Eastern Mount Lofty Ranges Prescribed Water Resources Area

2017 Surface water status report

Department for Environment and Water
GPO Box 1047, Adelaide SA 5001

Telephone	National	(08) 8463 6946
	International	+61 8 8463 6946
Fax	National	(08) 8463 6999
	International	+61 8 8463 6999
Website	www.environment.sa.gov.au	

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2017 Status summary
Eastern Mount Lofty Ranges PWRA

Finniss & Currency

The Finniss River and the Currency Creek are two of the higher rainfall catchments of the Eastern Mount Lofty Ranges PWRA.. They are assigned a ***green*** surface water status for 2017, a wet year, with streamflow being much higher than the average observed for the catchments.

Green status means that the total annual streamflow was above the 75th percentile[1] of 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 ***green*** surface water status for 2017, a wet year, with streamflow being much higher than the average observed for the region.

Green status means that the total annual streamflow was above the 75th percentile[1] of 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, it means 75% of the years on record had annual flow of less than 100 ML.

Rainfall

See Figures 1 and 5

Rainfall station	Mt Barker rainfall station (M023733) Reporting period: 1976/77-2016/17, in line with streamflow data availability
Annual total[2]	988 mm 273 mm above the average annual rainfall of 715 mm (1889/90-2016/17)
Monthly rainfall summary	Higher than average rainfall was recorded between September 2016 and February 2017. This accounted for approximately 60% of the total rainfall for 2016/17 September recorded more than double the average monthly rainfall (228 mm compared to 86 mm) Lower than average rainfall was experienced in August 2016, and between March and June 2017
Spatial distribution	A band of higher rainfall (800-900 mm) runs along the higher elevation sections of the western boundary of the PWRA. Rainfall decreases towards the eastern boundary Rainfall for 2016/17 was higher than average across the whole region, with the western boundary experiencing annual rainfall totals over 1000 mm Spatial distribution of rainfall over the past five years is consistent with the longer-term pattern for the region
Rainfall trend	Long-term trend - Annual rainfall volumes recorded at the Mt Barker rainfall station indicate an increasing long-term trend Short-term trend - The last five years of rainfall indicate an increasing trend as a result of the high rainfall experienced in 2016/17

[2] For the water-use year 1 July 2016 to 30 June 2017

Streamflow

See Figures 2, 3 and 6

Streamflow gauging stations	4 long-term stations are used within the following catchments: Angas (A4260503), Bremer (A4260533) and Finniss (A4260504) Rivers and Currency Creek (A4260530) Streamflow data availability: 1976/77-2016/17 (common period where streamflow data exists for all the gauging stations used in this report)
Annual total[2]	All gauging stations analysed recorded streamflow above the average annual streamflow in 2016/17

	2016/17 streamflow (ML)	Average annual streamflow (1976-2016) (ML)	Percentile Rank
Angas River	14 681	4909	91st
Bremer River	43 376	16 293	91st
Currency Creek	12 909	5871	91st
Finniss River	50 624	22 224	91st
Combined	121 590		91st

Monthly streamflow summary	Significantly higher-than-average flows were experienced in July, September and October 2016 in all catchments Flows for these months were approximately 4-times the average monthly values for the Finniss River and Currency Creek catchments, and 6 to 8 times for the Angas and Bremer Rivers
Streamflow trend	Long-term trend - Annual streamflow volumes recorded at the Bremer and Finniss River gauging stations (1976/77-2016/17) indicate a declining long-term trend. Similar trends can be observed at the Angas River and Currency Creek stations Short-term trend - The last five years of streamflow indicate an increasing trend as a result of the high rainfall experienced in 2016/17

Water use

Surface-water allocation and use[2]	Total water allocation for the EMLR PWRA was 22 257 ML (compared to 22 166 ML in 2015/16). The increase from the previous year is the result of the allocation of existing user licences in the area Lower Angas Bremer flood allocation: 5549 ML (excluding the volume allocated for delivery of flood diversions) (based on allocation data) Estimated water use from licensed surface water sources: 4118 ML (based on allocation data) Estimated use from licensed watercourse sources (excluding flood diversions): 5916 ML (based on allocation data) Estimated non-licensed water demand: 3483 ML (30% of the existing stock and domestic dam capacity) Estimated use from plantation forestry: 3191 ML (based on data from the WAP)

