

Bellevue

Eyre Peninsula Groundwater Dependent Ecosystems monitoring site

2022 Report Card

Summary

Type of site: Control site for Bramfield

Status: **Green**, improving trends in the short term (2016 to 2022). Stable condition (2021-2022) likely due to ongoing good winter rainfall, and stable groundwater levels.

Red Gums:



Condition
Good

Annual change
(2021-2022)
Stable



Short term
trend
(2016 to 2022)
Improving



Long term
trend
**More data
required**



**Groundwater
levels:**

Annual
change
(2021-2022)
Stable



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 Bellevue assessed as in 'poor' condition in Oct 2022.

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 of Red Gum (*Eucalyptus camaldulensis*) Woodland (approximately 17 ha).

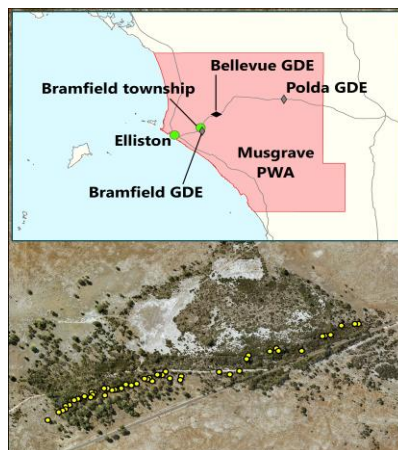
Native apricot (*Pittosporum sp.*) and sheoak (*Allocasuarina spp.*) grows amongst the Red Gum overstorey and midstorey. The understorey is predominately intact and includes flax lily (*Dianella spp.*). Around the wetland proper is an extensive zone of honey-myrtle (*Melaleuca sp.*).

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

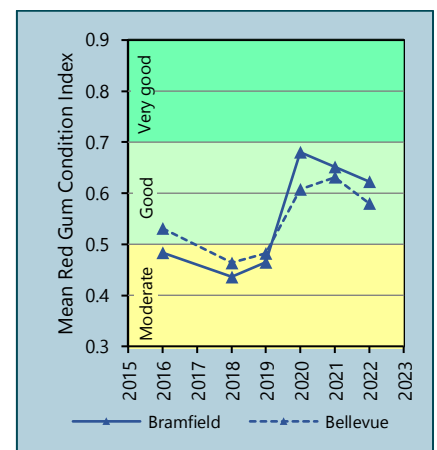
While there is unlicensed extraction of water for stock and domestic purposes, this is assumed to be low compared to extraction for licensed consumptive purposes at other sites, with a low likelihood of it having any impact on the GDE.

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 good, with an average Red Gum Condition Index (RCI) score of 0.53. In 2018 and 2019 the condition declined to moderate, before improving to good in 2020, (average RCI score of 0.61). In 2021 and 2022 condition has remained good, with a total 3% decrease in average RCI score (0.58) over these years. The small reduction in RCI was caused by lower tip growth and/or reproduction (fruit and flower) scores, an indication of less vigour in the trees. This small change is not statistically significant, thus the condition can be considered stable for the period 2020 to 2022. The dataset is too short to enable determination of any long term trends.



Bellevue site map (yellow dots represent 49 surveyed trees)



Graph 1 Change in Red Gum Condition Index at Bellevue (control site for Bramfield) and Bramfield from 2016 to 2022

