

# Northern Adelaide Plains PWA

## T1 aquifer

2014 Groundwater level and salinity status report



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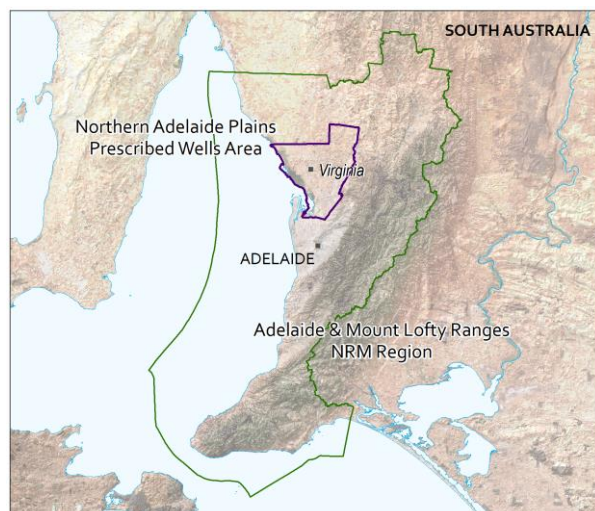
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# 2014 Summary



The Northern Adelaide Plains Prescribed Wells Area (NAP PWA) is located immediately to the north of the Adelaide metropolitan area, in the Adelaide and Mount Lofty Ranges 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.

Within the NAP PWA, the first two aquifers intersected in the Tertiary sediments, namely the T1 and T2 aquifers, are the main sources of groundwater withdrawals for irrigation purposes. The T1 aquifer and the deeper T2 aquifer are essentially effectively separated by the Munno Para Clay.

The T1 aquifer, the focus of this report, consists of several stratigraphic units varying in lithology and thickness. In the NAP PWA the T1 aquifer consists primarily of Hallett Cove Sandstone, Dry Creek Sand and limestone of the upper Port Willunga Formation. The T1 aquifer is absent in the north-east portion of the NAP PWA.

The main source of recharge to the aquifer is from the Mt Lofty Ranges, which lie to the east of the NAP PWA. Rainfall events in the ranges recharge the fractured rock system, which in turn recharges the sedimentary aquifers beneath the plains by lateral flow across the faults.

Although there is no direct recharge from rainfall to the confined T1 aquifer, there may be an indirect correlation between water levels and rainfall, as dry years will result in increased groundwater pumping, which in turn may lead to a lowering of groundwater levels. Conversely, groundwater levels may rise after a wet year due to reduced extractions.

The Smithfield rainfall station (number 23025) is located in the centre of the NAP PWA and recorded 422 mm of rain in 2014. This is 11% less than the long-term average annual rainfall of 476 mm for that station, and is comparable to the 466 mm of rainfall recorded in 2013. The monthly rainfall data for 2014 indicate that while significantly above-average rainfall was observed for February, there was below-average rainfall for eight out of the 12 months, with a period of below-average rainfall from August to December (Fig. 1).

The T1 aquifer is the main source of irrigation extraction in the area south of Waterloo Corner and, for 2013–14, the licensed extractions totalled 3455 ML<sup>1</sup> which is 4% more than the previous water-use year (Fig. 2). This volume of extraction equates to 13% of the 26 500 ML total allocation volume for the whole NAP PWA.

Pumping from the T1 aquifer for industrial purposes has formed a large long-standing cone of depression near the coast in the south-western corner of the NAP PWA that has been relatively stable over the last 20 years (Fig. 3). Periods of rising and of falling groundwater levels have been observed over the last 50 years. Seasonal fluctuations are generally between 5 and 10 m and overall, groundwater levels have been relatively stable over the last ten years (Fig. 4).

