



Australian Government



Assessment of the salt export objective and salinity targets for flow management 2018–19

January 2020

Published by the Murray–Darling Basin Authority
MDBA publication no: 01/20
ISBN (online): 978-1-925762-68-6



GPO Box 1801, Canberra ACT 2601

engagement@mdba.gov.au



1800 230 067



mdba.gov.au

© Murray–Darling Basin Authority 2020

Ownership of intellectual property rights



With the exception of the Commonwealth Coat of Arms, the MDBA logo, trademarks and any exempt photographs and graphics (these are identified), this publication is provided under a *Creative Commons Attribution 4.0* licence. (<https://creativecommons.org/licenses/by/4.0>)

The Australian Government acting through the Murray–Darling Basin Authority has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Murray–Darling Basin Authority, its employees and advisers disclaim all liability, including liability for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying upon any of the information or data in this publication to the maximum extent permitted by law.

The Murray–Darling Basin Authority's preference is that you attribute this publication (and any Murray–Darling Basin Authority material sourced from it) using the following wording within your work:

Cataloguing data

Title: Assessment of the salt export objective and salinity targets for flow management 2018–19, Murray–Darling Basin Authority Canberra, 2020. CC BY 4.0

Accessibility

The Murray–Darling Basin Authority makes its documents and information available in accessible formats. On some occasions the highly technical nature of the document means that we cannot make some sections fully accessible. If you encounter accessibility problems or the document is in a format that you cannot access, please contact us.

Acknowledgement of the Traditional Owners of the Murray–Darling Basin

The Murray–Darling Basin Authority pays respect to the Traditional Owners and their Nations of the Murray–Darling Basin. We acknowledge their deep cultural, social, environmental, spiritual and economic connection to their lands and waters.

The guidance and support received from the Murray Lower Darling Rivers Indigenous Nations, the Northern Basin Aboriginal Nations and our many Traditional Owner friends and colleagues is very much valued and appreciated.

Aboriginal people should be aware that this publication may contain images, names or quotations of deceased persons.

Contents

- Basin salinity management 1
 - Salt export objective..... 1
 - Salinity targets for flow management..... 3

Basin salinity management

Salinity management across the Murray–Darling Basin is a significant challenge. If not managed well, salinity poses an ongoing risk to the Basin’s land and water resources. While salt occurs naturally in the Basin’s landscape, activities such as irrigation development and land clearing can cause salts to concentrate in certain places. Water flowing through the River Murray system and out to the Southern Ocean through the Murray Mouth is the main natural process by which salt can leave the Basin.

Salt export objective

The Basin Plan includes a salt export objective to ensure salt is flushed at a sufficient rate into the Southern Ocean from the River Murray system. The Murray–Darling Basin Authority assesses achievement of the salt export objective by estimating the number of tonnes of salt exported per year averaged over the preceding three years. The salt load is calculated as the product of average daily salinity in Lake Alexandrina and modelled daily flow over the Barrages.¹

