

Baroota PWRA

2014 Groundwater level and salinity status report



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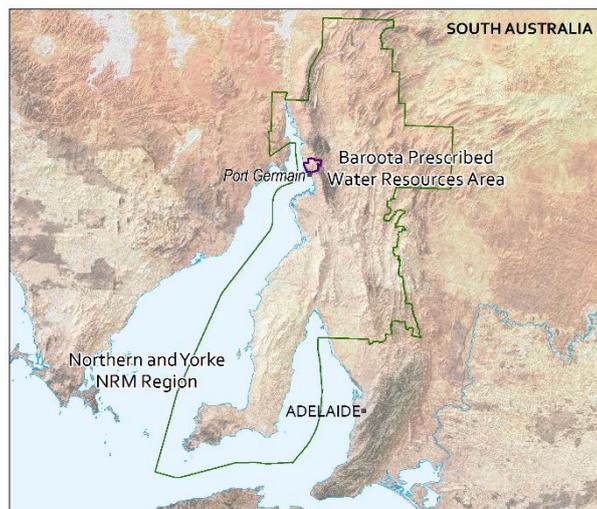
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2014 Summary



The Baroota Prescribed Water Resources Area (PWRA) lies on the western side of the Flinders Ranges in the Mid North region of South Australia, approximately 25 km north of Port Pirie, within the Northern and Yorke NRM Region. It is a local-scale resource for which surface water and groundwater is prescribed under South Australia's *Natural Resources Management Act 2004*. Groundwater extractions are limited under a Notice of Prohibition, pending the development and adoption of a water allocation plan that will provide for sustainable management of the resource.

Groundwater extractions in the Baroota PWRA occur from Quaternary clay and gravel sediments, which can be up to 100 m thick and were deposited as outwash from the Flinders Ranges. This is underlain by a deeper Tertiary sand aquifer.

Rainfall and groundwater extractions are important factors in groundwater level and salinity changes. Below-average rainfall results in a reduction in recharge to the aquifers. Below-average summer rainfall can also result in increasing irrigation extractions, and these two elements can cause the groundwater levels to fall and salinity to increase. Conversely, increases in rainfall results in increases in recharge, decreases in irrigation extractions and groundwater levels may rise and salinity stabilise or decline. Streamflow and leakage from the Baroota Reservoir also contributes recharge to the groundwater system, but due to a number of years of below-average rainfall since 2002 and lower inflows into the reservoir, the contribution to the aquifer was reduced.

The Port Germein rainfall station (number 19037) is located within the Baroota PWRA. Rainfall at this station was irregular throughout 2014 (Fig. 1). Despite experiencing above-average rainfall during the months of February, April and May, rainfall was below average in March and remained below the monthly average for the rest of the year. The total annual rainfall in 2014 at Port Germein rainfall station was 353 mm, which is just above the long-term average of 324 mm and the 340 mm recorded in 2013.

Metered extractions from the Baroota PWRA totalled 830 ML¹ in 2013–14, an 11% decrease compared to the previous water-use year (Fig. 2). Groundwater extractions are augmented by reticulated water from the Whyalla pipeline.

Long-term monitoring data indicate groundwater levels have fallen consistently to the lowest levels recorded in 30 years, with declines of up to 10 m across the area since 2002. Given that there has been a fundamental change in one of the primary recharge mechanisms through the significant reduction in streamflow into Baroota Reservoir, these reductions in groundwater level are expected to continue until higher rainfall occurs. However, this consistent fall in groundwater levels should be seen in the context of a substantial aquifer thickness (up to 100 m).

In 2014, seven wells with available data recorded a rise in water levels between 2013 and 2014, with a median rise of 0.36 m and a maximum of 2.47 m. A negligible change in water level was recorded in seven wells with available data in 2013 and 2014, where the change in the maximum recovered groundwater level is less than 0.1 m (Fig. 3). Two wells recorded declines of 0.1 and 0.6 m. The overall improving or stable groundwater levels may be the result of slightly above-average rainfall and less extraction. However, despite groundwater levels stabilising and increasing in 2014, the long-term declines in water level should not be overlooked.

