

Eastern Mount Lofty Ranges PWRA

Fractured rock aquifers

2014 Groundwater level and salinity status report



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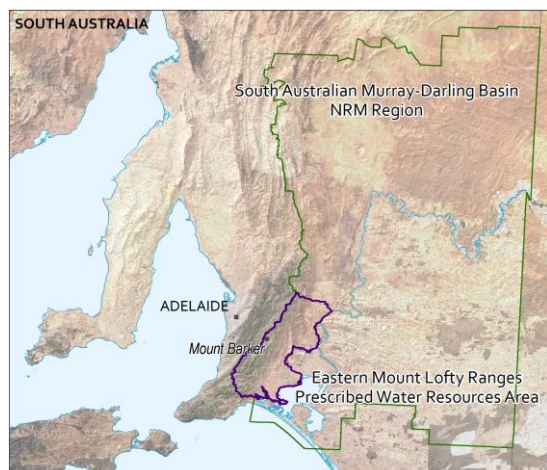
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2014 Summary



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 km². It incorporates the Murray Plains and eastern slopes of the Mount Lofty Ranges and lies within the South Australian Murray-Darling Basin NRM Region. 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* 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 that 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 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.

The fractured rock aquifers (FRAs) in the EMLR PWRA comprise four geological units: the Barossa Complex, the Adelaidean sediments, the Normanville Group and the Kanmantoo Group. Generally, the Adelaidean sediments are more favourable in terms of recharge, salinity and yields, while the Barossa Complex and Kanmantoo Group provide groundwater of poorer quality and low yields. Groundwater flow within the fractured rock aquifers generally follows the topography and moves from higher elevations towards the lower elevations, where it eventually flows into the sedimentary aquifers in the valleys, or discharges into rivers and streams. The regional flow direction of the FRAs is from north-west to south-east.

Trends in groundwater levels and salinity in the FRAs of the EMLR are primarily climate driven: below-average rainfall results in a reduction in recharge to the aquifers. Below-average summer rainfall can also result in increasing irrigation extractions, and these two elements can cause the groundwater levels to fall and salinity to increase. Conversely, increases in rainfall results in increases in recharge, decreases in irrigation extractions and groundwater levels may rise and salinity stabilise or decline.

Due to the spatial extent of the region's fractured rock groundwater resource, the analysis of rainfall in 2014 was undertaken using data recorded from two rainfall stations: Mount Barker (number 23733) and Ashbourne (number 23701). Data from the Mount Barker rainfall station was chosen as groundwater-surface water connectivity in this area is highly influenced by rainfall and is impacted by concentrated extraction activities that occur in the local area throughout summer (Fig. 1). Ashbourne rainfall station was chosen as part of the analysis due to its central location among monitoring wells in the south of the region (Fig. 2).

The total annual rainfall at Mount Barker for 2014 was 656 mm, 112 mm below the long-term (1889–2014) average of 768 mm. While February and July rainfall was significantly above the long-term monthly average, rainfall from August to December was well below average in 2014. The total annual rainfall at Ashbourne for 2014 was 429 mm, 222 mm below the long-term (1889–2014) average of 651 mm. While February rainfall was more than double the long-term monthly average, rainfall was below average for the remainder of the year, particularly from August to December.

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. The majority of groundwater is used for the irrigation of pasture (40.4%) and lucerne (18.2%). Irrigation of various food crops including olives, vegetables, potatoes, berries and orchards each utilise 7.5% or less, with viticulture using 10.3% of the groundwater extracted.

There are 47 observation wells that currently monitor the water levels of the FRAs, however, not all wells are monitored each year. Monitoring data since 2004 show that groundwater levels are generally stable, as demonstrated in Figure 3.

Sufficient data were available in both 2013 and 2014 to undertake a comparison of maximum recovered groundwater levels in 27 wells, including several nested sites. The majority of observation wells (88%) recorded a fall in groundwater levels. In the northern and central areas of the PWRA, 12 wells recorded declines of up to 0.83 m, two wells recorded rises of up to 0.84 m, while one well showed no significant change where the change in maximum recorded water level between 2013 and 2014 was less than 0.05 m (Fig. 3). In the south of the PWRA, the declines were more pronounced, with all 12 monitored wells recording a fall in water level of up to 4.78 m (Fig. 4). Overall, there was a median 0.5 m decline in water levels in the FRAs across the PWRA, which can be attributed to the below-average rainfall.

There are currently 13 observation wells monitoring the salinity of the FRAs in the EMLR PWRA, located near Meadows and Mount Barker. Salinity monitoring data since 2004 indicate that the salinity is generally stable (fig. 5).

