T2 AQUIFER

NORTHERN ADELAIDE PLAINS PWA

GROUNDWATER LEVEL AND SALINITY STATUS REPORT

2011

Government of South Australia
Department of Environment,
Water and Natural Resources

Science, Monitoring and Information Division
Department of Environment, Water and Natural Resources
25 Grenfell Street, Adelaide
GPO Box 2834, Adelaide SA 5001

Telephone	National	(08) 8463 6946
	International	+61 8 8463 6946
Fax	National	(08) 8463 6999
	International	+61 8 8463 6999
Website	www.waterforgood.sa.gov.au	

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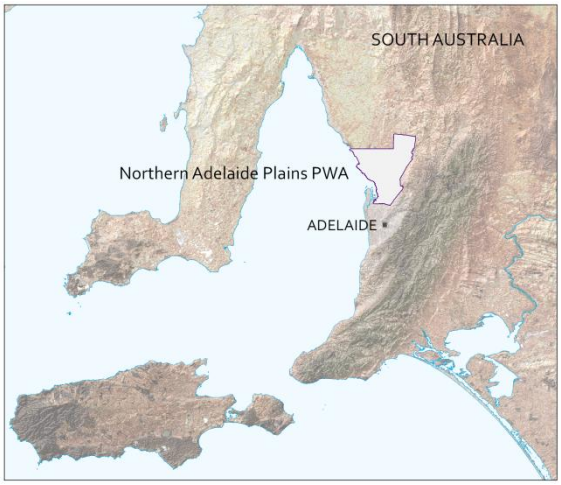
2011 SUMMARY



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 T2 aquifer, which underlies the T1 aquifer, occurs throughout the entire NAP PWA and consists of well-cemented limestone of the lower Port Willunga Formation.

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 T2 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 T2 aquifer provided the majority (68%) of licensed groundwater extractions in the NAP PWA for the 2010–11 water-use year. Metered extractions from the aquifer totalled 7573 ML, representing a 28% decrease from the previous water-use year (Fig. 2).

Extractions from the T2 aquifer have created a long-standing cone of depression centred on Virginia that has been relatively stable over the last 20 years and reaches its maximum seasonal drawdown in March (Fig. 3). Different extraction regimes in the Kangaroo Flat area results in the maximum seasonal drawdown occurring during December, forming a small cone of depression in the area at this time of year (Fig. 4). Between 1969 and 1999 there was an overall trend of decreasing groundwater levels in the T2 aquifer. After a slight recovery in water levels from 2002 to 2006, below-average rainfall since 2006 led to increased extraction and a slight downward trend in water levels. Over the last five years, levels have either stabilised or increased and in 2011, the majority of observation wells have recorded a rise in levels (Fig. 5).

Groundwater of the T2 aquifer is relatively fresh, ranging from 500 to 4500 mg/L (Fig. 6) with an average of about 1200 mg/L. Between 1960 and 1980 salinity was relatively stable in most wells. Since 2000, salinity is generally higher but has been relatively stable over the last ten years, with larger increases in salinity generally found in the north of the PWA.

The T2 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 T2 aquifer is supported by:

- A rise in the maximum recovered groundwater level of up to 3 m recorded in 41 observation wells during 2011 (Fig. 5). Ten observation wells recorded a decline in the maximum recovered groundwater level of up to 2 m.
- A decrease in salinity of up to 450 mg/L was recorded in 19 observation wells during 2011, while eight wells recorded a rise in salinity of up to 120 mg/L.

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.

