McLaren Vale PWA

Maslin Sands aquifer

2014 Groundwater level and salinity status report

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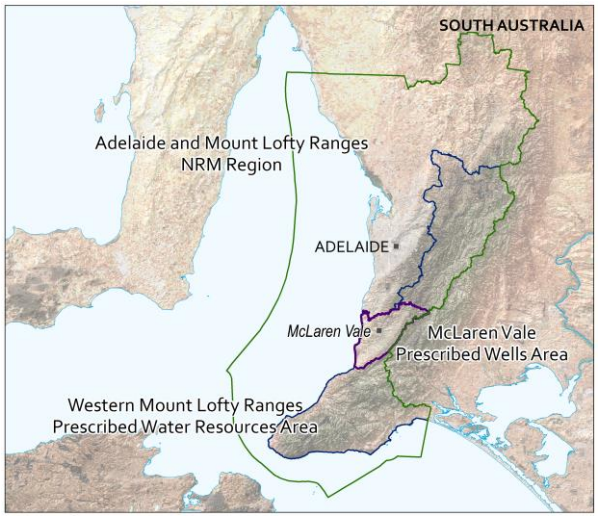
2014 Summary



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 a separate groundwater level and salinity status report that has 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 Maslin Sands aquifer, which is unconfined in the north-east of the PWA where it crops out and comprises fine to coarse Tertiary sands and clays. Further to the south-west, it becomes confined and is separated from the overlying Port Willunga Formation aquifer by the Blanche Point Formation aquitard comprising low-permeability marine mudstones and limestones. The potentiometric surface indicates that groundwater flows from elevated recharge areas in the north-east towards the south-west. Recharge to the Maslin Sand aquifer is believed to occur as a result of infiltration through the soil or by percolation from streamflow in drainage lines where it is unconfined.

Rainfall and groundwater extractions are important factors influencing changes to groundwater level and salinity. The Maslin Sands aquifer is recharged by rainfall in the north-east of the PWA where the formation crops out. Therefore, 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 and nearly 185 mm less than that of 2013. 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 Maslin Sands aquifer in the McLaren Vale PWA totalled 662 ML[1] for the 2013–14 water-use year, which represents a 6.5% decrease when compared to the previous water-use year (Fig. 2). This also accounts for 16% of the total groundwater used within the McLaren Vale PWA for the 2013–14 water-use year. Groundwater in the region is primarily used for viticulture and is supplemented with treated effluent from the Christies Beach Wastewater Treatment Plant via the Willunga Basin Water Company reticulation scheme. This additional water is used primarily in the west of the PWA, including the Sellicks Beach, Aldinga, Maslin Beach, Willunga and McLaren Vale areas.

Groundwater levels in the Maslin Sands aquifer have generally been stable or slowly declining since monitoring began in 1987 and is strongly linked to winter and spring rainfall. Water levels declined up to 1.5 m following the 2006 drought, however higher rainfall in recent years has produced a recovery in groundwater levels in some observation wells.

[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.

In 2014, declines in water levels were observed in 44% of wells with available data when compared to 2013 water levels. There was a median decline of 0.63 m, and a maximum decline of 1.12 m. A negligible change in water level was observed in 52% of wells, where the change in maximum recovered water levels between 2013 and 2014 was less than 0.10 m. Only one well (4%) showed a water level rise, which was of 0.14 m. The data distribution of wells seen in Figure 3 indicates that groundwater levels remained relatively stable along the northern extent of the Maslin Sands aquifer, while declines were observed to the north-east of McLaren Vale between the aquifer's northern extent and the Willunga Fault.

During the past 10 years, many of the observation wells show a slightly increasing trend in groundwater salinity.

In 2014, most wells with available data (61%) show a change in salinity of less than 5% when compared with 2013, indicating stable salinity overall. Groundwater salinity is generally fresh within the Maslin Sands aquifer, with 85% of wells with salinity data available for 2014 showing salinities of less than 1500 mg/L (Fig. 4).

