

Southern Basins PWA

Uley South lens

2014 Groundwater level and salinity status report



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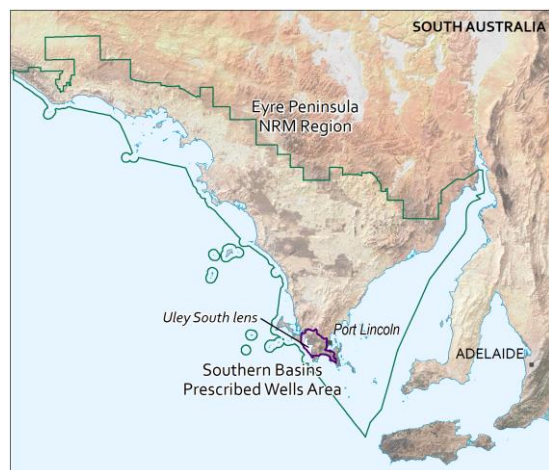
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2014 Summary



The Southern Basins Prescribed Wells Area (PWA) is located at the southern-most part of the Eyre Peninsula, between Port Lincoln and Coffin Bay, in the Eyre Peninsula NRM Region. It is prescribed under South Australia's *Natural Resources Management Act 2004* and a water allocation plan provides for the sustainable use of the groundwater resources. The Uley South lens is located in the south-west of the Southern Basins PWA.

Within the Southern Basins PWA there are two main sedimentary sequences containing groundwater that overlie basement rocks: the Quaternary limestone aquifer and the underlying Tertiary Sands aquifer. The Quaternary limestone aquifer comprises a generally thin veneer of aeolianite sediments of the Bridgewater Formation and is continuous across the PWA. These sediments are known to be over 130 m thick in parts of the Uley South lens. Areas within the Quaternary limestone aquifer defined by salinity of less than 1000 mg/L, such as the Uley South lens, are described as fresh groundwater lenses in the current water allocation plan. The main source of recharge to the Quaternary limestone aquifer is the direct infiltration of rainfall and groundwater flow is predominantly toward the nearest coastline in the Southern Basins PWA.

The condition of the groundwater resources in the Southern Basins PWA is highly dependent on recharge from rainfall, with trends in groundwater levels and salinity 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. Historical rainfall data have indicated that trends of above or below-average rainfall can last for up to 25 years, and that greater recharge responses have been observed when rainfall occurs in high-intensity events.

The Westmere rainfall station (number 18137) is located in the south of the Southern Basins PWA, about 10 km east of the Uley South lens, and recorded 491 mm of rain in 2014. This is 83 mm below the long-term (1898–2014) average annual rainfall of 574 mm. Above-average rainfall was recorded in February, May and June, while rainfall was well below-average between August and November (Fig. 1).

Licensed groundwater extractions in the Southern Basins PWA occur predominantly from the fresh groundwater lenses within the Quaternary limestone aquifer. Metered extractions from the Uley South lens totalled 4742 ML in 2013–14, a 12 % decrease from the previous water-use year (Fig. 2). This volume of extraction equates to 69 % of the total 2014 allocation of 6887 ML for the Uley South lens and represents 96 % of the total licensed extractions from the Quaternary limestone aquifer in the Southern Basins PWA.

Monitoring records reveal a long-term decline of nearly two metres in groundwater levels of the Uley South lens after 1992, which coincides with a trend of below-average rainfall recorded at the Westmere rainfall station. Above-average rainfall since 2009 has led to a rise in groundwater levels throughout the lens, although current groundwater levels remain lower than those recorded prior to 1992.

In 2014, of the 50 observation wells with water level data available for comparison with 2013, 58% recorded a rise in the maximum recovered groundwater level (the highest recorded groundwater level over the year, usually following winter rainfall) of up to 0.69 m, with a median increase of 0.23 m, between 2013 and 2014 (Fig. 3). A decline in groundwater levels of up to 0.62 m, with a median decrease of 0.06 m, was recorded in 32% of wells, while negligible change was recorded at the remaining 10% of wells, where the change in maximum recovered groundwater levels between 2013 and 2014 was less than 0.02 m. Generally, rises in groundwater level were recorded in the centre of the Uley South lens, roughly corresponding to less vegetated areas, while declines were recorded to the west, north and south of this central area.

Within the Uley South lens, groundwater salinity has been relatively stable over the last ten years, with any fluctuations in salinity generally less than 70 mg/L.

