

Australia

Capital city: Canberra
Inhabitants: 25 Million



INSTITUTIONAL SETTING AND PURPOSE

Under the Water Act 2007, the Bureau of Meteorology (BoM) is the institution responsible for delivering water information across Australia to support national decisions. In Australia, groundwater management is vested in the States/Territories. As a consequence, the collection of groundwater data and

maintenance of the groundwater monitoring networks is also the responsibility of various organisations including State/Territory water agencies or water authorities. The BoM has been mandated to collate, standardise and disseminate the state collected groundwater information at a national level.

CHARACTERISTICS OF THE NETWORK

In total there are around 910,000 sites with nationally consistent groundwater information across Australia available through the Bureau website. Of these:

- 710,000 have bore log information, including construction, lithology and/or hydrostratigraphy;
- 250,000 have at least one groundwater level measurement, ~2,000 sites are continuously logged with updated groundwater levels released on the Bureau website weekly;
- 200,000 have salinity data; and
- 120,000 have hydrochemistry data.

PROCESSING

Two types of products give an overview of the state of the quantity of groundwater resources in Australia: groundwater level status map and groundwater level trend maps presented as Upper, Middle and Lower aquifer groups (Figure 1).

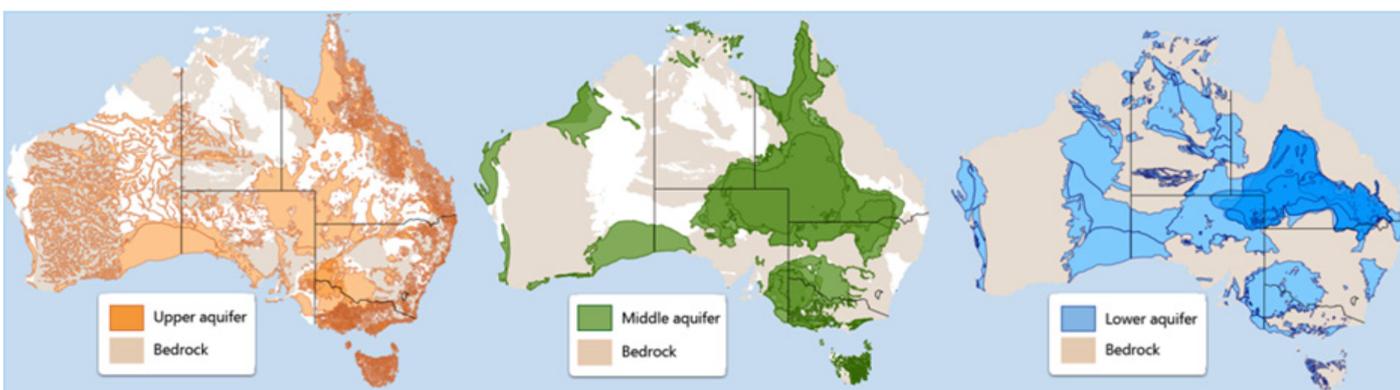


Figure 1 – Upper, Middle and Lower aquifers across Australia

In order to fully understand these maps, it should be noted that all major aquifers in Australia have been grouped by Upper, Middle and Lower aquifer, according to a methodology based on the Victorian Aquifer Framework (VAF), and further modified to extend across Australia. The objective of this aggregation was to make non-groundwater experts aware of the 3D nature of

aquifers. The approach used was first to divide Australia into several “groundwater provinces” (Figure 2), and then (using a simplified stratigraphic table) group hydrogeological units into upper, middle and lower aquifer groups. Small and single aquifer systems may not be included in the stratigraphic table given the national perspective of this analysis.

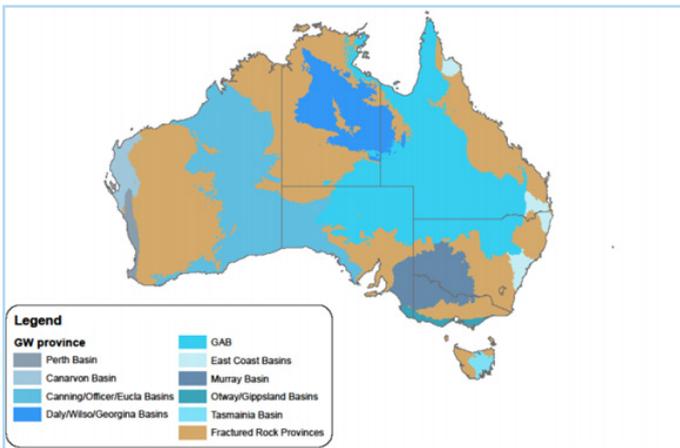


Figure 2 – Groundwater Provinces across Australia

Groundwater level status maps

Groundwater status maps compare recent groundwater levels at wells with the level for the past 20 years in the upper, middle and lower aquifer layers. Status is reported as either average, below average or above average, Figure 3. Wells classified as average are those where the recent level is between the 30th and 70th percentile when compared to the last 20 years. Wells with a level at or above the 70th percentile are classified above average, below the 30th percentile are classified as below average.

