RIVER MURRAY WEEKLY REPORT

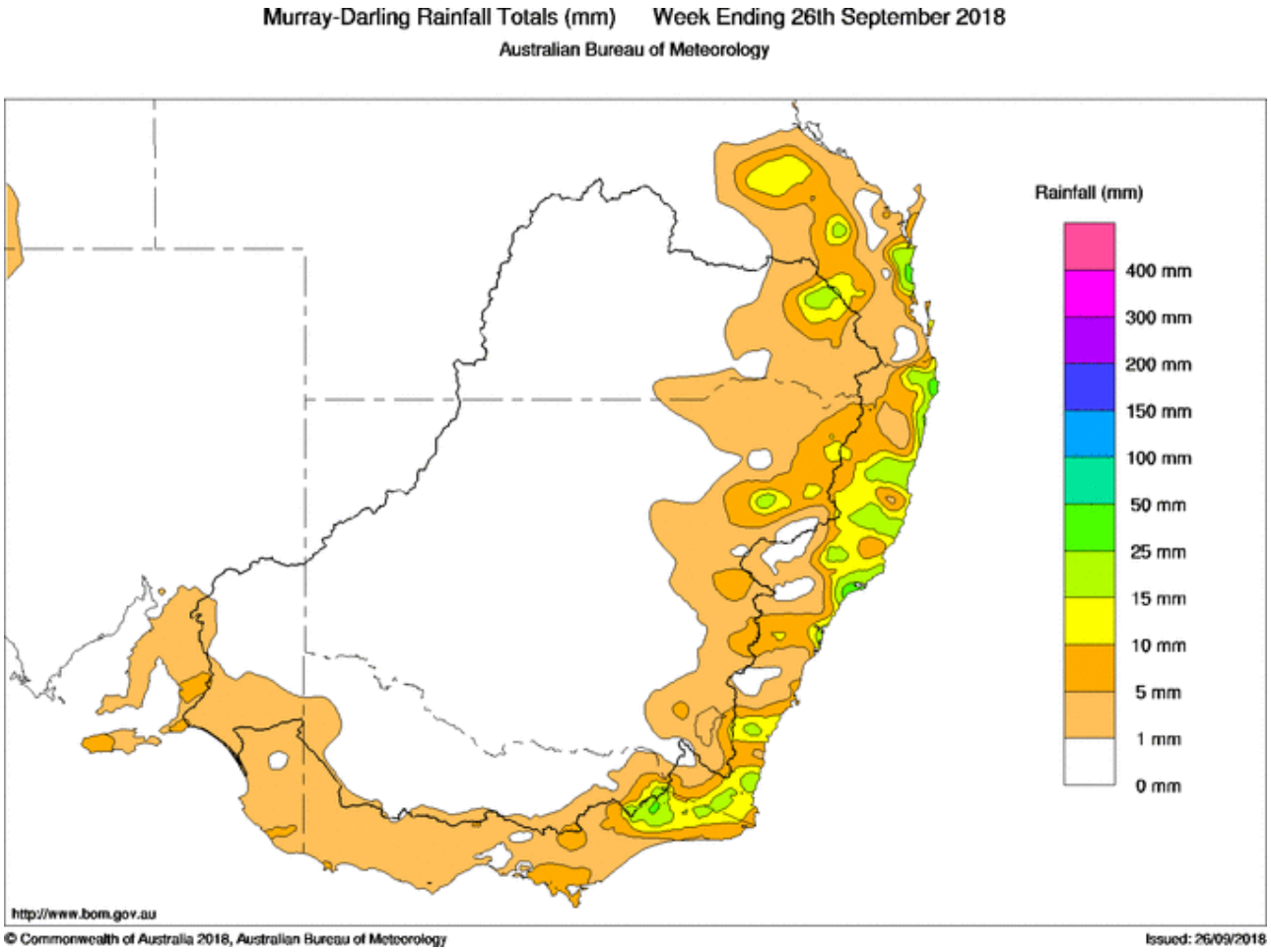
FOR THE WEEK ENDING WEDNESDAY, 26 SEPTEMBER 2018

Trim Ref: D18/46375

Rainfall and inflows

Rainfall was scarce over the majority of the Murray-Darling Basin this past week (Map 1) falling mainly around the southern and eastern fringes of the Basin. Notable totals included 28 mm at MacAlister in Queensland's Darling Downs and 14 mm at Gunnedah Airport AWS on the northwest slopes of NSW.

