THREATS TO NATURE PROJECT

ISLAND RESCUE

Case studies in success

Royal Penguins-Macquarie Island-Credit Kimberley Collins CC BY 2p0

Australia's islands are biodiversity treasures – centres of endemism and havens for species threatened on the mainland. But many have been degraded by rabbits, goats and other feral plant-eaters and their wildlife decimated by cats, rats and other invasive predators.

Eradicating such invaders has been one of the greatest conservation achievements in Australia in recent times, with Macquarie and Dirk Hartog islands outstanding exemplars.

THE THREAT TO ISLANDS FROM INVASIVE VERTEBRATES

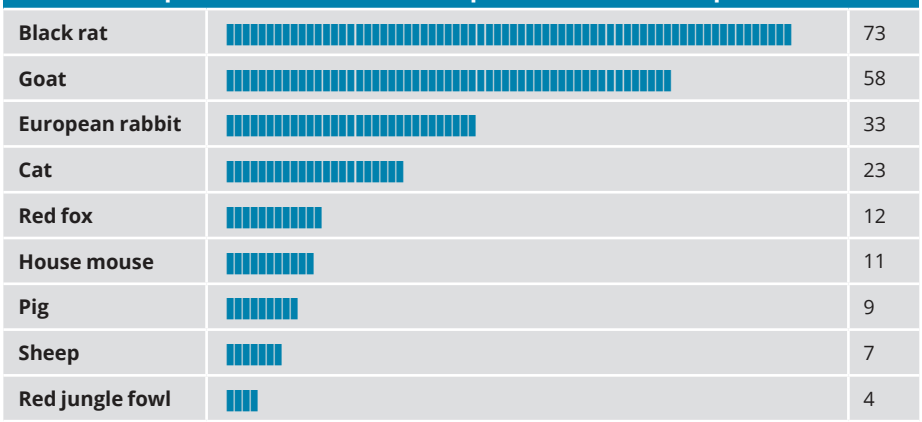
Australia's islands are precious.[1] In particular, our oceanic islands (those never linked to the mainland) harbour large numbers of unique species – Christmas Island, for example, has, or had, 11 birds, 5 mammals, 5 reptiles, 5 fish, 16 plants and about 200 invertebrates unique to the island.[2]

Our islands are also important as safe havens for species threatened on the mainland. About 100 islands now harbour 32 threatened mammal species susceptible to predation by cats and foxes.[3]

But the isolation of islands also means that their wildlife are highly vulnerable to invasive species.[3] Evolving with fewer competitors, predators and parasites than continental wildlife, island species often have poor defences against invaders.[4] Although islands (not counting Tasmania) make up only 0.5% of Australia's land area, species endemic to islands account for about 30% of our extinctions, most due to invasive species, particularly predators such as cats and black rats.[5]

A 2009 assessment of Australia's priority islands (for conservation values and invasive species impacts) documented 60 introduced vertebrates with medium to major potential impacts. The highest-impact species included black rat, cane toad, cat, donkey, goat, horse, pig, rabbit and fox.[7]

Figure 1. Number of eradication successes on Australia islands (up to 2018), for the top 9 introduced species



Source: Database of Island Invasive Species Eradications (2018)[9]

ERADICATING ISLAND INVADERS

In Australia and worldwide, some of the greatest conservation achievements of recent times have come from eliminating harmful invaders on islands. Australia (and New Zealand) has been a pioneer in island eradications.[8] By 2018, Australia had achieved 243 successful eradications of 18 introduced species on islands – mainly black rats, goats, rabbits, cats, foxes and pigs (Figure 1).

The largest Australian islands subject to eradications have been sub-Antarctic Macquarie Island (128 km^2) (Box 1), and the Western Australian Dirk Hartog Island (630 km^2) (Box 2). Both are World Heritage sites with outstanding conservation values.

