

Eastern Mount Lofty Ranges PWRA

Murray Group Limestone aquifer

2015 Groundwater level and salinity status report



Department of Environment, Water and Natural Resources
GPO Box 1047, Adelaide SA 5001

| | | |
|-----------|--|-----------------|
| Telephone | National | (08) 8463 6946 |
| | International | +61 8 8463 6946 |
| Fax | National | (08) 8463 6999 |
| | International | +61 8 8463 6999 |
| Website | www.environment.sa.gov.au | |

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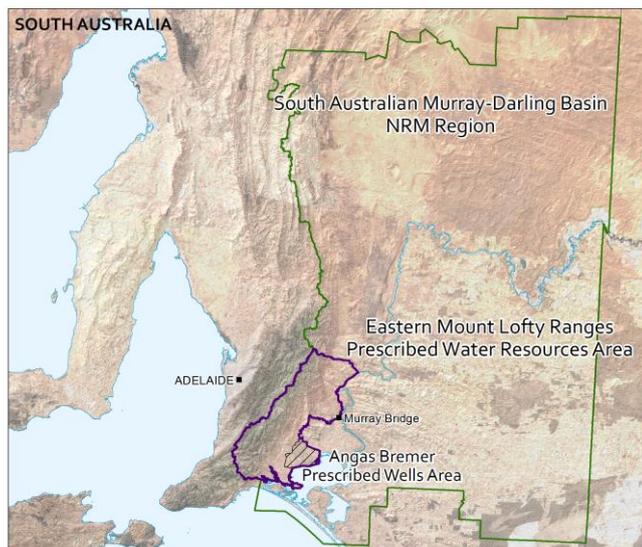
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2015 Summary



The Eastern Mount Lofty Ranges Prescribed Water Resources Area (EMLR PWRA) is located about 50 km east of Adelaide and covers an area of approximately 2845 km² in the South Australian Murray-Darling Basin NRM Region. It incorporates the Murray Plains and eastern slopes of the Mount Lofty Ranges. It is a regional-scale prescribed resource for which groundwater is protected and managed under South Australia's *Natural Resources Management Act 2004*. The *Water Allocation Plan for the Eastern Mount Lofty Ranges* (the WAP) provides for the sustainable use of the region's water resources. The Angas Bremer Prescribed Wells Area (PWA) is located within the boundaries of the EMLR PWRA and a separate groundwater level and salinity status report has been prepared for this PWA and can be found on the [Water Resource Assessments](#) page of WaterConnect.

There are three sedimentary aquifers in the EMLR PWRA, namely the Permian Sand, Murray Group Limestone (MGL) and Quaternary. This report focuses on the MGL aquifer, in particular within the Currency Limestone Underground Water Management Zone (Fig. 1), which is defined in the WAP. The MGL aquifer predominantly consists of a shallow marine fossiliferous limestone that was deposited approximately 50 million years ago. It is up to 100 m thick and overlies the Kanmantoo Group fractured rock aquifer and, in some areas, the Permian Sand aquifer. It is confined by overlying Quaternary clay sediments to the south-west of Murray Bridge, but is unconfined north of Murray Bridge. The primary recharge mechanisms are lateral throughflow from the adjoining Kanmantoo Group aquifer, and downward leakage from the overlying Quaternary aquifer.

Despite the confined nature of the MGL in the Currency Limestone Underground Water Management Zone, which does not receive direct recharge from incident rainfall, the intensity and timing of rainfall (and related variations in rates of groundwater extraction) can have an effect on groundwater levels and salinities. For example, if the PWRA experienced above-average rainfall during typically dry summer months, this could result in decreases in irrigation extraction, causing groundwater pressure levels to rise and salinity levels to stabilise or decrease.

The Finnis rainfall station (BoM Station 23714) is located just north of the Currency Limestone Underground Water Management Zone (Fig. 1). The station recorded 405 mm of rainfall in the 2014–15 water-use year, nearly 100 mm less than the long-term average (1900 to 2015) of 493 mm and more than 150 mm less than the five-year average annual rainfall (Figs. 1 and 2). Though the five-year average annual rainfall is more than 60 mm above the long-term average, a declining rainfall trend can be seen over the past five years (Fig. 2).

