



Research Projects Progress Report
RAG meeting, 2 November 2011
Nicky Pegg

This document reports on research and conservation activities at Dambari Wildlife Trust between November 2010 and October 2011. It is divided into several sections (1) the antelope project; (2) the rhino project; (3) the carnivore project; (4) the student programme; (5) outputs and publications; (6) new projects and timeline for 2012. Specific activities under the “conservation across boundaries” programme are reported elsewhere.

1. Antelope Project

1.1. Fieldwork

The long-term antelope monitoring project in the Togwe Wilderness Area continued. The late wet-season (April) assessment was completed; the late dry-season assessment was scheduled for the end of October and is thus not included in this report.

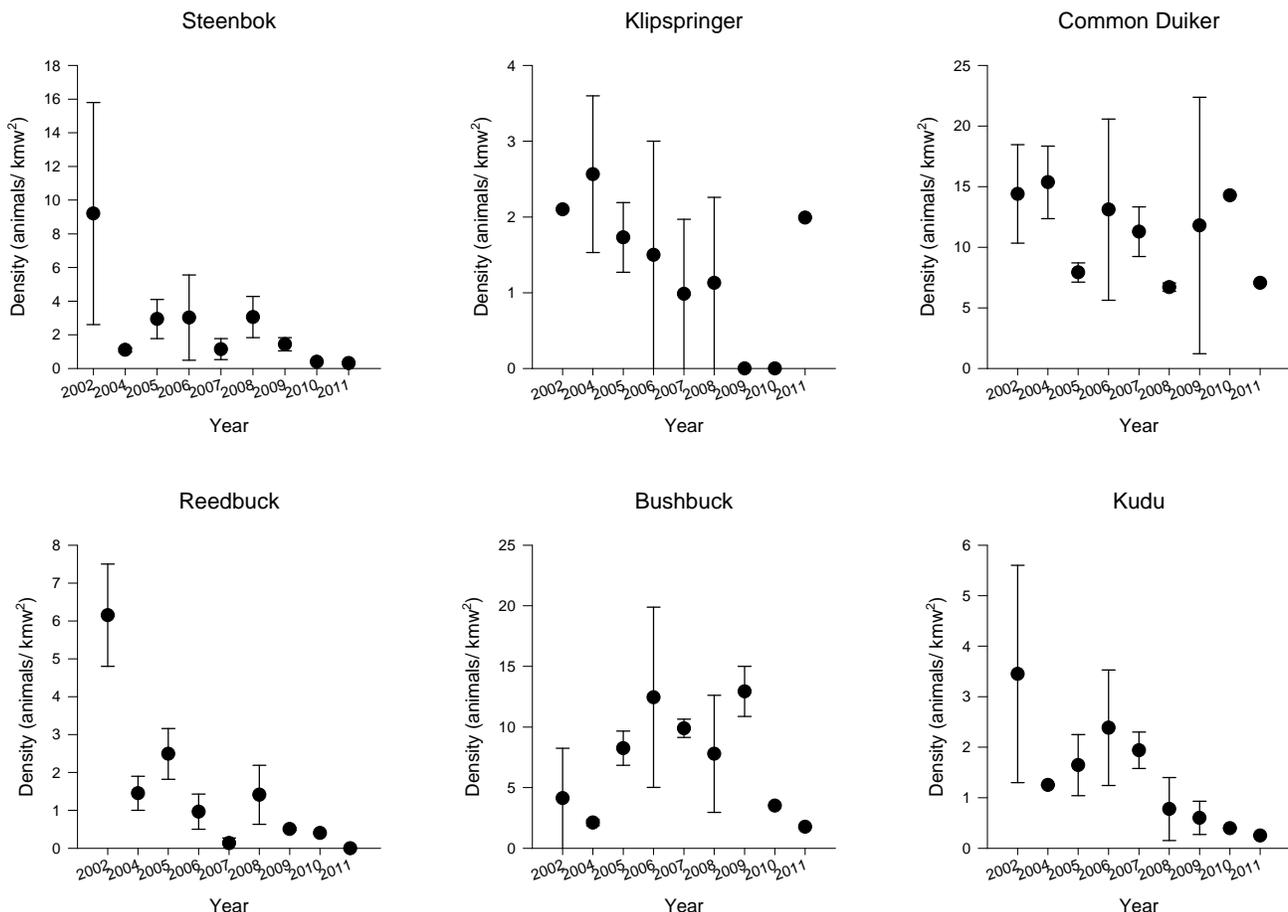


Figure 1: Trends in antelope density in the Togwe Wilderness Area since 2002. Error bars are SE of the mean (from April and October data). October 2011 data were not available at the time this report was prepared, and no data were collected in 2003.

