
NORTHERN ADELAIDE PLAINS PWA

T2 AQUIFER

Groundwater Level and Salinity Status Report

2013



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

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ISBN 978-1-922255-05-1

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

2013 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 9,750 ML* in 2012–13, a 13 % increase from the previous water-use year (Fig. 1). This volume of extraction equates to 37 % of the total allocation limit of 26,500 ML for the NAP PWA and is approximately 75 % 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 462 mm of rain in 2013. This is 14 mm less than the long-term average annual rainfall for that station. While May, July and August received rainfall significantly above their long-term average, January, March, June, October and November recorded significantly below-average rainfall (Fig. 2). This continued the trend of slightly below average rainfall experienced in 2012 as a whole (see status report on [WaterConnect](#)), particularly in the months of October and November, which were at the start of the 2012-13 irrigation season.

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). 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 2013, there were 47 observation wells with adequate records to allow a comparison of maximum recovered water levels with the previous year. Rises ranging from 0.06 to 6.04 m, and with a median of 0.83 m were recorded in 77 % of wells (Fig. 4). This reverses the overall decreasing trend of the previous year, and is in spite of the trend of slightly below average rainfall. Decreases ranging from 0.08 to 2.11 m were recorded in the remaining wells. The observed fluctuations in the groundwater level are within the natural, long-term variability of the resource (Fig. 4) and are linked to fluctuations in rainfall and extraction volumes.

Between 1960 and 1980, the salinity of the T2 aquifer was relatively stable in most wells. Since 2000, the salinity is generally higher, particularly in the north of the PWA, but has been relatively stable over the last ten years. In 2013, salinity ranged between 567 and 6550 mg/L, with 80 % of 358 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. A total of 162 wells recorded salinity in both 2012 and 2013, and 59 % of these wells recorded an decrease in salinity in 2013 when compared to 2012 salinity data. The median change in salinity for these wells was a decrease of 10 mg/L.

* The licensed groundwater use for the 2012–13 water use year is based on the best data available as of February 2014 and may be subject to change, as some extraction volumes are in the process of being verified

The T2 aquifer of the Northern Adelaide Plains PWA has been assigned a green status for 2013:

2013 STATUS "No adverse trends, indicating negligible risk to the resource"

This means that the groundwater status was observed to be stable (i.e. no significant change) or improving over the reporting period. Continuation of these trends favours a very low likelihood of negative impacts on beneficial use. The 2013 status for the T2 aquifer is supported by:

- an overall rise in the maximum recovered water level when compared to 2012 water level data
- an overall decrease in salinity when compared to 2012 levels.

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 Resources* page on [WaterConnect](#).

