

Marne Saunders PWRA

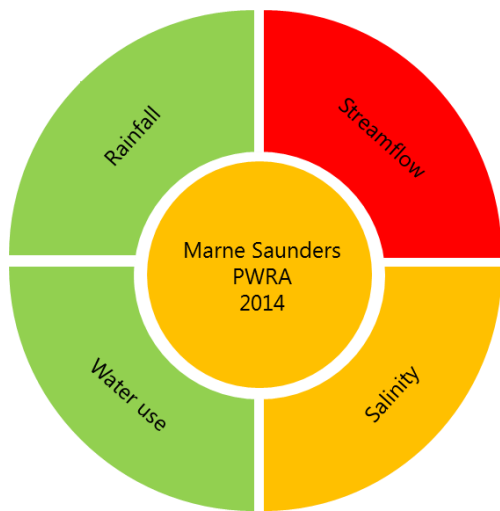
Surface water status report

2014



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

2014 Summary



The Marne Saunders Prescribed Water Resources Area (PWRA) has been assigned an amber status for 2014:

Adverse trends indicating medium risk to the resource eventuating in the short-term

This hydrological status for 2014 is supported by:

- above average rainfall at 3 of 3 rainfall analysis sites
- below average streamflow at 2 of 2 streamflow analysis sites
- variable salinity at 2 salinity analysis sites
- moderate water use compared to annual streamflow.


This status report provides a snapshot of the surface water resources in the Marne Saunders PWRA for the financial year 2013–14. Surface water status reports are limited to reporting on the hydrological status of the PWRA. Available data on climate, streamflow, salinity and water use is summarised and compared with recent and long-term data to provide an indication of the hydrological status of its water resources. Each element is discussed with reference to recent or more long-term trends where, if at all, they are present in the data. These status reports seek to support informed policy-development and management decisions by resource managers and those responsible for, or reliant on, the water resources. Status of the prescribed resource for the previous years is shown below.




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.

The Marne Saunders PWRA is located approximately 60 km north-east of Adelaide (Figure 1). 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) was developed by the South Australian Murray–Darling Basin Natural Resources Management Board in 2010, which seeks to provide for sustainable management of water resources.


Status symbols

 No adverse trends, indicating a stable or improving situation (green)


Trends are either stable (no significant change), or have improved over the reporting period, indicating that there is insignificant risk of impact to the beneficial use of the resource.

 Adverse trends, indicating low risk to the resource in the short-term (1 to 3 years) (yellow)

Observed adverse trends are gradual and if continued, are unlikely to lead to a change in the current beneficial uses of the surface water resource in the short-term.

 Adverse trends, indicating medium risk to the resource eventuating in the short-term (amber)

Observed adverse trends are significant and if continued, moderately likely to lead to a change in the current beneficial uses of the surface water resource in the short-term.

 Adverse trends, indicating high risk to the resource within the short-term (red)

Trends indicate degradation of the resource is occurring. Degradation will very likely result in a change in the beneficial use (e.g. reduced ability to access surface water entitlements and/or decline in the condition of environmental assets).

 Unclear (grey)

Trends are unable to be determined due to a lack of adequate information on which to base a sound judgement of status.

Data from the same stations summarised in previous reports are used in analysis, for comparison of annual trends. Three long-term meteorological stations were selected for analysis of rainfall trends: Keyneton (M023725), Cambrai (M024513) and Mount Pleasant (M023737) (Figure 1). Annual rainfall was above average across the three rainfall analysis sites in 2013–14. The spring month of September recorded below average rainfall for the third consecutive year across all stations analysed. This is the second consecutive year of below average rainfall from September to January.

Data from two gauging stations were selected for analysis of streamflow and salinity trends: Marne River at Marne Gorge (A4260605) and Saunders Creek in Gorge (A4261174) (Figure 1). Streamflow was below average at both streamflow analysis sites in 2013–14. Salinity was variable in 2013–14 when compared to the range of salinity for the previous year.

Water use was moderate in 2013–14 when expressed as a percentage of the total available streamflow in 2013–14.

