

McLaren Vale PWA

Port Willunga Formation aquifer

2014 Groundwater level and salinity status report



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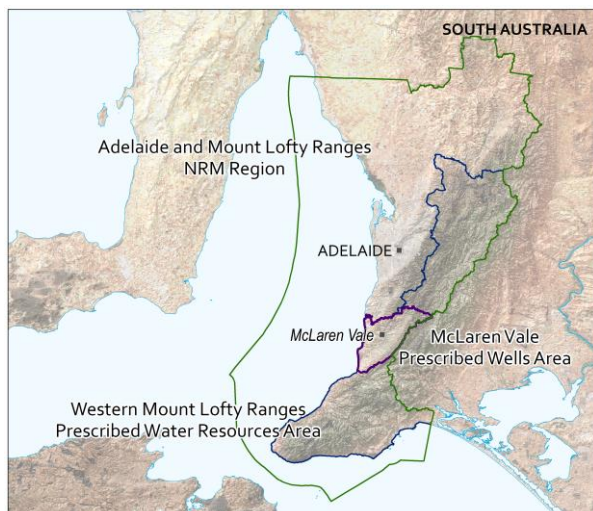
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2014 Summary



The McLaren Vale Prescribed Wells Area (PWA) is located approximately 35 km south of Adelaide within the Adelaide and Mount Lofty Ranges NRM Region. It is a regional-scale resource for which groundwater has been prescribed under South Australia's *Natural Resources Management Act 2004* and a water allocation plan provides for sustainable management of the water resources. The McLaren Vale Prescribed Wells Area (PWA) is located within the boundaries of the Western Mount Lofty Ranges Prescribed Water Resources Area (WMLR PWRA) and separate groundwater level and salinity status reports that have been prepared for this PWRA can be found on the [WaterConnect](#) website.

The Willunga Basin, situated within the McLaren Vale PWA and the Willunga Embayment, is a structurally controlled trough, bounded in the south-east by the Willunga Fault and to the north by basement outcrop. The basin contains sedimentary aquifers of Quaternary and Tertiary age, and a fractured rock aquifer is formed by basement outcrop in the north and the hills to the east of the Willunga Fault.

There are four aquifer systems recognised within the Willunga Embayment; the Quaternary aquifer, the Port Willunga Formation aquifer, the Maslin Sands aquifer and the fractured rock aquifer. This report focuses on the confined Port Willunga Formation aquifer, which is a coarse-grained sandy limestone overlain by younger Quaternary aquifers and underlain by the Maslin Sands and the fractured rock aquifer. Groundwater movement within the Port Willunga Formation typically flows from the more elevated north-eastern part of the basin towards the coast in a south-westerly direction. Recharge to the Port Willunga Formation is believed to occur as a result of infiltration through the soil or by percolation as a result of streamflow in drainage lines at or near the Willunga Fault, and possibly as lateral throughflow across the fault.

Trends in groundwater levels and salinity within the Port Willunga Formation are primarily climate driven: below-average rainfall results in a reduction in recharge to the aquifer. 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.

The climate of the McLaren Vale PWA is characterised as Mediterranean with hot, dry summers and mild, wet winters. Data from the Willunga rainfall station (number 23753) were chosen for the analysis of rainfall trends (Fig. 1). The long-term monthly average rainfall is graphed in orange, while the total monthly rainfall is graphed in blue. In 2014, the total annual rainfall was 480 mm, which is 160 mm below the long-term (1889–2014) annual average of 641 mm. The months of February, May and July experienced above-average rainfall. In particular, February received more than double the amount of average rainfall experienced throughout the month. However, rainfall was well below-average between August and December.

Licensed groundwater extractions (excluding stock and domestic use) for the Port Willunga Formation in the McLaren Vale PWA for the 2013–14 water-use year totalled 2692 ML¹, which represents a 4.7% decrease from the previous water-use year (Fig. 2). Groundwater extractions from this aquifer accounted for 65% of total extractions within the McLaren Vale PWA, with the primary use for this groundwater being viticulture.

Long term groundwater levels in the Port Willunga Formation have shown widespread declines of up to 5 m since 1993. However since 2010, most observation wells show stabilisation or a reduced rate of decline.

Data from 25 observation wells were used to assess the annual trend in maximum recovered groundwater levels from 2013 to 2014. In 2014, a median decline of 0.22 m in the maximum recovered groundwater levels was observed in 48% of wells with available data when compared to 2013 water levels. A median rise of 0.19 m was observed in 28% of wells with available data (Fig. 3), while a negligible change in water level was observed in the remainder of observation wells, where the change in maximum recovered water

¹ The licenced groundwater use for the 2013–14 water-use year is based on the best data available as of April 2015 and may be subject to change, as some extraction volumes are in the process of being verified.

level between 2013 and 2014 was less than 0.1 m. Declining water levels were generally observed in the northern part of the aquifer extent, while rising water levels were observed to the south of Aldinga Beach.

