Cats, fire, and seismic lines: the secret life of bilbies in the West Kimberley

While many people know the greater bilby (Macrotis lagotis) as the long-eared chocolate critter encountered at Easter time, the real story is much less sweet. Bilbies were once widespread across most of Australia, but the species has suffered a dramatic decline since European settlement of Australia. Bilbies are particularly vulnerable to predation by feral cats and foxes. Very few of us are lucky enough to have encountered these charismatic animals in the wild.

Bilbies are now only found in around 20% of their former range, such as the Tanami Desert, Pilbara and Kimberley regions. Many of these areas are subject to development for oil and gas, irrigated agriculture, and mining. Understanding the effect of disturbances such as vegetation clearing on bilbies can inform management strategies to ensure that these vulnerable marsupials persist across north-west Australia.

At our study site in the West Kimberley, both natural (fire) and anthropogenic (seismic lines) disturbance is common, and feral cats are found throughout the region. We set out to identify how these disturbances influence preferred habitat, behaviour and diet of bilbies.

Methods and results

1. Can we predict preferred bilby habitat in the West Kimberley?

Although they are habitat generalists (they can live in a range of habitat types), it would be helpful if we could predict where bilbies are most likely to occur so that we can avoid disturbing those sites. With assistance of the Yawaru Traditional Owners and Country Managers, we performed four years of surveys at Yulleroo to identify the characteristics of sites where bilbies were present. Bilbies showed slight preference for areas of open grassland on red sandy dunes. Unexpectedly, bilbies showed no preference for any particular fire age.

2. What impact do seismic lines have on the behaviour of bilbies and their predators?

We used motion-triggered camera traps to measure animal activity on and off seismic lines. We frequently recorded bilbies, cats, dingoes, cattle and agile wallabies on seismic lines, apparently using them as movement corridors. While this behaviour is well known for feral cats and dingoes, it was unexpected for bilbies. This result is important, as it suggests that where tracks, roads, fence lines, or seismic lines are present, bilbies may use these clearings for movements; but their predators are also doing the same thing.

Bilbies have evolved alongside natural disturbances such as fire or flood events. They often prefer areas with a diversity of fire ages, where freshly-burnt areas can provide food plants that grow immediately after fire, and older, mature vegetation supports grubs and provides shelter. As a result, bilbies are highly mobile, and often move large distances to new areas in response to fire.
3. What do bilbies in the West Kimberley eat?
We collected over 70 bilby scats (dung) throughout the course of the study. We used traditional microscopic analysis to identify food items. Much of the food was too digested to identify under the microscope, and therefore we trialled ‘DNA Barcoding’ to assist identification of food items. These two approaches worked well together, and some of the uncertainty of identification in traditional microscopic analysis was removed by the DNA Barcoding approach. We found that bilbies in the West Kimberley have a similar diet to those living in other parts of Australia. Some diet items, such as the grass Yakirra australiensis, were not recorded during any of the concurrent botanical studies, but were present in bilby scats collected at the same time (i.e. the animals were better at finding these plants than we were). Bilbies also ate large grubs found in the roots of Acacia trees and Cockroach Bush (Senna notabilis). Both Cockroach Bush and Yakirra germinate soon after fire, and also often after vegetation clearing (they are often seen on the side of new tracks).

Conclusions and recommendations

Bilby habitat selection was not strongly influenced by fire; however their behaviour was influenced by clearing, as bilbies used seismic lines as movement corridors. Further, bilbies consume a range of food that may be promoted by clearing and fire. Clearly this is a complex relationship, but not unexpected given that bilbies have evolved in the arid and semi-arid regions of Australia where fire and rainfall events can change the landscape drastically in a short period of time.

The presence of bilbies is difficult to predict from habitat variables; predictions based on habitat type can therefore be inaccurate. This is problematic for biological surveys required prior to development projects. Currently, the best approach is to physically inspect the area to be disturbed for the presence of bilbies on foot, rather than rely on predictions from imagery and habitat descriptions.

Given bilbies, feral cats and dingoes all use linear clearings (such as seismic lines) as movement corridors, future disturbances in areas where bilbies are present should consider some method of feral cat control to reduce cat density while seismic lines recover.

Fire regimes and vegetation recovery strategies should consider promoting the germination of important diet resources for bilbies such as Yakirra and Cockroach bush in order to maximise the potential for an area to support bilbies. It is likely that this goal will be achieved by burn regimes that maximise fire age heterogeneity, as is currently undertaken by many land managers in the Kimberley.

Disturbances such as vegetation clearing and fire can alter the availability of food items like grubs, and also the behaviour of predators.

More information
Contact Stuart Dawson
E: s.dawson@murdoch.edu.au

References

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Authors
1 Buru Energy, 2 University of Adelaide, 3 Curtin University.