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# T1 AQUIFER

## NORTHERN ADELAIDE PLAINS PWA

### GROUNDWATER LEVEL AND SALINITY STATUS REPORT

2011

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Water and Natural Resources

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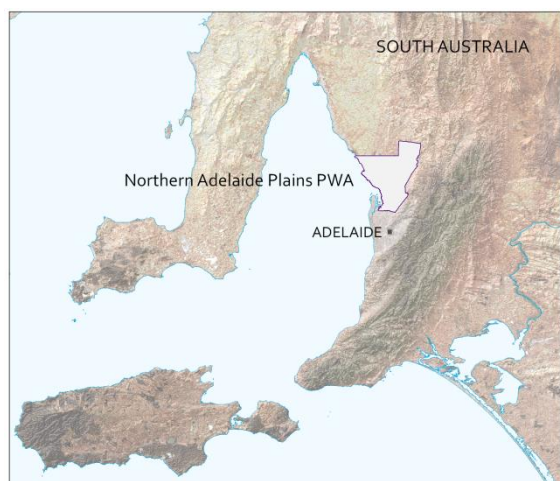
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## 2011 SUMMARY



The Northern Adelaide Plains Prescribed Wells Area (NAP PWA) is located immediately to the north of the Adelaide metropolitan area. It is a regional-scale resource for which groundwater has been prescribed under South Australia's *Natural Resources Management Act 2004* since 1976. A Water Allocation Plan provides for the sustainable management of the water resources.

The T1 aquifer consists of several stratigraphic units, varying in lithology and thickness. In the NAP PWA, the T1 aquifer consists primarily of the Hallett Cove Sandstone, Dry Creek Sand and limestone of the upper Port Willunga Formation. The T1 aquifer is absent in the north-east part 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 system beneath the plains. Although there is no direct rainfall recharge 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 585 mm of rain in 2011. This is more than 100 mm over the long-term average annual rainfall for that station, with most of the rain received in March (Fig. 1).

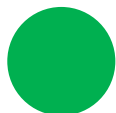
The T1 aquifer is the main source of irrigation extraction in the area south of Waterloo Corner. Metered extractions from the T1 aquifer totalled 3180 ML in the 2010–11 water-use year (Fig. 2), a 14% decrease from the previous water-use year and comprising 28.6% of the total licensed groundwater extractions in the NAP PWA in 2010–11.

Overall, both increasing and decreasing groundwater level trends have been observed over the last 50 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 (Fig. 3), which has been relatively stable over the last 20 years. Seasonal fluctuations are generally between 5 and 10 m and overall, groundwater levels have been relatively stable over the last ten years. In 2011, the majority of observation wells have recorded a rise in levels due to the reduction in extractions (Fig. 4).

Groundwater in 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. Salinity levels have been reasonably stable over the past ten years with observation wells recording salinities of up to 2000 mg/L in 2011 (Fig. 5).

The T1 aquifer of the Northern Adelaide Plains PWA has been assigned a green status for 2011:

## 2011 STATUS



“No adverse trends, indicating a stable or improving situation”

