



# The Southern Gulf Water Resource Assessment

CSIRO has completed, for the Australian Government, an investigation of the opportunities and risks of water resource development in the Southern Gulf catchments in northern Australia.

The Southern Gulf Water Resource Assessment seeks to enable informed decisions relating to resource management and sustainable regional development in the Southern Gulf catchments. This Assessment presents information synthesised from existing datasets to assist regional-scale and on-Country planning and further place-based research.

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The Assessment provides an independent source of fundamental information on the feasibility, economic viability and sustainability of potential water developments in the study area.

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## The Southern Gulf catchments

The climate of the Southern Gulf catchments is largely hot and semi-arid. Rainfall is highly variable between wet and dry seasons and from year to year, which has major implications for evaluating and managing risks to development, infrastructure and industry.

The Southern Gulf catchments are largely intact but not pristine. They have many unique characteristics and valuable ecological assets, including wetlands of national importance and significant habitats for biodiversity conservation. Their freshwater, terrestrial and marine habitats hold great cultural, ecological and commercial value.

















Like many parts of northern Australia, a notable proportion of the Southern Gulf catchments is Aboriginal freehold land (12%). Indigenous Peoples have continuously occupied and managed the Southern Gulf catchments for tens of thousands of years. They retain significant and growing rights and interests in land and water resources, including future development and planning.

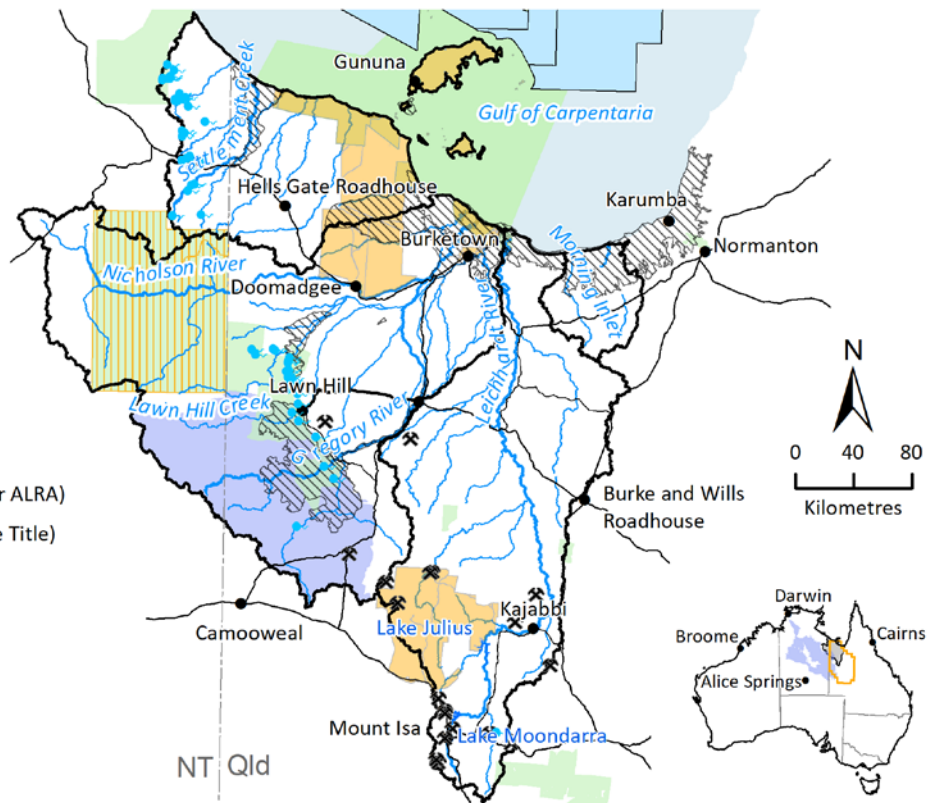
The creeks and rivers of the Southern Gulf catchments contribute about 6% of the mean annual flow into the Gulf of Carpentaria. The flow of water in the Leichhardt catchment is more regulated than most catchments in northern Australia, having five existing water storages. The Gregory River, which flows into the Nicholson River, is the largest perennial river in semi-arid Queensland.

