Eastern Mount Lofty Ranges PWRA

2015 Surface water status report

Government of South Australia
Department of Environment, Water and Natural Resources

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This document is available online at www.waterconnect.sa.gov.au/Systems/GSR/Pages.

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.

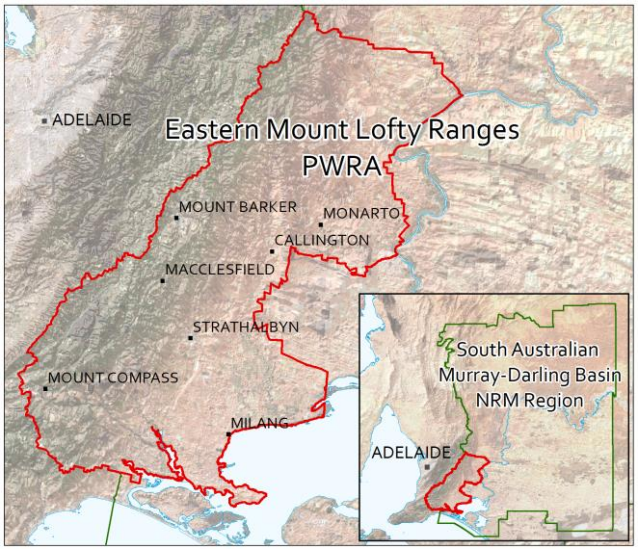
For further details about the *Eastern Mount Lofty Ranges PWRA*, please see the *Water Allocation Plan* for the Eastern Mount Lofty Ranges PWRA on the Natural Resources South Australian Murray-Darling Basin website.

Gridded rainfall data was sourced from the Bureau of Meteorology (BoM). Station rainfall data was sourced from the Scientific Information for Land Owners database (SILO) and is Patched Point Data. Further information on SILO climate data is available at: http://www.longpaddock.qld.gov.au/silo/index.html.

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

To view descriptions for all status symbols, please visit WaterConnect.

2015 Summary



Description of the Prescribed Area

The Eastern Mount Lofty Ranges Prescribed Water Resource Area (PWRA) is located 50 km east of Adelaide. Surface water (including within watercourses) and groundwater resources in the PWRA have been prescribed under South Australia's *Natural Resources Management Act 2004*. A Water Allocation Plan (WAP) developed by the South Australian Murray-Darling Basin (MDB) Natural Resources Management Board and adopted in 2013, seeks to provide for sustainable management of these water resources. The Eastern Mount Lofty Ranges (EMLR) 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 Bremer, Angas, Finniss Rivers 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 are highly dependent on rainfall, with trends in streamflow and salinity primarily climate driven, i.e. below-average winter rainfall results in a reduction in annual streamflow volumes. Below-average summer rainfall can also result in increased irrigation extractions, and these two elements can cause salinities to increase by reducing the amount of streamflow available to dilute salts. Conversely, increased rainfall results in increased streamflow volumes, decreased irrigation extractions and salinities may stabilise or decline.

Rainfall summary

The Mount Barker rainfall station (M023733) is located along the western edge of the EMLR PWRA where annual rainfall totalled 594 mm in the 2014–15 water-use year, 171 mm below the long-term average annual rainfall (Fig. 1). 2014-15 rainfall was the seventh lowest of the past 39 years (for the period 1976–2015, to align with available streamflow data). During the 12 months to June 2015, only four months (July, January, April and May) had above average rainfall, with the spring months of October and November and also December recording below average rainfall during the last three consecutive years. This trend of months with consecutive below average spring and early summer rainfall is commensurate with three neighbouring rainfall stations located within, or nearby the EMLR PWRA. The spatial distribution of rainfall for the past five-years shows average annual rainfall over that period to be below the long-term average along the south western boundary and above average in the east and south east part of the EMLR PWRA (Fig. 7). The spatial distribution of rainfall for 2014–15 shows well below average rainfall across the entire PWRA.

