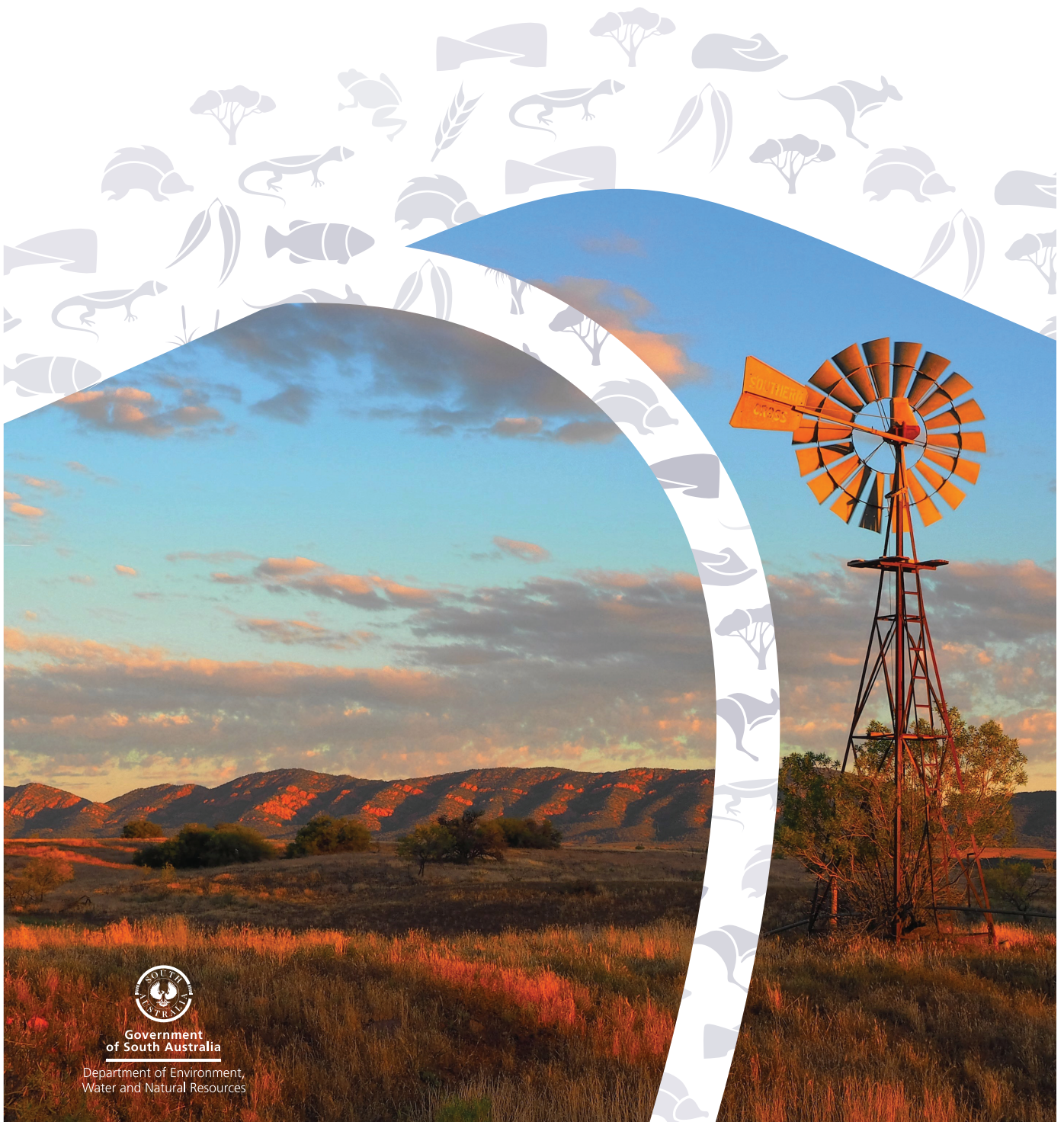


# Musgrave PWA Bramfield

## 2016 Groundwater level and salinity status report



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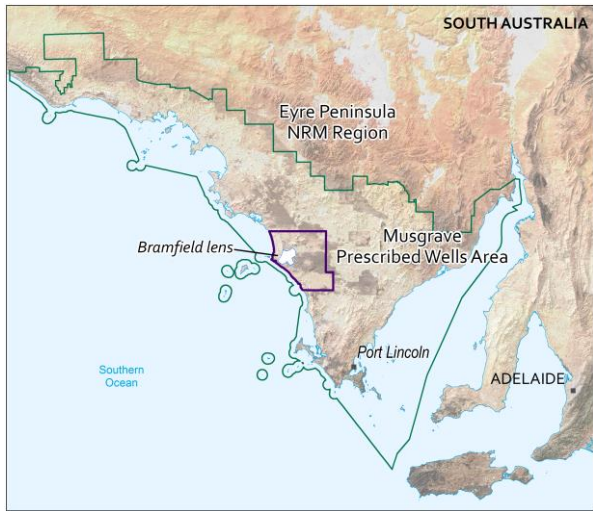
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# Regional setting



Within the Eyre Peninsula Natural Resources Management Region, the Musgrave Prescribed Wells Area (PWA) is located approximately 120 km north-west of the township of Port Lincoln. 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. The Bramfield fresh groundwater lens (herein "Bramfield") is situated in the north-west of the Musgrave PWA.

Within the Musgrave PWA, there are three main sedimentary sequences containing groundwater that overlie basement rocks: the Quaternary limestone aquifer; the underlying Tertiary sands aquifer; and deeper Jurassic sediments that occur only within the Polda Trough. The Quaternary limestone aquifer comprises a generally thin veneer of aeolianite sediments of the Bridgewater Formation and is continuous across the PWA. The main source of recharge to the Quaternary

limestone aquifer is the direct infiltration of rainfall and groundwater flow is predominantly in a westerly to south-westerly direction toward the Southern Ocean.

Groundwater levels and salinity in the Musgrave PWA are highly responsive to recharge from rainfall and trends in groundwater level or salinity are primarily climate driven: below-average rainfall results in a reduction in recharge to the aquifers. Below-average summer rainfall can also result in increasing extractions, and these two elements can cause the groundwater levels to fall and salinity to increase. Conversely, above-average rainfall can result in increases in recharge, decreases in extractions and groundwater levels may rise and salinities may stabilise or decline. Historical rainfall data indicate that trends of above or below-average rainfall can last for up to 25 years, and that high-intensity rainfall events can result in rapid water level (i.e. recharge) responses.