The Bureau of Meteorology is currently forecasting similar conditions to continue over the coming week.



Map 1 - Murray-Darling Basin rainfall map week ending 26 September 2018 (Source: Bureau of Meteorology).

Upper Murray tributaries continued to slowly recede this week. The flow in the upper Mitta Mitta River at Hinnomunjie averaged 1,450 ML/day, while the upper Murray at Biggara eased to 920 ML/day. Downstream of Hume Reservoir, inflow from the Kiewa River averaged 2,070 ML/day and the Ovens River continued to slowly recede and is currently near 1,900 ML/day.

River operations

- Transfers from Dartmouth Reservoir to Hume Reservoir expected to continue at high rates
- Transfers from Hume Reservoir to Lake Victoria also expected to continue at high rates
- Goulburn spring pulse reaching the Murray

System operations

Continuing dry conditions during winter 2018 and into spring have resulted in low tributary inflows and higher early season demands and river losses. Compared with a more average inflow year when tributary inflows would refill and possibly spill storages, dry conditions this year (and no water available to MDBA in Menindee Lakes) are requiring the transfer of large volumes of water stored in Dartmouth Reservoir to Hume Reservoir and further downstream to Lake Victoria in order to help prepare the system to meet expected demands along the River Murray over summer and into autumn.

The continuing dry conditions and lack of materialisation of any streamflow improvements means water transfers through the system have increased to relatively high rates. Releases from Dartmouth Reservoir are likely to reach channel capacity (approximately 3.4 m local gauge height at Tallandoon) in coming weeks. Further downstream, operations are using Murray Irrigation infrastructure to maximise delivery of water around the Barmah Choke. Additional water is also being delivered downstream of Yarrawonga Weir using pre-wetted anabranch channels and the lower floodplain in Barmah and Millewa Forests. Running water through the forest also assists with moving more water around the Choke and is being managed in a way that aims to minimise the delivery losses as much as practicable.

River operations

MDBA active storage decreased by 54 GL this week to 5,070 GL (60% capacity).

Ongoing transfers from **Dartmouth Reservoir** to Hume Reservoir decreased the Dartmouth storage volume by 41 GL to 3,331 GL (86% capacity). Water stored in Dartmouth Reservoir is generally referred to as the system's drought reserve and is called upon in dry seasons when the downstream storages have insufficient water to meet demands. Substantial calls on water in Dartmouth occurred in 2003-04 and 2006-07 and to a lesser extent 2015-16 (Figure 1). Substantial calls on water from Dartmouth are expected this year if stream flows don't improve.