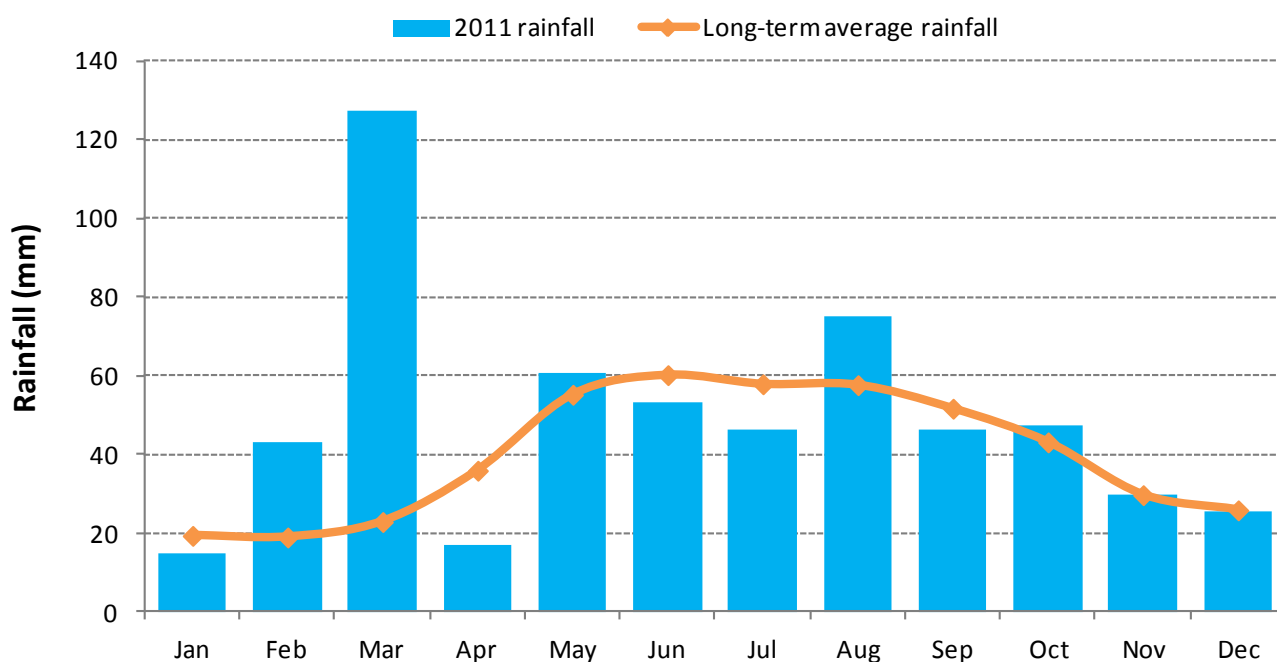
This means that groundwater level and salinity trends are either stable (i.e. no significant change) or improving (i.e. decreasing salinity or rising water levels). The 2011 status for the T1 aquifer is supported by:

- The majority of observation wells recorded a rise in the maximum recovered groundwater level of up to 2 m during 2011, with only three observation well recording declines of between 0.03 and 1.6 m (Fig. 4).
- Observation wells recorded minor decreases in salinity in the majority of wells in 2011.

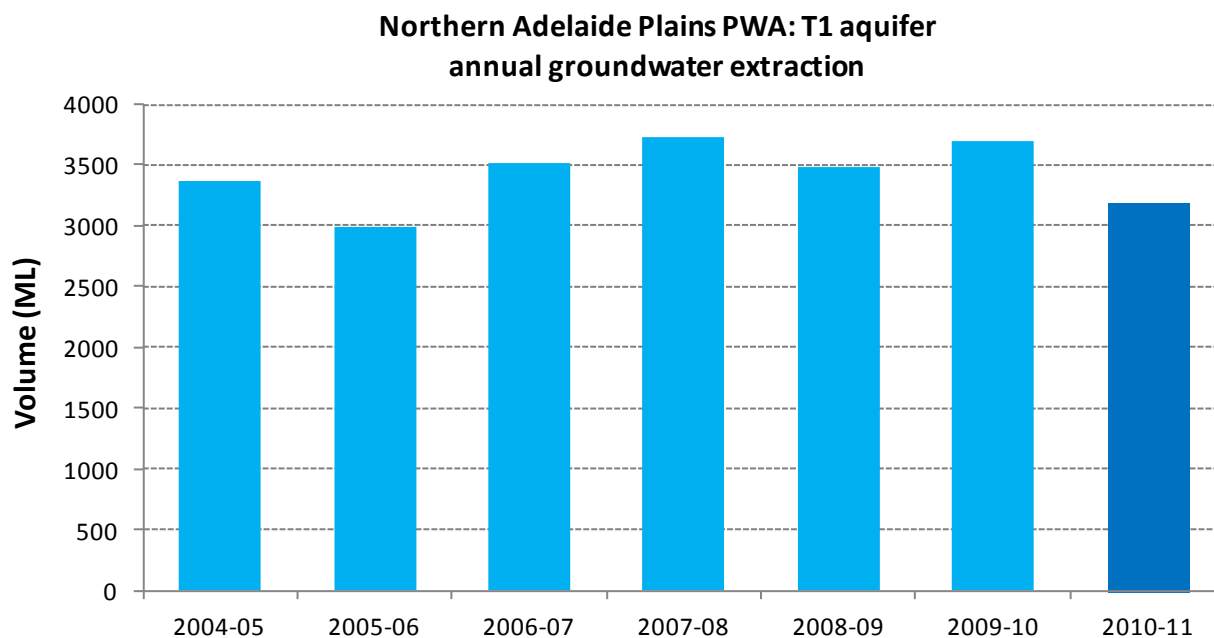
To view the *Northern Adelaide Plains PWA Groundwater Level and Salinity Status Report 2009–10*, which includes background information on hydrogeology, location of rainfall stations and relevant groundwater dependent ecosystems, [visit WaterConnect](#).