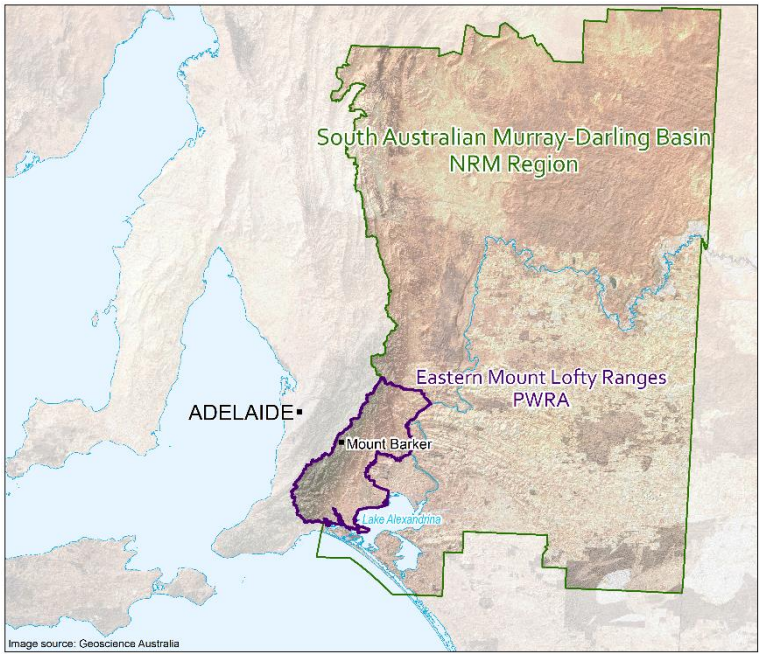
[2] For the water-use year 1 July 2016 to 30 June 2017

Surface water salinity

See Figure 4

Salinity monitoring sites	Finniss River (A4261075) and Bremer River (A4260533) gauging stations
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 and Currency Rivers) show lower salinities than the drier northern catchments (Angas and Bremer Rivers)
Salinity – 2016/17 water-use year	Highest salinity recorded at Finniss River: 969 mg/L Highest salinity recorded at Bremer River: 2834 mg/L
Salinity - 1995/96–2016/17	Salinity recordings at Finniss River were less than 1000 mg/L for 82% of the salinity data period Salinity recordings at Bremer River were comparably more saline with values between 1000-2500 mg/L for 77% of the salinity data period

Regional setting



The Eastern Mount Lofty Ranges (EMLR) Prescribed Water Resources Area (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.

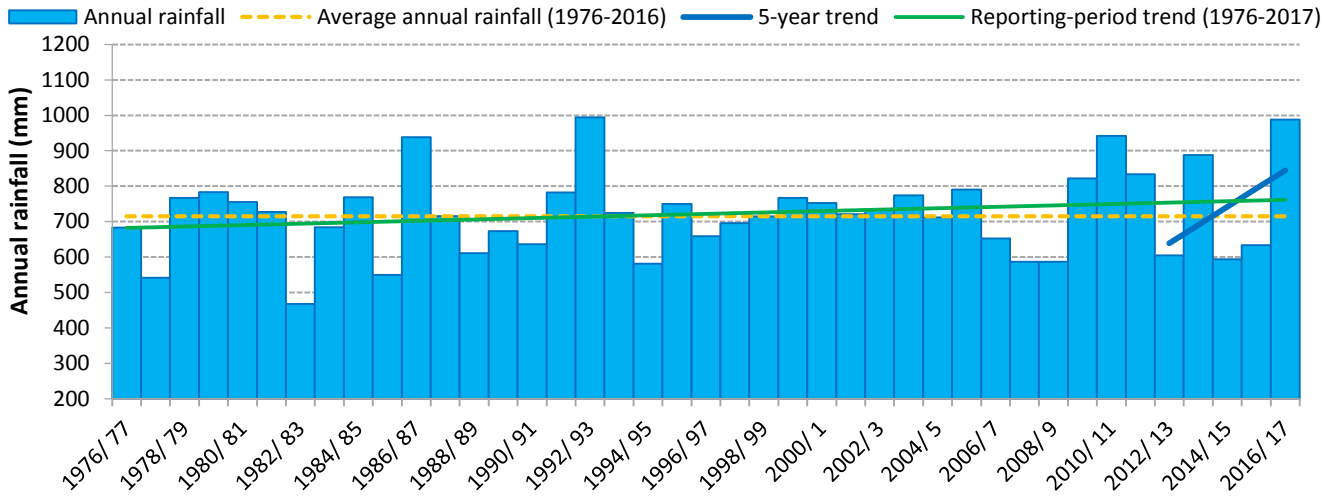


Figure 1. Annual rainfall (mm) for 1976/77–2016/17 at the Mount Barker rainfall station (M023733)

