



Australian Aquifer Boundary grouping and alignment with National Aquifer Framework

1. Introduction

The Bureau of Meteorology's [Australian Groundwater Insight](#) displays the extent of all major aquifers in Australia, grouped by Upper, Middle and Lower aquifer levels. The purpose of this aggregation is to convey the 3D nature of aquifers to non-groundwater experts. Aquifers are categorised as belonging to Upper, Middle or Lower horizons in accordance with the methodology initially established with the [Victorian Aquifer Framework \(VAF\)](#), and further modified in reference to their stratigraphic horizon position.

The aim behind this dataset is to depict, as well as possible, the major groundwater resources across Australia. This includes all the major GIS aquifer boundaries created by States, Territories and Geoscience Australia including Great Artesian Basin, Murray Basin, Daly Region and the Perth region aquifer datasets (see data sources). The Aquifer Boundaries layer attempts to show all significant aquifers in a sedimentary basin with depth, in contrast to the Principle Hydrogeology which shows only the major aquifer at each location.

The other aim is to support the interpretation of groundwater levels and salinity data for non-groundwater experts using the three groups to differentiate between well-monitored groundwater resources in different basins. For example, this allows you to compare aquifer characteristics including size, levels and salinity, across Australia.

2. Purpose

The purpose of this update is to align the existing aquifer boundaries and their aggregation with the [National Aquifer Framework](#) (NAF) and produce a stratigraphic table to show what NAF Hydrogeological Units are included in each group. This data conveys the relative sequence of layers in a simplified way. It will also improve the consistency of the Bureau's groundwater products.

This document describes the approach used to group the aquifers.

3. Approach used

Australia was first divided into several major provinces based on Geoscience Australia's Geological Provinces layer ([Australian Geological Provinces, 2013.01 edition—Province Full Extent](#)). Figure 1 shows the main provinces used to guide the grouping of the aquifer boundaries into meaningful hydrogeological areas. Nine provinces, for which GIS aquifer boundaries exist, are identified across Australia and are separated by bedrock highs shown in brown in Figure 1. The bedrock represents areas of hard rock between sedimentary basins.

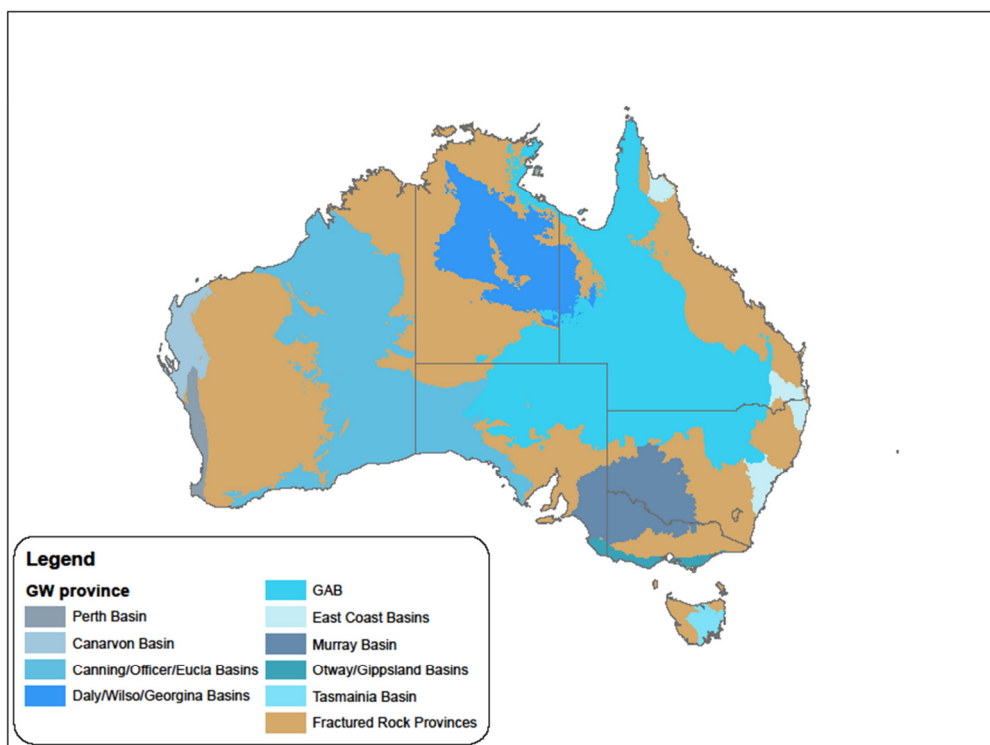


Figure 1. Groundwater Provinces across Australia

Secondly a simplified [stratigraphic table](#) was created to display how NAF Hydrogeological Units (HGUs) are separated into upper, middle, lower and bedrock. The table further divides the 9 provinces into 20 basins (and sub basins where needed) and bedrock highs. It also shows the relevant NAF Hydrogeological Complex's (HGCs), which provides information about the age, depositional environment and rock type. This table only shows some of the more complex hydrogeological provinces or basins in Australia. At this stage the smaller and single aquifer systems have not been included in the table. HGCs that are regarded as major aquifers within a province are shown in **bold** to help identify them in the table.

