

Endangered Tasmanian devils insured against future threats

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Credit: Kunal Kalra on Unsplash

The largest ever analysis of Tasmanian devil genetics has found

protected populations are as robust as wild ones, raising hopes for the endangered species' survival.

Last year a number of threatened species recovery plans were removed by the former government; now new research shows "insurance populations"—isolated from threats to prevent extinctions—could help preserve many animals.

Specifically, one of the largest wildlife [genetic studies](#) in the world has found that insurance populations of the endangered Tasmanian devil, in zoos and on Maria Island off the east coast of Tasmania, are as genetically diverse as wild populations. This means insurance animals are as healthy and likely to reproduce and can be reintroduced into the wild, bolstering the species' numbers.

The research, published *iScience*, is led by the University of Sydney's Wildlife Genomics Group, in collaboration with the Tasmanian government's Save the Tasmanian Devil Program.

At their height, Tasmanian devils—which are only found in their namesake state—were found at densities of 1.3 devils per km². Populations across most of the state have declined by an estimated 80% since 1996 due to a contagious cancer, devil facial tumor disease (DFTD). The disease is not the only issue facing devils: they are also threatened by roadkill, habitat destruction, and climate changes. Although there have been no local extinctions as a result of DFTD, populations remain sparse.

The fact that the insurance population animals are as genetically robust as the wild ones shows specific breeding strategies are effective, study co-author Dr. Carolyn Hogg says.

"The consistency is likely thanks to our ongoing strategic management of

the insurance population, which includes over 37 zoos, as well as devils on Maria Island.

"By integrating orphan joeys that have been exposed to DFTD in the wild, we have ensured we have captured any genetic changes as a result of the disease."

James Biggs, Director of Conservation and Population Management, Zoo and Aquarium Association, who manages the protected Tasmanian devil population, said: "This program demonstrates the role and value of zoos in buying time for a species until the primary threats are addressed, and [wild populations](#) can be restored."

Dr. Hogg added that the breeding strategy can be applied to other [endangered species](#) and is therefore a useful tool to address the global biodiversity crisis. "We have already applied it to species which are part of different safe haven (fenced site) populations on the Australian mainland, such as bilbies and woylies—an extremely rare, small marsupial," she said.

Around 1 million species already face extinction worldwide, many within decades, according to the recent Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) assessment report. According to the Australian Conservation Foundation, Australia leads the world in mammal extinctions.



Capturing devils for genetic analysis. Credit: Dr Carolyn Hogg/USYD

Testing the devils

Between 2012–2021, the researchers examined more than 1,300 wild and insurance population Tasmanian devils. They were collected from 31 sites across the species' range—over 64,519 square km.

They analyzed both genome-wide diversity and the diversity of over 500 critically important genes associated with immunity and reproduction and found no substantial differences between wild and insurance animals.

Additionally, they found that, despite prior University research that suggested low [genetic diversity](#) in the species, there are in fact six genetically diverse groups of devils spread throughout Tasmania.

"Improving [gene flow](#) between these regions may lead to improved genetic diversity in the [species](#)," Dr. Hogg said.

The researchers commenced trial releases of insurance [population](#) devils in 2015. With the new study's results in tow, they will continue to monitor animals' health and genetics for at least four to six years—equivalent to two to three generations of devils.

The world's largest carnivorous marsupial, the endangered Tasmanian devil is found only on the island state of Tasmania. It was once prevalent throughout Australia but is thought to have become extinct on the mainland around 400 years ago due to predation by wild dogs. The devils' feisty name is courtesy of early European settlers, who observed them angrily fighting for mates and defending themselves against predators.

More information: Katherine A. Farquharson et al, Restoring faith in conservation action: Maintaining wild genetic diversity through the Tasmanian devil insurance program, *iScience* (2022). [DOI: 10.1016/j.isci.2022.104474](#)

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