conservation efforts. Sable antelopes, mostly found at Shimba Hills National Reserve, have significantly declined in the past three decades due to poaching and drought. According to the Kenya Wildlife Service, their number has dropped from 265 in 1960 to 56 in the last census. The KWS Board chairman, Lt. Gen (Rtd) Walter Raria Koipaton, made a firm commitment to protect Shimba Hills National Reserve from all forms of illegal activities and emphasized the importance of preserving Shimba's unique biodiversity and ecological integrity. Shimba Hills National Reserve is situated in the southeast corner of the country, covers 300 km^2 and is the only site in Kenya where sable still occurs.

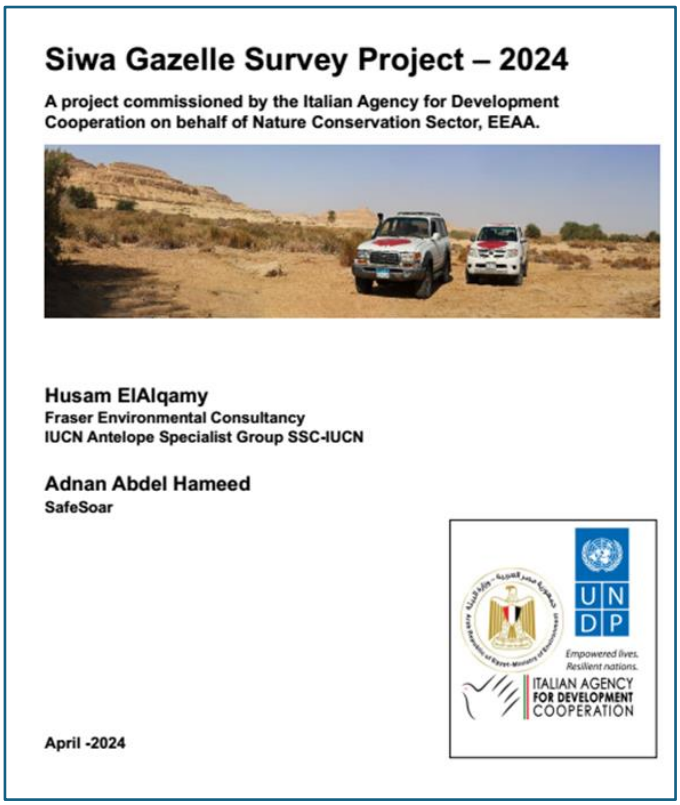
Sources: https://www.kws.go.ke/content/kenya-government-unveils-second-edition-sable-antelopes-recovery-action-plan-2024-2033
https://www.the-star.co.ke/counties/coast/2024-03-05-state-launches-action-plan-to-protect-endangered-sable-antelopes/

Ragati-Chehe Forest mountain bongo sanctuary

The Ragati Forest Mountain Bongo Security Site was officially opened in March 2024. It will form a remote base for rangers from the Kenya Forest Service, Kenya Wildlife Service, and community scouts to ensure the safety and security of mountain bongo and create a safe environment contributing to future reintroduction efforts. It is equipped with solar lighting, water storage, accommodations, and a viewing platform. This project is one of three current efforts to reintroduce mountain bongo to the forests of Kenya. Community engagement has been an important component so far, with a survey indicating that 92% of community members across five locations close to the forest support the idea of a mountain bongo reintroduction. Regular public meetings keep communities informed of progress, while collaboration with the Ragati and Chehe Community Forest Associations empowers communities to secure user rights and co-manage their local forests.

Source: https://wilderinstitute.org/blog/blog-milestones-in-conservation-safeguarding-the-future-of-kenyas-mountain-bongo/

Gazelle survey in Siwa, Egypt



Siwa oasis and surrounding area close to the western border of Egypt with Libya is one of the last known refuges for the endangered slender-horned gazelle *Gazella leptoceros* and also harbours dorcas gazelle *G. dorcas*.

ASG member Dr Husam Elalqamy recently co-led a field survey of the area. The Nature Conservation Sector – Egyptian Environmental Affairs Agency was keen to establish the status of gazelle species in the Siwa Protected Area and its vicinity. The survey project was formulated and sponsored by the Italian Agency for Development Cooperation.

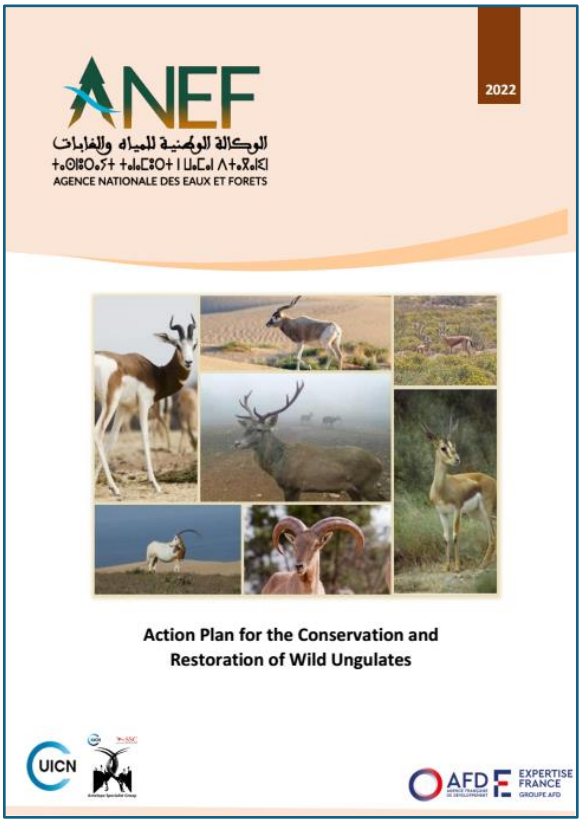
The project commenced in April 2024 aiming to survey a total area of 20,000 km² encompassing Siwa Protected Area and a buffer zone of 20 km around its edges. The study aimed to assess two parameters, gazelle population size and gazelle occupancy in the area. The study started in April 2024 and ended in early May 2024. The study involved Distance sampling of indirect signs of gazelle presence (dung piles) over 113 km of line transects covering 20,000 km² of range. The study also involved 196 days of camera trapping over 14 sites distributed selectively in Siwa Protected Area.

In addition, some interviews were done with some elders of the local community to gather their local knowledge about the species. Unfortunately, gazelle presence was very scant in the study with very few indirect detections (dung and tracks). None of the deployed camera traps were successful in capturing any gazelle presence. The study was able to establish that the status of the habitats around the Siwa Range is still in good condition and should be able to sustain a viable gazelle population while the current decline is probably attributed to human factors (poaching).

The study concluded that given the current decline in gazelle population in Siwa it is highly unlikely to recover naturally and *ex-situ* measures should be in place such as population enforcement or even full reintroduction. These are also in line with the conservation measures proposed for the species in the Sahelo-Saharan Megafauna Initiative developed by the Convention on Conservation of Migratory species of Wild Animals (CMS).

Morocco National Action Plan published

Within the framework of the implementation of the national strategy for the conservation of wild ungulates 2007-2021, several measures to restore extinct species and maintaining and enhancing populations of other species and their habitats in a favourable conservation status, have been undertaken by the National Agency for Water and Forests (ANEF), including: reintroduction of Addax, Scimitar-horned Oryx, and Dama Gazelle in the south and south-east of the country; reinforcement of wild populations of Dorcas Gazelle, and Cuvier's Gazelle through releases in their historic range where numbers have declined; development of semi-captive populations in around 30 reserves across the whole country; and raising awareness among local populations on the conservation of these antelopes and the importance of their involvement in conservation and sustainable management.



At the end of the previous ungulate conservation strategy, it was deemed necessary to compile a new reference and planning document containing the actions needed to conserve and restore these species' populations in the years to come, taking into account the issues affecting their conservation and the new priorities of ANEF in terms of development and enhancement of natural areas and species. This approach is a response to the country's international commitments on the conservation of wild ungulates, particularly the provisions of the CBD and CMS, and it is also in line with regional initiatives, especially the conservation and restoration of the Sahelo-Saharan megafauna.

