

Northern Adelaide Plains PWA

T1 aquifer

2016 Groundwater level and salinity status report



Government
of South Australia

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Water and Natural Resources

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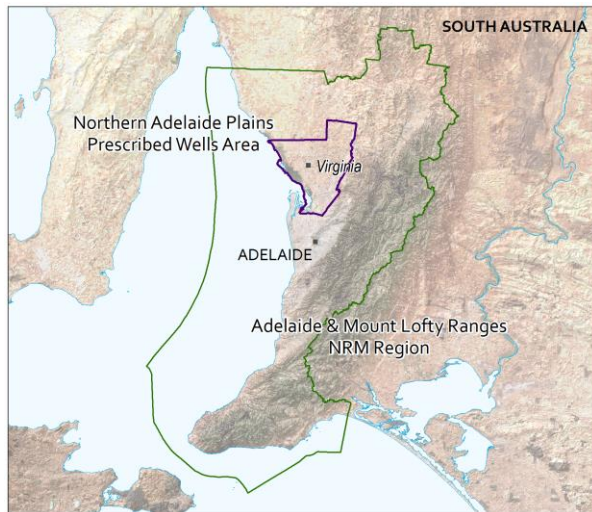
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Regional setting



The Northern Adelaide Plains (NAP) Prescribed Wells Area (PWA) is located immediately north of the Adelaide metropolitan area, in the Adelaide and Mount Lofty Ranges Natural Resource Management Region. 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.

Within the NAP PWA, the two shallowest Tertiary aquifers (the T1 and T2 aquifers) are the main sources of groundwater, which is used mostly by the horticulture industry. The T1 aquifer and the deeper T2 aquifer are separated by the Munno Para Clay aquitard (i.e. confining layer).

The focus of this report is the T1 aquifer which, within the NAP PWA, consists of several stratigraphic units of varying lithology and thickness.

In the reporting area, the T1 aquifer consists primarily of the Hallett Cove Sandstone, Dry Creek Sand and limestones of the upper Port Willunga Formation. The T1 aquifer is absent in the north-east portion of the PWA.

Groundwater recharge to the T1 aquifer is thought to occur by lateral inflow from the adjacent fractured rock aquifers of the Mount Lofty Ranges, which are located along the eastern boundary of the PWA. Outflows from the groundwater system occur through extraction from irrigation and domestic wells, and discharge to Gulf St Vincent.

Although there is no direct recharge from rainfall to the confined T1 aquifer, there may be an indirect correlation between groundwater pressure levels and rainfall, as periods of below-average rainfall will likely result in increased rates of groundwater extraction, which may lead to declines in groundwater pressure levels. Conversely, groundwater pressure levels may rise after periods of above-average rainfall due to reduced rates of groundwater extraction.

2016 Status

The T1 aquifer of the Northern Adelaide Plains PWA has been assigned a green status for 2016:

2016 Status



Positive trends have been observed over the past five years

The 2016 status for the T1 aquifer is based on:

- all monitoring wells (100%) show a five-year trend of rising groundwater pressure levels
- most monitoring wells (78%) show a five-year trend of decreasing or stable salinities.

It should be noted that the wells showing rising groundwater pressure levels are located in areas where the highest rates of extraction occur.

Rainfall

The Smithfield rainfall station (BoM Station 23025) was selected as representative of rainfall throughout the NAP PWA and recorded 365 mm of rainfall in the 2015–16 water-use year (Fig. 1). This is 23% less than the long-term average of 475 mm (1900–2016) and 15% less than the five-year average annual rainfall of 429 mm (2011–16) (Figs 1 and 2). A trend of declining rainfall is evident over the long-term (Fig. 1). Monthly rainfall data show January, March and May recording above-average rainfall, but the remaining months recording totals below their long-term average (by a median 13 mm/month).

Water use

The T1 aquifer is the main source of groundwater in the area south of Waterloo Corner and the rate of extraction has been generally stable for the past four irrigation seasons. Metered groundwater extractions totalled 3429 ML¹ in 2015–16, a 2% increase from the previous water-use year and 1% less than the five-year average annual extraction (Fig. 3). The T1 extractions in 2015–16 represent 13% of the 26 500 ML total allocation volume for all aquifers within the NAP PWA.

