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# EASTERN MOUNT LOFTY RANGES PWRA FRACTURED ROCK AQUIFERS

Groundwater Level and Salinity Status Report

2012

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Water and Natural Resources

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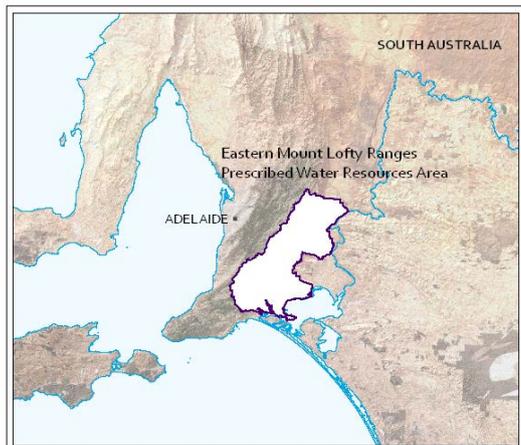
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# 2012 SUMMARY

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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 km<sup>2</sup> 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*. A water allocation plan for the EMLR PWRA is being finalised, with the draft provided to the public for consideration in 2011. As such, the groundwater resources of the EMLR PWRA are currently managed mainly through Notices of Prohibition that limit water to current use levels while the water allocation plan and existing user licensing processes are finalised. 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 the PWA and can be found on the [WaterConnect](#) website.

The EMLR PWRA is underlain 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 of 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 aquifers 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 aquifers 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 resource, the analysis of rainfall in 2012 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 is highly influenced by rainfall and is impacted by concentrated extraction activities that occur in the local area throughout summer. Ashbourne rainfall station was chosen as part of the analysis due to its central location amongst monitoring wells in the south of the region. The long–term monthly average rainfall is graphed in orange against the total monthly rainfall recorded (Fig. 1 and Fig. 2). In 2012 the total annual rainfall at Mount Barker for 2012 was 779 mm, 11 mm above the long–term average annual rainfall (1889–2012) of 768 mm (Fig. 1). Although total rainfall at Mount Barker in 2012 was slightly above the annual average, the monthly data indicates that rainfall was below the long–term monthly average for seven out of 12 months, with significantly below–average rainfall from September through to December, which also coincides with peak extraction activities in the north of the PWRA. In 2012 the total annual rainfall at Asbourne was 694 mm, 42 mm above the long–term average (1889–2012) of 652 mm (Fig. 2). Monthly data for 2012 from this station indicates that while rainfall in the months of May and June was significantly above average, rainfall was below–average for seven months throughout summer and autumn when peak demands on water from the groundwater resource 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.

Monitoring of groundwater levels of the fractured rock aquifers has been undertaken for the past 10 to 25 years in the EMLR PWRA and the monitoring network currently comprises 46 observation wells, although not all wells are monitored each year. Sufficient data to undertake groundwater analysis is available for 16 wells. In 2012, the majority of water level observation wells (12 out of 16) indicated a rise in water level (up to 8.5 m) when compared to the maximum water level recorded in 2011. In the northern and central part of the PWRA, half of the wells indicated a slight rise in groundwater levels, with the remaining wells recording declines of up to 0.68 m (Fig. 3). In the southern part of the PWRA, 90% of the wells indicated a rise in water level of up to 8.46m (Fig. 4), which may be attributable to above-average rainfall that occurred in the months of May and June as indicated by records taken at Ashbourne rainfall station. The observations taken within the reporting period support the longer-term trends of stable or slightly declining water levels in the fractured rock aquifers. The data available also show seasonal variations in water levels mainly attributable to agricultural irrigation practices.

There are currently fourteen 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). In 2012, samples were collected from ten of these monitoring wells. The salinity of these wells ranged from 501 to 2,454 mg/L, with seven wells recording values below 1,500 mg/L. Sufficient data to assess the change in salinity from 2011 to 2012 was available for nine of the observation wells. Increases in salinity were observed in all nine wells, with the salinity increases ranging from 28 to 239 mg/L between 2011 and 2012. The increase of 239 mg/L occurred for a well that has typically recorded low salinity concentrations of approximately 1000 mg/L and less. The increase in salinity represents a change from 865 mg/L to 998 mg/L, which is within the typical salinity range.

