

Bramfield

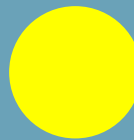
Eyre Peninsula Groundwater Dependent Ecosystems monitoring site

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.

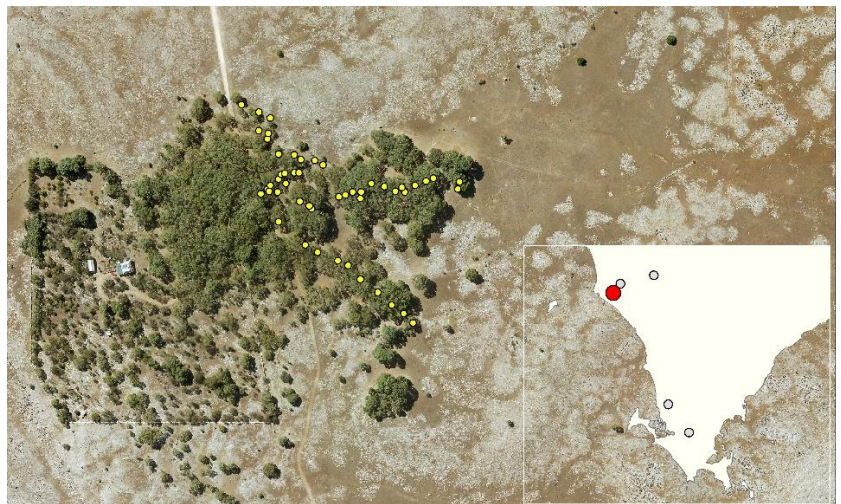


Adult Red Gums at Bramfield assessed as in 'moderate' condition.

The **Bramfield** Groundwater Dependent Ecosystem (GDE) monitoring site is situated one kilometre south of Bramfield. The site includes a remnant patch (approximately 16 ha) of Red Gum (*Eucalyptus camaldulensis*) Woodland. The understory is dominated by native and introduced grasses.

Bramfield is a licensed extraction GDE Site, monitored to assess the impacts of licensed extractions. Located in a licensed extraction area, there a number of users (including SA Water) who hold licenses to extract a limited amount of water for drinking water supply and other 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.



Bramfield 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 0.49, declining to 0.46 in 2019. While this shows a 3% 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 the control site Bellevue (see Bellevue GDE 2019 Report Card), 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 Bramfield:

- In the short term (2016 to 2019) total annual rainfall has decreased from 543.9 mm in 2016 to 263.8 mm in 2019, with an associated decline in groundwater levels (Graph 1).
- In the long term, there is also a decline in total annual rainfall (blue line) and in 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 temperature 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.

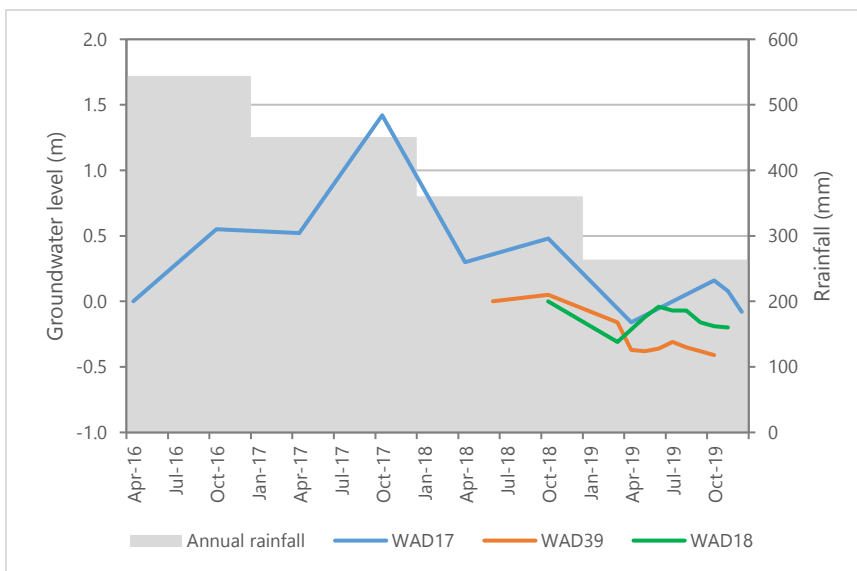
Similar decline in groundwater levels and Red Gum condition was observed at the control site Bellevue, which is located outside the zone of influence of licensed extraction. Since these declines occurred at both the control and the licensed extraction sites, it is further indication that this can be attributed to factors other than licensed extraction, specifically reduced rainfall and recharge, and increasing temperature.

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 Bramfield in 2019 to improve the site specific accuracy of data collection. Additions include:

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

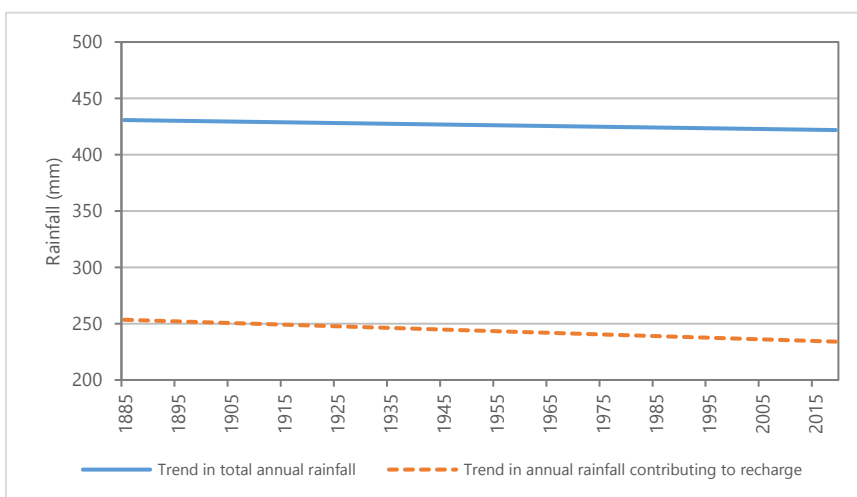


Graph 1 Total annual rainfall^{^^} and change in groundwater levels^{**} at three wells, from 2016 to 2019.

Notes:

^{^^}Rainfall data for 2016 to 2018 is regional data obtained from the Bureau of Meteorology station, Elliston (number 18069). Rainfall data for 2019 onward is site specific data obtained from the rainfall gauge installed at the Bramfield GDE site.

^{**}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*^{*} from 1885 – 2019 (Elliston (18069) and Bramfield rain gauges).

Note:

^{*} 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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