

Investigating feral cat control methods for western Kangaroo Island

Context

Feral cats have been implicated in a majority of the 30+ mammal extinctions that have taken place since European arrival in Australia. Some Australian mammals now persist only in havens such as cat and fox free exclosures or offshore islands. Kangaroo Island is one of Australia's largest offshore islands (4405 km²), and is considered a stronghold for some fauna species that are now rare or threatened on the nearby mainland. These include Rosenberg's goanna, the pygmy copperhead, bush stone-curlew, glossy black-cockatoo, southern brown bandicoot and the Kangaroo Island dunnart. The island is free of some introduced pests that are present on the adjacent mainland, such as the red fox and the European rabbit, but it does have high densities of feral cats, which are a threat to the persistence of the island's native wildlife, especially its mammals.

Kangaroo Island is one of five offshore islands for which feral cat eradication is proposed over the coming decade with the support of the Australian Government. The eradication program on Kangaroo Island has already begun, and poison baiting may be one of the main methods used. The 1080-based bait "Eradicat" is the only bait that is currently commercially available in Australia for feral cats. While 1080 baiting may strongly benefit native wildlife populations by decreasing

the rate of predation by feral cats, the baiting may potentially have direct negative impacts on wildlife if they consume the baits. Native mammals tend to have higher tolerance of 1080 in areas where native plants that naturally contain the toxin (for example *Gastrolobium* species, or poison peas) are common, such as in the south-west of Western Australia. Plants naturally containing 1080 are rare in South Australia and toxicology studies suggest that both common and threatened species native to Kangaroo Island are likely to have a low tolerance of the toxin. This low tolerance would only be a problem if non-target animals consume the baits. However, to date no field-based studies have successfully shown that native species on Kangaroo Island are unlikely to do this.



Rosemary Hohnen inspecting a southern brown bandicoot caught during the study.
Photo: David Hancock

In brief

A feral cat eradication program has begun on Kangaroo Island in South Australia. Poison baiting is a tool in feral cat eradication. The 1080-based bait "Eradicat" is used in the south-west of Western Australia. Elsewhere in Australia, where non-target impacts may be higher, its use has been strictly limited to particular situations. Understanding the potential impacts of feral cat baiting on non-target animals is important, particularly for threatened species native to Kangaroo Island, such as Rosenberg's goanna, the southern brown bandicoot, and Kangaroo Island dunnart.

Toxicology studies suggest that species native to Kangaroo Island (including threatened species) are likely to have a low tolerance of 1080. While this would only be a problem if native animals ate the baits, no previous studies have examined the likelihood of this happening for Kangaroo Island species. To address this knowledge gap, this research undertook a trial of non-toxic Eradicat baits in order to find out 1) which native species consume baits, 2) what proportion of the population of each of these species consumes baits, and 3) what proportion of the baits is taken by feral cats.

We found that non-target species (animals other than feral cats) accounted for over 99% of bait takes that we could identify. Given the potentially lethal impacts of 1080 ingestion by non-target species, our results suggest that Eradicat may be a poor choice of bait for broad-scale feral cat control on Kangaroo Island.



Southern brown bandicoots accounted for 1% of baits taken during the trial. Photo: Rosie Hohnen

Our aims

The southern brown bandicoot and Kangaroo Island dunnart are two species found on Kangaroo Island that are listed nationally as Endangered and would be likely to benefit significantly from feral cat control. However, these two species, along with more common species such as the brushtail possum and bush rat, are estimated to have a low tolerance of 1080, and could potentially consume the baits. We therefore set out to examine the non-target impacts of Eradicat baiting on Kangaroo Island. To do this, we ran an uptake trial on western Kangaroo Island using non-toxic Eradicat baits containing Rhodamine B, which once consumed is deposited in whiskers, thus allowing us to trace uptake of the bait by mammals.

We aimed to find out: 1) which native species will take baits; and 2) what proportion of non-toxic Eradicat baits is taken by feral cats compared to non-target species; and 3) what proportion of the population of the non-target species will consume non-toxic Eradicat baits. The study was designed to provide knowledge about the extent to which both cats and non-target species will be impacted by Eradicat baiting on Kangaroo Island, and hence to provide guidance about whether the method is suitable for feral cat eradication.

