Eastern Mount Lofty Ranges Prescribed Water Resources Area

2018 Surface water status report

Government of South Australia

Department for Environment and Water

2018 Status summary
Eastern Mount Lofty Ranges PWRA

Finniss & Currency

The Finniss River and Currency Creek are two of the higher rainfall catchment areas of the Eastern Mount Lofty Ranges PWRA. They are assigned a ***yellow*** surface water status for 2018, with streamflow being higher than the average observed for the catchments.

Yellow status means that the total annual streamflow was between the 50th and 75th percentile[1] for the period of data availability.

The status presented is based on the combined streamflow recorded at the Finniss River and Currency Creek gauging stations (refer to Figure 6).

Angas & Bremer

The Angas and Bremer Rivers are two of the lower rainfall catchments of the Eastern Mount Lofty Ranges PWRA. They are assigned a ***yellow*** surface water status for 2018, with streamflow being higher than the average observed for the region.

Yellow status means that the total annual streamflow was between the 50th and 75th percentile[1] for the period of data availability.

The status presented is based on the combined streamflow recorded at the Angas and Bremer River gauging stations (refer to Figure 6).

This status report does not seek to evaluate the sustainable limits of the resource. Nor does it make any recommendations on management or monitoring of the resource. These actions are important, but occur through separate processes such as prescription and water allocation planning.

[1] Percentile: The nth percentile of a set of data is the value at which n% of the data is below it. For example, if the 75th percentile annual flow is 100 ML, 75% of the years on record had annual flow of less than 100 ML. Median streamflow: 50% of the records were above this value and 50% below.

Rainfall

See Figures 1 and 5.

Rainfall station	Mount Barker rainfall station (M023733) Reporting period: 1976–77 to 2017–18, in line with streamflow data availability
Annual total[2]	829 mm This was 105 mm above the average annual rainfall of 724 mm (1976–77 to 2017–18).
Monthly rainfall summary	Higher than average rainfall was recorded between July and September 2017. This accounted for approximately 55% of the total rainfall for 2017–18. In August 2017, Mount Barker rainfall station recorded double the average monthly rainfall (206 mm compared to 101 mm). Lower than average rainfall was experienced in October 2017, and between January and June 2018.
Spatial distribution	The highest rainfall band for the area occurs along the western boundary, due to the topographic effects coincident with the higher elevations. Rainfall for 2017–18 was lower than the average long-term annual rainfall in the south-western part of the Prescribed Water Resources Area (PWRA), but comparable across the remainder of the area. Spatial distribution of rainfall in 2017–18 is consistent with the five-year annual average (2013–14 to 2017–18) distribution.
Rainfall trend	Long-term trend – Annual rainfall volumes recorded at the Mount Barker rainfall station indicate an increasing long-term trend. Trends were consistent with data from Finniss (M023714), Kanmantoo (M023724) and Meadows (M023730) rainfall stations. Langhorne Creek (M024515) rainfall station indicated a decreasing long-term trend and Tepko rainfall station (M024533) was stable. Short-term trend – The last five years of rainfall indicate an increasing trend.

[2] For the water-use year 1 July 2017 to 30 June 2018

Streamflow

See Figures 2, 3 and 6.

Streamflow gauging stations	Four long-term stations are used within the following catchments: Angas River (A4260503), Bremer River (A4260533) Finniss River (A4260504) and Currency Creek (A4260530). Streamflow data availability: 1976–77 to 2017–18 (a common period where streamflow data exists for all the gauging stations used in this report).
Annual total[2]	All gauging stations showed recorded streamflow above the average annual streamflow in 2017–18.

	Average annual streamflow (1976–77 to 2017–18) (ML)	2017-18 Streamflow (ML)	Percentile rank
Angas River	5168	6014	64th
Bremer River	17 095	22 889	70th
Finniss River	22 917	22 939	52nd
Currency Creek	6049	6313	52nd
Combined		58 156	59th

Monthly streamflow summary	Except for August and September 2017, which had much higher than average streamflow, the remainder of the period had lower than average streamflow. For the Finniss River, monthly flows ranged from 18 ML in February to 12420 ML in August, and the Bremer River had monthly flows which ranged from zero flow in January to April to 15 035 ML in August.
Streamflow trend	Long-term trend – Annual streamflow volumes recorded at the Bremer River and Finniss River gauging stations (1976–77 to 2017–18) indicate a declining long-term trend. A similar trend can be observed at Currency Creek station. However, the Angas River shows an increasing trend (from 1996–7). Short-term trend – The last five years of streamflow indicate an increasing trend primarily due to much higher-than-average rainfall in 2016–17.

