



LEGISLATIVE ASSEMBLY OF THE NORTHERN TERRITORY

No. 314

WRITTEN QUESTION

J Davis to the Minister for Water Resources, Hon Joshua Burgoyne MLA:

Cambrian Limestone Aquifer and Lake Woods

- 1. What assessment has been undertaken of the long-term impacts of groundwater extraction on the Cambrian Limestone Aquifer and groundwater-dependent ecosystems?**

The Cambrian Limestone Aquifer (CLA) is a large, connected groundwater system between 50 and 400 metres thick. It covers about 570,000 km², roughly the size of France.

Groundwater and surface water resources of the CLA system in the Northern Territory (NT) are subject of extensive water assessments undertaken for their component regional scale aquifers to understand their geology 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); and
- Western Davenport Plan (Arrinthrunga and Chabalowe Formation aquifers).

Each of these plan areas have detailed water resources assessment reports that underpin them, available publicly at: [Water allocation plans | NT.GOV.AU](http://NT.GOV.AU)

The NT Government (NTG) hydrogeologists, alongside leading science experts from the Bureau of Meteorology (BoM), CSIRO and Geoscience Australia, consultants, universities and licensed drillers, contribute to providing accurate and comprehensive information on the CLA.

The Department of Lands, Planning and Environment gathers data from:

- nearly 5,000 CLA bores;
- continuous monitoring of 117 bores and 56 surface water sites; and
- 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. These are modelled by the Department using the coupled Daly Roper numerical model (DR3) which is now in its third iteration and underwent its most recent upgrade in 2024.

There are several published reports on the CLA that can be found on Territory Stories at [Territory Stories Website](#)

The Department also regularly monitors the groundwater levels across the CLA, which is available at [Water data portal | NT.GOV.AU](#)

a. Has the Department identified ecological thresholds beyond which groundwater extraction would be considered unacceptable?

The establishment of ecological thresholds in areas where there is inferred strong connection/dependence of terrestrial communities on groundwater and surface water resources is dependent on climate variability. A number of water allocation plans identify these thresholds, for example the Mataranka and Katherine plans identify trigger values in ground and surface water which drive the plan outcomes. This work is ongoing and complex across a region of this size, and updates are reflected in water allocation plans and their reviews, and additionally through scientific investigations which are also published as they become available.

b. What monitoring is being undertaken to detect impacts before irreversible damage occurs?

The Department maintains an extensive groundwater and surface water monitoring network across the region, including > 150 groundwater monitoring bores and > 50 streamflow gauging sites. Regular monitoring ensures water resources are as modelling scenarios predict and enables unexpected changes to be identified.

This is in addition to independent groundwater and surface water monitoring that is being established by researchers at the Charles Darwin University (CDU) to monitor water resources across the Beetaloo Sub-basin region. More information is also obtained from industry data collected by water license holders and site-specific data gathered by leading scientific research organisations such as CSIRO, Geoscience Australia, BoM and University institutions.

2. What evidence can the Department provide that current allocation limits will protect groundwater-dependent ecosystems over the next 30 to 40 years?

In each water allocation plan within the CLA, the volume allocated for extraction is less than one percent of total storage, with the Arid Zone plans less than 0.1 percent. This is before considering the effects of recharge which replenishes storages, which typically occurs annually in the Top End and every few years in the Arid Zone.

Long term storages have gradually been increasing in the CLA over the past few decades, despite fluctuations in line with long-term climate trends, and despite recent media reports to the contrary.

The relative groundwater level drawdown impact across the extent of the CLA, is relatively small.

The evidence base is well published in supporting documents to the following water allocation plans referred to in response to Question1.

Each of these plan areas have detailed water resources reports that underpin them, available publicly at: [Water allocation plans | NT.GOV.AU](https://www.nt.gov.au/water/management/plans-and-policies/water-allocation-plans/)

a. Have ecological water requirements been determined for the groundwater-dependent ecosystems identified through the Strategic Regional Environmental and Baseline Assessment (SREBA)?