What we did

Our non-toxic Eradicat bait uptake trial was conducted at four sites within the Flinders Chase National Park and Ravine des Casoars Wilderness Protected Area on western Kangaroo Island (Figure 1). We deployed a total of 576 non-toxic baits containing 20 mg of Rhodamine B at baiting stations across the four sites in early August 2018 and again in late November 2018 (288 per season). At these sites, baits were placed in open areas in front of motion-activated camera traps, which recorded which species approached and removed the baits.

Previous trapping at these four sites in 2017 and 2018 had identified that the Kangaroo Island dunnart was present at all sites, and the southern brown bandicoot at two of them.

Other vertebrates native to Kangaroo Island and considered likely to take the baits were known from all four sites: the bush rat, western pygmy-possum, little pygmy-possum, common brushtail possum, tammar wallaby, western grey kangaroo and Rosenberg’s goanna.

Two to three weeks after the baiting period, we trapped all sites for six nights, and identified all the species we captured. Samples of whiskers were taken from all captured mammal species and were later examined in the laboratory for evidence of bait uptake – traces of Rhodamine B are detectable in whiskers within four days of consumption. This helped us determine what proportion of a population of a given species will consume the baits.

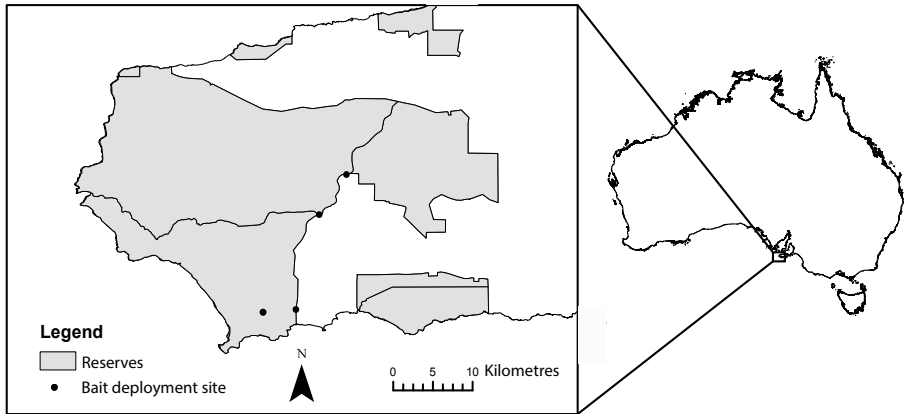


Figure 1. Locations of the four sites where non-toxic “Eradicat” baits were deployed on western Kangaroo Island



Rosemary Hohnen and volunteer Laura O'Connor measuring animals caught during the survey. Photo: Megan Barnes

Key findings

Non-target species accounted for over 99% of the bait takes that we could identify. In both baiting sessions, over 60% of all baits laid were taken by either the common brushtail possum, bush rat or Australian raven, which are all locally abundant. In the November baiting, Rosenberg's goanna and southern brown bandicoot also took baits (3% and 1%, respectively) (Table 1). A Kangaroo Island dunnart approached a bait on just one occasion but did not consume it. Evidence of bait consumption was visible in the whiskers of captured

common brushtail possums (100% of post-baiting captured individuals in August, 80% in November), bush rats (59% in August and 50% in November), house mice (45% in November) and western pygmy-possums (33% in November) (Table 2).

Unfortunately, no Kangaroo Island dunnarts and only one southern brown bandicoot were captured for examination of their relative uptake. While the instances of these two species approaching and consuming baits were few, it is possible that the proportion of the population

that did so was higher than that of the more abundant animals such as the common brushtail possum and bush rat.

Cats approached the baits on very few occasions (twice in August and four times in November) and took a bait on only one occasion, in August (<1% of 576 baits deployed). Potentially, this could reflect a low density of cats or an aversion to scavenging, which has been observed in feral cats in some parts of Australia.

