

Marne Saunders PWRA

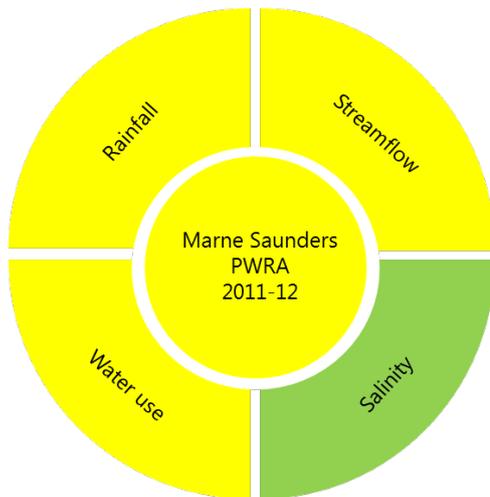
Surface water status report

2011–12



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

2011–12 Summary



The Marne Saunders Prescribed Water Resources Area (PWRA) has been assigned a yellow status for 2011–12:

Adverse trends indicating low risk to the resource in the short-term

This hydrological status for 2011–12 is supported by:

- Variable rainfall across all rainfall analysis sites
- below average streamflow at Marne River
- steady salinity
- very high 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 2011–12. 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 management decisions by resource managers and those responsible for, or reliant on, the water resources. Status of the prescribed resource for 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. Data from three long-term meteorological stations were selected for analysis of rainfall trends; Keyneton (M023725), Cambrai (M024513) and Mount Pleasant (M023737) (Figure 1). Rainfall was variable across the three rainfall analysis sites in 2011–12.

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 Marne River in 2011–12. Salinity was steady in 2011–12 when compared to the range of salinity for the previous year.

**Saunders Creek streamflow data does not contribute to the status of the PWRA due to limited data availability*

Water use was very high in 2011–12 when expressed as a percentage of the total available streamflow in 2011–12.

