RIVER MURRAY FLOW REPORT and WATER RESOURCES UPDATE

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Report #41/2015
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This supersedes the previous flow report issued by the Department of Environment, Water and Natural Resources (DEWNR) on 9 October 2015. The next flow report will be provided on Friday, 23 October 2015.

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 1000 ML.

WATER RESOURCES UPDATE

During September 2015, the total River Murray System inflow was approximately 490 GL, which is less than a third of the September long-term average of 1 620 GL. Inflow to Menindee Lakes (from the Darling System) during September 2015 was approximately 0 GL, which is well below the September long-term average of 190 GL.

The flow to South Australia during September 2015 was approximately 260 GL, which is around a quarter of the September long-term average of approximately 1 000 GL. The flow comprised:

- approximately 124 GL of Entitlement Flow (135 GL of September Entitlement Flow less 11.1 GL of deferred Entitlement Flow); and
- approximately 136 GL of environmental water from the Commonwealth Environmental Water Holder (CEWH) and the Murray-Darling Basin Authority's *The Living Murray* (TLM).

STORAGE VOLUMES

Murray-Darling Basin storage volumes at 14 October 2015 and 14 October 2014

Storage	Full Supply Volume (GL)	14/10/2015 (GL)	14/10/2014 (GL)	Long-term average (end of Oct)
Dartmouth	**3 856**	**2 471 (64%)**	**3 600 (93%)**	
Hume	**3 003**	**1 382 (46%)**	**2 321 (77%)**	
Lake Victoria	**677**	**564 (83%)**	**633 (94%)**	
Menindee Lakes	**1 731***	****96 (6%)**	**301 (17%)**	
TOTAL	**9 267**	**4 513 (49%)**	**6 855 (74%)**	**7 498 (81%)**

*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 2015, unless the storage position improves significantly.

RAINFALL AND TEMPERATURE OUTLOOK

The latest Bureau of Meteorology weather outlook for October to December 2015 indicates a greater than 80 per cent chance of drier than average rainfall conditions with above average temperatures across the Murray-Darling Basin. The outlook is influenced by the record warm sea surface temperatures in the Indian Ocean and mature El Niño conditions in the Pacific Ocean.

El Niño is often associated with below-average winter and spring rainfall over eastern Australia, and above-average daytime temperatures over the southern half of the country. El Niño events have been shown to adversely affect water resources availability, particularly from spring. Substantial rainfall will be required to provide reasonable inflows to the interstate storages.

For the latest forecast on El Niño please refer to the following website:
http://www.bom.gov.au/climate/enso/

