

Protecting Australian mammals from introduced cats and foxes: Australia's haven network

Key implications

Mammal species and subspecies that are highly susceptible to predation from introduced foxes and cats need representation within Australia's network of safe havens to help avoid extinction. (Safe havens are predator-free islands and mainland areas protected by predator-exclusion fences.)

The greatest return on future investments will result from creating large new havens in locations that can support multiple taxa that are susceptible to predation by introduced predators, but which are not protected within the existing haven network.

If planned carefully, new havens in just 12 bioregions could ensure a minimum standard of protection for all 67 predator-susceptible taxa (i.e., with each taxon in at least one haven). At the current rate of network expansion, this milestone could be achieved within a decade. By creating another 39 islands or fenced havens in strategic locations, we could provide at least three havens for each of the 67 priority taxa. This level of protection could also mean that 40% of the susceptible taxa are in at least six havens each.

Mechanisms to support and enhance coordination and collaborations among organisations that manage and create havens would help the haven network grow more efficiently and effectively.

Havens are critical for avoiding extinctions in the short term. Improved options for controlling cats and foxes at landscape scales will be needed before extremely predator-susceptible species can be reintroduced into open landscapes.



Boodies (*Bettongia lesueur*) used to cover two-thirds of Australia, but now only exist within havens. Photo: Hugh McGregor, Arid Recovery.

Problem statement

Since their introduction in the late 1700s, cats have spread across the entire Australian mainland and Tasmania, and are present on many of the larger islands. European red foxes were introduced in the 1870s, and now occupy most of the mainland south of the tropics and some large islands.

Many Australian mammal species are highly susceptible to these introduced predators. Cats and foxes were the main drivers of extinction for over 20 native mammal species. Many species avoided extinction only because they existed on islands that remained free of cats and foxes. Many other species suffered large declines in their overall numbers and distribution, and are continuing to decline.

Native species that are extremely susceptible to predation can only persist in areas where cats and foxes are completely (or in some cases, virtually) absent. Even intensive management programs like poison-baiting cannot reduce cat and fox density sufficiently for some mammal species to persist. For some species, protection within a cat-and fox-free haven is the only option for preventing extinction in the short term.

Not all species that need safe havens are found within them. Identifying the species which need protection within a haven, and ensuring that these are adequately represented within the haven network, is critical to preventing extinctions. In order to accommodate all species that are susceptible to cats and foxes, new havens will be needed.

Creating havens is time-consuming and costly. A systematic and coordinated approach will minimise the number of new havens required to reduce extinction risk for the greatest number of predator-susceptible taxa, at the lowest overall cost.

Identifying priority species

We assessed the susceptibility of each Australian terrestrial mammal species and subspecies (other than bats) to predation by foxes and cats at the population-level. We found that one quarter, or 67 species and subspecies (listed in Figure 1), are highly or extremely susceptible to introduced predators, and need protection within havens.

Stocktake of Australia's havens

We undertook a stocktake of Australia's havens. At the end of 2017, Australia had 101 island havens covering 2152 km² and 17 fenced havens covering 346 km²; 14 more havens were under development. Of these, six have since been completed. Some island havens were naturally fox- and cat-free, others have required feral animal eradication programs to make them suitable as havens.

The largest mainland fenced haven is Arid Recovery at 123 km², with part of that haven containing cats at tightly managed densities for experimental purposes. Newhaven Sanctuary contains the largest fenced area that is cat- and fox-free, at 94.5 km². Island havens cover a larger cumulative area than fenced havens, and can also be much larger: the largest island haven is Dirk Hartog at 628 km², with the second-largest being Barrow at 325 km²; both lie off the West Australian coast. There are plans to eradicate introduced predators from another five large islands by 2030 (French, 174 km²; Bruny 356 km²; Phillip, 101 km²; Christmas, 137 km²; and Kangaroo, 4416 km²).

Havens have already helped to prevent the extinctions of 13 species. For example, boodies and greater stick-nest rats used to occur across two-thirds of Australia, but now only exist within havens. Havens have also improved the conservation outlook for many other species.

