

Far North Prescribed Wells Area Great Artesian Basin (J-K) aquifer

2018 Groundwater level and salinity status
report



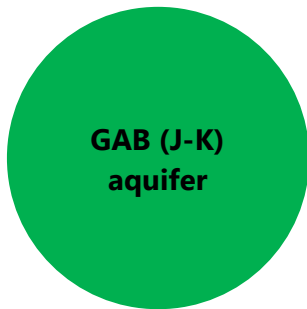
**Government
of South Australia**

Department for
Environment and Water

2018 Status summary

Far North PWA

Great Artesian Basin (J-K) aquifer



The Great Artesian Basin (GAB) Jurassic-Cretaceous (J-K) aquifer of the Far North Prescribed Wells Area (PWA) has been assigned a **green** status for 2018 because positive trends have been observed over the past five years.

The status is based on five-year trends: over the period 2014–18, 76% of wells show rising or stable groundwater levels and all wells show decreasing or stable salinities.

The assigned status for the J-K aquifer cannot be generalised across the entire GAB groundwater system due to a reduced number of recent groundwater level measurements in the Western Recharge Zone, Western Zone and Central Zone of the PWA.

The status is based on five-year trends. To view the *Far North PWA groundwater level and salinity status report 2011*, which includes long-term trends in rainfall, groundwater levels and salinity, please visit the [Water Resource Assessments](#) page on WaterConnect. To download the full record of groundwater level and salinity data for the Far North PWA, please visit the *Groundwater Data* page on [WaterConnect](#).

This status report does not seek to evaluate the sustainable limits of the resource, nor does it make any recommendations on management or monitoring of the resource. These actions are important, but occur through separate processes such as prescription and water allocation planning.

Rainfall

Summary	As local rainfall has no influence on levels or rates of groundwater extraction from the GAB, rainfall analysis is not presented in this report
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Groundwater extraction

Total allocated volume	49 528 ML/y (all aquifers of the PWA)
Licensed groundwater extractions	Although the Far North PWA is prescribed, metering of groundwater extraction is currently limited across the PWA ¹

¹ The Water Allocation Plan for Far North PWA estimates groundwater extraction in the area – see [More information](#)

Groundwater level

See Figure 1

Five year trend: 2014–18	23 out of 37 wells (62%) show a rising trend, at rates of 0.03–2.13 m/y (median of 0.25 m/y) 5 wells (14%) show stable levels 9 wells (24%) show declining levels, at rates of 0.07–0.63 m/y (median of 0.14 m/y); four of these wells show their lowest level on record Monitoring wells of BHP's Olympic Dam mine (i.e. the Wellfield B extraction area) show a declining trend in groundwater levels consistent with the Olympic Dam Environmental Protection and Management Program ²
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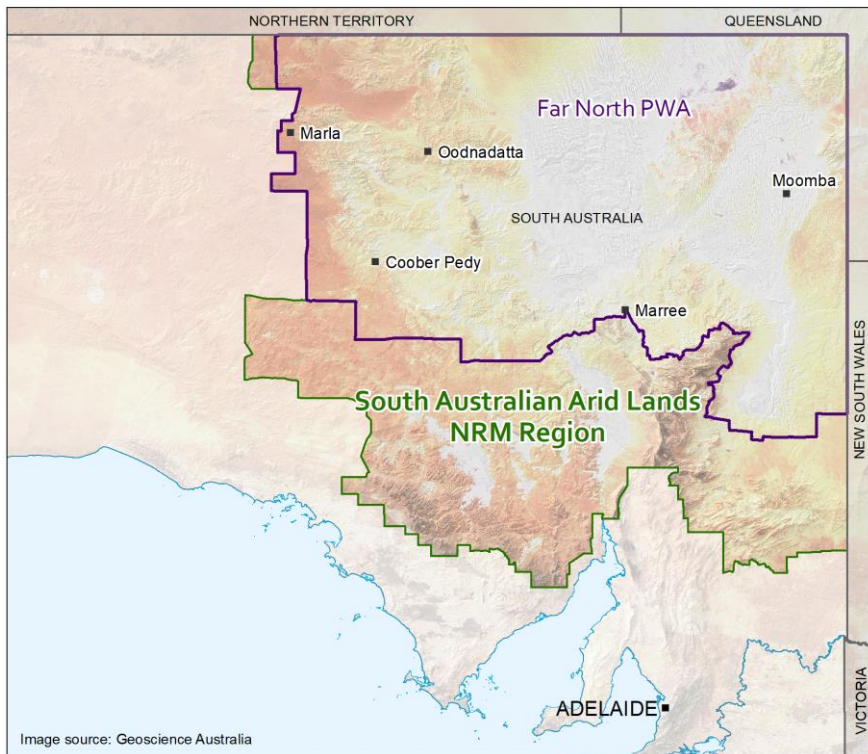
Groundwater salinity