The sporadic nature of salinity monitoring in the past, and the variation in production zone intervals of the wells sampled, make the interpretation of any groundwater salinity changes difficult. A variety of long-term trends are evident. There does not appear to be any significant negative trend in salinity (i.e. less than a rate of 2% increase per year). Despite the widespread fall in groundwater levels, the change in operation of Baroota Reservoir and a significant period of drought, there is no evidence of any corresponding rise in salinities throughout the irrigation area, albeit based on a very limited data set. This indicates there is a level of resilience in groundwater salinity to such pressures. Groundwater salinity in the Baroota PWRA is relatively fresh with most wells recording salinity levels between 1000 and 1500 mg/L.

¹ The licensed groundwater use for the 2013–14 water-use year is based on the best data available as of April 2015 and may be subject to change, as some extraction volumes may not be verified.

In 2014, only two wells were monitored for salinity. The Quaternary aquifer recorded a salinity of just over 900 mg/L, while the Tertiary aquifer recorded a salinity of 4000 mg/L (Fig. 4). Although there are less salinity readings for 2014 compared to previous years, the two that were collected have not recorded a significant change in salinity level when compared to available data for 2013.

The Baroota PWRA has been assigned a green status for 2014:

2014 Status



"No adverse changes, 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 12-month reporting period. If these conditions were to continue, there is a very low likelihood of negative impacts on beneficial uses such as drinking water, irrigation or stock watering.

The 2014 status of the Baroota PWRA is supported by:

- stable or increasing groundwater levels when compared to 2013 data.

Salinity has not been considered in the 2014 status of the Baroota PWRA because of the lack of data.

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

To view the *Baroota PWRA groundwater level and salinity status report 2009–10*, which includes background information on hydrogeology, location of rainfall stations and relevant groundwater-dependent ecosystems, please visit the *Water Resource Assessments* page on [WaterConnect](#).

To view or download groundwater level and salinity data from observation wells within the Baroota PWRA, please visit [Groundwater Data](#) on WaterConnect.

For further details about the Baroota PWRA, please see an update on the development of the *Baroota Water Allocation Plan* on the Natural Resources Northern and Yorke [website](#).

