
NORTHERN ADELAIDE PLAINS PWA

T2 AQUIFER

Groundwater Level and Salinity Status Report

2012



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

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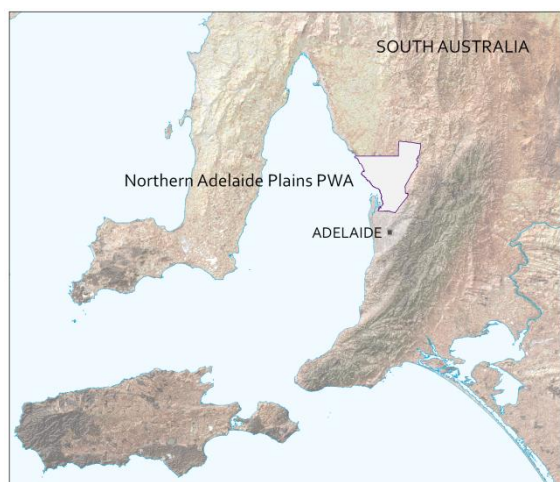
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ISBN 978-1-921923-87-6

This document is available online at www.waterconnect.sa.gov.au/GSR

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 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 in the ranges recharges the fractured rock system and in turn, the water filters down-gradient towards the coast, recharging the aquifer system beneath the plains.

Metered extractions from the T2 aquifer totalled 8602 ML* in 2011–12, a 14% increase from the previous water-use year (Fig. 1). This volume of extraction equates to 33% of the total allocation limit of 26 500 ML for the NAP PWA and is approximately 70% of the total licensed groundwater extractions in the NAP PWA.

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 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.

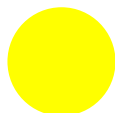
Extractions from the T2 aquifer have created long-standing cones of depression centred on Virginia and near the coast in the south-west of the PWA where significant industrial extraction occurs (Fig. 3). The cone of depression in the south-west is not evident in the latest potentiometric surface of the T2 aquifer as some data was not collected during 2012 due to access issues. 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 2005, below-average rainfall from 2006 led to increased extraction and a slight downward trend in water levels. Over the previous five years, levels either stabilised or increased. In 2012, decreases in the maximum recovered water level ranging from 0.1 to 3.6 m were recorded in 24 wells (52%) when compared to 2011 water level data (Fig. 4). The declines in water level may be the result of the increase in extractions as these wells are located around the Virginia area within the cone of depression and in the Kangaroo Flat region. The increase in extractions are likely to be associated with the drier conditions experienced in 2012 compared to 2011. Elsewhere, increases of 0.03 to 2.1 m were recorded in 21 wells and one well recorded no overall change in water level. 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

Between 1960 and 1980 salinity of the T2 aquifer 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. In 2012, salinity ranged between 570 and 5030 mg/L, with 75% of monitored wells recording a salinity of less than 1500 mg/L (Fig. 5). These wells are primarily located along the Gawler River and around the Virginia area, with salinity generally increasing north and south of these areas. The majority of observation wells (78%) recorded an increase in salinity in 2012 when compared to 2011 salinity data.

The T2 aquifer of the Northern Adelaide Plains PWA has been assigned a yellow status for 2012:

2012 STATUS



“Gradual adverse trends indicating low risk to the resources 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 T2 aquifer is supported by:

- an overall decrease in the maximum recovered water level when compared to 2011 water level data
- an overall increase in 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: T2 aquifer annual groundwater extraction