See Figures 2 and 3

2018 salinity	664–22 995 mg/L (58 wells; median of 2095 mg/L)
Five year trend: 2014–18	3 out of 36 wells (8%) show decreasing trends, at rates of 38–68 mg/L/y (median of 62 mg/L/y) 33 wells are stable

² BHP's Olympic Dam mine monitoring network data is not yet available via DEW's Enviro Data SA website, but can be found at http://minerals.statedevelopment.sa.gov.au/mining/mines_and_quarries/olympic_dam

Regional setting



The Far North PWA is located in the South Australian Arid Lands Natural Resources Management 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 groundwater is prescribed under South Australia's *Natural Resources Management Act 2004* and a water allocation plan provides for their sustainable management.

Groundwater in the Far North PWA is sourced predominately from the Cadna-owie Formation and Algebuckina Sandstone (and equivalents), which as a single aquifer unit is described as the Jurassic-Cretaceous (J-K) aquifer, and represents the GAB at a regional scale. The depth to the GAB (J-K) aquifer is as much as 2400 m below ground level in the state's north-east, but decreases towards the edge of the basin, with the aquifer cropping out along the western and southern margins. The GAB (J-K) aquifer ranges from less than 50 m in thickness around the basin's western margin to greater than 500 m near the Poolowanna Trough (Fig. 1).

Recent research has shown that much of the groundwater contained in the GAB (J-K) aquifer in South Australia was recharged more than 10 000 years ago under different climatic conditions to those that are observed today. Present-day recharge along the western margin of the GAB (J-K) aquifer in South Australia is low, and although active recharge occurs to the GAB (J-K) aquifer from the occasional flooding of ephemeral rivers in the Northern Territory, the rates of recharge are relatively low compared to rates of discharge. Upward leakage from the underlying Cooper Basin is also thought to contribute recharge to the GAB (J-K) aquifer, but the magnitude of this flow is yet to be determined.