1.2. Captive Antelope Collection and *ex situ* research

Few changes have occurred in the antelope collection since breeding has been suspended in common and red duikers. Since November 2010, 1.1 blue duikers, 0.1 steenbok and 0.2 common duikers were born. Five deaths occurred in the period, including the remaining yellow-backed duiker, Bear (Appendix 1).

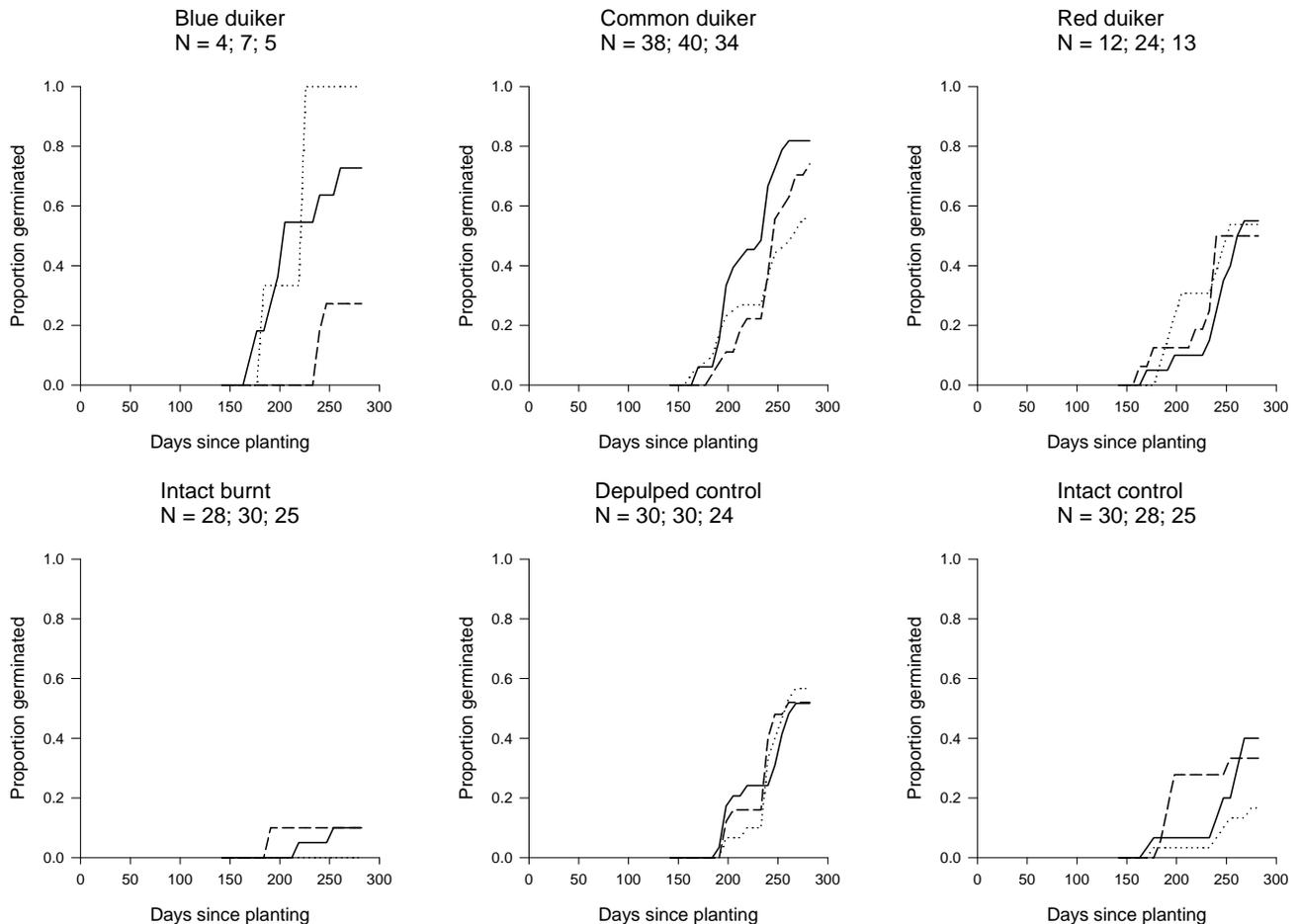


Figure 2: Proportion of, and time to, germination of seeds from each treatment for Tree 1 (solid line), Tree 2 (dotted line) and Tree 3 (dashed line). Data were grouped by week, starting on 1st September 2010. N refers to the number of stones planted for Trees 1, 2, and 3, respectively.

