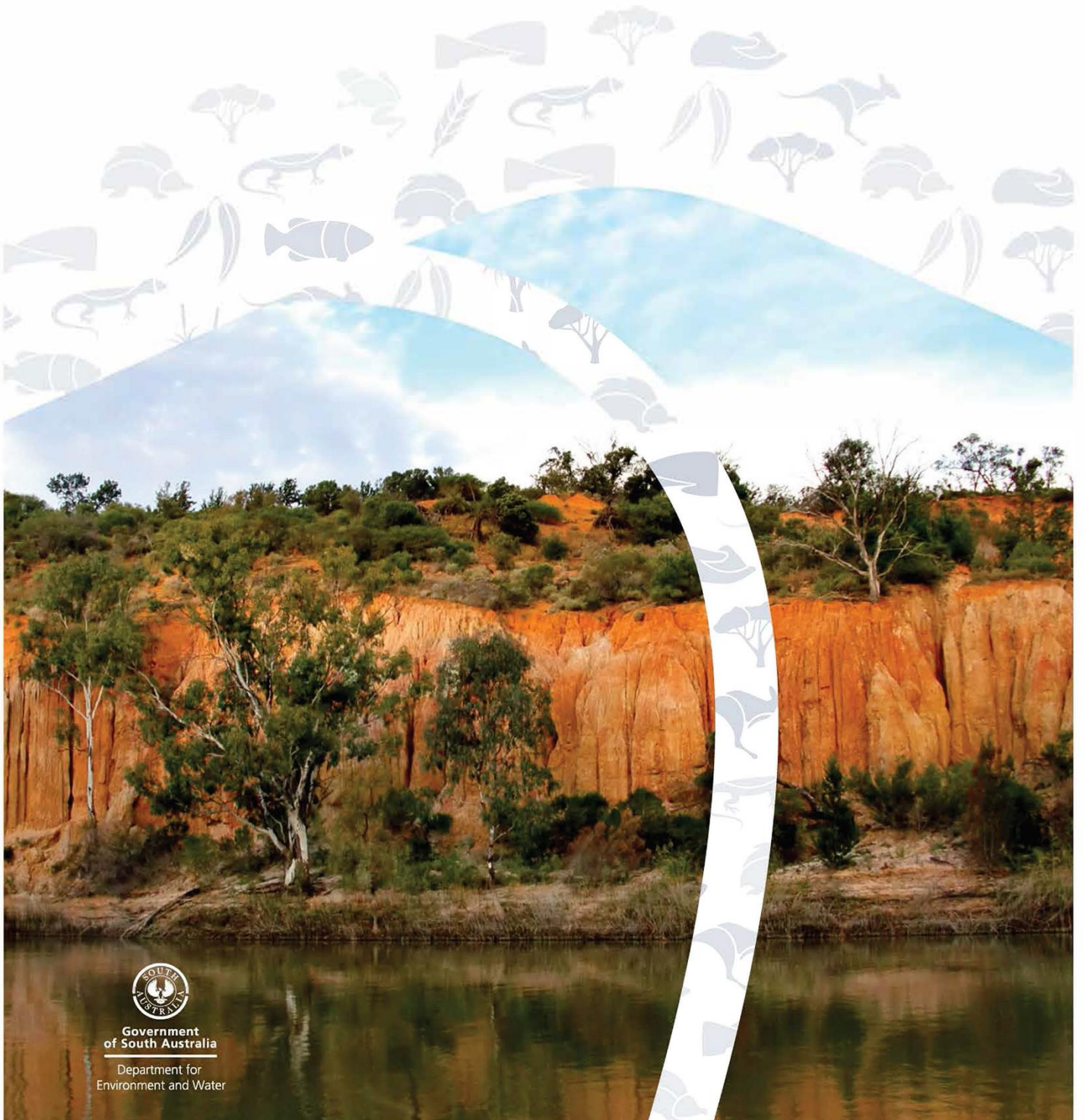


River Murray Prescribed Watercourse

2017 Surface water status report



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2017 Status summary

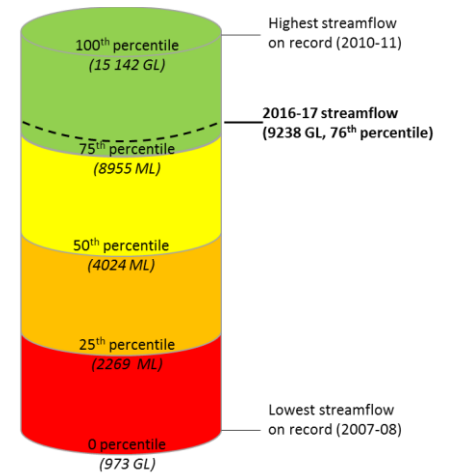
River Murray Prescribed Watercourse



The River Murray Prescribed Watercourse (PWC) is assigned a **green** surface water status for 2017, a wet year, with streamflow being much higher than the average observed for the region.

Green status means that the total annual streamflow was above the 75th percentile¹ of the period of data availability.

The status presented is based on a comparison to annual river flows to South Australia ('Flow to SA'), since 1978/79.