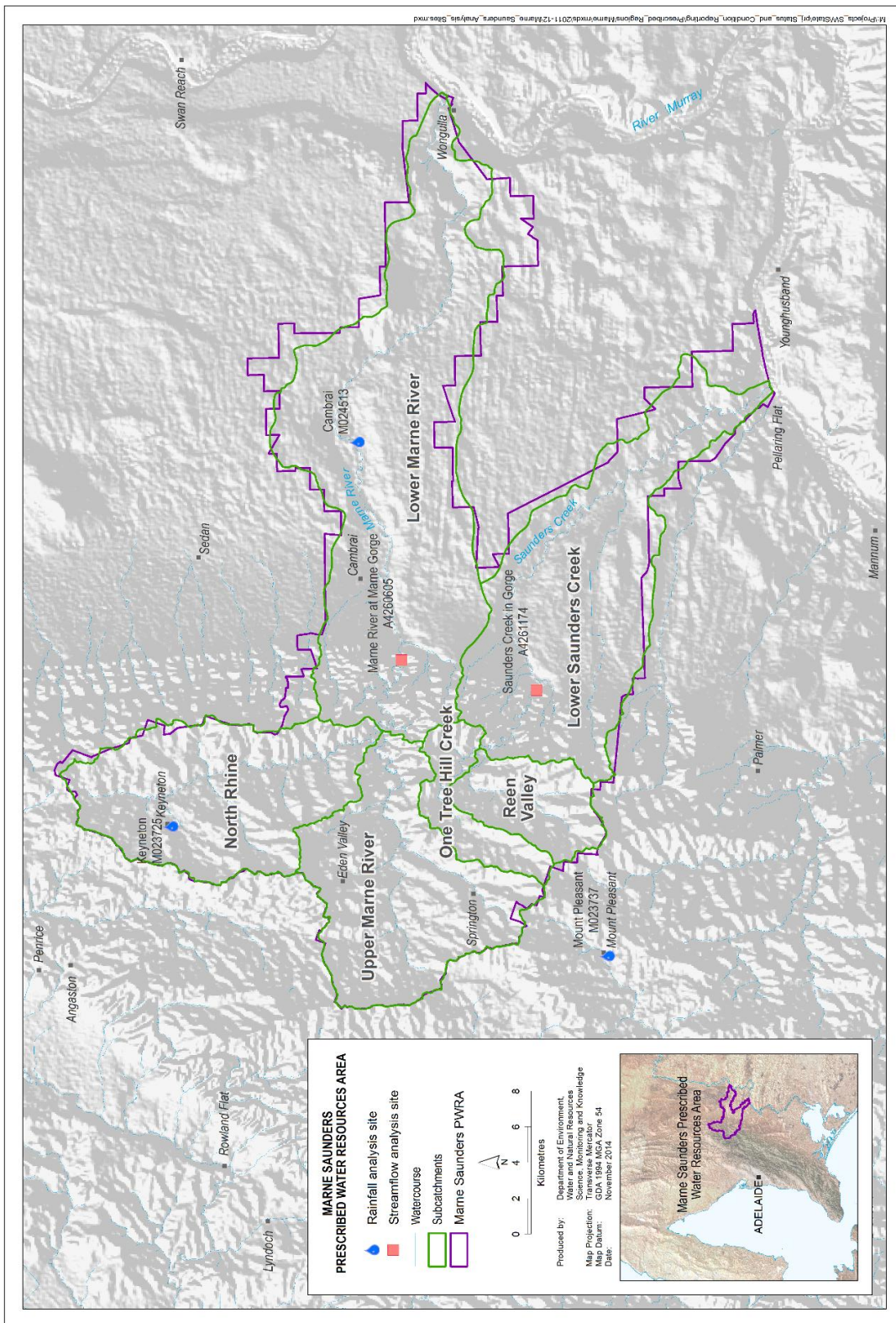


Figure 1. Monitoring analysis sites as used in the Marne Saunders PWRA Surface water status report

Rainfall

Status	Degree of confidence	Comments on recent historical context
Above average	High: good coverage of rainfall stations representing the rainfall variation across the region	Above average rainfall at Keyneton and Cambrai after below average rainfall the previous year. Above average rainfall at Mount Pleasant after consecutive years of below average rainfall

