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From the ASG Chairs ...

Membership - Next Quadrennium

2013

Despite their major importance (biological, ecological, socio-economic etc.), Antelopes do not usually stand out in the media or on the frontline of the global conservation agenda. Nonetheless, 2013 was a busy year for ASG. All of you, ASG members, are active in your own fields and some of your results appear in the columns of *Gnusletter*. Here is an opportunity to invite every one of you to present results of your involvement in Antelope conservation. Below is a list of some of the meetings which were either co-organized or attended by ASG in 2013:

- Western Giant Eland conservation strategy workshop, Saly Portudal, Senegal, 28-31 January 2013;
- 16th session of the Conference of the Parties (CoP16) of CITES, Bangkok, Thailand, 3-14 March 2013;
- Restoration of Goitered Gazelle to the Caucasus, Baku Azerbaijan, 2-6 April 2013;
- 13th annual meeting of the Sahelo-Saharan Interest Group (SSIG), Agadir, Morocco, 2-3 May 2013;
- Mountain Bongo conservation workshop, Dubai, UAE, May 2013;
- CMS Saiga antelope technical workshop, Astana, Kazakhstan, 18 June 2013;
- Meeting with Forestry and Wildlife Department on Antelope priorities and planning in Eritrea; Asmara, 13-20 September 2013;
- EAZA Antelope & Giraffe TAG meeting, Edinburgh, UK, 27-28 September 2013;
- 19th Session of the FAO African Forestry and Wildlife Commission (AFWC), Windhoek, Namibia, 30 September-5 October 2013;
- Dama Gazelle conservation workshop, Edinburgh, UK, 19-21 November 2013 (report to follow in next Gnusletter).

2014

Here is the first issue of *Gnusletter* for 2014.

In 2014, under the auspices of its ASG Red List Authority Coordinator, David Mallon, ASG will be reassessing the status of all antelopes for the IUCN Red List, as part of the next cycle of the Global Mammal Assessment, due in 2015. This is a major task and we will be asking ASG members later in the year for information on status updates and inviting reviews of draft assessments. For anyone wishing to become a Red List assessor, an online training course is now available: www.iucnredlist.org.

This is an appropriate moment to renew our request for copies of published papers and reports: please send to the Co-Chairs a copy of all material on antelopes that you produce. This information is an indispensable source of reference for the Red List and future status updates and it also helps to depict the level of activity within ASG.

Among other IUCN initiatives, the criteria for identifying Key Biodiversity Areas (KBAs) are near completion and a Red List of Ecosystems is under development. Details of these and their implications for antelopes and habitats will be summarized in Gnusletter once they have been finalized.

ASG is committed to strategic planning for threatened antelopes. We intend to work further on this theme in 2014. Another issue of current concern is the intentional genetic manipulation of antelopes to produce extreme colour variants or enlarged trophies. An ASG policy statement on this is under development.

As a reminder, ASG is currently elaborating a special issue of *Gnusletter* on the African Buffalo, a non-antelope taxon covered by ASG. The issue will be published in 2014. Once more, we invite everyone interested in this taxon to submit original publications and reports, summaries of published papers and reports, brief news and any other material including interesting and/or nice pictures.

We wish you all an excellent 2014 with many successful projects!

Free-ranging Giant Sable, Angola (© Pedro Vaz Pinto)

Free-ranging Central African Giant Eland, Central African Republic (© Philippe Chardonnet)

Reports and Projects

Dama Gazelle (*Nanger dama*) Breeding Programs at Two Conservation Centers in the U.S.A

Brandon Speeg and Steve Shurter, White Oak Conservation
Adam Eyres, Fossil Rim Wildlife Center

Introduction:
Dama gazelle (*Nanger dama*) are listed as Critically Endangered by the International Union for the Conservation of Nature (IUCN) and have undergone an estimated 80% reduction in total wild population due to overhunting and habitat loss (IUCN Redlist 2013). Dama gazelle are a priority species for the IUCN Antelope Specialist Group due to the precarious situation in the wild and disturbing parallels with the decline and extinction of scimitar horned-oryx (*Oryx dammah*). Similar to oryx recovery efforts, successful dama gazelle conservation will rely on repatriation from captive stock as part of the broader strategic plan. Consistent reproduction in dama gazelle captive breeding programs at conservation centers in the United States demonstrates the potential for successful repatriation management.

This review focuses on the captive population of addra gazelle (*Nanger dama ruficollis*) in North America, found in both Association of Zoos and Aquariums (AZA)-accredited zoos and private institutions. A smaller population of Mhorr gazelle (*Nanger dama mhorr*) is found in AZA zoos, but no data was included for this population. The 2012 AZA Population Analysis and Breeding Plan lists 134 animals (*N.d.ruficollis*) in 22 institutions, with the known AZA population descended from 12 founders after an initial capture of 5.15 animals from Eastern Chad in 1967. The current gene diversity is 85.77%, with many unknown lineages resulting from assumptions for founder representation in the AZA population. Large numbers of dama gazelles with unknown lineages exist in private institutions, predominantly in Texas. The overall North American population has the potential to significantly contribute to repatriation programs with appropriate scientific management and collaboration.

The Conservation Centers for Species Survival (C2S2) consortium is a group of six centers that collectively manage more than 25,000 acres devoted to endangered species study, management and recovery. Five of the six centers manage *N.d. ruficollis* (dama gazelle hereafter) and collectively hold 46.3% of the AZA population, according to the 2012 AZA Population Analysis. Dama gazelle are a C2S2 focal species, and the group is invested in innovative approaches to managing large populations of ungulates as a precursor to reintroductions. This report summarizes and contrasts two C2S2 institutions' breeding programs (Fossil Rim Wildlife Center [FR] and White Oak Conservation [WO]), focusing on animal husbandry methods and lessons learnt as a guide for repatriation programs.

Facilities:
White Oak (WO) is a private 3,000 Ha facility dedicated to the breeding and conservation of imperiled species, located at 30°44'49 N and 81°44'10 W on the southern coastal plain in the semi-tropical climate of northeast Florida, USA. Fossil Rim Wildlife Center (FR) is an AZA member facility, encompassing 749 Ha located at 32°10'51 N and 97°47'47 W in the cross timbers ecoregion of Texas, USA. The two facilities experience similar annual temperature ranges, but differ in annual average precipitation, with WO receiving 0.4m more annual precipitation than FR (NOAA 2013). Although both breeding centers manage ungulates in larger enclosures than a traditional zoo, there are significant differences in the size of the enclosures, the presence of other species, husbandry methods, and geography that affect breeding program success. White Oak has managed dama gazelle since the late 1970s, starting with F1 stock derived from animals imported from the Catskill Game Farm. White Oak utilizes moderately sized, naturalistic enclosures that give large ungulates the benefit of living in correct social groupings, and has produced 285 calves since 1980. As of September 2013, White Oak manages 35 dama gazelle in four separate herds (Table 1). The enclosures have varying degrees of grass and tree cover, with grass predominantly composed of coastal bahia (*Paspalum notatum*), giving herds access to significant natural forage from March to October. In addition to natural forage, the herds are offered alfalfa (*Medicago sativa)* hay (western USA) and pelleted diet (ADF 16, HMS Zoo Diets Inc.) at approximately 1.3kg of grain/adult and 1 kg of alfalfa hay/adult per day. The herds have access to automatic water sources and trace mineral blocks ad libitum. All dama enclosures are fenced with 2.4 m chain-link and contain 2.4 m wooden-walled corrals, small barns and open-sided shelters for cover against the weather.

Fossil Rim's *N.d.ruficollis* program began in 1984 with animals from San Diego and White Oak. The first calf was born in 1989 and FR has produced 45 calves since the start of the program. From 1999 until 2006 FR ceased breeding dama due to significant hoof issues. Since restarting the program in 2006, FR has produced 12 calves. The collection at Fossil Rim has never been a large group, unlike many of the other ungulate species that are managed as 1.10 (male.female) to 1.20 herds. The original group was just 1.5 animals and those 5 females produced 25 calves over the first 7 years that they were breeding. FR now manages 8.9 animals (additional animals acquired in 2012 for increased programmatic impact) currently split between a bachelor and breeding group, with significant capacity for population growth as calves are produced, and with a goal of an effective herd size of at least 10 breeding females with offspring. As of September 2013, the breeding herd was in a 12.1 Ha mixed species enclosure shared with 2.5 bongo (*Tragelaphus eurycerus*), 0.3 kudu (T*ragelaphus strepsiceros*), 1.2 emu (*Dromaius novaehollandiae*) and 1.3 blackbuck (*Antilope cervicapra*). The area is predominantly coastal Bermuda grass (*Cynodon dactylon)*, juniper (*Juniperus ashei*), oak (*Quercus spp.*) and includes two water sources - a man-made lake and a plumbed water tank for supplementation. They also receive free choice mineral and salt, alfalfa hay, and are fed a custom blend concentrate pellet shared with the other animals in the pasture.