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.

¹ The nth percentile of a set of data is the value at which n% of the data is less than this value. For example, if the 75th percentile annual flow is 100 ML, 75% of the years on record had annual flow of less than 100 ML.

Rainfall

Figure 1, 2 and 7

Rainfall station	Murray Bridge rainfall station (M024521) Reporting period: 1978/79-2016/17, in line with streamflow data availability
Annual total ²	450 mm 101 mm above the average annual rainfall of 349 mm (1889/90-2016/17) 2016/17 annual rainfall was the 6 th highest of the past 38 years at the Murray Bridge rainfall station
Monthly rainfall summary	Higher than average rainfall was recorded in July and September 2016, which accounted for 40% of the annual rainfall in 2016/17 September recorded almost 3 times the average monthly rainfall (108 mm compared to 36 mm) Rainfall conditions were consistent throughout the PWC, with the Meningie (M024158), Milang (M024519) and Overland Corner (M024012) rainfall stations recording similar rainfall trends during the 2016/17 period
Spatial distribution	Spatial distribution of rainfall for the past 5 years shows a similar pattern across the South Australian (SA) portion of the Murray-Darling Basin when compared to the annual average 2016/17 has shown an increase in the annual rainfall across the majority of the Murray-Darling Basin when compared to the annual average and the 5-year average Rainfall in SA impacts of the amount of water irrigators use but it is the rainfall in upstream states that impacts on the status of the resource and inflows Increased proportion of the region experiencing rainfall over 1000 mm in south-eastern Victoria and along the eastern part of New South Wales and Queensland Significant reduction in the proportion of the area receiving rainfall between 200-400 mm
Rainfall trend	Long-term trend - Annual rainfall volumes recorded at the Murray Bridge rainfall station indicate a slightly increasing long-term trend (38 years) Short-term trend - An increasing rainfall trend was observed over the past 5 years, primarily in response to the high rainfall in 2016/17

² For the water-use year 1 July 2016 to 30 June 2017

Streamflow

Figure 3 and 8

Streamflow gauging stations	<p>Flow into South Australia is not gauged directly. Instead the reported 'Flow to South Australia' (A4261001) is calculated from flows recorded at the 2 gauging stations at Mullaroo Creek (A4140211) and the River Murray downstream of Rufus River (A4260200)</p> <p>Streamflow data availability: 1978/79-2016/17</p>
Annual total ²	<p>Flow to South Australia: 9238 GL, 63% larger than the average annual streamflow of 5661 GL</p> <p>Percentile ranking: 76th</p> <p>River Murray has a large catchment area upstream of the PWC that contributes to the flow. Higher than average flows in the PWC can be attributed to above-average rainfall conditions across the whole Murray-Darling Basin and do not necessarily align to rainfall in SA</p>
Monthly streamflow summary	<p>Monthly streamflow was above average for all months between August 2016 and January 2017</p> <p>November and December 2016 flows were approximately 3-times the average for the months (November: 2191 ML compared to 730 ML; December: 1882 ML compared to 580 ML)</p>
Streamflow trend	<p>Long-term trend - Annual streamflow volumes (the calculated 'Flow to SA' indicate a declining long-term trend (1978/79-2016/17)</p> <p>Short-term trend - The last five years of streamflow indicate an increasing trend as a result of the high rainfall experienced in 2016/17</p>

Water use

Figure 4

Surface-water use data ²	<p>Total licensed water use from the River Murray PWC was 425 GL (compared to 597 GL in 2015/16). This included:</p> <ul style="list-style-type: none">• 35 GL for metropolitan Adelaide and associated country areas• 33 GL for country towns• 13 GL for the Lower Murray swamps (including Environmental Land Management Allocation)• 344 GL for all other purposes (metered and non-metered use)
Resource Volume ²	<p>Surface water extraction was approximately 5% of the total resource volume (compared to 24% in 2015/16)</p> <p>SA Water use from the River Murray was low in 2016/17 as high rainfall in the Mount Lofty Ranges resulted in Adelaide water supply taken predominately from these storages rather than the River Murray. Additionally, irrigation water use was lower than the previous year due to above-average rainfall</p>

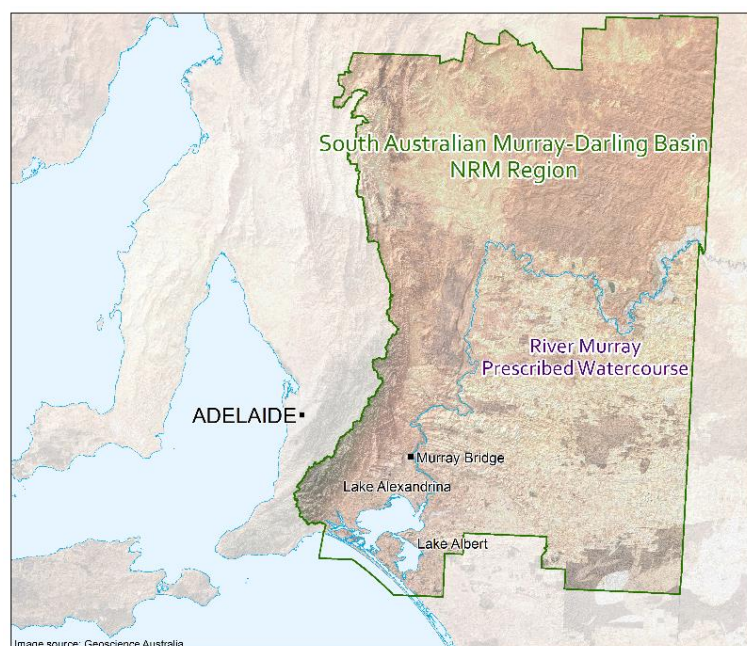
² For the water-use year 1 July 2016 to 30 June 2017

