Western Mount Lofty Ranges PWRA

Tertiary limestone aquifer

2015 Groundwater level and salinity status report

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

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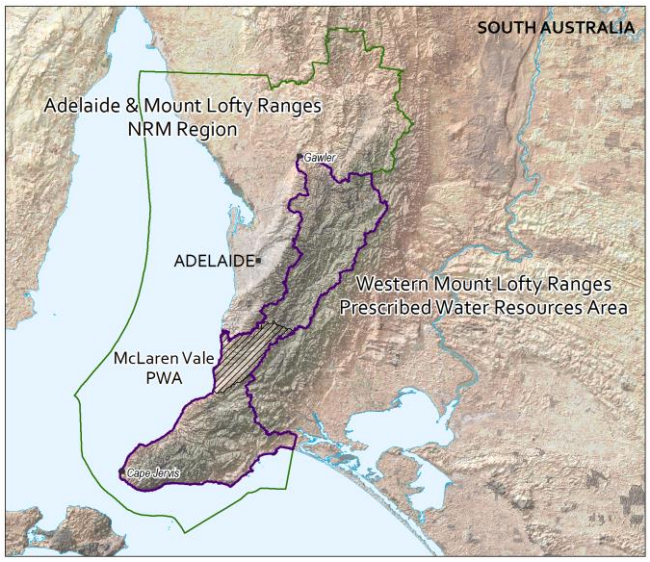
2015 Summary



The Western Mount Lofty Ranges (WMLR) Prescribed Water Resources Area (PWRA) covers an area of approximately 2750 km^2 stretching from Cape Jervis on the south coast to Gawler in the north, within the Adelaide and Mount Lofty Ranges NRM Region. It is a regional-scale resource for which groundwater, surface water and watercourse water are 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.

There are three sedimentary aquifers in the WMLR PWRA: Permian Sand, Tertiary limestone and the Quaternary. This report focuses on the Tertiary limestone aquifer, an important aquifer that is present only in the Myponga and Hindmarsh Tiers Basins, in the south of the PWRA on the Fleurieu Peninsula. It produces high yields and contains good quality groundwater with salinity generally below 1000 mg/L. This aquifer is confined by overlying Quaternary clays and can experience seasonal artesian conditions. It is widely developed for irrigation, primarily for dairy pasture and viticulture.

Despite the confined nature of the Tertiary limestone aquifers, which do not receive direct recharge from incident rainfall, the intensity and timing of rainfall (and related variations in rates of groundwater extraction) can have an effect on groundwater pressure levels and salinity. For example, if the Fleurieu Peninsula experienced above-average rainfall, this could result in less groundwater being extracted from the Tertiary limestone aquifers for irrigation purposes, with commensurate increases in groundwater pressure levels and reductions in salinities.

The Hindmarsh Valley rainfall station (BoM Station 23823) was used for rainfall analysis due to its central location within the Hindmarsh Tiers Basin (Fig. 1); 704 mm of rain fell in the 2014–15 water-use year, over 200 mm less than the long-term average of 938 mm (1900–2015), and nearly 150 mm less than the five-year average of 850 mm (Figs. 1 and 2). A general trend of declining rainfall over the past five years is evident (Fig. 2).

Long-term monitoring data show that within the Hindmarsh Tiers Basin, groundwater pressure levels experienced a steady decline in all monitoring wells between 2001 and 2009, showing a good correlation with below-average trends in rainfall. Since 2009, most of these wells have recorded a noticeable improvement in pressure levels in response to higher rainfall, including the unusually wet summer of 2010–11. In the Myponga Basin, groundwater pressure levels have remained stable since monitoring began in 1975, with a period of lower-than-average levels between 2005 and 2009. Pressure levels in the Myponga Basin also experienced some recovery since 2009, with 2013 levels the highest on record in most wells.

In the five years to 2015, 8 out of 10 wells within the Hindmarsh Tiers Basin recorded a trend of stable or rising groundwater pressure levels (Fig. 3). Rises ranged between 0.6 and 0.12 m/y. The two remaining monitoring wells recorded declining trends of 0.04 and 0.09 m/y. In the Myponga Basin, seven out of eight monitoring wells recorded a declining trend over the past five years, while the remaining well recorded stable pressure levels. The declines in the Myponga Basin ranged between 0.15 and 0.19 m/y.