BOX 1

Macquarie Island

Island values: One of the world's premier breeding sites for seabirds and marine mammals.[10]

Eradications:

- Wekas (1989): Preyed on seabirds and a now-extinct endemic rail and parakeet.[11] Eradicated by shooting.[12]
- Cats (1990): Preyed on seabirds (killed ~60,000 seabirds a year[13]) and a now-extinct endemic rail and parakeet.[11] Eradicated by shooting and trapping.[11]
- Black rats and house mice (2011): Could threaten seabirds in the absence of cats and rabbits.[14,15] Eradicated by aerial baiting.[12]
- Rabbits (2014): Overgrazed plants, caused denudation and erosion. Eradicated by biological control (rabbit haemorrhagic disease), toxic baits and shooting.[12]

Cost: $20 million for the 2007–2014 program, funded by the Tasmanian and Australian governments.[12]

Outcomes: Vegetation recovery has been dramatic[16,17] and eight threatened seabird populations have rebounded enough for

The oiling gangs that plundered seal and penguin populations on Macquarie Island in the 19th and early 20th centuries inflicted further damage by introducing invasive animals. Photo: King penguins on Macquarie Island | Kimberley Collins | CC BY 2.0

BOX 2

Dirk Hartog Island

Island values: Globally significant for birds, marine turtles, reptiles, seascapes and landscapes.[19] When restoration is complete, the island will support 'one of the most diverse mammal assemblages in Australia'.[19]

Eradications (year achieved):

- Sheep (2015) and goats (2017): Caused habitat degradation. Removed by mustering and shooting.[19]
- Cats (2018): Caused the local extinction of at least 10 mammal species, leaving just three native mammals on the island. Eradicated by aerial baiting and trapping.[18]

Cost: <$7 million.[18,20] Funded by the Western Australian Government and the Gorgon Barrow Island Net Conservation Benefits Fund.[21]

Outcomes: Ecosystem recovery is evident with increased vegetation cover and less erosion.[20] The reintroduction of

Dibblers are one of 10 mammal species being reintroduced to Dirk Hartog Island. The others are boodies, woylies, Shark Bay bandicoots, western quolls, mulgaras, greater stick-nest rats, desert mice, Shark Bay mice and heath mice. Banded hare-wallabies and rufous hare-wallabies have also been introduced (although it is not certain whether they were part of the original fauna). Photo: Emma Massembauer, DBCA

THE ELEMENTS OF SUCCESS

Clear objectives: One of the appealing features of island eradications is that the objectives are clear and can be decisively achieved within a few years, with recovery of species often occurring without further interventions (as long as biosecurity is effective in preventing reinvasion).

Escalating ambitions: As eradication techniques have advanced, so have ambitions. The sizes and types of eradications now far exceed what was thought possible only a decade or two ago. They demonstrate the power of learning from doing.

Planning, trialling, problem-solving: Success requires detailed planning, which may take several years, and testing of assumptions and techniques under all conditions.[22] High levels of logistical competence are essential, particularly for eradications on remote islands.[12] Tenacity, persistence and creativity are often needed to solve problems during a project.[12]

Full financial commitment: Securing funding for the duration of a project is often the most important success factor.[22] It is vital that funding is not wound back as numbers of the target species dwindle, for the last few individuals are often the most difficult and expensive to remove.[22]

National threat planning: Two threat abatement plans – for exotic rodents on islands and feral cats – have each accorded high priority to island eradications and been instrumental in generating support for eradications.

WHERE WE ARE NOW

Australia has made great strides with island eradications, and ambitious projects are underway or proposed to eradicate feral cats from another five large islands by 2030.[3] But the pace of eradications is slow. A systematic assessment is needed to identify the highest eradication priorities.[23] It is also important to boost biosecurity on Australia's islands to prevent new invasions.[24]

An innovative partnership project successfully eradicated black rats (Rattus rattus) from an island off Flinders Island in Tasmania's far northeast. Photo: John French

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If Australians are to protect what is most distinctive about this country – our unique plants, animals and ecological communities – we urgently need to overcome the key threats facing them.





It is not possible to recover all of our threatened species one by one through species-focused efforts. We also need a concerted national focus to overcome the major threats our native plants and animals have in common – in particular **invasive species**, **climate change**, **habitat destruction**, **adverse fire regimes** and **changes to natural water flows**.

Australia's threat abatement system needs to be more ambitious, better funded and nationally coordinated.