

# Eastern Mount Lofty Ranges PWRA

## Murray Group Limestone aquifer

2014 Groundwater level and salinity status report



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# 2014 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 km<sup>2</sup> in the South Australian Murray-Darling Basin NRM Region. It incorporates the Murray Plains and eastern slopes of the Mount Lofty Ranges and lies within the Murray-Darling Basin. 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 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, which can be found on the [WaterConnect](#) website.

The EMLR PWRA is characterised by fractured rock and sedimentary aquifers that are of varying age, water quality and yield. The fractured rock aquifers occur in the west of the PWRA, where groundwater is stored in and moves through joints and fractures in the basement rocks forming the ranges. Sedimentary aquifers occur in the valleys and plains to the east, where groundwater flows through the pore spaces within the sediments. Recharge to these aquifers occurs directly from the portion of rainfall that percolates down to the watertable through the soil profile and, in the case of the confined sedimentary aquifers, indirectly by throughflow from adjacent aquifers.

There are three types of sedimentary aquifers in the EMLR PWRA, namely the Permian Sand, Murray Group Limestone (MGL) and Quaternary aquifers. This report focuses on the MGL aquifer, in particular within the Currency Limestone Underground Water Management Zone, 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 the Permian Sand aquifer in some areas. It is confined by the overlying Quaternary clay sediments to the south-west of Murray Bridge, but is unconfined in the northern area of the EMLR PWRA.

Despite being a confined aquifer that does not receive direct recharge from rainfall, the intensity and timing of rainfall and subsequent extraction practises can have an effect on groundwater levels and salinity in the MGL aquifer. For example, if the EMLR PWRA experienced above-average rainfall during typically dry summer months, this could result in less groundwater being extracted from the MGL aquifer for irrigation purposes and therefore smaller declines in groundwater levels and stable or improving salinity.

The climate of the EMLR PWRA is characterised as Mediterranean with hot, dry summers and cool to cold, wet winters. Data from the Finniss rainfall station (number 23714), located in the centre of the Murray Group Limestone Management Zones, was chosen for the analysis of rainfall in 2014 (Fig. 1). The annual rainfall received at Finniss for 2014 was 388 mm which is 110 mm below the long-term (1889–2014) average of 498 mm, and follows well above-average rainfall between 2009 and 2013. While February rainfall was two times the long-term monthly average, rainfall was well below-average between August and November.

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 estimation is based on land and water-use surveys of agricultural properties and the theoretical irrigation requirements for various crops. It should be noted that this is an estimation and 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 in the confined MGL aquifer are monitored in a network of observation wells including 15 located within the Currency Limestone Underground Water Management Zone. Declining groundwater levels were observed in the period from 2004 to 2009, which may have been the result of increased extraction activities during years of below-average rainfall. Since 2009 the groundwater levels have gradually recovered, possibly in response to reduced extraction due to periods of higher rainfall and reduced demand on groundwater resources following the recovery of the Lake Alexandrina.

A comparison of the maximum recovered water levels determined for 2013 and 2014 was possible for three of the observation wells in the MGL aquifer, two of which are located within the Currency Limestone Underground Water Management Zone (Fig. 2). One monitoring well within the management zone recorded a fall in water level of 0.36 m, while the other monitoring wells recorded negligible change, where the maximum recovered water level between 2013 and 2014 was less than 0.1 m.

Increases in groundwater salinity represents a significant risk to the resource in the Currency Limestone Underground Water Management Zone. Salinity in the centre of the management zone is typically less than 1500 mg/L. Declining groundwater levels observed during 2009 and 2009 as a result of increased extraction due to the drought, was accompanied by increases in salinity in several observation wells. Since 2010 salinity levels have decreased slightly or stabilised in most wells in response to a decrease in extraction.

In 2014, a total of 11 observation and irrigators wells were sampled for salinity (Fig. 3); however, only one well had data for both 2013 and 2014 available for comparison. This well showed a 1% decrease, or effectively no change in salinity from 2013. The observed 2014 salinities for all wells was consistent with recent readings, also indicating no significant change in salinity during the period between 2013 and 2014.

