

Water resources within the Cambrian Limestone Aquifer

This factsheet has been prepared in response to the release of an academic paper by Ndehedehe et al and associated media coverage claiming to demonstrate depletion of the Northern Territory's Cambrian Limestone Aquifer^{1,2}.

Claim: The CLA is 'getting drier' and this is linked to increased water extraction

Our response: The CLA is a vast natural system barely touched by water extraction

What is the CLA

The Cambrian Limestone Aquifer (CLA) is a large, connected groundwater system between 50 and 400 metres thick. It covers about 570,000 square kilometres, roughly the size of France.

Where is the CLA

The CLA covers a large portion of the Northern Territory (Figure 1) starting just south of Adelaide River in the north, down past Tennant Creek and almost to Alice Springs in the southeast. Part of the CLA also extends into western Queensland near Mount Isa.

What do we know about the CLA and its various aquifers

The CLA contains 3 Cambrian basins; the Daly, Georgina and the Wiso Basin. Each basin has several fractured and karstic aquifers with different:

- water levels
- water quality
- flow
- response to rainfall and water extraction.

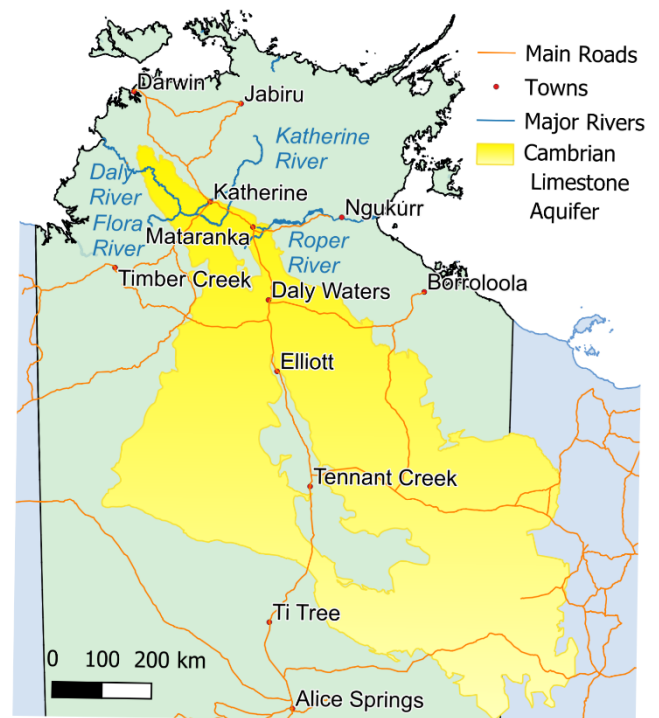


Figure 1. Indicative area of Cambrian Limestone Aquifer

² Tracking [freshwater](#) depletion in Northern Australia: A multi-satellite approach. Ecological Informatics (June 2025).

² [NT's vast Cambrian Limestone Aquifer 'getting drier', new study finds](#): ABC online, 3 August 2025.

Detailed water assessments are undertaken for each aquifer to understand their geology (rock formations) and hydrogeology (how water is stored and moves through, into and out of the aquifer). Assessments of groundwater and surface water inter-connectivity are also conducted, where relevant, to provide reliable data and an overview of water storage and quality.

Water allocation plans have been developed to carefully manage water use from the more productive aquifers including the:

- Katherine plan (Katherine Tindall Limestone aquifer)
- Ooloo plan (Ooloo Dolostone aquifer)³
- Mataranka plan (Mataranka Tindall Limestone aquifer)
- Georgina Wiso plan (Gum Ridge, Anthony Lagoon, Montejinni Limestone aquifers)
- Western Davenport plan (Arrintringa and Chabalowe Formation aquifers)

What science informs our knowledge of the CLA

Northern Territory Government hydrogeologists, alongside leading science experts from the Bureau of Meteorology, CSIRO and Geoscience Australia, consultants, universities and licensed drillers, are most qualified to provide accurate and comprehensive information on the CLA.

We gather data from:

- nearly 5,000 CLA bores
- continuous monitoring of 117 bores and 56 surface water sites
- ecosystem mapping through remote sensing and field studies.

This data is fed into integrated groundwater and surface water computer 'models' to assess the current and future water use impacts.

What is GRACE and how does it improve our knowledge of the CLA

GRACE (Gravity Recovery and Climate Experiment) satellites measure changes in gravity linked to water movement across:

- aquifers
- soil moisture
- surface water (lakes and rivers)
- snow and ice.

It provides insights into water storage changes. Groundwater change is estimated indirectly by subtracting other water components (like soil moisture or surface water) which adds some uncertainty.

