

River Murray Flow Report and Water Resources Update



Report #36/2021

Issued 10:00 am 17 September 2021

This supersedes the previous flow report issued by the Department for Environment and Water (DEW) on 10 September 2021. The next flow report will be provided on Friday 24 September 2021.

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 August 2021, the total River Murray System inflow was approximately 1 362 GL, which is below the August long-term average of 1 592 GL. During August 2021, the total Menindee Lakes inflow was approximately 398 GL, which is above the August long-term average of 182 GL.

The flow to South Australia during August 2021 was approximately 602 GL, which is about 70 % of the August long-term average of 860 GL. The flow comprised of Entitlement Flow (including environmental water on SA licence), environmental water, trades and unregulated flow.

MANAGEMENT OF SOUTH AUSTRALIA'S DEFERRED WATER

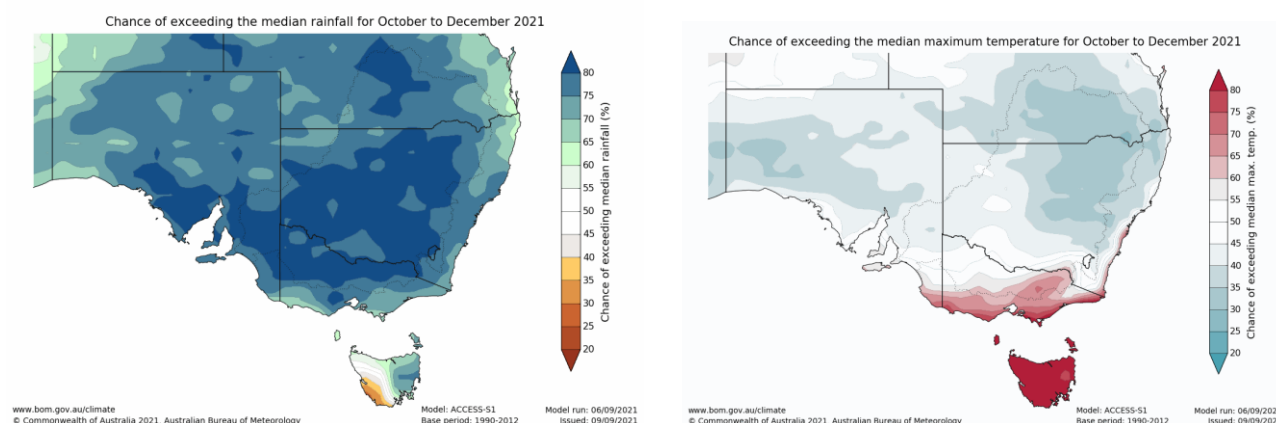
The Murray-Darling Basin Authority confirmed that on 1 September 2021 South Australia had 359.3 GL of deferred water held in storage in the Murray-Darling Basin. During August approximately 27 GL of stored water spilt from the storage right due to Hume Dam and Lake Victoria reaching capacity. Under Schedule G of the Agreement when a storage spills then the SA storage right is the first water to spill from the storage. The following table identifies the storage in which it is held and its purpose. Volumes stored are adjusted for net evaporation losses and spills until delivered to South Australia.

At 1 September 2021				
Purpose	Lake Victoria (GL)	Hume (GL)	Dartmouth (GL)	Total (GL)
*CHWN	0	22.2	236.3	258.5
Private Carryover	0	0	100.8	100.8
Total	0	22.2	337.1	359.3

*Critical Human Water Needs (CHWN)

RAINFALL AND TEMPERATURE OUTLOOK

The latest Bureau of Meteorology weather outlook forecasts that rainfall from October to December is likely to be above median throughout the Murray-Darling Basin. The likelihood of exceeding the median rainfall is forecast to be higher in October and lower in November. Temperatures are more likely to be average to below average across the majority of the Basin with some areas in the south east of Victoria having a greater chance of exceeding the median maximum temperature for the next three months.



The Bureau has noted that the negative Indian Ocean Dipole (IOD) has continued and is likely to continue through spring, returning to neutral in December 2021. A negative IOD increases the chance of above average winter-spring rainfall for much of southern and eastern Australia.

Above average sea surface temperatures to the north of Australia and in the eastern Indian Ocean are also providing more conducive conditions for rainfall across parts of Australia.