Groundwater level

Over the past five years, groundwater pressure levels have been generally stable, with seasonal fluctuations (due to pumping) mostly in the range 5 to 10 m. Near the coast in the south-western corner of the NAP PWA, pumping from the T1 aquifer for industrial purposes has formed a large and long-standing cone of depression that has been stable over the past 20 years (Fig. 4).

In the five years to 2016, all monitoring wells show a trend of rising groundwater pressure levels with the remaining well showing a declining pressure level. Rises in pressure levels ranged between 0.10 and 1.21 m/y, with a median of 0.30 m/y. These wells appear in three clusters where the most intensive extraction occurs: one between Milner and Virginia; one around Waterloo Corner; and one between Salisbury and the coast (Fig. 5).

Groundwater salinity

Most groundwater within the T1 aquifer is good quality with salinity of less than 1500 mg/L; however, salinities of nearly 3000 mg/L have been measured in some areas (Fig. 6).

In the five years to 2016, nine of 14 salinity monitoring wells (64%) show stable salinities, while two wells (14%) showing a decreasing trend of 82 and 89 mg/L/y (Fig. 7). The three remaining salinity monitoring wells, mostly located in the Waterloo Corner area, show a rising trend of up to 24 mg/L/y.

¹The licensed groundwater use for the 2015–16 water-use year is based on the best data available as of February 2017 and may be subject to change, as some extraction volumes are in the process of being verified.

More information

To determine the status of the T1 aquifer for 2016, the trends in groundwater pressure level and salinity over the past five years (2012 to 2016, inclusive) were analysed, in contrast to the year-to-year assessments that have been used in past *Groundwater level and salinity status reports*. Please visit the [Frequently Asked Questions](#) on the *Water Resource Assessments* page on WaterConnect for more detail on the current method of evaluating the status of groundwater resources.

To view descriptions for all status symbols, please visit the *Water Resource Assessments* page on [WaterConnect](#).

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, please visit the *Water Resource Assessments* page on [WaterConnect](#).

To download groundwater level and salinity data from monitoring wells within the Northern Adelaide Plains PWA, please visit the *Groundwater Data* page under the Data Systems tab on [WaterConnect](#).

