

# Polda

Eyre Peninsula Groundwater Dependent Ecosystems monitoring site

## 2019 Report Card

### Summary

**Type of site:** Licensed extraction monitoring site.

**Status:** **Yellow**, minor adverse trends in the short term (2016 to 2019).  
Change in condition likely due to climate variability.



#### Red Gums:



Condition

**Moderate**



Trend

**Declining**

Short term  
(2016 to 2019)



Trend

**More data  
required**

Long term

#### Ground water levels:



Trend

**Declining**

Short term  
(2016 to 2019)

**Climate:** Above average maximum temperatures and declining annual rainfall and recharge events.

This Report Card should be read in conjunction with the Overview, which provides information about Groundwater Dependent Ecosystem (GDE) monitoring and summary information for all monitored GDE sites.



Adult Red Gums at Polda assessed as in 'moderate' condition.

The **Polda** Groundwater Dependent Ecosystems monitoring site is situated thirty three kilometres east of Bramfield, on the Birdseye Highway. The site includes a remnant patch (approximately 65 ha) of Red Gum (*Eucalyptus camaldulensis*) Woodland. The understorey is dominated by native and introduced grasses.

Polda is a licensed extraction GDE Site, monitored to assess the impacts of licensed extractions. Located in a licensed extraction area, there are a number of users who hold licenses to extract a limited amount of water for private commercial purposes. Access to water extraction details can be [found on WaterConnect](#) in the relevant 2018 Groundwater level and salinity status report.

There is also extraction of water for stock and domestic purposes for which a license is not necessary. This extraction is assumed to be low compared to extraction for licensed consumptive purposes, and there is a low likelihood of it having any impact on the GDE.



Polda site map. Note: yellow dots represent 50 surveyed trees.

### Red Gum condition

Tree condition monitoring was undertaken in 2016 and repeated in 2018 and 2019. In 2016 the average Red Gum Condition Index (RCI) score was 0.51, declining to 0.43 in 2019. While this shows an 8% decline in Red Gum condition over this three year period, the dataset is too short to enable determination of any long term trends.



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## Groundwater and climate assessment

Analysis of climate and groundwater data, and comparison to conditions at both the Bellevue and Bramfield GDEs in the Musgrave Prescribed Wells Area (PWA) (see Bellevue and Bramfield GDE 2019 Report Cards), indicate the short term decline in Red Gum condition is likely caused by climate variability.

Graphs on the right show climatic factors contributing to groundwater and possibly Red Gum decline at Polda:

- In the short term (2016 to 2019) total annual rainfall has decreased from 508.2 mm in 2016 to 219.6 mm in 2019, with an associated decline in groundwater levels (Graph 1).
- In the long term, while total annual rainfall at Polda has remained almost constant (blue line) and there has been a decline rainfall contributing to groundwater recharge (orange line) (Graph 2).

In addition, the average annual maximum air temperature at Elliston has increased by 2.2 degrees Celsius between 1962 and 2019.

In combination, this decreasing rainfall and increasing temperatures reduce water availability for Red Gums. Less water is immediately available from rainfall, there is more evaporation, and there is a reduction in groundwater recharge. Groundwater levels therefore decline, and this is thought to be significant for long term Red Gum health.

