



elephants at LARGE

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In recent decades, Botswana's elephant numbers have recovered from near collapse to being far and away the largest free-ranging population in Africa. Never mind South Africa's so-called elephant 'problem', northern Botswana lays claim to 150 000 of these habitat drivers and their increasingly noticeable impacts have been the subject of a growing debate. **Michael Chase** has been tracking elephant movements in the region since early 2001 and his findings are casting invaluable light on the situation. ▶



ABOVE A large herd gathers to enjoy the bounty of the miombo woodlands in Sioma Ngwezi National Park, Zambia, during the wet season.

OPPOSITE, TOP With little else to browse on, elephants rely heavily on mopane during the dry season, causing much concern and debate about the carrying capacities of these forests.

OPPOSITE The Okavango Delta is an elephant's paradise, yet in the wet season many elephants move away from this 14 000-square-kilometre oasis.

PREVIOUS SPREAD Calcrete soil along the Chobe River in Botswana comes as a welcome, cooling relief for parched, tired elephants.



It's 2002 and I am deep in the elephant heartland of Botswana. From my vantage point in an elevated hide, I start counting the elephants that have come to drink at the Noghatsaa waterhole in Chobe National Park. I am astounded by the sheer numbers that are passing through this series of artificial waterholes. The herds are probably the largest seen in recent times. A week later, I return to collar one of the animals, but they have all disappeared.

Over the next four years, on four separate occasions, I see upwards of 5 000 elephants amassed in one place in northern Botswana, but it's not until 2005, during another impressive aggregation of elephants on the Linyanti floodplains, that I am able to deploy any satellite collars. For the next two years, these collars provide me with continuous data about the movements of three elephants. They convince me that I have discovered the largest and longest migration of these pachyderms on the African continent.

Once on the verge of extinction, Botswana's free-ranging elephant population is now the largest in Africa. It's a considerable achievement, but both the animals and the Botswana have become victims of their own success.

With estimates of up to 150 000 elephants (30 per cent of the total population), the country now faces a number of difficult challenges in elephant conservation and management. For me, though, the situation presents an opportunity to realise a lifelong ambition to study the ecology of these animals.

In 1999, while working as a wildlife ecologist for Conservation International (CI), I submitted an ambitious proposal aimed at enhancing our understanding of elephant movements. Many of the previous studies had been conducted in relatively small conservation areas, surrounded by human settlements, where elephants may not have demonstrated their full movement potential. This, however, would be the first grand-scale transfrontier elephant study using state-of-the-art satellite tracking technology.

Under the supervision of John Hanks, then head of CI's transfrontier conservation area (TFCA) programme, and with funding from the US Fish and Wildlife Service, we believed this study would provide the impetus for a vast conservation area. Curtice Griffin, professor of wildlife ecology at the University of Massachusetts, subsequently convinced me to turn this research into a doctoral study.

Two years later, I was counting, collaring and tracking Botswana's elephants, but I soon realised that they could not be studied in isolation. During the 1980s, large numbers of elephants had sought refuge here, fleeing Angola's civil war, poaching in Zambia and culling operations in Zimbabwe's Hwange National Park. And so, between 2001 and 2007, researcher Kelly Landen and I, together with a small team of experts, set about collaring nearly 50 elephants in northern Botswana, Namibia and Zambia. Soon after the collars were fitted, we started receiving data that significantly altered long-held assumptions about elephant migrations.

We learned that the home ranges of elephants in northern Botswana were the most variable to be reported for African elephants. Those collared along the perennial rivers of the Chobe, Zambezi and Okavango tended to roam over small areas. (The smallest was 910 square kilometres belonging to a 45-year-old elephant bull.) The year-round occurrence of elephants here, as well as their sedentary home ranges, indicates that they are probably not being limited by food and water, and that severe impacts to local vegetation will continue.



Elephants using artificial waterholes, such as those in Savuti, had the largest home ranges. One young bull that was collared at a waterhole moved over an impressive 24 828 square kilometres, the largest home range ever recorded for an African elephant. These epic journeys are highly significant, considering that the average range of elephants in the rest of Africa is just 3 000 square kilometres. The only other studies that report comparable movements come from northern Namibia and Mali, arid areas where elephant movements are relatively unrestricted. ▶



ABOVE A matriarch is darted on the Angola–Namibia border in the Caprivi Strip.

