

Earthwatch Field Report 2004

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OTHER RESEARCHER: Louise Egerton

POSITION/TITLE: Researchers

AFFILIATION:

Independent Researchers
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PROJECT TITLE:

A scientific and conservancy approach towards sustainable use management of elephants in northwestern Namibia

RESEARCH SITE: Northwest Namibia, Kunene Region

START AND FINISH DATES:

Team I: May 1 - 1, 2004
Team II: May 30 – June 14, 2004
Team III: July 1 – July 15, 2004
Team IV: July 31 – August 14, 2004
Team V: September 1 – September 15, 2004

NO. OF EARTHWATCH VOLUNTEERS: 22

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HIGHLIGHTS

(a) Elephant research concentrated on activity budgets, identification and monitoring, with the aim of improving the understanding of elephant in the target area. This information will be incorporated into long-term Ministry of Environment and Tourism (MET) and conservancy elephant monitoring programmes.

Information collected during this Earthwatch season will be combined with local knowledge as well as previous collected data to develop a sustainable management plan for elephants in northwestern Namibia.

(b) During the 5 Earthwatch expeditions scientists and volunteers collected data on previously identified elephants and collected over 75 hours of activity budgets and social interaction studies. In addition, a new study was launched to examine the defaecation rates and seed composition in the dung of elephants.

These studies helped in the understanding of numbers, social interactions, daily activities, feeding regimes and movement of both elephants and giraffe in northwestern Namibia. The dung studies will eventually give information about the amount of vegetation consumed by elephants and their protein (seed) intake.

While these animals have been photographed by just about every filmmaker interested in desert-dwelling animals, however very little research has actually been carried out and/or published.

OBJECTIVES

(a) The elephants involved in this study are resident for the majority of their time outside of protected areas and within the communal areas. As populations of both man and elephant are increasing, the chances of increased confrontations are inevitable. Opportunities do exist for the mitigation of this conflict to the benefit of the local population, the environment and wildlife populations. The conservancy approach in Namibia however provides the vehicle for solutions to some of these problems. The rights of use over wildlife have resulted in a far more positive attitude towards elephants. Elephants are now potential assets to rural populations and benefits are being generated through consumptive and non-consumptive use of wildlife. This broadens livelihood options, increases rural job creation and skills, and provides communities with local development funds.

Historically there were probably between 2500 and 3500 elephants in the northwest. This population was hunted extensively by Boer hunters in the latter part of the 19th century without ever really decreasing their numbers (Viljoen, 1987). By the 1960's, the number of elephants in the north was estimated to be between 600-800 (Owen-Smith, 1970). This number was further reduced by war and drought to approximately 357 individuals by 1983 (Viljoen, 1987). Since this time, it is believed that elephant numbers have recovered to the 1960's levels. There have been two previous studies on these elephants (Viljoen, 1988; Lindeque and Lindeque, 1991). However these studies were undertaken either during or very soon after a war (1975-1990). The disturbances caused by large numbers of troops driving around the Kunene district have no doubt impacted the elephants' movement and social behaviour. The area has entered a relatively peaceful period with only occasional poaching or problem animal incident (one elephant was shot at Omarumba in 1997). Disease is still a problem with one animal dying of anthrax in 1991/2 prompting the MET to immunise all other animals in the area. Therefore in light of the expansion of elephant numbers and relative stability of the area, movement and behaviour patterns need to be re-addressed.

(b) Specific objectives for this year's Earthwatch research season

Elephant Research Objectives

The following objectives were investigated during the 2002 season:

- a) the home ranges of elephants;
- b) resident times of elephants in various areas;
- c) activity budgets and behavioural interactions;
- d) dung studies to determine vegetation intake;

METHODS

Elephant research methods and techniques

Earthwatch volunteers were involved in characterising, investigating the social behaviour and collation of this data onto a database.

Characteristics and Social Behaviour of the northwest Kunene Elephants

It is possible to identify individual elephants by identifying the following characteristics (based on Laws, 1966):

- a) sex;
- b) tusks;
- c) ears;
- d) tail; and
- e) footprint patterns.

This information will be collected into photographic libraries housed in the conservancies and/or support agencies as appropriate. At the same time as the photographic library is being collated, the following aspects of population dynamics will also be studied:

- a) social behaviour, not only between members of the herd but also interaction with other family units;
- b) the population structure and age distribution within the herds;
- c) activity behaviour (i.e. feeding, sleeping, social interactions); and
- d) genetic linkage studies.

Results collected from these observations will be transferred to a specially designed 'Access' database for this study.

The Dung Study

The majority of the data were collected from the Hoarusib ephemeral river in the cold dry season from May to September over 28 elephant defecations.

After each defecation the total amount of dung boluses were weighed and the number of boluses recorded. One bolus was retained from each defecation to determine the percentage of moisture loss in their dung and to help establish the amount of water in the diet of desert-dwelling elephants. The bolus was weighed fresh and then stored in a net bag to allow airflow and prevent germination. The weight was then recorded at varying intervals thereafter. In general, measurements were taken approximately one-three days and one- two months after the time of collection.

A second bolus from each defecation was dissected and all the seeds were extracted. All seeds found in the dung were taken to the National Herbarium in Windhoek to identify the species. All of the seeds found in the dung throughout the season belonged to *Acacia erioloba*.