In 2014, declines in the maximum recovered groundwater level ranging from 0.13 to 3.32 m, with a median of 0.78 m, were recorded in 14 observation wells (61%), when compared with 2013 groundwater level data and are mostly located around the Waterloo Corner area and south of the Little Para River (Fig. 4). Rises ranging from 0.26 to 1.13 m, with a median of 0.67 m, were recorded in seven observation wells. Negligible change in water level was recorded in two of the observation wells, where the change in maximum recovered water level between 2013 and 2014 was less than 0.1 m. The overall drop in groundwater levels between 2013 and 2014 may be the result of the increase in groundwater extractions and are within the long-term variation of groundwater levels.

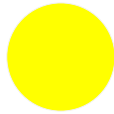
Groundwater of the T1 aquifer is relatively fresh with most wells recording salinities of less than 1500 mg/L, however, the salinity has been found to reach up to nearly 8000 mg/L in some areas. Over the past 10 years, salinity has generally been gradually increasing (Fig. 5).

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

In 2014, salinity within the NAP PWA ranged between 630 and 2375 mg/L, with 73% of monitored wells recording a salinity of less than 1500 mg/L (Fig. 5). Of the 45 wells with salinity records for both 2013 and 2014, most (82%) recorded an increase or decrease in salinity of less than 5%, indicating stable salinity overall.

The T1 aquifer of the Northern Adelaide Plains 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, 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 T1 aquifer is supported by:

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

To view the descriptions for all status symbols, please visit the *Water Resource Assessments* page on [WaterConnect](#).

To view the *Northern Adelaide Plains PWA groundwater level and salinity status report 2009–10*, which includes background information on hydrogeology, rainfall and relevant groundwater-dependent ecosystems, and to view the descriptions of all status symbols, please visit the *Water Resource Assessments* page on [WaterConnect](#).

To download groundwater level and salinity data from observation wells within the Northern Adelaide Plains PWA, please visit the *Groundwater Data* page under the Data Systems tab on [WaterConnect](#).

For further details about the Northern Adelaide Plains PWA, please see the *Adelaide Plains Water Allocation Plan* on the Natural Resources Adelaide and Mt Lofty Ranges [website](#).

