

Wildlife interrupted: How fencing is threatening Africa's wildlife by blocking migrations

[By Penny van Oosterzee, *New Scientist*, Dec 6, 2017](#)

'Since 1977, there has been a precipitous decline in wildlife, averaging 70 per cent across Kenya.'

WE DEFLATED our tyres so that they could ooze through the Kalahari sand on our search for herds of wildlife migrating across the savannah. Eager ecologists from Australia, we scanned the horizons for dust clouds or heaving bodies. Instead, we were shocked to find that southern Africa's great plains were mostly empty. We expected teeming herds of wildlife; we were confronted by a profusion of fences that sliced across the landscape.

We had not realised before our holiday visit in April and May this year that Africa's iconic migrations are dying. Fifteen large mammals used to travel en masse across the continent, but five had already stopped by 2008, when the first migration audit was carried out. Most of those that remain are now in jeopardy, and the fences we encountered over and over again share the blame. My colleagues have warned of disastrous and far-reaching consequences, yet the problem has received relatively little attention from the international community.

Long-distance migrations are among the most spectacular and heroic of natural events, and the majority are in Africa. For 10 million years, hoofed animals – ungulates – have evolved in lockstep with its savannah grasses. They thrived thanks to one outstanding characteristic: mobility. In their millions, wildebeest, eland, impala, kob, hartebeest, springbok and many others tracked the shifting seasonal patterns of greening vegetation. Two regions reign supreme: the Serengeti Mara of East Africa and the Kalahari of southern Africa focused on Botswana, which was where we were. The wildebeest is the keystone species in both places: without it predators such as the lion, cheetah and wild dog wouldn't survive.

On we travelled through different varieties of fences, from simple wire-strand cattle fences to 2-metre-high, double-layered ones set with a gap of 10 metres or more in between, free of large mammals. "The sheer extent of fencing makes it a substantial modifier of the landscape, extinguishing entire migrations and even pushing species to extinction," says Michelle Gadd of the US Fish and Wildlife Services. Between 2007 and 2012 she carried out a thorough assessment of the impact this has had on wildlife in southern Africa. "There were only about 30 reports and few of these had seen the light of day – never published because they were unpopular with the host country governments," says Gadd.

The erection of large fences in Botswana began relatively recently, with the Kuke fence in 1958. Then a British protectorate, Botswana was considered good only for cattle, and the fence was built to separate them from wildlife that were thought to carry diseases like foot-and-mouth. Running hundreds of kilometres across the northern edge of the Central Kalahari Game Reserve, the fence blocks access to the waters of the Okavango delta.

After independence in 1966, the European Economic Community gave Botswana privileged access to European beef markets as long as it built even more fences to create zones free of foot-and-mouth disease. Thousands of kilometres were erected in the 1970s and 1980s, splitting the rangeland into 17 zones and severing migration routes. Today, Botswana's perimeter is less than 4300 kilometres, but within the country there are more than 5000 kilometres of fences that serve the cattle industry.

To be clear, fencing does have benefits. It can prevent poaching, illegal resource extraction and conflicts between people and wildlife. But their ecological and economic impact were not assessed before they were built, says Gadd. "They frequently plough straight through areas where there are no cattle at all." She says the fences serve political purposes not ecological ones. In her study, she found just one impact assessment, whose recommendations to relocate and take down various fences were mostly ignored.

In Botswana, like elsewhere on the continent, fences are particularly problematic during droughts when animals migrate out of the Kalahari desert in their hundreds of thousands in search of water. Deaths aren't uncommon during droughts, but the scale of the losses after fences were erected was staggering. Gadd uncovered reports of die-offs along fence lines in the order of 300,000 wildebeest carcasses, 10,000 hartebeest and 60,000 zebra from the handful of incidental surveys carried out. Precise numbers will never be known.

Further north in Tanzania, thousands of tourists visit the Serengeti each year to witness the iconic wildebeest migration – an industry worth \$1.2 billion. But not so long ago Botswana was home to a similar event. "It was the severe drought of the 1980s which triggered perhaps the last great migration of wildebeest out of the Kalahari," says Doug Williamson, who was there studying the migration of antelopes. He has the dubious distinction of bearing witness to the end of Botswana's wildebeest migration.

"Over a quarter of a million animals headed north for water toward the Okavango, only to find their usual route blocked," he says. Fences channelled the wildebeest east to the ephemeral Lake Xau, which at the time was unfenced but had been emptied by cattle. "The die-offs were massive," says Williamson, "and the migration simply ceased." The Kalahari wildebeest, once said to rival the millions in the Serengeti, were reduced to an aerial count of 260 animals in 1987. As a result, the migration has permanently ceased.