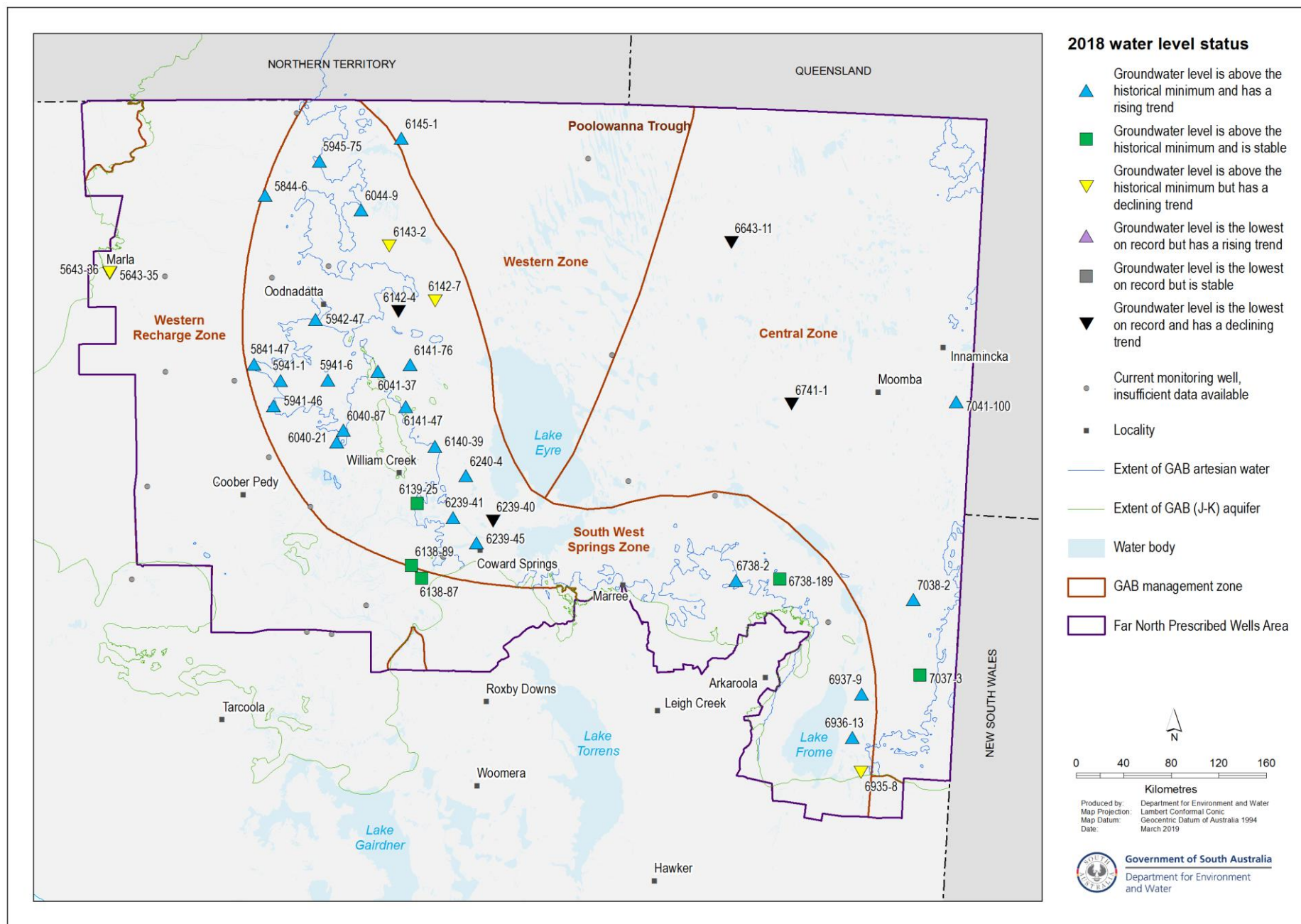


Figure 1. Five-year trends (2014–18) in groundwater levels: