Tarangire Elephant Project

Interim Research Report to the

International Elephant Foundation

December 2006

Preliminary report on the radio collaring three bull elephants in the Tarangire Ecosystem

Project Objectives

- To provide updated and accurate information on the movement patterns of one of the keystone species of the Tarangire ecosystem.
- To use this information to support and guide the land conservation efforts currently taking place in the Tarangire-Manyara ecosystem.

Project Rationale

There are currently very few data showing the movement patterns of bull elephants within the Tarangire-Manyara ecosystem. Their movement is thought to be extensive, with bulls potentially moving as far as the Ngorongoro Conservation Area and West Kilimanjaro, and as such, their movements are likely to play an important role in maintaining gene flow between the disparate elephant populations.

Currently several conservation organisations are working to protect wildlife migration routes and dispersal areas in land between Tarangire and Manyara National Parks (on Manyara Ranch), with a large part of their efforts concentrated in the area of north of Tarangire. Without good information on elephant movements it is difficult to know whether the critical migration routes are being preserved by these efforts, or whether different areas need to be targeted. Putting satellite GPS radio collars on bulls will provide us with a detailed and comprehensive picture of the bull movements, which will be used to help guide and strengthen the case of the land protection efforts in the Tarangire-Manyara ecosystem.

Radio collaring

All collaring occurred on Manyara Ranch, a 40,000 acre land trust linking Tarangire and Manyara National Parks. Formerly a government operated cattle ranch, Manyara Ranch is now run by a Tanzanian land trust and managed by the African Wildlife Foundation (AWF). Manyara Ranch was selected as the collaring site because it is used by elephants

from three different populations (Tarangire, Lake Manyara and Lolsimongori Mountain), and therefore maximised the chance of collaring individuals with different dispersal patterns.

Collaring equipment

All collaring equipment was purchased from a company called African Wildlife Tracking based in South Africa. The consignment included three satellite GPS collars, one Icom© handheld VHF receiver and one Yagi VHF antenna. The GPS collars upload the elephants' position (in latitude/longitude) to geostationary satellites from where the information is transmitted to a data retrieval centre for daily distribution to the clients. The system allows the user to alter the data collection protocols remotely, for instance to increase downloads during periods of high movement, or to decrease collar activity during times of relative inactivity to preserve battery life. All three collars were initially programmed to gather information every 12 hours during the dry season, though this was subsequently changed to collect the elephants' position every 8 hours to better capture their increased movements during the wet season. With the current uploading schedule, the collar batteries are expected to last two years.

Collaring procedure

A small team of Tarangire Elephant Project (TEP) staff visited Manyara Ranch four days prior to the start of the collaring to establish distribution and levels of elephant use of the Ranch. This team also set up a camp close to the Ranch headquarters for the collaring team.

The collaring team met on Monday, September 11 2006 to discuss collaring logistics and practise infield collaring protocol. Our aim was to collar at least one known Tarangire bull and at least one other bull that was not known to be a Tarangire resident. We intended to collar older bulls (preferably 35 years and older), as these individuals were most likely dominant breeding bulls and therefore prone to migrate more widely to find females during the main breeding season.

The TEP staff selected the animal to be darted and the darting was carried out by Richard Hoare (TAWIRI vet) and Moris Kilewo (the TANAPA vet). A list of participants can be found in Appendix 1. All three bulls were collared on Tuesday, September 12 2006, with two animals darted in the morning and one in the afternoon. Once the elephant was sedated, the collars were fastened, and body measurements, blood and parasite samples collected (Appendix 1).

Bull Identification

The third bull collared (*Elephant 3*) was a known, resident Tarangire male called 'Plato'. He is a large, one-tusked male and one of the more dominant animals in the population and frequently seen in Tarangire Park. It was not known from which population the other two bulls came. We did not have an identification card for *Elephant 2*, though we had

seen this male in Tarangire on at least one occasion, so this bull is probably either a Tarangire male or an infrequent visitor from Lake Manyara. *Elephant 1* had never been recorded in the park previously and we suspect that he is a Manyara National Park bull.

Plate 1: Bull 1 goes down following darting

Plate 2: Keeping other males at bay during collaring.

