

Arid Zone Monitoring Species Profile

Hopping mice

Spinifex hopping mouse *Notomys alexis*
Dusky hopping mouse *Notomys fuscus*
Fawn hopping mouse *Notomys cervinus*
Mitchell's hopping mouse *Notomys mitchelli*

Language names

Jilku, Jilyku, Jungunypa, Mpwenyelpe, Tarkawara, Tjunginpa, Wijipardu, Wilkiniti (Dusky hopping mouse)

Spinifex hopping mouse

National status: Not listed

IUCN Red List: Least concern

Dusky hopping mouse

National status: Vulnerable

IUCN Red List: Vulnerable

Fawn hopping mouse

National status: Not listed

IUCN Red List: Near Threatened

Mitchell's hopping mouse

National status: Not listed

IUCN Red List: Least concern



Image: Fitch Images (Wikimedia Commons)

Dusky hopping mouse.

Not so long ago, there were ten different species of hopping mice, but five of these species became extinct soon after European colonisation. Of the five species that are left, four live in deserts, and three are recorded in the AZM dataset. Their distributions are mostly separate, but there are overlaps in some areas, making it hard to identify tracks to species level. This factsheet presents findings from the AZM dataset on the two most commonly recorded hopping mice species: the spinifex hopping mouse and the dusky hopping mouse. The factsheet mentions the Mitchell's hopping mouse and the fawn hopping mouse, but does not present AZM data on either.

Key threats

Habitat change from too much grazing by feral livestock and other herbivores (camels, rabbits, mice), and from weed invasion (especially buffel grass)

- Predation by cats and foxes
- Wrong-way fire
- Climate change (changing rainfall, temperature, droughts)

Animals that might be confused with hopping mice during surveys

- Other small mammals
- Small birds

Other small mammals do not hop, so check whether the back footprints are in pairs. Some birds leave hopping prints, but you can usually see their toes, unlike the tracks of a hopping mouse.

Telling between the hopping mice

Mitchell's hopping mice live in the southern deserts, but their range partly overlaps with the spinifex hopping mouse range. In the very eastern and north-eastern deserts, the dusky hopping mouse and the fawn hopping mouse might be more likely than the spinifex hopping mouse. Spinifex hopping mice prefer sandy areas with spinifex, dusky hopping mice prefer canegrass on sand dunes, fawn hopping mouse prefer open gibber flats and Mitchell's hopping mice prefer mallee shrublands on sand dunes.

Spinifex hopping mouse description

The spinifex hopping mouse has a soft fur coat which is grey, fawn or pale orange, with a white underbelly. They have large eyes and ears, big back feet, long tufted tails and move with a hopping and galloping gait. Spinifex hopping mice weigh around 35 g. Spinifex hopping mice (both males and females) have a small throat pouch with central bare area.

Spinifex hopping mice live in the sandy spinifex country of central Australia. They avoid the heat of the day by sheltering in a deep, humid burrow. Their burrows are often under the hummocks of plant species like canegrass and spinifex.



Image: Judy Dunlop

Spinifex hopping mouse (front view).



Image: Ian Morris

Spinifex hopping mouse (side view).

Fawn hopping mouse description

The fawn hopping mouse has pale fawn to gery upperparts and a white underbelly. Its bi-coloured tail is at least 12 cm long, and it weighs 30-50 g. It lives in gibber plains and claypans, and shelters in deep burrows during the day.

Dusky hopping mouse description

The dusky hopping mouse is 8-11 cm long and weighs about 35 g. It has large ears, dark eyes and long narrow hind feet to hop on. The tail is longer than their body with a black tuft on the end. Their fur is pale orange on the back and white on the underside. Dusky hopping mice have a throat pouch or chest gland which looks like a round fleshy lip covered in coarse white hairs.

Dusky hopping mice are usually in sand dunes covered with canegrass (*Zygochloa paradoxa*) or nitre bush (*Nitraria billardierei*) (not spinifex). They sometimes live in different habitats, even gibber plains, but always near a small sandy area for digging a burrow. They avoid the heat of the day by sheltering in a deep burrow. Dusky hopping mice eat mostly seeds, as well as green shoots and insects.



Image: Sarah Legge

Dusky hopping mouse.

Mitchell's hopping mouse description

Mitchell's hopping mouse lives in the very southern deserts, and may be detected along the southern edge of the AZM project area. It is larger than the other two hopping mice, at about 50 g, but it has the same large back feet, long tufted tails and a hopping gait. Mitchell's hopping mice do not have a throat pouch.