GAB (J-K) aquifer

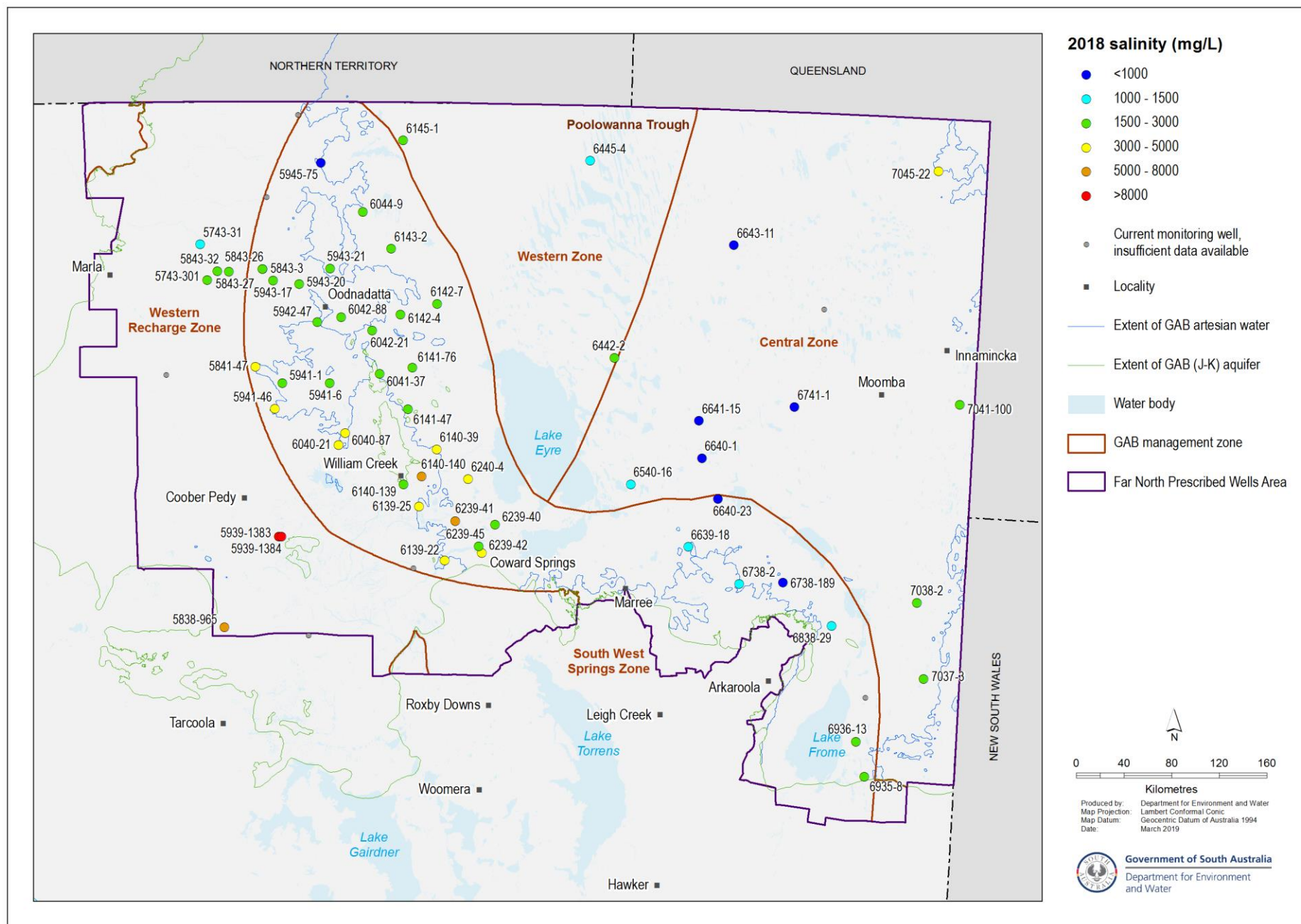
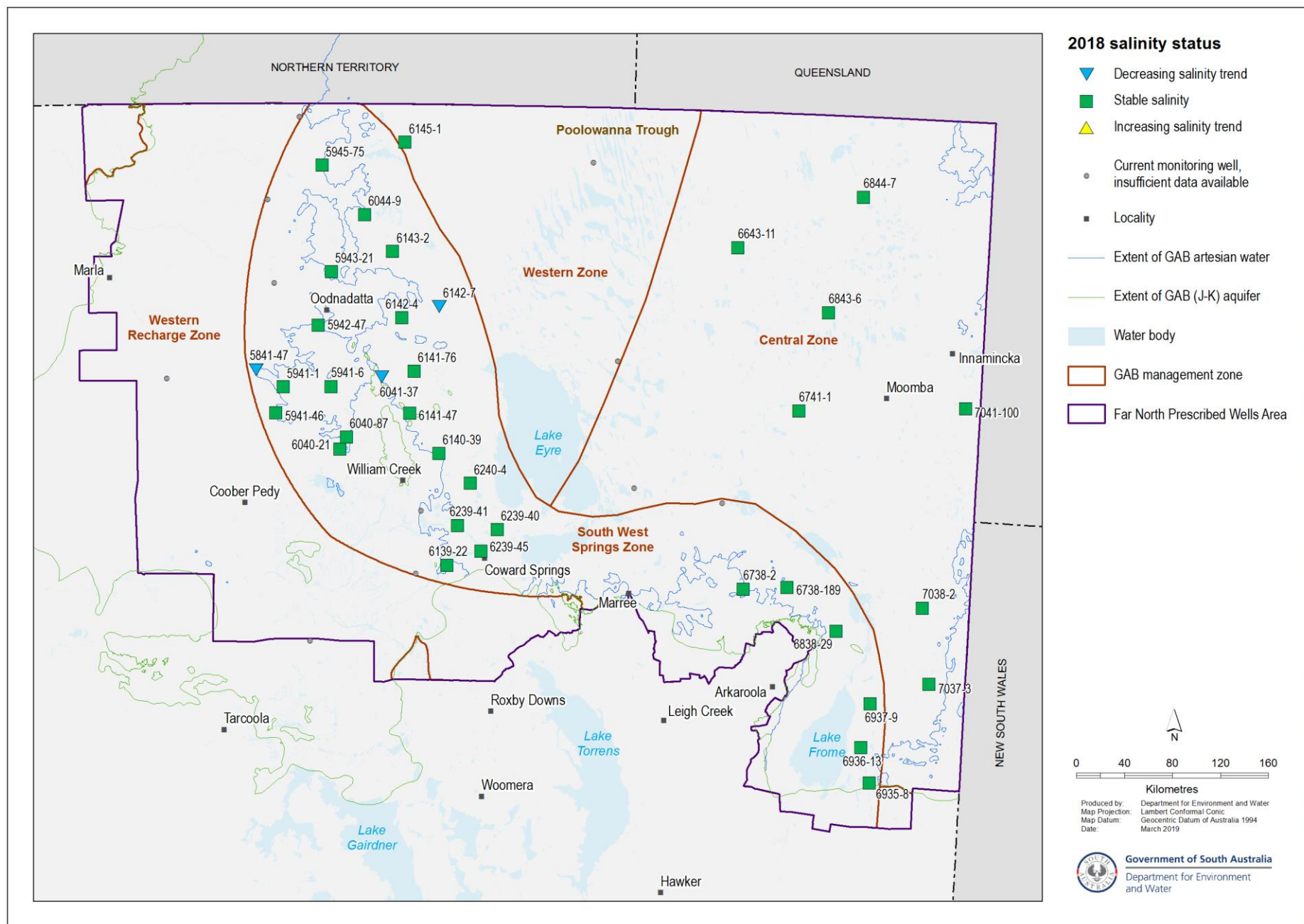