We found that, by the end of 2017, havens supported 188 populations of 38 predator-susceptible threatened mammal species and subspecies. This represents over half of the 67 species and subspecies identified as highly or extremely susceptible to cats and foxes.

Many of Australia's haven mammal populations have been translocated within the past 10 years and translocation success is generally high. When failures occur, they usually happen within the first year. Thirty out of 35 translocations to islands (86%) and 42 out of 60 translocations to fenced areas (70%) were successful at the one-year mark.



Numbat. Photo: Dilettantiquity Flickr CC by 2.0.

Uneven protection

Havens have been created and are managed by many organisations, ranging from local councils and small private organisations to large non-government organisations and state government agencies. The distributed effort has resulted in diverse approaches to funding, site selection (from local to state to national scale) and implementation, which is a strength of the haven network.

However, the diversity of stakeholders and objectives means that the network expansion has not consistently focused on creating havens that can support unrepresented species, viewed from a national perspective. For example, the 17 havens created up to the end of 2017 did not add any new species to the network. This pattern may be broken soon, with some havens being established now that are planning to accept translocations of new species.

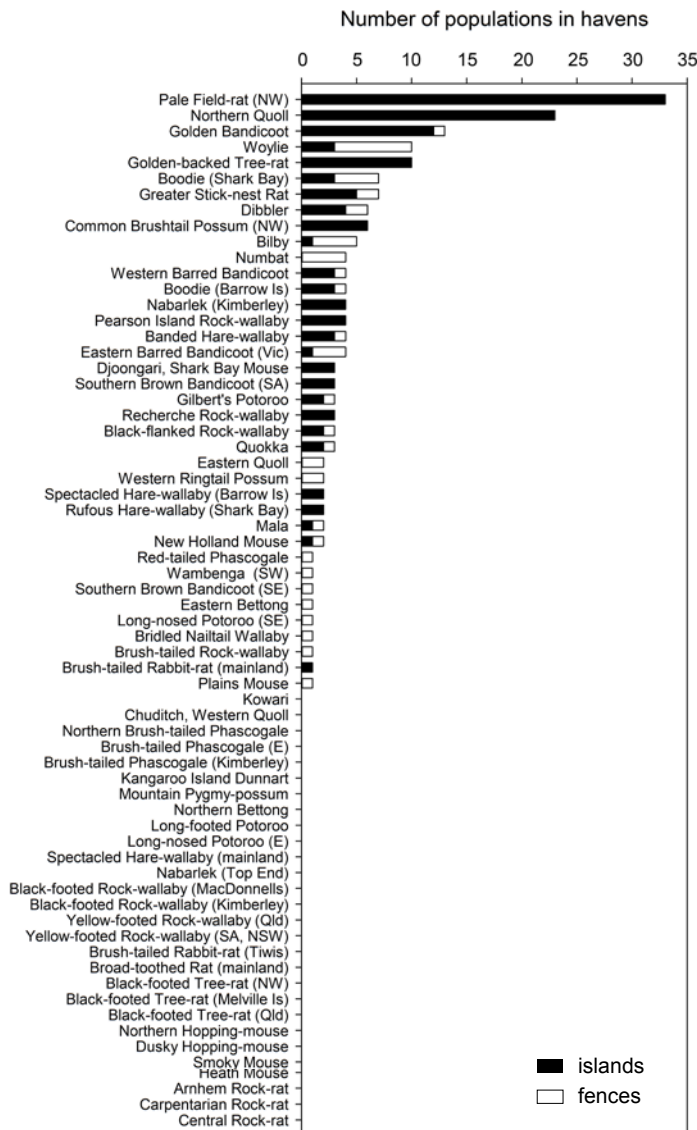
Protection is also uneven. For example, at the end of 2017, woylies and golden bandicoots are each found in over ten havens, but 29 taxa (43%) are not represented in any havens, and an additional 15 taxa (23%) occur in only one or two havens.

Systematic planning

We used a systematic planning approach to identify the minimum number and locations of future havens to most efficiently add remaining unrepresented predator-susceptible species to the network.

