River Murray Prescribed Watercourse

2018 Surface water status report

Government of South Australia
Department for Environment and Water

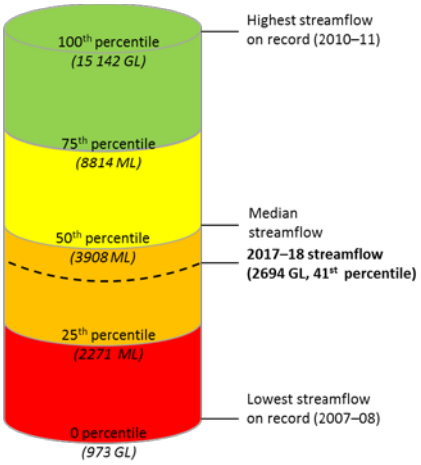
2018 Status summary
River Murray PWC

River Murray

The River Murray Prescribed Watercourse (PWC) is assigned an ***orange*** surface water status for 2018, with streamflow being lower than the average observed for the region.

Orange status means that the total annual streamflow was between the 25th and 50th percentile[1] for the period of data availability.

The status presented is based on a comparison with 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. Median streamflow: 50% of the records were above this value and 50% below.

Rainfall

Figures 1, 2 and 7

Rainfall station	Murray Bridge rainfall station (M024521) Reporting period: 1978–79 to 2017–18, in line with streamflow data availability
Annual total [2]	300 mm This was 66 mm below the average annual rainfall of 366 mm (1978–79 to 2016–17).
Monthly rainfall summary	Higher than average rainfall was recorded in August, November and December 2017, which accounted for 51% of the annual rainfall in 2017–18. In December 2017 almost twice the average monthly rainfall (49 mm compared to 29 mm) was recorded. Lower than average rainfall was recorded between January and June 2018. 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 2017–18 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 (1978–79 to 2017–18). In 2017–18 there has been a decrease in the annual rainfall across the western area of the Murray-Darling Basin when compared to the annual average and the five-year average (2013–14 to 2017–18). Rainfall over 1000 mm is experienced in the south-eastern area of the Murray-Darling Basin. The area with over 1000 mm of rainfall was slightly reduced in the five-year period and in 2017–18 compared to the average annual period. Rainfall in SA impacts on the amount of water irrigators use, but it is the rainfall in these higher rainfall zones that impacts on the status of the resource and inflows.
Rainfall trend	Long-term trend – Annual rainfall totals recorded at the Murray Bridge rainfall station indicate a slightly increasing long-term trend between 1978–79 and 2017–18. Short-term trend – An decreasing rainfall trend was observed over the past 5 years.

[2] For the water-use year 1 July 2017 to 30 June 2018

Streamflow

Figures 3 and 8

Streamflow gauging stations	Flow into South Australia is not gauged directly. Instead the reported 'Flow to SA' (A4261001) is calculated from flows recorded at the two gauging stations at Mullaroo Creek (A4140211) and the River Murray downstream of Rufus River (A4260200). Streamflow data availability: 1978–79 to 2017–18
Annual total[2]	Flow to South Australia: 2694 GL, 3059 GL lower than the average annual streamflow of 5676 GL (1978–79 to 2017–18) The River Murray has a large catchment area upstream of the PWC that contributes to the flow. Storages in the system can also influence the relationship between rainfall over the River Murray catchment and the flow entering the PWC. Therefore, flows in the PWC do not necessarily align to rainfall in SA.
Monthly streamflow summary	The monthly streamflow was lower than average for all months in 2017–18.
Streamflow trend	Long-term trend – Annual streamflow volumes (the calculated 'Flow to SA') indicate a declining long-term trend (1978–79 to 2017–18). Short-term trend – The last five years of streamflow indicate an increasing trend primarily due to much higher-than-average rainfall in 2016–17.

Water extraction

Figure 4

Surface water extraction [2]	Total licensed water extraction from the River Murray PWC was 535 GL (compared to 425 GL in 2016–17). This included: • 71 GL for metropolitan Adelaide and associated country areas • 38 GL for country towns • 15 GL for the Lower Murray swamps (including Environmental Land Management Allocation) • 410 GL for all other purposes (metered and non-metered extraction).
Resource volume [2]	Surface water extraction was approximately 20% of the total resource volume (compared to 5% in 2016–17). The average for 2004–05 to 2017–18 was 22%.