Surface water salinity

Figure 5, 6 and 8

Salinity monitoring	<p>Long-term gauging stations at Morgan (A4260554) and Murray Bridge (A4261003/A4261126) provide a good indication of salinity (measured as electrical conductivity or EC) for sections of the River Murray between the state border and the Lower Lakes</p> <p>A combination of sites are used to assess salinity in Lake Alexandrina and Lake Albert</p>
General observations	<p>Salinity increases during sustained summer events while decreasing throughout the winter months as a result of higher dilution capacity as flow volumes increase</p>
Salinity – 2016/17 water-use year	<p>Highest salinity recorded at Morgan gauging station: 755 EC</p> <p>Highest salinity recorded at Murray Bridge gauging station: 643 EC</p> <p>Highest calculated salinity at Lake Alexandrina: 1049 EC (exceeding 1000 EC for 3 days in July 2016). Average salinity: 501 EC</p> <p>Highest calculated salinity at Lake Albert: 1990 EC. Average salinity: 1760 EC.</p>
Salinity - 2007-17	<p>For 2007–17 salinity at Morgan did not exceed 800 EC, and over the same period, salinity at Murray Bridge did not exceed 830 EC. <i>The Basin Plan 2012 targets for salinity levels are less than 800 EC ($\mu\text{s/cm}$) at Morgan and less than 830 EC ($\mu\text{s/cm}$) at Murray Bridge for 95% of the time</i></p> <p>For 2007-17 the calculated Lake Alexandrina salinity was less than 1000 EC 65% of the time. <i>The Basin Plan 2012 includes a salinity target for Milang (Lake Alexandrina) of less than 1000 EC 95% of the time</i></p> <p>The majority of the days that the salinity targets were exceeded for Lake Alexandrina occurred during the millennium drought. Salinity has only exceeded 1000 EC 3-times (over a period of 1-3 days) since the start of July 2012 (less than 1% of the total days over the last 5-year period)</p>

Regional setting



The River Murray Prescribed Watercourse (PWC) extends from South Australia's eastern border to Lake Alexandrina and Lake Albert, and includes the lower sections of Currency Creek and the Finniss, Angas and Bremer Rivers.

Surface water and watercourse resources in the PWC have been prescribed under South Australia's Natural Resources Management Act 2004. The most recent water allocation plan (WAP) was adopted in 2017, and provides for sustainable management of these water resources.

Topography is characterised by gently rolling sand hills, with numerous ephemeral floodplain waterbodies along the river's path. Streamflow is generated in the Murray–Darling Basin (MDB) catchment, which has an area over 1,000,000 km², and spans across eastern South Australia, Victoria, New South Wales and southern Queensland. From the South Australian border, the River Murray PWC extends approximately 650 km, draining in a westerly direction to the township of Morgan where it heads south, entering Lakes Alexandrina and Albert before discharging into the Southern Ocean at the Murray Mouth near Goolwa.

While the system is regulated and there is some storage capacity, the status of surface water resources in the River Murray PWC is still highly dependent on rainfall, with trends in streamflow primarily climate driven, i.e. below-average rainfall results in a reduction in annual streamflow volumes. It is important to note that whilst rainfall in South Australia impacts on the amount of water that irrigator's use, it is the rainfall in upstream states that impacts on the status of the resource and inflows.

Below-average summer rainfall and above average temperatures can also result in increasing irrigation extractions, and these two elements can cause salinities to increase by reducing the amount of streamflow available to dilute salts. Conversely, increases in rainfall can result in increases in streamflow volumes, both directly as well as from decreases in irrigation extractions, and salinities may stabilise or decline. As the River Murray is the lowest point in the landscape, it is the focus of saline groundwater discharge from regional aquifers, which significantly influences salinity levels in the river.

