
EASTERN MOUNT LOFTY RANGES PWRA FRACTURED ROCK AQUIFERS

Groundwater Level and Salinity Status Report

2013



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Water and Natural Resources

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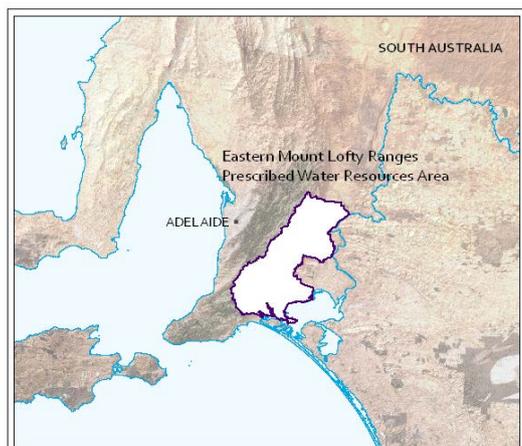
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2013 SUMMARY



The Eastern Mount Lofty Ranges (EMLR) Prescribed Water Resources Area (PWRA) is located approximately 50 km east of Adelaide and covers an area of approximately 2845 km² incorporating the eastern slopes of the Mount Lofty Ranges and the Murray Plains. It is a regional-scale prescribed resource for which groundwater, surface water and watercourse water are prescribed under South Australia's *Natural Resources Management Act 2004* and a Water Allocation Plan provides for the sustainable use of the groundwater resources.

The EMLR PWRA is characterised by fractured rock and sedimentary aquifers that are of varying water quality and yields. Recharge to these aquifers occurs directly from the portion of rainfall that percolates down to the watertable through the soil profile.

The fractured rock aquifers in the EMLR PWRA comprise four geological units; the Barossa Complex, Adelaidean sediments, 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 aquifer generally follows the topography and moves from higher elevations towards the lower elevations, where it eventually flows through the sedimentary aquifers in the valleys, into rivers and streams. The regional flow direction of the fractured rock aquifer is from north–west to south–east.

The climate of the EMLR PWRA is characterised as Mediterranean with hot, dry summers and cool, wet winters. Due to the spatial extent of the region's fractured rock groundwater resource, the analysis of rainfall in 2013 was undertaken using data recorded from two rainfall stations; Mount Barker (number 23733) and Asbourne (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 amongst monitoring wells in the south of the region (Fig. 2). In 2013 the total annual rainfall at Mount Barker for 2013 was 762 mm, 6 mm below the long–term average of 768 mm. The monthly data for Mount Barker rainfall station indicates that for nine of the 12 months, rainfall was significantly below–average. In 2013 the total annual rainfall at Asbourne was 671 mm, 18 mm above the long–term average of 653 mm. Monthly data for 2013 from this station indicates that while rainfall in the months of May and June was significantly above–average, rainfall was below–average for nine months throughout summer and autumn when peak demands on water from the fractured rock aquifers may occur in the south of the PWRA.

Extensive metered groundwater extraction data is not yet available, however it is estimated that approximately 32,100 ML is required each year from the aquifers of the EMLR PWRA (excluding the Angus Bremer Prescribed Wells Area). 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 of 38,757 ML/y for the EMLR PWRA, excluding the Angus 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 utilize 7.5% or less, with viticulture using 10.3% of the groundwater extracted.

There are 46 observation wells that currently monitor the water levels of the fractured rock aquifers, however not all wells are monitored each year. Sufficient data was available in 2012 and 2013 to undertake a comparison of maximum recovered

groundwater levels in 16 wells. The majority of observation wells (88%) recorded a rise in groundwater levels. In the north of the PWRA, three out of five wells recorded increases of up to 0.07 m (Fig. 3), and in the south, the increases were more pronounced, with all 11 monitored wells recording a rise in water level of up to 3.1 m (Fig. 4), which can be attributable to above-average rainfall.