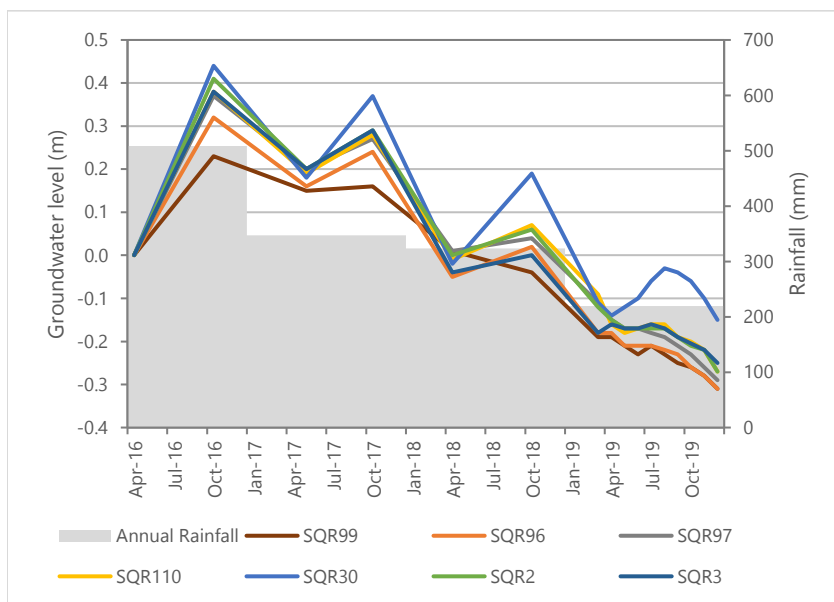
Although located on different groundwater lenses, a similar decline was observed at both Bramfield and Bellevue, a control site located outside the zone of influence of licensed extraction. This indicates the decline can be attributed to factors that are relatively consistent across the three sites, specifically reduced rainfall and recharge, and increased temperatures, rather than being caused by licensed extraction which varies significantly across the sites.

## Monitoring into the future

Tree condition monitoring will continue on a yearly basis. As time goes on more data will allow for the identification of any long term trends in the GDE condition.

New monitoring infrastructure was installed at Polda in 2019 to improve the site specific accuracy of data collection. Additions include:

- a water level data-logger at one well, and
- a rain gauge to measure rainfall intensity and amount.

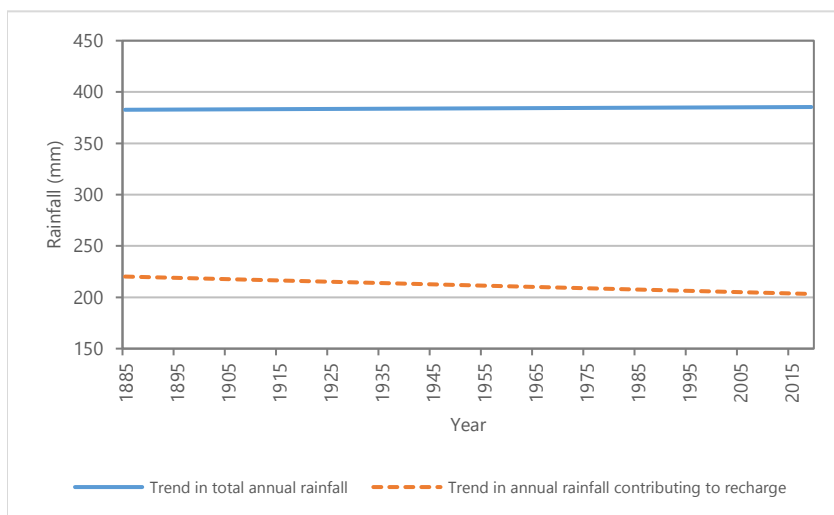


**Graph 1** Total annual rainfall<sup>^^</sup> and change in groundwater levels<sup>\*\*</sup> at seven wells, from 2016 to 2019.

Notes:

<sup>^^</sup>Rainfall data for 2016 to 2018 is regional data obtained from the Bureau of Meteorology station, Mt Wedge (number 18056). Rainfall data for 2019 onward is site specific data obtained from the rainfall gauge installed at the Polda GDE site.

<sup>\*\*</sup>For each well, the groundwater levels shown are relative to the groundwater level at the start of the monitoring period, which is shown as zero.



**Graph 2** Long term trends in *total annual rainfall* and *annual rainfall contributing to recharge*<sup>\*</sup> from 1885 – 2019 (Mt Wedge (18056) and Polda rain gauges).

Note:

<sup>\*</sup> Increases in groundwater levels are generally only observed when the monthly rainfall is more than 20 mm. To calculate the *annual rainfall contributing to groundwater recharge*, the portion of the rainfall over 20 mm in each month is summed.

## For more information

Access the full report on assessment of Red Gum condition in 2018 [here](#): Muller K. L., N.J. Souter and Australian Water Technology (2019). *Eyre Peninsula Groundwater Dependent Ecosystem Data Analysis: Red Gum tree condition data (five sites)*. A report for Natural Resources Eyre Peninsula, Department for Environment and Water, Port Lincoln, South Australia.

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