Streamflow summary

Streamflow gauging stations analysed within the EMLR PWRA are located in the Angas River, Bremer River, Finniss River and Currency Creek. All gauging stations analysed within the EMLR PWRA recorded streamflow below the long-term average in 2014-15. The Finniss River gauging station recorded annual streamflow of 9241 ML in the 2014–15 water-use year (10th percentile (%ile)), which is much lower than the long-term average annual streamflow of 22 856 ML and ranks in the 0-25th percentile range of streamflow over the period of record (Fig. 2). The Currency Creek gauging station, like the Finniss River, is located in the southern part of the EMLR PWRA and recorded a below average streamflow of 2270 ML in the 2014-15 water use year (7th %ile), to also be ranked in the 0-25th percentile range of streamflow. The Bremer River gauging station, located in the middle part of the EMLR PWRA, recorded annual streamflow of 11 137 ML in the 2014–15 water-use year (41st %ile), lower than the long-term average annual streamflow of 14 304 ML and ranks in the 25-50th percentile range of streamflow over the period of record (Fig. 3). The adjacent Angas River gauging station recorded a below average streamflow of 2033 ML in the 2014-15 water use year (32nd %ile), to also be ranked in the 25-50th percentile range of streamflow. All stations analysed experienced below average streamflow during the late winter, spring and early summer months of August to December, as well as during February, March and June for the 2014-15 water-use year. However, the Finniss and Currency Creek gauging stations experienced three months (January, April and May) of above average streamflow following higher than average rainfall during these months, while above average streamflow's were

recorded in the Angas and Bremer River gauging stations during July and May. The annual streamflow volume recorded at the Finniss River and Bremer River gauging stations (Figures 2 and 3) indicates a short-term declining trend, with similar trends being observed at the Angas River and Currency Creek gauging stations.

Water use summary

Water use in the EMLR PWRA includes licensed extractions from dams and watercourses, estimated non-licensed demand (generally stock and domestic dams), forestry and Lower Angas Bremer flood diversion. Water use for the EMLR PWRA in 2014-15 was estimated to be 16 181 ML, more than the previous year's total of 15 503 ML (Fig. 4). Estimated water use from licensed surface water sources totalled 4043 ML in 2014–15 (based on allocation data in the absence of total actual usage data). Non-licensed water demand is taken from the EMLR WAP and is estimated to be 3483 ML, and this volume equates to approximately 30% of the existing stock and domestic dam capacity. Data for estimated use from plantation forestry is also taken from the WAP and this equates to 3191 ML. An estimate of Lower Angas Bremer flood diversions totalled 5464 ML in 2014-15 (based on allocation data).

Salinity summary

Despite data gaps with no recorded information, Finniss River at Ford Road (A4261075) and Bremer River near Hartley (A4260533) gauging stations provide a good indication of salinity (measured as Total Dissolved Solids) from July 2004 and July 1995 respectively (Fig. 5 and Fig. 6). A clear pattern of increasing salinity in the spring and summer months and decreasing salinity in the autumn and winter months is observed, highlighting the climatic influence. In the Bremer River, 13 % of data is less than 1000 mg/L, with the majority (76 %) between 1000-2500 mg/L, while the Finniss River is comparatively less saline with 80 % of data less than 1000 mg/L.

