



**USAID**  
FROM THE AMERICAN PEOPLE

## **Where Are the Conservation Corridors for Elephants in Saadani National Park and the Lower Wami-Ruvu River Basin of Eastern Tanzania?**

*Summary Report of Elephant Collaring Operation*



*By Alfred Kikoti, August, 2010*



**COASTAL RESOURCES CENTER**

*University of Rhode Island*

This publication is available electronically on the Coastal Resources Center's website at [www.crc.uri.edu](http://www.crc.uri.edu). For more information contact: Coastal Resources Center, University of Rhode Island, Narragansett Bay Campus, South Ferry Road, Narragansett, Rhode Island 02882, USA. Tel: 401) 874-6224; Fax: 401) 789-4670; Email: [elin@crc.uri.edu](mailto:elin@crc.uri.edu)

**Citation:** Kikoti, A, 2010. Where Are the Conservation Corridors for Elephants in Saadani National Park and the Lower Wami-Ruvu River Basin of Eastern Tanzania? Summary Report of Elephant Collaring Operation. Coastal Resources Center, University of Rhode Island. Narragansett. pp. 10.

**Disclaimer:** This report was made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of the authors and do not necessarily reflect the views of USAID or the United States Government. Cooperative agreement # 621-A-00-10-00012-00

**Cover Photo:** Collared elephant seen from the air in the Wami Mbiki Management Area

**Photo Credit:** Alfred Kikoti

## **Table of Contents**

<b>INTRODUCTION.....</b>	<b>4</b>
PROJECT GOAL .....	4
PROJECT OBJECTIVES.....	5
CAPTURE AND COLLARING OPERATION .....	5
ISSUES AND CONCERNS .....	6
OPPORTUNITIES .....	7
<b>REFERENCES.....</b>	<b>9</b>

## **Introduction**

The Saadani National Park (NP), Wami-Mbiki Wildlife Management Area (WMA) and the Wami and Ruvu rivers provide important ecological links for wildlife in eastern Tanzania. Although there is little information on the abundance, distribution and dispersal patterns of elephants in the region, Milewski (1993) speculated that elephants occurred throughout the area. Baldus et al. (2001) reported extensive elephant signs along the Wami River in the southern part of Saadani NP (formerly game reserve) and estimated a population of 50 elephants in the northern part of the park. Bloesch and Klotzli (2004) also reported elephant signs in the central part of the park near Saadani Village. Based upon local knowledge, Sumerlin and Gritzner (2007) speculated on the occurrence of elephant movement corridors linking Saadani NP with the Selous Game Reserve to the south along the Ruvu River and to the southwest to Mikumi NP through the Wami-Mbiki WMA. However, there are only limited wildlife survey data available for Saadani NP, Wami-Mbiki WMA or the Wami-Ruvu River Basin. In addition to their diverse habitats and wildlife communities, the region also hosts diverse human populations. To the south west of the park is the Wami-Mbiki WMA with a core area of 2,500 km<sup>2</sup> and a buffer zone of 1,500km<sup>2</sup>. The buffer zone is surrounded by 23 villages. Despite its designation, there is much deforestation in the WMA and adjacent lands due to agricultural expansion and cattle grazing along the floodplains of the Wami River and wood harvesting for fuelwood, timber, and charcoal production. Wildlife poaching (eg snares, dogs, rifles) also occurs. Further west of the WMA there is large scale irrigated sugar production ([Melamari et al., 2003](#)) and abundant rice pads.

This complex mosaic of diverse natural communities in protected and unprotected status interspersed with numerous human settlements, cattle overgrazing, small shifting cultivation, large scale agriculture, and fenced ranches, pose significant challenges for wildlife conservation in eastern Tanzania. Further, there is reportedly much human-elephant conflict because of the seasonal movements of elephants and the proximity of human settlements and agriculture to elephant habitats in the region. With increasing human populations and loss of natural habitats in eastern Tanzania, the probability for conflict will increase.

With elephant home ranges and dispersal areas increasingly fragmented and human-elephant conflicts increasing (Dublin et al., 1997; Hoare & du Toit, 1999; Sitati et al., 2003), protection of movement corridors is recommended for linking protected areas and reducing human-elephant conflicts in Tanzania (Mwalyosi, 1991; Hofer et al., 2004) and other eastern and southern African countries (Osborn & Parker, 2003; Douglas-Hamilton et al., 2005). Further, in Tanzania human settlements and farms around several protected areas, including Saadani NP (Tobey et al., 2005; Torell et al., 2006), have increased their isolation, and threatens traditional migration routes (Borner, 1985; Mwalyosi, 1991; Newmark, 1993, 1996; Kamenya, 2000; Hofer et al., 2004). Further, human settlements and farms around Saadani NP are increasingly isolating the park and reducing the remaining large, contiguous habitats into smaller, isolated remnants.