# 2016 Status

Bramfield, in the Musgrave PWA, has been assigned a green status for 2016:

## 2016 Status



Positive trends have been observed over the past five years

The 2016 status of Bramfield is based on:

- most monitoring wells (87%) showing a five-year trend of rising or stable groundwater levels
- most monitoring wells (83%) showing a five-year trend of stable or decreasing salinity.

### Rainfall

The Elliston rainfall station (BoM Station 18069), located to the south-west of Bramfield in the township of Elliston, recorded 463 mm of rain in the 2015–16 water-use year, which is 33 mm above the long-term average of 430 mm (1900–2016) and 50 mm above the five-year average annual rainfall of 413 mm (Figs 1 and 2). Although above-average rainfall have been registered in three of the past five years, the five-year average rainfall (2011–16) is lower than the long-term average (1900–2016) (Figs 1 and 2). Monthly rainfall data show seven months recording above-average rainfall when compared with their corresponding long-term averages and most notably, the months of November, February, March recorded more than double their long term average monthly rainfall. There appears to be a trend of increasing rainfall in the west and south-western parts of the PWA when comparing 2015–16 rainfall with five-year and long-term average annual rainfall (Fig. 1).

### Water use

Within the Musgrave PWA, the Bramfield consumptive pool (Fig. 1) has historically been reserved predominantly for the purpose of providing public water supply. Licensed groundwater extractions occur predominantly from the fresh groundwater lenses within the Quaternary limestone aquifer, and Bramfield has provided a water supply for the township of Elliston since 1974. Metered extractions from Bramfield in 2015–16 totalled almost 66 ML, a 1% increase from the previous water-use year and 9% below the five-year average annual extraction<sup>1</sup> (Fig. 3). This volume of extraction equates to 5.5% of the total allocation limit of 1191 ML for Bramfield and accounts for 99% of the total licensed extractions within the Musgrave PWA.