Extensive metered groundwater extraction data are not yet available for the EMLR PWRA; however, it is estimated that approximately 32 100 ML is required each year from all aquifers of the PWRA (excluding the Angas Bremer PWA). This estimate is based on land and water-use surveys of agricultural properties and the theoretical irrigation requirements for various crops. It should be noted that actual current groundwater extraction may be different. The estimated demand is below the calculated sustainable yield for the EMLR PWRA of 38 757 ML/y (excluding the Angas Bremer PWA). However, at a local scale within the EMLR PWRA, the estimated demand may exceed the calculated sustainable yield, such as from the MGL aquifer within the Currency Limestone Underground Water Management Zone.

Groundwater levels show a declining trend from 2004 to 2009, which may be the result of below-average rainfall resulting in possibly increased extraction volumes. Since 2009 however, groundwater levels have gradually recovered. In the five years to 2015, most monitoring wells in the MGL aquifer (13 of 16 wells) show a trend of rising or stable groundwater levels (Fig. 3). Rises ranged between 0.06 and 0.38 m/y. The remaining three monitoring wells recorded a declining trend ranging between 0.05 and 0.3 m/y.

Each year, irrigators in the EMLR PWRA submit a salinity sample from their irrigation wells to the Department of Environment, Water and Natural Resources (DEWNR) for analysis. Results of the analyses have been included in this report to augment measurements from DEWNR's salinity monitoring network (Fig. 4). Salinity in the management zone is typically less than 1500 mg/L. Salinity has

not been routinely monitored in the past and as such, there is insufficient data available to conduct a five-year trend analysis of groundwater salinity. As a result, salinity has not been considered in the assessment of the status for the Murray Group Limestone aquifer. Annual salinity monitoring of groundwater sources by water license holders in the EMLR PWRA is expected to improve this understanding into the future.

To determine the status of the Murray Group Limestone aquifer for 2015, the trend in groundwater levels over the past five years (2011 to 2015, inclusive) were analysed, in contrast to the year-to-year assessments that have been used in past *Groundwater level and salinity status reports*. Please visit the [Frequently Asked Questions](#) on the *Water Resource Assessments* page on WaterConnect for more detail on the current method of evaluating the status of groundwater resources.

The Murray Group Limestone aquifer of the Eastern Mount Lofty Ranges PWRA has been assigned a green status for 2015:

2015 Status



Positive trends have been observed over the past five years

The 2015 status for the Murray Group Limestone aquifer is based on:

- most monitoring wells (81%) show a five-year trend of rising or stable groundwater levels.

To view descriptions for all status symbols, please visit the *Water Resource Assessments* page on [WaterConnect](#).

To view the *Eastern Mount Lofty Ranges PWRA Groundwater Level and Salinity Status Report 2011*, which includes background information on hydrogeology, rainfall and relevant groundwater-dependent ecosystems, please visit the *Water Resource Assessments* page on [WaterConnect](#).

To view or download groundwater level and salinity data from observation wells within the Eastern Mount Lofty Ranges PWRA, please visit [Groundwater Data](#) on WaterConnect.

For further details about the Eastern Mount Lofty Ranges PWRA, please see the *Water Allocation Plan for the Eastern Mount Lofty Ranges* on the Natural Resources SA Murray-Darling Basin [website](#).