ANEF organized a workshop in Agadir on 20 October 2022, with the participation of national and international experts, wildlife and reserve managers and scientists, to develop a new national action plan for the conservation of wild ungulates for 2023-2035. The results and conclusions of that workshop, propose a set of concrete actions to be undertaken over the next 12 years to create a national dynamic around the restoration and conservation of ungulates. The action plan is based on seven Intervention Strategies, identified through analysis of the threats facing the species and the key opportunities to improve their conservation status, such as development of semi-captive populations within a network of reserves, control of poaching, rehabilitation of ecosystems, reintroduction of extinct species, reinforcement of wild populations, promotion of cooperation, and development of conservation projects based on the involvement of local communities.

The Action Plan was published in summer 2024 and is available in French and English (translation provided by ASG).

Goitered gazelles in the Caucasus

In the early 1900s, the goitered gazelle population in the Caucasus declined rapidly due to hunting and agricultural expansion, leading to extinction in Georgia and parts of Azerbaijan in the 1960s. Conservation efforts and the establishment of protected areas have resulted in an increase in gazelle numbers, with the majority now found in isolated protected areas along the Caspian Sea coast, particularly Shirvan National park in Azerbaijan. Since 2012, reintroduction and translocation activities have been carried out in the Azerbaijan-Georgia transboundary area to restore goitered gazelles to their historical habitats. The Gazelle Reintroduction Programme is implemented by WWF-Caucasus in close cooperation with the governments of Azerbaijan and Georgia and with financial support from the German Government (BMZ / KfW) and WWF-Germany. In Georgia, the gazelles were first released in 2013 into the Samukhi Plain in the eastern Kakheti region. This population of goitered gazelles has been rising and in January 2024, Georgia received a further 16 gazelles from neighbouring Azerbaijan as part of the ongoing efforts to restore the population of the species in the country.

Goitered gazelles in the pre-release enclosure on Samukhi Plain (© ASG)

Although the gazelles were driven to near extinction by external factors, the impacts of climate change pose one of the most critical challenges they face today. The region is characterized by arid and semi-arid landscapes with limited annual rainfall and high temperatures, and as a result, the gazelles have faced increasing water scarcity. During the monitoring process, the need to create a permanent resource of drinking water for Goitered Gazelles in the Samukhi Plain was identified. A solar power plant has been constructed near the Iori River to provide water from the river channel to three water points. This project was implemented by the WWF Caucasus Programme Office, with the active involvement of the Ministry of Environment and Agriculture and the Agency for Protected Areas and with the financial support of the Wildlife Adaptation Innovation Fund (WAIF/WWF-US). In Azerbaijan, water was piped 8 km from a natural spring in the mountains to artificial watering points in the lowlands.

In 2022, the Parliament of Georgia approved establishment of the Nugzar Zazanashvili Samukhi Multipurpose Use Protected Area covering 132 km^2. This is the first protected area in Georgia, named after Georgian scientist, famous environmentalist and poet Mr. Nugzar Zazanashvili who for 20 years held the position of Conservation Director of the WWF Caucasus Programme Office and who made an invaluable contribution to the successful implementation of the Gazelle Reintroduction Programme in the Caucasus.

Nugzar Zazanashvili (right) surveying gazelle reintroduction sites, and ASG co-Chair David Mallon (in the middle) (© Elshad Askerov)

Sources:
https://www.wwfcaucasus.org/?8989366/Nugzar-Zazanashvili-Samukhi-Multipurpose-Use-Protected-Area-Established-in-Georgia
https://www.worldwildlife.org/pages/improving-water-access-for-goitered-gazelles-in-the-transboundary-area-of-azerbaijan-and-georgia; https://agenda.ge/en/news/2024/76

New Protected Areas and a breeding facility for goitered gazelle in Uzbekistan

About 4,000 goitered gazelles *Gazella subgutturosa* [*jeyran* in the Uzbek language] are estimated to remain in Uzbekistan, with 1,400–1,600 in the Bukhara region. Two new protected areas have been established to conserve the unique ecosystems of the Kyzylkum desert, which provides habitat for threatened species, including Goitered Gazelles. Kyzylkum ('red sands' in Turkic languages) covers about 300,000 km^2 between the Amu Darya and Syr Darya rivers. Most of this desert lies in in Uzbekistan, extending into Kazakhstan and Turkmenistan. The two new PAs were established following the Presidential decision "On measures to establish protected natural areas within the system of the State Committee for Ecology and Environmental Protection of the Republic of Uzbekistan" dated February 16, 2022, No. 131. These protected areas are Markaziy Kyzylkum National Nature Park (12,000 km^2) and Oktog-Tomdi State Reserve (400 km^2). Both areas are administered by the State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection. Another scientific project "Impact of Establishing a Jeyran Breeding Centre in Central Kyzylkum" aims to increase the number of animals in the wild and to study their behaviour. As part of this project, a captive-breeding facility will be constructed to establish a herd of goitered gazelles in a semi-captive environment in natural conditions.
Sources: https://www.cms.int/cami/en/news/new-protected-areas-and-breeding-facility-conserve-jeyran-uzbekistan
https://www.cms.int/cami/en/news/two-new-protected-areas-established-kyzylkum-desert-uzbekistan-0

Kazakhstan saiga census results 2024

The annual aerial saiga census in Kazakhstan took place from 14 April to 1 May. The results were announced on 3 June and showed that the total number of saiga in the country was 2,833,600, a 48% increase since 2023. The Ustyurt population is 63,600 (60.2% increase on 2023), the Ural population is 1,620,000 (43.4% increase), and the Betpak Dala population is 1,150,000 (54.3% increase).

The huge survey area means it is only possible to count the animals from aircraft. This year, as in recent years, helicopters were used. The count follows an approved methodology, developed over many years and improved with the use of modern technology. The surveys were conducted in West Kazakhstan, Mangistau, Akmola, Aktobe, Kostanay, Karaganda, Ulytau, Pavlodar and Abay regions, covering the range of the three populations: Ural, Ustyurt and Betpak Dala. Within Betpak Dala there are now three quite distinct groups: Irgiz-Turgai (the main one), Tengiz, and an eastern group which is located at the junction of Pavlodar, Karaganda and Abai *oblasts* (districts) in the eastern part of the country. This group was included in the aerial survey for the first time; before that, estimates were calculated from ground observations.

The survey team was made up of 45 people divided into two field teams, one covering the Betpak Dala population and the other team the Ustyurt and Ural populations. During 215 flight hours (15 hours more than in 2023), the teams surveyed an area of 151,226 km^2.

Survey methodology

Helicopters flew straight-line, parallel transects at 5-km or 10-km intervals, depending on the density of saiga sightings, at a constant altitude of 120 m. The flight lines did not overlap to prevent double counting. Saiga were counted in a strictly defined strip along each transect and the resulting density was calculated. Herds were photographed to verify the figures obtained by the visual count as it is impossible to make an accurate count of animals in such large, mobile herds. Extrapolations are then made across the area covered by transects, adding a calculation of possible error.

Analysis

The annual figures are calculated using the standard, well established methodology. They are derived by extrapolation and primarily reflect the population trend, i.e. an increase of over 40%, and the approximate total. The surveys were conducted in April 2024, before calving, which took place in May, so by the beginning of June, considering the successful breeding season, the number of the species will have almost doubled (that is, to around 5 million saiga in Kazakhstan).

The survey was organised by the State enterprise *Okhotzooprom* of the Committee for Forestry and Wildlife of the Ministry for Ecology and Natural Resources of Kazakhstan. The scientific part of the work – i.e. planning the survey routes, data collection, processing the results – was conducted by the Association for the Conservation of Biodiversity of Kazakhstan (ACBK). Representatives of the Institute of Zoology, the Territorial Inspectorate for forestry and wildlife, staff of the relevant protected areas, and the Association of Hunters, “Tabigat” also participated in the survey.

