

RIVER MURRAY FLOW REPORT and WATER RESOURCES UPDATE

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Report #49/2016

Issued 10:00 am 23 December 2016

This supersedes the previous flow report issued by the Department of Environment, Water and Natural Resources (DEWNR) on 16 December 2016. The next report will be provided on Friday 30 December 2016.

In this report, for ease of representation, large volumes of water are expressed in gigalitres (GL), while smaller volumes are expressed in megalitres (ML). One GL is equal to 1 000 ML.

WATER ALLOCATIONS AND CARRYOVER

South Australian River Murray water access entitlement holders (Class 3a, 3b, 4, 7 and 8) are being provided with a 100 per cent water allocation in 2016-17. Eligible water access entitlement holders (Class 3a, 3b, 4 and 7) will also have access to private carryover.

MANAGEMENT OF SOUTH AUSTRALIA'S DEFERRED WATER

The Murray-Darling Basin Authority confirmed that on 1 December 2016, South Australia had 141.6 GL of deferred water held in storage. The table below identifies the storage in which it is held and the purpose.

At 1 December 2016				
Purpose	Lake Victoria (GL)	Hume (GL)	Dartmouth (GL)	Total (GL)
*CHWN	0.0	0.0	82.0	82.0
Private Carryover	0.0	0.0	59.6	59.6
Total	0.0	0.0	141.6	141.6

*Critical Human Water Needs (CHWN)

Volumes stored are adjusted for net evaporation losses and spills until delivered to South Australia.

South Australia cannot defer water when receiving unregulated flow. However, the State will continue to seek opportunities to defer and store water when conditions allow.

WATER RESOURCES UPDATE

During November 2016, the total River Murray System inflow was approximately 1 500 GL, which is nearly double the November long-term average of 800 GL. Inflow to Menindee Lakes (from the Darling System) during November 2016 was approximately 680 GL, which is around five times the November long-term average of 130 GL.

The flow to South Australia during November 2016 was approximately 2 170 GL, which is well above the November long-term average of approximately 900 GL. The flow comprised:

- 180 GL of Entitlement Flow (includes environmental water on SA licence);
- 10 GL of additional environmental water from a return flow event;
- 1 959 GL of unregulated flow;
- 12 additional dilution flow; and
- 9 GL of trade into South Australia.



STORAGE VOLUMES

Murray-Darling Basin storage volumes

Storage	Full Supply Volume (GL)	21/12/2016 (GL)	21/12/2015 (GL)	Long-term average (end of December) (GL)
Dartmouth	3 856	2 989 (78%)	2 050 (53%)	
Hume	3 003	2 798 (93%)	1 249 (42%)	
Lake Victoria	677	656 (97%)	541 (80%)	
Menindee Lakes	*1 731	1 582 (91%)	73 (4%)	
TOTAL	9 267	8 025 (87%)	3 913 (42%)	6 871 (74%)

*Menindee Lakes can be surcharged to 2 015 GL

RAINFALL AND TEMPERATURE OUTLOOK

The latest Bureau of Meteorology weather outlook for January to March 2017 indicates average to drier than average rainfall with warmer than average temperatures across the Murray-Darling Basin. The outlook is influenced by the Southern Annular Mode (SAM), which is currently negative. A negative SAM usually results in reduced rainfall and higher temperatures during the summer months.