Although I have had several conversations with Dr Viv Wilson concerning morphometry of duiker skulls, we have not yet undertaken the planned study. There are data from student projects that also await preparation for publication; my aim is to dedicate some time to this over the next few months.

Since November 2010, three *ex situ* studies have been completed. Two are being written up as fourth-year projects by the students who undertook them. Final results will be available in 2012 once the dissertations have been examined and corrected.

The third study, which commenced in March 2010, was on marula germination. Final germination success and germination rate data were obtained by February 2011. Five treatments were applied to fruits from three independent trees: (i) antelope ingestion by three different species, (ii) mechanical depulping, (iii) simulating a “veld fire” on intact fruits, (iv) simulating a “veld fire” on mechanically depulped fruits and (v) control. Veld fire simulation involved overlaying fruits or kernels with dry grass to a depth of 2 cm and burning the grass. Germination success and germination rate (time to germination) were significantly enhanced by antelope ingestion (Fig. 2). Mechanical depulping enhanced germination, but to a lesser extent than did antelope-ingested fruits. Fire inhibited germination. Within treatments, there was a significant inverse correlation between kernel volume and germination success. However, double

germination (i.e. both seeds in a kernel germinating) occurred in the larger kernels of the subset of samples that germinated. This study is being written up for publication; I intend to submit it by the end of the year.

2. Rhino project

I have become more intensively involved with rhino monitoring and data collection in Matopos National Park since May 2011. This was partially in response to concerns raised at the March 2011 rhino strategy workshops regarding the status of IPZ populations. With funding and equipment donated by SAVE Foundation, Australia, DWT launched a camera-trap survey with the specific aims to augment patrol data and locate or verify rhinos that had not been seen for some time. In addition, DWT is providing technical support with record keeping and establishing and maintaining electronic records of rhino data.

Early in the project, it became apparent that white rhino monitoring in MNP was substantially better than black rhino monitoring. Few sightings of black rhinos were recorded in the sightings register, and many of those sightings were of unidentified individuals. Reasons for this appear to be a complex combination of ranger apathy, lack of confidence approaching dangerous wildlife, and insufficient training and leadership. DWT has offered to provide further technical support to train rangers in identification skills and filling in field cards, as none of the current Scientific Services staff are accredited trainers, and the only accredited trainer on station at MNP (John Mvula – the Senior Ranger) has administration tasks that limit time available for rhino work.

2.1. Camera trap survey

A pilot survey was carried out in June and July to determine optimal camera heights and angles to paths to enable a high probability of photographing rhino ear notches. At the end of July, a standardised protocol was implemented, based on the Tropical Ecology Assessment Monitoring (TEAM) Network system. The TEAM Network protocol is a compromise between double-sampling the same individuals of larger species, and not detecting smaller species with small ranges. This protocol was deemed appropriate because the target species, rhinos, have relatively large, but well defined home ranges. Thus, multiple sample sites within possible ranges would increase the probability of detecting individuals.

The IPZ was overlaid with a 1-km² grid, and alternate grid blocks were selected for sampling (this gives a sample density of approximately one camera per 2 km²). Five arrays, each of ten grid blocks, were identified for sequential sampling. MNP Scientific Services staff and I identified suitable sample sites within 500 m of the midpoint of sample blocks where possible. However, if terrain was rugged or no suitable sites existed within the 500 m radius, a distance of 700 m (i.e. the equivalent distance from the centre to the corner of a block) was allowed. Despite this, some blocks were inaccessible and were excluded; 45 sites in total have been identified with eight to ten sites per sampling array.

Cameras were attached to trees at heights between 1 m and 1.6 m and were angled at between 0° and 45° of the main path to capture head-on photographs. To avoid overexposure of early morning and late afternoon photographs (low sun), cameras faced south if possible. Camera settings were: 8 MP resolution, 3-4 second delay between triggers, one photograph captured per trigger, sensor sensitivity set to “low” in winter (when ambient temperature was cool) and “normal” in hotter weather. “High” sensitivity settings resulted in a large number of false triggers by moving vegetation and heat waves. 14-day trapping periods were used.

At the end of each fortnight period, cameras were moved to the next array, and used memory cards were collected. Photographs were downloaded and those that had captured animals were catalogued with the species present, site number and date. For rhinos, animals were identified where possible. Photographs were deemed to belong to the same sequence (i.e. multiple photographs of the same individual or group) if consecutive photographs were taken within a 30-minute period. This will be important in the analysis stages to avoid temporal autocorrelation. All data were entered into a custom-made Access database.