### Groundwater levels

In the five years to 2016, groundwater levels across Bramfield show a rising trend (Fig. 4). Three wells to the north and north-east (outside of the boundary of the lens) also show a trend of stable or rising water levels. One well, located immediately south of the boundary, shows a declining trend. Rates of change in groundwater levels are slow, with rises ranging between 0.05 and 0.12 m/y and declines around 0.03 m/y.

### Groundwater salinity

In 2016, and within Bramfield boundary, salinities ranged between 438 and 1138 mg/L (Fig. 5). Five out of six salinity monitoring wells show salinities below 1000 mg/L. In the five years to 2016, five of six (83%) of salinity monitoring wells show a trend of decreasing or stable salinity (Fig. 6).

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<sup>1</sup> The actual five-year average annual extraction volume may be higher as extraction data for the one of the three licensed users was not collected in 2012–13.

# More information

To determine the status of Bramfield for 2016, the trends in groundwater levels and salinities over the past five years (2011 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 *Musgrave Prescribed Wells Area Groundwater Level and Salinity Status Report 2011*, 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 monitoring wells within the Musgrave PWA, please visit [Groundwater Data](#) on WaterConnect.

For further details about the Musgrave PWA, please see the *Water Allocation Plan for the Southern Basins and the Musgrave Prescribed Wells Areas* on the Eyre Peninsula Natural Resources [website](#).