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

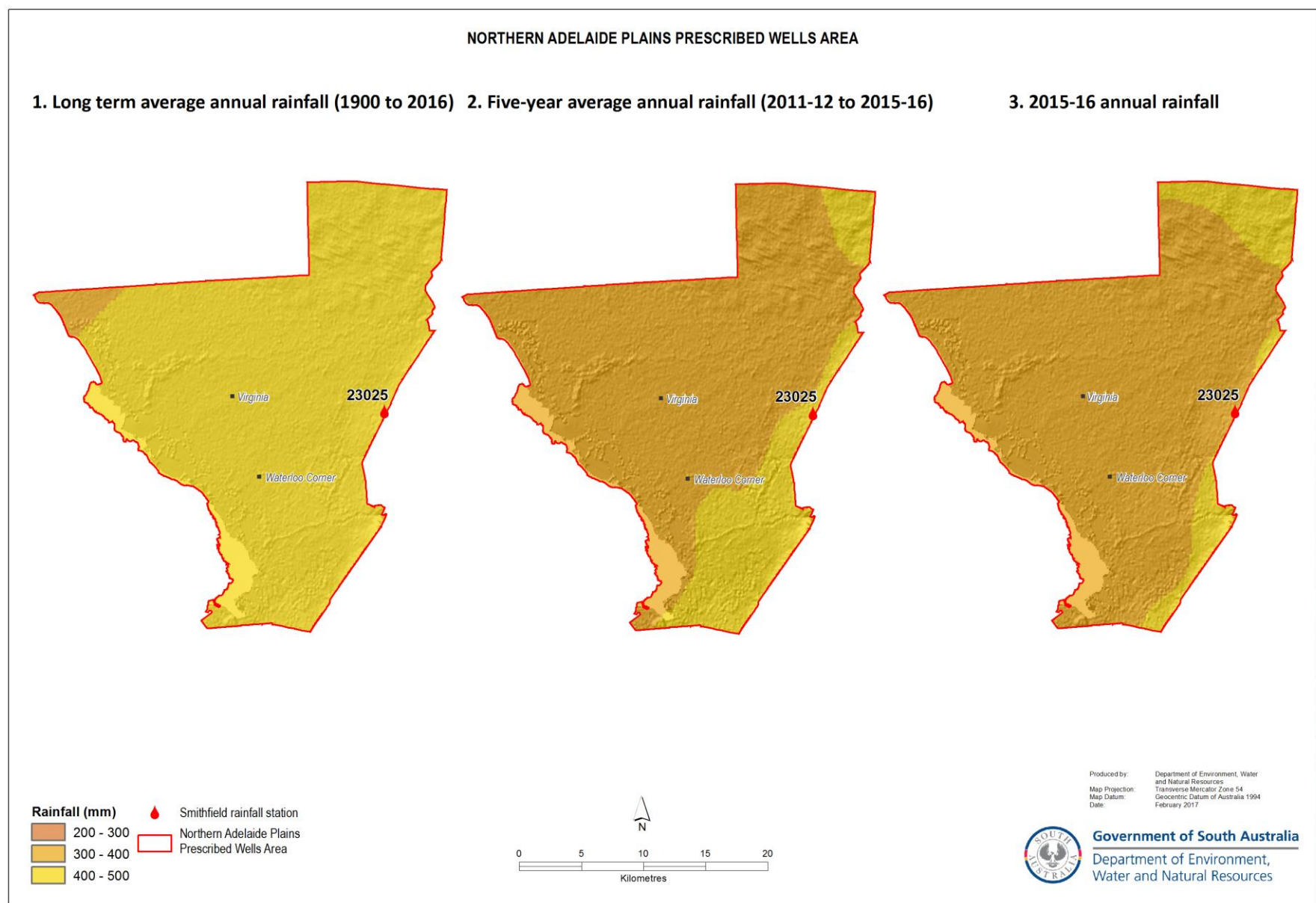


Figure 1. (1) Long-term and (2) five-year average annual rainfall and (3) annual rainfall for the 2015–16 water-use year in the Northern Adelaide Plains PWA²

² 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.