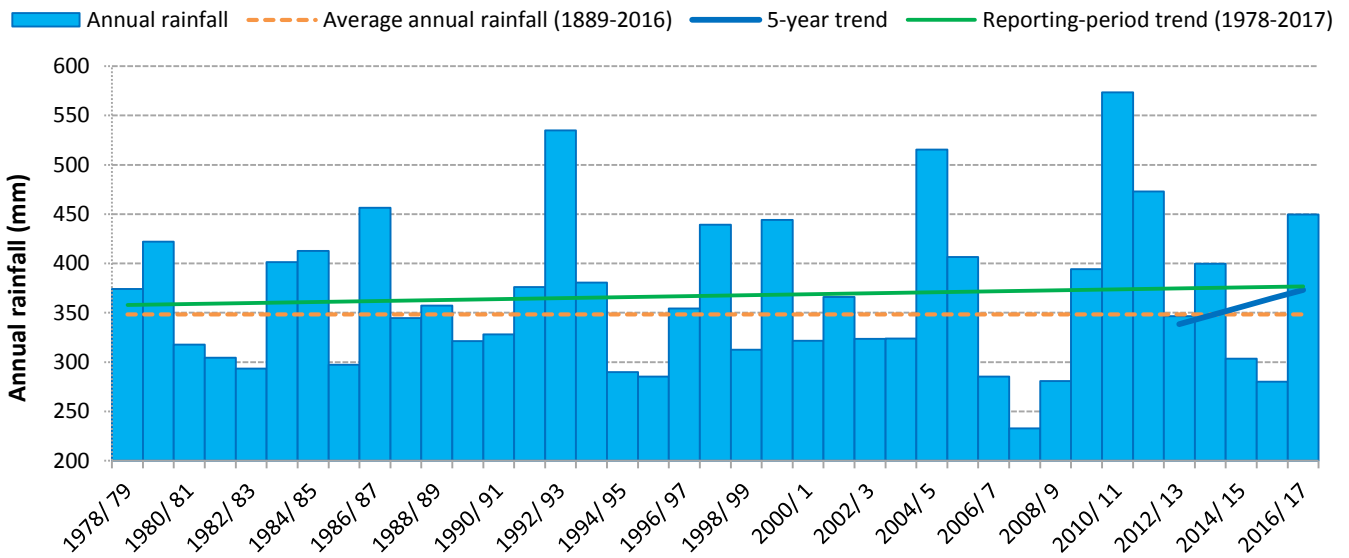


Figure 1. Annual rainfall (mm) for 1978/79–2016/17 at the Murray Bridge rainfall station (M024521)

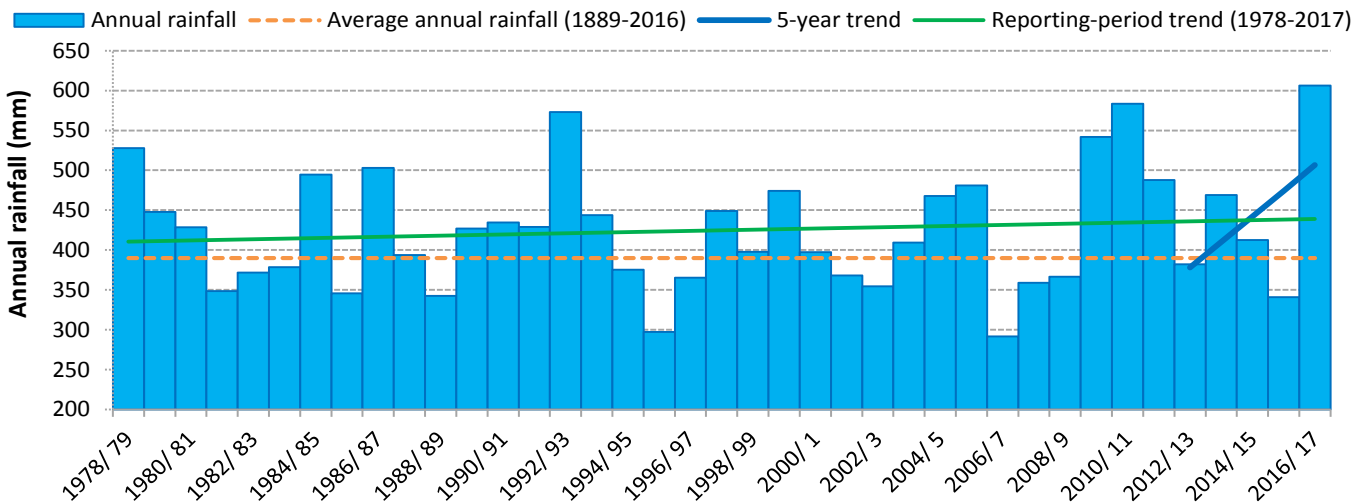


Figure 2. Annual rainfall (mm) for 1978/79–2016/17 at Milang rainfall station (M024519)