The Maslin Sands 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 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, it is 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 Maslin Sands aquifer is supported by:

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

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

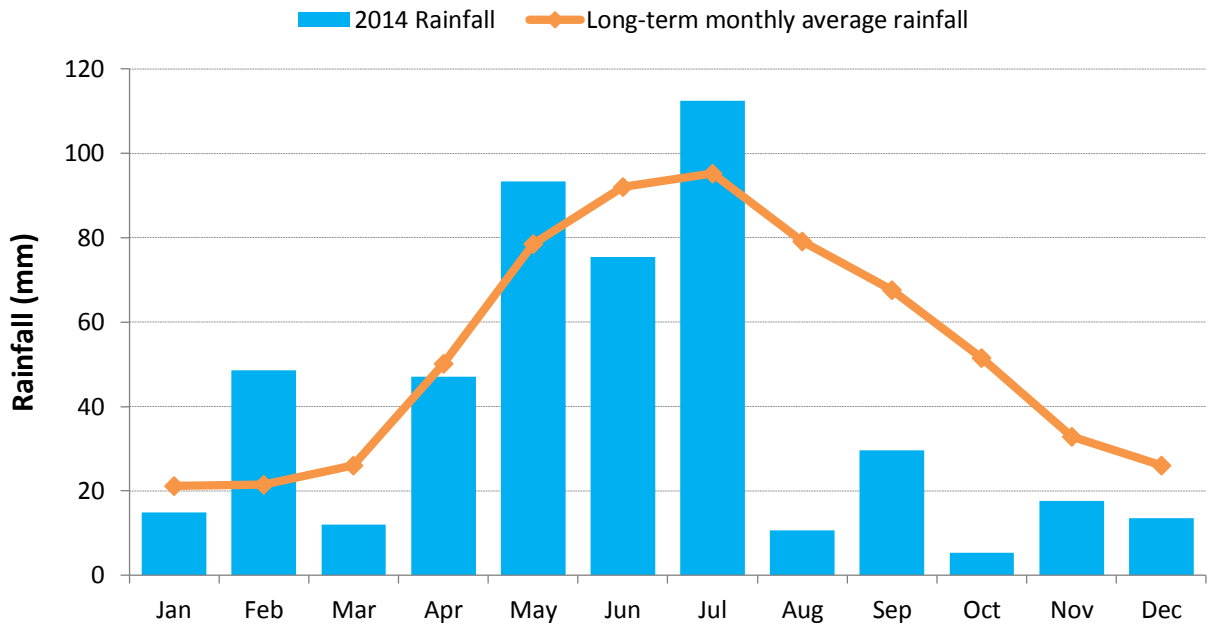


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Willunga rainfall station[2] (number 23753) in the McLaren Vale Prescribed Wells Area.

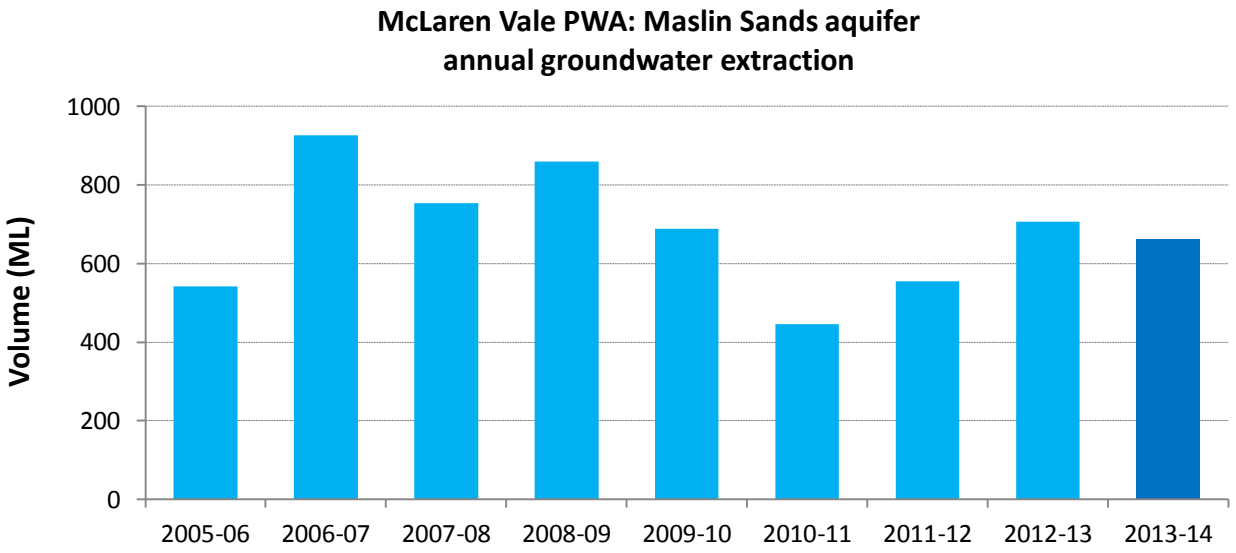


Figure 2. Historical licensed groundwater use from the Maslin Sands aquifer in the McLaren Vale Prescribed Wells Area.