## **Project Goal**

To obtain information on the seasonal movements, abundance, and distribution of elephants within Saadani NP, Wami-Mbiki WMA and lower Wami-Ruvu River Basin that will contribute to establishing a regional network of wildlife conservation corridors and community

conservation programs to reduce human-elephant conflicts. This project will also promote development of a regional elephant management plan.

### Project Objectives

1. Conduct satellite telemetry studies of elephants to determine local and regional seasonal movements, habitat use and corridors
2. Conduct systematic aerial surveys of elephants in Saadani NP, Wami-Mbiki WMA and lower Wami-Ruvu River Basin to determine seasonal distribution and abundance.
3. Work with local communities and wildlife managers to identify and establish conservation corridors and reduce human-elephant conflict in the region.

### Objective 1. Conduct satellite telemetry studies of elephants to determine local, regional, seasonal movements, habitat use and corridors

#### Capture and Collaring Operation

During the month July 2010, 17 satellite collars were deployed on six bulls and eleven female elephants (Table 1). Five of the collars were deployed in Saadani region, whereby four (collar ID: K2, K2, K3 and K4) within Saadani National Park and K1 at Sakura village located on the north east of the park (Fig 1). In Wami Mbiki Wildlife Management Area we deployed 12 collars, whereas two in the north west, two in south west, three in north east, four in the east of Wami Mbiki and five at Mkongo which is central area of Wami Mbiki Wildlife management Area(Fig 2). Ages of collared elephants ranged from 20 to 40 years old.

**Table 1. Capture region, location, date, sex, age and remarks of 17 elephants tagged with satellite telemetry units in eastern Tanzania, July 2010.**

ID	SEX	REGION	CAPTURE LOCATION	CAPTURE DATE	AGE	ANIMAL CONDITION/REMARKS
K1	♂	Saadani	Sakura village	20 <sup>th</sup> July	35	ok
K2	♀	Saadani	Madete	21 <sup>st</sup> July	25	ok
K3	♀	Saadani	Madete	21 <sup>st</sup> July	20	ok
K4	♂	Saadani	Mkwaja HQ	22 <sup>st</sup> July	35	ok
K5	♀	Saadani	Buyuni	22 <sup>nd</sup> July	30	Multiple wounds/cut trunk
K6	♀	Wami Mbiki	East Mkongo	24 <sup>th</sup> July	27	ok
K7	♂	Wami Mbiki	South West	24 <sup>th</sup> July	20	ok
K8	♀	Wami Mbiki	Kwamsungura	25 <sup>th</sup> July	26	Bullet wound & cut trunk
K9	♀	Wami Mbiki	Kwamsungura	25 <sup>th</sup> July	23	ok
K10	♀	Wami Mbiki	Mkongo	25 <sup>th</sup> July	26	ok
K11	♂	Wami Mbiki	North east	25 <sup>th</sup> July	30	Bullet wound
K12	♀	Wami Mbiki	Kwamsungura	26 <sup>th</sup> July	25	ok
K13	♂	Wami Mbiki	Kwamsungura	26 <sup>th</sup> July	35	ok
K14	♀	Wami Mbiki	Kwamsungura	27 <sup>th</sup> July	30	ok
K15	♀	Wami Mbiki	East Msanja	27 <sup>th</sup> July	26	Bullet wound
K16	♀	Wami Mbiki	South West	27 <sup>th</sup> July	28	ok
K17	♂	Wami Mbiki	South West	27 <sup>th</sup> July	40	ok

The duty cycle of the satellite telemetry units was set to download six GPS fixes per day, one every four hours. Their projected battery life is two years. Tanzanian-certified veterinarians (R.

Fyumagwa and R. Hoare) immobilized all elephants using ethorphine (M99: C-vet UK). Once the elephant was recumbent, it was fitted with a telemetry unit, and physical and health status measurements taken. The effect of the immobilizing drug was reversed using diprenorphine (M5050: C-vet UK). All elephants were darted from a helicopter provided by the Grumeti Fund.

All collars are working and sending data as expected. At the time of writing this report, we had already had data for over two weeks and it appears that the elephants are still restricted on the rivers and wetlands. We speculate that when the short rains starts around October, the elephants will disperse to other areas.