Status summary

The hydrological behaviour of the surface water catchments in the EMLR PWRA are variable in that the volume of streamflow generated per unit of catchment area varies from one catchment to another, making it challenging to assign a status based on the EMLR PWRA as a whole. Therefore, the gauging stations used for analysis have been separated into two groups of similar yielding characteristics. A group of higher yielding catchments includes the Finniss River and Currency Creek catchments, while the lower yielding catchments include the Angas and Bremer River catchments. Annual streamflow from the four gauging stations were extended and combined each year for the common period 1973-74 to 2014-15 and then weighted based on gauging station catchment area and ranked. The total 2014-15 streamflow of 11 511 ML from the grouped Finniss and Currency streamflow gauges is the 10th percentile (%ile) and ranks in the 0-25th percentile range of streamflow over the period of record, which means 10% of the annual streamflow values during the period 1973-74 to 2014-15 were equal to or below the 2014-15 total annual streamflow. The total 2014-15 streamflow of 13 170 ML from the grouped Angas and Bremer streamflow gauges is the 39th %ile and ranks in the 25th-50th %ile range of streamflow over the period of record, which means 39% of the annual streamflow values during the period 1973-74 to 2014-15 were equal to or below the 2014-15 total annual streamflow. The %ile range of individual streamflow gauging stations is included later in the report (Fig. 8). Status is defined based on which percentile grouping the current year's total streamflow percentile value occurs within. This is a new approach, compared to assessments used in past *Surface water status reports*. Please visit the Frequently Asked Questions on the *Water Resource Assessments* page on WaterConnect for more detail on the current method of evaluating the status of surface water resources.

2015 Status

The higher yielding Finniss River and Currency Creek catchments is assigned a red surface water status for 2015 based on the combined streamflow recorded at the Finniss River and Currency Creek gauging stations:

'Total annual streamflow was between the 0–25th percentile of the period of record'

The lower yielding Angas and Bremer River catchments is assigned an amber surface water status for 2015 based on the combined streamflow recorded at the Angas and Bremer River gauging stations:

'Total annual streamflow was between the 25th–50th percentile of the period of record'

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.

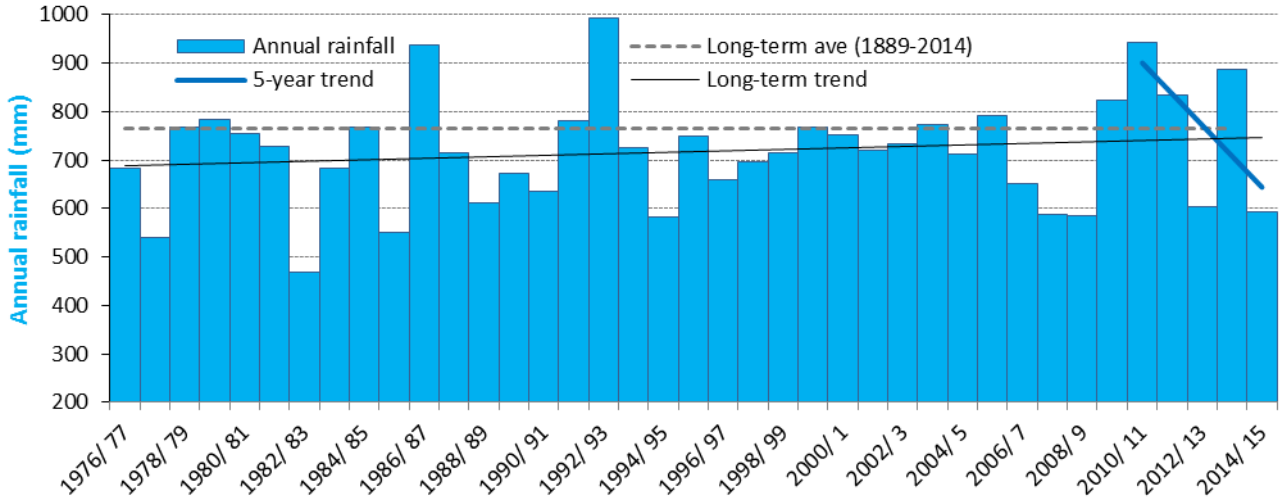


Figure 1. Annual rainfall (mm) for the 1976–77 to 2014–15 water-use years (July–June), the long-term trend and long-term average annual rainfall, and the short-term trend for the past five-years recorded at Mount Barker rainfall station (M023733)

