Joining forces:

cultural knowledge and modern science combine to safeguard Kimberley bilbies

Bilbies were once widespread across most of Australia. But, like so many other native Australian animals, they have fallen victim to introduced foxes and feral cats, and the impact of land clearing and altered fire regimes. Two projects underway in the Kimberley region – one on the Dampier Peninsula and the other in the Fitzroy River catchment – are providing opportunities for DBCA to work with Indigenous ranger groups to combine traditional cultural knowledge with contemporary science to improve the outlook for this iconic species.

by Ruth McPhail, Bruce Greatwich, Fiona Carpenter and Martin Dziminski

Western Australia's remote Kimberley region is about three times the size of England and twice the size of Victoria. It is known for its rugged, beautiful scenery and rich and ancient cultural history. It is remote and sparsely populated, with only 0.09 people per square kilometre, compared to the average of 3.3 people per square kilometre nationwide, and provides a stronghold for many native species.

Currently, about 93.5 per cent of the Kimberley region has been determined as native title. As majority landholders in the Kimberley, traditional owners and their ranger groups are responsible for the health of their country. This has provided agencies such as DBCA with the opportunity to work with Indigenous ranger groups to combine traditional cultural knowledge with contemporary science to work on country and conserve natural and cultural values, and protect species such as the greater bilby (*Macrotis lagotis*).

BILBY BIO

Historically, there were two species of bilby – the lesser bilby (*M. leucura*) and the greater bilby (*M. lagotis*). The lesser bilby became extinct in about the 1950s or 60s, and now only the greater bilby survives. This species has achieved icon status among Australian marsupials, due to its unique appearance, conservation significance and cultural importance to traditional owners.

Bilbies are nocturnal omnivores that do not need to drink water; they get all the moisture they need from their food, which includes arthropods and their larvae, seeds, bulbs, fruit and fungi. They were once widespread across most of mainland Australia. However, due to the introduction of feral cats and foxes, changed fire regimes, and the degradation of habitat, the bilby's range and abundance has decreased significantly. They have disappeared from at least 80 per cent of their former range across Australia, and their numbers continue to decline. The species is currently listed as Vulnerable under the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* and the Western Australian *Biodiversity Conservation Act 2016*.

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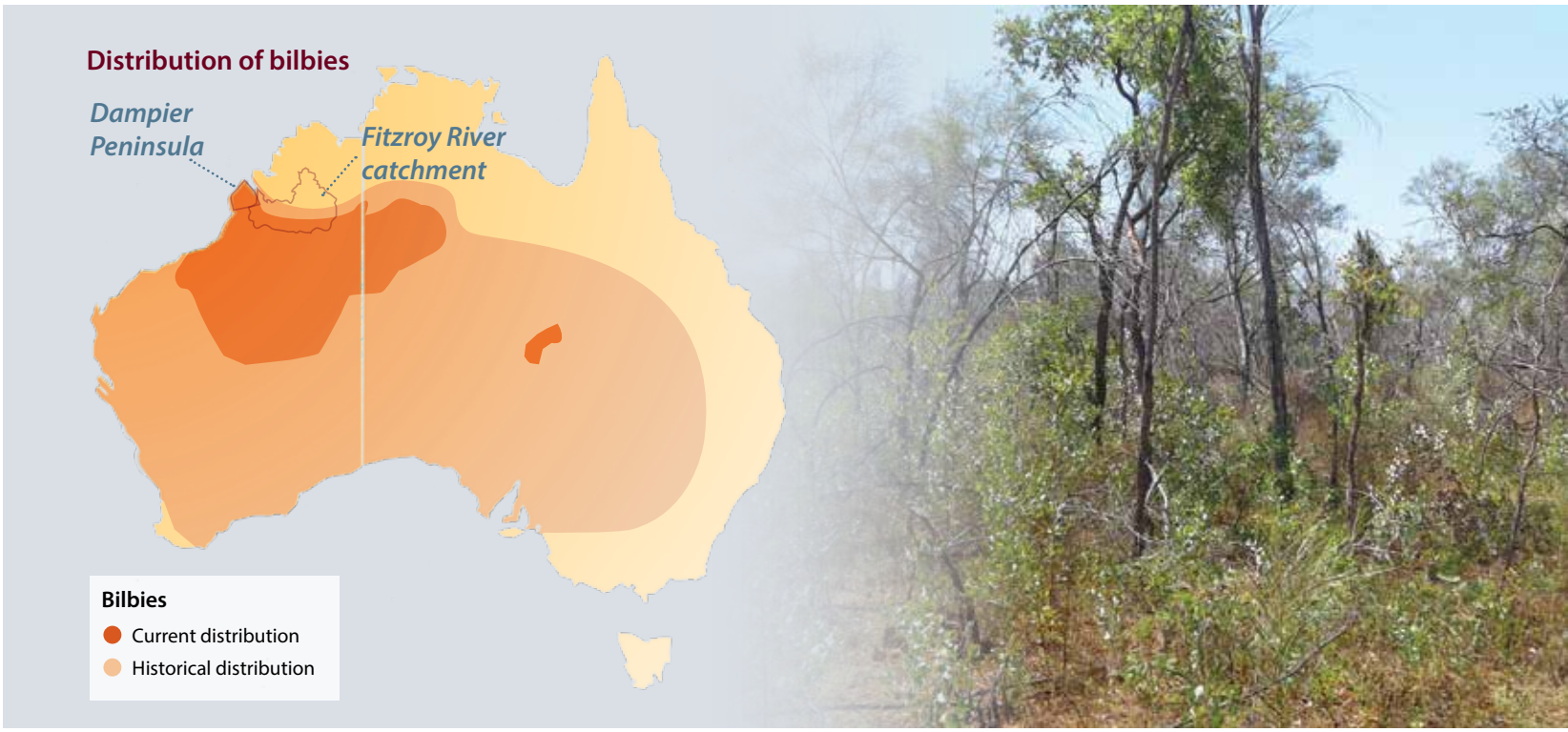
Main The greater bilby is the only remaining bilby species in Australia.
Photo – Jiri Lochman
Inset Research teams have been surveying the Kimberley to determine the range of bilbies.

