

Far North PWA

GAB aquifer

2014 Groundwater level and salinity status report



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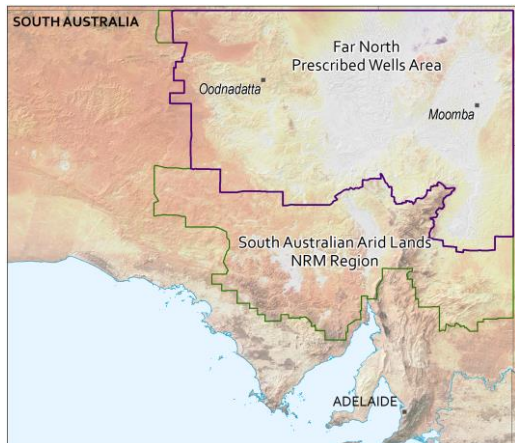
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2014 Summary



The Far North Prescribed Wells Area (PWA) is located in the South Australian Arid Lands NRM Region and is bounded in the north and east by the State's shared borders with New South Wales, Queensland and the Northern Territory. The Far North PWA covers approximately 315 000 km² (~32% of the State) and is prescribed under South Australia's *Natural Resources Management Act 2004*. A water allocation plan provides for the sustainable use of the groundwater resources.

Groundwater extraction in the Far North PWA is predominately sourced from the Great Artesian Basin (GAB) aquifer, with the Cadna-owie Formation and Algebuckina Sandstone (and equivalents) forming the major water-bearing aquifer system. Aquifer thickness ranges from less than 50 m around the basin's western margin to greater than 500 m near the Poolowanna Trough. Depth to

the GAB aquifer is as much as 2400 m in the State's north-east but this decreases towards the basin margins, with the aquifer cropping out along the western and southern margins.

Recent research has shown that much of the groundwater contained in GAB sediments in South Australia was recharged under past climatic conditions up to 30 000 years ago. Present-day recharge along the western margin of the GAB in South Australia is negligible and although active recharge to the GAB from flooding of ephemeral rivers in Northern Territory does occur, the volumes of recharge are relatively small compared to discharge. Upward leakage from the underlying Cooper Basin is also thought to contribute recharge to the GAB aquifer.

The Water Allocation Plan for the Far North PWA estimates groundwater extraction from the GAB aquifer is in the order of 90 ML/d for stock and domestic use and 4 ML/d for town water supply. Total groundwater discharge from springs has been estimated at 66 ML/d. This is a scalable estimate due to the inherent difficulties in measuring flows and the low number of spring flow measures. Petroleum operations have a current allocation volume of 60 ML/d for co-produced water. Mining operations have a current allocation volume of 44.6 ML/d. In addition to this volume, BHP Billiton's Olympic Dam mine has been granted a special water licence to extract water from the GAB aquifer. This licence was issued under the *Roxby Downs (Indenture Ratification) Act 1982* and permits BHP Billiton to extract up to an agreed volume of 42 ML/d from the GAB aquifer. While the mine itself is located outside of the Far North PWA, the wellfields are located within the prescribed area.

As local rainfall has no influence on pressure levels or extraction from the GAB, no rainfall analysis is presented in this report. Overall, the groundwater elevation and salinity of the GAB aquifer in the Far North PWA have remained relatively stable over a long period of time. While there have been small fluctuations over the years, the latest values are similar to historical measurements.

In 2014, water level data was recorded for 26 wells within the area. As only one well has adequate records to allow a comparison of maximum recovered water levels with water level data from 2013, water level data 2012 were selected to be used for comparison purposes. Of the eight observation wells that have both 2012 and 2014 data available for comparison, most (75%) recorded a rise in the maximum recovered groundwater level, with three wells recording increases of more than one metre. Negligible change in water level was recorded in one of the observation wells, where the change in maximum recovered water level between 2012 and 2014 was less than 0.10 m. The remaining well recorded a decline of 0.25 m. The lack of data available for comparison should be noted, particularly as the results are grouped in two localised areas—north-east of Arkaroola and north-west of Innamincka—and therefore, may not be representative of the whole GAB aquifer.

In 2014, salinities ranged between 500 and 21 000 mg/L, with 27% and 67% of 86 monitored wells recording a salinity of less than 1500 mg/L and 3000 mg/L, respectively (Fig. 1). A total of 20 wells have salinity measurements for both 2013 and 2014 available for comparison; changes in salinity of around 1% were recorded in all wells in 2014 when compared with 2013 salinity data, indicating stable salinity.

