
NORTHERN ADELAIDE PLAINS PWA

T1 AQUIFER

Groundwater Level and Salinity Status Report

2012



Government of South Australia
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Water and Natural Resources

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2012 SUMMARY



The Northern Adelaide Plains Prescribed Wells Area (NAP PWA) is located immediately to the north of the Adelaide metropolitan area. 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 T1 aquifer 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 of the NAP PWA.

The main source of recharge to the system 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 and in turn, the water filters down-gradient towards the coast, recharging the aquifer systems on the plains.

The T1 aquifer is the main source of irrigation extraction in the area south of Waterloo Corner. Metered extractions from the T1 aquifer totalled 3190 ML* for 2011–12 (Fig. 1), which is 10 ML more than the previous water-use year. This volume of extraction equates to 12% of the total allocation limit of 26 500 ML for the NAP PWA.

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 that 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 456 mm of rain in 2012. This is 20 mm less than the long-term average annual rainfall for that station. While March and June received rainfall significantly above their long-term average, April, July, October and November recorded significantly below-average rainfall (Fig. 2). In 2011 the Smithfield rainfall station recorded over 100 mm more rainfall than the long-term average. The decrease in extractions and overall increase in groundwater levels in 2011 are likely to be related to this above-average rainfall.

Overall, trends of both increasing and decreasing 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. Pumping from the T1 aquifer has formed a large, long-standing cone of depression near the coast in the south-western corner of the NAP PWA where significant industrial extraction occurs that has been relatively stable over the last 20 years (Fig. 3). In 2012, decreases in the maximum recovered water level ranging from 0.03 to 2.3 m were recorded in 12 observation wells (60%) when compared to 2011 water level data. These wells are located primarily in the Virginia to Waterloo Corner area and along the Little Para River (Fig. 4). The declines in water level may be the result of the increase in extractions that are likely to be associated with the drier conditions experienced in 2012 compared to 2011. Elsewhere, increases of 0.1 to 0.6 m were recorded in eight observation wells. Fluctuations in the groundwater level of this magnitude are within the natural, long-term variability of the resource (Fig. 4) and are linked to fluctuations in rainfall and extraction volumes.

* The licensed groundwater use for the 2011–12 water use year is based on the best data available as of July 2013 and may be subject to change, as some extraction volumes are in the process of being verified

Groundwater of the T1 aquifer is relatively fresh with an average salinity of about 1200 mg/L, but it can reach up to nearly 8000 mg/L. In 2012, salinities ranging from 650 to 2500 mg/L were recorded, with 71% of monitored wells recording salinity of less than 1500 mg/L (Fig. 5). The majority of observation wells (73%) recorded a rise in salinity in 2012 when compared to 2011 salinity data.

The T1 aquifer of the NAP PWA has been assigned a yellow status for 2012:

2012 STATUS



“Gradual adverse trends indicating low risk to the resource in the medium term”

This means that gradual adverse trends in the resource status have been observed over the reporting period. Continuation of these trends is unlikely to negatively impact the beneficial use of the resource for at least 15 years. The 2012 status for the T1 aquifer is supported by:

- an overall decrease in the maximum recovered water level when compared to 2011 groundwater level data
- an overall increase in groundwater salinity when compared to 2011 salinity data.

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, [visit WaterConnect](#).

To view descriptions of all status symbols, [click here](#).

For further details about the Northern Adelaide Plains PWA please see the [Water Allocation Plan for the Northern Adelaide Plains Prescribed Wells Area](#).