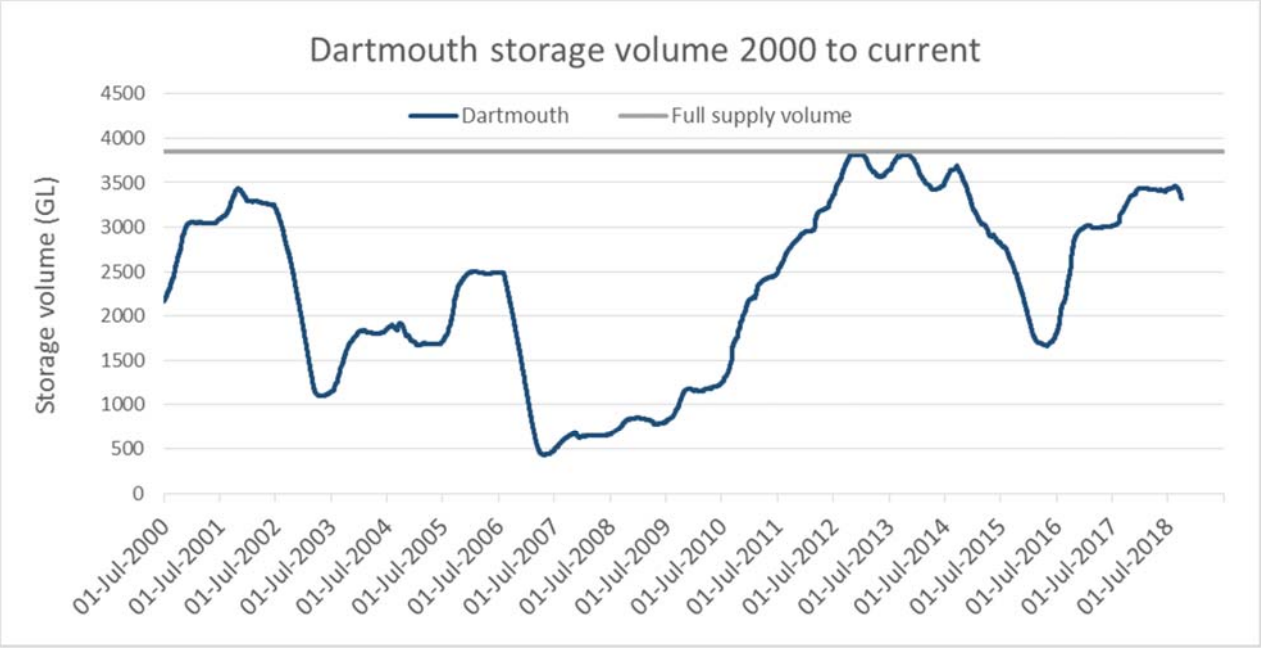


Figure 1 – Dartmouth storage volume 2000 to present

This week, the release from Dartmouth, measured at Colemans gauge, averaged 8,500 ML/day. Looking further ahead, transfers are likely to continue over the coming months and will deliver flows at Tallandoon that will vary up to channel capacity (approximately 3.4 m local gauge height).

At **Hume Reservoir** the storage decreased 18 GL to 1,580 GL (53% capacity). The release increased to 16,700 ML/day, and is expected to increase further over coming days.

At **Lake Mulwala** the level is currently 124.74 m AHD, which is within the normal operating range. Yarrawonga Main Channel diversion decreased from around 1,800 ML/day to the current rate of 1,200 ML/day. Diversions into Mulwala Canal have increased to 2,800 ML/day. This increase in diversion is for water to be transferred downstream of the Barmah Choke using Murray Irrigation Limited (MIL) escapes. Water returns to the River Murray near Torrumbarry via Perricoota escape and into the Edward River via the Edward Escape.

The release from **Yarrawonga Weir** is 13,200 ML/day and will be gradually increased over the next two weeks, possibly reaching up to 15,000 ML/day. At these flow rates, a component of the flow is being transferred around the Barmah Choke via pre-wetted anabranch channels and the lower flood plain. As the flow rate increases, Barmah forest regulators will be gradually opened to maximise transfers through the forest whilst maintaining the River Murray level at Picnic Point below 2.6 m on the local gauge. These higher releases are being undertaken to boost transfers to Lake Victoria. This action is also continuing to provide connectivity between the river and forest channels (mainly in the Barmah Forest) benefiting native fish.

Flow at the **Edward River** offtake is currently 1,550 ML/day and will fluctuate around this rate over the coming week. At the **Gulpa Creek** offtake, the flow is targeting the maximum regulated rate of 350 ML/day. Downstream, return flows from the Millewa Forest are gradually reducing, with the flow at Toonalook currently 3,150 ML/day. Diversion into Wakool Main Canal averaged 300 ML/day, while the Wakool, Yallakool and Colligen offtakes are currently passing around 60, 440 and 290 ML/day respectively, as part of an environmental action for native fish outcomes. Releases from Edward Escape are boosting flow in the Edward River to target around 2,700 ML/day downstream of **Stevens Weir**. Over the coming week, the target flow downstream of Stevens Weir will increase to around 3,000 ML/day. At this flow rate, Tumudgery and Niemur regulators will need to be partially opened and will deliver water via anabranch channels in Werai Forest to the Niemur River. These higher flows are being targeted to boost transfers to Lake Victoria.