[2] For the water-use year 1 July 2017 to 30 June 2018

Surface water salinity

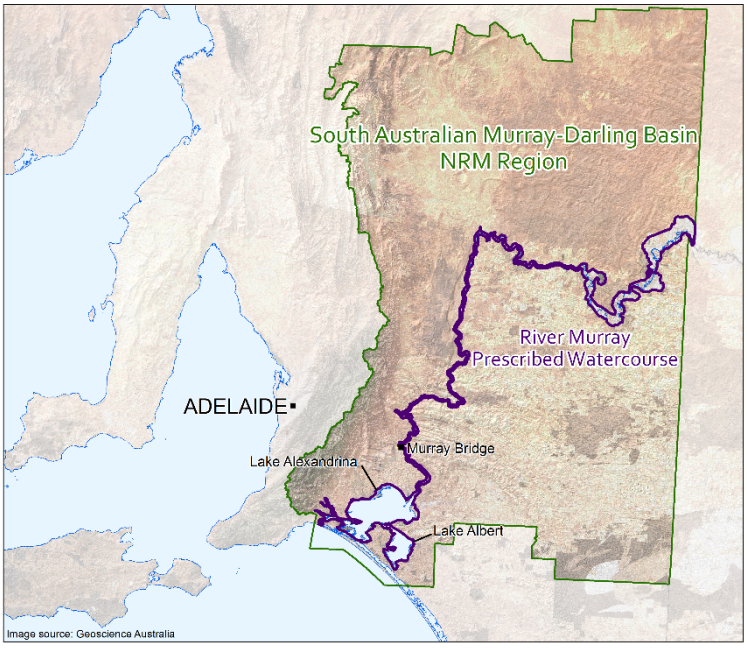
Figures 5, 6 and 8

Salinity monitoring	Morgan gauging station (A4260554) – data available from 2005 Murray Bridge gauging station (A4261003/A4261126) – data available from 2005 A combination of sites are used to assess salinity in Lake Alexandrina and Lake Albert.
General observations	There was low salinity in the winter–spring months as a result of greater dilution as flow volumes increased. Salinity then increased during the lower-flow summer period in the River Murray. Salinity consistently increased in Lake Alexandrina over 2017–18, while salinity in Lake Albert remained stable, after a long period of recovery following the millennium drought.
Salinity: 2017–18 water-use year[2]	Highest salinity recorded at Morgan gauging station: 466 EC[3] Highest salinity recorded at Murray Bridge gauging station: 581 EC Highest calculated salinity at Lake Alexandrina: 917 EC (Average salinity: 700 EC) Highest calculated salinity at Lake Albert: 1837 EC (Average salinity: 1564 EC)
Salinity: 2008–18	For 2008–18 salinity at Morgan did not exceed 800 EC, and over the same period, salinity at Murray Bridge did not exceeded 830 EC. *The Basin Plan 2012 targets for salinity levels are less than 800 EC at Morgan and less than 830 EC at Murray Bridge for 95% of the time.* For 2008–18 the calculated Lake Alexandrina salinity was less than 1000 EC 75% of the time. *The Basin Plan 2012 includes a salinity target for Milang (Lake Alexandrina) of less than 1000 EC for 95% of the time.* 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 three 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).

[2] For the water-use year 1 July 2017 to 30 June 2018

[3] EC: electrical conductivity, measured in micro-siemens (µs/cm)

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. The River Murray is a prescribed watercourse under South Australia's Natural Resources Management Act 2004. The most recent water allocation plan (WAP) was adopted in 2019, 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 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 upstream 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.