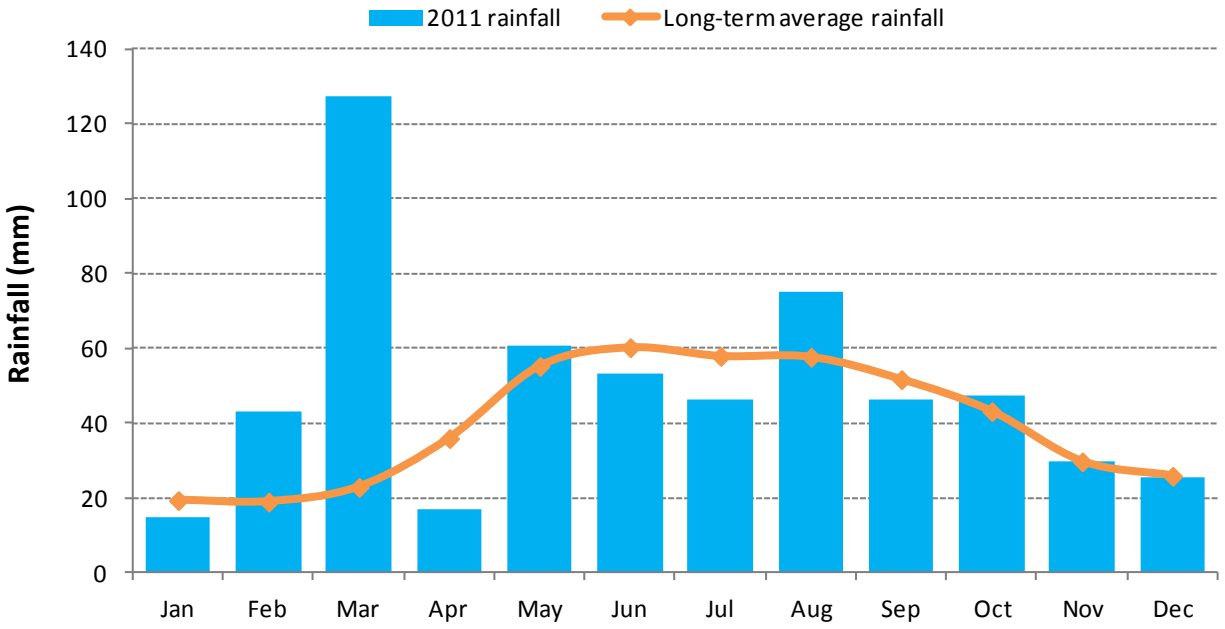


Figure 1 Monthly rainfall (mm) for 2011 and the long-term average monthly rainfall at the Smithfield rainfall station (number 23025) in the Northern Adelaide Plains PWA

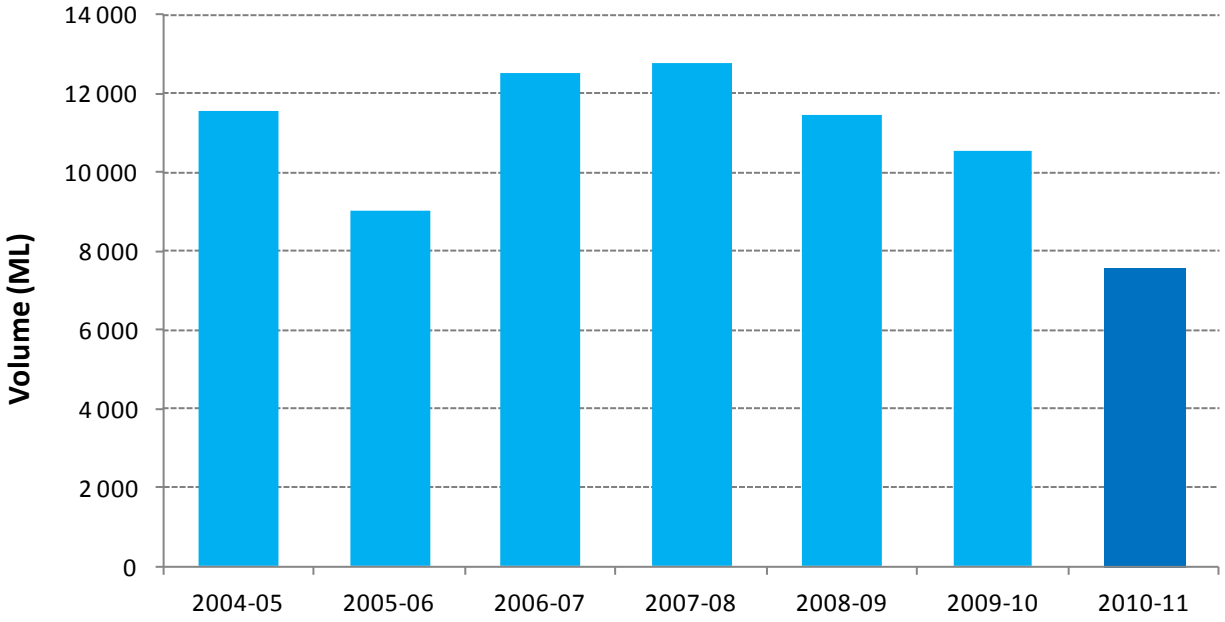


Figure 2 Historical licensed groundwater extraction for the T2 aquifer in the Northern Adelaide Plains PWA

