Caught IN THE ACT

Camera traps offer glimpses into unseen worlds that thrill nature lovers. They're also a valuable tool for scientific research. By Morgan Trimble

"Every time we returned to camp with a handful of memory cards, it felt like Christmas. Each was a present full of wonderful surprises," said confessed camera-trap addict Cathy Hue. At first, Cathy, who loves watching animals in the field, was disappointed that camera trapping would be a big part of her job with NGO Wildlife ACT. But she soon changed her mind. "To be able to witness everything that happens in a specific location all through the day and night, without physically being there, is phenomenal."

Cathy was part of the team that, working with Ezemvelo KZN Wildlife, discovered a fascinating interaction in Hluhluwe-iMfolozi Park. "I'll never forget the first photo I saw of the hitchhiking genet," she said. "It was a large male buffalo looking at the camera. Sitting up straight on the buffalo's rump, looking rather like a pet cat, was a large-spotted genet. It was completely surreal."

Later, cameras caught 'Genet Jackson', as the animal was nicknamed, riding a different buffalo, then sitting casually atop a white rhino. These photos captivated everyone from social-media scrollers to biologists. They illustrate the lucky-packet allure that makes camera trapping so popular with hobbyists, always wondering, "What will turn up next?"

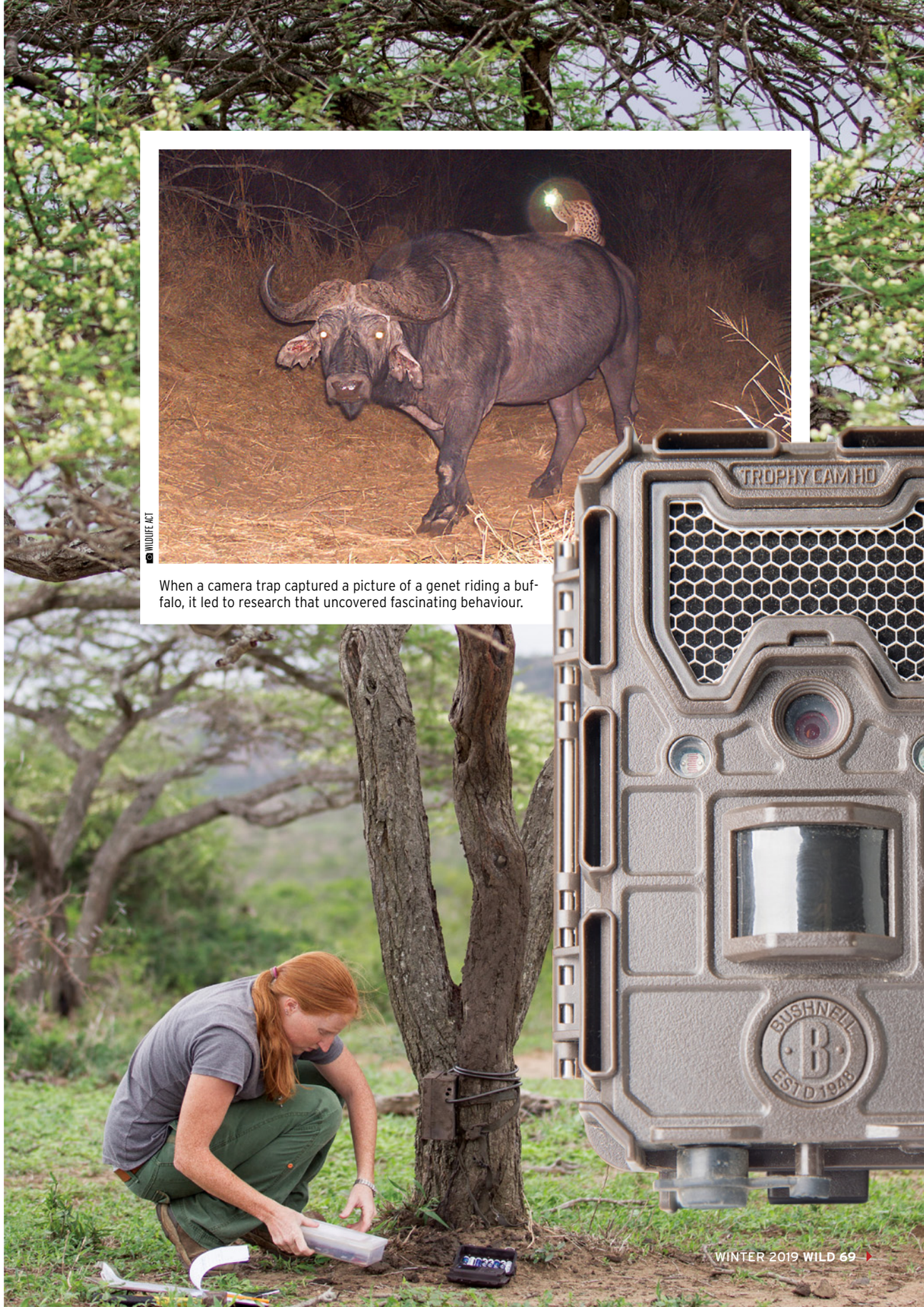
As technology has improved and prices have dropped, scientists increasingly use camera traps to answer important questions in conservation and ecology. A recent review detailed 172 camera-trap studies across 30 African countries since 2005, with South Africa leading the way.

Camera traps offer several benefits over traditional research methods. They're cheaper, less invasive and time saving. On average, African camera-trap studies used nearly 6 000 'trap nights', a measure of survey effort equal to the number of cameras deployed times the number of days they're active. A single human observer would need to keep constant watch for 15 years to match that!