On the Murray, the flow at **Barmah** continues to gradually rise. This week the flow rate increased from 7,750 ML/day to the current flow of 8,300 ML/day, and will continue to increase over the coming weeks as more water returns to the River Murray from Barmah Forest.

Inflow to the Murray from the **Goulburn River,** measured at McCoys Bridge, increased to 770 ML/day. Flow at McCoys Bridge is expected to continue increasing to around 7,500 ML/day in the second week of October as a spring pulse is delivered for the benefit of riparian vegetation in the lower Goulburn River. Water released for this flow pulse is a combination of environmental water and Inter Valley Trade (IVT) delivery that will help meet downstream Murray demands. River users in the Echuca district and downstream should be aware that water levels will rise and then fall noticeably over the coming weeks as the Goulburn flow pulse moves through the system.

On the **Campaspe River**, inflows to the Murray are now receding as a spring pulse is also delivered for the benefit of bankside vegetation. The peak reached 1,500 ML/day at Rochester mid-week and is now receding. As with the upcoming Goulburn flows, the inflows from the Campaspe are a combination of environmental water and IVT. Information regarding current opportunities for allocation trade between the Goulburn and Murray valleys is available at the Victorian water register website.

The flow downstream of **Torrumbarry Weir** continued to increase from about 6,000 ML/day to the current flow around 7,100 ML/day. Flow will continue to rise over the coming weeks as higher inflows from the Goulburn system build upon increasing Murray flows. The diversion to National Channel has remained steady at 2,500 ML/day.

Water continues to be delivered to Gunbower Creek and Gunbower Forest on behalf of environmental water holders. Return flows from the watering of Gunbower forest continue to re-enter the Murray near

Barham. More information on the Gunbower Forest watering can be found on the North Central Catchment Management Authority (NCCMA) website.

Inflow from the **Murrumbidgee River**, measured at Balranald, remains steady around 1,400 ML/day.

At **Euston**, the weir pool is targeting a level around full supply level (FSL) to 10 cm below FSL. The downstream flow is rising and is near 8,800 ML/day.

The **Menindee Lakes** storage volume decreased by 4 GL to 156 GL (9% capacity). WaterNSW continues to manage the Menindee Lakes in accordance with the Lower Darling Annual Operations Plan. As part of drought contingency measures, WaterNSW has installed two temporary block banks across the lower Darling below Pooncarie near Jamesville and below Burtundy near Ashvale to assist in maintaining supply to domestic, stock and permanent plantings along the lower Darling. The release from Weir 32 remains near 210 ML/day.

At **Wentworth Weir,** operations continue to target a pool level of around 10 cm above FSL to assist pumpers in the upper reaches of the Darling arm of the weir pool. The downstream release is steady around 7,100 ML/day. In the coming week flows are expected to begin rising.

The **Lock 9** weir pool is currently targeting around 10 cm below FSL. The **Lock 8** weir pool is currently around 30 cm below FSL and may be lowered up to 50 cm below FSL in October as part of the weir pool variability program. The **Lock 7** weir pool is currently targeting around 10 cm above FSL to deliver flow in the upper Lindsay River for the benefit of native fish. The level is likely to increase to around 30 cm above FSL in the coming weeks in order to target a flow rate of around 40 ML/day.

At **Lake Victoria**, the storage volume is currently 353 GL (52% capacity). This is the lowest volume for the end of September since September 2009 (292 GL), and is the third lowest September volume this century (Figure 2). Significant transfers from Hume storage and delivery of Goulburn Valley IVT are expected to result in the volume in storage at Lake Victoria improving over October, November and into December.

