Marne Saunders Prescribed Water Resources Area

2016 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.

To view the *Marne Saunders PWRA Surface water status report 2010–11*, which includes background information on rainfall, streamflow, salinity, water use and relevant water-dependent ecosystems, please visit the *Water Resource Assessments* page on WaterConnect.

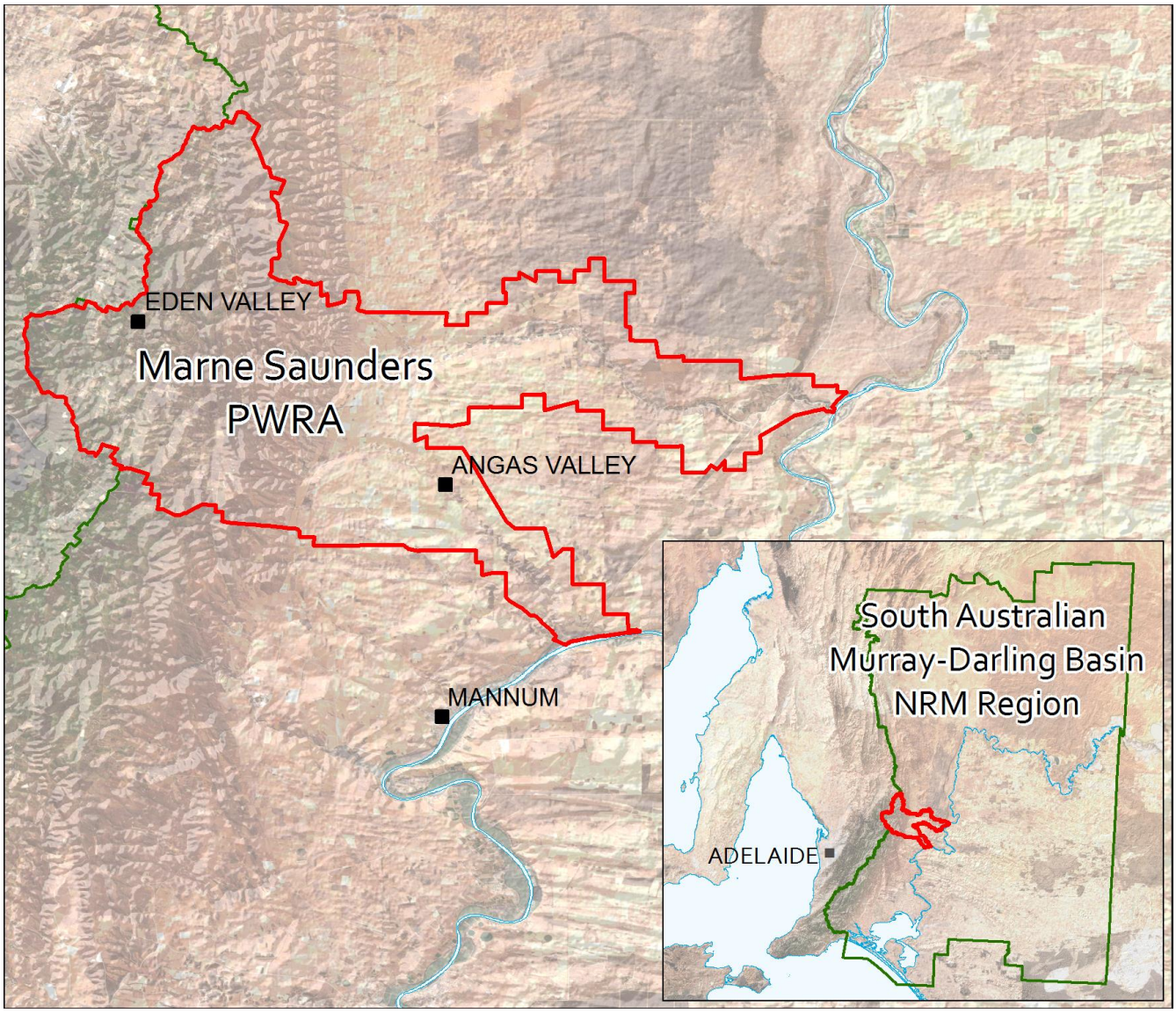
For further details about the *Marne Saunders PWRA*, please see the *Water Allocation Plan* for the Marne Saunders PWRA on the Natural Resources SA Murray-Darling Basin website: http://www.naturalresources.sa.gov.au/samurraydarlingbasin/home.