The El Niño-Southern Oscillation (ENSO) is currently neutral. Forecast models are indicating a cooling of the tropical central Pacific but remaining ENSO neutral over the coming months. Two of the international models are forecasting that La Nina thresholds will be met in spring or early summer.

The latest Bureau of Meteorology outlook information can be accessed [here](#).

STORAGE VOLUMES

Table 1: Murray-Darling Basin Storage volumes

Storage	Full Supply Volume (GL)	15/09/2021 (GL)	15/09/2020 (GL)	Long-term average (end of Sept) (GL)
Dartmouth	3 856	2 972 (77%)	2 152 (56%)	
Hume	3 007	2 909 (97%)	1 947 (65%)	
Lake Victoria	677	654 (97%)	662 (98%)	
Menindee Lakes	*1 731	1 761 (102%)	463 (27%)	
TOTAL	9 271	8 296 (89%)	5 224 (56%)	7 457 (80%)

*Menindee Lakes can be surcharged to 2 015 GL

WATER QUALITY - Salinity

A number of targets are identified under the Murray-Darling Basin Plan, which all Basin jurisdictions must have regard to in managing River Murray flows. The targets for real-time salinity are identified below. Salinity should not exceed these values for 95 % 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 September 2020 to September 2021. The dashed-lines identify the Basin Plan (BP) thresholds for the corresponding colour coded location.

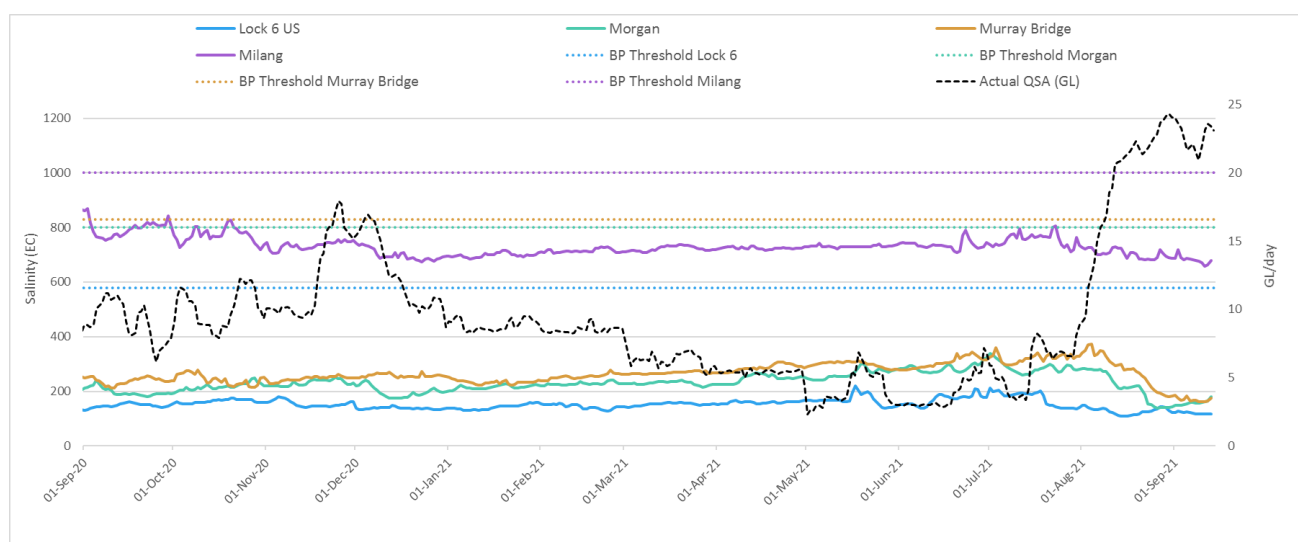


Figure 1: SA River Murray daily average salinity

FLOW OUTLOOK



The flow at the South Australian border is approximately 20 GL/day and will increase to around 22 GL/day over the coming week. It comprises:

- full September Entitlement Flow (4.5 GL/day);
- plus water for the environment (see below *Environmental News*);
- interstate trade adjustments; and
- Unregulated flow.

The flow over Lock 1 is approximately 20 GL/day. Estimates for the flow over Lock 1 the following Friday are yet to be determined.

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.

NEW PENALTIES FOR UNAUTHORISED OR UNLAWFUL WATER USE

All South Australian River Murray water users are reminded that they must remain within the available allocation on their water account at all times.

