

Marne Saunders PWRA

2015 Surface water status report



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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](#).

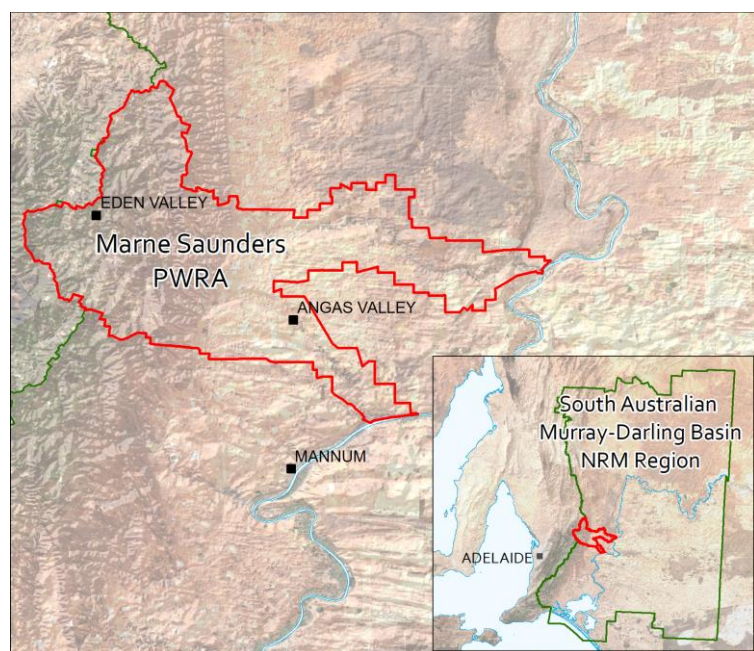
For further details about the *Marne Saunders PWRA*, please see the *Water Allocation Plan* for the Marne Saunders PWRA on the Natural Resources SA Murray-Darling Basin website: <http://www.naturalresources.sa.gov.au/samurraydarlingbasin/home>.

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](#).

2015 Summary



Description of the Prescribed Area

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

The topography of the Marne Saunders PWRA can be defined into two distinct zones. 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.

Rainfall summary

The Keyneton rainfall station (M023725) is located in the north-west of the PWRA on the outskirts of the township of Keyneton. Rainfall totalled 396 mm in the 2014–15 water-use year, 124 mm below the long-term average annual rainfall (Fig. 1). Last year's rainfall was the seventh lowest of the past 42 years at the Keyneton rainfall station (for the period 1973–2015, to align with the period of available streamflow data). During the 12 months to June 2015, only three months (July, January and April) had above average rainfall, with the spring months of September to November and the summer month of December recording below average rainfall during the last three consecutive years. This trend of months with consecutive below average spring rainfall is commensurate with the Mt Pleasant rainfall station (M023737) located just outside the PWRA, 25 km south of Keyneton and the Cambrai rainfall station (M024513) located on the plains of the PWRA. A trend of declining rainfall over the past five-years is evident (Fig. 1). The spatial distribution of rainfall for the past five-years shows average annual rainfall over this period is similar to that of the long-term average, with a slight increase in average rainfall experienced along the eastern reaches of the Marne Saunders PWRA (Fig. 4). However, the spatial distribution of rainfall for 2014–15 shows below average rainfall across the entire PWRA, particularly in the east of the PWRA where average annual rainfall drops below 500 mm.

Streamflow summary

Two streamflow gauging stations are located within the Marne Saunders PWRA. Situated on the Marne River approximately 5 km west of Cambrai is the Marne Gorge gauging station (A4260605), while the Saunders Creek gauging station (A4261174) is located just north of the township of Sanderston. Marne Gorge gauging station recorded annual streamflow of 3202 ML in the 2014–15 water-use year (44th percentile (%ile)), lower than the long-term average annual streamflow of 5593 ML and ranks in the 25-50th percentile range of streamflow over the period of record (Fig. 2). However, only one month (2183 ML in July 2014) experienced above average streamflow, with no flow being observed at the station between November 2014 to June 2015. A declining streamflow trend over the past five-years is evident (Fig. 2). Saunders Creek gauging station has six years of streamflow data and recorded 541 ML in 2014-15 (150 ML in 2013-14).

Water use summary

Water use from licensed surface water sources in the Marne Saunders PWRA totalled 735 ML in 2014–15, more than the previous year's total of 604 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. Recorded streamflow for the Marne Saunders PWRA in 2014–15 was approximately 3743 ML (total streamflow recorded at Marne Gorge and Saunders Creek gauging stations), with approximately 1231 ML (sum of licensed and non-licensed extraction) recorded or estimated as being extracted. As such, of the 4974 ML (3743 plus 1231 ML) total estimated resource capacity for 2014-15 (not including evaporation from farm dams), it is estimated that 25 % was extracted for use (27 % in 2013–14) (Fig. 3).