During the past 10 years, several observation wells have shown a slightly increasing salinity level.

In 2014, of the 73 observation wells used for the assessment, 19% continued this trend, showing an increase in salinity when compared to 2013 data. However, most (69%) show stable salinity, where the increase or decrease was less than 5%, and 12% show a decrease in salinity. Groundwater salinity is generally fresh within the Port Willunga Formation aquifer, with 81% of wells with salinity data available for 2014 showing salinities less than 1500 mg/L. Higher salinities generally occur in the south of the PWA near Aldinga Beach, while the lower salinity wells are located between Willunga and McLaren Vale (Fig. 4).

The Port Willunga Formation aquifer in the McLaren Vale PWA has been assigned a yellow status for 2014:

2014 Status



“Gradual adverse changes, indicating a low risk to the resource in the medium.”

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 Port Willunga Formation aquifer is supported by:

- nearly half of wells show a decline in the maximum recovered groundwater level when compared with 2013 data.

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

To view the *McLaren Vale 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 McLaren Vale PWA, please visit [Groundwater Data](#) on [WaterConnect](#).

For further details about the McLaren Vale PWA, please see the *Water Allocation Plan for the McLaren Vale Prescribed Wells Area* on the Natural Resources Adelaide and Mount Lofty Ranges [website](#).

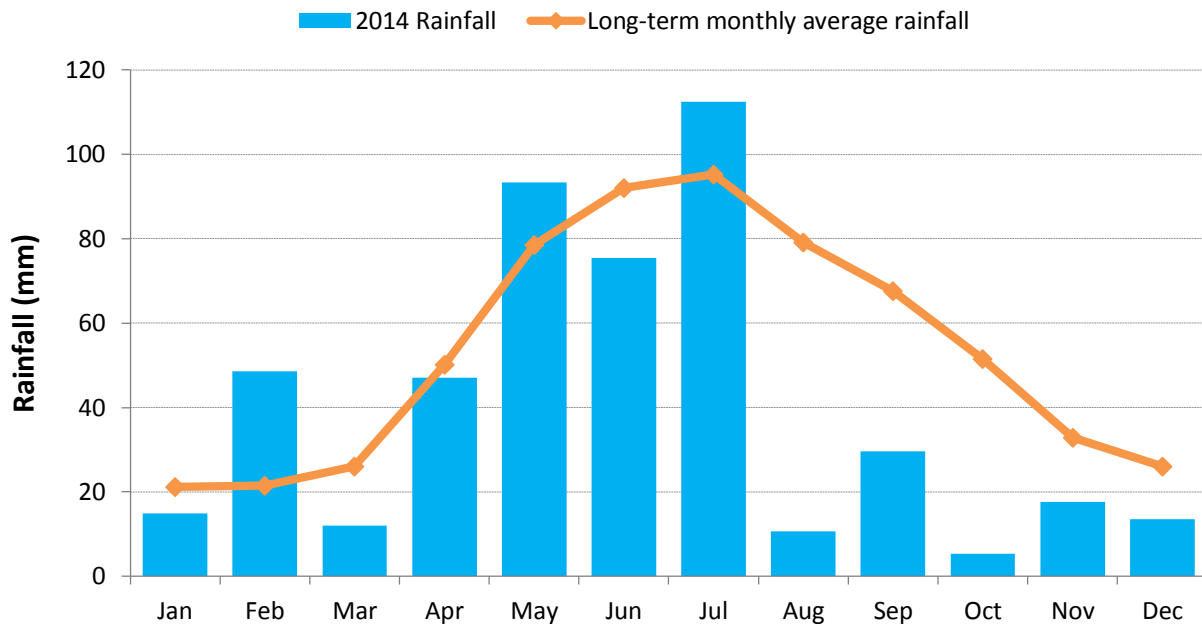


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Willunga rainfall station² (number 23753) in the McLaren Vale Prescribed Wells Area

