Arid Zone Monitoring
Species Profile

Marsupial moles

Northern marsupial mole, Karrkaratul is *Notoryctes caurinus*
Southern marsupial mole, Itjaritjari is *Notorycytes typhlops*

Language names

Arkutelene, Itjaritjari, Kakarratulpa, Kakarrartuunpa, Karrkaratul/Kakarratul, Mantararrarr, Pujarrpujarrpa/Pujjarrpujarr, Tjalupantji, Tutharrutharra, Urrkemate, Yirtarrutju, Yitjarritjarri

Northern marsupial mole, Karrkaratul
National status: Not listed
IUCN Red List: Least concern

Southern marsupial mole, Itjaritjari
National status: Not listed
IUCN Red List: Least concern

Image: Kiwirrkurra Indigenous Protected Area

Kakarratul (northern marsupial mole) found by Kiwirrkurra Rangers .


Image: Joe Benshemesh

Itjaritjari (southern marsupial mole).


Image: Kiwirrkurra Indigenous Protected Area

Burrowing Kakarratul (marsupial mole) found by Kiwirrkurra Rangers.

Animal Description

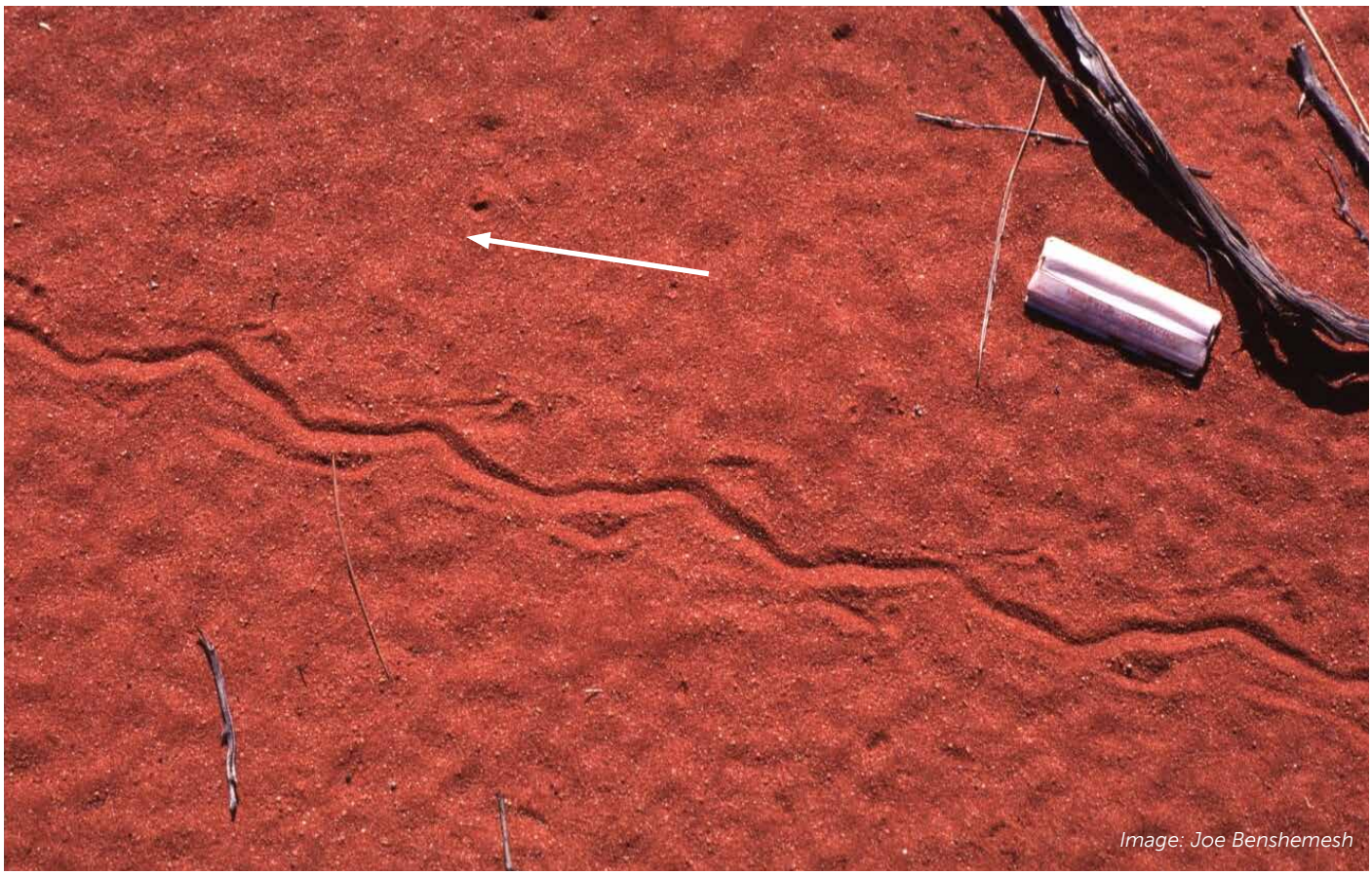
There are two species of marsupial moles, one lives mostly in north-western deserts, and the other lies in the southern deserts. Their ranges probably overlap, but it's hard to know where because the two species look so similar. They are small, with a head-body length of 12-16 cm and a short tail. Marsupial moles have bodies that are specialised for burrowing through sand. They have short, dense, pale golden fur, and a tubular body shape. They have short, strong legs with large shovel like claws for digging. Their eyes are tiny and do not work at all (they are blind), and their ears are tiny and simple.