Long-term monitoring data show salinities in the Hindmarsh Tiers and Myponga Basins are generally below 1000 mg/L and have been stable since monitoring began in 2007. Because of this, salinity is not frequently monitored and as such, there was insufficient data available in 2015 to conduct a five year trend analysis. Instead, salinity data from 2010 to 2014 (inclusive) was used. Most wells recorded a salinity of less than 1000 mg/L in 2014 (Fig. 4) and all wells recorded a trend of stable salinity in the five years to 2014 (Fig. 5).

To determine the status of the Tertiary limestone aquifer for 2015, the trends in groundwater pressure levels and salinities over the past five years (2011 to 2015, inclusive) were analysed. This is a new approach, in contrast to the year-to-year assessments that have been used in past *Groundwater level and salinity status reports*. Please visit the Frequently Asked Questions on the *Water Resource Assessments* page on WaterConnect for more detail on the current method of evaluating the status of groundwater resources.

Hindmarsh Tiers Basin

The Tertiary limestone aquifer in the Hindmarsh Tiers Basin has been assigned a green status for 2015:

2015 Status  Positive trends have been observed over the past five years

The 2015 status for the Hindmarsh Tiers Basin is based on:

- most monitoring wells 80% recorded a five-year trend of stable or rising groundwater pressure level
- all monitoring wells show a five-year trend of stable or decreasing salinity.

Myponga Basin

The Tertiary limestone aquifer in the Myponga Basin has been assigned a yellow status for 2015:

2015 Status Minor adverse trends have been observed over the past five years

The 2015 status of the Myponga Basin is based on:

- most monitoring wells (88%) recorded a five-year trend of declining groundwater pressure level.

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

To view the *Western Mount Lofty Ranges PWRA Groundwater Level and Salinity Status Report 2011*, which includes background information on hydrogeology, rainfall and relevant groundwater-dependent ecosystems, please visit the *Water Resource Assessments* page on WaterConnect.

To view or download groundwater level and salinity data from monitoring wells within the Western Mount Lofty Ranges PWRA, please visit Groundwater Data on WaterConnect.

