Western Mount Lofty Ranges PWRA

Tertiary limestone aquifer

2014 Groundwater level and salinity status report

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

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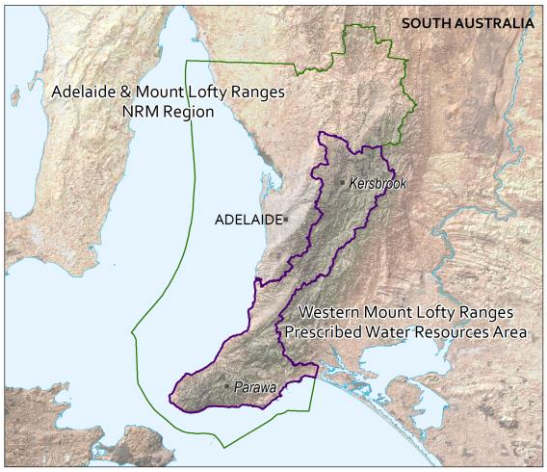
2014 Summary



The Western Mount Lofty Ranges (WMLR) Prescribed Water Resources Area (PWRA) 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.

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. There are three types of sedimentary aquifers in the Western Mount Lofty Ranges PWRA: Permian sand, Tertiary limestone and Quaternary sediments. 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, which can cause seasonal artesian conditions. It is widely developed for irrigation, primarily for dairy pasture and viticulture.

Despite being a confined aquifer that does not receive direct recharge from rainfall, the intensity and timing of rainfall and subsequent extraction practises can have an effect on groundwater levels and salinity in the Tertiary limestone aquifer. For example, if the region experienced above-average rainfall during typically dry summer months, this could result in less groundwater being extracted from the aquifer for irrigation purposes and therefore smaller declines in groundwater levels and stable or improving salinity.

The climate of the WMLR PWRA is characterised as Mediterranean, with hot, dry summers and mild, wet winters. The Hindmarsh Valley rainfall station (number 23823) recorded a total annual rainfall of 685 mm for 2014, which is 260 mm below the long-term (1889–2014) annual average of 945 mm and 240 mm less than the rainfall received in 2013. Monthly rainfall data for 2014 are depicted in Figure 1 and indicates that February and June were the only months in which 2014 rainfall readings exceeded their long-term monthly average. August, September and October have a notably lower total in comparison to their long-term averages.

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 Western Mount Lofty Ranges PWRA. However, at a local level scale within the WMLR PWRA, the estimated demand may exceed the sustainable yield calculated for some management zones. 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%) and lucerne (3%), and other uses (9%).

Long-term monitoring data shows that within the Hindmarsh Tiers Basin, the maximum recovered groundwater level of the Tertiary limestone aquifer experienced a steady decline in all observation 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 the maximum recovered groundwater level in response to higher rainfall, including the unusually wet summer of 2010–11. In the Myponga Basin, groundwater levels have remained stable since monitoring began in 1975, with a period of lower-than-average levels between 2005 and 2009. Over the last five years, some recovery in groundwater levels has been observed. 2013 water levels in both basins were typically the highest on record.

In 2014, all but one of the 19 observation wells in both basins with 2013 and 2014 data available for comparison, recorded a decline in the maximum recovered groundwater level. The declines ranged from 0.14 to 2.24 m, with a median of 0.41 m (Fig. 2). The remaining observation well recorded a negligible change, where the change in maximum recovered water level between 2013 and

2014 was less than 0.1 m. This general decline in water level could be the result of below-average rainfall being recorded during the irrigation season in late 2013, therefore causing an increase in extraction and subsequent decline in water levels.

Salinities within the Tertiary limestone aquifer are generally below 1000 mg/L and have been relatively stable since 2007 when regular monitoring began.

Similar to 2013 data, salinity levels ranged between 360 and 1200 mg/L in 2014, with most of the monitored wells recording a salinity of less than 1000 mg/L (Fig. 3). Most wells (75%) recorded a change in salinity from 2013 to 2014 of less than 5%, indicating stable salinity overall.

The Tertiary limestone aquifer of the Hindmarsh Tiers and Myponga Basins in the Western Mount Lofty Ranges Prescribed Water Resources Area has 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, they are unlikely to negatively impact the beneficial uses of the resource (e.g. drinking water, irrigation or stock watering) for at least 15 years.

The 2014 status for the Tertiary limestone aquifer is supported by:

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

To view descriptions for all status symbols, please visit 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 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.