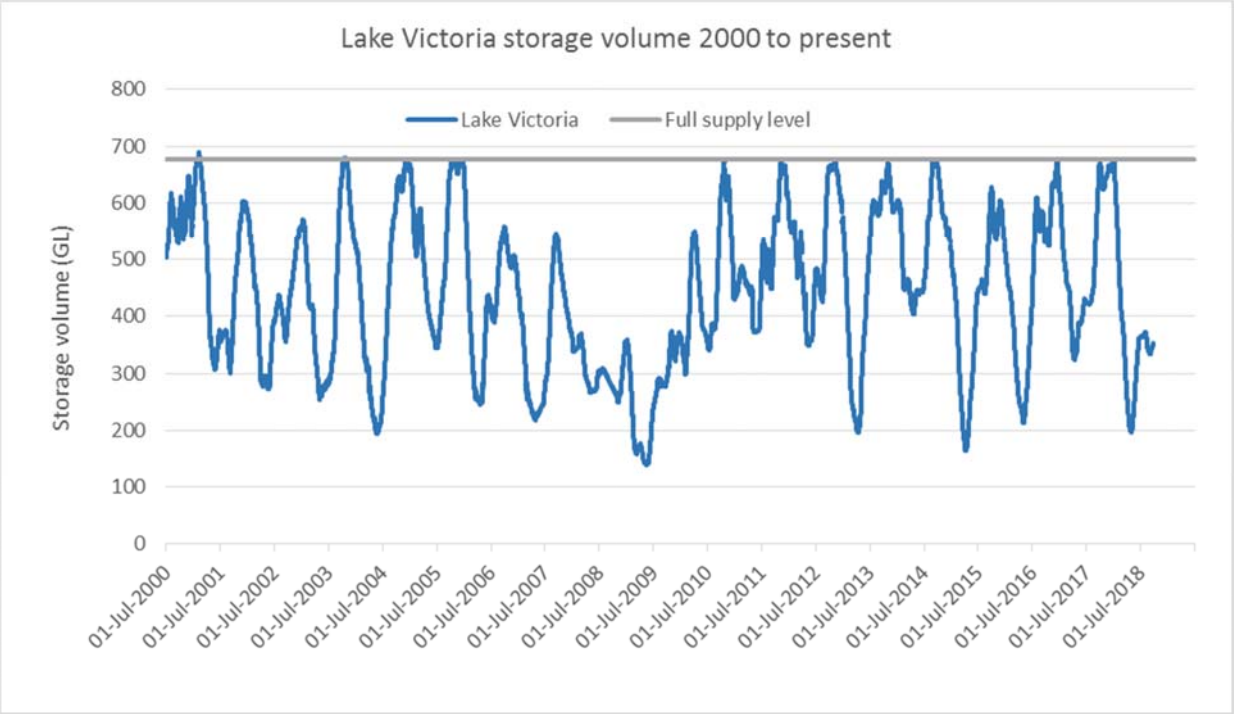


Figure 2 – Lake Victoria storage volume 2000 to present

Flow to **South Australia** is currently targeting 6,000 ML/day and will increase briefly over the weekend to 6,450 ML/day before returning to 6,000 ML/day to support the operation of the **Chowilla** environmental regulator. The regulator is being operated to deliver an in-channel rise along Chowilla Creek and connected anabranches to improve their ecological condition (Photo 1). The **Lock 6** water level is currently around 19 cm above FSL which is almost at the target level of 20 cm above FSL to assist the Chowilla action. Flows from this event are expected to remain mostly within creek banks.

At **Lock 5** and **Lock 2**, the weir pools are currently targeting around 35 cm and 50 cm above the normal pool level. The pool levels will be held for a short period before being slowly lowered back to the normal operating level. For more information see the South Australian Department for Environment and Water's latest River Murray flow report. Downstream at **Lock 3 (Overland Corner)**, the lock has now reopened after a major refurbishment.

Photo 1 – In-channel watering at Chowilla Creek (photo courtesy of SA Water)

The 5-day average water level in the **Lower Lakes** is currently 0.77 m AHD. When conditions allow, environmental water is being released through the barrages to maintain connectivity between Lake Alexandrina and the Coorong estuary. Barrage releases have prioritised Tauwitchere and Goolwa and all fishways remain open.