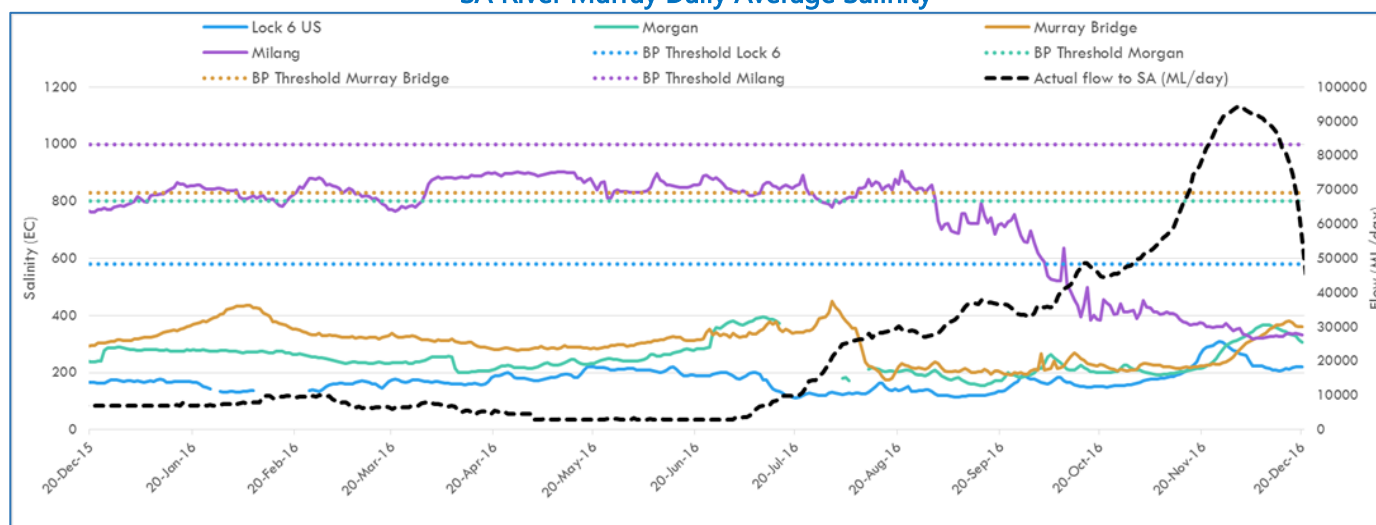
WATER QUALITY - Salinity

A number of targets are identified under the Basin Plan, which all Basin States must have regard to in managing River Murray flows. The targets for real-time salinity are identified below. Salinity must not exceed these values for 95 per cent of the time:

- 580 EC at Lock 6
- 800 EC at Morgan
- 830 EC at Murray Bridge
- 1 000 EC at Milang

The following graph shows the salinity at these locations and the flow to South Australia (QSA) from December 2015 to December 2016. The dashed-lines identify the Basin Plan (BP) thresholds for the corresponding colour coded location.

SA River Murray Daily Average Salinity



Note: Missing Lock 6 salinity readings from 8-23 February 2016 are due to a faulty EC sensor.
Missing Morgan salinity readings from 16-11 August 2016 are due to a faulty EC sensor

River Murray Flow Report and Water Resources Update

FLOW OUTLOOK

The flow at the South Australian border is approximately 28 GL/day and will decrease to around 19 GL/day during the coming week. The flow to South Australia comprises the normal December Entitlement Flow of 7 GL/day, environmental water, unregulated flow and additional dilution flow.

Below is a table of the predicted (and actual) River Murray water levels and peak dates from Lock 6 to Murray Bridge. The predictions are a guide only, based on the peak flow of 95 GL/day at the South Australian border and previous flood events.

Location	Normal Pool Level (m AHD)	Current level at 21/12/16 (m AHD)	Water level is currently	Actual Peak		Predicted Peak		2011 High Water Level (m AHD)
				Level (m AHD)	Date	Level (m AHD)	Date	
Lock 6	19.25	19.55	Falling	20.19	7 Dec			20.11
Renmark	-	17.09	Falling	17.44	8 Dec			17.38
Lock 5	16.30	16.69	Falling	17.05	8 Dec			17.05
Lyrup	-	15.50	Falling	15.80	10 Dec			15.68
Berri	-	14.99	Falling	15.21	10 Dec			15.16
Lock 4	13.20	14.56	Falling	14.73	12 Dec			14.75
Loxton	-	13.40	Falling	13.54	13 Dec			13.42
Cobdogla	-	11.57	Falling	11.59	16 Dec			11.52
Lock 3	9.80	10.95	Falling	10.98	17 Dec			10.93
Overland Corner	-	10.39	Falling	10.41	18 Dec			10.27
Waikerie	-	8.94	Falling	9.20	19 Dec			9.06
Lock 2	6.10	8.30	Falling	8.32	20 Dec			8.25
Cadell	-	7.00	Falling	7.01	20 Dec			6.82
Morgan	-	6.35	Falling	6.38	20 Dec			6.20
Lock 1	3.20	4.42	Rising			4.50	23 Dec	4.42
Swan Reach	0.75	3.29	Rising			#3.20	26 Dec	3.04
Mannum PS	0.75	1.37	Rising			#1.40	26 Dec	1.05
Murray Bridge	0.75	1.08	Rising			#1.15	26 Dec	1.01

Note: Water levels (in particular below Lock 1) can be affected by local wind conditions by approximately 0.3 m
Water levels based on limited data

Now is a great time to enjoy the River Murray. However visitors are reminded to exercise caution at all times when using the river and to seek local advice.