GDEs dependent on water from the CLA are protected by the water allocation plans described in 1. Many of the potential GDEs within the Beetaloo Basin identified through the SREBA do not access water in the CLA (which is 50m+ bgl) are not affected by extraction from this aquifer.

b. If not, how can the Department be confident current extraction levels are sustainable?

GDEs dependent on water from the CLA are protected by the water allocation plans described in 1. Many of the potential GDEs within the Beetaloo Basin identified through the SREBA do not access water in the CLA (which is 50m+ bgl) are not affected by extraction from this aquifer.

3. The Independent Expert Scientific Committee's advice of 2024 on unconventional gas exploration and appraisal in the Beetaloo Basin (IESC 2024-150) records that "Detailed local-scale environmental studies are needed to ensure adequate understanding and protection of the Basin's surface and groundwater water resources in areas where unconventional gas development is planned".

- a. Which local-scale environmental studies of the Basin's water resources have been commenced or completed since that advice, by whom, and on what dates?**

The Department continues to undertake scientific research across the region in partnership with external research partners, as well as regular ground and surface water monitoring of the resources. Additionally, water licence applicants are required to demonstrate detailed understanding of the local hydrogeological context in the region they plan to extract to inform water licence applications and water licence holders have strict monitoring conditions, which they need to adhere to demonstrate observed impact of extraction is in line with modelled predictions. All water investigations, water extraction licences, statement of reasons for decisions and documents associated with extraction licences are available at [NT's Water Licensing Portal](#).

Further studies are undertaken to inform environmental impact assessment through the Environmental Protection Agency for larger planned developments and are also publicly available through the NT Environment Protection Authority website: [Environmental impact assessments register | NTEPA](#)

The Department also regularly monitors the groundwater levels across the CLA, which is available at [Water data portal | NT.GOV.AU](#).

- b. What scientific uncertainties does the Department consider remain regarding the Cambrian Limestone Aquifer, and in which document are they recorded?**

There are always scientific uncertainties regarding groundwater systems, regardless of how well they have been investigated. These are well established and documented in literature over the last few years, including through the extensive SREBA studies (found in Territory Stories), GBA (Geological and Bioregional Assessment) investigations, research papers published by CSIRO and Geoscience Australia through GISERA Gas Industry Social and Environmental Research Alliance), Water Resource Reports for the Georgina, Wiso, Mataranka, Katherine, Ooloo and Flora water management areas and through the Hydraulic Fracturing Inquiry (references below).

- c. Where a water extraction licence application is assessed in an area for which those studies have not been completed, what does the Controller rely on in their place?**

The Applicant is expected to undertake relevant investigations to support their licence application. The licence application is assessed by the Department considering existing hydrogeological understanding. This, along with public submissions are considered by the Controller for each licence determination.

- 4. Lake Woods is recognized as an internationally significant wetland and biodiversity area. Has the Government considered formal protection of Lake Woods and its catchments?**

The NTG has formally designated Lake Woods as a site of international/national conservation significance, while it is listed in the Australia Government's National Directory of Important Wetlands. Longreach water hole which also covers some of the northern extent of Lake Woods is also fully fenced and managed by the Parks and Wildlife Division of Department of Tourism and Hospitality.

- a. If not, why not?**

Not applicable

- b. What assessment has been undertaken of risks to Lake Woods from future groundwater extraction?**

There have been various groundwater licence applications and enquiries received by the Department within a 100km radius of Lake Woods in recent years, each which have had site-specific impact assessments undertaken. The risk of groundwater extraction is considered very low, due to surrounding groundwater levels being below the elevation of the base of the Lake (i.e. 35-40 mbGL). In this regard, it is considered an inflow (rainfall) dependent ephemeral system, not a GDE.

- c. If that assessment has not been undertaken, on what basis does the Department conclude there is no risk?**

Not applicable.