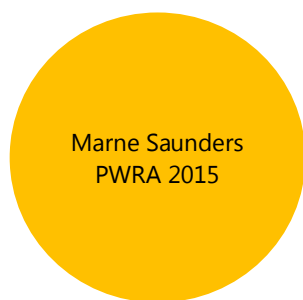
Salinity summary

Marne Gorge and Saunders Creek gauging stations provide a good indication of salinity (measured as Total Dissolved Solids) (Fig. 5). A clear pattern of increasing salinity in the spring and summer months and decreasing salinity in the autumn and winter months is shown in Figure 5, highlighting the climatic influence and availability of freshwater replenishment in the streams. At the Marne Gorge gauging station, 51 % of salinity data is between 1000-2500 mg/L and the remainder between 2500-4000 mg/L (for the period 2002-15). Salinity at the Saunders Creek gauging station was slightly higher, with 24 % between 2500-4000 mg/L, 51 % between 2500-4000 mg/L and 25 % greater than 4000 mg/L. The highest recorded salinities at both sites occurred during the Millennium Drought between 2006-2009, the result of consecutive years of below average streamflow.

Status summary

To determine the status of the Marne Saunders PWRA for 2015, the total streamflow for the water use period July 2014 – June 15 (2014-15) is expressed as a percentile by comparing it to the annual streamflow data measured over the entire period of record (1973-74 to 2014-15). The percentile value indicates the percentage of records in the dataset that are equal to or below that streamflow. For example, if the 90th percentile annual streamflow is 100 ML, this indicates that 90 percent of the annual streamflow values over the entire period of record were equal to or lower than 100 ML/y. The 2014-15 annual streamflow is the 44th percentile, which means 44% of the annual streamflow values for 1973-74 to 2014-15 are equal to or below the 2014-15 annual streamflow. Status is defined based on which percentile grouping the current year's streamflow percentile value occurs within (shown in the image below). 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.

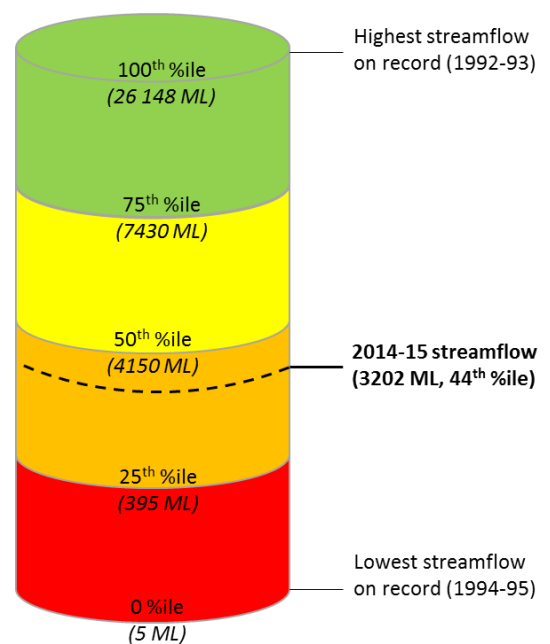
2015 Status



The Marne Saunders at a whole PWRA scale is assigned an amber surface water status for 2015 based on the status of streamflow at Marne Gorge:

'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.