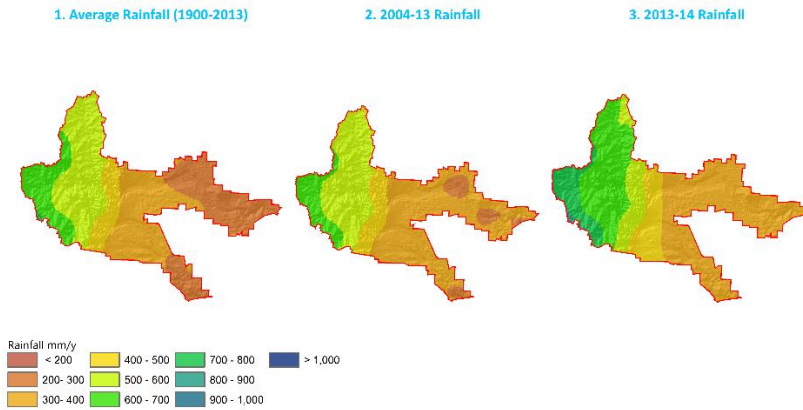


Figure 2. Annual rainfall distributions for the Marne Saunders PWRA

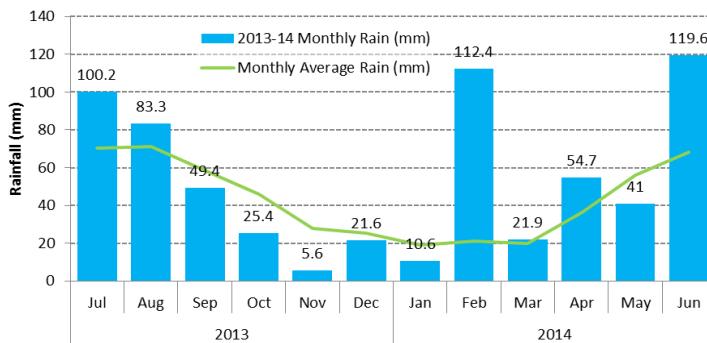


Figure 3. Monthly rainfalls at Keyneton (M023725)

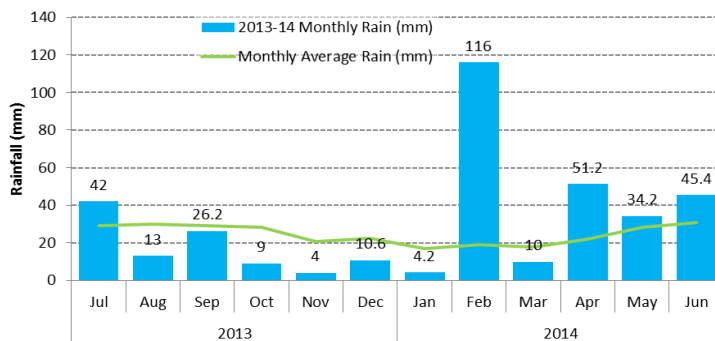


Figure 4. Monthly rainfalls at Cambrai (M024513)

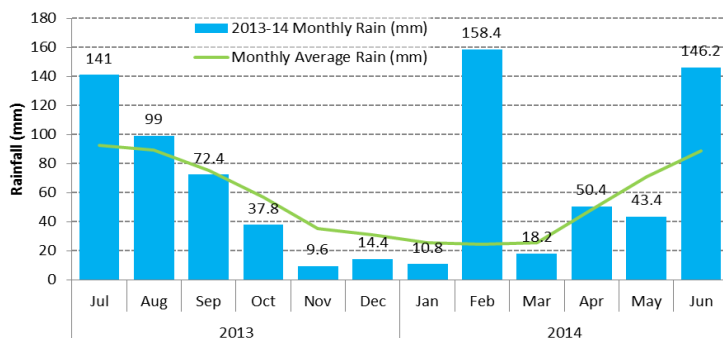


Figure 5. Monthly rainfalls at Mount Pleasant (M023737)

Rainfall in the Marne Saunders PWRA typically varies from less than 300 millimetres (mm) in the east to over 700 mm in the west (Figure 2). The three panels of Figure 2 indicate that rainfall was higher across the entire PWRA for the year 2013–14 (Panel 3) in comparison to the long-term average (Panel 1) and higher across the western half of the PWRA in comparison to the short-term average (Panel 2).