The fractured rock aquifers of the Eastern Mount Lofty Ranges Prescribed Water Resources Area have been assigned a yellow status for 2012:

## 2012 STATUS "Gradual adverse trends, indicating low risk to the resource in the medium term"

This means that gradual adverse trends in resource condition have been observed over this reporting period. Continuation of these trends is unlikely to negatively impact the beneficial use (i.e. drinking water, irrigation or stock watering) of the resource for at least 15 years. The 2012 status for the fractured rock aquifers is supported by:

- an overall increase in the maximum recovered groundwater level in 2012 when compared to 2012 water level data
- an overall increase in groundwater salinity in 2012 when compared to 2012 salinity data.

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

To view descriptions of all status symbols, [click here](#).

For further details about the Eastern Mount Lofty Ranges PWRA, please refer to the [Water Allocation Plan for the Eastern Mount Lofty Prescribed Water Resources Area](#).

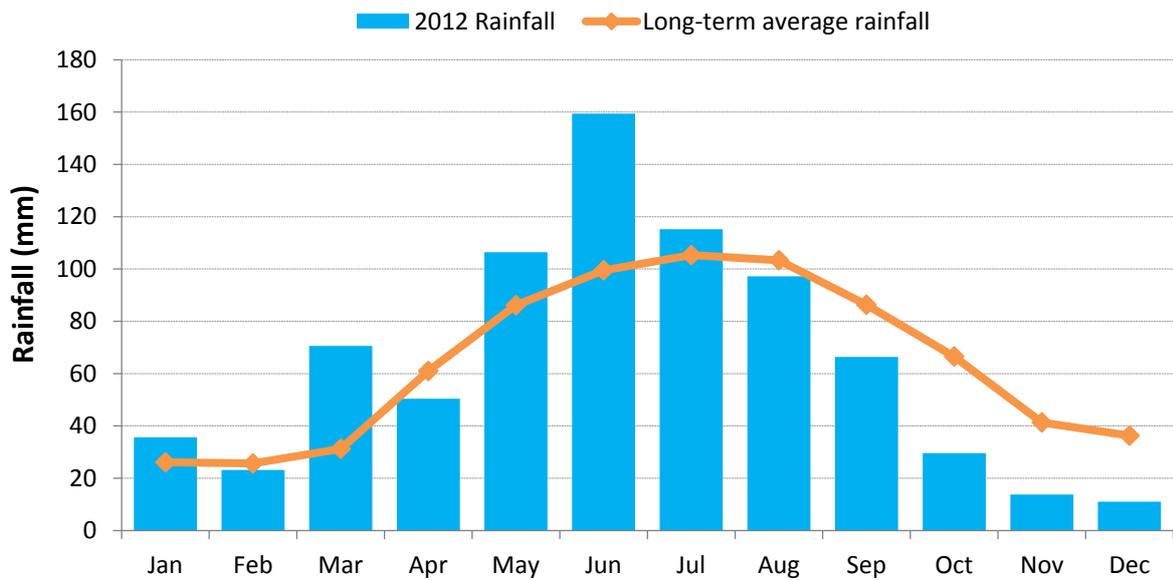


Figure 1. Monthly rainfall (mm) for 2012 and the long-term average monthly rainfall (mm) at the Mount Barker rainfall station (number 23733) in the Eastern Mount Lofty Ranges Prescribed Water Resources Area