Table 1: WO and FR herd composition and enclosures September 2013			
	Enclosure Description	Herd Type	Herd Composition
White Oak	1 Ha enclosure: predominantly grass	Breeding herd	• 1.0 adult • 0.6 adults • 5 calves*
	1 Ha enclosure: tree-covered	Breeding herd	• 1.0 adult • 0.6 adults • 1 calf*
	0.2 Ha enclosure: partially tree-covered, partially grass	Female, holding herd	• 0.3 adult • 3 calves*
	6 Ha enclosure: tree-covered	Mixed-species bachelor herd	• 9.0 adult
Fossil Rim	12.1 Ha enclosure:	Breeding Herd	• 1.0 adult • 0.7 adults • 2 calves*
	16.2 Ha enclosure: partially tree-covered partially cultivated grass	Bachelor Herd	• 7.0 adult

**calves defined as < 1 year old*

Handling:
At WO, the dark, dirt-substrate barns allow for efficient and safe hand-restraint for treatments of individual animals for high parasite burdens and to trim overgrown hooves. For medical treatment, the herds are lured in the wood-walled corrals using food as an attractant and then closed into the dark barns. The groups can also be herded into the corrals by staff on foot, but this method brings additional risks for injury due to the animals' exceptional speed, especially in juveniles from 1 to 6 months old, who are not conditioned to the practice. Anecdotal evidence from animal staff suggests that dama gazelle have poor night vision and the darkened barns prompt them to lie down, reducing stress and allowing safe handling. The barns are divided into two small rooms (one holding and one handling) and individual animals are manually restrained by the horns. With conditioning, many adult animals remain lying down when restrained, allowing access to hoofs for trimming and necks for venipuncture. Efficient and safe handling systems are vital when managing dama gazelle for increased breeding production to facilitate vaccination, identification, and herd management.

Due to the free range aspect of the dama herd at Fossil Rim, chemical immobilization was the protocol for medical management, but due to the effects of carfentanil (specifically the excitatory stage just prior to recumbancy) net gunning has become the preferred method of capture. Occasionally for medical or management needs, an adult dama may be net gunned from the pasture and moved into the holding pens. These pens are designed similarly to those at WO and management of the animals, once in the pens, is much the same. Animals are moved from the holding pen, via a lane, to a dark and padded room where they can be hand restrained and treated.

Behavior:
Calves are strict hiders and stay tucked in grass or at the base of trees to avoid predators and are easily caught for neonatal exams or treatment until approximately 1.5-2 weeks of age.

Adults exhibit no defensive behaviors when calves are handled. Low-level female-female aggression is observed between adults, particularly when confined to corrals or barns, but rarely results in injury. Adult male to juvenile female aggression is infrequent and minor, but can occur before young females begin to cycle. However, aggressive behavior has been observed in adult breeding males towards juvenile males (4-6 months of age) in the breeding herd, with initial minor chasing dependent upon the individual breeding male. In small enclosures, this initial chasing can escalate to severe aggression in 1-2 days if the juvenile male is not removed. White Oak transfers juvenile males to the bachelor herd (usually in pairs or groups) at the first signs of aggression from the breeding male. Adult and juvenile males are managed in bachelor groups in a large mixed-species enclosure, at a significant distance from females, with little observed aggression or resultant injury.

White Oak has managed up to 15 males in one bachelor herd and up to 30 animals in a breeding herd without observed density-dependent negative social effects; however, at higher densities, anecdotal evidence suggests that parasite burdens and other health issues are exacerbated. Investigating density dependent health factors is difficult due to the effects of other variables including high precipitation and moist substrates, and limits the ability to determine an optimal carrying capacity per Ha for reproduction.

Health:
Dama gazelle at White Oak require moderately intense animal management focused on parasite control, hoof-care, and managing the herd structure. Compared to other captive ungulates at WO, dama require moderate veterinary management, and many of the primary health concerns are associated with the subtropical climate, moist conditions and overcrowding of enclosures. They include endemic endoparasitism from *Haemonchus sp*. and *Trichuris sp*.; poor hoof health with abscessation; and occasional outbreaks of fusobacteriosis. A higher prevalence of omphalitis in newborn calves is also seen, again, probably predisposed by moist substrates and increased substrate contamination by overcrowding. In contrast, the FR herd rarely has GI parasites, likely due to drier, and possibly less dense,

pasture conditions. Tooth and oral cavity infection and localized and systemic *Trueperella pyogenes* are not uncommon in the FR herd.

White Oak and Fossil Rim have encountered hoof health issues, attributed to an arid-land species on moist substrate. Overall, FR has experienced more significant hoof issues impacting breeding success, despite receiving 0.4m less precipitation per year. Soil type differences may explain this discrepancy. WO has rapidly draining spodosol fine sand soil, while FR soils retain more water due to the mollisol/vertisol clay and sandy loams (USDA NRCS). Anecdotal evidence and observation by animal staff at WO find a pronounced increase in hoof issues requiring medical treatment after prolonged periods of rain. The larger, mixed-species enclosures at FR make observation and handling more difficult than at WO. The moderate size of the enclosures at WO allow for close observation by animal care staff and efficient animal handling for medical treatments and calf identification, while providing adequate space to reduce aggression and manage breeding herds of 10-20 animals.

Climate:

Calves are cold tolerant and survive parturition and the neonatal stage with nighttime temperatures of 0°C. Dama tolerate summer heat over 40°C, as expected. Births at both facilities occurred throughout the year over a 29-year period, but both facilities had the most births in August (WO-42 and FR-18). For White Oak, a predictable association was found between births and both the average monthly precipitation ($p=0.012$) and average monthly temperature ($p=0.036$) in which higher precipitation and peak temperatures were related to a higher number of births (Fig. 1 and 2) using linear regression analysis in SigmaStat 3.0 (SPSS Inc., 2003). Using the same statistical method for Fossil Rim data, a similar predictable association was found between births and average monthly temperature ($p=0.026$) but not average monthly precipitation (Fig. 3 and 4). Zerbe found births throughout the year in dama gazelle in International Species Information System institutions in the northern hemisphere (Zerbe et al., 2012). This study also found birth peaks between day 210 and 245 (late July to early September). Seasonality is reported in wild populations that demonstrate synchronized calving following the rainy season from July to September (Sahara Conservation Fund 2013).

Figure 1: WO-Dama Gazelle Births by Average Monthly Temperature

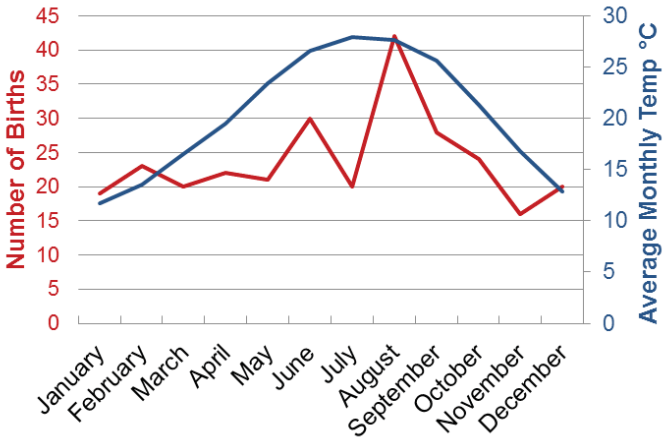


Figure 2: WO-Dama Gazelle Births by Average Monthly Precipitation

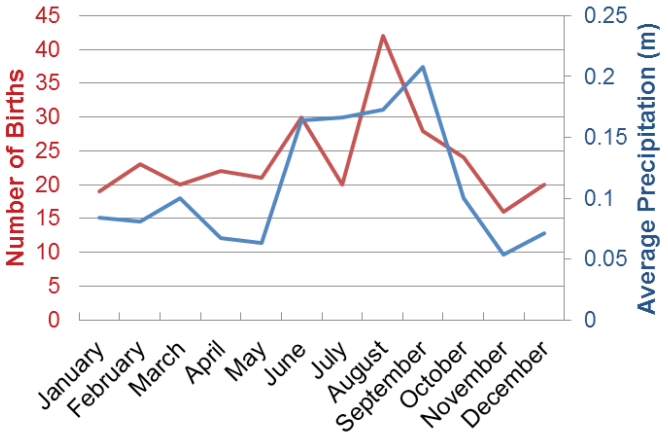
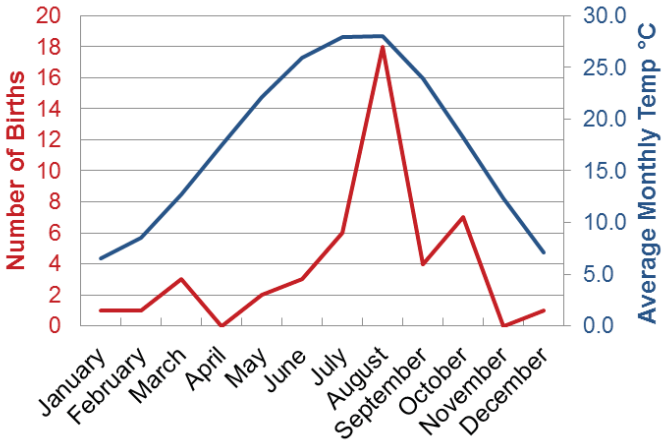
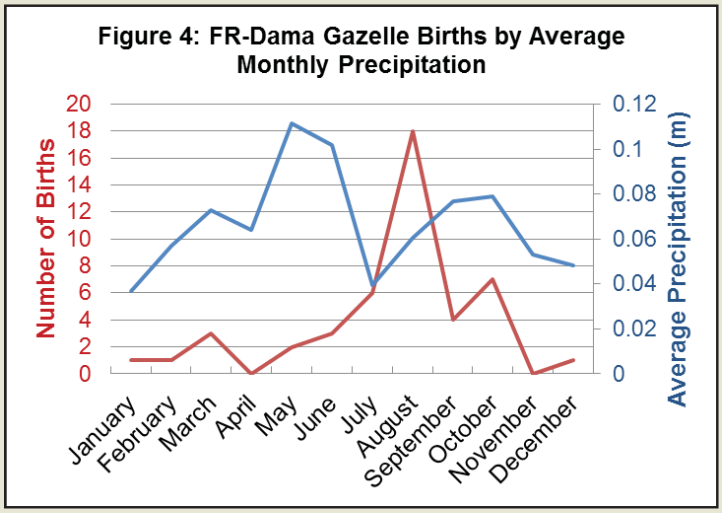