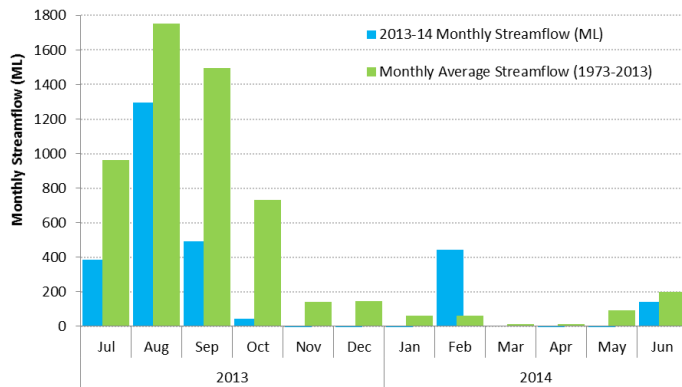
Keyneton Bureau of Meteorology (BoM) rainfall station received an above average rainfall of 646 mm in 2013–14 in comparison to its long-term average of 520 mm (Figure 3). Above average rainfall was experienced in 6 months across 2013–14 with February and June receiving considerably more than the monthly average rainfall.

Cambrai BoM rainfall station received an above average rainfall of 366 mm in 2013–14 in comparison to its long-term average of 294 mm (Figure 4). Above average rainfall was experienced in 5 months across 2013–14. The months of August to January and March all received below the monthly average rainfall.

Mount Pleasant BoM rainfall station received an above average rainfall of 802 mm in 2013–14 in comparison to its long-term average of 664 mm. Above average rainfall was experienced in 6 months across 2013–14 (Figure 5). The months of September to January were consistently below average across all rainfall stations summarised.

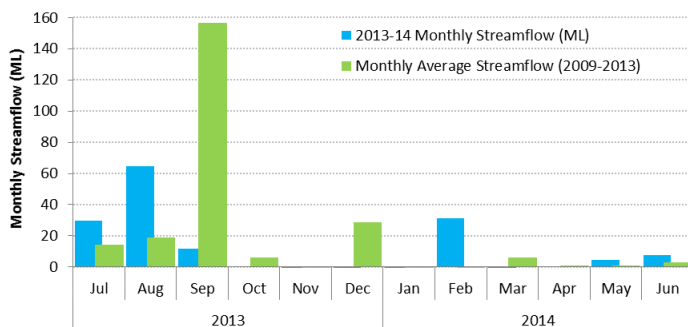
Streamflow

Status	Degree of confidence	Comments on recent historical context
Below average	High: data derived from long-term gauging station	Third year of below average streamflow at Marne River and Saunders Creek after well above average streamflow recorded in 2010–11



Marne River at Marne Gorge gauging station (A4260605) experienced a below average annual streamflow of 2804 megalitres (ML) for 2013–14 (51% lower than the 5667 ML long-term average). The monthly breakdown of streamflow for 2013–14 (Figure 6) highlights that all months except February received below average streamflow. No streamflow was recorded from November to January and April to May.

Figure 6. Monthly streamflow at Marne River (A4260605)