Source: *https://altyndala.org/results-from-the-2024-saiga-aerial-census-in-kazakhstan-are-in/*

RECENTLY PUBLISHED ARTICLES

AFRICA

"We have that connection, we have love; we take wildlife as gifts from our ancestors": relations between antelopes and Khwe in Namibia's Bwabwata National Park

Nghitevelekwa, R., Lendelvo, S., Nakanyete, F.N., Likuwa, K., Matengu, K., & Mushavanga, D. (2024).
Anthropology Southern Africa 47(2), 183-196.

Abstract
Wildlife plays significant roles in many societies that go beyond its ecological importance and economic rationale associated with conservation. This article examines the meanings of antelopes for the Khwe people in Bwabwata National Park in north-eastern Namibia. It underlines the importance that indigenous communities attach to wildlife and advocates for a more comprehensive understanding of human-wildlife relationships beyond ecological and economic values and the usual framing of conflicting relationships. The article explores how antelopes go beyond being merely "wild animals" to being intertwined in the lives and spaces of the Khwe. Drawing from secondary data, lived experiences and empirical data collected through qualitative methods of semi-structured interviews and focus group discussions, we engage Khwe residents in Bwabwata National Park, including elders, traditional leaders and the management committee of the Kyaramacan Association. Our fundamental question is: what lessons can we draw from the relations of the Khwe with certain antelope species to foster coexistence in Namibia's community conservation landscapes? Conceptually, we adopt the concept of mechanical solidarity, which emphasises a collective conscience based on shared knowledge, norms and values. We propose that integrating this approach into community conservation practices could enhance conservation outcomes.

Assessment of community capacity building and recovery of the hirola antelope in Ijara sub-county, Garissa county, Kenya

Yassin, M., Mohamed, A.M., Isiah, S., & Abdullahi, A. (2024).
American Journal of Environment Studies 7(3), 1-16.

Abstract
Purpose: This study aimed at establishing the role of community capacity building in the recovery of the hirola antelope.
Materials and Methods: A Pragmatic research design was used to assess how community capacity building in the recovery of the hirola antelope. A total of 357 respondents were targeted by this study. A chi-square test was done to establish the effect of community capacity building for conservation and the recovery of endangered Hirola antelope. Moreover, logistic regression was used to establish the relationship between community capacity building and the recovery of the hirola antelope. The collected data was presented in form of Figures and Tables.
Findings: Half (55.5%) of the respondents reported coexisting harmoniously between the community and the Hirola in the area. Similarly, half (52.4%) of the respondents reported a high extent of Hirola poaching cases in the area. Half (52.70%) of the respondents reported a high extent of the conservancy engaging in education on wildlife conservation. Moreover, the results revealed a statistically significant relationship between Harmonious co-existence between the community, predation on Hirola, Hirola poaching cases, the extent of low

deforestation, capacity building, awareness creation on community conservation and sensitization and awareness on anti-poaching and Hirola recovery (p=<0.05). In addition the study observed harmonious coexistence (COR= 2.66, C.I= 1.151-6.188, p-value = 0.022), predation of hirola (COR= 4.31, C.I= 1.277-14.567, p-value = 0.019), hirola poaching cases (COR= 3.205, C.I= 1.091-9.416, p-value = 0.034), extent of deforestation (COR= 2.46, C.I= 0.995-6.105, p-value = 0.050), awareness creation on community conservation approaches (COR= 1.764, C.I= 1.124-2.769, p-value=0.014) and sensitization and awareness on antipoaching (COR= 1.764, C.I= 1.124-2.769, p-value=0.014) were significantly associated with the recovery of the hirola antelope.

Implications to Theory, Practice and Policy: The decline of the Hirola antelope population is attributed to a complex interplay of factors including disease, habitat loss, and predation, exacerbated by increased tree cover that diminishes their grazing space and heightens predation risks. However, community capacity building showed a significant association with the recovery of the endangered hirola antelopes. Policy implications of these findings necessitate multifaceted conservation strategies such as reducing tree encroachment through controlled deforestation, enhancing habitat management to maintain open grazing areas, and implementing comprehensive disease monitoring to prevent outbreaks. Additionally, community-based conservation efforts, such as anti-poaching initiatives and local capacity building, which have shown effectiveness should be sustained and expanded. Policymakers must prioritize integrated approaches that address both ecological and socio-economic dimensions to ensure the long-term recovery and survival of Hirola antelopes.

Coexistence through sustainable conservation strategies for sitatunga *Tragelaphus spekii* in African ecosystems

Mayengo, G., Ngonyoka, A., Mtili, B., Ojija, F., & Mng'ong'o, M.E. (2024).
Wildlife Biology e01274.

Abstract

Sitatunga *Tragelaphus spekii* is an antelope species adapted to the dense swamps and marshes of Sub-Saharan Africa, where traditional population survey techniques have been ineffective and encountered difficulties in making estimations. The species formerly occurred alongside waterways throughout the lowland forest zone of West and central Africa, extending into swamp systems in the savanna zones of central, East, and southern Africa. In most parts of Africa, the sitatunga population is declining, and attracting the attention of conservationists. Furthermore, its geographical range has been recorded to have shrunk. The present study reviewed major threats to sitatunga, assessed previous and current management approaches, and proposed new approaches to effectively manage its declining populations in Africa. To achieve the study objectives, published literature, reports, online information, expert knowledge, and personal experience were reviewed to acquire relevant information. Results indicated that sitatunga are threatened due to increased habitat loss, population isolation, political instability, water level changes, habitat fragmentation, illegal hunting, and diseases. Current wildlife management approaches raise many doubts as to their effectiveness. National-level management may unsustainably segment management actions while the protected area approach manages only part of the range of wildlife. The current tenure system in most parts of Africa discourages human–wildlife co-existence, whereas human–wildlife conflict management approaches only treat the symptoms and not the root cause of the problems. If wildlife, including sitatunga, are to persist in Africa, management approaches should be changed and include re-focusing of the management context at the ecosystems and landscape level; assessing the genetic diversity of sitatunga; promoting better wetland management, including the aspect of human dimension in management; using non-invasive techniques to genetically estimate the minimum population size; assessing inbreeding; and enhancing the

implementation strategy of wildlife policy in African countries. Changing the attitude of the local community may take time, but it is a pivotal point if humans and wildlife are to coexist.

Population monitoring of a Critically Endangered antelope, the mountain bongo, using camera traps and a novel identification scheme

Sandri, T.., Prettejohn, M., Omengo, F., Cain, B., Jones, M., & Harris, W.E. (2024).
Oryx 58(4), 514-521.

Abstract

Conservation monitoring is paramount for the gathering of information on species and populations in need of conservation actions. However, monitoring of the mountain bongo *Tragelaphus eurycerus isaaci*, a Critically Endangered antelope endemic to Kenya, has hitherto been limited to surveillance (i.e. focused on persistence of the species in particular areas), thus limiting the information that could be retrieved on the status and trends of these populations. Using a newly developed identification system, we implemented robust design mark–recapture using existing camera-trap records of four wild subpopulations of the bongo. We provide data on sex and age structure and the first estimates of population size in the wild. Males and calves seem to be suffering higher mortality than females, and only two of the four monitored populations include adults of both sexes and calves. The combined size of these two breeding populations is estimated to be 29–50. Our findings confirm the critical situation of the mountain bongo in the wild and highlight the need for conservation actions to reinforce the wild populations for the long-term conservation of this antelope.

Benefits of traditional and local ecological knowledge for species recovery when scientific inference is limited

Sheppard, D.J., Stark, D.J., Muturi, S.W., & Munene, P.H. (2024).
Frontiers in Conservation Science 5, 1383611.