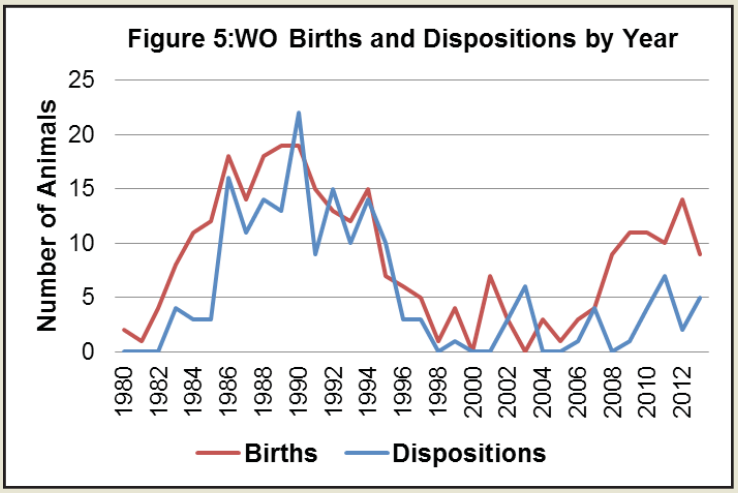
Figure 3: FR-Dama Gazelle Births by Average Monthly Temperature





White Oak Historic Breeding Program:
White Oak has maintained a stable population of dama gazelle with significant off-take (dispositions) to partner institutions by managing breeding herds of 5-10 females in large enclosures with surplus males managed in bachelor groups. The sub-tropical climate and short gestation rate allows for year-round reproduction and rapid population growth. Figure 5 displays two peaks of production from 1984 to 1994 and from 2008 to the current. The reduced production from 1998 to 2006 was the result of collection planning and management decisions rather than a reduction in reproduction or an increase in deaths. The WO breeding program started with only 3.6 initial acquisitions in the early 1980s, supplemented with 4 males in the late 1980s and 1990s to increase genetic diversity.

In November 2007, 1.3 animals were acquired from Oregon Wildlife Foundation to reinvigorate the breeding program, and the population grew from 3.8 animals in January 2008 to 15.20 animals by September 2013, with 64 births and 19 dispositions from the original 8 females in those six years. Historical data on reproduction is provided in Table 2.



These breeding programs demonstrate that dama gazelle have the biological potential for rapid population growth when managed in the correct environment. Successful dama gazelle breeding programs should include:

- access to high quality natural forage and supplementary diet to improve fertility and survival
- housing in multiple (2-3) moderately-sized breeding enclosures (1-2 Ha) with larger enclosures available for bachelor groups (>5Ha) located beyond visual and olfactory contact from the breeding herds
- handling systems for vaccinations, hoof maintenance, and

Table 2: WO and FR Dama Reproduction Data

	White Oak	Fossil Rim
Total Births (WO 1980-2013; FR 1989-2013)	285	45
Total Acquisitions	19 (9.10)	30 (13.17)
Total Dispositions	184 (97.87)	26 (14.12)
Overall Progeny Sex Ratio	48%	40%
Average Dam Age at First Parturition	25.5 months	27.5 months (n=8)
Minimum Dam Age at First Parturition	17 months	16 months
Average Interbirth Interval	9.8 months	11.7 months
Minimum Interbirth Interval	6 months (182 days)	7 months
(221 days)		
Maximum Calf Production for One Dam*	18	8
Oldest Dam Age at Last Parturition*	13.5 years	8.2 years
Average Female Life Span*	5.0 years	5.6 years (n=8)
Average Female Life Span excluding neonatal mortality (<1 year)*	8.9 years	7.4 years (n=6)
Range of Female Life Span*	0-15.2 years	0-10.7 years

** females living their lifespan at WO or FR*

herd maintenance (removing young males, etc)

- locations in arid environments with well-draining soils
- effective protection from predators for young calves
- efficient neonatal handling protocol and accurate identification methods
- frequently updated and revised breeding plans to accommodate short gestation times and early sexual maturity
- access to some level of professional veterinary care or guidance, and experienced animal care staff.

Addra gazelles at White Oak

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Lessons from the Capture and Collaring of the Critically Endangered Hirola Antelope in Ijara, Kenya; A Progress Report

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Summary

To better inform conservation efforts, we initiated work on the demography, habitat selection, and movements of hirola (*Beatragus hunteri*) in Ijara District in 2011. As part of this effort, we captured nine adult females (>3 years old) from herds at the periphery of this species' historic geographic range in Arawale and the Burathagoin grazing fields of Ijara District. From August to December 2012, we fitted GPS collars on nine females from seven different herds (mean herd size = 7 ± 2 SE, range = 5-11) to relocate associated individuals and to estimate demographic parameters. GPS radiocollars (Vectronic Aerospace) are set to record one location every three hours for the next 3 years. Iridium satellite communication permits us to track herds within 24 hours of movement. Once per month, we are relocating animals visually from the ground to record survival, recruitment, and age structure; we are comparing these data to those from herds occupying 1) a predator-proof sanctuary in Ishaqbini Community Conservancy; and 2) areas with higher-quality range than Arawale and Burathagoin. This effort will enable us to better understand the relative influence of predation and range quality in driving hirola population dynamics, and will provide insight into historic declines and contemporary lack of recovery. Additionally, the data we generate on habitat selection and movements can be used to identify sites suitable for any future reintroduction efforts.

Acknowledgments

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Background and Need for Research in Hirola Conservation
Historically, conservation of hirola (*Beatragus hunteri*) has been limited by the lack of sustained funding characteristic of low-profile species, weak local involvement, and a dearth of basic biological information (Andanje 2002, Butynski 2000, Kingdon 1982). In attempt to fill these knowledge gaps, we initiated a field study in the Ijara District of eastern Kenya in January 2011 to understand the demography, habitat selection, and seasonal movements of hirola, all of which have been identified by the Hirola Management Committee of the Kenya Wildlife Service (KWS) as critical to guiding future conservation efforts (Andanje 2002, Butynski 2000, Dahiye and Aman 2002).

Recently, we have completed a major undertaking to fit nine adult female hirola from seven distinct herds with GPS radio-collars on community lands in Ijara District. We targeted herds at the periphery of the historic geographic range, where hirola often come into contact with humans and their livestock. We hope that information generated from these herds will prove particularly valuable, given the majority of hirola occur in areas lacking formal protection and thus rely ultimately on the goodwill of local communities.

Because of the strong pastoral presence in the study area, community involvement was key to carrying out this exercise. So, as an initial step, we held two meetings in Gababa village and in Masalani town in Ijara to encourage local participation and to address firsthand any concerns raised by community members.

Community members were quick to voice two major concerns. First, they were apprehensive that livestock would be disturbed by our capture efforts. Second, community members were sensitive to their lack of involvement in past hirola captures and translocations. We note that while communities were eventually supportive of our work on hirola conservation, suspicion toward formal conservation persists because of weak local involvement and communication in past efforts. Community-based conservation is a relatively new concept in Ijara, and many individuals associate such activities with loss of grazing rights and fines levied by agencies for trespassing into formally protected areas.

After holding a third meeting with communities and government officials from Ijara, we eventually received enthusiastic endorsement from all involved, and several local elders participated in the capture effort from start to finish. It is our hope that these elders will serve as ambassadors for hirola conservation throughout Ijara, thereby strengthening long-term conservation efforts. It is only through such grassroots involvement that the general public will understand their indispensable role in the conservation of hirola, and their responsibility both to hirola and future generations to practice sustainable natural resource management.

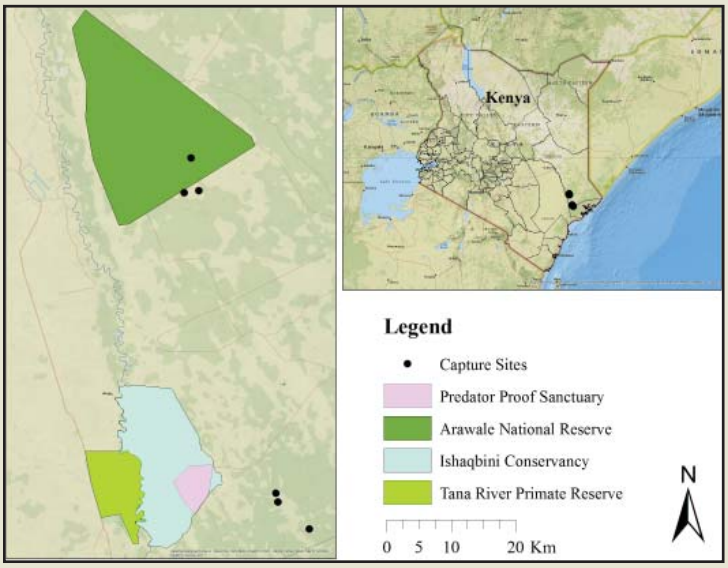

Plate 1: Map of the project area, showing capture sites.

