Mapping the bilby activity area at the Kurlku (Ngurrara) bilby population.

Northern Australia Environmental Resources Hub

National Environmental Science Programme

Monitoring, mapping and safeguarding Kimberley bilbies

Wrap-up factsheet

The Fitzroy River catchment is an important stronghold for bilbies

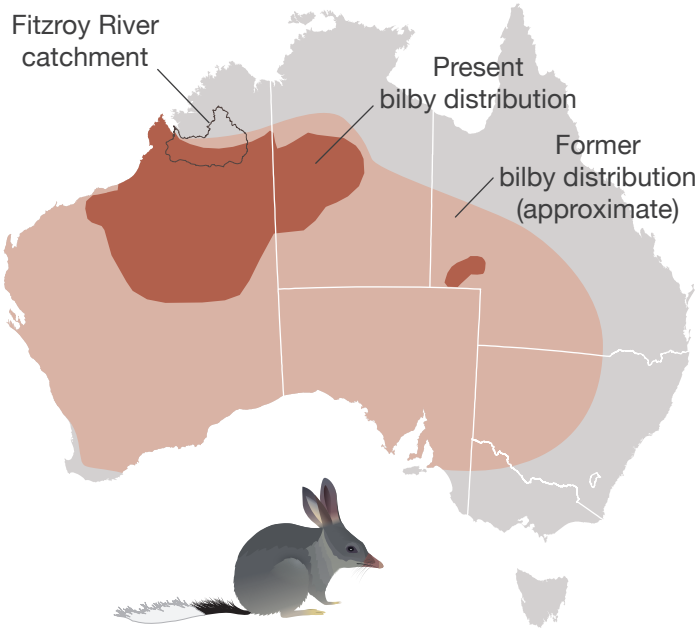
The greater bilby (*Macrotis lagotis*) is an iconic threatened Australian mammal of high cultural importance to Traditional Owners. Bilbies have an important ecological role as ecosystem engineers in arid environments through the beneficial digging, soil turn-over and habitat that they create.

The species is suffering an ongoing decline in range and abundance attributed to a number of threats including predation by feral cats and foxes, inappropriate fire regimes, and habitat degradation through introduced herbivores and land clearing. The Fitzroy River catchment in Western Australia's Kimberley region is believed to be a stronghold for bilbies but until now, there have been no coordinated, systematic surveys or monitoring to confirm this.

This project aimed to increase knowledge of the occupancy, abundance and distribution of bilbies in the Fitzroy River catchment, and identify on-ground management actions to alleviate key threats. Our research will help to inform bilby recovery planning and threat abatement programs. Our results will also support evidence-based land-use planning and environmental impact assessment processes.

In partnership with Indigenous rangers, this project:

- conducted occupancy surveys of bilbies, and introduced animals that threaten them, in the Fitzroy catchment
- undertook abundance surveys to estimate the size of their populations
- developed habitat suitability models to see where in the Fitzroy catchment was the best habitat for bilbies to live.



The greater bilby formerly occurred over much of arid Australia. Data source: IUCN.

Bilby occupancy across the area, coupled with large areas of potentially suitable habitat, confirm the Fitzroy River catchment as important for the continued survival of bilby populations. The widespread presence of threats to bilbies (foxes, cats and introduced herbivores) also highlights the need for management actions to protect bilbies from these threats.

Our study provides a flagship example of the partnership between modern science and traditional biocultural knowledge to deliver new knowledge critical for informing the effective conservation of a cultural icon.

Adult bilbies captured on a remote camera during the bilby abundance surveys.

Bilby occupancy declined with increasing cattle occupancy

We estimated that bilbies used 21% of the surveyed 2-ha plots in the Fitzroy catchment project area. If a plot was used by a bilby, there was a 49% chance of finding evidence of that use. This result highlights the importance of repeatedly surveying a site to increase the chance of detecting a bilby if it is in the area. These estimates are comparable to the La Grange area west of our study area which has also been identified as a stronghold. We found bilby occupancy was most strongly influenced by cattle occupancy, with areas with lots of cattle less likely to be occupied by bilbies. Overgrazing and trampling by cattle and other introduced herbivores has been implicated as a factor contributing to the decline of bilbies through the degradation of their habitat. Bilbies were also more likely to be detected in open woodland with a higher fire frequency, probably reflecting greater ease of detection in more open habitats.

