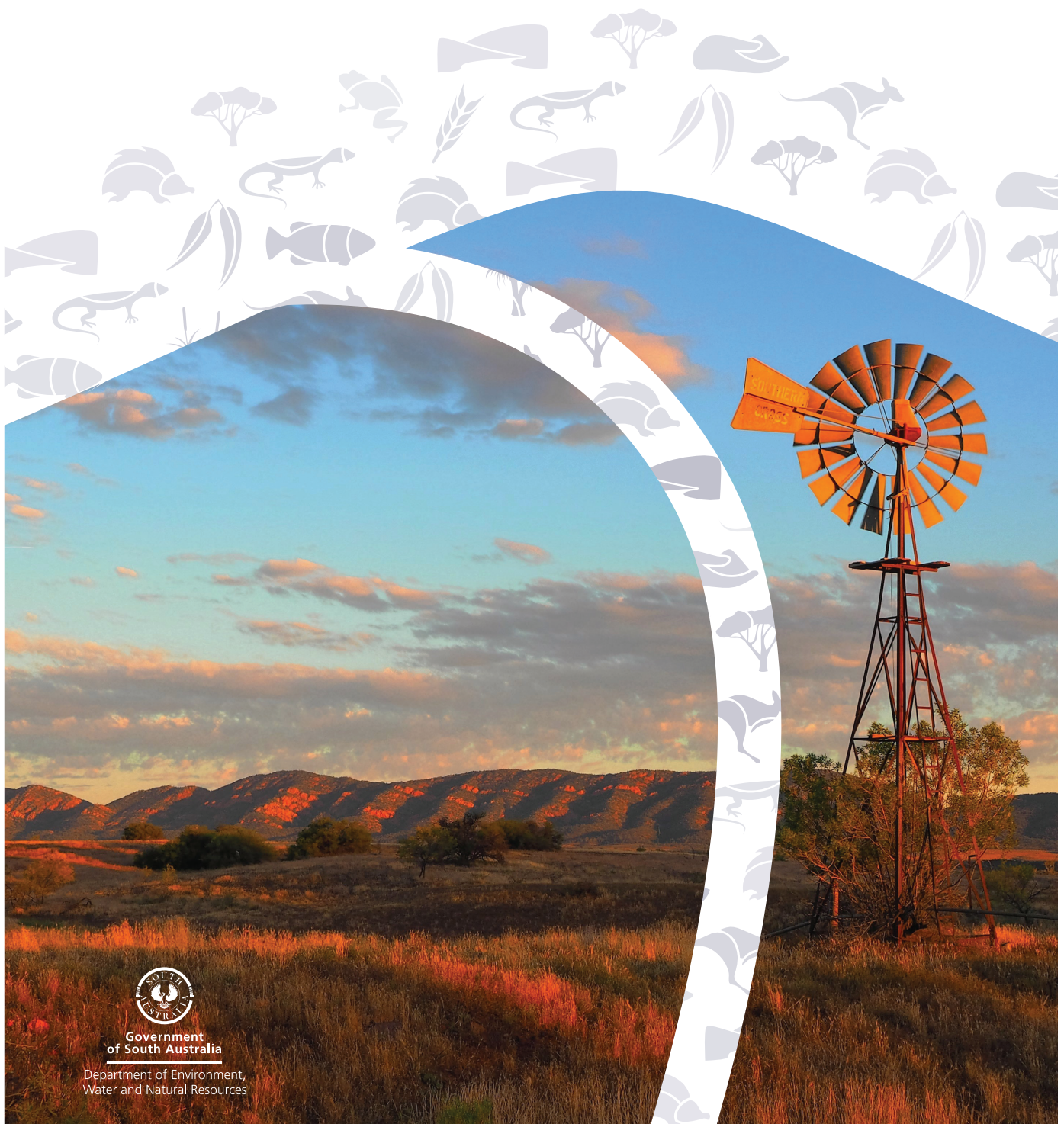


# Baroota PWRA

## 2016 Groundwater level and salinity status report



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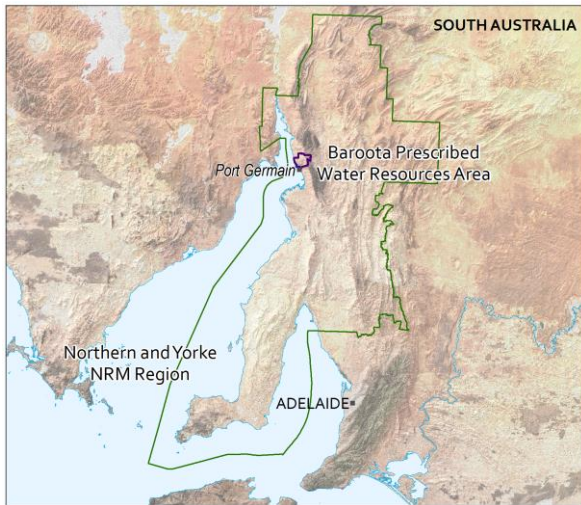
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# Regional setting



The Baroota Prescribed Water Resources Area (PWRA) is located within the Northern and Yorke Natural Resources Management Region and lies on the western side of the Flinders Ranges in the Mid North region of South Australia, approximately 25 km north of Port Pirie. It is a local-scale resource for which groundwater, surface water and watercourse water are 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 the Quaternary aquifer, which is comprised of clay and gravel sediments that were deposited as outwash from the Flinders Ranges, and can be up to 100 m thickness. These shallow sediments are underlain by a deeper Tertiary sand aquifer.

Variations in rainfall and rates of groundwater extraction are important factors in groundwater level and salinity changes in the Baroota PWRA. Below-average rainfall may result 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 may result in increases in recharge, decreases in irrigation extractions and groundwater levels may rise and salinity may stabilise or decrease.

Connections between surface water bodies and groundwater may also affect groundwater levels and salinity in the Baroota PWRA. Leakage from the Baroota Reservoir manifests as streamflow along Baroota Creek and may contribute recharge to the groundwater system, especially when the reservoir is full and overflow occurs. Below-average rainfall between 2002 and 2009 saw lower surface water inflows to the reservoir and consequently, recharge to the aquifers that underlie Baroota Creek was reduced.

# 2016 Status

The Baroota PWRA 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 Baroota PWRA is based on:

- most monitoring wells (73%) show a five-year trend of rising or stable groundwater levels
