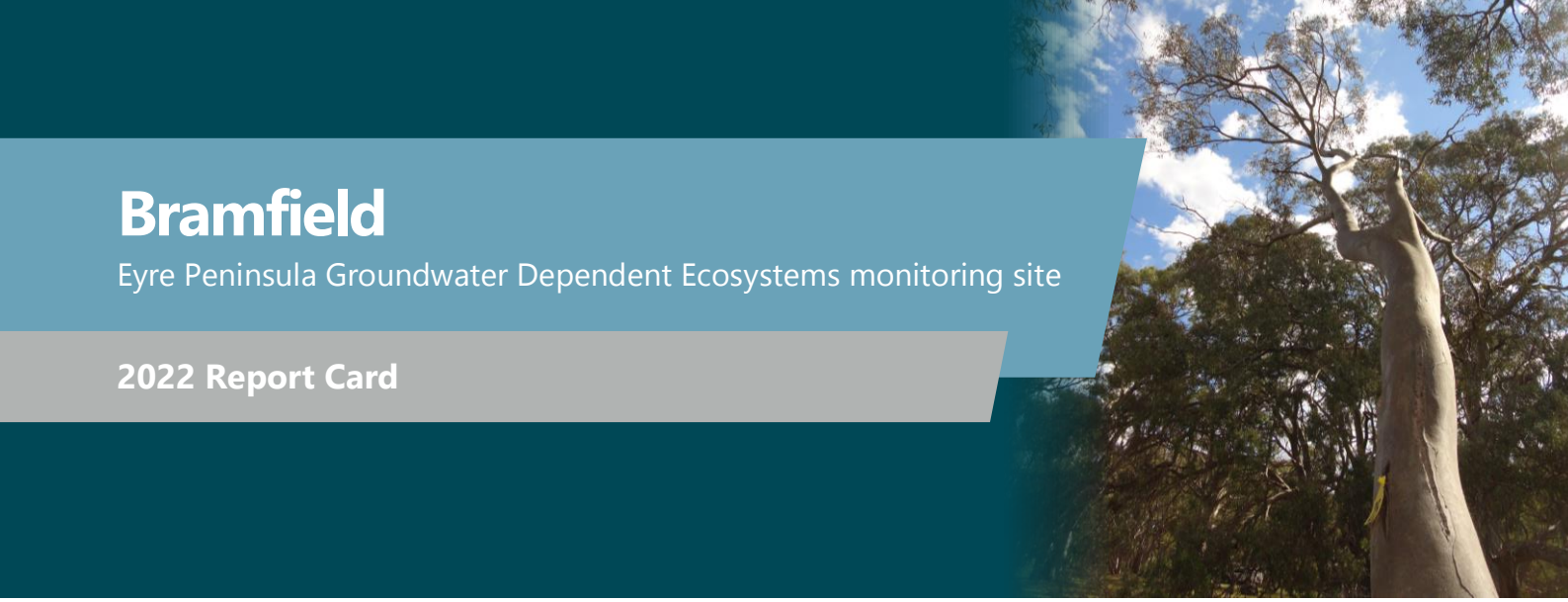
Bramfield

Eyre Peninsula Groundwater Dependent Ecosystems monitoring site

2022 Report Card



Summary

Type of site: Licensed extraction monitoring site.

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	Annual change (2021-2022)	Short term trend (2016 to 2022)	Long term trend
	Good	**Stable**	**Improving**	**More data required**
		—	↗	?

Groundwater levels:	Annual change (2021-2022)
	Declining
	↙

Climate: Below average maximum summer temperatures and near average total annual rainfall, with small 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 2022.

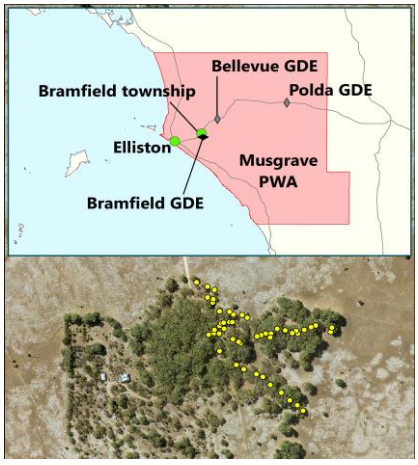
The **Bramfield** Groundwater Dependent Ecosystem (GDE) monitoring site is situated one kilometre south of Bramfield. The site includes a remnant patch of Red Gum (*Eucalyptus camaldulensis)* Woodland (approximately 16 ha). The understory is dominated by native and introduced grasses.

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 allocations for these licensed extractions have, however, reduced from 467 ML (2018-2019) to 62.3 ML (2021-2022), with an associated reduction in actual extraction from 91 ML (2018-2019) to 26.3 ML (2021-2022).

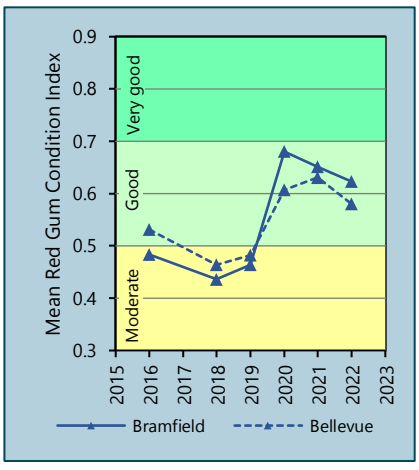
There is also extraction of water for stock and domestic purposes for which a license is not necessary. This extraction is assumed to be low compared to extraction for licensed consumptive purposes, and there is a low likelihood of it having any impact on the GDE.

