# River Murray PWC

## 2015 Surface water status report

Government of South Australia
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This document is available online at www.waterconnect.sa.gov.au/Systems/GSR/Pages.

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.

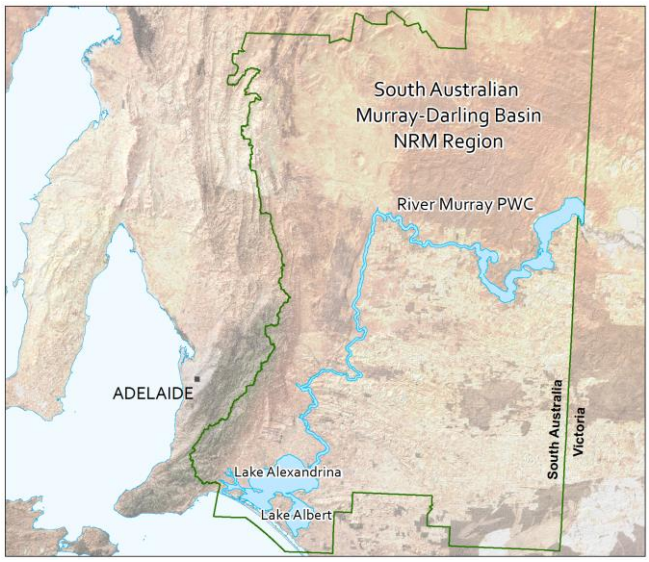
For further details about the *River Murray PWC*, please see the *Water Allocation Plan for the River Murray PWC* on the Natural Resources SA Murray-Darling Basin website.

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: http://www.waterconnect.sa.gov.au.

To view descriptions for all status symbols, please visit WaterConnect.

# 2015 Summary




**Description of the Prescribed Area**

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 resources in the PWC have been prescribed under South Australia's *Natural Resources Management Act 2004*. A Water Allocation Plan (WAP), prepared by the South Australian Murray-Darling Basin Natural Resources Management Board and adopted in 2002, seeks to provide 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, with an area over 1 000 000 km$^2$ and spans across eastern South Australia, Victoria, New South Wales and southern Queensland. From the South Australian border, the River Murray PWC extends approximately 900 km, draining in a westerly direction before heading south at the township of Morgan, 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 and salinity primarily climate driven, i.e. below-average winter rainfall results in a reduction in annual streamflow volumes. 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.

**Rainfall summary**

The Murray Bridge rainfall station (M024521) had an annual rainfall total of 352 mm in the 2014–15 water-use year, very close to the long-term average annual rainfall of 351 mm (Fig. 1). During the 12 months to June 2015, only four months (July, January, April and May) had above average rainfall, with the spring months of September to 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 Meningie (M024158) and Overland Corner (Barmera, M024012) rainfall stations. Despite the majority of months in the 2014–15 water-use year experiencing below average rainfall at the Murray Bridge rainfall station, total annual rainfall was comparable to the long-term average due to well above average rainfall occurring in January and April. This was also true for the Milang (M024519) rainfall station which experienced higher than average rainfall during January and the Autumn months (Fig. 2). However, this trend was not consistent across the PWC, where the average rainfall for the 2014–15 water-use year was the third lowest of the past 37 years at the Meningie rainfall station, and the fifth lowest at the Barmera rainfall station (M024012) based on the period 1978–2015 (the same period as available streamflow data), with both sites having rainfall below the long term averages. The spatial distribution of rainfall for the past five years shows an increase in the average annual rainfall across the South Australian portion of the Murray–Darling Basin compared to that of the long-term average (Fig. 7). This broad-scale increase is influenced by above average rainfall years, which have occurred three out of the past five water-use years at each site in SA. Conversely, the spatial distribution of rainfall for 2014–15 shows a decline across the entire MDB catchment when compared to the long-term average, with a decrease in the percentage of area that receives more than 300 mm of annual rainfall, most notably in the south-west of the region. Most importantly for the water resources of the MDB, the south-east of the catchment also experienced a contraction in the area that received 1000 mm or more of rain annually.