Field Operations and Logistics
Our capture efforts of three individuals in August 2012 complemented an effort to translocate hirola into a predator-proof sanctuary within Ishaqbini Conservancy, for which a report has already been circulated by the Northern Rangelands Trust.

We based our operation at the Masalani KWS station from the 13th-16th December 2012. We captured hirola during early morning hours (0600-0800) and late in the evening (1700-1900) when temperatures were low and conducive for such an exercise. Given our ongoing, ground-based studies of hirola in Ijara, we quickly noticed that detecting hirola from the air was more difficult than doing so from the ground. As we flew from Masalani towards Arawale, the first animals one could see were reticulated giraffes (*Giraffa camelopardalis reticulata*) co-occurring with pairs of lesser kudu (*Ammelaphus imberbis*). These species are the most abundant ungulates in the area, and our data suggest their numbers are increasing. Our preliminary work with satellite imagery demonstrates that tree encroachment throughout Ijara has converted historically-open rangeland into dense woodland, presumably favoring browsers (like giraffe and lesser kudu) but potentially at the expense of forage for hirola and other grazers.

As we hovered away from Masalani towards the capture sites, we regularly encountered bomas (livestock corrals) and Burchell's zebras (*Equus burchelli*). Zebra associate closely with hirola, and these areas eventually resulted in encounters with hirola. It worth mentioning that, although hirola and livestock utilize the same areas, they seemed to do so at different times: hirola were always at least 2 km away from bomas.

After nearly two hours of searching, we were rewarded by finding approximately 13 animals in two groups in Arawale. These groups and others were found in open areas along the edges of woodlands. Reticulated giraffe, lesser kudu, Burchell's zebra, topi (*Damaliscus lunatus*), and buffalo (*Syncerus caffer*) were common in these areas as well. While we could see thousands of buffalo and topi in these grasslands, we only found seven total groups of hirola in these areas (from which three individuals were fitted with GPS collars in August 2012).

Once groups were sighted, the first task was to determine the herd's age structure—calves, juveniles, subadults, adult females, and adult males (Plate 2)—without disturbing the group. Following this, we carefully identified our target female and prepared the dart gun and the collar. We targeted adult females for two reasons. First, we have noted that young hirola are faithful to mothers for at least nine months prior to dispersal, thereby enabling us to monitor juveniles for nearly a year by relocating mothers. Second, in other species of ungulates, the survival of adult females (as opposed to juveniles or adult males) most strongly influences rates of population change. We are conducting demographic analyses to assist in identifying age classes that are most important for population growth, and to uncover mechanisms responsible for population change of hirola. It is our hope that these analyses will guide future management directions.

Once we had identified a target female, we separated her from the herd. The pilot then descended within 30 meters and a gunner darted the target individual. We then hovered for 7-10 minutes until the animal went down under the watchful eye of the team. Total pursuit time was 5 minutes or less for most individuals.

We immobilized hirola with a combination of 2.5 mg Etorphine hydrochloride (a narcotic) and 25 mg Azaperone (a tranquilizer). We used 6mg Diprenorphine hydrochloride as a reversal. During processing, capture technicians drew blood samples (15 ml) from the jugular vein and we fixed uniquely-numbered ear tags to individuals to aid in future identification. At this point, the vet administered the reversal agent while we deployed the collar. Average handling time was less than 5 minutes per animal. The blood samples we collected complement an existing data bank and will be screened to evaluate serum chemistry and pregnancy hormones.

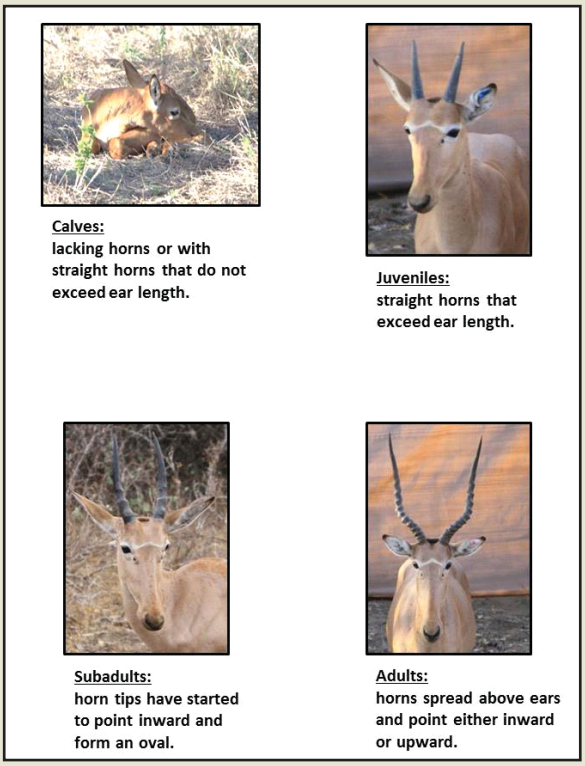

Plate 2: Age classes used to identify heard structure.

Individuals Captured and Herd Composition

We fit three females in Arawale (Plate 3) and six females in Burathagoin with Vectronic Aerospace GPS Plus Iridium collars. In sum, the nine adult females that we GPS collared in 2012 belong to seven groups totaling 51 individuals. Conservatively, we estimate that this represents nearly 13% of the global population (King et al. 2011).

Plate 3: Releasing a collared adult female hirola in Arawale.

Table1: Herd composition of herds containing collared female hirola in Ijara.							
COLLAR ID	STUDY AREA	Adult Males	Adult Females	Sub-adults	Juveniles	Calves	Total # in herd
11482*	Barathagoin	1	5	1	2	0	9
11483**	Arawale	1	4	2	2	2	11
11484	Barathagoin	1	6	0	0	0	7
11485**	Arawale	1	4	2	2	2	11
11486	Arawale	1	4	0	0	0	5
11487	Barathagoin	1	3	0	0	1	5
11488	Barathagoin	1	4	0	0	2	7
11490*	Barathagoin	1	5	1	2	0	9
11491	Barathagoin	1	6	0	0	0	7

***Note**: Individuals were classified into the following age/sex categories (Plate 2: modified from Andanje 2002).*
** these individuals belong to the same herd. ** theses individuals belong to the same herd.*

Preliminary results from our capture and post-collaring efforts suggest that hirola are selecting open grassland with scattered trees. Hirola strongly avoid dense tree cover (Plate 4), which complements evidence that the geographic range of this species has collapsed alongside tree encroachment over the past 30 years.

Colours and Collars
Collar batteries are expected to last for 4 years and will relay information in near-real time (within 24 hours) on habitat selection and movements. Interested parties are welcomed to monitor movements of hirola hersd at http://www.jakegoheen.com/index.php/research-group/abdullahi-hussein-ali.html.
GPS radiocollars record GPS location every three hours throughout

Plate 4: GPS movement trajectories of 4 hirola herds 1-31 January 2013 in the Buratha-goin grazing fields. Note the pronounced avoid-ance of tree cover (dark green)

the year. Each collar is equipped with a Very High Frequency (VHF) signal that emits 50 pulses per minute for monitoring, or 30 pulses per minute to indicate mortality if the individual has not moved for eight hours or more. VHF signals will be used to relocate animals visually to note the occurrence of calves and age structure of herds. Initial concern was raised that that GPS collaring (or otherwise marking) hirola might make individuals more conspicuous to predators. From the only study of its sort (Butynski 2000), no differences were found in mortality rates between radio-collared and non-collared individuals in Tsavo East National Park. Despite this, we deliberately purchased beige colored collars to match the coats of hirola. To date all the collared females are alive and roaming freely in our study areas.

Conclusions and Recommendations for Future Captures

Depending on the number of hirola required for study and the availability of resources, the option to dart or use drive nets should be considered carefully. From our capturing and post-collaring efforts, hirola do not seem as sensitive to chemical immobilization as earlier assumed, but may be prone to negative effects of capture when handling is prolonged. In addition, collaring appears to not have had undue influence on the movements of these animals, as the first data points collected post-collaring do not lie outside established home ranges. This is reassuring, and tells us that the process may not have been quite as stressful as we anticipated.

Our study represents the first effort to collar hirola in their native range. The overarching goals of our study are to 1) understand the relative importance of range quality versus predation in driving numbers of hirola; and 2) identify preferred habitats where population growth is high. We hope that information from our study will form the basis of conservation and monitoring of this critically endangered species in its native range in eastern Kenya, and will prove particularly useful in informing future reintroduction efforts of sanctuary-bred animals.