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) (Graph 1). In 2021 and 2022 condition has remained good, with a total 6% decline in average RCI score (0.62) over these two years (3% decline each year). 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 in RCI in 2022 is not statistically significant, thus the condition can be considered stable for the period 2021 to 2022. 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 2022

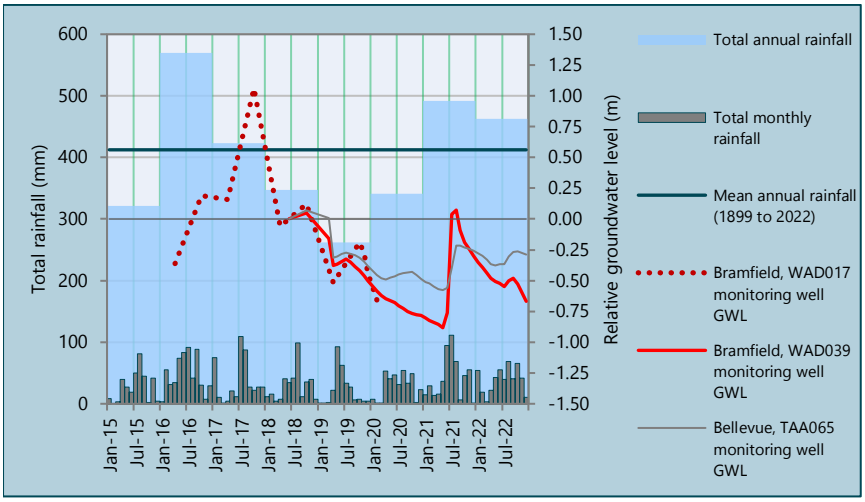
Groundwater and climate assessment

Red Gum condition remained good through 2022, with trees supported by stable groundwater levels, above 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:

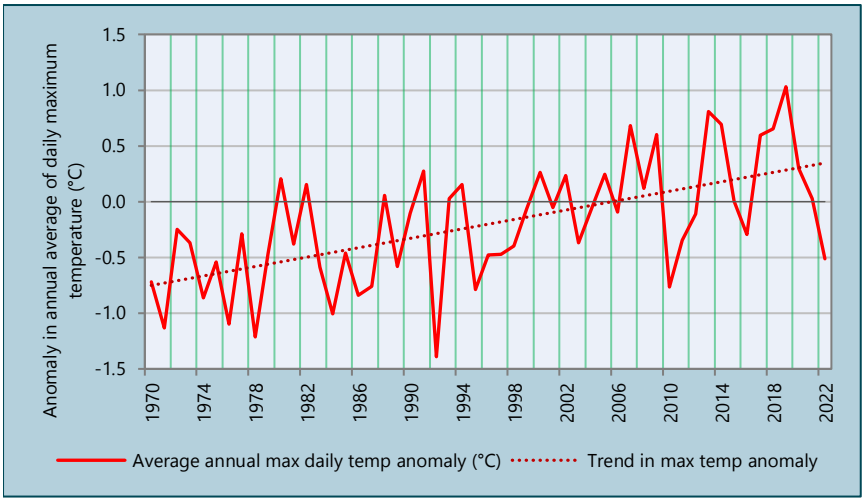
- Total annual rainfall decreased from 492 mm in 2021 to 463 mm in 2022, 51 mm above the long term[1] mean annual rainfall (Graph 2).
- Through the summer months of 2022, levels in monitoring well WAD039 continued to decline. This decline was, however, followed by a small amount of recharge of groundwater in August and September, followed by further decline from September to the end of December. The recharge in August-September coincided with higher than average spring rainfall.
- 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 term[1] mean (Graph 3). These cooler temperatures could result in improved groundwater recharge, with less evaporation occurring after rainfall events. The impact of cooler temperatures on Red Gum condition is possibly mixed. Cooler temperatures can 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 Bellevue, Polda and Coulta in 2022.

During 2022, there was a smaller decline in groundwater levels but similar declines in Red Gum condition 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 2022, there was no significant negative impact on the Red Gum GDE at Bramfield as a result of licensed groundwater extraction.



Graph 2 Total annual and total monthly rainfall^^, and change in groundwater levels** at monitoring wells at Bramfield, WAD017 (5930-0132) and WAD039 (5930-1532), and at Bellevue (control site for Bramfield), TAA065 (5930-1531)

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 and 2021 is site specific data obtained from the rainfall gauge installed at the Bramfield GDE site. Rainfall data for 2022 is a combination of site specific data patched with SILO data for Bramfield Post Office (station number 18003).
**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 term[1] 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).

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.

[1]All 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 (Bellevue, Polda, Wanilla and Coulta) report cards here

For groundwater status and long term water extraction 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*.

Contact: Eyre Peninsula Landscape Board, **Senior Water Resources Officer** P (08) 8688 3200