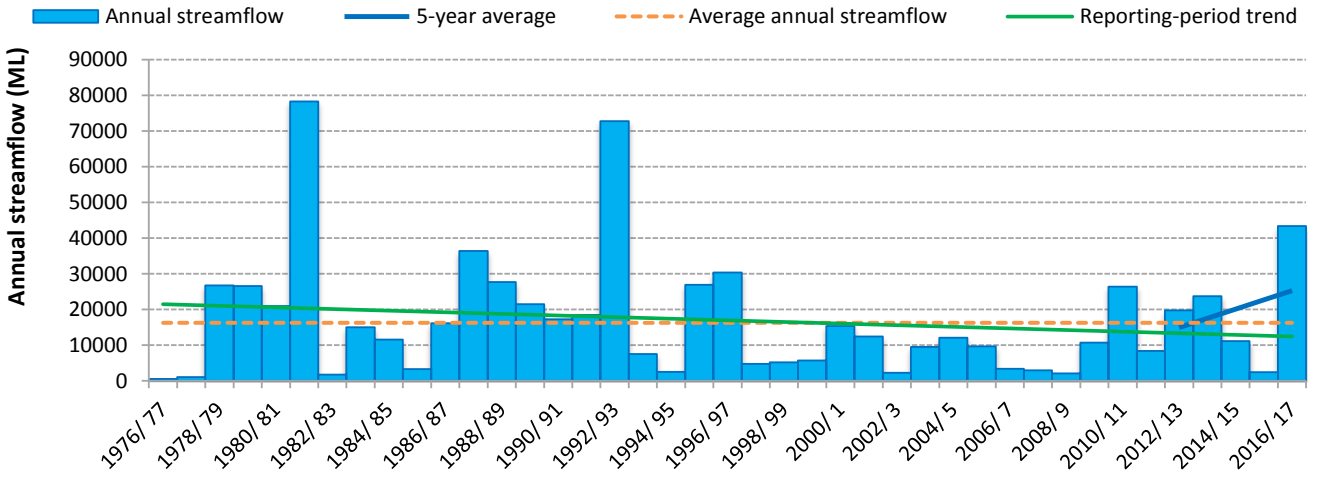


Figure 2. Annual streamflow (ML) for 1976/77–2016/17 at the Bremer River gauging station (A4260533)

