



## The Namibian Elephant and Giraffe Trust

Incorporating the Northwest Namibia Desert-dwelling Elephant Project  
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**Title:**

**Movement, population distribution and social dynamics of African elephants in northwest Etosha National Park/Omusati Region of Namibia.**

**Responsible Researchers:**

Dr. Keith Leggett  
Elephant Researcher  
Namibian Elephant and Giraffe Trust

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**Collaborating Researchers:**

Mr. Werner Killian  
Etosha Ecological Institute  
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**Collaborating Partners:**

Ministry of Environment and Tourism

**Possible Students:**

Ms. Regen Jamieson  
University of Rhode Island  
USA

**Period:**

Start: October 2005  
Finish: December 2007  
(Possible extension until 2010)

April 2005

## **SUMMARY**

The proposed project to study the movement, population distribution and social dynamics of the elephants in the Omusati Region of Namibia is the first of its kind in this Region. The project will work in conjunction with established conservancies, communities and the Ministry of Environment and Tourism. The proposed study would be an extension of a study currently underway in the northwestern Kunene region.

The proposed project focuses on the seasonal and annual movements of the northwest Etosha and Omusati elephants, in addition the social and population dynamics will also be investigated. The data gathered by this study will be shared with the Ministry of Environment and Tourism (MET), Conservancy, Communities, Local and Regional Government authorities and all interested parties.

The project will initially focus in northwest section of Etosha National Park and the southern Omusati Region. However, the project will be expanded to include the entire elephant range in both the communal and commercial farming areas.

## **BACKGROUND**

### **Previous Elephant Research**

There has been very little research carried out on the elephant populations in the focus area. A study by Lindeque and Lindeque (1991) on the movement of 2 collared elephant showed that a elephants in the areas had extensive ranges, however since this study no follow up research has been undertaken. In November 2002, the MET GPS collared 6 female elephants in Etosha National Park but these elephants showed limited movement with the majority staying within the Park boundary. The elephants in the focus area are thought to range seasonally from Etosha National Park into the Omusati Region, however little data is available to confirm these movements.

### **Physical Background**

Geological the proposed research area is broadly defined Western Kalahari woodland, which is sandwiched between the Koakoveld escapement to the west and the Cuvelai mopane shrubland, landscapes to the east. The vegetation is dominated by acacia tree and shrub savannah, with a ferralic arenosol soil type, broadleaf woodland vegetation type and is dominated by Kalahari sandveld (Mendelsohn et.al., 2002).

Surface water only exists in the area during or soon after the wet season, when many seasonal pans are filled. Groundwater quality is most of the region is not of high quality and borehole are not plentiful in the area (Mendelsohn et al., 2000). However, some permanent water points exist north of the Etosha National Park border at Omatambo-Maowe, Uutshathima, Onamatangs and Onambandje. These areas support relatively large human and domestic stock populations.

## **Human Settlements**

The human population density of the proposed research area is generally very low (less than 1 person/km<sup>2</sup>) (Mendelsohn et al., 2000). However the areas immediately surrounding the permanent settlements of Omatambo-Maowe, Uutshathima, Onamatangs and Onambandje support densities of between 10-40 persons/ km<sup>2</sup>. The majority of people living in the area are Owambo-speaking.

## **THE PROPOSED STUDY**

The elephants involved in this study appear to be resident both in protected area (Etosha National Park) and within the communal farming areas of the Omusati Region. 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 farmers, rural populations, 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 to 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, as well as providing communities with local development funds.

## **AIMS AND OBJECTIVES OF THE RESEARCH**

The aims and objectives of the research are as follows:

- To assess the current seasonal and annual ranges of elephants in the Omusati/northwestern Etosha area.
- Carry out identification, social and behavioural studies on resident elephants.
- Establish the age structure, reproductive and survival rates amongst the study elephants.
- To assess the potential human elephant conflict with communal farmers.
- Provide appropriate elephant data to MET officials and other interested parties.

## **PROBLEM STATEMENT**

Very little information is available to the managers and decision-makers at all levels on elephants in the Omusati Region. What information is available is not readily accessible nor is it currently integrated into decision-making, planning and management.

## **OVERALL GOAL**

Contribute towards a better understanding of the Omusati Region elephants for an improved sustainable management use and benefit all peoples living in the area.

## **PROJECT PURPOSE**

Decision-makers at all levels in the Omusati region have an improved access to elephant information and that the two key stakeholders (MET and conservancies) have improved mechanisms for sustainable management.

## **METHODS**

All research will be conducted in collaboration with the MET officials. MET's Conservation Scientist for the Etosha National Park (Mr. W. Killian) is a research partner in this programme. Other MET staff from Etosha National Park would also be invited to assist in the project as opportunity and their programmes allow. All research results will be distributed at regular intervals to all collaborating partners.

### **Tracking of individuals by Satellite GPS collars**

The scientists acting in conjunction with the MET and appropriate stakeholders will initiate and undertake tracking of 8 male elephants using GPS collars. Until recently, the best method for studying herd distribution and ranges of elephants has been the radio tracking of collared individuals combined with aerial surveying. The recent advances in GPS collars have made it possible to reduce the amount of aerial surveying and tracking time. Once the collars are attached to individuals, they will record the location of the individual for up to 2 years. The time interval between location readings can be altered from hourly to daily or even weekly. This system is expensive but more than pays for itself with the reduction in effort and disturbance required for aerial surveying and tracking time on the ground. Private funding will be obtained to for the collaring operation and it is expected that those contributing (up to 6 individuals) will be present at the collaring, however they will take no physical part in the collaring being there only as observers. Mr. Killian's knowledge and experience would be an invaluable in fulfilling this objective.