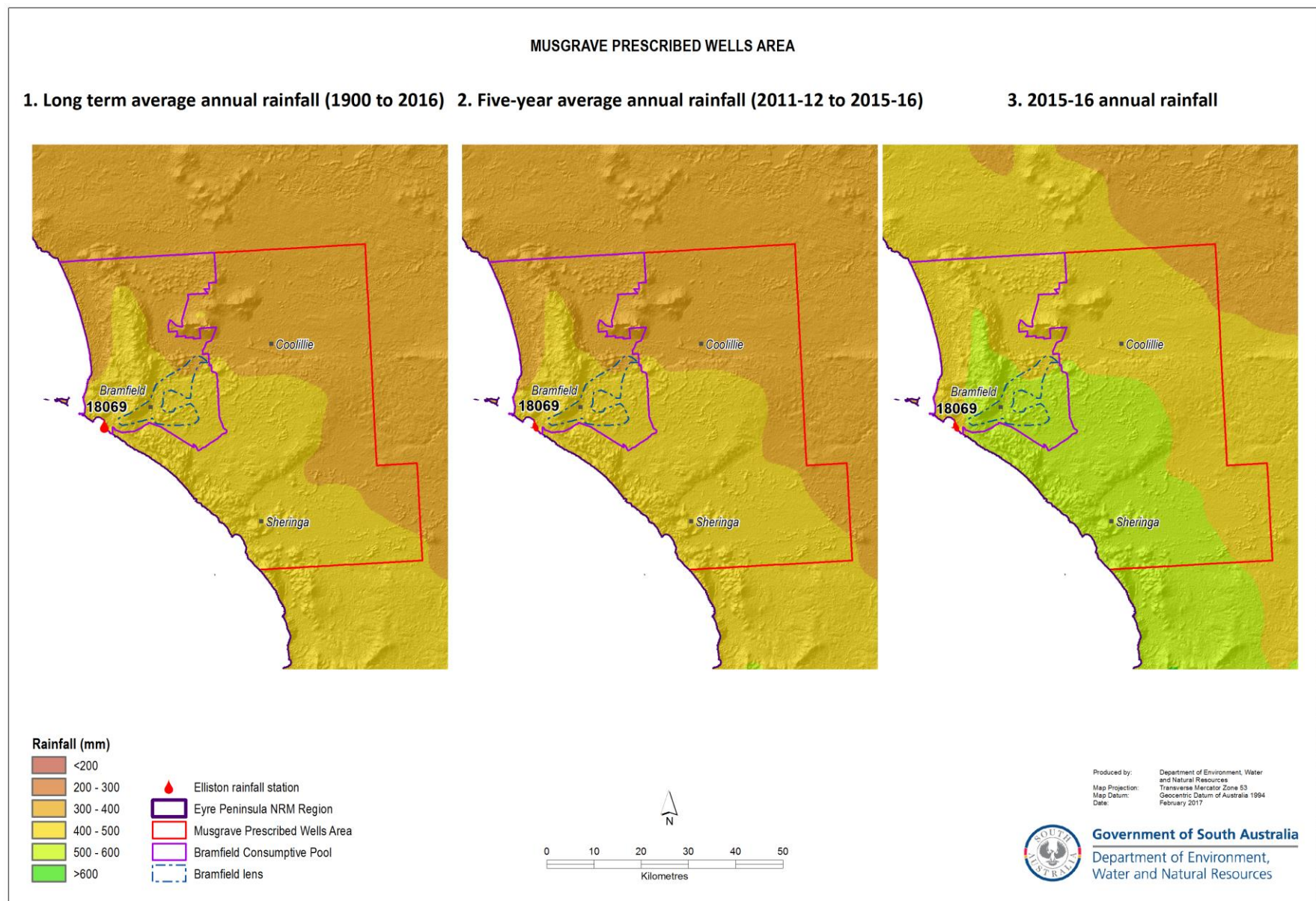


Figure 1. (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall for the 2015–16 water-use year in the Musgrave PWA<sup>2</sup>

<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).