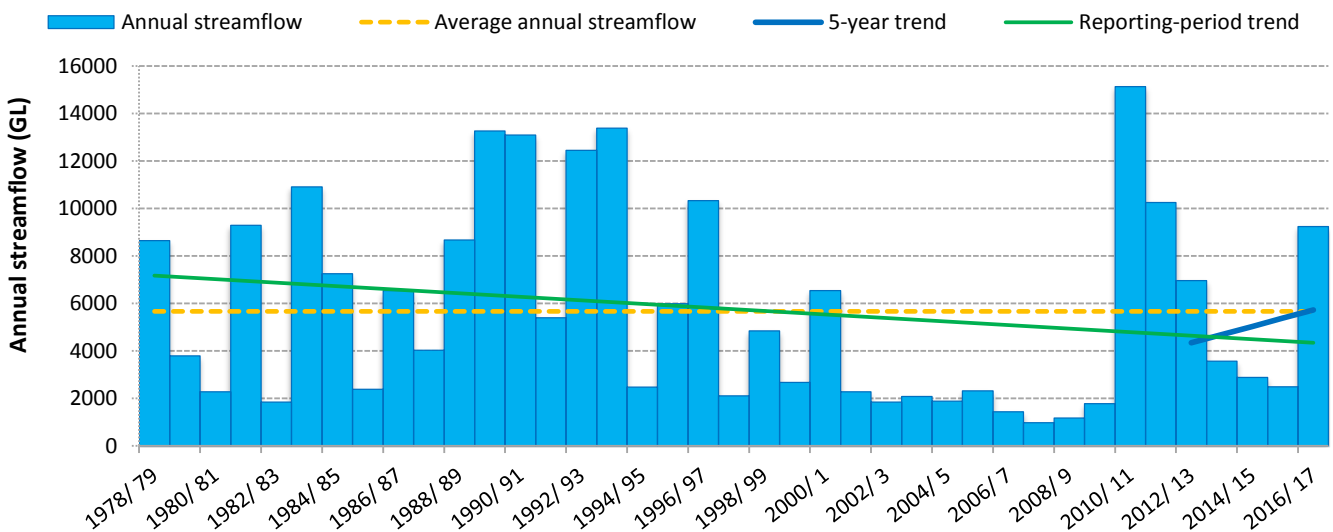


Figure 3. Annual streamflow (GL) to South Australia for 1978/79–2016/17

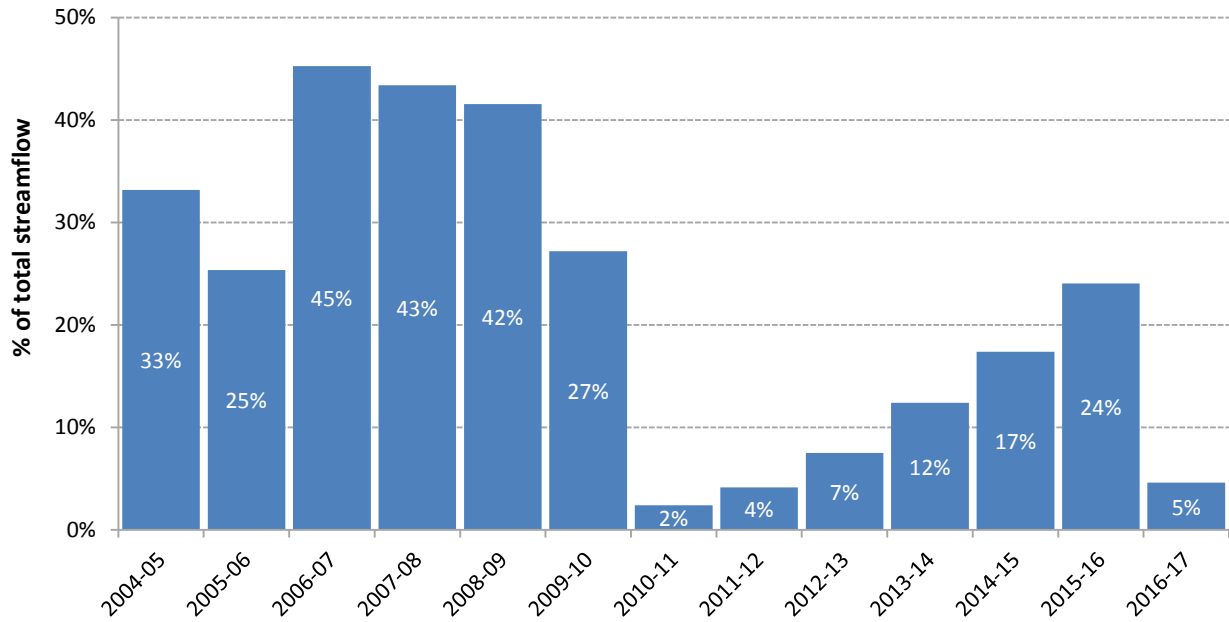


Figure 4. Surface water use as a percentage of total streamflow available for 2005/06–2016/17 for the River Murray PWC.