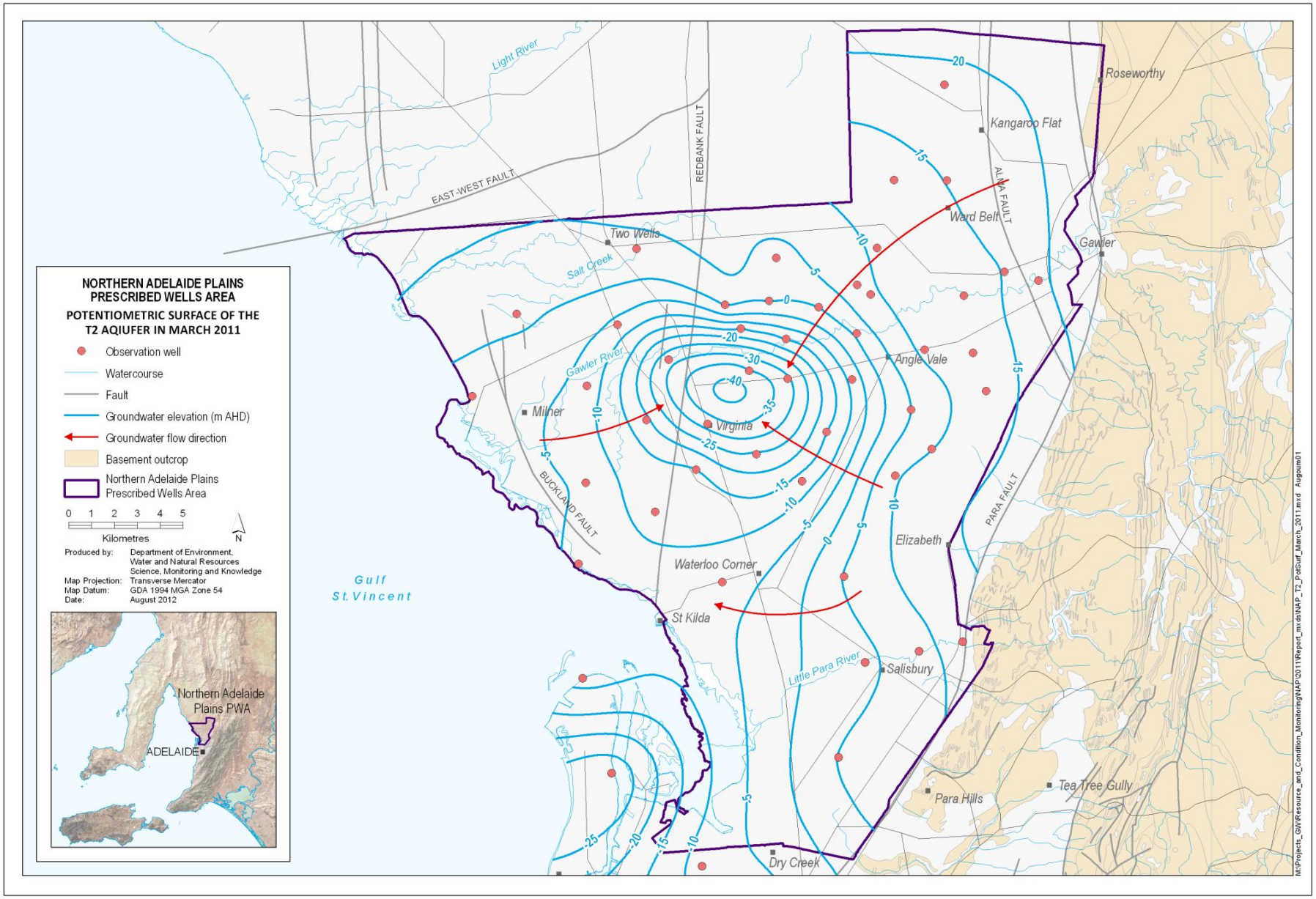


Figure 3 Potentiometric surface of the T2 aquifer in the Northern Adelaide Plains PWA in March 2011 to reflect the maximum seasonal drawdown