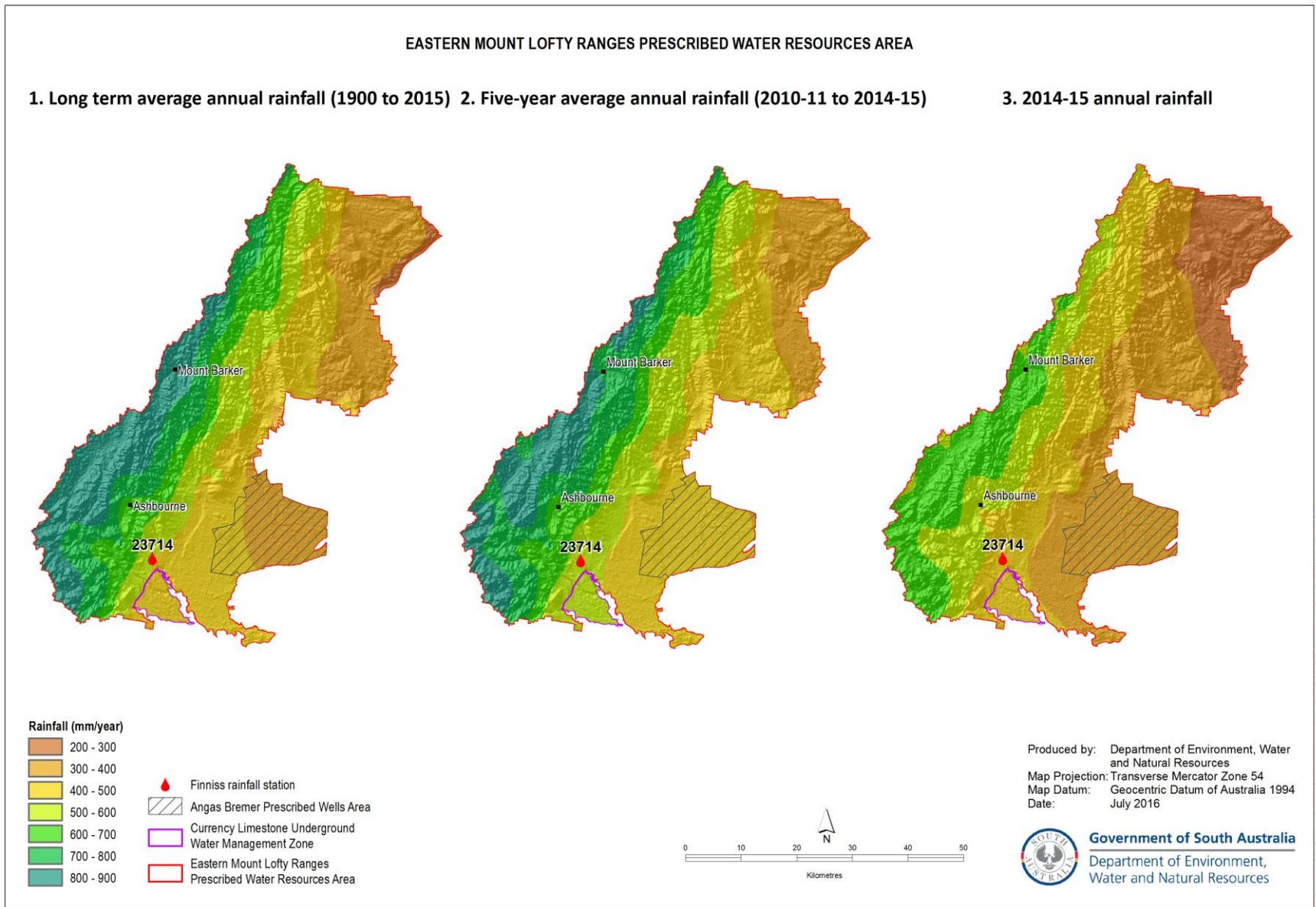


Figure 1. (1) Long-term and (2) ten-year average annual rainfall and (3) annual rainfall for the 2014–15 water-use year in the Eastern Mount Lofty Ranges Prescribed Water Resources Area¹

¹ Rainfall data used in this report is sourced from the SILO Patched Point Dataset, which uses original Bureau of Meteorology daily rainfall measurements and is available online at www.longpaddock.qld.gov.au/silo.