Figure 2. 2018 groundwater salinities: GAB (J-K) aquifer



More information

To determine the status of the GAB (J-K) aquifer for 2018, the trends in groundwater levels and salinities over the past five years (2014 to 2018, inclusive) were analysed, in contrast to the year-to-year assessments that have been used in *Groundwater level and salinity status reports* published prior to 2015. 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, and to review the full historical record of the monitoring wells, please visit the *Water Resource Assessments* page on [WaterConnect](#).

For additional information related to monitoring wells nomenclature, please refer to the *Well Details* page on [WaterConnect](#).

The WAP for the Far North PWA estimates groundwater extraction from the GAB (J-K) aquifer to be around 4 ML/d for town water supply purposes; the rate of use for stock and domestic purposes is uncertain but thought to be in the order of 90 ML/d. Recent water savings have been achieved via [the Great Artesian Basin Sustainability Initiative](#) that has included replacing bore drains with piping and rehabilitating free-flowing wells. Across the South Australia extent of the GAB, these measures have resulted in an estimated saving of 134 ML/d (49 000 ML/y). Estimated total groundwater discharge from naturally-occurring springs is around 66 ML/d, but this has not yet been validated because of the difficulties in measuring actual flows. Petroleum operations have a current allocated volume of 60 ML/d for water that is co-produced during the extraction of oil and gas. Current mining operations have a total allocated volume of 44.6 ML/d of which 42 ML/d have been granted to BHP's Olympic Dam mine as a special water licence to extract water from the GAB (J-K) aquifer under the *Roxby Downs (Indenture Ratification) Act 1982*. While the mine itself is located outside of the Far North PWA, the wellfields are located within the PWA.

For information completeness and consistency across all the groundwater and salinity status reports, the legend on each map herein shows the full range of water level and salinity status that could possibly be reported. However, the measured data that appear on each map may not span this full range.

To view the *Far North PWA groundwater level and salinity status report 2011*, which includes background information on hydrogeology, rainfall and relevant groundwater-dependent ecosystems, please visit [WaterConnect](#). To view all past published *Groundwater level and salinity status reports*, please visit the [Water Resource Assessments](#) page on WaterConnect.

To download groundwater level and salinity data from monitoring wells within the Far North PWA, please visit the *Groundwater Data* page under the *Data Systems* tab 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](#).

Units of Measurement

mm	millimetre
ML	megalitre
ML/d	megalitre per day
m/y	metres per year
mg/L	milligrams per litre
mg/L/y	milligrams per litre per year
mm/y	millimetres per year

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