

Bramfield

Eyre Peninsula Groundwater Dependent Ecosystems monitoring site

2021 Report Card

Summary

Type of site: Licensed extraction monitoring site.

Status: **Green**, improving trends in the short term (2016 to 2021). Stable condition (2020-2021) likely due to ongoing good winter rainfall, and increasing groundwater levels.

Red Gums:



Condition
Good

Annual change
(2020-2021)
Stable



Short term
trend
(2016 to 2021)
Improving



Long term
trend
**More data
required**



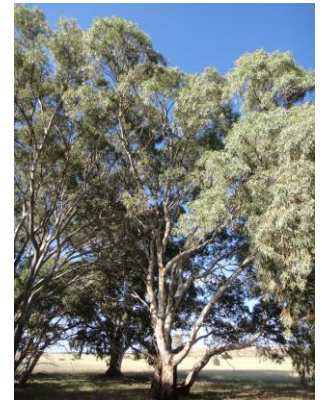
**Groundwater
levels:**

Annual
change
(2020-2021)
Improving



Climate: Below average maximum summer temperatures and above average total annual rainfall, with good recharge events.

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



Adult Red Gum at Bramfield assessed as in 'very good' condition in Oct 2021.

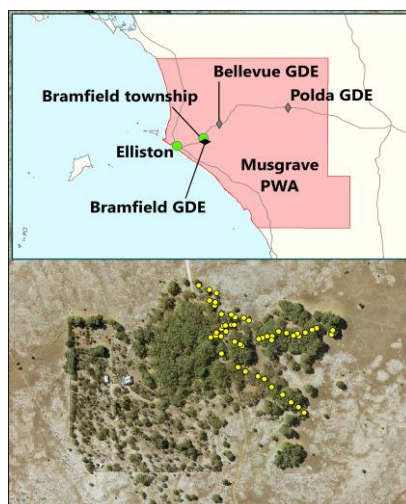
The **Bramfield** Groundwater Dependent Ecosystem (GDE) monitoring site is situated one kilometre south of Bramfield. The site includes a remnant patch of Red Gum (*Eucalyptus camaldulensis*) Woodland (approximately 16 ha). The understory is dominated by native and introduced grasses.

The Bramfield GDE site is monitored to assess the impacts of licensed water extraction from the Bramfield groundwater lens in the Musgrave Prescribed Wells Area. There are a number of users (including SA Water) who hold licenses to extract water for town water supply, domestic use, and other private commercial purposes. Water extraction information can be [found on WaterConnect](#) in the *Musgrave Prescribed Wells Area 2019-20 groundwater status overview*.

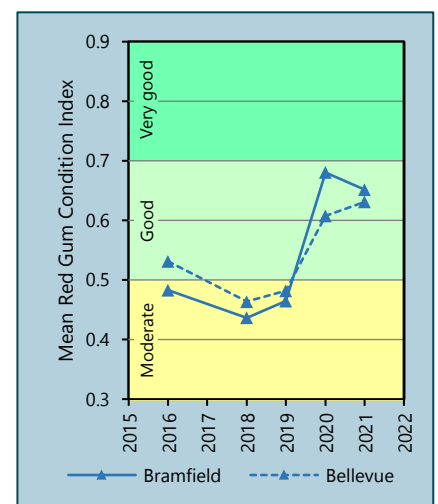
There is also extraction of water for stock and domestic purposes for which a license is not necessary. This extraction is assumed to be low compared to extraction for licensed consumptive purposes, and there is a low likelihood of it having any impact on the GDE.

Red Gum condition

Tree condition monitoring is carried out in late October to early November. First completed in 2016, monitoring has been repeated annually since 2018. In 2016 the Red Gum condition was moderate, with an average Red Gum Condition Index (RCI) score of 0.48. In 2018 and 2019 the condition declined, before improving to good in 2020, (average RCI score of 0.68). In 2021 condition has remained good, with a 3% decline in average RCI score (0.65). This small change is not statistically significant, thus the condition can be considered stable for the period 2020 to 2021. The dataset is too short to enable determination of any long term trends.



Bramfield site map
(yellow dots represent 50 surveyed trees)



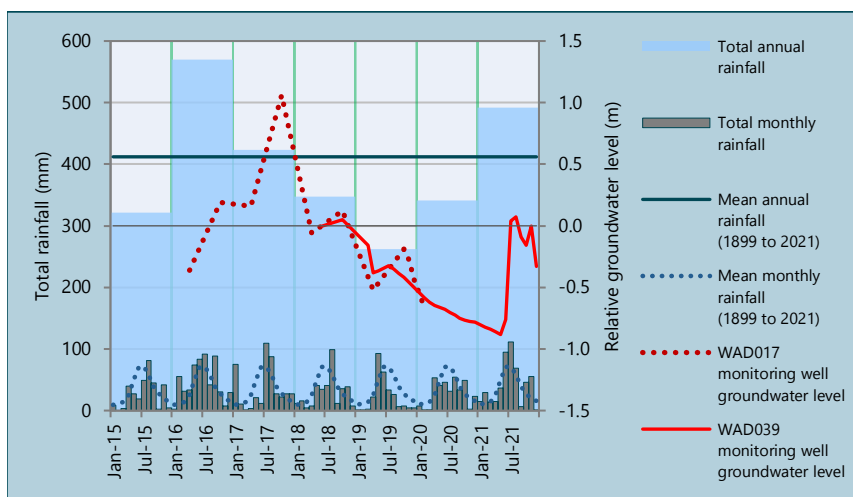
Graph 1 Change in Red Gum Condition Index at Bramfield and Bellevue (control site for Bramfield) from 2016 to 2021