[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.

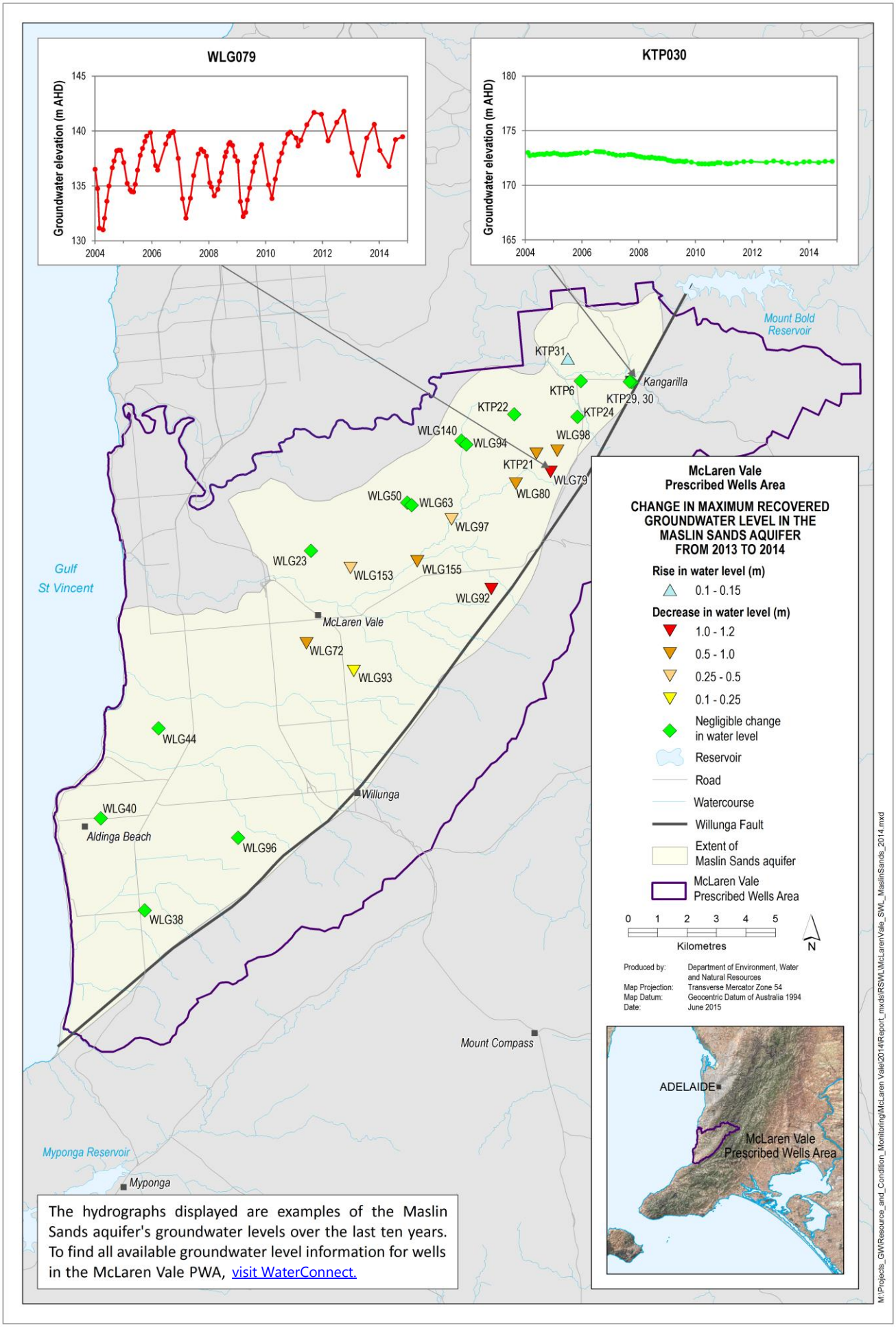


Figure 3. Overall changes in maximum groundwater levels of the Maslin Sands aquifer in the McLaren Vale Prescribed Wells Area from 2013 to 2014

