



# view from **THE TOP**

In conservation circles, Botswana is considered to be one of Africa's success stories. The government is stable and has a strong conservation agenda and, particularly in the north, wildlife-based tourism is thriving. Nonetheless, for respected researcher **Michael Chase**, alarm bells were ringing and, as the results of an intense aerial survey show, there is every reason to be worried.

TEXT BY MICHAEL CHASE  
PHOTOGRAPHS BY KELLY LANDEN

**A**s the scarlet sun ascends over the horizon, the drone of a small plane disturbs the Okavango Delta's early morning silence. The animals below are accustomed to the air traffic that ferries tourists to and from remote safari camps and pay little attention, but inside the confines of the four-seater Cessna 182 there is a palpable sense of excitement. I'm part of a team that is embarking on a three-month aerial survey to count wildlife across northern Botswana's magnificent wilderness. It is the first survey of its kind over what has long been considered one of Africa's last wildlife strongholds, where the commonly held perception is that elephant numbers are *burgeoning* and that wildlife is *secure*.

Botswana's conservation track record over the past 20 years has been impressive, a model for other countries. And yet, in reading the diaries of early explorers and biologists' reports from the 1960s and having spent countless nights around campfires with bush-trodden *madalas*, I know that as little as 40 years ago thousands of migrating wildebeest and zebras moved seasonally between the Central Kalahari, the Makgadikgadi Pans and the Okavango Delta. Springbok, hartebeest and gemsbok grazed on extensive grasslands in herds that numbered tens of thousands. In spite of all our conservation achievements, we simply don't see these spectacles any more. ▶

The catastrophic crash in wildlife numbers during the 1970s has largely been attributed to the construction of veterinary fences, which blocked seasonal migratory routes and prevented animals from accessing food and water. To avoid repeating such mistakes, the Botswana government regularly surveyed wildlife in an attempt to



understand population trends. In 2004, however, budget constraints put paid to these efforts and since then, debates have raged about the conservation status of wildlife, elephant numbers and the reliability of previous aerial censuses.

After 10 years of studying the ecology of elephants and flying many surveys over various sections of the five-country Kavango–Zambezi Transfrontier Conservation Area (KAZA TFCA), I had seen enough nagging signs that wildlife numbers appeared to be declining to be concerned. I suspected that deforestation, habitat fragmentation, poaching and fires were playing a role, but wanted to investigate it scientifically. Reliable estimates of wildlife numbers based on technically robust survey methods were, I believed, of paramount importance to

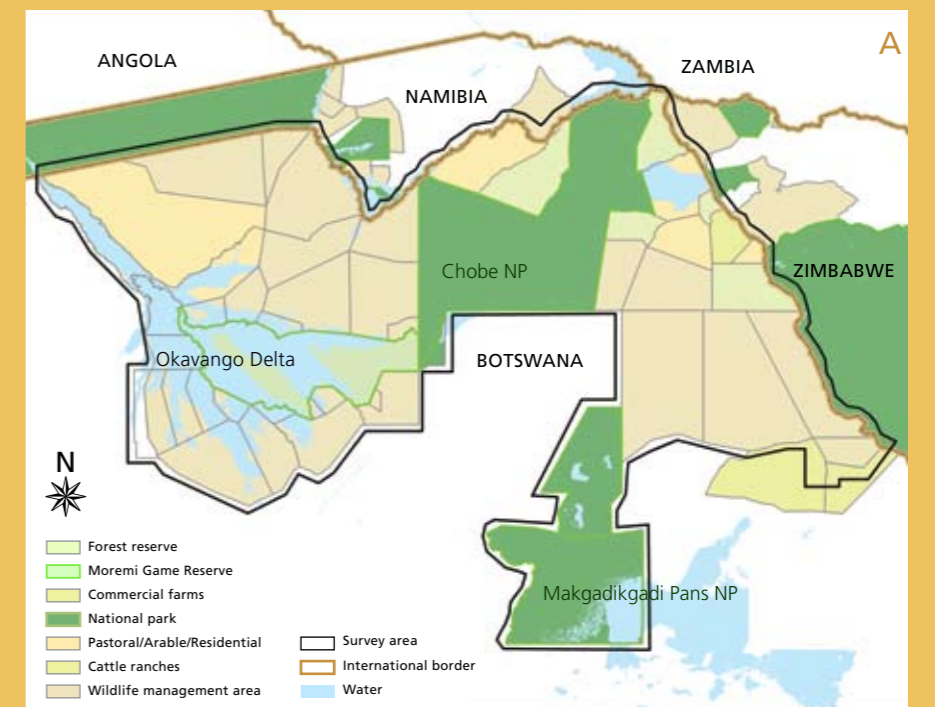
it wasn't long before the survey data and subsequent analyses began to reveal that in parts of northern Botswana the wildlife was in trouble