Salinity was monitored in 41 wells within the Uley South lens in 2014, ranging between 410 and 1229 mg/L. Most salinities are less than 700 mg/L with a median of 528 mg/L (Fig. 4); the higher value was observed at a relatively deep well. A total of 21 monitoring wells were available for comparison with 2013 measurements and reveal an overall 0.5% increase in salinity in 2014. Eleven wells recorded an increase ranging between 0.5-10.5%, with a median increase of 1.5%, and 10 wells recorded a decrease ranging between 0.4 to 4.2%, with a median decrease of 1.1%

The Uley South lens of the Southern Basins PWA has been assigned a green status for 2014:

2014 Status



“No adverse changes, indicating negligible risk to the resource”

This means that the groundwater status was observed to be stable (i.e. negligible change) or improving over the 12 month reporting period. Continuation of these changes favours a very low likelihood of negative impacts on beneficial use (e.g. drinking water, irrigation or stock watering) of the resource. The 2014 status for the Uley South lens is supported by:

- an overall rise in the maximum recovered groundwater level when compared to 2013 water level data
- negligible change in groundwater salinity when compared to 2013 salinity data.

To view descriptions for all status symbols, please visit [WaterConnect](#).

To view the *Southern Basins Prescribed Wells Area 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 Southern Basins PWA, please visit [Groundwater Data](#) on WaterConnect.

For further details about the Southern Basins PWA, please see the *Water Allocation Plan for the Southern Basins Prescribed Wells Area* on the Natural Resources Eyre Peninsula [website](#).

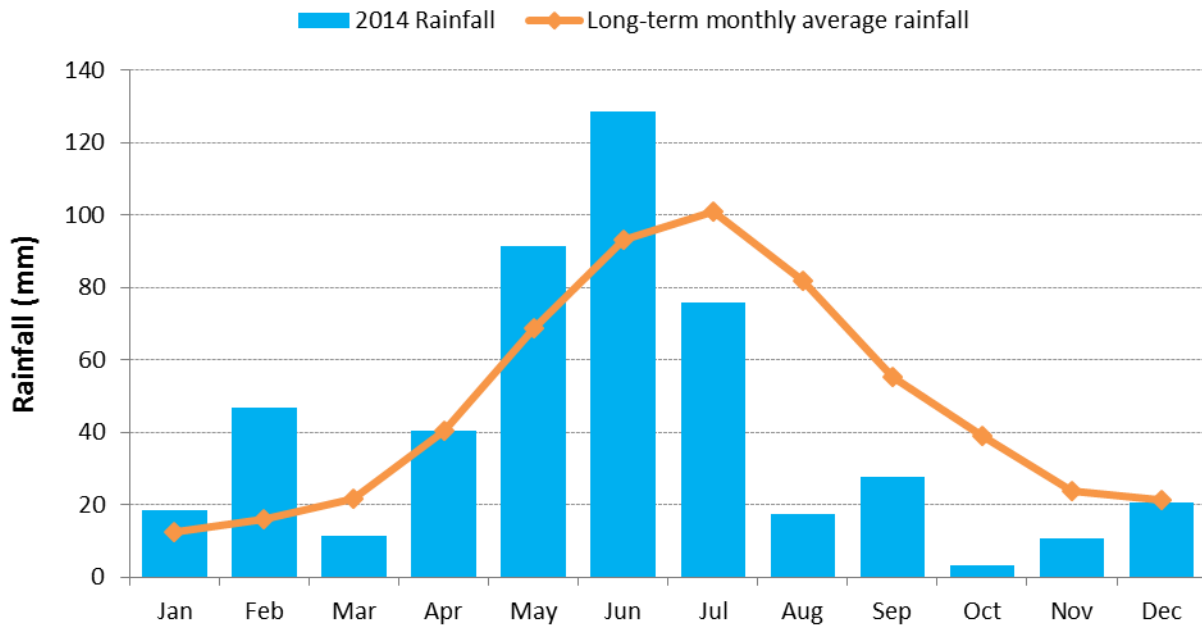


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Westmere rainfall station¹ (number 18137) in the Southern Basins Prescribed Wells Area

