Celebrating a new century of wildlife preservation in Australia

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Once an exotic species integrates into the complex web of nature, it becomes almost impossible to extract them without causing unforeseen damage. For example, killing foxes can cause cats to erupt, and eradicating cats risks causing a rabbit plague. In most cases however, eradication efforts are simply ineffective because individuals killed are rapidly replaced by immigration or reproduction. Research over the past few years suggests yet another important reason why pest control does not provide the expected benefit to biodiversity:

Exotic species are not the root of the problem. Instead, the spread of exotic species and the resulting loss of native biodiversity are both symptoms of a deeper ecological dysfunction. Research has now provided compelling evidence that ecological health and resilience are tightly linked with the presence and stability of large (apex) predators.

Apex predators play a critically important role in maintaining ecosystem function. Sitting on the top of the food web, they exert a predatory force that cascades down through the web’s layers. This predatory force acts to suppress and regulate herbivores and mesopredators (smaller - subordinate - predator species). The loss of apex predators.

Exotic species have a notorious reputation. They kill, consume and harass natives, sometimes to extinction. Australia has lost much of its biodiversity to these marauding pests, with almost half of the world’s mammalian extinctions over the past 200 years occurring here. The worst villain of them all has been the red fox, although cats and rabbits are certainly on the Most Wanted list as well. Pest control has become the fundamental toolkit of conservation activity, and much of Australia’s wilderness is under a constant shower of 1080 poison-baits. Despite the extent of efforts applied to rid Australia of its pests, benefits to biodiversity have seldom been demonstrated. In fact, in many cases it seems to have made matters worse.

The new natives

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Top left: Wild camels in the Simpson Desert. After thousands of years mega fauna are back in Australia. Dingoes probably have the ability to regulate even these giants but it will require long-term protection for them to form such capable packs

Top middle: Chased up a tree near Lake Eyre. Native prey can survive alongside the Australian wildcat as long as dingoes 'keep them honest'

Top right: Wilderness enriched with wild horses

Bottom left: The Australian rabbit is an asset or a pest depending on how dingoes are managed

Bottom middle: Wild goats outcompete rock wallabies where dingoes are controlled. When allowed to recover, dingoes regulate goats to the benefit of rock wallaby survival

Bottom right: Desolation of the Gammon Ranges conservation areas (National Park and Aboriginal Protected areas all look like this in many places - it is sad but very often these dead mulga forests extend as far as the eye can see). This is a direct consequence of poison baiting and dingo control in general
releases this inhibiting factor resulting in population eruptions of both native and exotic herbivores and mesopredators, and the decimation of biodiversity and productivity. In North America, for example, wolves regulate the density and behaviour of elk thereby protecting vegetation to the benefit of beavers and riparian songbirds. On the other hand, the loss of wolves and cougars from much of their range has resulted in the elimination of tree recruitment, in some areas for over a century.

Across the globe apex predators have been driven to extinction or extreme range reduction mainly through long-term intensive persecution. Michael Soulé, renowned American conservation biologist, eloquently described the worldwide annihilation of large predators as the “decapitation of ecosystems”. Many leading ecologists argue that the loss of large predators rivals climate change as a principal threat to life on this planet. There is even compelling evidence that large predators help ecosystems buffer the effects of climate change and disease. Research and conservation focus is therefore increasingly turning towards wolves, lions, sharks and other apex predators. The devastating consequence following their loss, and the extraordinary ecological recovery that follows their restoration, is a universal pattern. Australia is no exception to this fundamental ‘law of nature’, as recent studies demonstrate.

