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# EASTERN MOUNT LOFTY RANGES PWRA PERMIAN SAND AQUIFER

Groundwater Level and Salinity Status Report

2012

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**Government of South Australia**  
Department of Environment,  
Water and Natural Resources

Department of Environment, Water and Natural Resources  
25 Grenfell Street, Adelaide  
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](http://www.environment.sa.gov.au)

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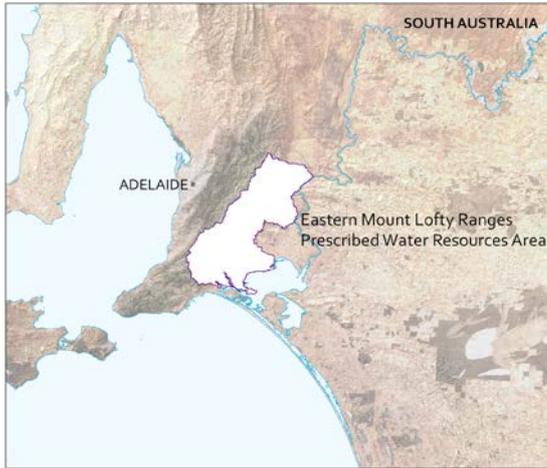
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# 2012 SUMMARY

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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>. 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*. 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 Angus 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.

There are two different types of aquifers in the EMLR PWRA. The fractured rock aquifers occur where groundwater is stored and moves through joints and fractures in the basement rocks. Sedimentary aquifers occur in the valleys where groundwater flows through the pore spaces within the sediments. Recharge to both of these aquifer types occurs directly from the portion of rainfall that percolates down to the water table through the soil profile or, in the case of the sedimentary aquifers, indirectly by throughflow from adjacent aquifers.

There are four fractured rock aquifers and three sedimentary aquifers in the EMLR PWRA. The Barossa Complex, Adelaidean sediments and the Kanmantoo and Normanville Groups form the fractured rock aquifers. Permian sand, Murray Group limestone and Quaternary alluvium form the sedimentary aquifers.

The Permian Sand formation, also known as the Cape Jervis Formation, can be found in several large U-shaped valleys carved into the Kanmantoo Group by ancient glaciers. It comprises glacial deposits of unconsolidated sands, silts and clays with occasional gravel beds. The Permian Sand aquifer forms part of the eastern slopes of the Mount Lofty Ranges and underlies Tertiary Murray Group limestone and Quaternary sediments of the Murray Plains. The aquifer can be highly permeable resulting in high yields and low salinities. However in some areas where there is high clay content, the aquifer is low yielding and high in salinity. Despite this variability, the Permian Sand aquifer is widely developed for localised irrigation and the Mt Compass town water supply.

Groundwater is extracted from the aquifers of the EMLR PWRA for a range of purposes, such as irrigation of crops or for stock and domestic purposes. Water taken for irrigation practices will be managed through a water licensing system; however, water taken for stock and domestic purposes is exempt from this requirement. Although extensive meter data is not yet available for licensable groundwater extractions, it is estimated that approximately 32 100 ML is taken each year from the aquifers of the EMLR PWRA (excluding the Angus Bremer Prescribed Wells Area). This estimation is based on land-use surveys of agricultural properties and the theoretical irrigation requirements for various crops. Please note that this is an estimate and actual current use may be different. The majority of the groundwater is used for the irrigation of pasture (40%) and various food crops including olives, vegetables, potatoes, berries and orchards (31%). The remaining is used for the irrigation of lucerne (18%) and wine grapes (10%). 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 the estimated demand may exceed the sustainable yield, such as where the Permian Sand aquifer underlies the Tookayerta Creek catchment.