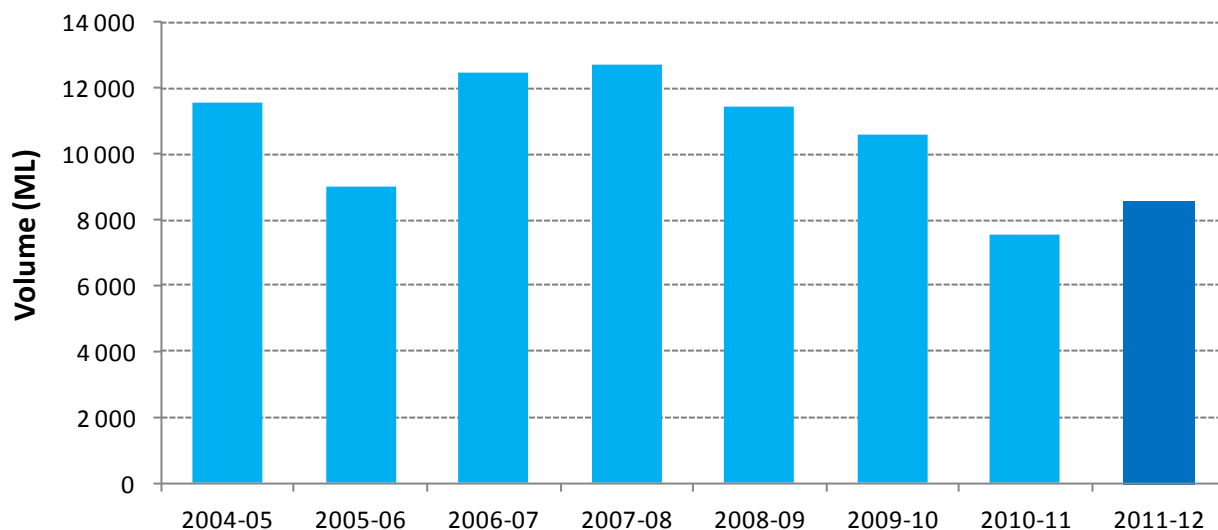


Figure 1. Historical licensed groundwater use* for the T2 aquifer of the Northern Adelaide Plains Prescribed Wells Area

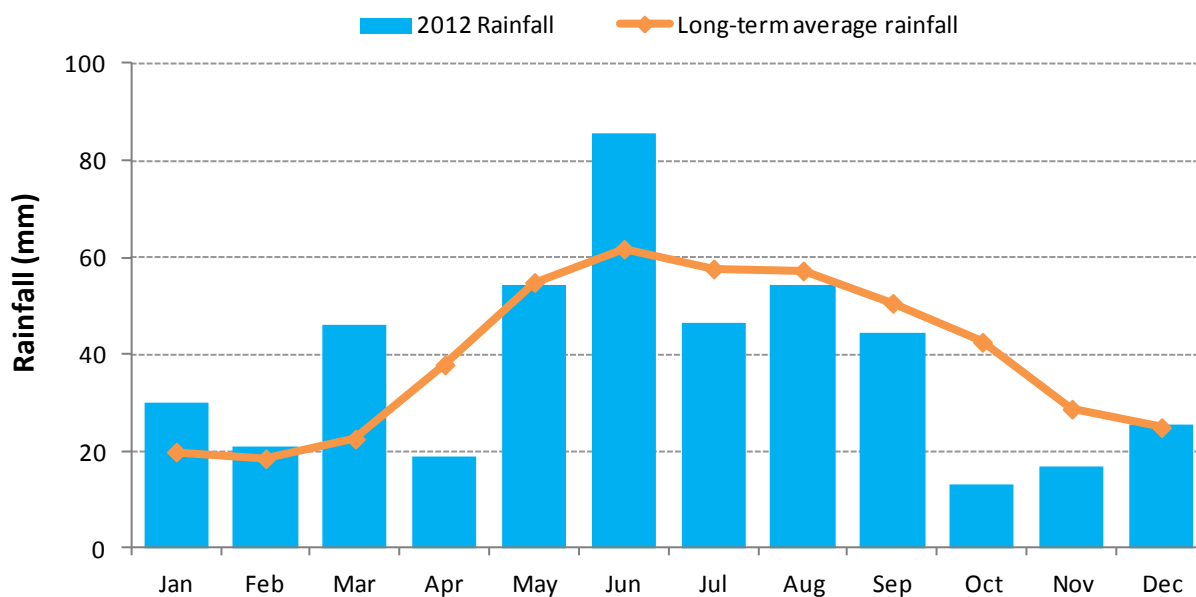


Figure 2. Monthly rainfall (mm) for 2012 and the long-term average monthly rainfall (mm) at the Smithfield rainfall station (number 23025) in the Northern Adelaide Plains Prescribed Wells Area