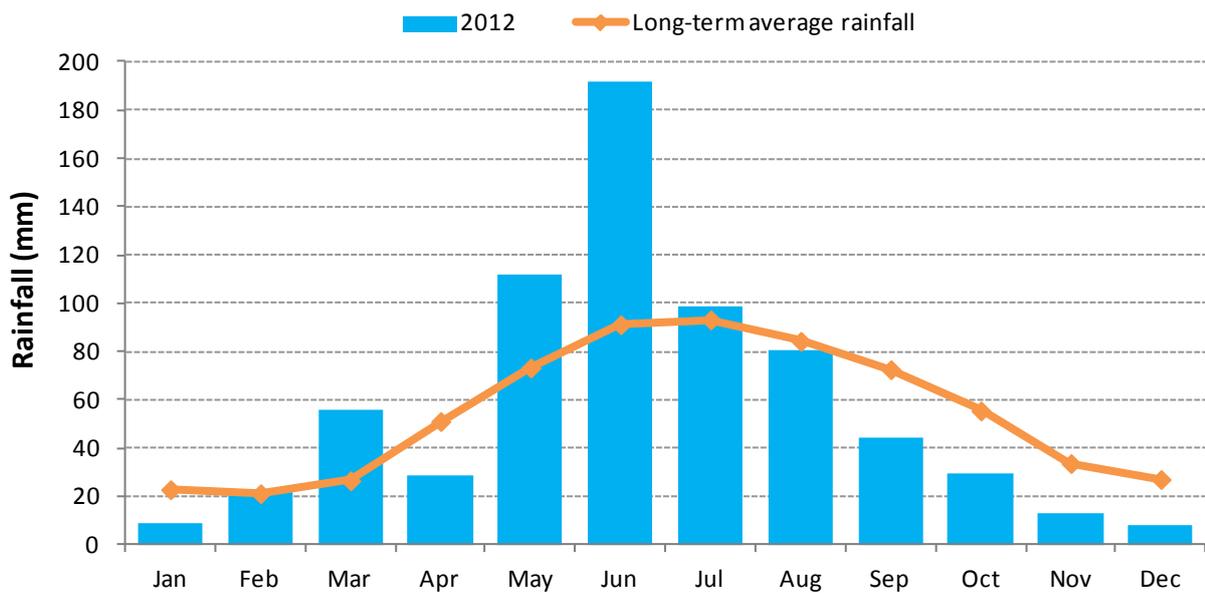


Figure 2. Monthly rainfall (mm) for 2012 and the long-term average monthly rainfall (mm) at the Asbourne rainfall station (number 23701) in the Eastern Mount Lofty Ranges Prescribed Water Resources Area

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](http://www.longpaddock.qld.gov.au/silo).