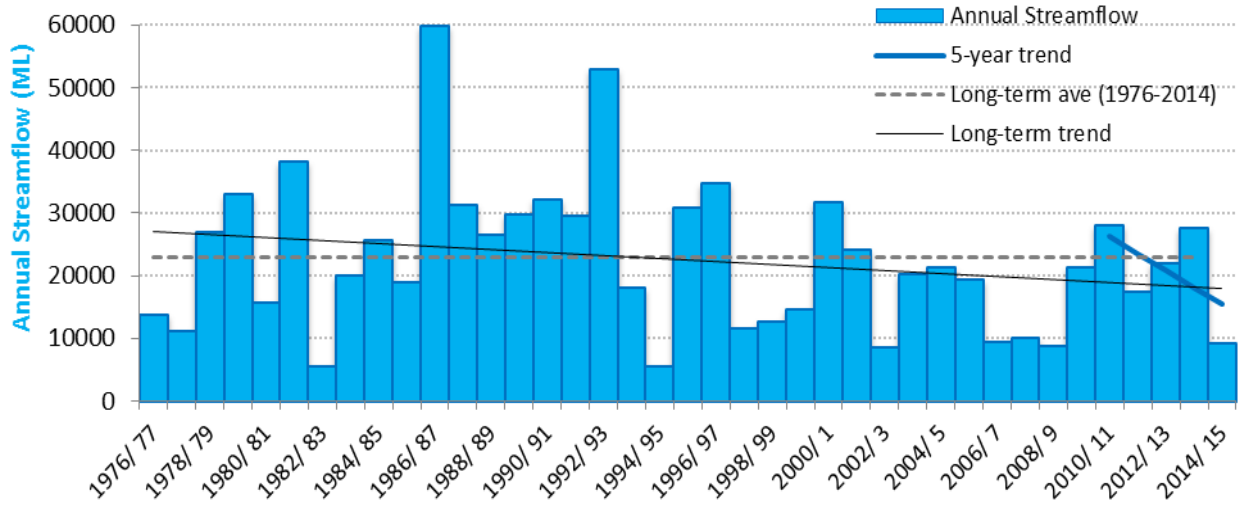


Figure 2. Annual streamflow (ML) for the 1976–77 to 2014–15 water-use years (July–June), the long-term trend and long-term average annual streamflow, and the short-term trend for the past five-years recorded at the Finniss River gauging station (A4260504)

