

# Science for Saving Species

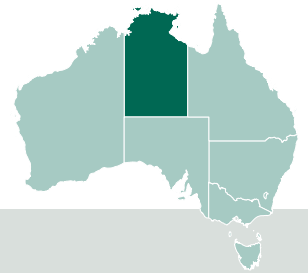
## Research findings factsheet

### Project 3.1



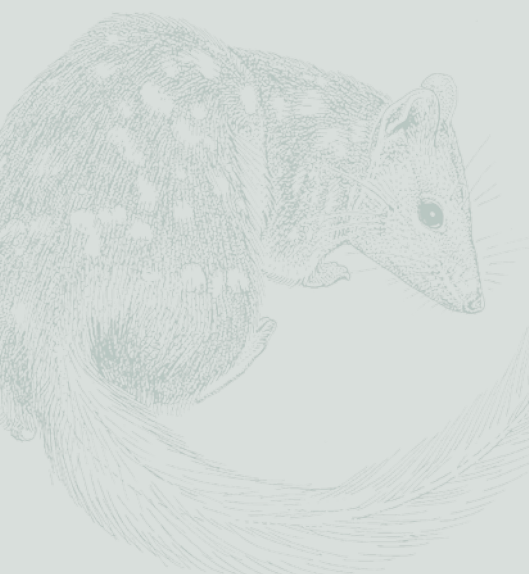
National Environmental Science Programme

## Factsheet: A Threatened Mammal Index for the Northern Territory



### Research in brief

This project is developing a Threatened Species Index (TSX) for Australia that can assist policy-makers, conservation managers and the public to understand how some of the population trends across Australia's threatened species are changing over time. It will inform policy and investment decisions, and enable coherent and transparent reporting on relative changes in threatened species numbers at national, state and regional levels. Australia's TSX is based on the Living Planet Index ([www.livingplanetindex.org](http://www.livingplanetindex.org)), a method developed by World Wildlife Fund and the Zoological Society of London. The TSX has been designed to be a dynamic tool to which new monitoring data are added and examined annually.



### How can the index be used?

For the first time in Australia, an index has been developed that can provide reliable and rigorous measures of trends across Australia's threatened species, or at least a subset of them. In addition to communicating overall trends, the indices can be interrogated and the data downloaded via a web-app to allow trends for different taxonomic groups or regions to be explored and compared. So far, the index has been populated with data for some threatened and near-threatened birds and mammals, and monitoring data

for threatened plants are currently being assembled.

These indices will allow Australian governments, non-government organisations, stakeholders and the community to better understand and report on which groups of threatened species are in decline by bringing together monitoring data. It will potentially enable us to better understand the performance of high-level strategies and the return on investment in threatened species recovery, and inform our priorities for investment.

### A Threatened Species Index for mammals in the Northern Territory

Different taxonomic groups can be explored individually in the Threatened Species Index. And we can also look at trends produced for Australian states and territories. Here, we present a report from the national Threatened Mammal Index (TMX) on trends for threatened and near-threatened mammals for the Northern Territory (Figure 1A). In its first iteration, this index incorporates data from 10 threatened and near-threatened mammal taxa (Near Threatened, Vulnerable, Endangered or Critically Endangered under the EPBC Act and/or IUCN – see Table 1). We used information from the Australian Species Profile and Threats Database and the international

IUCN Red List as of July 2019 to make a decision about the currently listed taxa (143 taxa, which counts both species and subspecies).

Data on these mammal taxa come from fixed sites where they have been repeatedly monitored in a systematic and standardised way.

The index shows the estimated yearly change in relative abundance of threatened and near-threatened mammal taxa in relation to a baseline year, for which 1995 was chosen, where the index is set to 1.0. This baseline year was chosen because very few of the ongoing monitoring programs originated before 1995.