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: www.waterconnect.sa.gov.au.

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

MARNE SAUNDERS PWRA



The Marne Saunders Prescribed Water Resources Area (PWRA) is located approximately 70 km north-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) developed by the South Australian Murray-Darling Basin Natural Resources Management Board and adopted in 2010, seeks to provide for sustainable management of these water resources.

The western part of the region is located along the northern extent of the Mount Lofty Ranges and characterised by undulating hills and valleys with high rainfall, while the east is largely defined by flat plains with localised hills and rocky outcrops throughout 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, draining in an easterly direction across the plains, where majority of the flow is lost to groundwater, before discharging into the River Murray.

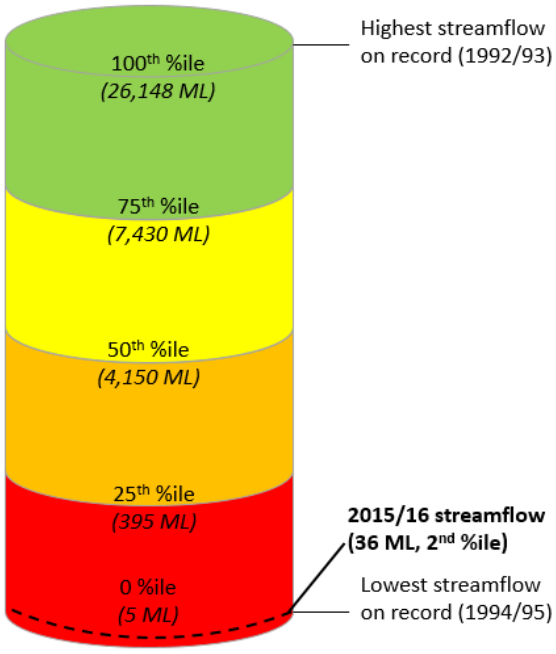
Surface water resources are highly dependent on rainfall, with trends in streamflow and salinity primarily climate driven, i.e. below-average winter rainfall results in a reduction in annual streamflow volumes. Below-average summer rainfall can also result in increased irrigation extractions, and these 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.

2016 Status

The Marne Saunders at a whole PWRA scale is assigned a ***red*** surface water status for 2016 based on the status of streamflow at Marne Gorge:

Annual streamflow was below the 25th percentile (%ile) 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.



Rainfall

Annual rainfall for the 2015/16 period was below the long-term average for the PWRA, as indicated in Figure 1, Keyneton rainfall station, which is representative of the region. Drier than average conditions were recorded during the first half of the 2015/16 analysis period, while the first six months of 2016 were significantly wetter, with approximately 50 % of the annual total for the 2015/16 period occurring in March, May and June 2016. These rainfall trends were consistent with the Cambrai (M024513) and the Mt Pleasant (M023737) rainfall stations, the latter of which is located just outside the PWRA, 10 km south-east of Springton.

A declining rainfall trend over the past five-years is evident (Figure 5-2), with the spatial distribution of rainfall indicating a reduction in the proportion of the PWRA that receives over 500 mm of rainfall when compared to the long-term average (Figure 5-1). Lower than average rainfall was also experienced throughout the western reaches of the region when compared to the long-term rainfall distribution. This is more pronounced during the 2015/16 water-use year where below average rainfall occurred across the entire PWRA, with approximately half the region receiving less than 200 mm of rainfall (Figure 5-3).

Streamflow

Two streamflow gauging stations are located within the Marne Saunders PWRA. The Marne Gorge gauging station (A4260605) is situated on the Marne River, approximately 5 km west of Cambrai, while the Saunders Creek gauging station (A4261174) is located just north of the township of Sanderston (Figure 6).