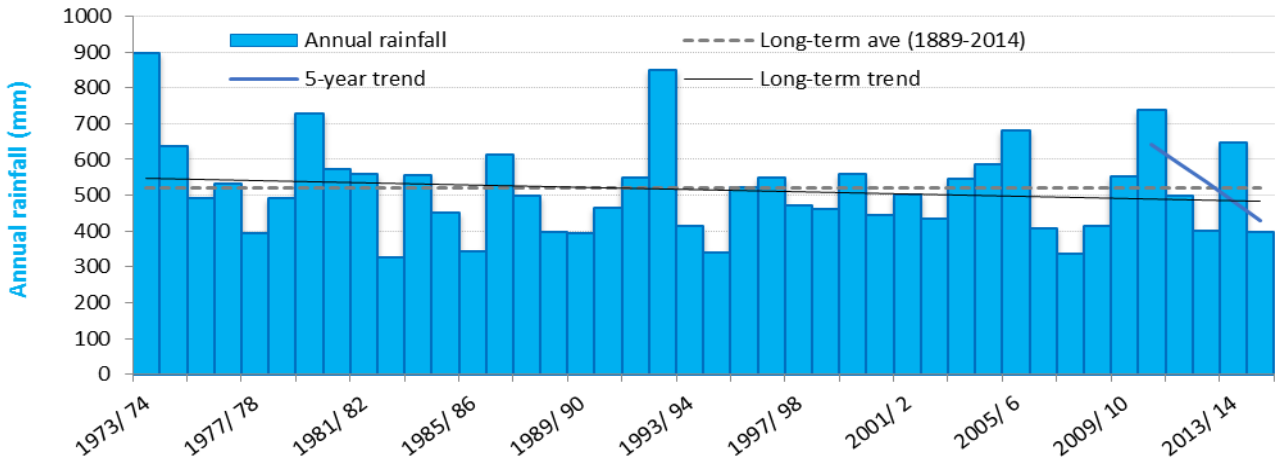


Figure 1. Annual rainfall (mm) for the 1973–74 to 2014–15 water-use years (July–June), the long-term trend and long-term average annual rainfall, and the short-term trend for the past five-years recorded at Keyneton rainfall station (M023725)

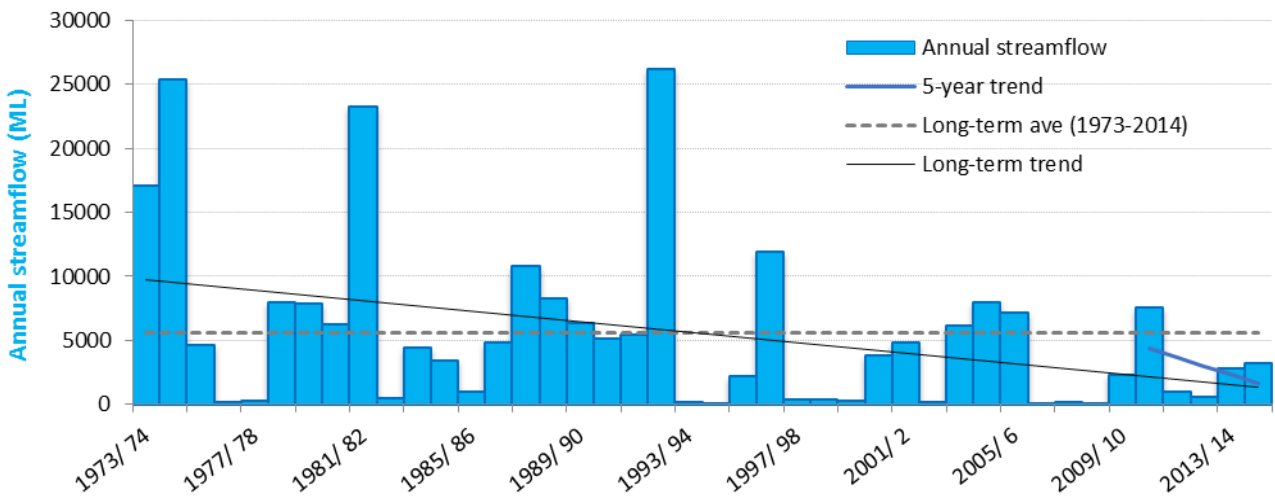


Figure 2. Annual streamflow (ML) for the 1973–74 to 2014–15 water-use years (July–June), the long-term trend and long-term average annual streamflow, and the short-term trend for the past five-years recorded at Marne Gorge gauging station (A4260605)