- 5. The Georgina Wiso Water Allocation Plan 2023-2031 (the Plan) sets an estimated sustainable yield of 210,000 megalitres per year across the Georgina Basin and Wiso Basin water management zones, and Table 2 allocates 10,000 megalitres per year to petroleum activity as a beneficial use.**

- a. What is the current total of granted allocations, and of pending applications, in the Plan area? Please provide as a table by licence or application number, volume, purpose and water management zone, including any applications associated with irrigated agriculture or data centre development.**

You can access the details for each licence, including licence volumes, from the water licensing portal at [Water licence and notice portals | NT.GOV.AU](#).

Further summary information is also available in the Department's annual 'State of the Resource' Reports, published for each plan area on the [Water insights across the Northern Territory | DLPE](#).

- b. Clause 5.1 of the Plan provides that a review may occur where the actual volume of water taken under water licences within the water accounting period “exceeds 70% of the estimated sustainable yield” or “exceeds 70% of the volume allocated to the beneficial use category as per Table 2, excluding use for public water supply”. What was the actual volume of water taken under water licences in each water accounting period since the Plan was declared, in each water management zone?**

The status of the Water Resource Report accounts for all licences in the Georgina Wiso plan area and is available at [Water insights across the Northern Territory | DLPE](#).

- c. What volume was taken under licences for petroleum activity in each of those periods, against the 10,000 megalitre allocation in Table 2?**

The status of the Water Resource Report accounts for all licences in the Georgina Wiso plan area is available at [Water insights across the Northern Territory | DLPE](#).

The total volume licenced for economic use in the Georgina Wiso plan area in 2024-25 was 4,192 megalitres, 45 percent was for Agriculture, 25 percent for public water supply and the remaining 30 percent for petroleum beneficial uses.

- d. Has the Minister considered initiating a review of the Plan under clause 5.1 since it was declared; if so, on what date and with what outcome?**

An official mid-term (four-year) review of the Plan will be completed in 2027.

- e. Will a cumulative assessment across all allocations and applications be completed before further licences are granted?**

The Department continually assesses potential impacts of proposed licensed extraction in numerical modelling scenarios undertaken on receiving new licence applications. Potential impacts to nearby groundwater users, environmentally sensitive receptors and water availability are all considered in these assessments.

- 6. What assessment has the Department undertaken of the intergenerational impacts of Beetaloo development on water resources, biodiversity and environmental values over the next 30 to 40 years?**

Water allocation plans identified in the response to question 1 have been developed to carefully manage water use within the region. The Plans set levels of extraction that are sustainable into the future and are reviewable every five years to ensure extraction is behaving as modelling predicted.

a. Can that assessment be tabled?

There are numerous assessments available through publicly available platforms such as the [NT EPA website](#), [water licensing portal](#) and [Territory Stories](#).

b. If no such assessment exists, how can the Government assure Territorians that current decisions will not leave future generations with depleted water resources or degraded ecosystems?

The Department maintains a suite of numerical models which are periodically re-calibrated and updated as new information becomes available. Modelling future scenarios ensure potential cumulative impacts of extraction are understood to manage the ability of future generations to access water or incur detrimental impacts to local ecosystems. These models inform water resources assessments, planning and regulation.

All water licence holders are subject to strict, enforceable license conditions which may stipulate water level and quality monitoring which is submitted to and review by the Department.

Regarding the Department's water monitoring, refer to response to question 1(b).

Further references for scientific studies across the CLA.

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Orr ML, Bernardel G, Owens R, Hall LS, Skeers N, Reese B and Woods M (2020) Geology of the Beetaloo GBA region. *Technical appendix for the Geological and Bioregional Assessment: Stage 2*. Department of the Environment and Energy, Bureau of Meteorology, CSIRO and Geoscience Australia, Australia.

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Wilkes, P., Rachakonda, P. K., Larcher, A. and Woltering, M. (2019) *Baseline assessment of groundwater characteristics in the Beetaloo Sub-basin, NT. Geochemistry Analysis report to the Gas Industry Social and Environmental Research Alliance (GISERA)*. May 2019. CSIRO, Canberra. CSIRO, Australia.

ALL Water Allocation Plan documents, Water Allocation Plan background reports and water resource reports (Georgina Wiso, Katherine, Mataranka, Ooloo, Western Davenport) are available at [Territory Stories website](#).