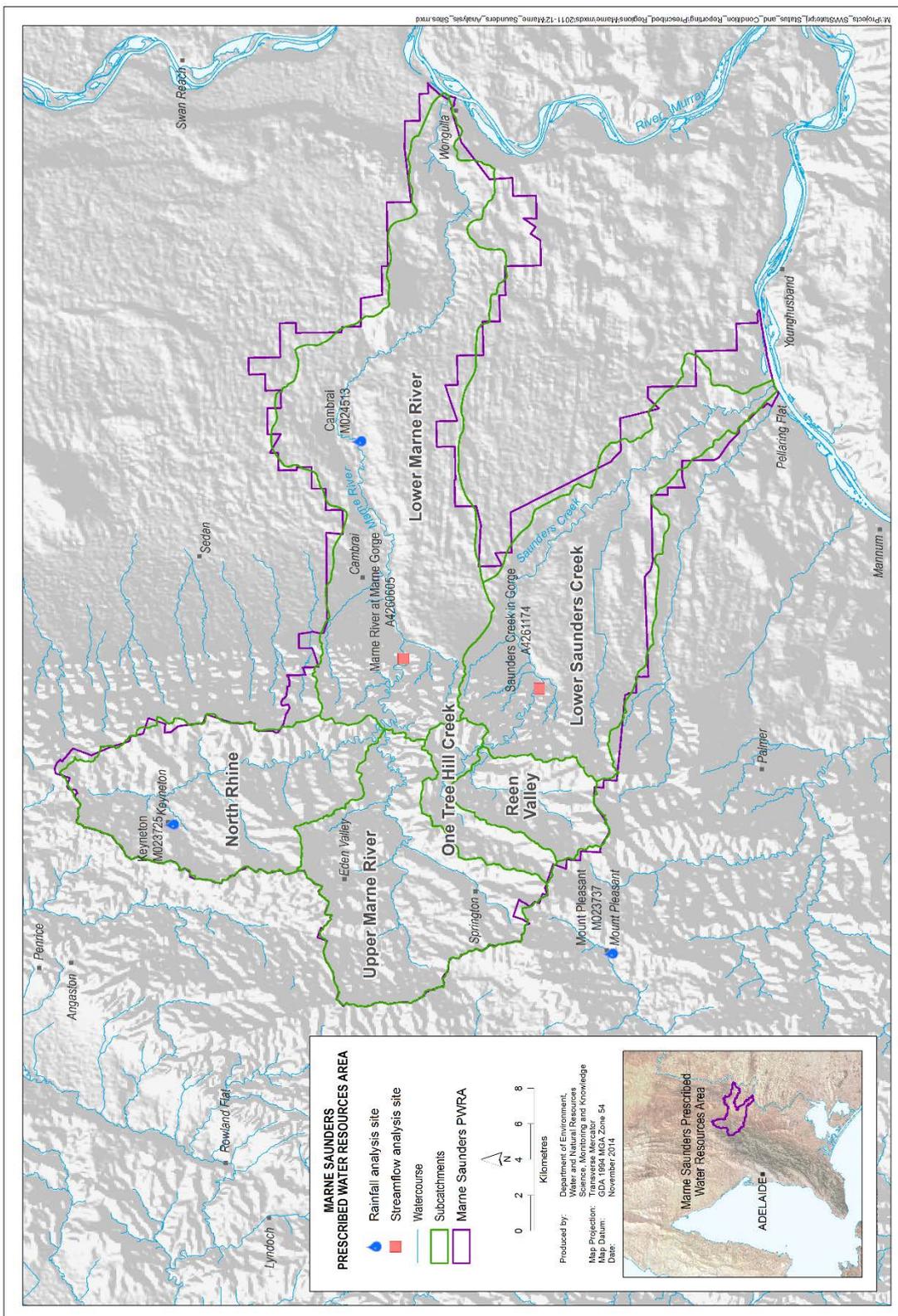


Figure 1. Monitoring analysis sites as used in the Marne Saunders PWRA Surface water status report

Rainfall

Status	Degree of confidence	Comments on recent historical context
Variable	High: good coverage of rainfall stations representing the spatial rainfall variation across the region	Average rainfall at Keyneton after two years of above average rainfall. Second year of above average rainfall at Cambrai. Below average rainfall at Mount Pleasant after two years of above average rainfall.

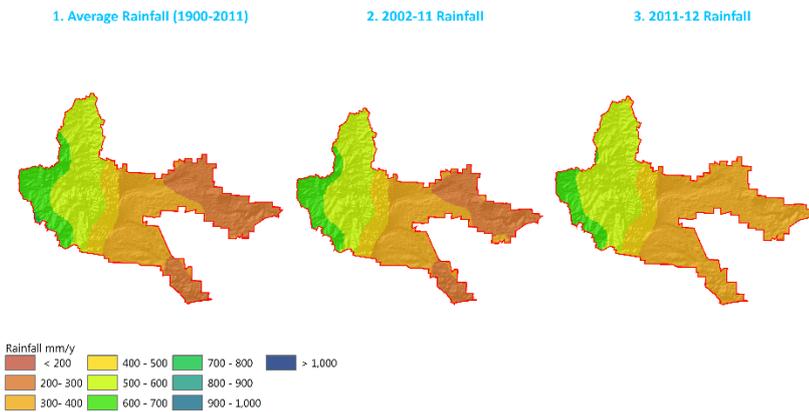


Figure 2. Annual rainfall distributions for the Marne Saunders PWRA

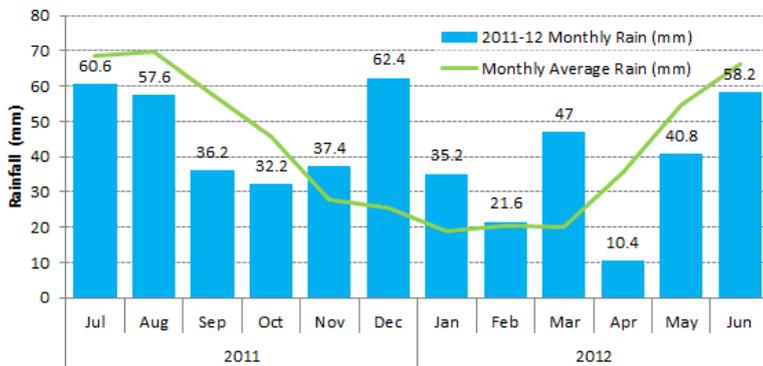


Figure 3. Monthly rainfalls at Keyneton (M023725)