McLaren Vale PWA: Port Willunga Formation aquifer annual groundwater extraction

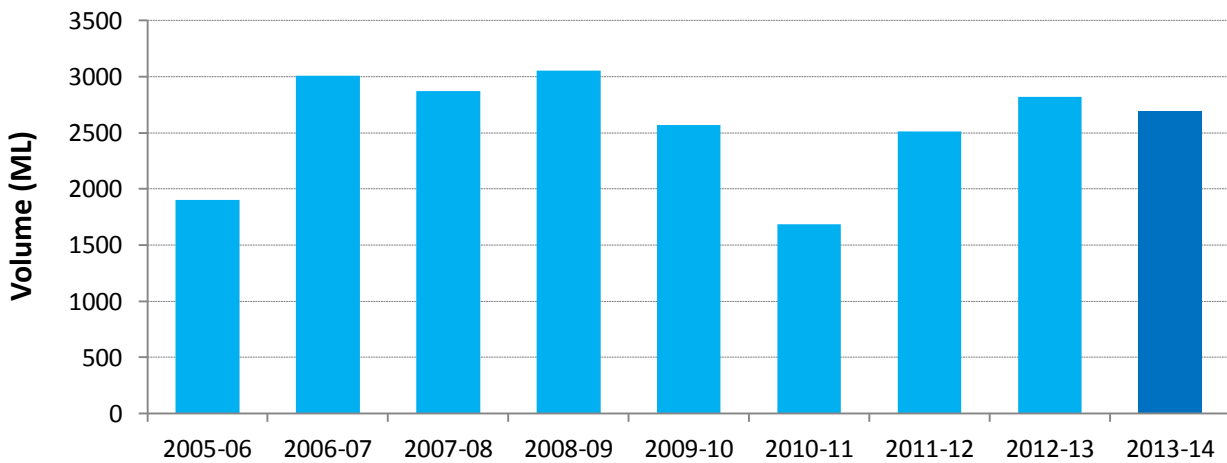


Figure 2. Historical licensed groundwater use from the Port Willunga Formation aquifer in the McLaren Vale Prescribed Wells Area

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.

