RIVER MURRAY FLOW REPORT and WATER RESOURCES UPDATE

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Report #14/2016
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This supersedes the previous flow report issued by the Department of Environment, Water and Natural Resources (DEWNR) on 8 April 2016. The next flow report will be provided on Friday 22 April 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 RESOURCES UPDATE

During March 2016, the total River Murray System inflow was approximately 64 GL, which is less than one third the March long-term average of 221 GL. Inflow to Menindee Lakes (from the Darling System) during March 2016 was approximately 0 GL, which is well below the March long-term average of 187 GL.

The flow to South Australia during March 2016 was approximately 219 GL, which is below the March long-term average of approximately 286 GL. The flow comprised:

- approximately 176 GL of Entitlement Flow (186 GL of March Entitlement Flow less 10 GL of deferred Entitlement Flow);
- approximately 40 GL of environmental water from the Commonwealth Environmental Water Holder (CEWH), The Living Murray (TLM) and other sources; and
- approximately 3.2 GL of trade into South Australia.

STORAGE VOLUMES

Murray-Darling Basin storage volumes at 13 April 2016 and 13 April 2015

Storage	Full Supply Volume (GL)	13-04-2016 (GL)	13-04-2015 (GL)	Long-term average (end of April)
Dartmouth	3 856	1 675 (43%)	2 939 (76%)	
Hume	3 003	661 (22%)	609 (20%)	
Lake Victoria	677	247 (36%)	170 (25%)	
Menindee Lakes	1 731*	**51 (3%)	76 (4%)	
TOTAL	9 267	2 634 (28%)	3 794 (41%)	5 424 (59%)

*Menindee Lakes can be surcharged to 2 015 GL
**Menindee Lakes are under New South Wales control

MENINDEE LAKES

Under the Murray-Darling Basin Agreement, the Murray-Darling Basin Authority controls the Menindee Lakes until the stored water volume decreases to 480 GL. The New South Wales Government assumes control of the storage at 480 GL and maintains control until the volume in storage exceeds 640 GL. On 18 February 2014, the volume in the Menindee Lakes dropped to below 480 GL and control switched to the New South Wales Government.

Given that the Menindee Lakes remain under New South Wales control, there is less flexibility in the way water can be delivered to South Australia in 2016, unless the storage position improves significantly.

RAINFALL AND TEMPERATURE OUTLOOK

The latest Bureau of Meteorology weather outlook for April to June 2016 indicates above average rainfall is likely across the Murray-Darling Basin with temperatures above average. The outlook is influenced by a record warm Indian Ocean and weakening El Niño in the Pacific Ocean.

The Bureau of Meteorology has released it ENSO Outlook, which indicates the likelihood of an El Niño or La Niña event occurring in the upcoming season. The status has shifted from El Niño to La Nina watch. A La Niña watch means there is approximately 50% chance of a La Niña event in 2016.

For the latest forecast on El Niño please refer to the following website:

