



Tsavo Elephant Research
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Dear Earthwatch Volunteers,

Thank you for your participation in the 2008 - Elephants of Tsavo Research. With your participation we were able to cover a larger area, in a shorter period of time and thus were able to collect more data and find more known elephants, than I could on my own.

As you discovered patience, a bit of luck and attention to details are requirements for a successful study on elephants. I appreciate the many long hours you spent in the field helping to collect the data.

I am happy to say we accomplished all of our goals with the four 2008 teams. We made some significant discoveries on elephant distribution; the data showed that with the November rains the elephants dispersed from the southern region of Tsavo East and then returned in large numbers in December (no other teams have provided the data to so clearly illustrate this dispersal pattern). In addition you provided an opportunity for me to find individuals I've not seen in many months: Park - Amadeus, Augustus, Calypso, Sagon, Miranda and in Rukinga - Jefferson and Electra.

The wildlife data you collected will be used by KWS to monitor the endangered/threatened species and the impact and trends in the bush-meat trade. Further the livestock data provide empirical evidence to KWS of encroachment into the National Park; this will help them address this pressing issue.

Thank you again for your support and participation.

Warm regards,
Barbara



EARTHWATCH INSTITUTE ANNUAL FIELD REPORT

Elephants of Tsavo

Date completed:

26 January 2009

Completed by:

PI - Dr. Barbara McKnight

Period covered by this report:

4 Teams (Jun, Oct, Nov, Dec 2008)

1. Reporting on Research Objectives

All of the four objectives were accomplished with each of the four team's surveys.

- *Define Seasonal and Spatial Elephant Distribution*
Determine group size, composition, number of calves less than one year, state of the vegetation, wildlife association and identification of known individuals.
- *Elephant Behavior*
Determine the seasonal diurnal behavior of elephants: feeding, water activity, resting, travel, threatened-vehicle, interactions between individuals and occurrence of musth (a periodic condition in bull elephants characterized by highly aggressive behavior and also accompanied by a significant rise in reproductive hormones such as testosterone).
- *Water Resources-Habitat*
Monitor the seasonal (natural and artificial) water resources. Plot the time, location and extent of fires and destroyed vegetation.
- *Wildlife - Livestock*
Determine the total number and distribution of wildlife that is endangered, threatened, rare, unknown status and all predators in the National Park and Rukinga. Park boundary: record all wildlife species to determine the impact of the bush meat trade. Census livestock and determine spatial and temporal distribution and encroachment into the National Park.

2. Project development

3.1 Removed and modified original objectives:

Boundary Survey: The boundary surveys for the June team were conducted along the western park boundary and the eastern private land boundary. The private land boundary provided data outside my objective of providing data to KWS. Therefore the private land transect was eliminated and starting with the Oct team changed to concentrate only along the park boundary.

3. Results

3.1 Summary of Results

Water Resources- Habitat

Data from the surveys showed two large areas in the National Park that burned and one large area in Rukinga Wildlife Sanctuary. In addition the data collected on available water resources were used to plot elephant distribution related to water and was submitted to the Senior Warden after each survey.

Elephant Density - Distribution

The total number of elephants sighted in the southern region of the Tsavo Ecosystem fluctuated due to fires and rainfall and the subsequent changes in the vegetation: Dry season: June n=1,442; October n=981 and Wet season: November n=191; December n=1,974. Fewer elephants were recorded within private land than the National Park. The density of elephant numbers during the dry season surveys show that the majority was along Voi and Mbololo Riverine. As the vegetation changed to green and the waterholes filled the elephants dispersed.

Of particular interest was the November - December surveys. It was difficult to find elephants in November while during the December survey elephants were recorded during all transects. These data suggest the elephants had dispersed outside the southern region of the park with the rains and then returned in December. Aggregations of elephants were recorded in December. Groups feeding and moving as a coordinated unit ranged in size from 55 to 146 individuals. During the four surveys, data

was collected on 43 known individuals (24 ♂ and 19 ♀ with their offspring) some of whom had not been seen in many months.

Group Composition - Size

Within the National Park 359 groups were recorded: families (59.3%; n=213) and lone bulls (20.9%; n=75) were most frequently sighted. Discreet family units ranged in size from 2 to 27 individuals and mixed groups ranged from 12 to 32 individuals. Bull group size ranged from two bulls to 15 bulls.

Within Rukinga Wildlife Sanctuary a total of 41 groups were recorded. No elephants were sighted in June. During the Oct/Nov/Dec surveys sightings of Bull groups (39.0%, n=16) dominated. While lone bulls and families sightings were the same (26.8%, n=11). Bull group size range was 2 to 15 individuals. Family group sizes ranged from 2 to 16 individuals.