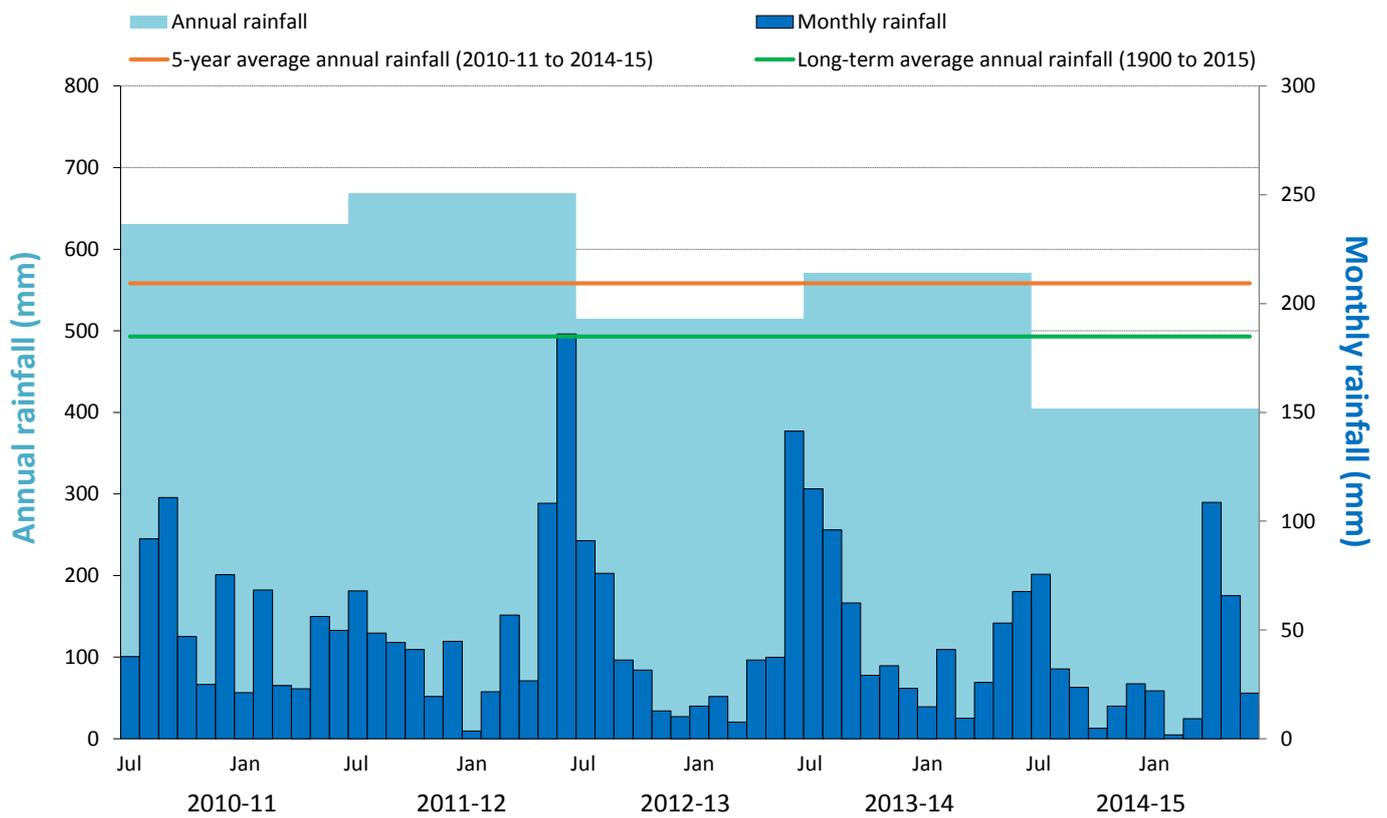


Figure 2. Annual (July–June) and monthly rainfall for the past five water-use years, and the five-year and long-term average annual rainfall recorded at Finniss (BoM Station 23714)²

² Rainfall data used in this report is sourced from the SILO Patched Point Dataset, which uses original Bureau of Meteorology daily rainfall measurements and is available online at www.longpaddock.qld.gov.au/silo.