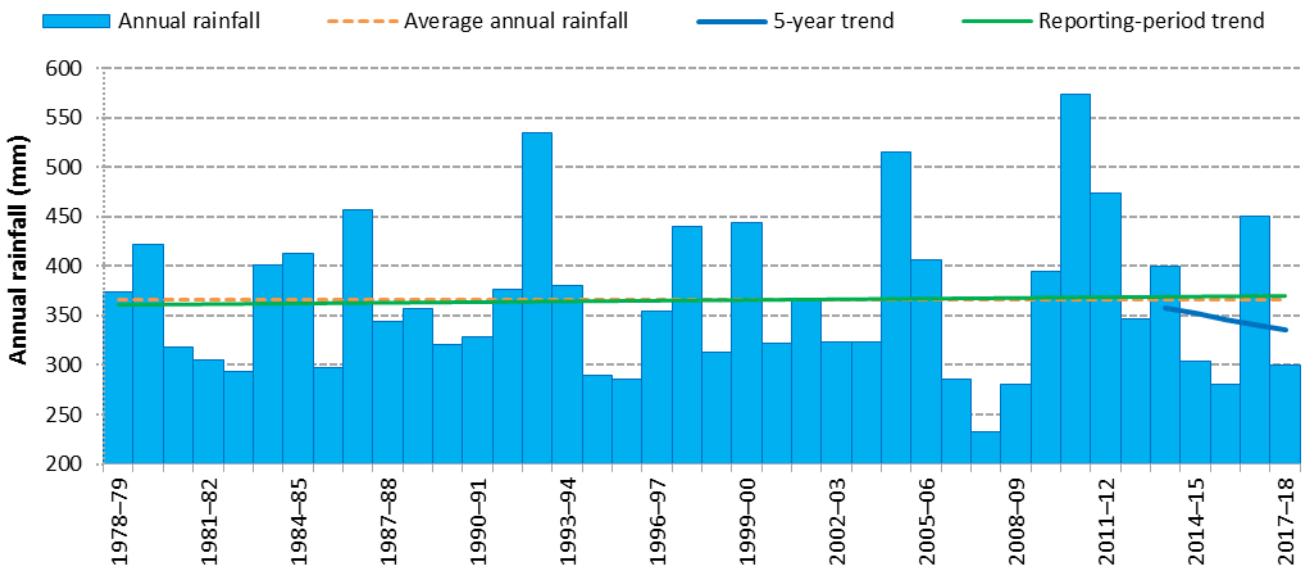


Figure 1. Annual rainfall for 1978–79 to 2017–18 at the Murray Bridge rainfall station (M024521)

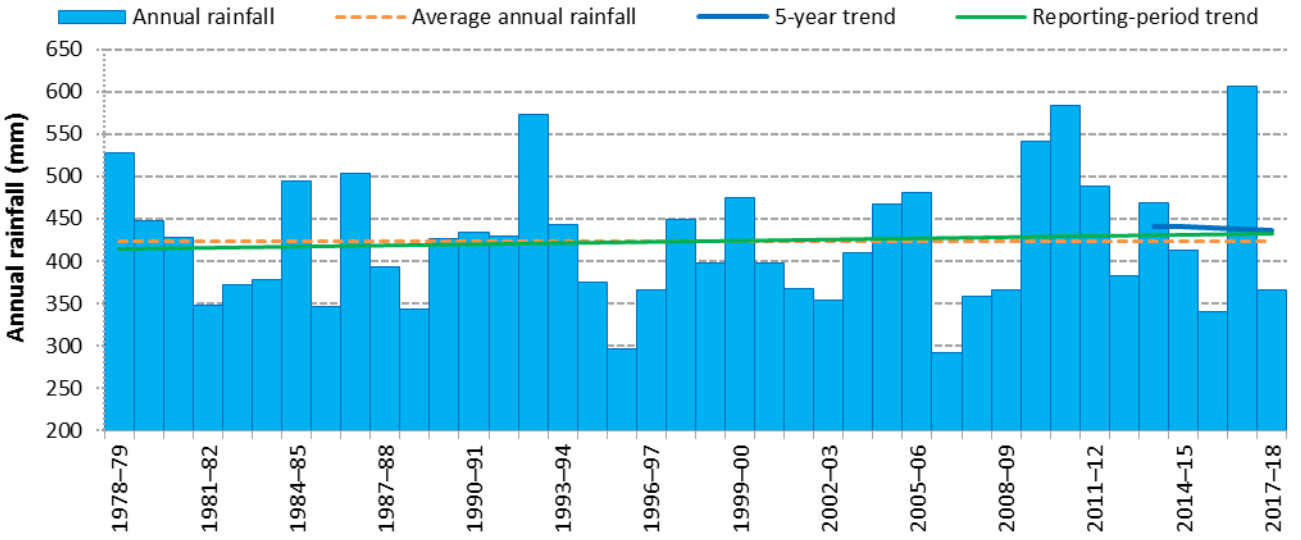


Figure 2. Annual rainfall for 1978–79 to 2017–18 at Milang rainfall station (M024519)