For media inquiries contact the Media Officer on 02 6279 0141

ANDREW REYNOLDS
Executive Director, River Management

Water in Storage

Week ending Wednesday 26 Sep 2018

MDBA Storages	Full Supply Level (m AHD)	Full Supply Volume (GL)	Current Storage Level (m AHD)	Current Storage (GL)	Current Storage %	Dead Storage (GL)	Active Storage (GL)	Change in Total Storage for the Week (GL)
Dartmouth Reservoir	486.00	3 856	477.63	3 331	86%	71	3 260	-41
Hume Reservoir	192.00	3 005	183.55	1 580	53%	23	1 557	-18
Lake Victoria	27.00	677	24.09	353	52%	100	253	+5
Menindee Lakes		1 731*		156	9%	(- -) #	0	-4
Total		**9 269**		**5 420**	**58%**	**- -**	**5 070**	**-58**
Total Active MDBA Storage							60% ^	

Major State Storages

Burrinjuck Reservoir	1 026		433	42%	3	430	-1
Blowering Reservoir	1 631		1 122	69%	24	1 098	-58
Eildon Reservoir	3 334		2 166	65%	100	2 066	-4

* Menindee surcharge capacity – 2050 GL ** All Data is rounded to nearest GL **
# NSW has sole access to water when the storage falls below 480 GL. MDBA regains access to water when the storage next reaches 640 GL.
^ % of total active MDBA storage

Snowy Mountains Scheme

Snowy diversions for week ending 25 Sep 2018

Storage	Active Storage (GL)	Weekly Change (GL)	Diversion (GL)	This Week	From 1 May 2018
Lake Eucumbene - Total	571	+39	Snowy-Murray	+0	492
Snowy-Murray Component	265	+27	Tooma-Tumut	+5	112
Target Storage	1 240		Net Diversion	-5	380
			Murray 1 Release	+2	593

Major Diversions from Murray and Lower Darling (GL) *

New South Wales	This Week	From 1 July 2018	Victoria	This Week	From 1 July 2018
Murray Irrig. Ltd (Net)	17.2	150	Yarrawonga Main Channel (net)	9.2	60
Wakool Sys Allowance	4.2	21	Torrumbarry System + Nyah (net)	17.4	147
Western Murray Irrigation	0.4	2	Sunraysia Pumped Districts	1.8	13
Licensed Pumps	n/a	34	Licensed pumps - GMW (Nyah+u/s)	1	7
Lower Darling	0.2	2	Licensed pumps - LMW	4.6	38
TOTAL	**22.0**	**209**	**TOTAL**	**34**	**265**

* Figures are derived from actual and estimates where data is unavailable. Please note that not all data may have been available at the time of creating this report.
** All data above is rounded to nearest 100 ML for weekly data and nearest GL for cumulative data**

Flow to South Australia (GL)

* Flow to SA will be greater than normal entitlement for this month due to environmental flows.

Entitlement this month	135.0 *
Flow this week	41.2
Flow so far this month	142.1
Flow last month	174.7

(5 900 ML/day)

Salinity (EC) (microSiemens/cm at 25º C)

	Current	Average over the last week	Average since 1 August 2018
Swan Hill	60	60	70
Euston	80	90	120
Red Cliffs	150	170	150
Merbein	-	180	140
Burtundy (Darling)	790	780	750
Lock 9	140	140	140
Lake Victoria	150	170	180
Berri	230	230	210
Waikerie	280	280	250
Morgan	290	300	260
Mannum	260	260	310
Murray Bridge	330	340	400
Milang (Lake Alex.)	830	830	830
Poltalloch (Lake Alex.)	890	850	740
Meningie (Lake Alb.)	1 550	1 540	1 510
Goolwa Barrages	2 230	2 460	4 080