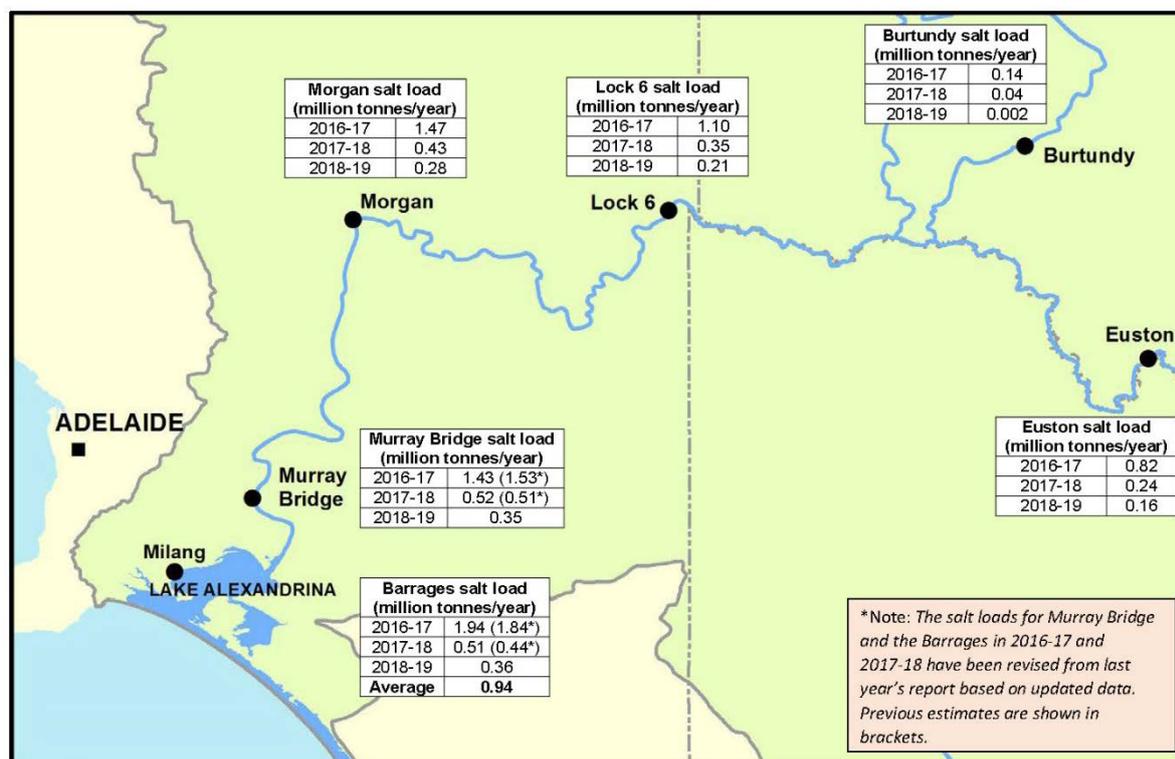


Figure 1 Salt loads at key locations in the Murray–Darling Basin

¹ A detailed description of the methodology is provided in the following report: MDBA 2013, Approach for estimating salt export from the River Murray System to the Southern Ocean, Murray–Darling Basin Authority, Technical Report 2013/09 (<https://www.mdba.gov.au/sites/default/files/pubs/Approach-for-estimating-salt-export-from-the-River-Murray-System-to-the-Southern-Ocean-June2013.pdf>).

The estimated annualised rate of salt export over the barrages was 0.94 million tonnes (Figure 1) during the three-year assessment period (July 2016–June 2019). This is less than the Basin Plan’s indicative figure of 2 million tonnes per year.

Due to low inflows into the River Murray system it has not been possible to export 2 million tonnes of salt per year over the barrages from July 2016 to June 2019, despite the additional flows provided to mimic natural flow patterns using environmental water under the Basin Plan.

A range of factors influence how much salt is exported each year. These factors include river regulation, changed land management practices, complex groundwater systems and the highly variable nature of the hydrological conditions in the Basin. It may not be possible to flush 2 million tonnes of salt consistently while maintaining salt concentration or salinity levels in the river at acceptable levels.

During periods of low flow, such as 2017–18 and 2018–19, preventing salt entering the river is more important than exporting salt to the ocean. Salt interception schemes (SIS), built over the past three decades to protect the shared water resources in the river, play an important role during these periods by diverting salt away from the River Murray system (Table 1). During periods of high flow, such as those experienced during the floods of late 2016, SIS play less of a role in reducing river salinity, as there is greater dilution and more salt is exported.

Table 1 Estimated salt export over the barrages and salt diverted away from the river system by salt interception schemes

Variable	2016-17 (million tonnes/year)	2017-18 (million tonnes/year)	2018-19 (million tonnes/year)
Salt diverted away from the river and adjacent landscapes through operation of SIS	0.40	0.48	0.47
Estimated salt export over the lower lake barrages (annualised average over the three preceding years)	0.87*	0.86*	0.94

*Note that revised salt loads over the Barrages for 2016-17 and 2017-18 have not been incorporated into these averages

The achievement of the salt export objective should therefore be viewed in the wider context of overall salinity management, including all the measures implemented in the Basin over the last three decades. While it is anticipated that the increased environmental flows resulting from the Basin Plan will assist to flush salts from the Basin and particularly the River Murray system over time, it will still be difficult to export salt during dry times when water availability and river flows are low.