- most monitoring wells (75%) show a five-year trend of stable groundwater salinity.

### Rainfall

The Port Germein rainfall station (BoM station 19037) recorded 363 mm of rainfall in the 2015–16 water-use year (Fig. 1). This is 11% above the long-term annual average (1900 to 2016) of 327 mm, and nine millimetres above the five-year average annual rainfall (2011–16) of 354 mm (Figs 1 and 2). A subtle trend of increasing rainfall has been observed in the recent past, relative to long-term annual average rainfall (Fig. 1). In the 2015–16 water use year, monthly rainfall totals for December, February and April were less than 10 mm, while the wettest month (November) recorded double its long-term monthly average. The months of January, March and June were also considerably above their long-term monthly average (Fig. 2).

### Water use

Extraction data for the two consecutive water-use years of 2014–15 and 2015–16 were available only in aggregate; therefore, the annual extractions for each of the two individual water-use years have been estimated on an average-monthly-usage approach, based on the best available extraction data of the past three water-use years<sup>1</sup>. Estimated extractions from the Baroota PWRA totalled 685 ML in 2015–16, which represent a 17% and 8% decrease when compared to 2013–14 and 2014–15 water-use years, respectively. This is 16% less than the five-year average annual extraction rate of 813 ML/y (Fig. 3).

### Groundwater levels

In the five years to 2016, 8 of 15 monitoring wells (53%), which are mainly located in the vicinity of the Baroota Creek, have shown a trend of rising groundwater levels, at rates ranging between 0.1 and 1.4 m/y (Fig. 4). Of the remaining monitoring wells, three monitoring wells (20%) show stable water levels and four (27%) show a declining trend, with rates ranging from 0.01 to 0.11 m/y. Rises in groundwater levels are likely to be attributed to reduced rates of extraction as a consequence of above-average rainfall recorded in 2015–16 (Figs 2 and 3).