New penalty rates have been declared for taking water in excess of available allocation (unauthorised use) or without authorisation (unlawful use). These penalty rates will apply to any unauthorised or unlawful water use in the current quarter, being Quarter 1 of the 2021-22 water use year (between 1 July 2021 and 30 September 2021).

Accounting period	Up to and including 500,000 kilolitres overuse	More than 500,000 kilolitres overuse	Unlawful taking or use of water
1 July 2021 to 30 September 2021	\$1.125/kilolitre	\$1.500/kilolitre	\$1.500/kilolitre

For further information, please visit the following website www.environment.sa.gov.au/topics/water/water-markets-and-trade/fees-and-charges

ENVIRONMENTAL NEWS

Recent rainfall in Victoria and NSW has generated unregulated flow to South Australia. South Australia is also receiving water for the environment from South Australia's environmental water allocation and return flows from upstream watering actions.

The Commonwealth Environmental Water Office is also contributing additional water for the environment through the 2021 Murray Wetland Flow. More information on this event can be found [here](#).

The current flows from the River Murray and upstream tributaries, through to the Coorong, will provide a range of benefits for the environment in SA, including:

- providing for barrage releases to the Coorong to support a productive, food-rich environment for fish and birds;
- providing habitat for birds, frogs and threatened small-bodied native fish species in the Lower Lakes;
- maintaining good connections from the Coorong to the upstream areas of the River Murray, and its tributaries, to enable fish movement and migration including for lamprey which are currently migrating into the river from the Southern Ocean for spawning;
- maintaining healthy water quality, salinity and water levels in the River Murray Channel and the Lower Lakes and Coorong, including through targeted releases at the barrages when weather conditions are best suited to push water down the Coorong;
- removing excess salt from the River Murray;
- undertaking floodplain operations at Chowilla, Pike and Katarapko as well as raising the water levels in weir pools 2, 4, 5 and 6 (see more details below in Environmental Water Operations); and
- Delivering a range of outcomes to wetlands in the Riverland via arrangements with Renmark Irrigation Trust and the Murraylands and Riverland Landscape Board.



Figure 2: A nationally vulnerable Southern Bell Frog spotted on the Pike Floodplain (Samantha Walters, DEW)

Larry the Lamprey is back!

It's already been a year since Larry the Lamprey made his heroic journey from the Southern Ocean up the River Murray as far as Lock 11 in 2020. Larry's next generation are now migrating up the River Murray and scientists have been in the field monitoring their movements. Commencing in early August 2021 regular monitoring of barrage fishways by SARDI Aquatic Scientists has taken place to assess lamprey migration. As at 15 September 2021, 22 pouched lamprey have been captured from fishways at Goolwa and Tauwitchere barrages. Scientists have fitted these fish with monitoring tags so their journey can be tracked upstream, to help solve the mystery of where they spawn. You can follow Larry's 2021 travels here:

<https://www.environment.sa.gov.au/topics/river-murray/improving-river-health/environmental-water/where-is-larry-the-lamprey> .



Figure 3: SARDI Aquatic Scientists and SA Water pulling a fishtrap from a barrage fishway to monitor lamprey as they migrate (Kirsty Wedge, DEW)

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. At 12 September 2021, a total of approximately 7 544 054 cubic metres of sand had been removed by dredging operations.

Both dredges are currently operating between the Goolwa and Tauwitchere channels 24 hours a day, seven days a week.

Barrage releases combined with dredging have helped to maintain flow connectivity of the River Murray Channel to the Murray Mouth and have assisted in exporting salt from the river system.

There are a number of shallow zones in and adjacent to the Murray Mouth. Mariners should use caution when traversing the mouth area, follow all directions, reduce speed and avoid travelling at low tide. Mariners equipped with echo sounders should check depths regularly. Navigation through the Murray Mouth is only permitted during daylight hours. Exclusion Zones established around the dredging operations are in place to ensure public safety. Refer to Notice to Mariners No 42 of 2016 [Notice 42](#).

There is a partial park closure in place for the northern tip of the Coorong National Park. For more information visit [Coorong partial park closure notice](#).

BARRAGE OPERATIONS AND WATER LEVELS IN THE LOWER LAKES

The water level in Lake Alexandrina is approximately 0.73 m AHD and Lake Albert is approximately 0.72 m AHD. The difference is due to wind effects.

