

## Following the plot: the value of long-term ecological monitoring

While the outlook for those interested in biodiversity conservation in Australia is often grim, a recently published book, *Biodiversity and Environmental Change: Monitoring, Challenges and Direction* does contain some good news and success stories. An important ingredient in this success has been knowledge gained from long-term environmental monitoring.



Credit: Adrian Manning

In the ACT, a long-term experiment in a [woodland reserve](#) may take time to deliver results of an ecological kind, but it has already succeeded in another respect.

The [Mulligan's Flat–Goorooyarroo Woodland Experiment](#) is a collaboration between the ACT Government and scientists from CSIRO and the Australian National University. The reserve protects an area of grassy woodland with [yellow box](#) and [Blakely's red gum](#) which, like most temperate eucalypt woodlands, is endangered.

In partnership with the ACT Government, the scientists are mixing research with habitat restoration to identify the best ways of saving this woodland type and hence increasing biodiversity. Different treatments being assessed include:

1. adding 2000 tonnes of dead wood for habitat and to [increase the structural complexity of the ecosystem](#);
2. excluding kangaroos to give regrowth a chance to establish;
3. prescribed burning to explore direct effects on biodiversity, and also interacting effects with other treatments; and
4. re-introducing the eastern bettong (an inveterate digger for tasty underground fungi, roots and tubers) to understand how it affects regeneration, and how regeneration affects it.

Preliminary results are already influencing park management policy – for example, dead wood is now being added to other woodland reserves in the ACT. The research team expects subsequent results will also inform other restoration projects, particularly in temperate eucalypt woodlands.



Credit: Adrian Manning

### **Just add a few trees**

Most of Australia’s temperate eucalypt woodlands have been cleared for grazing. But years of research show that even a thin scattering of native trees in paddocks can make a difference to the health of these environments.

The trees help conserve soil and the shade they throw reduces heat stress in livestock – both of direct monetary benefit to the farmer. They also provide a home for wildlife or protected stepping stones for them between stands of bush.

This work has been championed at Nanangroe in New South Wales by Professor David Lindenmayer from the Australian National University, who is Science Director of the [Long Term Ecological Research Network \(LTERN\)](#) and an editor of *Biodiversity and Environmental Change*.

‘The Nanangroe Plantation Plot Network within LTERN, which has been going for 16 years now, builds on an earlier project in which ecologists learned that even small, isolated patches of native vegetation can harbour more small mammals and marsupials than previously believed,’ says Prof. Lindenmayer.

‘We shared the results with locals, and now some farmers are replanting some previously cleared land, and providing the conditions to bring wildlife back to their farms.

‘Our results are a direct consequence of years of accumulated research, monitoring and observation. It would not have been possible from a short-term project.

‘The length of time we’ve been conducting this research gives us confidence in our findings, and, just as important, it gives the farmers confidence that we are right.’

The Nanangroe research is important in a conservation sense, too. More than a third of the ecological communities listed as threatened under the [Environment Protection and Biodiversity Conservation Act 1999](#) to occur in temperate woodlands.

### **Booderee and the eastern bristlebird**

At Jervis Bay, on the south coast of New South Wales, park managers have achieved the feat of protecting some high-profile endangered species, including the eastern bristlebird (*Dasyornis brachypterus*), in one of the most heavily trafficked conservation areas in the country, [Booderee National Park](#).

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This 6500 hectares park is home to more than 260 species of terrestrial vertebrates and over 625 species of plants. Vegetation types range from sedgelands, through woodlands and forest and into subtropical rainforest. It is one of its last and most important strongholds of the eastern bristlebird.

The park is managed by Parks Australia and the Wreck Bay Aboriginal community. One factor in their success is way scientific knowledge gained from the Jervis Bay Booderee National Park Plot Network has been woven into park management decisions.

Another factor is the mutually respectful relationship developed between the park managers and the researchers, who have been working in the park for more than 10 years.

### **Desert learnings**

LTERN's Desert Ecology Plot Network in the Simpson Desert has been a valuable resource for many young scientists.

What they have learned has changed local people's views about the fragility and importance of deserts, and contributed to the decision of Bush Heritage Australia to buy two western Queensland properties, 'Ethabuka' and 'Cravens Peak', now conservation reserves.

'One of our students, Anke Frank, now a post-doc, found that cattle grazing may lead to changes in the small patches of gidyea woodland, which function as temporary refuges for native species,' says Associate Professor Glenda Wardle of the University of Sydney, who has been working in the area for 16 years.

'Stands of gidyea are important, because they occur in spinifex grassland, which doesn't always offer sufficient refuge.

'As a result, we have something new to add to the already responsible management of the property between the two conservation parks. The manager is sensitive to cattle stocking rates, and responds quickly to destock or decrease his herds in droughts and after fires, to give the vegetation and the native creatures a chance.'



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Doctoral student Aaron Greenville is trying to fathom the interactions between species, rainfall and wildfire.

‘You need decades of data to be able to understand these interactions, because there are so many variables and they are changing all the time, depending on weather conditions,’ Aaron says.

‘Our understanding is evolving. For instance, there’s now quite a bit of evidence that dingoes help keep numbers of feral cats and foxes in check. Most graziers don’t like dingoes, but they also don’t like cats and foxes – when they shoot them, they’ll give them to us for research.

‘Further east and north, we are seeing evidence of dingoes managing kangaroo numbers. Graziers like this because the ’roos can become over-abundant and compete with stock for food. Pastoralists’ views on dingoes are slowly changing.’

Another doctoral student, Tony Popic, found diverse interactions among the plants growing in the desert plots and the animals that visit the flowers under different conditions. This has led to the discovery of many new species of native bees and wasps.

‘Activity in the desert changes markedly and dramatically between times of rain and extended dry periods,’ Tony says.

‘We want to understand how this affects fundamental things such as pollination, which is important for the plants, for the insects and other creatures they feed. If plants aren’t being pollinated, new plants aren’t growing to feed livestock.

‘If we can get a handle on what’s happening, we can decide how to manage it so that we maximise growing and regenerating conditions.’

*Compiled from recent [TERN](#) newsletter items: original articles are [here](#) and [here](#). Republished with the permission of [TERN](#) and Claire Heath.*

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