Plate 3: Dorsal view of the GPS satellite collar

Plate 4: Collaring completed. Dr Richard Hoare applies the antidote.

Recent elephant movements

After the collaring, Plato (*Elephant 3*) moved immediately to Tarangire National Park and has remained there for the past two months (Figure 1). He has concentrated his movements along the Tarangire River in the northwest corner of the park, which is a traditional dry season ranging area for Tarangire elephants and a known "bull area" for the northern subpopulation. *Elephant 1* spent most of September on Manyara Ranch and then migrated to Tarangire, spending most of the time on the border between the Park and the Burungi Game Controlled Area hunting block. *Elephant 2* spent the majority of the time on Manyara Ranch or on Olasiti village land; the latter is a hunting block that has recently seen increased anti-poaching patrols through a joint project between a hunting outfitter and the local community. It is interesting to note that elephants are now starting to move into this area, likely due to the increased security. *Elephant 2* also moved some distance along the narrow land corridor adjoining Manyara Ranch and Manyara National Park, but then returned to the Ranch, which suggests that this land strip is still being used by migrating elephants. We have now altered the collection parameters to gather data every eight hours as we are entering the main elephant breeding period when we expect most bull movement. The next six months of data collection should be particularly illuminating with regards to bull dispersal patterns. Towards the end of the wet season we will have sufficient information on bull movement patterns to begin ground transects in areas with high elephant usage to further elucidate use patterns on the ground.

Figure 1. Movement patterns for 'Plato' (Elephant 3) from September – November 2006. Note the immediate movement from the collaring site on Manyara Ranch to Tarangire National Park, where he has concentrated over the past two months.

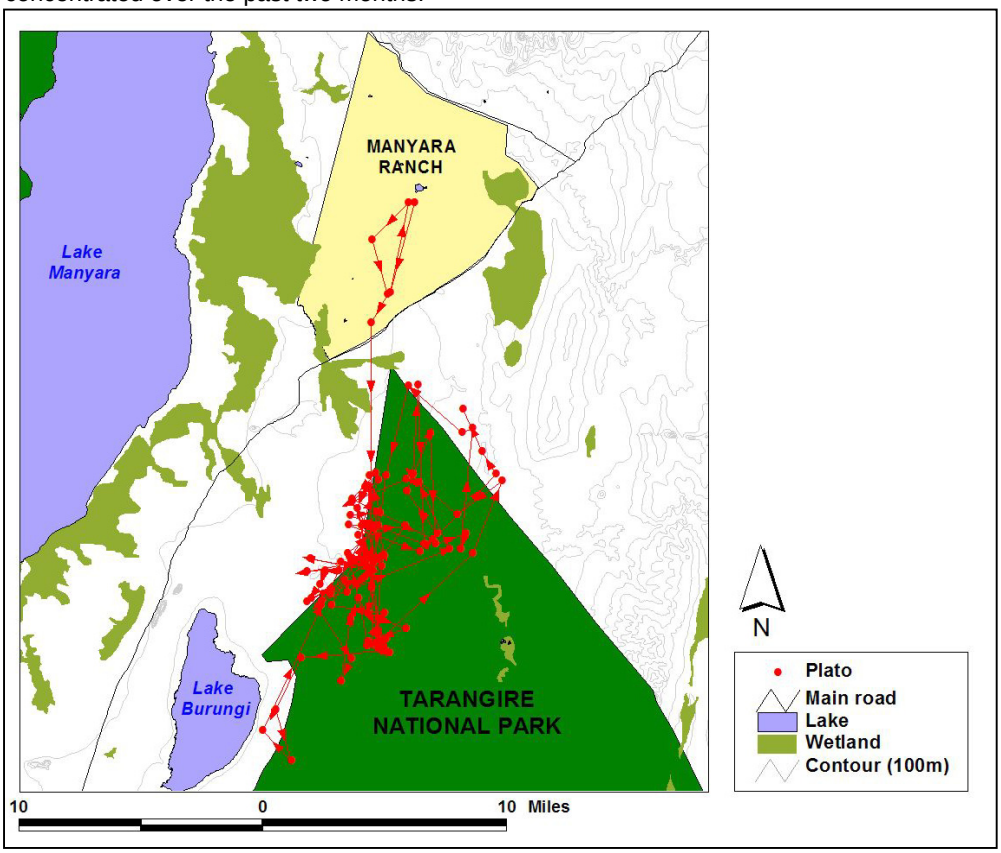


Figure 2. Movement patterns for Elephant 1 from September – November 2006. Note the brief foray onto the wetland area between Manyara Ranch and Lake Manyara. This bull thus far has the most wide-ranging movement patterns.

