RIVER MURRAY FLOW REPORT and WATER RESOURCES UPDATE

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Report #40/2016
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This supersedes the previous flow report issued by the Department of Environment, Water and Natural Resources (DEWNR) on 14 October 2016. The next flow report will be provided on Friday 28 October 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. They will receive a letter and updated water account with their carryover volume endorsed. It is expected that this advice will be received by entitlement holders in October 2016.

MANAGEMENT OF SOUTH AUSTRALIA'S DEFERRED WATER

The Murray-Darling Basin Authority confirmed that on 1 October 2016, South Australia had 141.7 GL of deferred water held in storage. The table below identifies the storage in which it is held and the purpose.

At 1 September 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	59.7	59.7
Total	0.0	0.0	141.7	141.7

*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 September 2016, the total River Murray System inflow was approximately 2 828 GL, which is above the September long-term average of 1 628 GL. Inflow to Menindee Lakes (from the Darling System) during September 2016 was approximately 167 GL, which is more than three quarters of the September long-term average of 198 GL.

The flow to South Australia during September 2016 was approximately 1 035 GL, which is around the September long-term average of approximately 1 001 GL. The flow comprised:

- approximately 135 GL of Entitlement Flow;
- approximately 9 GL of environmental water from the Commonwealth Environmental Water Holder (CEWH), The Living Murray (TLM) and other sources;
- approximately 887 GL of unregulated flow; and
- approximately 4 GL of trade into South Australia.

STORAGE VOLUMES

Murray-Darling Basin storage volumes at 19 October 2016 and 19 October 2015

Storage	Full Supply Volume (GL)	19-10-2016 (GL)	19-10-2015 (GL)	Long-term average (end of October)
Dartmouth	3 856	2 795 (73%)	2 431 (63%)	
Hume	3 003	2 961 (99%)	1 357 (45%)	
Lake Victoria	677	527 (78%)	543 (80%)	
Menindee Lakes	*1 731	536 (31%)	93 (5%)	
TOTAL	9 267	6 819 (74%)	4 424 (48%)	7 497 (81%)

*Menindee Lakes can be surcharged to 2 015 GL

MENINDEE LAKES

The Murray-Darling Basin Authority is entitled to direct releases from the Menindee Lakes to supplement water availability in the River Murray until the stored volume in Menindee Lakes decreases to 480 GL. When the volume held in Menindee Lakes decreases to 480 GL, the Murray-Darling Basin Authority is not entitled to direct releases to supplement the River Murray until the volume in storage exceeds 640 GL.

On 18 February 2014, the volume in the Menindee Lakes dropped to below 480 GL and has not increased to above 640 GL.

RAINFALL AND TEMPERATURE OUTLOOK

The latest Bureau of Meteorology weather outlook for October to December 2016 indicates average rainfall is likely across the Murray-Darling Basin with temperatures below average. The outlook is influenced by a negative Indian Ocean Dipole (IOD), warmer than normal sea surface temperatures to Australia's north and east, and a La Niña watch remains in place.

