

# Threats loom for Australia's outback biodiversity

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Waterholes in the Simpson Desert. Credit: Glenis McBurnie

(Phys.org) —Biologists have developed a new approach to identify major threats to the aquatic habitats that support freshwater life in drier parts of Australia.

In a study published in the journal *Global Change Biology*, researchers worked on some of Australia's most iconic outback sites, including the central Australian gorges, mound springs and the Cooper's Creek, Georgina, and Diamantina river region in western Queensland, to

identify the types of habitat that are likely to be vulnerable to climate change and how management may address this.

Seeking to guide conservation planning, researchers Professor Jenny Davis, Dr Alexandra Pavlova, Associate Professor Paul Sunnucks and Dr Ross Thompson, from the Australian Centre for Biodiversity at Monash University, characterised the different types of aquatic habitats in arid regions as either evolutionary refugia or ecological refuges.

Professor Davis said the method enabled them to detail the vulnerabilities of these habitats, and the animal life they support, to a [changing climate](#).

"Look beyond the red dunes, dry plains and rocky outcrops of inland Australia and it is the presence of water, especially groundwater, that sustains rare and unique biodiversity," Professor Davis said.

"Evolutionary refugia are permanent springs, fed by groundwater, that contain relict species from wetter times, in some cases from millions of years ago. These [ancient species](#) will become extinct if a spring dries through over-pumping of groundwater.

"Ecological refuges are the waterholes that fill and flow after flooding rains. These are important for mobile species such as waterbirds and fish. These waterholes and the species they support are vulnerable to dams and off-takes that stop beneficial flooding."

The research highlighted the importance of groundwater in a drying and warming world as a buffer for arid springs and waterholes against climatic changes.

"The gorges, springs and riverine [waterholes](#) support many aquatic species, including waterbirds, fish and a wide variety of invertebrates, as

well as being a focus for terrestrial birds, reptiles and marsupials," Professor Davis said.

"Managing this water wisely is critical, with adaptive management an important tool for ensuring the future survival of many of the outback's iconic organisms."

The rivers form one of the last near-natural desert river systems left in the world, transforming from an arid environment as masses of water travel hundreds of kilometres from the Great Dividing Range in Queensland to South Australia's Lake Eyre. Nearby, the mound springs fed by the Great Artesian Basin, represent islands of water in a sea of desert, and contain unique collections of plants and animals.

The study emphasised the necessity of ensuring that outback industries, including mining, pastoralism and tourism, manage water wisely.

"Unique freshwater ecosystems are experiencing rapid declines in biodiversity due to a range of threats including large scale irrigation, mining, water pollution and invasive species like mosquito fish," Professor Davis said.

"Across all of outback Australia there is an urgent need to manage the threats to inland aquatic biodiversity and protect the ability of aquatic habitats to cope with changing climates."

**More information:** [onlinelibrary.wiley.com/doi/10 ...  
1/gcb.12203/abstract](https://onlinelibrary.wiley.com/doi/10.1111/gcb.12203/abstract)

Provided by Monash University

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