Groundwater level trend maps

Trends in groundwater levels for wells in the upper, middle, and lower aquifers and for 5, 10 and 20 years are presented as groundwater level trend maps, Figure 3, showing short and long-term changes in groundwater levels and how these patterns vary spatially. Trends are only shown for wells that meet a minimum data requirement.

Trend is reported as rising, stable and declining. The threshold for a stable trend is anything within $\pm 10\text{cm/year}$, which was selected to reflect the typical accuracy of the data.

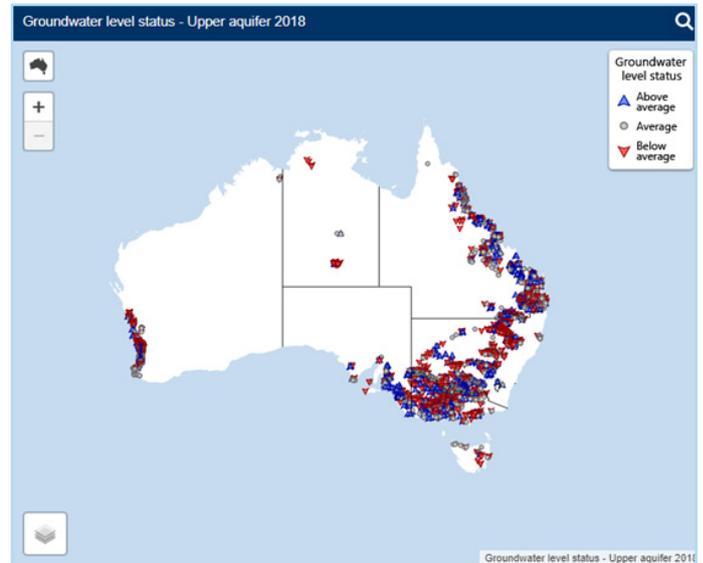


Figure 3 – Groundwater level status for upper aquifer 2018

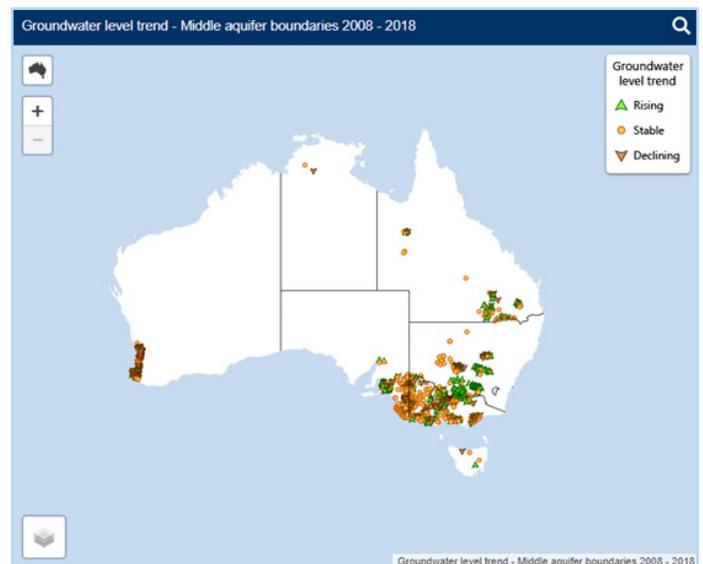


Figure 4 – Groundwater 10 years level trend, for middle aquifers

DISSEMINATION

The Australian Groundwater Insight is a map portal providing access to a wide range of groundwater information, designed for non-experts. The Groundwater Status map and the Groundwater Level Trend maps, described above, are available through this portal.

Moreover, BoM provides several groundwater information products through its website. The data are collected from States and Territories, then processed to be nationally consistent and freely available online. Some of these products are:

Australian Groundwater Explorer – Mapping portal for visualising and analysing groundwater bore data including bore locations and logs; groundwater level data; and salinity and other hydrochemistry measurements. Interactive maps, tables and graphs are used to visualise the information. Data can be downloaded in several formats. Groundwater levels are updated weekly for telemetered bores.