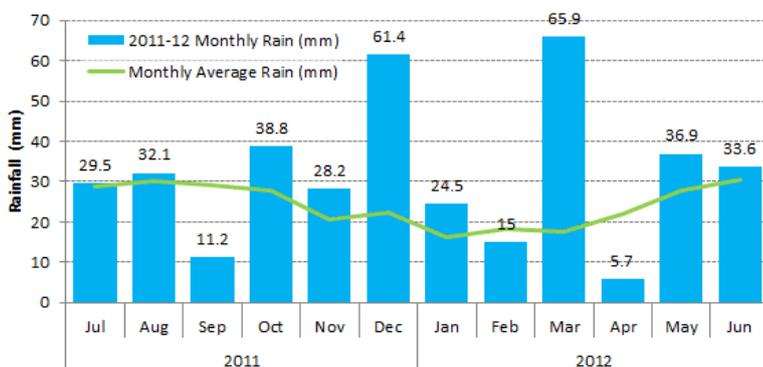


Figure 4. Monthly rainfalls at Cambrai (M024513)

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 lower in the west and higher in the east of the PWRA for the year 2011–12 (panel 3) in comparison to the long-term and short-term averages (panels 1 and 2).

The Keyneton Bureau of Meteorology (BoM) rainfall station received an average rainfall of 500 mm in 2011–12 in comparison to its long-term average of 511 mm (Figure 3). Above average rainfall was experienced predominantly in the late spring and summer months across 2011–12 with December and March receiving double the monthly average rainfall.

The Cambrai BoM rainfall station received an above average rainfall of 383 mm in 2011–12 in comparison to its long-term average of 291 mm (Figure 4). Above average rainfall was experienced in 9 months across 2011–12. As was recorded at Keyneton BoM rainfall station, the months of December and March received more than double the monthly average rainfall.

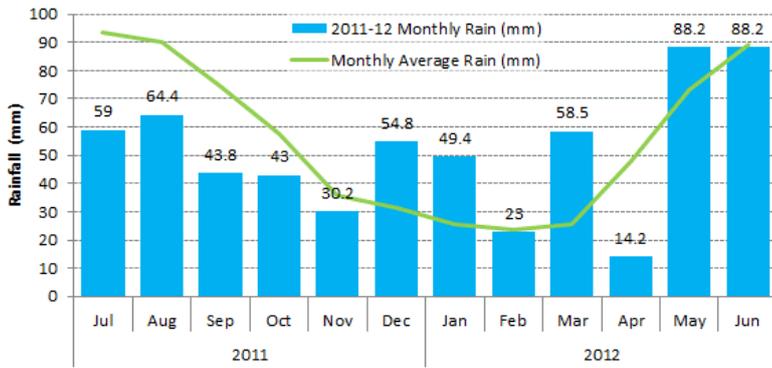


Figure 5. Monthly rainfalls at Mount Pleasant (M023737)

The Mount Pleasant BoM rainfall station received a below average rainfall of 617 mm in 2011–12 in comparison to its long-term average of 668 mm (Figure 5). Above average rainfall was experienced predominantly in the summer months across 2011–12.

The months of September and April were consistently below average across all rainfall stations summarised.

Streamflow

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

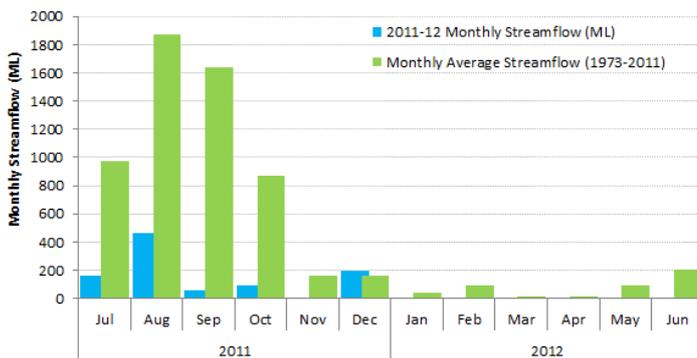


Figure 6. Monthly streamflow at Marne River (A4260605)

Marne River at Marne Gorge gauging station (A4260605) experienced a below average annual streamflow of 976 megalitres (ML) for 2011–12 (84% lower than the 6147 ML long-term average). The monthly breakdown of streamflow for 2011–12 (Figure 6) highlights that December was the only month to receive above average streamflow. August alone received 47% of the annual total with no streamflow recorded from January to June.

