Western Mount Lofty Ranges PWRA

Fractured rock aquifers

2014 Groundwater level and salinity status report

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

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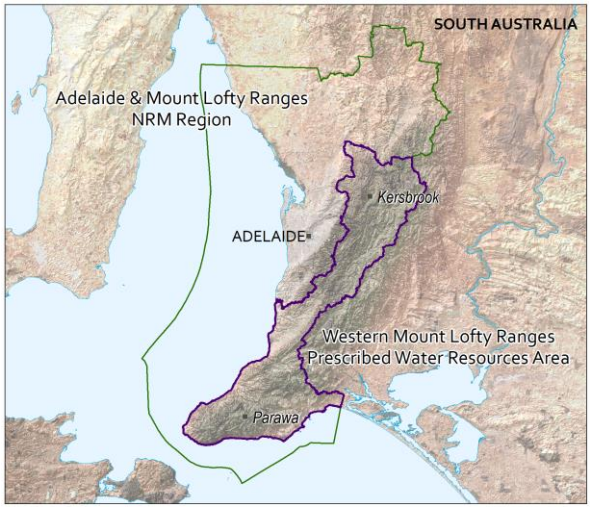
2014 Summary



The Western Mount Lofty Ranges (WMLR) Prescribed Water Resources Area (PWRA) is within the Adelaide and Mount Lofty Ranges NRM Region. It covers an area of approximately 2750 km^2 stretching from Cape Jervis on the south coast to Gawler in the north. It is a regional-scale resource for which groundwater, surface water and watercourse water is prescribed under South Australia's *Natural Resources Management Act 2004*. A water allocation plan provides for the sustainable use of the water resources. The McLaren Vale Prescribed Wells Area (PWA) is located within the boundaries of the WMLR PWRA and a separate groundwater level and salinity status report that has been prepared for this PWA can be found on the WaterConnect website.

The WMLR PWRA is characterised by fractured rock and sedimentary aquifers that are of varying age, water quality and yield. Recharge to these aquifers occurs directly from the portion of rainfall that percolates down to the watertable through the soil profile or indirectly from throughflow from adjacent aquifers. The fractured rock aquifers (FRAs) of the WMLR PWRA are comprised of three geological units: the Barossa Complex, Adelaidean sediments and the Kanmantoo Group. Generally, the Adelaidean sedimentary rocks are more favourable in terms of recharge, salinity and yields, while the Barossa Complex and Kanmantoo Group provide groundwater of poorer quality at low yields. Recharge to the FRAs occurs directly from infiltration of rainfall, and groundwater flow generally follows the topography, moving from higher points towards the lowest areas where it eventually discharges into rivers and streams.

Trends in groundwater levels and salinity in the FRAs of the WMLR 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.

In 2014, the total annual rainfall recorded at the Uraidla rainfall station (number 23750) was 1020 mm, which is about 45 mm below the long-term (1889–2014) average of 1066 mm and around 150 mm less than 2013. The months of February, June and July experienced rainfall which exceeded long-term monthly average patterns, while the months of August, September and October received rainfall which was significantly below the monthly long-term average rainfall for Uraidla (Fig. 1). Uraidla rainfall station was chosen due to its central location among observation wells.

Although extensive meter data is not yet available for groundwater extractions within the PWRA, an estimated 50 250 ML/y is drawn from all aquifers for licensed purposes based on a land-use survey of irrigated 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 sustainable yield of 70 324 ML/y calculated for the whole of the WMLR PWRA. However, on a local scale, the estimated demand may exceed the sustainable yield calculated for some management zones within the PWRA. The majority of groundwater is used for the irrigation of pasture (35%) and various fruits (33%). The remainder is used for the irrigation of wine grapes (14%), vegetables (6%), lucerne (3%) and other uses (9%).

Long-term monitoring data within the FRAs across the WMLR PWRA reveal a good correlation between groundwater levels and rainfall. Following a widespread decline in groundwater levels in the Central Hills region after the 2006 drought, most observation wells have shown either a stabilisation, reduced rate of decline or increases in water levels since 2009, in response to higher rainfall recharge. There is insufficient data collected within the Fleurieu Peninsula region of the WMLR PWRA to allow an assessment of the FRAs in that area.