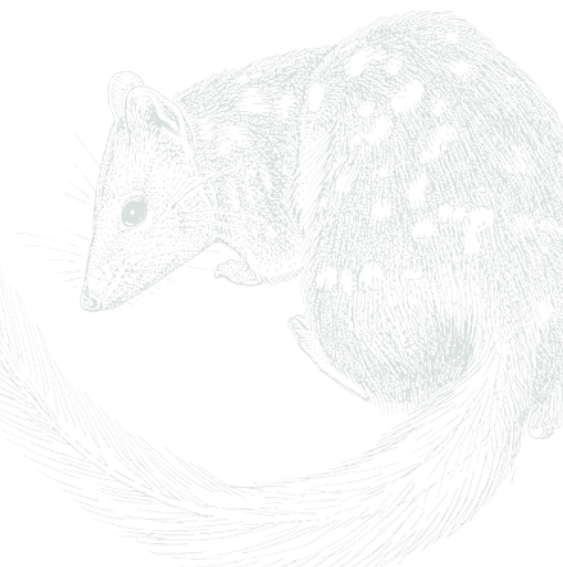


## A Threatened Species Index for mammals in the Northern Territory (continued)

However, later baseline years are also available to support the specific needs of conservation managers and can be selected via the web-app. Changes in the index are proportional – a value of 0.5 indicates the multi-taxon relative abundance is 50% below the baseline value; a value of 1.5 indicates 50% above baseline.

For the index on all sites in the Northern Territory where threatened and near-threatened mammals were monitored, the TMX value in 2016 based on the current

data is 0.60. This suggests that the relative abundance of threatened and near-threatened mammals for which we have information has decreased by 40% between 1995 and 2016. While the overall index value in 2016 is 0.60, individual taxa have TMX values between 0.25 (a 75% decrease) and 1.36 (a 36% increase) (Figure 1A). It is expected that more data (and taxa) will be added as they become available each year, allowing the index to grow.



## What should we know about the Northern Territory data?

This overall index on all monitored sites is based on 206 time series (defined as sites where data on a taxon are recorded using the same methodology and a consistent monitoring effort through time) across these 10 taxa. Data quality was maximised by: 1) checking whether each dataset had been produced by standardised monitoring; and 2) by sending surveys on 127 eligible datasets to custodians and requesting them to assess the trends produced

for their datasets. Feedback was received for 74% of the datasets. Only time series that had been produced by standardised monitoring and with a minimum length of two years, collected between 1995 and 2016 inclusive, were used for index calculation. Sub-trends of the overall trend can be calculated if data on at least three taxa are available.

The data underlying the index mostly derive from monitoring programs in the northern part of the Northern

Territory (Figure 1B). The number of sites monitored that met the TMX criteria (Figure 1C) has substantially increased since around 1995, while the number of taxa monitored increased from four in 1995 to nine in 2010 (Figure 1D). In combination, this has resulted in a large increase in the time series available: from 26 in 1995 to 195 in 2010.