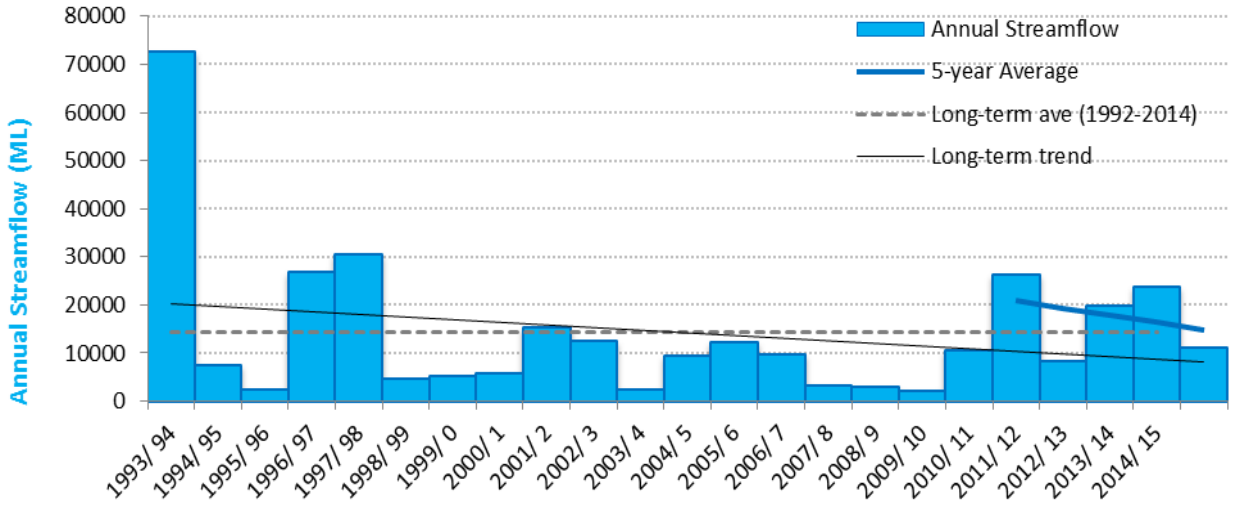


Figure 3. Annual streamflow (ML) for the 1976–77 to 2014–15 water-use years (July–June), the long-term trend and long-term average annual streamflow, and the short-term trend for the past five-years recorded at the Bremer River gauging station (A4260533)

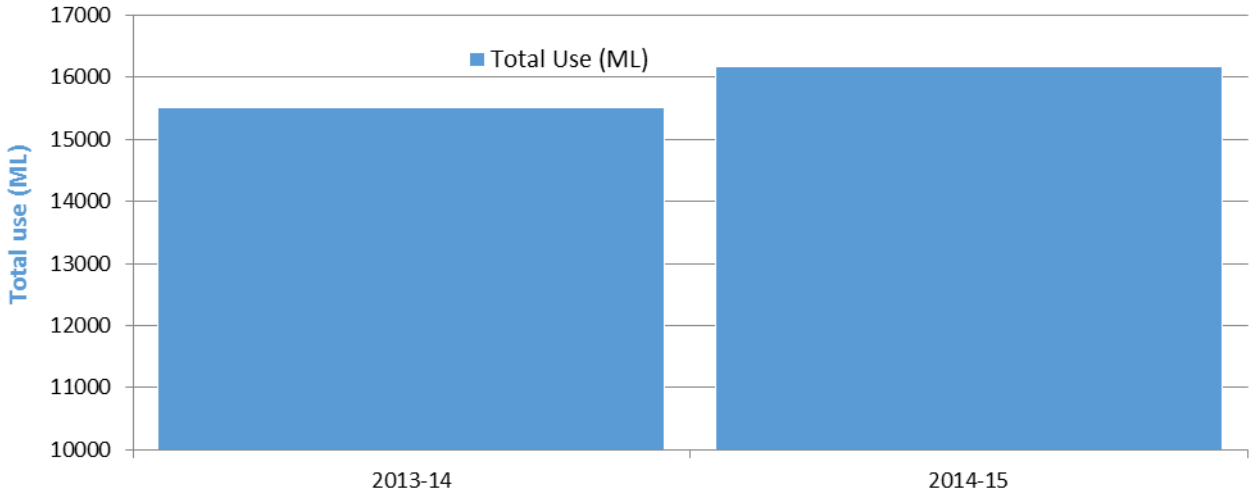


Figure 4. Surface water use data for the 2013-14 to 2014-15 water use years for the Eastern Mount Lofty Ranges PWRA