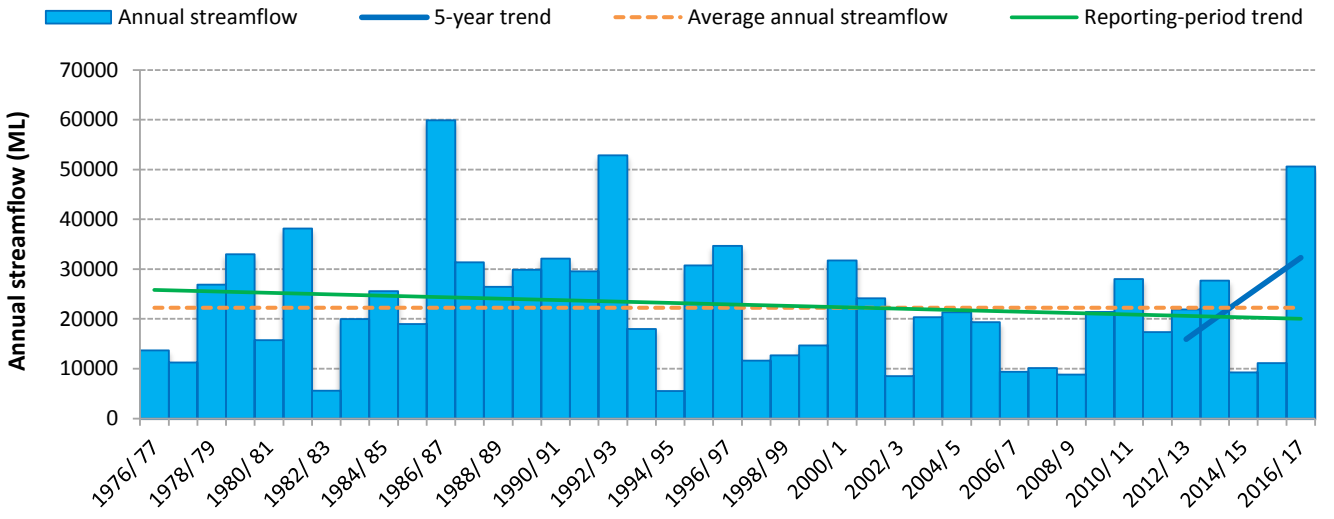


Figure 3. Annual streamflow (ML) for the 1976/77–2016/17 at the Finniss River gauging station (A4260504)

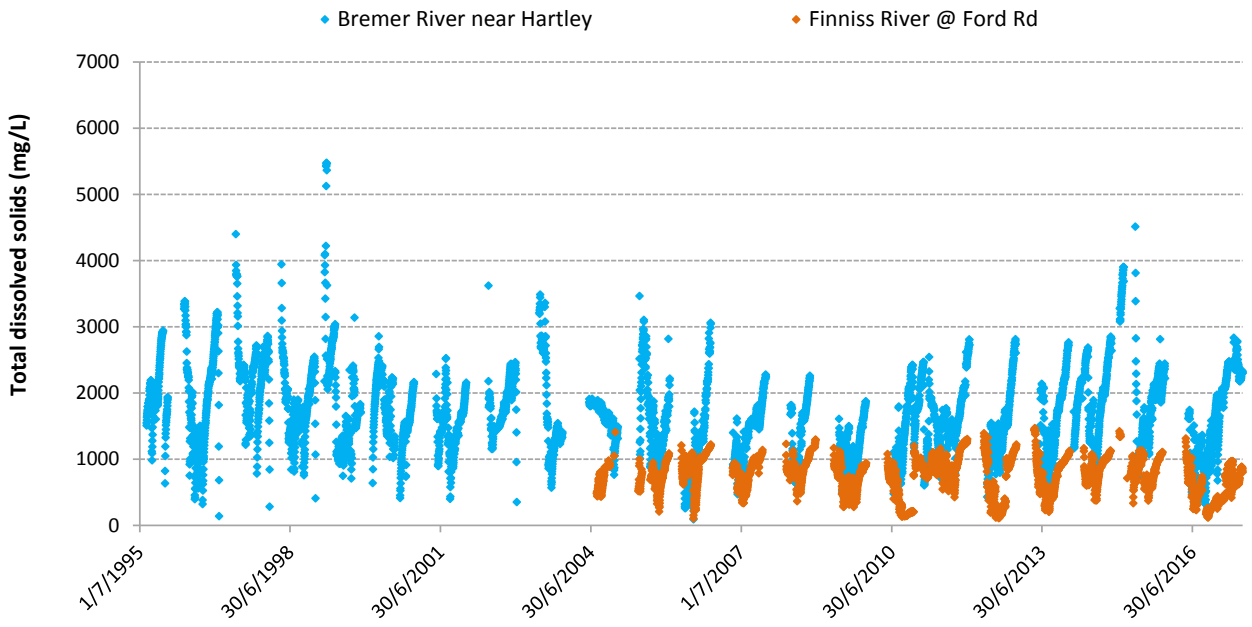


Figure 4. Salinity data (TDS mg/L) at the Finniss River at Ford Road (A4261075) and Bremer River (A4260533) gauging stations