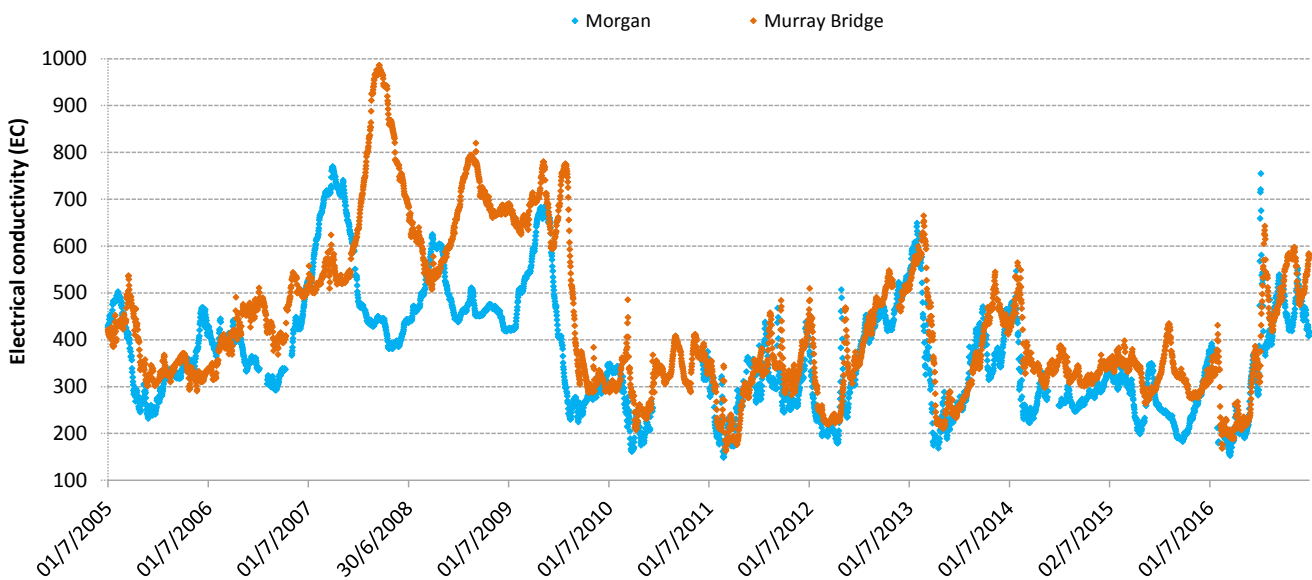


Figure 5. Salinity data (EC) for 2005/06–2016/17 along the River Murray at Morgan (A4260554) and Murray Bridge (A4261003/A4261126) monitoring sites