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

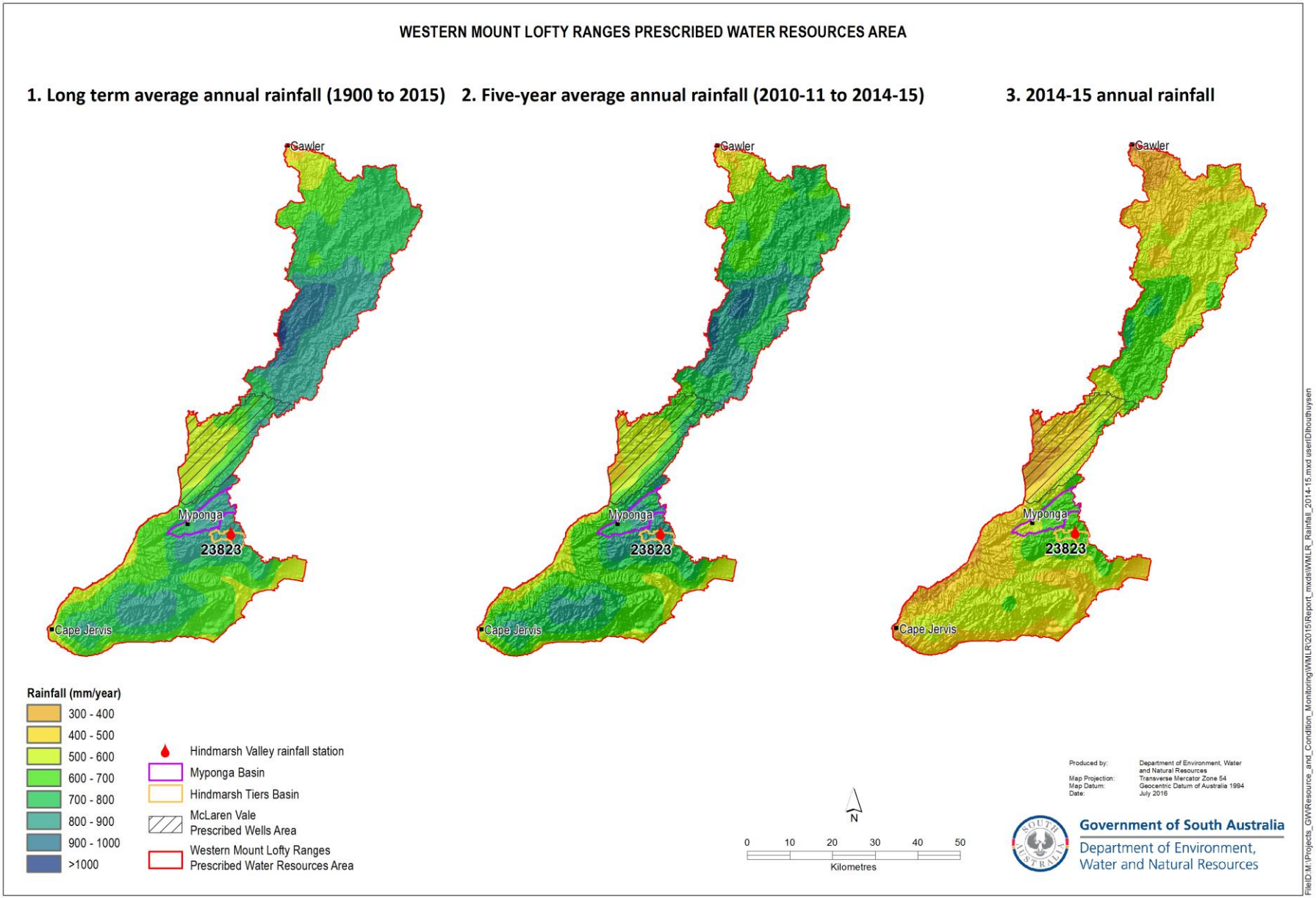


Figure 1. (1) Long-term and (2) five-year average annual rainfall and (3) annual rainfall for the 2014–15 water-use year in the Western Mount Lofty Ranges PWRA[1]

[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.