Figure 2 shows all aquifer groups displayed together. Please note that sand and sediments at land surface are not shown on the map unless they are considered an aquifer, for example the surficial sands in the Perth Basin have been included as an upper aquifer. The distribution of middle, lower and the bedrock aquifers can be seen more clearly in Figures 3 and 4. The aquifer boundaries have also been assigned a NAF HGC number, so that they can be linked directly back to the NAF.

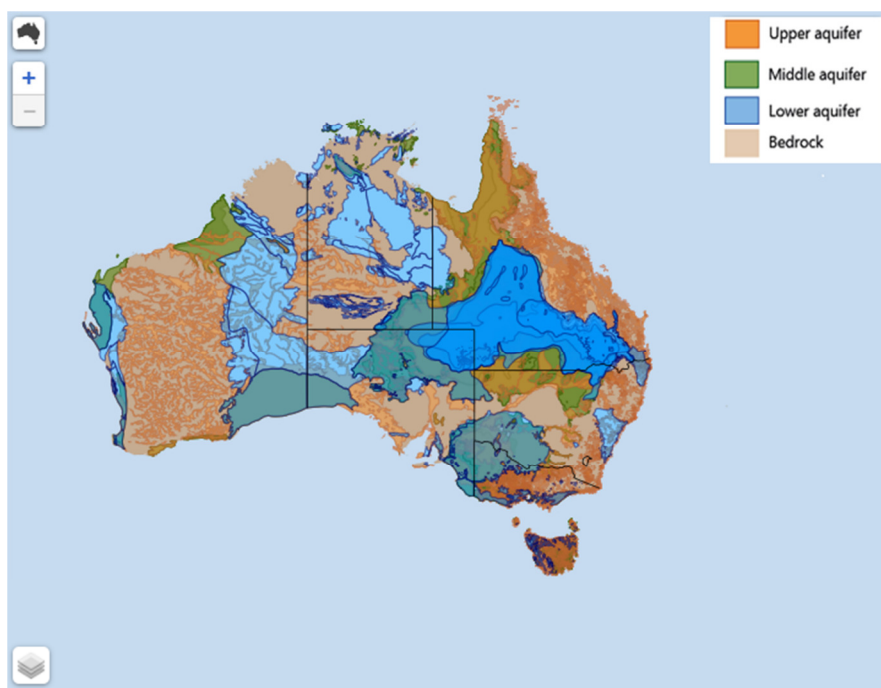


Figure 2. Upper, middle, lower aquifers and bedrock

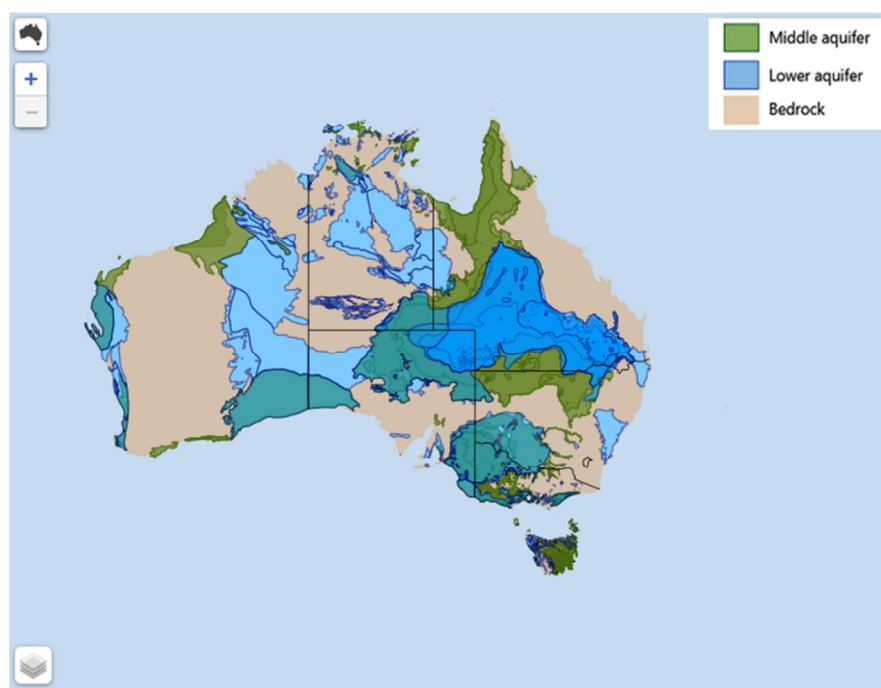


Figure 3. Middle and lower aquifers and bedrock

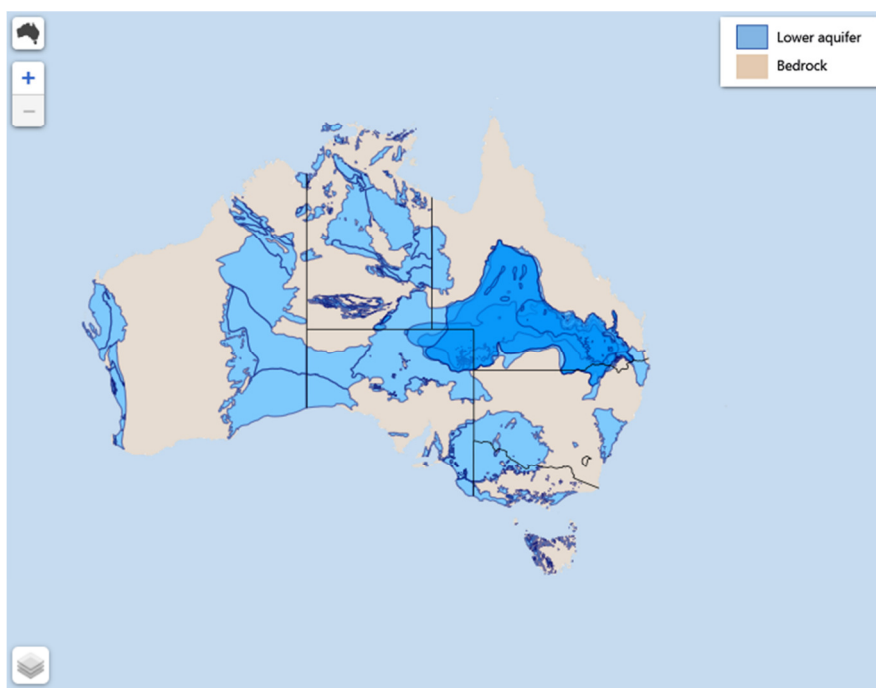


Figure 4. Lower aquifers and bedrock

3.1. Known Limitations

- Not all HGUs identified in the table have a GIS boundary and therefore are not included in the Aquifer Boundary dataset, such as some of the shallow Quaternary sediments that are small and were not captured in this broadscale mapping.
- Some aquifer boundaries have been grouped together and this has reduced the level of detail in some areas, such as the Tertiary basalts that run along the Great Dividing Range of Queensland. Most of the local names of the aquifers were not able to be included in the data.
- Some aquifer GIS shapefiles may not be up to date.
- Linking the Aquifer Boundaries to the NAF highlighted the need to update the NAF by reordering 110 (Marine sediments), 109 (Fluvial sediments) then 108 (Upper Tertiary sediment aquitard), to make it consistent with the ordering in the VAF.