Back home in Australia, a new research paper awaited us shouting its chilling headline: "Fencing bodes a rapid collapse of the unique Greater Mara ecosystem". A group led by Mette Løvschal of Aarhus University in Denmark had examined satellite images of the Greater Mara – the northern extent of the Serengeti Mara which stretches from Tanzania into Kenya – from 1985 to 2016. The migrations there are among the last of their kind, representing a unique and irreplaceable African heritage, says Løvschal. For centuries, wildlife and semi-nomadic pastoralists roamed the area, following changes in rainfall.

Since 1977, however, there has been a precipitous decline in wildlife, averaging 70 per cent across Kenya, including in the Greater Mara. The drop mirrors the 76 per cent increase in livestock in the region. Wildlife now comprises only 10 per cent of the total animal flesh on

Kenya's rangelands. Rapid population growth, land privatisation for cultivation and a more sedentary lifestyle have come with their signature trademark: fences.

Løvschal's satellite study shows how they expanded over time from clusters in the north into open savannah closer to the border with Tanzania. The team found that fence-building increased precipitately in 2014 due to rapid population growth and changes in government land policies that encouraged settlement and privatisation.

"The resultant land degradation is now threatening to lead to the collapse of the Greater Mara within just a few years," says Løvschal. Long-distance migrations support more than just the species that are on the move. Migrating herbivores like zebras, oryx and springbok pattern the very structure of the savannah by eating different vegetation and following rain showers. They are also food for big cats, hyaenas and wild dogs. Without the web, without the migrations, the whole system would collapse, warn Løvschal and her colleagues, destroying one of the last bastions for Kenyan wildlife. Already, part of the wildebeest population that migrates northwards, where the study shows fences are densest, has seen a catastrophic drop in numbers.

Løvschal, an archaeologist, sees a parallel with the mid-1st millennium BC in northern Europe, when thousands of hectares of wildlife-rich land were rapidly enclosed and parcelled out into "Celtic Fields" for agricultural intensification. "My concern is that once the fences are in place [on the African landscape] they won't be removed. Just like the Celtic Fields, still visible today, that caused a chronic landscape state shift."

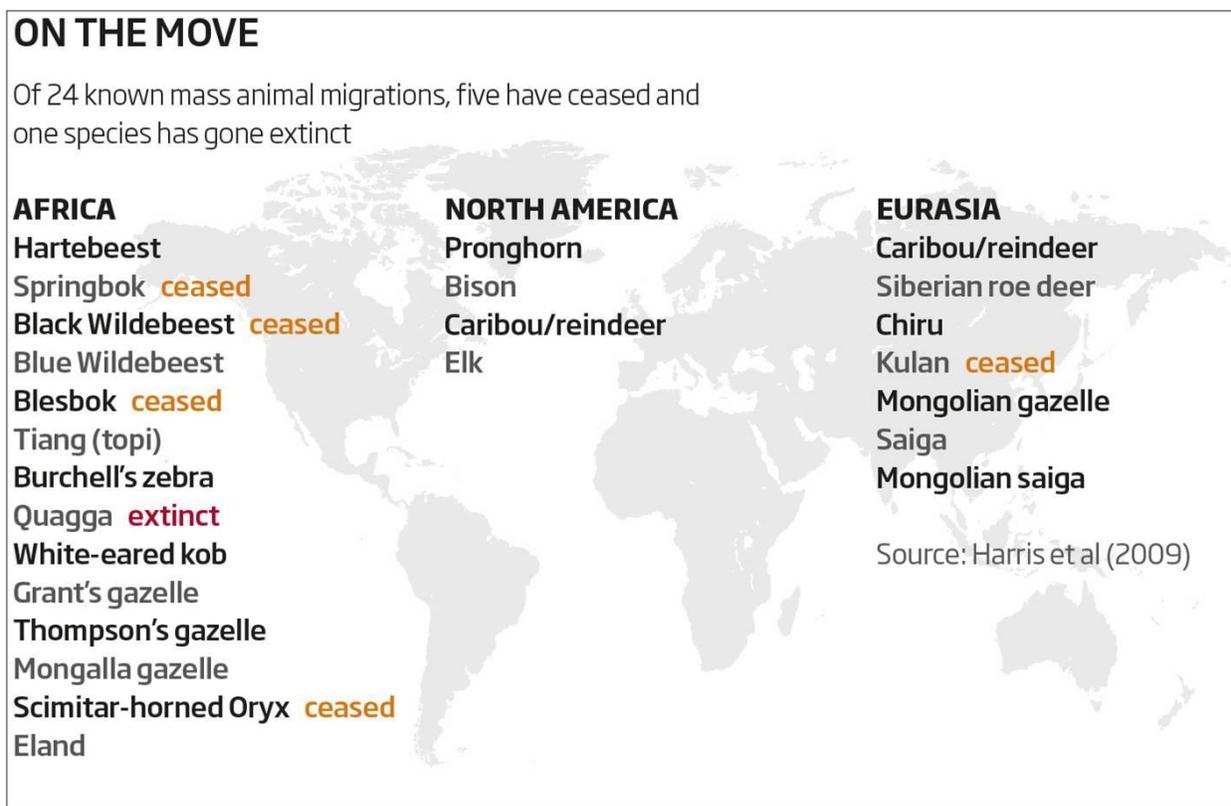
What could stop such a catastrophic outcome for the Greater Mara? A possible answer comes from the Mara North Conservancy, a model of community-based natural resource management. After decades of land fragmentation and degradation, a partnership was agreed in 2009 between 800 pastoralist landowners and the private tourism sector to lease land in return for income from tourist safaris and associated tented camps. A similar model has proved to be successful in Namibia. There, conservancies now cover 16 per cent of the country and are recognised for their contribution to helping wildlife recover.