Abstract

Many critically endangered species persist in remnant populations so small that ecological information required to assist recovery, such as species-typical demographic parameters and habitat preferences, can be difficult to acquire based on science alone. Traditional ecological knowledge (TEK) or local ecological knowledge (LEK) can fill information gaps and provide additional understanding, though this expertise is not everlasting and often overlooked. We report on research focused on a species survival plan for mountain bongo (*Tragelaphus eurycerus isaaci*), a critically endangered antelope endemic to Kenya, persisting in the wild with fewer than 80 individuals in four separated montane forests. In preparation for a potential conservation translocation of captive-bred bongos into one or more forests, extensive camera trapping yielded limited results, suggesting that data were based on the activities of just a few individuals. Moreover, additional information critical to translocations, such as typical group size and sex ratios, could neither be observed nor obtained from the literature. This knowledge gap was largely resolved using expert interviews conducted with eight former Kenyan hunters, along with historical range and browse mapping, enriching understanding of behavioral characteristics rendering bongo particularly vulnerable to exploitation. Consistently similar responses from observations spanning a 50-year period (1950s to 1990s) across four ecosystems added certainty to responses. This study endorses a combination of data sources when dealing with remnant populations, and specifically recommends making use of this documented mountain bongo TEK/LEK to inform decisions about potential bongo reintroductions in Kenya.

Conservation priority of the vulnerable *Gazella cuvieri* in Northwestern Algeria: Insight from ecological niche modelling and geographical analysis

Bensahraoui, M., Benamor, N., & Bounaceur, F. (2024).
Ecological Frontiers.

Abstract

The Cuvier's gazelle (*Gazella cuvieri*) is an endemic species to the Maghreb region, with a range extending from Morocco to Tunisia. Understanding the ecological requirements and distribution patterns of this species is crucial for its conservation. In this study, we employed MaxEnt species distribution modelling (SDM) and explored spatiotemporal niches to investigate the distribution of *G. cuvieri* in Northwestern Algeria. We selected 10 out of 23 environmental variables for the final dataset to understand their effect on the distribution of the Cuvier's gazelle. Model accuracy was high for Cuvier's gazelle distribution (AUC = 0.89). Our results showed that *G. cuvieri* showed the most significant relative contribution at a mean temperature of warmest quarter (24.88%) followed by annual precipitation (15.72%). Based on permutation importance, temperature annual range was the most significant with 49.82%. Comparison of major land cover classes showed that cropland was the main habitat type for *G. cuvieri,* while grasslands and shrublands were significant areas for this species. *G. cuvieri* demonstrated high selectivity in terms of habitat suitability. Therefore, we recommend that conservation efforts be directed, and that priority be given to the areas identified in this study as potential conservation habitats.

Modelling habitat suitability of reintroduced scimitar-horned oryx (*Oryx dammah*) in Sidi Toui National Park, Tunisia

Louhichi, M., Khorchani, T., Eifler, D., Eifler, M., Orton, M., Dadi, K., ... & Chammem, M. (2024).
Journal of Oasis Agriculture and Sustainable Development 6(02).

Abstract

Reintroducing endangered species into their restored habitats is a significant aspect of conservation biology. The scimitar-horned oryx (*Oryx dammah*), one of the most critically endangered antelopes worldwide, was reintroduced into several protected areas in Tunisia. Understanding their habitat requirements within micro-level ecosystems is crucial for developing effective management plans to aid in species recovery. Using information-theoretic and multimodel inference (MMI) techniques, we evaluated the impact of habitat and management characteristics on the distribution of the scimitar-horned oryx in Tunisia's Sidi Toui National Park during different seasons, from June 2020 – May 2022. Our analyses, using regression coefficients and selection probabilities, revealed that factors influencing habitat suitability varied seasonally for the scimitar-horned oryx. However, the presence of grasses emerged as the most consistent indicator of their occurrence throughout the year. The strong fit of models to the data was confirmed by Receiver Operating Characteristic (ROC) plots, which indicated an Area Under the Curve (AUC) > 0.9. The study has significant implications for developing practical habitat management plans for the scimitar-horned oryx in Sidi Toui National Park

African dryland antelope trade-off behaviours in response to heat extremes

Berry, P., Dammhahn, M., Hauptfleisch, M., Hering, R., … & Blaum, N. (2024).
Ecology and Evolution 14(6), e11455.

Abstract

Climate change is predicted to narrow the prescriptive zone of dryland species, potentially leading to behavioural modifications with fitness consequences. This study explores the behavioural responses of three widespread African antelope species—springbok, kudu and eland—to extreme heat in a dryland savanna. We classified the behaviour of 29 individuals during the hot, dry season on the basis of accelerometer data using supervised machine learning and analysed the impact of afternoon heat on behaviour-specific time allocation and overall dynamic body acceleration (ODBA), a proxy for energy expenditure, along with compensatory changes over the 24-hour cycle. Extreme afternoon heat reduced feeding time in all three antelope species, increased ruminating and resting time, while only minimally affecting walking time. With rising heat, all three species reduced ODBA on feeding, while eland reduced and kudu increased ODBA on walking. Diel responses in behaviour differed between species, but were generally characterised by daytime reductions in feeding and increases in ruminating or resting on hot days compared to cool days. While antelope compensated for heat-driven behavioural change over the 24-hour cycle in some cases, significant differences persisted in others, including reduced feeding and increased rumination and resting. The impact of heat on antelope behaviour reveals trade-offs between feeding and thermoregulation, as well as between feeding and rumination, the latter suggesting a strategy to enhance nutrient uptake through increased digestive efficiency, while the walking response suggests narrow constraints between cost and necessity. Our findings suggest that heat influences both behaviour-specific time allocation and energy expenditure. Altered diel behaviour patterns and incomplete compensation over the 24-hour cycle point to fitness consequences. The need to prioritise thermoregulation over feeding is likely to narrow the prescriptive zone of these dryland antelope.

The complete mitogenomes of the two grysbok species: *Raphicerus melanotis* Thunberg 1811 (Cape grysbok) and *Raphicerus sharpei* Thomas 1897 (Sharpe's grysbok)

Deon de Jager, Eline D. Lorenzen (2023).
Mitochondrial DNA Part B Resources 8(10): 1119-1123.

Abstract

In this study, we report the novel, complete mitochondrial genomes of two dwarf African antelope species: *Raphicerus melanotis* (Cape grysbok) and *R. sharpei* (Sharpe's grysbok). The circular mitogenomes were 16,384 and 16,392 base pairs in length, respectively, and each contained the expected 37 genes typically found in mammalian mitogenomes. The maximum-likelihood phylogenetic analysis placed *R. sharpei* as the sister lineage to *R. campestris*, known as steenbok, which is the only other member of the *Raphicerus* genus, with 83% bootstrap support, to the exclusion of *R. melanotis* (100% bootstrap support). This corroborated previous findings based on the cytochrome *b* gene only. The number of base differences per site between the coding regions of the mitogenomes of *R. sharpei* and *R. campestris* was 0.0519, while it was 0.0701 between *R. sharpei* and *R. melanotis* and 0.0709 between *R. melanotis* and *R. campestris*. The novel grysbok mitogenomes will be valuable resources in future phylogenetic analyses, and phylogeographic and conservation genetics studies.

AMERICA

Horns, hunters, and harvest: re-examining management paradigms for pronghorn

Tafelmeyer, L.E., LaSharr, T.N., Binfet, J., Bredehoft, M., ... & Monteith, K.L. (2024).
The Journal of Wildlife Management e22674.