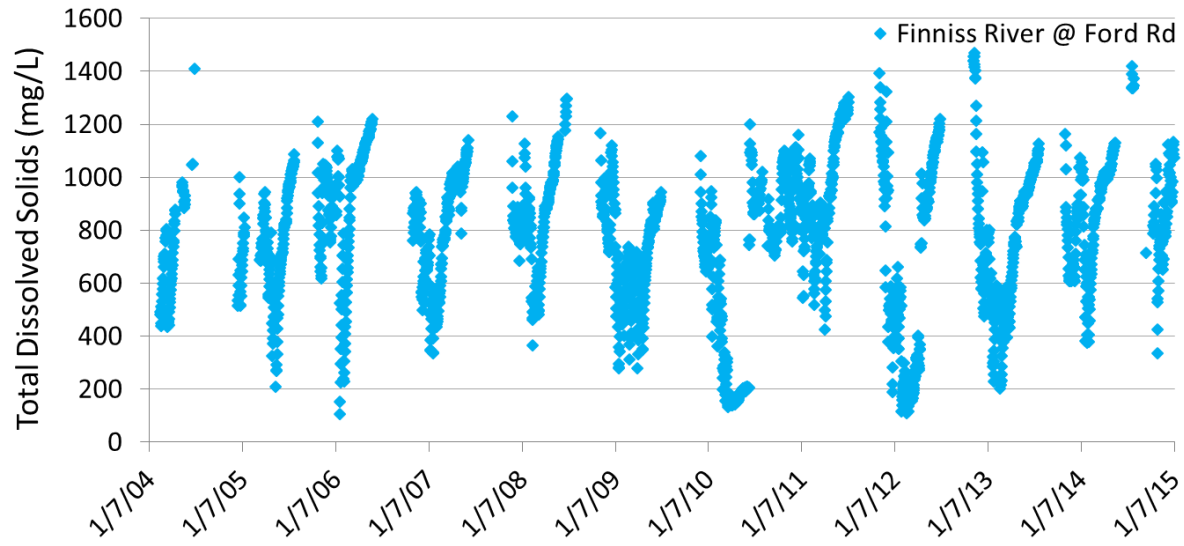


Figure 5. Salinity data (TDS mg/L) for the 2004–05 to 2014–15 water use years at Finniss River at Ford Road (A4261075) gauging station

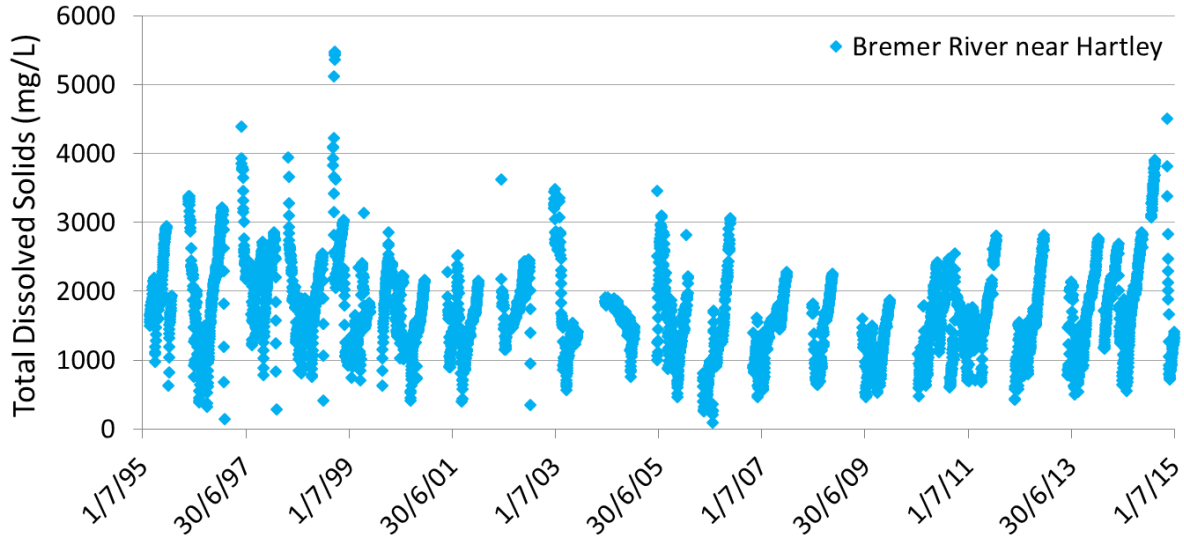


Figure 6. Salinity data (TDS mg/L) for the 1995–96 to 2014–15 water use years at Bremer River near Hartley (A4260533) gauging station