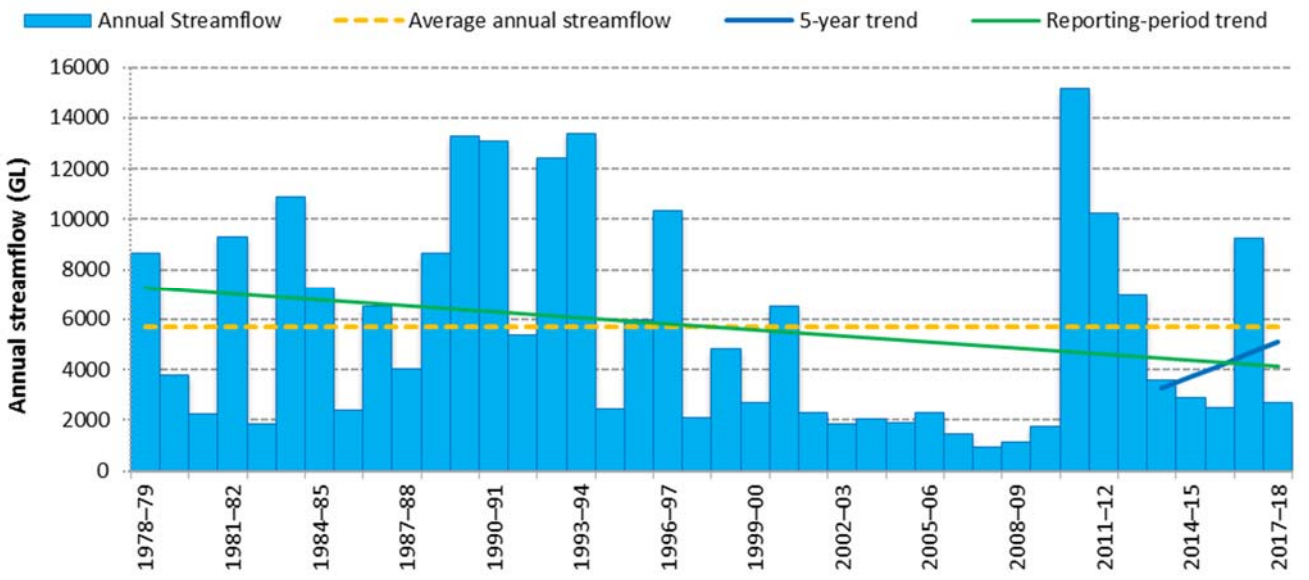


Figure 3. Annual streamflow to South Australia for 1978–79 to 2017–18

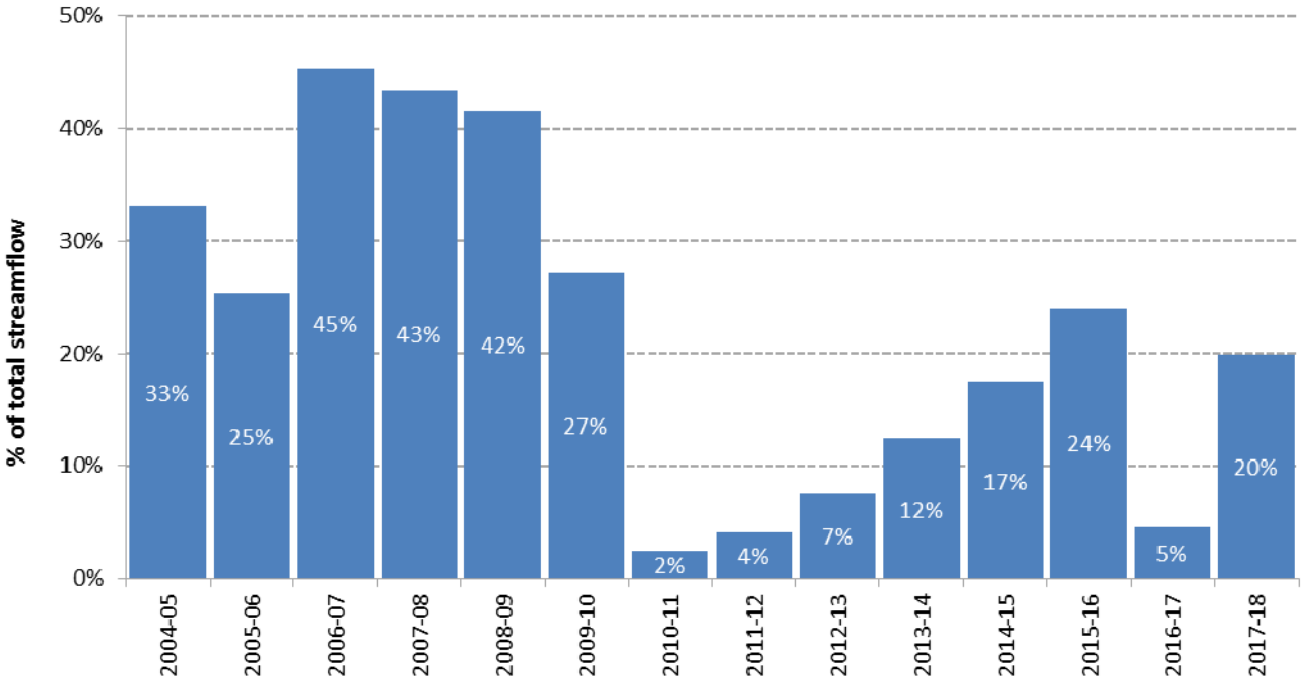


Figure 4. Surface water extraction as a percentage of total streamflow available