# Scientists sequence southern corroboree frog genome to boost conservation efforts



Scientists have successfully sequenced the genome of the southern corroboree frog, a critically endangered species native to Australia, in a significant breakthrough that may boost efforts to conserve the amphibian. The southern corroboree frog, known for its distinctive yellow and black markings, inhabits the alpine regions of Kosciuszko National Park in New South Wales. It faces severe threats from the chytrid fungus disease and habitat degradation linked to climate change, leading experts to describe the species as “functionally extinct.”

The genome sequencing, a project that spanned a decade, revealed remarkable findings about the frog’s genetic makeup. Despite the frog's small size, its genome is exceptionally large—approximately three times the size of a human genome—ranking among the largest recorded for frogs. Much of this genome consists of non-coding DNA, which does not code for proteins, and repeated genetic elements. Researchers suggest that these features hint at unusual evolutionary processes in the species’ history.

Dr Tiffany Kosch, a conservation biologist at the University of Melbourne and the lead author of the genome study published in Wellcome Open Research, explained the species’ unique status: “They’re quite unique frogs. They belong to this ancient family of frogs that’s only found in Australia. They’re about 100 million years old.” Kosch described how tissue samples collected from frogs in Australia were preserved at extremely low temperatures and transported to New York for DNA extraction and sequencing. The process involved breaking the DNA into small pieces, which were then analysed and reassembled by the Vertebrate Genome Laboratory.

Following the genome’s mapping, Dr Kosch’s team has initiated further research into the frogs’ vulnerability to chytrid fungus disease. This includes exploring selective breeding and genetic engineering approaches, with the aim of enhancing the frogs’ resistance to the pathogen over the next five to ten years. Kosch said, “The hope is that work with the southern corroboree frog could be used as a proof-of-concept for other frogs threatened by the chytrid fungus, and potentially other species threatened by climate change. The genome is really just the first step in helping us get there.”

Other experts have underscored the importance of the genome sequencing. Dr Simon Clulow, an associate professor in conservation ecology at the University of Canberra who was not involved in the research, noted that having a complete genome sequence facilitates investigations into genetic traits, especially those related to disease resistance. He stated, “The main impact on corroboree frogs, as with many frogs around the world... is an invasive disease called chytrid fungus. One potential avenue for helping the species overcome the disease was identifying resistant genetic traits, and mapping the genome was a really useful step towards this sort of goal.”

Professor Nicki Mitchell, a zoologist at the University of Western Australia and a Biodiversity Council member, commented on the broader context of frog genome research, describing it as a field still in its early stages. She said, “For various reasons, frogs have been one of the slowest groups in the vertebrate world to have genomes completed,” citing larger genome sizes and complexities such as duplicated chromosomes in some species. Highlighting the southern corroboree frog’s conservation priority, she stated, “This was probably the highest priority for an Australian frog genome, given it was our most high profile amphibian on the precipice of extinction.”

Despite recognition of the species’ importance, challenges remain regarding funding for biodiversity conservation. According to Mitchell, while the southern corroboree frog is among 110 priority species under Australia’s Threatened Species Action Plan, the total number of species listed as threatened exceeds 2,200 under the Environment Protection and Biodiversity Conservation Act. Mitchell noted that current funding for biodiversity is “minuscule compared to what we need,” with the Biodiversity Council advocating for nature spending to be raised to at least 1% of the federal budget. She described the southern corroboree frog as “a symbol of the twin crises that we’re facing as a globe, of climate change and biodiversity loss.”

The genome sequencing of the southern corroboree frog represents a crucial foundation for future conservation strategies, with the potential to inform scientific efforts aimed at combating disease and enhancing species resilience in the face of environmental change.

Source: [Noah Wire Services](https://www.noahwire.com)

## References

* <https://knowablemagazine.org/content/article/living-world/2024/new-strategies-offer-hope-for-frogs-dying-from-fungus> - This article discusses the genome sequencing of the southern corroboree frog and its potential to aid in developing disease-resistant frogs, aligning with the article's mention of genome sequencing efforts to combat chytrid fungus disease.
* <https://experiment.com/projects/increasing-host-resistance-to-combat-disease-causing-mass-amphibian-extinction> - This project focuses on identifying immune genes associated with disease resistance in corroboree frogs, supporting the article's mention of research into enhancing the frogs' resistance to chytrid fungus disease.
* <https://www.nqcc.org.au/corroboree_frogs_threatened_extinction> - This page highlights the challenges faced by corroboree frogs due to chytrid fungus and habitat degradation, corroborating the article's mention of these threats leading to the species being described as 'functionally extinct.'
* <https://www.unimelb.edu.au/newsroom/news/2024/december/engineering-immunity-in-frogs-to-fight-fungal-disease> - This news release details efforts by the University of Melbourne to genetically engineer immunity in frogs against chytrid fungus, supporting the article's mention of research into enhancing the frogs' resistance to the pathogen.
* <https://www.dcceew.gov.au/environment/biodiversity/threatened/recovery-plans/southern-corroboree-frog-and-northern-corroboree-frog> - This national recovery plan outlines actions to ensure the long-term viability of the southern corroboree frog, aligning with the article's mention of genome sequencing as a crucial foundation for future conservation strategies.
* <https://www.nationalparks.nsw.gov.au/conservation-programs/southern-corroboree-frog-conservation-project> - This conservation project focuses on battling chytrid fungus and protecting frog habitat, supporting the article's mention of efforts to combat the disease and habitat degradation threatening the species.
* <https://www.theguardian.com/environment/2025/apr/30/tiny-functionally-extinct-frog-could-be-saved-after-scientists-sequence-genome> - Please view link - unable to able to access data