Elephant Births

An effort was made to record newborns and calves less than one year during the surveys conducted in Oct/Nov and Dec. This was of course not always possible due to visibility constraints. Nevertheless, the Nov/Dec appeared to be months of elephant births; 0-3 months, n=31; 4-12 months, n=46.

Elephant Boundary Crossings

During the June team a group of 15 bulls was sighted crossing the Nairobi-Mombasa main road. This sighting combined with the May 2007 EW team sighting of 4 bulls crossing the main road provide empirical evidence of an elephant crossing point between the National Park and private land.

Wildlife-Livestock

Wildlife and livestock total, spatial and temporal distribution has been submitted to KWS. These data will assist them in the conservation efforts of endangered/threatened/unknown status species: Hirola, Grevy's Zebra and Cheetah. With the unknown status of vultures in Tsavo and their decline due to poisoning in other areas of Kenya, the data on vulture sightings will help KWS monitor their status in this area. Our boundary transects provide data KWS requires to address the bush-meat trade and livestock encroachment into the National Park.

3.2 Research Impact/Benefits/Contribution to Conservation

Local

The data collected during the four teams provided empirical data on elephant temporal/spatial distribution and boundary crossings. These data show that elephants utilize both national park and private land and illustrate the necessity for the Tsavo elephants to have access to these areas on a seasonal basis. In addition this data on elephant seasonal density and distribution in the western region of the park has the potential of alerting park management of possible elephant/human conflict areas and prepare accordingly. Further, the data on the status of water resources assist conservation managers in the park and private land to make decision on water development.

National / Regional

The Tsavo elephants comprise 1/3 of the total number of elephants in Kenya and is therefore one of the most important population to monitor. The data collected on elephants compliments the periodic aerial surveys. The data collected (elephants, wildlife, livestock) benefited KWS management in providing data to address the country-wide issues of elephant dispersal, elephant/human conflict, health of the other wildlife (commercial trade in bush meat) and livestock number; land use for ranching and encroachment inside the National Parks.

International

Tsavo is one of the 45 regions in Africa chosen by CITES (Convention on the International Trade in Endangered Species) as a MIKE (Monitor the illegal killing of Elephants) sites. This research compliments and contributes to monitoring this important population.

4. Communication of Results

Reports and raw data submitted to KWS and the Ministry are confidential and not for distribution. Some of the reports I submit on my own, others are required by officials. I concentrated my efforts this year on supplying data sets/results to KWS related to habitat and elephant conservation and management. I have included a list of these reports submitted during 2008 to illustrate the type of report and to whom the data was given.

- KWS - *Bi-annual/annual reports*.
Required reports - Nairobi and Tsavo Headquarters (Jan/June).
- KWS - *Elephant density/distribution map/report* (each survey).
Tsavo East Senior Warden (June, Oct, Nov. Dec)
- KWS - *Research Findings and Their Implication to Park Management*.
Required report to Tsavo East Senior Warden (October)
- KWS - *Elephant Mortality (2003-2007) Mombasa/Nairobi Main Road*.
Required report to CWS Senior Warden (January)
- KWS - *Lecture/Practical- KWS Manyani Training School - Officers & Rangers*
Tsavo Elephant Research: Objectives/results: Elephant Population Dynamics: age/sex structure, grouping patterns and range. Techniques on individual identification (May/Aug).
- Ministry of Science and Technology, Republic of Kenya - *Bi-annual/annual report*
Required report - Nairobi
- Rukinga Wildlife Sanctuary - *Data/report*.
Requested data and results - Sanctuary Management
- Lion Sighting Data - Kenya Lion Project
- Cheetah Sighting Data - Cheetah Research Project

5. Educational Opportunities

5.1 Local community - students/staff

This research involved the participation, education and employment of three research field assistants: Felix Ndamu, Samuel Chege and Ben Ndambuki. Their responsibilities included training, educating and supervising Earthwatch volunteers.

Ben Ndambuki implements much of his experiences from Earthwatch teams to teach children (6 to 12 years old) in his home area about conservation of the habitat, elephants and other wildlife.

6. Acknowledgements

I thank the Ministry of Science and Technology-Republic of Kenya and Kenya Wildlife Service for research clearance and permission to study the elephants in Tsavo. I am grateful to the research staff (Felix Ndamu, Samuel Chege & Ben Ndambuki) for their assistance in the field. I thank Rukinga Wildlife Sanctuary management for permission to conduct surveys in the sanctuary. I am grateful to *Earthwatch Institute* for funding and the volunteers spending many hours in the field collecting data.