Based on years of living in the bush as a professional hunter, Adam O’Neill (C&A Environmental Services) published a controversial theory that the dingo is a vital guardian of Australian ecosystems, and that our efforts at pest control are counter productive. A comprehensive scientific review of the main drivers of extinctions over the past 50,000 years led Chris Johnson (University of Tasmania) to a similar conclusion. Johnson and colleagues conducted an analysis of extinction patterns across the continent and found that marsupial species have mainly been lost where dingoes were scarce. This study provides striking evidence that persecution of an apex predator can cause a wave of extinctions across a continent. Indeed, the presence of dingoes has been found to correlate positively with practically every threatened species studied, including several species of small native mammals, rock-wallabies, turtles and ground nesting birds. For example, a comprehensive study of factors influencing the survival of bilbies in the Tanami Desert, by Rick Southgate (University of Adelaide) and colleagues, found a positive association with dingoes.

These ecologists suggested that the mechanism that supports native biodiversity is the suppression of exotic mesopredators (foxes and cats) and herbivores (eg rabbits, rabbits, rabbits...).
goats and kangaroos) by dingoes. This has since been confirmed. Chris Johnson and Jeremy VanDerWal (James Cook University) established that dingoes set an upper limit on fox densities, and Michael Parsons (Curtin University) and Daniel Blumstein (UCLA) demonstrated that kangaroos avoid areas where dingo scent is present. A large field study by Mike Letnic (University of Sydney) and colleagues found two distinct ‘ecological universes’ on either side of the dingo barrier fence. Inside the fence foxes and kangaroos dominate while outside the fence dingoes, small native mammals (including the threatened dusky hopping mouse) and vegetation are more abundant. These studies fall in line with Euan Ritchie (Deakin University) and Chris Johnson’s analysis revealed that across the globe large predators have a four-fold suppressing influence on mesopredators.

Dingoes, like other wolves, are highly intelligent and socially complex. Just how intelligent they are was recently demonstrated experimentally in the Dingo Discovery Centre in Victoria by Bradley Smith and Carla Litchfield (University of South Australia). Dingoes live in family groups (packs) lead by a single breeding pair. Packs hunt, defend their territory and care for pups cooperatively, and we are now realising that their ecological influence is tightly linked with the cohesiveness of their social structure. Predator control (even at low levels) fractures the dingo's pack structure and disrupts their ecological functioning. The social stability of dingo populations even provides a more consistent and long-lasting benefit to the arid zone vegetation than does rainfall alone. In our arid zone study sites, plant cover and diversity increased as rainfall decreased, because dingo control was more intensive in the higher rainfall regions. This result challenges the popular view that the devegetated state of the Australian arid zone is caused by droughts.

These scientific advances have prompted several prominent ecologists to call for the recovery of dingo populations wherever possible. For example, Chris Dickman (University of Sydney) and colleagues have proposed reintroducing dingoes back inside the dingo barrier fence to facilitate the recovery of degraded wilderness areas.

And Chris Johnson added that, in addition to dingo recovery, Tasmanian devils could be reintroduced back to the mainland to help rebuild Australia’s predator guild.

Although the recovery of biodiversity through the promotion of predators requires a major shift in the established conservation paradigm, its application has extraordinary potential to restore ecosystem health and function.

The fox, cat, rabbit, goat, donkey, horse, pig, deer, camel, cane toad and others are now an integral part of the Australian wilderness and beauty. They are the new natives. Nowhere else in the world is the extraordinary camel to be found in the wild. And who can avoid being filled with wonder at the site of a wild brumby? The incredible rabbit that survives anything hurled at them, and the clever fox that will always out-manoeuvre us. Who knows when the cat arrived, but some say they have been here since the Dreaming. The wild goat perched on the cliffs drenched in sunlight like a mythological creature, is a sight to behold. And the wise old cane toad sitting silently on a stump in the rainforest, as if he has been there since the beginning of time. Do these scenes spell the doom for the rock wallaby, the bilby and the quandong tree? Not while the dingo howls in the background.

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In 2007 Arian was first awarded a University Grant for her project “Persistence of endangered mammals: Is the dingo the key?”

In 2008 Arian was awarded a second University Grant for her project.

In recognition of her outstanding research in 2009 the Wildlife Preservation Society of Australia awarded a Centenary Grant to Arian.