Bilbies are resilient to some level of feral cat presence, although fox presence is alarming

Despite a high occupancy rate of feral cats on the survey plots and on cameras, we did not find an association between feral cat and bilby occupancy, suggesting that bilbies are resilient to some level of feral cat presence. Even so, feral cats were observed commonly stationed at burrows occupied by bilbies. We also found no evidence that occupancy of dingoes influenced bilby occupancy, but interestingly, cat occupancy tended to decrease with increasing dingo occupancy.

A concerning finding of our study was the presence of foxes at the three bilby populations where we estimated abundance. We also observed foxes waiting at burrow entrances, sometimes for extended periods. Foxes have been implicated as primarily responsible for the extirpation of bilbies in the southern portion of their former range across Australia, and a single fox can decimate an

Feral cats and foxes were recorded by remote cameras stationed at bilby burrows by day and night.

entire bilby colony. It is generally thought that foxes do not pose a threat in the more tropical northern climates, as they are less prevalent. However, our study suggests otherwise, at least in the southern section of the Fitzroy catchment which is the northern-most extent of the bilby's range.

Suitable habitat for the bilby is more likely to occur in the southern section of the Fitzroy catchment

We recorded population sizes of 4, 6 and 13 for the three bilby colonies where abundance surveys were completed. Population monitoring over several years in the Kimberley, Pilbara and central desert regions recorded similar populations of 2 to 15 individual bilbies. Monitoring of three populations in the adjacent La Grange area estimated population sizes of 2, 10 and 44 individuals. Based on our models, broad areas of habitat suitable for bilbies were predicted to occur in the southern half of the Fitzroy catchment. This result is probably not surprising given the complex rocky terrain in the north of the catchment is generally not considered suitable for the species.

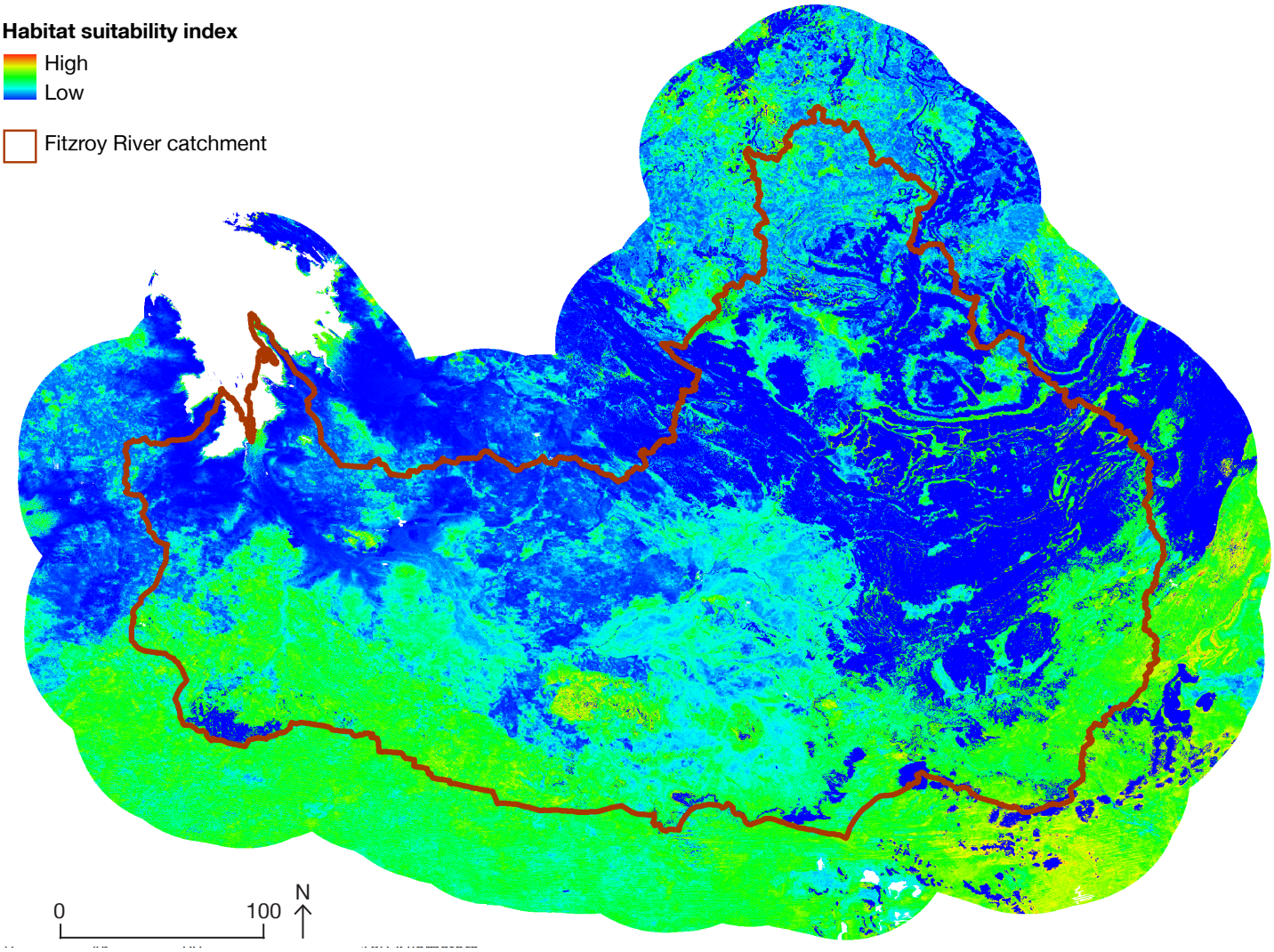
Based on data from occupancy, density and habitat suitability, we estimated the bilby population within the Fitzroy catchment at 11,806 ± 6,068 individuals, although this is based on a small number of plots sampled across the area and a density estimate derived from just three populations.