Northern Adelaide Plains PWA: T1 aquifer annual groundwater extraction

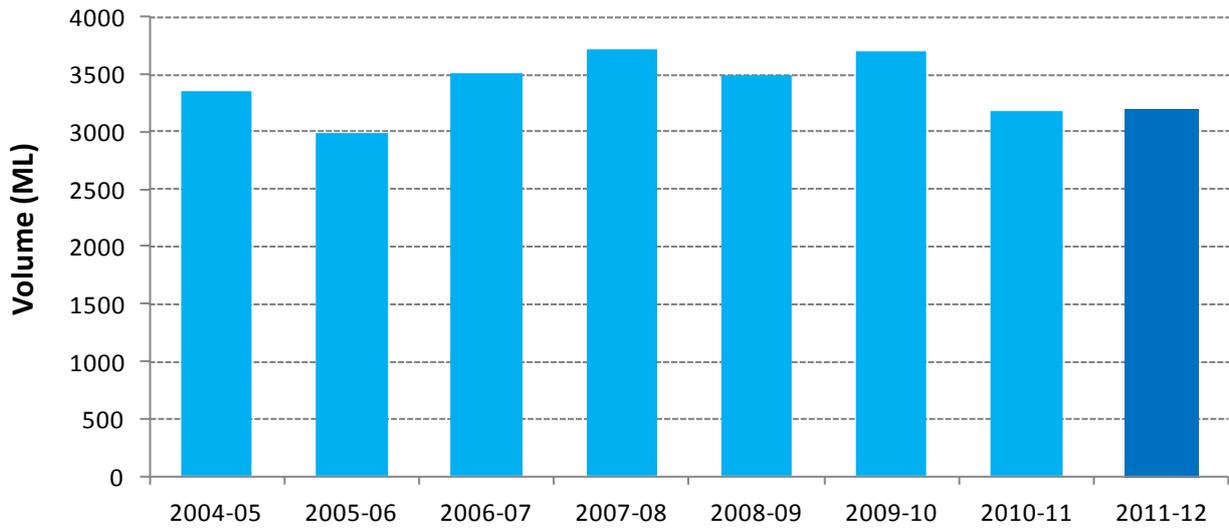


Figure 1. Historical licensed groundwater use* for the T1 aquifer of the Northern Adelaide Plains Prescribed Wells Area

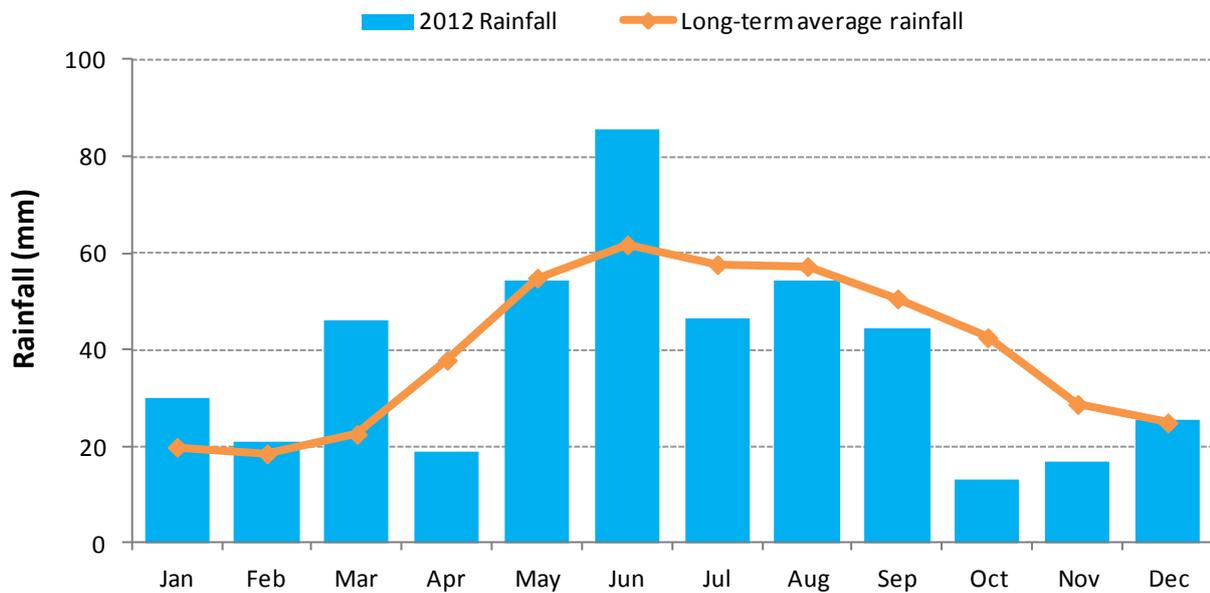


Figure 2. Monthly rainfall (mm) for 2012 and the long-term average monthly rainfall (mm) at the Smithfield rainfall station (number 23025) in the Northern Adelaide Plains Prescribed Wells Area