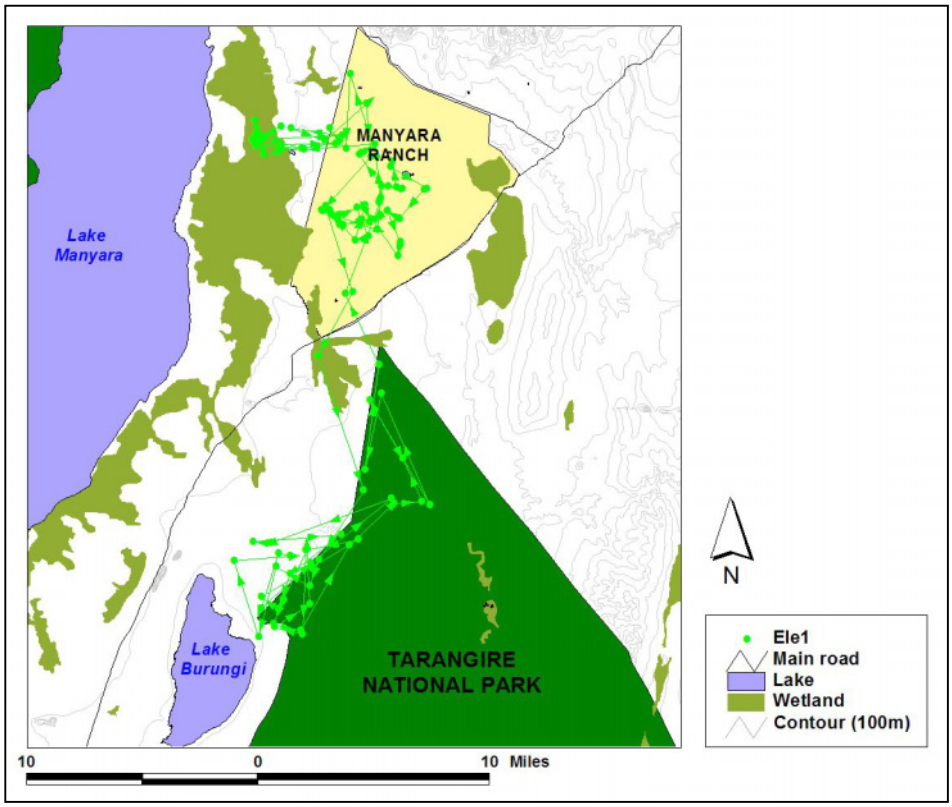
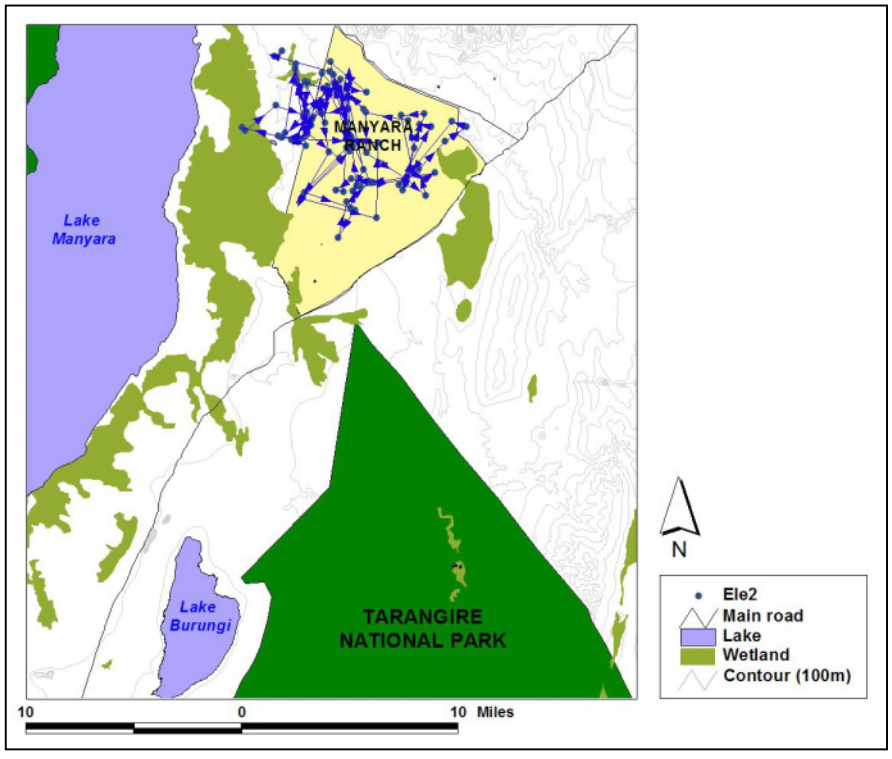