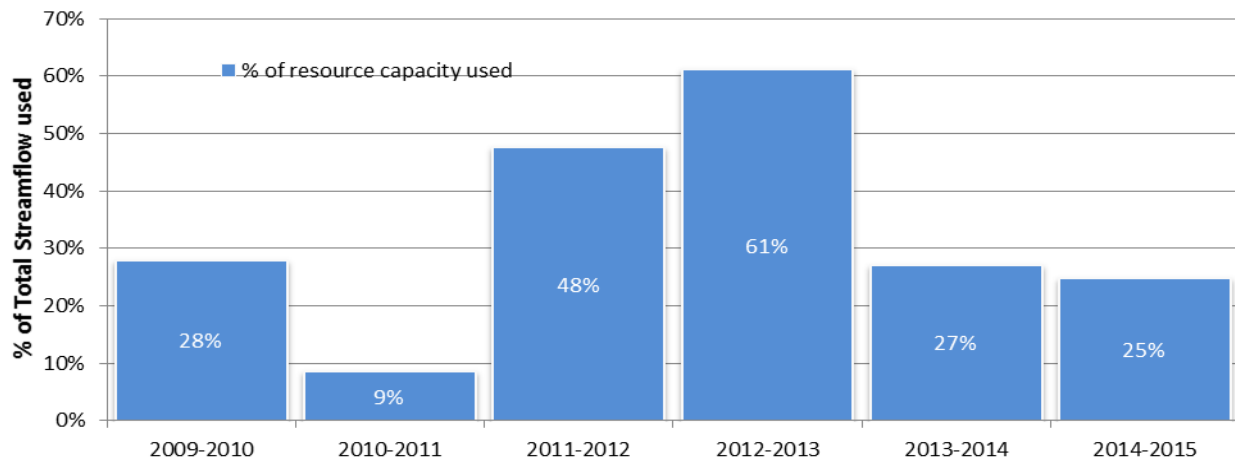


Figure 3. Surface water use as a percentage of total resource capacity available for the 2009–10 to 2014–15 water-use years

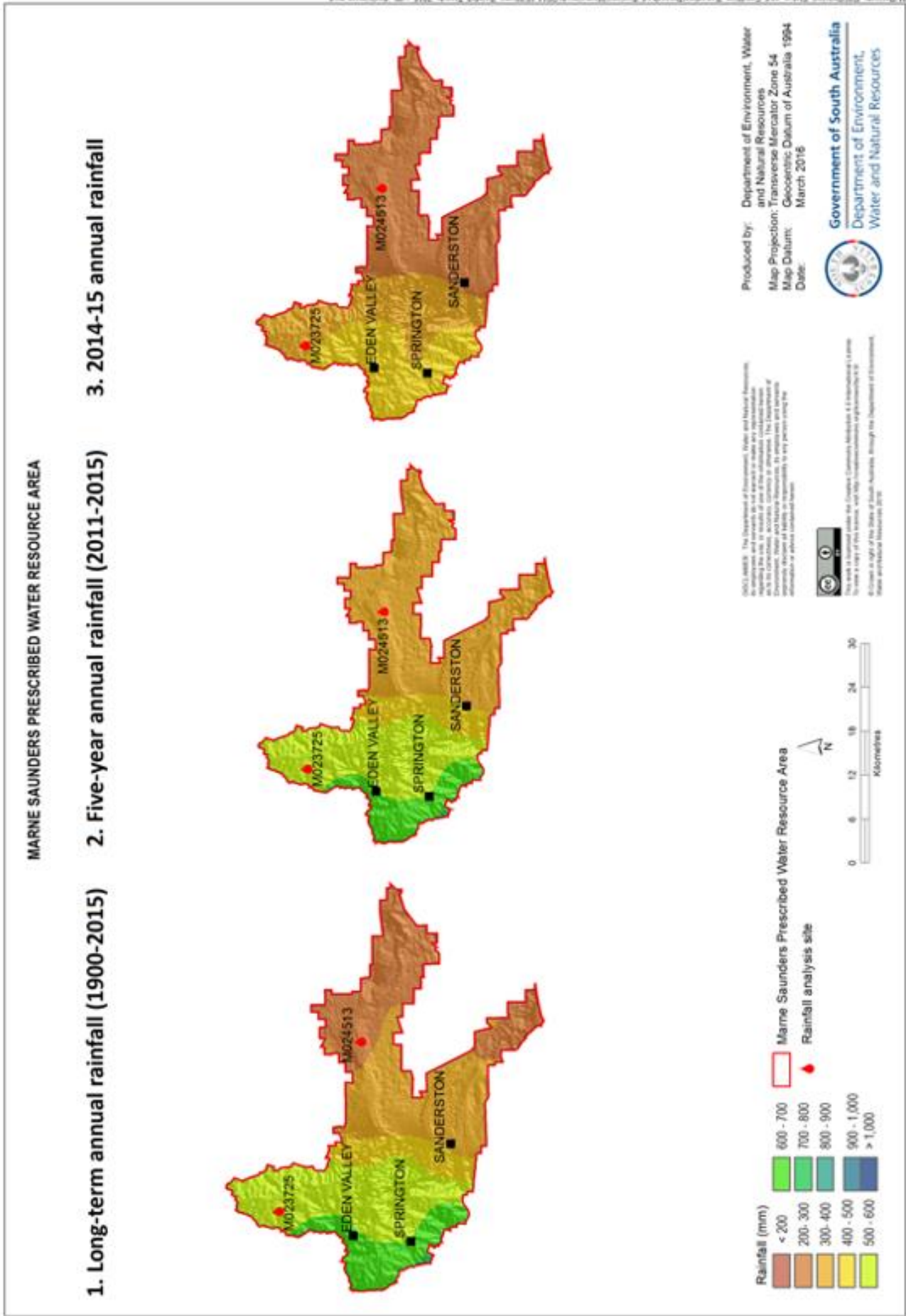


Figure 4. (1) Long-term and (2) five-year average annual rainfall and (3) annual rainfall for the 2014–15 water-use year in the Marne Saunders PWRA