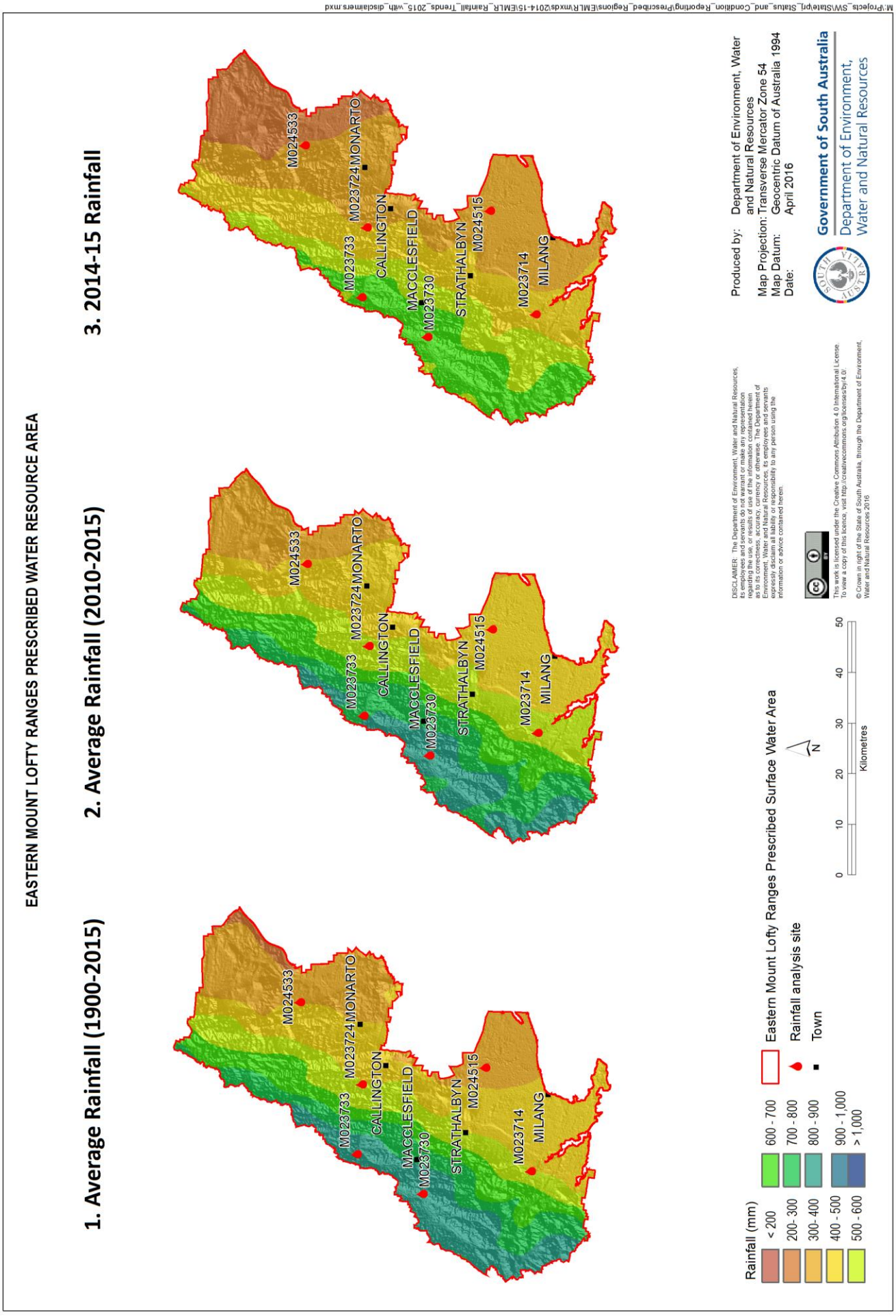


Figure 7. (1) Long-term and (2) five-year average annual rainfall and (3) annual rainfall for the 2014–15 water-use year in the Eastern Mount Lofty Ranges PWRA