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

Northern Adelaide Plains PWA: T2 aquifer annual groundwater extraction

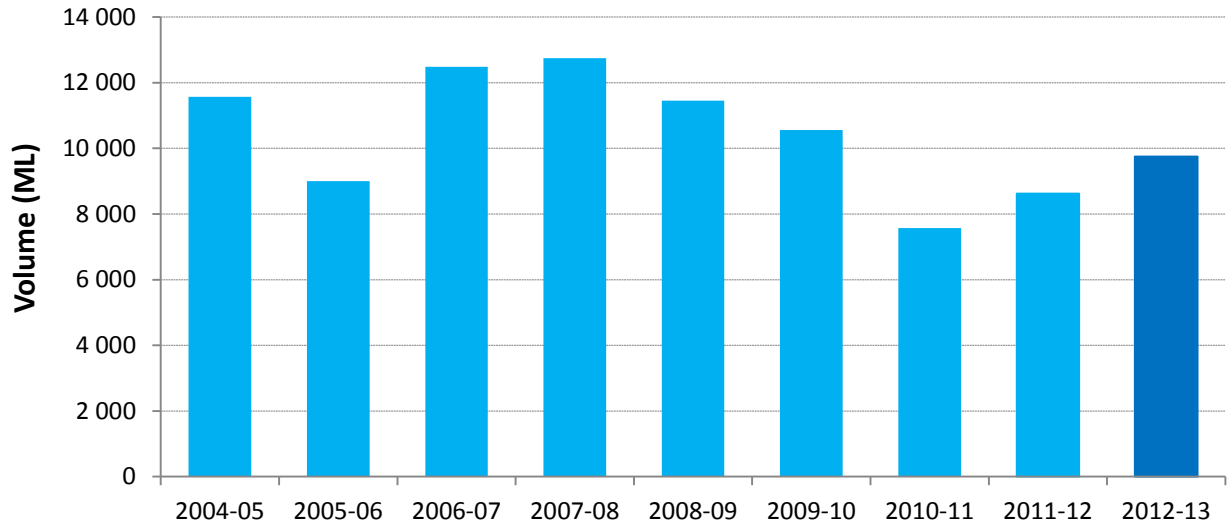


Figure 1. Historical licensed groundwater use for the T2 aquifer of the Northern Adelaide Plains Prescribed Wells Area

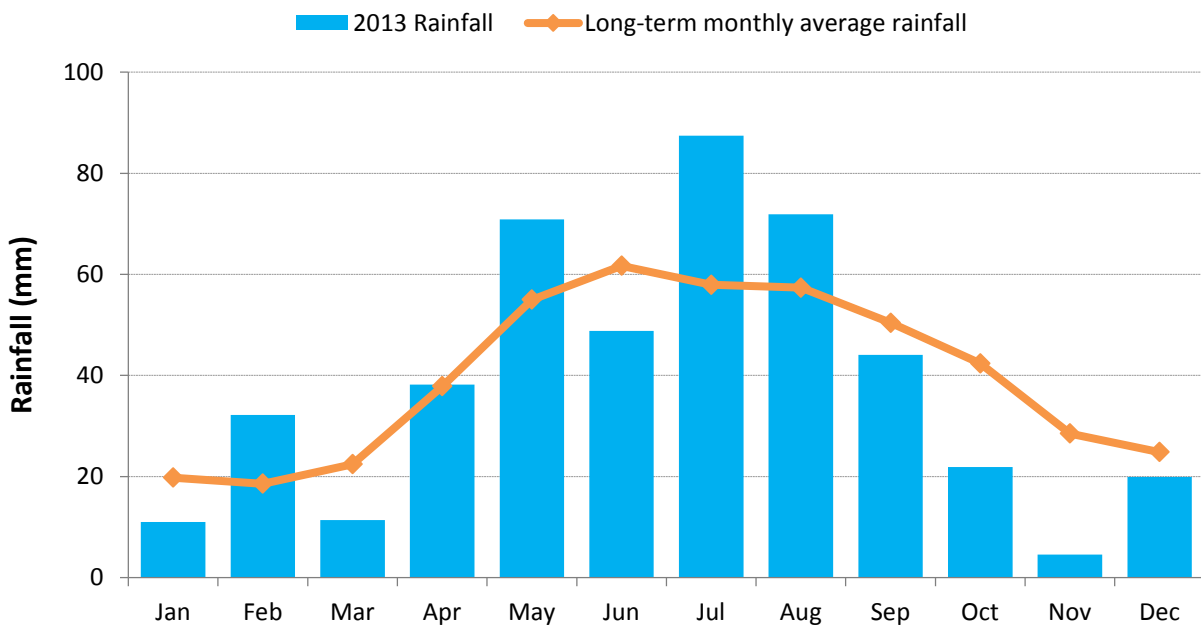


Figure 2. Monthly rainfall (mm) for 2013 and the long-term average monthly rainfall (mm) at the Smithfield rainfall station (number 23025) in the Northern Adelaide Plains Prescribed Wells Area

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.

