

Nature



New South Wales

Rewilding Special edition

Journal of National Parks Association of NSW | Volume 60, No. 1 | Autumn 2016

Bettongs and Bantengs

Welcome to Australia's Wild Anthropocene!

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Humans have fundamentally transformed the planet to such an extent that many agree that we have entered a new geological epoch – the 'Anthropocene'. Much about how we think about this period is dominated by the stark recognition that this epoch is identifiable as a sixth mass extinction.



Australia is home to the world's only wild Dromedary Camel population

One distinguishing feature of this period is the vast movement of species across the globe. This 'biotic globalisation' is considered a major threat, and much effort is directed towards saving biodiversity by controlling non-native species. However, emerging evidence urges caution, and highlights a fundamentally different approach. Embracing our modern ecologies can significantly promote biodiversity, locally and globally.

Killing is not a silver bullet

In Australia, 30 mammal species have been lost in the past 200 years, the worst mammalian extinction wave in modern times. Some introduced species have been implicated in this decline, particularly Foxes and Cats, and so Australian conservation focuses on controlling and eradicating non-native species. But ecosystems are incredibly complex, and trying to mend nature by

killing wildlife can cause further harm.

Rarely do control operations meet their conservation targets, and they often backfire. Mallefowl nesting success actually declines where Foxes are poison-baited¹; Woylie populations have crashed because intensive Fox control caused higher Cat predation²; and native vegetation was damaged by Rabbits following an island eradication of Cats³. Even if control efforts achieve certain aims, there are significant other reasons to hold back.

Many 'invasive' species are endangered⁴. Australia has provided safe haven for many refugees: Rabbits are simultaneously 'declared pest animals' across Australia, and Vulnerable to extinction in their native Iberian Peninsula; Carp are so successful in the Murray-Darling there are plans to infect them with herpes, even while they are listed as Vulnerable in their native range. Banteng are

Endangered in Southeast Asia but are thriving in the Northern Territory, and of six introduced Deer species, three are threatened with extinction.

The word 'native' has a long and convoluted history⁵, and for some there is no defined place to call home. Driven to extinction in the wild 2,000 years ago, Dromedary Camels long persisted only in domestication, until a few pioneers went 'feral' across Australia's deserts. Today, Australia is home to the world's only wild Dromedary population. As author Ken Thompson asks in his book by this name, 'Where Do Camels Belong?'⁶. Their nearest relative, the Bactrian Camel of Mongolia, is Critically Endangered. The true ancestral roots of all Camels is not in the Middle East but in North America where they evolved for tens of millions of years, but went extinct about 8,000 years ago. Many species must move to

survive, and thankfully camels persisted long enough to make their escape into South America, Asia and North Africa, and more recently - Australia.

Introduced species are rewilding the world

Humanity started driving extinctions long before white men sailed boats across the seas. One of the great tragedies of our past has been the extinction of many of the Earth's megafauna (>100kg) by the end of the Pleistocene, 10-50 thousand years ago, probably by human hunters. Australia lost its entire megafauna assemblage thousands of years before Captain Cook landed on these shores. These declines continue today with around 60% of surviving megafauna threatened in their native ranges⁷.

With a vision to bring back a Pleistocene-like wilderness, there has been a growing call to 'rewild' the world with large animals. Because many species are gone forever, the case has been made to introduce similar species to replace missing functions. Scientists have called for the rewilding of North America with African Cheetahs and Asian Elephants, and one project has introduced Cattle and Horses into a Dutch nature reserve to recreate the great game herds of the past. But much of this has already been spontaneously accomplished.

In an upcoming study⁸ we show that in every major region of the world there are currently more megafauna genera, compared to the end of the Pleistocene, thanks to introduced and 'feral' species. After thousands of years with no megafauna, Anthropocene Australia includes nine species of which seven are threatened or extinct in their native ranges. Some species have escaped domestication, and in their wild form they are bringing back ancestral traits. This is one of the greatest rewilding success stories in the world, but it is not celebrated as such.