It is expected that initially 8 collars would be fitted depending on funding availability. All eight GPS collars will be deployed on free ranging adult males, four in the southern Omusati Region and four in the northwest of Etosha National Park.

### **Characteristics and Social Behaviour**

The characterisation of an individual elephant using observational and photographic techniques is not a simple procedure. Ideally, all members of the family units should be identified and characterised. During the initial stages of the project however, only the matriarch and a small number of dominant cows will be identified in each of the family units. This will allow more herds to be identified and their interactions

monitored in a shorter space of time. It is envisaged that by the end of the project individual identification of all the elephants within the area should be possible. Bachelor units and lone males will also be identified and monitored whenever possible. It is possible to identify individual elephants by identifying the following characteristics:

- (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; and
- (b) the population structure and age distribution within the herds.

### **Human/Elephant Conflict**

Using the GPS collar data local “Hot Spots” for elephant damage and threats will be identified. Once this information has been collected then a strategy of how best to approach the elephant problem can be addressed per area. It may be that some areas are predisposed to elephant incursion and destruction. Once the characteristics of the area can be defined, it may be possible to come up with preventative strategies to stop the elephants raiding and if this fails, other more active management strategies may be necessary (in conjunction with MET).

### **Geographical Information Systems (GIS)**

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. These complex natural and human made interactions are not surprisingly difficult to understand and to predict. However, the union of remote satellite imagery, geographical information system (GIS) technology, and the development and advances of landscape ecology has provided a framework within which the analysis, modelling and prediction of wildlife distributions can be undertaken to suitable confidence levels.

It is envisaged that GIS will initially be used for display and ‘simple’ analysis of the spatial distribution of the elephant herds/individuals. Such display and analysis would include the creation of spider diagrams, histograms, triangulations and tessellations and such calculations as home range pattern identification (using many of the common models such as Kernel, Minimum Convex Polygon, Harmonic Mean, etc.), site fidelity testing, location statistics, nearest neighbour analysis, etc.

## **Information dissemination**

It is proposed that 6 monthly meetings with MET, conservancies and communities be used to disseminate all information gathered from the project. In addition, the project will keep in close liaison with appropriate stakeholders in the Omusati Region, making all data available through them for further dissemination.

## **PROJECT DESIGN**

The project will be initially be carried out over a 2-year period beginning after the GPS collaring of the eight elephants in the Omusati/northwest Etosha area. Any extension to the project would be dependent on the success of the initial phase of the project.

- Project design will incorporate the active involvement of MET.
- Project design must include gathering of additional essential information and synthesis of this, together with research results, into awareness materials for decision-makers, environmental education, tourists and the general public.

## **LOG-FRAME**

See Appendix A for a detailed log-frame breakdown.

## **PROVISIONAL SCHEDULE**

### **Staff and Time Schedule**

Staff dealing with research components is as follows:

Dr Keith Leggett will act as Project Manager and Chief Scientist on this project. Should funding become available an additional full-time Namibian researcher/co-ordinator will be appointed to assist Dr. Leggett in the implementation of this study. It is also hoped to involved Masters and PhD students from Namibia and overseas in this study.

Mr. Werner Killian will be the MET liaison person and work in close collaboration with Dr. Leggett in all aspects of the project.

Ms. Regen Jamieson of the University of Rode Island has requested to study these elephants as part of her MSc. The participation of Ms. Jamieson is dependent on availability of funding and acceptance by the University of Rhode Island.

The project is initially planed for 2 years with a possible extension to 5 years depending on funding.

## **EXPECTED OUTPUTS**

The predicted outputs of the project will be:

- The establishment of long-term movement, behavioural and social characteristics of elephants in the focus area.
- Awareness materials as appropriate (e.g. poster, radio tape, video, and environmental education materials), as well as publications in the international scientific literature.
- Provide detailed information on the movement, range and social structure to MET.
- Interim and final reports for policy makers and donors;
- Regular meetings with interested and affected parties, with visual material such as slide shows, pamphlets and posters
- Presentation of final research results to conservancy committees, traditional leader, decision-makers, relevant government, NGO and public forums.

### Ongoing outputs throughout the course of the Project

- fact sheets summarising relevant issues for policy-makers and institutions.
- papers for scientific periodicals
- participation of staff from Ministry of Environment and Tourism

## **PROPOSED BUDGET FOR PROJECT**

The total cost of this 2 -year project is estimated to be \$US354710. A detailed budget is found in Appendix B.

## **REFERENCES**

Lindeque, M. and Lindeque, P.M., 1991. "Satellite tracking of elephants in northwest Namibia". *Afr. J. Ecol.*, **29**:196-206.

Mendelsohn, J., Jarvis, A., Roberts, C. and Robertson, T. (2002) "Atlas of Namibia", Ministry of Environment and Tourism, Namibia, 200 pages.

Mendelsohn, J., el Obeid, S. and Roberts, C. (2000) "A profile of north-central Namibia", Gamsberg Press, Namibia, 79 pages.