## THE SURVEY

**Total flying time** 250 hours  
**Total flight line** 25 598 kilometres  
**Total area** 73 478 square kilometres

**Special notes** Observations of bird species included wattled crane, southern ground-hornbill, saddle-billed stork, African fish-eagle, lappet-faced vulture and bateleur. Baobab trees were assessed for size and possible damage. Elephant carcasses and bones were recorded, as were environmental conditions, like the extent of bush fires and the structural integrity of fence lines. In the tribal grazing areas, cattle were also counted. Technically robust, the survey's ground coverage sampling intensity averaged 20 per cent in comparison to five per cent during previous surveys. It is the first independent fixed-wing aerial survey to provide concession-level estimates for wildlife populations in Botswana.

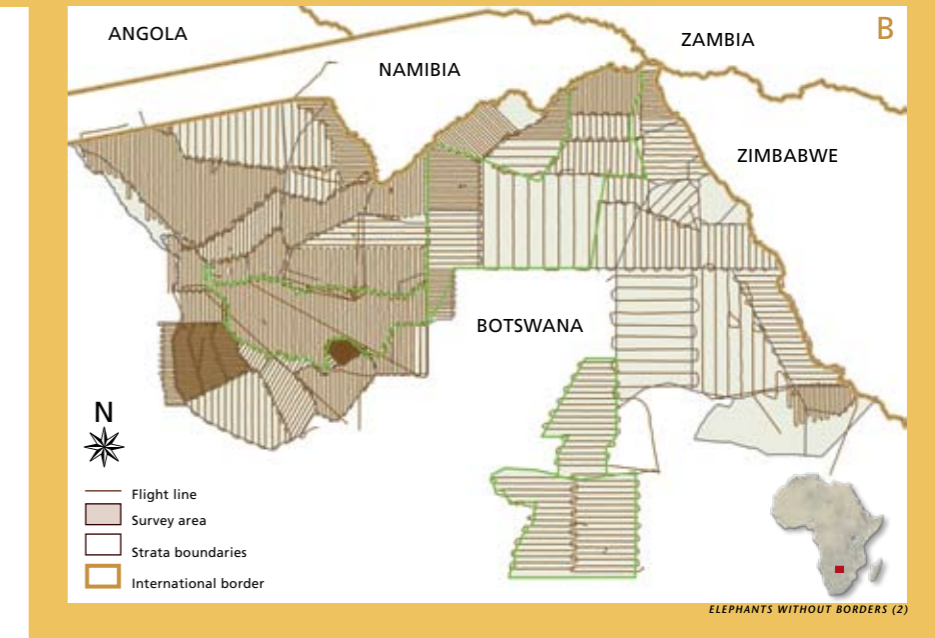
To access the full results of the survey, go to [www.elephantswithoutborders.org](http://www.elephantswithoutborders.org)



Botswana, which relies heavily on the wildlife tourism industry for job creation and foreign income.

In 2010, during a meeting with the Honourable Minister of Environment, Kitso Mokaila, I was given the encouraging news that the government would help to fund a thorough aerial count of wildlife throughout northern Botswana. Eagerly, I submitted a proposal for Elephants Without Borders to take on this responsibility and in July was granted permission and support to start this seminal count.

We started flying in September, at the beginning of the dry, hot season. Our altitude averaged 90 metres above ground level and we followed straight, parallel lines or transects. Flying for five hours each day in cramped conditions and contending with buffeting winds, high-flying birds and the heat take immense skill and concentration. Despite the challenging conditions, Mike Holding – friend, wildlife film-maker and expert bush pilot – once again volunteered to help fly the survey. Together with experienced observers Kelly Landen and Allen Bekker we took to the skies to collect the new information.



Each day brought fresh excitement as we traversed the natural splendour of Botswana's ecosystems, from open grasslands, woodlands and sandy ridges to wetlands, pans and rivers. Over some areas, we witnessed a seemingly never-ending panorama of unique habitats, but it wasn't long before the survey data and subsequent analyses began to reveal that in parts of northern Botswana the wildlife was in trouble.

ABOVE In September 2010, Elephants Without Borders undertook an aerial survey of wildlife in northern Botswana that covered 73 478 square kilometres (see map A) and 25 598 kilometres of transects or straight lines (see map B).

OPPOSITE, ABOVE Springbok drink from an artificial waterhole in Nxai Pan National Park. The antelope did not fare well in the survey, with population estimates significantly lower than those of 1996.