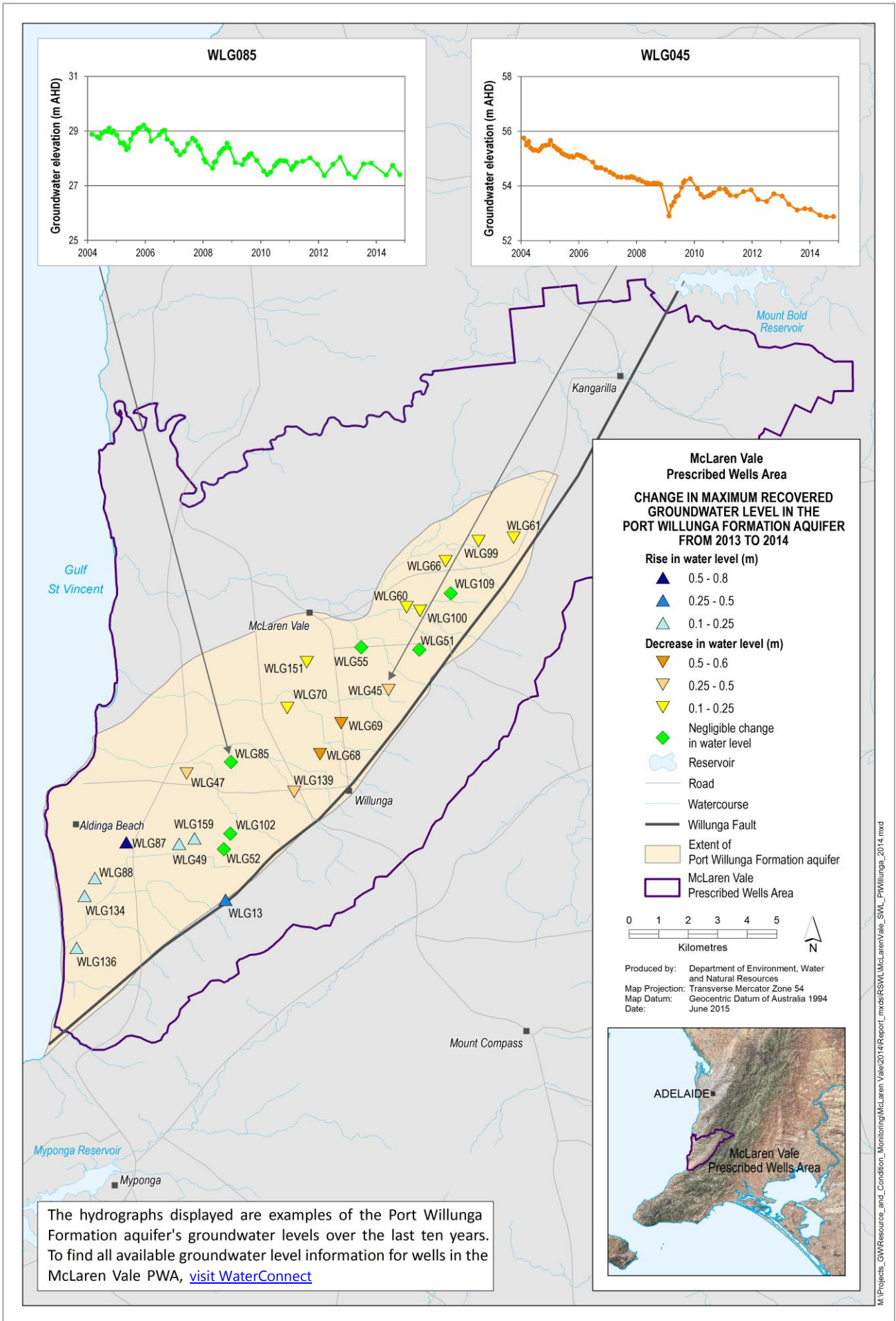


Figure 3. Overall changes in maximum groundwater levels of the Port Willunga Formation in the McLaren Vale Prescribed Wells Area from 2013 to 2014

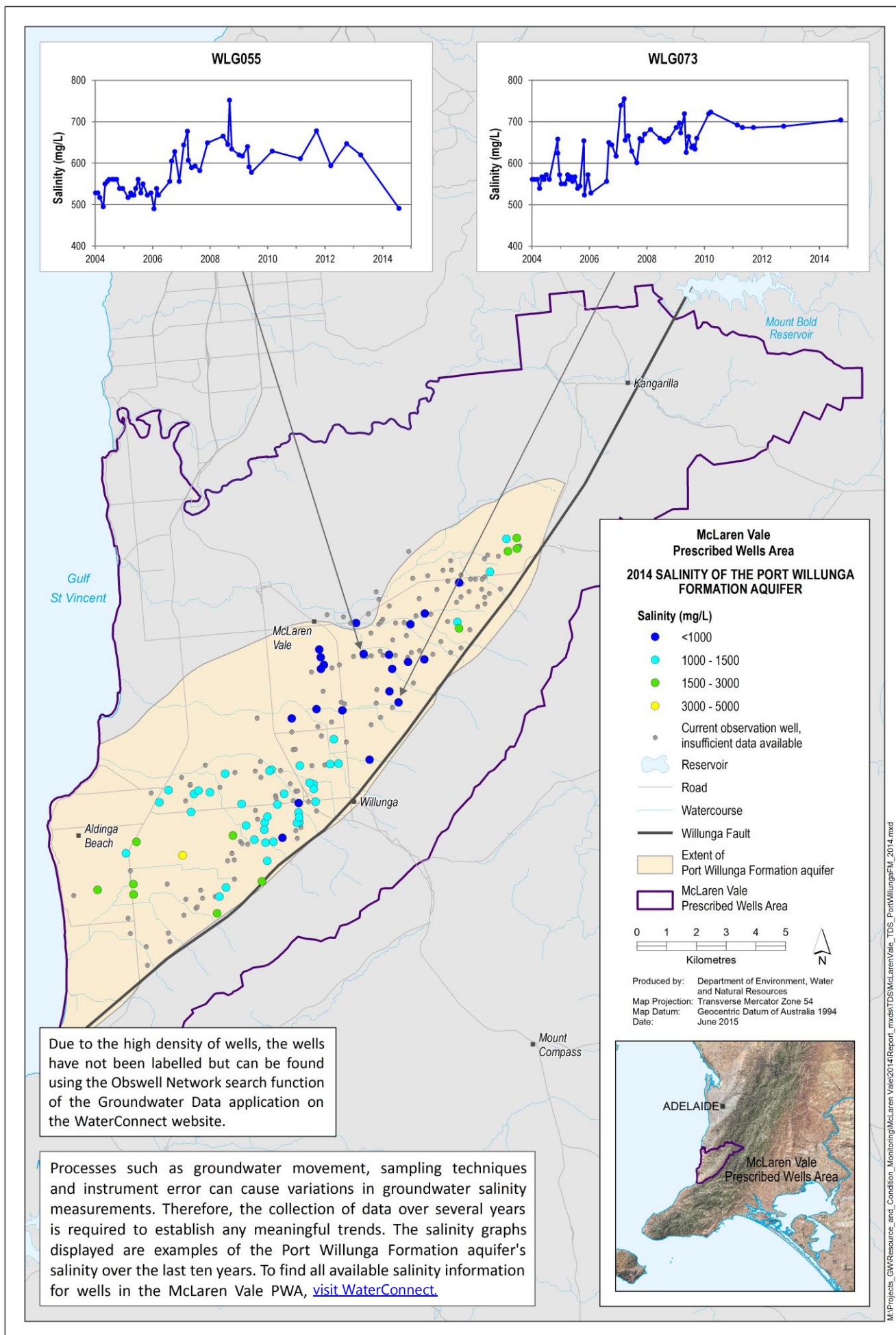


Figure 4. Groundwater salinity of the Port Willunga Formation in the McLaren Vale Prescribed Wells Area for 2014