The Great Artesian Basin aquifer of the Far North PWA 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 the beneficial uses of the resource (e.g. drinking water, irrigation or stock watering).

The 2014 status for Great Artesian Basin aquifer is supported by:

- an overall rise in the maximum recovered groundwater level when compared with 2012 water level data, albeit based on limited data
- stable groundwater salinity when compared with 2013 salinity data.

It should be noted that the green status is based on limited data, particularly for groundwater level, and may not be indicative of the entire GAB aquifer.

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

To view the *Far North PWA Groundwater Level and Salinity Status Report 2011*, which includes background information on hydrogeology, location of rainfall stations and relevant groundwater dependent ecosystems, and to view descriptions for all status symbols, please the Water Resources page on [WaterConnect](#).

To download groundwater level and salinity data from observation wells within the Far North PWA, please visit [Groundwater Data](#) on WaterConnect.

For further information about the Far North PWA, please see the *Water Allocation Plan for the Far North Prescribed Wells Area* on the Natural Resources South Australian Arid Lands [website](#).

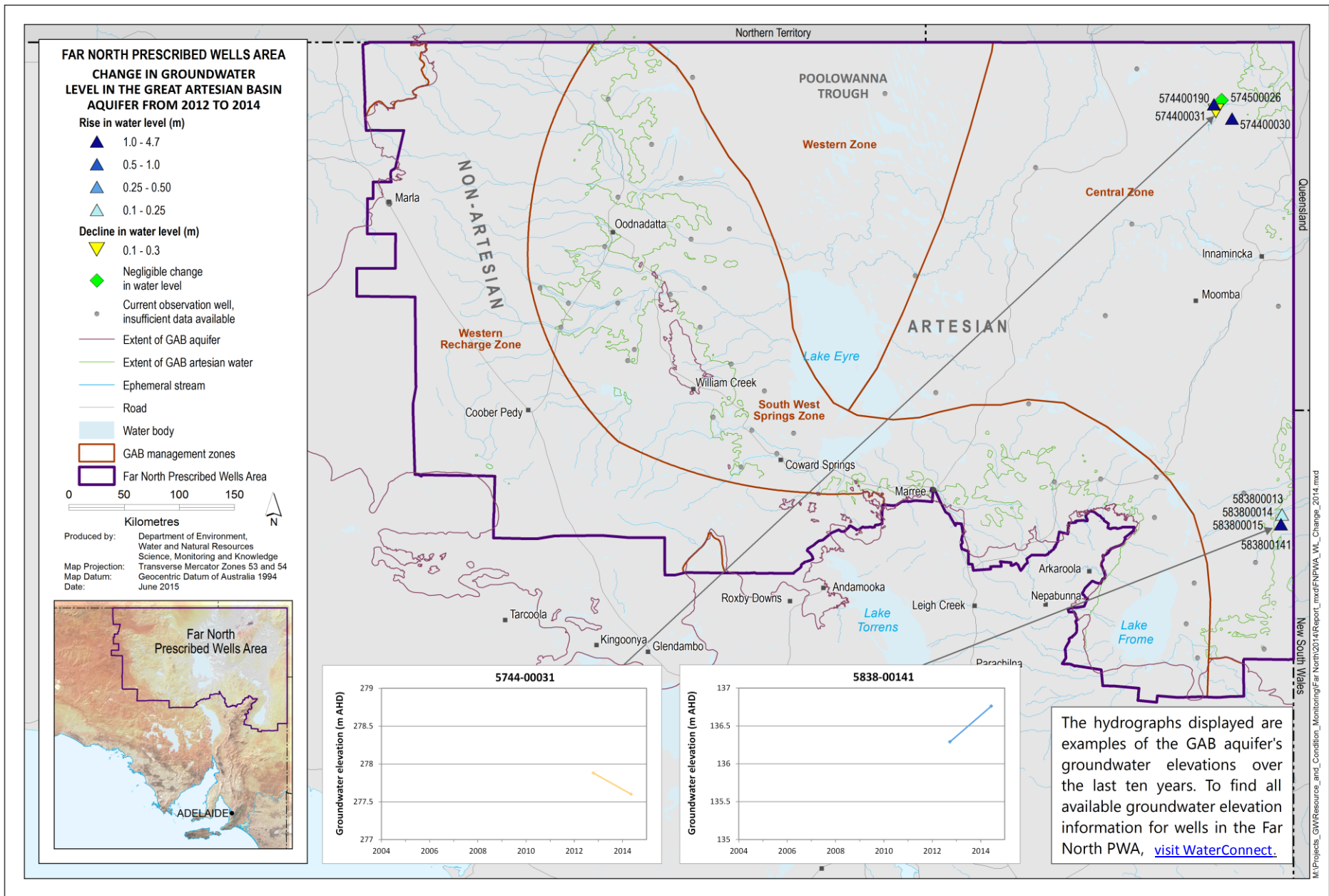


Figure 1. Overall change in groundwater elevation in the Great Artesian Basin aquifer of the Far North Prescribed Wells Area for 2014