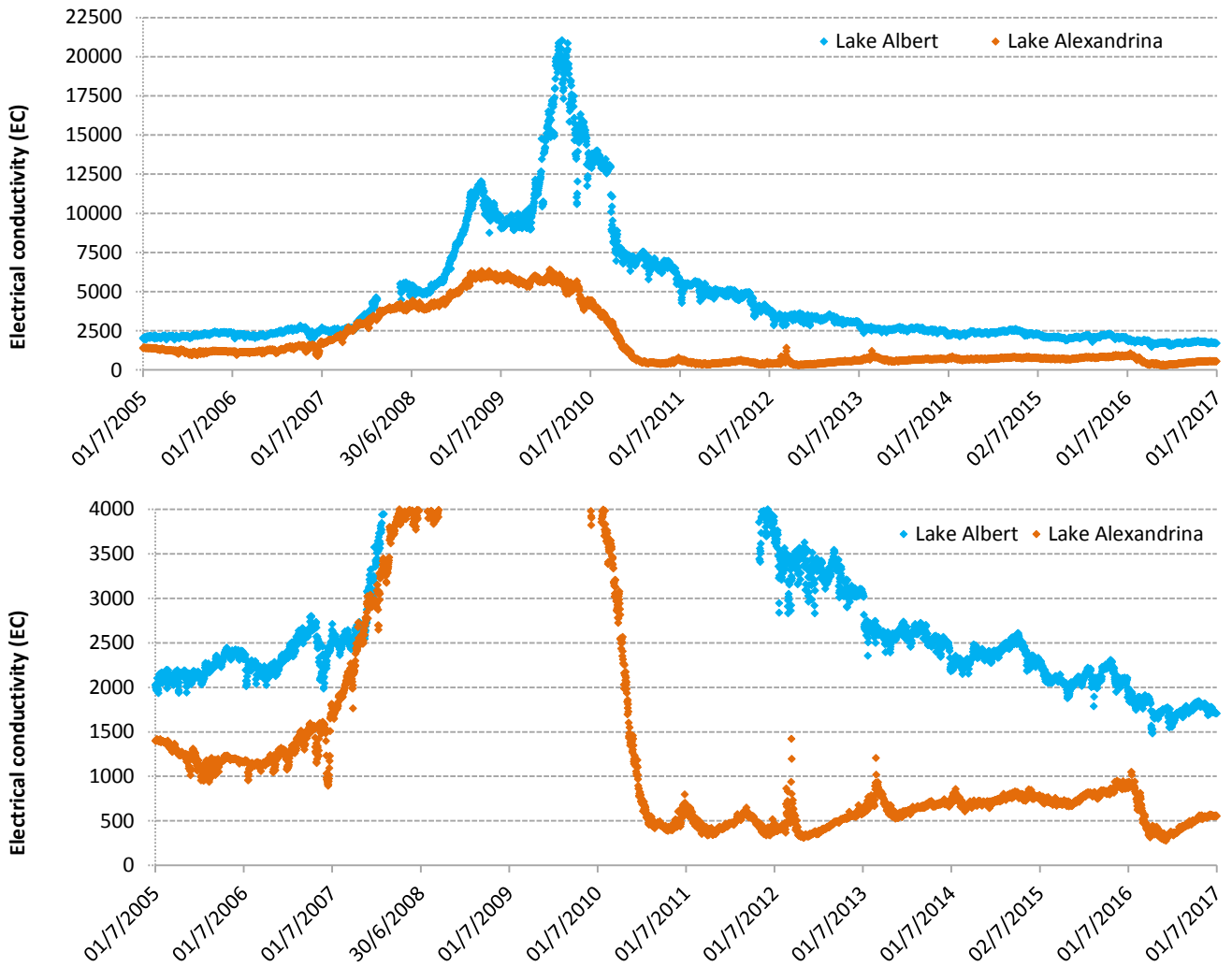


Figure 6. Salinity data (EC) for 2005/06–2016/17 in Lake Alexandrina and Lake Albert, showing the full range (top), and below 4000 EC (below).

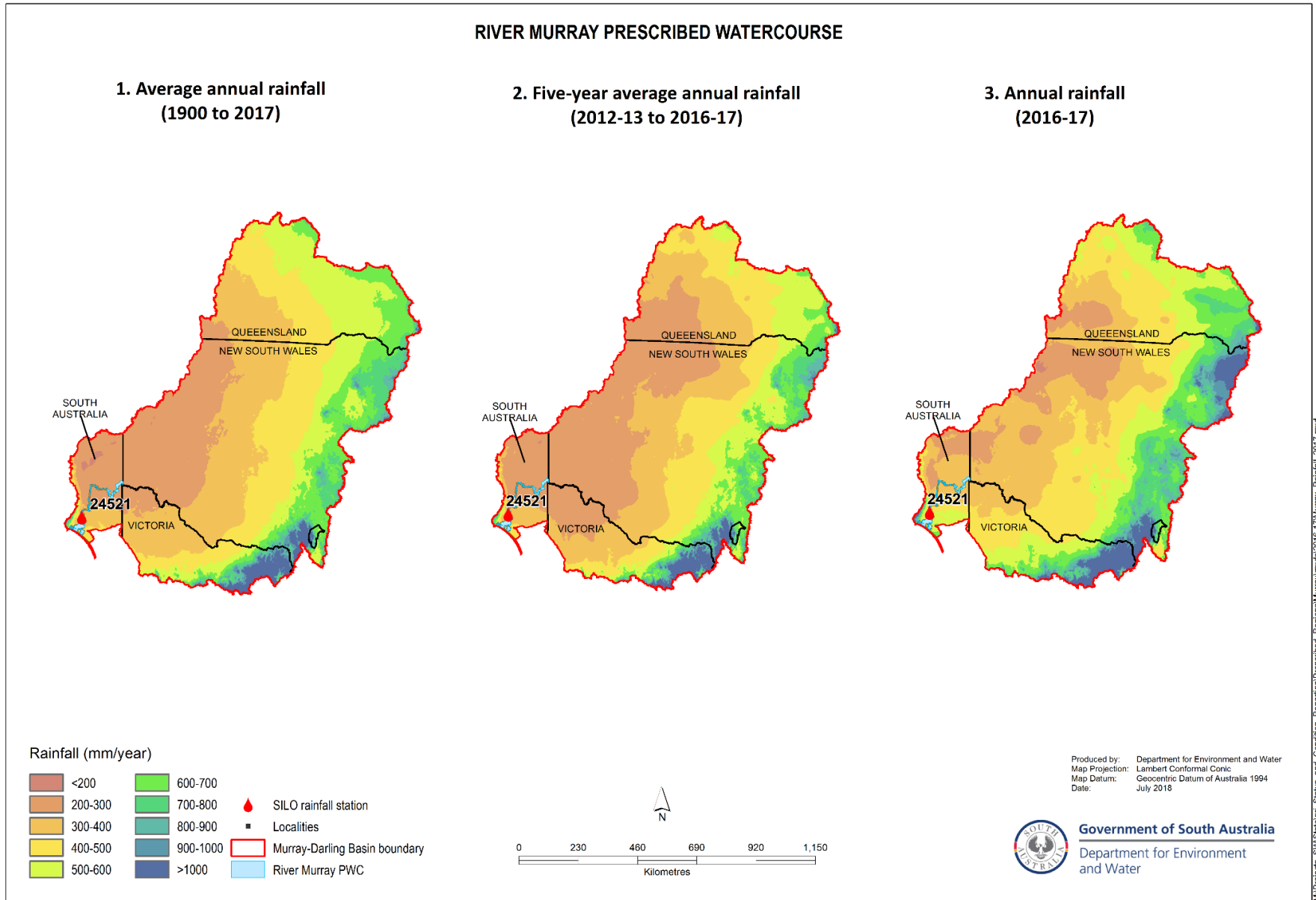


Figure 7. (1) Average annual rainfall (2) 5-year average annual rainfall and (3) annual rainfall for the 2016/17 in the Murray–Darling Basin³

³ Data sources: SILO Patched Point Dataset <https://legacy.longpaddock.qld.gov.au/silo/> and BoM Australian Water Availability Project (<http://www.bom.gov.au/jsp/awap/>)

