

# Researchers tracking the epic Serengeti migration reveal that humans have greater impact than food or predators

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Across the Serengeti-Mara, an estimated 1.3 million wildebeest and 250,000 zebra are making their annual migration in one of the most spectacular sights of the natural world.

Six of these [animals](#) are currently wearing high-tech GPS collars, equipped with [mobile phone technology](#) – and over the past 10 years, a total of 40 have done so. Scientists involved in this unique tracking programme analyse how these animals make decisions during their migration and use this information to devise effective mitigation strategies to ensure their survival.

The research, led by Dr Grant Hopcraft of the University of Glasgow's Boyd Orr Centre for Population and Ecosystem Health, which was last year awarded the Queen's Anniversary Prize for Further and Higher Education, sheds new light on the drivers behind the animals' migratory decision-making.

The group's findings suggest that although [wildebeest](#) and zebra migrate together, they move for very different reasons: wildebeest are constantly looking for fresh grazing, whereas zebra balance their need to get access to good food against the relative risk of being killed by a predator. However, the results also show that both species are driven, above all else, by the need to avoid the threat of humans and human development.

"The impact of humans trumps everything else," said Dr Hopcraft.

"This provides critical insights as to why other migrations are collapsing," he added, pointing to the dwindling numbers of saiga (small antelopes) found on the Mongolian Steppes, the Mongolian gazelle, a horse-like animal called the kulan, the pronghorn antelope in the U.S state of Montana, and caribou and bison in North America.

The findings on the impact of human behaviour come at a time when the Tanzanian Government has been considering a national highway through the Serengeti to create a trade route from Dar es Salaam and other Indian Ocean ports to Lake Victoria, offering access to countries such as Uganda, Kenya, Burundi and Rwanda. If built, the road is likely to carry as many as 3,000 vehicles across the Serengeti every day.

"A road would have catastrophic effects on how these animals migrate. It would separate their dry season refuge from their wet season calving grounds. All 1.3 million wildebeest and 250,000 zebra would have to cross that road in order to access the Mara River which is the only source of water during the [dry season](#)," he said.

Another threat to wildebeest and zebra is poaching. Evidence suggests there are about 80,000 wildebeest hunted illegally every year for the bushmeat trade.

"When these animals encounter areas of high poaching, both species attempt to exit the area as soon as possible by moving a long way and in straight lines, regardless of the food. It appears as though these animals can detect risky areas and respond accordingly, which means if we want to protect migrations we need to focus on managing humans and not the animals," said Dr Hopcraft.

The lightweight tracking collars, which weigh 1kg and contain a GPS

device, mobile phone engine and battery pack, can last up to two years and give the scientists real-time information about how the animals respond to the landscape around them. The scientists select female animals which are reproductively active as they are most responsive to migratory decision-making.

Dr Hopcraft also reports a puzzling and previously undescribed phenomenon of migrations: when wildebeest and zebra encountered prime habitats with very good grazing, they move faster than when they are in areas with poor grazing.

"Moving fast when resources are good, rather than settling down in one spot and enjoying the feast is counter-intuitive. Why move if you're in a good spot? Every other species does exactly the opposite. But we believe the difference in the wildebeest and zebra's behaviour is down to the sheer density of the herds. It's a numbers game," he said.

When the grazing is at its peak, the entire herd of 1.3 million wildebeest, plus 250,000 zebra, and about 300,000 gazelle all converge on the same area of the Serengeti. The prime grass is eaten almost immediately and individuals are then forced to find the next hotspot before everyone else does. In other words, the competition for food drives the race.

This unique eat-and-run feature of mass migrations suggests that we might be losing key ecosystem processes, without even realising it. If animals such as the bison behaved like wildebeest when they were in super-high concentrations, then the distribution and cycling of nutrients such as dung and urine was probably very different in these eco-systems historically, compared to today.

"These intact ecosystems where natural process such as migrations have occurred for thousands of years serve as a critical benchmark against which we can measure our own impact," he said.

**More information:** Competition, predation, and migration: individual choice patterns of Serengeti migrants captured by hierarchical models: *Ecological Monographs*, 2014

Provided by University of Glasgow

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