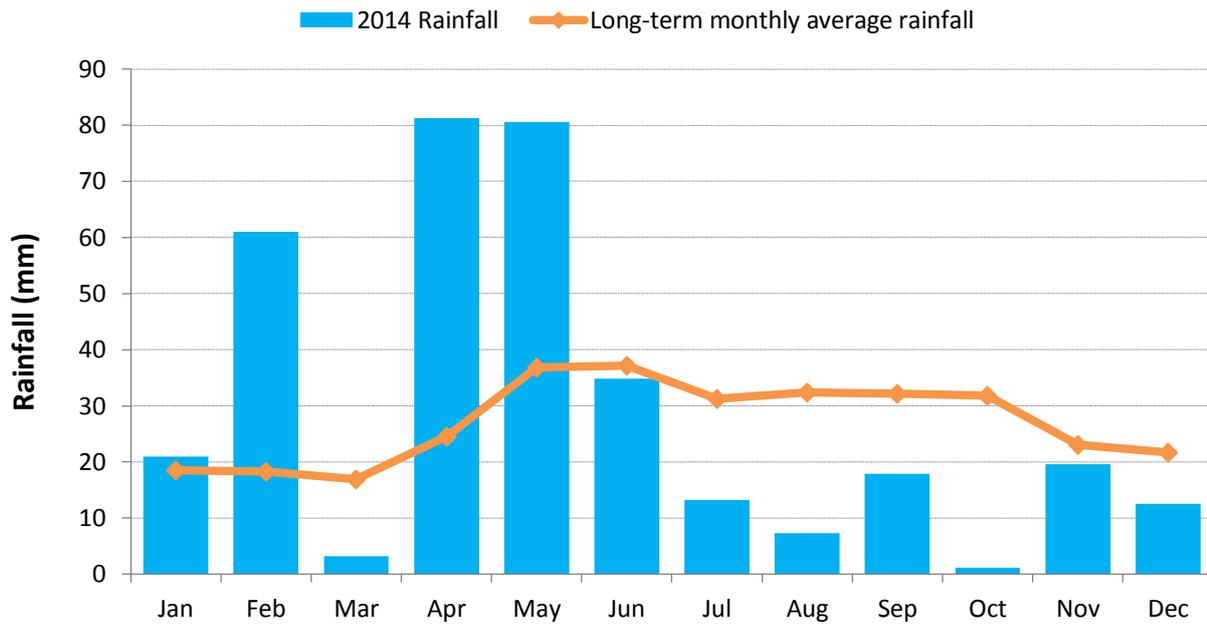


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Port Germein rainfall station² (number 19037) in the Baroota Prescribed Water Resources Area

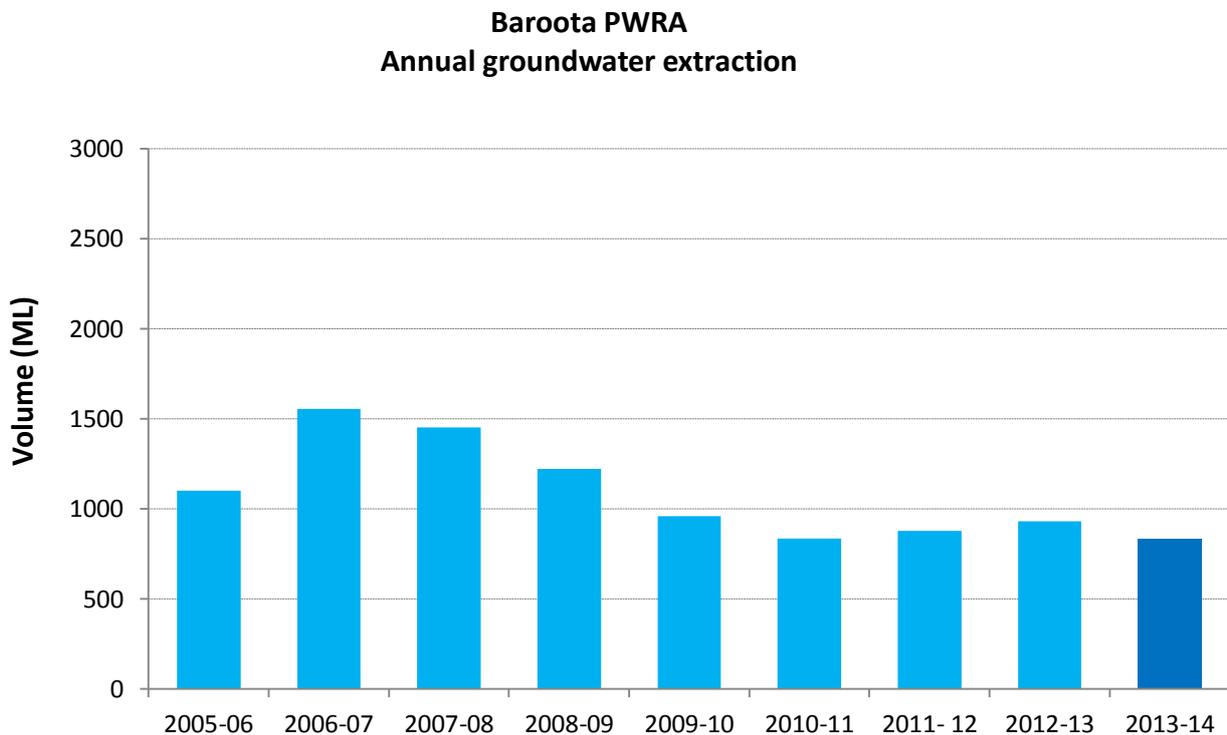


Figure 2. Historical licensed groundwater use in the Baroota Prescribed Water Resources Area

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.