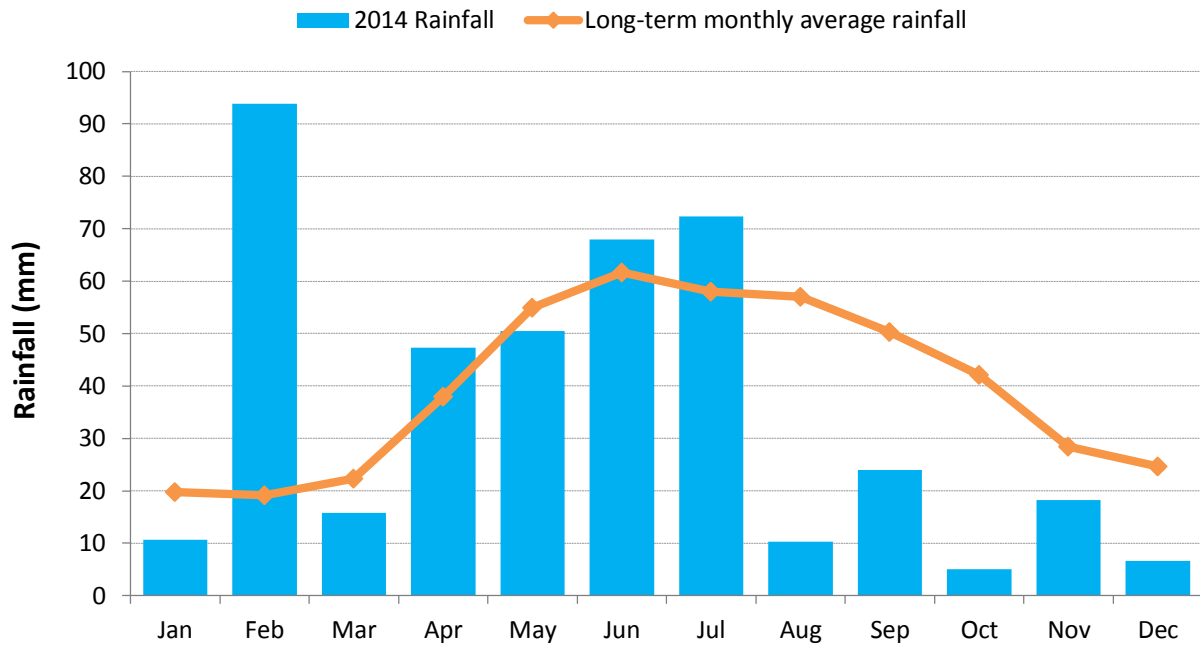


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Smithfield rainfall station<sup>2</sup> (number 23025) in the Northern Adelaide Plains Prescribed Wells Area

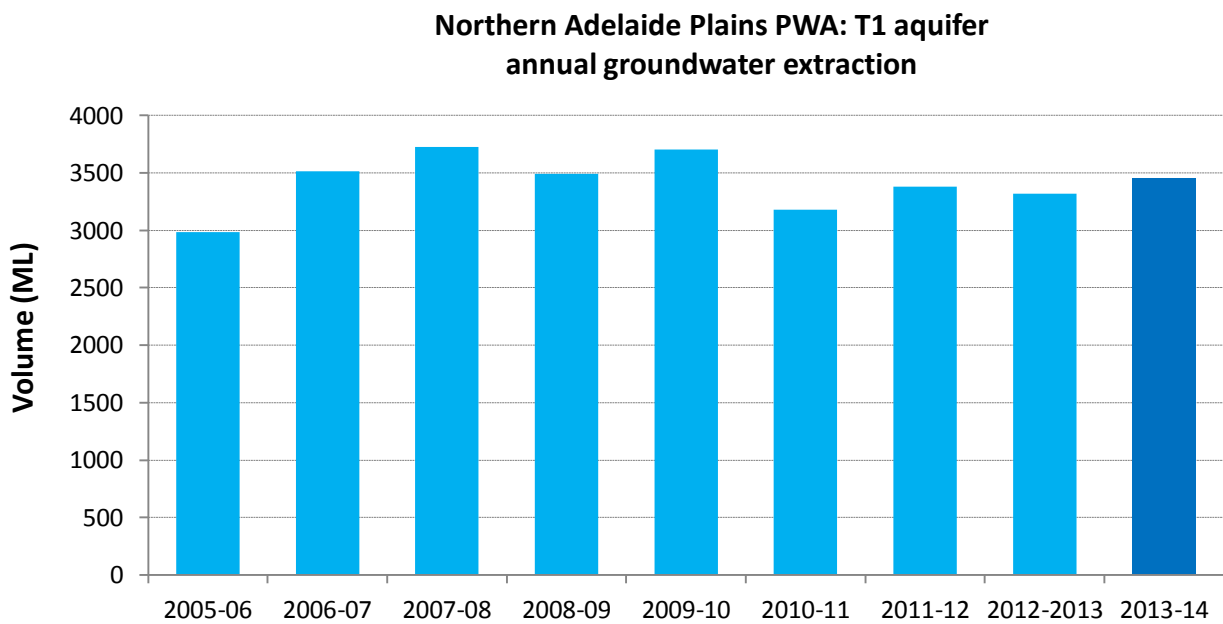


Figure 2. Historical licensed groundwater use for the T1 aquifer of the Northern Adelaide Plains Prescribed Wells Area

<sup>2</sup> 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](http://www.longpaddock.qld.gov.au/silo).

