Wanilla

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). Improving condition (2020-2021) likely due to ongoing good winter rainfall, and increasing groundwater levels.

Red Gums:	Condition **Good**	Annual change (2020-2021) **Improving**	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 May to July 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 Wanilla assessed as in 'good' condition in Oct 2021.

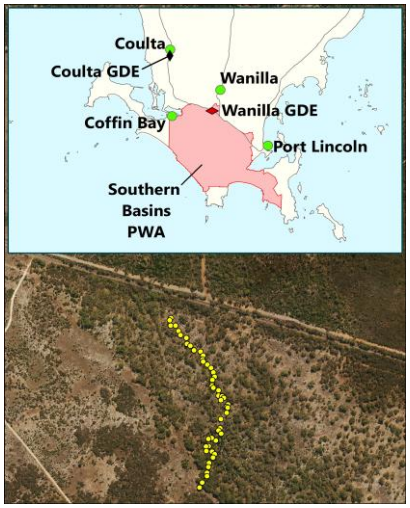
The **Wanilla** Groundwater Dependent Ecosystem (GDE) monitoring site is situated four kilometres east of the Coffin Bay road turn off on Flinders Highway. The site is part of a large remnant patch of Red Gum (*Eucalyptus camaldulensis)* Woodland. Amongst the Red Gum overstorey and midstorey grows native apricot (*Pittosporum sp.*), coast beard-heath (*Leucopogon sp.*), hop-bush (*Dodonaea sp.*) and sheoak (*Allocasuarina spp.*).

The Wanilla GDE site is monitored to assess the impacts of licensed water extraction from the Uley Wanilla groundwater lens in the Southern Basins 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 *Southern Basins Prescribed Wells Area 2019-2020 groundwater status overview.*

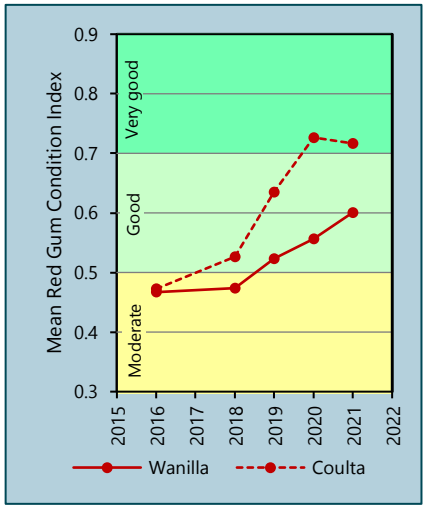
While there is unlicensed extraction of water for stock and domestic purposes, this is assumed to be low compared to extraction for licensed consumptive purposes at other sites, and there is a low likelihood of it having any impact on the GDE.

Red Gum condition

Tree condition monitoring is carried out in late October to early November. In 2016, when the monitoring commenced, the Red Gum condition was moderate, with an average Red Gum Condition Index (RCI) score of 0.47. There has been a steady improvement in condition since then, with condition in 2020 being good (average RCI score of 0.56), a 9% improvement in Red Gum condition since 2016. The condition has improved by a further 4% through 2021 (average RCI score of 0.60), and remains good. The dataset is too short to enable determination of any long term trends.



Wanilla site map
(yellow dots represent 50 surveyed trees)



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

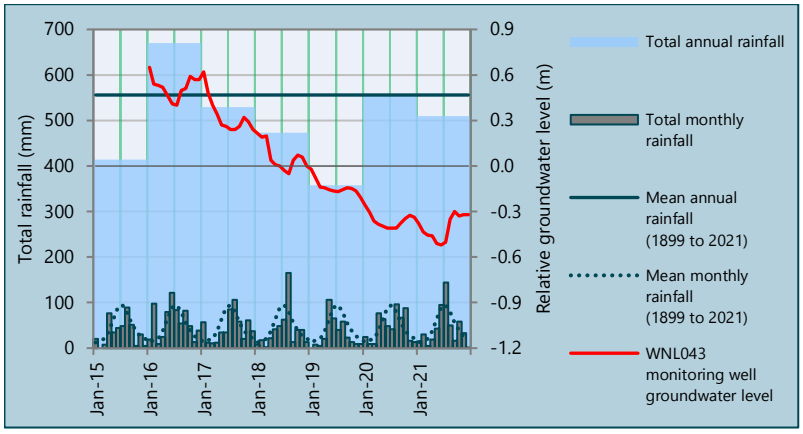
Groundwater and climate assessment

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

As detailed below, Graphs 2 and 3 shows climatic factors contributing to groundwater recovery, and associated stable Red Gum condition:

