Science for Saving Species

Research findings factsheet

Project 3.1

Threatened Species Recovery Hub

National **Environmental Science** Programme

Factsheet: A Threatened Bird Index for Australia

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 Australian birds

Here, the national Threatened Bird Index (TBX) is shown (Figure 1A). In its first iteration, this index incorporates data from 43 threatened bird species and subspecies (Vulnerable, Endangered or Critically Endangered under the EPBC Act and/or as assessed by BirdLife Australia - see Table 1), which comprise about 28% of Australia's threatened birds. 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 TBX value given the current data is 0.48. This suggests that the relative abundance of threatened birds for which we have information has decreased by 52% between 1985 and 2015. While the overall index value in 2015 is 0.48, individual species have TBX values between 0.31 (a 69% decrease) and 0.72 (a 38% decrease).

What should we know about the data?

This index is based on 5,320 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 43 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 national index are representative of most eastern states but are marginal for Western Australia and the arid zone (Figure 1B). The number of sites monitored (Figure 1C) has substantially increased since around 1992; while the number of species monitored increased from 17 species in 1992 to 41 in 2010 (Figure 1D). In combination, this has resulted in a huge increase in the time series available; from 1,024 in 1992 to 4,484 in 2010.

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 does not include data for all of Australia'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. Also, monitoring data are biased to the eastern states, but marginal for Western Australia and the arid zone. 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.

- The index includes about 10 species or less for the years 1985 to 1989, 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.

- Unsurprisingly, there are limited appropriate monitoring data for remote areas (though it is also true that fewer birds in remote regions are listed as threatened).

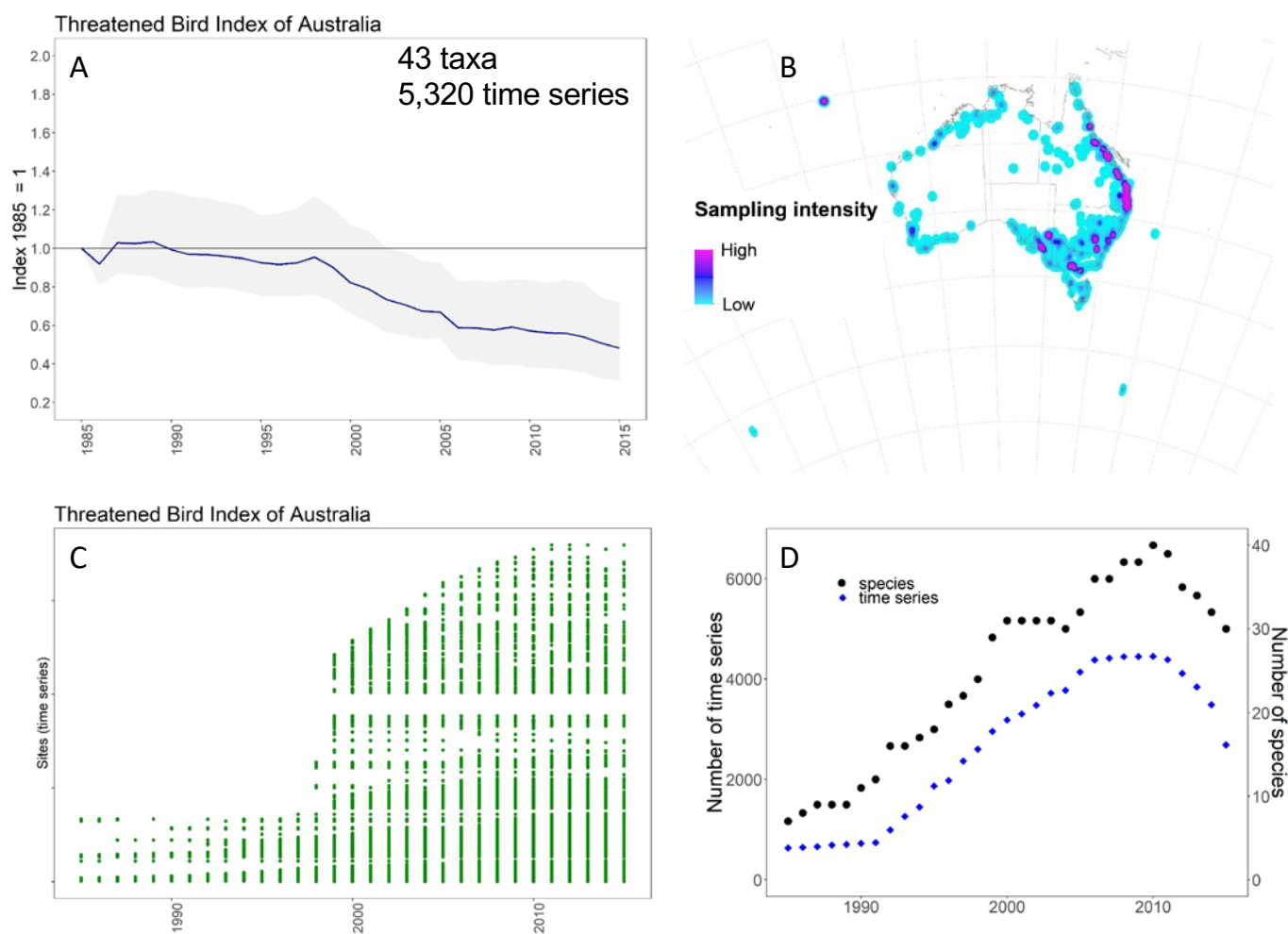*Australian Fairy Tern. Photo: G. Ehmke, BirdLife Australia.*

Threatened Bird Index of Australia

A — 43 taxa / 5,320 time series

B — Sampling intensity: High / Low

Threatened Bird Index of Australia

C

D — species / time series

Figure 1 (above):

A) The Threatened Bird Index (TBX). 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 Australia. 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.