Table 1: The percentage of baits taken by all species that approached the bait stations in August and November for both the first round of baiting and all six rounds of baiting.

Common name	Scientific name	First round		All rounds	
		Winter	Summer	Winter	Summer
Shy heathwren	<i>Calamanthus cauta</i>	-	-	-	-
Grey shrike-thrush	<i>Colluricincla harmonica</i>	-	-	-	-
Australian raven	<i>Corvus coronoides</i>	6	28	11	18
Feral cat	<i>Felis catus</i>	-	-	-	-
Southern brown bandicoot	<i>Isodon obesulus</i>	-	-	<1	1
Tammar wallaby	<i>Notamacropus eugenii</i>	-	-	-	-
Western grey kangaroo	<i>Macropus fuliginosus</i>	-	-	-	-
House mouse	<i>Mus musculus</i>	-	-	2	1
Bush rat	<i>Rattus fuscipes</i>	47	17	38	20
Kangaroo Island dunnart	<i>Sminthopsis fuliginosus aitkeni</i>	-	-	-	-
Short-beaked echidna	<i>Tachyglossus aculeatus</i>	-	-	-	-
Common brushtail possum	<i>Trichosurus vulpecula</i>	9	38	20	38
Rosenberg's goanna	<i>Varanus rosenbergi</i>	-	10	-	3
Unknown		38	7	29	19

Table 2: The number of individuals with whisker samples where Rhodamine B banding was, or was not, visible, split between the two trial periods (August and November) pooled across all study four sites.

Common name	Species	August			November		
		Number of individuals without bands	Number of individuals with bands	Proportion of individuals with bands (%)	Number of individuals without bands	Number of individuals with bands	Proportion of individuals with bands (%)
Western pygmy-possum	<i>Cercartetus concinnus</i>	-	-	-	4	2	33
Little pygmy-possum	<i>Cercartetus lepidus</i>	1	-	-	2	-	-
Southern brown bandicoot	<i>Isodon obesulus</i>	-	-	-	1	-	-
House mouse	<i>Mus musculus</i>	6	5	45	5	-	-
Bush rat	<i>Rattus fuscipes</i>	34	48	59	19	19	50
Common brushtail possum	<i>Trichosurus vulpecula</i>	-	18	100	2	10	83

The trial did not find evidence of little pygmy possums consuming baits.
Photo: Rosemary Hohnen



Recommendations

Ultimately, the results of this trial suggest that Eradicat may be a poor choice of bait for broad-scale feral cat control on western Kangaroo Island. Impacts on common species are of particular concern with populations of the bush rat, common brushtail possum and Australian raven likely to be severely negatively affected by the use of this bait. Impacts on Rosenberg's goanna could potentially be avoided by baiting in August when this species is less active.

Unfortunately, encounter rates by the threatened southern brown bandicoot and Kangaroo Island dunnart were too low to draw robust conclusions, except to confirm that bandicoots will consume baits in some circumstances. Two other feral cat baits that are currently in development, "Curiosity" and "Hisstory", use a hard, though

digestible, poison pellet that sits in the middle of the sausage bait. This allows the poison to be ingested by cats, but not smaller native wildlife (which are likely to chew around and then discard the poison pellet). This alternative form of poison delivery may have lower impacts on Kangaroo Island wildlife and may therefore be a more appropriate choice. However, as we saw only low uptake of baits by feral cats on western Kangaroo Island, it may be necessary to use these alternative baits at a higher density than was deployed in this study, that is, more than 60 baits per km², to increase the likelihood of cats encountering and consuming them. Alternative methods such as trapping, shooting and the use of grooming traps would also help control cats in accessible areas.

Cited material

Hohnen, R., Murphy, B., Legge, S., Dickman, C., & Woinarski, J. (forthcoming). Uptake of "Eradicat" feral cat baits by non-target species on Kangaroo Island. *Wildlife Research*.



Rosenberg's goanna did take the non-toxic baits during the trial. They are the only species of goanna on Kangaroo Island. Photo: Rosemary Hohnen

Further information

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