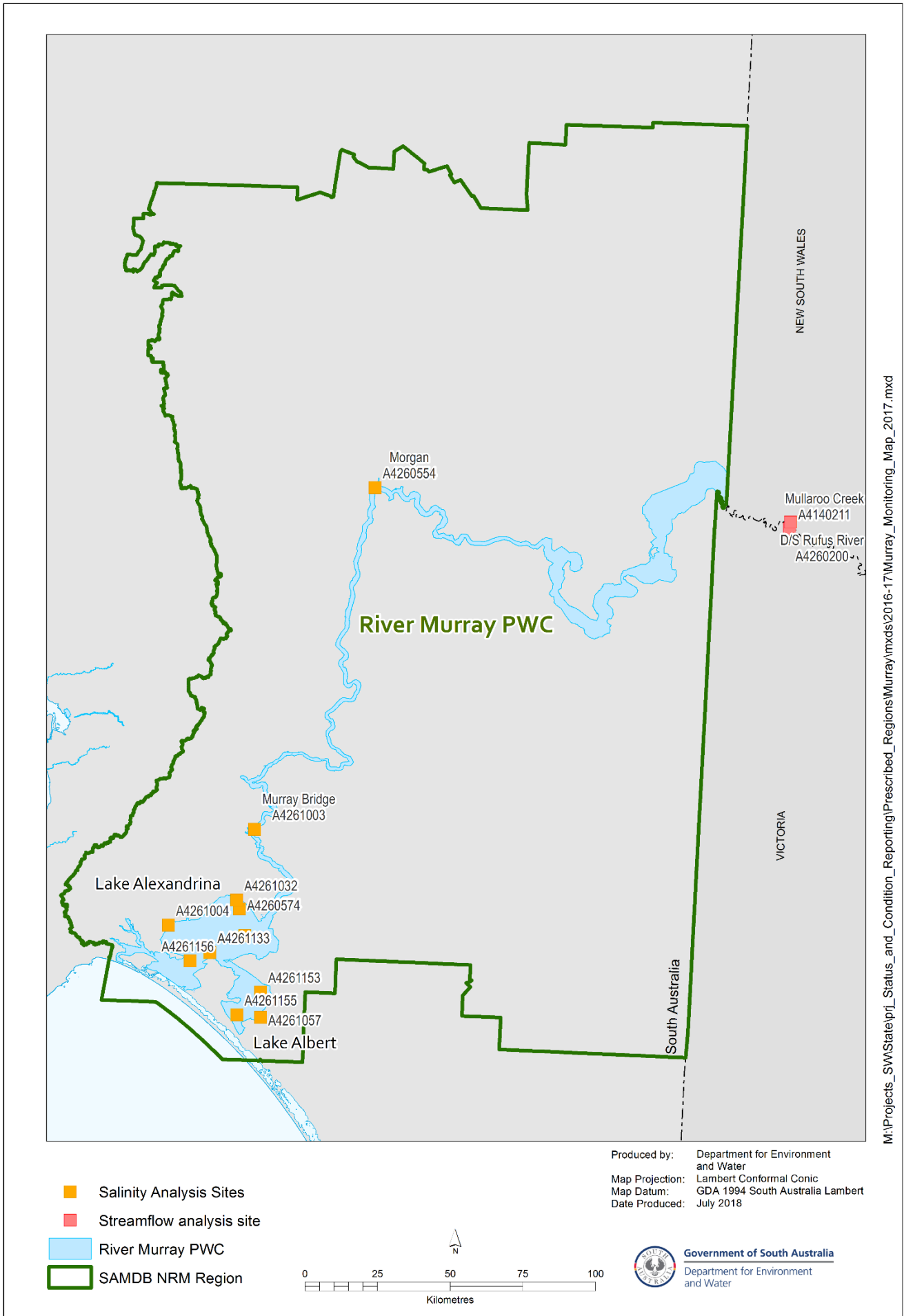


Figure 8. Streamflow gauging stations, rainfall analysis sites and salinity monitoring stations for the River Murray PWC

More information

The status of the River Murray PWC was determined by expressing the annual streamflow to SA for 2016/2017 as a percentile of the total annual streamflow for the period (1978/79–2016/17).

The total 2016/17 streamflow (9238 GL) represents the 76th percentile, i.e. 76% of the historic annual streamflow totals were less than the streamflow observed in 2016/17.

To view descriptions for all status symbols, and to review the full historical record of the gauging stations (streamflow and salinity), please visit the *Water Resource Assessments* page on [WaterConnect](#).

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

Rainfall data used in this report is sourced from the SILO Patched Point Dataset, which uses original Bureau of Meteorology daily rainfall measurements and is available online at <https://legacy.longpaddock.qld.gov.au/silo/>. Rainfall maps have been compiled using daily gridded data produced by the BoM Australian Water Availability Project (<http://www.bom.gov.au/jsp/awap/>).

To view the *River Murray PWC 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](#).

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

For further details about the *River Murray PWC*, please see the *Water Allocation Plan for the River Murray PWC* on the Natural Resources SA Murray-Darling Basin [website](#).



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