

Science for Saving Species

Research findings factsheet

Project 3.1



National Environmental Science Programme

Factsheet: A Threatened Bird Index for New South Wales



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 is still in the early stages of development, but it has been designed to be a dynamic tool to which new monitoring data can be added and examined.

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. 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 birds, and monitoring data for threatened plants are being assembled and threatened mammals are planned next.

By bringing together monitoring data, these indices will allow Australian governments, non-government organisations, stakeholders and the community to better understand and report on trends for threatened species groups including which are decreasing, increasing or staying stable. 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 future investment.

A Threatened Species Index for birds in New South Wales

Here, the national Threatened Bird Index (TBX) is drilled down to report on information relating to trends for threatened birds in New South Wales (Figure 1A). In its first iteration, this index incorporates data from 16 threatened bird species or subspecies (Vulnerable, Endangered or Critically Endangered under the EPBC Act and/or as assessed by BirdLife Australia - see Table 1). More data will be added as they become available each year allowing the index to grow.

The index shows the estimated yearly change in relative abundance of threatened bird species in relation to a baseline year, for which 1985 was chosen, where the index is set to 1.0. 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-species relative abundance is 50% below the baseline value; a value of 1.5 indicates 50% above baseline.

In 2015, the NSW TBX value given the current data is 0.24. This suggests that the relative abundance of threatened birds for which we have information has decreased by 76% between 1985 and 2015. While the overall index value in 2015 is 0.24, individual species have TSX values between 0.14 (a 86% decrease) and 0.45 (a 55% decrease). In comparison, the national TBX shows a decrease of 52% in the compiled data.



What should we know about the New South Wales data?

This index is based on 674 time series (defined as sites where data on a species are recorded using the same methodology and a consistent monitoring effort through time) across these 16 species. Data quality was maximised by 1) checking whether each dataset had been produced by standardised monitoring and 2) by sending surveys on 111 eligible datasets to custodians and requesting them to assess the trends produced for their datasets. Feedback was received for 82% of the datasets. Only time series that had been produced by standardised monitoring and with a minimum length of four years collected between 1985 and 2015 inclusive were used for index

calculation. No trends are calculated for indices with datasets on less than three species.

The data underlying the NSW index have very good spatial representativeness across habitats in eastern NSW but have low representativeness of inland arid NSW habitats (Figure 1B). The sample is also biased with respect to functional groups, including a disproportionate number of migratory shorebirds (Table 1). The number of sites monitored (Figure 1C) in NSW has substantially increased since 1985; while the number of species monitored increased from four species in 1993 to 14 in 2007

(Figure 1D). In combination, this has resulted in a huge increase in the time series available over time; from 126 in 1993 to 539 in 2007.

As more quality assured data become available, they can be added making the index more powerful, meaningful and representative. Increasing the number of species, regions and functional groups monitored should be a priority in the future. It is important that existing monitoring programs be sustained, and continue to provide data to the index, to enable us to track changes in threatened species relative abundance. BirdLife Australia have committed stewardship for the TBX-component of the TSX.

Interpretational issues and constraints

- For migratory species, for example, shorebirds, decreases in the TBX may be a result of declines that have occurred far away from the locations where they have been monitored (e.g. monitoring in Australia may be detecting the impact of decreases in habitat elsewhere in the flyway).
- This composite index includes data for only a small proportion

of NSW's threatened bird species because monitoring programs do not exist for all species, or the data from such programs were not suitable for incorporation in the TBX. There would be scope for increasing the comprehensiveness of representation of threatened bird species, with strategically established targeted monitoring for those threatened species not currently included in the index

(see Table 1), thus the index has the capacity to identify strategic monitoring opportunities. This is a key objective of current investment in monitoring under the NSW Government's *Saving our Species program*.

- The index includes fewer than 10 species for the years 1985 to 1998, so trends in that period may not be readily matched to trends from later periods during which many more species were included in the composite index. This impacts the interpretation of the index if 1985 is chosen as a baseline, thus a later reference year (i.e. 1990, 1995, 2000) would be more appropriate.
- Given the limitations outlined above, interpretation of the NSW TBX, at this point in time, should be made with caution. As more data are collected and incorporated in future years, confidence in the TBX as representative of the status of threatened birds in NSW can increase.