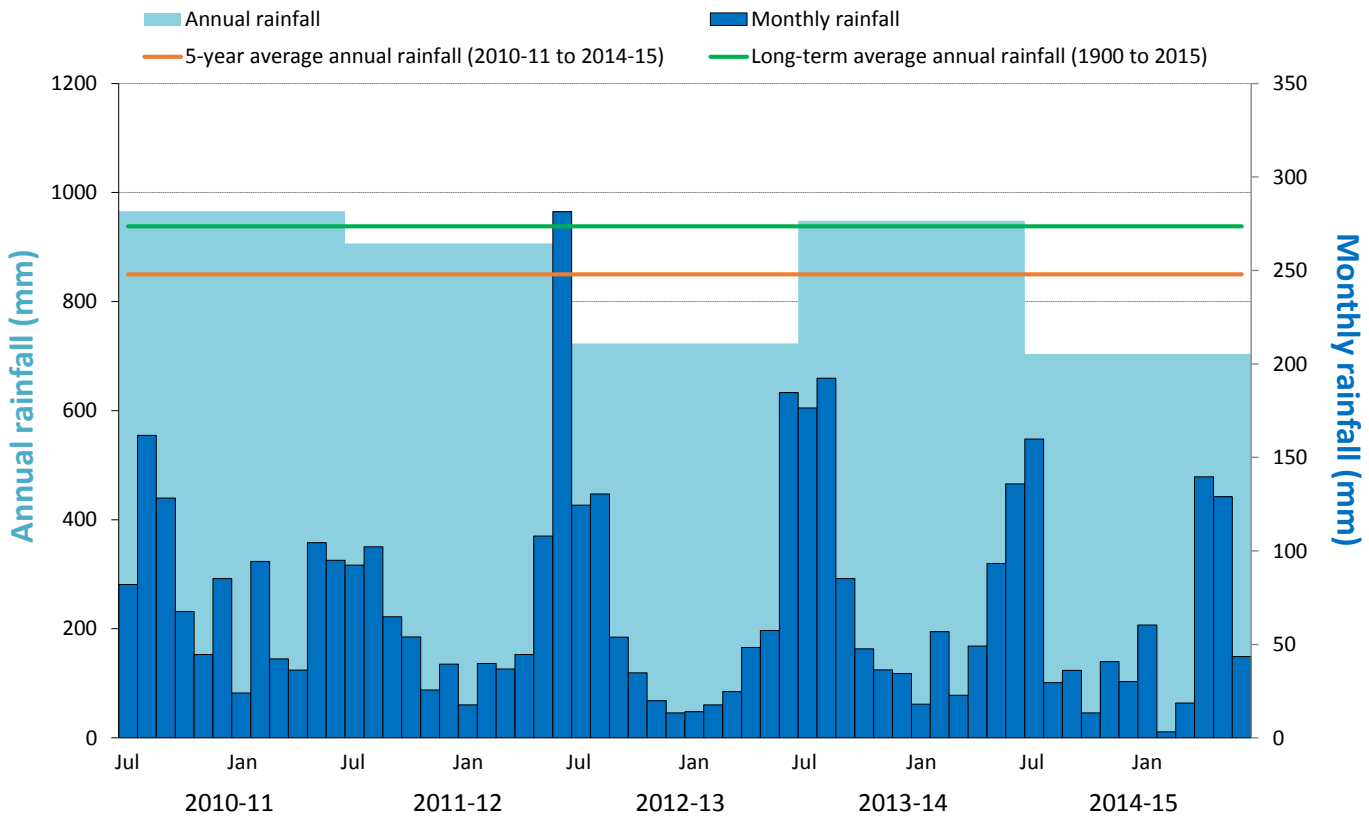


Figure 2. Annual (July–June) and monthly rainfall for the past five water-use years, and the five-year and long-term average annual rainfall recorded at Hindmarsh Valley (BoM Station 23823)[2]

[2] 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.