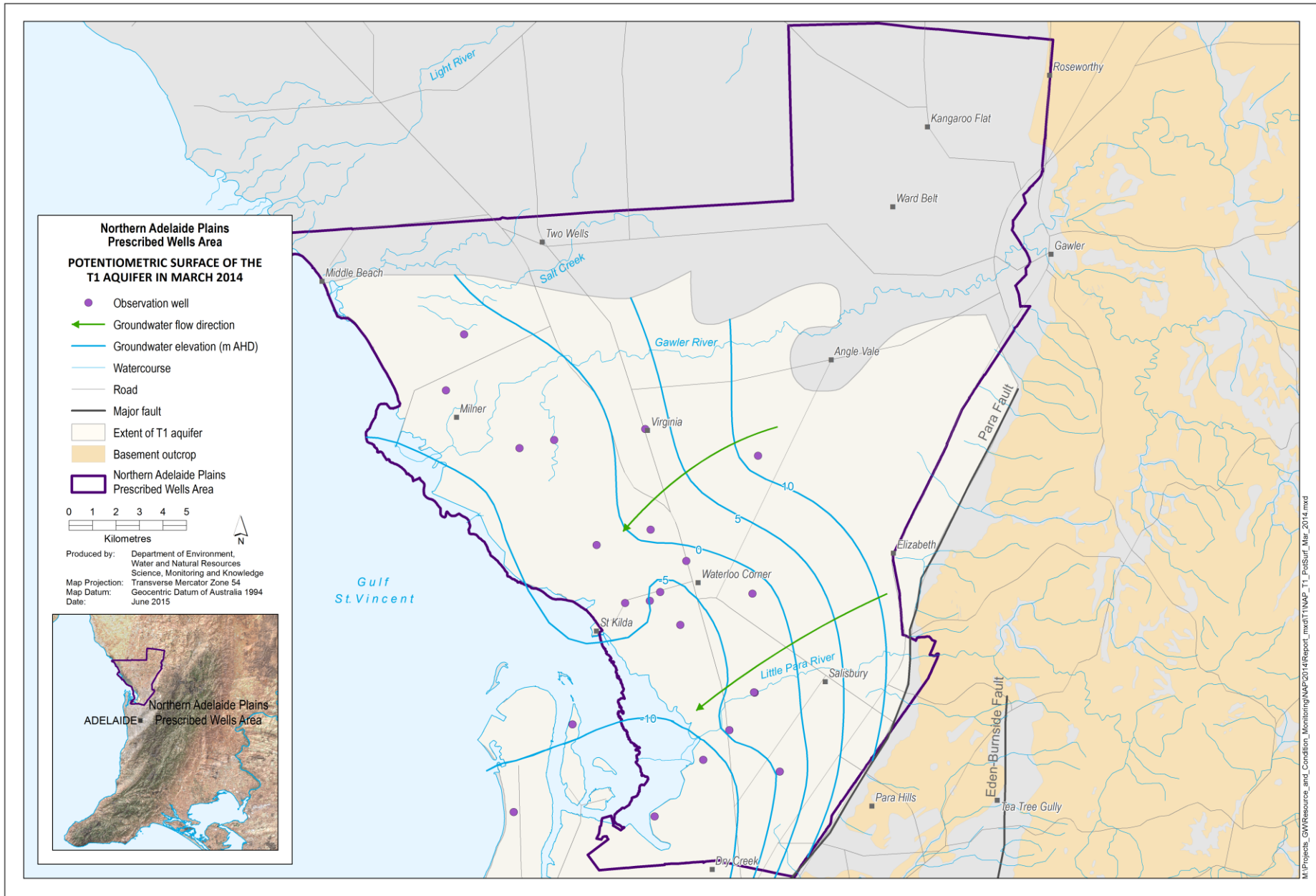


Figure 3. Potentiometric surface and direction of groundwater flow in the T1 aquifer of the Northern Adelaide Plains Prescribed Wells Area in March 2014