- Total annual rainfall decreased from 555 mm in 2020 to 510 mm in 2021, 46 mm below the long term[1] mean annual rainfall (556 mm) (Graph 2).
- The lower than average total annual rainfall, was offset by high total monthly rainfall in June and July. Rainfall in these months was 6 mm (6%) and 50 mm (53%) higher than the long term[1] 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 WNL043 continued to fall and in May 2021 were the lowest since January 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 remained relatively stable between July and December 2021 (Graph 2).
- Temperatures were cooler than usual, with the monthly average of the 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. They can also contribute to improved Red Gum condition, with the trees being impacted less by heat stress.

Red Gum condition at Wanilla has improved every year since 2016, with a net 13% improvement in conditions from 2016 to 2021 (Graph 1). The net improvement in Red Gum condition at Coulta (control site for Wanilla) for the same period is, however, much higher (24%) even though condition there has remained stable for the last year. A longer data set is however required to determine whether these differences are statistically significant, and what may be causing them if they are.

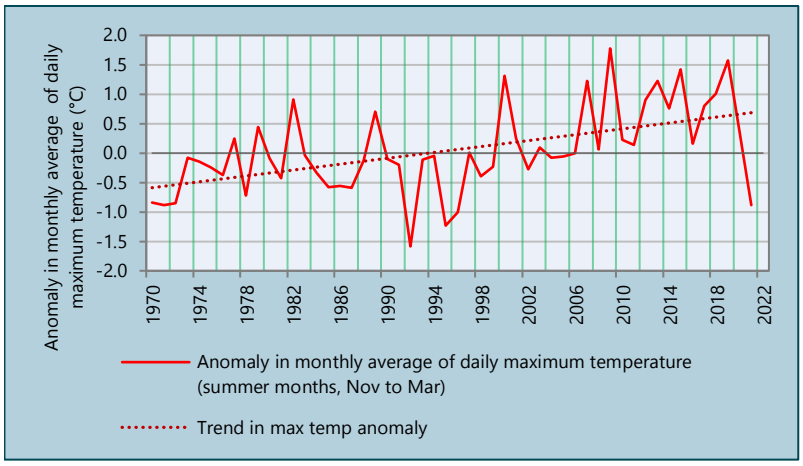


Graph 2 Total annual and total monthly rainfall^^, and change in groundwater level** at one monitoring well WNL043

Notes:

^^Rainfall data for 2016 to 2018 is obtained from the Bureau of Meteorology station, Port Lincoln (Big Swamp) (number 18017). Rainfall data for 2019 and 2021 is site specific data obtained from the rainfall gauge installed at the Wanilla GDE site.

**The groundwater levels shown for monitoring well WNL043 (6028-1605) are relative to the groundwater level in June 2018, which is 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 term[1] mean of the annual average of the daily maximum temperature. Maximum daily temperature is measured at the Bureau of Meteorology station, Big Swamp (number 18017).

Monitoring into the future

Tree condition and groundwater level monitoring will continue on a yearly basis. A study is also going to be undertaken in 2022-2023 to confirm definitively whether the Wanilla and Coulta Red Gums are using local groundwater. This will be done by looking at stable chemical isotopes that occur in the local groundwater, and which are a "signature" for a groundwater source, and comparing these to the isotopes occurring in tree sap.

[1]All 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). *Southern Basins Prescribed Wells Area. 2019-20 groundwater status overview*.

Contact: Eyre Peninsula Landscape Board, **Manager – Planning and Engagement** P (08) 8688 3200