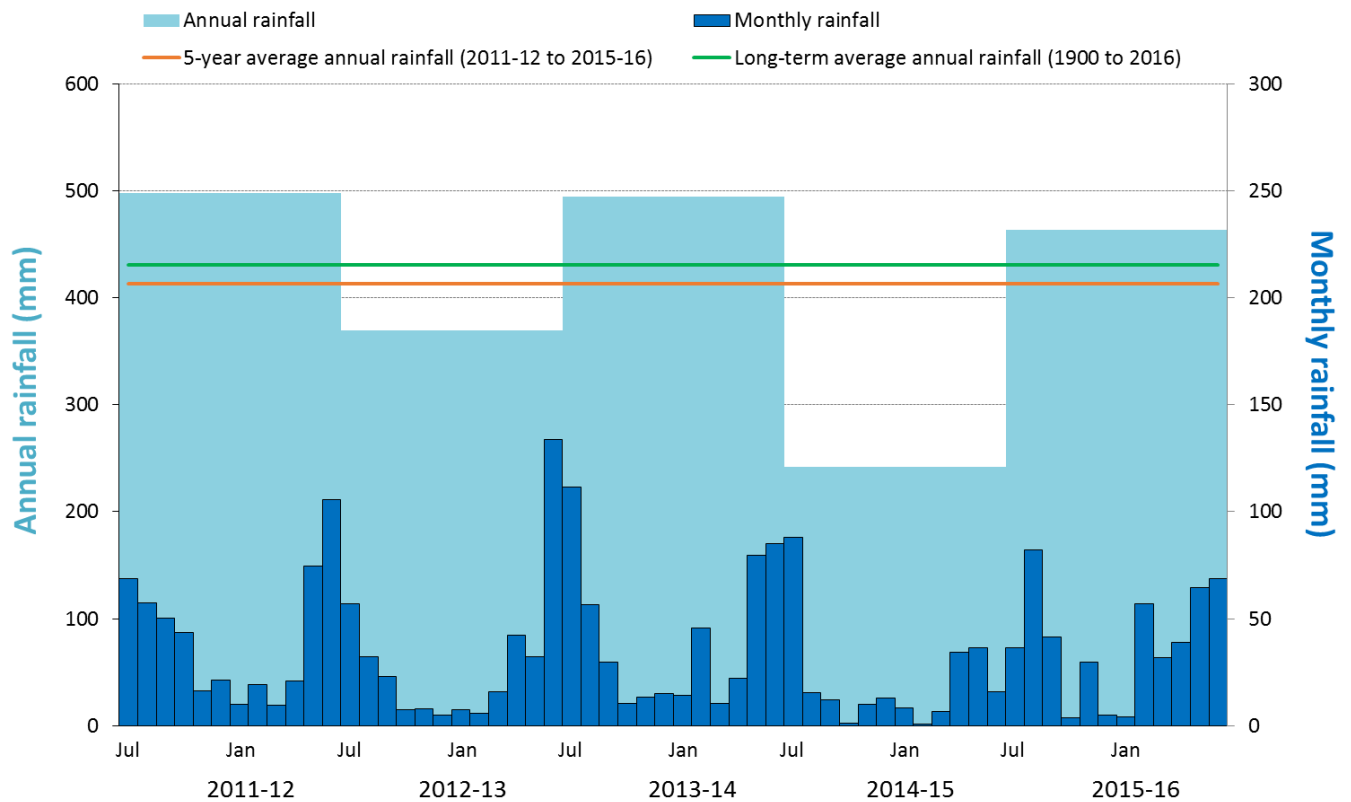


Figure 2. Annual (July–June) and monthly rainfall for the past five water-use years, and the five-yearly and long-term average annual rainfall recorded at Elliston (BoM Station 18069)<sup>3</sup>

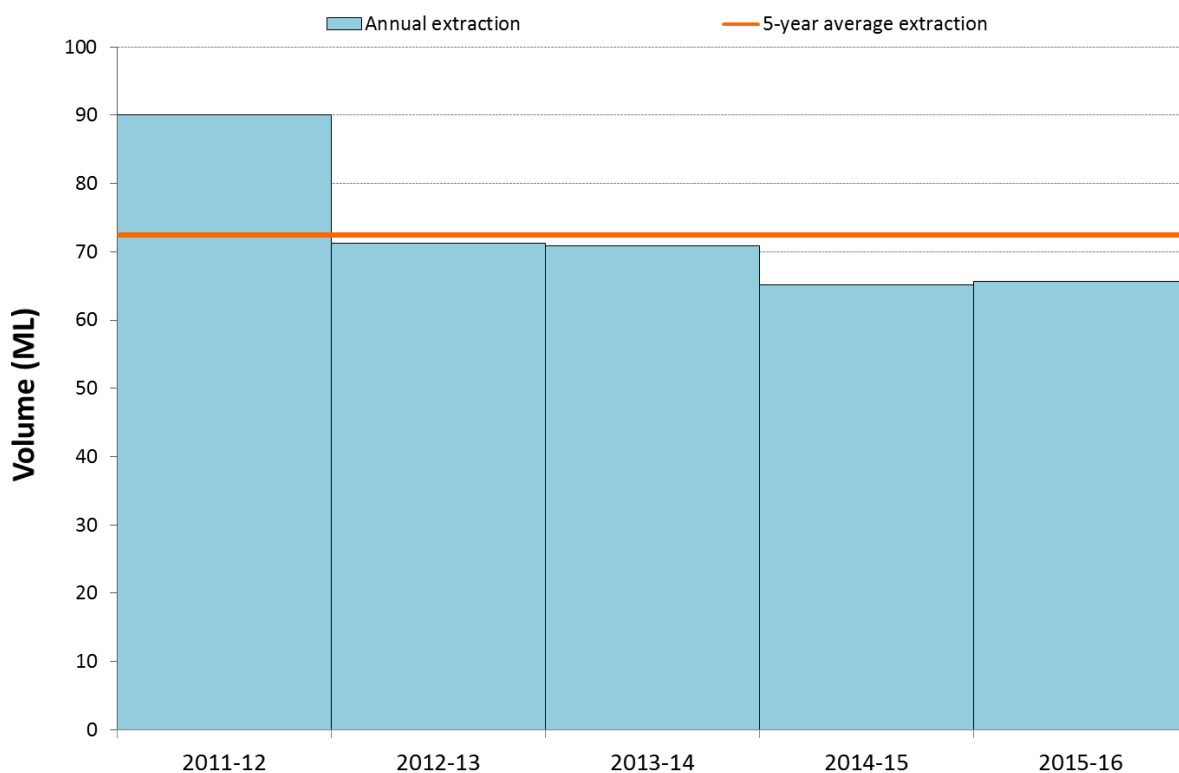


Figure 3. Licensed groundwater extraction volumes<sup>4</sup> from Bramfield in the Musgrave PWA for the past five water-use years