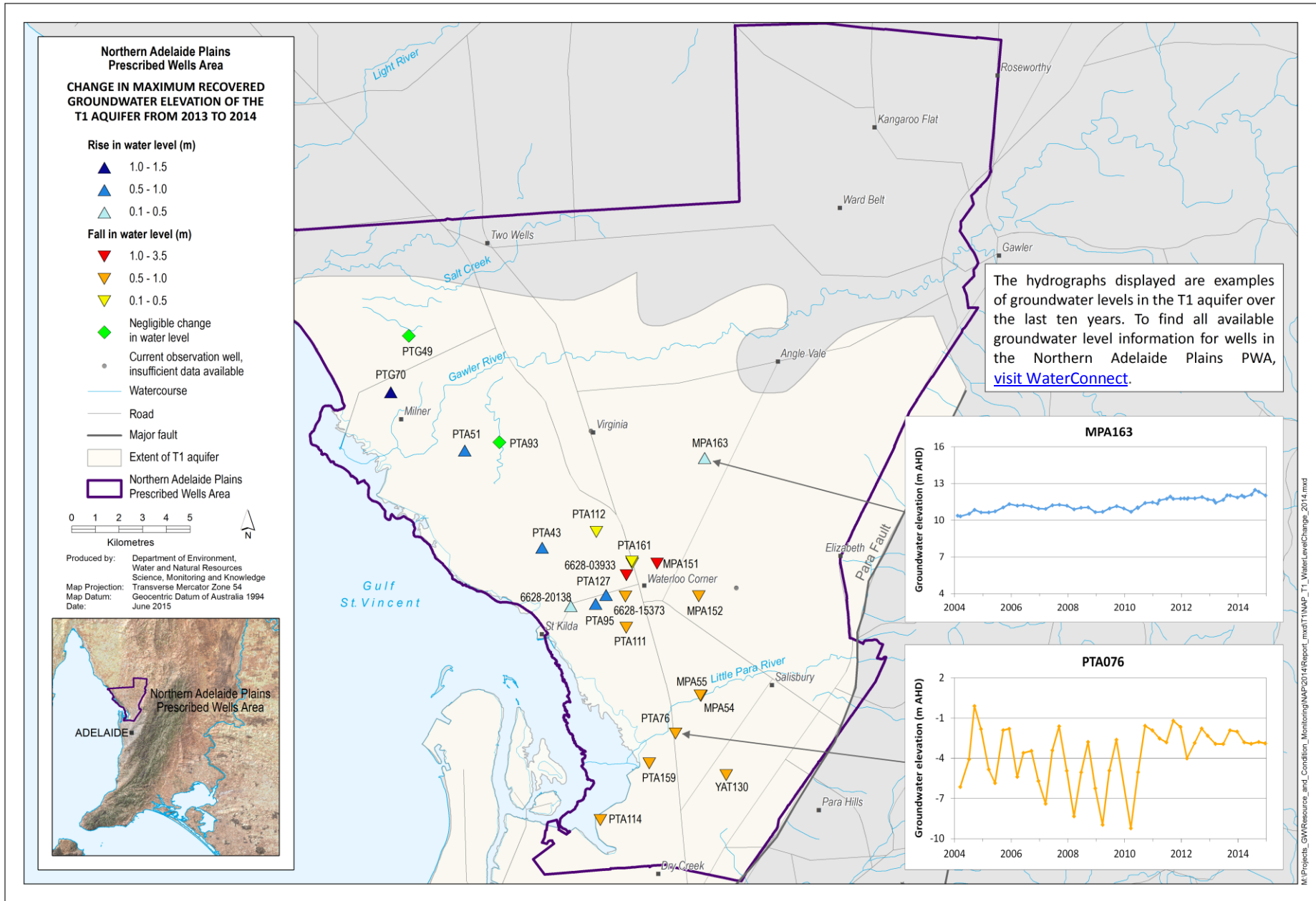


Figure 4. Overall changes in maximum recovered groundwater levels in the T1 aquifer of the Northern Adelaide Plains Prescribed Wells Area

