Marne Saunders Prescribed Water Resources Area

2020–21 Surface water and groundwater status overview

Marne Saunders PWRA	Fractured rock aquifers	
	Murray Group Limestone	
	Surface water	

LEGEND

- Highest on record
- Very much above average
- Above average
- Average
- Below average
- Very much below average
- Lowest on record
- Long-term trend

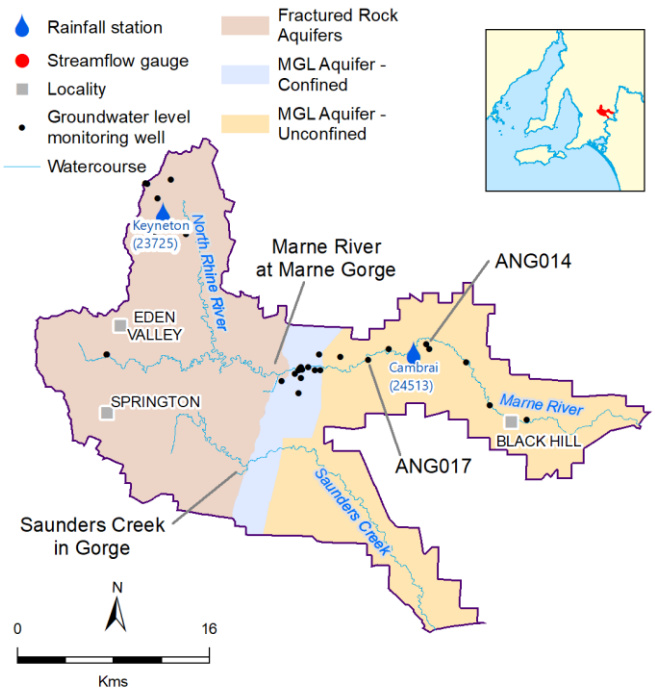
Regional context

The Marne Saunders Prescribed Water Resources Area (PWRA) relies on both surface water and groundwater resources which are managed under a Water Allocation Plan adopted in 2010.

The PWRA is located in the Murray–Darling Basin. It is characterised by high rainfall in the hills and valleys of the ranges to the west, while the east is largely defined by gently undulating plains with very low rainfall.

The main watercourses within the PWRA are the ephemeral Marne River and Saunders Creek which have their headwaters in the Mount Lofty Ranges.

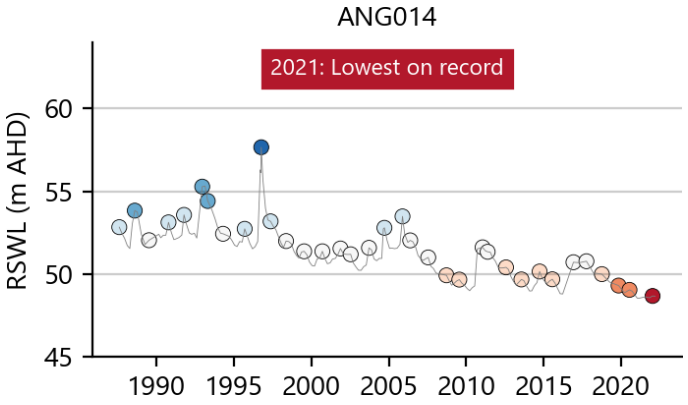
Groundwater is located in two types of aquifer: fractured rock aquifers found in the ranges to the west and the sedimentary Murray Group Limestone aquifers occurring beneath the plains.



Groundwater levels

40% of all monitoring wells have groundwater levels classified 'Lowest on record'.

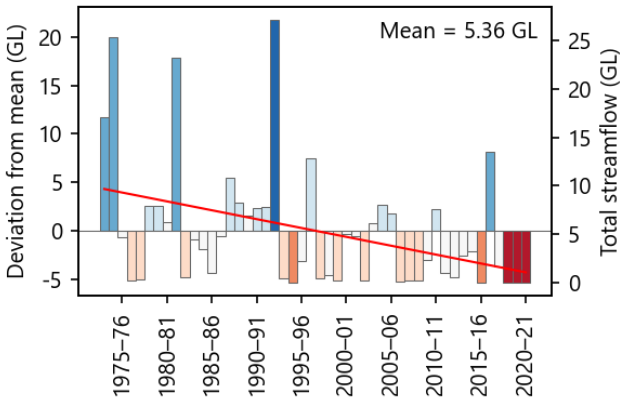
- Groundwater levels in the fractured rock and Murray Group Limestone aquifers are classified from 'Below average' to 'Lowest on record' compared to their historical record.
- Six of fifteen monitoring wells are classified 'Lowest on record' in 2021 when compared to their respective historical record.
- Five-year trends in groundwater level indicate that the majority of monitoring wells (93%) are declining.
- The figure below shows long-term groundwater levels at a monitoring well located near the Marne River (see map).



Streamflow

Streamflow is classified 'Lowest on record' with no flow observed at the 2 principal gauging stations in the PWRA.

- Flow regime across the region shows worsening conditions with no flow recorded at the Marne River and Saunders Creek gauging stations.
- 1973-2021 data for Marne River recorded at Marne Gorge gauging station (shown below) indicate a declining trend in streamflow.