OPPOSITE, BELOW Recovering from precariously low numbers in the 1980s, the buffalo population appears to be stable or increasing.





29 per cent of the carcasses we recorded were located in close proximity to villages and homesteads in the Okavango Panhandle and Chobe Enclave, two areas where human–elephant conflict is known to occur



ABOVE Cattle farming and habitat encroachment are displacing wildlife and blocking dispersal corridors.

TOP The meandering Okavango River. Water flow rates in the river were below average during the 1980s and 1990s, although the 2010 flood is the fourth-highest on record. While it is tempting to ascribe declines in wildlife numbers to the drought, it's not the only factor.

OPPOSITE 70 kilometres of the fence enclosing the Nxai Pan National Park have been removed. Zebras, in particular, seem to be taking advantage of the increased access to the Okavango Delta.

PREVIOUS SPREAD Contrary to popular perception, elephant numbers have, in fact, stabilised. Lower birth rates, increased mortality and greater opportunities to move into neighbouring countries could all account for this levelling off.

The Okavango Delta, Ngamiland's spectacular natural centrepiece, supports a wide diversity of antelopes, including lechwe, waterbuck, reedbuck and the elusive sitatunga. It also serves as a focal concentration area in the dry season, providing abundant water and food for other wildlife. As expected, throughout our survey most animals were seen

in the delta or within 30 kilometres of a major perennial river. According to our estimates, however, 11 of 14 species counted in Ngamiland declined by an average of 61 per cent between 1996 and 2010, averaging a drop of 10 per cent each year.

Wildebeest numbers in the delta have fallen by a staggering 90 per cent, from 23 538 in 1999 to just 1 985 in 2010. In Moremi Game Reserve, which protects a large part of the delta, we estimated just 130 wildebeest. The species' plight highlights the general trend of wild ungulates:

**11 of 14 species counted in Ngamiland declined by an average of 61 per cent between 1996 and 2010**

tsessebe, for example, declined by 83 per cent and warthog numbers fell by 81 per cent. Even impala were down 24 per cent.

Why have large mammal populations in the delta fallen so drastically? Climatic variations can have a strong impact on the availability of water and food, which in turn affects population numbers. An analysis of rainfall data for Ngamiland and water-flow data for the Okavango River showed that the severe 20-year drought, which started in the 1980s, did indeed correspond with significant declines in wildlife populations in the Okavango Delta. Drought, however, should not be seen as the only or principal factor driving wildlife declines.

The results of our aerial survey offer the best evidence to date that wildlife losses are likely to be linked to the steady increase in human settlements

	CHOBE	NGAMILAND		CHOBE	NGAMILAND		CHOBE	NGAMILAND
Elephant	0%	0%	Impala	↑ 894%	↓ 24%	Sable	↑ 58%	↓ 20%
Buffalo	↑ 11%	↓ 6%	Kudu	↑ 62%	↓ 79%	Tsessebe	↑ 150%	↓ 83%
Eland	↑ 73%	↓ 25%	Lechwe	↑ 97%	↓ 58%	Warthog	↑ 896%	↓ 81%
Giraffe	↑ 0.7%	↓ 65%	Ostrich	↓ 21%	↓ 96%	Wildebeest	↓ 51%	↓ 90%
Hippo	↑ 5000%	↑ 344%	Roan	↓ 28%	↓ 60%	Zebra	↑ 9.3%	↓ 53%

on lands adjacent to conservation areas. These new data show that even Botswana's relatively well-managed protected areas cannot be relied on to secure wildlife numbers, as the animals' ranges often encompass land beyond their borders, where migratory habitats are being settled by people and where grazing pasture has been turned into farmland.

To examine the impact of people and agriculture on wildlife density, we also surveyed the Habu tribal lands on the western side of the delta where subsistence farming and cattle grazing occur. Here we recorded 33 cattle – and just three wild animals – per square kilometre. In the neighbouring Abu wildlife management area there are 40 wild animals per square kilometre. There is a clear separation between areas of high cattle and high wildlife numbers, demonstrating that where people and livestock are concentrated, wildlife populations are lower. There also seems to be increasing competition for grazing lands – cattle were observed within conservation areas, the Jao concession and eastern portions of the Makgadikgadi Pans National Park.

The Makgadikgadi Pans National Park encompasses one of the largest salt flats in the world. Inhospitable to human habitation, the flats remain relatively undisturbed. The plains surrounding this inland sea of salt serve as a huge

grazing area for migrating wildlife species, but the Makgadikgadi alone is too small to support wide-ranging ungulate populations.