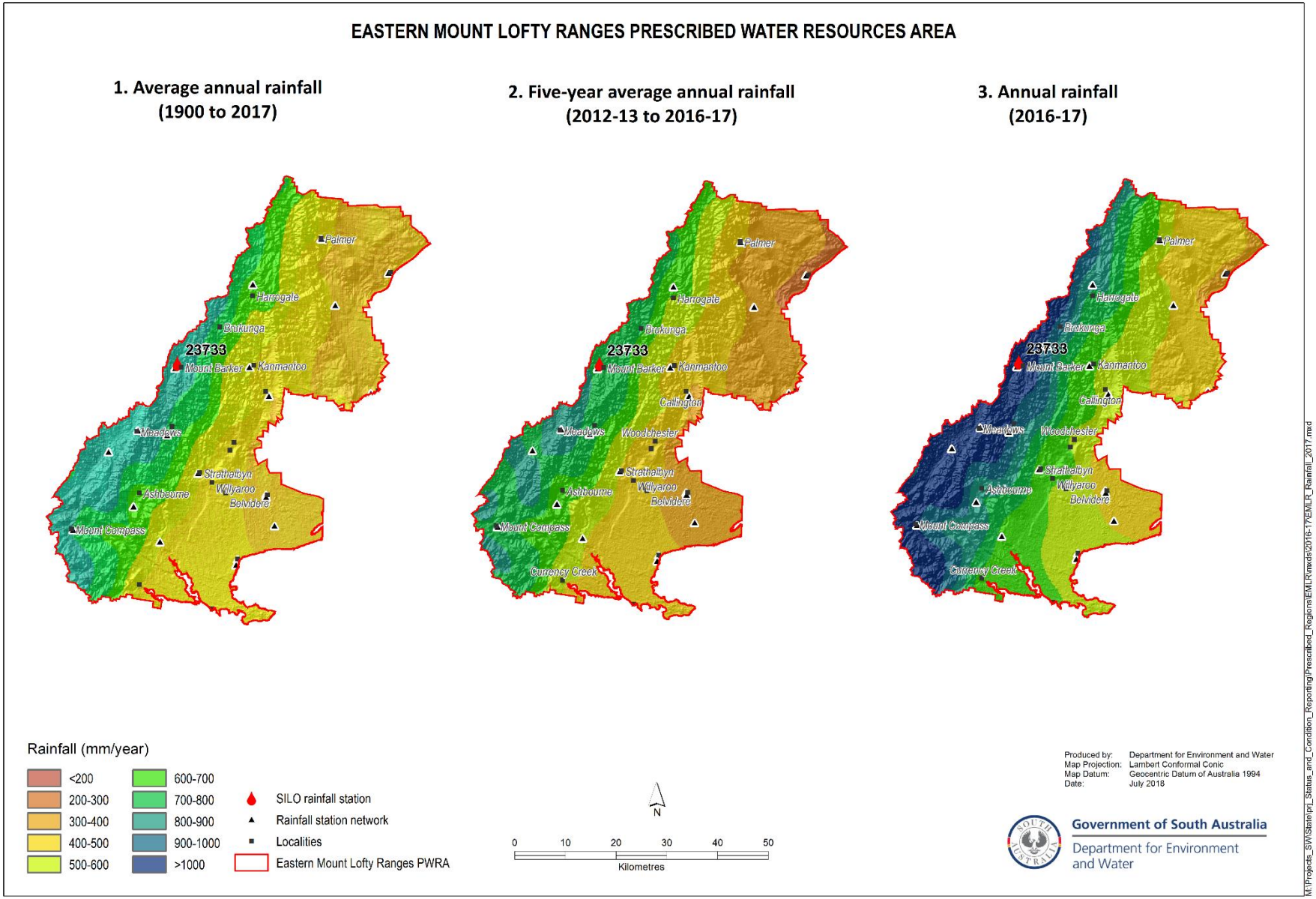


Figure 5. Spatial distribution of (1) Average annual (2) five-year average annual rainfall and (3) annual rainfall for 2016/17 in the EMLR PWRA[3]

[3] Data sources: SILO Patched Point Dataset https://legacy.longpaddock.qld.gov.au/silo/ and BoM Australian Water Availability Project (http://www.bom.gov.au/jsp/awap/)