The immense effort of collaring individuals from these groups will only pay off with close monitoring, objective scrutiny, and open dialog among communities, government officials, and conservationists. At the end of every month, we visually locate herds to which these nine individuals belong to generate information on age structure, recruitment, and survival (Table 1). Because these herds are exposed to a suite of predators including wild dogs (*Lycaon pictus*), cheetah (*Acinonyx jubatus*), and lions (*Panthera leo*), the demographic data we collect from collared individuals will be compared to that of the hirola recently translocated to a predator-proof sanctuary in Ishaqbini Community Conservancy. This effort will enable us to evaluate the relative influence of range quality and predation in influencing hirola population dynamics, and will provide insight into historic declines and contemporary lack of recovery. In addition, movement data from these nine individuals can be used in the future to identify habitats in which population growth maximized for future reintroduction efforts.

Finally, we hope to elevate discussion for revival of Arawale National Reserve to restore hirola populations that are not just numerically viable but also ecologically functional. In promoting conservation of hirola populations, we must consider formal protection of Arawale National Reserve, which has been neglected by authorities following the disintegration of financial support in the mid-1980s. By virtue of its size (533 km^2), remote locale, vegetative composition, and abundances of tsetse flies (that reduce the profitability of livestock), Arawale represents the last hope for long-term hirola conservation in its native range.

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APPENDICES

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- Mr. Amos Kibara: Research Assistant and Field Coordinator
- Dr. Jacob R. Goheen: Academic Advisor to Mr. Ali
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- Dr. Rajan Amin: Academic Advisor to Mr. Ali
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KWS Personnel:

- Mr. Alfred Kemboi: Ranger
- Dr. Charles Musyoki: Head of Species Conservation, Kenya Wildlife Service
- Maj. (Rtd) Joseph Mugane: Pilot
- Mr. Jarso Halkano: Ranger
- Mr. John Kariuki: Lab Tech
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- Mr. Paul Macharia: Driver\

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Microfilariae in an oribi *Ourebia ourebi* sub-auricular patch. - Clive Spinage

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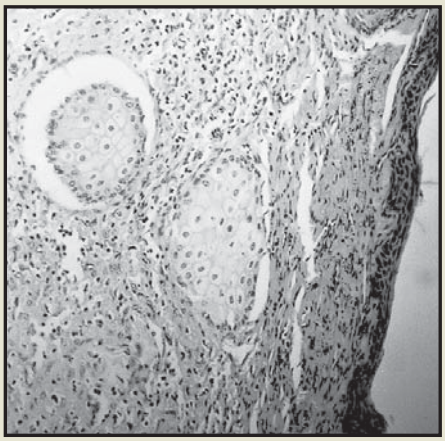
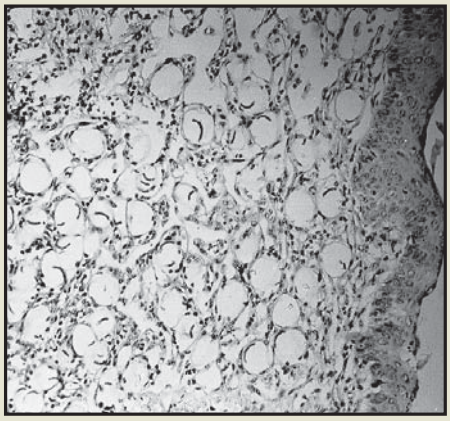
In 1968 I had occasion to collect two adult male oribi *Ourebia ourebi masakensis* Lönnberg & Gyldenstolpe in the former Mutara Hunting Reserve, Rwanda, 1020'S 30020'E. Specimen A, collected on 14 October 1968, was younger than B, collected on 18 July 1969. Specimen A was not dissected until two hours *post mortem* and some deterioration had taken place in the tissues. Samples of the bare sub-auricular patches were taken from each animal, fixed in formalin, and subsequently embedded in paraffin wax, stained in haematoxylin and eosin, and examined histologically.



Specimen A showed a typical integumentary arrangement (Figure 1). The dermis was well supplied with sebaceous glands, some associated with hair follicles, and beneath these were scattered sudoriferous glands. Also present were dense foci of nuclei with scant cellular tissue, which may have represented an early stage of microfilarial infection.



Specimen B showed extensive infection throughout with numerous microfilariae immediately below the stratum granulosum, each microfilariid worm in a lacuna (Figure 2).

Microfilariae represent the larval stage of a number of different parasitic nematode worms, one genus of which is *Setaria*, widely present in ungulates the adult worms are found lying freely on the peritoneal covering of the intestine. Adult *Setaria scalprum* has been identified from oribi, including in Uganda (Round 1968), but I have found no record of microfilariae in oribi in the 44 years since this observation was made. Microfilariae are presumably attracted to the sub-auricular patch because of its naked surface. Transmission from host to host is by small blood-sucking diptera such as *Stomoxys* spp. which would select bare patches of skin for feeding. The sub-auricular gland is believed to be an odoriferous emitting organ with a role in social interaction, and its scent may also play a role in attracting blood-sucking diptera.

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Figure 1. Section through the sub-auricular patch of Specimen A, showing sebaceous glands. Shrinkage is due to *post mortem* changes. x12.5.
Figure 2. Section through the sub-auricular patch of Specimen B, showing microfilariae in lacunae. x12.5.

Taxonomic Inflation in the Bovids

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An abridged version of the publication: Heller, R., P. Frandsen, E.D. Lorenzen & H.R. Siegismund 2013. Are there really twice as many bovid species as we thought? Systematic Biology, 62: 490–493.

For access to the original publication, please contact Rasmus Heller at RHeller@Bio.KU.DK.

Two recent volumes of potentially great significance and impact (Groves and Grubb [2011] *Ungulate Taxonomy*, abbreviated G&G; Wilson and Mittermeier [2011] *Handbook of the Mammals of the World, Hoofed Mammals*, abbreviated HMW) have proposed that the number of recognized bovid species should be increased from 143 (as recognized in *Mammals of the World* [Wilson & Reeder, 2005] and generally followed by the IUCN) to 279. In a recent publication, we argue that this dramatic increase is due almost entirely to the use of G&G's diagnostic version of the phylogenetic species concept (PSC), which—in our opinion—inflates the number of recognized species while devaluing the level of meaningful biodiversity covered by the species term (Heller et al. 2013). This phenomenon has been termed "taxonomic inflation" and has several undesirable consequences (Isaac et al. 2004). We believe the magnitude of the proposed taxonomic revision, coupled with the prominence of the two publications that advocate it, should cause concern among those interested in bovid taxonomy and bovid biology in general. Here, we present a brief outline of our critique of the proposed bovid taxonomy.

The primary source of the proposed taxonomy defines a species as "the smallest population or aggregation of populations, which has fixed heritable differences from other such populations or aggregations" (G&G, page 1). Under the PSC these are "100% diagnosable, that is they have fixed heritable differences between them" (G&G, page 2). The notion of "fixed heritable differences" is in practice interpreted to mean any combination of traits that differ in multivariate space, with the consequence that if two sampled populations fail to overlap in a multivariate analysis of e.g. morphological traits (morphometrics), they are recognized as distinct species. This leads to quite excessive splitting of species that are generally considered to be polytypic with various ecotypes or subspecies (e.g. the klipspringer is elevated to eleven species in G&G, the buffalo to at least four and the topi to nine species). There are three main problems with this approach to species delimitation: I) it builds on the argument that morphometric variability is a reliable proxy of significant evolutionary divergence; II) it is prone to sampling issues (especially to low sample sizes or patchy sampling) and III) species can be repeatedly subdivided until the species term semantically collapses to what is generally referred to as a population.

While it is true that phenotypic variation can be informative about biodiversity in a general sense, it has been shown repeatedly that this relation is not straightforward at a finer taxonomic scale (within species or between closely related species). It is generally acknowledged that diversity exists even within species and that any species concept should accommodate this (e.g. Padial et al. 2010). Indeed, as evolution is a continuous process that acts among and within populations, it is only natural that variability in traits that are affected by the evolutionary processes should be present at any level. Very often, not least in the African antelopes, it turns out that there is a discrepancy between the distribution of phenotypic and genetic diversity, either in the shape of cryptic genetic diversity or, conversely, the lack of genetic structure among phenotypically

distinct populations. G&G argue that morphometrics reveal the evolutionary process leading to speciation, yet genetic studies show that this is not always the case. For example, phenotype is not just a result of the genotype, but also of environmental factors that are not heritable and hence not subject to evolutionary forces. By choosing random morphometrics measurable in e.g. museum specimens to delimit and designate species, we therefore risk distorting biodiversity assessment towards irrelevant (morpohological) dimensions of the 'real' (evolutionary) biodiversity present in an area. A prime example of the problems with G&G is *Homo sapiens*. Using PSC, one could partition humans into dozens of species with no overlap in traits such as skin color (in the case of human "races"), physical measures or genetic markers (which potentially distinguish even local populations), especially if sample sizes were limited as is often the case with museum specimens. An increase in species number due to the use of a more splitting-biased species concept, rather than the inclusion of novel data, is taxonomic inflation (Isaac et al. 2004). We suggest that G&G represents a case of taxonomic inflation, which was subsequently authorized by the inclusion in HMW.