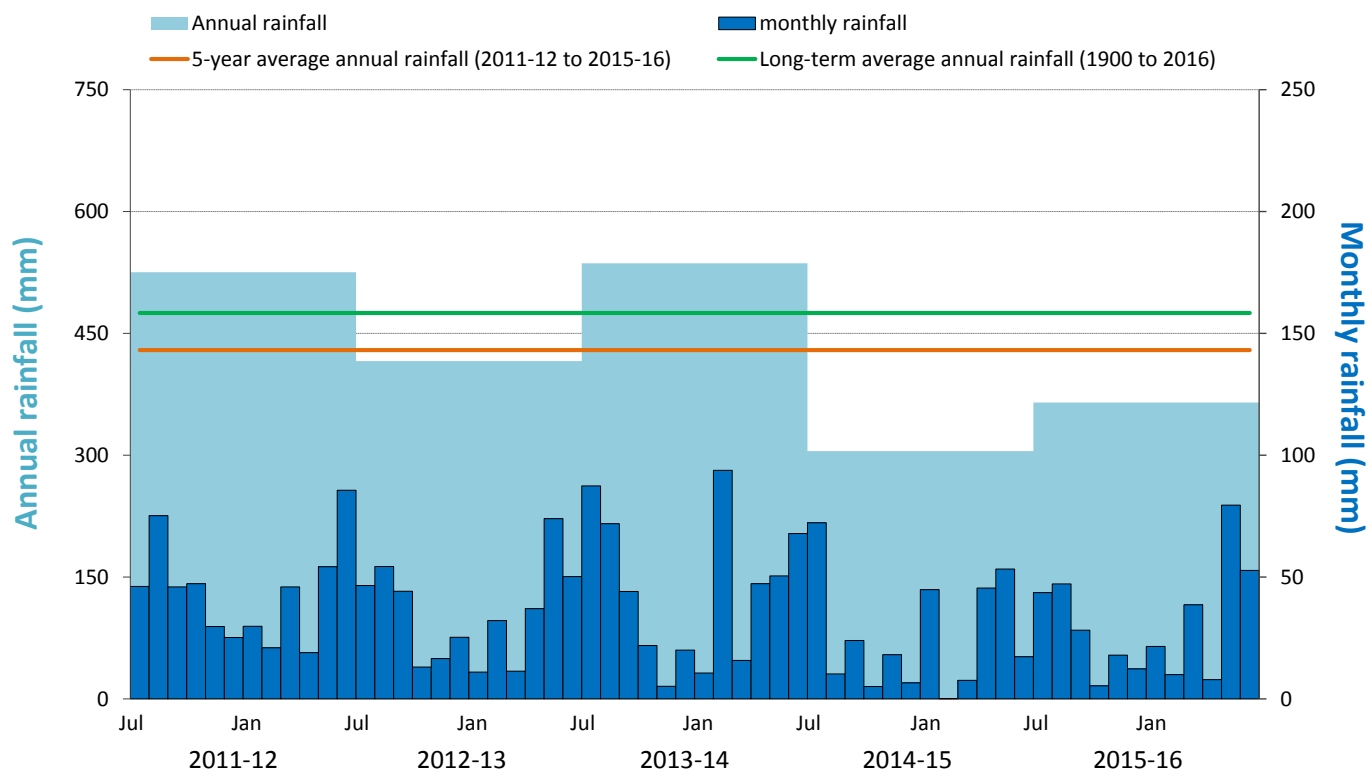


Figure 2. Annual (July–June) and monthly rainfall for the past five water-use years, and the five-year and long-term average annual rainfall recorded at Smithfield (BoM Station 23025)³

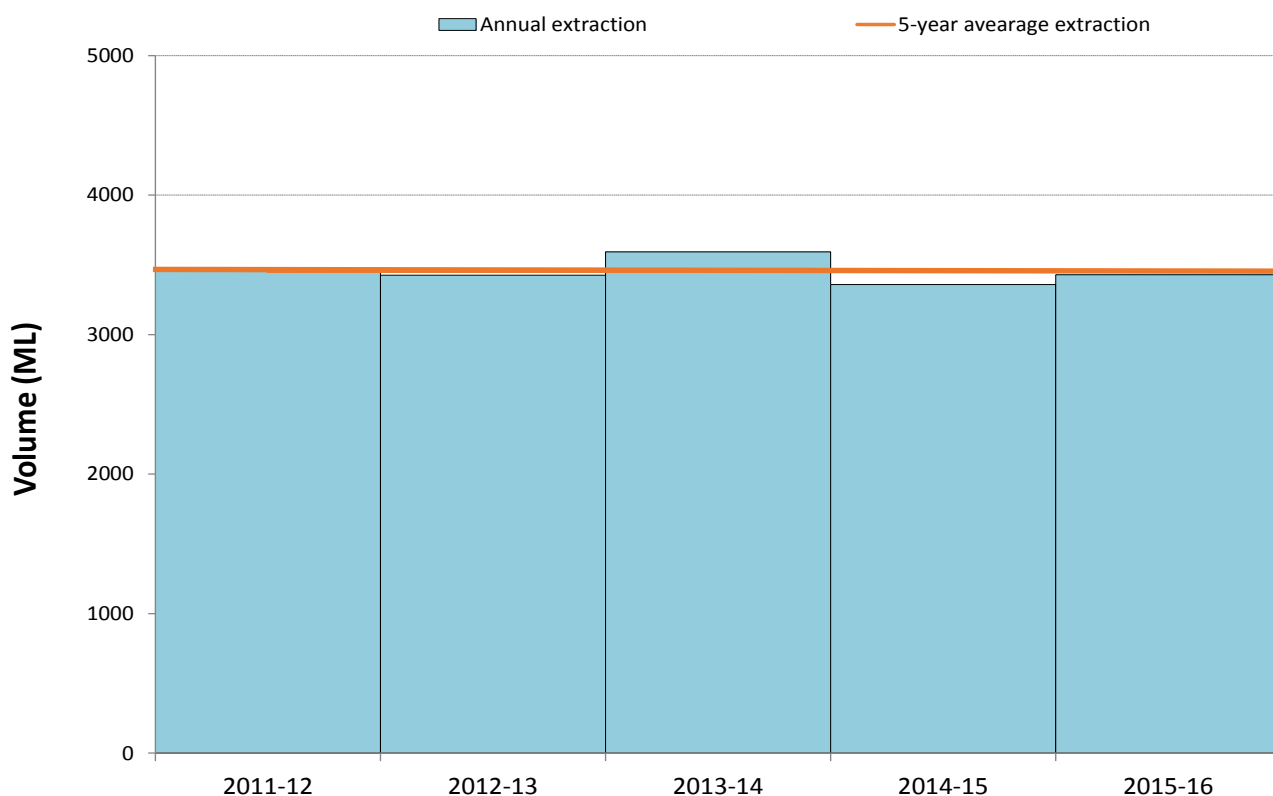


Figure 3. Licensed groundwater extraction volumes⁴ for the past five water-use years, for the T1 aquifer in the Northern Adelaide Plains PWA

