

Southern Basins PWA

Uley Wanilla lens

2014 Groundwater level and salinity status report



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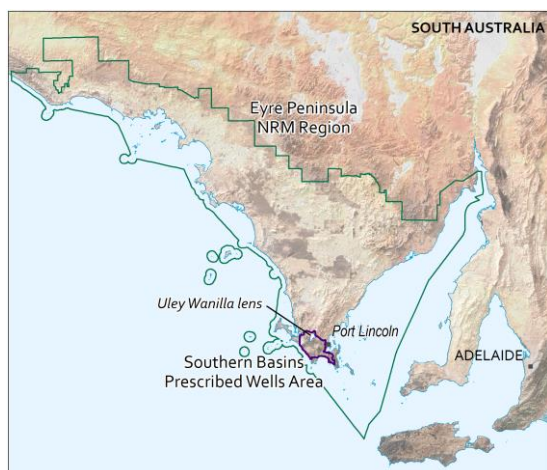
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2014 Summary



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 Wanilla lens is located in the north 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. Areas within the Quaternary limestone aquifer defined by salinity of less than 1000 mg/L, such as the Uley Wanilla 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 in a southerly direction.

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 Big Swamp rainfall station (number 18017), located approximately 3 km to the east of the Uley Wanilla lens, recorded an annual rainfall of 524 mm for 2014. This is 33 mm below the long-term (1898–2014) annual rainfall average of 557 mm. In 2014, February rainfall was around three times greater than average while May and June rainfall were around 50% greater than average. Rainfall was well below-average between August and November (Fig. 1).

Licensed groundwater extractions in the Southern Basins PWA occur predominantly from fresh groundwater lenses within the Quaternary limestone aquifer, and in 1949 the Uley Wanilla lens was the first groundwater lens developed to augment the Tod River Reservoir. Extractions from Uley Wanilla have decreased steadily since 1993 in response to falling groundwater levels. Metered extractions from the Uley Wanilla lens totalled 86.7 ML in 2013–14, an increase of 81.5% from the previous water-use year and a 32% increase over the 2011–12 water-use year (Fig. 2). The significant increase in groundwater extractions observed during the 2013–14 water-use year was due to an intentional effort to minimise groundwater extractions in 2012–13 in order to observe system dynamics with a reduced demand. The 2013–14 extraction volume equates to 47% of the total 2013–14 allocation of 184 ML for the Uley Wanilla lens and represents 1.8% of the total licensed extractions from the Southern Basins PWA.

The long-term observation records show a positive correlation between groundwater levels and rainfall. A trend of declining groundwater levels between 1992 and 2008 coincides with a dominant below-average trend in rainfall recorded at the Big Swamp rainfall station for that period. The rise in groundwater levels recorded in observation wells in 2009 and 2010 correlates with above-average rainfall received in those years and a reduction in extraction, though groundwater levels are still well below those recorded prior to 1985.

In 2014, there were 14 observation wells with sufficient data to allow a comparison of changes in maximum recovered water levels with levels recorded in 2013. Eleven wells recorded a rise in the maximum recovered groundwater level (the highest recorded groundwater level over the year, usually following winter rainfall) of up to 0.89 m, with the most significant rises occurring in the northern-part of the lens. Three observation wells recorded a decline in maximum recovered water level of up to 0.13 m (Fig. 3). Overall, there was a median 0.12 m rise in groundwater levels between 2013 and 2014 despite the significant increase in extractions during the water-year. This appears to be the result of the above-average rainfall observed in the early part of 2014 contributing to groundwater recharge.

Long-term salinity observations in the Uley Wanilla lens show a variety of trends over the historical record. Regular salinity measurements taken from town water supply wells show that salinities have generally stabilised since 2009. In 2014, groundwater salinity in the Quaternary limestone aquifer ranged from 373 to 870 mg/L within the defined Uley Wanilla lens, while one observation well located approximately 1 km east of the lens recorded a salinity of 3052 mg/L in 2014 (Fig. 4). A total of seven observation wells had sufficient data to compare salinities between 2013 and 2014; five of these wells recorded a median salinity decrease of 5% and two recorded a median increase of 1%.

The Uley Wanilla 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 reporting period. Continuation of these changes favours a very low likelihood of negative impacts on beneficial uses such as drinking water, irrigation or stock watering. The 2014 status for the Uley Wanilla lens is supported by:

- an overall slight rise in the maximum recovered groundwater level when compared to 2013 water level data
- negligible change in salinity in 2014 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](#).