Protecting bilbies from threats

The widespread presence of threats to bilbies in our study area highlights the need for appropriate management of these threats. A combination of landscape-scale and local management actions will likely provide the most benefit to bilbies. The management area surrounding bilby populations should be large enough to create habitat complexity and accommodate movement of the population within the managed area.

Feral cats and foxes

Baiting programs, coupled with supplementary trapping and traditional hunting, are likely to be effective for controlling feral cats and foxes in and around bilby populations. For example, annual strategic aerial application of the Eradicat® bait has been shown to be effective for controlling feral cats at the landscape scale but it can also be applied locally. Baiting with Eradicat® is also effective for fox control.



Model of bilby habitat suitability, showing that the southern part of the Fitzroy catchment is likely to have more suitable habitat for bilbies.

Fire management

Recently burnt areas have been shown to be favoured by feral cats, probably because hunting success is improved. Management of both fire and introduced predators at the same time is likely to achieve the best outcome. Intense and large landscape-scale wildfires destroy large areas of habitat that provide food resources and cover from predation. Bilby populations require smaller, more frequent fires that create a mosaic of different age classes of regrowth, which increase habitat and resource diversity. Localised fire management around bilby populations such as fire breaks and patch mosaic burning are recommended.

Introduced herbivores

Due to the transient behaviour of bilbies, fencing off areas is unlikely to be effective. Removal or reducing the number of feral herbivores and unmanaged livestock, or negotiating the closure of artificial water points in the vicinity of bilby populations, are potential management options.

Nyikina Mangala completing bilby plots and capturing plot data. Photo: Kyle Raina.

Land clearing

The negative effects of land clearing are manifested on local and landscape scales. Careful management to ensure sufficient areas of connected suitable habitat remain to support bilby populations is likely to reduce the impacts of land clearing. Securing land specifically for bilby conservation could also be considered.

Ngurrara ladies point out a fresh bilby burrow while completing occupancy surveys.

Further information

This project was led by Lesley Gibson from the Western Australian Department of Biodiversity, Conservation and Attractions (DBCA).

This factsheet and further information are available from the project webpage at nesplandscapes.edu.au/projects/nesp/bilbies

Contact: lesley.gibson@dbca.wa.gov.au, bruce.greatwich@dbca.wa.gov.au or martin.dziminski@dbca.wa.gov.au

All photos by WA DBCA unless otherwise attributed.

Government of Western Australia
Department of **Biodiversity, Conservation and Attractions**
Yimarddoo Warra Rangers Nyikina Mangala
Ebbinyadee Rangers
KIJA Rangers
Ngurrara Rangers
Bunuba Rangers
environs Kimberley
Kimberley Land Council

This project is supported through funding from the Australian Government's National Environmental Science Program.

Northern Australia Environmental Resources Hub
National Environmental Science Programme
nesplandscapes.edu.au nesplandscapes@uwa.edu.au
/NESPLandscapes @NESPLandscapes
November 2021