**Streamflow summary**

Flow to South Australia is calculated based on both the River Murray D/S Rufus River (A4260200) and the Mullaroo Creek (A4140211) stations; the calculated flow is reported as the virtual site Flow to South Australia (A4261001) (Fig. 8). Flow to South Australia was 2884 GL in the 2014–15 water-use year, half the long-term average annual streamflow of 5826 GL, with a long-term declining trend (Fig. 3). Streamflow recorded in 2014-15 (42$^{nd}$ percentile (%ile)) ranks in the 25-50$^{th}$ percentile range of streamflow over the period

of record. All months recorded below the monthly average streamflow. The River Murray has a large catchment area outside of the PWC that contributes to the flow and below average flows can be attributed to below average rainfall conditions in the south-east and northern headwater catchments of the MDB.

**Water use summary**

In 2014–15 total water use (diversions) from the River Murray PWC was 501 GL, more than the previous year's total of 443 GL. A breakdown of the diversions is summarised below:

- 73.2 GL for metropolitan Adelaide and associated country areas
- 35.8 GL for country towns
- 15.7 for the Lower Murray swamps (including Environmental Land Management Allocation)
- 376.2 GL for all other purposes (metered and non-metered consumption).

Streamflow in 2014–15 was approximately 2884 GL, with approximately 501 GL (excluding environmental water) recorded as being diverted from the PWC. As such it is estimated that 17 % was extracted for use (compared to 12 % in 2013–14) (Fig. 4).

**Salinity summary**

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 (Fig. 5). A combination of sites are used to assess salinity in Lake Alexandrina and Lake Albert (Fig. 6). Salinity levels of less than 800 EC (µs/cm) at Morgan and less than 830 (µs/cm) at Murray Bridge for 95 % of the time are targets in the Basin Plan. Between 2005–15, salinity at Morgan did not exceed 800 EC, while over the same period, salinity at Murray Bridge exceeded 830 EC for one event of 92 days in 2008 (2.5 % of total days). The Basin Plan includes a salinity target for Milang (Lake Alexandrina) of less than 1000 EC 95% of the time. This can be compared to a calculated Lake Alexandrina salinity of less than 1000 EC 46 % of the time between 2005–15. However, the majority of days exceeding the salinity target can be attributed to the drought years, as salinity has only exceeded 1000 EC on four occasions since the end of December 2010 (9 % of total days over the last five-year period 2010-11 to 2014-15). A maximum salinity of 856 EC and an average salinity of 737 EC was recorded across 2014–15 for Lake Alexandrina, while a maximum of 2610 EC and an average of 2373 EC was recorded for Lake Albert across the same period.

**Status summary**

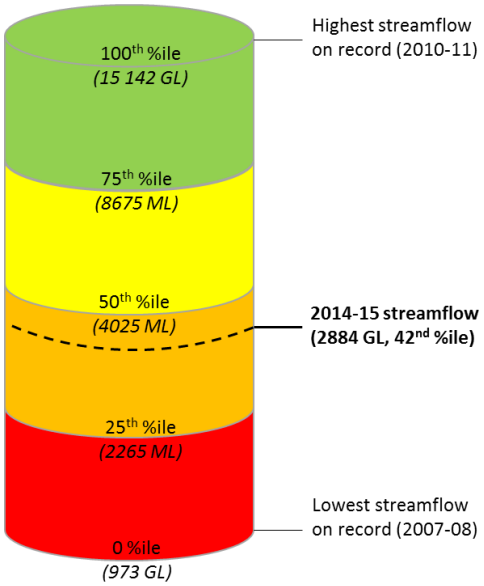
To determine the status of the River Murray PWC for 2015, the total streamflow for the water use period July 2014 – June 15 (2014-15) is expressed as a percentile by comparing it to the annual streamflow data measured over the entire period of record (1978-79 to 2014-15). The 2014-15 annual streamflow is the 42$^{nd}$ percentile, which means 42% of the annual streamflow values for 1978-79 to 2014-15 are equal to or below the 2014-15 annual streamflow. Status is defined based on which percentile grouping the current years' 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 River Murray at a whole PWC scale is assigned an amber surface water status for 2015 based on the status of streamflow:

'Annual streamflow was between the 25$^{th}$–50$^{th}$ 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.