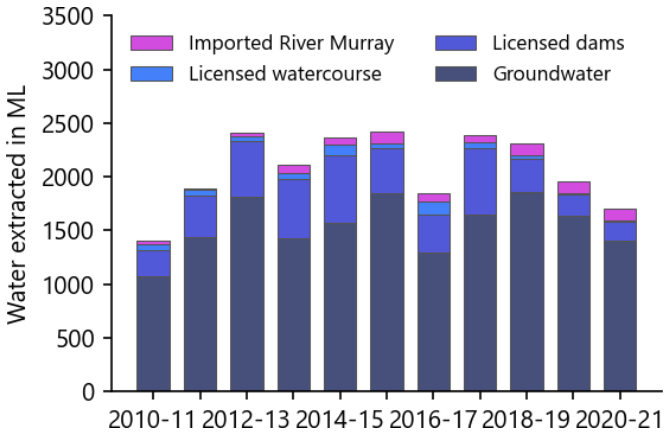


Marne Saunders PWRA 2020–21 Surface water and groundwater status overview

Water use

Water use in 2020–21 was 2,180 ML with 1,407 ML of this total extracted from groundwater, 661 ML from surface-water sources (188 ML from licensed take and 474 ML of estimated demand from non-licensed sources) and 112 ML imported from the River Murray.

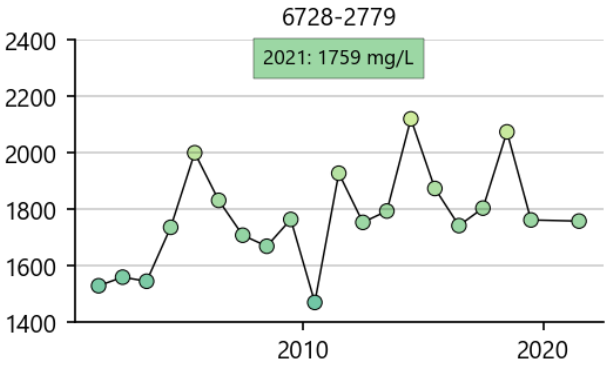
- Water sources include watercourses, farm dams, groundwater and imported water from the River Murray for municipal water supply and irrigation.



Salinity

In 2021, groundwater salinity from 77 wells ranges from 507 to 7,540 mg/L with a median of 1,839 mg/L.

- In the nine years to 2021, 16 of 29 wells (56%) in the fractured rock aquifer show an increasing trend in salinity. Nine-year trends show that rates of change in salinity vary from a decrease of 3.3% per year to an increase of 1.9% per year.
- In the nine years to 2021, 13 of 22 wells (59%) in the Murray Group Limestone aquifer show a declining trend in salinity. Nine-year trends show that rates of change in salinity vary from a decrease of 6.1% per year to an increase of 6.7% per year with a median rate of 0.2% decrease per year.
- The figure below shows salinities over the past 20 years at a well located east of Cambrai.



- No salinity values were recorded in the Marne River or Saunders Creek due to insufficient flow in 2020–21.

Climate

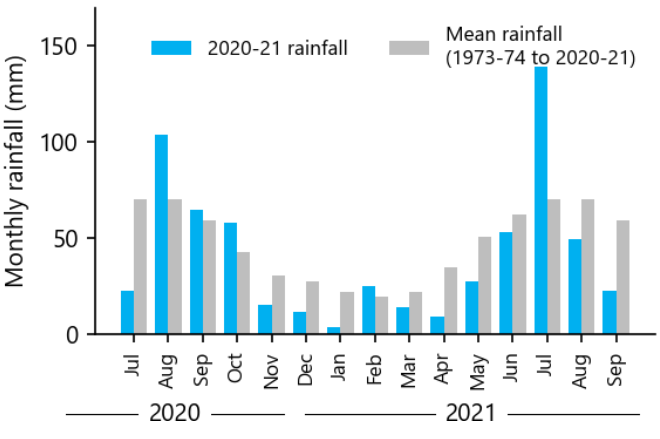
Climate is one of the main drivers of trends in the local water resources. Surface water and groundwater resources in the Marne Saunders PWRA are highly dependent on rainfall.

Below-average winter rainfall results in a reduction in annual streamflow volumes. Below-average summer rainfall can increase the need for irrigation and therefore lead to higher water extraction. This can in turn lead to an increase in salinity. Conversely, increased rainfall results in increased surface water availability and decreased irrigation extractions with potential decline or stabilisation of salinity.

Below-average rainfall also results in reduced recharge to shallow aquifers. This, together with increased water extractions, can cause groundwater levels to decline even in deeper confined aquifers. Conversely, above-average rainfall can cause increased recharge and lower irrigation extraction which can cause groundwater levels to rise.

Rainfall across the region was below-average for 2020–21.

- Rainfall typically ranged from <300 mm/y on the plains at the eastern boundary of the PWRA to >650 mm/y across the higher elevations at the western boundary.
- Rainfall at Keyneton is 407 mm in 2020–21, 20% below-average, while rainfall at Cambrai is 224 mm, 21% below average. This pattern is consistently observed across the PWRA (data for Keyneton presented below).
- Below-average monthly rainfall is observed at both stations for most of the 2020–21 period with very dry conditions experienced during late-spring, early-summer 2020 and autumn 2021.
- The trend in annual rainfall over the period 1973 to 2021 is declining for Keyneton.



More Information

This fact sheet is a high-level summary. More information (including metadata) is available in the suite of Water Resource Assessments for the Marne Saunders Prescribed Area at: https://www.waterconnect.sa.gov.au/Systems/GSR/Pages/Default.aspx

Government of South Australia
Department for Environment and Water