Flood recovery: Threatened small mammal population assessments

Giles' Planigale and Fat-tailed Dunnart surveys in north-west Victoria

June 2024

Key Messages

- We detected Giles' Planigale and Fat-tailed Dunnart within a flood-impacted area, 12 months post-flooding.
- This is the first record of Giles' Planigale in Victoria for 11 years.
- We suggest camera traps and/or pitfall buckets should be used for future monitoring of small mammals on the floodplain.

Large-scale, extreme flood events can potentially cause catastrophic population declines in floodplain-dwelling species, especially those that are small, terrestrial and cannot easily move away from inundated habitats.

Threatened mammals of the Murray River floodplain

Areas in north-west Victoria that were inundated during the 2022 floods were known to support populations of at least two FFG listed small mammal species, Giles' Planigale (*Planigale gilesi*) and the Fat-tailed Dunnart (*Sminthopsis crassicaudata*).

The status of both species in this area is unresolved - the planigale has not been detected since 2013, and the dunnart not since 2020 (at Ned's Corner).

Both species are very small, ground dwelling, and forage for insects and small vertebrates on the floodplain. During the day, they shelter in cracking clay soils or underneath woody debris.

The 2022 floods likely impacted this critical denning and foraging habitat for both species. Regional land-use practices that degrade habitat have also likely reduced suitable habitat on the floodplain and fragmented populations, potentially limiting the ability of these two species to recover from extreme events like flooding.

Project aims

- To conduct surveys for Giles' Planigale and the Fat-tailed Dunnart in the flood-impacted region of north-west Victoria, one year post-flooding, using a range of cost-efficient techniques.
- To establish whether the target species are persisting in the region and compare the detection rates achieved by three different survey techniques.

Arthur Rylah Institute for environmental research

VICTORIA State Government | Energy, Environment and Climate Action

Survey methods

We compared three different survey methods to assess their suitability for detecting threatened floodplain mammals. The most effective known method to record planigales is to use pitfall buckets to capture live animals. However, due to budget and logistical constraints, this wasn't possible. Instead, we deployed Elliott type A traps for live trapping (72 baited traps/site). Additionally, at each site, we deployed five Reconyx white-flash cameras with drift fences to funnel animals towards the bait in the centre. Four transects were also installed at each site, which were surveyed at night on foot using a handheld FLIR thermal imaging camera, and a spotlight was used to assist with confirming the identity of animals detected on the FLIR camera.

Study Area

This survey focused on the 2022 flood footprint in north-western Victoria (Figure 1), where there were previous records of both species. The sites consisted of a mosaic of cracking clay soils, chenopod shrublands and Blackbox woodland. Cracks had formed in the soil and the vegetation had recovered following the flood. We visited four sites at two paired locations, Kulnine East and Lindsay Island, between February and April 2024.

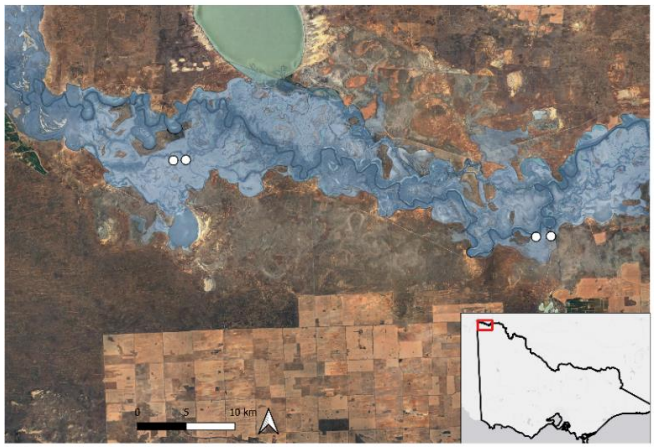

Figure 1: The location of paired study sites (white dots) at Murray Sunset National Park, northwest Victoria, with the 2022 flood area shown in blue.

