



Natalie Barrett, the database manager at the Australian National Insect Collection in Canberra, studies a collection of ants.

Photo: Gary Schafer

From drawer to database

In a quiet office that smells of mothballs, Natalie Barrett extracts a dung beetle from a drawer lined with specimens.

The database managers at the Australian National Insect Collection in Canberra uses forceps to delicately arrange several labels pinned to the beetle so that she can read the tiny words that describe when and where it was collected and who collected it. Sometimes there'll be information about how the insect was captured and what its habitat was like. Sometimes the handwritten words are so small that she must look at them through a microscope.

Barrett enters the information into a database on her computer and moves on to the next beetle. Dung beetles are easy. The wings of moths and butterflies can fall apart when handled and dragonflies have a tendency to lose their heads.

Across the country hundreds of others like Barrett painstakingly transform the mass of information about Australia's plants and animals into digital form.

"You get to travel the country in a way, because you're always going to different localities with the specimens," Barrett says.

"They come from all over Australia, so if you think about it like that, and think about the interesting things they do... that helps to make [databasing] interesting, but it can be fairly mindless and tedious as well.

"Some people really like it and other people don't. I think it's just having that mindset to realise what you're doing is for a contribution to science."

Their work to database the

AUSTRALIANS BIODIVERSITY WITH NYSSA SKILTON

nation's species is now part of an ambitious project to create an online Australian encyclopaedia of biodiversity.

The *Atlas of Living Australia*, which was allocated \$30 million in the Federal Government's budget last year, aims to draw together information on all Australian species and make it freely accessible online.

The database will include information on specimens held in Australia's natural history collections, including the Australian National Wildlife Collection, the Fish Collection and the Herbarium, as well as data from field observations of living organisms.

Imagine a website where you can view detailed images of Australia's species, listen to audio files of the noisier creatures, watch videos of animals in their own habitats and study maps of where they occur across the continent.

Scientists can upload data about species to answer questions about what habitats certain species prefer, and what effects changes in their habitats may have. Land managers can use the data to help them determine where to locate national parks, or how to better conserve endangered species.

Atlas of Living Australia director Donald Hobern says the importance of properly managing Australia's biodiversity data is growing as human pressures on

the environment and climate change increasingly affect our flora and fauna.

"Getting the best understanding we can of where wildlife is concentrated now, where different species are found and what their needs are likely to be into the future is really critical."

Hobern says information about Australia's biodiversity is scattered across the country, throughout the scientific literature and even in overseas collections.

He wants to gather it in one place where it is freely accessible to scientists and the public.

"We want to make sure it's as easy as possible for that information to flow into a shared pool where we can all benefit from it in the future, rather than it getting lost or disappearing into somebody's hard drive."

Hobern envisages an army of field workers – from organisations including CSIRO, universities and special-interest groups such as Birds Australia – will record and upload information on the website to create a more complete picture of Australia's biodiversity.

It is a similar process to gathering climate data for weather forecasts. Weather tracking depends on satellites, weather monitoring stations and also individuals who maintain small weather stations in their backyards.

"In the same way, I think for us really to be able to take good care of the biodiversity around us, and to understand what's happening to it, we need to make use of every source of information we've got available," Hobern says.

But there's still a lot of catching up to do.

The Australian National Insect

Collection contains an estimated 11 million specimens, of which about 4 per cent has now been databased. One drawer of

specimens, such as the drawer of bull ants pictured, can take two solid days of work to transfer the information about the specimens online. And collections are not often funded specifically for databasing. It's more likely to occur as a by-product of research.

Hobern's not overwhelmed by the magnitude of the task.

"I feel excited. I'm coming to this with full recognition that we're not going to be able to do everything," he says.

"But on the other hand I think it's going to be fairly easy for us in the time that we've got to create some tools which really do help to support all areas of research around Australian biodiversity."

The *Atlas of Living Australia's* Lee Belbin leads the geospatial data management team to compile information about the locations where different species have been recorded.

One area the team concentrates on is creating maps of environmental data, which include representations of mean surface temperatures and different land uses across the nation.

Scientists may be able to use the maps to study how well species are conserved in specific areas, comparing national park land for example to farm land.

They can also study how species might respond to a two-degree increase in temperature as a result of climate change.

The website could contain data on where specimens exist, references to published papers on the species, keys used to identify species, DNA sequences and the

list goes on. "I think one of the major challenges that is unique about this project in the world is just trying to handle the complexity of the biological information," Belbin says.

"As well as being useful to the public, it's going to be an exceptionally powerful tool for both the research community working in anything to do with biology, conservation or ecology, but also for policymakers."

The five-year *Atlas of Living Australia* project is funded under the Australian Government's National Collaborative Research Infrastructure Strategy until June 2012.

Organisers plan to launch the first of its tools, particularly its mapping tools, in September this year.

At the Australian National Insect Collection the oldest specimens, which were collected in the late 1800s, remain preserved in dark, temperature-controlled conditions. They lie in metal cabinets, secured in drawers lined with naphthalene, which wards off the museum beetles that like to snack on their deceased cousins. Barrett is optimistic about the future of the specimens, despite the age of some.

"There's no reason why this stuff shouldn't still be around in hundreds of years' time. But if it's not, that's why we database it."

■ This article is the second of a series of four which will explore different aspects of Australia's biodiversity. For more information about International Year of Biodiversity, visit www.cbd.int/2010