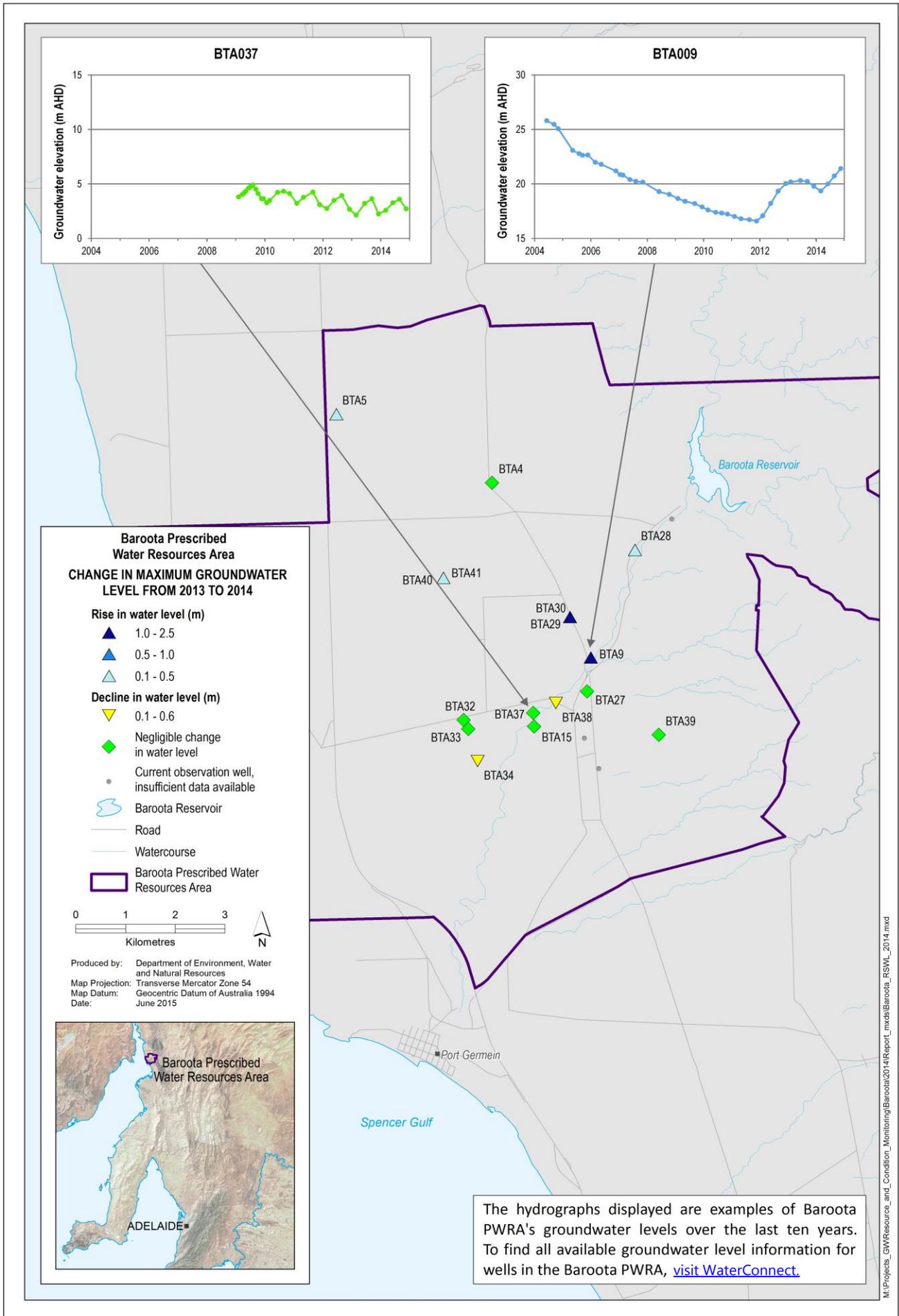


Figure 3. Overall changes in maximum groundwater levels of the Baroota Prescribed Water Resources Area from 2013 to 2014