³ 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.

⁴ The licensed groundwater use for the 2015–16 water-use year is based on the best data available as of February 2017 and may be subject to change, as some extraction volumes are in the process of being verified.

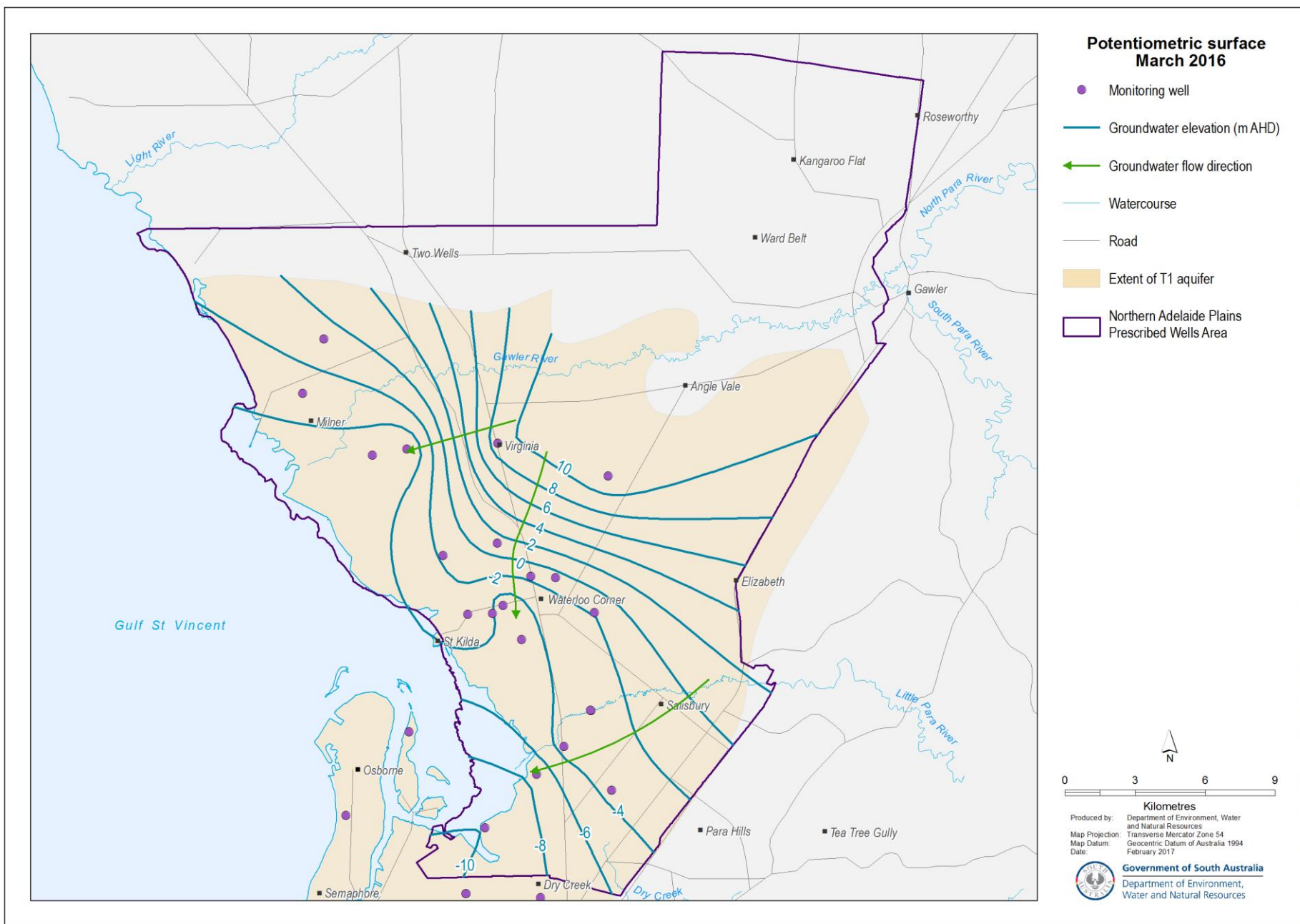


Figure 4. Potentiometric surface and direction of groundwater flow in the T1 aquifer (Northern Adelaide Plains PWA) in March 2016