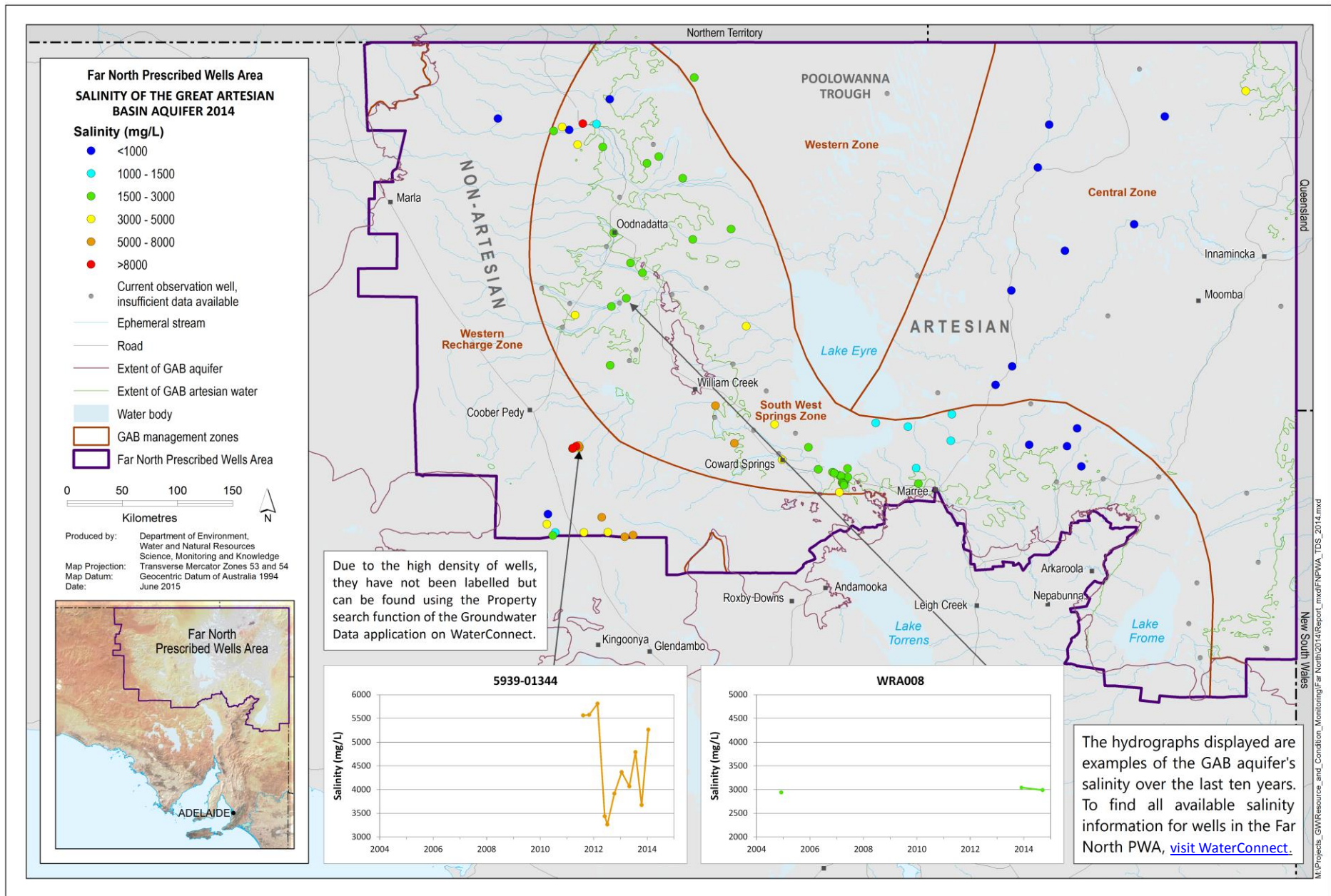


Figure 2. Groundwater salinity of the Great Artesian Basin aquifer of the Far North Prescribed Wells Area for 2014