In 2014, samples were collected from 12 of these monitoring wells. The salinity of these wells ranged from 514 to 2653 mg/L, with seven wells recording values below 1500 mg/L (Fig. 5). Sufficient data to assess the change in salinity from 2013 to 2014 were available for eight of the observation wells. Changes in salinity were less than 4% for all wells bar one, which recorded an increase of 28%.

The fractured rock aquifers of the Eastern Mount Lofty Ranges PWRA has been assigned a yellow status for 2014:

2014 Status



“Gradual adverse changes, indicating low risk to the resource in the medium term”

This means that minor adverse changes in the resource status have been observed over the 12-month reporting period. If these conditions were to continue, they are unlikely to negatively impact the beneficial uses of the resource (e.g. drinking water, stock watering and irrigation) for at least 15 years.

The 2014 status for the fractured rock aquifers of the Eastern Mount Lofty Ranges PWRA is supported by:

- an overall decline in the maximum recovered groundwater level in 2014 when compared to 2013 data.

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, location of rainfall stations 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 Prescribed Water Resources Area, please visit [Groundwater Data](#) on WaterConnect.

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

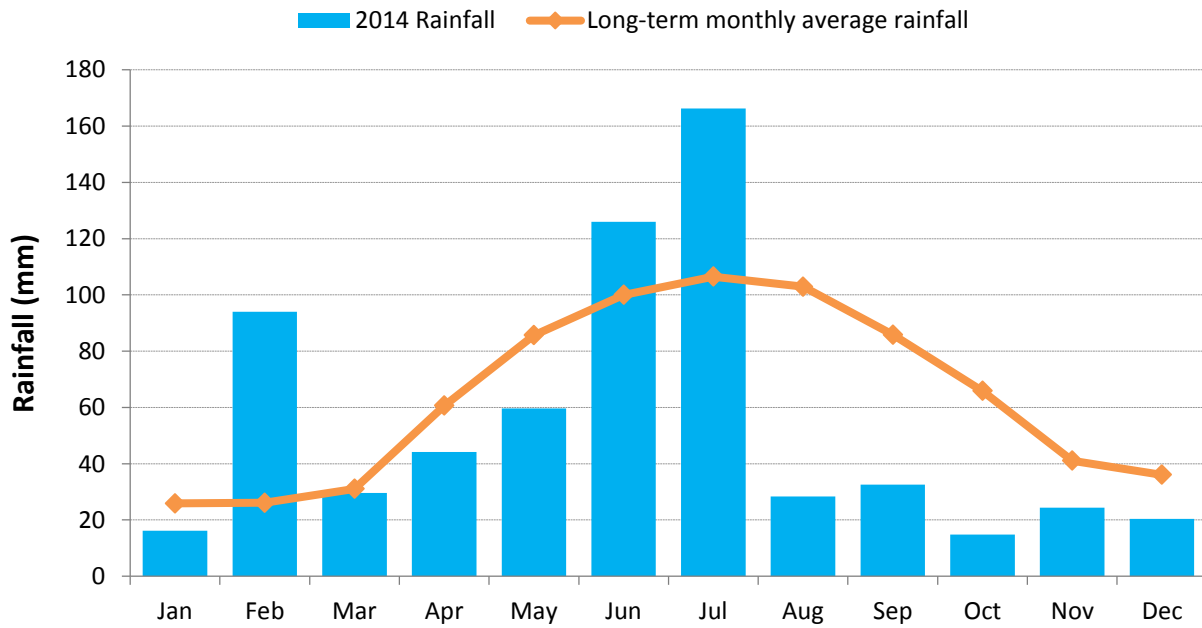


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Mount Barker rainfall station¹ (number 23733) in the Eastern Mount Lofty Ranges Prescribed Water Resources Area