The Marne Gorge gauging station recorded annual streamflow of 36 ML in the 2015/16 water-use year (2nd percentile), much lower than the long-term average of 5,536 ML (Figure 2). Historically, the majority of streamflow in the Marne PWRA occurs between July to October. Typically, this period accounts for approximately 85 % of the total annual flow in any given year. However, below average rainfall conditions during June, September and October 2015 resulted in no streamflow at the Marne Gorge gauging station during this period, impacting on the total annual streamflow for the 2015/16 period. Similar conditions were observed at the Saunders Creek gauging station over the same period. A long-term (1973-2006) declining in streamflow is observable from the Marne Gorge streamflow records (Figure 2).

Water use

Water use from licensed surface water and water course sources in the Marne Saunders PWRA totalled 460 ML in 2015/16, less than the previous year's total of 735 ML. Existing stock and domestic dams are not managed through the Marne Saunders WAP (i.e. the volume taken from them is not limited to an allocated volume and they are not metered), therefore an estimate is used to report on non-licensed water demand. Estimated non-licensed water demand is 496 ML and this volume equates to approximately 30 % of the existing stock and domestic dam capacity.

Streamflow for the Marne Saunders PWRA in 2015/16 was approximately 57 ML (combined total streamflow records at the Marne Gorge and Saunders Creek gauging stations), with licensed and non-licensed extraction totalling 956 ML. The total resource capacity

for the 2015/16 water-use year (excluding evaporation from farm dams) is estimated to be 1,013 ML (57 ML plus 956 ML), with an estimated 94 % extracted for use (Figure 3).

Salinity

Salinity data is available for the Marne Gorge gauging station from 2002, and the Saunders Creek gauging station from 2010, with both stations providing a good indication of regional salinity variation (Figure 4). Salinity increases during sustained summer events, while decreasing throughout the winter months as a result of higher diluting flow levels.

Salinity levels recorded at the Marne Gorge gauging station are generally lower than those observed at the Saunders Creek gauging station. The majority of salinity data at the Marne Gorge station is less than 2,500 mg/L, while more than 60 % of salinity data recorded at the Saunders Creek is greater than 2,500 mg/L. The highest recorded salinities at both sites occurred during the Millennium Drought between 2006–09 as a result of consecutive years of below average streamflow.

Background information

The status of the Marne Saunders was determined by expressing the annual Marne Gorge streamflow for 2015/2016 as a percentile of the total annual streamflow for the period (1977/78 to 2015/16).

The total 2015/16 streamflow from the Marne Gorge gauging station represents the 2nd percentile, i.e. 98 % of the long-term historic annual streamflow totals were greater than the streamflow observed in 2015/16.

