

Improved methods to detect and protect arid-zone groundwater-dependent ecosystems

Project information



Resilient
Landscapes

National Environmental Science Program



Photo: L Hutley

This project will use Indigenous knowledge, remotely sensed data, hydrogeological information and ecological field surveys to improve methods for detecting and mapping groundwater-dependent ecosystems, assessing risks of water extraction on flora, fauna and socio-cultural values, and monitoring changes in their extent and condition.

Project details

Surface groundwater-dependent ecosystems (GDEs) in Australia's arid zones are crucial for biodiversity and are culturally significant to Traditional Owners. As interest grows in developing water resources in these regions, there is a need for a better understanding of the ecology and socio-cultural values of GDEs and the risks associated with water extraction. The project combines Indigenous knowledge, remote sensing, hydrogeological data, and ecological surveys to detect, map, and monitor GDEs, assessing the impacts of water extraction on flora, fauna, and cultural values.

Key activities include integrating Traditional Owner knowledge, refining remote sensing tools for GDE detection, using stable isotope analysis to assess groundwater dependence, and mapping GDEs with risk assessments for groundwater drawdown. The goal is to develop tools for managing GDEs and informing water-allocation plans, with active involvement of Indigenous Rangers and relevant government agencies. Outputs will include a research plan, monitoring protocols, and communication products tailored to community needs.

Key research areas

To help inform the sustainable management of groundwater-dependent ecosystems, this project is:

- collaborating and engaging with Traditional Owners to inform critical areas of work
- assessing groundwater dependence using stable isotopic and plant physiological metrics
- refining remote-sensing tools to identify and monitor arid-zone groundwater-dependent ecosystems
- mapping and conducting risk assessments of arid-zone terrestrial and aquatic groundwater-dependent ecosystems to better inform water-allocation planning and decision-making.



Sandhill tee-tree. Photo: L Hutley

What is the NESP Resilient Landscapes Hub?

The Australian Government's National Environmental Science Program (NESP) funds environment and climate research. NESP currently supports four multi-disciplinary research hubs, each hosted by an Australian research institution. The program:

- provides evidence for the design, delivery and on-ground outcomes for environmental programs
- helps decision-makers, including those from Indigenous communities, build resilience
- supports positive environmental, social and economic outcomes.

This project is funded by the NESP Resilient Landscapes Hub, which is hosted by The University of Western Australia. The Resilient Landscapes Hub's research supports the management of Australia's terrestrial and freshwater ecosystems to make them more resilient to extreme events and pervasive pressures.



Further information

The project is being led by Professor Lindsay Hutley from Charles Darwin University.

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