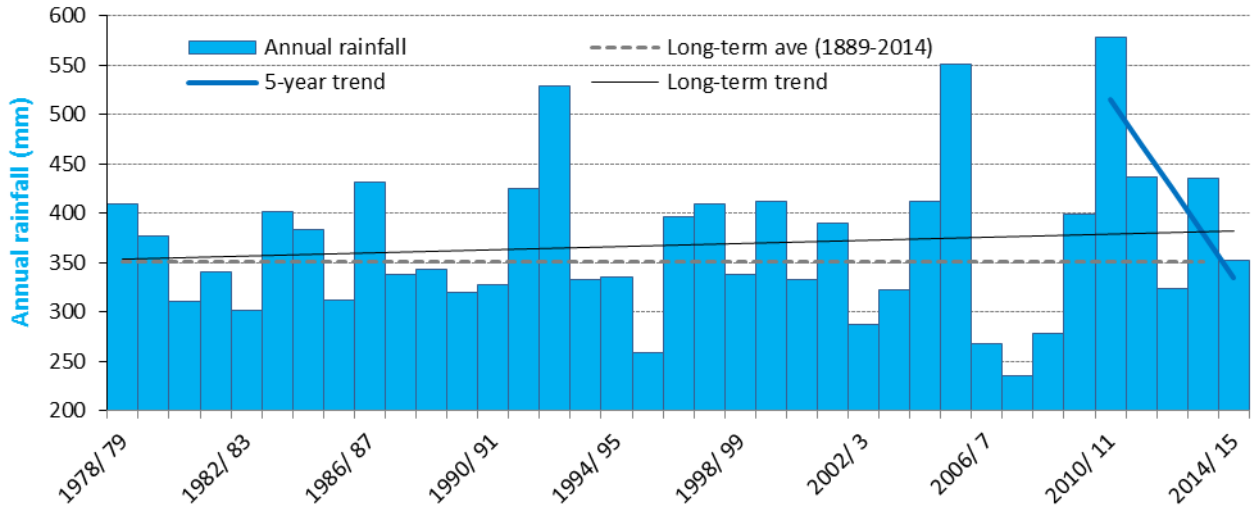



Figure 1. Annual rainfall (mm) for the 1978–79 to 2014–15 water-use years (July–June), the long-term trend and long-term average annual rainfall, and the short-term trend for the past five-years recorded at the Murray Bridge rainfall station (M024521)

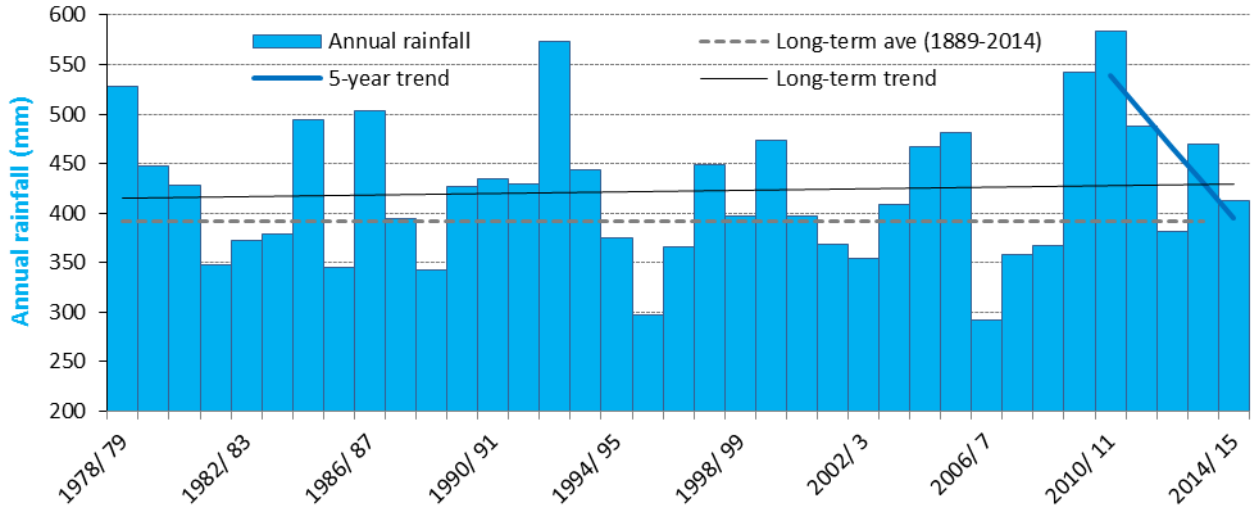



Figure 2. Annual rainfall (mm) for the 1978–79 to 2014–15 water-use years (July–June), the long-term trend and long-term average annual rainfall, and the short-term trend for the past five-years recorded at Milang rainfall station (M024519)