So what impact does the choice of species delimitation criterion have? In the case of G&G, HMW and the bovids, the consequences are severe. G&G propose an increase of almost 100% in the number of bovid species, stating that: "If this [species concept] results in more—perhaps many more—species being recognized than previously, surely this is a small price to pay for exactitude?" (G&G, p. 2). However, it is important to realize that there is no exact number of species due to the dynamic nature of evolution. Therefore, G&G's method raises the question of whether one is more willing to accept type 1 taxonomic errors (erroneously splitting a species into several species) or type 2 taxonomic errors (failing to split a species complex into several species). In conservation terms, G&G and HMW argue that type 1 errors are better, because they give us the best chance of protecting as much biodiversity as possible, following the logic that we cannot conserve it if we do not know it is there. While this logic is appealing, we seriously doubt that increasing the number of bovid species by 100% (possibly much more if G&G's methods were to become universally accepted), including extreme individual cases such as proposing nine species of topi, will do any good to conservation efforts. On the contrary, we think there is a serious risk entailed in spending resources on separate conservation plans for populations of antelope solely differentiated by arbitrary morphometrics, diverting and diluting resources from more meaningful biodiversity units. Due to the status of the species label as a biodiversity currency, we must have strong requirements for species designation. Therefore, we believe good scientific practice advocates that the null hypothesis should be that two populations (of apparently similar organisms) are not distinct species, and that convincing evidence is required to change this hypothesis.

We raise the issue of taxonomic inflation here because we hope to increase awareness of this fundamental aspect of bovid biology among the *Gnusletter* readership. We argue that the approach of G&G is flawed, and we hope that their proposed method of species delimitation will not be widely applied. It is not a simple task to categorize continuous biodiversity into discrete species. Evolution and speciation are ongoing, dynamic processes, and populations may be at any stage in these processes at any given time. Consequently, whether or not to split populations into species will always be subject to a prior reflection on what we want the species label to signify. In diagnosing species, we support the use of an integrative taxonomy drawing on diverse types of data (e.g. ecological, behavioural, morphological and genetic) with a stringent requirement that the considered traits are informative regarding the speciation process (Padial et al. 2010; Schlick-Steiner et al. 2010). Ideally, morphometrics should be combined with other biological information including careful genetic analyses, which can be used to quantify divergence and speciation (e.g. estimating divergence times, gene flow, selection etc.). Finally, we want to point out that we do not consider 143 to be the definitive number of bovid species, nor do we advocate static species lists. We agree with G&G that it is high time that the biodiversity of the bovids is assessed in a systematic and comprehensive manner, as there may well be cryptic diversity that is important to discover and protect. However, we do not comply with the approach of G&G to accomplish this objective.

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Meetings and Updates

New conservation strategy for Western Derby Eland -published

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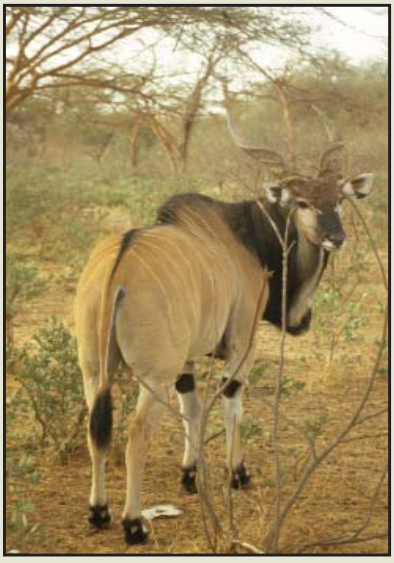

Western Derby Eland (*Tautotragus derbianus derbianus*) has been listed as Critically Endangered by IUCN since 2008. In 2013, IUCN Antelope Specialist Group joined the ongoing conservation efforts of the Directorate of National Parks in Senegal (DPN), Society for the Protection of Environment and Fauna in Senegal (SPEFS), and the Czech University of Life Sciences Prague (CULS) by supporting the

organization of a Species Conservation Strategy Planning (SCSP) Workshop in Saly, Senegal. The Workshop was organized by Derbianus Czech Society for African Wildlife in cooperation with DPN and SPEFS, and supported by CULS (CR), Prague Zoo (CR), Knowsley Safari Park (UK) through the generosity of Lord Derby, Chester Zoo (UK) and IUCN Species Conservation Planning Subcommittee. More than 40 participants from 7 countries within 4 continents participated in the workshop which was led by David Mallon, co-chair of ASG. Within 3 days the conservation strategy for the Western Derby Eland was established and has recently been published. A field trip to Niokolo Koba National Park (NKNP) and Fathala Reserve preceded the workshop. There participants had possibility to observe the habitat of the last wild Western Derby Eland and to see at first hand the logistical and technical problems involved in working in this remote area.
The last remaining wild population of Western Derby Eland was estimated at 170 individuals (2006) in NKNP. It is threatened by poaching and habitat loss especially caused by cattle grazing. A semi-captive population was established in 2000 from 6 founders captured in NKNP by the DPN and SPEFS. This population is managed in cooperation with CULS and in 2013 contains 95 individuals divided into several herds within two fenced reserves in Western Senegal – Bandia and Fathala. The conservation programme is based on breeding management, research and education and since 2010 has been led by the NGO Derbianus Czech Society for African Wildlife.

Early record, extension of historical distribution and other notes on the mountain nyala *Tragelaphus buxtoni* as revealed by literature review

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Language barriers often constrain the full review of scientific issues. This is one of the reasons for an ongoing project to review and synthesis valuable information on Ethiopian and Eritrean mammals scattered in Italian literature and/or museums (Gippoliti, 2012; in prep.).

Evangelista's review of early knowledge of mountain nyala *Tragelaphus buxtoni* (Evangelista, 2012) prompted me to write this note concerning information on the species as available in published and unpublished accounts in Italian language.

Luigi Robecchi Brichetti (1855-1926) was an important explorer of Somalia, in fact the first to use this name for the region (Robecchi Bricchetti, 1899). In his first journey in the Horn of Africa in 1888, he was stationed for a long time in Harrar and described it in a book (Robecchi Bricchetti, 1896). During his stay in Harrar, he was in charge of building some palaces in the town. He traveled to a nearby forest on Mt. Gara Muletta to find large trees for the building. While in the forest, he observed and shot two large 'spiral horned' brown antelopes "as large as oxen of our countryside". Although there is no reference to any zoological collection made during this particular expedition, an attempt was made to find if, among the several antelope skulls of the former Robecchi Bricchetti collection (now in the civic Museum of Pavia) it was possible to find at least one of the *Tragelaphus buxtoni* shot at Gara Muletta, but the results were negative. Few doubts exist, concerning the identification of the two antelopes, considering their size and the mountain forest habitat described by Robecchi Bricchetti, and this early record does in fact confirm the historic presence of the species at Gara Mullata, the new easternmost edge of historic distribution range (Yalden et al., 1984; Malcom & Evangelista, 2005). Most worthwhile, this predates by 20 years the official first mountain nyala shot by Major Ivor Buxton in 1908 (Evangelista, 2012).

It is generally unappreciated that during the short domination of Ethiopia by Italy, several projects concerning the study and protection of game species were run by Saverio Patrizi, superintendent of hunting for the whole of then Italian East Africa. In 1936 Italy began a short period of domination over Ethiopia that ended in 1941. Saverio Patrizi (1902-1957) was appointed Superintendent of hunting and fishing for all of then Italian Eastern Africa and began a census of Ethiopian wildlife. He also established the nucleus for a future "Addis Ababa Natural History Museum" (Patrizi, 1940a), prepared a list of protected species, and gazetted a number of partial or total reserves to protect some large mammal species, including Job, Nacfa and Gash-Setit in Eritrea and Semien, Miesso (Harar), Mt. Chillalo and Didessa in Ethiopia (Anon., 1940). The Mt Chillalo Reserve was specifically created for the mountain nyala, but it should be noted that hunting of the species was already said to be forbidden under Abyssinian rule (Anonymous, 1940). Patrizi spent a short period in the Arussi in January 1940 to study the species and to try to capture some live animals for the Rome Zoological Garden (Taibel, 1949). Taibel cited a paper by Patrizi on the ecology of the species on Mt. Chillalo (Patrizi, 1940b), but I have been unable to find a copy of the second issue of *Bollettino di Idrobiologia Caccia e Pesca dell'Africa orientale italiana*, probably because it was never sent to Italy after the fall of Italian colonies in 1941. The attempt to catch the animals on Mt. Kaka with the help of natives on horseback failed, but the skin of an adult male was mounted for the planned Addis Ababa Museum. Successively, Taibel was able to obtain three calves, all females, obtained in different months of the year, suggesting a lack of birth seasonality (Taibel, 1949). Taibel (1949) also reported the observation of mountain nyala in the Bale region by Augusto Toschi in 1941, precisely on Mt Dojo or Doio, between Dodola and Goba. While prisoner of war in Kenya, Saverio Patrizi compiled a review of the antelopes of the former Italian East Africa (Patrizi, 1943). Here we can find the proof that at that time the range of the mountain nyala was much better understood than previously believed. Patrizi (1943: 12) gives the range as: "Arussi e Bale (Aranò – Goba: Laggio – mt. Caccà, Etosà, Cillalo – Gugù,

Cercer). He further adds that the species has been observed at lower altitudes near the eastern shores of Lake Langano and at Sole (latter locality with a question mark).