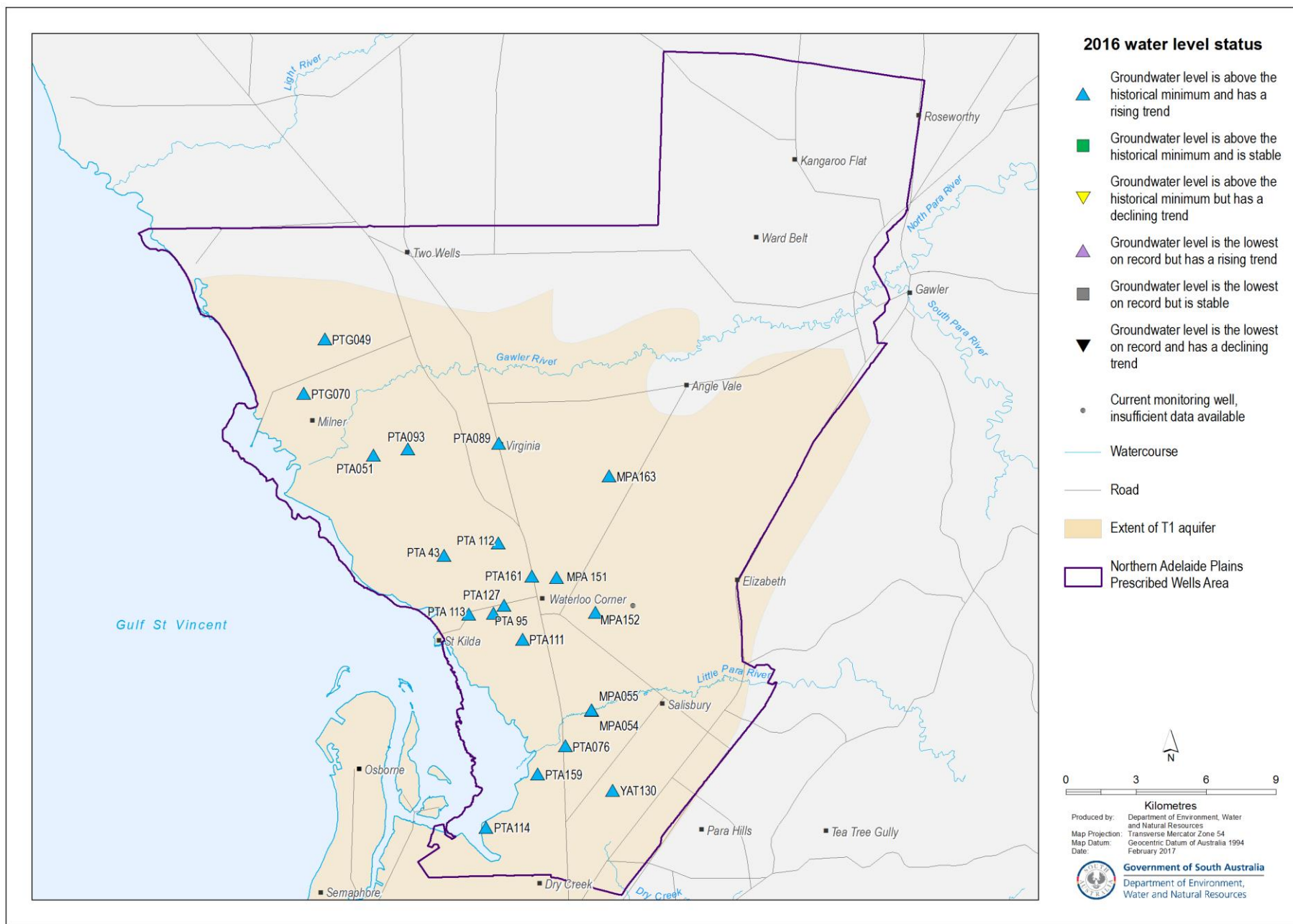


Figure 5. 2016 status of the groundwater pressure levels in the T1 aquifer (Northern Adelaide Plains PWA) based on the five-year trend from 2012 to 2016