GRACE data can help track long-term trends in drought recovery and water balance trends at large regional scales but is not suitable for short-term or local monitoring. The department's dedicated regional groundwater and surface water monitoring programs provide far more detailed, accurate information needed for these assessments, based on real, observed water level changes not projected water fluxes based on coarse scale gravitational field variations.

³ Updated to reflect correct name of water plan/resource (19 December 2025)

Key researcher claims and the department assessment

Claim: “The CLA is ‘getting drier’

Our response: The CLA cycles between wet and dry periods in response to long-term climate trends

Researchers analysed data from 2002 to 2022. The 2010 - 2011 wet-season observed record wet La Niña events which recharged the groundwater systems to record highs. The period from 2012 to 2022 however included 5 unusually dry years with less than average recharge, meaning CLA storage was temporarily reduced in some locations. However, rainfall records and GRACE data from 2022 to 2024 suggests storage in the CLA has since recovered to record high levels, which is supported by observed water level increases and confirms the CLA is not drying up but rather follows natural climate cycles.

The department uses all available climate data to understand natural climate variability impact on water resources. Bureau of Meteorology rainfall data from 1900 onwards shows regular wet and dry periods, with long-term average rainfall generally increasing over the 1974-2024 period. These trends are reflected in changes to groundwater storage in the CLA.

Claim: “Drying in the CLA is accelerating”

Our response: Totally unsubstantiated

There is no evidence or statistical analysis to support claims that drying in the CLA is accelerating.

The paper describes a period of steady negative trends in water storage with no evidence of acceleration. No statistical analysis, like checking for changes in the rate of decline, support claims of significant drying. Claims of speeding up are unsupported guesses without this analysis.

Claim: “Changes in CLA storage started to significantly decline after 2014”

Our response: The CLA had a drier period and then recovered

The paper estimates total water storage losses are about 6–8 cubic kilometres per year over the entire aquifer. While this sounds significant, over the vast area of the CLA, it's less than the depth of your thumbnail, around a centimetre of water lost in a year. This is not considered a significant decline. We know 2012 to 2022 included 5 below average rainfall years which led to lower than usual water storage in some areas. But we also know that since 2022 the CLA has recovered to record high levels.

Claim: “Drying in the CLA is linked to water extraction”

Our response: Totally unsubstantiated

GRACE data is not sensitive enough to distinguish between changes in water storage caused by natural climate and changes caused by water use. The paper estimates total water storage losses are approximately 6–8 cubic kilometres per year, with a range of uncertainty (error bars) from ± 0.29 to ± 0.75 cubic kilometres per year.

Water licences extracting from the CLA since 2014, use on average around 50,000 ML (0.05 cubic kilometres) per year⁴, which is a tiny proportion of the total water losses, and 10 times smaller than the uncertainty in the measurements. This means that natural environmental factors like rainfall variability dominate water storage changes. Consumptive human use (extraction) is too small to detect reliably by satellite estimation methods.