### Groundwater salinity

Groundwater in Baroota PWRA appears freshest near Baroota Creek, with 67% of monitoring wells showing salinities below 1000 mg/L in 2016 (Fig. 5). The only salinity measurement greater than 3000 mg/L is shown by BTA032, which is in contact with the deeper Tertiary aquifer. The irregular frequency of salinity monitoring in the past, and the disparity in production zone intervals of the wells sampled, make the interpretation of groundwater salinity data across the Baroota PWRA difficult. However, in the five years to 2016, four wells have data that is suitable for trend analysis, with three of these showing stable salinities and the remaining well showing a rise in trend at a rate of 18 mg/L/y (Fig. 6).

<sup>1</sup> The licensed groundwater use for the 2013–14, 2014–15, and 2015–16 water-use years 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 Baroota PWRA for 2016, the trend in groundwater levels and salinities 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 *Baroota PWRA 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 view or download groundwater level and salinity data from 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](#).



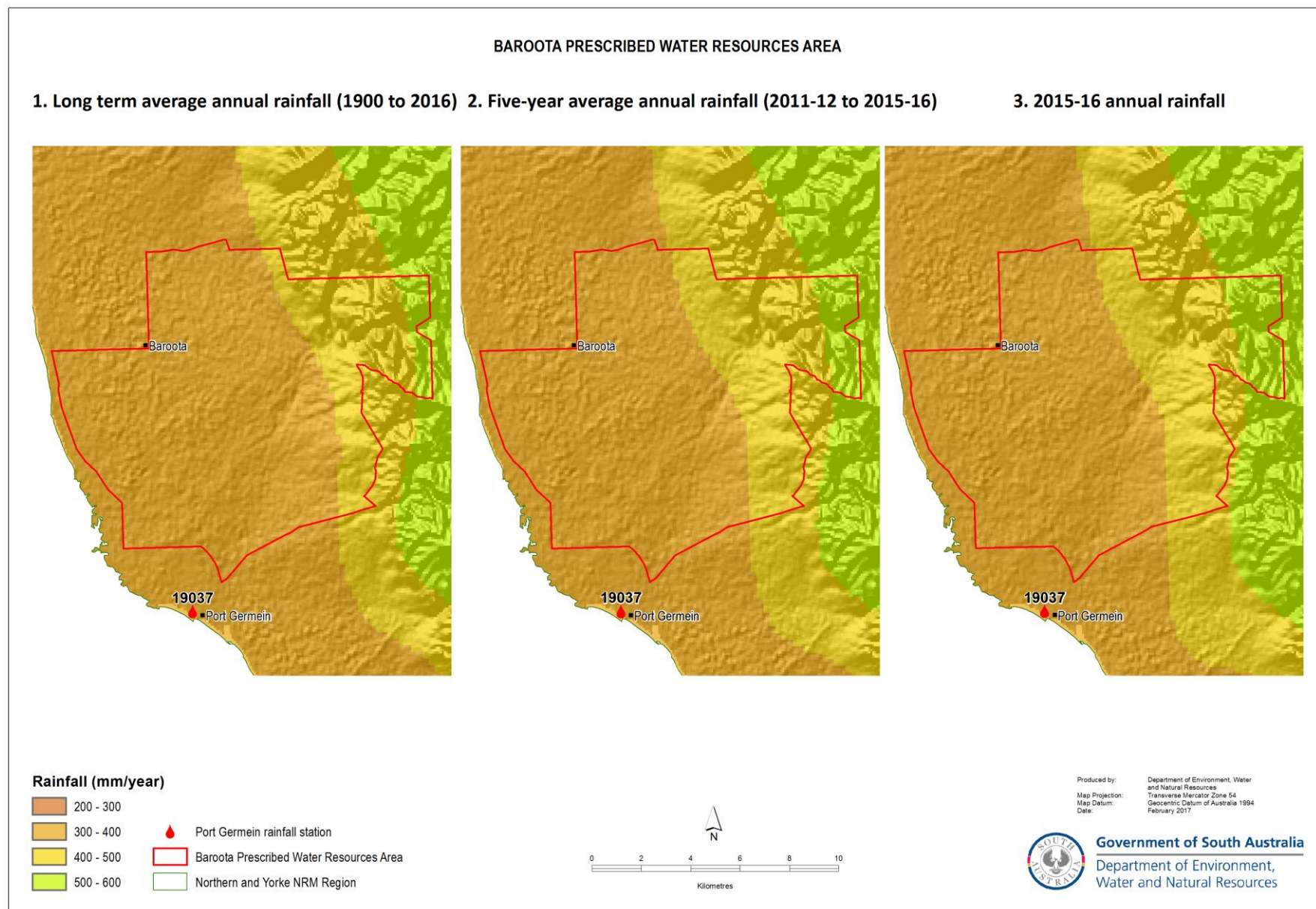


Figure 1. (1) Long-term and (2) five-year average annual rainfall and (3) annual rainfall for the 2015–16 water-use year in the Baroota PWRA<sup>2</sup>

<sup>2</sup> 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](http://www.longpaddock.qld.gov.au/silo).

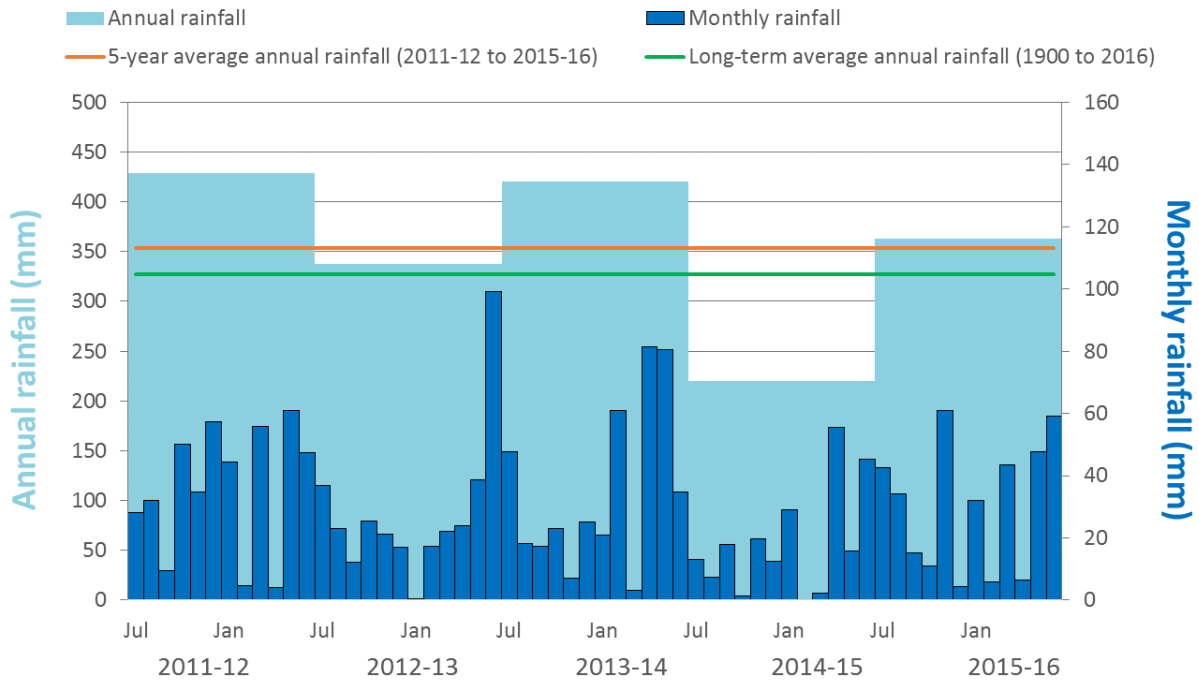


Figure 2. Annual (July–June) and monthly rainfall for the past five water-use years, and the five-year and long-term average annual rainfall recorded at Port Germein (BoM Station 19037)<sup>3</sup>