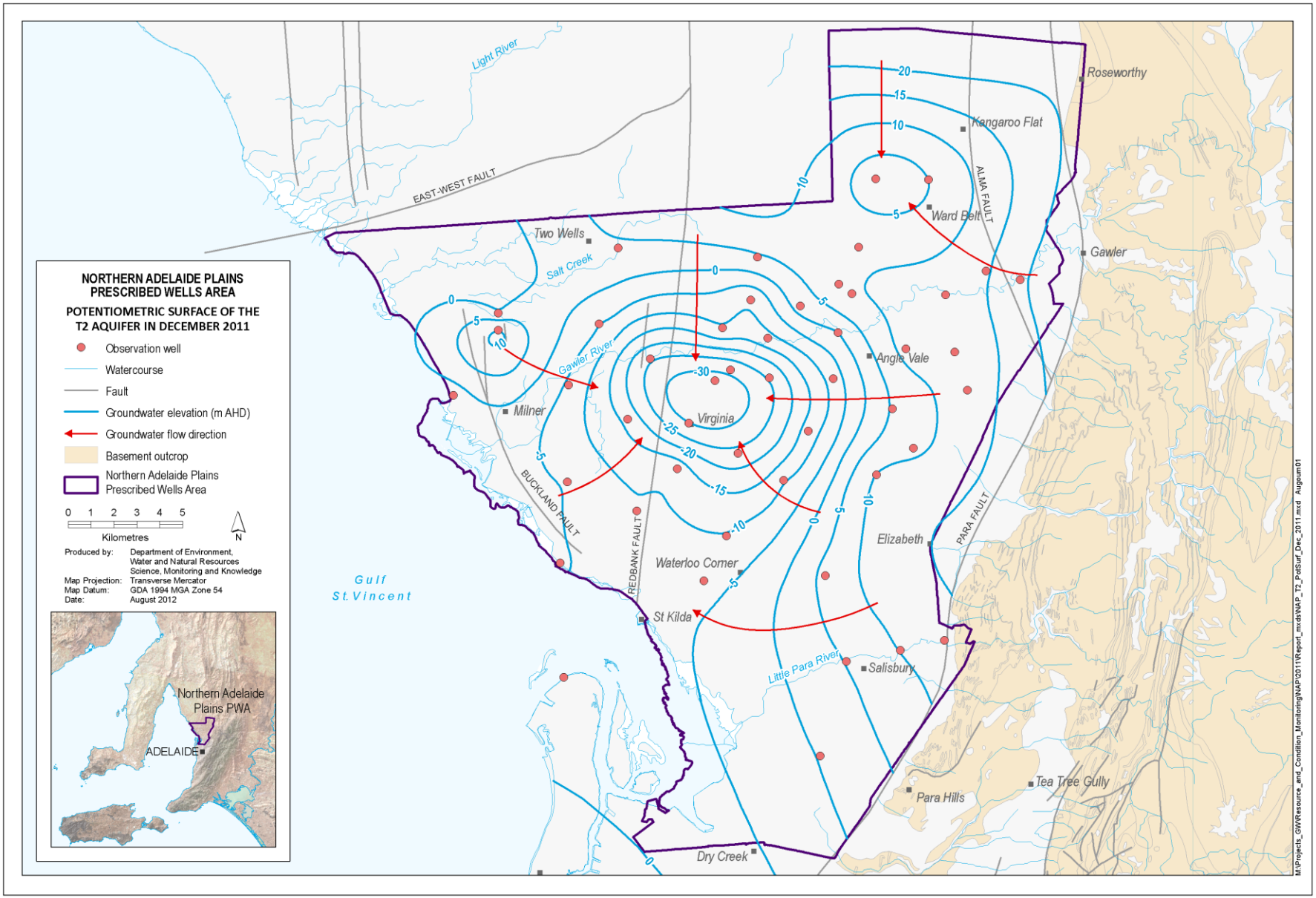


Figure 4 Potentiometric surface of the T2 Aquifer in the Northern Adelaide Plains PWA in December 2011 to reflect the maximum seasonal drawdown in the Kangaroo Flat area