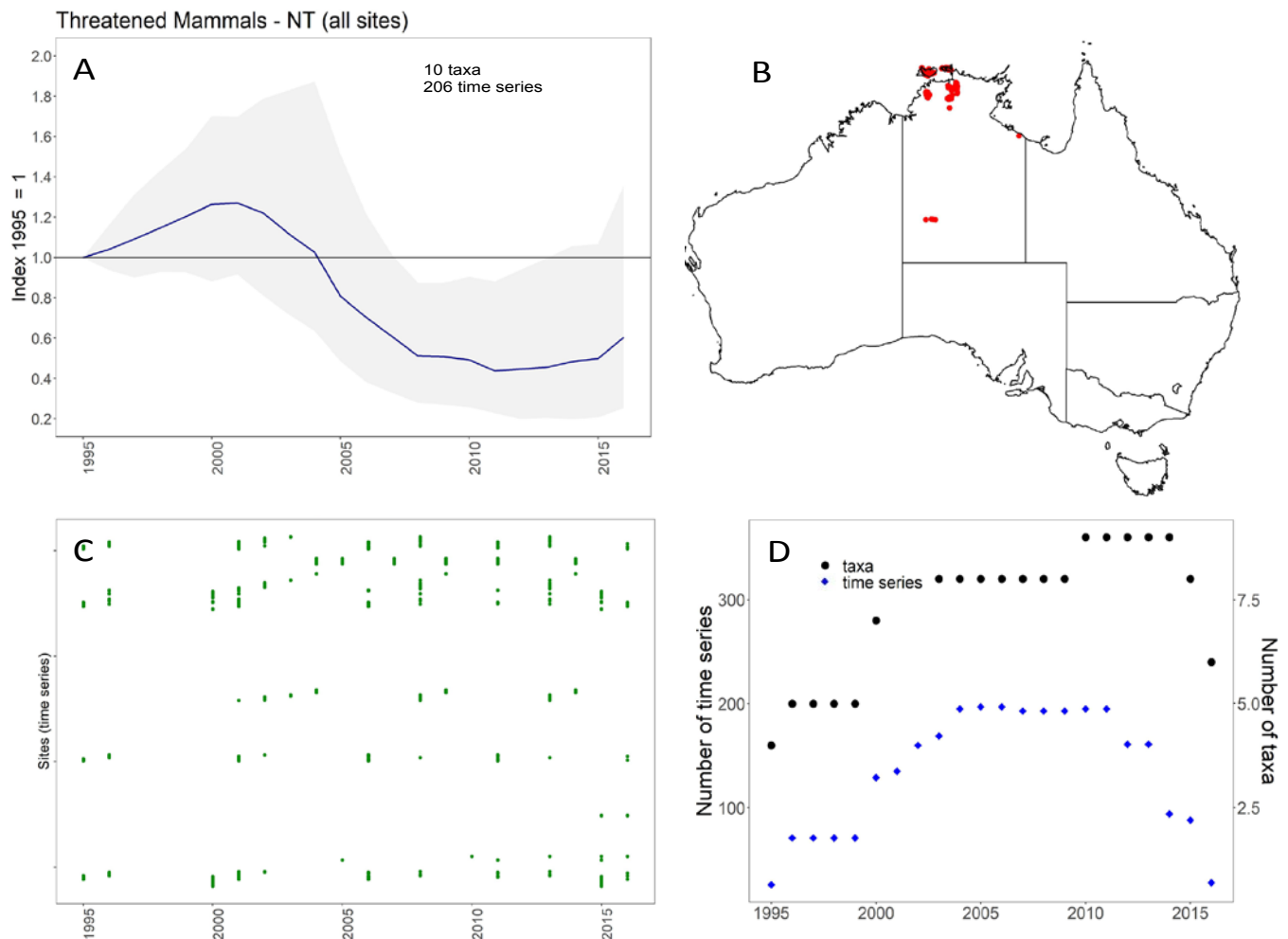
As more high-quality data become available they can be added, making the index more powerful, meaningful and representative. Increasing the number of taxa, regions and functional groups monitored should be a priority in the future. Increasing the number of taxa, regions and functional groups monitored would strengthen the value of the index. Ongoing long-term monitoring programs allow for continuing capability to track changes in the relative abundance of threatened and near-threatened mammal taxa.



LEFT: Brush-tailed rabbit rat.  
Image: Hugh Davies

## Interpretational issues and constraints

- This composite index only includes data for threatened and near-threatened mammal taxa provided by the custodians endeavouring to meet the TMX criteria supplied. Inspection of these data indicates that they are biased to the coastal areas of most states and are sparse for the arid zone. The index can be useful for also identifying strategic monitoring opportunities to increase the comprehensiveness of representation of threatened and near-threatened mammal taxa (see Table 1).
- There were limited appropriate monitoring data for remote areas available for inclusion in the index to 2016.
- Some mammal subgroups, such as bats and rodents, are still underrepresented.
- The proportional representation of threatened and near-threatened mammal taxa, and spatial coverage, is low in comparison to data on threatened and near-threatened birds (Threatened Bird Index).