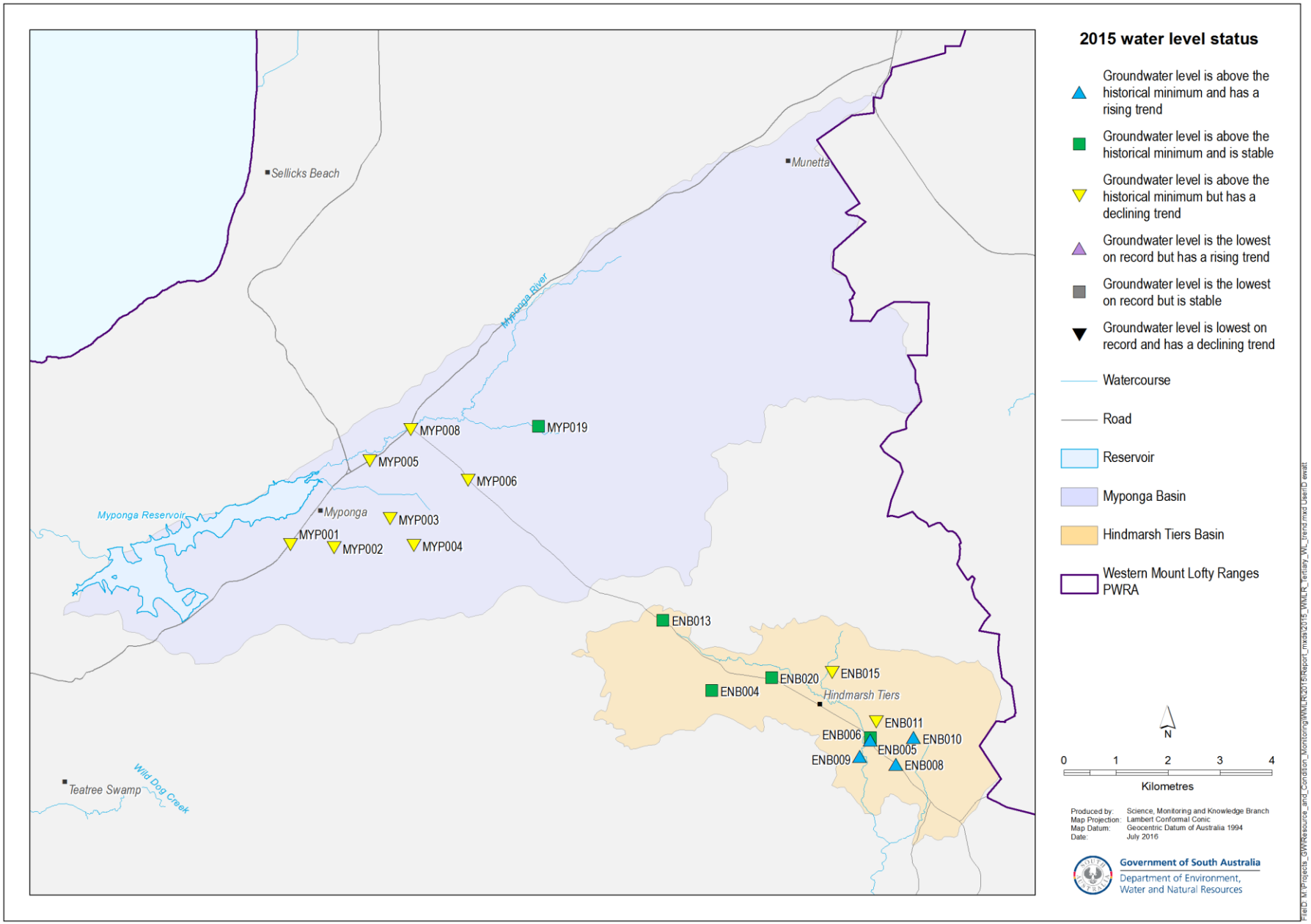


Figure 3. 2015 status of groundwater levels in the Tertiary limestone aquifer (Western Mount Lofty Ranges Prescribed Water Resources Area) based on the five-year water level trends from 2011 to 2015

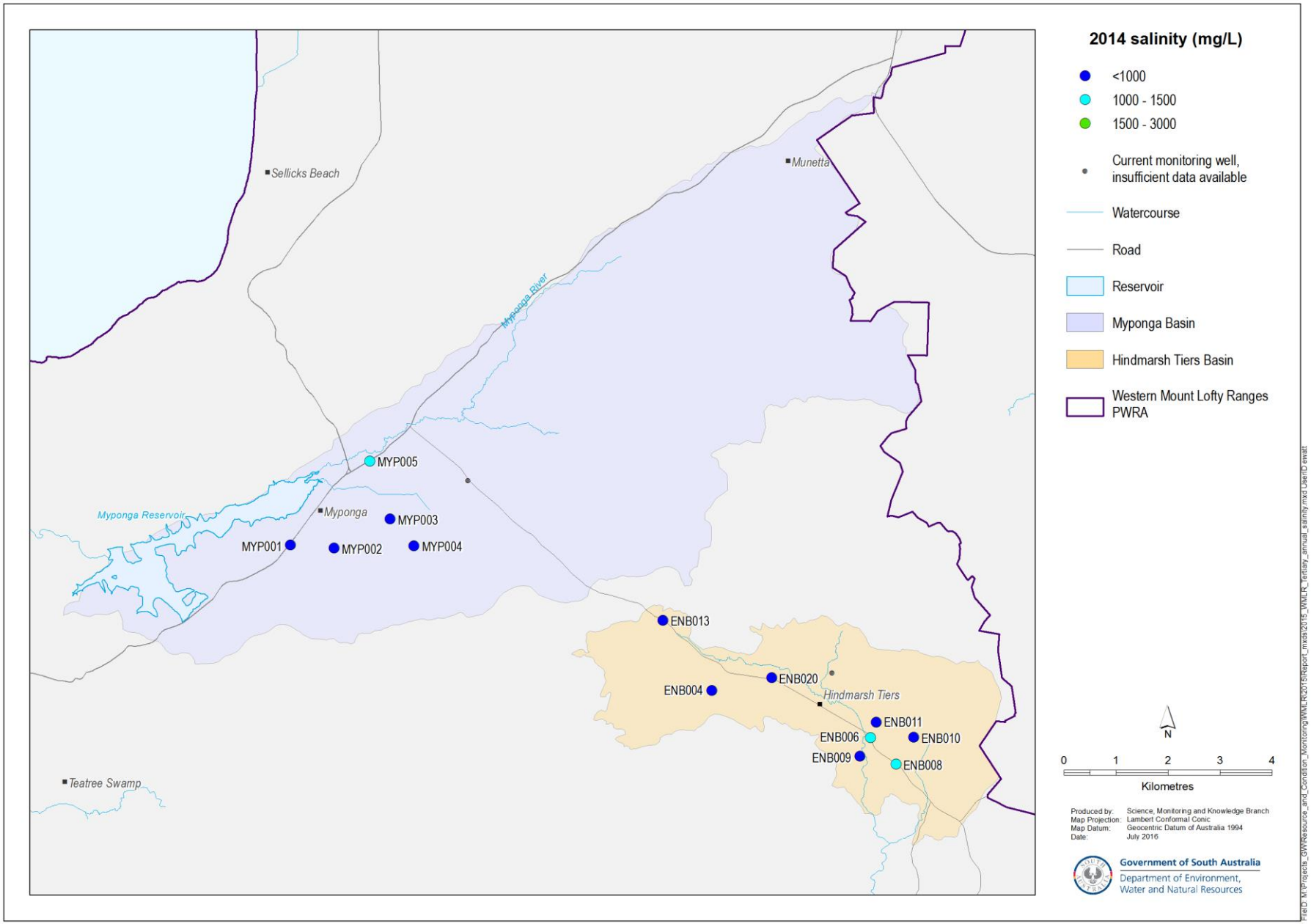


Figure 4. 2014 groundwater salinities of the Tertiary limestone aquifer (Western Mount Lofty Ranges Prescribed Water Resources Area)