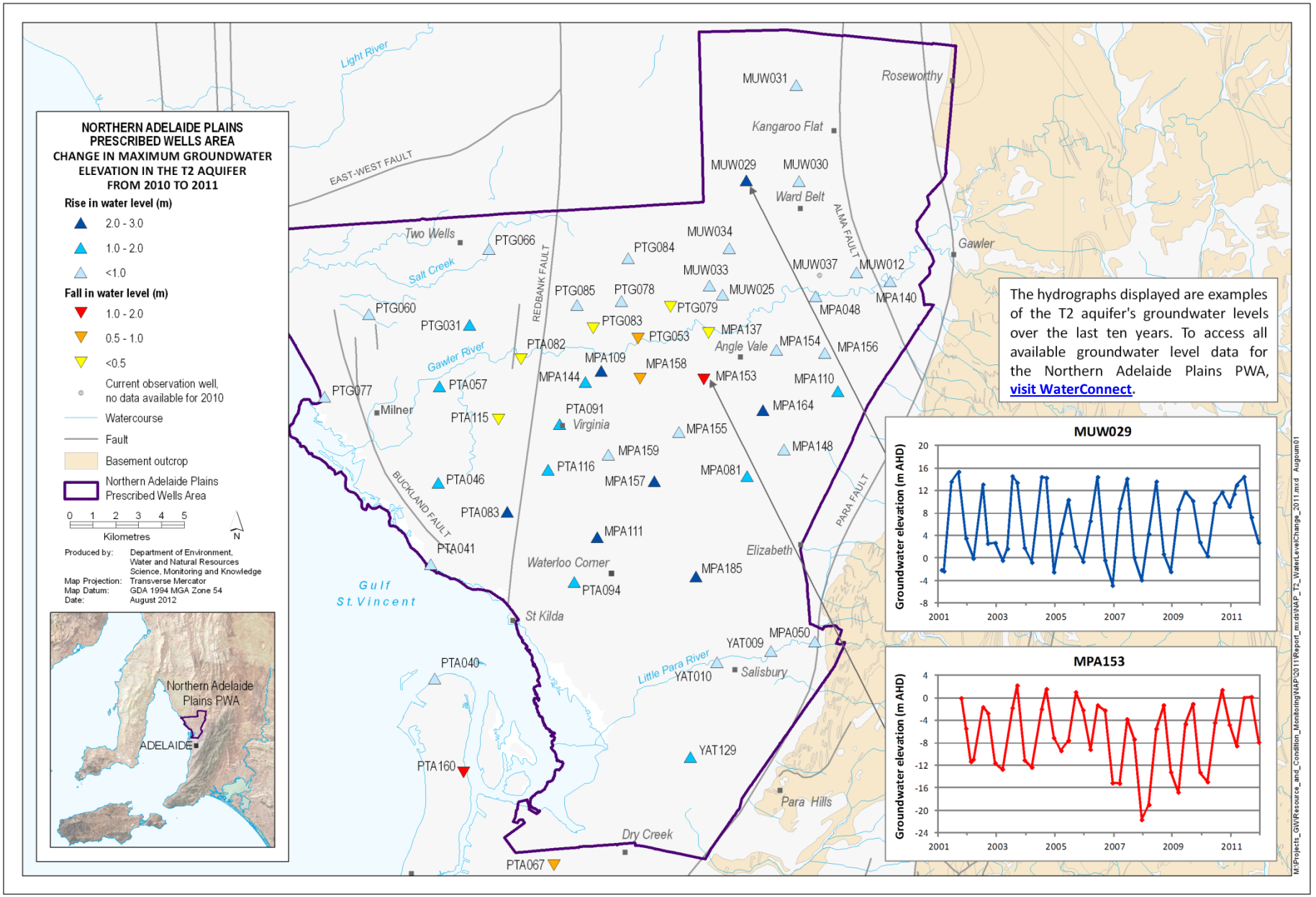


Figure 5 Overall changes in the maximum recovered groundwater level from 2010 to 2011 in the T2 aquifer of the Northern Adelaide Plains PWA