Water extraction

Surface water allocation	Total water allocation for the Eastern Mount Lofty Ranges (EMLR) PWRA was estimated to be 21 943 ML (compared to 22 257 ML in 2016–17). Lower Angas Bremer flood allocation: 5247 ML excluding the volume allocated for delivery of flood diversions (based on allocation data) Licensed surface water sources: 4122 ML (based on allocation data) Licensed watercourse sources (excluding flood diversions): 5900 ML (based on allocation data) Non-licensed water demand: 3483 ML (30% of the existing stock and domestic dam capacity) Estimated extraction from plantation forestry: 3191 ML (based on data from the Water Allocation Plan or WAP).

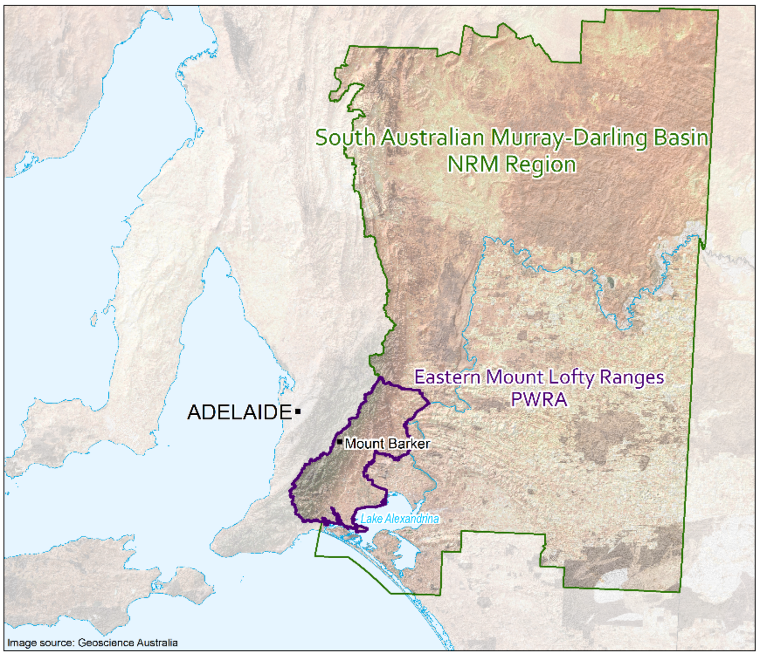
[2] For the water-use year 1 July 2017 to 30 June 2018

Surface water salinity

See Figure 4.

Salinity monitoring	Finniss River gauging station (A4261075) – data available from 2004 Bremer River gauging station (A4260533) – data available from 1995
General observations	Salinity increases during sustained summer events while decreasing throughout the winter months as a result of higher dilution capacity as flow volumes increase. In general, the wetter southern catchments (Finniss River and Currency Creek) show lower salinities than the drier northern catchments (Angas and Bremer Rivers).
Salinity: 2017–18 water-use year	Highest salinity recorded at Finniss River: 1313 mg/L (compared to 969 mg/L in 2016–17) Highest salinity recorded at Bremer River: 2396 mg/L (compared to 2834 mg/L in 2016–17)
Salinity: 1995–96 to 2017–18	Salinity recordings at Finniss River were less than 1000 mg/L for 82% of the salinity data period. Salinity recordings at Bremer River were higher with values between 1000-2500 mg/L for 76% of the salinity data period.

Regional setting



The Eastern Mount Lofty Ranges (EMLR) PWRA is located 50 km east of Adelaide. Surface water, watercourses and groundwater resources in the PWRA have been prescribed under South Australia's *Natural Resources Management Act 2004*. A water allocation plan (WAP) adopted in 2013 provides for sustainable management of these water resources.

The Eastern Mount Lofty Ranges PWRA can be divided into two topographically distinct regions. The west of the PWRA is characterised by steep hills and valleys, while the eastern side is comprised of flat plains and localised rises stretching out towards the River Murray.

