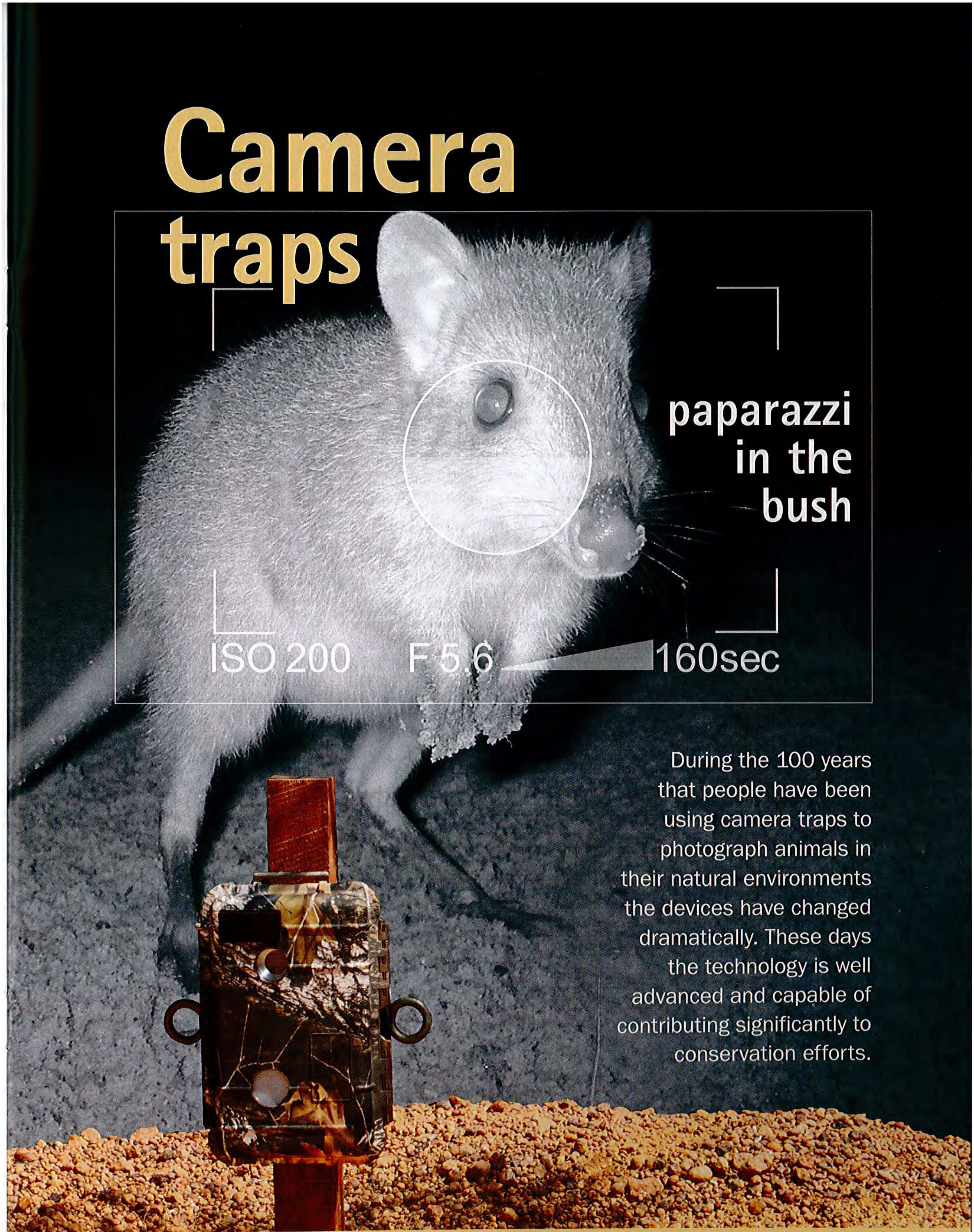
Camera traps

paparazzi in the bush



During the 100 years that people have been using camera traps to photograph animals in their natural environments the devices have changed dramatically. These days the technology is well advanced and capable of contributing significantly to conservation efforts.

by Neil Thomas, Brian Macmahon and Nicky Marlow

When you think of a trap you generally think of something that physically restrains an animal allowing you to directly handle it. Camera traps, on the other hand, do not restrain the animal but take a remote candid photograph of the subject. The animal itself triggers the camera by either pulling on a baited wire, moving a trip wire, treading on a trigger plate, or setting off a photo-electric sensor.