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

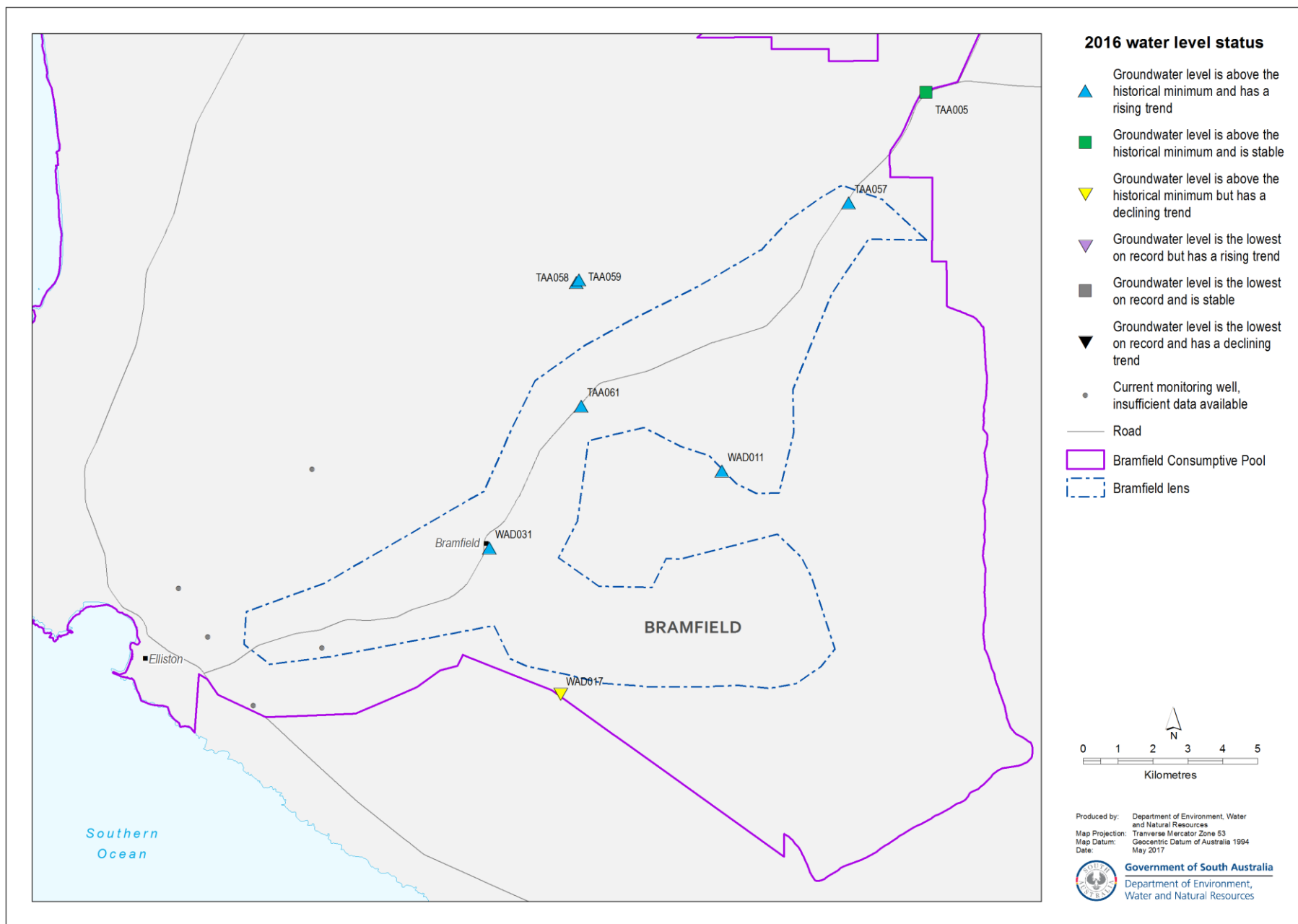


Figure 4. 2016 status of groundwater levels for Bramfield (Musgrave PWA), based on the five-year groundwater level trend from 2012 to 2016