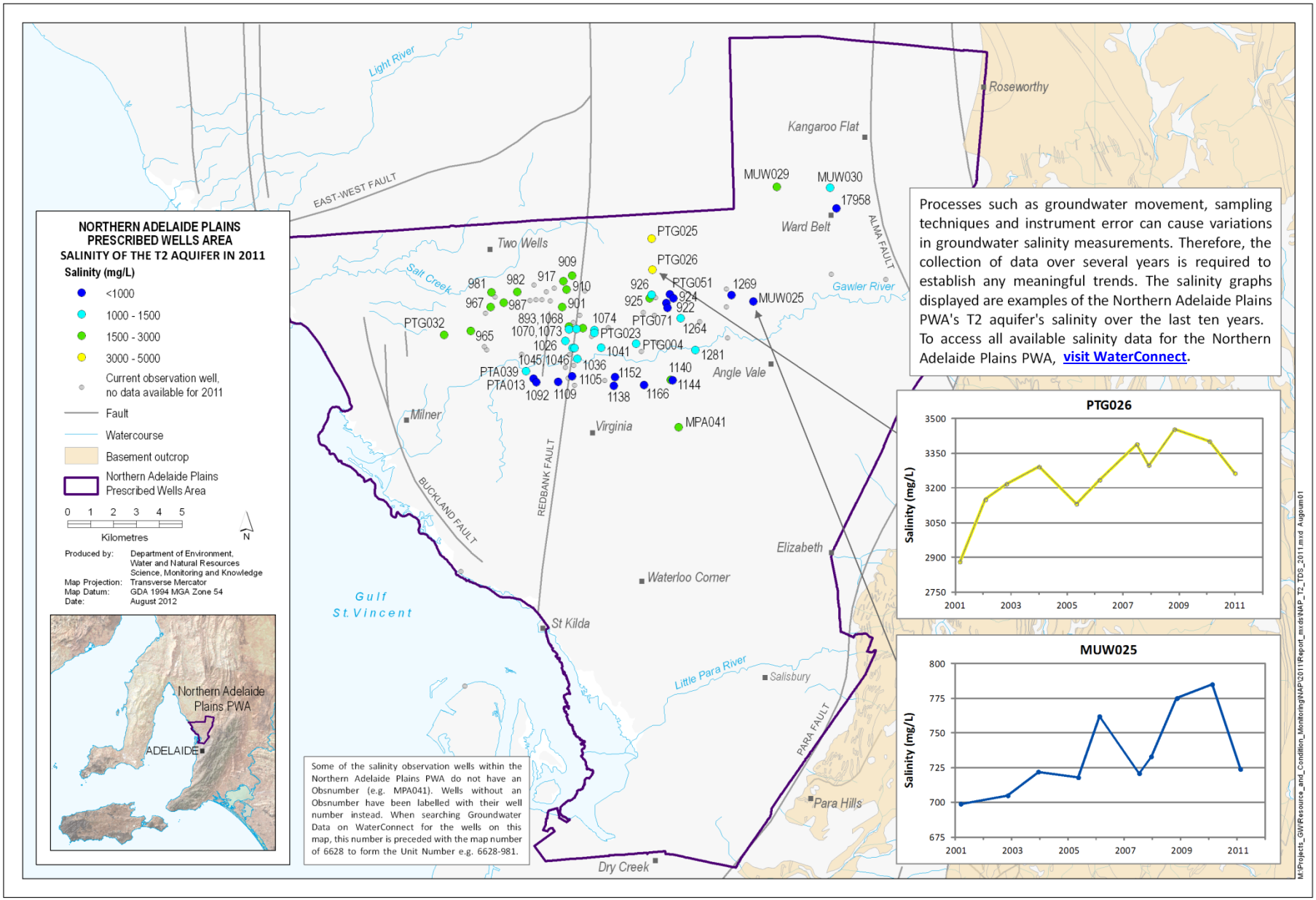


Figure 6 **Groundwater salinity in the T2 aquifer of the Northern Adelaide Plains PWA in 2011**