The survey will continue for 12 months, until July 2012, with each site being sampled at least once per standard season (hot, wet; cool, dry and hot, dry). This will enable analysis of seasonal variation in habitat use and distribution.

Summary of results to date

The first circuit of the IPZ was completed on 4th October, by which time sampling effort totalled 579 trap nights. In this time, approximately 1850 photographs of birds and mammals were captured. Of the 41 mammals species detected (Table 1), 75% were photographed within the first fortnight of sampling (Fig. 3). Despite camera position being deliberately biased towards larger species, a large number of small mammals (especially carnivores) have been detected. The only large (> 10 kg) mammals not yet recorded that have been listed as being present in the Park are wildebeest (*Connochaetes taurinus*) and tsessebe (*Damaliscus lunatus*).

The survey has been effective in verifying rhino presence and identifying individuals. Of 79 photo sequences of rhinos, 46% were sufficiently clear to identify the animal/s; 16% generated partial identifications (e.g. only one ear seen), and 38% were not identifiable because of ear position, photograph angle or low photograph resolution. Most photographs were taken at night, which made individual identification challenging as nocturnal photographs are in black-and-white, and many images were quite grainy. To date, only one known white rhino has not been photographed, while 53% of known black rhinos have been identified from photographs.

Table 1: Wild mammal species photographed between 26th July and 4th October 2011.

Herbivores (antelope, suids, giraffe, zebra, hippo, rhinos, leporids, rodents, etc)	Carnivores	Other (Insectivores and primates)
Bushbuck Bushpig Duiker, common Eland Hare, scrub Hippo Hyrax, rock Hyrax, yellow-spotted Impala Klipspringer Kudu, greater Porcupine Reedbuck Rhino, black Rhino, white Rock-rabbit, Jameson's red Sable Springhare Steenbok Warthog Waterbuck Zebra, common	Caracal Cheetah Civet Genet* Honey badger Hyaena, brown Jackal, black-backed Jackal, side-striped Leopard Mongoose, banded Mongoose, Meller's Mongoose, slender Mongoose, water Mongoose, white-tailed Serval	Aardvark Galago, lesser (nightape) Baboon, chacma Monkey, vervet

*Genet taxonomy is not clear from the literature. Genets of two sizes have been photographed; I assume these to be "small-spotted" and "rusty-spotted" genets.

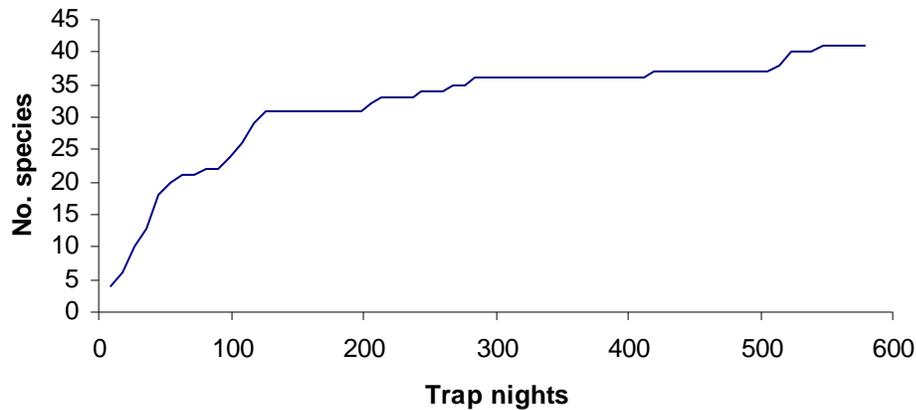


Figure 3: Species accumulation curve (wild mammals only) in the IPZ.

3. Carnivore project

Samual Williams' PhD thesis is still under preparation. His initial intention to submit the thesis by June 2011 was precluded by the absence of a staff member who was assisting him with the spoor identification analysis (i.e. identifying individual cheetah from spoor; an experiment undertaken at De Wildt in South Africa). His revised submission target is the end of the year. At present, Sam is running a research programme for his PhD supervisor in Limpopo Province of South Africa.

DWT will be collaborating with Dr Andrew Jacobson of Duke University (also affiliated with the National Geographic Big Cats Initiative) to publish a meta-analysis of carnivore questionnaire data. In September, Jean Purdon, a Zimbabwean MSc graduate from the University of Pretoria, undertook to enter all data into a standardised spreadsheet. By the end of September (at which time she left Dambari temporarily to attend a course in South Africa), she had input data from nine of the ten student questionnaire surveys. Jean will liaise with Dr Jacobson and Sam Williams on the analysis and write-up of a manuscript when the data have been input and verified. DWT will retain intellectual property rights.