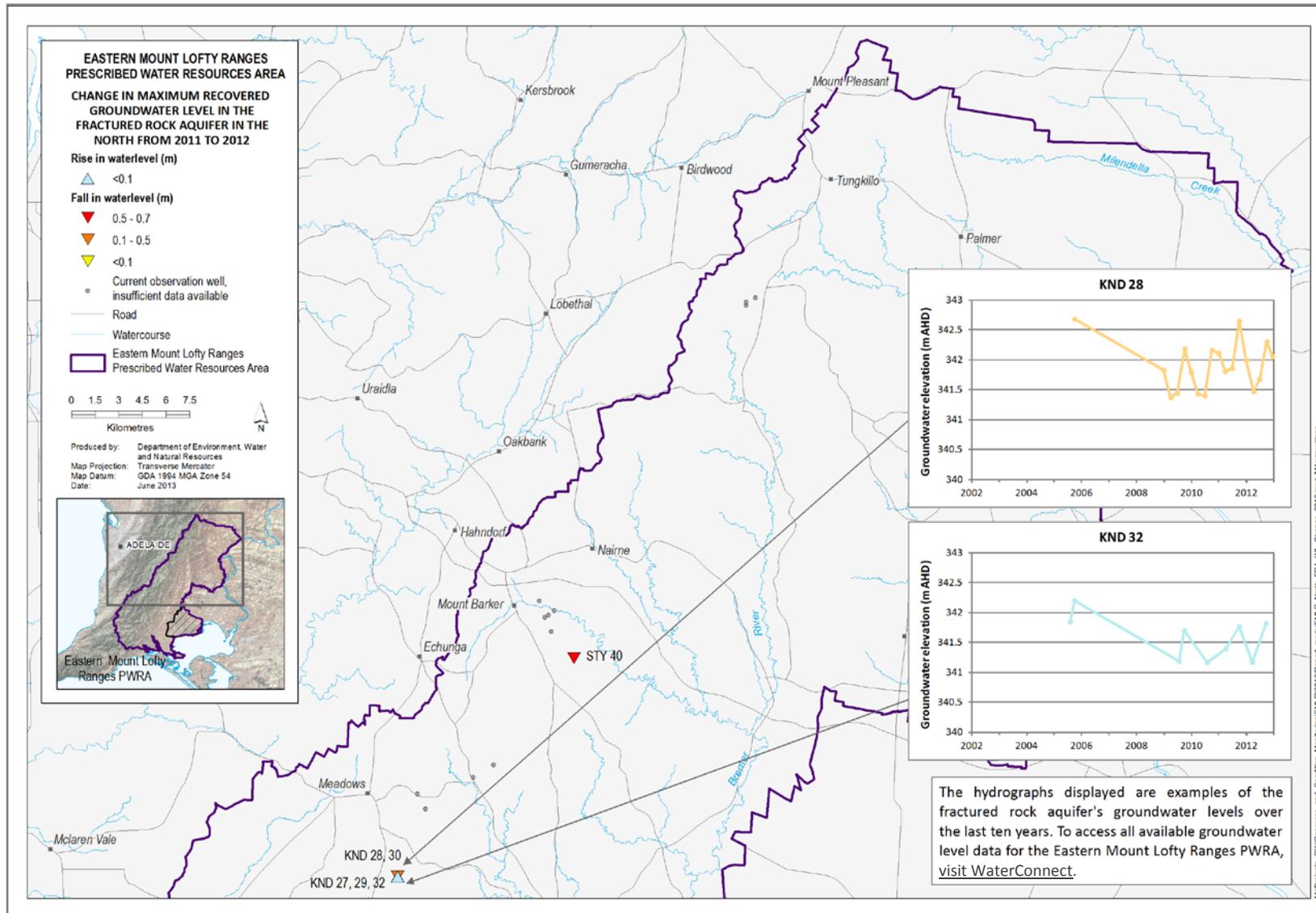


Figure 3. Overall changes in yearly maximum groundwater levels in observation wells in the fractured rock aquifers located in the northern and central Eastern Mount Lofty Ranges Prescribed Water Resource Area from 2011 to 2012

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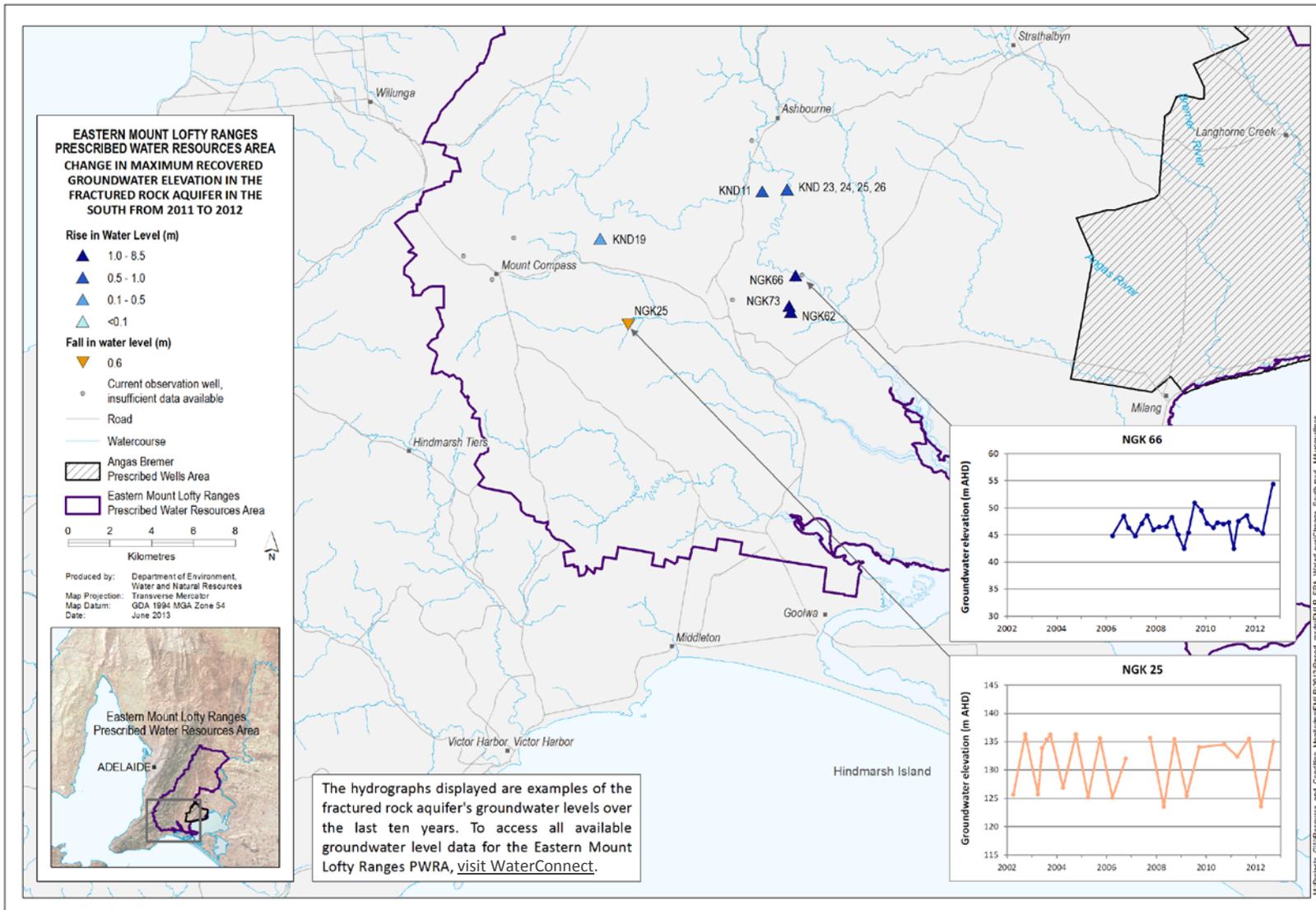