Key threats

- Predation by foxes and cats
- Soil compaction by feral herbivores (camels, livestock, cattle, rabbits)

Mole signs (tunnels and tracks)

When on the surface, marsupial moles have a shuffling walk, with a zig-zag tail through the middle of the track and broken tracks from their limbs on either side. Karrkaratul (northern marsupial moles) have similar tracks to Itjaritjari (southern marsupial moles) but may have a less noticeable tail drag. When underground, marsupial moles "swim" through the soil and the mole packs (backfills) the sand behind it as it moves, so there is no empty tunnel.



Itjaritjari (southern marsupial mole) tracks on the surface (arrow shows which way it is moving).

Itjaritjari (southern marsupial mole) tracks on the surface and crater where it has dug into the sand.

Itjaritjari (southern marsupial mole) uplift from burrowing just under the surface.

Mole tunnels – there is no empty tunnel because it is backfilled as the mole moves through the sand.

A good way to find marsupial moles is to dig trenches that are about 1m deep, wait a couple of days for the sand to dry out, then check the sides of the trenches for signs of mole tunnels.

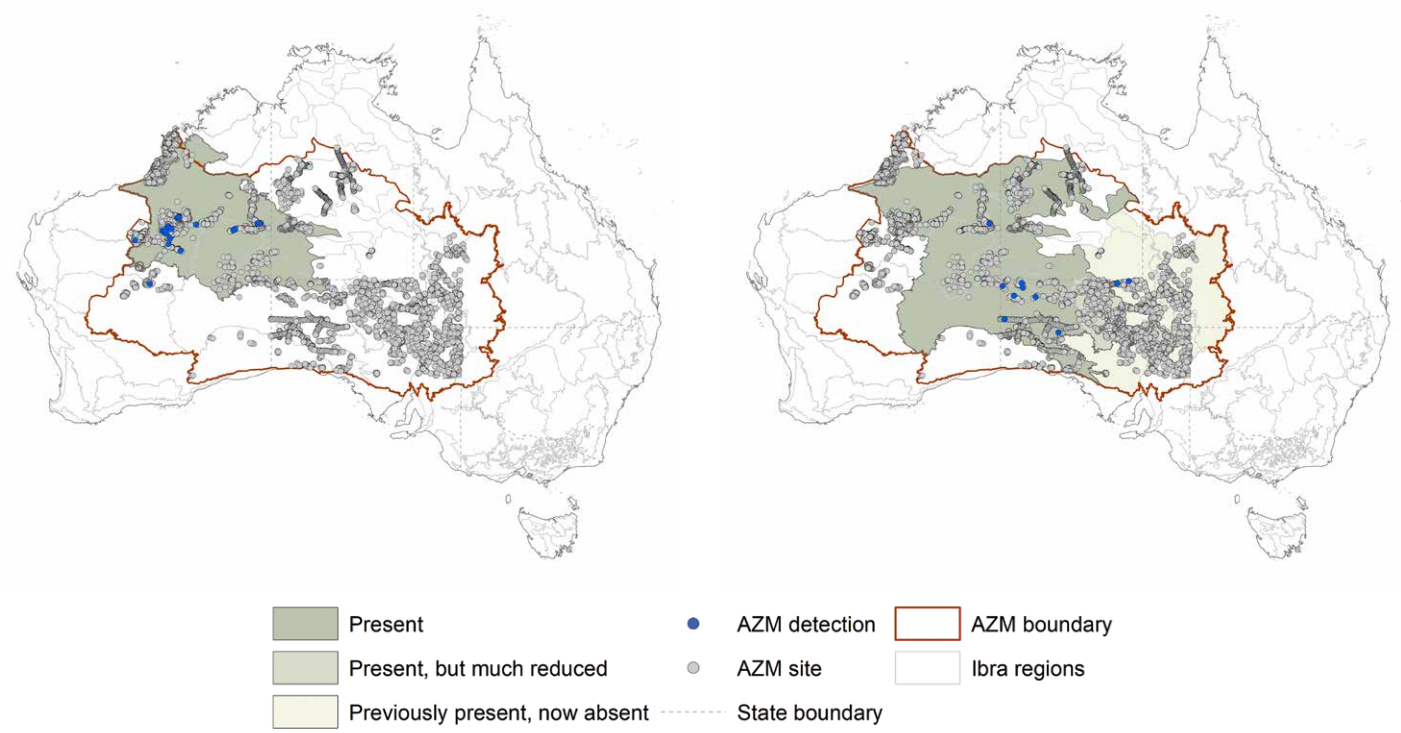
Habitat

Marsupial moles live underground in sand dunes and adjacent swales, and in sandy soils along river flats. They need deep loose sand to move through, so they aren't found in places with hard-packed soil. They spend most of their time underground, but will come up to the surface every now and then, particularly in wet weather. Underground sign is most common in big areas of dunes. They eat invertebrates, especially the ants, termites and beetle larvae.

Arid Zone Monitoring project findings

Marsupial mole distribution

The maps summarise detections of marsupial moles in the AZM dataset between 2000 and 2020. There are no records for 1980-2000. Karrkaratul (northern marsupial moles) have been detected in the Great Sandy, Little Sandy, the Gibson and Tanami Deserts of Western Australia. Itjariitjari (southern marsupial moles) have mostly been detected in South Australia. It's possible that records in WA and the NT near to SA have been mis-identified, in both directions. Each blue dot shows a survey site where marsupial moles were recorded. The grey dots show all the other sites that were surveyed, but where moles were not recorded.



Distribution of Karrkaratul (northern marsupial moles) (left) and Itjariitjari (southern marsupial moles) (right).