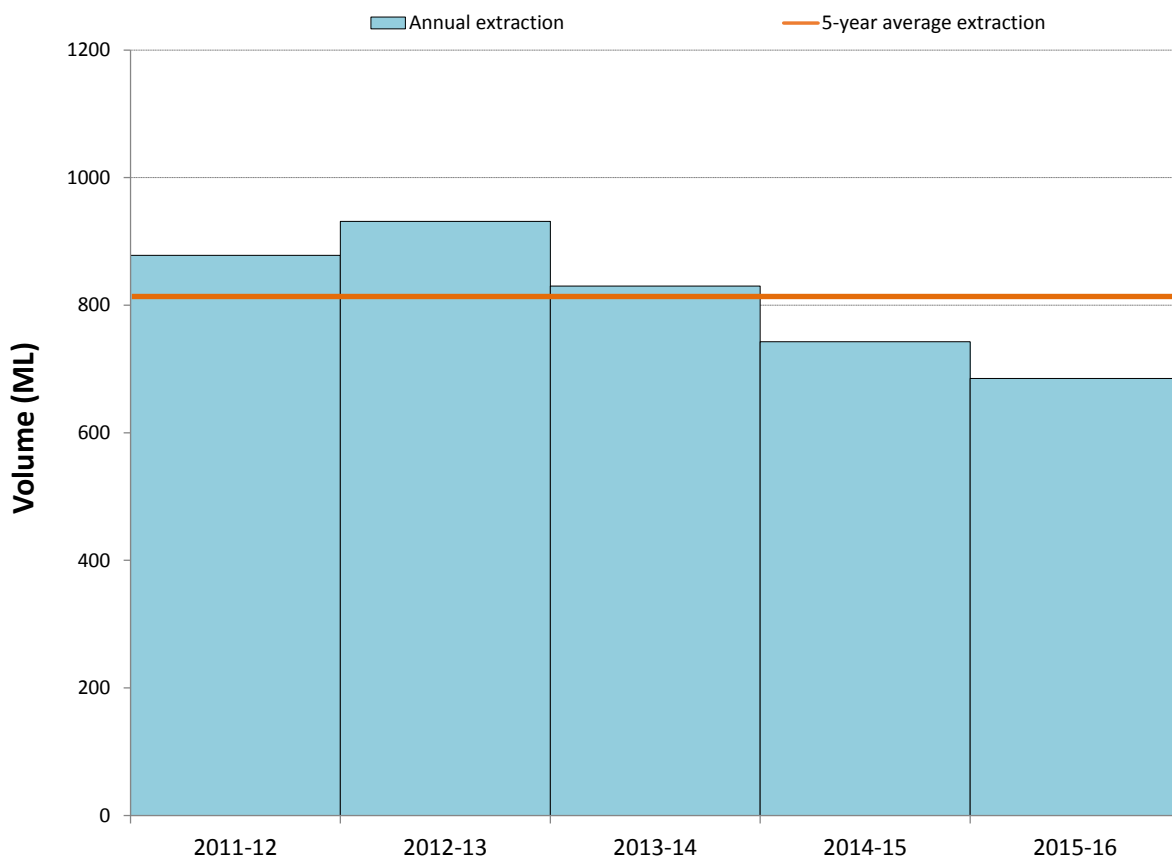