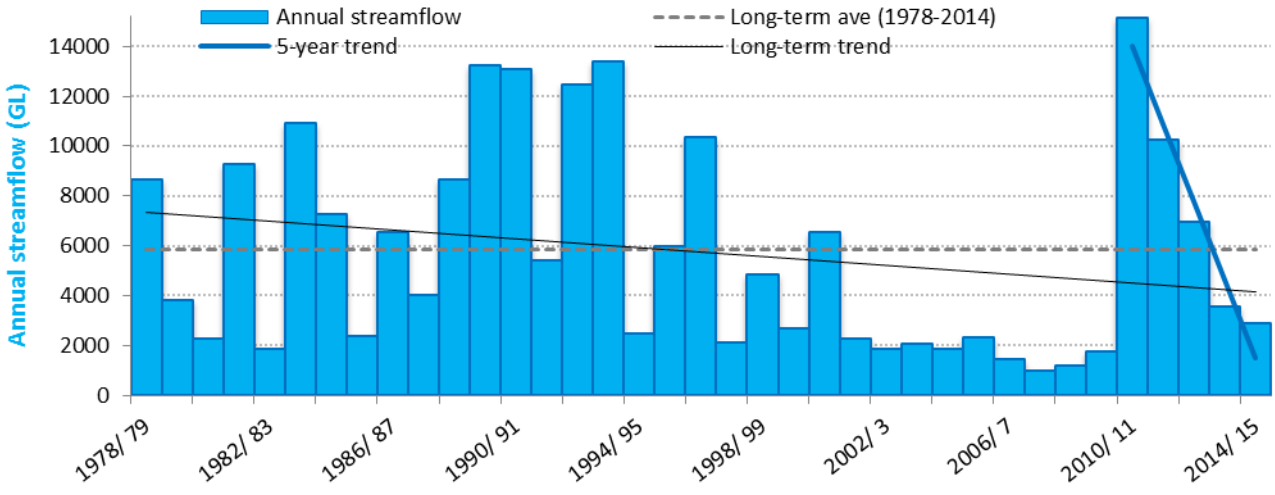



Figure 3. Annual streamflow (GL) to South Australia for the 1978–79 to 2014–15 water-use years (July–June) the long-term trend and long-term average annual streamflow, and the short-term trend for the past five-years

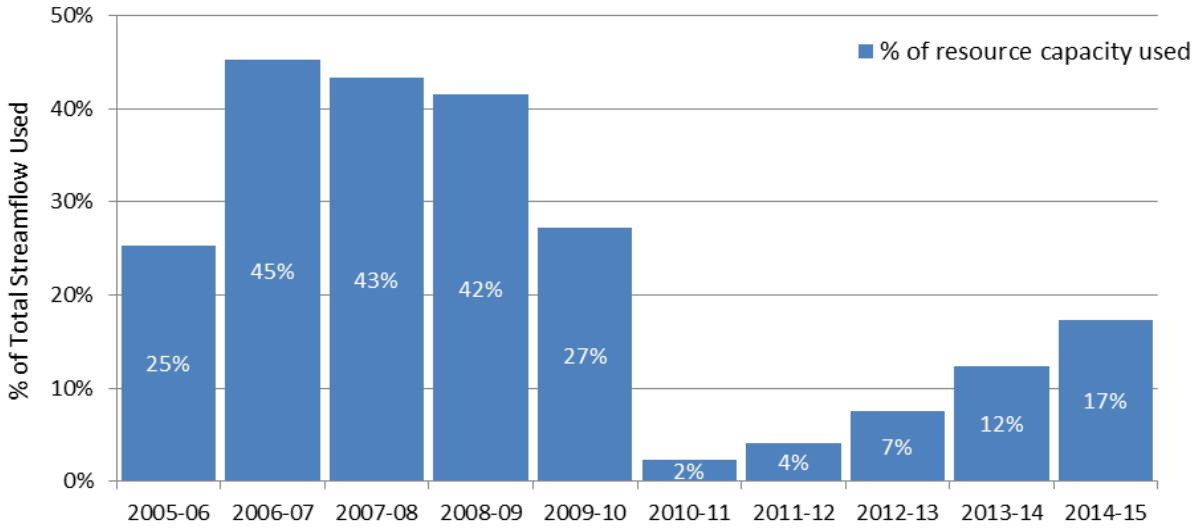



Figure 4. Surface water use as a percentage of total resource capacity available for the 2005–06 to 2014–15 water-use years for the River Murray PWC