The main watercourses include the lower-yielding Bremer and Angas Rivers, and the higher-yielding Finniss River and Currency Creek. These watercourses, along with numerous streams from a number of other smaller catchments within the EMLR PWRA, drain from the eastern side of the Mount Lofty Ranges, and discharge into the River Murray and Lake Alexandrina.

Surface water resources in the PWRA are highly dependent on rainfall, with trends in streamflow and salinity primarily climate driven, i.e. lower than average winter rainfall will result in reduced annual streamflow volumes. Below-average summer rainfall can also result in increased irrigation extractions. These two elements can cause salinities to increase by reducing the amount of streamflow available to dilute salts. Conversely, higher rainfall will result in increased streamflow volumes, decreased irrigation extractions and declining or stabilising salinity.

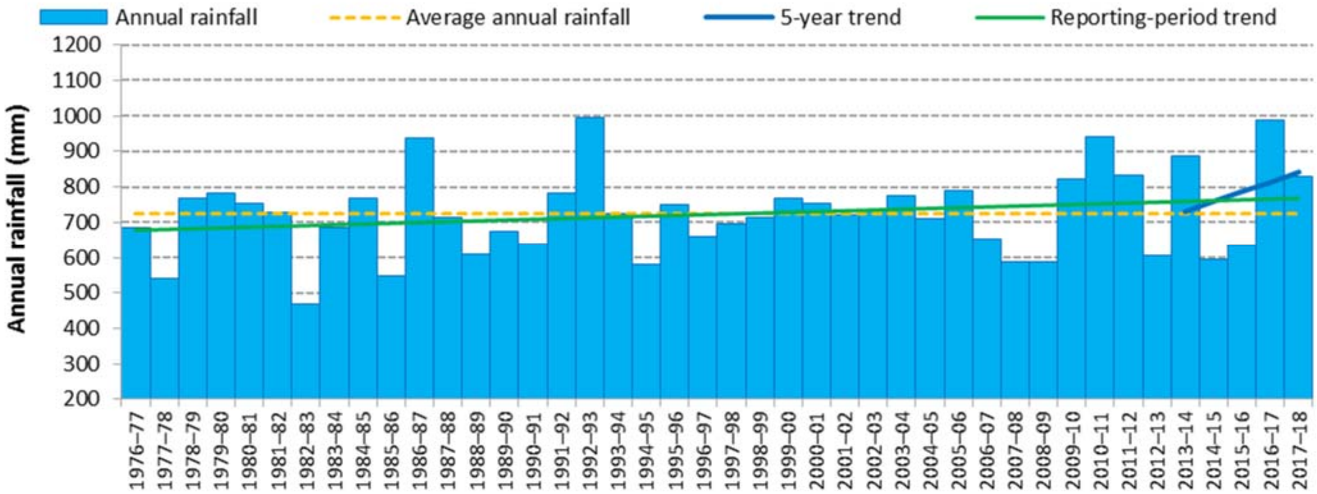


Figure 1. Annual rainfall for 1976–77 to 2017–18 at the Mount Barker rainfall station (M023733)