In 2014, there was an overall decline in groundwater levels in the Central Hills region. Of the 98 observation wells with data for both 2014 and 2013, most (62%) recorded a fall in the maximum recovered groundwater level from 2013 (Fig. 2), which may be a response

to less rainfall. Falls in groundwater level ranged from 0.09 to 5 m with most of these wells (69%) recording a decline of less than 1 m. 30% of the wells with sufficient data recorded a rise in groundwater level ranging from 0.07 to 5.9 m, again with most these wells (72%) displaying an increase of less than 1 m. Negligible change in the groundwater level was recorded in the remaining 7% of wells with available data, where the change in the maximum recovered groundwater level was less than 0.1 m. Overall, the median change for the monitored wells was a decline of 0.33 m. Declines in groundwater levels were more common around Uraidla and Echunga and north of Clarendon Weir (Fig. 2). Increases were common south-west of Lenswood and north of Little Para Reservoir. Levels were variable between Oakbank and Kersbrook.

The groundwater salinity distribution in the FRAs for 2014 is shown in Figure 3. During the period 2003 to 2013, several wells showed either increasing or decreasing salinity trends, although most were stable. In 2014, monitoring results indicate that the salinity continues to be stable with 85% of wells recording salinities of less than 1500 mg/L and most wells (65%) recording a change in salinity of less than 5%.

The fractured rock aquifers in the Western Mount Lofty Ranges PWRA have been assigned a yellow status for 2014:

2014 STATUS

"Gradual adverse changes, indicating a 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, it is unlikely to negatively impact the beneficial use of the resource (i.e. drinking water, irrigation or stock watering) for at least 15 years.

The 2014 status for the fractured rock aquifers are supported by:

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

To view descriptions for all status symbols, please visit the Water Resource Assessments page at WaterConnect.

To view the Western 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, please visit the Water Resource Assessments page at WaterConnect.

To view or download groundwater level and salinity data from observation wells within the Western Mount Lofty Ranges Prescribed Water Resources Area, please visit Groundwater Data on WaterConnect.

For further details about the Western Mount Lofty Ranges Prescribed Water Resources Area, please see the Water Allocation Plan for the Western Mount Lofty Ranges Prescribed Water Resources Area on the Natural Resources Adelaide and Mount Lofty Ranges website.

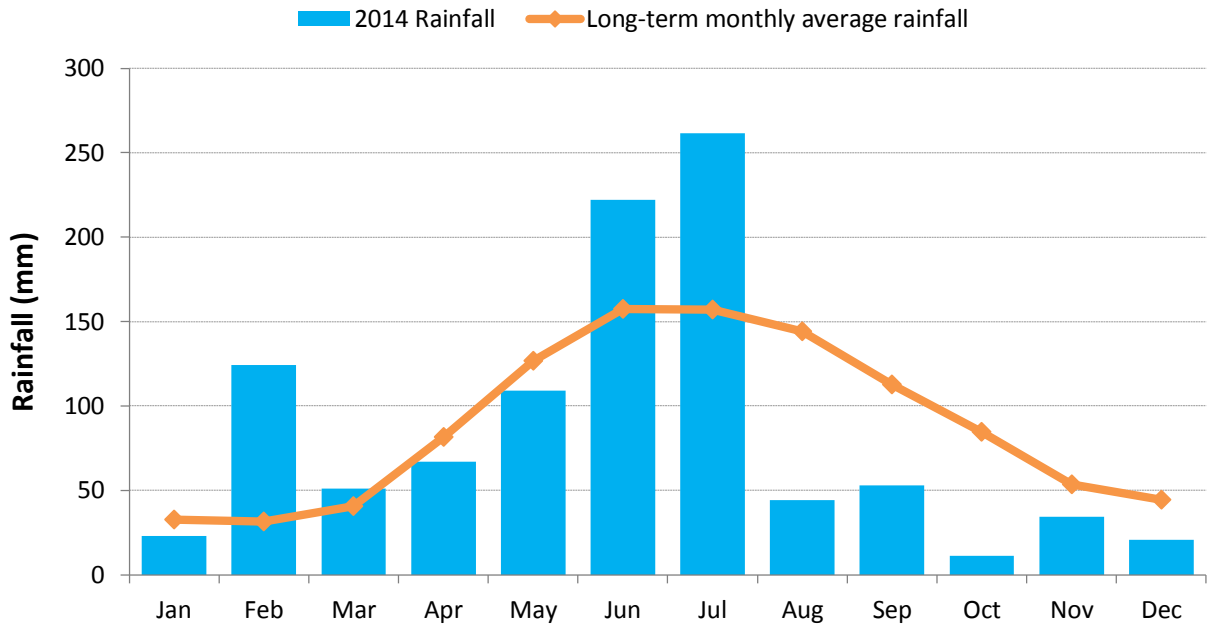


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Uraidla rainfall station* (number 23750) in the McLaren Vale Prescribed Wells Area.

