

Australians called on to rescue dwindling river life

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Environmental scientists have urged Australians to rally to the rescue of endangered lungfish and other river wildlife by restoring catchments and river banks, especially in cities.

New research at the National Environmental Research Program's Environmental Decisions Hub (NERP EDH) has found that climate change and urbanisation are putting a 'double whammy' on the nation's freshwater wildlife – and identifies several ways the public and landholders can come to the rescue of imperilled species.

"While [freshwater habitats](#) occupy less than one per cent of the Earth's surface, they are a major contributor to global biodiversity," says Dr Chrystal Mantyka-Pringle of NERP EDH and The University of Queensland (UQ). "They support 10 per cent of all known species on Earth, and one third of all vertebrates.

"However, in recent decades, freshwater ecosystems worldwide have suffered population declines and a loss of species richness."

Dr Jonathan Rhodes of NERP EDH and UQ says that freshwater species in southeast Queensland, where the scientists carried out the study, are suffering substantial declines.

"With its lungfish, gobies, catfish, rainbowfish, eels, bass, snails, damselflies, limpets, dragonflies, water striders, water beetles and backswimmers, southeast Queensland currently contains the richest

range of freshwater species in Australia," says Dr Rhodes.

"But this area of the state has already lost a great deal of its native vegetation due to urbanisation and agriculture, and this has significantly changed river flows in catchment areas and increased the amount of sediment, resulting in declining water quality and the loss of aquatic biodiversity.

"As southeast Queensland is one of Australia's fastest growing metropolitan regions, its impact is likely to put threatened species under even greater stress."

To save the nation's freshwater habitats, the researchers developed mathematical models to identify individual as well as combined effects of climate change and land-use on freshwater species.

"Previous research shows that the decline is caused by climate change and urbanisation, but we didn't know the exact reasons," says Dr Mantyka-Pringle. "We show that actually land-use and climate change are combining to put a 'double whammy' on the freshwater species."

The combined impact results in higher runoff of nutrients, sediment and toxic pollutants from urbanisation, as well as higher water temperatures and higher nutrients (due to greater runoff from higher rainfall and floods) caused by [climate change](#), Dr Mantyka-Pringle explains.

"These are the main drivers of declines in fish, crustaceans and insects in freshwater habitats," she says.

The best strategy to decrease the impact of this 'double whammy' is to replant native vegetation around catchment areas, Dr Rhodes says.

"Restoring riparian habitats is a common way to reduce runoff of pollutants from land. The plants filter nutrients, trap sediment and

provide shade in the area, which keeps water temperatures lower."

Dr Mantyka-Pringle says additional incentives should be provided to landowners to restore river banks and native [freshwater](#) species. "These include fencing cattle off from river banks, as well as help to regular clear weeds such as lantana, glycine, mistflower, broadleaved paspalum, blue billygoat weed, and crofton weed."

More information: Mantyka-Pringle, C. S., Martin, T. G., Moffatt, D. B., Linke, S., Rhodes, J. R. (2014), "Understanding and predicting the combined effects of climate change and land-use change on freshwater macroinvertebrates and fish." *Journal of Applied Ecology*, 51: 572–581. [DOI: 10.1111/1365-2664.12236](https://doi.org/10.1111/1365-2664.12236)

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