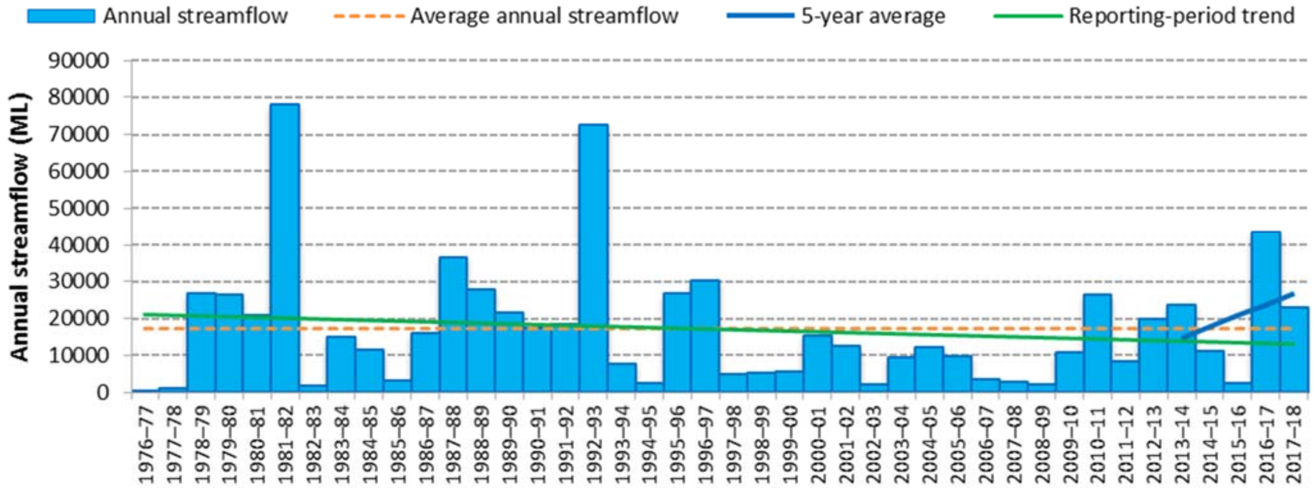


Figure 2. Annual streamflow for 1976–77 to 2017–18 at the Bremer River gauging station (A4260533)

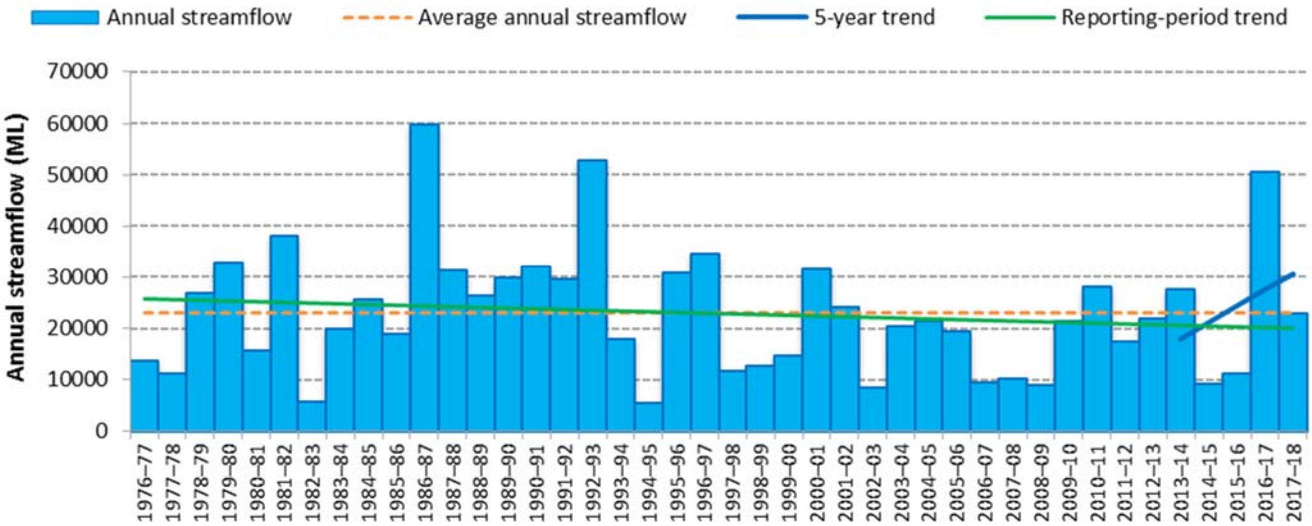


Figure 3. Annual streamflow for 1976–77 to 2017–18 at the Finniss River gauging station (A4260504)