Abstract

The sustainable use of wildlife is foundational to the success of the North American model of wildlife conservation. Harvest management often is shaped through both species biology and public desires. The long timespan it takes males of most ungulate species to reach peak weapon size has created a situation in harvest management in which harvest strategies cannot prioritize both generous hunter opportunity and opportunities to pursue large-weaponed males; therefore, current harvest paradigms prioritize one at the expense of the other. In contrast to other species, pronghorn (*Antilocapra americana*) attain the majority of their peak horn size early in life. The rapid development of horns relative to their age may allow for liberal harvest without sacrificing the opportunity for hunters to harvest males with large horns. We evaluated the influence of sex ratios and average age of harvested males on the average horn size of harvested male pronghorn from 2019 to 2022 in 9 hunt areas in Wyoming, USA. Although mean age of harvested males was negatively affected by rate of harvest, increases in mean age at harvest led to only slight increases in mean horn size (i.e., a 1-year increase in mean age increased mean horn size by 2.1 cm [~1 inch]). The proportion of the harvest composed of large-horned males was not influenced by mean age of harvest or sex ratio of the population. Based on simulated populations, increasing harvest led to an increase in the number of large-weaponed pronghorn in the harvest - a relationship that existed for bighorn sheep (*Ovis canadensis*) and elk (*Cervus canadensis*) but only at low to moderate rates of harvest. The comparatively young age that pronghorn attain near-peak horn size alleviates what is otherwise a tradeoff between hunter opportunity and managing for large horn size that is evident in management of other ungulate species. Though rarely a reality in management for large ungulates, for pronghorn, liberal harvest may be possible while still providing opportunity to harvest males with large horns.

Climatically robust multiscale species distribution models to support pronghorn recovery in California

Bean, W.T., Butterfield, H.S., Howard, J.K., & Batter, T.J. (2024).
Ecology and Evolution 14(6), e11454.

Abstract

We combined two climate-based distribution models with three finer-scale suitability models to identify habitat for pronghorn recovery in California now and into the future. We used a consensus approach to identify areas of suitable climate now and future for pronghorn in California. We compared the results of climate models from two separate hypotheses about their historical ecology in the state. Under the migration hypothesis, pronghorn were expected to be limited climatically by extreme cold in winter and extreme heat in summer; under the niche reduction hypothesis, historical pronghorn of distribution would have better represented the climatic limitations of the species. We combined occurrences from GPS collars distributed across three populations of pronghorn in the state to create three distinct habitat suitability models: (1) an ensemble model using random forests, Maxent, classification and regression Trees, and a generalized linear model; (2) a step selection function; and (3) an expert-driven model. We evaluated consensus among both the climate models and the suitability models to

prioritize areas for, and evaluate the prospects of, pronghorn recovery. Climate suitability for pronghorn in the future depends heavily on model assumptions. Under the migration hypothesis, our model predicted that there will be no suitable climate in California in the future. Under the niche reduction hypothesis, by contrast, suitable climate will expand. Habitat suitability also depended on the methods used, but areas of consensus among all three models exist in large patches throughout the state. Identifying habitat for a species which has undergone extreme range collapse, and which has very fine scale habitat needs, presents novel challenges for spatial ecologists. Our multimethod, multihypothesis approach can allow habitat modelers to identify areas of consensus and, perhaps more importantly, fill critical knowledge gaps that could resolve disagreements among the models. For pronghorn, a better understanding of their upper thermal tolerances and whether historical populations migrated will be crucial to their potential recovery in California and throughout the arid Southwest.

Cannot outrun the past: age, nutrition, and cohort influence horn size in pronghorn

Tafelmeyer, L.E., LaSharr, T.N., Binfet, J., Bredehoft, M., ... & Monteith, K.L. (2024).
The Journal of Wildlife Management 88(8), e22653.

Abstract

In North America, most ungulate species exhibit life-history traits typical of long-lived, iteroparous species wherein young males tend to prioritize essential life functions including body growth and maintenance that constrains allocation of resources to horn, antler, and pronghorn growth. As a result, males of most ungulate species require several years of growth before reaching asymptotic body size and thereafter, peak weapon size is attained. Unique among ungulate species in North America, pronghorn possess a suite of life-history traits resulting in a precocious (i.e., unusually early development) pace of life relative to other North American ungulates. We tested the hypothesis that the fast pace of life of pronghorn extends to precocious development of large horns, and evaluated how horn size was affected by environmental conditions during the year they were grown and the potential for cohort effects associated with environmental signatures during the year of birth. We evaluated the influence of age and the environment on horn size of pronghorn using data collected from 1,789 male pronghorn harvested from 2019 to 2022 in Wyoming, USA. Pronghorn attained 95% of their peak horn size by 3.5 years old. Climatic conditions influenced horn growth through cohort effects and year of growth pathways. Snow depth during the year of birth positively influenced horn size, whereas the effects of environmental conditions during the year of horn growth were dependent on age. For young animals, snow depth and moderate drought positively influenced horn size during the year of horn growth, but the effect was negligible for prime aged and old animals. The precocious nature of pronghorn extended to their horn growth characteristics, resulting in early attainment of a large proportion of their peak horn size. The unique ecology of pronghorn and rapid attainment of size early in life can allow for greater flexibility to balance hunter opportunity and production of large-horned males for pronghorn as compared with other ungulates.

Seasonality in Sonoran pronghorn (*Antilocapra americana sonoriensis*) survival and movement within a managed rangeland

Barbour, N., Bright, J., Hervert, J., Gurarie, E.D., Fuest, S., ... & Fagan, W.F. (2024).
The Journal of Wildlife Management e22675.

Abstract

The endangered Sonoran pronghorn has a large portion of its range within a military operations area in southwestern Arizona, USA. Sonoran pronghorn have been actively managed in this

region for more than 20 years. Recovery efforts have included release of captive-born pronghorn into areas both currently and historically occupied by wild pronghorn. These areas provide habitat for federally endangered essential and experimental non-essential, referred to as 10(j), pronghorn populations. More than 20 years of monitoring efforts have resulted in a large dataset on their spatial occurrence and movement within these areas. To synthesize long-term trends and seasonality in Sonoran pronghorn movement and mortality, we employed a suite of quantitative analyses that characterized the pronghorns' 1) individual and population-level home ranges, 2) occurrence near active military targets, 3) trends in seasonal group sizes and composition, 4) sex- and group-specific survivorship, and 5) changes in movement-based behavior following release from captivity. We found strong seasonal trends throughout, including sex-specific differences in seasonal movement rates, home ranges, survival, and group composition. Further, captive-born pronghorn released into the endangered population exhibited markedly higher survival compared to those released in 10(j) areas. Captive-born pronghorn exhibited significant seasonal use of active military target areas. These analyses, which represent the most comprehensive analysis of Sonoran pronghorn movement and survival to date, have important implications for the future conservation and management of this endangered species. Our results indicate that active management of endangered Sonoran pronghorn has successfully increased survival, and we recommend maintaining or increasing current recovery efforts, such as captive breeding and placement of supplemental resources throughout their range (e.g., freestanding water and supplemental forage), to further boost the survivorship of both wild- and captive-born pronghorn. Moreover, future management efforts could use our seasonality results to create dynamic prediction models of when and where pronghorn are likely to overlap with military activities to best manage interactions. Our methods have added application to other mobile species of conservation interest occurring in disturbed and resource-limited landscapes.

Hematology and biochemical reference intervals for free-ranging pronghorn (*Antilocapra americana*) in West Texas

Reeves, A.M., Gray, S.S., Harveson, L.A., Hilton, C.D., … & Dittmar II, R.O. (2024).
Journal of Zoo and Wildlife Medicine 55(3), 573-584.