TOP Once the cow is stable, the EWB team – including Kelly Landen (left) and the author (centre) – take measurements and fit the collar.

A major factor contributing to the size of the ranges is that elephants in Botswana are free to roam over a wilderness area encompassing some 115 000 square kilometres, of which 75 000 square kilometres are set aside for wildlife conservation. With the additional data gathered from Angola, Namibia, Zambia and Zimbabwe, we have been able to plot the largest contiguous elephant range in Africa. Interestingly, though, of the 80 000 GPS fixes that we received from our collared

elephants, 65 per cent occurred outside protected areas.

Despite this large range, there are increasing barriers to elephant movements. None of our collared elephants, for example, penetrated intact veterinary fences. Botswana's fences have been the focus of international controversy, but they have had an unintended positive repercussion. The fences have effectively separated agricultural and grazing lands from conservation areas, and have reduced the encroachment of livestock, crops and human disturbances into the elephants' range.

Over a period of 21 months, one of our elephants (a bull known as '03') ranged across 21 000 square kilometres, and covered a straight-line distance of more than 460 kilometres from his collaring site in Botswana. He had a short excursion into Hwange in Zimbabwe, then moved north-west across the Caprivi Strip towards Katima Mulilo, where he crossed the Zambezi River into Zambia. Although his four-country odyssey is particularly impressive, cross-border movements are not unusual.

All in all, 35 of our collared elephants have moved across international

boundaries, indicating that there is much interaction between elephant populations in northern Botswana, Zimbabwe and Namibia's Caprivi Strip. Furthermore, elephants in these three countries are serving as the source for repopulating south-eastern Angola and south-western Zambia.

In 2007, I completed my degree and, determined to continue my studies, my colleagues and I established a small NGO called Elephants Without Borders (EWB). With a grant from the Shikar Safari Club in the US, we were able to pursue our investigations into elephant ranging behaviour.

Lush and green, the Okavango Delta is ideal habitat for elephants. So, when we collared Letsatsi, an adult cow near Vumbra on its north-eastern floodplains, we didn't expect her to wander too far from this sanctuary. However, when the first rains arrived in October, the matriarch and her herd surprised us by travelling 210 kilometres across three countries into Luiana Partial Reserve, a 10 740-square-kilometre conservation area in south-eastern Angola.

It is impressive cross-border migrations such as these that have allowed us to map key wildlife corridors. Letsatsi and her herd used a 30-kilometre gap in the Caprivi–Botswana border fence to get into Angola. This area along the Kwando River forms the largest corridor for elephants moving from Botswana into Angola and Zambia across the Caprivi Strip. If the fence along the southern boundary of Botswana's NG13 concession was realigned, the conservation corridor would widen to 150 kilometres, thereby enhancing wildlife dispersal into Angola.

Following Letsatsi's lead, EWB decided to visit Angola in November 2007. The purpose of our trip was twofold: to provide the government with information on elephant distribution and abundance in Luiana and to obtain its endorsement to embark on a fourth aerial survey.