In 2008, Grant Harris at the American Museum of Natural History did the first global audit of migrations of hundreds to thousands large terrestrial mammals and found 24 located in Africa, North America and Eurasia. "It's shocking that our planet has these masses of large animals moving long distances and we know so little about them," he says.

Tragically, one thing we do know is which ones we have already lost. Of the 24 species that Harris identified, one – the quagga – was extinct and another five had stopped migrating by the time Harris and his team looked (see "On the move"). As regards the causes, there are two main ways to destroy mass migrations, says Harris. One is to kill the animals outright by over-hunting. "The second is to stop them from having access to food or water, like fencing them out."

An early casualty of the combination of hunting and fences was the springbok migration across the Karoo region of South Africa – the country's largest with perhaps millions of animals. In 1897, the last great concentration of springbok was forced into a small cul-de-sac of savannah where they were hunted, leaving only a minimal population unable to build up numbers large enough to resume migration.

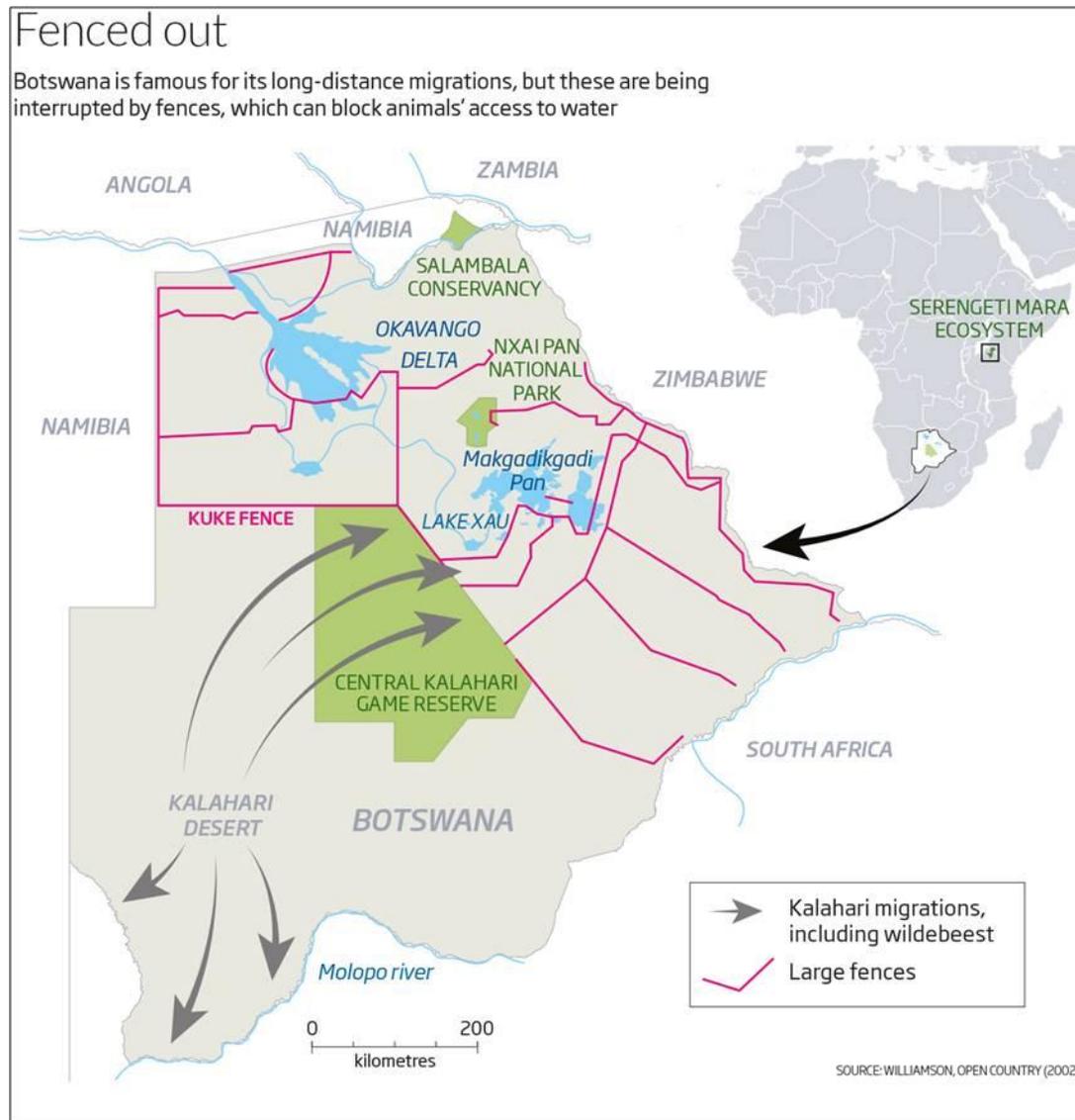
There is an ironic twist to the tale. “Fences may never provide freedom from foot-and-mouth disease in southern Africa,” says Genevieve Weaver. Four years ago, she and others from the EcoHealth Alliance in New York carried out a thorough global review of foot-and-mouth in wildlife and came to this sobering conclusion: apart from the African buffalo, the disease is endemic to livestock, not wildlife. That isn’t to say wildlife cannot catch it – they can – but they aren’t reservoirs. Cattle mostly are. “Past outbreaks that were blamed on African buffalo may have been caused by carrier cattle,” says Weaver, adding that livestock and human movement remain significant causes of outbreaks.