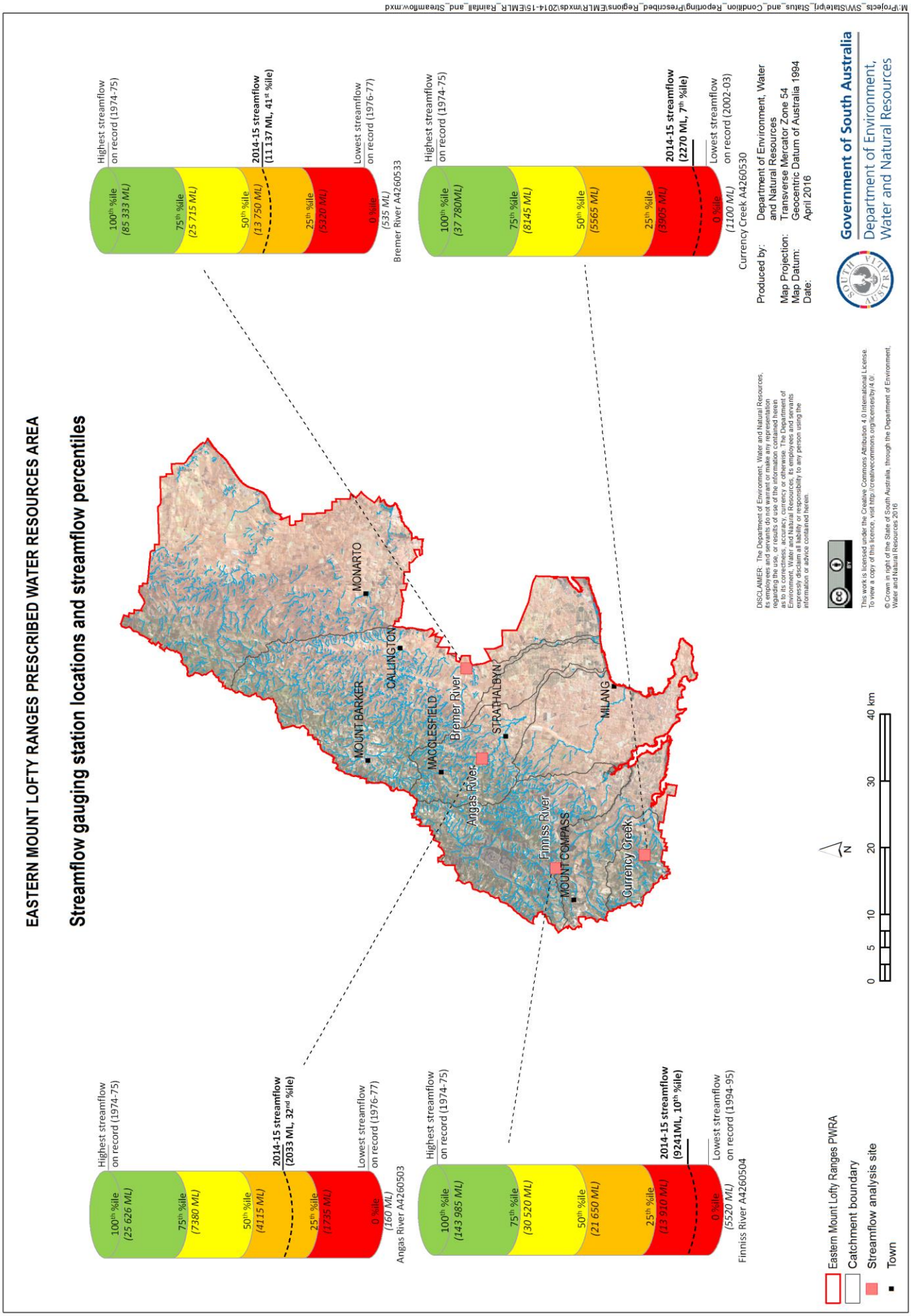


Figure 8. Surface water gauging stations and streamflow percentiles in the Eastern Mount Lofty Ranges PWRA

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