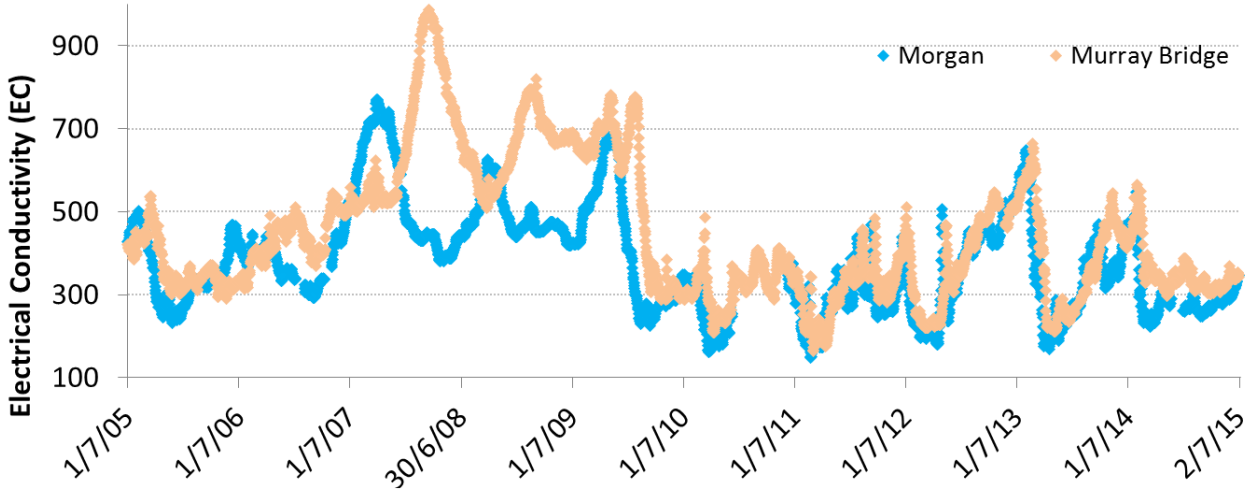



Figure 5. Salinity data (EC) for the 2005–06 to 2014–15 water use years along the River Murray at Morgan (A4260554) and Murray Bridge (A4261003/A4261126) monitoring sites

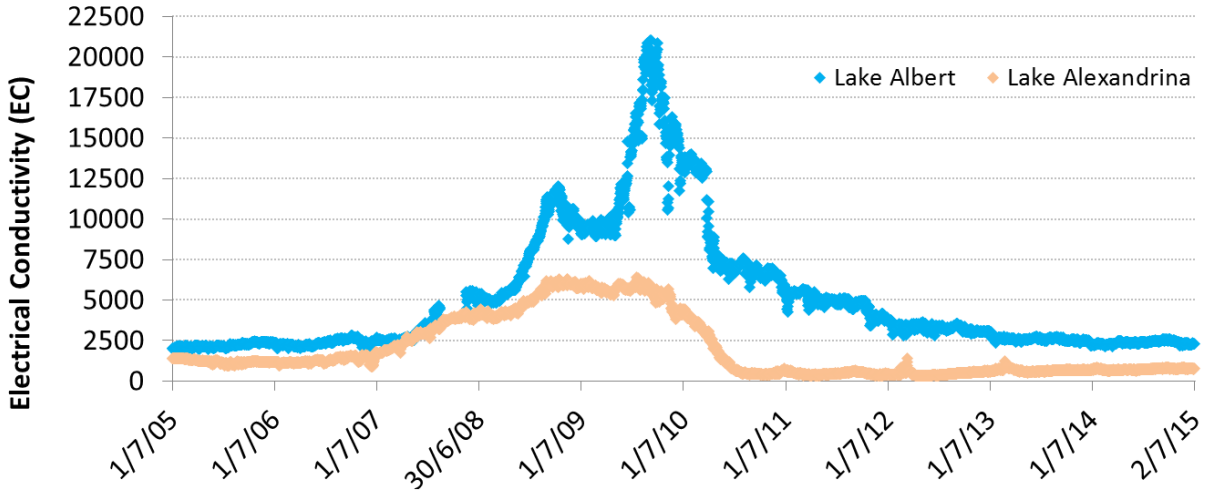



Figure 6. Salinity data (EC) for the 2005–06 to 2014–15 water use years in Lake Alexandrina and Lake Albert