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

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



**Figure 1.** Monthly rainfall (mm) for 2011 and the long-term average monthly rainfall at the Smithfield rainfall station (number 23025) in the Northern Adelaide Plains PWA



**Figure 2.** Historical licensed groundwater extraction for the T1 aquifer in the Northern Adelaide Plains PWA

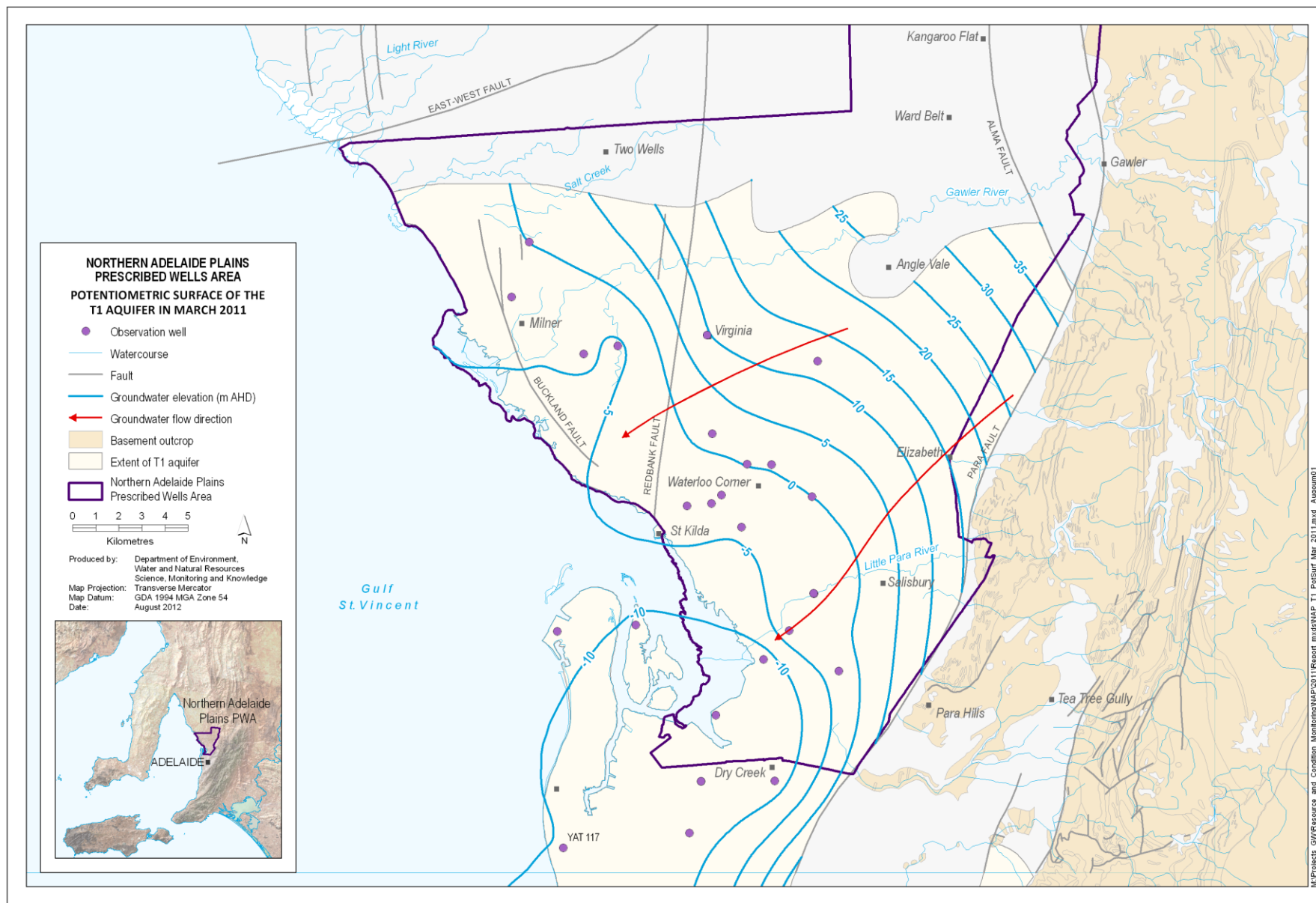


Figure 3. Potentiometric surface and direction of groundwater flow in the T1 aquifer of the Northern Adelaide Plains PWA in March 2011