4. Student programme

Two students have joined DWT to carry out their third-year work-related learning module. Cedric Maforimbo is from Lupane University and Faith Muzama is from Bindura University of Science Education. Both have selected *ex situ* antelope projects: Faith is investigating how plant spinescence affects cropping rate in duikers of different sizes; Cedric is undertaking a foraging behaviour project that will provide information towards enrichment of the captive animals. The students' proposals will be submitted to their university supervisors for approval in early November; data collection will commence in January.

In addition to their projects, both students are gaining experience in the running of the Field Station, through working with the general staff, the administration staff, and accompanying N. Pegg on field excursions. The US Embassy has provided funding to support student activities, including field- and project-work.

5. Outputs and publications

In December 2010, I received notification that my PhD had been passed, subject to corrections. I completed the corrections in early April, and my PhD was officially awarded in June once the loose-leaf copies had been received by the library.

One paper has been published this year, appearing in the April 2011 edition of *South African Journal of Wildlife Management*. As indicated earlier in the document, another manuscript is nearing completion. Andy Bowkett and I are preparing a poster entitled "Filling the gaps: linking *ex situ* research and *in situ* conservation". Andy will present the poster at the ZSL Antelope Conservation symposium in November.

During the year, I ran a GPS / radiotelemetry practical for NUST students at Dambari. This has become a popular annual event for first or second year students from NUST and LSU. I also presented a talk about CAB to Wildlife and Environment, Zimbabwe in April, and DWT hosted an “animal counting” practical for Matobo Conservation Society members at Mpopoma Dam in September.

6. Planned activities for 2012

Existing projects will continue into 2012, although it is anticipated that writing up and disseminating historical carnivore studies will be completed early in the year. Three new projects are under development, and will be implemented once funding is secured:

6.1. School conservation clubs: training resource monitors at rural secondary schools

This project aims to develop capacity in the youth in rural Matobo District by providing training in resource monitoring. In the first year of the programme, conservation clubs at five secondary schools within a 10-km radius of the Matopos IPZ will be developed and supported. A field officer will spend at least two days per month during the school terms working with students and club teachers. Resources to be monitored will include non-timber forest products, wildlife, water, etc. In addition, the field officer will run awareness campaigns (e.g. climate change, environmental health and litter) during the year. Club members will be encouraged to produce a quarterly newsletter which will be circulated among schools and stakeholders.

Project budget for 2012: \$14,882

Funds secured so far: \$1,500 (Edgars Stores, Zimbabwe)

Other funds applied for: Rufford Small Grants Programme (£5,457); contributions from local corporate sponsors.

Other resources needed: Field Officer

6.2. Mitigation of predator-livestock conflict in the Matobo Hills

The goal of this project is to promote the coexistence of humans, livestock and wild predators. Over three phases, we will (i) assess the location, scale and type of predator-livestock conflicts in the Matobo Hills and educate farmers about predators’ behavior, (ii) trial different low-cost methods of livestock management, compare their relative effectiveness and improve them by adapting the methods to local conditions, and (iii) disseminate the results to participating farmers, other stakeholders and to the wider public.

Project budget (18 months): \$34,505

No funds secured yet; two applications rejected.

Alternative donors need to be identified.

Other resources needed: Field Officer

6.3. Small carnivore species richness, abundance and distribution across land use types and along a rainfall gradient

Small carnivores were extracted as a priority group at the May 2011 CAB workshop held at Dambari. To fill the gap in knowledge, a project is being formulated to carry out a detailed survey of small carnivores using camera traps and questionnaires. To cover available land-use types and to take into account the East-West rainfall gradient in the Matobo Hills, sampling will be carried out along a 100-km E-W transect. Camera trapping will occur at a density of one camera per 2 km² (in line with standard protocols). Ancillary data about distributions, perceived abundance and perceptions of small carnivores will be collected by means of structured interviews. This will allow human knowledge to be calibrated against objectively-obtained data. The survey will be carried out during the dry season (April to October), since vegetation in the wet season is likely to interfere with detection by cameras. The intention is to collaborate with Sarah Durant of ZSL, whose team has developed methods to enable species absence to be determined.

Project budget: not completed

No funds secured yet.

Applications will be sent to: International Foundation for Science (IFS).

Other resources needed: Field interviewer (may be a student); equipment (cameras).