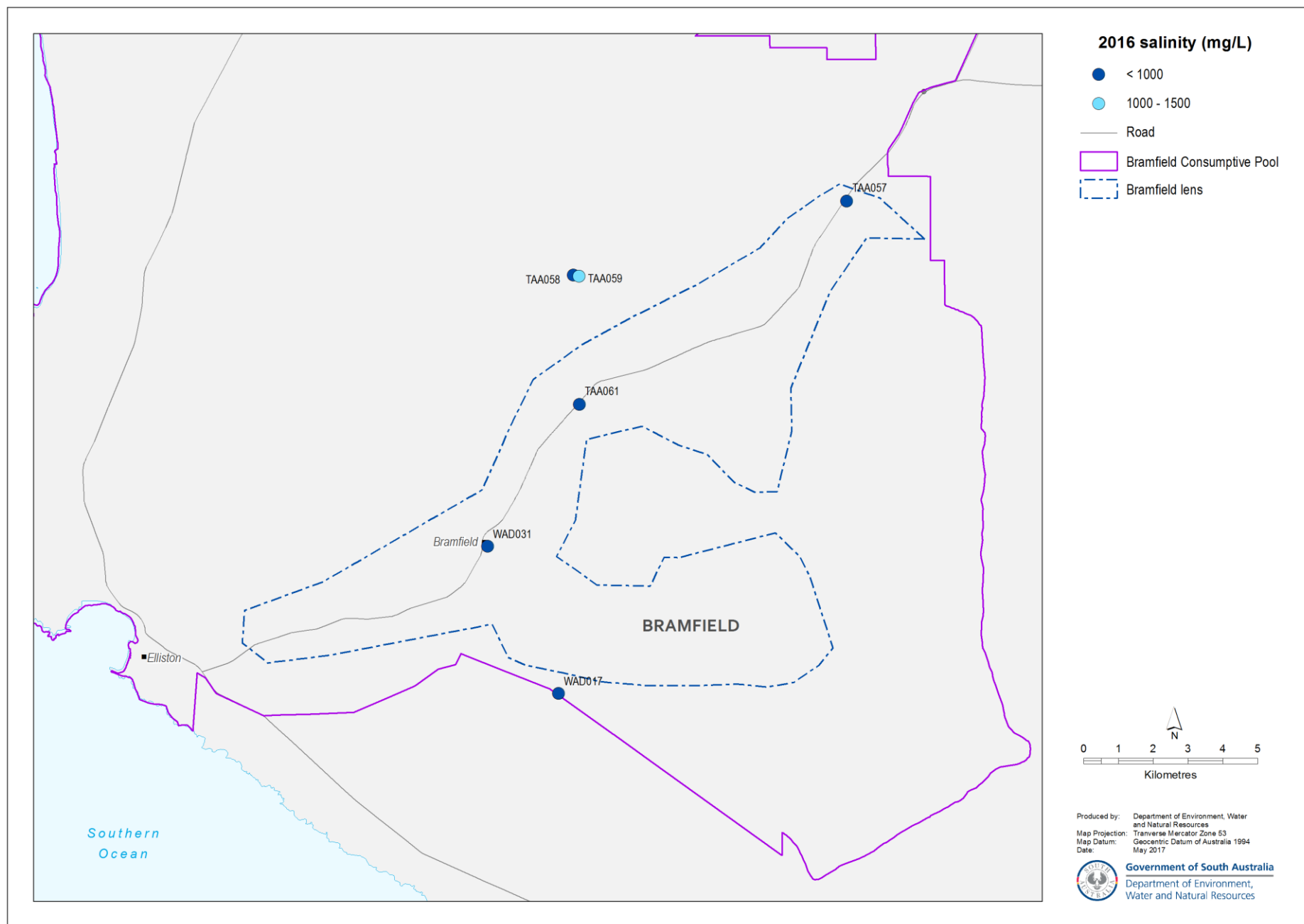


Figure 5. 2016 groundwater salinity of Bramfield (Musgrave PWA)