There are currently 14 observation wells monitoring the salinity of the fractured rock aquifers in the EMLR PWRA. These wells are located near Meadows and Mount Barker (Fig. 5) where salinity levels are relatively pronounced. In 2013, samples were collected from 10 of these monitoring wells. The salinity of these wells ranged from 500 to 1900 mg/L, with eight wells recording values below 1,500 mg/L. Sufficient data to assess the change in salinity from 2012 to 2013 was available for eight of the observation wells. Increases in salinity were observed for five of the wells, ranging from 8 to 45 mg/L, with a maximum change of 4 % when compared with 2012 data. Decreases ranging from 17 to 112 mg/L were recorded in the remaining three wells, with a maximum change of 8 %. These changes are within the historical salinity range observed in these wells.

The fractured rock aquifers of the Eastern Mount Lofty Ranges Prescribed Water Resources Area have been assigned a green status for 2013:

2013 STATUS



“No adverse trends, indicating negligible risk to the resource”

This means that the groundwater status was observed to be stable (i.e. no significant change) or improving over the 12 month reporting period. Continuation of these trends favours a very low likelihood of negative impacts on the beneficial use (e.g. drinking water, irrigation or stock watering) of the resource. The 2013 status for the fractured rock aquifers is supported by:

- an overall rise in the maximum recovered groundwater level in 2013 when compared to 2012 data
- no significant changes in salinity in 2013 when compared to 2012 data

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, and to view the descriptions of all status symbols, please visit the *Water Resources* page on [WaterConnect](#).

For further details about the Eastern Mount Lofty Ranges PWRA, please see the *Water Allocation Plan for the Eastern Mount Lofty Prescribed Water Resources Area* on the Adelaide and Mt Lofty Ranges Natural Resources Management [website](#).