Figure 3. Movement patterns for Elephant 2 from September – November 2006. This bull remained on the Ranch for the entire data collection period, but will likely move beyond the Ranch borders as there are no resident bulls on the Ranch.



Appendix 1

Data collected per individual elephant during time of collaring

Parameters	Elephant ID1	Elephant ID2	Elephant ID3
Date of collaring	12-Sep-06	12-Sep-06	12-Sep-06
Known Elephant Name	Not Known	Not Known	Plato
Estimated Age (years)	40-45	35-40	35-40
GPS East (Degrees decimals)	35.99112	35.98252	35.97475
GPS South (Degrees decimals)	-3.56473	-3.58615	-3.58335
Immobilization drug	M99	M99	M99
Immobilization dose	15mg	15mg	15mg
Dart Site	Left flank	Left flank	Left flank
Dart time	4:42pm	12:04pm	9:56am
Time to knock-down	4:53pm	12:11 / 12:14pm	10:04am
Antidote drug	M5050	M5050	M5050
Antidote drug dose	36mg	24mg	36mg
Injection site	Left ear vein	Left ear vein	Left ear vein
Time of antidote	5:23pm	12:51 pm	10:32am
Time to wake	5:26pm	12:54 pm	10:36am
Shoulder height (cm)	330	320	340
Forehead-tail length (cm)	342	395	Not collected
Rear foot length (cm)	67	69	65
Rear foot circumference (cm)	145	152	145
Tail length (cm)	131	146	144
Trunk length (underside) (cm)	202	206	216
Tusk circumference (L) (cm)	50	356	50
Tusk length minimum (L) (cm)	96	Not collected	93
Tusk length maximum(L) (cm)	109	125	115
Tusk circumference (R) (cm)	49	Not collected	N/A*
Tusk length minimum (R) (cm)	Not collected	Not collected	N/A*
Tusk length maximum (R) (cm)	106	Not collected	N/A*
Hair sample collected?	Yes	Yes	Yes
Other samples collected	Blood, tissue, saliva	Blood, tissue, saliva	Blood, tissue, saliva

**Bull had only 1 tusk (left)*

Appendix 2

Collaring participants

Personnel name	Affiliation
Charles Foley	Tarangire Elephant Project
Lara Foley	Tarangire Elephant Project
Sammy Sikombe	Tarangire Elephant Project
Linus Munishi	Tarangire Elephant Project
John Joseph	Tarangire Elephant Project
John Mkindi	Tarangire Elephant Project
Richard Hoare	TAWIRI Veterinary officer

Sean Richards	TAWIRI
Vet assistant	TAWIRI Veterinary assistant
Vet assistant	TAWIRI Veterinary assistant
Moris Kilewo	TANAPA Veterinary officer
Mr Masawe	Game officer, Mto wa Mbu
Carol Hosford	Woodland Park Zoo
John Simonson	Sinyati
Annette Simonson	Sinyati
Brendon Simonson	Sinyati
Anna Estes	University of Florida
David Peterson	Dorobo safaris
Trude Peterson	Dorobo safaris