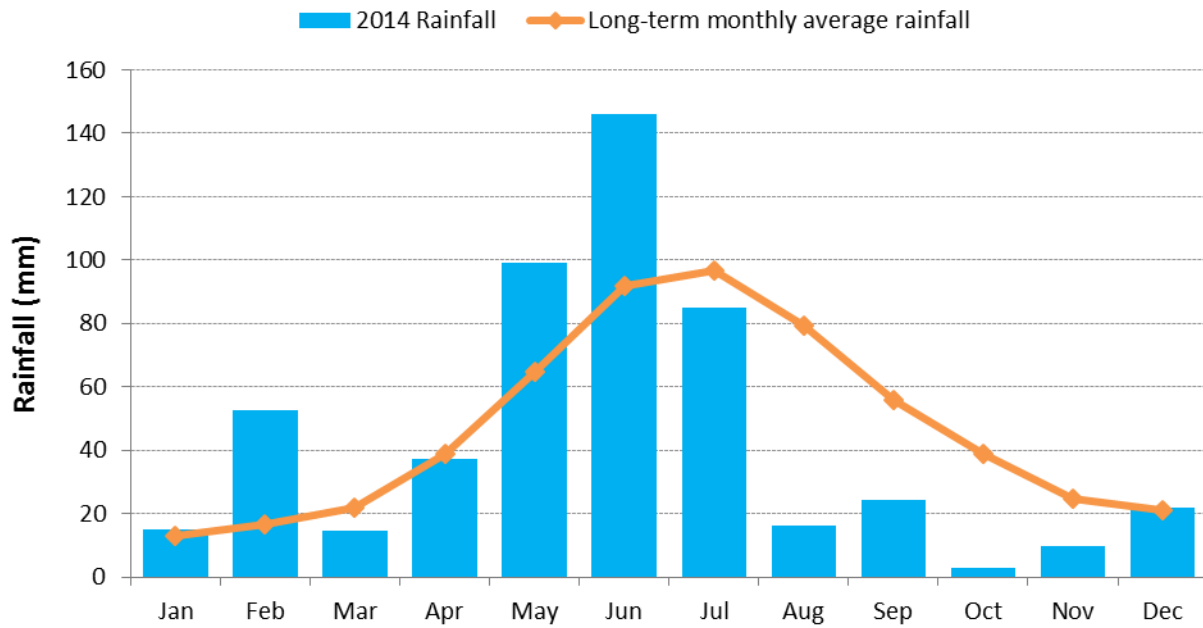


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Big Swamp rainfall station¹ (number 18017) in the Southern Basins Prescribed Wells Area