Introduced animals, particularly those with domestic ancestry, do not usually receive conservation attention, and it has become customary to view their ecological roles as harmful by default. But aside from clear cases of



Konik horse, stallions fighting during breeding season. Oostvaardersplassen, Netherlands.
Mission: Oostvaardersplassen, Netherlands, June 2009
Photo: Mark Hamblin/Wild Wonders of Europe

extinctions, the term 'harm' is usually vague, and may be better replaced with 'change'. Australia's Anthropocene megafauna are, of course, changing their new habitats, possibly by bringing back lost Pleistocene functionality, and none have caused extinctions. In fact, very few introduced species have.

Overall, introduced species provide undervalued, understudied but probably important and beneficial ecological functions. In Australia, introduced Bantengs have formed symbiotic feeding-cleaning relationships with native Torresian Crows⁹; introduced Rabbits are filling important niches as ecological engineers and as prey¹⁰; and islands with Foxes and Cats have more native mammals because they help suppress Rats¹¹.

Valuing all wildlife

Killing wildlife in the name of conservation is also ethically and socially problematic, because the harm we cause to individuals is certain and severe, whereas the hoped-for benefits to populations and ecosystems may never materialise¹². Last year, animal rights advocates, including international public figures Morrissey and Brigitte Bardot, sent letters of condemnation to the Australian government for its

plan to kill 20 million wild Cats by 2020. Similarly, a Brumby cull in the Northern Territory in the 1980s resulted in the symbolic trial and conviction of members of the Australian government by the International Court of Justice for Animal Rights. Many Australian Aboriginal people have embraced introduced species and do not want them culled, even incorporating them into their Dreaming¹³.

Does valuing the lives and ecological functions of introduced species mean that we are giving up on Australia's rich endemic fauna and flora? Do we have to choose between the conservation of the endangered introduced Banteng and the endangered native Bettong? Not necessarily.

When introduced species drive the decline of natives, it is often assumed that the absence of ancient co-evolution disadvantages the natives who have not had enough time to develop effective mechanisms to fight back. However, species may be more adaptable than previously believed. The introduction of Cane Toads to Australia has triggered behavioural and morphological adaptations to the Toad's toxin, enabling the recovery of native predator populations from initial declines¹⁴.



Mobs of emus have long been a common sight in inland Australia. They now share country with introduced animals like camels and horses.

Large predators can help species coexist

The ecological effects of species do not exist in a vacuum, but rather are highly context specific. One powerful driver of relationships between native and introduced species is the presence of large predators⁴. Apex predators shape ecosystems by suppressing populations of their herbivore prey and smaller mesopredators, enabling more species to coexist than otherwise would. Where apex predators are removed grazing pressure can become too high for some plant species to tolerate, and higher predation by mesopredators can all but eliminate some prey species. This pattern holds true regardless of whether ecosystems contain mostly natives or a mix of native and introduced species.

Apex carnivores are some of the most persecuted and endangered group of species on the planet, and so many ecosystems lack their ecological roles. In the absence of apex predators, population irruptions of prey and mesopredators occur both in and out of their native ranges, and native and introduced species can irrupt together. Foxes, wild Boar and Deer can reach high densities both in their native and introduced ranges where apex predators are removed. Similarly, both introduced Rabbits and native Bilbies can reach high densities and suppress other species when their predators are excluded⁴.

Australia's apex predator, the Dingo, benefits ecosystems by limiting populations of introduced animals such as Foxes, Cats, wild Goats and Rabbits, and native species such as Kangaroos and Emus. They are also formidable hunters of introduced wild Boar, wild Donkeys and Brumbies. Dingoes consistently outperform our most

intensive of pest control operations¹⁵ even though we probably kill many more animals, because they do more than just kill, they also communicate. Prey know that Dingoes are a threat and will stay away from areas they frequent, and will stay hidden during the times of day they are most active. This produces areas and times where small native animals are safer⁶.

Fostering a wild Anthropocene

Dingoes, however, have no safe place in Australia. There are two main reasons for this: they are killed on pastoral lands by farmers trying to protect their livestock; and they are also killed on national parks as part of conservation predator control programs. Here lies the quandary – but also a solution.

Continuing to battle introduced species in the hope of recreating more historic ecosystems will harm globally endangered species and risk causing further losses of native species that depend on Dingoes. But if we are willing to re-imagine a new Australia – a wild cosmopolitan ecology in which both Bettongs and Bantengs belong – we can start supporting those ecological mechanisms that promote coexistence. National Parks are the most obvious places to start.

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