Who's there?

A common use for camera traps is to measure species richness or create species inventories. While camera traps make it much easier to record elusive species, working with them is not always easy.

To estimate mammal richness in the Cape of Good Hope, Table Mountain National Park, Robin Colyn and colleagues sorted through nearly 30 000 photos of fynbos blowing in gusting Cape winds to find about a thousand that showed an actual animal. Robin was thrilled to capture footage of rare mammals in the southern peninsula but it was a



WILDLIFE ACT

When a camera trap captured a picture of a genet riding a buffalo, it led to research that uncovered fascinating behaviour.

MORGAN TRIMBLE

Opposite: A camera encased in a rugged, waterproof housing is mounted on a tree in Hluhluwe-iMfolozi Park.

More than 5 000 images and clips showed the same female elephant, always alone.

challenging journey. Besides the struggle with false-alarm photos, Robin hiked 230 kilometres to install and check cameras, and endured the disappointment of finding that inquisitive baboons had commandeered 13 cameras.

How many?

Camera trap surveys are frequently used to estimate how many individuals of a species are present in an area. This technique relies on individually recognisable animals. Leopards, with their unique spot patterns which act like fingerprints, are a classic example. Scientists have estimated leopard abundance with camera trap surveys from the Kruger National Park to Ithala Game Reserve to the Cederberg and many places in between. While leopards are the most frequent research subject for camera trap studies across Africa, the technique works for other species.

SANParks scientist Lizette Moolman and colleagues used camera traps to answer the lingering question of how many elephants live in Garden Route National Park and surrounds. For 15 months, they maintained a network of cameras spanning the entire range.

"We got 140 capture events," said Lizette, "but for each you may have the elephant feed or stand in front of the camera for a time. So, you get many photographs or video clips for every event." She analysed more than 5 000 elephant images and clips, looking for identifying features such as tusk shape and ear notches. Each showed the same female elephant, always alone. The conclusion that just one elephant remains is sad, but the study provides valuable information to help protect her.

Finding good habitat

Camera traps can go much further than confirming that a species is present in a park. Researchers use them to figure out which particular spots are good habitat. A technique called occupancy modelling teases apart how local aspects, such as vegetation cover, elevation and temperature, influence the chances of a species being present and triggering the camera at trapping stations spread across an area.

David Ehlers Smith and research colleagues used this technique in KwaZulu-Natal's fragmented coastal forests, including large patches in Vernon Crooks and Oribi Gorge nature reserves. Camera trapping isn't just for mammals. David's focal species were birds: the rare and reclusive spotted ground thrush and lemon dove, both difficult for human observers to survey.

"Large reserves such as Vernon Crookes and Oribi Gorge are the population sources for forest specialist birds. There's some amazing biodiversity in those reserves," said David. His models show that the birds depend on large, mature forest patches with particular understory characteristics. "Now we're working on the connectivity between those reserves and smaller forest patches."

Animal activities

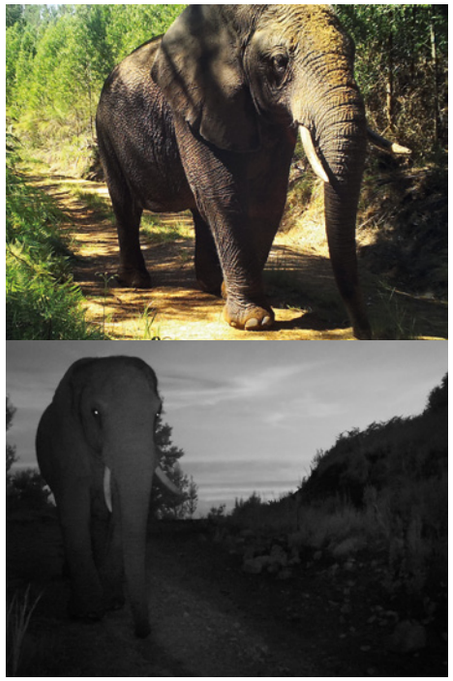
Clever camera-trap experiments also reveal animal behaviour and its ecological consequences. In Hluhluwe-iMfolozi, Elizabeth le Roux and colleagues studied how an ecological concept called 'landscape of fear' influences nutrient cycling. The idea is that herbivores nervous about becoming a predator's dinner prefer to feed in areas with good visibility. They spend more time there, so they defecate more there, thus concentrating nutrients in open areas.

Elizabeth compared sites with good visibility to bushier sites. Camera traps recorded which animals visited and for how long. She also checked how much dung accrued. As expected, smaller herbivores spent more time in open areas and dung accumulated there. But the study found a crucial role for megaherbivores, such as rhinos and elephants, that don't worry much about predators. They're happy to feed at open sites but travel and defecate widely, moving nutrients throughout the landscape. "If you're a plant which happens to be growing in a predator-risky area, you may be particularly dependent on megaherbivores to bring back nutrients," explained Elizabeth.

Even in a study designed for other purposes, a serendipitous capture can provide insight. The researchers who discovered Genet Jackson hadn't intended to study genets. Intrigued by their initial still photos, they set their cameras to record video. They soon captured footage of the genet riding a black rhino that finally provided clarity. The genet was hunting insects from the rhino's back. This was the first time researchers had documented, let alone recorded, this unique behaviour.

What will camera traps reveal next? 🐾

A researcher in Hluhluwe-Imfolozi Park sets up a camera trap. Cameras can use motion or infrared sensors to trigger a capture.



A network of camera traps in Garden Route National Park recorded the same single elephant.