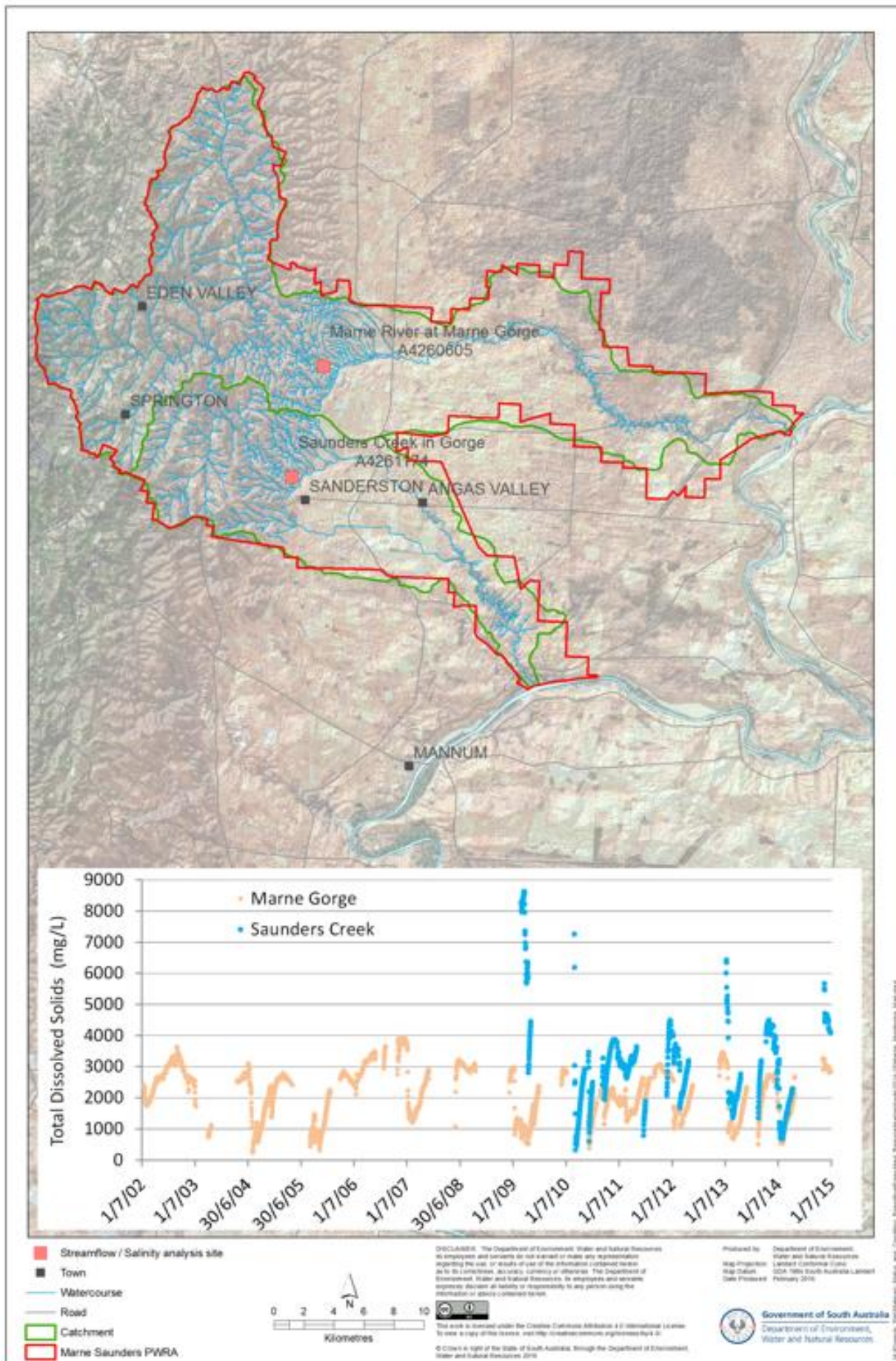


Figure 5. Surface water gauging stations in the Marne Saunders PWRA and salinity data (TDS mg/L) for the 2002–03 to 2014–15 water use years at Marne Gorge (A4260605) and 2009–10 to 2014–15 water use years at Saunders Creek (A4261174) gauging stations