for 2004–05 to 2017–18 for the River Murray PWC.

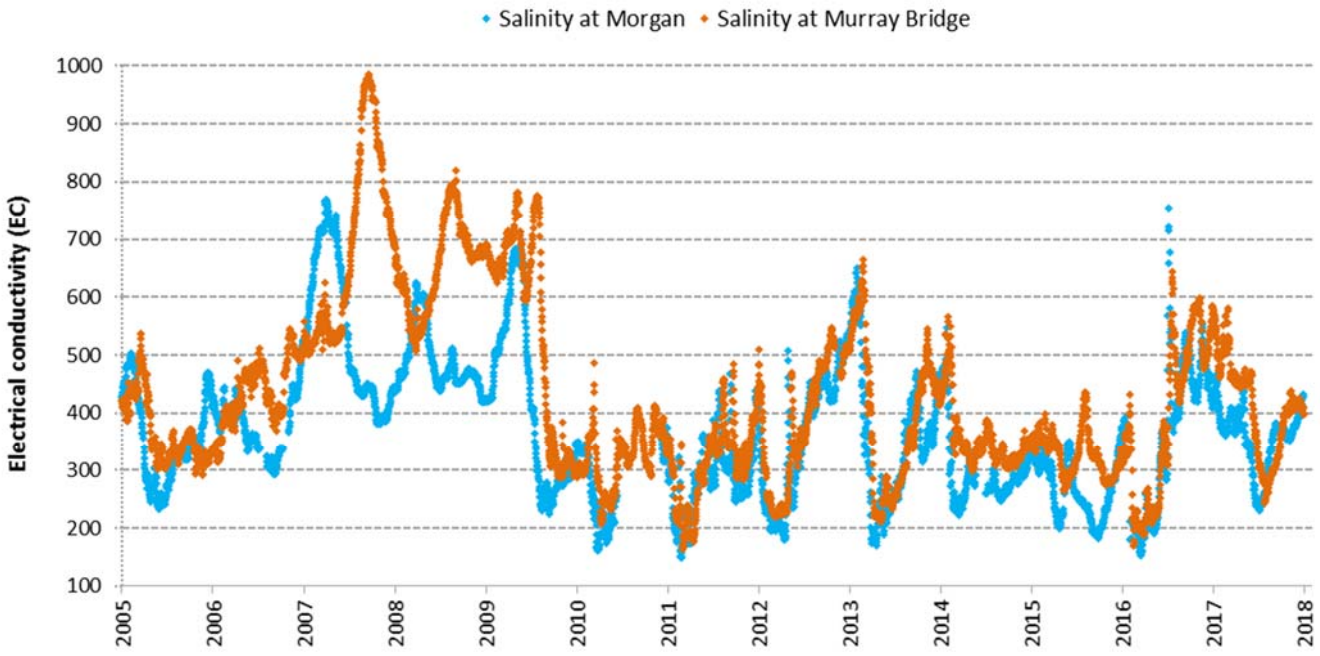


Figure 5. Salinity data (EC) for 2005 to 2018 along the River Murray at Morgan (A4260554) and Murray Bridge (A4261003/A4261126) gauging stations