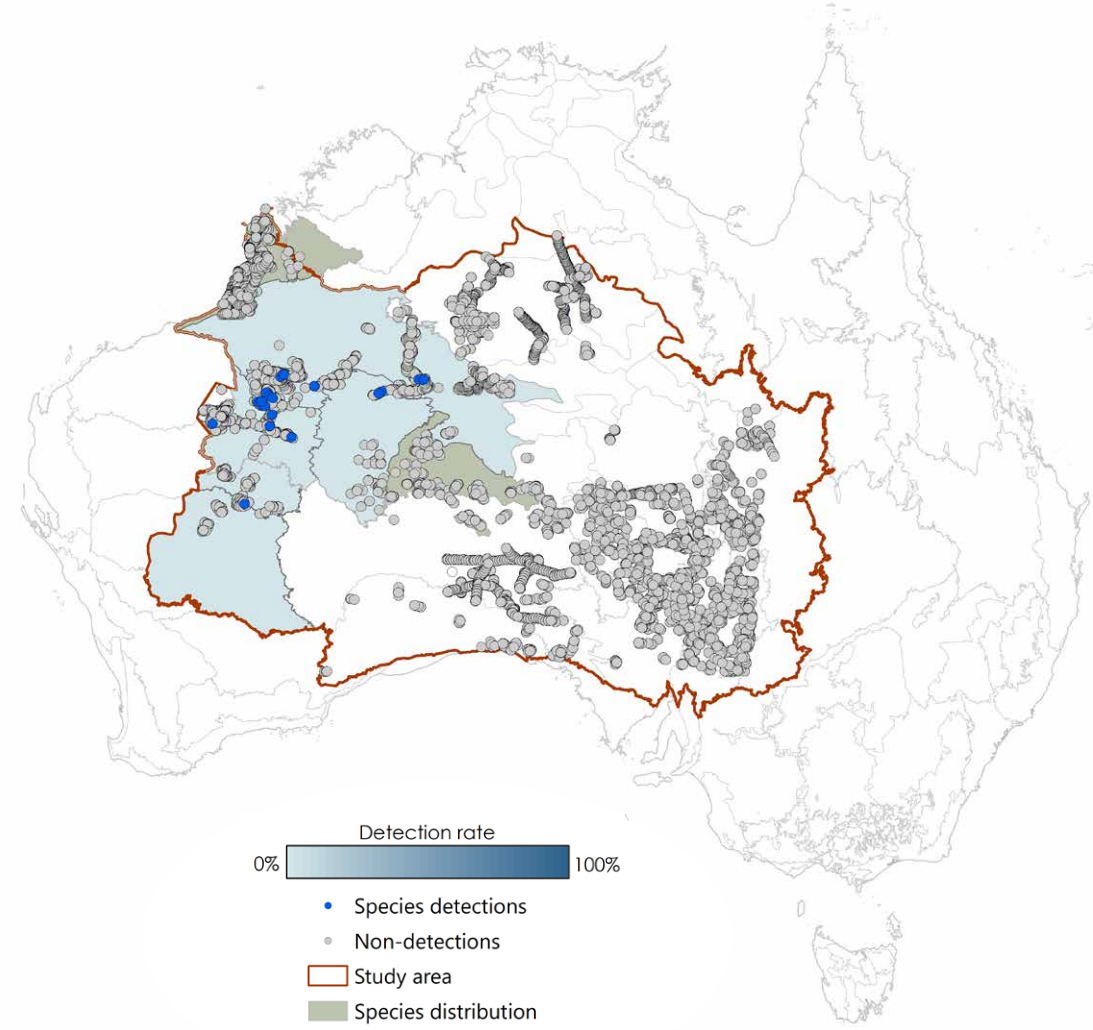
The maps above are based on data shared by data providers with the AZM project. The data are from track and sign surveys. This method is great for detecting species that live in sandy deserts, but not as good for species that prefer rocky habitats, or species with distributions that are mostly outside 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 over the past 40 years that have not yet been shared. If you see 'gaps' in the maps that you could fill by sharing your data, let us know.

Marsupial mole detection rates

Karrakaratul (northern marsupial moles) were detected at less than 1% of all surveys in the AZM dataset. It was the 26th most commonly recorded mammal species. Itjaritjari (southern marsupial moles) were also detected at less than 1% of all surveys in the AZM dataset, and they were the 28th most commonly recorded mammal species.

The map shows the detection rate for Karrkaratul (northern marsupial mole) across all surveys carried out in each bioregion, since the 2000s. Detection rates have been similar and low across the bioregions (light blue shading). A detection rate map has not been made for Itjaritjari (southern marsupial mole) because their detections were so low.