As of Tuesday 14 September 2021, the weekly releases were approximately 89 GL. A lake level cycling event is currently underway (see *Water levels in the Lower Lakes are going to be lowered* below for more details). Gate openings at the barrages during the week can be seen in Table 1.

Table 2: Number of barrage gates open each day for the week ending Tuesday 14 September 2021

Barrage (total number of gates)	8 Sept 2021	9 Sept 2021	10 Sept 2021	11 Sept 2021	12 Sept 2021	13 Sept 2021	14 Sept 2021	Objective of releases
Goolwa (120)	5	5	5→0	0→1→0	0	0→1→3	3	Maintain connectivity between the River Murray channel through to the Murray Mouth to support fish migration, provide some scouring of the Goolwa Channel and Murray Mouth.
Mundoo (25)	5*	5*	5*→0	0→4*→0	0	0→3*	3*	Provide some localised freshening conditions in the Mundoo channel and support fish passage.
Boundary Creek (5)	1	1	1	1	1	1	1	Provide attractant flow adjacent the fish way to support fish passage.
Ewe Island (110)	12*	12*	12*→0	0	0	0→1*	1*	Releases will help push fresher water down the Coorong to assist lowering salinity levels and provide habitat diversity.
Tauwichee (319)	30	30	30→21*	21*→11	11→21*	21*	21*	
Fishways	Fishways at all barrages and at Hunters Creek (11 in total) were open during the entire week							Provide for fish passage between the Coorong and Lower Lakes.

*Automated gate utilised to maximise delivery to Coorong and avoid reverse flows.

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 the South Australian Government, Murray-Darling Basin Authority and Commonwealth Environmental Water Office.

Water levels in the Lower Lakes are being lowered

As Lake Albert is a terminal wetland, the salinity of the lake can increase over time due to climate conditions and infrequent River Murray high flows. Prior to the 1980's, typical Lake Albert salinity was around 300 - 600 EC. The average daily salinity in Lake Albert at the present time is approximately 1 500 EC (potentially increasing up to 2 000 EC during summer).

One of the ways to lower salinity in the Lake is via lake level cycling. This action involves lowering the water level in Lakes Alexandrina and Albert (by releasing water from the barrages) to draw out salty water from Lake Albert, and then refilling the lakes with fresher water as it flows into the Lakes.

As South Australia is currently receiving unregulated flow it provides an opportunity to lower the Lakes' water levels and then refill them before summer, when usage and evaporation are high.

On Tuesday 24 August 2021 barrage releases were increased in order to lower the water level in Lakes Alexandrina and Albert. Water levels were reduced by 15 cm over 10 days. As at 15 September 2021 the water level in the lakes has

recovered to 0.73 and 0.72 m AHD respectively. From this point unregulated flow from upstream will be used to refill the Lower Lakes to approximately 0.75 – 0.85 m AHD over the next week.

RIVER VESSEL WASTE DISPOSAL STATIONS

Lock 3

The Lock 3 River Vessel Waste Disposal Station is currently out of commission due to an infrastructure failure. Investigations are underway to replace the station. In the interim river vessel users can contact Riverland Tank and Drain directly on 0412 839 392 for emptying of black and grey water in the Lock 3 area. Alternatively they can utilise the nearest alternative waste facility located at Waikerie. Normal boat waste (domestic or galley waste) can still be deposited at the Lock 3 facility at the present time.

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 Mariners should be aware of the risk of submerged navigation hazards and should regularly check river depth.

ENVIRONMENTAL WATER OPERATIONS

Chowilla Floodplain and Weir and Lock 6

A low to mid-level operation of the Chowilla environmental regulator has commenced, which will potentially inundate 2 000 – 5 000 hectares of the Chowilla floodplain upstream of the regulator than would otherwise be achieved by river flows. The operation plans to raise water levels in Chowilla Creek and through the Anabranche by between approximately 18.9 and 19.6 m AHD though the higher level is dependent on having flows in the River Murray of over 30 000 ML/day.

The water level in Weir and Lock 6 is also raised in conjunction with the Chowilla Regulator. This will see the water level raised up to a height of 19.67 m AHD depending on flow conditions at the time.