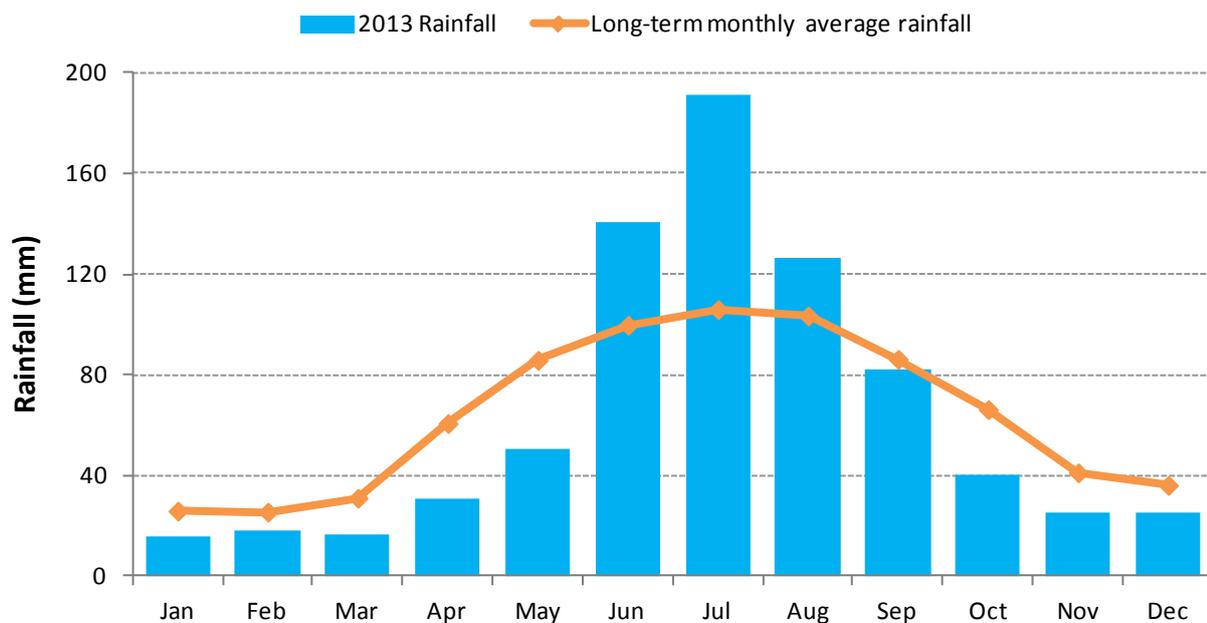


Figure 1. Monthly rainfall (mm) for 2013 and the long-term average monthly rainfall (mm) at the Mount Barker rainfall station (number 23733) in the Eastern Mount Lofty Ranges Prescribed Water Resources Area

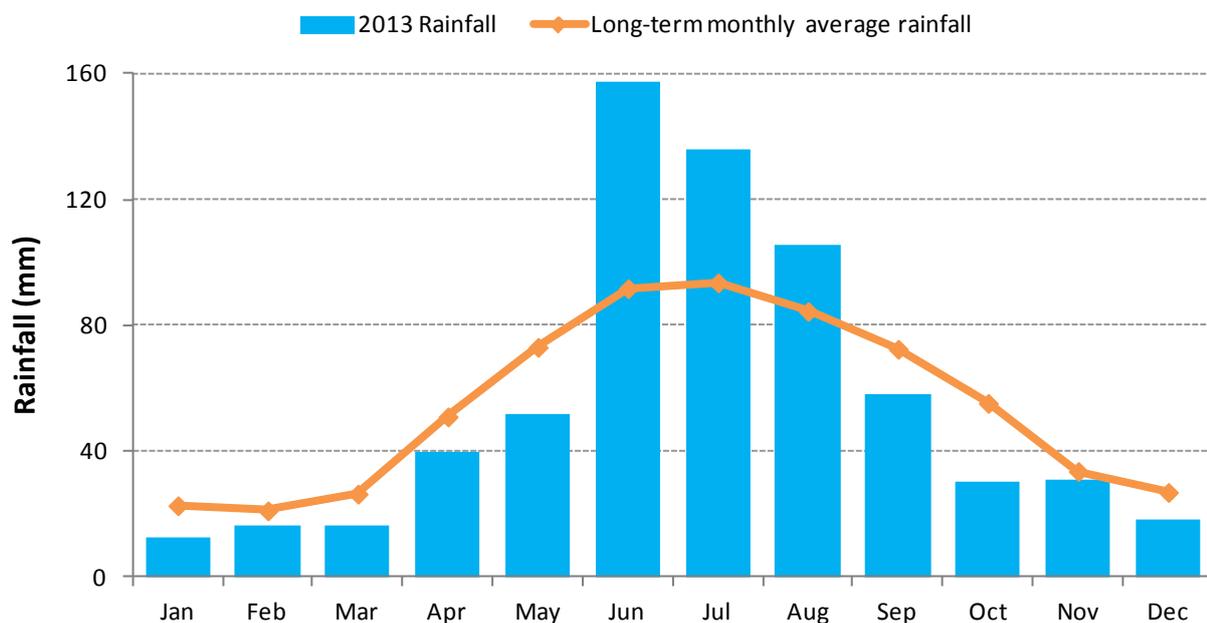


Figure 2. Monthly rainfall (mm) for 2013 and the long-term average monthly rainfall (mm) at the Asbourne rainfall station (number 23701) in the Eastern Mount Lofty Ranges Prescribed Water Resources Area

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.