Abstract

Pronghorn (*Antilocapra americana*) are considered a keystone species of North American grasslands and an important economic source for many landowners in Texas. Pronghorn restoration projects routinely capture and translocate individuals from surplus populations to restoration areas. The objective of this study was to generate normal hematological and biochemical reference intervals (RI) for free-ranging pronghorn populations in Texas as a health monitoring tool for pronghorn restoration efforts. Blood samples were collected by jugular venipuncture and divided among an EDTA tube, serum separator tube, and a single blood smear on site. Complete blood counts and biochemical profiles were completed at the Texas Veterinary Medical Diagnostic Laboratory. In total, 417 individuals (41 males, 376 females) were included in the analysis. RI were determined by robust methods (R Studio) and mixed models' analysis of variance (SPSS 28) to examine differences in blood parameters due to fever, sex, age (adult versus yearling [<1 yr of age]), cell abnormalities, and pathogen exposure reported by the testing laboratory. Sex, age, and pathogen exposure affected mean blood values, but did not warrant development of separate RI by class. Bluetongue virus was identified in 46.8% (195/417) of pronghorns and epizootic hemorrhagic disease in 89.4% (194/217) of pronghorns; 84.8% (184/217) of the pronghorns tested positive for both diseases. This information provides baseline hematology and biochemical parameters to assess the health of free-ranging pronghorn and guide wildlife managers in decision-making for future translocations and restoration objectives

ASIA AND MIDDLE EAST

Assessment of the global population size of the Mongolian gazelle *Procapra gutturosa*

Buuveibaatar, B., Strindberg, S., Ariunbaatar, B., Batdorj, S., ... & Olson, K.A. (2024).
Oryx 1-10.

Abstract

The Mongolian gazelle *Procapra gutturosa* is a wild ungulate ubiquitous across the largest remaining temperate grasslands of Mongolia, Russia and China. The species is nomadic and ranges over long distances, resulting in widely fluctuating abundance in any given location. Therefore, a comprehensive and range-wide survey is required to accurately estimate its global population size, but challenges are posed by the expansive geographical distribution and the political boundaries across the species' vast range. To obtain an estimate of the total population, we compiled data from recent range-wide surveys. During 2019–2020, we estimated the population size in Mongolia by conducting line transect distance surveys and total counts, and by deriving numerical predictions for unsurveyed areas through data analysis. The gazelle's population in Russia was surveyed in 2020 across its summer range using simultaneous counts, transect surveys and expert knowledge. The distance sampling surveys in Mongolia revealed that slightly more than half of the gazelles along the transects were detected. Our assessment of the gazelle population, although probably an underestimate, suggests there are c. 2.14 million individuals in Mongolia and c. 30,000 in Russia. These results confirm that the Mongolian gazelle is the most abundant nomadic ungulate in the open plains across its range. However, to obtain more accurate estimates across all range states and effectively monitor the gazelle's population status, it is essential to implement standardized survey protocols that correct for imperfect detection. At present, the management of the Mongolian gazelle is inadequate, as there is a lack of regular monitoring to identify any adverse population changes that could necessitate conservation interventions.

Safeguarding the last stronghold: Ecology and conservation of Asiatic Cheetah's prey species in Turan Biosphere Reserve (Iran)

Safiyan-Boldaji, P., Poirazidis, K., Hemami, M.R., Moser, D., Plutzar, C., Dullinger, S., & Schindler, S. (2024).
Global Ecology and Conservation 51, e02937.

Abstract

Identifying suitable habitats for wild felids is essential for effective area-based conservation efforts. However, modeling habitat suitability for extremely rare and endangered taxa such as the Asiatic Cheetah (*Acinonyx jubatus venaticus*) is challenging due to limited data availability. To address this, our study focused on analysing the distribution factors of the Asiatic Cheetah's main prey species, including the Wild Goat (*Capra aegagrus*), Urial (Ovis *vignei*), Goitered Gazelle (*Gazella subgutturosa*), Jebeer Gazelle (*Gazella bennettii*), and Cape Hare (*Lepus capensis*) in the Turan Biosphere Reserve (TBR), a critical Cheetah habitat in Iran. To determine habitat suitability for these prey species, we conducted a systematic field survey along 30 transects measuring 16 km each by collecting data in each 1 km interval, resulting in 1172 direct observations of their presence. These observations were then correlated with 44 variables grouped into four categories: bioclimatic, topography, vegetation, and distance to anthropogenic and natural features. Suitability maps were generated using a hierarchical modeling approach. Among the observed prey species, Urial had the highest frequency of sightings (675 visual observations over eight seasons), followed by Goitered Gazelle (564

observations), Cape Hare (278 observations), Jebeer Gazelle (232 observations), and Wild Goat (208 observations). The most influential predictors affecting prey species distribution were mean summer temperature (with optimal ranges at lower temperatures), terrain relief roughness (with optimal ranges at intermediate roughness), distance to wells (with optimal ranges at shorter distances), and distance to corrals (with variable optimal ranges across species). Our findings indicate that the western and eastern mountainous areas, along with their hilly surroundings, as well as the northwest and western plains of TBR, constitute the most suitable habitats for these five prey species. These models and suitability maps provide crucial evidence for implementing conservation measures in the vulnerable habitats of the Asiatic Cheetah and its primary prey species. Environmental conditions can be enhanced through the management of water sources, roads, corrals, and livestock grazing. In addition, the fragmentation of suitable areas within TBR highlights the importance of preserving corridors between these fragmented habitats. We recommend re-evaluating and expanding the boundaries of Turan National Park, Turan Wildlife Refuge, and Turan Biosphere Reserve to ensure the long-term conservation of this threatened felid species and its associated ecosystems.

Activity behavior of goitered gazelles in an arid environment

David A. Blank (2023). *Behavioural Processes* 204: 104804

Abstract

The daily activity pattern in ruminants consists mainly of alternating foraging with bouts of resting, while other behaviors usually play a minor role in the daily activity budgets of ungulates most of the year. Interactions of both intrinsic and extrinsic factors force animals to adopt compromises to form optimal time proportions for foraging and resting to satisfy their daily energy demands. This paper considers the impact of ambient temperature, pasture conditions, body-size, and the effects of lactation and animal growth on the daily activities of goitered gazelles (*Gazella subgutturosa*). My study found: 1) temperature was the most significant factor leading to the greatest daily hour-to-hour variations in activity, as well as significant monthly changes in activity fluctuations; 2) seasonal improvement of forage conditions did not have a distinctive effect on daily activity; 3) the effect of body size, lactation and fawn growth also did not noticeably change activity fluctuations; but 4) factors related to hiding behavior had a significant impact on goitered gazelle activity. Though goitered gazelles are a sexually dimorphic species, they did not demonstrate any significant deviation between males and females in their daily activities in contrast to typical dimorphic ruminants. The goitered gazelles' hiding behavior may provide a possible explanation for this distinction, as other previously observed dimorphic ungulates were mainly species where fawns followed their mothers from birth. Among other influences, ambient temperature and features of their hiding behavior were the most significant factors influencing diurnal activity of goitered gazelles, while age and sex had a weaker impact on daily behaviors.

Seasonal diet composition of Goitered Gazelle (*Gazella subgutturosa*) in an arid and semi-arid region of Western China

Zhang, N., Zhang, Z., Liu, C., Xiong, Z., Wei, Y., Meng, D., ... & Liu, Z. (2024).
Animals 14(5), 663.

Abstract

Global climate change, habitat fragmentation, and human interference have resulted in a significant, ongoing decline in the population of goitered gazelles. Effective conservation strategies require an understanding of resource requirements of threatened species, such as dietary needs. Therefore, we aimed to elucidate the food composition and seasonal dietary changes of goitered gazelles through microhistological analyses of fresh feces. Fabaceae

(11.5%), Gramineae (9.4%), Chenopodiaceae (20.2%), Asteraceae (10.1%), and Rosaceae (19.5%) formed the primary dietary components of goitered gazelle. Additionally, *Kraschenninnikovia arborescens* (13.4%) and *Prunus sibirica* (16.3%) were identified as the key forage plants. Forbs (50.4%) were the predominant plants for grazing throughout the year, particularly in the spring (72.9%). The proportion of trees in the diet was highest in the autumn (36.7%) and comparatively lower in other seasons. Furthermore, the proportions of shrubs (22.0%) and graminoids (14.8%) both reached their peaks in the winter. Our findings indicate that goitered gazelles strategically forage seasonally to cope with resource bottlenecks, enhancing their adaptability to arid and semi-arid habitats. Our study provides essential ecological information for the conservation of goitered gazelles and emphasizes the importance of dietary studies of species of ecological significance in environmentally sensitive areas.