Acknowledgements
I wish to thank Stefano Maretti (Museo di Storia Naturale, Pavia) for sharing information on the Robecchi Brichetti antelopes collection in Pavia, and Flavia Tracchi for help in obtaining old photos.

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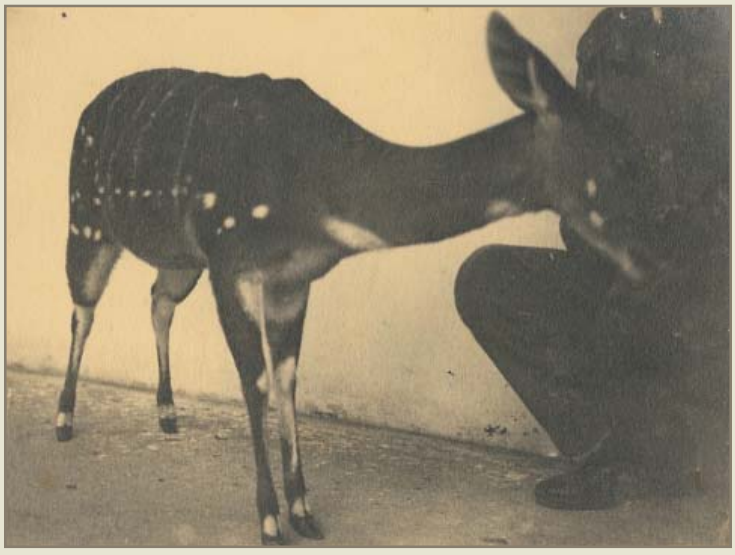

Female Mountain Nyala held at Adis Ababa in 1940 (courtesy Flavia Tracchi and family Patrizi).

Recent Publication

Can molecular data validate morphometric identification of faecal pellets in Tanzanian forest antelope species?

Andrew E. Bowkett • Trevor Jones • Richard L. Laizzer • Amy B. Plowman • Jamie R. Stevens

Received: 9 May 2012 / Accepted: 29 April 2013 © Springer Science+Business Media Dordrecht 2013

Abstract
Forest-dwelling antelope species are often difficult to detect during surveys due to their cryptic behaviour and densely vegetated habitats. Dung counts have traditionally been used to infer forest antelope abundance but genetic identification has shown that visual identification of ungulate dung to species is often unreliable. This study attempted to use easily obtained morphometric data from faecal pellets to statistically assign antelope dung piles to species. We measured pellets from 238 dung piles collected from the Udzungwa Mountains, south-central Tanzania, a largely forested landscape with five forest-associated antelope species including the endangered Abbott's duiker (*Cephalophus spadix*). The species identity of sampled dung piles was determined by amplifying a c. 600 bp fragment of the mitochondrial control region and aligning DNA sequences with published references. We found no diagnostic differences in faecal pellet size between antelope species although there were significant differences in mean pellet length and width. We employed a single variable linear discriminant analysis to predict the species of dung piles based on pellet length. Despite significant differentiation between species we obtained an overall accuracy of 58.8 % that did not meet our specified probability threshold (P \ 0.05). Abbott's duiker dung piles were correctly assigned in the majority of cases (74 %). Overall, morphometric assignment of dung piles to species was not accurate enough to validate dung counts as a survey method for forest antelope although our results do not preclude the development of alternative field identifi¬cation methods using additional non-molecular characters.

Electronic supplementary material The online version of this article (doi:10.1007/s12686-013-9935-3) contains supplementary material, which is available to authorized users.

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Latrine survey as a method to estimate the population size of Arabian gazelles (*Gazella arabica*)

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Abstract
Arabian gazelle (*Gazella arabica*) populations have been decimated in most parts of their original range. As a cryptic, crepuscular species, Arabian gazelles are difficult to observe, rendering monitoring programs for conservation purposes a challenging endeavour. Latrine mapping has been suggested as an effective, time- and cost-efficient tool to survey and estimate the abundance of gazelles in remote areas with low population densities. In the present study we collected data from five populations in Saudi Arabia to address the question of how population estimates can be inferred from such latrine counts and uncovered a non-linear relationship between both variables. Methodologies applied during the five surveys differed between study sites, so caution is required when interpreting our data. Still, given the immediate threat to the survival of the species, there is an urgent need to establish a time- and cost-efficient sampling method that will be vital for the conservation of remnant pockets of natural populations and for theproclamation of new protected areas in Saudi Arabia and other countries in the Middle East, and the present data are the only available source of information in this context.
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Keywords: Population estimate, Localised defecation, Road strip count, Desert ungulate, Habitat fragmentation

Metapopulation viability of a globally endangered gazelle on the Northeast Qinghai–Tibetan Plateau

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Keywords: Przewalski's gazelle (*Procapra przewalskii*)', Population dynamics, Vortex, Extinction, Conservation, Environmental change

Abstract
Conservationists are far from able to assist all species threatened by extinction. Population Viability Analysis (PVA) is often used to guide decisions about the management of threatened species. Using the updated Vortex package, we carried out a PVA for Przewalski's gazelle *Procapra przewalskii*, a globally endangered gazelle and conservation focus on the Qinghai–Tibetan Plateau, based on the extensive field surveys between 1994 and 2008 on the nine existing subpopulations (i.e., Yuanzhe, Hudong, Ketu, Shadao, Ganzihe, Haergai, Bird Island, Tianjun and Gonghe). Population size varied largely across subpopulations during the simulation. The nine subpopulations faced two distinct fates within the next 200 years: two will likely survive while the other seven appeared likely to go extinct. The average probability of extinction (PE) of subpopulations was 97.1%, with the mean time to extinction 66.7 years. The metapopulation will most likely decrease in size, but could persist. The number of offspring per adult female per year (OFY), the sex ratio, and the mortality of young females will seemingly play important roles in determining persistence, as will carrying capacity and inbreeding depression to be a lesser degree. The projected size and extinction rates for the subpopulations responded differently to variation in population parameters, with the highest sensitivity in Haergai. OFY was the most important demographic parameter for explaining variation in population size. These findings advance our understanding of how to mitigate extinction risks for the endangered Przewalski's gazelle and provide useful insights for its conservation that may also be applicable to other large ungulates.
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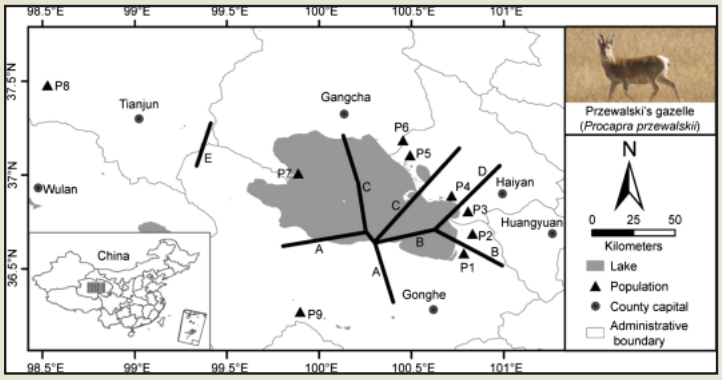

Distribution map of the nine examined subpopulations and genetic discontinuities (bold black lines) among subpopulations of Przewalski's gazelle (Procapra przewalskii). P1 represents the Yuanzhe subpopulation; P2, Hudong; P3, Ketu; P4, Shadao; P5, Ganzihe; P6, Haergai; P7, Bird Island; P8, Tianjun; and P9, Gonghe. The five genetic discontinuities (A–E) are referred to Yang et al. (2011) based on barrier analysis.

The energy-maintenance strategy of goitered gazelles (*Gazella subgutturosa*) during rut

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Abstract

In many polygynous ruminant species, males decrease their food intake considerably during the rut. To explain this phenomenon of rut-reduced hypophagia, two main hypotheses, the Foraging-Constraint Hypothesis and Energy-Saving Hypothesis, have been proposed. In our research, we assessed the behavioral strategy of goitered gazelles (Gazella subgutturosa) through the rutting period. According to our findings, male goitered gazelles spent less time feeding during the rut compared to pre- and post-rut feeding times, but then maximized their energy intake during the rutting season when they were not engaged in rut-related behaviors. Females, in contrast, did not change their time budgets across the different stages of the rut. Therefore, rut-induced hypophagia is mainly arising from the constraints of rut-related behaviors for male goitered gazelles, so that the Foraging-Constraint Hypothesis better explains their strategy during rut.

Keywords: Energy strategy, Feeding, Lying, Rut-related

Contagious Caprine Pleuropneumonia in Endangered Tibetan Antelope, China, 2012

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http://wwwnc.cdc.gov/eid/article/19/12/13-0067_article.htm

Contagious caprine pleuropneumonia is a severe respiratory disease of goats caused by *Mycoplasma capricolum* subsp. *capripneumoniae* (Mccp), a member of the *M. mycoides* cluster (1). Mccp infection is associated with a 60% mortality rate and 90% illness rate, and the disease can cause substantial losses of livestock. We report a 2012 outbreak of contagious caprine pleuropneumonia in endangered Tibetan antelope (*Pantholops hodgsonii*) in China.