The Murray Group Limestone aquifer in the Currency Limestone Underground Water Management Zone of the Eastern Mount Lofty Ranges Prescribed Water Resources Area has been assigned a green status for 2014:

## 2014 Status



“No adverse changes, indicating negligible risk to the resource.”

This means the groundwater status was observed to be stable, i.e. no significant change, or improving over the reporting period. Continuation of these trends favours a very low likelihood of negative impacts on beneficial uses (e.g. drinking water, irrigation or stock watering). The 2014 status for the Murray Group Limestone aquifer is supported by:

- overall stable water levels or minor declines between 2013 and 2014
- negligible change in salinity levels between 2013 and 2014 and observed salinities within the historical range.

To view descriptions for all status symbols, please visit [WaterConnect](#).

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

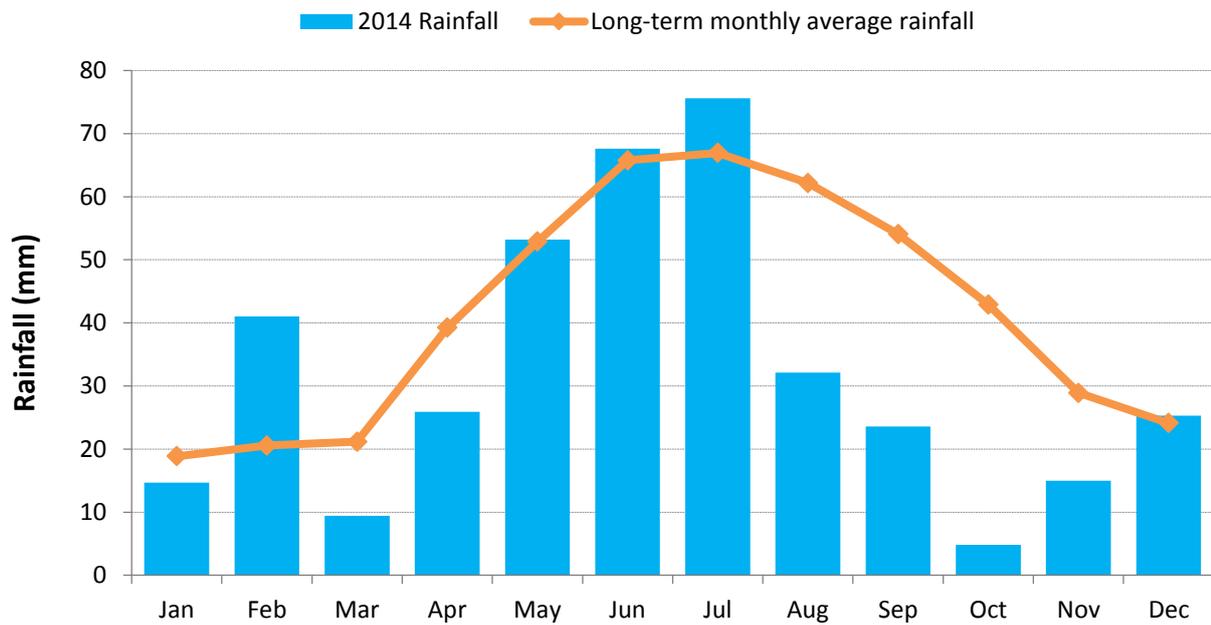


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Finniss rainfall station<sup>1</sup> (number 23714) in the Eastern Mount Lofty Ranges Prescribed Water Resources Area

<sup>1</sup> 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](http://www.longpaddock.qld.gov.au/silo).

