

Savanna bird abundance deceives

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Flocks of brilliant emerald budgerigars are an iconic image of the Australian outback, signifying seasonal renewal. But, are large numbers of nomadic parrots really a sign of landscape health and good management?



Credit: Eric Vanderduys, CSIRO

Savannas are grassy woodlands in which tree density is low enough to allow the growth of a thick groundcover of grasses. While the majority of the world's savannas are degraded by human activity, in northern Australia these ecosystems are in relatively good condition, and new species are discovered regularly.

Alex Kutt, formerly CSIRO but now with GHD (an environmental and engineering services consultancy), has assessed bird populations in the Australian savanna. He has found that some bird communities can change rapidly over periods as short as one to five years. While it is well documented that birds can be very mobile in this landscape, following changes in food resources caused by varying weather conditions, Dr Kutt's research indicates that change is greater where the landscape has been cleared or disturbed by partial tree thinning.

Dr Kutt and his team of researchers have found that where vegetation has been changed by grazing activities – such as clearing for exotic pasture development – nomadic bird species are dominant, as are birds more tolerant to disturbance.

'This observation shows that where habitats are modified, some bird species prevail, while others become more vulnerable and transitory, more liable to depletion due to environmental pressures,' says Dr Kutt.

From 2004 to 2008, Dr Kutt and his colleagues recorded more than 15,000 birds at 60 sites in the Desert Uplands Bioregion. This bioregion is an elevated area covering 68,850 square kilometres of outback central northern Queensland, straddling the Great Dividing Range. It contains the headwaters of a number of major catchments running into the Gulf of Carpentaria, Lake Eyre Basin and Great Barrier Reef Marine Park.



Credit: Federal Department of Sustainability, Environment, Water, Population and Communities

Besides the well-known budgie, other abundant woodland species were the weebill (Australia's smallest bird), zebra and double-barred finches, crested bellbirds, brown treecreepers and other small passerines (perching birds) such as thornbills and fairy-wrens.

Birds were often more abundant in the most modified and cleared sites.

'Landholders often interpret high bird numbers as a sign of good landscape health. But, in fact, lots of birds of a few species usually indicates a largely negative change,' says Dr Kutt.

Complementary research in the region examined variations in mammal, reptile and bird abundance caused by small-scale clearing. Woodland bird species, such as brown treecreepers and grey-crowned babblers, and terrestrial geckos, such as *Diplodactylus steindachneri* were found to be particularly vulnerable. Dr Kutt says this is a warning sign that even slight changes to the intact native savanna woodlands cause some species to decline. These are the same species that have been affected by clearing of temperate woodlands in the south.



Credit: Eric Vanderduys, CSIRO

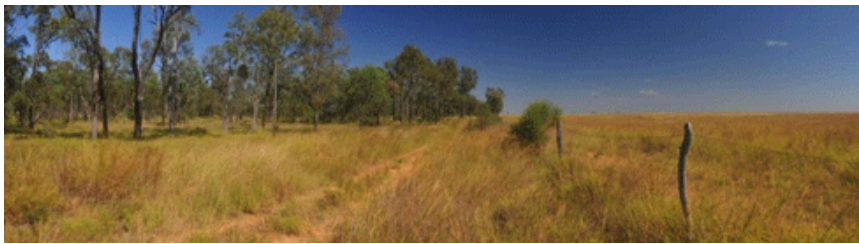
Long-term grazing can also cause a shift in the dominant groundcover vegetation from perennial to annual species. In turn, this affects which animals congregate in the area. [Eric Vanderduys](#) of CSIRO's Ecosystem Sciences and his colleagues have found that mixed flocks are a common component of Australia's savanna environments and are similar in bird abundance and species richness to flocks in other ecosystems.

Mixed flocks are formed by birds of different species, which probably join the flock to improve their success in foraging and vigilance against predators. Some species are most commonly encountered within mixed flocks instead of on their own. Because changes in habitat can influence the composition of mixed flocks and other species assemblages, studying these flocks can help predict how birds will respond to environmental changes.

Dr Kutt and Mr Vanderduys's studies conclude that it is important to undertake repeated and long-term monitoring of species to really understand how native animals are affected by grazing, land management and climate.

'We need to tease out what are natural patterns of change in biodiversity on a yearly or decadal basis, and what represents a more insidious change due to human influences,' says Mr Vanderduys.

Mr Vanderduys is about to resample the sites visited during Dr Kutt's research: an essential step towards building an inventory of the fauna in the Australian savanna. The data he and his team collect will also help with early detection of significant changes in animal populations.



Credit: Eric Vanderduys, CSIRO

'The need for broad-scale, long-term biodiversity monitoring, to support evidence-based policy and management in the Australian rangelands, is clear and pressing,' says Dr Teresa Eyre, from the Queensland Department of Science, Information Technology, Innovation and the Arts.

To help the government implement long-term studies, Dr Eyre, Dr Kutt and their collaborators have proposed a framework addressing the pitfalls that often stall biodiversity monitoring in Australia. They propose three different levels of monitoring:

1. targeted – localised, field-based monitoring of target species, addressing specific management questions
2. surveillance – broad-scale, field-based sampling of animals at a range of locations at different times
3. landscape-scale – to provide regional to national-scale intelligence on habitat quality and trends in threats to biodiversity.

'Some processes take time to become apparent, so from a usability point of view, the longer the study the better,' says Holly Hanlon, the Biodiversity and Pest Regional Coordinator with the Queensland Murray–Darling Committee. Ms Hanlon makes scientific findings accessible and actionable for landholders.

'Most landholders are very keen to understand and apply the latest research,' she says.

At a time when northern Australia is often seen as an untapped resource for local and international agriculture, as well as for mining development, understanding the factors that affect savanna ecosystems over several years is crucial.

'Mining is well established, and the expansion of agriculture is probably inevitable,' says Dr Kutt.

'However, the associated negative biodiversity changes should not be inevitable. There is an opportunity to genuinely integrate monitoring and conservation into development schemes to track how species are faring and prevent the [terrible mistakes made in southern Australia](#).'

More information

Kutt AS, Perkins GC, Colman N, Vanderduys EP and Perry JJ (2012). [Temporal variation in a savanna bird assemblage: what changes over 5 years?](#) *Emu* **112**, 32–38.

Kutt AS, Vanderduys EP, Ferguson D and Mathieson M (2012). [Effect of small-scale woodland clearing and thinning on vertebrate fauna in a largely intact tropical savanna mosaic.](#) *Wildlife Research* **39**, 366–373.

Vanderduys EP, Kutt AS, Perry JJ and Perkins GC (2012). [The composition of mixed-species bird flocks in northern Australian savannas.](#) *Emu* **112**, online early.

Eyre TJ, Fisher A, Hunt LP and Kutt AS (2011). [Measure it to better manage it: a biodiversity monitoring framework for the Australian rangelands.](#) *The Rangeland Journal* **33**, 239–253.

[Australian bird status survey a call to action](#), *ECOS*

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