The complete article can be found n the Emerging Infectious Disease Journal Vol. 19 No. 12 December 2013

Antelope News

Northern Rangelands Trust (NRT) publishes its guide to Ranger-Based Wildlife Monitoring, Wildlife-CoMMS

By: *Juliet King, Dominic Lesimirdana, Mohamed Golicha, Sinyati Lesowapir & Daniel Letoiye*

NRT has published a comprehensive set of guides for the Wildlife-Conservancy Management Monitoring System (Wildlife-CoMMS). Wildlife-CoMMS was developed together with their Conservancies and is a simple system for monitoring wildlife and illegal activities, which covers all levels of monitoring from data collection, through to analysis, reporting and interpretation. It. The guides support the training, implementation and practical day-to-day management and encourage self-sufficiency in fully operating and maintaining Wildlife-CoMMSin Community Conservancies in the long term. Over 300 rangers from 18 Community Conservancies have been trained in the system and are collecting data on a daily basis across almost 20,000 km2 of Northern Kenya. The guides are freely available and can be downloaded at www.nrt-kenya-comms.org

Kenyan parliament passes motion to increase penalties for poaching

On 22 May 2013 Kenyan MPs overwhelmingly approved a motion to increase the number of game rangers and the passing of an emergency amendment to the Wildlife Act that raises penalties for killing wildlife, especially elephants and rhinos, to up to 15 years in jail and/or a fine of up to Ksh 10 million. This increase of 2,500% on current fines means that wildlife crimes now have the same status and punishments as the Economic Crimes' Act, the Organized Crime Act and the Anti-Terrorism Crime Act. It is a spectacular victory for Kenya as it restores its capacity to demonstrate leadership in protecting wildlife and natural resources.

Members of parliament noted structural problems in KWS and insisted that the parastatal organization be reviewed and measures put in place to halt corruption. They also encouraged the enlisting of communities to benefit from conservation as well as promised to support the passing of the Wildlife Bill, which has been stalled since 2007, not least to address compensation for human-wildlife conflict and benefits sharing.

Parliamentarians appear to be completely aligned to the message that President Kenyatta gave at his inauguration "My fellow Kenyans, poaching and the destruction of our environment has no future in this country." John Scanlon, Secretary General of global wildlife trade control body CITES, said "Treating wildlife crime as a serious crime is key to reversing the current disturbing trends in elephant and rhino poaching and smuggling. Kenya is deeply engaged in the fight against wildlife crime and CITES Parties have encouraged initiatives to strengthen legislation and penalties and moves in this direction are welcomed." Source: *WildlifeDirect*

Bongo Group Discovered in Mau Forest

Submitted by Bongo Surveillance Program

LATEST NEWS…… The BSP team have just retrieved bongo camera trap photographs (page 22) from the Maasai Mau forest in June – part of the Mau complex. This is the first time known in recent years to actually have visual evidence of a bongo group surviving in this area. This is a very rare find, indeed.

IUCN-SSC Guiding Principles on Trophy Hunting

These Guidelines have been translated by the International Council for Game and Wildlife Conservation (CIC) and are now available in Chinese, German, Portuguese, Russian and Spanish, in addition to the English original. They can be downloaded from: http://cms.iucn.org/about/work/programmes/species/publications/iucn_guidelines_and__policy__statements/

Mau bongo - Massai Mau Forest May 2013

Deadly Antelope Fencing Comes Down - USA Today

HIGHLIGHT: MONTANA

Deadly antelope fencing comes down

The Associated Press

GREAT FALLS A deadly barbed-wire fence that scores of antelope encountered each year west of Nashua was removed by Montana Fish, Wildlife and Parks earlier this week, giving the animals a better chance of surviving annual migrations.

The project was part of stepped-up efforts to remove old fencing in locations in northeastern Montana that a researcher has identified as barriers to pronghorn migrations, said Drew Henry, a FWP wildlife biologist in Glasgow.

"There's a lot of those pinch points from north Valley County to Canada," Henry said.

The old woven-wire and barbed-wire fencing that was removed was strung for about a mile along U.S. Highway 2.

It was a potential barrier for pronghorn and other wildlife trying to cross the busy road and an adjacent set of Burlington Northern-Santa Fe train tracks, according to FWP.

The FWP crew was assisted by Glasgow-area residents Darvin Henry, Bob Kemp and Andrew McKean and his son, Merlin, as well as Montana Department of Natural Resources and Conservation employees Matt Poole and Marc Kloker in removing the fence.

"Every fall there's antelope stacked up around that area on each side of the highway," FWP spokesman Ron Selden said. "It's a choke point. They're just stuck there. And they get scared trying cross the highway."

MONTANA FISH, WILDLIFE AND PARKS VIA AP

Merlin McKean and other workers remove wire from an old fence in the Nashua, Mont., area that was hindering migrating antelope.

Selden said he was amazed at the number of bones and skulls, of all shapes and sizes, that littered both sides of the old fence, the remains of antelope that didn't make it to the other side.

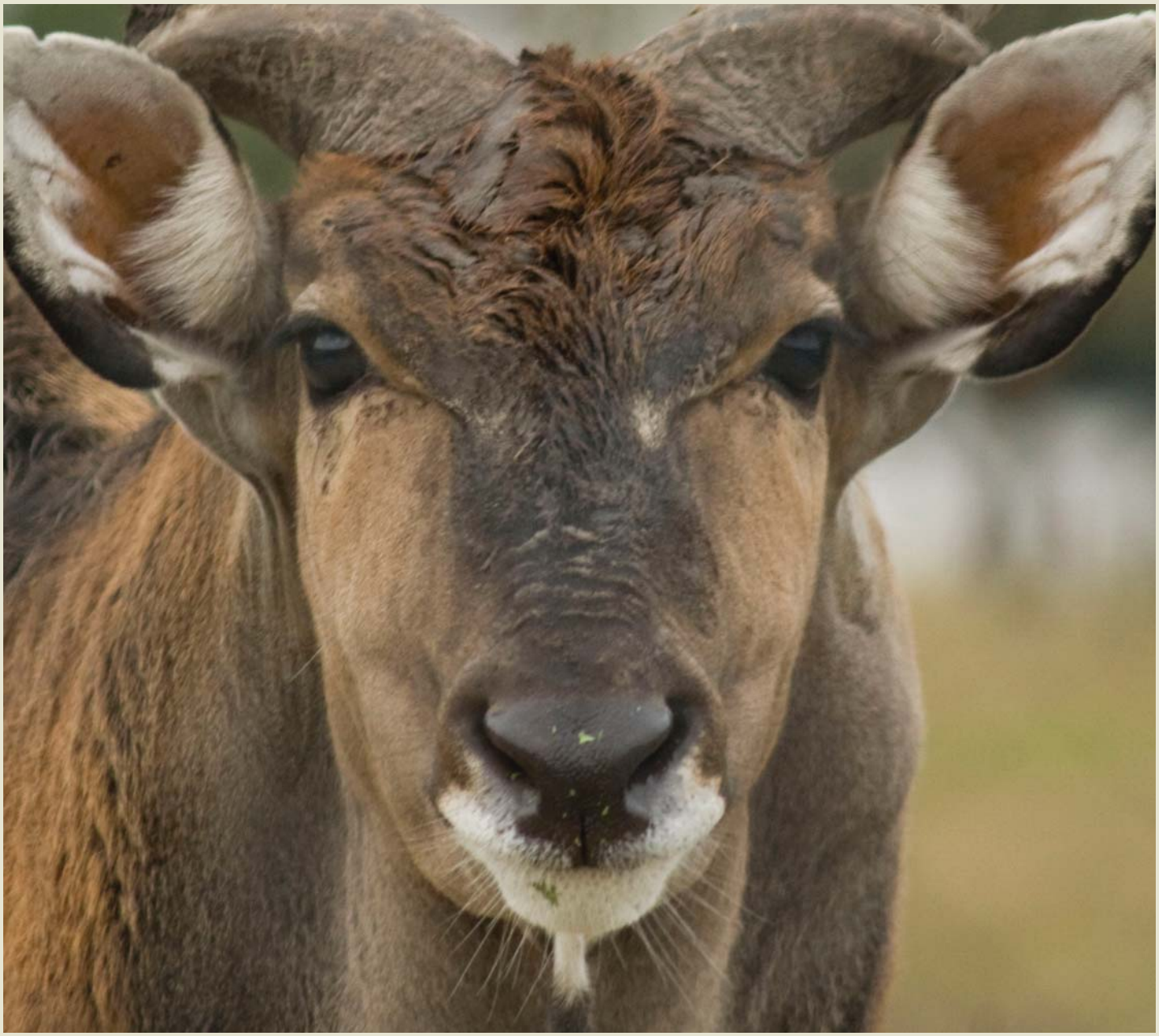
Even with the fence removed, the stretch remains a difficult crossing for the fastest land mammals in North America, which prefer to go under fences rather than jump over them. That's not possible with sheep-style fencing that has heavy-gauge wire panels right to the ground.

"They still get hit by trains and cars," Selden said. "At least it should remove some of the stress."

The property where the old fencing was removed is owned by Valley County, Jim Strodtbeck and Jason Sauer, who gave their permission to proceed with the project.

Nearly 7,000 feet of woven wire and about 3,000 feet of four-strand barbed wire fence and numerous metal posts were hauled away. The wire and posts will be recycled.

Antelope migrate south in the winter and north in the summer.



Eastern giant eland at White Oak Conservation Foundation in Yulee, FL

GNUSLETTER

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