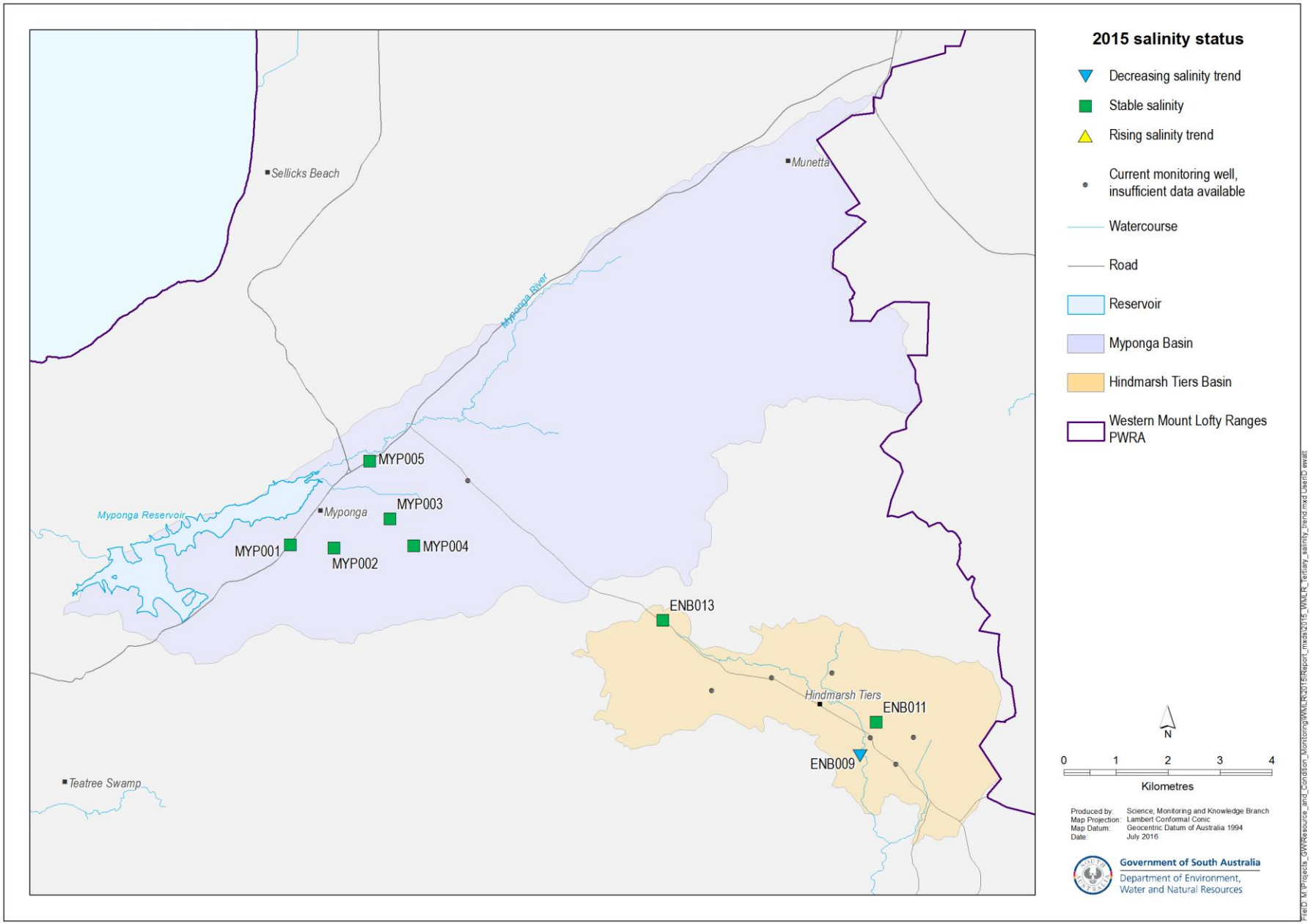


Figure 5. 2015 status of groundwater salinities in the Tertiary Limestone aquifer (WMLR Prescribed Water Resources Area) based on the five-year trends from 2010 to 2014

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