As recommended in the 2017 Basin Plan Evaluation², the 2020 review of water quality targets in the water quality and salinity management plan will consider the appropriateness of the salt export objective as an indicator of adequate flushing of salt from the river system in the context of a variable climate. The outcomes will be used to inform the scheduled review of the Basin Plan in 2026.

Salinity targets for flow management

The Basin Plan also includes salinity targets for flow management (operational targets) at five reporting sites. These targets seek to ensure River Murray water is suitable for drinking, agriculture, recreation and the environment.

Salinity has been continuously monitored over the five-year reporting period (2014–19) at the five reporting sites—Murray Bridge, Morgan, Lock 6, Burtundy and Milang (see map in Figure 1 for reporting site locations). The targets are deemed to have been met if the percentage of days above the target is less than 5%, or the salinity has been below the target value for 95% of the time.

Results for July 2014 to June 2019 (Table 2) show that the salinity target values were achieved at four of the five reporting sites—Murray Bridge, Morgan, Lock 6 and Milang. However, the recorded salinity at the Burtundy site was above the target for 46% of the time.

Table 2 Salinity levels at the reporting sites over the five-year period from 1 July 2014 to 30 June 2019, compared to the target values in Basin Plan (section 9.14)

Reporting site	Target value (EC*) (µS/cm)	Non-exceedance salinity at 95% of the time (µS/cm)**	% of days above the target value
River Murray at Murray Bridge	830	540	0
River Murray at Morgan	800	471	0
River Murray at Lock 6	580	287	0
Darling River downstream of Menindee Lakes at Burtundy	830	1,621	46
Lower Lakes at Milang	1,000	996	4.6

* EC is an electrical conductivity unit commonly used to indicate salt concentration or the salinity of water.

As a guide, EC > 800 µS/cm is marginal for drinking, EC > 1,600 µS/cm is brackish, EC > 4,800 µS/cm is saline.

** Salinity values are compiled from best available data (daily mean values derived from continuously logged data).

² MDBA 2017, Basin Plan Evaluation, Murray–Darling Basin Authority publication no 52/17, Canberra (https://www.mdba.gov.au/sites/default/files/pubs/1041-BPE-2017-report_0.pdf).

As noted in a recent review³, almost all of the northern Basin has been in extreme drought since April 2017 with rainfall in the bottom 10% of all years and large areas experiencing the driest conditions on record. Dry conditions, low river flows and lack of water availability, which limit the ability of water managers to respond to high salinity levels, have made it difficult to achieve the target at Burtundy.

Recorded salinity levels at Burtundy were above the target value from 23 November 2018 to 2 June 2019, with a peak of 1,226 EC on 25 May 2019. Low or no flows from March 2019 to the end of the reporting period stranded the data recorder above the waterline on two occasions (7 April to 29 April and 3 June to 30 June) so salinity levels could not be recorded at these times.

Salinity levels at Milang showed an increasing trend and remained above 1,000 EC from 28 March to 10 June 2019. If this trend continues and current conditions persist, there is a risk that the Milang target may not be achieved in the next reporting period.

As required under the Basin Plan, the Murray–Darling Basin Authority is working to review the water quality targets in the water quality and salinity management plan by 2020. Part of the review will be an examination of the appropriateness of the salinity targets, particularly at Burtundy. This will need to consider the future flow regime in the northern Basin and lower Darling following the changes made to the Basin Plan arising from the Northern Basin Review. The future effect of enhanced protection of environmental flows, which is one of the northern Basin toolkit measures, and the future management arrangements for Menindee Lakes linked to the implementation of a sustainable diversion limit adjustment mechanism (SDLAM) project, will also need to be considered.

³ Vertessy R, Barma D, Baumgartner L, Sheldon F, Bond N 2019, Final report of the Independent Assessment of the 2018–19 fish deaths in the lower Darling, 29 March 2019, Canberra (https://www.mdba.gov.au/sites/default/files/pubs/Final-Report-Independent-Panel-fish-deaths-lower-Darling_4.pdf).

Office locations

Adelaide
Albury-Wodonga
Canberra
Goondiwindi
Griffith
Mildura
Murray Bridge
Toowoomba

 mdba.gov.au

 1800 230 067

 engagement@mdba.gov.au