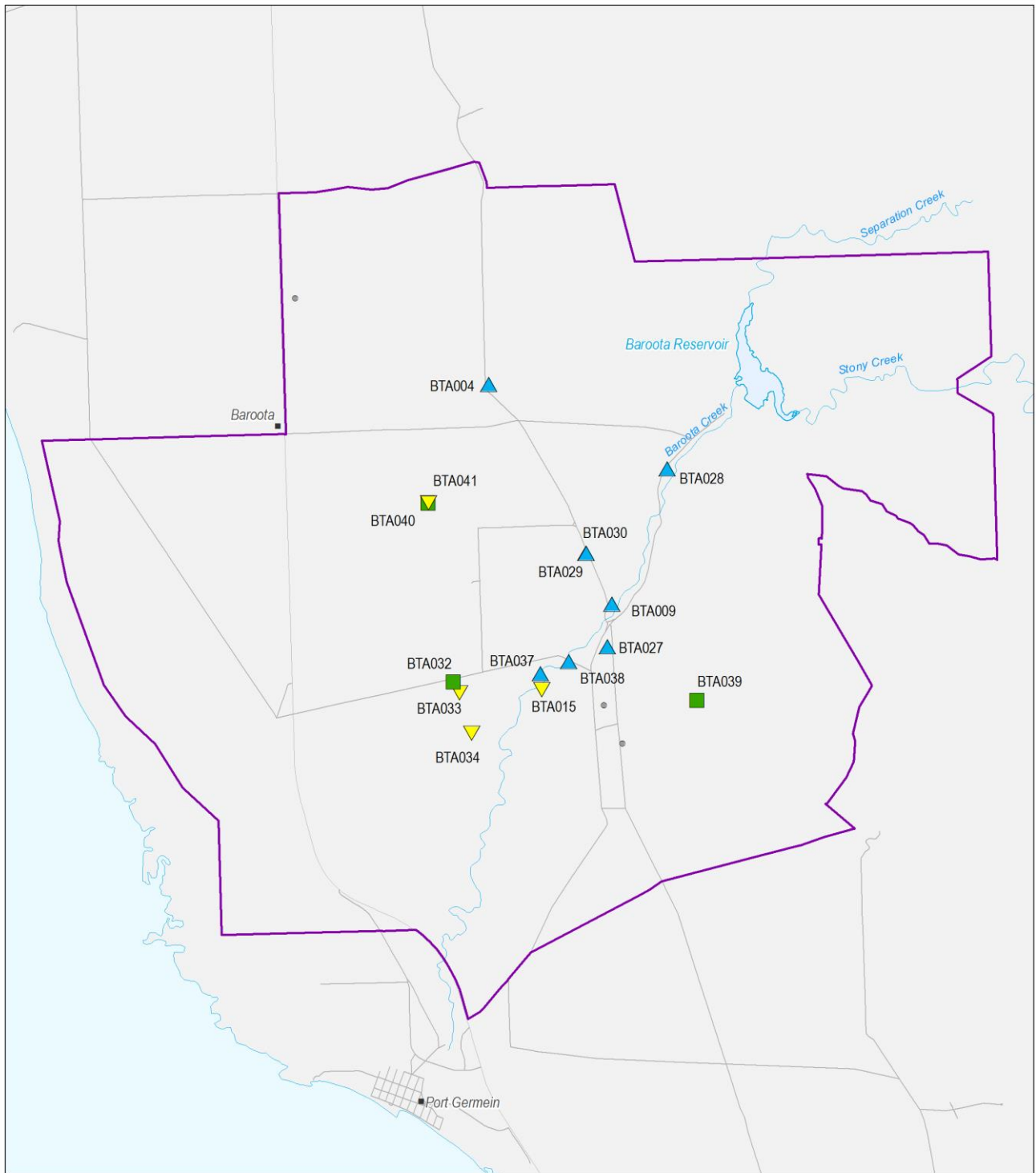