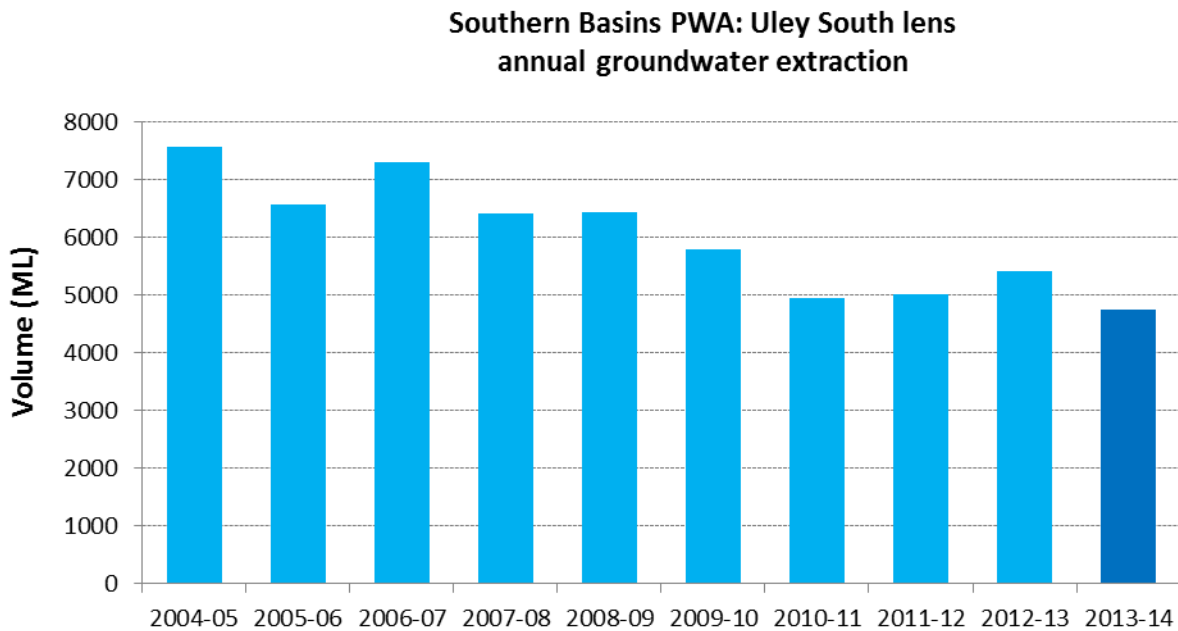


Figure 2. Historical licensed groundwater use for the Uley South lens of the Southern Basins Prescribed Wells Area

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.

