



## Ecologist Michael Clarke describes Australian wildfires' devastating aftermath

**Australia is in the grip of its worst wildfire season on record. The human death toll stands at 28, and thousands of homes have been destroyed across more than 10 million hectares of land — an area larger than Portugal. An estimated 1 billion wild mammals, birds and reptiles have perished. Michael Clarke, an ecologist at La Trobe University in Bundoora, Melbourne, has been studying the effect of fires on native ecosystems — and how they recover — ever since a fire tore through his field site 15 years ago. Clarke spoke to *Nature* about how animals fare in the wake of wildfires, and why this season's fires could prove particularly devastating.**

### What happens in the aftermath of a wildfire?

It is deathly silent when you go into a forest after a fire. Apart from the undertakers — the carrion eaters like currawongs, ravens and shrike-thrushes — picking off the dead bodies, there's nothing much left in the forest. It's a chilling experience.

Any animal that manages to make it through the fire uninjured faces three major challenges. One is finding shelter from climatic extremes, the second is the risk of starvation. And third, they've got to avoid predators. They're exposed; there's nowhere

to hide in a barren landscape.

Even if an animal makes it to an unburnt patch, the density of organisms trying to eke out a living will be way beyond the area's carrying capacity. After fires in 2007, one unburnt patch I visited in the Mallee [a region in the far north of Victoria] was literally crawling with birds, all chasing one another, trying to work out who owned the last bit of turf. It was insufficient to sustain them all.

### Which animals are likely to be most affected?

Animals like koalas that live above ground in small, isolated populations and have a limited capacity to flee are in all sorts of trouble. During past fires, we've seen some really surprising creative behaviours, like lyrebirds and wallabies going down wombat burrows to escape fire. But a large majority of animals are simply incinerated. Even really big, fast-flying birds like falcons and crimson rosellas can succumb to fire.

### How are this season's fires different from those in previous years?

The scale is unprecedented: such synchronous loss of vast areas of habitat. The ferocity of the fires, which can create their own weather, means the wildlife is at a loss to respond.

The fires are also burning differently to how they have in the past. Previously, you could rely on wet gullies acting as natural barriers to the spread of a fire. This year, with the dryness, the fires are just going straight through gullies and rainforest pockets that would otherwise be places where animals could take refuge afterwards.

### How long will it take for ecosystems to recover?

Recovery will probably be slower than for previous fires. Re-vegetation depends on rainfall, and that's become so unpredictable. Tree hollows and nectar-producing trees, key resources for animals, take years or decades to recover.

One concern is the future of several migratory bird species that fly between Tasmania, Victoria and southern Queensland. They make pit stops on the coastal heathlands along the east coast, precisely where a lot of these fires have been happening. It'll be years before those habitats are back in production as stop-over points for migratory birds.

Other animals are being pushed closer to extinction. There are real concerns for the brush-tailed rock wallaby, and the Kangaroo Island dunnart — a small marsupial — which has lost nearly all of its habitat.

### What does the future hold for these ecosystems?

The challenge will be to work out how to protect the pockets of forest habitat that are left. We may need to be proactive and carry out controlled burns near areas that become wildlife refuges during fires to keep future fires out. That doesn't sit well with me, but it may be the new normal that we're facing.

These fires are unprecedented but not unexpected. Thirty years ago, scientists predicted that there would be more severe fires due to climate change. We are seeing three big changes: increased frequency of fire, increased severity, and increased extent of these blazes. That triple whammy reduces fauna's capacity to recover.

### Interview by Dyani Lewis

This interview has been edited for length and clarity.



Animals that survive the fires, like this wombat pictured in New South Wales, will struggle to find food and shelter.