Estimating wildlife mortality during bushfire

**Project Summary
Project 8.3.4**

A Leadbeater's possum killed by bushfire while sheltering in a nest box in Mountain Ash Forests. Image: Doug Beckers, Flickr CC BY-SA 2.0

Research in Brief

The prediction by Professor Chris Dickman that more than 1 billion (and later 3 billion) animals were killed in the 2019–20 bushfires helped focus the world's attention on the plight of Australia's wildlife. Yet these predictions were admittedly "back of the envelope", based on research from the mid-2000s that used animal density estimates to predict the mortality of birds, reptiles and mammals due to land clearing. However, such mortality estimates may not be directly applicable to fire-induced mortality because some animals can survive fires, depending on their traits, the environment, availability of refuge habitat and the fire's intensity. This project will review the literature on wildlife mortality during fire and help provide a framework for obtaining rapid mortality estimates during future fires in Australia and around the world.

Why is the research needed?

Billions of animals were caught in the path of the 2019–20 bushfires, yet we have little understanding of what proportion of these animals died during and following the fires. Such an understanding is critical to estimating the overall impacts of the fires on wildlife, including threatened species, and the likely time to recovery. This project will help fill this gap by systematically reviewing the literature on fire-induced wildlife mortality.

How will the research help?

This project will highlight the scale of impacts on vertebrate animals during the 2019–20 bushfire season, and strongly complements NESP Threatened Species Recovery Hub Project 8.3.2.

We will review data on fire-induced wildlife mortality to help enumerate the scale of fire-induced wildlife mortality and reveal the species that have likely suffered the largest population declines due to the fires. It will thereby refine understanding of which species are in most urgent need of on-ground conservation actions, help provide more resolution for assessments of changes in conservation status, and provide a framework for obtaining rapid mortality estimates during future fires in Australia and around the world.

What research activities are being undertaken?

In this project, we will:

- undertake a systematic review and analysis to improve estimates of the impacts of fire on animal mortality
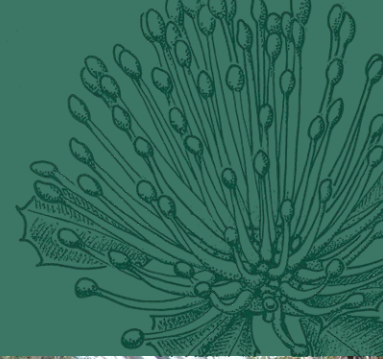
Kangaroo Island, two years before the fire. Left to right: John Woinarski, Jody Gates, Rosie Hohnen, Peter Copley, Robyn Molsher, Sarah Legge, Brett Murphy, Dan Rogers. Image: Chris Dickman

Kangaroo Island, a month after the fire. Image: Chris Dickman

- refine a modelling framework for estimating species' density in fire-prone ecosystems
- combine our findings with fire maps to make better estimates of wildlife mortality during fires.

This approach and modelling framework will provide:

- Enhanced understanding of the how many animals are typically killed by fire, and how it varies depending on species traits, environment, and fire intensity.
- A method for rapidly estimating wildlife mortality during future megafires.
- Insights into the likely time to recovery for threatened species.

Who is involved?

This project involves collaboration between researchers with expertise in different vertebrate animal groups from Charles Sturt University, The University of Sydney, Charles Darwin University, The Australian National University and The University of Queensland.

Where is the research happening?

The project consists of desktop analyses, with findings that will apply across fire-affected regions of southern and eastern Australia.

When is the research happening?

The project will run for 13 months in 2020 and 2021.

Further Information

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Threatened Species Recovery Hub

National **Environmental Science** Programme