http://www.bom.gov.au/climate/enso/

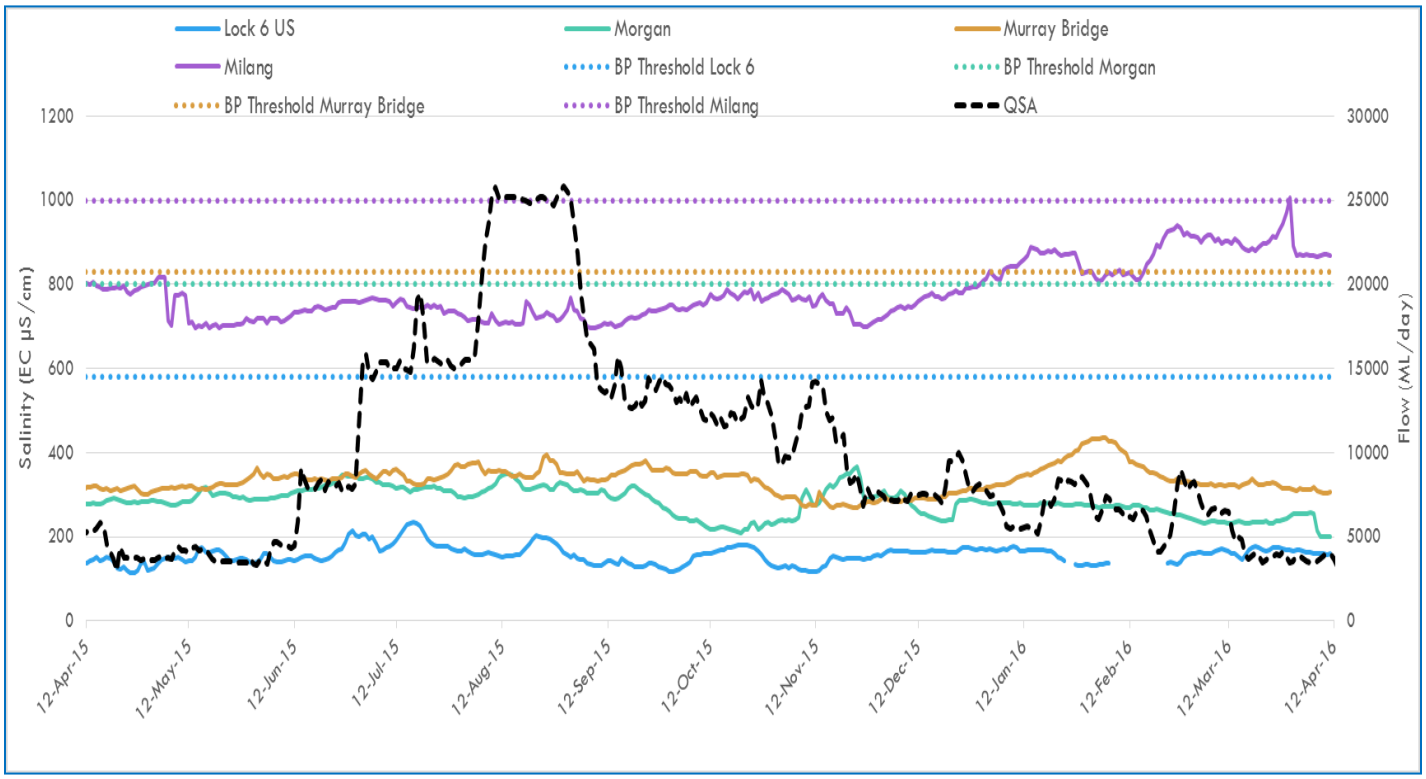
WATER QUALITY - Salinity

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 April 2015 to April 2016. The dashed-lines identify the Basin Plan (BP) thresholds for the corresponding colour coded location.

SA River Murray Daily Average Salinity



Note: Estimates have been used for missing Milang salinity readings from 10-17 March and 3-8 May 2015.
Missing Lock 6 salinity readings from 8-23 February 2016 is due to a faulty EC sensor.
The peak salinity at Milang in March 2016 is being investigated (likely to be a faulty EC sensor).

WATER QUALITY – Algal Blooms

It is not uncommon to experience algal blooms at this time of the year.

Due to low rainfall, low flows and warm weather conditions across the Murray-Daring Basin, potentially toxic blue-green algal blooms have developed extensively upstream of South Australia in the Lower Darling River, River Murray, Edward River, Wakool River and Murrumbidgee River.

The closest bloom to the South Australian border has been detected at Lock 9. There is no immediate threat to South Australia.

DEWNR and SA Water have been monitoring the occurrence of blue-green algal blooms in Victoria and NSW, and are taking action to mitigate the possible risk to South Australia. SA Water has implemented a risk mitigation strategy to minimise the risk of blooms extending to South Australia including diverting water through Lake Victoria to provide:

- additional detention time in the system;
- tumbling of the water through a number of regulators; and
- mixing with turbid Lake Victoria water.

Based on previous experience, it is expected that this will help suppress or prevent the establishment of an algal bloom. By increasing the volume of Lake Victoria water released into the main River Murray channel, the turbidity of the water downstream is likely to increase. This will assist in providing conditions that are not conducive to the development of algal blooms.

The Murray-Darling Basin Authority and the relevant South Australian Government agencies are regularly monitoring the situation.

FLOW OUTLOOK

The flow at the South Australian border is approximately 5 GL/day and will decrease to around 4.7 GL/day during the coming week. It comprises the normal April Entitlement Flow of 4.5 GL/day less deferred Entitlement Flow plus environmental water.

The flow over Lock 1 is approximately 3.7 GL/day and will decrease to around 3.2 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. They may change as new gauging information becomes available, or due to rainfall events or changed operations upstream. Flow forecasts are dependent on predictions made by the Bureau of Meteorology, Murray-Darling Basin Authority and water management agencies in upstream jurisdictions. The forecasts will be revised as new information becomes available.

ENVIRONMENTAL WATER

During April 2016, the Commonwealth Environmental Water Holder (CEWH) and the Murray-Darling Basin Authority's *The Living Murray* are expected to provide up to 53 GL of environmental water to South Australia. The environmental water will provide in-channel, Lower Lakes and Coorong environmental and water quality benefits.

DEWNR is continuing discussion regarding additional environmental water to be delivered during the remainder of 2015-16.