Vocalisation in wild-living mountain gazelles (*Gazella gazella*): structure and context of acoustical signals

Amir Arnon, A., Koyama, N.F. & Wronski, T. (2024).
Behaviour DOI:10.1163/1568539X-bja10283

Abstract

Describing vocalisations of species in the wild is an important step to understanding their function. A wild-living population of mountain gazelles (*Gazella gazella*) was monitored in Israel, using camera traps, thereby providing a first detailed description of the acoustic repertoire. We described six acoustical signals that were either reported by previous authors or that were hitherto not reported. Acoustic signals were categorised according to behavioural context as alarm calls, courtship calls or threat calls and — if possible — characterised by four acoustic variables, i.e., duration, maximum amplitude frequency, three power quartiles and fundamental frequency. Vocalisations were illustrated as spectrograms supplemented by full video sequences to show the acoustical signal in its environmental, social, and behavioural context. Given the rather inconspicuous character of many acoustic signals, we proposed further in-depth studies of vocalisation in mountain gazelles and other Antilopine species to unravel new insights into their behaviour and social organisation.

Environmental vulnerability to flooding and habitat suitability mapping of *Gazella marica*

Arash, S.R.A. & Cushman, S.A. (2024).
Journal of Wildlife and Biodiversity 8(2), 1-20.

Abstract

Floods are one of the catastrophic natural disasters that have threatened human society and biodiversity throughout history. This is particularly so in coastal habitats such as the Mond Protected Area of Iran and is one of the principal factors endangering Arabian sand gazelle in this area. The Arabian sand gazelle is considered an independent species in Iran and The Mond Protected Area is its only habitat in Iran. This study aimed to determine the suitability of the habitat and identify the flood-prone areas of Mand protected area. Using the maximum entropy method and MaxEnt software, a habitat suitability map was prepared. To study the impacts of Mond River flooding on gazelle habitats within the Mond Protected Area and provide 25 to 500-year return period flood inundation maps, a two-dimensional HEC-RAS model was developed. After mixing 2 | Journal of Wildlife and Biodiversity 8(2): 1-20 (2024) the flood inundation maps with the suitability map, it was determined that significant parts of the center and west sections of the study area are prone to devastating floods. Generally, in this study, we have determined by using flood zoning techniques in areas that are likely to be affected by

floods, which is very effective in managing floodplain areas and controlling floods to reduce flood damage to the only sand gazelle's habitat in Iran.

Habitat suitability, distribution modelling and GAP analysis of Przewalski's Gazelle conservation

Liang, D., & Li, C. (2024).
Animals 14(1), 149.

Abstract

Although the population of Przewalski's gazelle (*Procapra przewalskii*) has increased, this species is still threatened by a variety of risk factors, such as habitat loss and fragmentation, grassland fencing, grazing conflict, the segmentation of different populations, and declines in population genetic diversity. In order to determine the potential suitable habitat of Przewalski's gazelle and find a new suitable location for its conservation translocation, we used the MaxEnt model to predict the suitable habitats in Qinghai Province, Gansu Province, and the Ordos Plateau in Inner Mongolia and other regions with historical distribution records. On the basis of the MaxEnt model's prediction of the potential suitable habitat of Przewalski's gazelle, we used GAP analysis to determine the existing protection gaps and provide a new reference for the future protection of Przewalski's gazelle. We found that altitude, temperature, vegetation type, and distance from roads were the main environmental factors affecting the geographical distribution of Przewalski's gazelle. Most of the suitable habitat of Przewalski's gazelle is confined around Qinghai Lake. GAP analysis revealed that most of the suitable habitats of Przewalski's gazelle are not included in the established reserves, and Qinghai Lake National Nature Reserve only covers a small area around Qinghai Lake. The whole reserve only accounts for 7.11% of the area of the suitable habitat for Przewalski's gazelle and 15.79% of the area of the highly suitable habitat for Przewalski's gazelle. We suggest that conservation translocation for Przewalski's gazelle should be put on the agenda. It is necessary to consider reintroducing these gazelles into their potential suitable habitats as a feasible way of establishing new populations and saving this species.

Sexually differentiated decision-making involves faster recruitment in the early stages for the Tibetan antelopes (*Pantholops hodgsonii*)

Zhu, Q., Guan, J., Lei, T., Xuan, K., Guo, S., Zhao, Y., ... & Li, Z. (2024).
Current Zoology zoae036.

Abstract

Group living is widespread across diverse taxa, and the mechanisms underlying collective decision-making in contexts of variable role division are critical for understanding the dynamics of group stability. While studies on collective behavior in small animals such as fish and insects are well-established, similar research on large wild animals remains challenging due to the limited availability of sufficient and systematic field data. Here, we aimed to explore the collective decision-making pattern and its sexual difference for the dimorphic Tibetan antelopes *Pantholops hodgsonii* (chiru) in Xizang Autonomous Region, China, by analyzing individual leadership distribution, as well as the joining process, considering factors such as calving stages and joining ranks. The distinct correlations of decision participants' ratio with group size and decision duration underscore the trade-off between accuracy and speed in decision-making. Male antelopes display a more democratic decision-making pattern, while females exhibit more prompt responses after calving at an early stage. This study uncovers a partially shared decision-making strategy among Tibetan antelopes, suggesting flexible self-organization in group decision processes aligned with animal life cycle progression.

A high-quality chromosome-level reference genome assembly of Tibetan antelope (*Pantholops hodgsonii*)

Xu, B., Chen, J., Song, P., Gu, H., Jiang, F., Li, B., ... & Zhang, T. (2024).
Scientific Data 11(1), 1215.

Abstract

Tibetan antelope (*Pantholops hodgsonii*), a wild ruminant endemic to the Qinghai-Tibetan Plateau (QTP) in China, has evolved a series of genetic and physiological adaptation strategies to thrive in the harsh plateau environments. However, limited research on the genome of this species exists. Here, we established a high-quality chromosome-level reference genome assembly of the Tibetan antelope using PacBio HiFi, DNBSEQ, and Hi-C sequencing data. The assembly, totaling 3.13 GB, consists of 31 chromosomes (29 + X + partial Y), with a Scaffold N50 length of 92.23 Mb. The quality value (QV) and Benchmarking Universal Single-Copy Ortholog (BUSCO) score were 70.14 and 98.20%, respectively, indicating that our genome sequence is of high quality and completeness. Our genome not only contribute to the genetic conservation of Tibetan antelope but also provides a valuable resource for genetic, ecological, and evolutionary research within the sub-family Caprinae.

Responses of Tibetan antelope population to environment changes during the Holocene

Wang, Z., Qu, Q., Ma, D., Hou, X., Ji, K., Gao, X., ... & Hou, J. (2024).
Palaeogeography, Palaeoclimatology, Palaeoecology 641, 112132.

Abstract

Tibetan antelope is the only genus of large mammal endemic to the Tibetan Plateau. In the past decades, the antelope population has been significantly affected by human activities, including massive illegal hunting, followed by strict protection policies and establishments of natural reserves. Various techniques and many efforts have been devoted to monitoring antelope population fluctuation and migration in past decades. However, it remains unclear how the antelope population changed in the past, and how it varied with climate and environment. Here, we presented sedimentary records at Lake Zonag, one of the major calving grounds for the Tibetan antelope, to study past changes in antelope population and its response to environment in past 9000 years. The sedimentary fecal sterols, produced by antelopes, captured the sudden decrease in antelope population due to illegal hunting in 1980s, as well as the recent recovery because of protection. The antelope population varied significantly during the past 9000 years, generally following environment changes revealed by geochemical elements in the same sediment core. Large antelope population likely lived in environment with relatively warm and humid condition, while small antelope population occurred in adverse environment with relatively cold and dry condition. Two periods with notably low antelope population were observed at 5.1–4.5 and 4.1–3.7 ka. The increase in antelope population in the past 400 years likely resulted from wildlife protection from early Tibetans. This study provides a promising method to reconstruct past changes in antelope population, to study its response to environment changes, and to provide historical comparison for wildlife protection.