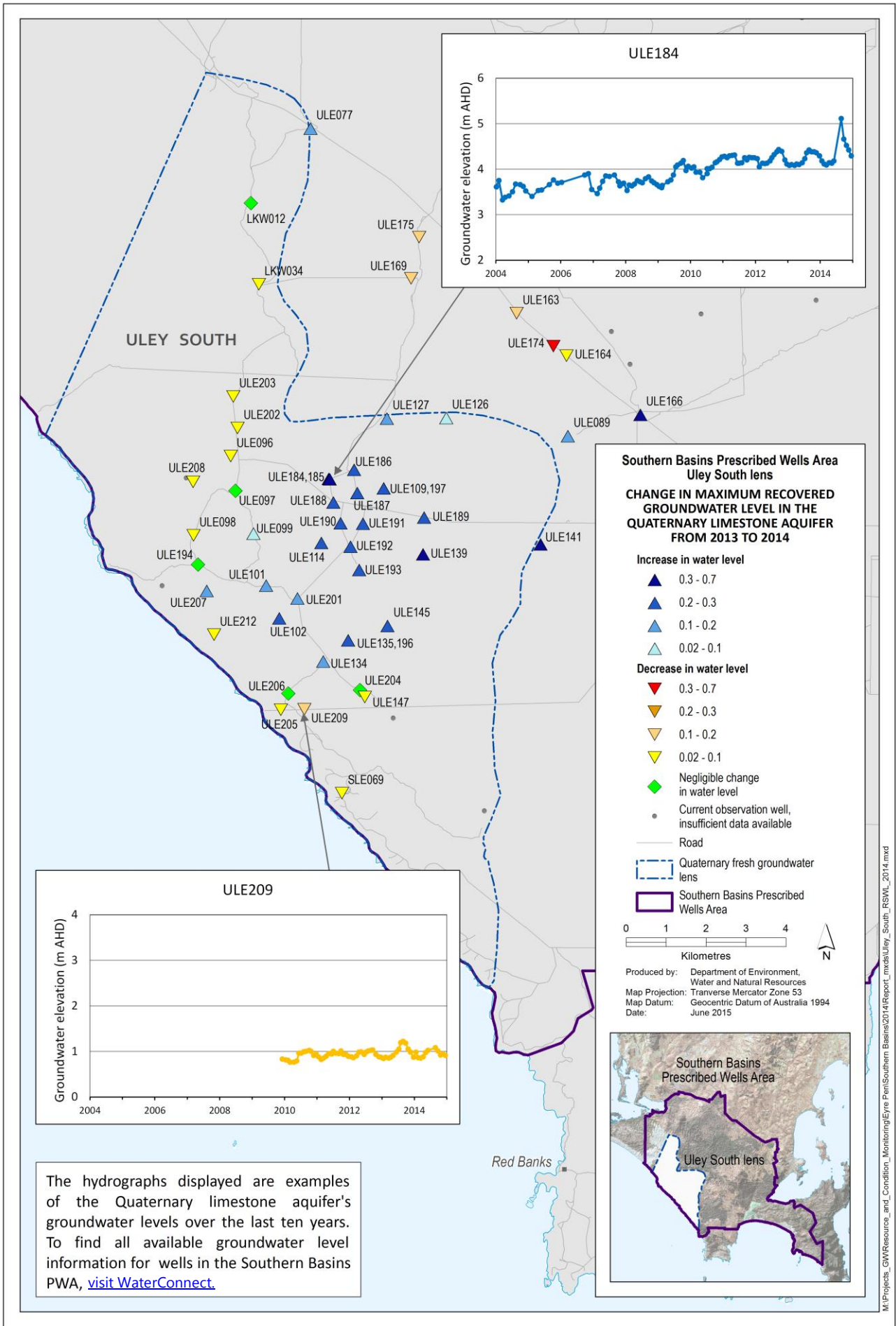


Figure 3. Overall changes in maximum groundwater levels in the Uley South lens of the Southern Basins Prescribed Wells Area from 2013 to 2014

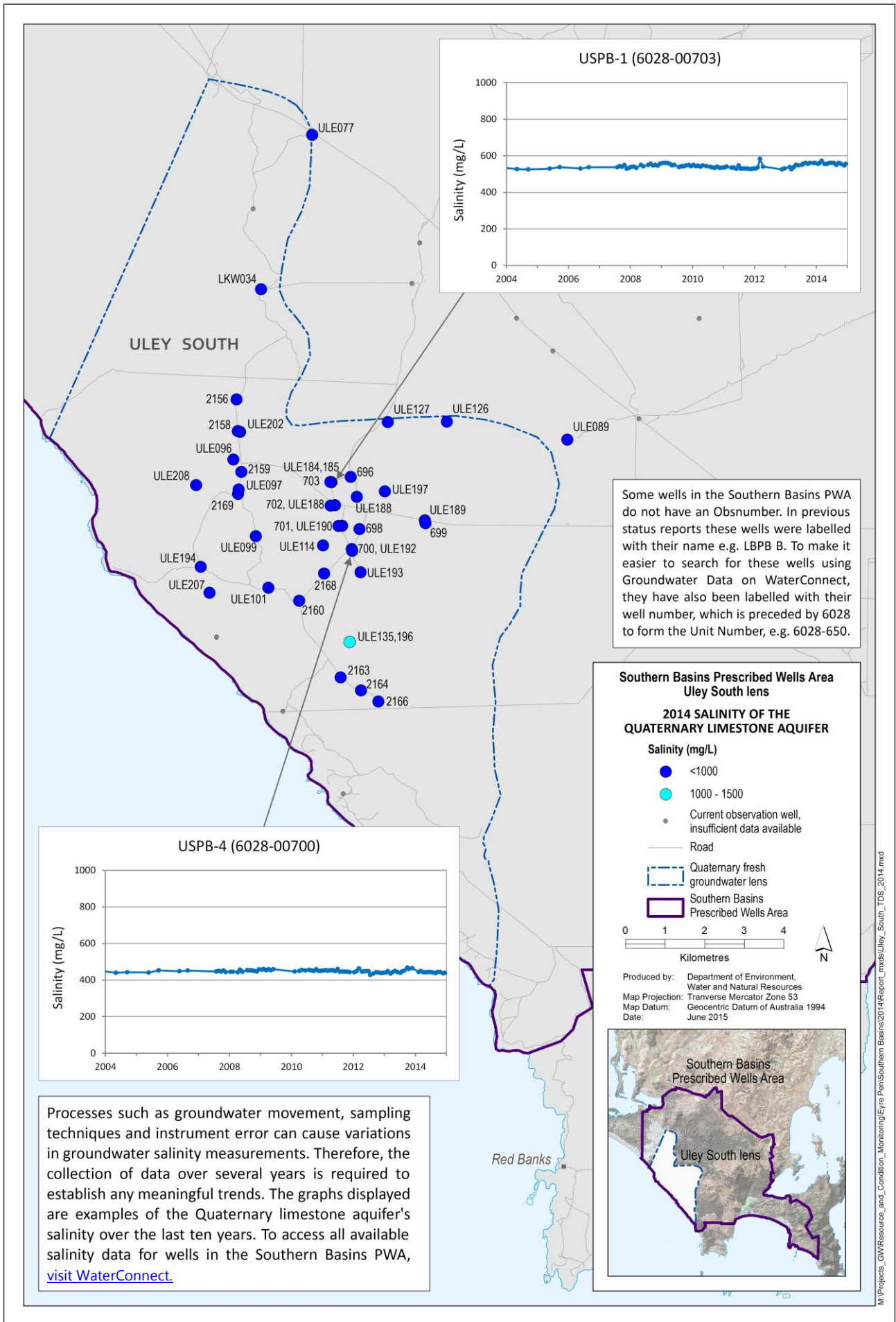


Figure 4. Groundwater salinity of the Uley South lens in the Southern Basins Prescribed Wells Area for 2014