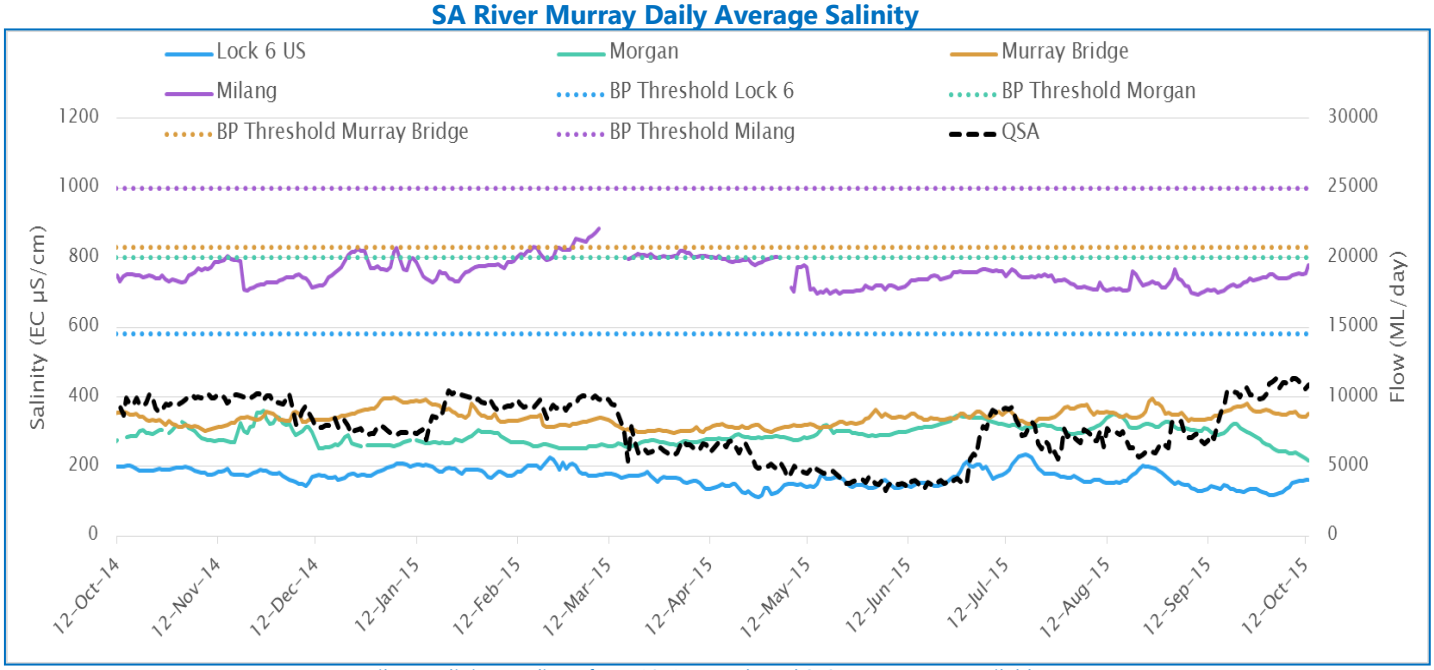
WATER QUALITY - Salinity

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 October 2014 to October 2015. The dashed-lines identify the Basin Plan (BP) thresholds for the corresponding colour coded location. It confirms that salinity has not exceeded the threshold at any of these four locations during this period.

SA River Murray Daily Average Salinity



Note: Milang salinity readings from 10-17 March and 3-8 May are not available.

FLOW OUTLOOK

The flow at the South Australian border is approximately 9.7 GL/day and will increase to around 10 GL/day during the coming week. It comprises the normal October Entitlement Flow of 5.5 GL/day plus environmental water less deferred Entitlement Flow.

The flow over Lock 1 is approximately 7.2 GL/day and will remain around this rate 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 October 2015, the Commonwealth Environmental Water Holder (CEWH) and the Murray-Darling Basin Authority's *The Living Murray* are providing environmental water to South Australia. The environmental water will provide in-channel, Chowilla anabranch, Lower Lakes, and Coorong environmental and water quantity and quality benefits.

South Australia and the CEWH have agreed on an environmental watering schedule to deliver environmental water to the Lower Lakes, Coorong and Murray Mouth in 2015-16. The bulk of the environmental water will be delivered before January 2016.

MANAGEMENT OF SOUTH AUSTRALIA'S DEFERRED WATER

The Murray-Darling Basin Authority confirmed that on 1 October 2015, South Australia had 84.7 GL of deferred water in storage. Of this total, 50 GL is stored for critical human water needs and 34.7 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, operational flow objectives for water quality and weather conditions.

TRADE RESTRICTIONS

On 6 August 2015, the New South Wales Department of Primary Industries announced the temporary closure of trade out of the Murrumbidgee Valley. The temporary closure is required as the inter-valley transfer account has reached its upper limit. When the inter-valley transfer account reduces comfortably below the limit, trade will be re-opened. Trade into the valley remains unaffected.

MURRAY MOUTH

Dredging operations at the Murray Mouth commenced on 9 January 2015 to maintain connectivity (exchange of water) between the river and the Southern Ocean. Dredges are currently operating in the Tauwitchere and Goolwa Channels but experiencing some problems with seaweed blockages. At 11 October 2015, a total of approximately 839 500 cubic metres of sand had been removed. Routine monitoring confirms an improvement in the condition of both channels as a result of dredging.

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://webapps.transportsa.com.au/news/templates/dtei_template2010.aspx?articleid=2865&zoneid=15

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 and flyers distributed 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 0.81 m AHD and Lake Albert is approximately 0.76 AHD. The difference in water levels is due to wind effects. During the week ending 13 October 2015, total barrage releases were approximately 18.5 GL. Barrage releases are being prioritised through Tauwitchere, with some releases through Goolwa, adjacent to the fishways. SA Water will continue to operate the barrages to minimise any negative salinity impacts from reverse flow events. All fishways are operating.

The Lower Lakes water level target is between 0.80 m AHD and 0.85 m AHD by December 2015 to prepare for the hot and dry summer months.