Not so flashy beginnings

Wildlife photographers have been using camera traps since the early 1900s to photograph everything from birds to large carnivores. The early camera traps were bulky and unreliable, and could only take a single photograph per trigger event. As a result, they were only used by very dedicated wildlife photographers. There was also concern about the welfare of the photographed animals as the light source was magnesium flash powder which not only resulted in very bright light but produced a pyrotechnic explosion likened to a 'small cannon report'. However, one of the earliest pioneers of camera traps highlighted the future conservation value of the camera when he said:

"Every camera hunter must admit that the immediate and lasting pleasure is better afforded in ranking a running deer from stem to stern, at twenty yards, with his 5 x 7 bore camera than driving an ounce ball [bullet] through its heart at 100 yards."

George Shiras III, 1906

It was not until the mid-1950s that the first camera traps were used by the scientific community and, although these were successful in recording information about their subject matter, they were still unreliable, often cumbersome, and required regular servicing (such as changing film). They were generally purpose-built by the researchers and, in many cases, could still only take one photograph per trigger event.

As camera technology improved with the development of fully automated cameras so did camera traps, particularly with the incorporation of infrared flashes and triggers. However, the improved camera traps still had major limitations—they were expensive, were prone to mechanical failure and required regular servicing as false triggers could consume all the film in a very short time. Despite these shortcomings, camera traps had proved to be a vital tool in monitoring elusive species, particularly large cat species such as tigers (*Panthera tigris*), where the animals' unique coat patterns could be used to identify individuals.

With the development of digital technology there was a rapid expansion in the use of camera traps, principally in the USA. This was not in wildlife research but by weekend hunters using the cameras to establish where trophy game may be found, before the start of the hunting season. As a result, there was a proliferation of web forums on how to modify and build your own digital camera traps and it was not long before there were commercially available digital camera traps, often referred to as game or trophy cameras.

Previous page
Top Camera traps photograph animals such as woylies.
Bottom A camera trap in the field.
Photos – Neil Thomas/DEC

Above A bilby in its natural habitat.
Photo – Jiri Lochman

Left A camera trap set up outside a bilby burrow.
Photo – Neil Thomas/DEC

Right Camera traps provided new information on animals in Dryandra Woodland.
Photo - Marie Lochman

Below Checking images on a camera trap.
Photo - Sallyanne Cousans

Below right A feral cat recorded by a camera trap.
Photo - Neil Thomas/DEC

Cats through the lens

Early in 2003, a senior technical officer at the then Department of Conservation and Land Management's (later the Department of Environment and Conservation's—DEC's) Wildlife Research Centre, John Angus, started investigating the feasibility of using commercially available digital camera traps to photograph feral cats (*Felis catus*). Feral cats are notoriously difficult to physically trap and nearly impossible to re-trap. Camera traps were seen as a possible technique to obtain multiple 'captures' of feral cats, which could be used to identify individual cats according to their markings and thus map their movements.

However, John found that many of the commercially available camera traps had poor resolution and a slow trigger time (the time between detecting the animal and taking the photograph), which in some cases resulted in the animal leaving the field of view before the photograph was taken. To overcome these problems, he started building his own cameras, modifying standard digital cameras by incorporating a control board that remotely triggered the camera when a passive infrared sensor detected movement of an animal. These proved to be very effective in photographing not only feral cats but other feral and native species.

Capturing bilbies at Dryandra

Research staff at DEC's Wildlife Research Centre then decided to investigate the use of camera traps to monitor one of the more elusive native marsupials, the bilby or dalgyte (*Macrotis lagotis*). This work was done at Dryandra Woodland, a re-introduction site for bilbies. Bilbies are difficult to monitor using traditional techniques. They do not readily go into standard cage traps and other accepted monitoring techniques, such as track counts, were not practical at Dryandra Woodland due to the lack of suitable sand. Late in 2005, camera traps were deployed at a number of bilby burrows throughout Dryandra resulting in numerous photographs of bilbies and other native fauna. Despite the bilbies being a nocturnal species, the cameras showed they were active up to half an hour after sunrise.

This initial work at Dryandra highlighted how effective camera traps could be in monitoring elusive animals, as well as highlighting some of the problems associated with using them. One of the major problems was the flash. Despite the native fauna being apparently oblivious to the white flash, feral species were startled. If feral species were to be monitored using camera traps this needed to be resolved. Fortunately, commercially available camera traps had by then improved markedly, with improved trigger times, higher resolution and infrared flash technology incorporated. A small downside of the infrared flash and filter is that the resulting photograph has a slight crimson colouration.