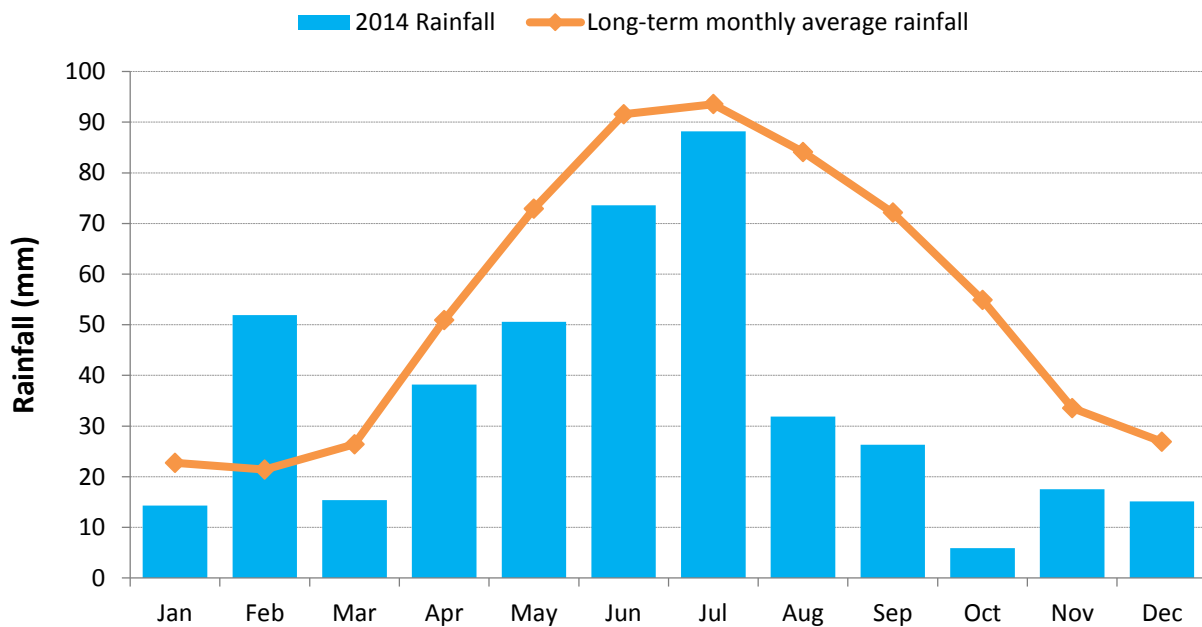


Figure 2. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Ashbourne rainfall station¹ (number 23701) in the Eastern Mount Lofty Ranges Prescribed Water Resources Area