Groundwater and climate assessment

Red Gum condition remained good through 2021, with trees supported by increased groundwater levels, higher than average total annual rainfall, and cooler than average maximum daily temperatures.

As detailed below, graphs on the right show climatic factors contributing to groundwater recovery, and associated stable Red Gum condition:

- Total annual rainfall increased from 342 mm in 2020 to 492 mm in 2021, 80 mm above the long term¹ mean annual rainfall (Graph 2).
- Rainfall in June, July and August was 18% to 56% higher than the long term¹ monthly means (Graph 2). This is indicative of rainfall events of good intensity (how hard the rain falls) and duration during these months, both of which are important for groundwater recharge.
- Through the early summer months of 2021, levels in monitoring well WAD039 continued to decline and in May 2021 were the lowest since monitoring commenced in June 2018. This decline was, however, followed by rapid recharge of groundwater in June and July, caused by the higher than average rainfall during these months. Groundwater levels increased by over 0.96 m during this period (Graph 2).
- Even though groundwater levels again declined after this recharge occurred, levels have recovered such that in late December 2021 they were the highest observed in WAD039 in any December since July 2019 (Graph 2).
- Temperatures were cooler than usual, with the monthly average of daily maximum temperature for the summer months (November to March) 1.2°C below the long term¹ mean (Graph 3). These cooler temperatures could result in improved groundwater recharge, with less evaporation occurring after rainfall events. They can also contribute to improved Red Gum condition, with the trees being impacted less by heat stress.

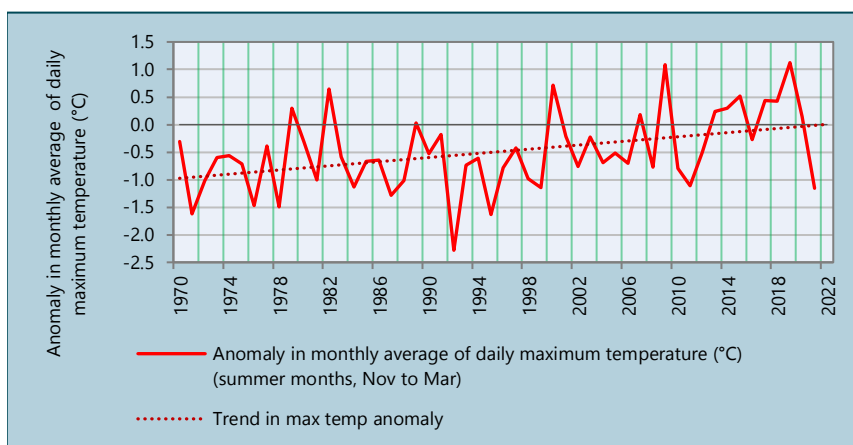


Graph 2 Total annual and total monthly rainfall[^], and change in groundwater levels^{**} at two monitoring wells, WAD017 and WAD039

Notes:

^{^^}Rainfall data for 2016 to 2018 is obtained from the Bureau of Meteorology station, Bramfield Post Office (number 18003). Rainfall data for 2019 and 2021 is site specific data obtained from the rainfall gauge installed at the Bramfield GDE site.

^{**}For monitoring wells WAD017 (5930-0132) and WAD039 (5930-1532), the groundwater levels shown are relative to the groundwater levels at June 2018, which are shown as zero.



Graph 3 Anomaly in annual average of daily maximum temperature[^] from 1970 to 2021

Note:

[^] This is the difference between the annual average of the daily maximum temperature for any one year and the long term¹ mean of the annual average of the daily maximum temperature. Maximum daily temperature is measured at the Bureau of Meteorology station, Bramfield Post Office (number 18003).

During 2021, similar changes in groundwater levels and Red Gum condition were observed at the Bellevue Red Gum GDE site, the control site for Bramfield, which is outside the zone of influence of licensed water extraction from the Bramfield groundwater lens. This indicates that during 2021, there has been no negative impact on the Red Gum GDE at Bramfield as a result of licensed groundwater extraction.

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.

¹All long term averages are for the period 1 Jan 1899 to 31 Dec 2021.

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 (DEW), Port Lincoln, South Australia.

For groundwater status information:

DEW (2021). [Musgrave and Southern Basins Prescribed Wells Areas. 2019-20 water resources assessment](#). DEW Technical Note 2021/15.

DEW (2021). [Musgrave Prescribed Wells Area. 2019-20 groundwater status overview](#).

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