Fluctuations in Chinkara gazelle population and gender ratios: a four-year study in Khuzdar and Labesla, Balochistan

Ullah, N., Basheer, I., Zhang, M., Rehan, M., Ur Rehman, F., & Khan, M.T. (2024).
Applied Ecology & Environmental Research 22(1).

Abstract

The Chinkara gazelle (*Gazella bennettii*), an endangered species, faces a serious threat from anthropogenic activities and climate change. In Balochistan, climate change and drought have created extremely challenging circumstances for its survival. The population status of many species cannot be determined due to a lack of data. If the current situation persists, there is a high risk of extinction for this species in its natural habitat. The purpose of this study was to examine the population dynamics and distribution patterns of Chinkara gazelle in the Khuzdar and Lasbela districts of Balochistan, Pakistan. The study covered an area of approximately 45,123.97 km2 and involved a double-observer survey at six sites from 2019 to 2022, using the BBRecapture package in the R programming language. The study detected a decreasing population trend in the Chinkara population over a four-year period. A population of 700, 683, 613 and 583 individuals were observed in 2019, 2020, 2021 and 2022, respectively. Rocky shrub land consistently recorded the highest number of chinkara sightings among various habitats. This study provides valuable information about the Chinkara gazelle population, including population trends, gender ratios, habitat preferences, and density. The findings contribute significantly to our understanding of the species and will be used to develop local-level conservation initiatives.

An insight into population structure and seasonal herd pattern of blackbuck (*Antilope cervicapra*) in semi-arid region of western Haryana, India

Delu, V., Singh, D., Dookia, S., Priya, Godara, A., & Karwasra, V. (2024).
Tropical Ecology 65(1), 92-102.

Abstract

The population structure and herd pattern of the blackbucks were investigated in a semi-arid area of village Badopal, Fatehabad, Haryana, which is surrounded by human settlements and agricultural intensification. Fortnightly, 25 field visits were conducted from September 2019 to August 2020 during four different season(s) and data was recorded by Scan sampling and line transect method in morning and evening hours. Total of 1900 individuals were screened which were divided into six herd categories with six age groups of both sexes. The adult male to adult female ratio during study period was recorded 25.02 with maximum 51.10% contribution in the population from adult females. Out of the total 133 groups screened, maximum 45 groups were sighted in autumn and minimum 14 in summer and overall annual group mean was 14.54 ± 2.43 with a mean crowding of 26.39. Out of the total six herd categories sighted at the site, maximum number was 42 for harem herd ($HH = 42$) and minimum was 9 for female herd ($FH = 9$) and the species exhibited partial social organization because both herd and solitary animals were observed. On the basis of seasonal and annual means, the DMRT test revealed that the size of harem herd (HH) was statistically maximum ($P < 0.05$) among all other categories. It is practically difficult to make a species-specific efficient conservation plan without regular monitoring of population size and knowledge of a species' sociality. Present study provide an insight of population structure and social behavior of blackbuck among a human dominating landscape, therefore, it can be implemented for long term habitat management of this isolated fragmented population and many such small populations throughout the western Haryana.

Not all is black and white: phylogeography and population genetics of the endemic blackbuck (*Antilope cervicapra*)

Jana, A. & Karanth, K.P. (2023). *Conservation Genetics* 24: 41-57.

Abstract

Genetic diversity of organisms is an indicator of their long-term survival and can potentially be shaped by the extent of geneflow between populations. Geographical features and anthropogenic interferences can both obstruct and also facilitate animal movement, directly or indirectly. Such patterns have not been extensively studied across grasslands in the Indian subcontinent which is a mosaic of both natural and man-made topography. This study looks at genetic variation in an endemic ungulate, the *Antilope cervicapra* or blackbuck, throughout its distribution range. Using mitochondrial and nuclear (microsatellite) information, we find that different markers shed light on different aspects of their evolutionary history. Absence of robust geographical clustering in mitochondrial DNA indicate recent isolation in these populations, while lack of shared haplotypes between sampling locations suggests female philopatry. Nuclear data shows the presence of three genetic clusters in this species, pertaining to the Northern, Southern and Eastern regions of India. Our study also shows that an ancestral stock separated into two groups that gave rise to the North and South clusters and the East population was derived from the South at a later time period. Both microsatellite and mitochondrial data indicate that the population from the Eastern part of India is genetically distinct and the species as a whole shows signatures of having undergone recent genetic expansion. In spite of immense losses in grassland habitats across India, blackbucks seem to have well-adapted to human altered landscapes and their numbers are beginning to show an upward trend.

AFRICAN BUFFALO

Range contraction and expansion of the African buffalo under climate change scenarios

Lawer, E.A., Darkoh, E.L. & Akasere, C. (2024).
Biodiversity, 1-15.

Abstract

Climate change is one of the leading causes of global biodiversity declines and extinctions. Yet knowledge of its impact on African buffalo distribution on the continent is lacking. In this study, we apply ensemble species distribution modelling to predict the distribution of two coarsely defined African buffalo functional groups under current and future climate scenarios (Shared Socioeconmic Pathway, SSP245 and SSP585 in 2100) and estimate habitat representation within protected areas. Model predictions indicate significant range contraction and expansion in the savanna and the forest buffalo functional groups, respectively. Also, the proportion of suitable habitats for both functional groups is represented poorly within protected areas, with the current coverage expected to decline further. Our findings reveal plausible implications of climate change on African buffalo conservation and zoonotic diseases. Overall, this climate-based approach could be applied to model the distribution of African buffalo subspecies at local geographical scales in countries with adequately sampled occurrence data to support conservation decision-making.

WILD CAMEL

Conservation genetics and population surveys of the Critically Endangered wild camel *Camelus ferus* in Mongolia

Jemmett, A.M. (2024).
Doctoral dissertation, University of Kent, The Institute of Zoology, ZSL. doi:10.22024/UniKent/01.02.105529

Abstract

The critically endangered wild camel, *Camelus ferus*, is a separate species to the domestic Bactrian camel, *Camelus bactrianus*. Surviving only in Mongolia and China, it has a narrow range of specialised Gobi Desert habitat. Added to this, its presumed small population and reduced genetic diversity leaves it threatened with extinction. Like many threatened species, conservation action has led to the creation of an ex-situ insurance population in Mongolia. The aim of this thesis was to use genetic research and timelapse camera trap distance sampling methods to improve our understanding of the species - both in the wild (in the Great Gobi A Special Protected Area in Mongolia), and in the ex-situ herd. Using a novel method of camera trap distance sampling using timelapse images we determined one of the first precise abundance estimates for the wild camel in the GGASPA, provisionally estimating the population to be 664 individuals (95% confidence intervals 400-1100). Despite the two species being separate, for *Camelus ferus* and *Camelus bactrianus*, common naming often confuses them. This is of importance when considering conservation implications. We used non-invasive genetic samples to determine that prevalence of introgression of DNA from domestic Bactrian camels *Camelus bactrianus* is extensive across the GGASPA, whilst also confirming that genetic diversity and inbreeding levels are comparable in both the in-situ and ex-situ wild camel populations. Finally, we looked at other ex-situ populations of critically endangered mammals, determining that they provide widely variable contributions to mitigating a taxon's extinction risk, which is inadequately assessed in conservation. All of this used together has improved our understanding of the threats that face the wild camel in Mongolia, both in the wild and in captivity. The data will continue to be used to inform further conservation management and to increase scientific and public awareness of the plight of the wild camel, with the overall aim of saving it from extinction.