

ABC News Fact check: Are 75pc of Australia's living species unknown?

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Australia may be known for its unique plants and animals, but how many do we actually know about?

Jo Harding is the manager of Bush Blitz, a program supported by federal and state government agencies and research institutions, which documents plants and animals around Australia, leading to the discovery of hundreds of new species.

Ms Harding recently told the ABC's RN Breakfast: "There's estimated to be about 75 per cent of Australia's biodiversity that's largely unknown. So there's certainly a lot out there still to find. We've discovered 700 new species so far, that's over the last approximately four years, and we're still counting."

On National Threatened Species Day, ABC Fact Check investigates whether Australia really does only know about a quarter of its plants and animals.

Undiscovered and undescribed species

The word 'biodiversity' has a complex scientific definition, but generally speaking, it is used as a catch-all phrase for all plants, animals and other living organisms in a particular area, a spokeswoman for Bush Blitz said.

It covers all types of plants (including algae) and fungi as well as vertebrates (such as mammals, reptiles, fish and birds) and invertebrates (such as insects and octopuses) in both marine and land environments.

A recent CSIRO publication on biodiversity says the scientific definition "includes more than just organisms themselves".

"Its definition includes the diversity of the genetic material within each species and the diversity of ecosystems that those species make up, as well as the ecological and evolutionary processes that keep them functioning and adapting," the publication said.

"Biodiversity is not simply a list of species, therefore. It includes the genetic and functional operations that keep the living world working, so emphasising inter-dependence of the elements of nature."

Professor Kris French, a scientist at the University of Wollongong, tells Fact Check there's also an important difference between 'discovered' and 'described' species.

According to Professor French, an undiscovered species is one that's never been seen before. But an undescribed species, which is more commonly spoken about in scientific literature, is different.

Undescribed species are species that may have been found before, maybe in different areas or by different people, but which haven't been formally identified. It is then up to an expert to examine the specimen to ensure it really is an undescribed species. The expert will then write a description for the species. Once the description of the new species has been established and published, it is called a described specimen.

This means that all described species have been discovered, but not all discovered species have necessarily been described.

Where the 75pc estimate comes from

Ms Harding's claim that about 75 per cent of Australia's biodiversity is unknown is based on a 2009 report published by the federal environment department. It aggregates information from a large number of sources and previous studies to calculate the number of species already discovered and estimate the number of species yet to be discovered both around the world and in Australia.

It determined that Australia had 147,579 "accepted described species", 26 per cent of its estimated total Australian species.

* includes mammals, birds, reptiles, frogs and fish

_ ^ chiefly micro-organisms _

Arthur Chapman, the author of the report, tells Fact Check: "The report relied on published information - firstly in peer reviewed literature, but where that did not exist, in the grey literature, and thirdly on unpublished expert opinion, both in Australia and overseas. In virtually all cases, expert opinion was sought to take advantage of any recent research and studies and for groups where no published estimates existed, and scientist all over the world were fully co-operative."

The report broke down the figures by classification groups, and Mr Chapman said where there were many variabilities and unknowns that made estimation of a total number of species difficult, he provided "a range of values with reasons for the best estimate where possible".

What the experts say

Dr John La Salle, director of the Atlas of Living Australia, says Mr Chapman's report is "the best starting place you've got" for Australian figures. The atlas is funded by the Federal Government and administered by the CSIRO.

Dr La Salle says global literature shows about 1.1 to 1.5 million described species, with estimates for the total number of species in the world ranging from 5 to 10 million. The claim made by Ms Harding falls within this range and Dr La Salle says he feels "very comfortable" that the claim is a "solid estimate".

Professor Nigel Stork, a biologist from Griffith University, also says the claim made by Ms Harding represents a fair estimate.

Professor Stork is an expert in invertebrates. "My own work is showing that we have probably only described a tenth of the world's terrestrial arthropods including the insects," he said.

Similarly, Professor French from the University of Wollongong says the claim is "not a bad ballpark estimate".

Mr Chapman's report has also been backed by scientists from the Australian Museum. Dave Britton, the branch head of natural sciences, says the report is the most authoritative currently available for information on species numbers in Australia.

Dr Britton says there are some problems when estimating the number of species in an area. One is that the process can be imprecise, because it often involves examining the number of species in a very

small area then extrapolating it to develop an estimate for a larger area. He also says there are often cases where the same species has been described multiple times by different experts over hundreds of years of scientific history, and this needs to be accounted for.

Martyn Robinson, a naturalist at the Australian Museum, says another possible method to estimate the number of unknown species is by examining the number of new species published each year in any given group as well as the number of unidentified species in museum collections.

Dr Britton says, in light of these difficulties, Mr Chapman's report is "pretty good" and his estimates are "quite conservative".

Internationally, Mr Chapman's report has been well received. The IUCN Red List of Threatened Species, published by the International Union for Conservation of Nature and Natural Resources, refers to Mr Chapman's report as a source of information for its statistics.

When the report was released, naturalist Sir David Attenborough said: "This report will provide a crucial reference point for all those who are acting to protect our planet for future generations."

Mr Chapman's work has also been used as reference material in other scientific literature discussing changes to biodiversity and changes in the numbers of species around the world.

The life we don't know about

The experts contacted by Fact Check say when people think of biodiversity, they tend to think of birds, bigger animals, trees and bushes. But much of the biodiversity Ms Harding was speaking of is smaller than that.

"The problem is the stuff we don't know about is the small stuff: insects, soil organisms, fungi, bacteria," Dr La Salle said.

Many unknown species are "largely invisible to the average person", said Dr Britton. "They're out there, but they're really tiny."

He says finding undescribed species means spending a lot of time looking down a microscope.

Professor Stork says there are new ways of examining species that could lead to more undescribed species being found.

"These days there is increasing interest too in evolutionary independent species that have been separated from each other by DNA techniques, without necessarily [having] any other morphological characteristics that we can use to tell them apart," he said.

Dr Britton says this means that the total number of species in Australia is much more likely to be higher than the estimate made by Mr Chapman, not lower.

The verdict

The scientists and experts who spoke to Fact Check all say it is very hard to count the number of unknown species. But those familiar with Mr Chapman's report say it is a strong piece of scientific

literature and likely to be an accurate representation of the scientific community's best estimates. Dr La Salle said: "You can't make a strong case against it."

Ms Harding's claim that "there's estimated to be about 75 per cent of Australian biodiversity that's largely unknown" checks out.

Sources

- Jo Harding, ABC RN Breakfast, July 22, 2014
- Bush Blitz website
- Department of the Environment, Australian Biological Resources Study, Bush Blitz
- Macquarie Dictionary, 'biodiversity'
- CSIRO, Biodiversity: Science and solutions for Australia, July 17, 2014
- A.D. Chapman, Numbers of Living Species in Australia and the World, September 2009
- Atlas of Living Australia website, Background
- ABC Rural, Tassie boy discovers new genus of spider, July 23, 2014
- IUCN Red List of Threatened Species, 2014
- IUCN Red List of Endangered Species, Table 1: Numbers of threatened species by major groups of organisms (1996 – 2014), July 24, 2014
- Peter Garrett, media release, Australia a global leader in biodiversity knowledge, September 29, 2009
- Brett Scheffers and others, What we know and don't know about Earth's missing biodiversity, September, 2012