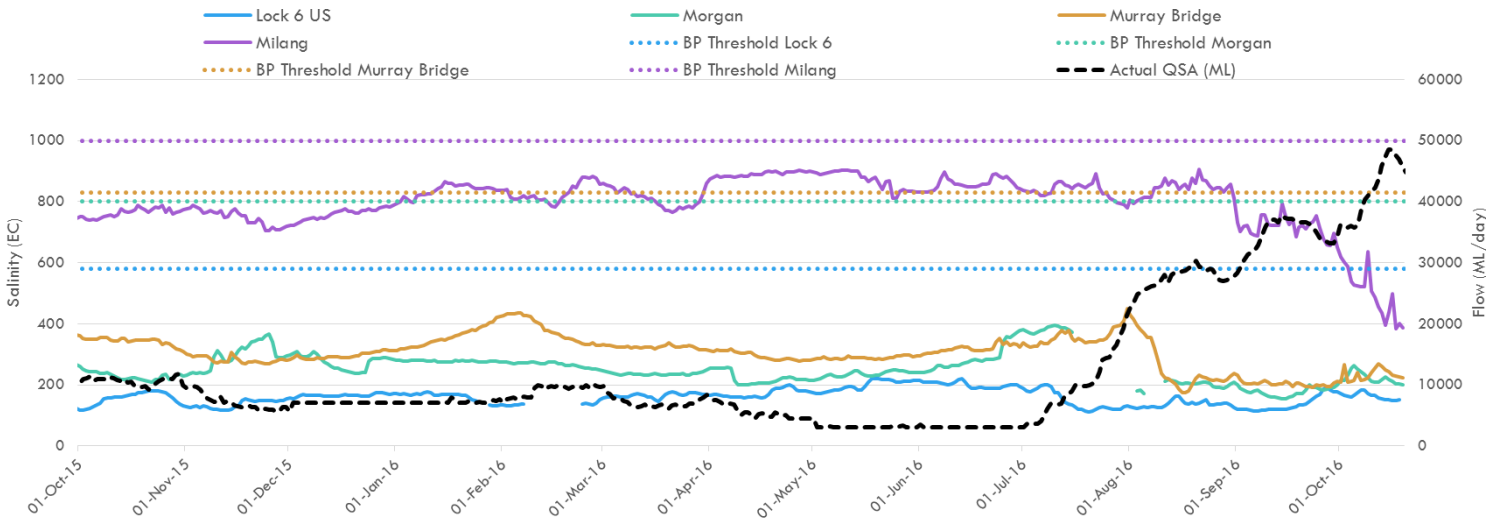
WATER QUALITY - Salinity

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 October 2015 to October 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 is due to a faulty EC sensor.
The missing Morgan salinity readings from 16-11 August 2016 is due to a faulty EC sensor

FLOW OUTLOOK

The flow at the South Australian border is approximately 48 GL/day and will increase to around 50 GL/day during the coming week. Due to recent rainfall events and flooding across Victoria and News South Wales the flow to South Australia is expected to increase to around 60 GL/day in late October and continue to increase into November and early December. Based on very preliminary estimates, the flow may peak between 70 to 80 GL/day in early December. The actual peak flow will be highly dependent on inflows and floodplain consumption upstream of South Australia.

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

The flow to South Australia comprises the normal October Entitlement Flow of 5.5 GL/day and unregulated flow.

At around 60 GL/day, the land beneath some shacks built on the floodplain will start to be inundated. For comparison, in 1956 the peak flow at the South Australian border was around 350 GL/day, in 1974 it was around 180 GL/day and in 2011 it was around 94 GL/day.

The flow over Lock 1 is approximately 41 GL/day and will increase to around 45 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.

ENVIRONMENTAL WATER

During October 2016, the Commonwealth Environmental Water Holder and the Murray-Darling Basin Authority's *The Living Murray* are expected to provide up to 18 GL of environmental water to South Australia.

This water is included in South Australia's Entitlement Flow. 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.

WATER ALLOCATIONS AND CARRYOVER

South Australian River Murray Water Access Entitlement Holders will receive a 100 per cent water allocation in 2016-17. Eligible water access entitlement holders (Class 3a, 3b, 4 and 7) also have access to private carryover. Letters and updated water accounts, with the carryover volume endorsed, have been mailed out to eligible water users. If you are an eligible water user and have not received your letter and updated water account, please call the DEWNR Berri Office on 8595 2053.

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. Dredges are operating in the Tauwitchere and Goolwa Channels. At 16 October 2016, approximately 1 640 456 cubic metres of sand had been removed. The dredging operations combined with recent substantial barrage releases have improved conditions at the Murray Mouth.

Mariners should be aware that barrage releases are likely to be highly variable i.e. 0 GL/day to approximately 50 GL/day and could cause a hazard for boating in the Coorong and the Murray Mouth. Mariners are advised that there are 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 and that Exclusion Zones established around the dredging operations remain in place to ensure public safety. For more information refer to the Notice to Mariners at http://dpti.sa.gov.au/news/?a=247918

There is also a partial park closure in place for the northern tip of the Coorong National Park. For more information refer to the following http://www.environment.sa.gov.au/parks/Safety/Park_closures/141219-coorong-national-park. Signage has been installed at appropriate locations advising of Exclusion Zones.

BARRAGE OPERATIONS AND WATER LEVELS IN THE LOWER LAKES

The water level in Lake Alexandrina is approximately 0.81 m AHD and Lake Albert approximately 0.88 m AHD. The difference in water levels is due to wind effects. The high water level is a result of poor weather conditions limiting times that the barrages can be opened to release water, and local high rainfall. Barrage operations will be managed, when conditions allow, to decrease the water level in the Lower Lakes. A water level of 0.8 m AHD is being targeted to create airspace to manage future inflows.

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 Tauwitchere, 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 18 October 2016 total barrage releases were approximately 338 GL.

During adverse weather conditions, SA Water will operate the barrages to minimise the risk of seawater entering Lake Alexandrina therefore minimising any negative salinity impacts from reverse flow events.

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 (upstream of SA)

For safety reasons, as the high flows upstream of the South Australian border continue to travel through the river system, several weirs along the River Murray will be temporarily opened (open river conditions) during October. This is a standard operating procedure during periods of high flow.

The weirs at Locks 7, 8, 11 (Mildura) and 15 (Euston) have already been opened. The weirs at Locks 9 and 10 (Wentworth) are expected to be opened in mid to late-October.

The weirs will be opened at a time when the upstream and downstream river levels are similar, resulting in minimal impacts to river users. Navigation markers at each weir will guide vessel operators to pass through the weir.

The weirs will be reinstated once the high flows cease.

WEIR POOL OPERATIONS

Lock 1

The Lock 1 weir pool remains approximately 0.1 m below the normal pool level (NPL) of 3.2 m AHD to enable engineering investigations to be undertaken at the weir.