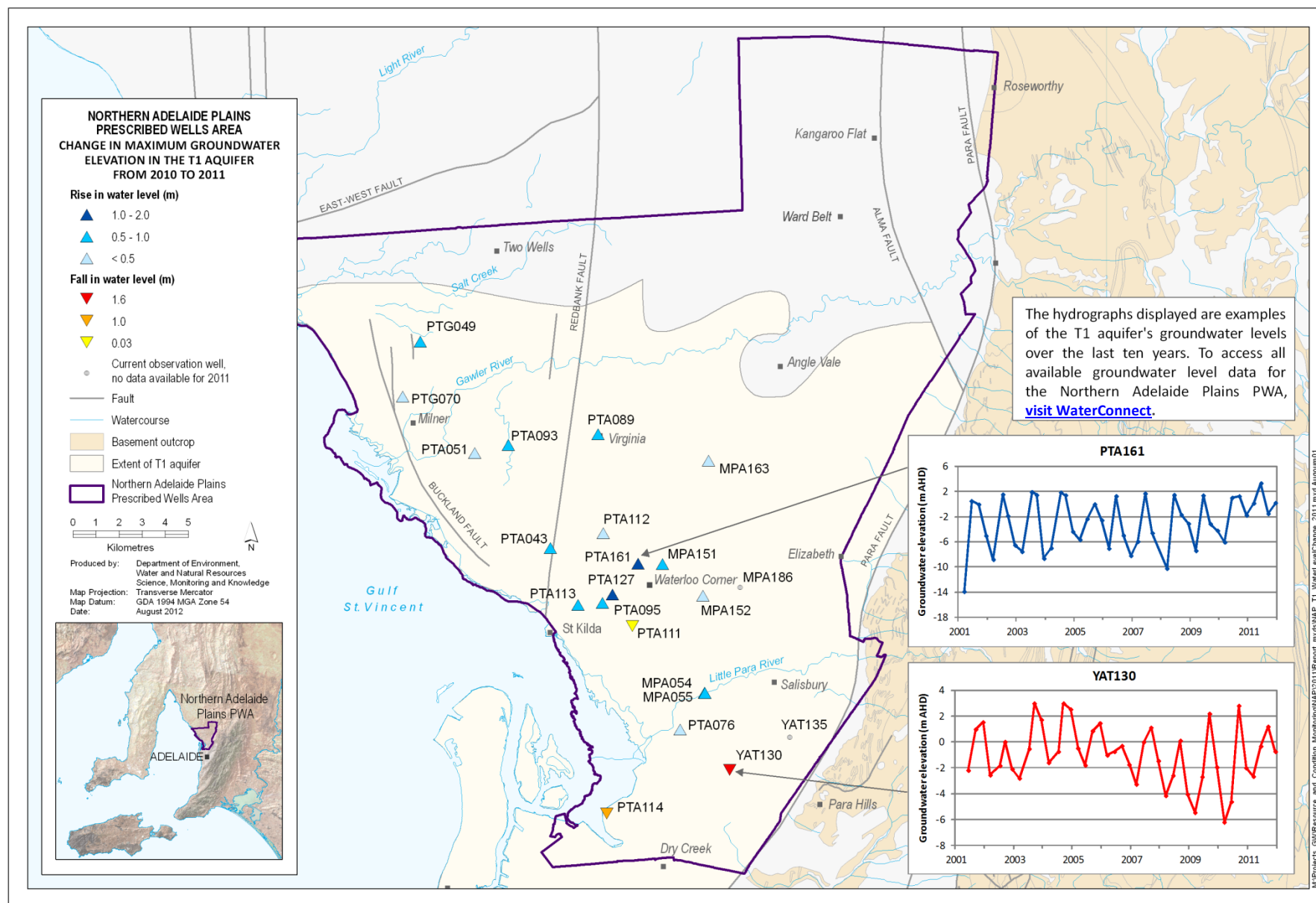


Figure 4. Overall changes in the maximum recovered groundwater level from 2010 to 2011 in the T1 aquifer of the Northern Adelaide Plains PWA