Nor are fences the only way to control foot-and-mouth disease. Policies like commodity-based trading, for instance, require farmers to keep their practices up to certain norms through testing, vaccination and standards for meat preparation. They can then participate in the international beef market even if they live in a country or region that is not completely free of the disease. The approach has been successful in India, the world’s largest global exporter of beef.

What’s more, fences have had economic and social costs. “In Africa, people have kept cattle for hundreds of years despite the existence of diseases like foot-and-mouth,” says Roman Grynberg at the University of Namibia. Yet today, the industry is only profitable for a very small proportion of well-connected cattle owners, some of whom are themselves high-level decision makers. “Not only have ill-conceived fences not insured the long-term viability of the cattle industry, they have also jeopardised a much bigger industry – wildlife tourism.” According to numbers collated by the US department of agriculture in 2015, tourism comprised 16 per cent of Botswana’s GDP. The livestock industry accounted for 2.5 per cent.

So what happens in areas where there aren't any fences or if you take them down? The movement of zebras around Botswana offers a clue. In 2007, several were given radio collars to monitor how they moved around the Okavango delta (see map). To the researchers' surprise, they left the delta entirely, headed south-east for 100 kilometres, skirted around the corner of fenced cattle ranches and made their way to the mineral-rich grasslands on the fringes of the Makgadikgadi salt pans. The full round trip, nearly 600 kilometres, was the longest ever migration recorded in Botswana.



A fence that had blocked this route starting in 1968 had been taken down in 2004. It was assumed that the zebras, which have a lifespan of around 15 years, wouldn't be able to re-establish their ancestral migration. Instead, the study showed they had an in-built ability to find their way after fences were removed.

It also demonstrated just how much we still have to learn about some of the most iconic migrations in the world, even as they are being halted in their tracks by advancing fences. Four

years after the 2007 study, a new one suggested the zebra made another, even longer journey (see “Zebra wanderlust”), the longest in Africa.

Yet another remarkable mass migration flies under the radar in war-torn South Sudan. Thought to have been wiped out in the conflict, a migration of a million antelope, known as white-eared kob, was found in 2014 to be alive and well. In 2017, a team based in Ethiopia led by Pablo Schapira of the African Parks Network collared 63 kob and found one that had travelled 825 kilometres, which acts as a proxy for the distance covered by several large herds. There are no barrier fences in South Sudan. Yet.

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Zebra wanderlust

It’s only in recent years that we’ve discovered just how far zebras can travel (see main copy). In September 2012, WWF researcher Robin Naidoo and his team collared eight adult females in Namibia’s Salambala Conservancy. The conservancy is just north of the border with Botswana. By early January 2013, all the animals had moved to Nxai pan in Botswana. The migration was done in two weeks in December.

“Community members knew that zebras moved away from the Salambala Conservancy in the wet season, and colleagues in Botswana knew zebras appeared on the Nxai Pan in the wet season. We didn’t know they were the same zebras,” says Naidoo. The straight-line return distance is 500 kilometres, just short of the 600-kilometre zebra migration discovered in 2007. But Naidoo’s animals actually travelled for an average of 955 kilometres, making it ostensibly the longest known migration in Africa – for now.