Locks 2 and 5

On 15 August 2016, the Lock 2 and Lock 5 weir pools commenced being raised above their normal operating range as defined in the table below.

Weir	Normal Pool Level (NPL) m AHD	Normal Operating Range m AHD
Lock 6 - Murtho	19.25	19.17 - 19.50
Lock 5 - Renmark	16.30	16.22 - 16.43
Lock 2 – Waikerie	6.10	6.02 - 6.40

The Lock 2 weir pool was raised by 0.75 m above NPL to reach its target level of 6.85 m AHD and is currently being drawn down. The Lock 5 weir pool was raised by 0.45 m above NPL to reach its target level of 16.75 m AHD and is also currently being drawn down. The weir pool raisings used unregulated flow and Commonwealth environmental water.

Weir pool manipulations aim to reinstate some of the natural variability of water levels in the River Murray system, which has been lost due to river regulation. The manipulations will assist to improve lateral connectivity, health, resilience and biodiversity of the river channel, floodplain and wetlands. Weir pool manipulations are becoming a routine part of river operations.

CHOWILLA WATERING

Chowilla

Operations to further test the Chowilla Regulator and ancillary structures are proceeding. Testing has involved progressively placing stop logs between the concrete piers at the Chowilla Regulator to raise the water level behind the structure. The target water level at the Chowilla Regulator of 19.75 m AHD (3.45 m above NPL) was achieved in late September resulting in inundation of more than 7 000 hectares of floodplain. The water level is currently being drawn down. The operation was anticipated to continue until December 2016, however flows in the Murray are likely to exceed the level maintained by the regulator by late October.

Lock 6

As the water level was raised behind the Chowilla Regulator, the Lock 6 water level was also progressively raised. The Lock 6 water level is currently being drawn down.

MODERNISATION OF WAIKERIE RIVER VESSEL WASTE DISPOSAL STATION

Modernisation of the Waikerie River Vessel Waste Disposal Station commenced on 25 July 2016 and has now been completed. The facility will re-open in the near future following re-commissioning and testing. Alternative temporary arrangements for pumping waste from vessels will continue until the facility is re-opened. The temporary pump-out service is available 1 kilometre downstream of the Waikerie River Vessel Waste Disposal Station. Users will need to call Mr Mick Kemp on 0428 861 777 to arrange a suitable time between 8 am and 4 pm. Please note that at least 3 hours notice will be essential.

LOWER MURRAY LEVEEE EMBANKMENTS

There are 67 kilometres of levees managed by SA Government between Mannum and Wellington. These embankments have all been inspected to update the Department's asset condition records. A number of localised defects, such as settlement, erosion and minor seepage have been prioritised for attention and are being addressed by earthworks in the coming weeks.

NAVIGATION ISSUES

While this is a great time to visit the river and its environs, all visitors travelling along the River Murray are reminded to exercise caution at all times when navigating through the navigable passes at the lock and 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. Mariners 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.

Mariners should be aware that barrage releases are likely to be highly variable ie 0 GL/day to approximately 50 GL/day and could cause a hazard for boating in the Coorong and the Murray Mouth.

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 19 October 2016

Location	River km	Normal Pool Level	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	30.48	33.81	33.32	32.28
Lock 9 Kulnine	764.8	27.40	27.40	30.03	29.44	28.80
Lock 8 Wangumma	725.7	24.60	25.3	27.60	27.19	26.79
Lock 7 Rufus River	696.6	22.10	-	25.70	25.24	24.92
Lock 6 Murtho	619.8	19.25	19.6	21.03	20.50	20.11
Renmark	567.4	-	-	18.54	18.04	17.38
Lock 5	562.4	16.30	16.5	18.07	17.50	17.05
Lyrup	537.8	-	14.16	16.85	16.26	15.68
Berri	525.9	-	13.83	15.81	15.74	15.16
Lock 4	516.2	13.20	13.59	15.65	15.08	14.75
Loxton	489.9	-	12.05	15.05	14.12	13.42
Cobdogla	446.9	-	-	13.44	12.38	11.52
Lock 3	431.4	9.80	9.9	13.16	12.02	10.93
Overland Corner	425.9	-	8.393	12.73	11.58	10.27
Waikerie	383.6	-	7.36	11.26	10.24	9.06
Lock 2	362.1	6.10	6.8	10.28	9.30	8.25
Cadell	332.6	-	4.80	9.17	8.08	6.82
Morgan	321.7	-	4.397	8.85	7.65	6.20
Lock 1 Blanchetown	274.2	3.20	3.1	6.81	5.38	4.42
Swan Reach	245.0	0.75	1.64	6.06	4.51	3.09
Mannum PS	149.8	0.75	1.30	3.15	1.90	1.46
Murray Bridge	115.3	0.75	0.933	2.06	1.26	1.21

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

FURTHER INFORMATION

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 Transport, Energy 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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