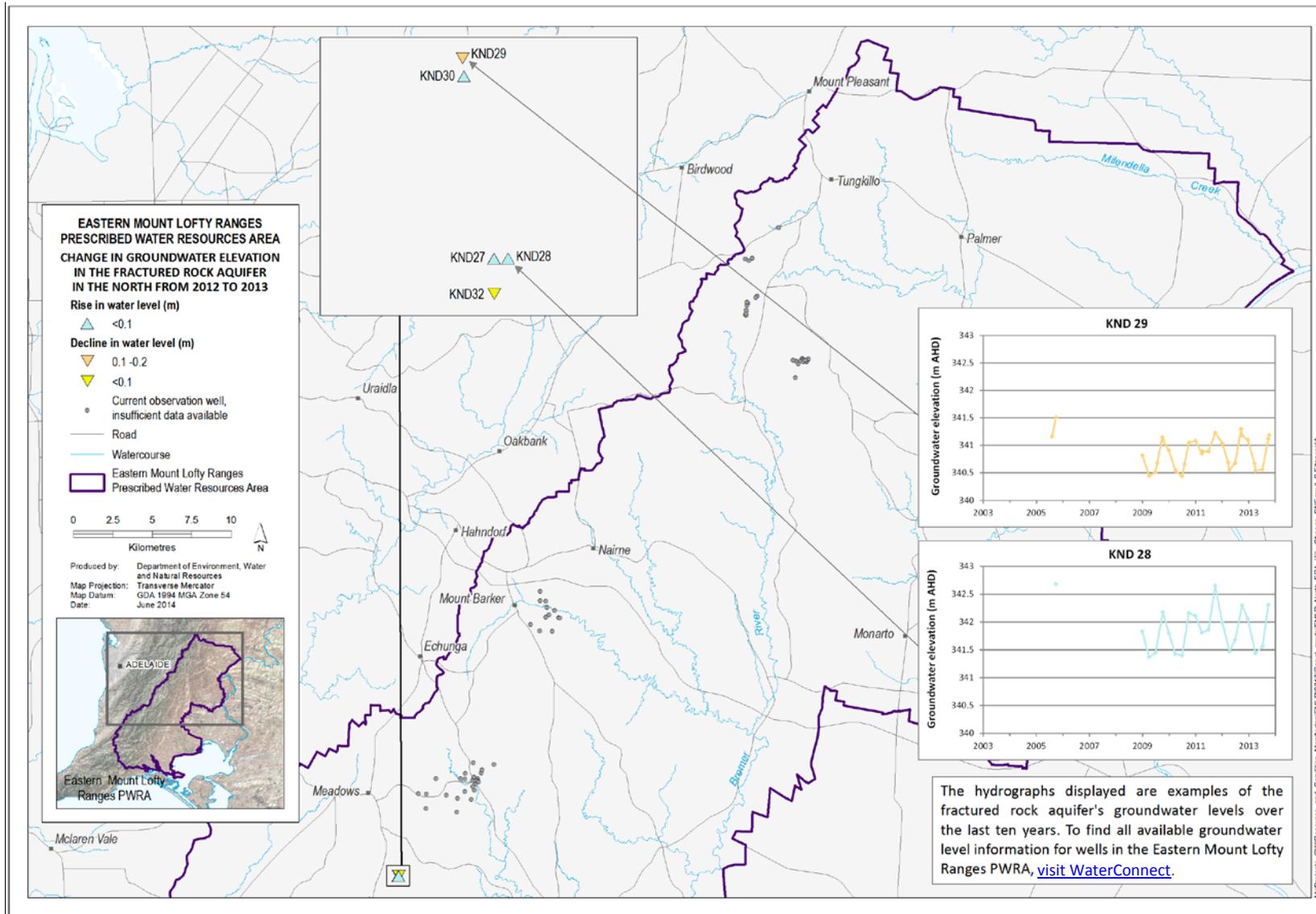


Figure 3. Overall changes in yearly maximum groundwater levels in the fractured rock aquifers in the northern and central Eastern Mount Lofty Ranges Prescribed Water Resource Area from 2012 to 2013