### **Issues and concerns**

**Poaching:** we saw poaching signs such as meat racks near Wami River, bullets wounds and cut trunks by snares on four collared elephants (Table 1). In general, bush meat and ivory poaching is serious issue, especially at Wami Mbiki.



**Poachers tried to destroy evidence by burning the elephant skull just after removing the ivory at Wami Mbiki WMA.**

**Habitat destruction:** we observed intense charcoal production within 5km of the western boundary of the Saadani National Park. There were also numerous human activities such as charcoal production in the buffer zones and some commercial logging for timber production in Wami Mbiki Wildlife Management Area.

**Uncontrolled cattle numbers:** we saw hundreds of cattle in the north and western side of Wami Mbiki Wildlife Management Area which is likely to increase competition of space and resources between the cattle and elephants and other wildlife species—increasing stress for the wildlife. As

a result, most of the elephants and other wildlife species were using the core area just on the south of Wami River where there were fewer cattle, because of the presence of anti-poaching camp at Mkongo.



**Example of charcoal production**

### **Opportunities**

Nine elephant families (ranging from 10 to 25 members) and four bulls were recorded in Saadani National Park, nine other bulls were observed at the Sakura village, which is located about 15km northeast of the park boundary. We also observed over 800 elephants in the Wami Mbiki VMA. The majority were within 20km of the Wami River, which is the only perennial river in the park and thus a primary water source for the diverse wildlife of both protected areas in the dry season. It appears the region has more elephants than was speculated by previous studies. This was confirmed by pilots who saw elephants, tracks or feeding signs almost everywhere. We also noted that more good habitats for elephants/wildlife exist outside the formal protected areas in the region. Four herds (ranging 13 to 15) of Sable antelopes (rare) were recorded in Saadani National Park during the collaring, but none in Wami Mbiki Wildlife Management Area.

## CONTRIBUTION FROM OTHER PARTNERS IN ELEPHANT COLLARING OPERATION

*AT SAADANI NATIONAL PARK AND WAMI MBIKI WILDLIFE MANAGEMENT AREA FROM  
APRIL TO JULY 2010.*

	<b>ORGANIZATION/INSTITUTION</b>	<b>ITEM/S CONTIBUTED</b>	<b>AMOUNT IN US \$</b>
1	Grumeti Fund Serengeti	Helicopter	19,000
2	Kilimanjaro Elephant Research Project	7 collars	25,690
3	A Tent with View Lodge - Saadani	JetA 1 5 drums , 2 vehicles, three ground trackers	4,800
4	Saadani National Park	1 vehicle, security for Aviation fuel, Air strip, 15 staff	3,000
5	Morogoro District Council	1 vehicle for collaring, 2 staff	2,000
6	Morogoro Regional Commissioner's office	1 truck – camping gear/fuel transportation	2,500
7	Wami Mbiki WMA	2 vehicles and Accommodations for 20 people for 6 days, logistics	6,000
8	Tanzania Wildlife Research Institute (TAWIRI)	Aircraft for spotting elephants, 1 vehicle, Veterinary services	4,800
9	Wildlife Conservation Society	Over 52% discount Spotter plane(10.5hrs)	2,500
10	Tanzania Peoples Defense Force (TPDF)	1 vehicles	1,000
11	Mtibwa Sugar Estates	Air strip - Mtibwa	500
12	Tanzania Airport Authority	Air strip - Morogoro	600
		<b>G.TOTAL</b>	<b>72,390</b>



