

---

## *Collaring Report*

### **Ecology of elephants on Chief's Island in the Okavango Delta, Botswana**

**February 2011**

---

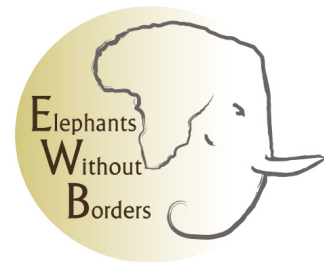


Submitted to: Department of Wildlife and National Parks  
Wilderness Wildlife Trust

Funded by: Mr. Jeff Neu

---

Michael Chase  
**Elephants Without Borders**  
Po Box 682  
Kasane  
Botswana  
Tel/Fax: ++267 6250202  
Email: [er@info.bw](mailto:er@info.bw)



## **PROJECT NARRATIVE**

### **Statement of Need**

The elephant range in Botswana is not a static feature. It is expanding. This recent expansion can be attributed to two factors. The first is related to density dependent dispersal, increasing elephant densities have encouraged elephants to roam further in search of food and water. The second factor is the recent availability of surface water either through artificial waterholes or the recent flowing of rivers which have previously been dry for ~25 – 30 years. Additional surface water to previously dry areas has increased the density of elephants and expanded their spatial distribution (Chase *pers. obs.*).

Elephants are re-occupying areas from which they have been absent for many years. During the past 15 years the elephant range in Botswana has expanded by 53%. Using aerial survey and telemetry data from 55 collared elephants the current elephant range in northern Botswana is estimated to be 138 000 km<sup>2</sup> (Chase unpublished data, Fig. 1). The current size of the elephant range is unlikely to expand any further, although occasional streaks into remote areas will continue. The current distribution of elephants is causing increasing concern about the impact of elephants on biodiversity, the viability of other species and the livelihoods and safety of people living within the elephant range (Chase, 2007). The most noticeable range expansion in Botswana has occurred south towards the Makgadikgadi and west of the Okavango Delta towards Xai Xai. In 2009, Elephants Without Borders (EWB) collared four elephants in the Makgadikgadi National Park (NP) to better understand the southern expansion of the elephant range along the Boteti River towards the Makgadikgadi salt pans (Chase 2009).

The western segment of the elephant range study commenced in October 2009 when an adult elephant bull was collared west of Gumare, and an adult cow was collared along the Southern Buffalo Fence in NG 24. In July 2010, EWB expanded this segment of our study and collared two elephant bulls in NG 26 on the western fringes of the Okavango Delta. This report details the collaring of these two elephant bulls as part of the second phase of monitoring elephant range expansion in Botswana.

### **Brief history of elephants in the Okavango Delta**

During the 1970s it was rare to observe elephants in the Okavango Delta. Their occurrence west of Chiefs Island was seldom recorded (Larry Patterson *pers. comm.*). In the aerial census conducted by Department of Wildlife and National Parks (DWNP) between January 1987 and September 1989, elephants were scarce west of 23°E, and over most of the southern and western Okavango Delta (Calef 1988). Beginning in the early 1980s the occurrence of elephants within the Delta began to increase. In recent years, it also appears that elephants are frequenting the areas of the Okavango Delta that have more permanent waters. Historically, elephants were scarce in these areas and were primarily found around the periphery of the delta's floodplains (Moraka 1984; Calef 1988). In contrast, aerial surveys conducted by Conservation International (Burm and Griffin 2000), elephants were widely distributed throughout the southern portions of the delta, both in more permanently flooded areas and seasonal floodplains.

The colonization and growing presence of elephants in the Delta may have been driven by increasing elephant numbers, the need to search for new sources of food which coincided with the gradual drying of the Savuti and Linyanti Rivers. The lack of water in these rivers could have enticed elephants to move towards the eastern parts of the Delta.

Whether elephants occurred in the Delta before the 1970s is unclear, but around the 1800s the whole country appears to have carried more surface water (Campbell 1990). Wetter conditions and more surface water may have reduced the need for elephants to rely on the Delta's water and vegetation. Hence, it would appear that elephants may have never occurred at the current densities being recorded in the Okavango Delta.

C.A. Spinage in 1990 wrote:

*A further increase in the present (elephant) population will lead to increasing conflict ...unless elephants disperse south and southwest of the Okavango Delta where presently the density is very low. It is not known why the delta is under-utilized by elephants: none has been recorded there nor were any shot during the tsetse control operations.*

### **The ecological role of elephants in the Okavango Delta**

A 2009 aerial survey of a concession in the Okavango Delta estimated elephant densities to be 3.7 elephants km<sup>2</sup>. This density is high when compared to Kruger NP which has 0.63 elephants per km<sup>2</sup> and where conservation managers are concerned about the impact of elephants on biodiversity (Chase 2009). A massive build-up of elephant numbers in the Delta has been followed by a decline in woodland density due to a combination of tree destruction by elephants and the effects of fire. The most noticeable impact is being exerted on *Acacia nigrescens* and mopane woodland, *Ficus sycomorus*, Marula (*Sclerocarya birrea caffra*), and Baobab (*Adansonia digitata*), which are highly favoured by elephant. These trees were established during periods of low elephant (and herbivore) biomass.