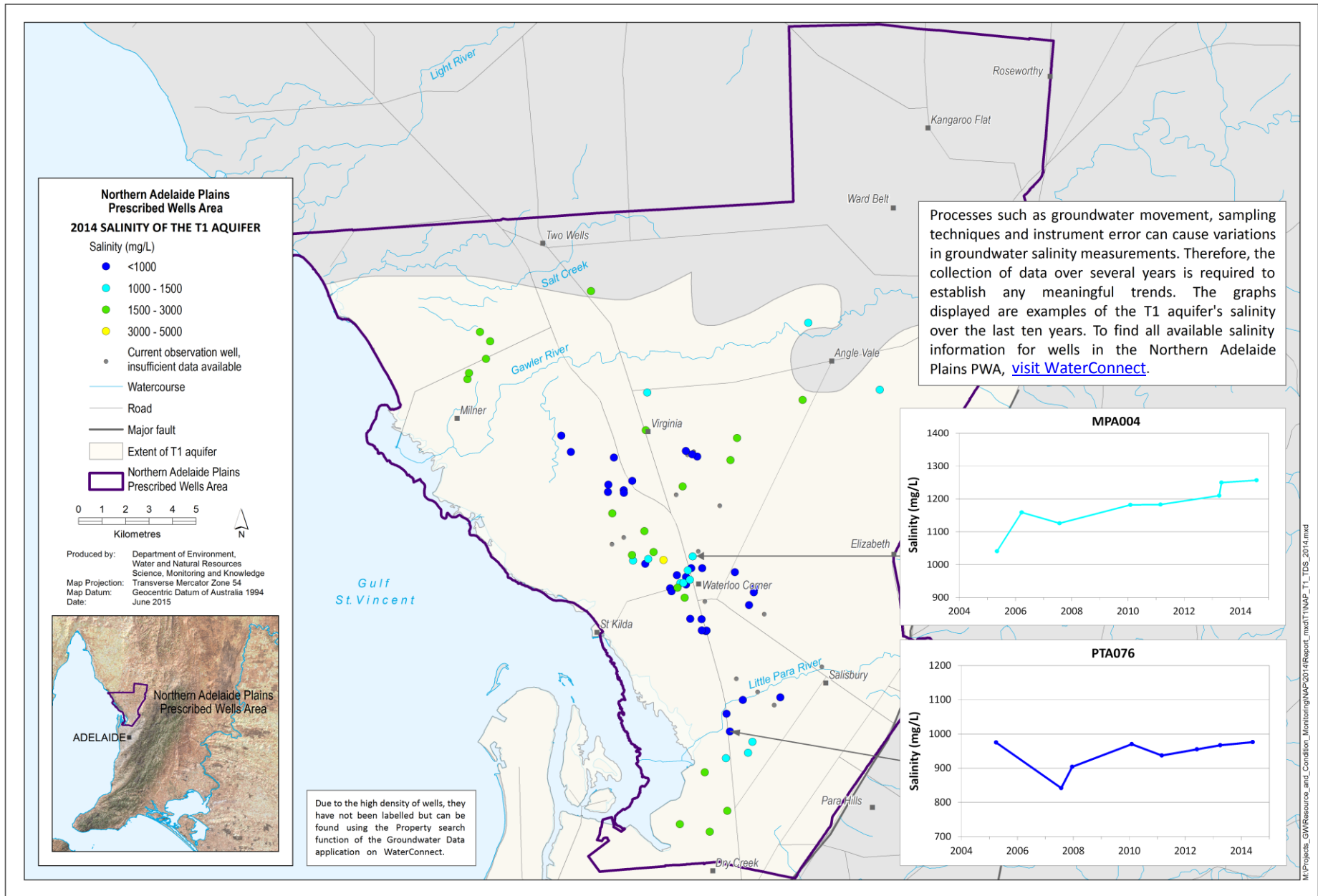


Figure 5. Groundwater salinity of the T1 aquifer of the Northern Adelaide Plains Prescribed Wells Area for 2014