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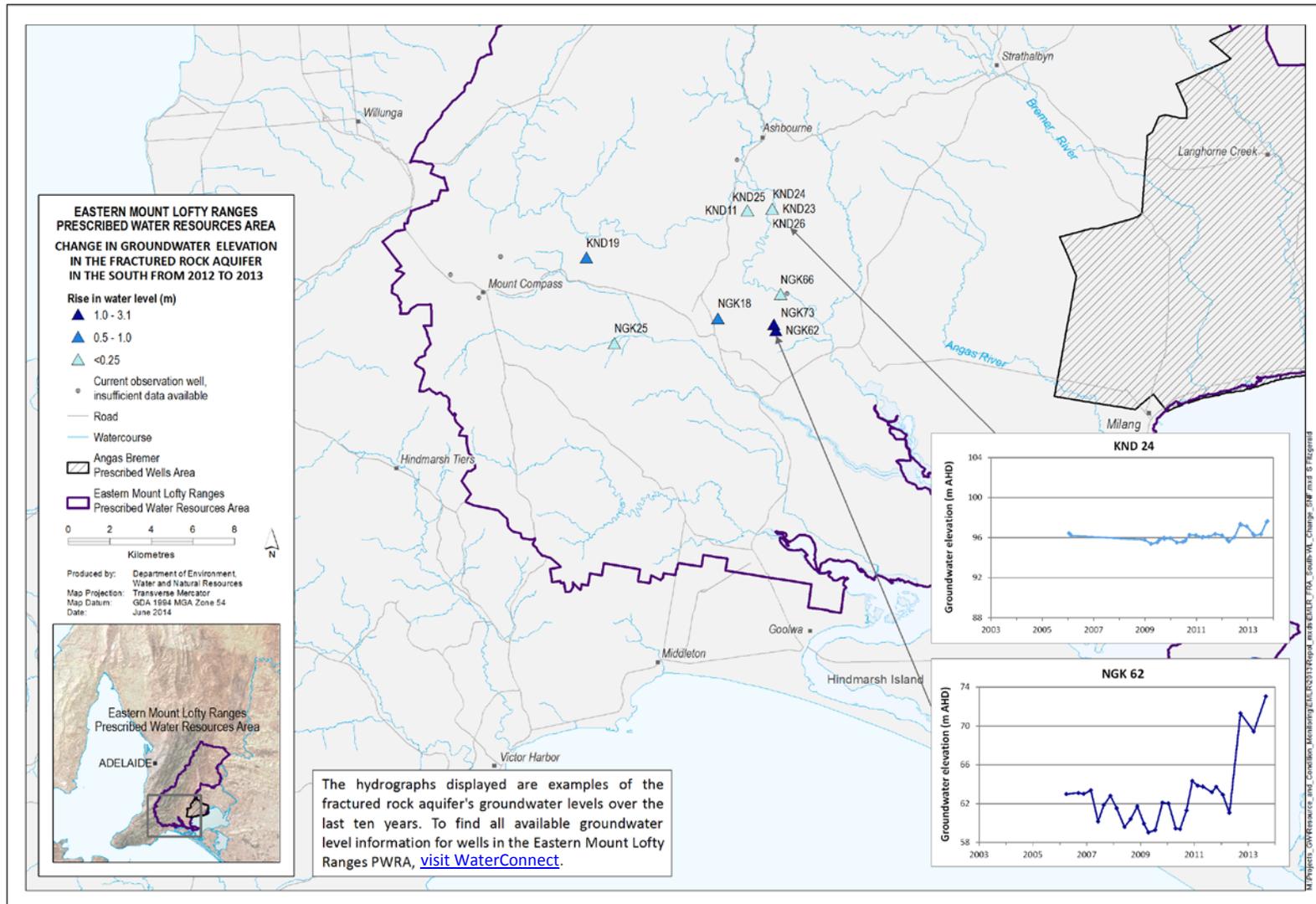


Figure 4. Overall changes in yearly maximum groundwater levels in the fractured rock aquifers in the south of the Eastern Mount Lofty Ranges Prescribed Water Resource Area from 2012 to 2013