## References

- Balfour, D., Dublin, H.T., Fennessy, J., Gibson, D., Niskanen L. & Whyte, I.J. (eds.) (2007): Review of options for managing the impacts of locally overabundant African elephants. IUCN, Gland, Switzerland. 80pp.
- Blanc, J.J., Barnes, R.F.W., Craig, G.C., Dublin, H.T., Thouless, C.R., Douglas-Hamilton, I. & Hart, J.A. (2007): African elephant status report 2007: an update from the African Elephant Database. Occasional paper series of the IUCN Species Survival Commission, no. 33. IUCN/SSC African Elephant Specialist Group. IUCN, Gland, Switzerland. Vi. + 276pp.
- Baldus, R. D. (2001): Where the Bush Meets the Beach – Saadani Game Reserve Through the Eyes of an Artist. Dar Es Salaam Guide, No 23. Dar Es Salaam. Tanzania
- Bioesch, U. and Kioetzli, F. 2004. The vegetation of the Saadani National Park and possible conservation and management strategies. Tanzania Wildlife Discussion Paper 33 (Eds. L. Siege and R.D. Baldus). Dar es Salaam.
- Borner, M. (1985): The increasing isolation of the Tarangire National Park. *Oryx* 19, 91-96.
- Douglas-Hamilton, I., Krink, T. & Volrath, F. (2005): Movement and corridors of African elephants in relation to protected areas. *Naturwissenschaften* 92, 158-163
- Dublin, H.T., McShane, T.O. & Newby, J. (1997): Conserving Africa's elephants: current issues and priorities for action. WWF, Gland, Switzerland.
- Gamassa, D.M. 1997: Natural resource management in lake Manyara basin.
- Grimshaw, J.M. & Foley, C.A.H. (1990): Kilimanjaro elephant project 1990: Final report. Friends of Conservation, Nairobi, Kenya.
- Hoare, R.E. & du Toit, J.T. (1999): Coexistence between people and elephants in African savannas. *Conservation Biology* 13, 633–639.
- Hofer, H., Hildebrandt, T.B., Gortz, F., East, M.L., Mpanduji, D.G., Hahn, R., Siege, L. & Baldus, R.D. (2004): Distribution and movements of elephants and other wildlife in the Selous-Niassa Wildlife Corridor, Tanzania. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH. Postfach 5180, D-65726 Eschborn, Germany.
- Kamenya, S.M. (2000): Disappearance of wildlife corridors and their impacts to the protected areas: lessons and conservation changes from Gombe National Park. African wildlife in the new millennium. Proceedings of a conference held at the College of African Wildlife Management, 13-15 December 2000, Mweka, Moshi, Tanzania.
- Kikoti A.P, Griffin, C, Pamphil, L. 2009: Elephant use and conflict in two Maasai communities leads to establishment of the Kitendeni Corridor - Tanzania's first wildlife conservation corridor (in press).

Malima, C., Hoare, R. & Blanc, J.J. (2005): Systematic recording of human-elephant conflict: a case study in south-eastern Tanzania. *Pachyderm* 38, 29-38.

Melamari, L, Madulu, NF, Isinka, A.( 2003): Baseline study in the Wami-Mbiki Pilot WMA in Morogoro, Mvomero and Bagamoyo Districts. Wami-Mbiki Report, vol.2, Wildlife Division, Ministry of Natural Resources and Tourism, Dar es Salaam.

Milevski, A. V. (1993): The Saadani Ecosystem: A Preliminary Ecological Study and Project Proposal. Department of Zoology, Field Museum of Natural History. Chicago. USA

Mwalyosi, R.B. (1991): Ecological evaluation for wildlife corridors and buffer zones for Lake Manyara National Park, Tanzania, and its immediate environments. *Biological Conservation* 57, 171-186.

Newmark, W.D. (1993): The role and design of wildlife corridors with examples from Tanzania. *Ambio* 22, 500-504.

Newmark, W.D. (1996): Insularization of Tanzanian parks and the local extinction of large mammals. *Conservation Biology* 10, 1549-1556.

Osborn, F.V. & Parker, G.E. (2003): Linking two elephant refuges with a corridor in the communal lands of Zimbabwe. *African Journal of Ecology* 41, 68–74.

Rohr, P.C. & Killingtonveit, A. (2003): Rainfall distribution on the slopes of Mt. Kilimanjaro. *Hydrological Sciences Journal* 48, 65-77.

Sitati, N.W., Walpole, M.J., Smith, R.J. & Leader-Williams, N. (2003): Predicting spatial aspects of human–elephant conflict. *Journal of Applied Ecology* 40, 667–677.

Stokke, S. & du Toit, J.T. (2002): Sexual segregation in habitat use by elephants in Chobe National Park, Botswana. *African Journal of Ecology* 40, 360–371.

Sumerin, D. & J. Gritzner (2007): “Rapid Assessment of the Interdependence of the Wami River to the Ecosystems and Biodiversity of Saadani National Park, United Republic of Tanzania,” manuscript, US Forest Service International Programs, US Department of Agriculture.

TANAPA (1998): Proposal on the Upgrading of Saadani Game Reserve and Zaraninge Forest Reserve into a National Park. TANAPA Planning Unit. Tanzania National Parks. Arusha. Tanzania.

Thoules, C. (1990): How to immobilize elephants, pages 164-170 in K. Kangwana (ed.). *Studying elephants*. AWF Tech. Handbook Series No. 7. African Wildlife Foundation, Nairobi, Kenya. 178pp.

Whyte, I. (1996): Collecting data from dead elephants, pages 171-178 in K. Kangwana (ed.). *Studying elephants*. AWF Tech. Handbook Series No. 7. African Wildlife Foundation,