

Groundwater research may be forest lifesaver

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Forest study site near Kangaloon Credit: Nicole Grant

For the first time researchers have identified the point where removing groundwater will damage the health of a forest.

It has been discovered that lowering [groundwater](#) by as little as ten metres below the surface can kill an Australian landscape.

Professor Derek Eamus who led the research of the UTS Plant Functional Biology and [Climate Change](#) Cluster (C3), in collaboration The National Centre for Groundwater Research and Training (NCGRT) said they had reached one of the 'holy grails' in groundwater science.

"All across Australia there are vast tracts of woodland, forest and riparian vegetation that depend on groundwater for survival, particularly during drought," Professor Derek Eamus said.

"We've known that there is a good chance [trees](#) will die if we extract too much water from under these ecosystems, but until now we didn't know clearly what that cut-off was.

"By assessing the health of trees and vegetation in pristine woodland in the Sydney catchment, we hope the research will establish sustainability limits that be incorporated in all licences to extract groundwater."

An early-warning system developed by the C3 researchers could be used by Australian groundwater consumers when they are in danger of taking too much water away from the trees.

"The system is an easy way to assess if we are over-extracting groundwater," Professor Eamus said. "This is what is happening in many of Australia's major [aquifers](#), especially in the Great Artesian Basin and parts of the Murray-Darling Basin."

The researchers used a tiny heat sensor to measure the amount of water used by trees. By injecting a small amount of heat, which the rising sap then carried up the tree trunk, the researchers could measure the sap flow and calculate how much water the tree was using.

"Up to a groundwater depth of six to nine metres the forest does fine – the diversity of [tree species](#) is high and the trees develop thick trunks and heavy leaf canopies," Professor Eamus said.

"But when the water table sinks below ten metres you begin to see a steep decline in all these things.

"Even though some tree roots may go much deeper in some parts of Australia, it appears that ten metres is the point at which tree health is clearly suffering. We think that this rule broadly applies to most types of groundwater dependent ecosystem across Australia," he said.

Provided by University of Technology, Sydney

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