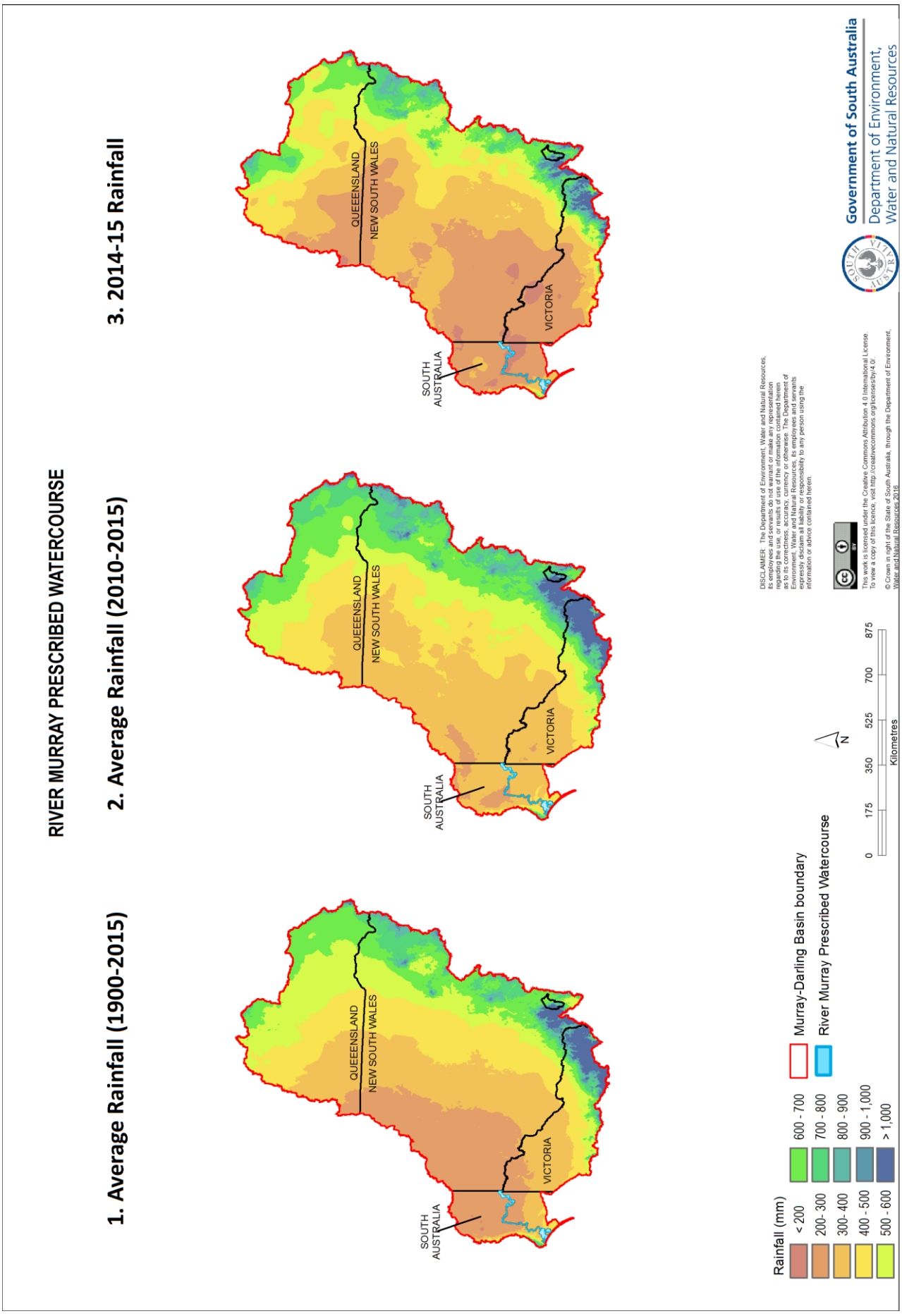



Figure 7. (1) Long-term and (2) 5-year average annual rainfall and (3) annual rainfall for the 2014–15 water-use year in the Murray–Darling Basin