Above Brushtail possum.
Photo – Jiri Lochman

Above left A fox recorded taking a bait at night.
Photo – Neil Thomas/DEC

Below left Camera trap set-up.

Below Quenda.
Photos – Sallyanne Cousans

Woylie decline in focus

In 2006, DEC started a major study, the Mesopredator Project, to investigate the recent decline in woylie (*Bettongia penicillata*) numbers in the south-west of Western Australia (see 'Down but not out: solving the mystery of the woylie population crash', *LANDSCOPE*, Winter 2008). Although the reasons for the decline were unknown, there were a number of potential causes including increased predation from native predators, such as carpet pythons (*Morelia spilota imbricata*) and wedge-tailed eagles (*Aquila audax*), or feral cat predation, disease, and the current baiting regime becoming less effective in controlling foxes (*Vulpes vulpes*). Camera traps were seen as a vital tool in investigating whether the 1080 meat baits used to control foxes were still effective.

A significant number of cameras was needed to adequately monitor the baiting effectiveness. A team of researchers deployed up to 50 camera traps in the field every few months to photograph what was happening to the baits. Some 13,500 photographs later, there was evidence that not only were foxes taking the baits, but a myriad of native fauna were also taking them, including quenda (*Isoodon obesulus*), woylies, bobtail lizards (*Tiliqua rugosus*), goannas (*Varanus* spp.) and meat ants. However, the main culprit was the brushtail possum (*Trichosurus vulpecula*), which took up to 50 per cent of the available baits on the first night they were deployed. Brushtail possums and other native fauna have developed a high tolerance to the 1080 poison used in fox baits. On average, an adult possum found in Dryandra Woodland would have to consume nearly 65 fox baits in a short timeframe to get a lethal dose, whereas a fox only needs to eat one 1080 bait. This tolerance to the poison 1080 occurs in many native animal species in south-west WA as the animals have co-evolved with poison bush (*Gastrolobium* spp.), which naturally contains this poison.

Despite possums taking many of the baits, other work showed the baiting program was still very effective in controlling foxes. There were still baits available and there were many photographs of foxes taking them. Of more concern to the woylies was the number of feral cats photographed and, despite many of them photographed investigating baits (and even one cat playing with a bait), no feral cat was photographed taking a bait. The photographs showed a variety of coat

colours and markings so that some feral cats could be individually identified and their movements followed as they moved throughout the reserve.

Cameras and conservation

Digital camera traps are a relatively new conservation tool and, as they have become more readily available, sophisticated and affordable, they are becoming a mainstream tool in conservation work. In recent times, there has been a rapid uptake in their use in ecological work, where they are seen as a reliable method of monitoring rare and cryptic species such as bilbies. They are also seen as a very simple tool for undertaking inventories of species that may be found in an area.

Recently, commercially available camera traps have improved remarkably—for example, movable infrared filters now result in clear daytime photographs and black and white night photographs. They can now be deployed into the field for several months at a time, taking hundreds to thousands of photographs, with the main limitations being the size of the memory card and the need for a power supply. The power issue can be solved with some camera traps now having solar panels.

Camera traps do have limitations. One of these is that, unless the target species has unique markings, it is not possible to identify individual animals from the photographs, and this means no reliable estimates of numbers of animals found in an area can be made. Also, small animals can move around some camera traps without detection, particularly if the camera trap is not set up correctly. Heat, wind, poorly mounted or positioned cameras, and even shadow movement can cause the camera trap to take numerous spurious photographs. So, although seen as an addition to the conservation arsenal, camera traps do not replace the wildlife ecologist going out into the field and undertaking the fundamental research of trapping and physically examining and marking individual animals.

Above Tammar wallaby.

Below left A bilby photographed by a camera trap at night.
Photos – Neil Thomas/DEC

Bottom left Preparing a camera trap set-up.
Photo – Andy Williams/DEC

Another early pioneer of the camera trap best explained the delight in using the cameras (despite their initial shortcomings), when he said:

> "If there be any sport in which the joys of anticipation are more prolonged, the pleasures of realization [sic] more enduring, than that of camera trapping ... I have yet to find it!"
>
> Frank M Chapman, 1927

As camera trap technology improves and more work is undertaken in analytical methods, there will be more and varied use of camera traps with just as much anticipation in the resulting photographs as found by the earliest pioneers of the camera trap. There will be no escaping the bush paparazzi!

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