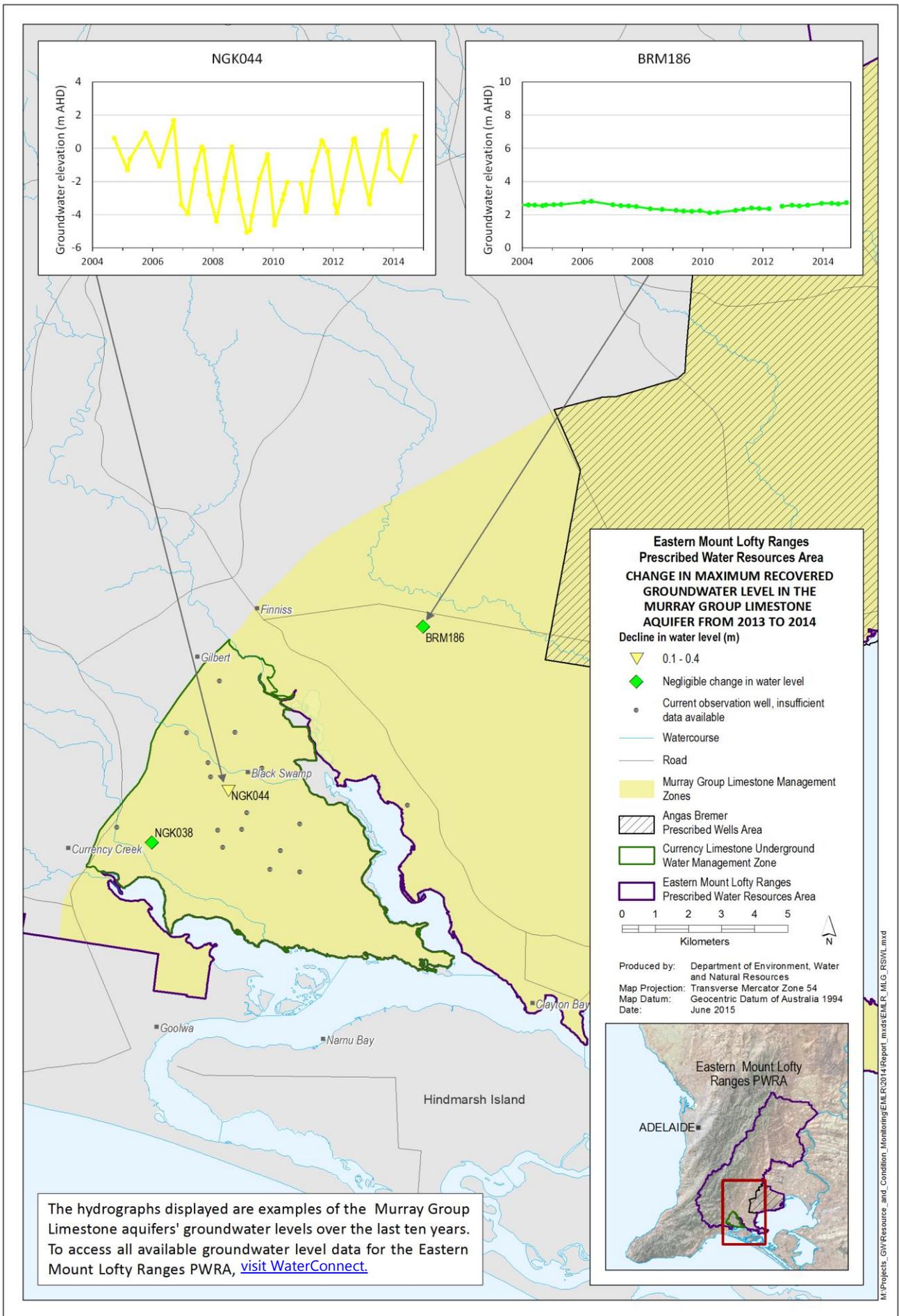


Figure 2. Overall changes in maximum groundwater levels of the Murray Group Limestone aquifer in the Eastern Mount Lofty Ranges Prescribed Water Resources Area from 2013 to 2014