River Levels and Flows

Week ending Wednesday 26 Sep 2018

River Murray	Minor Flood Stage (m)	Gauge Height local (m)	Gauge Height (m AHD)	Flow (ML/day)	Trend	Average Flow this Week (ML/day)	Average Flow last Week (ML/day)
Khancoban	-	-	-	500	F	560	1 830
Jingellic	4.0	1.41	207.93	2 500	F	2 830	4 740
Tallandoon (Mitta Mitta River)	4.2	3.29	220.18	9 070	S	8 990	8 430
Heywoods	5.5	3.07	156.70	15 200	R	13 930	11 520
Doctors Point	5.5	3.16	151.63	17 130	R	15 740	13 690
Albury	4.3	2.20	149.64	-	-	-	-
Corowa	4.6	3.06	129.08	14 580	F	14 490	13 000
Yarrawonga Weir (d/s)	6.4	2.07	117.11	13 250	S	13 180	13 100
Tocumwal	6.4	2.66	106.50	12 440	S	12 390	12 320
Torrumbarry Weir (d/s)	7.3	2.42	80.97	7 080	R	6 860	5 500
Swan Hill	4.5	1.33	64.25	6 870	R	6 110	5 410
Wakool Junction	8.8	3.21	52.33	8 560	R	7 790	7 380
Euston Weir (d/s)	9.1	1.69	43.54	8 810	R	8 240	8 190
Mildura Weir (d/s)		-	-	7 640	F	7 770	7 760
Wentworth Weir (d/s)	7.3	2.88	27.64	7 060	S	7 130	7 160
Rufus Junction	-	3.28	20.21	5 220	S	5 140	4 990
Blanchetown (Lock 1 d/s)	-	0.77	-	3 810	R	3 740	3 510
Tributaries							
Kiewa at Bandiana	2.8	1.95	155.18	1 930	F	2 070	2 320
Ovens at Wangaratta	11.9	8.55	146.23	1 900	F	2 300	3 700
Goulburn at McCoys Bridge	9.0	1.38	92.80	770	R	590	730
Edward at Stevens Weir (d/s)	5.5	2.42	82.19	2 670	F	2 440	2 650
Edward at Liewah	-	2.72	58.10	2 140	R	2 000	1 600
Wakool at Stoney Crossing	-	1.61	55.10	670	R	640	580
Murrumbidgee at Balranald	5.0	1.88	57.84	1 400	S	1 430	1 400
Barwon at Mungindi	6.1	2.86	-	0	F	0	0
Darling at Bourke	9.0	3.74	-	0	F	0	0
Darling at Burtundy Rocks	-	0.64	-	10	F	10	10

Natural Inflow to Hume	7 250	9 100

(i.e. Pre Dartmouth & Snowy Mountains scheme)

Weirs and Locks Pool levels above or below Full Supply Level (FSL)

Murray	FSL (m AHD)	u/s	d/s		FSL (m AHD)	u/s	d/s
Yarrawonga	124.90	-0.16	-	No. 7 Rufus River	22.10	+0.11	+0.96
No. 26 Torrumbarry	86.05	+0.00	-	No. 6 Murtho	19.25	+0.19	+0.35
No. 15 Euston	47.60	-0.02	-	No. 5 Renmark	16.30	+0.35	+0.11
No. 11 Mildura	34.40	+0.03	+0.24	No. 4 Bookpurnong	13.20	+0.00	+0.48
No. 10 Wentworth	30.80	+0.10	+0.24	No. 3 Overland Corner	9.80	-0.02	+0.60
No. 9 Kulnine	27.40	-0.07	-0.28	No. 2 Waikerie	6.10	+0.47	+0.10
No. 8 Wangumma	24.60	-0.32	+0.19	No. 1 Blanchetown	3.20	-0.01	+0.02