* 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

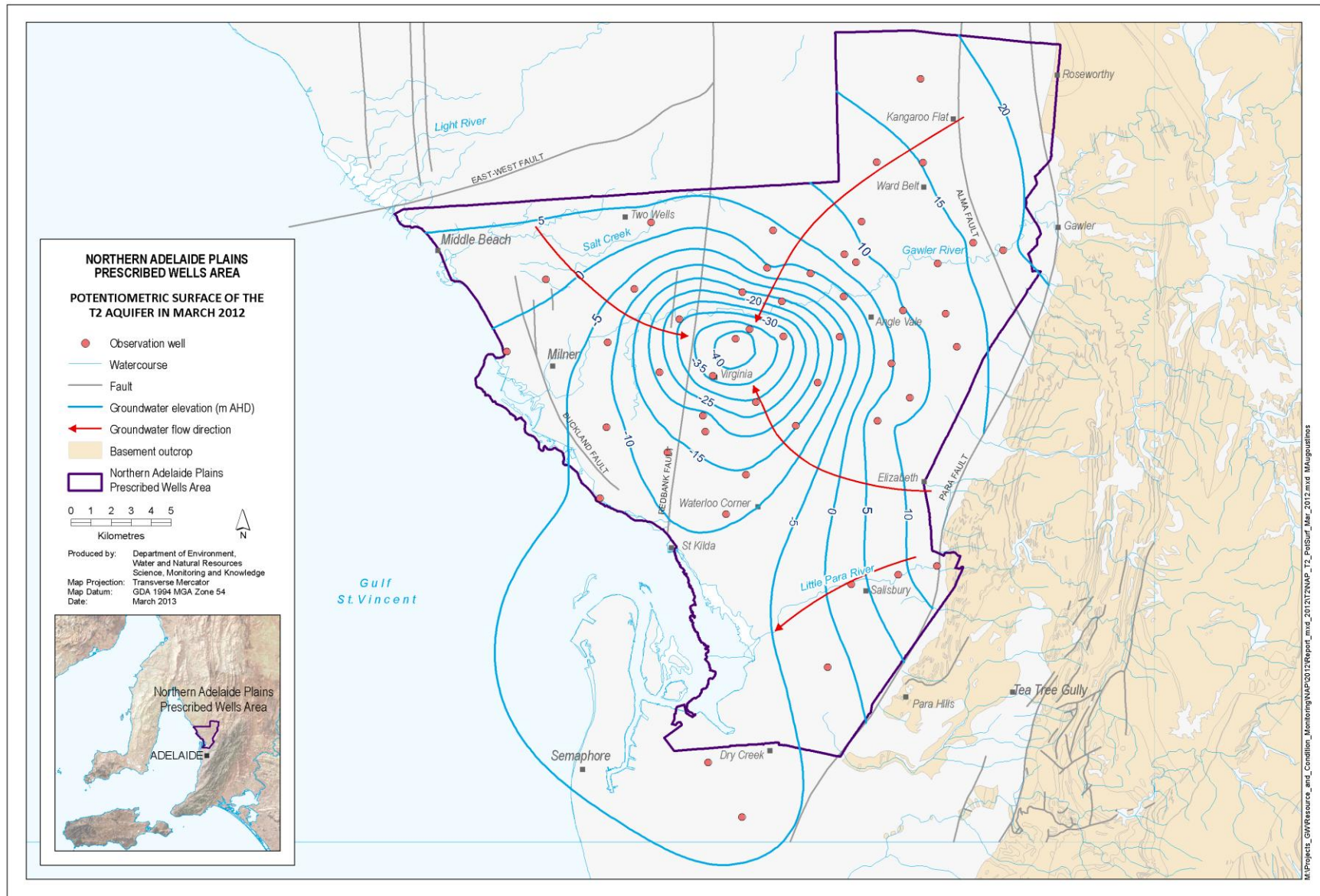


Figure 3. Potentiometric surface and direction of groundwater flow in T2 aquifer of the Northern Adelaide Plains Prescribed Wells Area