Figure 4. Overall changes in yearly maximum groundwater levels in observation wells in the fractured rock aquifers located in the south of the Eastern Mount Lofty Ranges Prescribed Water Resource Area from 2011 to 2012

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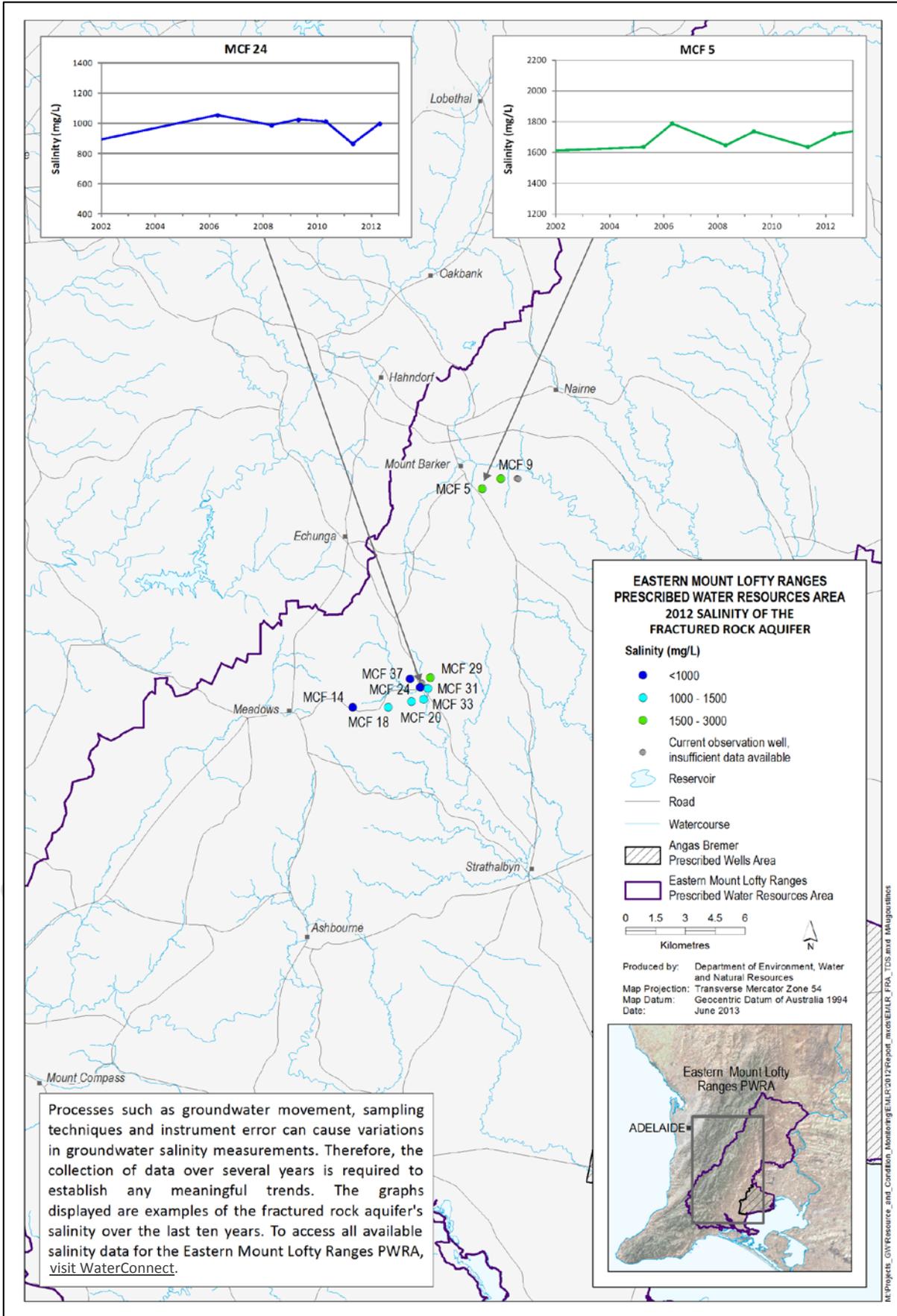


Figure 5. Groundwater salinity measurements in observation wells in the fractured rock aquifers of the Eastern Mount Lofty Ranges Prescribed Water Resource Area for 2012

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