After the water levels peak, the levels are likely to fall quickly (up to 0.4 m/day). All river users, houseboat owners and operators, as well as irrigators, will need to regularly check the water level and make daily adjustments.

Caution should be exercised when near riverbanks, as the rapid decrease in water level may affect bank stability. Depending on soil, vegetation or other factors, some riverbanks may be susceptible to slumping as water levels decrease. Signs of bank instability include cracks or leaning trees. Anyone with concerns about the safety of a particular riverbank should contact their local council. In the event of an emergency call 000.

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The flow over Lock 1 is approximately 81 GL/day and will decrease to around 75 GL/day during the coming week, depending on weather conditions and extractions.

It is important to note that flow forecasts in this advice are based on the information available at the time of preparation. Advice may change as new gauging information becomes available, or due to rainfall events or changed operations upstream. The forecasts will be revised as new information becomes available.

RIVER HAZARDS

After water levels peak at a location, they could decrease by up to 0.4 m/day. Be aware of the likely rapid decrease and take any necessary actions to modify pontoons and moorings.

Boaters are advised that current and forecast high flow conditions on the River Murray are causing inundation of riverbanks and associated structures.

Some boat launching facilities may become unserviceable due to changed river levels. Bridge clearances will also be reduced by rising water levels. Boaters should exercise caution when operating vessels near to the banks of the river or under bridges, and be aware of structures on, or near, the riverbank which may be submerged. Boaters are also likely to encounter floating debris which may cause damage to vessels or injury to water skiers.

Property owners who are likely to have submerged infrastructure (such as jetties) projecting into the river are reminded to attach a floating marker, coloured yellow, to the extremity of the infrastructure. This will assist boaters to avoid colliding with the submerged structures.

If you intend to engage in high speed activities, ensure that the area of water is safe prior to commencing the activity. Vessel wash should be kept to a minimum if operating in the vicinity of shacks and other structures.

For more information, contact Department of Planning, Transport and Infrastructure Marine Operations on 1300 183 046.

SANDBAGGING

As River Murray water levels increase there will be inundation of some properties on the floodplain. The State Emergency Service (SES) is distributing sandbags to residents, businesses and shack owners from a number of local government locations. To access sand bags call one of the following councils:

- Mid Murray Council - call 8540 0060 for collection from Morgan, Blanchetown Mannum or Cambrai
- Rural City of Murray Bridge – call 8539 1100 for collection from Murray Bridge; and
- Coorong District Council – call 0429 900 919 for collection from Tailem Bend

WATER QUALITY - BLACKWATER

Blackwater is occurring in the South Australian portion of the River Murray.

Blackwater is a natural phenomenon that can occur after a significant rainfall event, when organic matter on the floodplain (eg leaves and wood) is washed into the river. The breakdown of organic matter consumes dissolved oxygen, which reduces the level of dissolved oxygen in the water. The water is blackish in appearance and may have a strong unpleasant smell.

When the dissolved oxygen levels drop below critical levels it can cause fish and crustaceans to die. To report sightings of large numbers of dead or distressed fish contact the 24-hour FISHWATCH hotline on 1800 065 522.

SA Health has advised that blackwater in the River Murray poses no direct public health risk. In a small number of people, blackwater may cause a skin irritation due to sensitivity to natural organic matter in the water. SA Health does not recommend drinking water direct from the River Murray at any time unless it is treated.



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SA Water has advised that the water quality challenges presented by blackwater can be effectively treated via its treatment processes and therefore do not currently pose a drinking water quality issue.

DEWNR, SA Water and Murray-Darling Basin Authority with other government agencies are working closely to monitor the situation. Further information is available at www.environment.sa.gov.au/managing-natural-resources/river-murray/about-the-river/issues-for-river-health

MURRAY MOUTH

Dredging operations at the Murray Mouth commenced on 9 January 2015 to maintain connectivity (exchange of water) between the Coorong and the Southern Ocean.

