

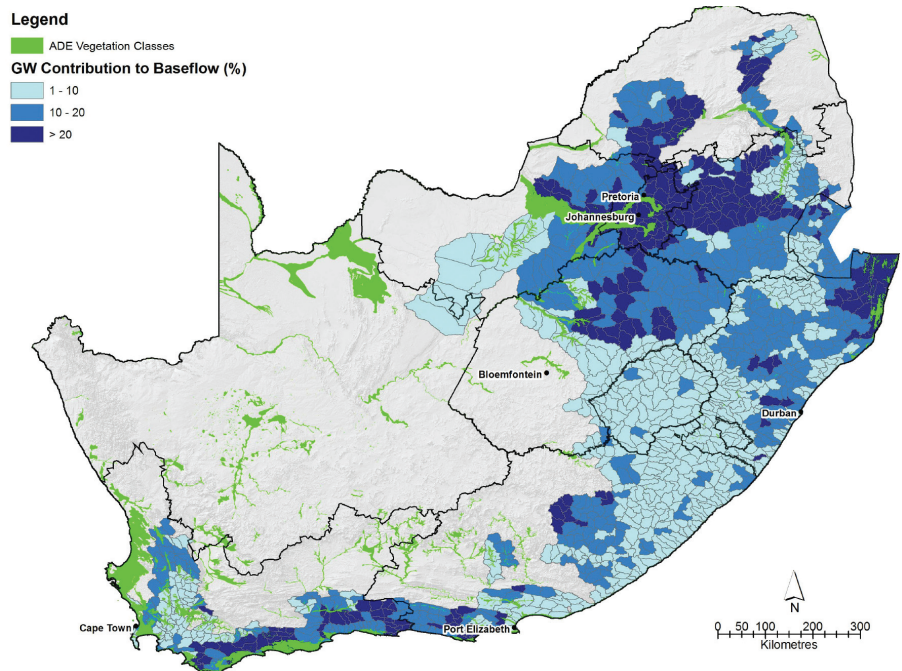
Focus on CSIR Research in Water Resources

Aquifer dependent ecosystems

Aquifer dependent ecosystems (ADEs) rely on groundwater in aquifers. They may occur where groundwater discharges from the aquifer to the surface environment, such as springs, wetlands and seeps, or where aquifers contribute to the baseflow of rivers. In terrestrial and riparian ecosystems, groundwater is not seen at the surface but is tapped by plants and used as 'cryptic' discharge. ADEs are important indicators of aquifer health and flow regimes. An oasis is a classic ADE, and like many in arid and semi-arid areas, its distinctive ecohydrology makes it an important biodiversity hotspot.

The Groundwater Sciences group at the CSIR is conducting a programme of research on ADEs, assessing their reliance on groundwater and their ecological importance. The map shows the probable distribution of ADEs at a national scale in South Africa, based on calculated groundwater fed baseflow to rivers and vegetation types.

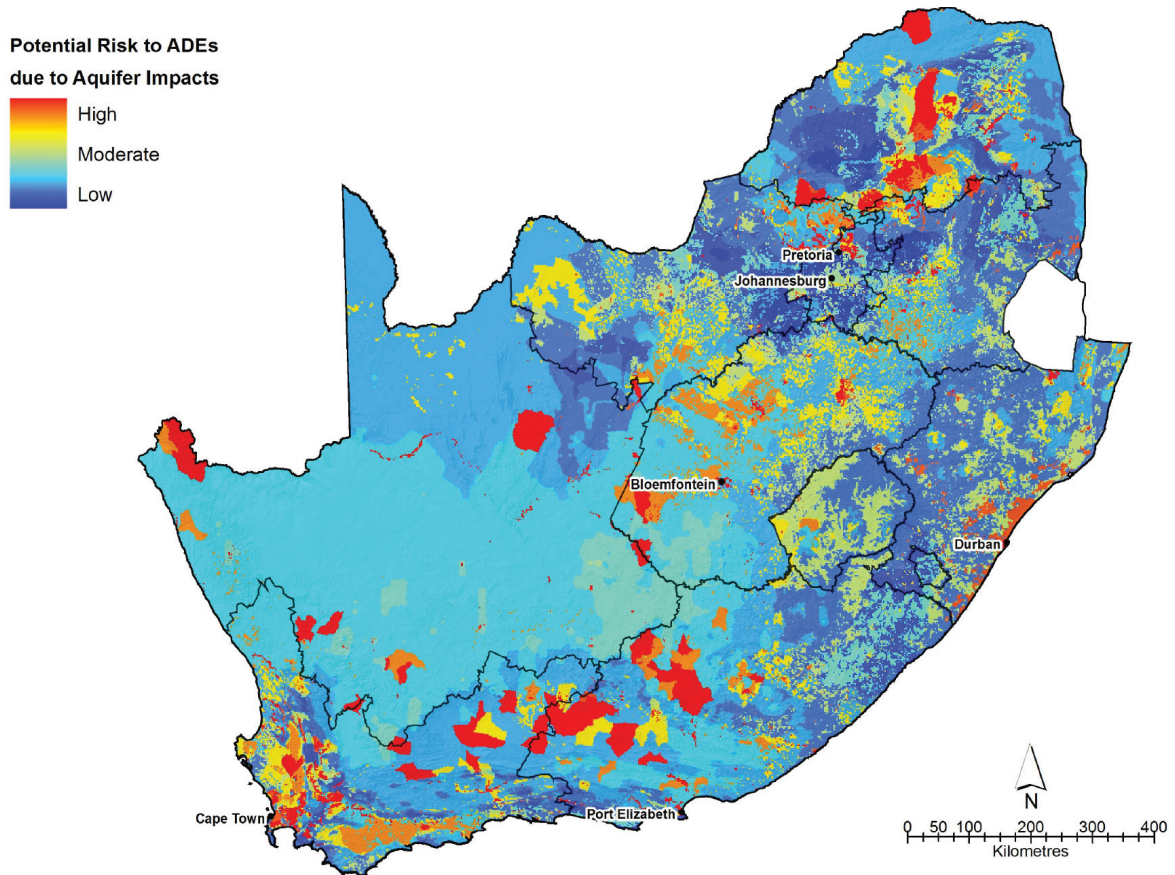
Riparian zones are linear oases or green corridors. They are usually dependent on groundwater stored in alluvial aquifers and episodic recharge



Probable occurrence of Aquifer Dependent Ecosystems at a national scale in South Africa.

by surface water. The picture shows the riparian zone of the Shingwedzi River in the northern Kruger Park, where researchers are starting to examine the dependence on groundwater in more detail.





Because ADEs are dependent on aquifers, they are vulnerable to changes in groundwater flow regimes. The map (above) shows the risk posed to ADEs based on an assessment of discharge vulnerability and potential hazards (groundwater abstraction and polluting land-use). The high risk (red) quaternary catchments are areas where groundwater is currently over-abstracted.

This map gives water resource planners and catchment managers a coarse scale screening tool to indicate where ADEs are vulnerable to threats. South African water legislation aims to protect water for use in support of sustainable development. Some groundwater may be allocated to the environment and protected for its ecological role, whereas greater benefits may be derived from abstractive use of water in other areas. ADE research aims to inform these decisions and improve impact prediction.

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