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

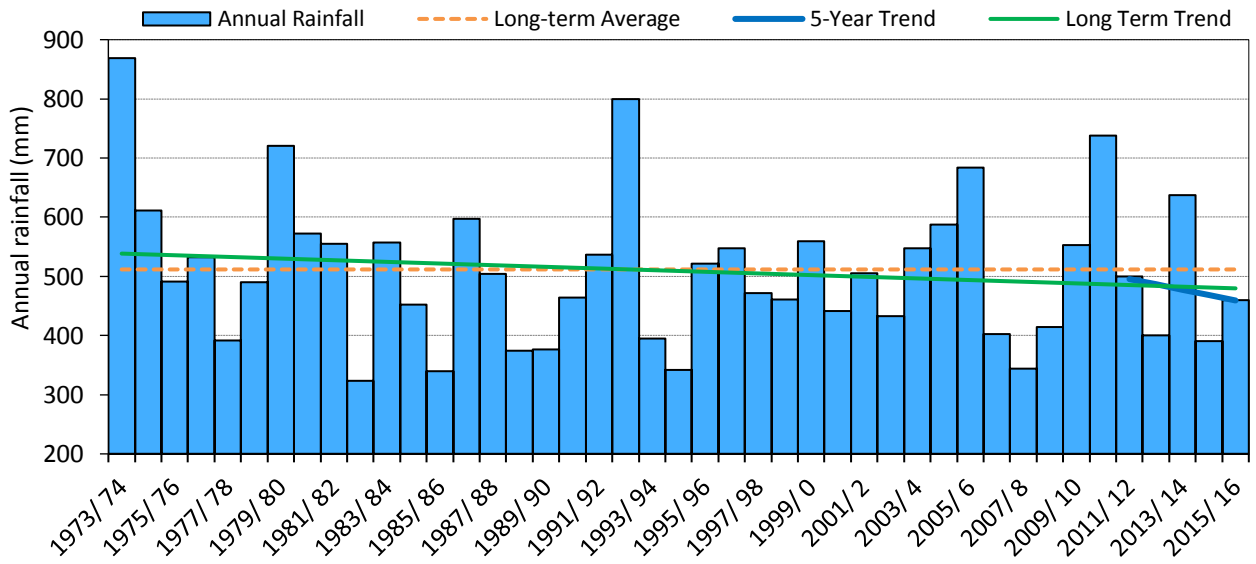


Figure 1. Annual rainfall (mm) for the 1973/74 to 2015/16 water-use years (July–June) at the Keyneton rainfall station (M023725)

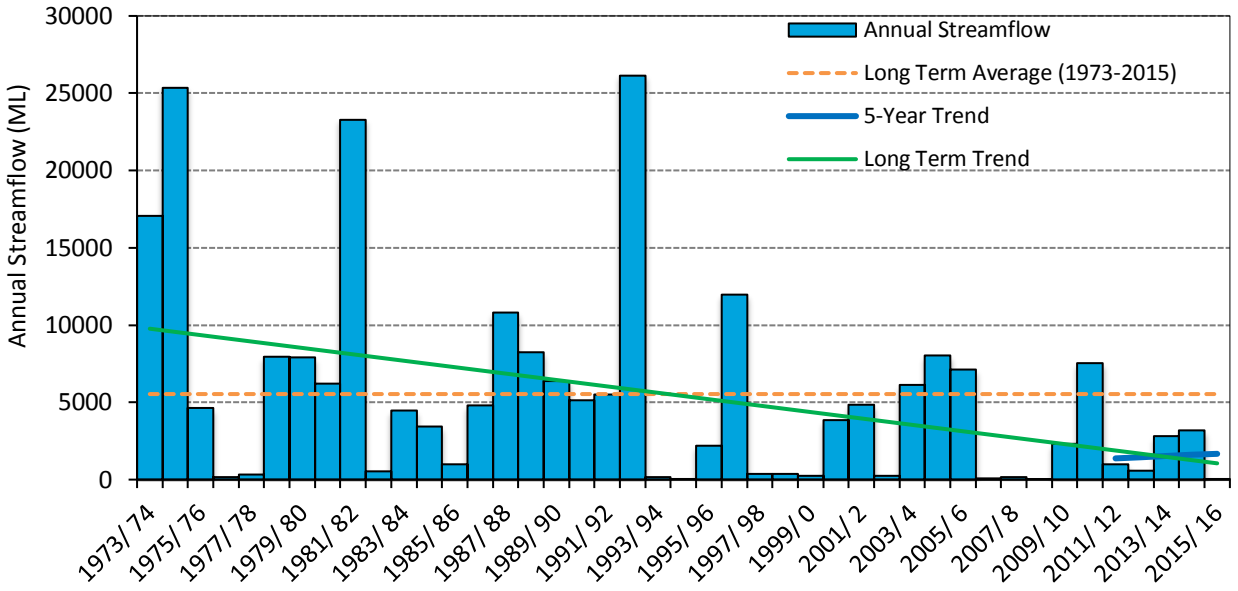


Figure 2. Annual streamflow (ML) for the 1973/74 to 2015/16 water-use years (July–June) at the Marne Gorge gauging station (A4260605)