With the creation of just 12 new havens in strategic locations (see Figure 2 on back page), we could ensure that all 67 predator-susceptible taxa receive a minimum level of protection (each taxa in at least one haven). At current rates of haven-creation (16 new havens were created in the past 10 years), this milestone could be achieved within a decade.

However as haven populations face a high risk of extinction



Australian mammals that are susceptible to cats and foxes and how many havens they are in

Figure 1: Some predator-susceptible mammal species (and sub-species) are well-represented in existing havens, but a large percentage are poorly protected, or not protected at all.



Wandiyali Restoration Trust conservation fence under construction in NSW just south of Canberra. Photo: C. Larcombe, Wandiyali Restoration Trust

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Systematic planning (continued)

from demographic population failure, catastrophic events and the continuing threat of introduced predators, such as by entry through a fence breach, a better haven target would be to have each species protected within multiple havens.

Creating 39 new havens could protect roughly three populations of all 67 predator-susceptible taxa and six populations of 40% of the taxa. To achieve at least six populations of all 67 predator-susceptible taxa, we would need to build 94 new havens.

Our analysis identified the best subregions for creating future havens; the best locations for havens within those subregions will depend on

a suite of environmental, climate change, economic, logistic and societal factors that must be assessed case-by-case. Havens should also be large enough for populations of threatened taxa to be genetically and demographically viable, and should support diverse species assemblages.

Mechanisms to support and enhance collaborations among organisations that manage and create havens will help to enhance a coordinated national approach. For example, financial support for multi-species recovery teams, and brokering co-funded investments across jurisdictions and organisations, could lead to more strategically located havens in future.

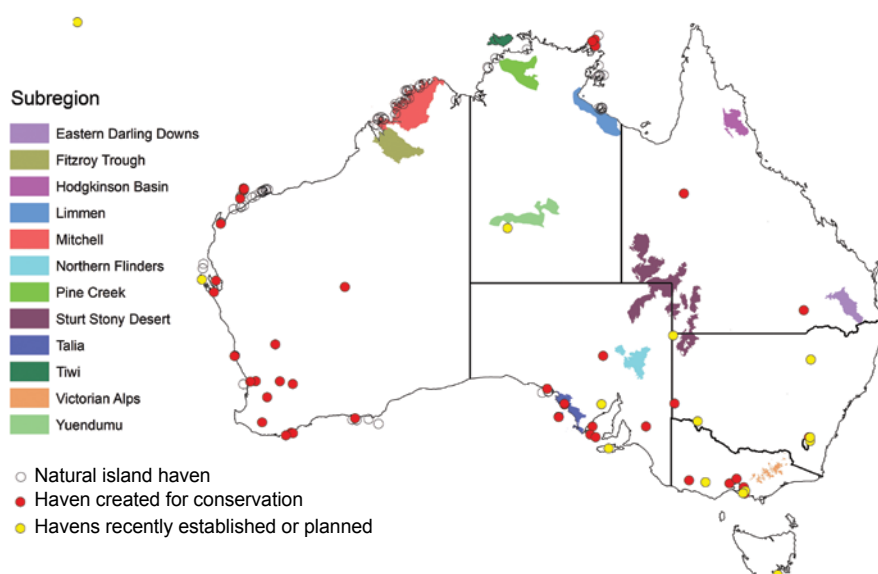


Figure 2: If new havens were created in each of the 12 subregions shown in the map, we could achieve representation, in at least one haven, for all 67 mammal taxa that are susceptible to predation by cats and foxes. The locations of existing havens are shown by red circles, and the locations of havens recently established, or being planned, yellow circles. The yellow circle for Christmas Island, to the north-west of Australia, is not shown.



The greater stick-nest rat became extinct on mainland Australia, but survived on natural island havens, the Franklin Islands off South Australia, which were not reached by foxes or cats. Photo: W. Lawler/Australian Wildlife Conservancy.

Reasons to continue managing cats and foxes in the broader landscape

Although havens can be critical for avoiding extinctions in the short term, they cover a minute proportion of species' former ranges. Improved options for perpetual control of the impacts of cats and foxes at landscape scales will need to be developed and implemented before we can re-introduce predator-susceptible species into open landscapes.

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