* 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

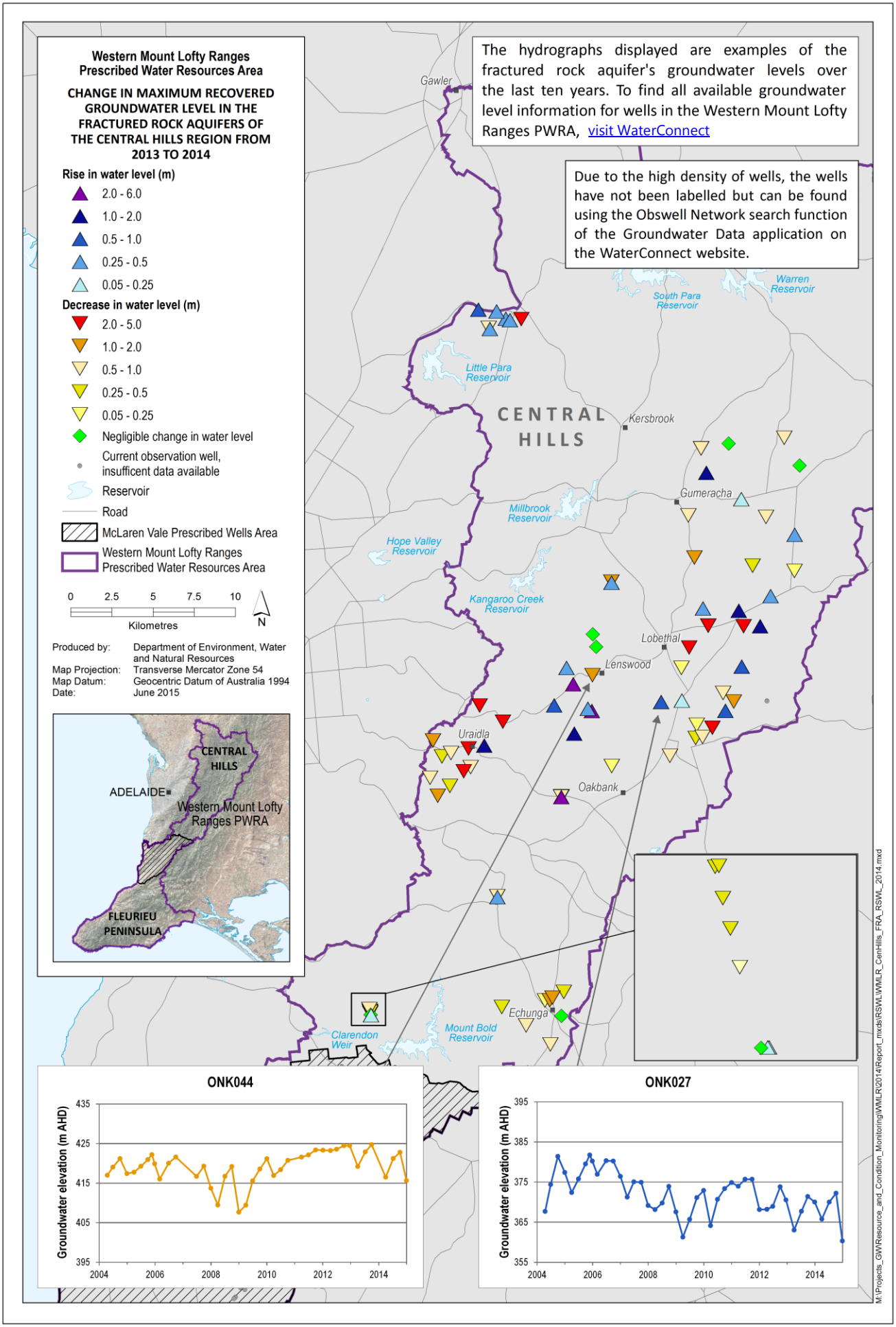


Figure 2. Overall changes in maximum groundwater levels of the Fractured Rock aquifer in the Western Mount Lofty Ranges Prescribed Water Resources Area from 2013 to 2014