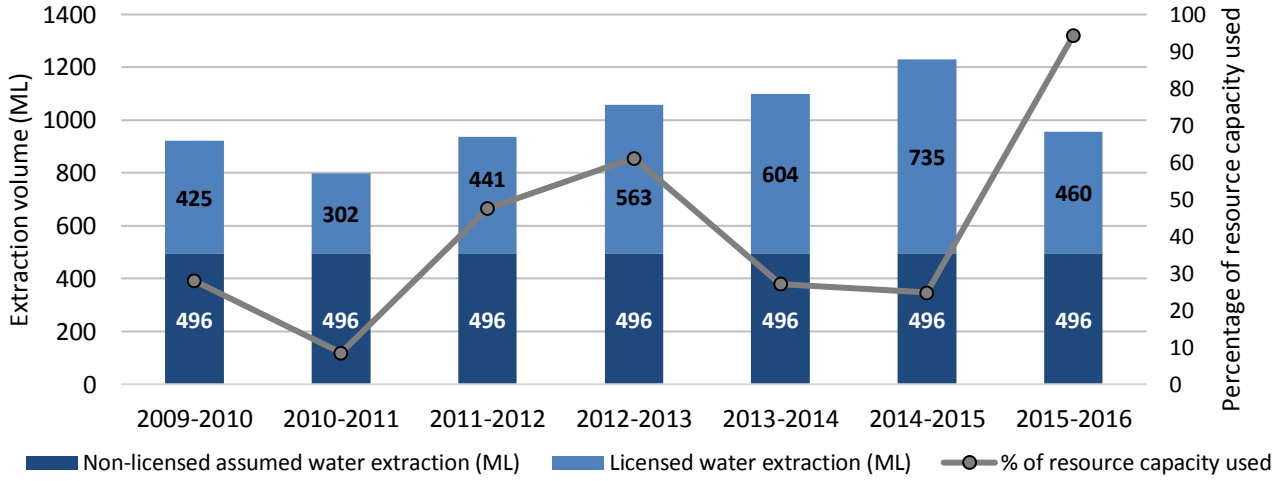


Figure 3. Surface water use as a percentage of total resource capacity available for the 2009/10 to 2015/16 water-use years

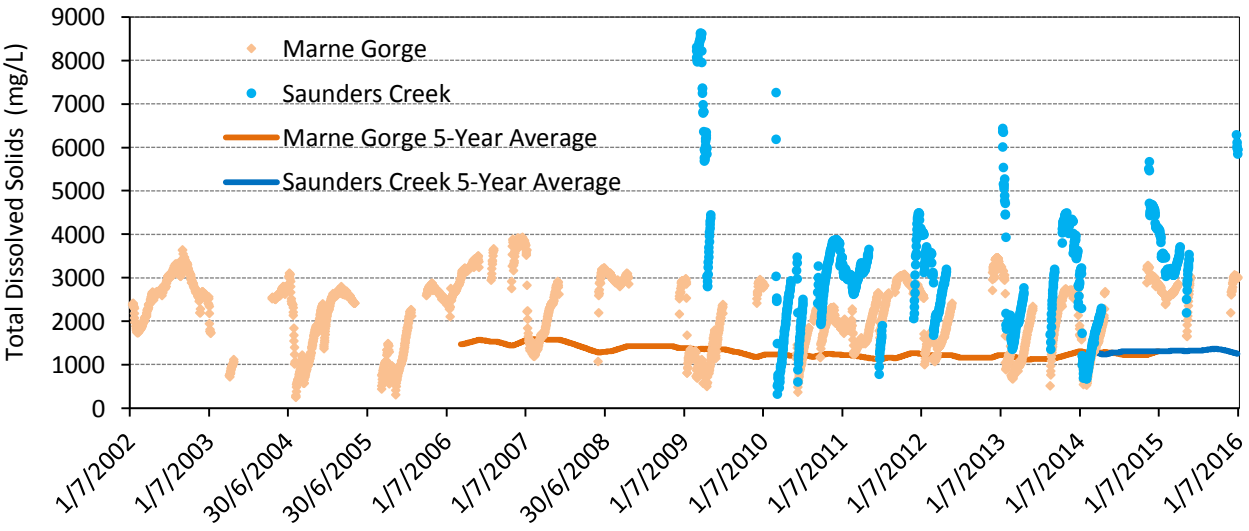


Figure 4. Marne Saunders PWRA and salinity data (TDS mg/L) for the 2002/03 to 2015/16 water use years at Marne Gorge (A4260605) and 2009/10 to 2015/16 water use years at Saunders Creek (A4261174) gauging stations