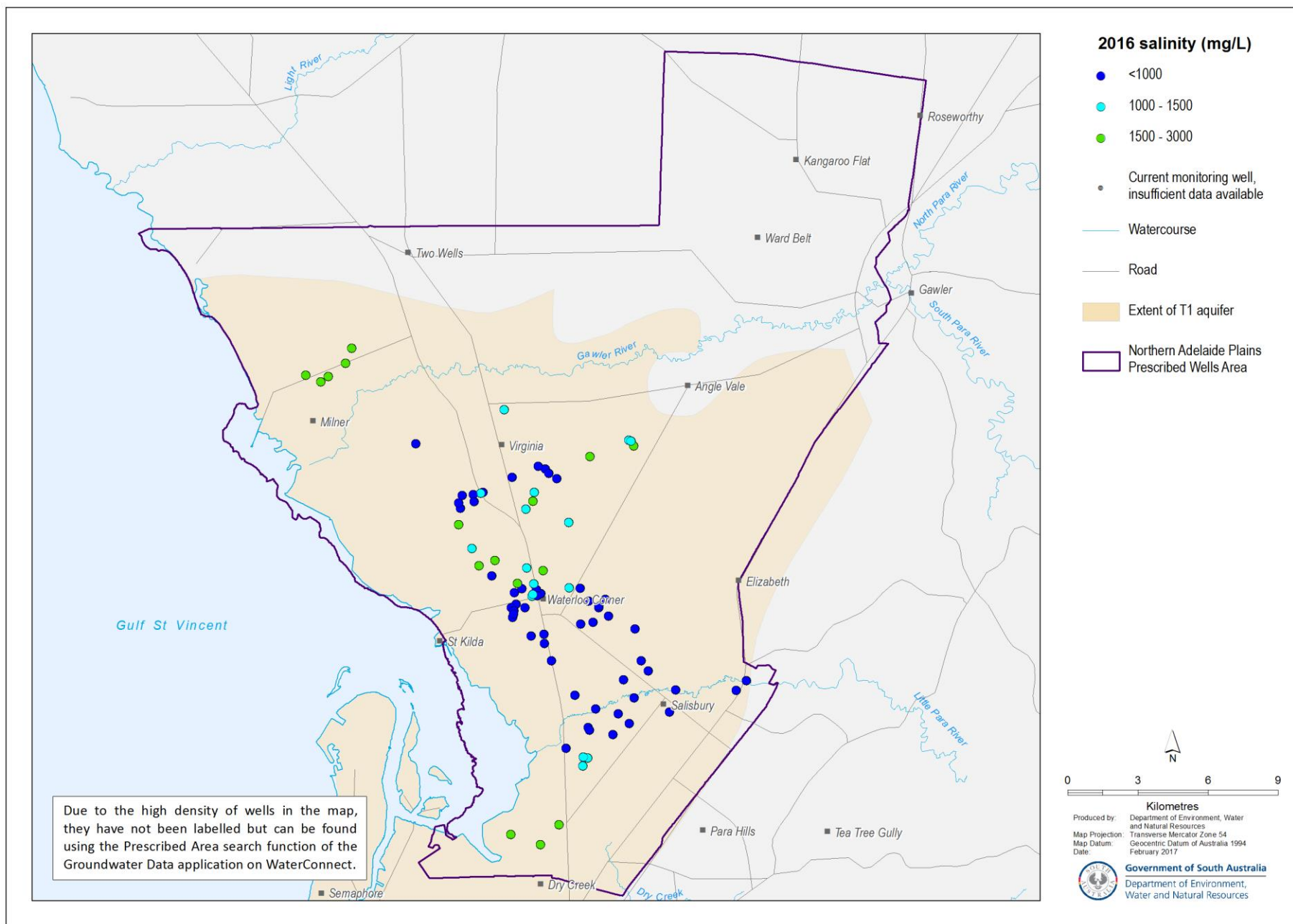


Figure 6. 2016 groundwater salinity of the T1 aquifer (Northern Adelaide Plains PWA)