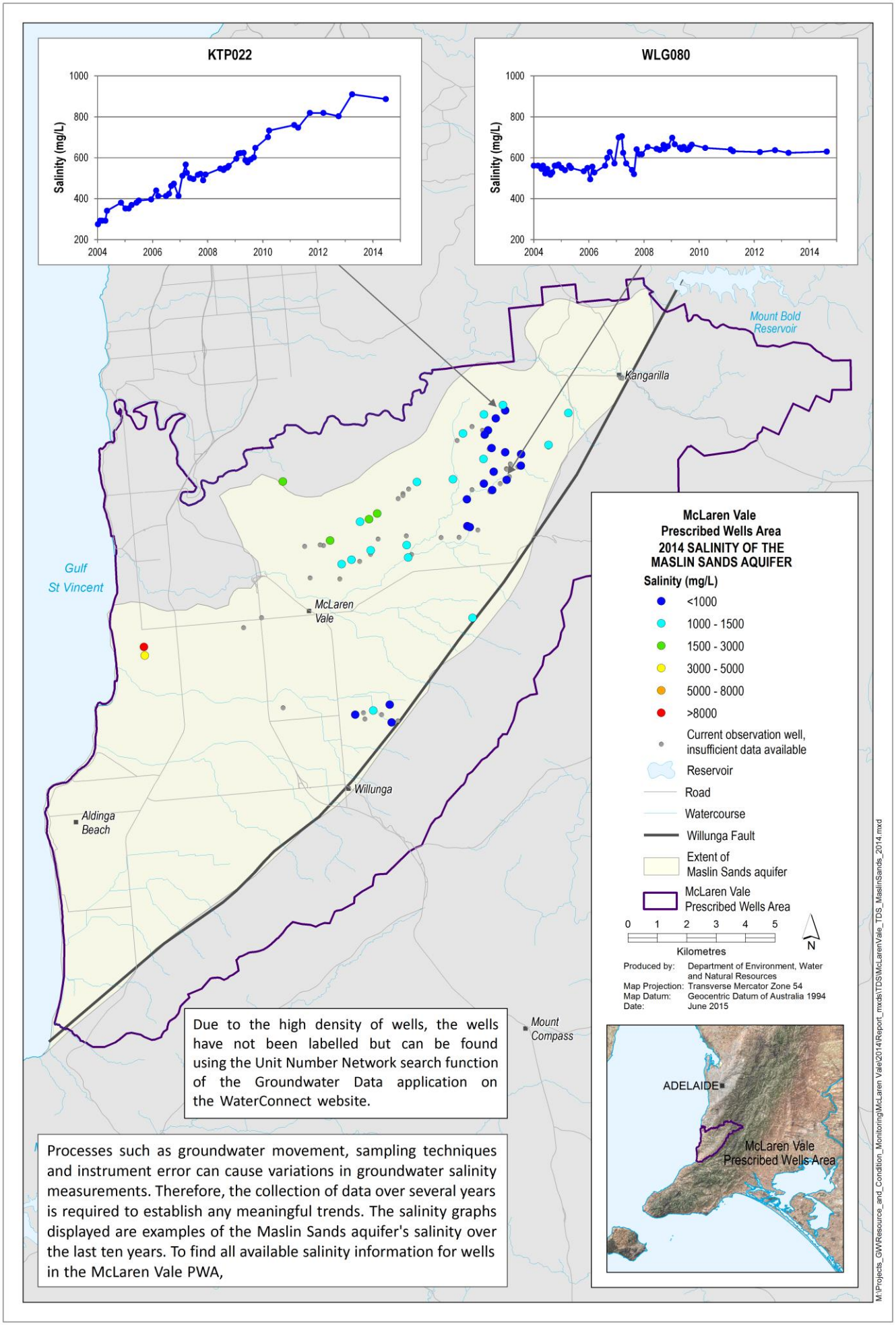


Figure 4. Groundwater salinity of the Maslin Sands aquifer in the McLaren Vale Prescribed Wells Area for 2014