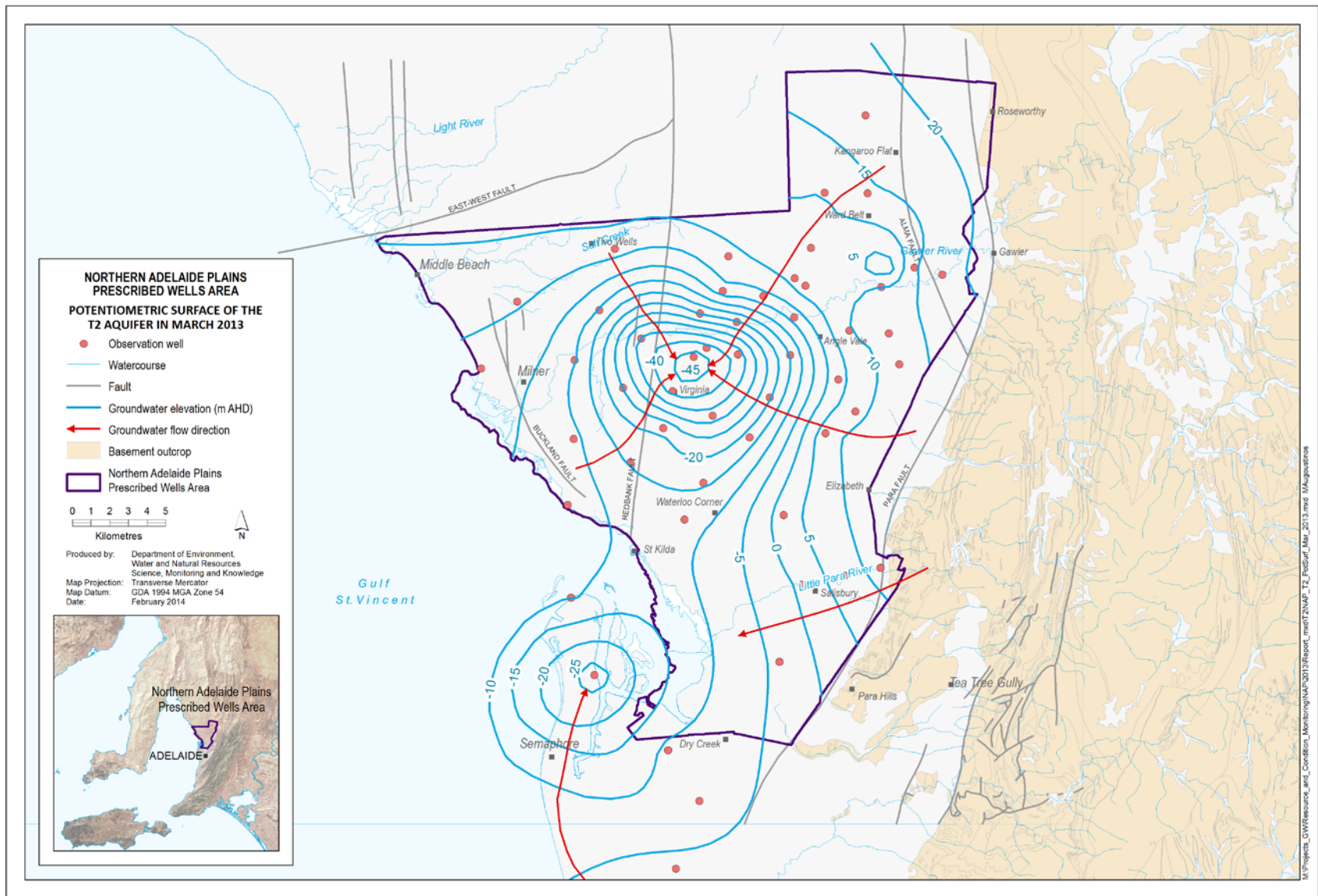


Figure 3. Potentiometric surface and direction of groundwater flow in T2 aquifer of the Northern Adelaide Plains Prescribed Wells Area in March 2013