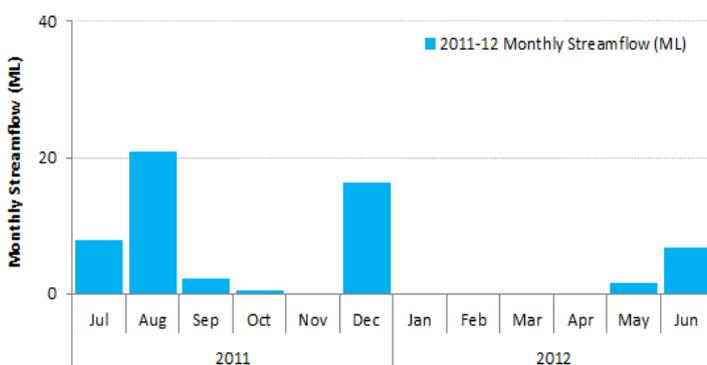
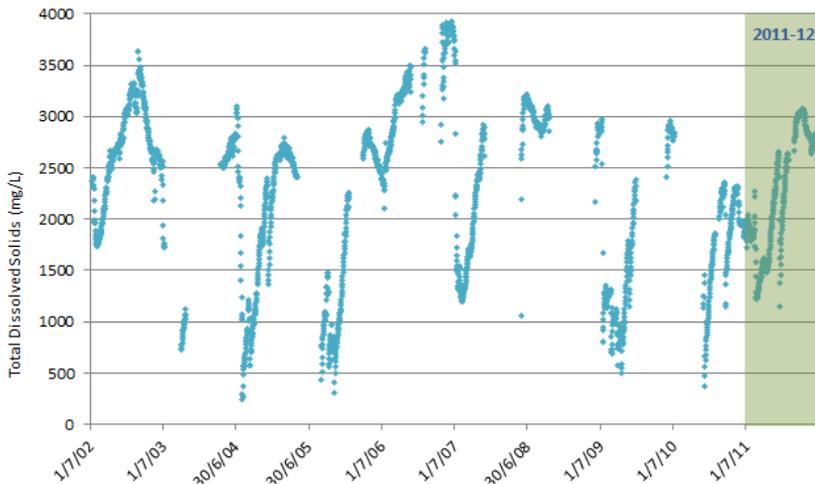


Figure 7. Monthly streamflow at Saunders Creek (A4261174)

Saunders Creek in Gorge gauging station (A4261174) experienced an annual streamflow of 57 ML for 2011–12 significantly lower than the 669 ML recorded the previous year. As this station has only a few years of streamflow data, an average streamflow is not provided. The monthly breakdown of streamflow for 2011–12 (Figure 7), highlights the majority of streamflow was recorded during the months of August and December. No streamflow was recorded in November and from January to April.

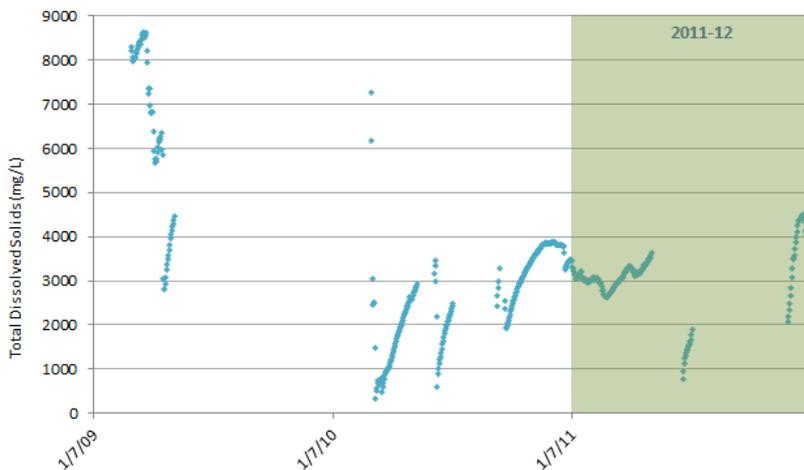
Salinity

Status	Degree of confidence	Comments on recent historical context
Steady	High: Data derived from long-term salinity monitoring at Marne River Medium: Data derived from short-term salinity monitoring at Saunders Creek	Salinity trends show the high range of salinity in 2011–12 being comparable to 2010–11 at both stations.



Of the total record for Marne River, 9% was recorded as <1000 mg/L, 43% of the record was between 1000–2500 mg/L and 48% between 2500–4000 mg/L. The salinity range in 2011–12 is comparable to the previous year, and less than the high salinity levels recorded around 2007 when streamflow was well below average.

Figure 8. Salinity data at Marne River from 2002–2012



For Saunders Creek, 5% was recorded as <1000 mg/L, 20% was between 1000–2500 mg/L, 57% between 2500–4000 mg/L and 17% of the record >4000 mg/L. The salinity range in 2011–12 is comparable to the previous year and less than the high salinity levels recorded around 2009.

