



Can predation on endangered species be a good thing?

Using native predators to smarten up endangered mammals for life outside fences

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For many of Australia's endangered mammal species, fenced predator-proof reserves provide a safe-haven from predation by introduced predators such as foxes and feral cats, often the major cause of native mammal decline and sometimes extinction on the mainland. Native marsupials, like the burrowing bettong (*Bettongia lesueur*) and western barred bandicoot (*Perameles bougainville*), now only occur on offshore islands or are introduced into fenced predator-proof reserves which are exempt from introduced predators. In the absence of predation, these threatened species can explode beyond the capacity of the reserves. Furthermore, these animals can lose their 'smarts', or anti-predator behavioural responses. Given that the long-term goal of most fenced predator-proof wildlife reserves is to reintroduce species back into the wild, outside fenced safe-havens, wildlife managers

face significant challenges to ensure the survival of native endangered species.

What if we could teach native endangered species to be warier of predators in general, while also conserving native predators? Western quolls (*Dasyurus geoffroii*), a native marsupial predator, has disappeared from most of its former range due to land clearing and predation by introduced foxes and feral cats. In 2018, western quolls were reintroduced to Arid Recovery, a large 123 km² fenced wildlife reserve in outback South Australia. Prior to 2018, Arid Recovery reintroduced the greater bilby (*Macrotis lagotis*), greater stick-nest rat (*Leporillus conditor*), burrowing bettong and western barred bandicoot to the fenced wildlife reserve. Western quolls are now breeding, expanding outside the reserve, and feeding on the native reintroduced mammals.

The project will investigate the differences in behaviour between bettongs that have been exposed to western quolls in the reserve, compared to bettongs in the quoll-free area of the reserve. Previous research at Arid Recovery has shown that bettongs can coexist with low densities of feral cats and increase their wariness after two years of exposure. The project will test the multi-predator hypothesis – species' response to one predator is generalised to other predators. If the multi-predator hypothesis holds, exposing bettongs to native predators may improve their awareness of introduced foxes and feral cats.

During the initial field trip this winter, radio collars were fitted to fifteen bettongs in exclosures, with and without quolls, to monitor their survival and behaviour. The project will examine how bettongs respond to different predator scents and replicas of native and introduced feral animals, including quolls and feral cats, to see if they alter their behaviour and increase their awareness. Furthermore, to determine if the reintroduction of quolls trigger anti-predator responses in naive prey, behavioural experiments will be conducted to examine the flight initiation distance, foraging behaviour, and trap docility of prey species. To identify whether reintroduced quolls are preying on and suppressing overabundant populations of bettongs, leading to a positive impact on native vegetation, the density of bettongs in areas where quolls are absent and present will be compared over time using trapping and track counts. Plant species known to be impacted by bettongs will also be monitored in each area to measure browsing damage and recruitment. To identify whether reintroduced quolls are negatively



Ben Stepkovitch releasing a burrowing bettong (*Bettongia lesueur*) that has been fitted with a radio collar.
Image: Janniko Kelk

impacting reintroduced prey species, the survival of the greater stick-nest rat, greater bilby, burrowing bettong, and western-barred bandicoot will be compared by radio-tracking individuals where quolls are present and absent. Any carcasses found will be swabbed for quoll deoxyribonucleic acid (DNA) and sent to Helix Molecular Solutions at the University of Western Australia to confirm if the animal had been preyed by a quoll. Population trajectories of prey species will be compared between areas with and without quolls, using track counts and annual cage trapping.

The results of the project will help to understand the role of native predators inside fenced wildlife reserves and if native predators significantly impact resident prey species and their ecosystems. The project will also assist in planning for other groups aiming to reintroduce native predators, such as the western quoll, into wildlife reserves. There may be lessons learnt for endangered wildlife conservation elsewhere.

The project is part of a larger ARC Linkage Grant led by the University of New South Wales Sydney



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focussing on addressing prey naivety and subsequent vulnerability of endangered species. The project is supported by Arid Recovery, a joint conservation initiative between BHP, the University of Adelaide, South Australia Department for Environment

and Water, Bush Heritage Australia, and the local community.

If you would like further information on the work being conducted at Arid Recovery, please visit their website <https://www.aridrecovery.org.au/>



A western quoll (*Dasyurus geoffroi*) at Arid Recovery. Image: Janniko Kelk