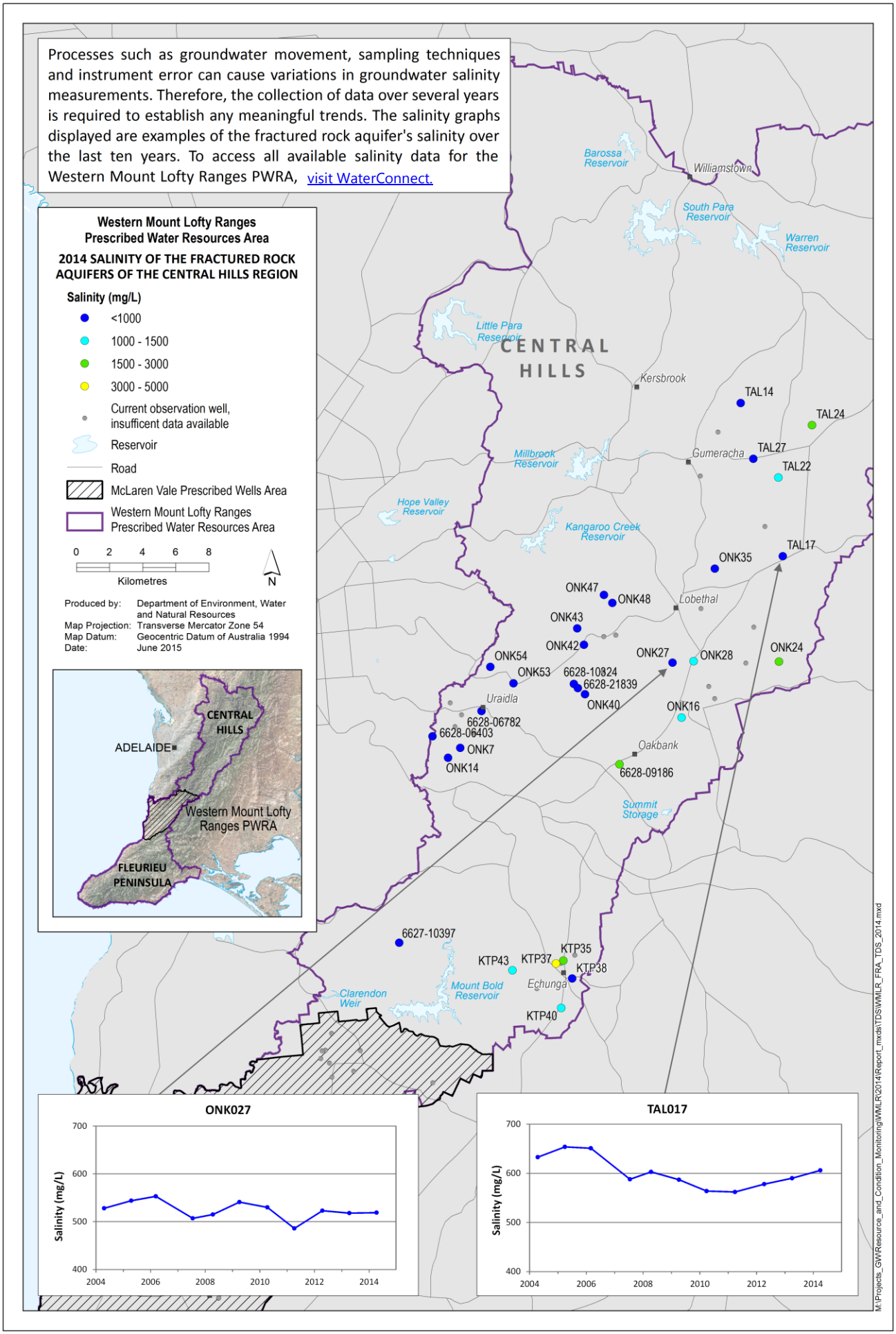


Figure 3. Groundwater salinity of the Fractured Rock aquifer in the Western Mount Lofty Ranges Prescribed Water Resources Area for 2014