Results

Over 1980 Elliott trap nights we captured a total of 869 animals – 859 House Mice *Mus musculus*, 8 Black Rats *Rattus rattus* and 2 Tree Skinks *Egernia striolata*. The vast majority of captures were of the introduced House Mouse (99%).

We had 869 camera trap nights, yielding ~83,000 photos. The cameras detected 28 vertebrate species, including Giles' Planigale (Figure 2) and Fat-tailed Dunnart (Figure 3). Both of these detections occurred at Lindsay Island and each were from a single camera trigger.

A total transect length of 3,200 m was surveyed on foot using thermal imaging technology. This resulted in 35 detections of four bird species and four mammal species. Again, House Mice were detected most frequently in thermal imaging surveys (37% of detections).

Figure 2: A camera image of a threatened Giles' Planigale (animal circled in white).

Credit: Arthur Rylah Institute for Environmental Research

This is the first record of Gile's Planigale in Victoria for 11 years.

A comparison of detection rates showed that camera traps (installed with drift fences) were the most effective of our three methods for detecting the two target threatened species (Table 1). However, detection rates were very low for both species, especially when compared to the invasive House Mouse.

Table 1: Comparison of detection rates (DetRate) of three small mammal species from three different survey methods (live Elliott traps, white-flash camera traps with drift fences, and thermal transects walked on foot). Detection rates reported are per night.

Species	Trapping DetRate	Camera DetRate	Thermal DetRate
Giles' Planigale	0%	0.001%	0%
Fat-tailed Dunnart	0%	0.001%	0%
House Mouse	0.43%	0.47%	0.16%

Conclusions

We found two threatened mammals, the Giles' Planigale and the Fat-tailed Dunnart, persisting on Lindsay Island 12 months following widespread landscape flooding. The low detection rates suggest these species are not present in high abundance in comparison to the invasive House Mouse. However, the individuals persisting in this landscape will hopefully be founders for population recovery.

How these terrestrial threatened species persist during and/or following flooding is unknown and warrants further research. It is possible that there was in situ survival of a few individuals during the floods, perhaps by climbing trees and taking refuge within small hollows or fissures for the duration of the flood event. Satellite imagery shows that there were some island refuges nearby that remained dry throughout the flood. Some of these were several hectares in size, other much smaller islands were within 500 meters of where we detected the species. This indicates it is possible that individuals have immigrated into the area from this refugia over the last 12 months, recolonising habitat on the floodplain.

We demonstrated that camera trapping with white flash cameras and drift fences proved the best method for detecting these species. However, previous studies have shown that pitfall live trapping is also a successful technique. In the future, it would be beneficial to undertake live trapping surveys to collect demographic and genetic data to help us better understand these threatened populations after a major flood. Genetic data can provide information on genetic diversity, whether these species underwent a genetic bottleneck during this flood event and can help inform how robust they may be to future disturbances in this landscape.

This project has shown:

- Evidence of persistence of Giles' Planigale and the Fat-tailed Dunnart on the Murray River floodplain following the 2022 major flood.
- That camera traps (with drift fences) and/or pitfall buckets are likely to be the most effective survey techniques for future monitoring of small mammals in this region.

Figure 3: A camera trap image of a threatened Fat-tailed Dunnart. Credit: Arthur Rylah Institute for Environmental Research

For further information contact Jemma Cripps (jemma.cripps@deeca.vic.gov.au) or Luke Woodford (luke.woodford@deeca.vic.gov.au)

Acknowledgements

This project was supported by the Victorian Government's flood recovery program.

Banner Photos (Luke Woodford): Blackbox woodland and chenopod shrubland, one year post-flood. A white flash camera with drift fence in situ.

ISBN 978-1-76136-787-8 (pdf)

Accessibility

If you would like to receive this publication in an alternative format, please telephone the DEECA Customer Service Centre on 136186, email customer.service@delwp.vic.gov.au, or via the National Relay Service on 133 677 www.relayservice.com.au.

We acknowledge Victorian Traditional Owners and their Elders past and present as the original custodians of Victoria's land and waters and commit to genuinely partnering with them and Victoria's Aboriginal community to progress their aspirations.