MANAGEMENT OF SOUTH AUSTRALIA'S DEFERRED WATER

The Murray-Darling Basin Authority confirmed that, on 1 April 2016, South Australia had 161.6 GL of deferred water in storage. Of this total, 101.8 GL is stored for critical human water needs and 59.8 GL for private carryover use in future dry years. Volumes stored are adjusted for net evaporation losses until delivered to South Australia.

DEWNR will continue to pursue opportunities to defer additional Entitlement Flow during 2015–16. Opportunities to defer and store water are considered on the basis of how Entitlement Flow is managed, plus operational flow objectives for water quality and weather conditions.

WATER ALLOCATIONS AND CARRYOVER

Water allocations for the next water year are based on the water resource conditions in the Murray-Darling Basin storages and the outlook for inflows. Currently, inflows to the Murray-Darling Basin storages are tracking under a very dry scenario. The very dry scenario will be used to inform opening water allocations in 2016-17.

By 30 April, a minimum opening water allocation announcement will be made by the Minister for Water and the River Murray, Hon Ian Hunter MLC. By 1 July 2016, the actual opening water allocation will be announced.

Carryover will be granted in 2016-17. Carryover can only be granted to eligible River Murray water access entitlement holders. Eligibility criteria includes:

- underuse in 2015-16;
- final meter readings submitted to DEWNR by 31 July 2016.

Unused water allocations traded into South Australia in 2015-16 will be included in determining 2015-16 underuse and eligibility for carryover in 2016-17.

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 11 April 2016, approximately 1 177 078 cubic metres of sand had been removed. Routine monitoring confirms an improvement in the condition of both channels as a result of dredging, but dredging is expected to remain in place until substantial high flows return.

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.

Any boats navigating through the Murray Mouth area should proceed with caution due to sandbars being present at shallow depth. Boats equipped with 'echo sounders' are strongly encouraged to regularly check depths and avoid travelling at low tide.

BARRAGE OPERATIONS AND WATER LEVELS IN THE LOWER LAKES

The water level in Lake Alexandrina is approximately 0.57 m AHD and in Lake Albert is approximately 0.54 m AHD. During the week ending 12 April 2016, total barrage releases were approximately 3.5 GL. Barrage releases at Tauwitchere are providing freshwater flow to the Coorong estuary to improve salinity levels and maintain fish habitat. All fishways are operational to provide a fish passage between Lake Alexandrina and the Coorong.

SA Water will continue to operate the barrages to minimise 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 Commonwealth Environmental Water Office.

WEIR POOL OPERATIONS

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

NAVIGATION ISSUES

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.

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 13 April 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	30.90	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	24.33	27.60	27.19	26.79
Lock 7 Rufus River	696.6	22.10	21.76	25.70	25.24	24.92
Lock 6 Murtho	619.8	19.25	19.25	21.03	20.50	20.11
Renmark	567.4	-	-	18.54	18.04	17.38
Lock 5	562.4	16.30	16.31	18.07	17.50	17.05
Lyrup	537.8	-	13.23	16.85	16.26	15.68
Berri	525.9	-	13.23	15.81	15.74	15.16
Lock 4	516.2	13.20	13.21	15.65	15.08	14.75
Loxton	489.9	-	10.00	15.05	14.12	13.42
Cobdogla	446.9	-	9.84	13.44	12.38	11.52
Lock 3	431.4	9.80	9.82	13.16	12.02	10.93
Overland Corner	425.9	-	6.22	12.73	11.58	10.27
Waikerie	383.6	-	6.28	11.26	10.24	9.06
Lock 2	362.1	6.10	6.13	10.28	9.30	8.25
Cadell	332.6	-	3.21	9.17	8.08	6.82
Morgan	321.7	-	3.18	8.85	7.65	6.20
Lock 1 Blanchetown	274.2	3.20	3.11	6.81	5.38	4.42
Swan Reach	245.0	0.75	0.60	6.06	4.51	3.09
Mannum PS	149.8	0.75	0.59	3.15	1.90	1.46
Murray Bridge	115.3	0.75	0.53	2.06	1.26	1.21

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

Government of South Australia
Department of Environment, Water and Natural Resources

FURTHER INFORMATION

The WaterConnect website is South Australia's comprehensive water information portal and can be accessed at:

http://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:

https://www.waterconnect.sa.gov.au/Systems/RTWD/Pages/Default.aspx

http://www.sawater.com.au/SAWater/Environment/WaterProofingAdelaide/TheRiverMurray/RMOU/Dailyflow.htm

http://livedata.mdba.gov.au/

The Department of Environment, Water and Natural Resources has published a series of inundation maps for the River Murray. They are available at:

https://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:

http://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: http://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:

http://www.mdba.gov.au/managing-water/environmental-water/delivering-environmental-water/living-murray-program

Department of Environment, Water and Natural Resources

http://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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