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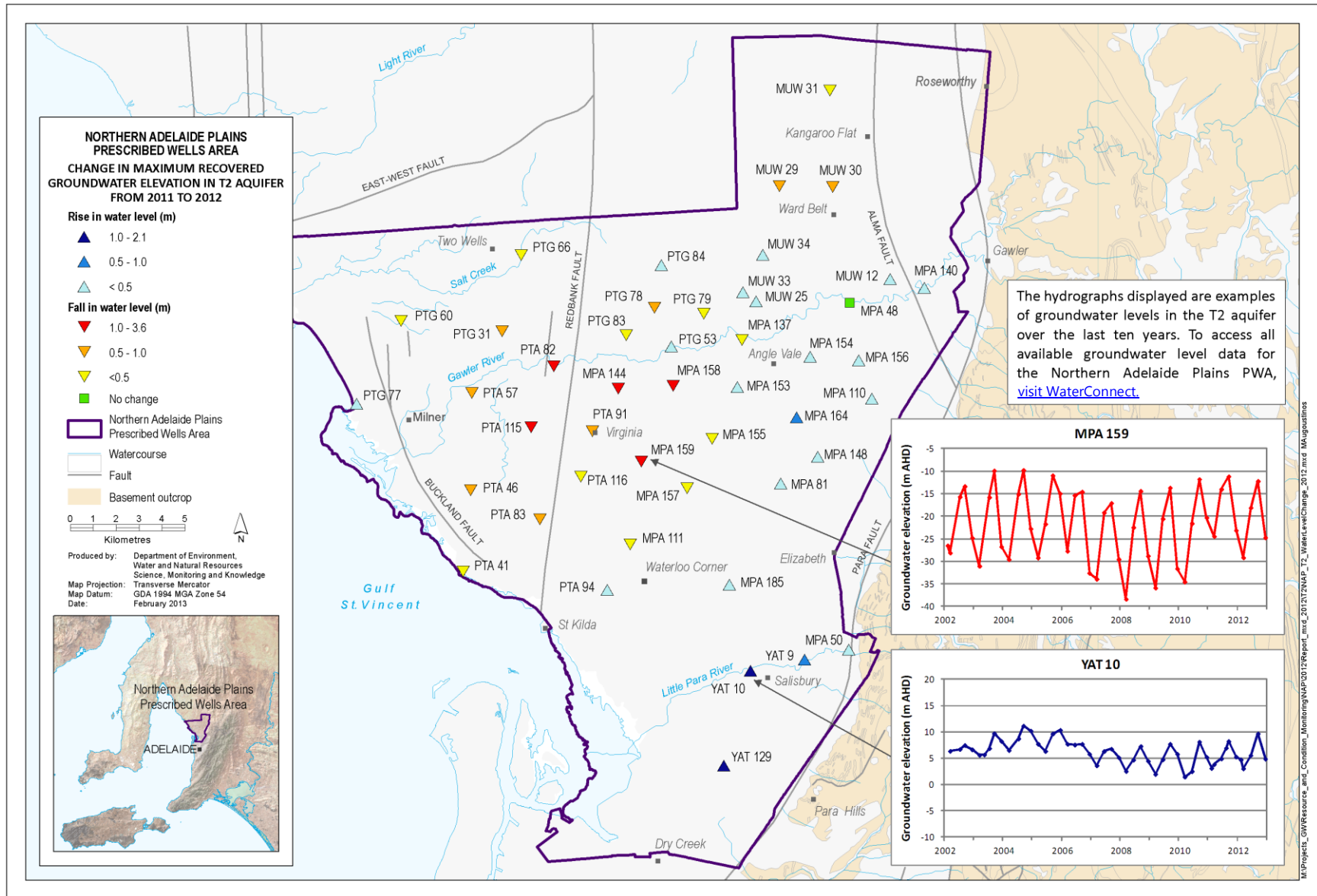


Figure 4. Overall changes in maximum recovered groundwater levels in the T2 aquifer of the Northern Adelaide Plains Prescribed Wells Area