Above Typical bilby habitat of the northern Great Sandy Desert.
Photos – Ruth McPhail/DBCA

Right An active bilby burrow in a termite mound.
Photo – Bruce Greatwich/DBCA

Bilbies are known as 'ecosystem engineers', which mean they play an important role in their environment by significantly modifying habitat. They are active diggers, and build deep extensive burrows, that other native species, such as small mammals, goannas, birds and snakes, use for refuge. While foraging for food, bilbies can turn over large amounts of soil, which aerates it and provides improved conditions for seed germination. Losing bilbies would irreparably change the habitats in which they live, with implications for the biodiversity of these areas.

Throughout most of their range, bilbies occur in low densities, can show low site fidelity and are thought to be highly mobile in response to resource availability and habitat modification. This



"... the bilby's range and abundance has decreased significantly; they have disappeared from at least 80 per cent of their former range across Australia."

Hear more about bilbies

Scan this QR code or visit Parks and Wildlife Service's '*LANDSCOPE*' playlist on YouTube.

Above The Dampier Peninsula is home to the most northern population of bilbies.
Photo – Ruth McPhail/DBCA

mobility and transient use of habitats mean that individuals and colonies can be difficult to locate and monitor over time. While bilby populations in south-west Queensland and the Tanami Desert in the Northern Territory have been better studied, their status in large parts of Western Australia remains unknown. Until now, there have been few studies of the bilby's distribution in the north of Western Australia, especially in the West Kimberley.

Recently, two projects have been established in the West Kimberley to conserve and protect bilbies – the Dampier Peninsula bilby project and the Fitzroy River Catchment bilby project. These projects aim to identify how many bilbies live in these areas and the threats they face. On-ground management activities, such as prescribed burning, will also be implemented at key sites in trials to manage and protect bilby habitat.

These projects provide an important opportunity to improve our knowledge of the bilby in a region of Australia where our knowledge is poor. The information gathered will help inform management actions at a larger scale.

MONITORING THE BILBIES OF THE DAMPIER PENINSULA

The Dampier Peninsula in the far north-west Kimberley is known for its red pindan cliffs and crystal blue ocean. It is also home to the most northerly bilby populations in Australia. As part of the Cape Leveque Road upgrade project, Main Roads WA provided funding to offset impacts on local bilby populations.