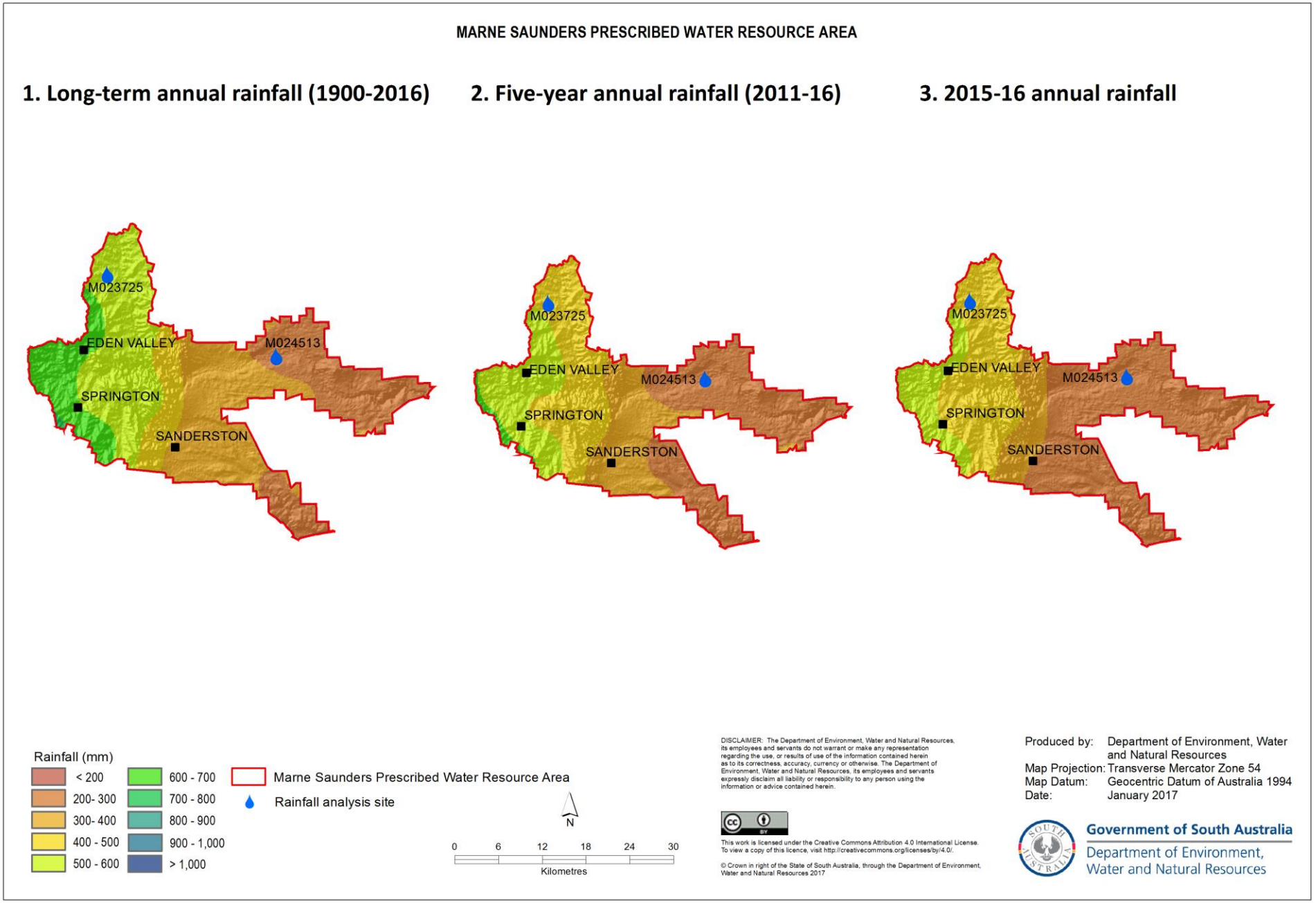


Figure 5. (1) Long-term and (2) five-year average annual rainfall and (3) annual rainfall for the 2015/16 water-use year in the Marne Saunders PWRA