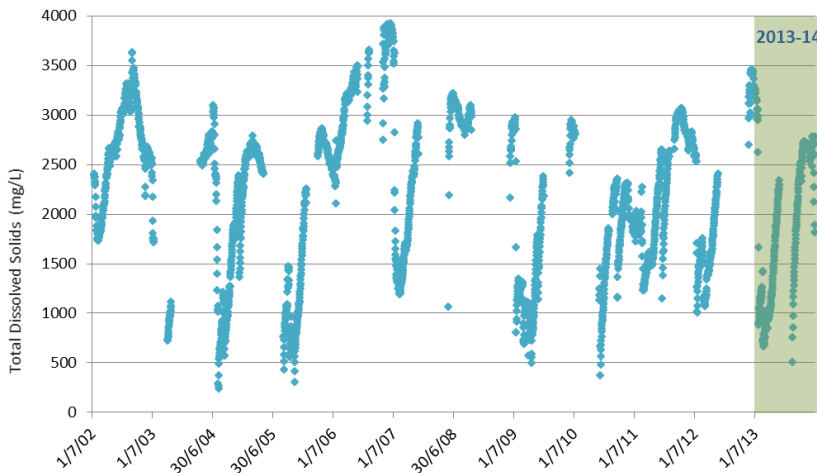


Saunders Creek in Gorge gauging station (A4261174) experienced a below average annual streamflow of 150 ML for 2013–14 (36% lower than the 233 ML long-term average). The monthly breakdown of streamflow for 2013–14 (Figure 7) highlights that 5 months received above average streamflow. No streamflow was recorded from November to January and also March.

Figure 7. Monthly streamflow at Saunders Creek (A4261174)

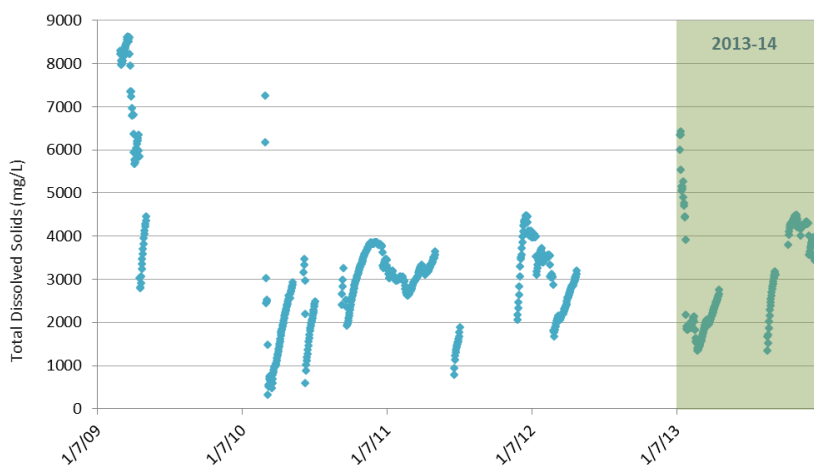
Salinity

Status	Degree of confidence	Comments on recent historical context
Variable	<p>High: data derived from long-term salinity monitoring at Marne River</p> <p>Medium: data derived from short-term salinity monitoring at Saunders Creek</p>	<p>Salinity trend at Marne River is comparable to the previous year whereas the salinity trend at Saunders Creek is higher compared to 2012–13 for the limited data that is available</p>



Of the total record for Marne River, 9% was recorded as <1000 mg/L, 46% of the record was between 1000–2500 mg/L and 45% between 2500–4000 mg/L. The salinity range in 2013–14 is comparable to the previous year but less than the high salinity levels recorded around 2007.

Figure 8. Salinity data at Marne River from 2002–2014



For Saunders Creek, 3% was recorded as <1000 mg/L, 28% was between 1000–2500 mg/L, 50% between 2500–4000 mg/L and 19% of the record >4000 mg/L. The salinity range in 2013–14 is higher compared to the previous year but less than the high salinity levels recorded around 2009.

Figure 9. Salinity data at Saunders Creek from 2009–2014

Surface water use

Status	Degree of confidence	Comments on recent historical context
Moderate use compared to annual streamflow	High to medium: high confidence in metered data, medium confidence in estimated data	Water use as a % of annual streamflow has decreased during 2013–14

Surface water use is summarised by licensed extractions and estimated non-licensed demand (Table 1).

Table 1. Summary of surface water use in the Marne Saunders PWRA

Marne Saunders PWRA surface water use (ML)	■	Licensed surface water extractions (dams)	549
	■	Licensed watercourse extractions	55
	■	Estimated non-licensed water demand	496
Total water extractions (ML)			1100

Water usage from licensed surface water sources in 2013–14 totalled approximately 604 ML (549 + 55), which is up from the previous year's total of 563 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. The estimated non-licensed water demand is 496 ML and this volume equates to approximately 30% of the existing stock and domestic dam capacity. As long as the estimated non-licensed dam capacity remains unchanged from one year to the next, so too will the estimated non-licensed surface water demand, irrespective of variations in annual rainfall and streamflow. As such, the limitations of this estimation method should be kept in mind when considering estimated non-licensed surface water demand.

