

# Extinction means more than a loss of species to Australia's delicate ecosystems

February 3 2016, by Matthew Mcdowell, Flinders University

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Near threatened: The Tasmanian Bettong (*Bettongia gaimardi*) is now part of a plan to save the species and restore a wider conservation area at Mulligans Flat. Credit: Wikimedia/JJ Harrison, CC BY-SA

European settlement of Australia, and the exotic predators and herbivores they brought with them, caused rapid widespread biodiversity loss. As a result, for the past 200 years Australia has had the [highest mammal extinction rate](#) in the world.

Some [extinct species](#) were deliberately persecuted, such as the Tasmanian Tiger, [Thylacinus cynocephalus](#), and some were neglected, such as the [recently extinct](#) Bramble Cay Mosaic-tailed Rat, *Melomys rubicola*.

Others, such as Gilbert's Potoroo, [Potorous gilbertii](#), appear to have simply been in the wrong place at the wrong time. Not yet extinct, but considered the most endangered marsupial in the world, it lost 90% of its natural habitat to a [bushfire](#) in late 2015.

When a [species](#) is lost from a community, the processes and functions it performed are also lost. All species contribute to the maintenance of their community ecology, but few contribute more than fossorial (digging) species such as bettongs, potoroos and bandicoots.

## **Part of the cycle**

Bettongs are particularly important because most species mainly eat hypogean fungi (truffles) and spread fungal spores wherever they dig.

As all Eucalyptus plants form a symbiotic relationship with hypogean fungus during at least part of their life, spreading spores is one of the most important ecosystem services a mammal can perform.



Humans wiped out the Thylacine, also known as the Tasmanian Tiger. Credit: Wikimedia

Bettongs also facilitate seedling germination and establishment, soil aeration, incorporate organic matter and improve moisture infiltration.

Before European settlement, at least five species of bettongs lived on mainland Australia, now (excluding the Rufous Bettong, *Aepyprymnus rufescens*, a similar beast but not of the genus *Bettongia*) only [Bettongia tropica](#) remains, and it's listed as endangered.

The almost total loss of these ecosystem engineers from mainland Australia has far-reaching implications that may ultimately lead to vegetation succession, the gradual replacement of one plant community by another. In this case, it will be an impoverished one.

Last year, I [published](#) a description of the Desert Bettong (*Bettongia anhydra*) in the *Journal of Mammalogy* based on the skull and jaws of an animal that was collected alive near the southwestern corner of the Northern Territory in 1933.

Until now, it has been considered synonymous with its morphologically similar cousin the Burrowing Bettong, [Bettongia lesueur](#). Sadly, the newly-identified Desert Bettong has never been encountered alive since. How many other native mammals have been lost without being recognised or have their remains resting in museum cabinets just waiting for the right person to look at them?

Recent breakthroughs in DNA research have shown that what were once considered wide-ranging species are in many cases species complexes. For example, molecular research on the Dusky Antechinus, [Antechinus swainsonii](#), has revealed a complex of five species.



An incomplete skull and jaws are all that remains of the only individual of *Bettongia anhydra* ever to be found alive. The rest of the animal probably went into the cooks pot! Credit: Matthew McDowell, Author provided

### **The good and the bad news**

The good news is Australia's biodiversity is richer than we thought. But the bad news is we're still losing species at an alarming rate. So what can we do to reduce further loss of our unique mammals beyond protecting pristine areas?

Before attempting a restoration project, we really need to know what it is we want to restore. Many native mammals became locally extinct before historical records were compiled. As a result, [Holocene](#) (



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