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

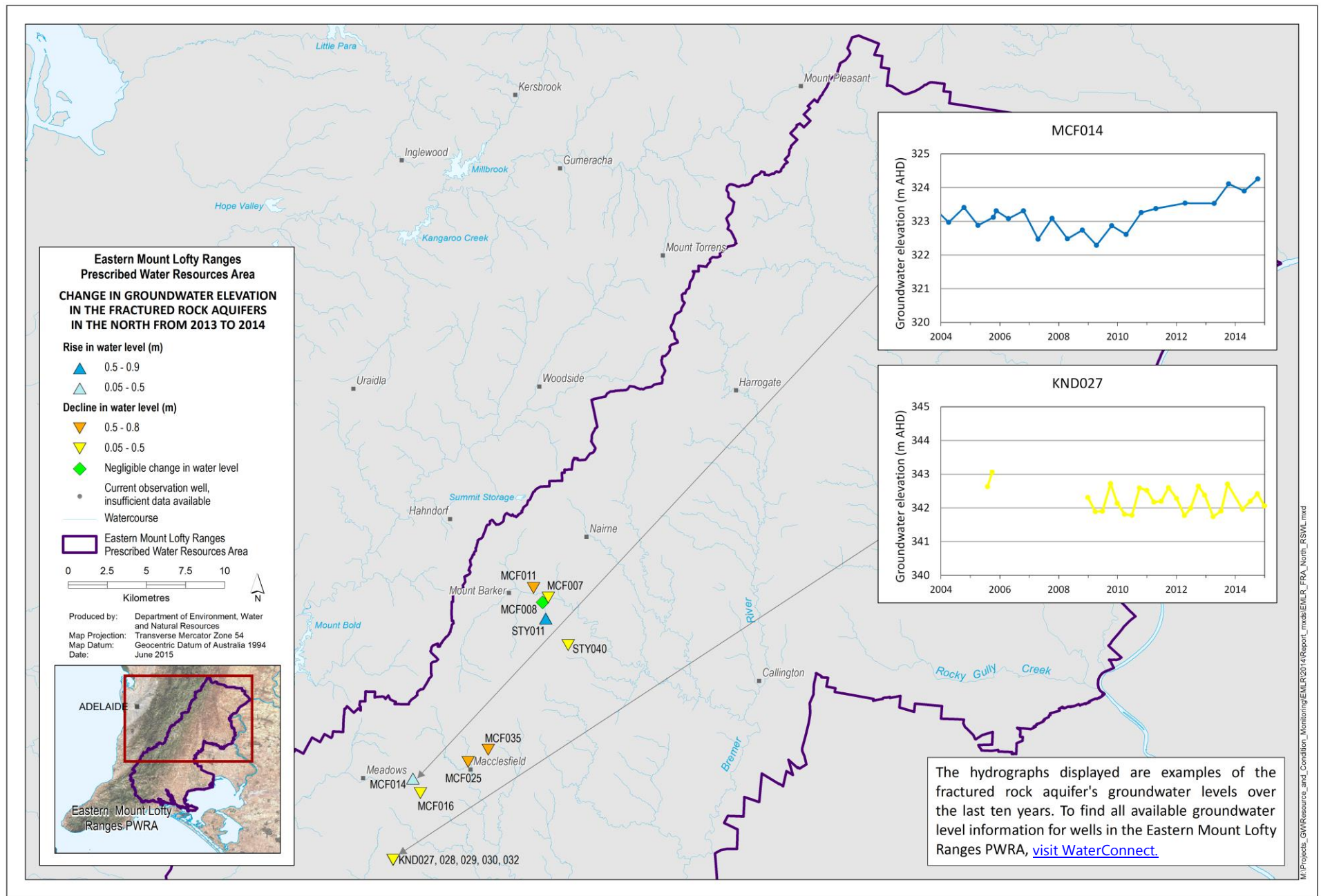


Figure 3. Overall changes in maximum groundwater levels of the fractured rock aquifers in the northern and central Eastern Mount Lofty Ranges PWRA from 2013 to 2014

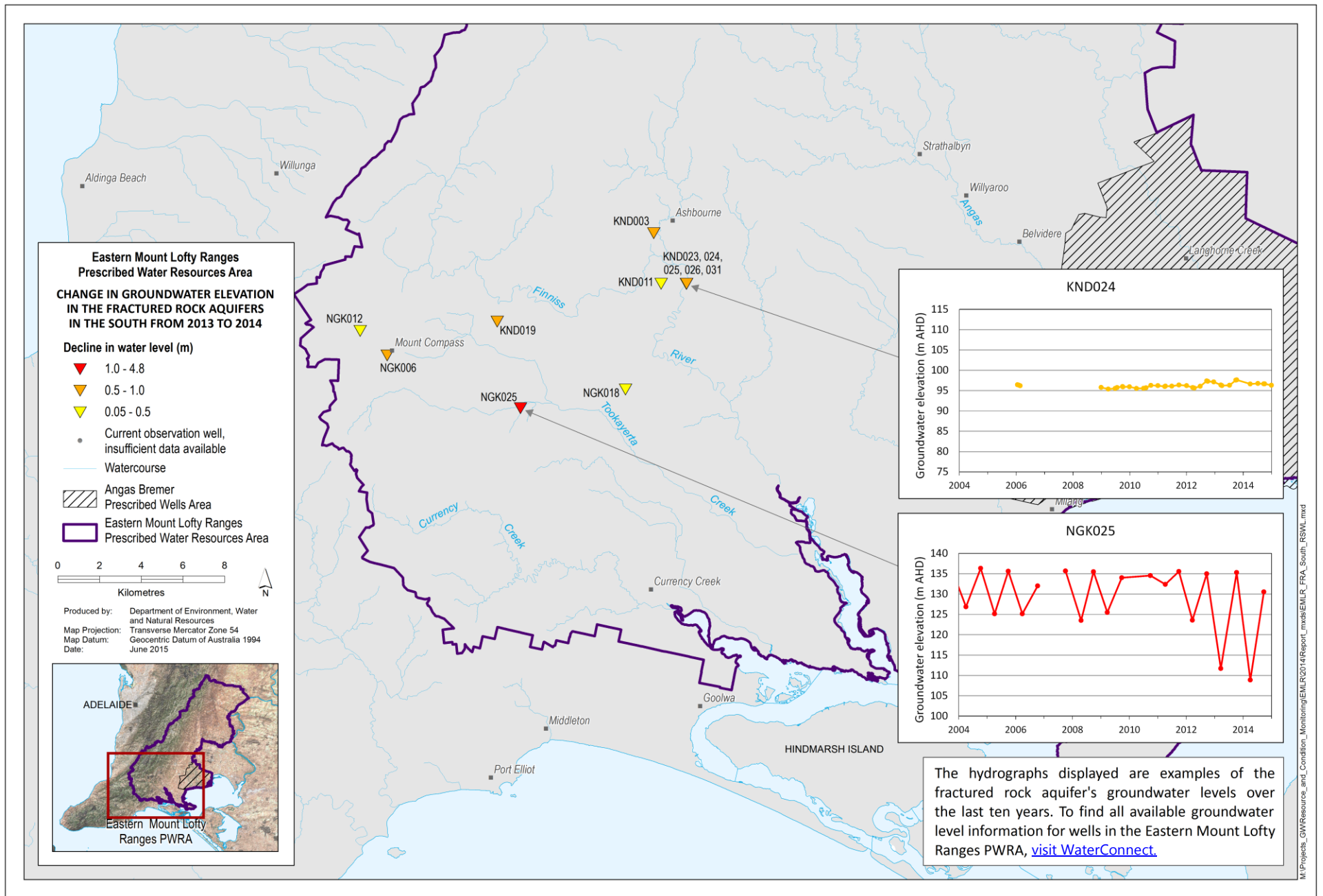


Figure 4. Overall changes in maximum groundwater levels of the fractured rock aquifers in the southern Eastern Mount Lofty Ranges PWRA from 2013 to 2014