The Ashbourne rainfall station (number 23701) is located in the township of Ashbourne and recorded 694 mm of rain in 2012, which is more than 40 mm above the long-term average annual rainfall for this station. The Mount Compass rainfall station (number 23735) is located in the township of Mount Compass and recorded 824 mm of rain in 2012, which is nearly 20 mm below the long-term average annual rainfall for this station. The month of June received more than double its long-term average at both of these stations (Fig. 1 & 2). The Finniss rainfall station (number 23714) is located within the Currency Creek observation network and recorded 661 mm of rain in 2012, which is more than 160 mm above the long-term average annual rainfall for this station. June received nearly three times its long-term average, with March, May, July and August also receiving above average rainfall (Fig. 3).

Groundwater levels of the Permian Sand aquifer in the Tookayerta groundwater management zone are monitored by the Mount Compass observation network and display seasonal variations caused by groundwater extraction. Observation wells with long-term data show that groundwater levels were quite stable between 1984 and 1994. Since 1994, many wells have displayed a consistent decline in water levels, while in others, the water levels have remained stable with lower levels recorded between 2004 and 2009. In 2012, 11 observation wells recorded a decline in the groundwater level of up to 1.3 m when compared to 2011 data and seven observation wells recorded an increase of up to 1.1 m (Fig. 3).

Groundwater levels of the Permian Sand aquifer in the Finniss Permian 1 management zone also display seasonal variations caused by groundwater extraction. The Ashbourne and Currency Creek observation well networks monitor the aquifer in the northern and southern areas of the management zone respectively. In the north of the management zone (around the Ashbourne area), long-term groundwater monitoring data show that overall groundwater levels have been reasonably stable. The majority of wells displayed stable or rising levels from the late 1990s to the early 2000s, followed by slightly lower levels recorded between 2003 and 2009, and then a period of recovery. This trend has continued in 2012, with 12 out of 13 observation wells with available data recording a rise in the maximum recovered groundwater level of up to 1.2 m when compared to 2011 levels (Fig. 3). In the south of the management zone, there are nine wells monitoring groundwater levels. Over the last eight years, some of these wells display a gradual decline in groundwater levels while other wells show stable levels. In 2012, groundwater levels appear to recover, with six out of eight wells with available data recording a rise in the maximum recovered groundwater levels of up to 0.6 m when compared to 2011 data (Fig. 3). One well recorded a decline of 0.03 m and another well recorded no change.

Groundwater salinity of the Permian Sand aquifer is not monitored, but is typically less than 1000 mg/L. The priorities for salinity monitoring in the EMLR PWRA are the aquifers with higher initial salinity (i.e. closer to the 1500 mg/L tolerance level for crops) that display trends of increasing salinity.

The condition of the Permian Sand aquifer of the Eastern Mount Lofty Ranges PWRA in 2012 has been assessed separately for the Tookayerta and Finniss 1 groundwater management zones.

## Tookayerta Permian management zone

The Permian Sand aquifer in the Tookayerta groundwater management zone has been assigned a yellow status for 2012:

### 2012 STATUS



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

This means that gradual adverse trends in the resource status have been observed over the reporting period. Continuation of these trends is unlikely to negatively impact the beneficial use of the resource for at least 15 years.

The 2012 status for the Permian Sand aquifer of the Tookayerta Permian management zone in the Eastern Mount Lofty Ranges PWRA is supported by:

- an overall decline in the maximum recovered groundwater level when compared to 2011 water level data.

# Finniss Permian 1 management zone

The Permian Sand aquifer in the Finniss Permian 1 groundwater management zone has been assigned a green status for 2012:

## 2012 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 reporting period. Continuation of these trends favours a very low likelihood of negative impacts on beneficial uses such as drinking water, irrigation or stock watering. The 2012 status for the Permian Sand aquifer of the Finniss Permian 1 management zone in the Eastern Mount Lofty Ranges PWRA is supported by:

- an overall increase in the maximum recovered groundwater level when compared to 2011 water level.

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, [visit WaterConnect](#).

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

For further details about the Eastern Mount Lofty Ranges PWRA, please see the [draft Eastern Mount Lofty Ranges Water Allocation Plan](#).