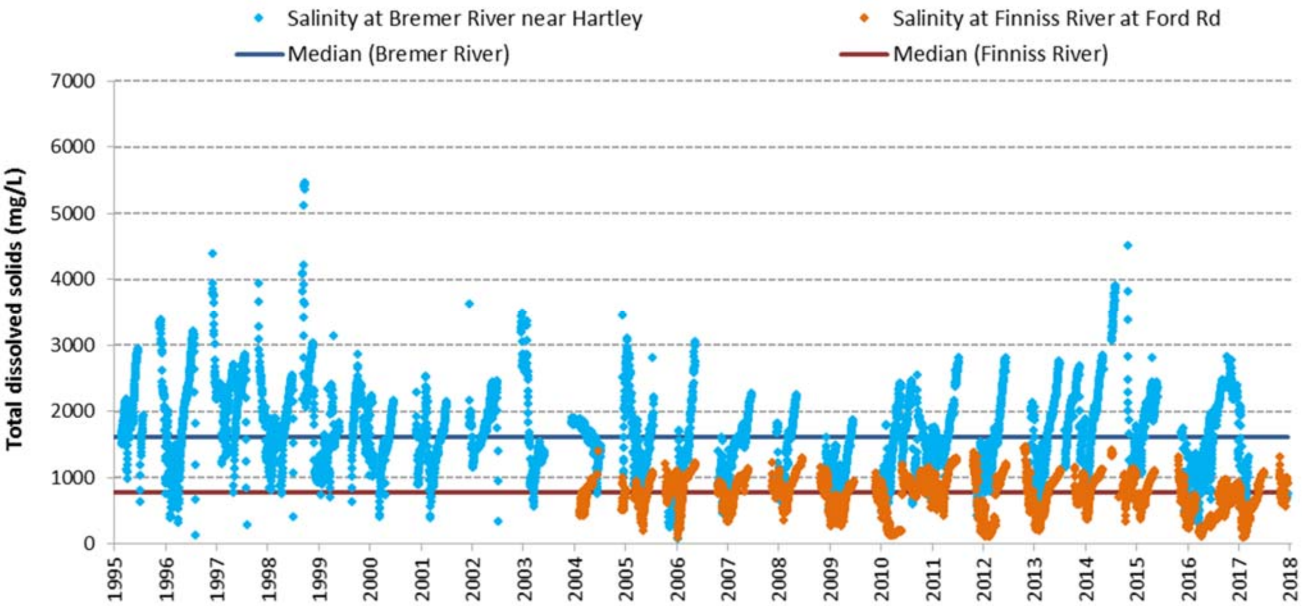


Figure 4. Salinity data for 1995 to 2018 at the Finniss River at Ford Road (A4261075) and Bremer River (A4260533) gauging stations