4. Data Sources:

Area	Dataset	Link/Source
Western Australia	Hydrogeology statewide	Sourced from Department of Water
	Eucla Basin (WA only)	(http://www.ga.gov.au/applications/provexplore/australian-geological-provinces) Geoscience Australia
Northern Territory	NT_HGU_6_7_2016 (for regions outside Great Artesian Basin)	http://www.ntlis.nt.gov.au/metadata/export_data?type=html&metadata_id=535D1EECEB0F528AE040CD9B21446C20
South Australia	SA groundwater basins	Department of Land Resource Management
	Various aquifer shapes	Department of Land Resource Management
New South Wales	NSW Management Plan Boundaries (Areas outside Great Artesian Basin and Murray Basin)	NSW Department of Primary Industries – Water
	Lachlan Formation aquifer in the Upper Lachlan	Upper Lachlan groundwater model
	AHGF Water Table Aquifer	Bureau of Meteorology
Victoria	Secure Allocations, Future Entitlements (SAFE) (for areas outside Murray Basin)	Department of Environment, Land, Water and Planning SAFE 2012
Tasmania	Tas_HGU_HGC_Framework_final_V_1_6	Department of Primary Industries, Parks, Water and Environment
Great Artesian Basin	Regional aquifers of the Great Artesian Basin	Hydrogeological Atlas of the Great Artesian Basin Geoscience Australia
Murray Basin	3D aquifer model	Bureau of Meteorology (2014)
Palaeovalley WA-SA-NT	Distribution of Palaeovalleys in Arid and Semi-arid WA-SA-NT	WASANT Palaeovalley Map Geoscience Australia
Queensland	AHGF Water Table Aquifer	Bureau of Meteorology