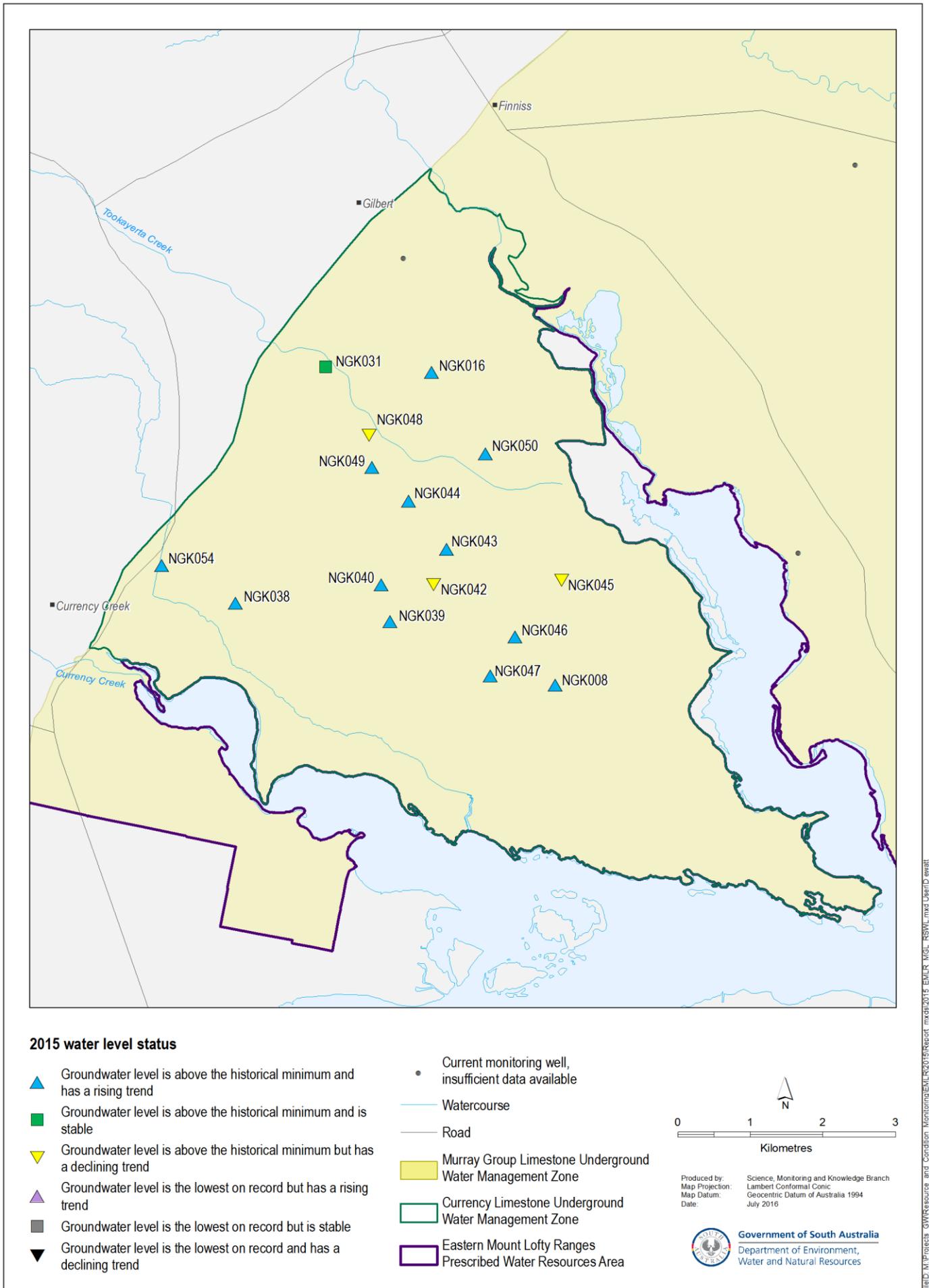


Figure 3. 2015 status of groundwater levels in the Murray Group Limestone aquifer (Eastern Mount Lofty Ranges Prescribed Water Resources Area) based on the five-year trend from 2011 to 2015