Northern Adelaide Plains PWA

T2 aquifer Groundwater Status Report 2013

Department of Environment, Water and Natural Resources

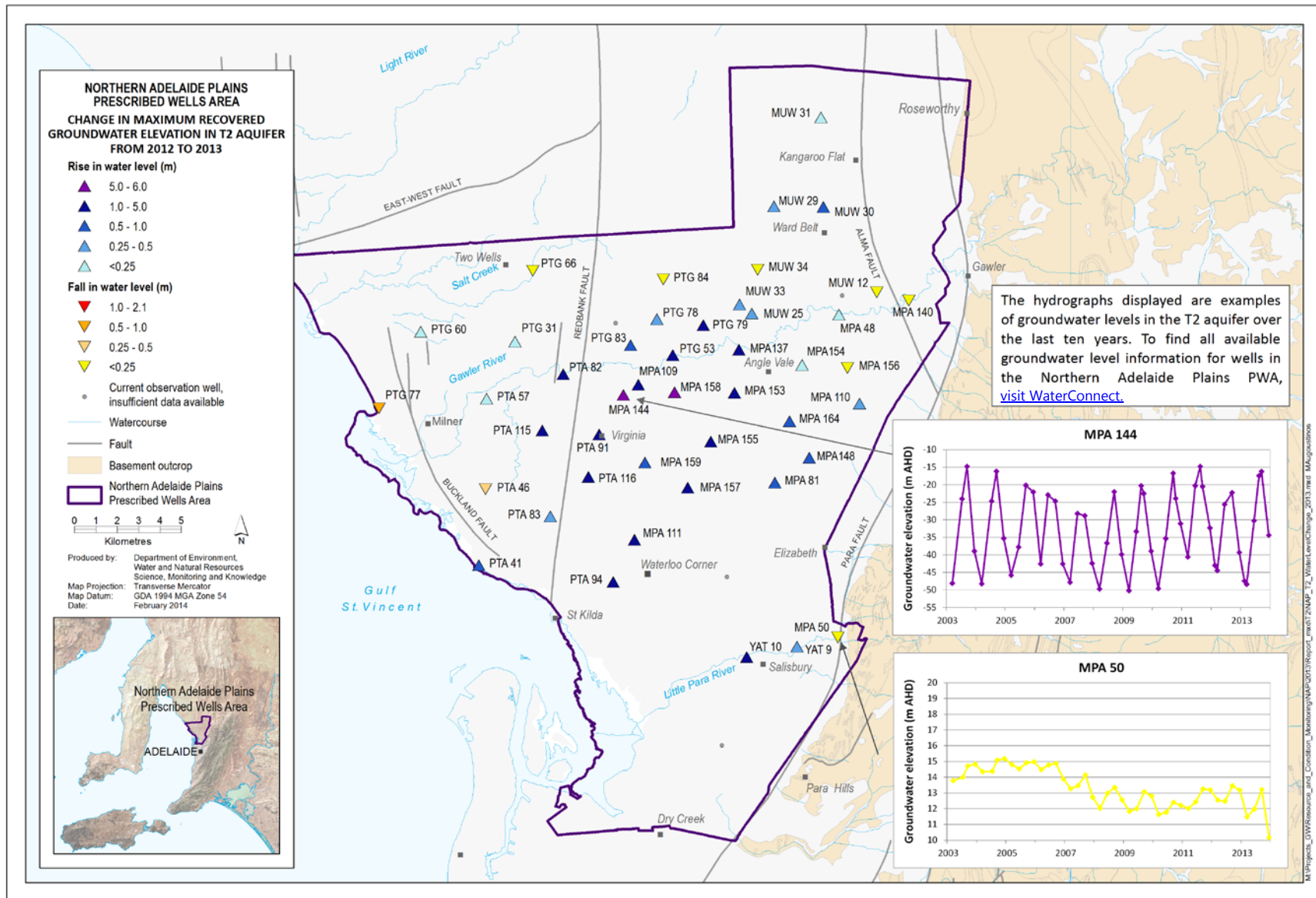


Figure 4. Overall changes in maximum recovered groundwater levels in the T2 aquifer of the Northern Adelaide Plains Prescribed Wells Area from 2012 to 2013