Coordinated by DBCA, this project aims to improve our understanding of the distribution, habitat preferences and threats to these populations and inform appropriate fire management across the peninsula to ensure bilbies persist. As bilbies are nocturnal and cryptic, the best way to estimate their distribution is to search for signs, such as tracks, scats, diggings and burrows.

To determine occupancy and distribution of bilbies, the Nyul Nyul, Bardi Jawi Oorany, Nyikina Mangala Rangers and Yawuru Country Managers have partnered with DBCA to survey bilby habitat using a standardised two-hectare sign plot technique, which has been developed and successfully used in other parts of Australia. This technique consists of a roughly 100 x 200-metre search area, where evidence of bilbies is searched for and recorded. Tracks and signs of other animals, such as snakes, lizards and birds, are also recorded, as well as information about the habitat, and observations of introduced predators (foxes and feral cats) and large herbivores (cattle, donkeys, camels and horses). For this project, the

Above Camels have been known to degrade and cause erosion to bilby habitat.
Photo – Ann Storrie

Above right Nyikina Mangala rangers Nathan Green and Shaquille Millindee entering data after completing a bilby plot.
Photo – Bruce Greatwich/DBCA

Right Bilby tracks and scats reveal clues about the species' distribution.
Photo – Ruth McPhail/DBCA

impact of late dry season fire on bilby occupancy is being investigated. To date, more than 250 two-hectare plots have been completed.

In the past, determining the size of a bilby population has been difficult. Counting the number of burrows within an area does not provide you with an accurate number of bilbies that live there, as individual bilbies can use up to 18 burrows within their home range, and there may be disused burrows present. They are also extremely hard to trap and mark, as they are 'trap shy' and don't tend to be lured by bait.

However, a novel technique developed by DBCA scientists, which uses DNA extracted from bilby scats, is providing accurate information about the population size. This technique enables researchers to distinguish individual bilbies from scat samples, which they can use to calculate an estimate of population size.

Active bilby sites have been found in areas where the substrate is suitable for burrowing, and where the particular *Acacia* spp. and *Senna* spp. that bilbies use as cues for food sources occur. At sites where bilbies are found, these *Acacia* spp. typically form monospecific stands where cossid moth larvae (witchetty grubs) – a major food resource for bilbies on the peninsula – can be found. Bilbies are also known to eat yakirra (*Yakirra australiensis*) seeds and bush onion (*Cyperus bulbosus*) bulbs. They also dig for termites in the late dry season.

FITZROY RIVER CATCHMENT BILBY PROJECT

Another recently commenced project – the Fitzroy River Catchment bilby project – has already contributed useful data about the distribution of bilbies in the area. It uses a combination of Indigenous cultural knowledge, such

as expert tracking and local knowledge of bilby populations, and contemporary science to map the distribution of bilbies and help inform management actions, such as feral predator control, and fire and livestock management.

The project is funded by the National Environmental Science Program (NESP) Northern Australia Environmental Resources Hub, and is a collaboration between DBCA, Environs Kimberley and Indigenous ranger groups across the southern Kimberley. When it wraps up at the end of 2020 it will have run for two years and employed traditional owners and ranger groups from across the southern Fitzroy River catchment.

Similar to the Dampier Peninsula project, this project uses the standardised two-hectare sign plot technique to determine where bilbies live. Using a standardised technique is important, so that occupancy at other surveyed areas can be compared, and to highlight changes in bilby occupancy when areas are resurveyed in the future. Detailed population abundance monitoring will also be carried out at several key sites and indications of old bilby signs at a number of locations will be followed up.

While there is still more work to be done in the Dampier Peninsula and the Fitzroy River Catchment areas, researchers are hopeful that by gathering comprehensive data about the bilby populations within these two important strongholds, steps will be taken to ensure that, unlike the lesser bilby, the greater bilby will be protected long into the future. And, these projects have provided the invaluable opportunity to develop partnerships with traditional owner groups and other land managers.

Above left Ngurrara Ranger Jamin Bent with a witchetty grub – a major food source for bilbies.
Photo – Ruth McPhail/DBCA

Above The bilby's unusual appearance, conservation status and cultural significance have earned it icon status.
Photo – Jiri Lochman

Below Nyikina Mangala bilby survey team.
Photo – Damien Giles/Nykina Mangala Rangers

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