* The licensed groundwater use for the 2011–12 water use year is based on the best data available as of July 2013 and may be subject to change, as some extraction volumes are in the process of being verified

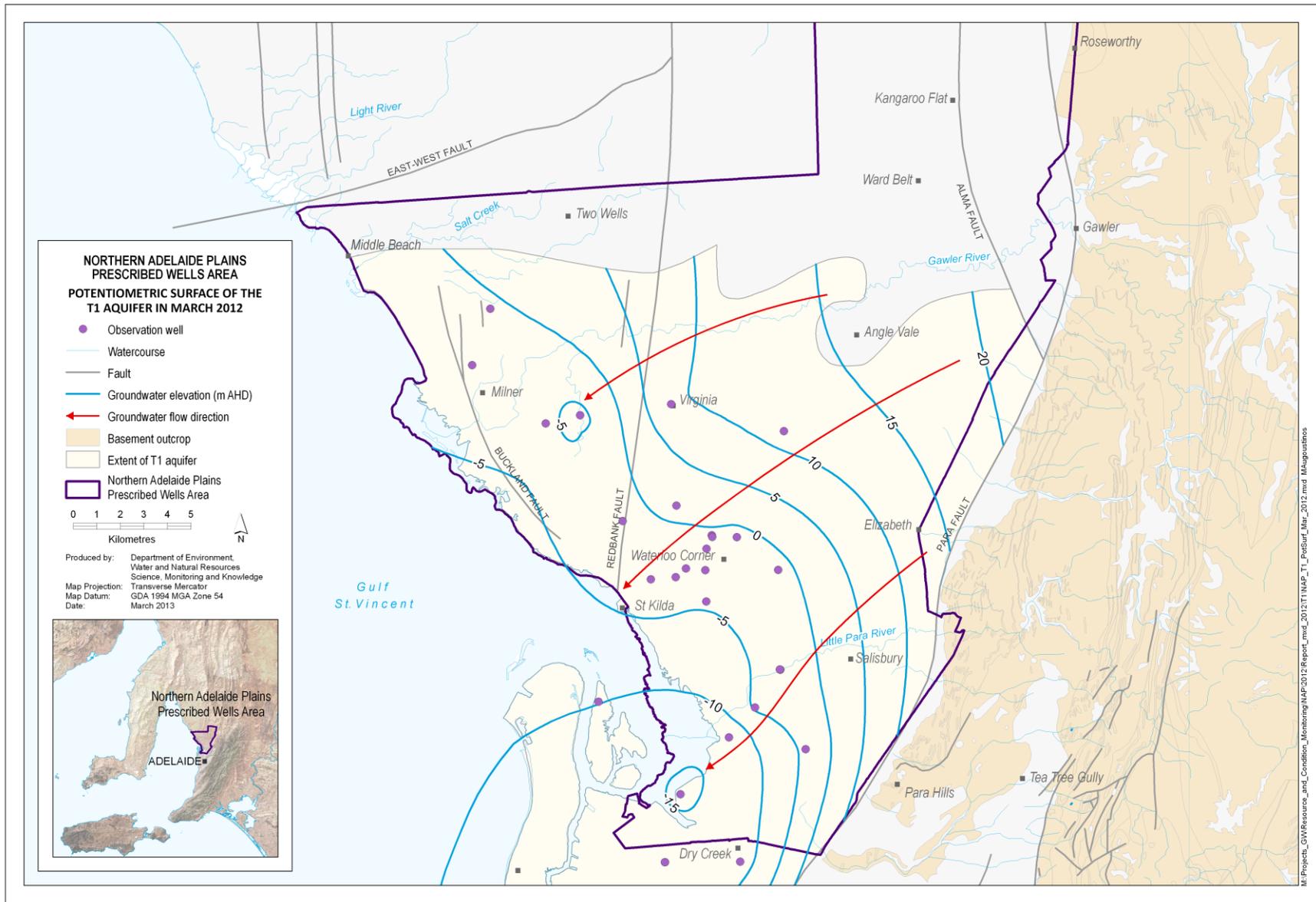


Figure 3. Potentiometric surface and direction of groundwater flow in the T1 aquifer of the Northern Adelaide Plains Prescribed Wells Area in March 2012