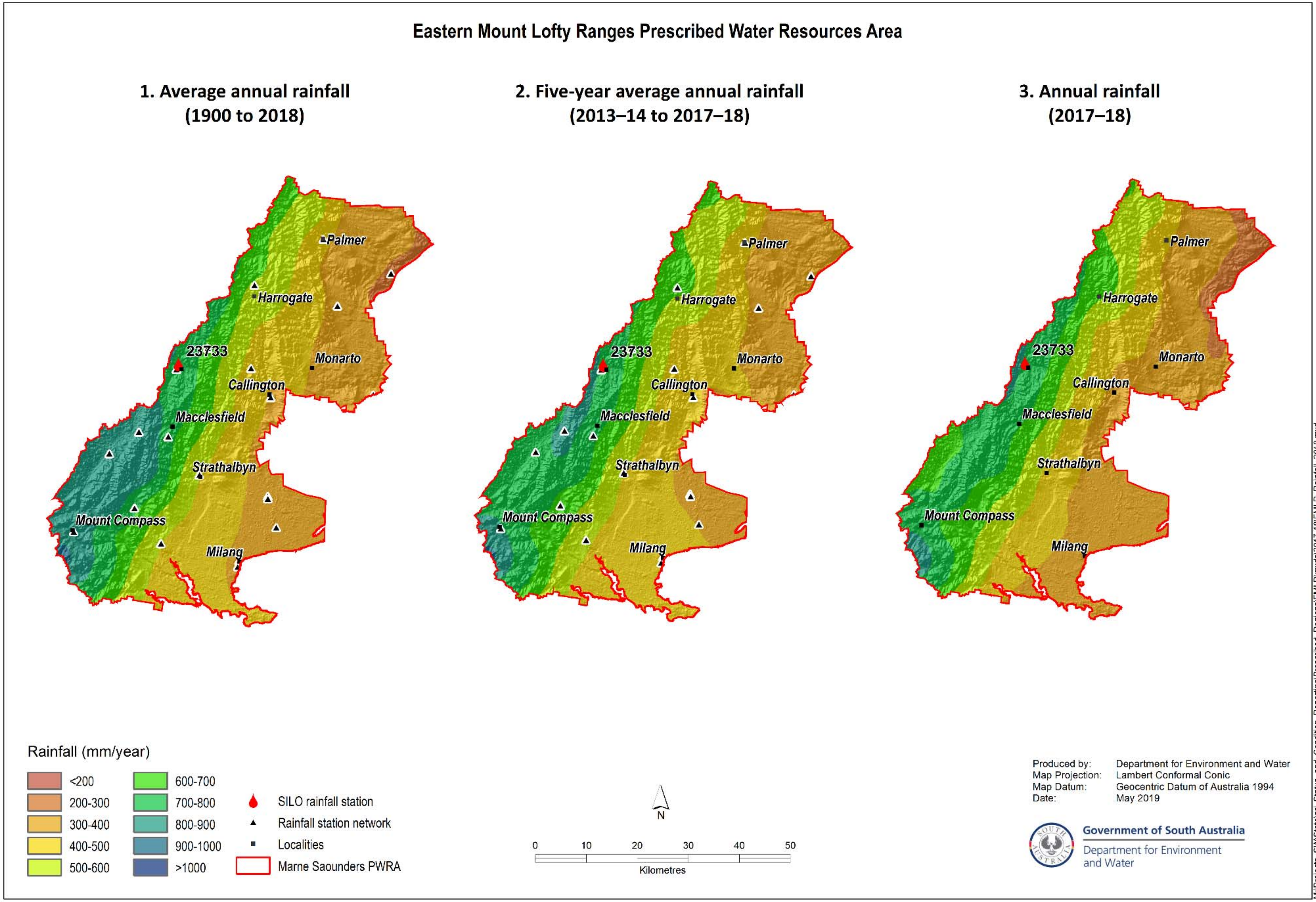


Figure 5. Spatial distribution of (1) Average annual rainfall (2) five-year average annual rainfall and (3) annual rainfall for 2017–18 in the EMLR PWRA[3]

[3] Data sources: SILO interpolated point and gridded datasets, available at https://legacy.longpaddock.qld.gov.au/silo/.

