

Bellevue

Eyre Peninsula Groundwater Dependent Ecosystems monitoring site

2019 Report Card

Summary

Type of site: Control site for Bramfield.

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

Red Gums:



Short term
(2016 to 2019)



Long term

Ground water levels:

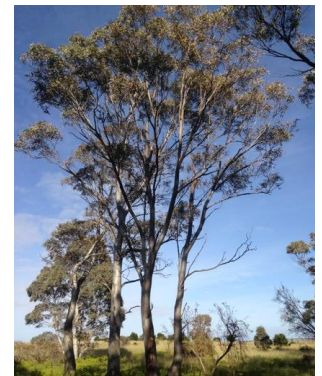


Short term
(2016 to 2019)



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 Bellevue assessed as in 'moderate' condition.

The **Bellevue** Groundwater Dependent Ecosystem (GDE) monitoring site is situated eight kilometres north-east of Bramfield, on the Birdseye Highway. The site includes a seasonal (ephemeral) wetland and a remnant patch (approximately 17 ha) of Red Gum (*Eucalyptus camaldulensis*) Woodland. Amongst the Red Gum overstorey and midstorey grow native apricot (*Pittosporum sp.*) and sheoak (*Allocasuarina spp.*). The understorey is predominately intact and includes flax lily (*Dianella spp.*). Around the wetland proper is an extensive zone of honey-myrtle (*Melaleuca sp.*).

Bellevue is a control GDE Site, and is monitored to assess the impact of factors other than licensed extraction (e.g. climate) on GDE condition. It is located outside the zone of influence of any current or known historic licensed extraction.

While there is unlicensed extraction of water for stock and domestic purposes, this is assumed to be low compared to extraction for licensed consumptive purposes at other sites, and there is a low likelihood of it having any impact on the GDE.



Bellevue 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 0.53, declining to 0.48 in 2019. While this shows a 5% decline in Red Gum condition over this three year period, the dataset is too short to enable determination of any long term trends.

Groundwater and climate assessment

Analysis of climate and groundwater data indicates 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:

- In the short term (2016 to 2019) total annual rainfall has decreased from 543.9 mm in 2016 to 267.0 mm in 2019, with an associated decline in groundwater levels (Graph 1). Since Bellevue is located outside the zone of influence of licensed extraction, this decline in groundwater level can be attributed to reduced rainfall and recharge.
- In the long term, there is a decline in total annual rainfall and in rainfall contributing to groundwater recharge (Graph 2).

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

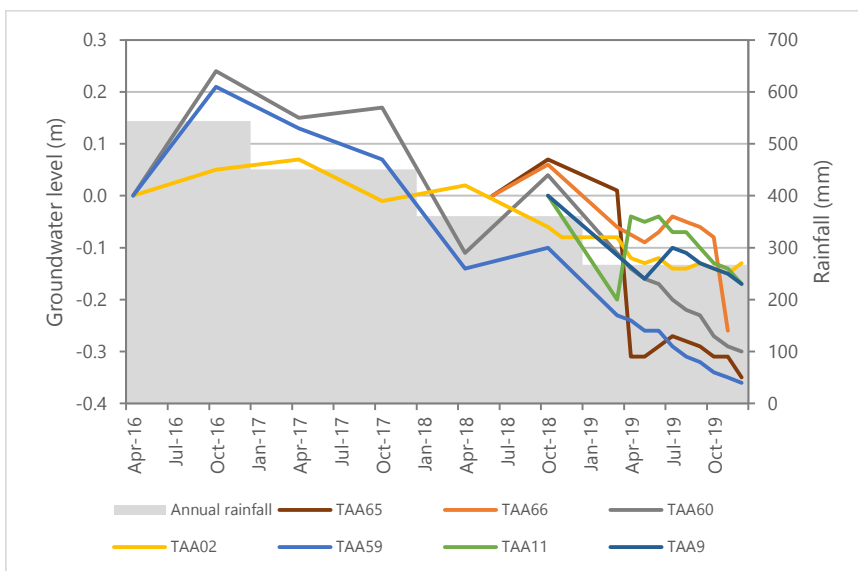
In combination, this decreasing rainfall and increasing temperatures reduce water availability for Red Gums. Less water is immediately available from rainfall, there is more evaporation, and there is a reduction in groundwater recharge. Groundwater levels therefore decline, and this is thought to be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

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 trends in the GDE condition.

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

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

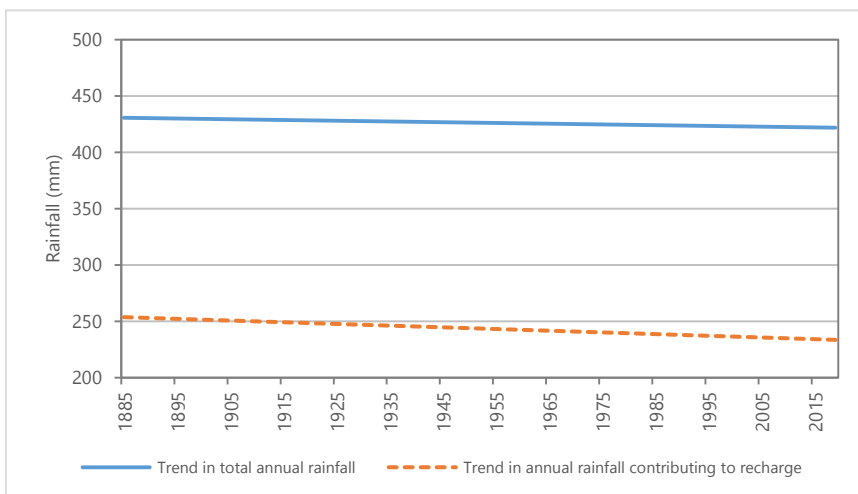


Graph 1 Total annual rainfall^{^^} and change in groundwater levels^{**} at seven wells, from 2016 to 2019.

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 Bellevue 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 Bellevue rain gauges).

Note:

^{*} Increases in groundwater levels are generally only observed when the total 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.

Contact: **Manager – Planning and Engagement**
P (08) 8688 3111