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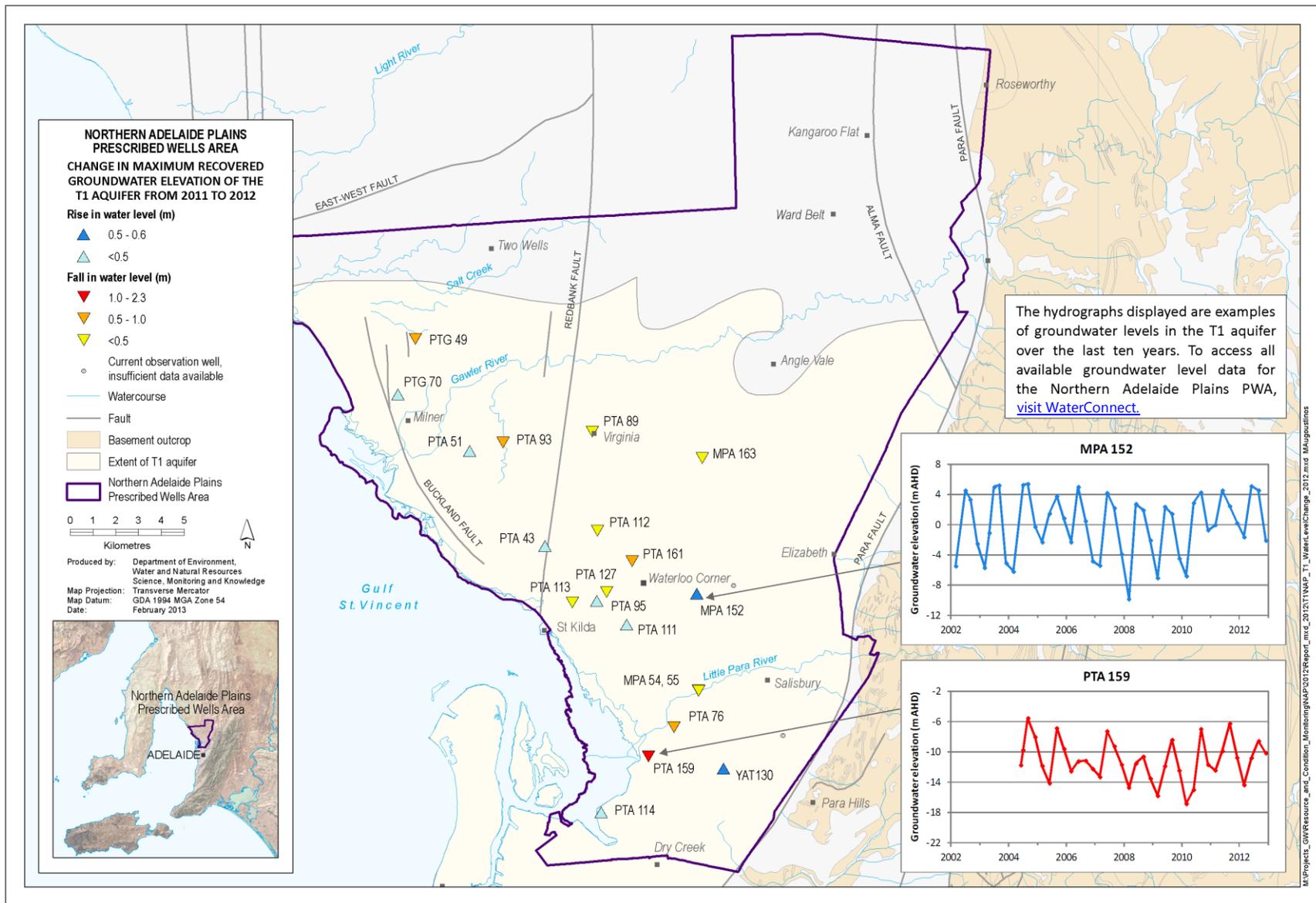