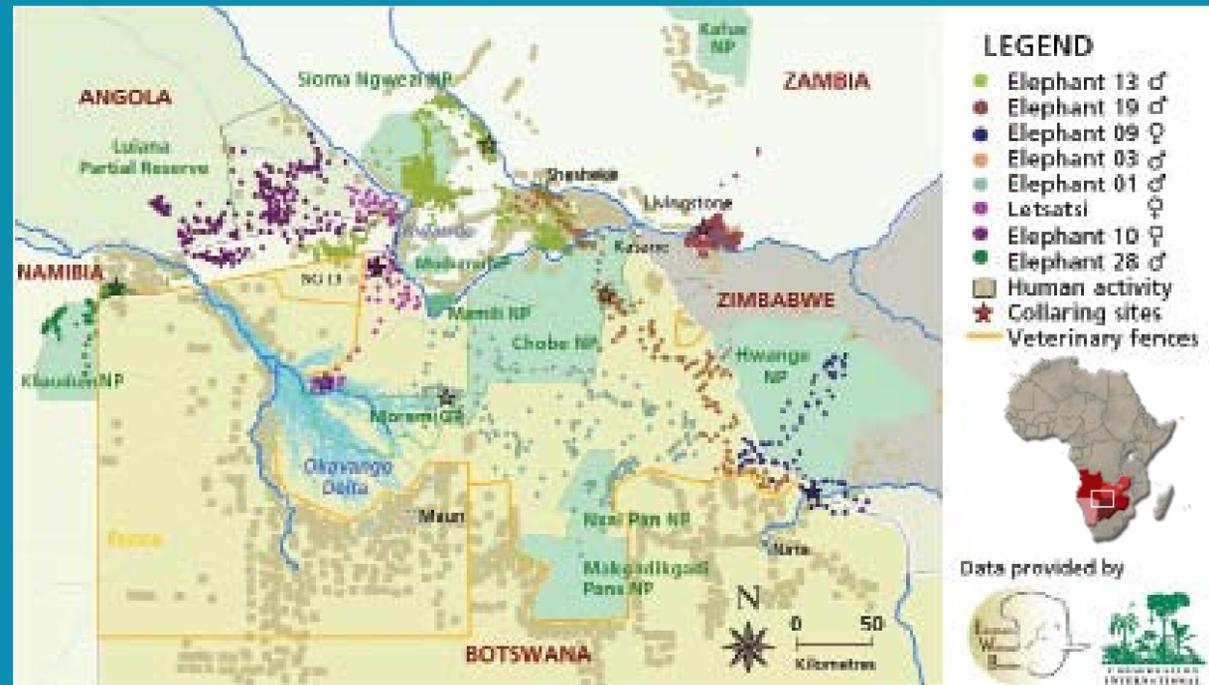
On the way to Menongue, the provincial capital of Kuando-Kubango, I was amazed by the vastness of the province and the absence of people and wildlife. Under Portuguese colonial rule, the region had abundant game, ▶



Sixty-nine thirsty elephants wait their turn to wallow in one of the few shallow pans in Khaudum National Park, Namibia.

WHOSE ELEPHANTS?

Data from eight elephants collared in the Kavango–Zambezi Transfrontier Conservation Area is providing valuable insights into how free-ranging elephants use space. There are small, but encouraging signs that, since the end of the civil war, some elephants are recolonising parts of Angola. By doing so, they may start to ease the congestion of animals in northern Botswana.





The KAZA TFCA

The KAZA TFCA (Kavango–Zambezi Transfrontier Conservation Area) will allow for conservation on the scale at which elephants evolved, as well as create an opportunity for sustainable development and co-management of shared ecosystems. Such a vast network of conservation lands is rare and provides one of the last chances to understand elephant-ecosystem dynamics, where populations are responding primarily to environmental variables rather than to anthropogenic disturbances.

At a time when South Africa is considering culling, the situation in Botswana suggests that density-dependent dispersal from areas of local high density to sink habitats (areas of low population density) may reduce free-ranging elephant populations. Using corridors to exploit new lands may result in a more dynamic ebb and flow of elephant numbers within a natural migratory system. There are encouraging signs that the vacuum created by Angola's decades-long war could siphon off a good many of Botswana's elephants. (The KAZA TFCA formed a primary focus of *Africa Geographic*, Vol. 15, No. 11.)

and large areas were designated as public hunting reserves. During Angola's intermittent 25-year civil war, the province – and Luiana in particular – served as the epicentre of operations for the rebel army, Unita (National Union for the Total Independence of Angola), and was severely affected by the conflict.

The road on which we travelled was littered with blown-up artillery and, along its sides, feeble sticks and stones painted red warned of the presence of unexploded landmines. Nobody is certain how many mines remain, but estimates range from 500 000 to 10 million. My thoughts turned to our collared elephants. How are they negotiating these vast minefields?