Eastern Regent Parrots. Photo: G. Ehmke, BirdLife Australia.

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

Time-series length (mean ± SD): 15.9 ± 7.8
Number of samples (years) per time series (mean ± SD): 10.7 ± 6.3
Number of data sources in Index: 35
Number of taxa in Index: 43

Taxon name	Functional group	Functional sub-group	BirdLife Australia status	EPBC status	# data sources	# time series	Mean time-series length
Black-browed Albatross	Marine	Albatrosses and Giant-Petrels	Least Concern	Vulnerable	2	2	33.5
Grey-headed Albatross	Marine	Albatrosses and Giant-Petrels	Endangered	Endangered	1	1	18.0
Northern Giant-Petrel	Marine	Albatrosses and Giant-Petrels	Least Concern	Vulnerable	1	17	14.0
Shy Albatross	Marine	Albatrosses and Giant-Petrels	Vulnerable	Vulnerable	2	3	12.3
Southern Giant-Petrel	Marine	Albatrosses and Giant-Petrels	Least Concern	Endangered	2	10	35.8
Wandering Albatross	Marine	Albatrosses and Giant-Petrels	Critically Endangered	Vulnerable	1	1	55.0
Australian Fairy Tern	Marine	Gulls Terns Noddies Skuas Jaegers	Vulnerable	Vulnerable	2	51	10.1
Houtman Abrolhos Lesser Noddy	Marine	Gulls Terns Noddies Skuas Jaegers	Endangered	Vulnerable	1	8	17.9
Australian Gould's Petrel	Marine	Petrels and Shearwaters	Vulnerable	Endangered	1	1	8.0
Grey Petrel	Marine	Petrels and Shearwaters	Endangered		1	3	4.0
Curlew Sandpiper	Shoreline (migratory)		Critically Endangered	Critically Endangered	2	851	20.1
Far Eastern Curlew	Shoreline (migratory)		Critically Endangered	Critically Endangered	2	927	18.6
Great Knot	Shoreline (migratory)		Endangered	Critically Endangered	2	600	14.8
Greater Sand Plover	Shoreline (migratory)		Vulnerable	Vulnerable	2	439	14.9
Lesser Sand Plover	Shoreline (migratory)		Endangered	Endangered	2	586	19.1
Red Knot	Shoreline (migratory)		Endangered	Endangered	2	462	15.2
Capricorn Yellow Chat	Terrestrial		Endangered	Critically Endangered	1	11	7.8
Eastern Regent Parrot	Terrestrial		Endangered	Vulnerable	2	76	12.5
Helmeted Honeyeater	Terrestrial		Critically Endangered	Critically Endangered	1	1	26.0
Northern Eastern Bristlebird	Terrestrial		Critically Endangered	Endangered	1	33	10.3
Orange-bellied Parrot	Terrestrial		Critically Endangered	Critically Endangered	1	7	24.3
Baudin's Black-Cockatoo	Terrestrial	Dry sclerophyll woodland/forest	Endangered	Vulnerable	1	26	5.4
Carnaby's Black-Cockatoo	Terrestrial	Dry sclerophyll woodland/forest	Endangered	Endangered	1	93	5.5
Painted Honeyeater	Terrestrial	Dry sclerophyll woodland/forest	Vulnerable	Vulnerable	1	104	11.7
Southern Squatter Pigeon	Terrestrial	Dry sclerophyll woodland/forest	Least Concern	Vulnerable	1	43	10.6
Superb Parrot	Terrestrial	Dry sclerophyll woodland/forest	Least Concern	Vulnerable	1	220	11.1
Southern Eastern Bristlebird	Terrestrial	Heathland	Endangered	Endangered	1	14	13.2
Western Ground Parrot	Terrestrial	Heathland	Critically Endangered	Critically Endangered	1	2	9.0
Christmas Island Goshawk	Terrestrial	Island endemic	Endangered	Endangered	1	29	10.6
Christmas Island Grey-capped Emerald-Dove	Terrestrial	Island endemic	Near Threatened	Endangered	1	112	10.9
Christmas Island Thrush	Terrestrial	Island endemic	Near Threatened	Endangered	1	120	10.8
Kangaroo Island Glossy Black-Cockatoo	Terrestrial	Island endemic	Endangered	Endangered	1	6	18.0
Black-eared Miner	Terrestrial	Mallee woodland	Endangered	Endangered	2	84	13.4
Mallee Emu-wren	Terrestrial	Mallee woodland	Endangered	Endangered	1	25	10.0
Malleefowl	Terrestrial	Mallee woodland	Vulnerable	Vulnerable	1	86	16.8
Red-lored Whistler	Terrestrial	Mallee woodland	Vulnerable	Vulnerable	1	40	10.0
Northern Rufous Scrub-bird	Terrestrial	Rainforest	Endangered	Endangered	2	21	7.2
Southern Rufous Scrub-bird	Terrestrial	Rainforest	Endangered	Endangered	2	29	5.0
Gouldian Finch	Terrestrial	Tropical savanna woodland	Near Threatened	Endangered	3	52	14.0
Southern Black-throated Finch	Terrestrial	Tropical savanna woodland	Vulnerable	Endangered	1	6	8.7
Western Purple-crowned Fairy-wren	Terrestrial	Tropical savanna woodland	Endangered	Endangered	2	23	12.7
Australasian Bittern	Wetland		Endangered	Endangered	1	95	12.6
Lord Howe Woodhen	Wetland		Endangered	Endangered	1	1	19.0

Threatened Species Recovery Hub

National Environmental Science Programme