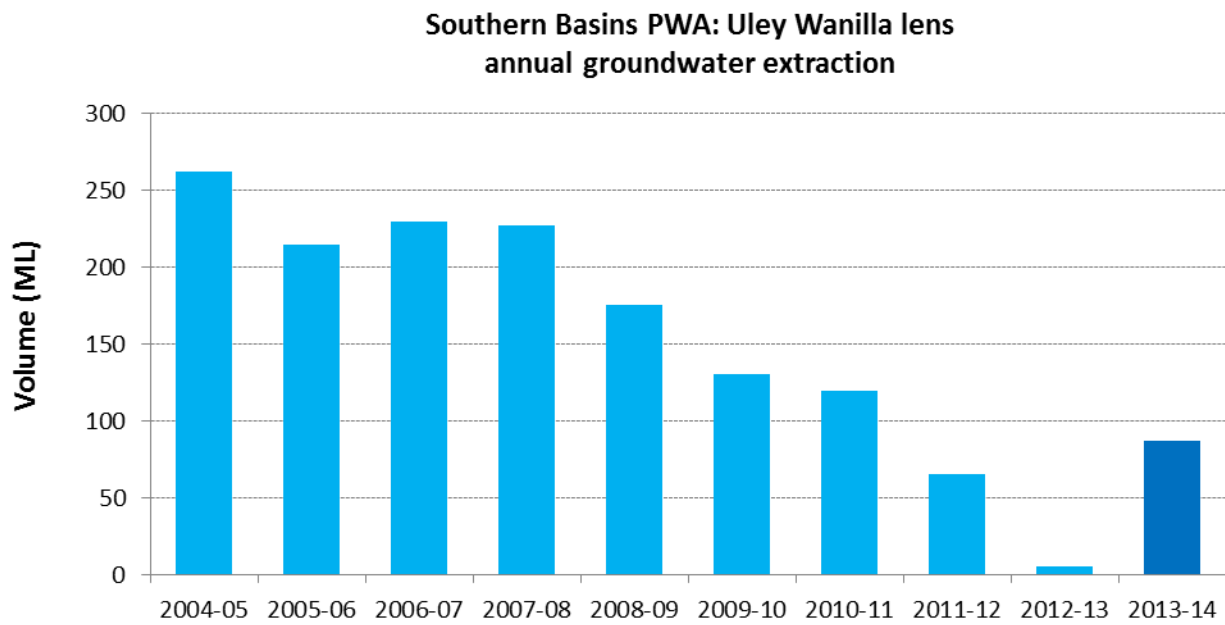


Figure 2. Historical licensed groundwater use for the Uley Vanilla lens of the Southern Basins Prescribed Wells Area

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.

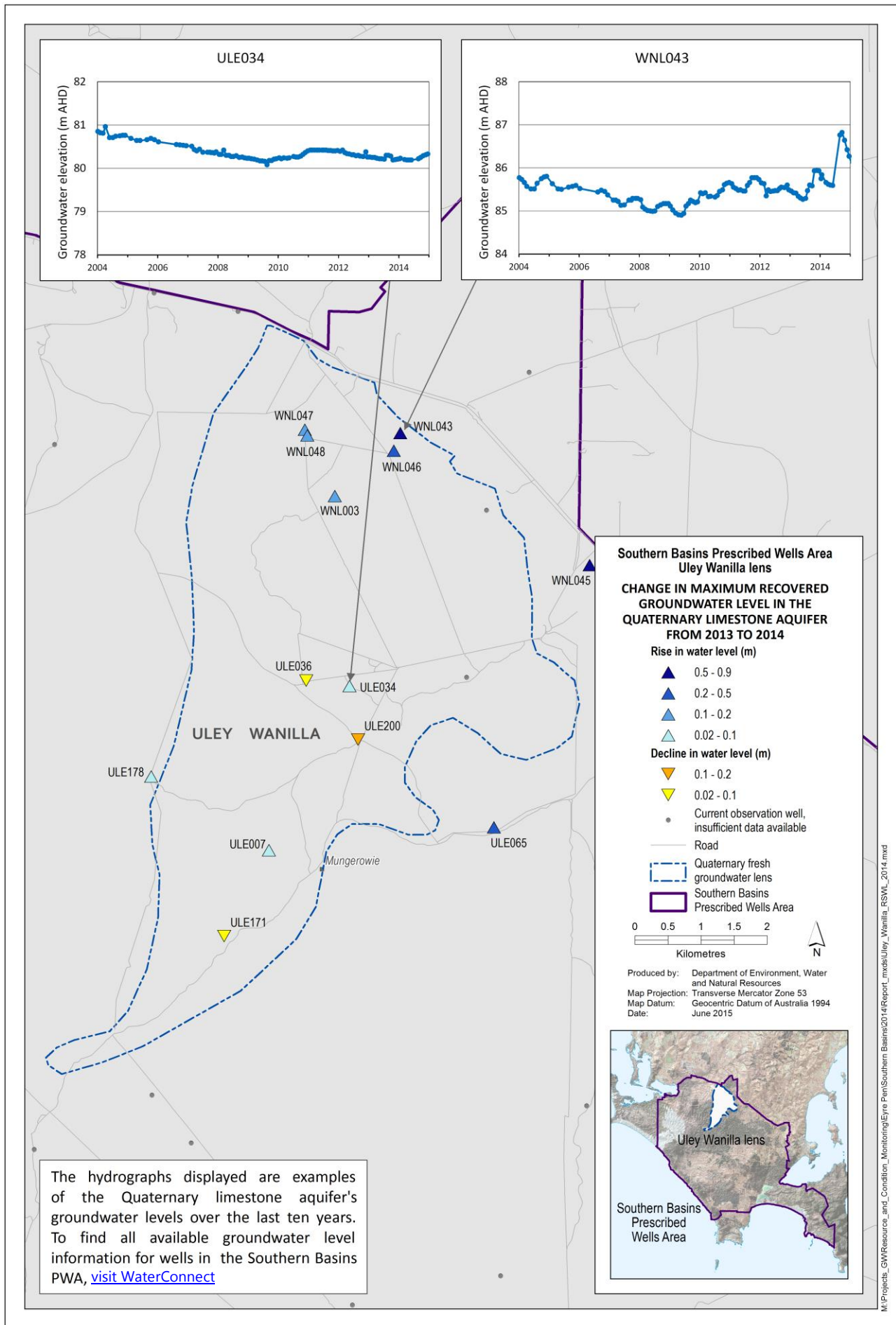


Figure 3. Overall changes in maximum groundwater levels in the Uley Wanilla lens of the Southern Basins Prescribed Wells Area from 2013 to 2014