Malleefowl. Photo: Butupa CC2.0 Wikimedia Commons



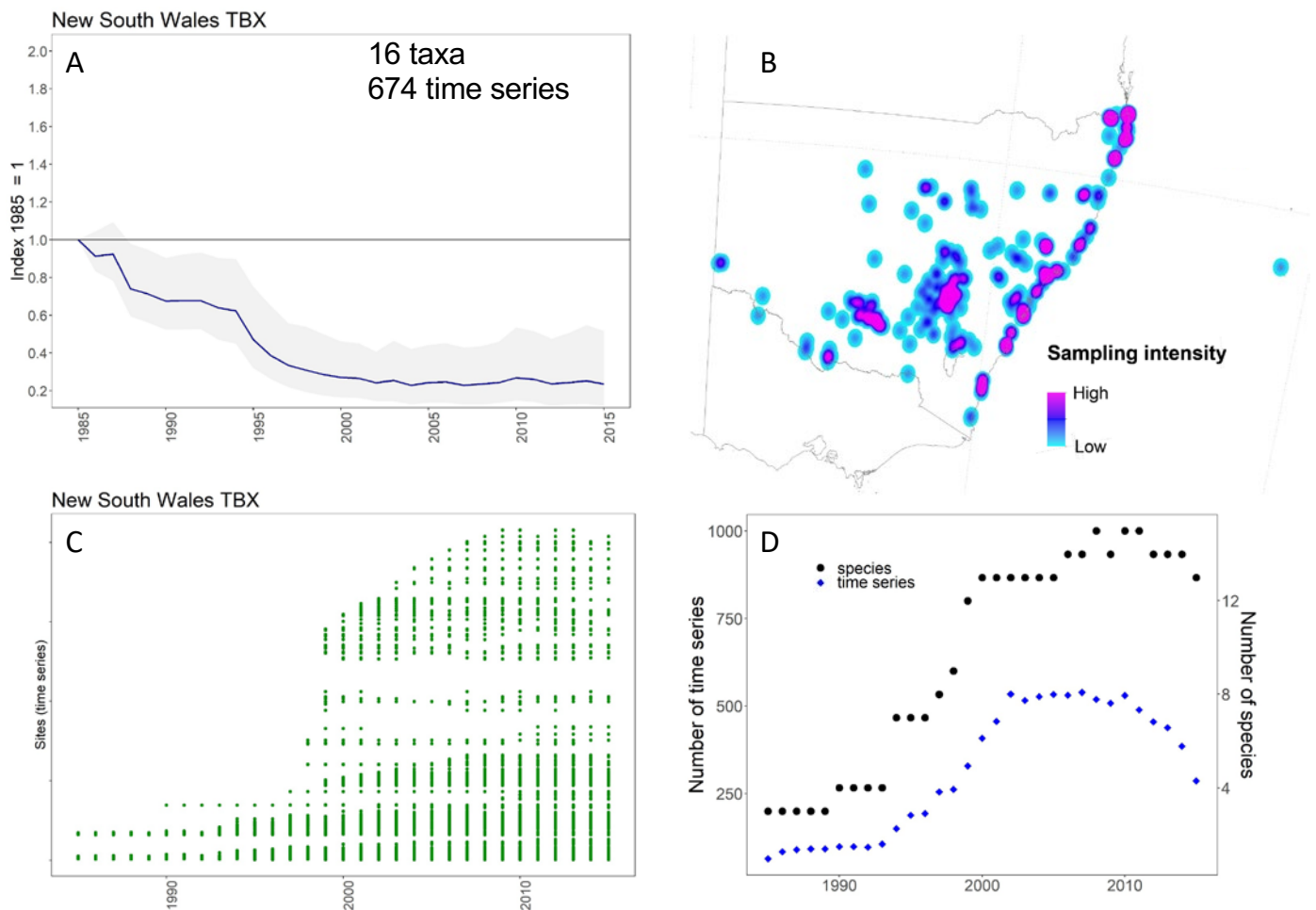


Figure 1 (above):

A) The Threatened Bird Index (TBX) for New South Wales. The blue line shows the change in threatened bird abundance relative to the baseline year of 1985, where the index is set to 1.0. The grey cloud shows the range of trends for the individual species that make up the overall multi-species index. It can be seen as the variability between single-species trends that build the composite.

B) A map showing where threatened bird data were recorded in New South Wales. Light blue indicates less data (fewer sites monitored), pink indicates more data (more sites monitored).

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

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



Northern eastern bristlebird. Photo: Zoe Stone



Table 1: Data on threatened bird taxa included in the NSW TBX.

Time-series length (mean \pm SD): 15.5 \pm 8.1

Number of samples (years) per time series (mean \pm SD): 10.7 \pm 5.6

Number of data sources in Index: 10

Number of taxa in Index: 16

Taxon name	Functional group	Functional sub-group	BirdLife Australia status	EPBC status	# data sources	# time series	Mean time-series length
Taxa in index							
Australian Gould's Petrel	Marine	Petrels and Shearwaters	Vulnerable	Endangered	1	1	8.0
Curlew Sandpiper	Shoreline (migratory)		Critically Endangered	Critically Endangered	2	81	22.0
Far Eastern Curlew	Shoreline (migratory)		Critically Endangered	Critically Endangered	2	101	21.1
Great Knot	Shoreline (migratory)		Endangered	Critically Endangered	2	38	16.8
Greater Sand Plover	Shoreline (migratory)		Vulnerable	Vulnerable	2	21	17.3
Lesser Sand Plover	Shoreline (migratory)		Endangered	Endangered	2	44	26.0
Red Knot	Shoreline (migratory)		Endangered	Endangered	2	43	16.4
Eastern Regent Parrot	Terrestrial		Endangered	Vulnerable	1	1	16.0
Northern Eastern Bristlebird	Terrestrial		Critically Endangered	Endangered	1	27	11.0
Painted Honeyeater	Terrestrial	Dry sclerophyll woodland/forest	Vulnerable	Vulnerable	1	43	11.9
Superb Parrot	Terrestrial	Dry sclerophyll woodland/forest	Least concern	Vulnerable	1	185	11.0
Malleefowl	Terrestrial	Mallee woodland	Vulnerable	Vulnerable	1	5	9.0
Northern Rufous Scrub-bird	Terrestrial	Rainforest	Endangered	Endangered	2	14	6.1
Southern Rufous Scrub-bird	Terrestrial	Rainforest	Endangered	Endangered	2	29	5.0
Australasian Bittern	Wetland		Endangered	Endangered	1	40	12.3
Lord Howe Woodhen	Wetland		Endangered	Endangered	1	1	19.0

Further Information

For more information or to become a *Friend of the Index* and receive updates on the progress of the project please contact: Dr Elisa Bayraktarov; e.bayraktarov@uq.edu.au

The data underpinning the index was contributed by many different individuals and organisations, including Commonwealth, State and Territory agencies, research institutions, environmental non-government organisations 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 TSX and to produce reports tailored to your particular needs.

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