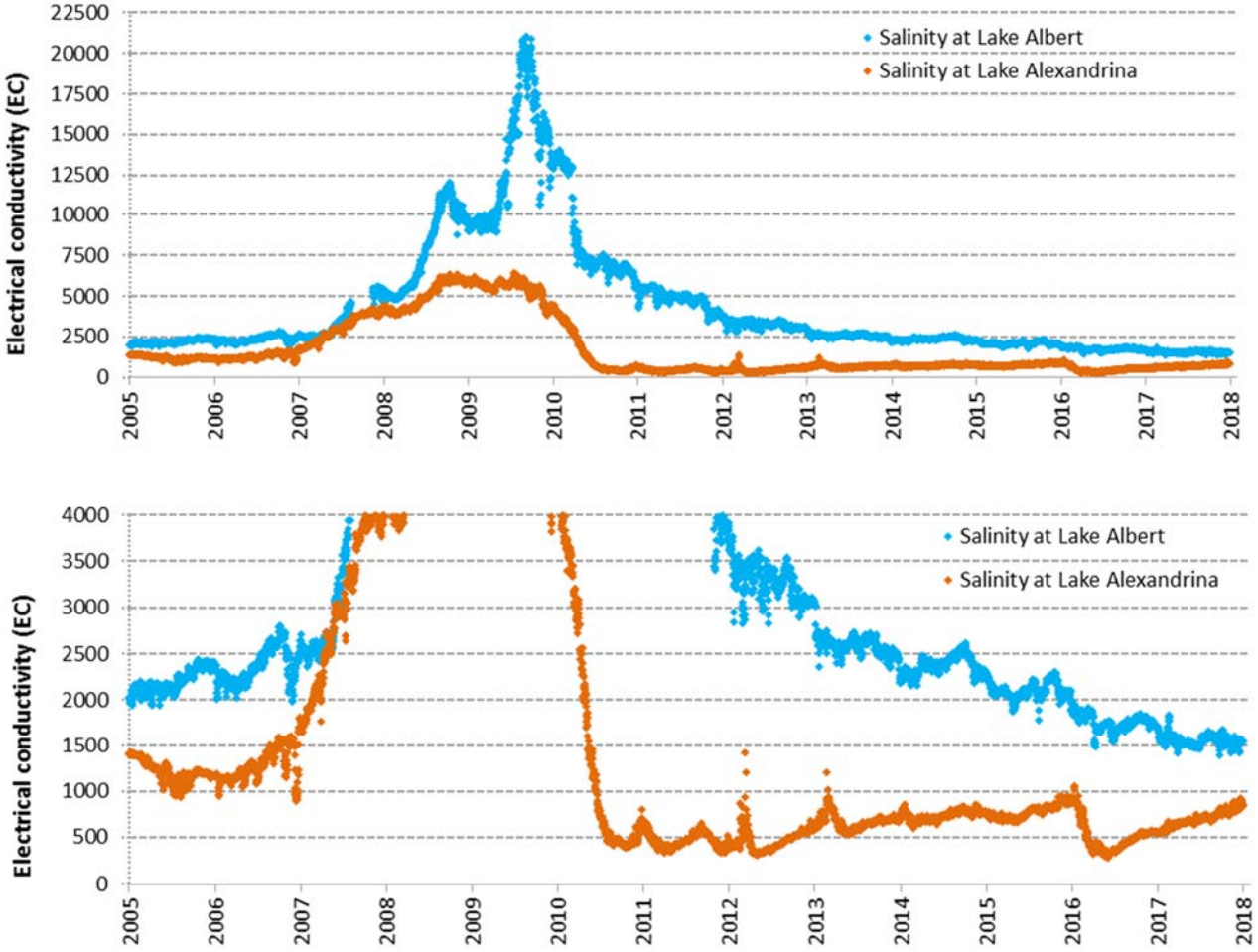


Figure 6. Salinity data (EC) for 2005–06 to 2017–18 in Lake Alexandrina and Lake Albert, showing the full range (above), and less than 4000 EC (below).