## Overview of the Southern Gulf catchments

- The Southern Gulf catchments span roughly 108,200 km<sup>2</sup> across the Northern Territory and Queensland.
- The study area comprises the catchments of the Southern Gulf rivers: Settlement Creek, the Gregory–Nicholson and Leichhardt rivers, the Morning Inlet catchments and the Wellesley Island groups.
- The dominant land use by area is commercial cattle grazing, which occurs on 77% of the study area.
- Mining is by far the largest industry, but occupies <0.05% of the study area. Irrigated agriculture occupies about 1,400 ha (0.01% of the area).
- The population of the catchments in 2021 was approximately 22,500 people, of whom about 27% are Indigenous Australians.
- Mount Isa is the only significant urban area, with a population of about 18,000. It is demographically and socio-economically distinct from the rest of the study area.
- The study area has some unique characteristics and ecological assets of national significance.
- Of the global climate models examined, 44% projected a drier future climate over the Southern Gulf catchments and 40% projected 'little change'.
- Existing annual groundwater licences across the catchments total about 3.5 GL. Licensed surface water extractions in the Leichhardt catchment total about 106 GL. Elsewhere they are small (<7 GL).

## The Southern Gulf catchments

-  Mapped spring
-  Operating mine
-  Locality
-  NT/Qld border
-  Road
-  Minor river
-  Major river
-  Reservoir
-  Southern Gulf catchments
-  Aboriginal Land NT (Scheduled under ALRA)
-  Aboriginal Land Qld (exclusive Native Title)
-  Important wetland
-  Protected area
-  Marine park
-  Cambrian Limestone Aquifer (CLA)
-  North West Minerals Province



## What the Assessment found

The study area contains extensive alluvial clay plains and upland regions. The uplands include the Barkly Tableland, which are underlain by the Cambrian Limestone Aquifer. The Gregory River is one of the few perennial rivers in the region. It receives groundwater discharge throughout the dry season from the Cambrian Limestone Aquifer and is highly valued by local residents.

Though not pristine, the Southern Gulf catchments have many unique characteristics and valuable ecological assets, including 13 wetlands of national importance. The mangroves, salt flats, reefs and seagrass habitats of the Southern Gulf are highly productive and have high cultural value. They provide food and habitat for dugongs, green sea turtles and prawns. Marine habitats also support fishing industries, including the Northern Prawn Fishery.

With irrigation, the Southern Gulf catchments have a climate suitable for a wide range of annual and perennial horticulture, and crops and forages. However, the opportunities and risks of irrigation development around each of the major rivers are starkly different.

Multiple locations suitable for irrigated agriculture occur across the study area. The extensive Armraynald Plain flanks the Gregory River and has some of the largest expanses of grey cracking clay soils in northern Australia, spanning 1.03 million ha.

Along the Nicholson River are 23,000 ha of red sandy and loamy soils. The Leichhardt catchment has over 100,000 ha of friable soils. Next to these, and up to 1 km from the river, are heavier clay soils.

It is physically possible to extract 150 GL of water in 75% of years across the Nicholson and Leichhardt catchments, which is sufficient water to irrigated 12,000 ha of broadacre crops during the dry season. Extracting this amount would result in a 3% reduction in mean annual discharge from these two catchments to the Gulf of Carpentaria. Groundwater systems across the Southern Gulf catchments could supply approximately 40 GL of water per year. The Cambrian Limestone Aquifer in the south-west of the study area is the most promising groundwater system.

If irrigated agriculture in the study area reached a hypothetical 10,000 ha, it could generate up to \$190 million in total economic activity and support up to 360 full-time equivalent jobs. This would increase the area of land under irrigation from 0.01% of the study area to 0.11%.

The nature and scale of any surface or groundwater development depends heavily on community and government values. How any potential development proceeds in practice will have implications for environmental outcomes, including water quality. An outcome of no change in land use or water resource development is also valid.

THE SOUTHERN GULF WATER RESOURCE ASSESSMENT WAS PREPARED BY CSIRO FOR THE NATIONAL WATER GRID



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