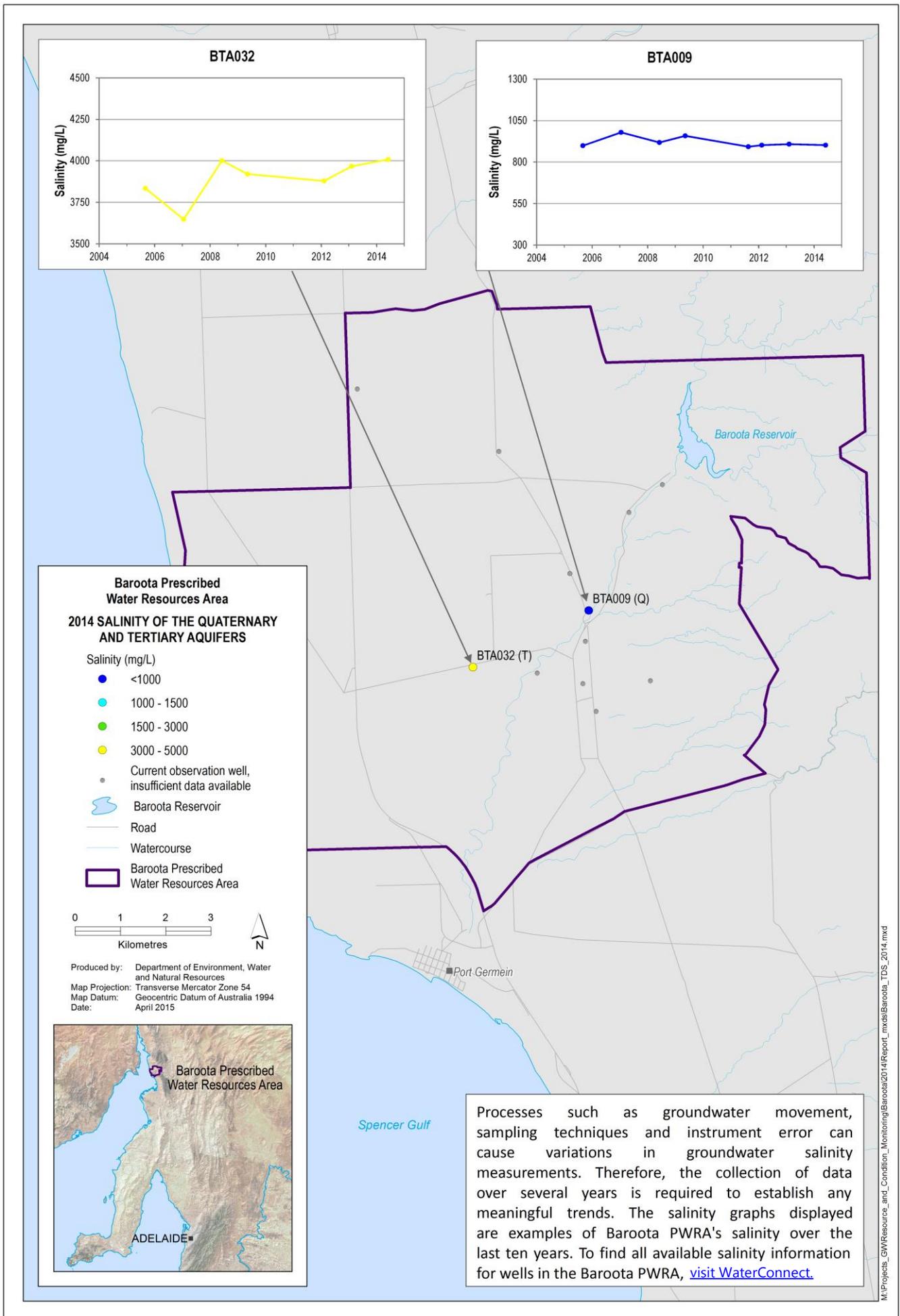


Figure 4. Groundwater salinity in the Baroota Prescribed Water Resources Area for 2014