Nearly 10 years ago, the Botswana government decommissioned portions of the fence surrounding the adjacent Nxai Pan National Park to allow wildlife to move ▶

Survey results for Chobe and Ngamiland showing the difference in wildlife populations between 1996 and 2010. While some species, especially in the Chobe area, appear to be stable, or even increasing, population figures from the Okavango Delta are generally not looking as healthy as previously assumed. Unless action is taken, these trends could ultimately have an adverse effect on Botswana's wildlife tourism industry.





Current numbers of wildlife still render northern Botswana one of Africa's great wildlife tourism destinations, but the system is at high risk

between the pans and the Okavango Delta. According to a recent study by Elephants Without Borders and another conducted by zebra researcher Hattie Bartlam-Brooks, elephants and zebras have resumed their historical movements between the two systems. The resumption of these long-distance migrations could have a positive impact on species that use this route. However, non-migratory species, such as springbok, are still in trouble.

Springbok numbers appear to be declining at a rate of nine per cent per year, with the 2010 survey estimate of 1 565 revealing a 50 per cent decline since 1996. Fortunately other wildlife populations in the region are largely stable. Gemsbok, which showed a steady fall until 1999, are now increasing, and ostrich numbers are up 72 per cent over the 2004 estimates.

Moving north, we flew over the entire Chobe district. Here the trends in wildlife populations are more positive, despite the extensive brushfires that had occurred



across a vast portion of the study area. Within Chobe National Park itself the buffalo, giraffe, kudu and zebra populations appear to be holding firm. Roan antelope and ostrich figures have fallen slightly, while those of sable and lechwe have doubled, eland and tsessebe have tripled, and impala and warthog are showing a tenfold increase.

**B**otswana is rightfully considered to be the elephant capital of the world, with a population that has been assumed to be growing. Estimates taken from the government's previous nine aerial surveys suggest that northern Botswana's elephant population did increase during the early 1990s, but since 2001 elephant numbers have remained at an estimated 130 000. These results are unexpected, given that the growth rate of elephant populations in the region is thought to be five per cent per year. They

certainly run contrary to the perception that the country's elephant population is increasing rapidly.

This trend could be attributed to reduced birth rates or increased mortalities (or both). The recent dispersal of elephants into neighbouring countries may also account for this apparent stabilisation – a Botswana government-approved 35-kilometre gap in the fence along the Caprivi border is already serving as an effective wildlife corridor facilitating the movement of animals from the Okavango Delta across the Caprivi Strip into Angola.

Other notable observations included a significant increase in elephant bulls in Makgadikgadi Pans and Nxai Pan national parks, which may be attributed to the rejuvenated Boteti River system. Chobe National Park posted the highest densities of elephants, especially along the Chobe River, where there are five elephants per square kilometre, and between the Linyanti and Savute rivers (eight elephants per square kilometre).

Elephants have extended their range south and west of the delta, towards the central Kalahari and Kwebe Hills respectively, a dispersal that coincides with increasing reports of conflict with humans. Some 29 per cent of the carcasses

we recorded were located in close proximity to villages and homesteads in the Okavango Panhandle and Chobe Enclave, two areas where human–elephant conflict is known to occur. This data reinforces further the escalating competition for resources between humans and wildlife. If farms continue to be allocated in prime wildlife habitat and critical migratory corridors, human–wildlife conflict will intensify, connectivity between seasonal ranges will be disrupted and wild animal numbers will decline.

**T**he results of the aerial survey have been presented to the Botswana government and key conservation stakeholders at a meeting hosted by the Botswana Tourism Organisation. There is a lot at stake. Current numbers of wildlife still render northern Botswana one of Africa's great wildlife tourism destinations, but the integrity of the system is at high risk. Aware of the consequences to the tourism industry if nothing is done, the government has undertaken to commit resources to understanding the reasons for wildlife declines. President Ian Khama, upon hearing the results of this study, pledged to '...formulate a plan of action that can effectively stop and ultimately reverse this undesirable trend'. **AG**

ABOVE Ostriches were among the large birds that were included in the survey, which also provided the country with its first estimates of African fish-eagle and southern ground-hornbill populations.

OPPOSITE, ABOVE Hippos seek refuge in a pool left by the receding waters of the Okavango River. Their numbers have increased substantially over previous figures, but this may be attributed to improved counting methods.

OPPOSITE, BELOW An iconic delta image – lechwe charging across floodplains – may be in jeopardy. The population here now stands at 32 000, less than half of the 1996 count.

BELOW Author Mike Chase sets up navigation systems and enters data recorded by the observers.