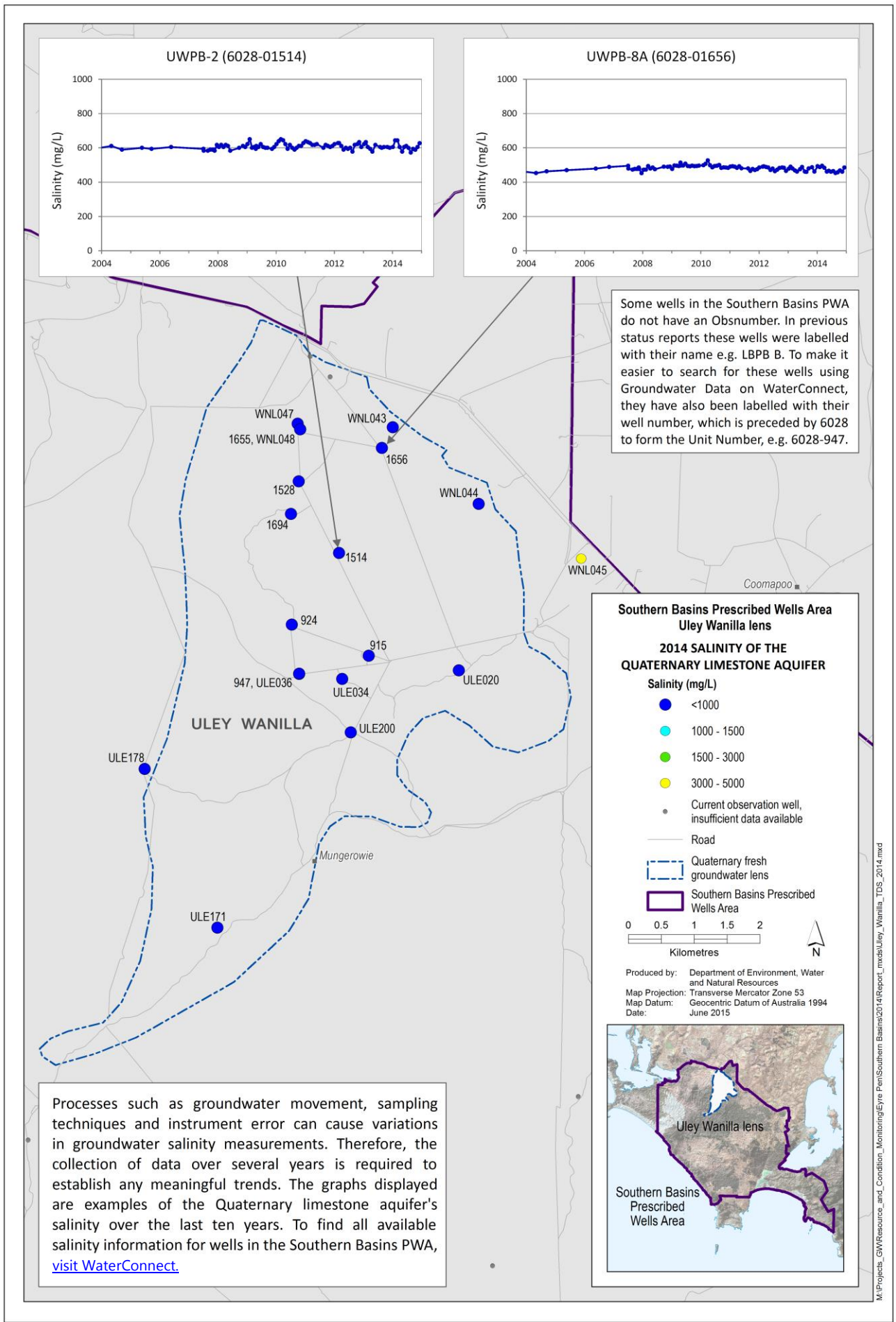


Figure 4. Groundwater salinity of the Uley Wanilla lens in the Southern Basins Prescribed Wells Area for 2014