Reversing the cycle of mammal extinction

Australia has the highest rate of recent mammal extinction on the planet.

It is an alarming fact. Australia is recognised globally as one of only 17 ‘megadiverse’ countries that have extraordinarily high levels of biodiversity, and collectively these countries account for around two-thirds of the world’s biodiversity. Bioplatforms Australia is investing in the Oz Mammals Genomics Initiative, which will support genomic data collection, data access and international collaboration in an endeavour to reduce extinction rates of Australia’s unique mammal fauna.

Clue to survival is in the DNA

Active collaboration domestically and internationally is key to effective outcomes.

The project aims to sequence whole genomes from at least five different mammal species. It will also generate a comprehensive phylogenetic (evolutionary) framework for Australian mammals, including data from species that have recently become extinct. Reference genomic datasets will also be developed for threatened species. By studying these genomes, researchers will gain a better understanding of breeding systems and dispersal patterns of threatened species, and improve our understanding of extinction risks.

Australian marsupials are genetically distinct and developmentally unique. This means that marsupial genomes are especially important comparative resources for understanding mammalian diversity world-wide.

The Oz Mammals Genomics initiative is an Australia-wide collaboration involving researchers from more than 30 institutions. Core members include: Australian Museum, Australian National Wildlife Collection, Centre for Biodiversity Analysis, Department of Parks and Wildlife Western Australia, Museum Victoria, South Australian Museum, Queensland Museum, University of Adelaide, University of Canberra and the Western Australian Museum. Ongoing international collaborations include the Natural History Museum, London (UK), University of Otago, Dunedin (NZ), and the Museum of Vertebrate Zoology, Berkeley (USA). The project is also involved with the Genome 10K project, EDGE and the IUCN Conservation Genetics Specialist Group.

We have an engaged domestic and international community now with the capacity to tackle collaboratively the urgent problem of mammal extinction.
The 3 objectives of the project are:

**UNDERSTANDING AND CONSERVATION**
Build a foundation of genomic data to advance our understanding and conservation of Australia’s unique mammals.

**SUSTAINABLE GENOMICS CAPACITY**
Establish genomics as a key capacity across Australian museums and government agencies, build the community to sustain this.

**CREATE AWARENESS**
Increase awareness among the public and conservation managers of the diversity of Australian mammals and how genomics can aid in their protection.

Eight new marsupial genomes will be sequenced as part of the Oz Mammals Genomics Initiative

![Bettongia gaimardi](Photo: Woodlands & Wetlands Trust & Stephen Corey)

![Gymnobelideus leadbeateri](Photo: David Lindenmayer)

![Perameles gunnii](Photo: Andrew Weeks)

![Petrogale penicillata](Photo: Doug Beckers)

![Sminthopsis crassicaudata](Photo: Stephen Frankenberg)

![Trichosurus vulpecula](Photo: Anna MacDonald)

![Vombatus ursinus](Photo: Scott Carver)

![Burramys parvus](Photo: Andrew Weeks)

Mapping the koala genome
At this stage, very few marsupial or monotreme genomes have been studied in detail (the koala genome is one example), but these have led to some spectacular, globally significant discoveries about evolution. Given the unique history and biology of Australian mammals, these discoveries are just the tip of the iceberg. Future insights from marsupial DNA may include the development of novel antimicrobials, or an improved understanding of sex chromosome evolution.

**For more information, please visit:** https://data.bioplatforms.com/organization/about/bpa-omg

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