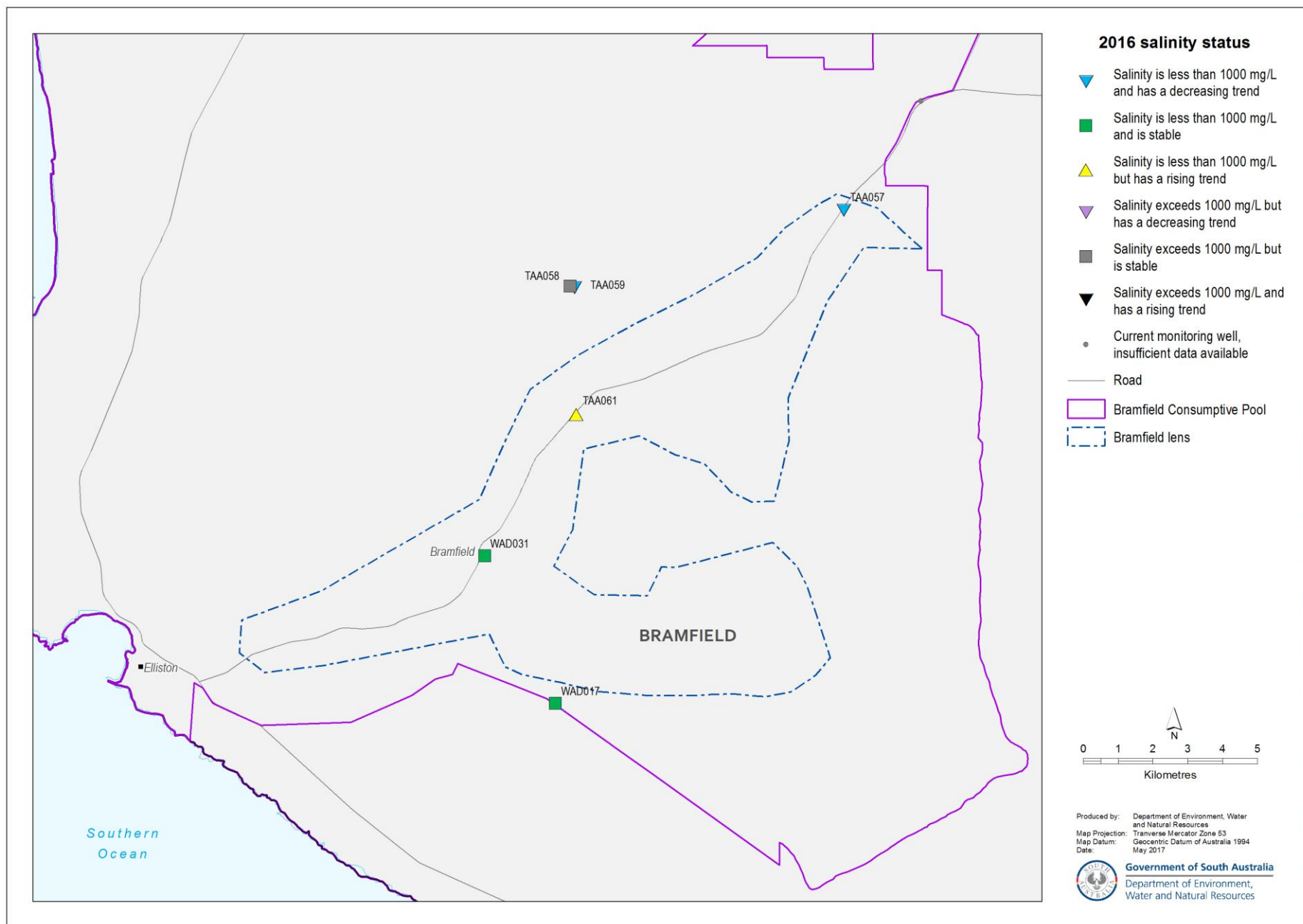


Figure 6. 2016 status of groundwater salinity for Bramfield (Musgrave PWA), based on the five-year trend from 2012 to 2016



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