Mitchell's hopping mice live in sandy areas of mallee shrubland and heath. They avoid the heat of the day by sheltering in a deep, humid burrow or in a hollow log.



Image: Dash Huang

Mitchell's hopping mouse.

Hopping mouse tracks

All hopping mice hop with their back feet together, leaving pairs of footprints. In good tracking conditions, you can see a ridge running across the middle of each back footprint. They can also use all four feet when moving slowly, and the tail leaves a mark in the track. Hopping mice often race along the same routes, creating a 'runway'.



Image: Katherine Tuft (Arid Recovery)

Hopping mouse tracks with imprint of ridge running across the middle of each back footprint



Image: Peter Smith

Spinifex hopping mouse runway (arrow shows which way it is going).



Image: Sarah Legge

Dusky hopping mouse runway.

Hopping mice burrows



Image: Naomi Indigo

Spinifex hopping mouse pop-hole.



Image: Sarah Legge

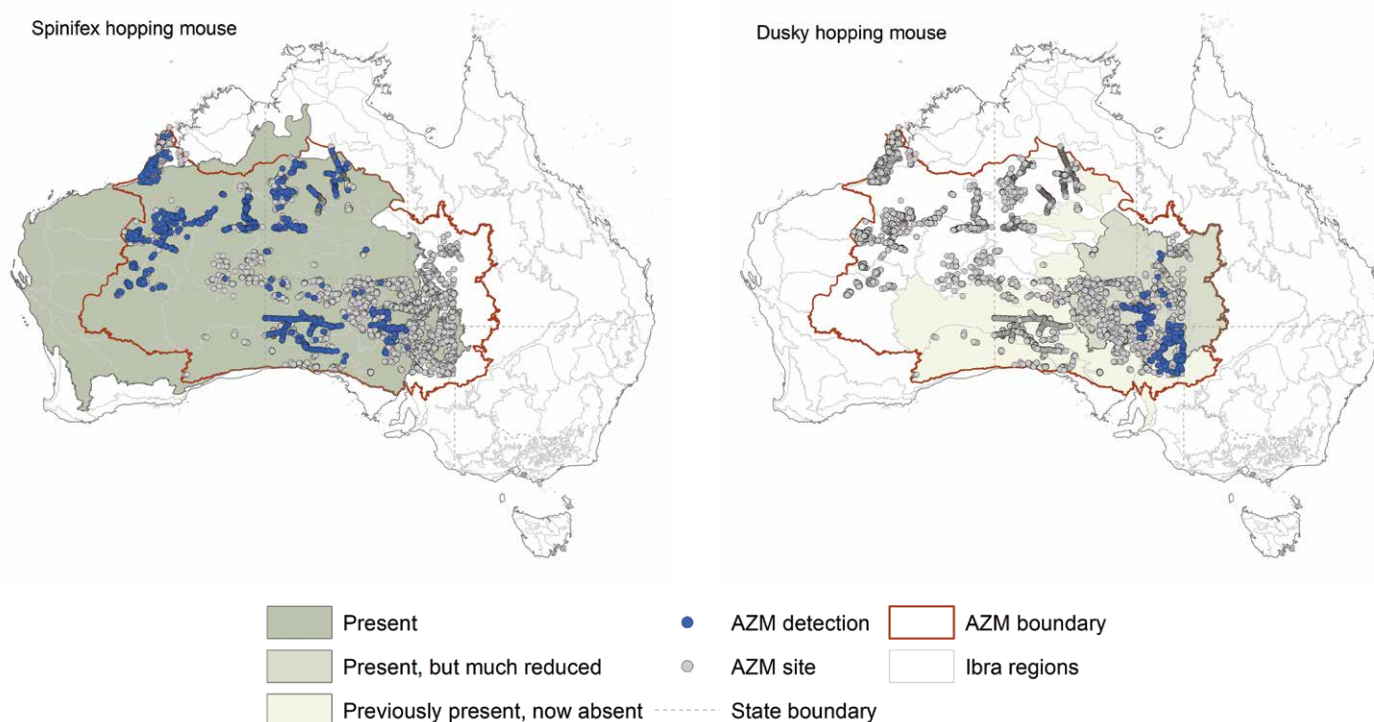
Dusky hopping mouse going down its pop-hole.