Northern Adelaide Plains PWA

T2 aquifer Groundwater Status Report 2013

Department of Environment, Water and Natural Resources

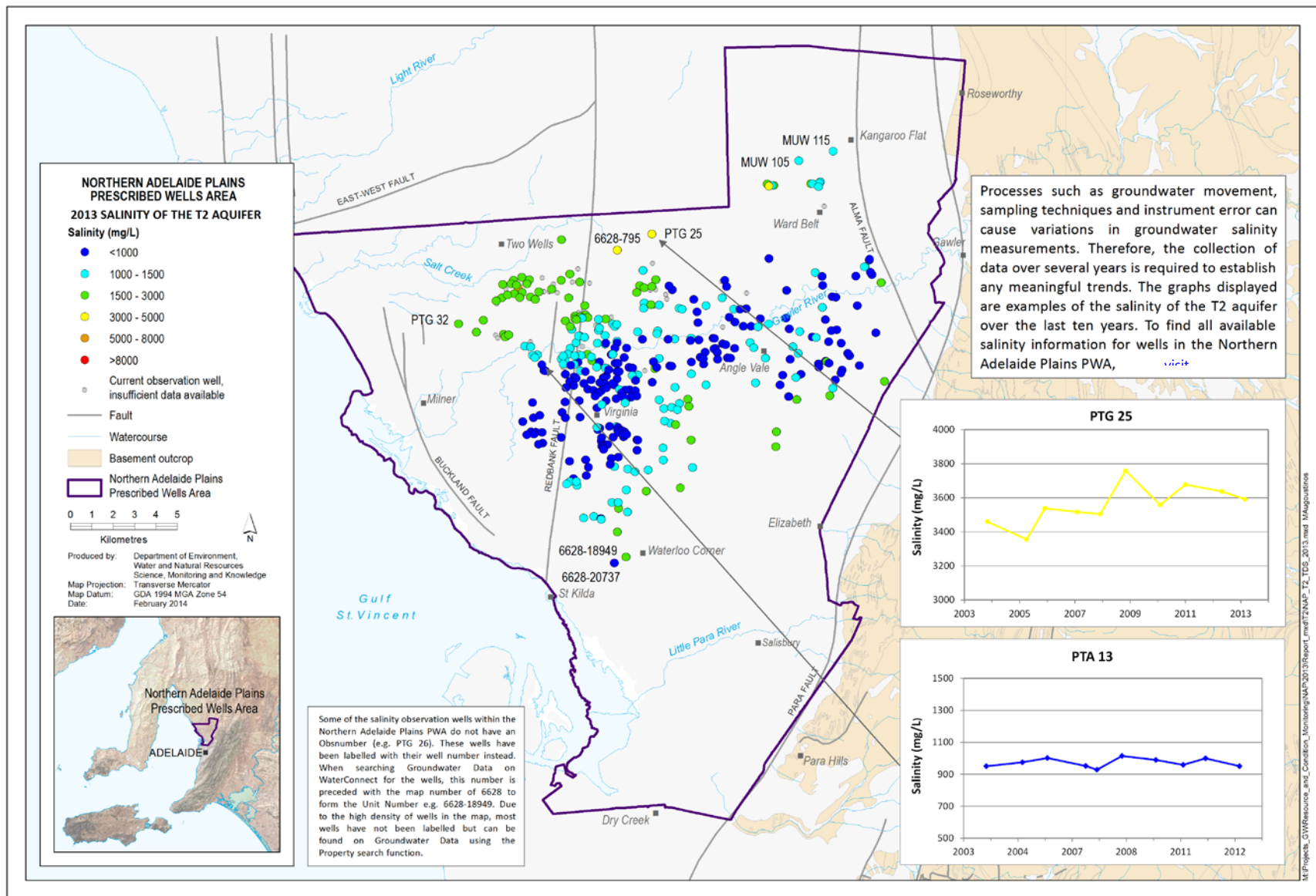


Figure 5. Groundwater salinity of the T2 aquifer of the Northern Adelaide Plains Prescribed Wells Area for 2013

Northern Adelaide Plains PWA

T2 aquifer Groundwater Status Report 2013

Department of Environment, Water and Natural Resources