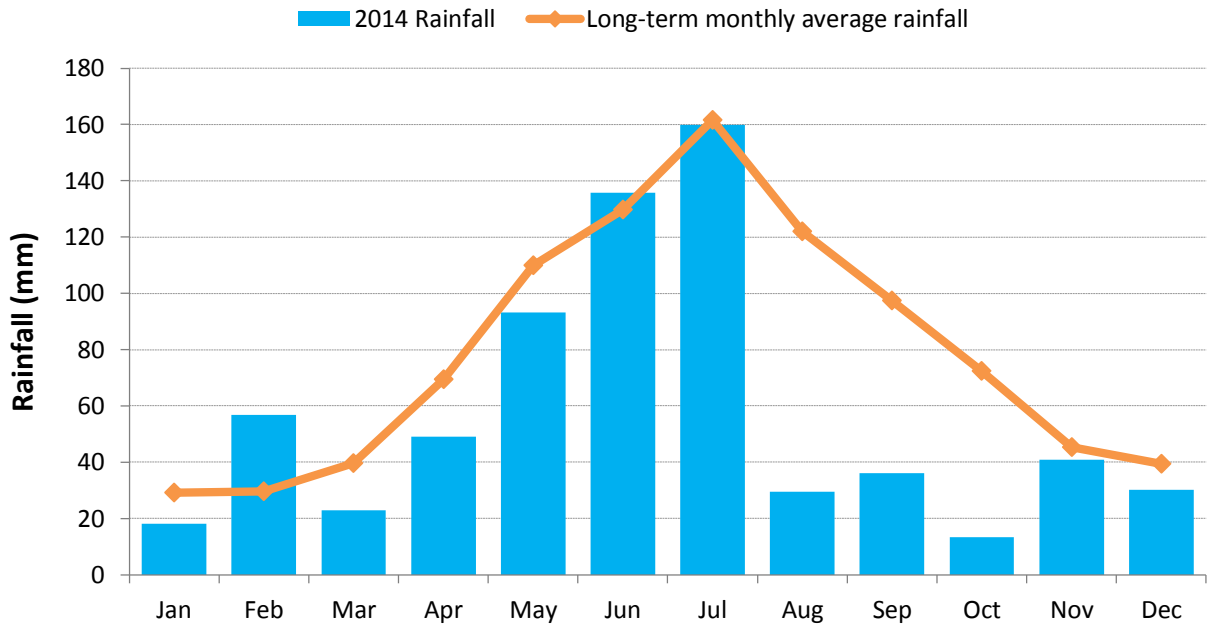


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Hindmarsh Valley rainfall station[1] (number 23823) in the Western Mount Lofty Ranges Prescribed Water Resources Area.