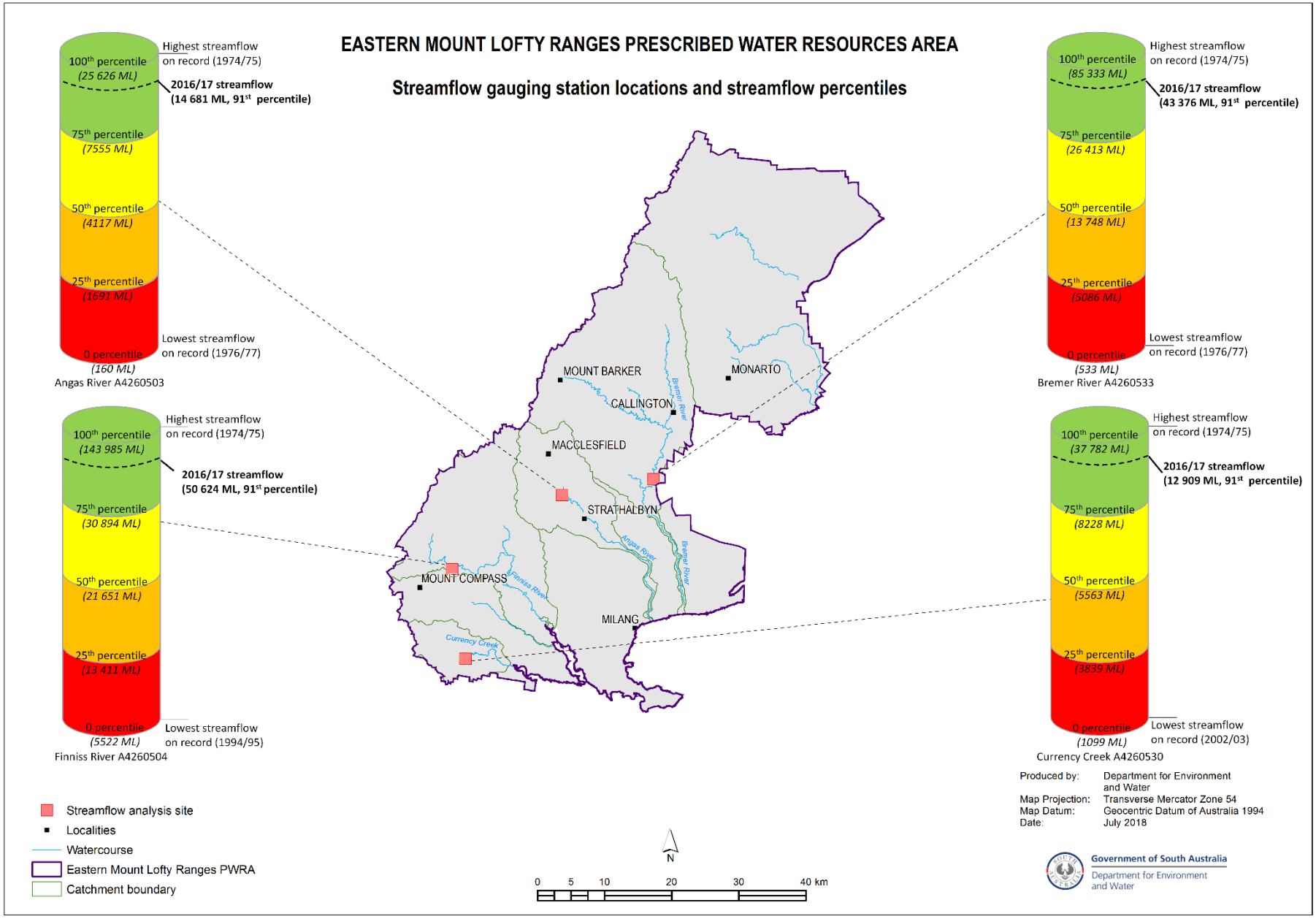


Figure 6. Streamflow gauging stations and streamflow percentiles in the Eastern Mount Lofty Ranges PWRA

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 lower yielding 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 1976/77–2016/17 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 2016/17 streamflow for the higher rainfall areas was 63 533 ML, which represents the 91st percentile over the period of record, i.e. only 9% of the previous years recorded streamflow totals that were above the streamflow in 2016/17. Similarly, the 2016/17 streamflow from the lower rainfall areas within the PWRA (58 057 ML) also represents the 91st 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 on WaterConnect.

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 is sourced from the SILO Patched Point Dataset, which uses original Bureau of Meteorology daily rainfall measurements and is available online at https://legacy.longpaddock.qld.gov.au/silo/. Rainfall maps have been compiled using daily gridded data produced by the BoM Australian Water Availability Project (http://www.bom.gov.au/jsp/awap/).

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

Streamflow and salinity data are available via WaterConnect: 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 website.

Government of South Australia

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