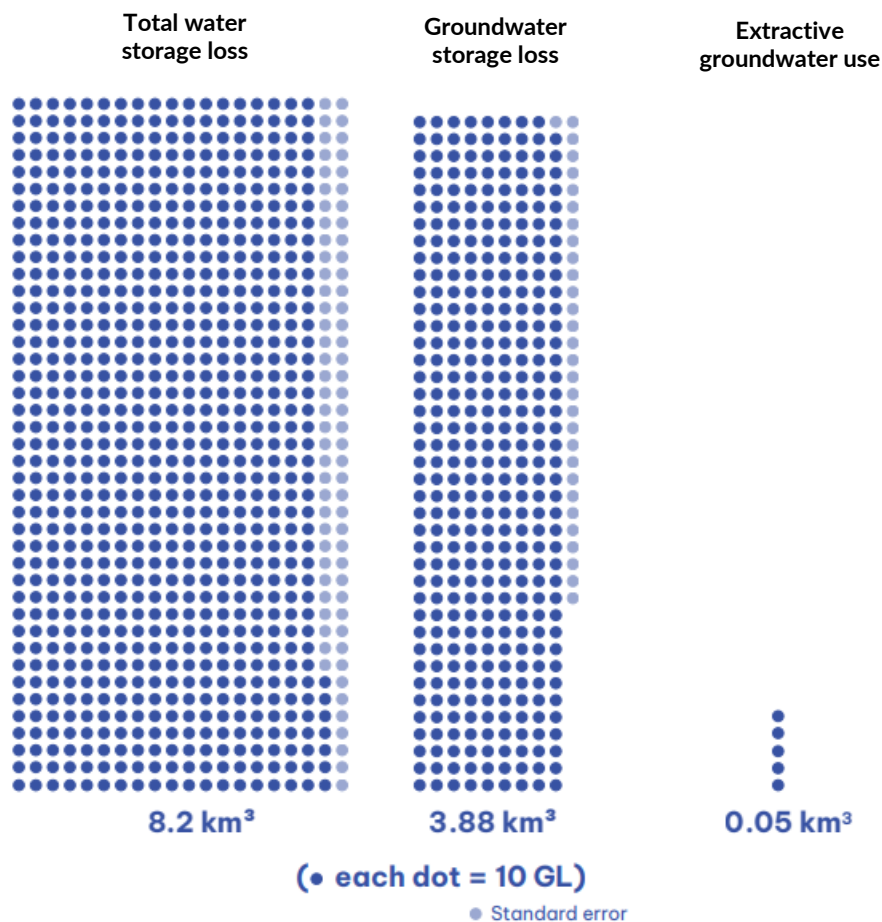


Figure 2. Infographic of claimed total water and groundwater storage losses from climate factors according to the paper, compared to water extracted under water licences. The lighter colour dots reflect the normal measurement uncertainty associated with each category.

How does new science inform NT water management

New science or technology is peer reviewed and assessed against our extensive existing knowledge base, then applied where appropriate. Water models are recalibrated regularly alongside 5 year water allocation plan reviews. Any decisions made about water under relevant legislation and regulation, are guided by scientific water availability assessments, risk assessments, ongoing monitoring and regular review.

Climate predictions for North Australia are incorporated into these reviews to assess long-term impacts on groundwater resources. Updated science is referenced and summarised in water allocation plan background reports.

⁴ This value represents average reported extractions over the 2014-2025 period from within the Katherine, Mataranka, Georgina Wiso, draft Flora, Ooloo and Western Davenport water allocation plan areas. While the nature of hydraulic connection between aquifers in these areas is subject to large uncertainties, they are all Cambrian-aged and thus could be considered part of the broader CLA system (19 December 2025).

Summary

The department welcomes new science from all collaborators. We recognise that despite having an extensive baseline knowledge, and regular updates to our water modelling, there will always be areas of scientific uncertainty that require ongoing investigation and refinement as scientific methods advance. Water planning is also an iterative process, and we continue to develop risk-based allocation plans and licensing decisions that reflect the best available knowledge of the resource and a conservative approach to allocation and water licensing to provide certainty for the Territory community and our ecosystems.

Research and further reading

Recently published documents that informed the Mataranka plan include the following:

[Mataranka plan background report](#)

- Daly Basin Groundwater Resources Assessment – North Mataranka to Daly Waters. [Technical Report 20/2015D](#).
- Strategic Regional Environmental and Baseline Assessment for the Beetaloo Sub-basin. [Technical Report 41/2022](#).
- Indigenous water values and water planning in the upper Roper River, Northern Territory. [CSIRO November 2011](#)
- Strategic Regional Environmental and Baseline Assessment for the Beetaloo Sub-basin: Water Quality and Quantity Baseline Summary Report. [Technical Report 24/2022](#)
- Water availability from the aquifer in the Tindall Limestone South of the Roper River. [Technical Report 34/2004D](#)
- Upgrade of the Coupled Model of the Cambrian Limestone Aquifer and Roper River Systems. [Technical Report 57/2020](#)
- Groundwater sources for the Mataranka Springs. <https://www.nature.com/articles/s41598-021-03701-1>
- Hydrogeological assessment of the Cambrian Limestone Aquifer and the Dook Creek Aquifer in the Roper catchment, Northern Territory. <https://publications.csiro.au/publications/publication/Plcsirop:EP2024-0699>
- Synthesis of existing information on the surface water resources of the Roper River Basin. [Technical Report 18/2023](#)
- Terrestrial Ecosystems Baseline Report: Strategic Regional Environmental and Baseline Assessment for the Beetaloo Sub-basin. [DEPWS Technical Report 36/2022](#)
- CSIRO Reports on the Roper River catchment, <https://www.csiro.au/en/research/natural-environment/water/Water-resource-assessment/Roper-River-Water-Resource-Assessment/Roper-report>

Lists and links to background reports, water resource assessments and maps that inform other plans within the CLA:

- [Georgina Wiso Plan](#)
- [Katherine Plan](#)
- [Oolloo Plan](#)

For more information see:

- <https://nt.gov.au/environment/water/management-security/water-management>
- <https://watersecurity.nt.gov.au/>
- <https://environment.nt.gov.au/news/2025/nt-experts-put-new-satellite-research-into-context>