Figure 4. Overall changes in maximum recovered groundwater levels in the T1 aquifer of the Northern Adelaide Plains Prescribed Wells Area

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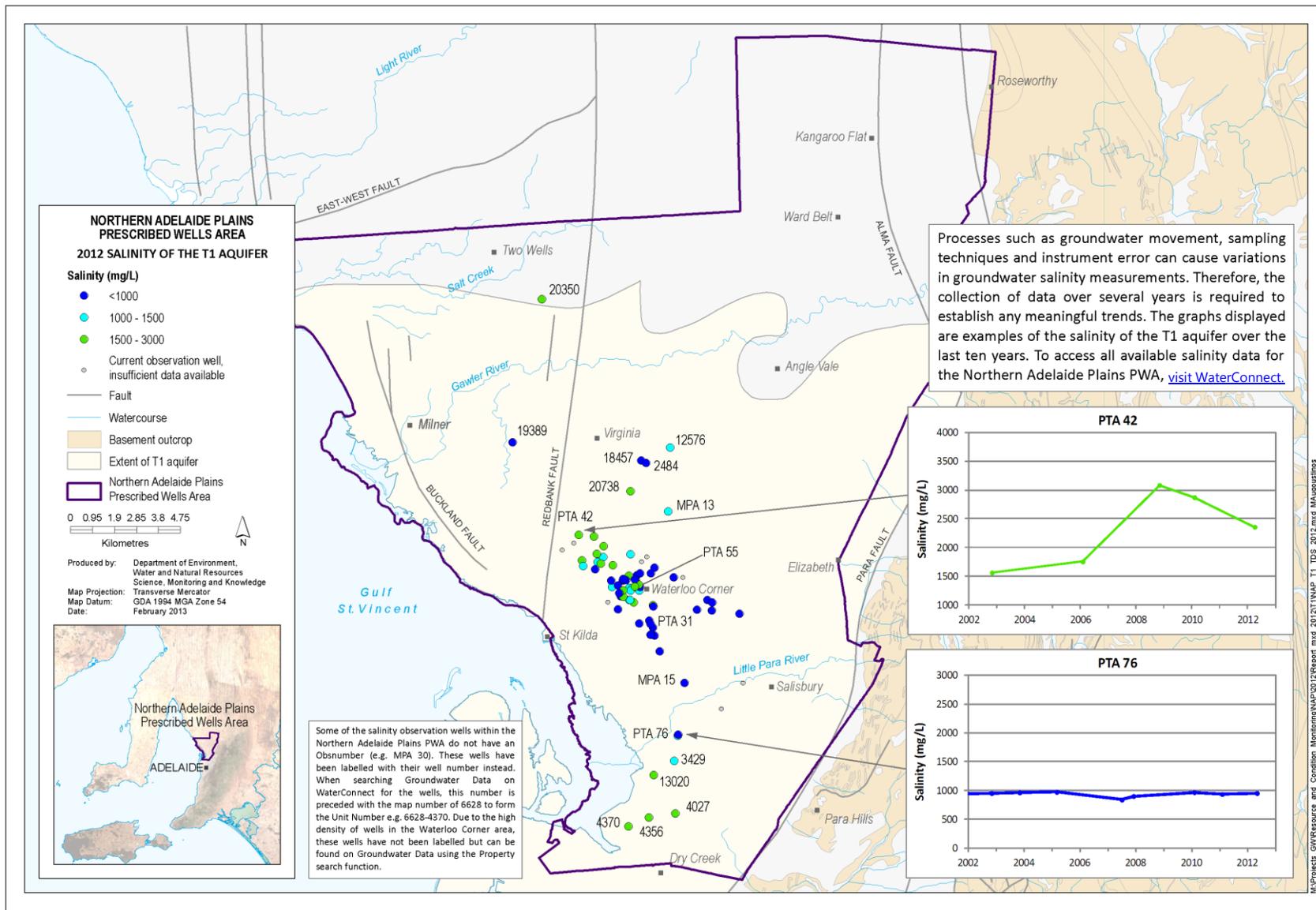


Figure 5. Groundwater salinity of the T1 aquifer of the Northern Adelaide Plains Prescribed Wells Area for 2012

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