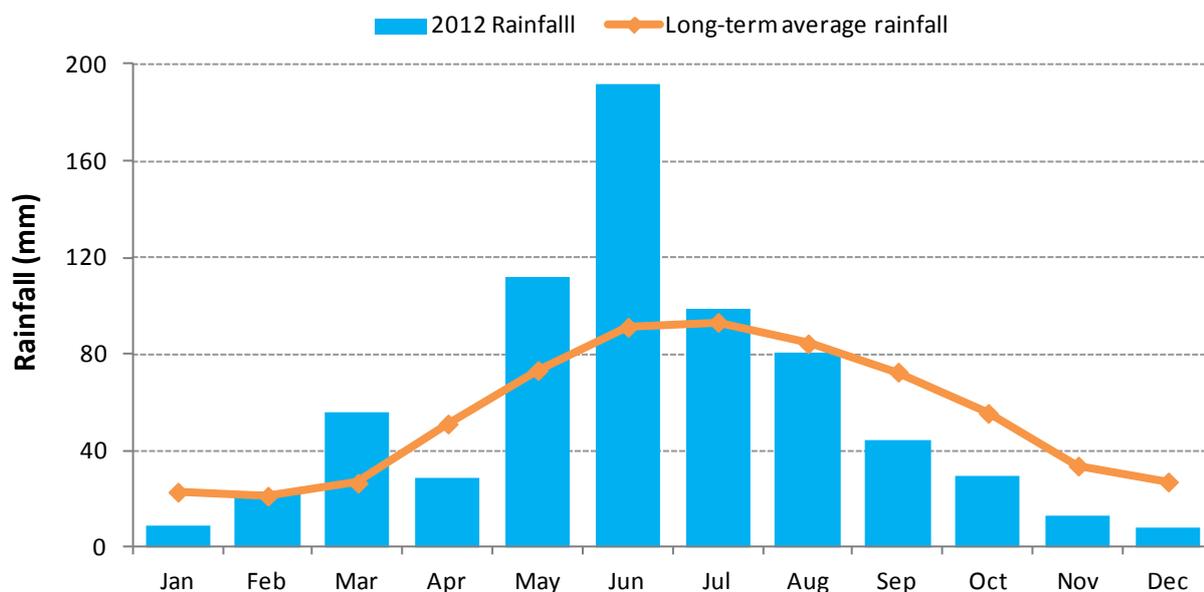


Figure 1. Monthly rainfall (mm) for 2012 and the long-term average monthly rainfall (mm) at the Ashbourne rainfall station (number 23701) in the Eastern Mount Lofty Ranges Prescribed Water Resources Area