Arid Zone Monitoring project findings

Hopping mouse distributions

The maps show the detections of spinifex hopping mice (left) and dusky hopping mouse (right) in the AZM dataset. Spinifex hopping mice are found across most of the project area, except the eastern bioregions, where they are replaced by dusky hopping mice and fawn hopping mice. Note the records for the spinifex hopping mouse from the very southern deserts could either come from spinifex hopping mice, or their close relative, the Mitchell's hopping mouse. Their tracks are very similar and their distribution overlaps. The dusky hopping mouse now lives in the deserts of northern SA and the southern NT, in a smaller area than their previous distribution.

Each blue dot shows a survey site where hopping mice were recorded. The grey dots show all the other sites that were surveyed, but where hopping mice were not recorded. These records were made by Indigenous Ranger groups, land councils, NGOs, government agencies and university researchers. The information about the overall distribution in the map background is from the Australian Faunal Directory¹, the Mammal Action Plan² and amended by expert input³.



The maps above are based on data shared by data providers with the AZM project. The data are from track and sign surveys. This method is great for detecting species that live in sandy deserts, but not as good for species that prefer rocky habitats, or species with distributions that are mostly outside the central deserts. The method also works best for larger-bodied animals with tracks that are easily identified.

It is possible that extra surveys have been carried out that have not yet been shared. If you see 'gaps' in the maps that you could fill by sharing your data, let us know.

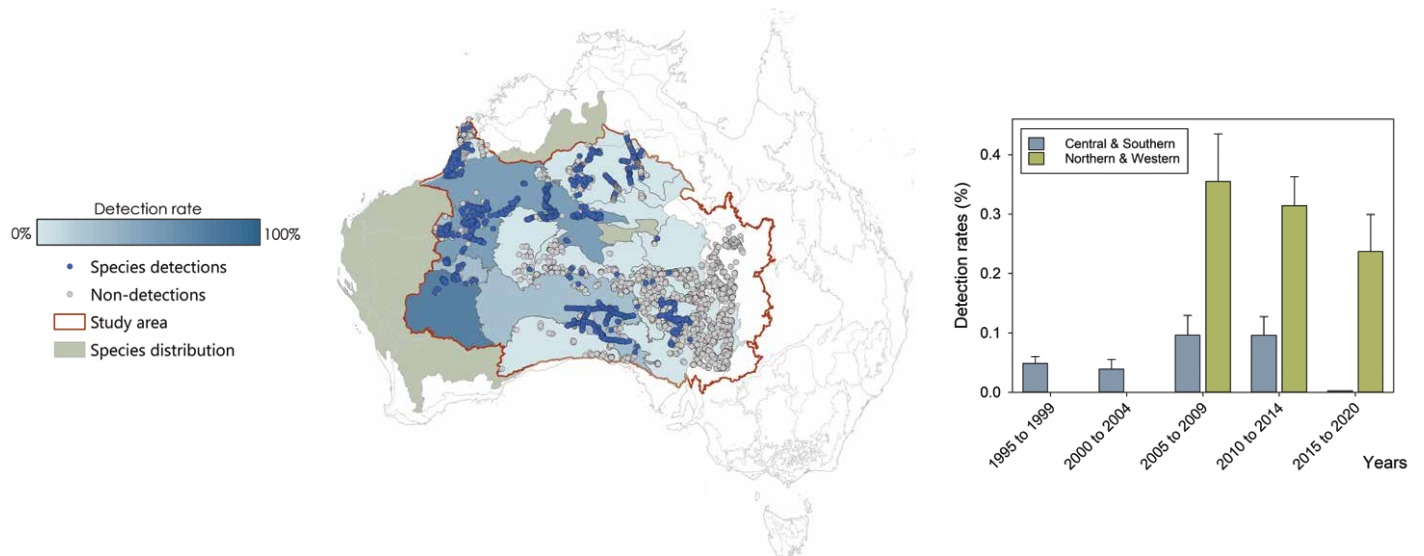
Things to think about when surveying for hopping mice

- Survey during good conditions (in the early morning is best, not too windy or straight after rain).
- Organise to do surveys at regular times every year – for example, before the wet or hot season (October) and in the early dry season or early cool time (April).
- Follow advice of experienced trackers - know how to tell hopping mice tracks apart from other small mammal species before you go to survey.
- If you want to see changes over time, you will need to go back to the same areas to sample over several years. If you want to see if management actions (feral animal culling or fire) are working, you need to sample many different sites, before and after the action. You might need help from a scientist to make the sampling design strong.