As the seeds in the stomach swell as much as twice their normal size, in order to establish the correct weight of the seeds at the time of consumption, dry seeds collected from *Acacia erioloba* pods were weighed. Two plies of 500 seeds were weighed 3 times and divided to get the mean weight of one seed which was 0.26g. The seeds were then counted in the dung bolus and multiplied by 0.26 to give the weight of the seeds

consumed. In order to understand how many pods the elephant has consumed in relation to the amount of seeds found in its dung, a further 20 pods were opened to get the average seed content of 13.75 in each pod.

Geographical Information Systems

Distribution patterns of large mammals are strongly influenced by environmental parameters, human persecutions and other human activities. Their distribution can be regulated by extrinsic factors such as weather conditions, food supply, vegetation and human disturbance of the landscape. All data obtained during the study will be transferred to a GIS system for easy visualisation of results.

RESULTS

Movement studies

Between 20-30th September 2004, 5 elephants were funded by personal donations by previous Earthwatch volunteers and external donors. The following results are a summary of four desert-dwelling elephants that were regularly seen by Earthwatch volunteers.

Activity studies

Activity budget studies are currently being undertaken and only preliminary analysis has been undertaken. These studies also include behavioural and social interactions as well as current herd associations.

Preliminary results:

Feeding	Water	Resting	Walking	Social
40.6	12.6	19.6	24.7	2.5

Diurnal activity (as a percentage) of elephants in Northwestern Namibia.

While only preliminary data it can be seen that elephants spend the majority of their time feeding or walking between feeding areas and water. Resting also makes up a significant part of their time while water activities (drinking, wallowing or dust bathing) a lesser amount. Social activities occupy only a small fraction of the total activity time.

The Dung Study

Defecations consisted of an average of 4.38 boluses of which only one seed species, *Acacia erioloba* was found in the dung. The average weight of one bolus (usually recorded after 15mins – 2hours of defecation) was 1153.30 g and an average of 5571.35g per total defecation.

As the hot dry season developed there was a noticeable decline in the number of *Acacia erioloba* seeds found in the dung ranging from 3 in September to 164 in June. The average number of seeds found in each bolus was 64. The average weight of *Acacia*

erioloba seeds per bolus was 16.64g and 66.56g per total defecation making up 1.19% of their diet. The majority of the dung was made up of fibrous plant material and wood/bark. Based on the calculation of no. of seeds per pod, the elephants consumed on average 4.65 pods per bolus and 20.37 pods per total defecation in one event. In terms of moisture lost over time, there was an average of 14.20% loss over a 36 hour period from that of the weight at the time of collection. The moisture then decreased by a further 12.74% over a 60 hour period with an average loss of 26.94%. There was a further 36.1% reduction from 60 hours to one month of which the average moisture % loss was 63.04%. The difference between 1 month and 2 months was insignificant with only a 1.74% reduction of which the average moisture loss after 2 months was 64.78%. In general the weight decreased over time as the bolus dries out and lost its moisture. However in a few instances the weight had actually *increased* by 5-10g from previous measurements. This could be due to fog which sealed water into the dung or the presence of organisms living in the dung after some time.

DISCUSSION

(a) The data collected during this year's Earthwatch has assisted the researchers to achieve their objectives. Although the data collected is by no means conclusive it has added significantly to the data collected last year and will again provide a very good base for additional studies.

(b) Research will be continued on elephants in the research area. Most importantly, monitoring will be continued for at least another year, then the data will be thoroughly analysed and evaluated. While this year's results have not greatly influenced the research plan beyond confirming the direction and purpose of the elephant research. The overall aim of the project is to assist the MET and the communities of the focus area to derive a sustainable management plan for elephants.

(c) Dr. Leggett is a member of the MET-coordinated 'Elephant Liaison Group' which meets irregularly to discuss elephant research, policy and management issues throughout Namibia. All data gathered from the research will be reviewed through this group. This group forms the basis for elephant policy and management decisions throughout the country thus acting as the appropriate springboard for which this study can contribute to all levels of management in the country. A greater understanding of the elephant/giraffe population numbers, densities and movements will help understand a better idea of when, where, how and why these species function, with particular reference to recruitment rates and possible dispersion or re-expansion areas. These findings in turn will be integral in the establishment of the proposed world heritage sites and peace parks which has been forwarded to ministerial level and international bodies for recommendation.

PUBLICATIONS

The following articles were published by the PI in the last 12 months.

1. K.E.A. Leggett, J. Fennessy and S. Schneider, (2004), A study of animal movement in the Hoanib River catchment, northwestern Namibia, *Journal of African Zoology*, **39** (1): 1-11

2. K.E.A. Leggett (2004). "Coprophagy and unusual thermoregulatory behaviour in desert-dwelling elephants of northwestern Namibia, *Pachyderm*, **36**: 113-115.

OTHER ACCOMPLISHMENTS AND BENEFITS

The project has received supplementary funding from several sources as a result of the 2004 Earthwatch season.

(a) \$US15 000 for the GPS collaring activity

The donations resulted directly from volunteer participation in the project.

ACKNOWLEDGEMENTS

Staff

Dr Keith Leggett (PI)

Ms. Louise Egerton (Research assistant)

Mr. Gerhard Laubschagne (Field assistant and driver)

Ms Anne Marie Uwu-Khaes (Base Camp Staff)

Mr Franz Höeseb (Base Camp Staff)

Co-operating institutions

Desert Research Foundation of Namibia (DRFN), Namibia

Integrated Rural Development and Nature Conservation (IRDNC), Namibia

University of Sydney, Australia

Denver Zoo, Colorado, USA

Wildlife Conservation Society, Bronx Zoo, New York, USA

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Earthwatch \$US34 000

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