

Feral predators in south-east Australia: Towards a 'beyond the fence' strategy

Project Summary
Project 1.1.5



Threatened
Species
Recovery
Hub

National Environmental Science Programme



Checking the micro-chip in a sedated fox.
Photo: F L'Hotellier, AWC

Research in Brief

Reintroducing threatened mammals into the broader landscape outside fenced reserves requires effective control of feral predators and knowledge of predator density. Most robust methods of density estimation require the identification of individual animals, possible for cats but not foxes. This project is developing new statistical methods to generate robust estimates based on camera trap data. The models use knowledge of space use derived from GPS collars to model encounter rates without the need for individual ID.

These estimates will be used to assess the effectiveness of predator control measures (e.g., baiting and trapping) and control strategies (e.g., timing, frequency and extent). They will ultimately be used to identify thresholds of predator density that enable the safe release of threatened mammals.

Why is the research needed?

Predation by foxes and cats has been identified as the primary cause of the decline and/or extinction of many Australian mammal species. Currently, AWC manages a network of feral predator-free 'safe havens' that are highly effective at conserving threatened mammals. In the longer term, AWC's objective is to develop strategies to enable the reintroduction of threatened mammals 'outside the fence', into the broader landscape. This is currently not possible in most parts of southern Australia given the high densities of predators. Effective control of introduced predators requires robust knowledge of predator densities and how they respond to different management strategies.

How will the research help?

The successful reintroduction of regionally extinct mammal species into predator-controlled landscapes will depend on (i) having robust information on predator densities, and (ii) having a robust understanding of the impacts of control measures on predator densities.

This project will apply and develop several methods to estimate predator density based on camera trap data, including Spatial Presence-Absence Models, Spatial Count Models, Spatial Mark-Resight Models and new methods that combine movement data for a portion of the population with encounter rates recorded by remote cameras. These methods are being compared to established methods such as sand plots that have been used routinely by conservation managers to monitor predator activity.



Fitting a GPS collar to a sedated fox in order to learn more about their spatial patterns of habitat use. Photo: F L'Hotellier, AWC



A sedated cat is fitted with a GPS collar. Photo: F L'Hotellier, AWC



Who is involved?

This project is being led by the Australian Wildlife Conservancy, who are collaborating with the University of Tasmania and the University of Melbourne.

Where is the research happening?

The research is being conducted at AWC's Scotia Sanctuary in western NSW.

When is the research happening?

The project will run for five years from 2017 to 2021.

While the project uses marked individuals initially, it is envisaged that an operational density estimation model will not rely on individual identification. This will be less costly and more sustainable operationally. The project will also investigate the response of small mammals and reptiles to predator control measures, given robustly estimated densities, by integrating the research with AWC's existing monitoring program.

The project takes place at AWC's Scotia Wildlife Sanctuary in the mallee of south-west NSW, but the methods will be relevant to reintroductions and the management of existing threatened populations elsewhere.

What research activities are being undertaken?

The research will monitor the response of cats and foxes to fox control. We will obtain data on density and spatial patterns of habitat use to determine (i) whether baiting is effective in controlling foxes and cats), (ii) how cats respond to changes in fox density;

and (iii) how native wildlife respond to changes in fox and/or cat density in the short and medium term. Cameras both on and off roads with different spatial arrangements will generate the data used to estimate densities of predators. These data will also be degraded spatially, post-collection, to determine how robust the estimates are to different camera arrangements.

The initial research is being conducted at AWC's Scotia Sanctuary in western NSW. The landscape at Scotia is dominated by mallee vegetation and research will be applicable elsewhere in the semi-arid woodlands of southern Australia. The outcomes of this research will be extended to other biomes.

Insights from these analyses will be used to test estimation methods at other sites in different biomes, such as Newhaven Sanctuary in the Northern Territory. Annual fauna surveys in the study area will continue to measure the response of small mammals and reptiles to predator control.



Weighing a sedated feral cat. Photo: F L'Hotellier, AWC

Further Information

For more information please contact the project leader:

David Roshier
david.roshier@australianwildlife.org