Spinifex hopping mouse detection rates

Spinifex hopping mice were detected at over 12% of all surveys in the AZM dataset. It was the sixth most commonly recorded mammal species, and the second most commonly recorded native mammal species, behind the dingo.

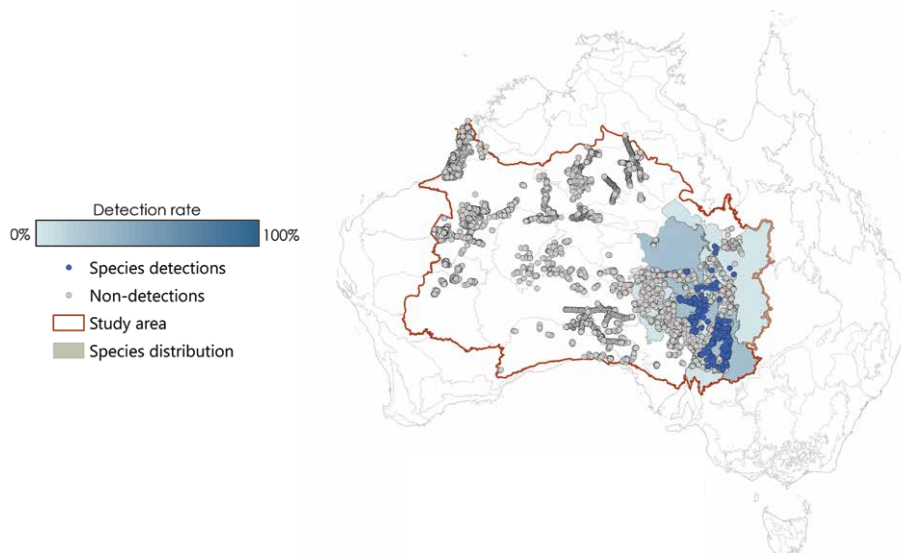
The map shows the detection rate for spinifex hopping mice across all surveys carried out in each bioregion, since the 1980s. Detection rates have been lower in the east and southeast of the project area (lighter blue shading). The graph shows the detection rate for spinifex hopping mice in five-year blocks from 1995. The data show the average detection rates across bioregions in the central and southern deserts, versus bioregions in the northern and western deserts. The graph confirms that detection rates were higher in northern and western bioregions, and detection rates of this species decreased in the north and west has over the past 15 years. A more detailed analysis of spinifex hopping mouse detections at a subset of AZM sites that were revisited over five or more years, suggests that they detected less often soon after fire, and more often when there is more green vegetation, but these patterns were only seen at some sites.



Dusky hopping mouse detection rates

Dusky hopping mice were detected at over 3% of all surveys in the AZM dataset. It was the 11th most commonly recorded mammal species, and the sixth most commonly recorded native mammal species.

The map shows the dusky hopping mouse detection rates across all surveys carried out in each bioregion, since the 1980s. The detection rate has been recorded fairly evenly across a small range. AZM detections of dusky hopping mice were more common between 2010-2021. This may be because rabbit control in the 1990s helped to reduce the numbers of cats and foxes, and some native mammal species expanded their range as a result. But it is also possible that some detections in early years were misidentified as spinifex hopping mouse (which would made dusky hopping mice seem rarer), or that people started targeting surveys for dusky hopping mouse in later years (making them seem more common).