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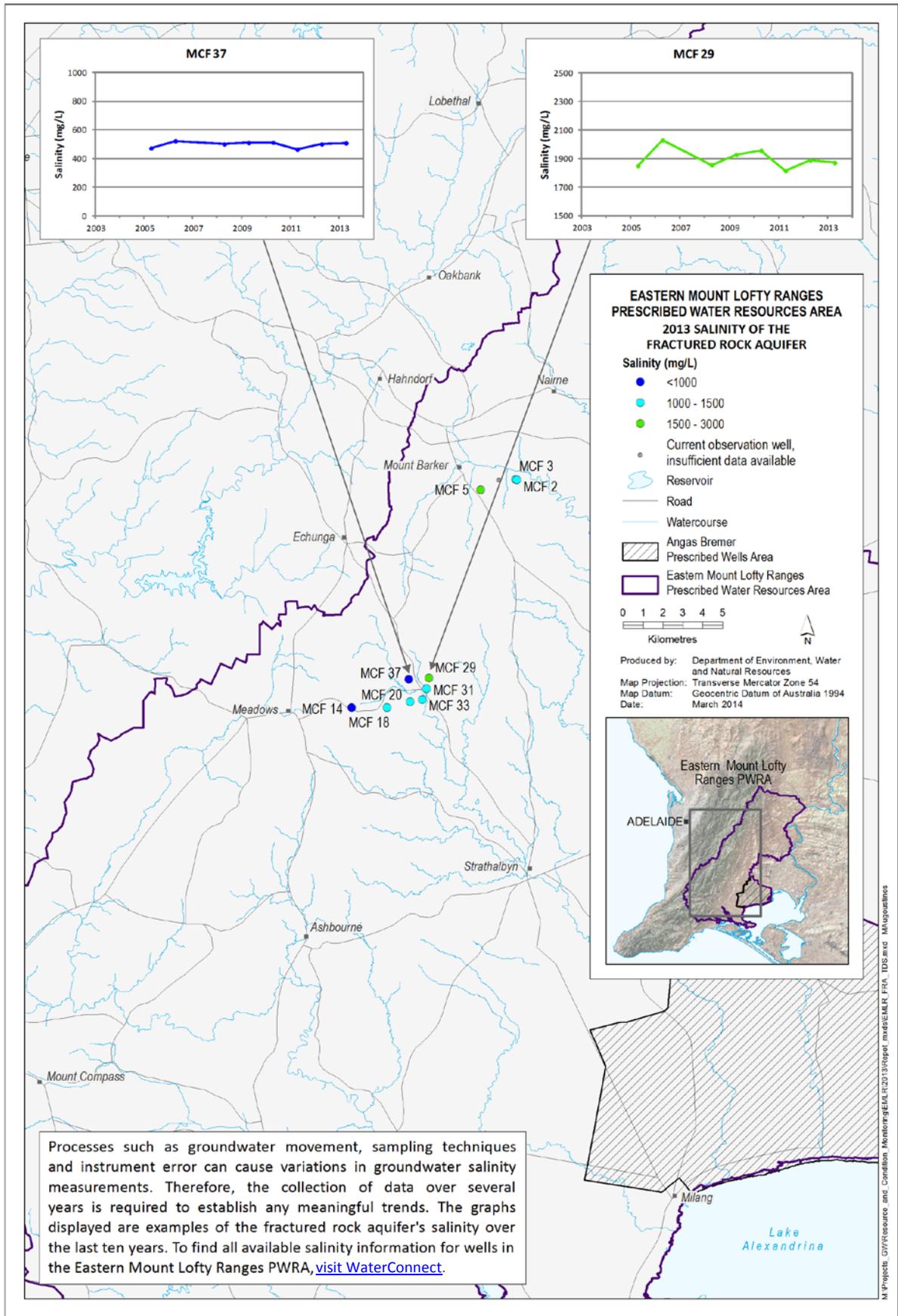


Figure 5. Groundwater salinity measurements from observation wells in the fractured rock aquifers of the Eastern Mount Lofty Ranges Prescribed Water Resource Area for 2013