[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

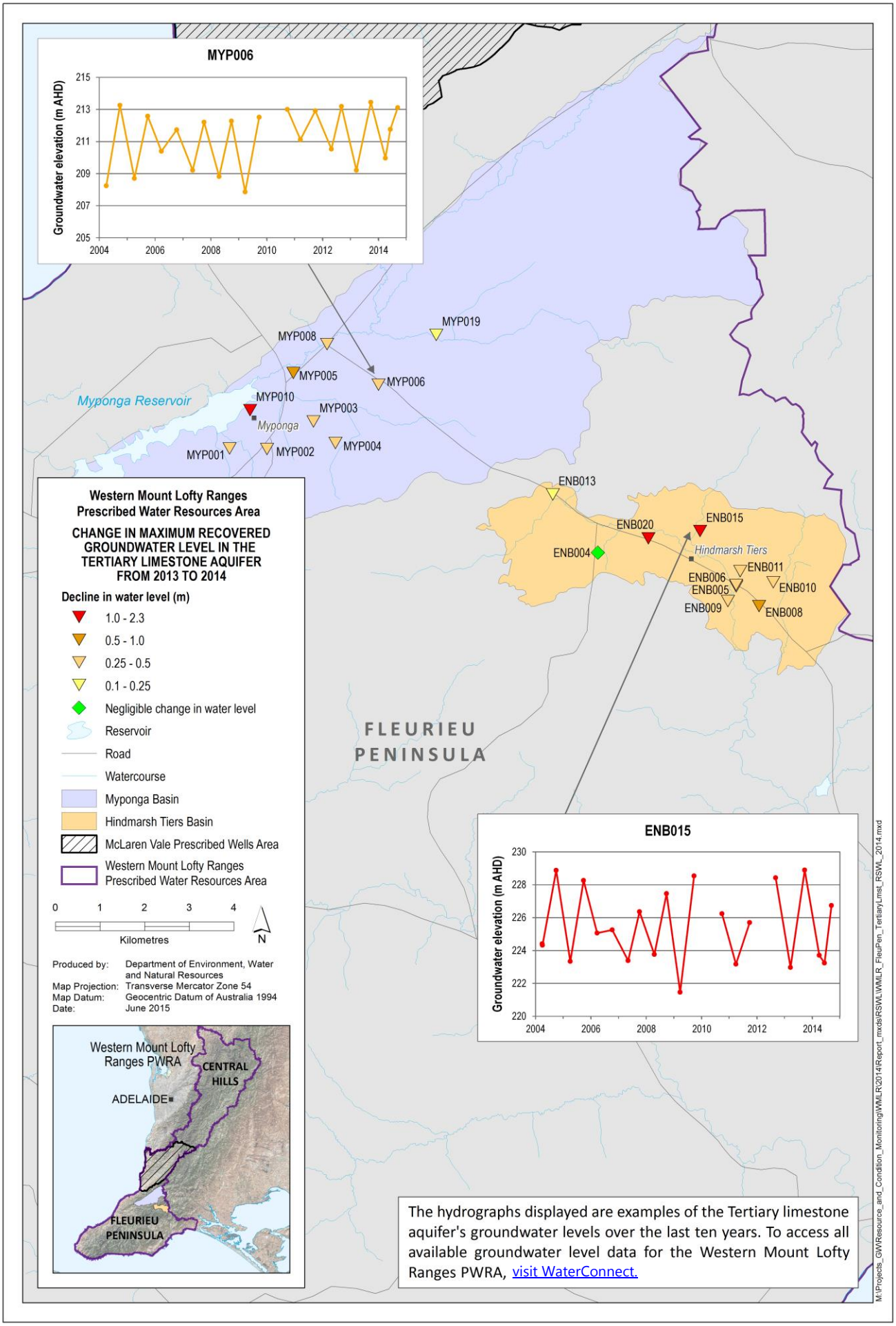


Figure 2. Overall changes in maximum groundwater levels of the Tertiary limestone aquifer in the Western Mount Lofty Ranges Prescribed Water Resources Area from 2013 to 2014

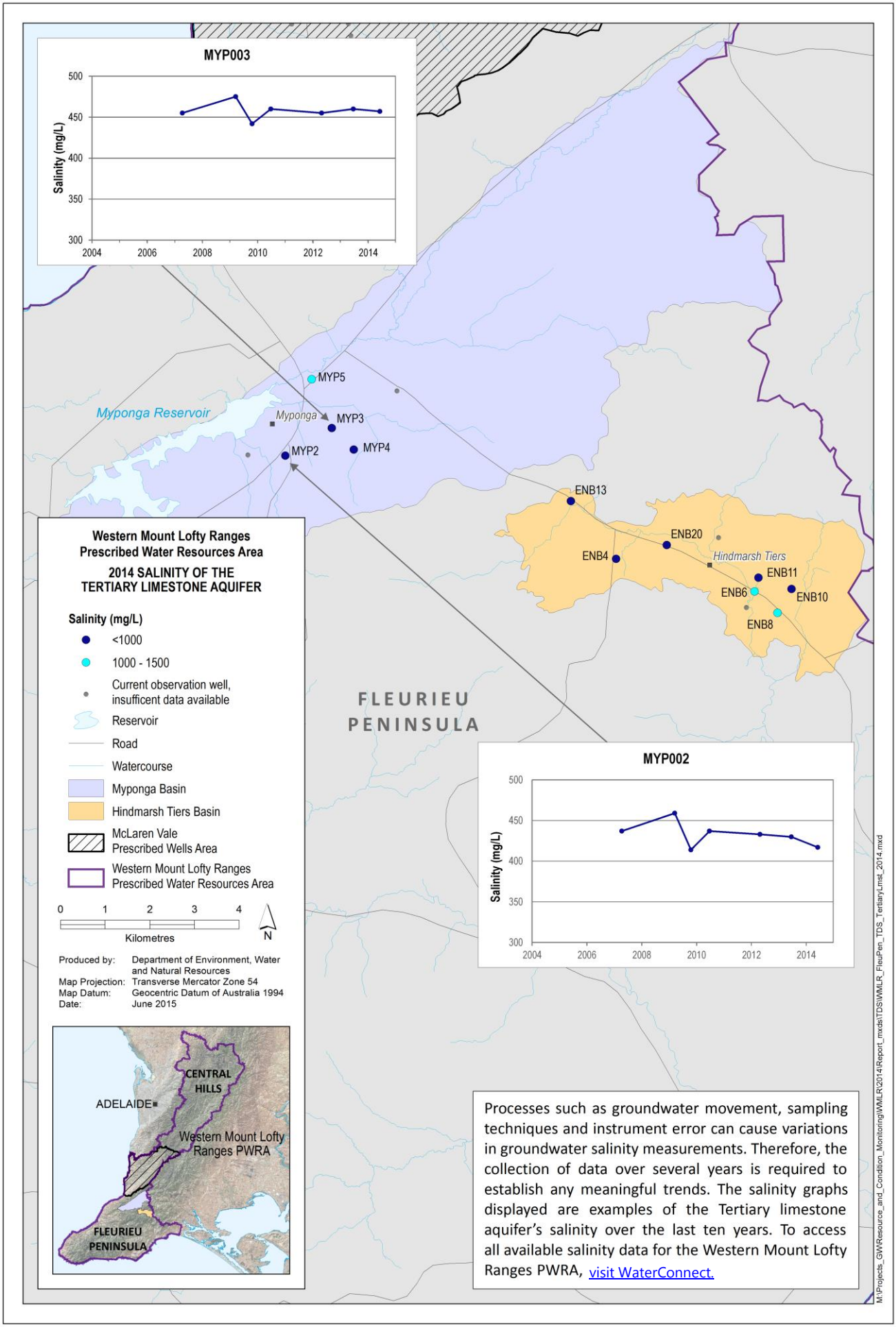


Figure 3. Maximum groundwater salinity of the Tertiary limestone aquifer in the Western Mount Lofty Ranges Prescribed Water Resources Area for 2014