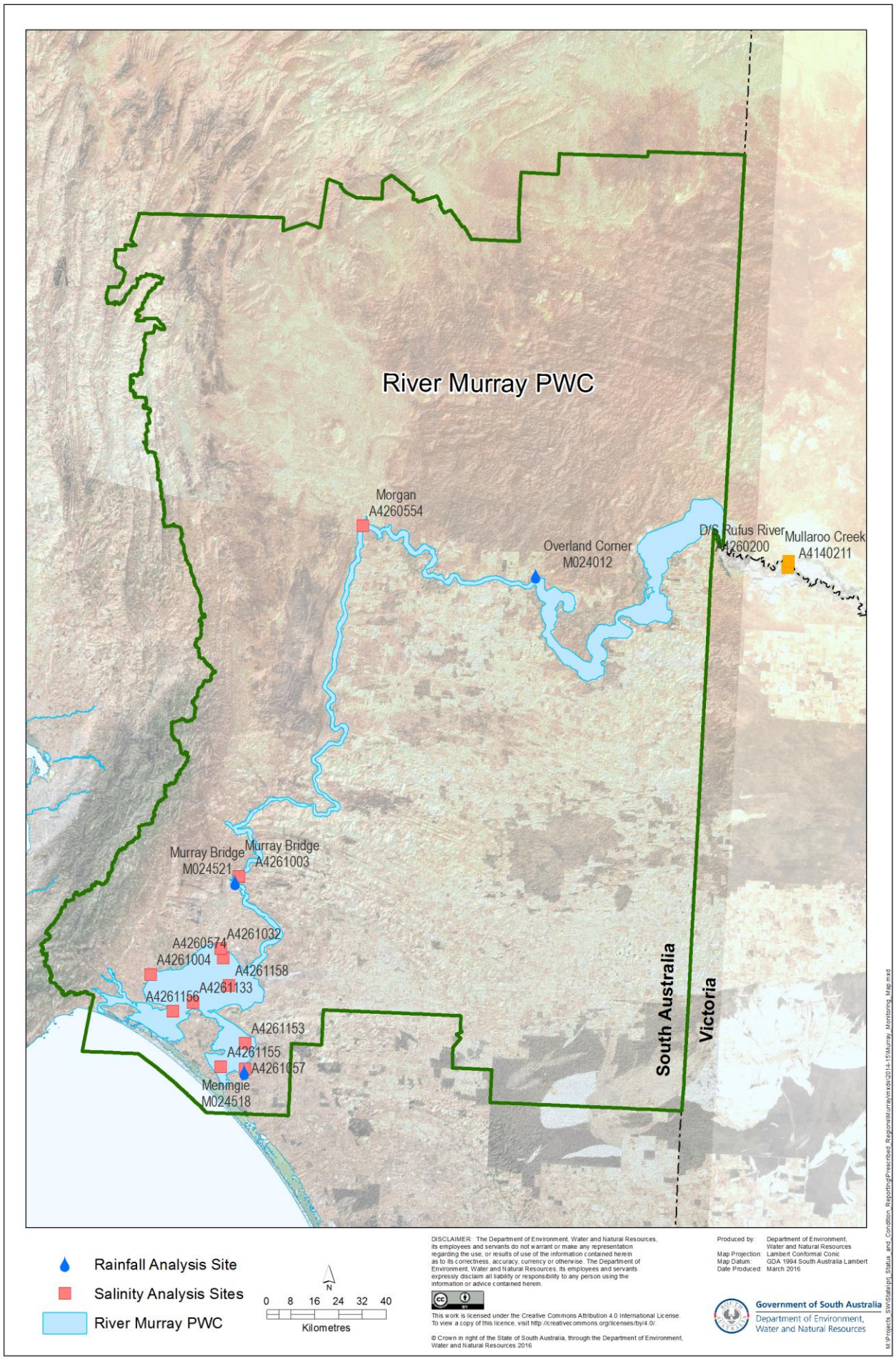



Figure 8. Surface water gauging stations, rainfall analysis sites and salinity monitoring stations for the River Murray PWC

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