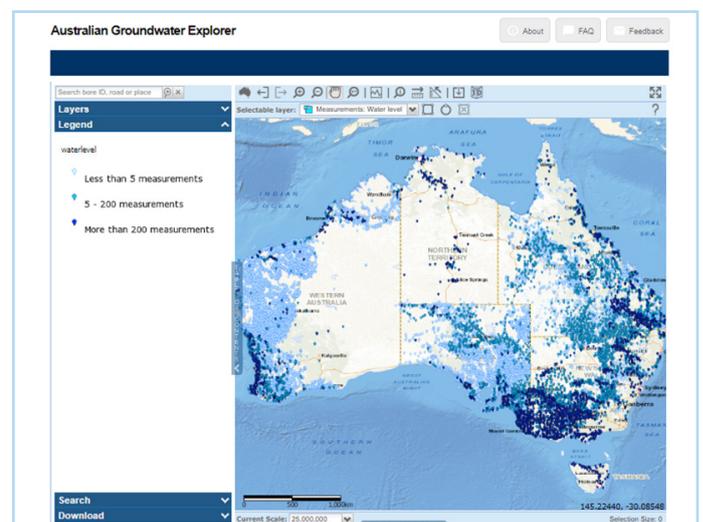


Figure 5 – Australian Groundwater Explorer Homepage

National Groundwater Information System (NGIS) – Database of spatial information on more than 910,000 wells and their attributes. It has been designed for GIS specialists who need access to the full dataset. Water stakeholders such as water agencies, catchment management authorities, consultants, academics, educational institutions, farmers and private industry use the system for groundwater assessment, accounting and modelling purposes. NGIS data are updated annually.

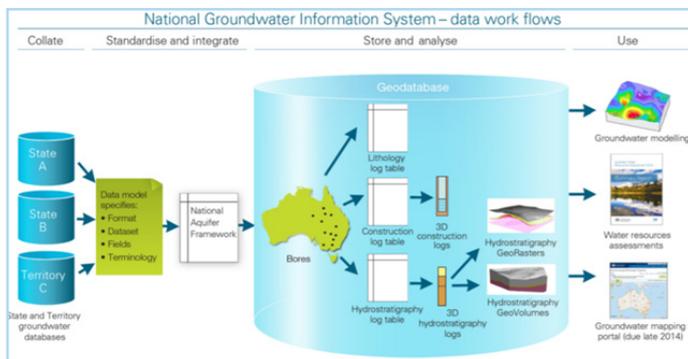


Figure 6 – NGIS data workflow

Groundwater Dependent Ecosystem Atlas (GDE) – Mapping portal providing a comprehensive national inventory of ecosystems that depend on groundwater. The Atlas is a valuable source of information for experts in government, research and industry sectors who work with ecosystems. It supports the consideration of ecosystem groundwater requirements in natural resource management, water planning and environmental impact assessment.

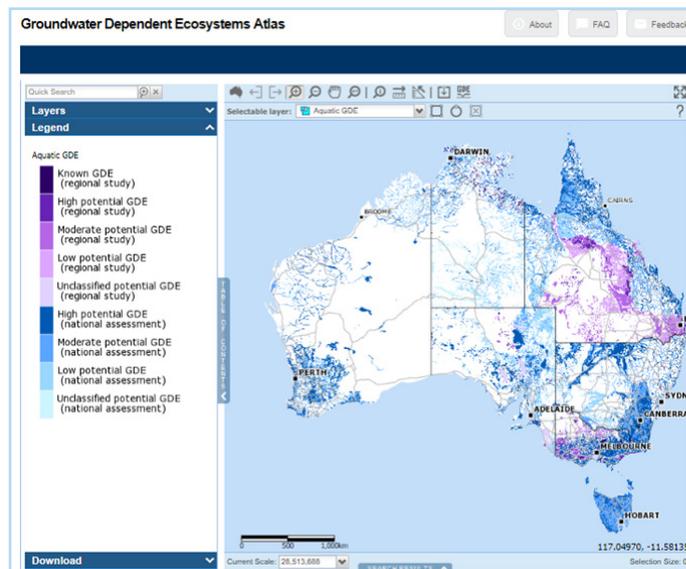


Figure 7 – Groundwater Dependent Ecosystems Atlas

Sources

- **Australian Groundwater Explorer** - <http://www.bom.gov.au/water/groundwater/explorer/map.shtml>;
- **Australian Groundwater Insight** - <http://www.bom.gov.au/water/groundwater/insight/#/overview/introduction>;
- **BOM, Groundwater Information website** - <http://www.bom.gov.au/water/groundwater/>;
- **BOM, Ownership of groundwater data** - <http://www.bom.gov.au/water/groundwater/explorer/copyright.shtml>;
- **Feedback from BOM** - received on 13-02-2020;
- **Groundwater Dependent Ecosystem Atlas (GDE)** - <http://www.bom.gov.au/water/groundwater/gde/map.shtml>;
- **Groundwater level and trend maps methodology** - <http://www.bom.gov.au/water/groundwater/insight/metadata.shtml>;
- **Groundwater Provinces across Australia** - <http://www.bom.gov.au/water/groundwater/insight/documents/AquiferBoundariesMethod.pdf>;
- **Hydrostratigraphy of Australia** - <http://www.bom.gov.au/water/groundwater/insight/documents/Hydrostratigraphy.pdf>;
- **National Groundwater Information System (NGIS)** - <http://www.bom.gov.au/water/groundwater/ngis/>; and
- **Victorian Aquifer Framework (VAF)** - <https://www.water.vic.gov.au/groundwater/victorias-groundwater-resources/victorian-aquifer-framework>.