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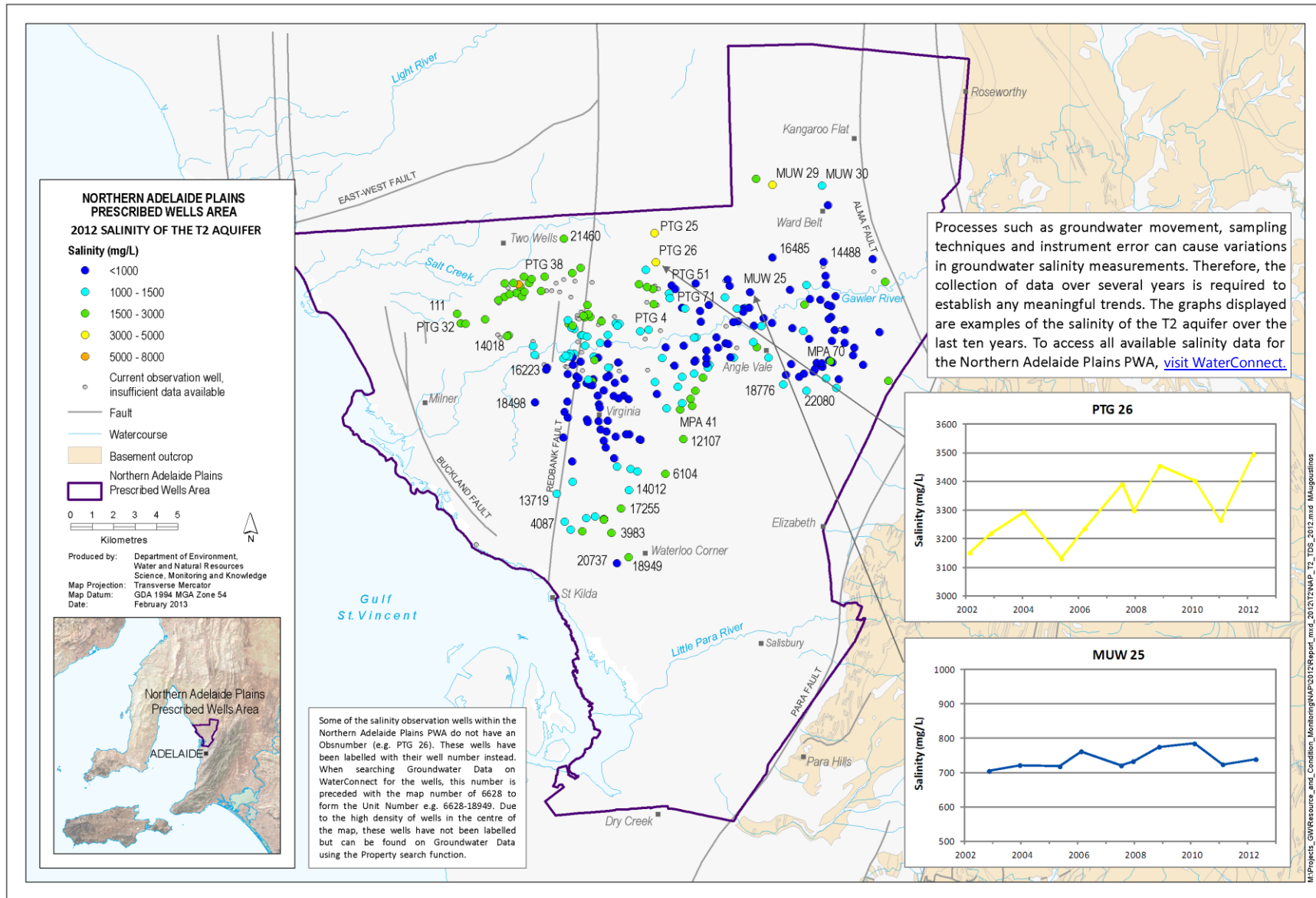


Figure 5. Groundwater salinity of the T2 aquifer of the Northern Adelaide Plains Prescribed Wells Area for 2012

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