The impact elephants are having on the Delta's vegetation appears to be a recent disturbance. Mature mopane and acacia woodlands which would have been destroyed during the 1800s (had there been large elephant densities) are now being heavily browsed. The acacia trees in the Okavango Delta (and other tree species) are characterized by being uniformly mature, evidently having grown up in response to high water levels and low elephant densities. However, many of these mature woodlands are now being drowned by the high flood waters and together with heavy elephant browsing, this has resulted in increased pressure on mopane and acacia woodlands (Chase *pers. obs.*). The estimated 27900 elephants which currently occur within the Delta (DWNP 2004), are hastening the trees' destruction by ring-barking, resulting in patches of dead acacia and mopane forest. Like that created by the *A. tortilis* woodland flooded by Lake Manyara in the sixties, dead trees in the Delta can only be partially attributable to elephants. Regeneration of the acacia trees, it seems, would take place only in a much wetter phase and reduced elephant densities.

The recent flow of the Boteti, Linyanti, Selinda and Savuti Rivers could temporarily relieve elephant densities in the Okavango Delta.

This is the first satellite telemetry study to monitor the ranging behavior of wild elephants on the western periphery of the Okavango Delta. This segment of EWB's elephant movement study aims to improve our understanding of the spatial ecology, and habitat use of elephants on the western periphery of their range.

## **PROJECT OBJECTIVES**

1. What is the current population status of elephants in the Okavango Delta?
2. Map the spatial distribution of elephants in relation to land cover and land use
3. Conduct satellite telemetry studies of elephants to determine seasonal movements, and habitat use
4. Identify corridors and barriers to elephant movements
5. Conserve mature tree species, through protection and establish seedlings

## **METHODS AND PROJECT ACTIVITIES**

### **Study Area**

The western extent of the study area extends along the border of Namibia to approximately 20<sup>0</sup> E. The northern boundary is defined by the Caprivi Border Fence to point where it joins the Okavango River near Shakawe. The northern runs along the Okavango River, and joins the Moremi Game Reserve's northern boundary. The eastern boundary joins the Makalamabedi Fence which extends south to the junction of the Khuke Fence. The southern boundary extends west along the Khuke Fence to the Namibian border.

### **Locating elephants to collar from the air**

A small fixed wing plane, flown by Mr. Mike Holding, was used to help locate and identify elephants to collar. We observed numerous elephant herds and bull groups throughout Chief's Island.

### **Capture and Collaring**

A Bell Jet Ranger helicopter flown by Mr. Peter Pearlstein was used to dart the elephant from the air. We darted one cow elephant. The elephant was collared on January 29, 2011. The elephant cow was immobilized by wildlife veterinarian, Dr. Rob Jackson. EWB researchers fitted the satellite collar to the elephant. Based upon the excellent performance of African Wildlife Tracking satellite collars during the Botswana segment of the elephant research project, we deployed the same collar on this elephant. The elephant appeared to be in good physiological condition.

The collar deployed is capable of recording a GPS location *fix* every hour. The life span of the collar has also increased from 2 – 4 years due to stronger lithium batteries within the transmitter units. Researchers are now able to monitor elephant's movements for longer periods and a finer temporal resolution. This will undoubtedly provide us with new and seminal information of the ranging behavior of these elephants not previously recorded.

Table 1. Collared elephant statistics

Elephant CH 53	
ID	Chloe
VHF Freq.	150.320
Sex	Cow
Age	30
Date Collared	29 January 2011
Herd size	Approx 25
Shoulder Height (cm)	283cm
Right Tusk circum.	29cm
Tusk Length (outer)	60cm

Figure 1. Collaring site of elephant cow, and subsequent movements, 31Jan- 6Feb 2011, north west periphery of Chief's Island.



EWB has a total of 18 collared elephants with satellite transmitters. This elephant will be added to the existing database, and monthly updates on the movements of all collared elephants will be sent to project collaborators.

## **Acknowledgements**

This collaring exercise was made possible with the generous financial support received from Mr. Jeff Neu. We extend our thanks to Dr. Cyril Taolo and Department of Wildlife and National Parks personnel for their support of this research project. The Department of Civil Aviation is acknowledged for providing the project with the necessary over flight authorization to conduct this collaring exercise. Mike Holding is acknowledged for providing his plane to help search for elephants to collar.

## **References**

- Burm, J. and C. Griffin. (2000) A census of wildlife populations in Northern Botswana – species abundance and distribution. Conservation International – Okavango Programme publication series.
- Calef, G.W. (1988) Aerial census of large mammals in northern Botswana, 1987. Department of Wildlife and National Parks, Gaborone.
- Campbell, A.C. (1990) History of Elephants in Botswana. *Proceedings of a workshop on the Future of Botswana's Elephants*. Eds. P. Hancock, Kalahari Conservation Society and Department of Wildlife and National Parks, Gaborone.
- Chase, M.J. (2007) Home ranges, transboundary movements and harvest of elephants in northern Botswana, and factors affecting elephant distribution and abundance in the Lower Kwando River Basin. PhD, Dissertation. Dept. of Wildlife and Fisheries Conservation. University of Massachusetts, Amherst.
- Chase, M.J. (2009) Elephant social dynamics, spatial ecology and Human Elephant Conflict in the Makgadikgadi Salt Pans and Kalahari Ecosystems. *Elephants Without Borders*, Kasane.
- DWNP (2004) Wildlife Aerial Survey Report. Gaborone.
- Moraka, D.N. (1984) Elephant and habitat relationships in northern Botswana. Department of Wildlife and National Parks, Report. Gaborone.