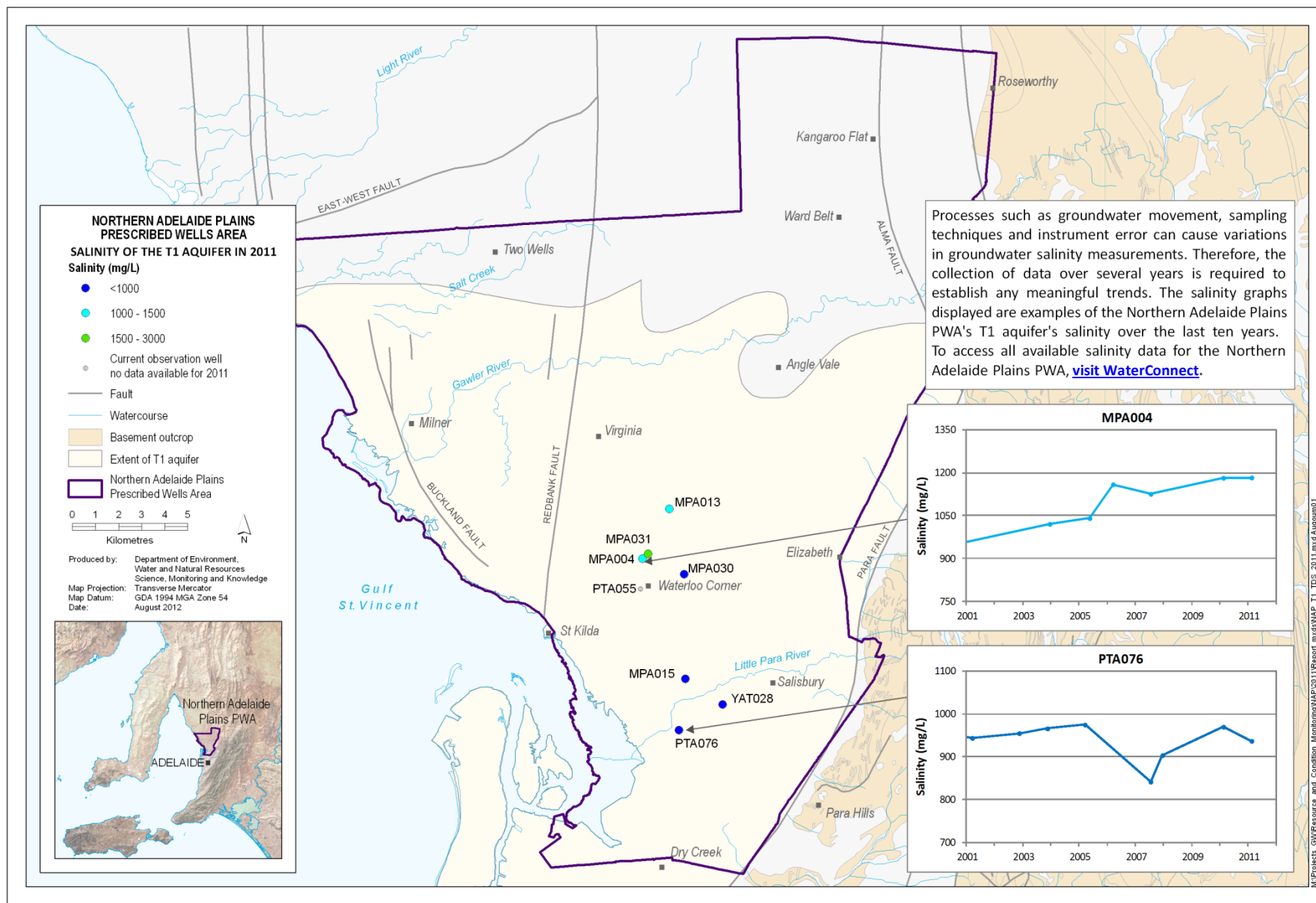


Figure 5. Groundwater salinity in the T1 aquifer of the Northern Adelaide Plains PWA for 2011