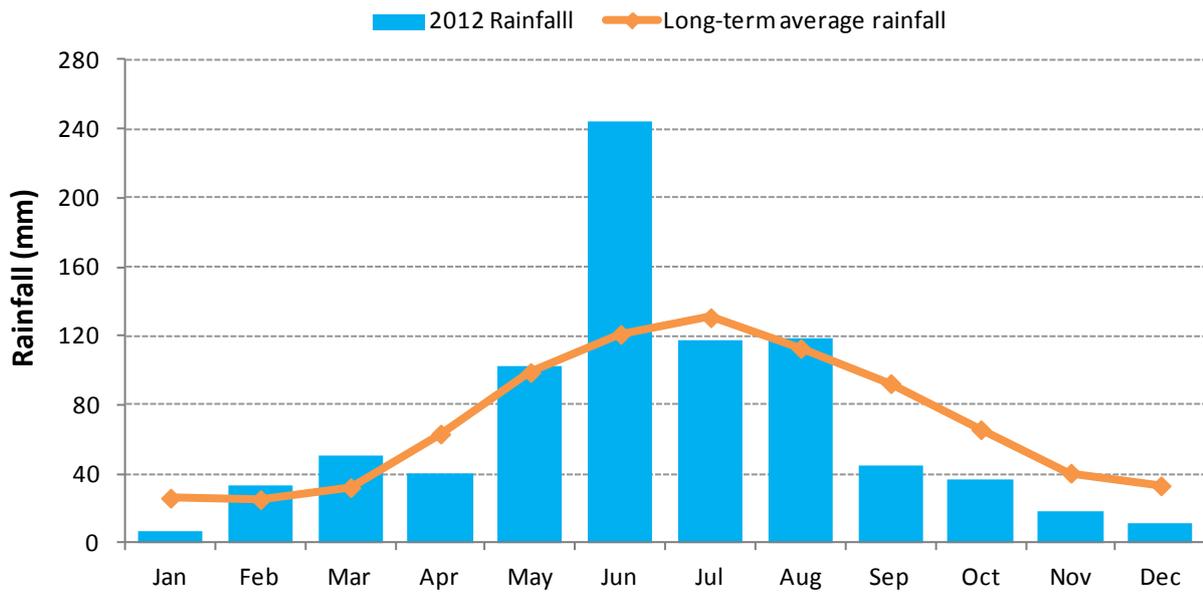


Figure 2. Monthly rainfall (mm) for 2012 and the long-term average monthly rainfall (mm) at the Mount Compass rainfall station (number 23735) in the Eastern Mount Lofty Ranges Prescribed Water Resources Area

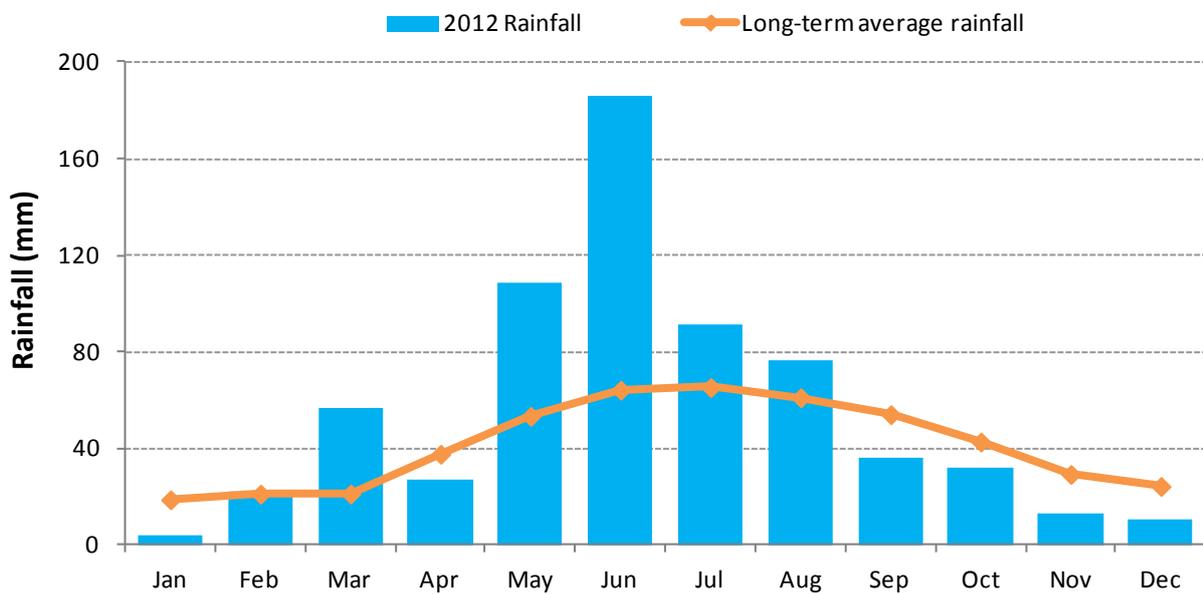


Figure 2. Monthly rainfall (mm) for 2012 and the long-term average monthly rainfall (mm) at the Finniss rainfall station (number 23714) in the Eastern Mount Lofty Ranges Prescribed Water Resources Area

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).