The dredging operations combined with recent substantial barrage releases have improved conditions at the Murray Mouth. On 27 October 2016, one of the two dredges was decommissioned. The remaining dredge paused operations on 5 December 2016 for maintenance during the Christmas-New Year period. Dredging will recommence early in 2017. At 5 December 2016 approximately 1 756 500 cubic metres of sand had been removed by dredging operations.

Mariners are advised that there are still a number of shallow zones in and adjacent to the Murray Mouth and should follow all directions in the area and reduce their speed. Boats equipped with echo sounders should regularly check depths and avoid travelling at low tide. Mariners are reminded that navigation through the Murray Mouth is only permitted during daylight hours. The Exclusion Zones established around the dredging operations have been removed for the duration of the stand down.

There is a partial park closure in place for the northern tip of the Coorong National Park. For more information visit www.environment.sa.gov.au/parks/Safety/Park_closures/141219-coorong-national-park.

ENVIRONMENTAL WATER

During December 2016, the Commonwealth Environmental Water Holder and the Murray-Darling Basin Authority's *The Living Murray* are providing environmental water to South Australia. The environmental water will provide in-channel, Lower Lakes and Coorong environmental and water quality benefits.

DEWNR is continuing discussions regarding environmental water to be delivered during 2016-17.

BARRAGE OPERATIONS AND WATER LEVELS IN THE LOWER LAKES

The water level in Lake Alexandrina is approximately 0.87 m AHD and Lake Albert approximately 0.86 m AHD. The difference in water levels is due to wind effects. Water levels are being actively managed to achieve a target water level of 0.85 m AHD at the end of December 2016.

Due to the unregulated flow event, when weather conditions are favourable, water is being released from the barrages into the Coorong. Releases are being prioritised at Tauwichee, Goolwa, Ewe Island and Mundoo barrages. The primary aims of the releases are to reduce salinity levels in the Lower Lakes and scour sand from the Murray Mouth. All fishways are operational to provide fish passage between Lake Alexandrina and the Coorong.

During the week ending 20 December 2016 total barrage releases were approximately 290 GL.

Water levels and barrage operations are monitored closely by South Australian Government agencies, the Murray-Darling Basin Authority and the Commonwealth Environmental Water Office.

WEIR POOL OPERATIONS

Due to high flows, the River Murray weirs were temporarily opened (open river conditions). This is a standard operating procedure during periods of high flow. Some of the weirs have now been reinstated as the high flows are receding.



LOXTON RIVER VESSEL WASTE DISPOSAL STATION

The Loxton River Vessel Waste Disposal Station was closed on 14 November 2016 and will remain closed until the high flows recede. The remaining 12 waste disposal stations operated by DEWNR are available for use.

Due to the high flow conditions no alternative waste pumping service is available at Loxton. The nearest river vessel waste disposal stations are at Berri (38 km upstream) or Lock 3 (55 km downstream). For further information contact Hayden Smith (DEWNR) on 0457 820 553.

LOWER MURRAY LEVEE EMBANKMENTS

Between Mannum and Wellington there are approximately 118 kilometres of levee banks, of which 67 kilometres are managed and maintained by the South Australian Government.

All Government-managed levee banks have had a condition assessment undertaken (prior to the peak flow). A final survey of the levees occurred on Monday 5 December 2016. If landholders have specific concerns about the Government-managed levee banks they can contact Mr Said Khelwaty, Project Engineer on 0434 076 515 or said.khelwaty@sa.gov.au.

The 2010 digital elevation data of levees (Government and private) can still be accessed under the Levee Profile Mapping section on the Water Connect website at www.waterconnect.sa.gov.au/River-Murray

For any general advice or other questions relating to government or privately owned levee banks you can contact DEWNR Infrastructure Operations Manager, Mr Richard Brown on 0412 046 777 or richard.brown@sa.gov.au.

NAVIGATION ISSUES

While this is a great time to visit the river, all visitors are reminded to exercise caution when navigating through the locks and 'opened' weirs, and to be mindful of partially submerged infrastructure such as jetties and floating debris. The higher flow may present a hazard to watercraft with low-horsepower engines.

Sandbars in the vicinity of the Murray Mouth may cause navigation hazards. Boaters are advised to navigate with caution when operating in the area. Sandbars are also present along sections of the River Murray downstream of Locks 7 and 8 and in South Australia. All watercraft users should be aware of the risk of submerged navigation hazards, and should regularly check river depth.