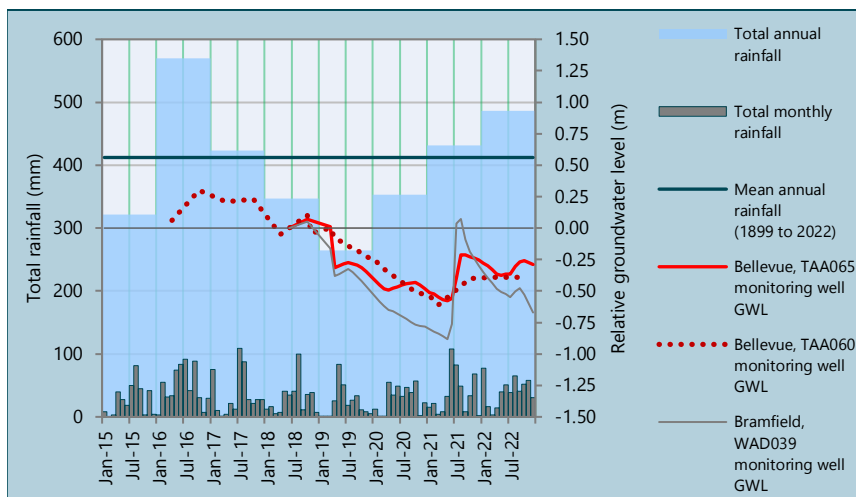
Groundwater and climate assessment

Red Gum condition remained good through 2022, with trees supported by stable 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 432 mm in 2021 to 486 mm in 2022, 74 mm above the long term¹ mean annual rainfall (Graph 2).
- Through the summer months of 2022, levels in monitoring TAA065 continued to decline. This decline was, however, followed by a small recharge of groundwater in August and September, and then further decline to the end of December.
- Temperatures were cooler than usual, with the monthly average of daily maximum temperature for the summer months (November to March) 0.9°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. Cooler temperatures could, however, also result in less vigour in the trees and might be the cause of the small decline in Red Gum RCI during 2022. Similar decline in RCI with cooler temperatures was also seen at Bramfield, Polda and Coultas in 2022.

The Bellevue Red Gum GDE site is located outside the zone of influence of licensed extraction from the Bramfield groundwater lens. The stabilisation in groundwater levels observed at Bellevue during 2022 therefore indicates that, in the absence of licensed extraction, during 2022, a stabilisation in groundwater levels should have been observed in most other wells on the Bramfield groundwater lens. Similarly, Red

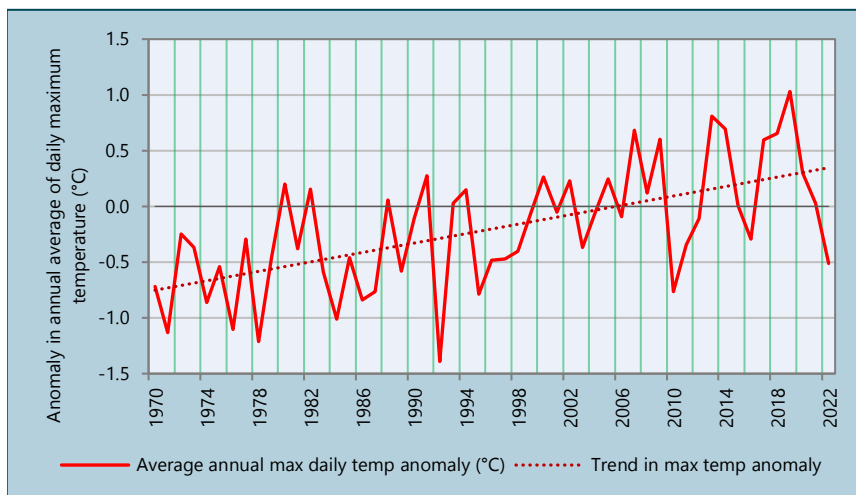


Graph 2 Total annual and total monthly rainfall^{^^}, and change in groundwater levels^{**} at monitoring wells at Bellevue, TAA065 (5930-1531) and TAA060 (5930-0006), and at Bramfield (extraction site for which Bellevue is the control), WAD017 (5930-0132)

Notes:

^{^^} Rainfall data for 2015 to 2018 is patched [SILO](#) data for the Bureau of Meteorology station, Bramfield Post Office (number 18003). Rainfall data for 2019 to the end of 2022 is site specific data obtained from the rainfall gauge installed at the Bellevue GDE site.

^{**}For all monitoring wells the groundwater levels shown are relative to the groundwater levels in that well at June 2018, which are shown as zero.



Graph 3 Anomaly in annual average of daily maximum temperature[^] from 1970 to 2022

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

Gum condition at other Red Gum GDE sites should at least have remained stable, during 2022.

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 2022.

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.

Access the 2022 *Overview and Red Gum GDE Condition Summary* and other specific site (Bramfield, Polda, Wanilla and Coultas) report cards [here](#)

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