The impact of the civil war on elephants is uncertain owing to the absence of reliable estimates of Angolan

populations. In the early 1970s there were, reportedly, large numbers of elephants, possibly as high as 200 000, but by 1991 they were believed to be on the verge of local extinction. The death of Unita leader Jonas Savimbi in February 2002, brought the civil war to an end and, in January 2004, we were able to conduct the first aerial survey of elephants in Luiana. It provided an estimate of just 329 animals.

No more than 18 months later, 1 513 elephants were counted during a second survey, a fivefold increase over the first. In November 2005, we conducted our first dry-season survey and anticipated a lower elephant count because of the limited availability of water in seasonal pans. Nonetheless, the estimate was 1 827 elephants, a 20 per cent increase on previous numbers.

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In the 23 months that we had been conducting surveys, the number of herds recorded had leapt from 14 to 42. They had also substantially expanded their distribution into the northern portions of the reserve.

Telemetry data, in combination with our aerial surveys, indicate that elephants are rapidly recolonising south-eastern Angola from the Caprivi Strip and northern Botswana. The timing suggests that the cessation of hostilities has created a sufficiently secure environment for the elephants to return.

During my meetings with administrators and, later, with the governor of the Kuando-Kubango Province, I learn of the impressive programmes that are ensuring that south-eastern Angola remains attractive to elephants. Governor João Baptista Tchindandi's dedication to conservation reminds me of a statesman in my own country. Back in the 1980s, Ian Khama helped to safeguard the future of Botswana's wildlife with his impressive anti-poaching programmes, which created a sanctuary for elephants. Both Khama and

OPPOSITE, ABOVE In the past, elephants seldom crossed the Chobe River from Botswana into Namibia. Today, it is common to see many herds feeding in recently established community conservancies in the eastern part of the Caprivi.

OPPOSITE Painted markers line the roadside to Menongue in Angola and warn of the thousands of landmines that lurk beneath the Kalahari sands.





ABOVE Bull elephants lead the way into new lands. This bull is crossing the Chobe River from Botswana into Namibia, and may well continue into Zambia.

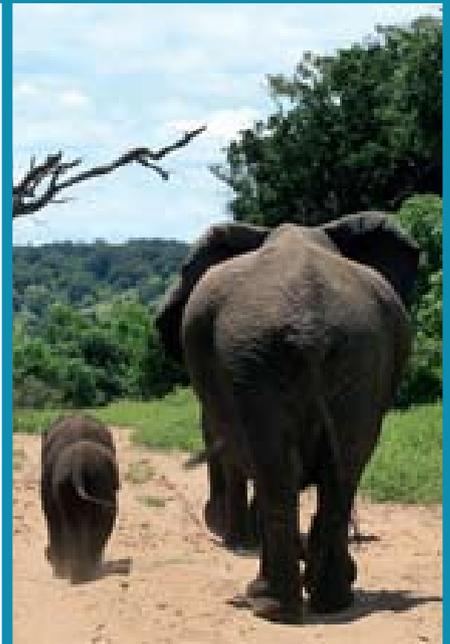
RIGHT It is hoped that initiatives such as the KAZA TFCA will enable mothers and calves to follow their ancestral migration paths for many years.

Tchindandi are clearly perceptive ambassadors for wildlife conservation and should serve as role models to the rest of Africa's leaders.

I remain hopeful that EWB will be granted permission to survey the teak forests of southern Angola, and I know the organisation's visit left key people and policymakers contemplating the fact that, with good management, ecotourism and wildlife conservation could help Angola to recover from the devastating aftermath of war.

Up-to-date population estimates of elephants in southern Angola are now critical, as recent surveys conducted in the Caprivi Strip and northern Botswana show dramatic declines in elephant numbers in certain areas. Do these figures represent a true decline, or have elephants simply moved away? We collared seven elephants in the Caprivi Strip in December 2007 and all of them have wandered into Angola.

If this proves to be the case, then the recovery of Botswana's elephant population, together with the recolonisation of Angola, could be one of the greatest conservation achievements on our planet in the past 50 years. ■



You can follow the movements of Letsatsi and other satellite-collared elephants by logging on to www.elephantswithoutborders.org and www.loveearth.com. EWB's work is currently being filmed by Afriscreen Films for the BBC Natural History Unit and Animal Planet. The film is due for release towards the end of 2008.