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RIVER MURRAY WATER LEVELS

Below is a table of River Murray water levels at a number of locations from Lock 10 (near Wentworth) to Murray Bridge.

River Murray Water Levels on 21 December 2016

Location	River km	Normal Pool Level (m AHD)	Current Level (m AHD)	1974 Flood Level (m AHD)	1993 Flood Level (m AHD)	2011 High Water Level (m AHD)
Lock 10	825.0	30.80	30.90	33.81	33.32	32.28
Lock 9 Kulnine	764.8	27.40	27.56	30.03	29.44	28.80
Lock 8 Wangumma	725.7	24.60	24.27	27.60	27.19	26.79
Lock 7 Rufus River	696.6	22.10	23.05	25.70	25.24	24.92
Lock 6 Murtho	619.8	19.25	19.55	21.03	20.50	20.11
Renmark	567.4	-	17.09	18.54	18.04	17.38
Lock 5	562.4	16.30	16.69	18.07	17.50	17.05
Lyrup	537.8	-	15.50	16.85	16.26	15.68
Berri	525.9	-	14.99	15.81	15.74	15.16
Lock 4	516.2	13.20	14.56	15.65	15.08	14.75
Loxton	489.9	-	13.40	15.05	14.12	13.42
Cobdogla	446.9	-	11.57	13.44	12.38	11.52
Lock 3	431.4	9.80	10.95	13.16	12.02	10.93
Overland Corner	425.9	-	10.39	12.73	11.58	10.27
Waikerie	383.6	-	8.94	11.26	10.24	9.06
Lock 2	362.1	6.10	8.30	10.28	9.30	8.25
Cadell	332.6	-	7.00	9.17	8.08	6.82
Morgan	321.7	-	6.35	8.85	7.65	6.20
Lock 1 Blanchetown	274.2	3.20	4.42	6.81	5.38	4.42
Swan Reach	245.0	0.75	3.29	6.06	4.51	3.04
Mannum PS	149.8	0.75	1.37	3.15	1.90	1.05
Murray Bridge	115.3	0.75	1.08	2.06	1.26	1.01

Note that the above water levels may be affected by local wind conditions.

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FURTHER INFORMATION

Please tell us what you value about the Coorong and Lower Lakes, and what threats you think need to be managed. Your input will help us write the updated Ramsar Management Plan. Find out more at www.environment.sa.gov.au/coorongvalues

The WaterConnect website is South Australia's comprehensive water information portal and can be accessed at www.waterconnect.sa.gov.au

Up-to-date River Murray salinity, flow and water level information can be accessed at the Department of Environment, Water and Natural Resources, SA Water and Murray-Darling Basin Authority websites

- www.environment.sa.gov.au/managing-natural-resources/river-murray/water-allocation-and-trade/water-allocations-and-announcements
- www.waterconnect.sa.gov.au/Systems/RTWD/Pages/Default.aspx
- www.sawater.com.au/SAWater/Environment/WaterProofingAdelaide/TheRiverMurray/RMOU/Dailyflow.htm
- <http://livedata.mdba.gov.au/>

The latest news, information and announcements about the River Murray and Basin Plan are available at [River Murray Update](#).

The Department of Environment, Water and Natural Resources has published a series of inundation maps for the River Murray. They are available at www.waterconnect.sa.gov.au/Systems/RMIM/SitePages/Home.aspx

Information on the management of acid drainage water in the Lower River Murray can be accessed at www.epa.sa.gov.au/environmental_info/water_quality/programs/acid_sulfate_soils/lower_river_murray_reclaimed_irrigation_area_lmria

Details of river height and rainfall information in the River Murray within Victoria and New South Wales are available at the Bureau of Meteorology website www.bom.gov.au/vic/flood

Information provided by the Commonwealth Environmental Water Office can be accessed at www.environment.gov.au/ewater/southern/murray/lower-murray.html

Information on The Living Murray can be accessed at www.mdba.gov.au/managing-water/environmental-water/delivering-environmental-water/living-murray-program

Chowilla Floodplain Icon Site management www.environment.sa.gov.au/Chowilla-floodplain

Department of Environment, Water and Natural Resources www.environment.sa.gov.au/Home

Information provided by the Department of Planning, Transport and Infrastructure on boat licences, registering motor boats, owning and operating water craft, and boat and marine safety can be accessed at www.sa.gov.au/boatingmarine

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