To see live salinity and water level data at various locations on the River Murray and in the Lower Lakes, please refer to the following website: http://www.waterconnect.sa.gov.au/Systems/RTWD/SitePages/Home.aspx

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

WEIR POOL OPERATIONS

The Lock 5 weir pool has been raised slowly during the past month and is now at 16.75 m AHD, which is the maximum water level for this weir pool raising event. This water level will be maintained until approximately 4 November 2015, when the water level will start to be lowered in small daily increments to the top of the normal operating range (16.43 m AHD). The water level will be held at 16.43 m AHD for a short period before being lowered to the normal pool level (16.30 m AHD) in conjunction with the Lock 6 and Chowilla Creek operations in early to mid-December 2015.

The Lock 2 weir pool has been raised slowly during the past month and is now at 6.60 m AHD, which is the maximum water level for this weir pool raising event. This water level will be maintained until approximately 4 November 2015, when the water level will start to be lowered in small daily increments to the normal pool level (6.10 m AHD).

The CEWH is providing approximately 6 GL towards weir pool raising events.

The aim of weir pool raising events is to mimic a degree of the historic natural water level variability, which has been largely lost through river regulation. The objective is to promote a range of ecological benefits. For further information please refer to the following website: www.naturalresources.sa.gov.au/weirpools

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

CHOWILLA OPERATIONS

The Chowilla Creek environmental regulator is being operated from 6 October to mid-December 2015 to achieve a low-level, in-channel water level rise. The water levels behind the Chowilla regulator are being raised gradually by up to 1.5 metres (up to 17.8 m AHD). This will increase the water levels within channels in the anabranch, connecting some low level wetland areas. Flows will remain in-channel throughout the event. The in-channel rise aims to provide important outcomes including the freshening of soils adjacent to the

watercourses, supporting the growth of existing seedlings and saplings and other riparian vegetation. Lock 6 will be operated within the normal operating range throughout the event.

Boating access past the Chowilla regulator will not be possible during the operation. The creeks and waterways above and below the regulator **will be open** to boating.

The event will be undertaken in conjunction with implementing pulse flows by operating the upgraded Pipeclay and Slaney Creeks weirs to test the new fishways. Pumping water to three wetlands that were not watered during 2014 will also be undertaken.

The Murray-Darling Basin Authority's *The Living Murray* is providing environmental water to support the Chowilla operation and environmental watering.

NAVIGATION ISSUES

Due to elevated water levels above Locks 2 and 5, vessels should navigate with caution when in the vicinity of, or travelling under bridges, and when navigating near the river banks as elevated water levels may increase the width of shallows and submerge hazards near the banks in some places.

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 14 October 2015

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	27.33	30.03	29.44	28.80
Lock 8 Wangumma	725.7	24.60	25.30	27.60	27.19	26.79
Lock 7 Rufus River	696.6	22.10	22.55	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	16.74	18.07	17.50	17.05
Lyrup	537.8	-	13.28	16.85	16.26	15.68
Berri	525.9	-	13.24	15.81	15.74	15.16
Lock 4	516.2	13.20	13.23	15.65	15.08	14.75
Loxton	489.9	-	10.21	15.05	14.12	13.42
Cobdogla	446.9	-	-	13.44	12.38	11.52
Lock 3	431.4	9.80	9.80	13.16	12.02	10.93
Overland Corner	425.9	-	6.77	12.73	11.58	10.27
Waikerie	383.6	-	6.75	11.26	10.24	9.06
Lock 2	362.1	6.10	6.60	10.28	9.30	8.25
Cadell	332.6	-	3.29	9.17	8.08	6.82
Morgan	321.7	-	3.69	8.85	7.65	6.20
Lock 1 Blanchetown	274.2	3.20	3.12	6.81	5.38	4.42
Swan Reach	245.0	0.75	0.89	6.06	4.51	3.09
Mannum PS	149.8	0.75	0.83	3.15	1.90	1.46
Murray Bridge	115.3	0.75	0.77	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: http://www.waterconnect.sa.gov.au

Up-to-date River Murray 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:
http://www.waterconnect.sa.gov.au/Systems/RTWD/SitePages/Home.aspx
http://www.sawater.com.au/SAWater/Environment/WaterProofingAdelaide/TheRiverMurray/RMOU/Dailyflow.htm
http://www.mdba.gov.au/river-data/live-river-data

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

Information on the management of acid drainage water in the Lower River Murray can be accessed online at:
http://www.epa.sa.gov.au/environmental_info/water_quality/acid_sulfate_soils_ass/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/about-basin/environmental-sites

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

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