Figure 3. Licensed groundwater extraction volumes<sup>4</sup> for the past five water-use years, in the Baroota PWRA

<sup>3</sup> 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](http://www.longpaddock.qld.gov.au/silo).

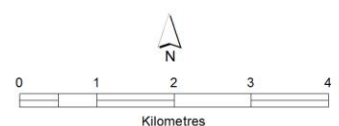
<sup>4</sup> The licensed groundwater use for the 2013–14, 2014–15 and 2015–16 water-use year is based on the best data available as of February 2017 and may be subject to change, as some extraction volumes are in the process of being verified.



#### 2016 water level status

- ▲ Groundwater level is above the historical minimum and has a rising trend
- Groundwater level is above the historical minimum and is stable
- ▼ Groundwater level is above the historical minimum but has a declining trend
- ▲ Groundwater level is the lowest on record but has a rising trend
- Groundwater level is the lowest on record but is stable
- ▼ Groundwater level is the lowest on record and has a declining trend

- Current monitoring well, insufficient data available
- Watercourse
- Road
- Reservoir
- Baroota Prescribed Water Resources Area



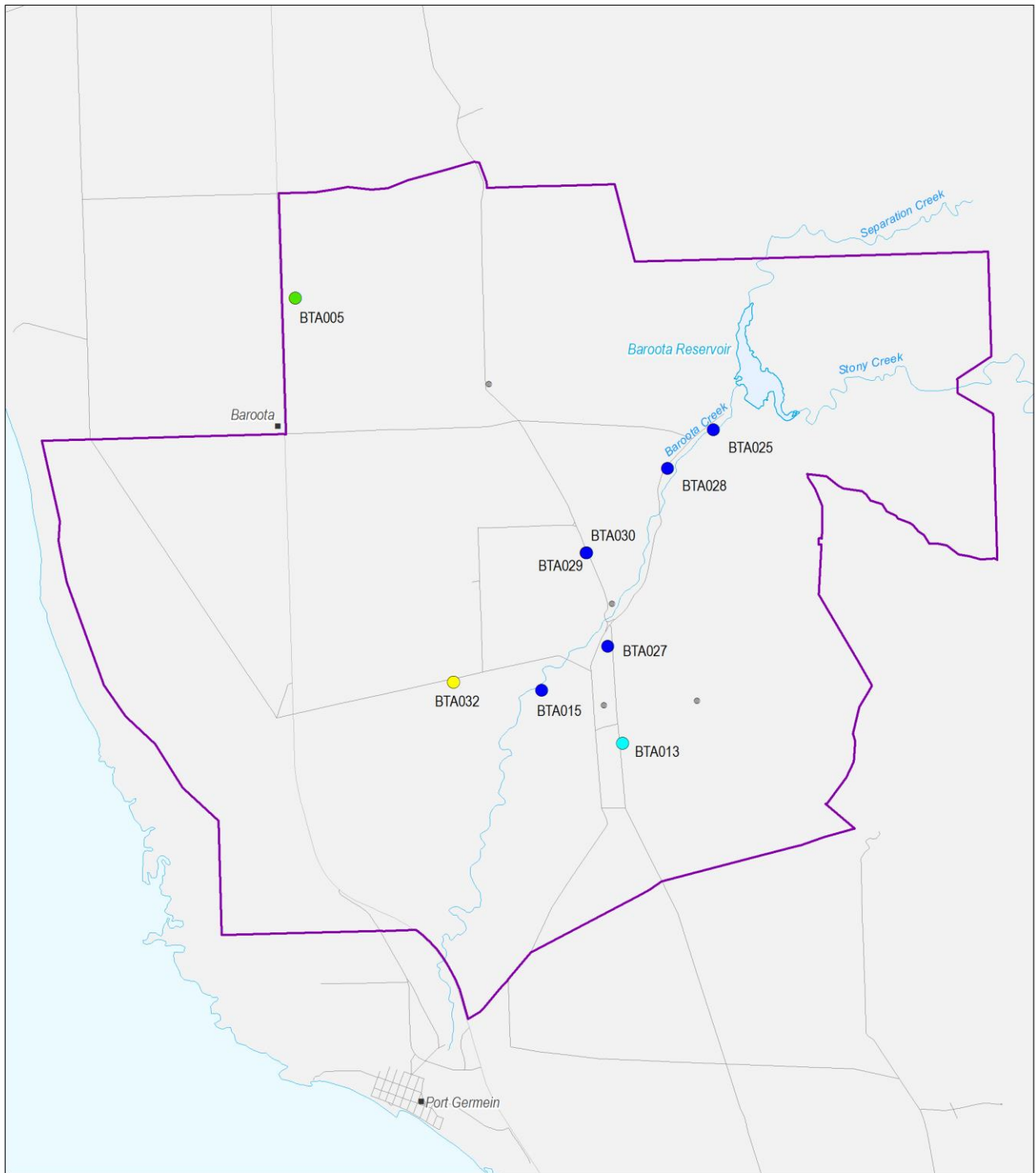
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Figure 4. 2016 status of groundwater levels in the Baroota PWRA, based on five-year trends from 2012 to 2016

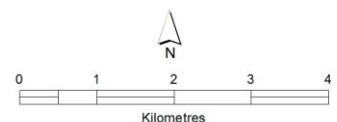




#### 2016 salinity (mg/L)

- <1000
- 1000 - 1500
- 1500 - 3000
- 3000 - 5000
- Current monitoring well, insufficient data available