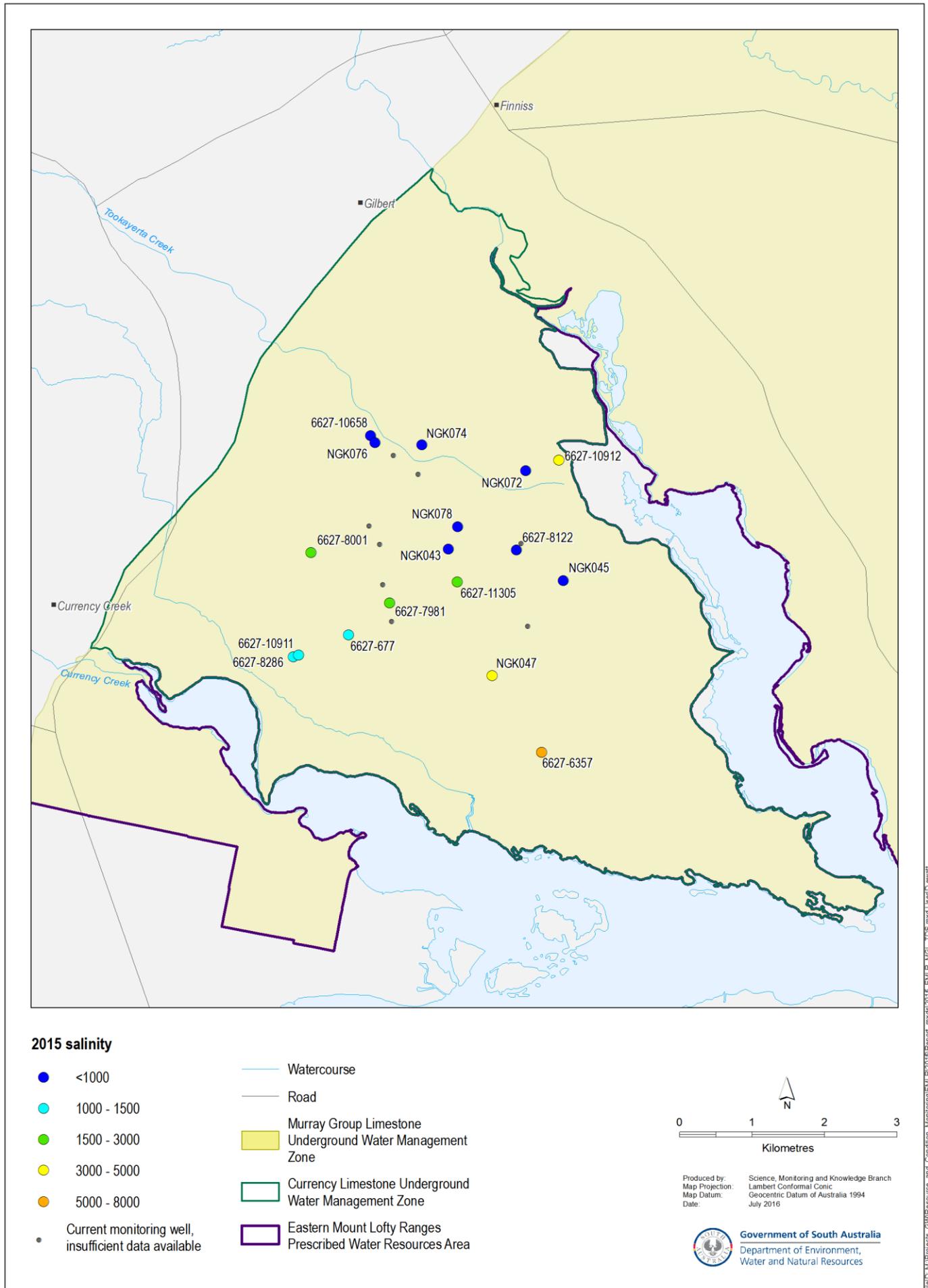


Figure 4. 2015 groundwater salinity of the Murray Group Limestone aquifer (Eastern Mount Lofty Ranges Prescribed Water Resources Area)

