

Science for Saving Species

Research findings factsheet

Project 3.1



National Environmental Science Programme

Factsheet: A Threatened Mammal Index for Tasmania



Research in brief

This project is developing a Threatened Species Index (TSX) for Australia which 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), 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.



RIGHT: Tasmanian devil. Image: JJ Harrison
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A Threatened Species Index for mammals in Tasmania

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 Tasmania (Figure 1A). In its first iteration, this index incorporates data from three 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.

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. 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 Tasmania where threatened and near-threatened mammals were monitored, the TMX value in 2016 based on the current data is 0.67. This suggests that the relative abundance of threatened and near-threatened mammals for which we have information has decreased by 33% between 1995 and 2016 and was largely driven by the decrease in data on the Tasmanian devil. While the overall index value in 2016 is 0.67, individual taxa have TMX values between 0.51 (a 49% decrease) and 0.92 (an 8% decrease) (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 Tasmanian data?

This overall index on all monitored sites is based on 129 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 three 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 representing the whole of Tasmania

(as in the case of the Tasmanian devil) or Macquarie Island (for the southern elephant seal and subantarctic fur seal) (Figure 1B). The same number of sites and taxa were consistently monitored between 1995 and 2016 (Figure 1C and Figure 1D).

As more high-quality data become available they can be added, making the index more powerful, meaningful and representative.



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 indicate 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).

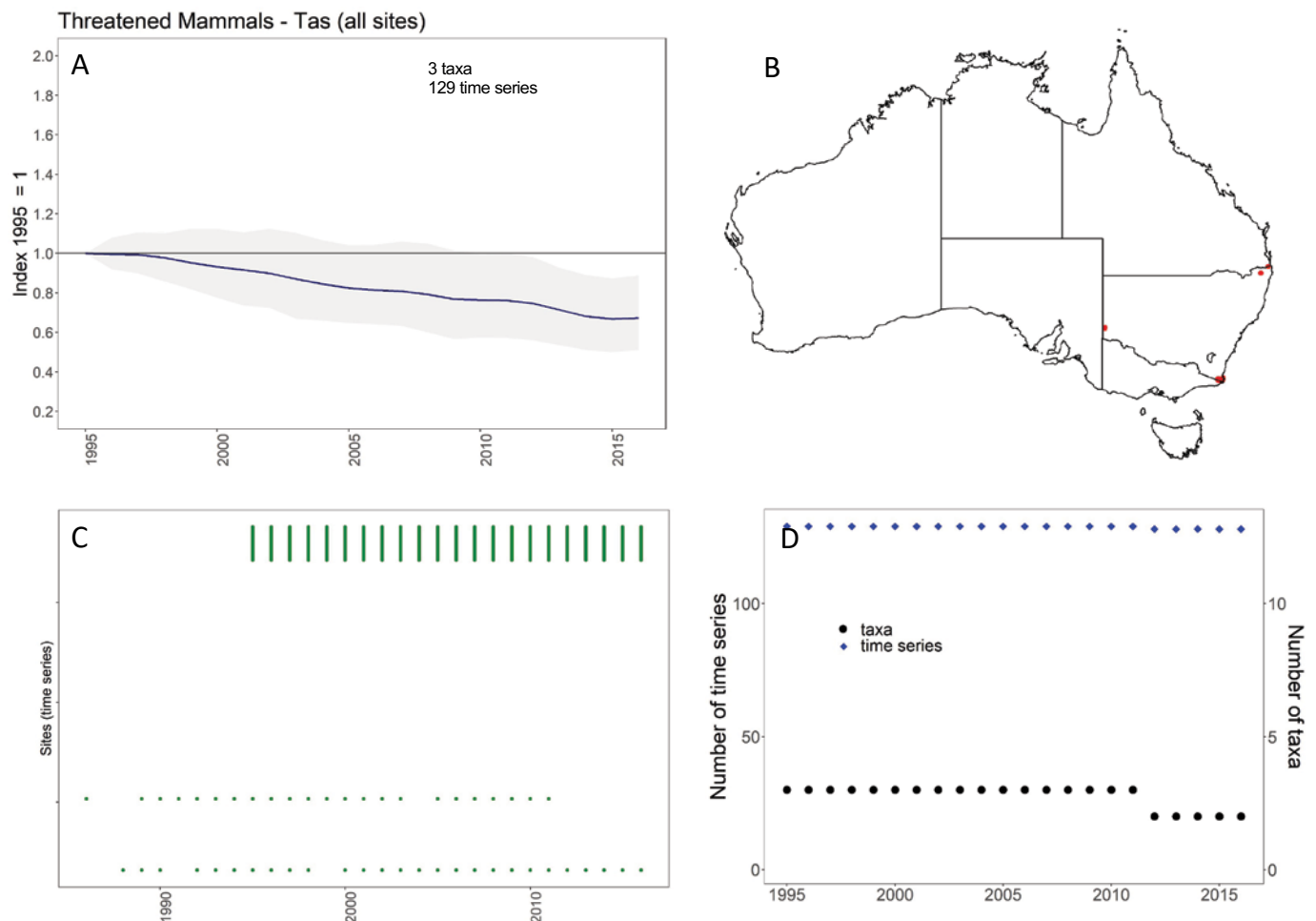


Figure 1: A) The Threatened Mammal Index (TMX) for Tasmania including data from all sites where threatened mammal taxa were provided. The blue line shows the change in mammal abundance relative to the baseline year of 1995, where the index is set to 1.0. The grey cloud shows the range of trends for the 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 mammal data were recorded in Tasmania. 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 Tasmania.

Times-series length (mean ± SD): 22.1 ± 0.7

Number of samples (year) per time series (mean ± SD): 22.0 ± 0.5

Number of data sources in index: 3

Number of data taxa in index: 3

Taxon common name	Taxon scientific name	Functional Group	IUCN Status	EPBC Status	# data sources	# time series	Mean time-series length
Southern elephant seal	<i>Mirounga leonina</i>	Marine:>5000g	Least Concern	Vulnerable	1	1	29.0
Subantarctic fur seal	<i>Arctocephalus tropicalis</i>	Marine:>5000g	Least Concern	Endangered	1	1	26.0
Tasmanian devil	<i>Sarcophilus harrisii</i>	Terrestrial:>5000g	Endangered	Endangered	1	127	22.0



Subantarctic fur seal. Image: Nicolas Servera CC BY-SA 3.0 Wikimedia Commons

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

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

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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