- Watercourse
- Road
- Reservoir
- Baroota Prescribed Water Resources Area

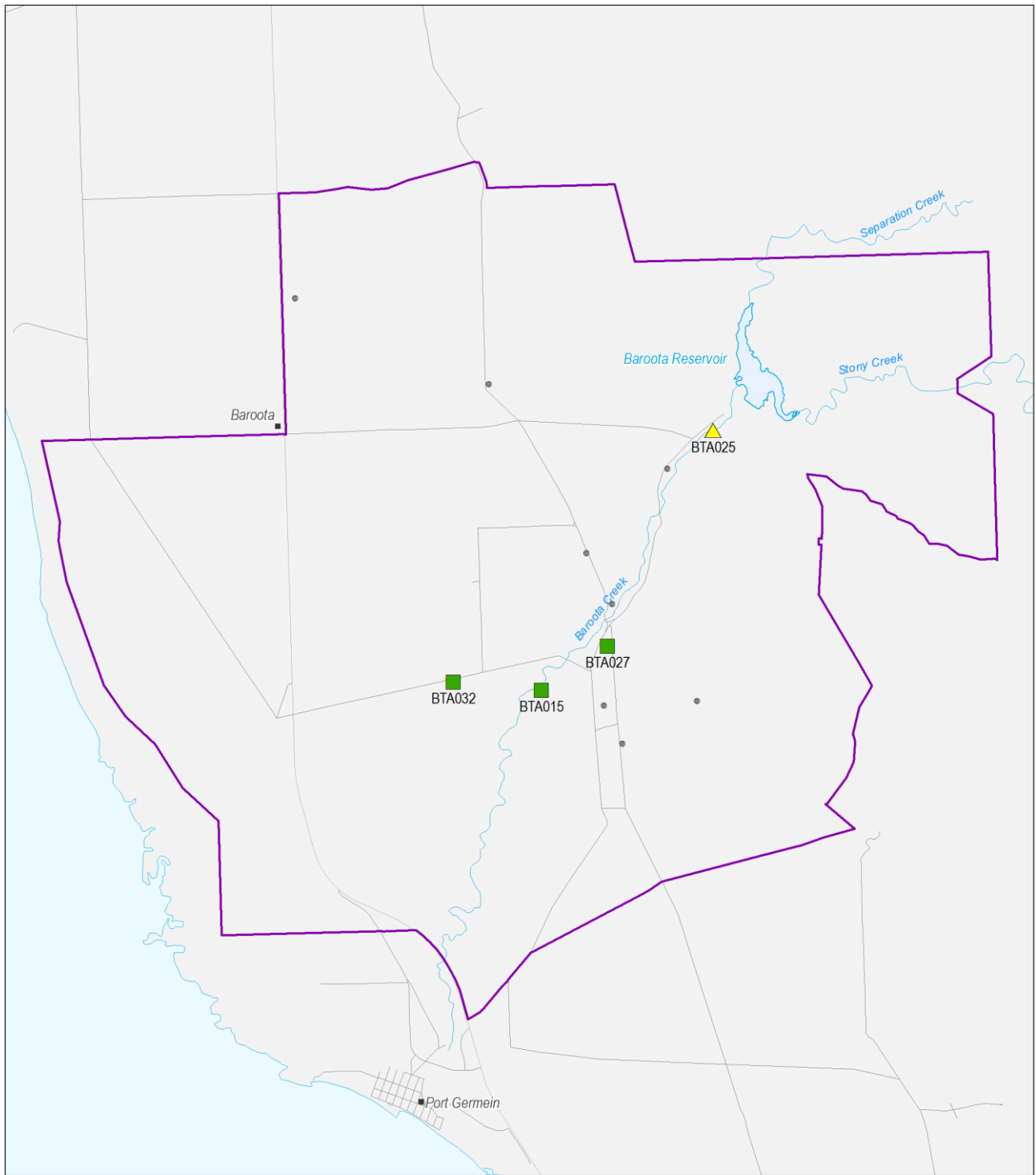


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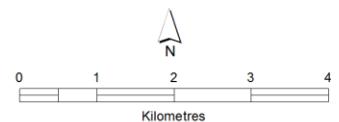
Figure 5. 2016 groundwater salinity of the Baroota PWRA



### 2016 salinity status

- ▼ Decreasing salinity trend
- Stable salinity
- ▲ Rising salinity trend
- Current monitoring well, insufficient data available

- Watercourse
- Road
- Reservoir
- ▭ Baroota Prescribed Water Resources Area



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Figure 6. 2016 status of groundwater salinity in the Baroota PWRA, based on five-year trends from 2012 to 2016



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