Things to think about when surveying for marsupial moles

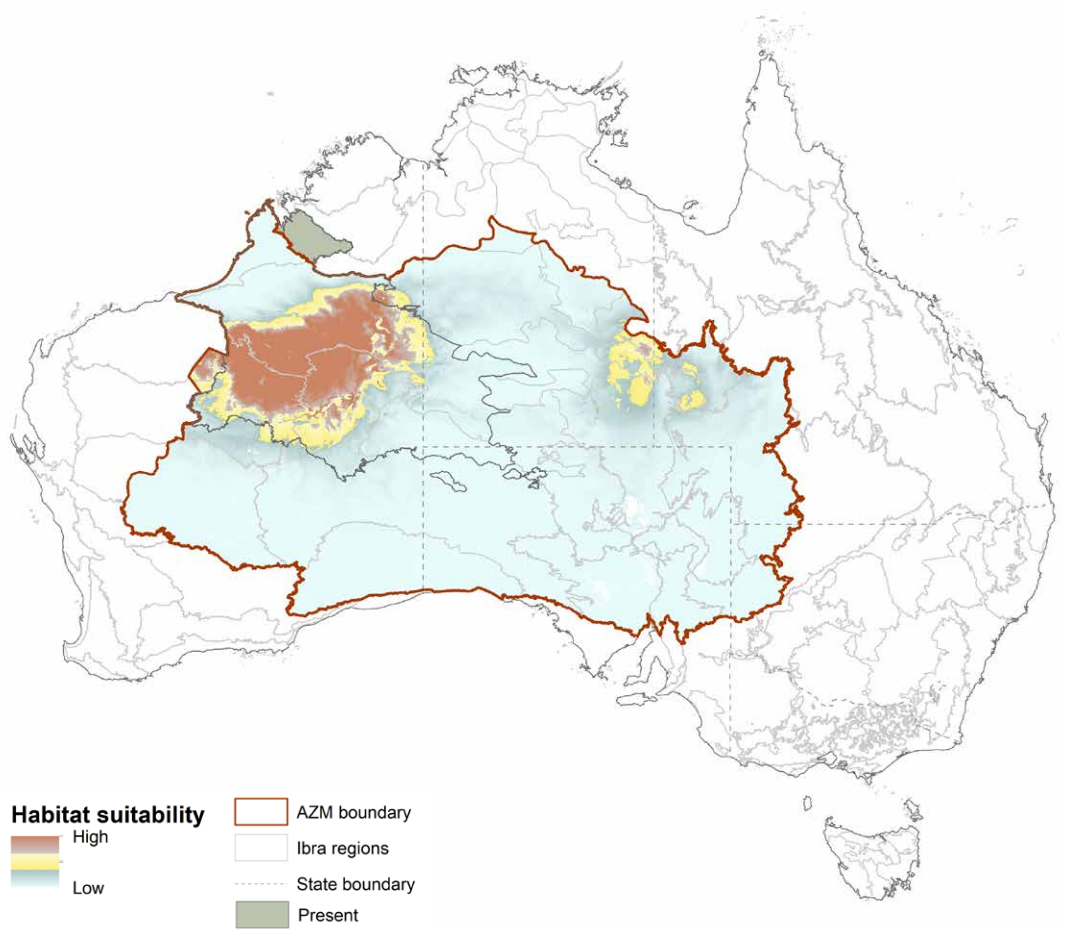
- Survey during good conditions (in the early morning is best, not too windy and not straight after rain).
- Organise to do surveys at regular times every year – for example, before the wet or hot season (October) and in the early dry season or early cool time (April).
- Follow advice of experienced trackers - know how to marsupial mole surface tracks apart other animal like small reptiles, before you go to survey.
- Rather than looking for tracks on the surface, a better way to find marsupial moles is to dig trenches that are about 1 m deep, wait a couple of days for the sand to dry out, then check the sides of the trenches for signs of mole tunnels.
- 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 (such as right-way 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.

Northern marsupial mole habitat suitability

The habitat suitability model can tell us about where Karrkaratul (northern marsupial moles) are 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 suggest moles are mostly found in areas with warm average temperatrues (> 23 degrees Celsius) with moderate rainfall. These are the red-brown and yellow coloured areas on the map - these places would be good to check, if surveys are targeting moles.

A habitat suitability map has not been made for Itjaritjari (southern marsupial mole) because their detections were so low.



Further information

Anangu Pitjantjatjara Yankunytjatjara Land Management Itjaritjari factsheet:
https://www.anangu.com.au/en/apy-information/land-management/threatened-species/768-itjaritjarifactsheets/file

Arid Zone Monitoring project:
https://www.nespthreatenedspecies.edu.au/projects/arid-zone-monitoring-surveys-for-vertebrates-across-arid-and-semi-arid-zones

References

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

Threatened Species Recovery Hub
National Environmental Science Programme

This project received support from the Australian Government's National Environmental Science Program.

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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