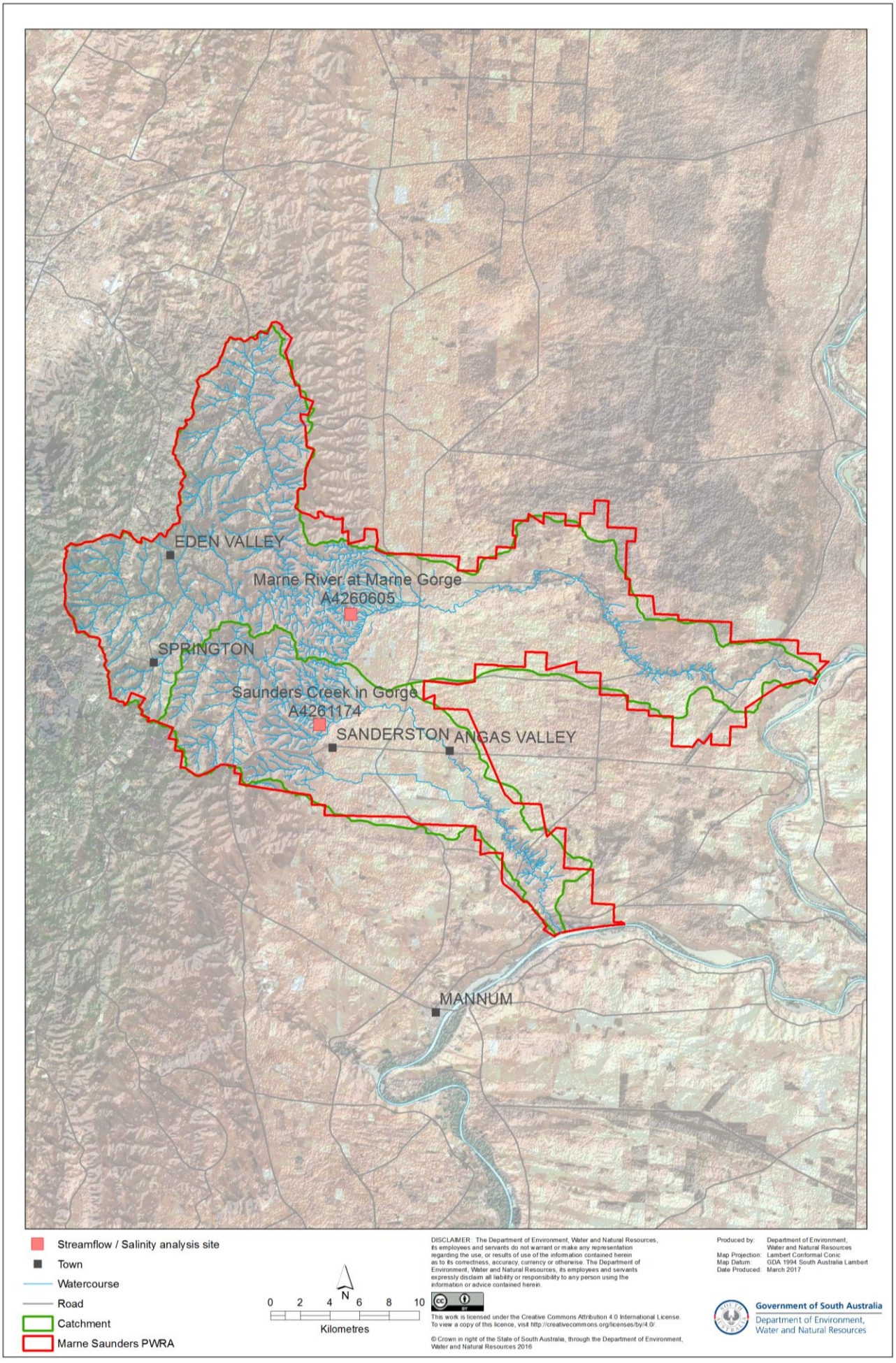


Figure 6. Surface water gauging stations in the Marne Saunders PWRA

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