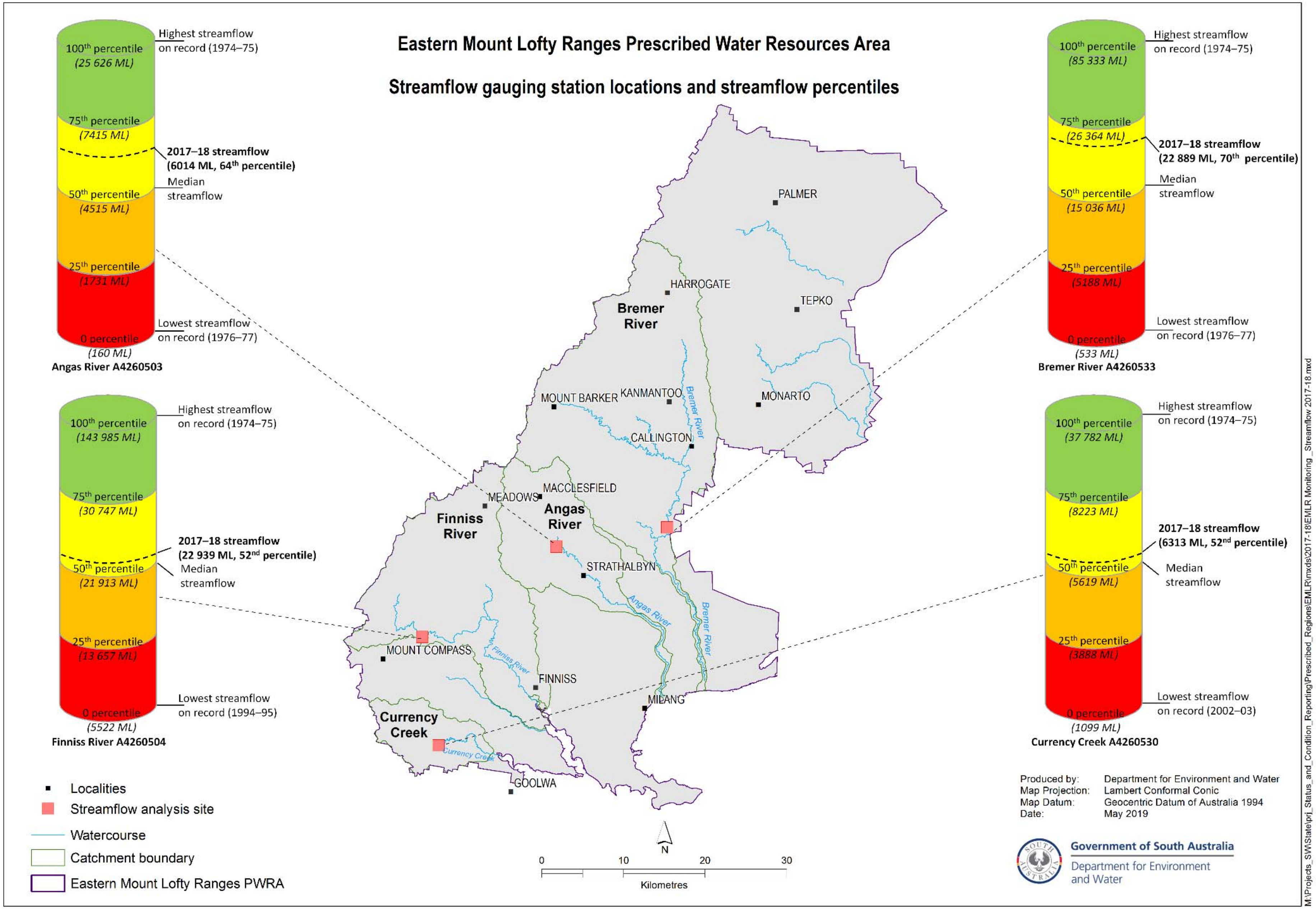


Figure 6. Streamflow gauging stations and streamflow percentiles in the Eastern Mount Lofty Ranges PWRA

More information

The spatial variability in hydrological behaviour of the surface water catchments within the EMLR makes it challenging to assign a single water-resource status for the PWRA. Therefore streamflow gauging stations used for analysis were chosen to be representative of the drier parts (lower rainfall and streamflow) and wetter parts (higher rainfall and streamflow) of the EMLR PWRA. The Finniss River and Currency Creek catchments represent the wetter areas, while the drier catchments are represented by the Angas and Bremer River catchments.

Annual streamflow records from the Finniss River and the Currency Creek gauging stations were combined for each year, and extended to the common period 1976–77 to 2017–18 to represent total streamflow for the higher rainfall areas of the PWRA. A similar exercise was undertaken with the Angas and Bremer River catchments to represent total streamflow for the lower rainfall areas of the PWRA. The total annual streamflow data for each area was then ranked against the annual stream flows for the entire period of record. The total 2017–18 streamflow for the higher rainfall areas was 29 253 ML, which represents the 52nd percentile over the period of record, i.e. 48% of the previous years recorded streamflow totals that were above the streamflow in 2017–18. Similarly, the 2017–18 streamflow from the lower rainfall areas within the PWRA (28 903 ML) represents the 70th percentile. Streamflow percentiles of individual gauges are shown in Figure 6.

To view descriptions for all status symbols, and to review the full historical record of the gauging stations (streamflow and salinity), please visit the *Water Resource Assessments* page at www.waterconnect.sa.gov.au.

Further information may be found among the Frequently Asked Questions on the *Water Resource Assessments* page of www.waterconnect.sa.gov.au.

Rainfall data used in this report are sourced from the SILO interpolated point and gridded datasets, which are calculated from Bureau of Meterology daily and monthly rainfall measurements and are available online at https://legacy.longpaddock.qld.gov.au/silo/.

To view the *Eastern Mount Lofty Ranges PWRA Surface water status report 2012–13*, which includes background information on rainfall, streamflow, salinity, water extraction and relevant water-dependent ecosystems, please visit the *Water Resource Assessments* page on www.waterconnect.sa.gov.au.

Streamflow and salinity data are available via WaterConnect at http://www.waterconnect.sa.gov.au.

For further details about the *Eastern Mount Lofty Ranges PWRA*, please see the *Water Allocation Plan* for the Eastern Mount Lofty Ranges PWRA on the Natural Resources South Australian Murray-Darling Basin site at https://www.naturalresources.sa.gov.au/samurraydarlingbasin/home.

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Head Office
Level 7
81-95 Waymouth St
ADELAIDE SA 5000

Telephone +61 (8) 8463 6946
Facsimile +61 (8) 8463 6999

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