Lower Lakes **FSL = 0.75 m AHD**

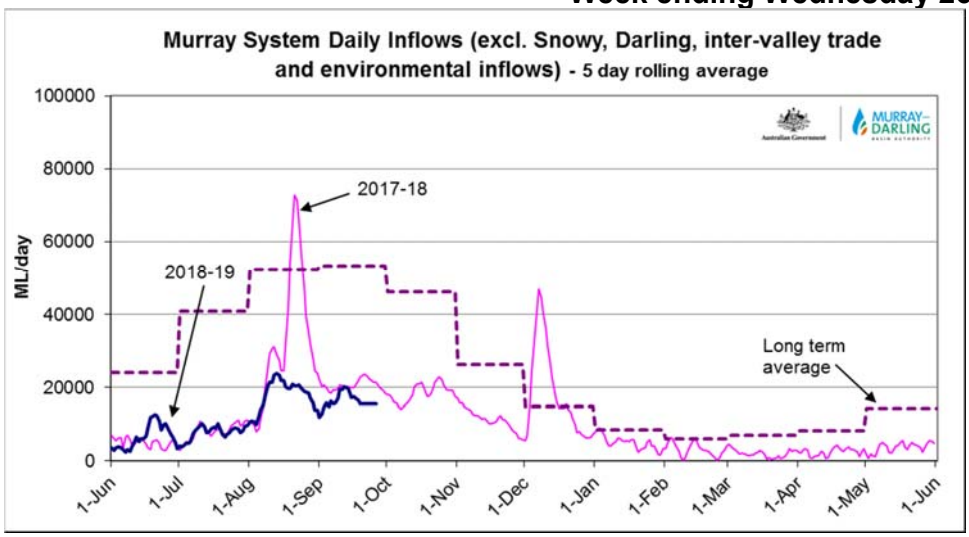
Lake Alexandrina average level for the past 5 days (m AHD)	0.77

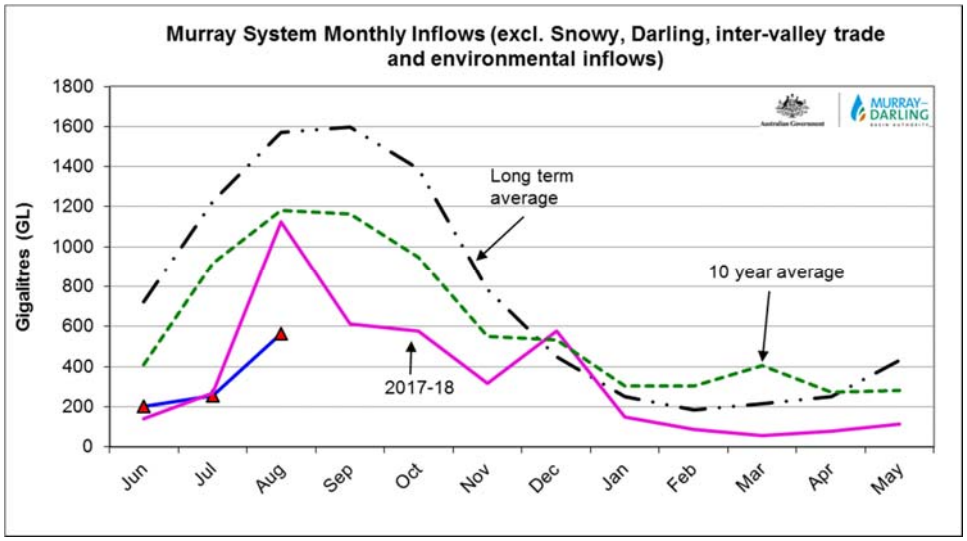
Barrages

	Openings	Level (m AHD)	No. Open	Fishways at Barrages: Rock Ramp	Vertical Slot 1	Vertical Slot 2	Dual Vertical Slots
Goolwa	128 openings	0.84	1	-	Open	Open	-
Mundoo	26 openings	0.76	All closed	-	-	-	Open
Hunters Creek	-	-	-	-	Open	-	-
Boundary Creek	6 openings	-	1	-	Open	-	-
Ewe Island	111 gates	-	All closed	-	-	-	Open
Tauwitchere	322 gates	0.85	2	Open	Open	Open	-

AHD = Level relative to Australian Height Datum, i.e. height above sea level

Week ending Wednesday 26 Sep 2018





State Allocations (as at 26 Sep 2018)

NSW - Murray Valley

High security	97%
General security	0%

NSW – Murrumbidgee Valley

High security	95%
General security	7%

NSW - Lower Darling

High security	100%
General security	0%

Victorian - Murray Valley

High reliability	78%
Low reliability	0%

Victorian - Goulburn Valley

High reliability	70%
Low reliability	0%

South Australia – Murray Valley

High security	100%

NSW : http://www.water.nsw.gov.au/water-management/water-availability
VIC : http://nvrm.net.au/seasonal-determinations/current
SA : http://www.environment.sa.gov.au/managing-natural-resources/river-murray