**Figure 1:** A) The Threatened Mammal Index (TMX) for the Northern Territory, including data from all sites where threatened and near-threatened mammal taxa were provided. The blue line shows the change in mammal abundance relative to the baseline year of 1995, where the index is set to 1.0. The grey cloud shows the range of trends for the individual taxa that make up the overall multi-taxon index. It can be seen as the variability between single-taxon trends that contribute to the composite (i.e., it is not statistical confidence).

B) A map showing where threatened and near-threatened mammal data were recorded in the Northern Territory. The red dots indicate repeatedly monitored fixed sites.

C) This dot plot shows the particular years for which monitoring data were available to compile the index. Each row represents a time series where a taxon was monitored with a consistent method at a single site.

D) The number of taxa (in black circles) and number of time series (in blue diamonds) used to calculate the index for each year.





**Table 1:** Data on threatened and near-threatened mammal taxa included in the TMX for Northern Territory.

Times-series length (mean  $\pm$  SD): 14.5  $\pm$  4.3

Number of samples (year) per time series (mean  $\pm$  SD): 3.3  $\pm$  1.1

Number of data sources in index: 6

Number of data taxa in index: 10

Taxon common name	Taxon scientific name	Functional Group	IUCN Status	EPBC Status	# data sources	# time series	Mean time-series length
Arnhem rock-rat	<i>Zyzomys maini</i>	Terrestrial:50-5000g	Vulnerable	Vulnerable	1	15	11.5
Black-footed rock-wallaby	<i>Petrogale lateralis</i>	Terrestrial:50-5000g	Vulnerable		1	7	2.0
Black-footed tree-rat (Kimberley and mainland Northern Territory)	<i>Mesembriomys gouldii gouldii</i>	Terrestrial:Arboreal:50-5000g	Vulnerable	Endangered	1	20	16.8
Black-footed tree-rat (Melville Island)	<i>Mesembriomys gouldii melvillensis</i>	Terrestrial:Arboreal:50-5000g	Vulnerable	Vulnerable	1	40	16.0
Black-footed tree-rat (north Queensland)	<i>Mesembriomys gouldii rattoides</i>	Terrestrial:Arboreal:50-5000g	Vulnerable	Vulnerable	2	2	7.0
Brush-tailed rabbit-rat	<i>Conilurus penicillatus</i>	Terrestrial:50-5000g	Vulnerable	Vulnerable	2	22	9.5
Brush-tailed rabbit-rat (Tiwi Islands)	<i>Conilurus penicillatus melibius</i>	Terrestrial:50-5000g	Vulnerable		1	18	16.0
Fawn antechinus	<i>Antechinus bellus</i>	Terrestrial:<50g	Vulnerable	Vulnerable	1	23	16.1
Kakadu pebble-mouse	<i>Pseudomys calabyi</i>	Terrestrial:<50g	Vulnerable		1	11	17.6
Northern quoll	<i>Dasyurus hallucatus</i>	Terrestrial:50-5000g	Endangered	Endangered	1	48	15.7



Northern quoll. Image: Nicolas Rakotopare

## Further Information

For more information or to become a *Friend of the Index* and receive updates on the progress of the project please contact the TSX Team at [tsx@uq.edu.au](mailto:tsx@uq.edu.au)

The data underpinning the index were contributed by many different individuals and organisations, including Commonwealth, state and territory agencies, research institutions and environmental non-government organisations (e.g., Australian Wildlife Conservancy and Arid Recovery) and consultants. Visit this web page for more information: [tsx.org.au](http://tsx.org.au)

Go to the web-app to access and explore the data behind the TMX and to produce reports tailored to your particular needs.

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