Figure 9. Salinity data at Saunders Creek from 2009–2012

Surface water use

Status	Degree of confidence	Comments on recent historical context
Very high use compared to annual streamflow	High to medium: high confidence in metered data, medium confidence in data that is estimated	Water use from licensed surface water resources increased during 2011–12

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)	392
		Licensed watercourse extractions	49
		Estimated non-licensed water demand	496
Total water extractions (ML)			937

Water usage from licensed surface water sources in 2011–12 totalled approximately 441 ML (392 + 49), which is up from the previous year's total of 302 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 2009–12 is shown in Figure 10.

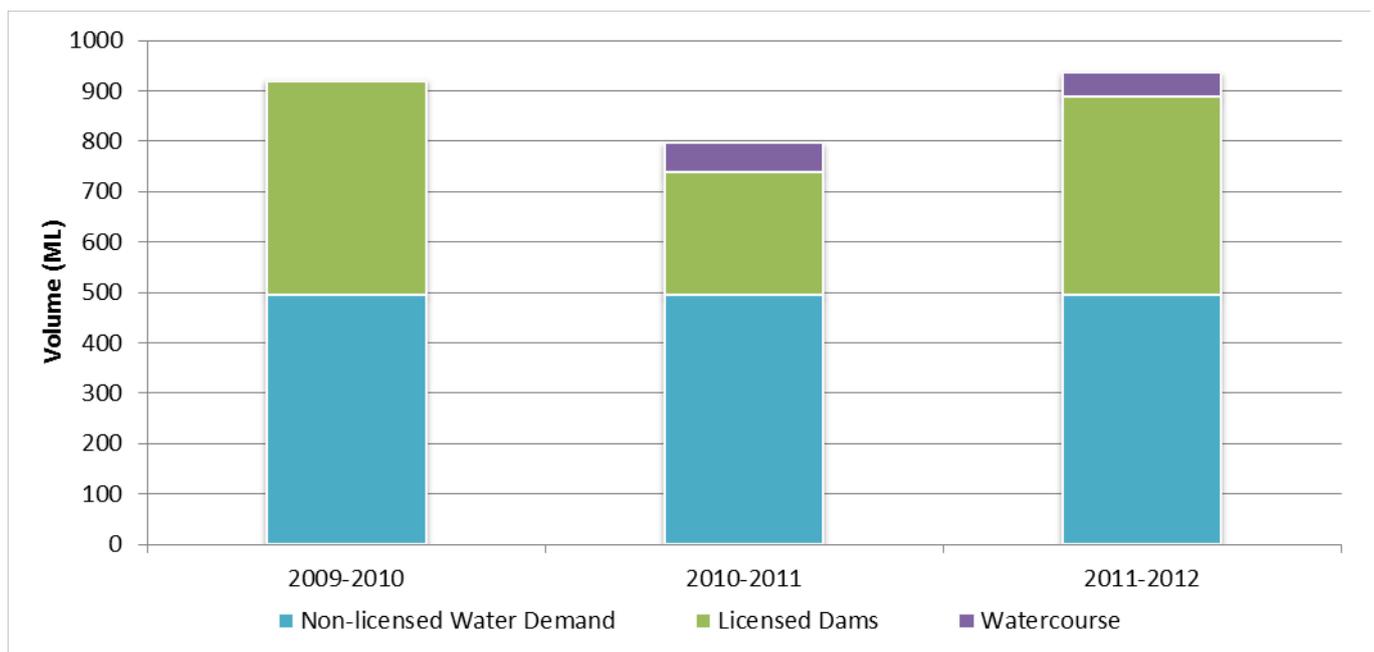


Figure 10. Surface water use in the Marne Saunders PWRA from 2009–12

Recorded streamflow for the PWRA in 2011–12 was approximately 1033 ML (combined streamflow of Marne Gorge and Saunders Creek), with approximately 937 ML (sum of licensed and non-licensed extraction) recorded or estimated as being extracted. As such, of the 1970 ML (1033 plus 937 ML) total estimated PWRA surface water volume for 2011–12 (not including evaporation from farm dams), it is estimated that 48% was extracted for use (9% in 2010–11).

The PWRA has been assigned a use rating of 5 (Very high use) for 2011–12.

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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ISBN 978-1-922255-26-6

Preferred way to cite this publication

DEWNR, 2015, *Marne Saunders PWRA Surface water status report 2011–12*, Government of South Australia, through Department of Environment, Water and Natural Resources, Adelaide.

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>.



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