The distribution of water use across the PWRA from 2009–14 is shown in Figure 10.

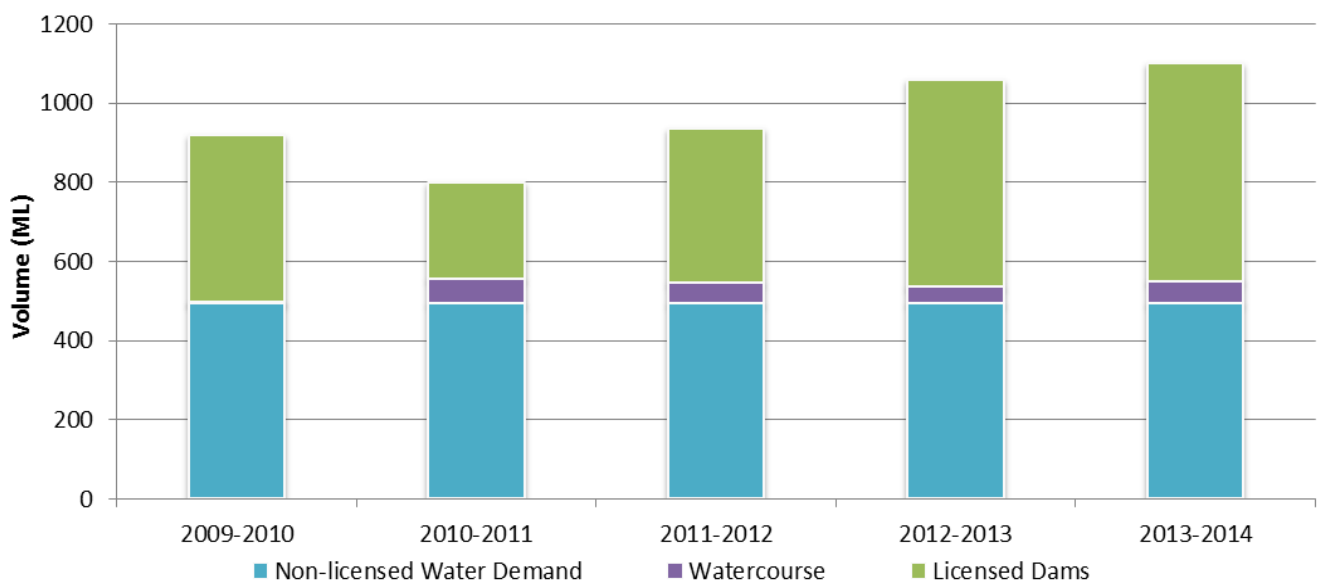


Figure 10. Surface water use in the Marne Saunders PWRA from 2009–14

Recorded streamflow for the PWRA in 2013–14 was approximately 2954 ML (combined streamflow of Marne Gorge and Saunders Creek), with approximately 1100 ML (sum of licensed and non-licensed extraction) recorded or estimated as being extracted. As such, of the 4054 ML (2954 plus 1100 ML) total estimated PWRA streamflow volume for 2013–14 (not including evaporation from farm dams), it is estimated that 27% was extracted for use (61% in 2012–13).

The PWRA has been assigned a use rating of 3 (Moderate use) for 2013–14.

Table 2. Use rating system

Rating	% of resource capacity used in current year	Description
1	0 – 10 %	Negligible use
2	11 – 20 %	Low use
3	21 – 30 %	Moderate use
4	31 – 40 %	High use
5	41 – 50 %	Very high use
6	Greater than 50 %	Extremely high use

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This Surface water status report is available online at <http://www.waterconnect.sa.gov.au>

To view the *Marne Saunders PWRA Surface water status report 2010–11*, which includes background information on location, 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 South Australian Murray–Darling Basin [website](#).

Gridded rainfall data was sourced from the Bureau of Meteorology (BoM). Station rainfall data was sourced from 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>.