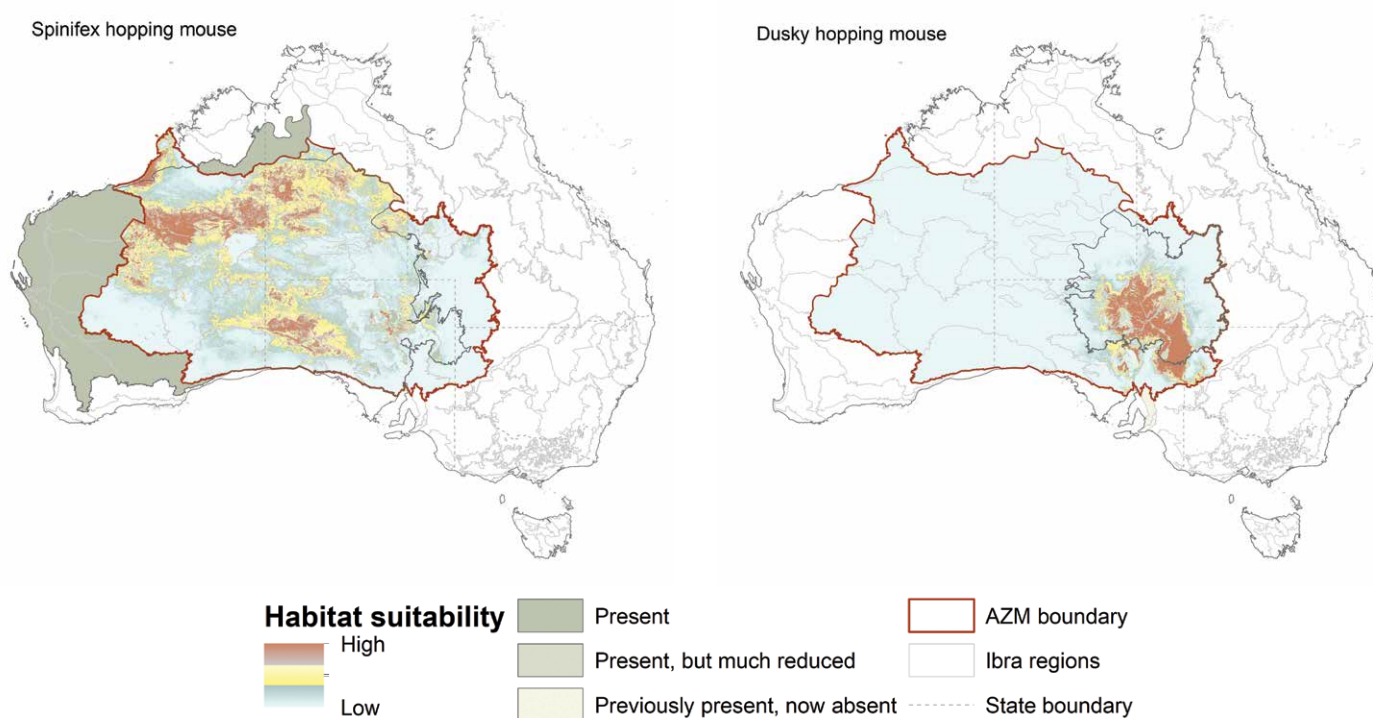


Habitat suitability

The habitat suitability model can tell us about where a species is most likely to be found. The analysis considered climate factors like annual, seasonal and daily temperature and rainfall; landform factors like elevation and slope; soil factors; and habitat factors like the amount of vegetation (NDVI) and fire frequency.

The model suggests that spinifex hopping mice are relatively widespread without strong preferences for landforms, soil types, climate, habitat and fire frequency. In contrast, dusky hopping mice prefer to live in flat low areas away from hills (<200 m), and where the mean temperature is moderate (between 18-24 degrees Celsius). These are the red-brown shaded areas of the dusky hopping mouse map.

The maps only show habitat suitability inside the AZM project boundary, but spinifex hopping mice are also found to the west of the project area, and could be common there. The habitat suitability model does not predict well in large areas where there has not been any sampling, for example in parts of the Great Sandy Desert or the Great Victoria Desert; getting more survey data from these areas would improve the model for the spinifex hopping mouse.



Further information

Arid Zone Monitoring project:

<https://www.nespthreatenedspecies.edu.au/projects/arid-zone-monitoring-surveys-for-vertebrates-across-arid-and-semi-arid-zones>

References

¹ ABRS. Australian Faunal Directory. 2021; <https://biodiversity.org.au/afd/home>. Accessed June, 2021.

² Woinarski, J.C.Z & Burbidge, A.A. & Harrison, P.L. (2014). The Action Plan for Australian Mammals 2012. (CSIRO Publishing: Melbourne.)

³ K. Moseby, H. Owens, Personal Communication 09/10/2020



National Environmental Science Programme

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The Arid Zone Monitoring project is a collaboration between the NESP TSR Hub and over 30 Indigenous ranger groups and Indigenous organisations, 8 NGOs and NRM groups, 5 government agencies institutions, and many individual researchers and consultants. The project has gathered track and sign data from across Australia's deserts, using it to map the distributions of desert species and their threats. The national database includes almost 50,000 species presence records from over 5300 unique sites and almost 15,000 site visits, over the period from 1982 to 2020. The project area was defined by using IBRA subregional boundaries - the project boundary captures Australia's desert subregions where track and sign-based surveys are commonly used. The project showcases the collective work carried out by all groups working across the arid zone, and lays the groundwork for creating ongoing, national-scale monitoring for desert wildlife.

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