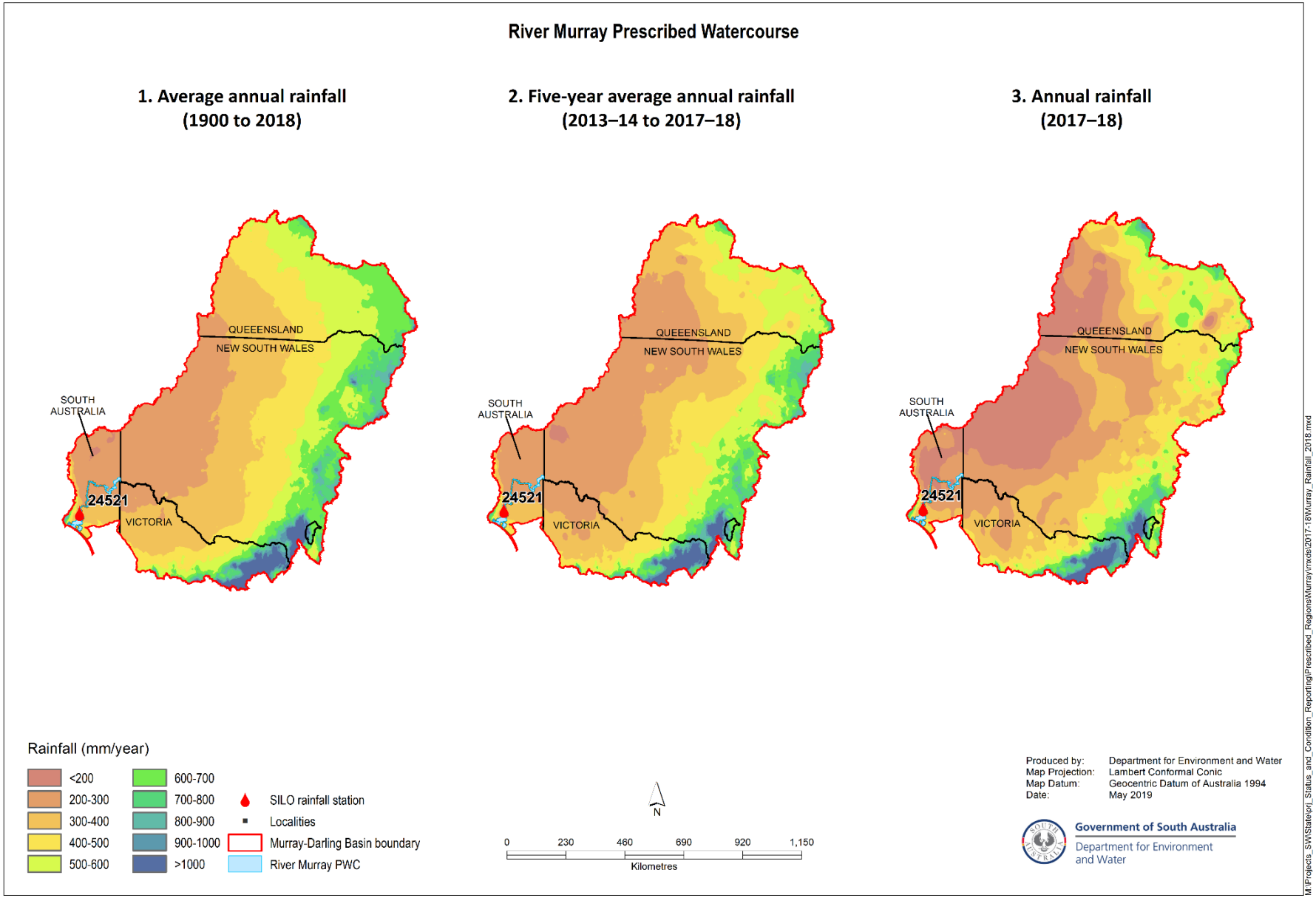


Figure 7. (1) Average annual rainfall (2) 5-year average annual rainfall and (3) annual rainfall for 2017–18 in the Murray–Darling Basin[3]

[3] Data sources: SILO interpolated point and gridded datasets, available at https://legacy.longpaddock.qld.gov.au/silo/.