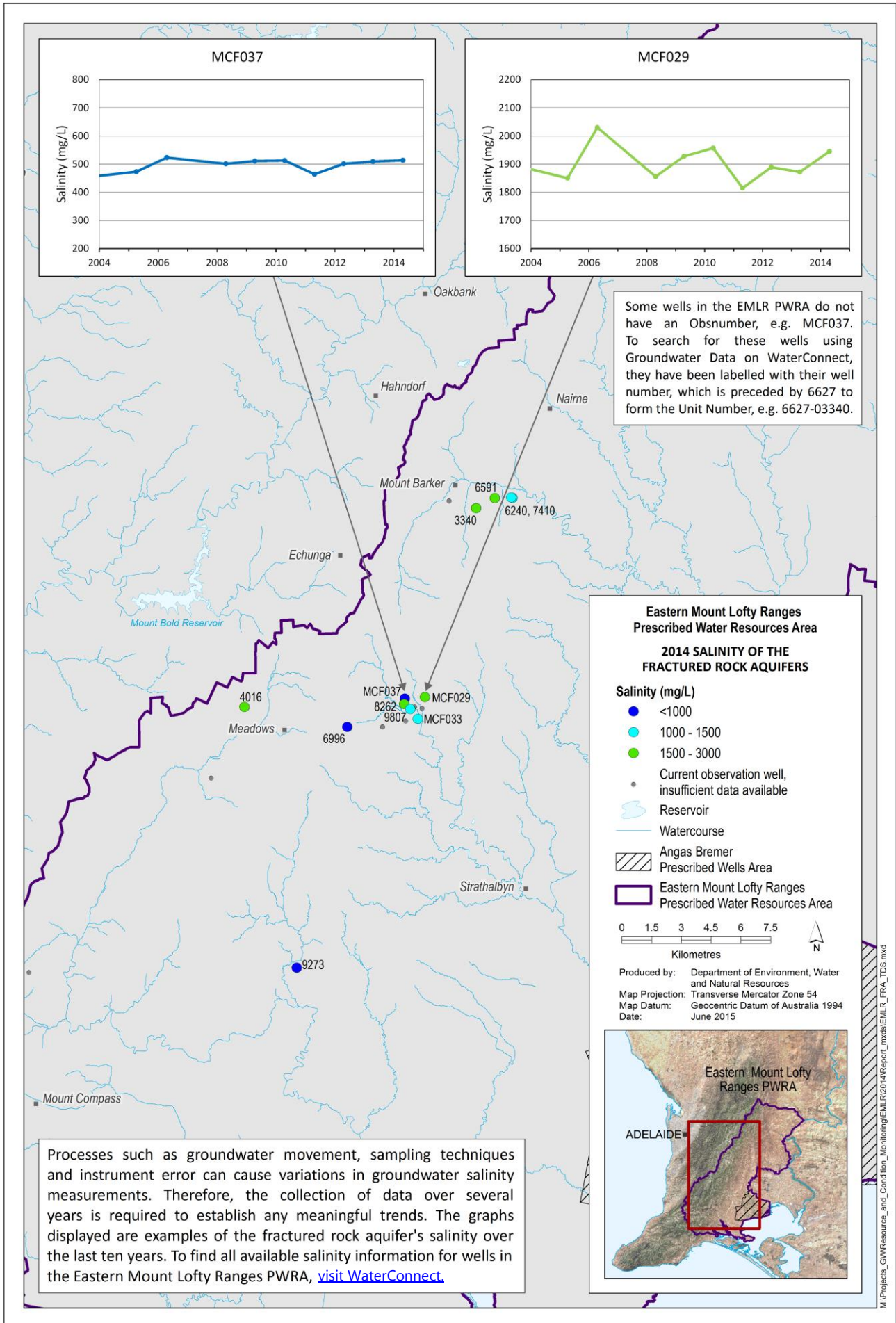


Figure 5. Groundwater salinity of the fractured rock aquifers in the Eastern Mount Lofty Ranges Prescribed Water Resources Area for 2014