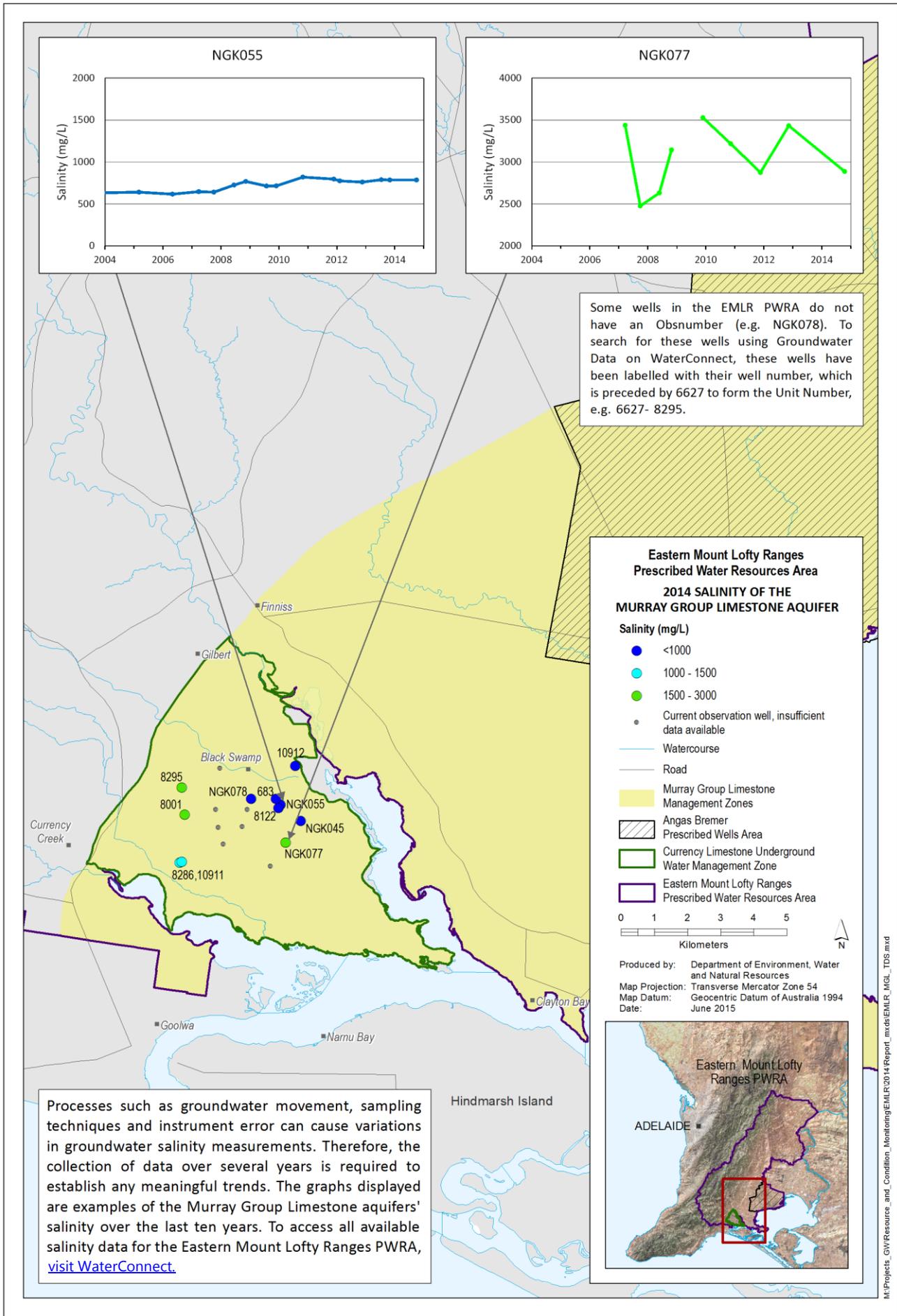


Figure 3. Groundwater salinity of the Murray Group Limestone aquifer in the Eastern Mount Lofty Ranges Prescribed Water Resources Area for 2014