Pike Floodplain and Weir and Lock 5

Operations on the Pike Floodplain commenced 26 July 2021. The operation will raise water levels on the Pike Floodplain between 15 m AHD to 15.4 m AHD.

The water level in Weir and Lock 5 is also raised in conjunction with the Pike Regulator. This will increase the water level to a height of 16.8 m AHD (+0.5 m AHD) depending on flow conditions.

Should the flow to South Australia increase significantly the Pike Regulator may be operated to raise the water level further to between 15.4 m AHD to 15.8 m AHD. The exact height will depend on the flow and conditions within the river and the Pike anabranch.



Figure 4: Black swans and their cygnets on the Pike floodplain (Samantha Walters, DEW)

Katarapko Floodplain and Weir and Lock 4

Operations on the Katarapko Floodplain also commenced 26 July 2021. The operation plans to raise the water levels on the Katarapko Floodplain initially up to 13 m AHD to 13.2 m AHD, depending on the actual flow conditions.

The water level in Weir and Lock 4 is also raised in conjunction with water levels on the Katarapko Floodplain. This will increase the water level to a maximum height of 13.5 m AHD (+ 0.3 m AHD).

Weir and Lock 2

The water level in Weir and Lock 2 is now at the maximum height of the event (6.65 m AHD). The water level will be held around this level until mid-October after which it will be lowered back to normal pool level at a rate of 3 cm / day.

National Park access

There are some short term access restrictions and closures of some roads, trails and campsites due to the environmental watering at Katarapko and Chowilla floodplains. On-site signage provides guidance about safe access. More information can be found at <https://www.parks.sa.gov.au/> or by contacting the Berri Regional Office on 8595 2111

RIVER MURRAY WATER LEVELS

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

River Murray Water Levels

Location	River km	Normal Pool Level (m AHD)	Current Level 15/09/2021 (m AHD)	2016 High Water Level (m AHD)
Lock 10	825.0	30.80	30.80	32.72
Lock 9 Kulnine	764.8	27.40	27.53	28.85
Lock 8 Wangumma	725.7	24.60	25.44	26.85
Lock 7 Rufus River	696.6	22.10	22.63	24.97
Lock 6 Murtho	619.8	19.25	19.67	20.19
Renmark	567.4	-	16.82	17.44
Lock 5	562.4	16.30	16.79	17.05
Lyrup	537.8	-	13.67	15.80
Berri	525.9	-	13.56	15.21
Lock 4	516.2	13.20	13.51	14.73
Loxton	489.9	-	10.68	13.54
Cobdogla	446.9	-	-	11.59
Lock 3	431.4	9.80	9.82	10.98
Overland Corner	425.9	-	7.20	10.41
Waikerie	383.6	-	6.83	9.20
Lock 2	362.1	6.10	6.63	8.32
Cadell	332.6	-	3.72	7.01
Morgan	321.7	-	3.48	6.38
Lock 1 Blanchetown	274.2	3.20	3.22	4.46
Swan Reach	245.0	0.75	0.90	3.11
Mannum PS	149.8	0.75	0.76	1.33
Murray Bridge	115.3	0.75	0.69	1.04

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

FURTHER INFORMATION

The Water Data SA website is South Australia's comprehensive water information portal. For real-time data (like salinity, water levels) go to the following page: [Water Data SA](#).

Up-to-date River Murray salinity, flow and water level information can also be accessed at the SA Water and Murray-Darling Basin Authority websites:

- [Water allocation and carryover announcements](#)
- [River Murray real-time water data](#)
- [SA Water River Murray info - levels, flows etc.](#)
- [Murray-Darling Basin real-time water data](#)

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

The Department for Environment and Water has published a series of inundation maps for the River Murray. They are available at [River Murray Inundation Maps](#).

Information on the management of acid drainage water in the Lower River Murray can be accessed at: [Managing Acid Sulfate Soils Research Project](#)

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:

- [Victoria rainfall and river conditions](#)
- [NSW rainfall and river conditions](#)

Information provided by the Commonwealth Environmental Water Office can be accessed at [CEWH Environmental Watering](#).

Information on The Living Murray can be accessed at [MDBA TLM](#).

Chowilla Floodplain Icon Site management [Chowilla-floodplain](#).

[Katarapko Floodplain](#) site management

[Pike Floodplain](#) site management

Department for Environment and Water [Home page](#).

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 [Boating and marine](#).

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