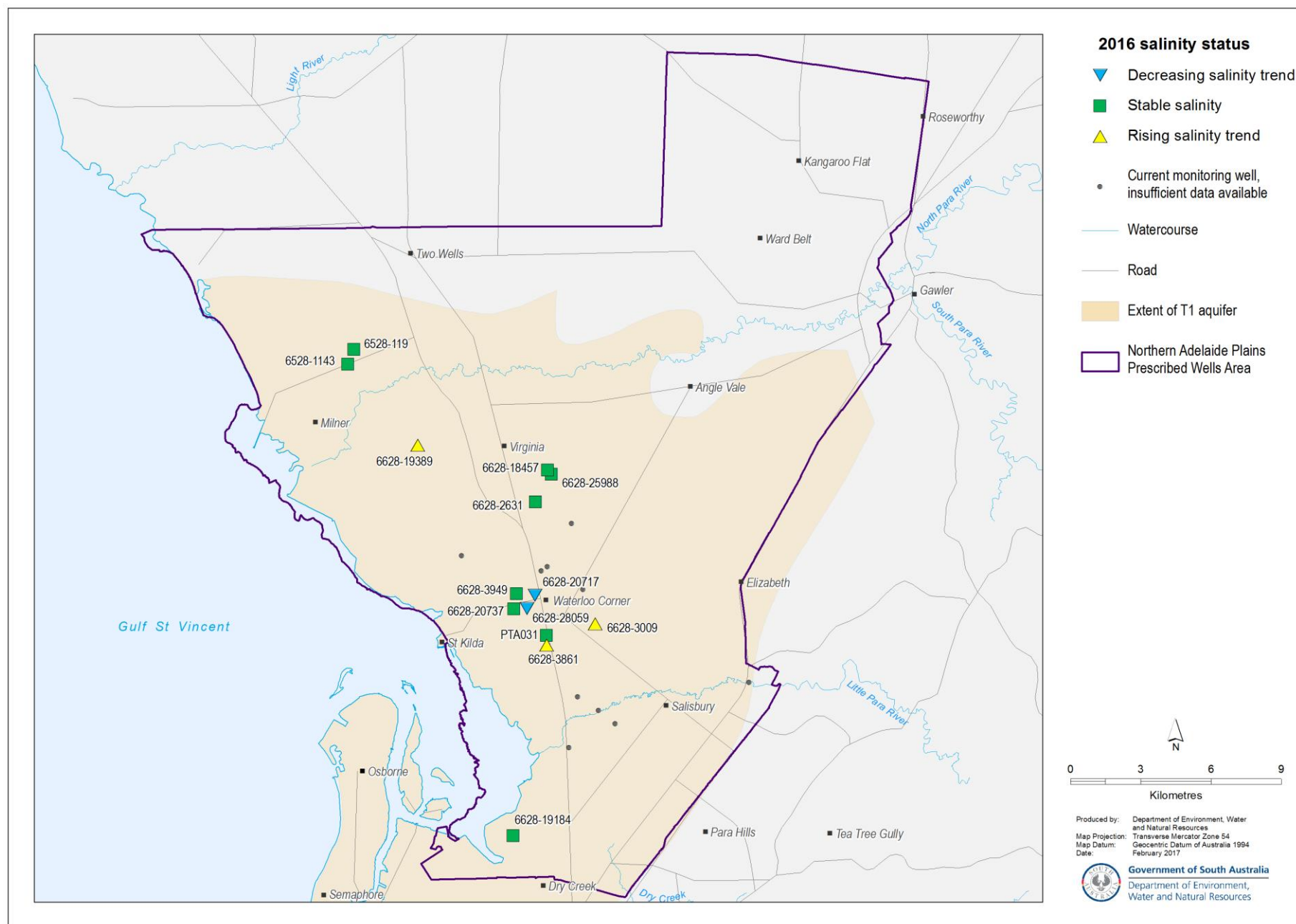


Figure 7. 2016 status of the groundwater salinities in the T1 aquifer (Northern Adelaide Plains PWA) based on the five-year trend from 2012 to 2016



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