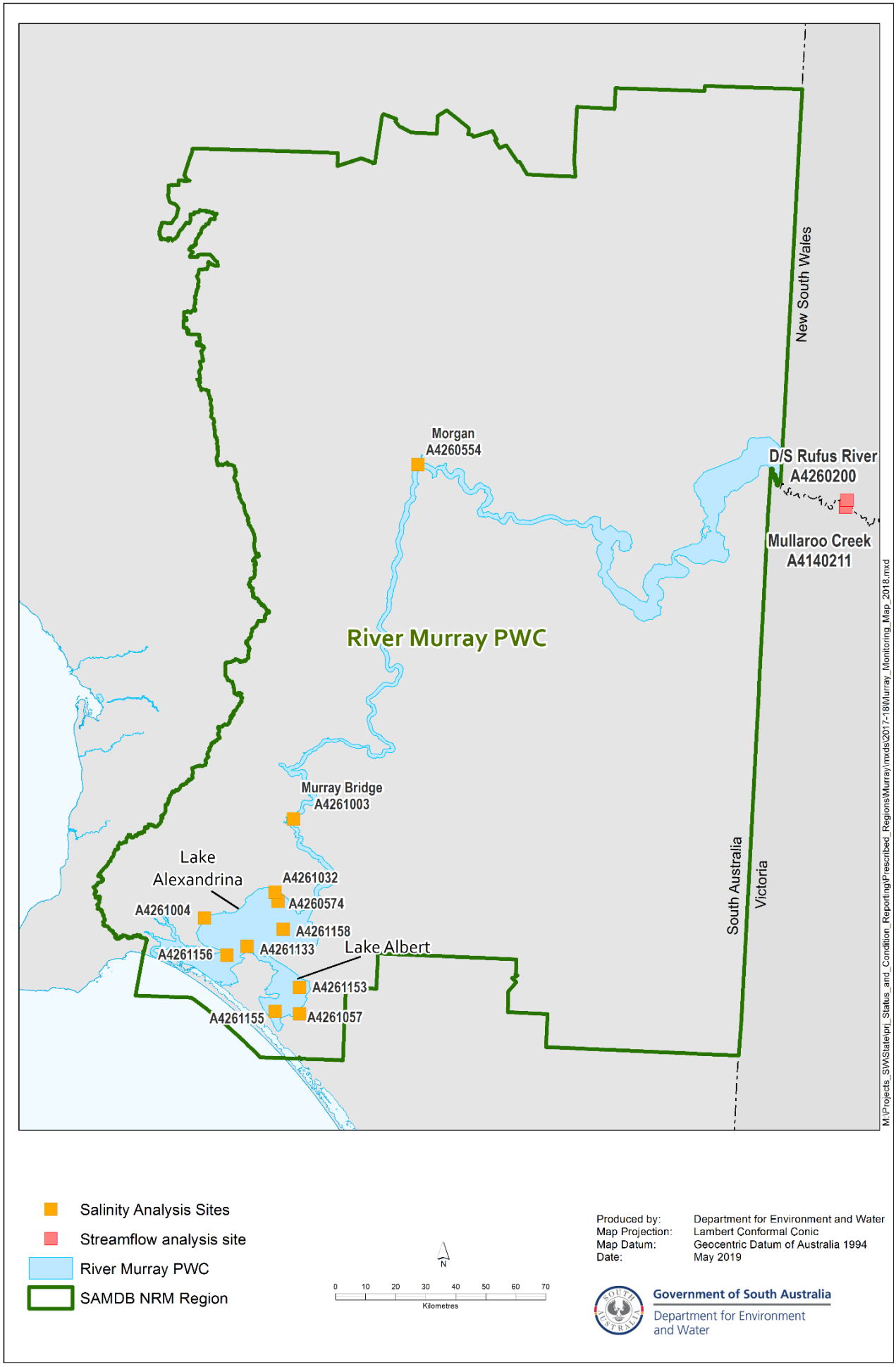


Figure 8. Streamflow gauging stations, rainfall analysis sites and salinity monitoring stations for the River Murray PWC

More information

The status of the River Murray PWC was determined by expressing the annual streamflow to South Australia ('Flow to SA') for 2017–18 as a percentile of the total annual streamflow for the period (1978–79 to 2017–18).

The total 2017–18 streamflow (2694 GL) represents the 41st percentile, i.e. 41% of the historic annual streamflow totals were less than the streamflow observed in 2017–18.

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 at www.waterconnect.sa.gov.au.

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 are sourced from the SILO interpolated point and gridded datasets, which are calculated from Bureau of Meteorology daily and monthly rainfall measurements and are available online at https://legacy.longpaddock.qld.gov.au/silo/.

To view the *River Murray PWC Surface water status report 2010–11,* which includes background information on rainfall, streamflow, salinity, water extraction and relevant water-dependent ecosystems, please visit the *Water Resource Assessments* page on www.waterconnect.sa.gov.au.

Streamflow and salinity data are available via WaterConnect at 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 site at https://www.naturalresources.sa.gov.au/samurraydarlingbasin/water/water-allocation-plans/river-murray-wap.

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