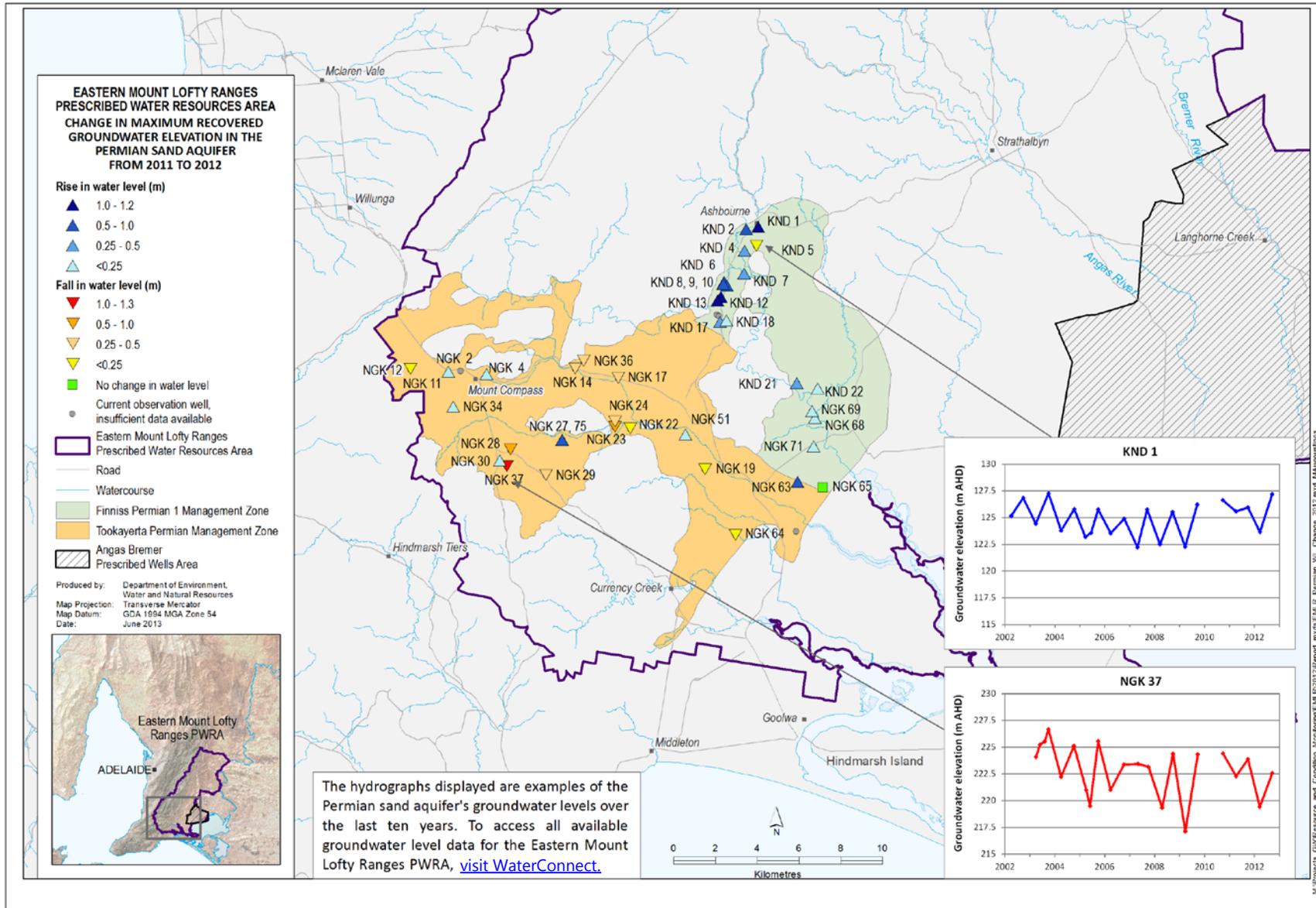


Figure 3. Overall changes in maximum groundwater levels in the Permian Sand aquifer of the Eastern Mount Lofty Ranges Prescribed Water Resources Area from 2011 to 2012

Eastern Mount Lofty Ranges PWRA

Permian Sand aquifer Groundwater Status Report 2012

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