

Licence WU67 Monthly Environmental Flow Report February 2022

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1. Introduction

Icon Water holds a Licence to Take Water under the Water Resources Act 2007 – Licence Number WU67.

Under Licence Number WU67 clause C1, it is a requirement to provide the following information to the Environment Protection Authority (EPA) by the 15th day of each month.

2. Compliance Analysis and Operational Interactions

Table 1 - Notes relating to the reporting month Environmental Flow releases

Reservoir	Notes
Corin	Corin Dam spilled throughout February. Releases were at licence requirements throughout February. The bi-monthly riffle release was achieved via overflows.
Bendora	Bendora Dam spilled for the majority of February. Releases were at licence requirements throughout February. The bi-monthly riffle release was achieved via overflows.
Cotter	Cotter Dam spilled throughout February. Releases were at licence requirements throughout February.
Googong	Googong Dam spilled throughout February. Googong mini-hydro operated for the majority of February. Releases were above licence requirements while the mini-hydro was operating.

Table 2 – Notes relating to abstraction from Murrumbidgee River

Mt MacDonald river gauge	Not applicable, natural river flows.
Murrumbidgee abstraction	There was no Murrumbidgee River abstraction for consumption in February.
Murrumbidgee To Cotter Eflow	M2C did not operate in February.
Murrumbidgee to Googong	M2G did not operate in February.
Angle Crossing river gauge	Not applicable, natural river flows.

3. Environmental Release Data

The environmental flow release requirements for the current month (a combination of requirements) are detailed in Table 3.

Table 3 – Current month Environmental Flow releases	(Total for month in MI)

	Corin	Bendora	Cotter	Googong
Previous month's shortfall (-) or Excess (+) *	34.1	58.9		
Monthly 75% of the 80 th %tile ML #	341	589		
Additional release required?	No	No	No	No
Current month's release target	306.9	530.1	550	400

Note: * Excess carried forward is capped at 10% of the current month's base flow.

Shortfall carried forward is 100% of the amount of water under released.

[#] Under stage 1 or greater water restrictions, targets flow change to a predetermined base flow.

Daily totals in Table 4 to Table 7 are reported as the 24-hour average from midnight to midnight. Operational changes to environmental flow releases occur during business hours, and therefore the value reported may be slightly different to the target flow on the day the flow is changed. This is particularly evident for large changes in flow e.g. the riffle and pool flushes as the flow is averaged for the day.

The actual daily flows, in megalitres per day (ML/d), from each reservoir are detailed in Table 4 to Table 7 together with the water produced at the water treatment plants (WTP) in Table 10.

Table 8 provides more detail with respect to environmental flows provided below Cotter Dam. The e-flows are made up of two components: water released from the Cotter Dam and water being pumped from Murrumbidgee River to below Cotter Dam. This is to satisfy the requirements set out by ACT EPA and Federal Department of the Environment for the operation of the Enlarged Cotter Dam.

Table 9 provides flow details for the operations of the Murrumbidgee to Googong pipeline. It details daily flows through the high lift pumps station as well as daily flows in the Murrumbidgee River at Angle crossing. This is to demonstrate compliance with the requirements set out by ACT EPA, Federal Department of the Environment and NSW Department of Planning.

Table 10 also details the quantity of treated water that has been transferred to Googong reservoir from Stromlo WTP.

Table 4 - Monthly Environmental Flow release data for Corin dam

			Environmental									EOM	EOM	EOM	
						Planned	Calculated	Calculated	Adjusted daily			Excess (+) /	Correction	Correction	
		410730	flow release		Additional	+/- 50%	Natural	Natural	base flow.	410752	410752	Shortfall (-)	to 410730 ,	to 410752 ,	
	410730 Gingera	Gingera	below Corin	Daily base	release (pool	release	Flow.	Flow.	EOM = Revised	Corin D/S	Corin D/S	to carry	Verified Vs	Verified Vs	
SUM	(unverified)	(verified)	Date	flow	/ riffle)	regime	(Unverified)	(Verified)	monthly target	(Unverified)	(Verified)	forward	unverified	unverified	Comments
Previo	us months ad	justment							-28.0						
	248.67	235.8	Tue 1-Feb-22	10.00		15.0	355.2	336.8	10.0	365.59	365.5				
	230.73	239.6	Wed 2-Feb-22	10.00		15.0	329.5	342.2	10.0	375.41	375.4				
	196.67	200.4	Thu 3-Feb-22	10.00		5.0	280.9	286.2	10.0	315.62	315.6				
	183.89	185.4	Fri 4-Feb-22	10.00		5.0	262.7	264.8	10.0	267.97	268				
	174.4	176.4	Sat 5-Feb-22	10.00		5.0	249.1	252.0	10.0	248.3	248.3				
	165.8	167.5	Sun 6-Feb-22	10.00		5.0	236.8	239.2	10.0	235.4	235.4				data extrapolated
	159.6	160.7	Mon 7-Feb-22	10.00		5.0	228.0	229.5	10.0	225.3	225.3				data extrapolated
	154.6	155.6	Tue 8-Feb-22	10.00		5.0	220.8	222.2	10.0	221.2	221.2				data extrapolated
	147.79	149.4	Wed 9-Feb-22	10.00		5.0	211.1	213.4	10.0	218.69	218.7				
	141.90	143	Thu 10-Feb-22	10.00	150	15.0	202.7	204.2	150.0	215.56	216.6				riffle achieved with overflows
	137.46	138.3	Fri 11-Feb-22	10.00	150	15.0	196.3	197.5	150.0	221.3	222.7				
	130.96	132.5	Sat 12-Feb-22	10.00	150	15.0	187.1	189.2	150.0	208.7	210.1				
	125.59	126.7	Sun 13-Feb-22	10.00		15.0	179.4	181.0	10.0	191.3	192.6				
	118.85	120.3	Mon 14-Feb-22	10.00		15.0	169.8	171.8	10.0	187.0	188.3				
	114.61	115.1	Tue 15-Feb-22	10.00		15.0	163.7	164.4	10.0	179.6	180.8				
	110.07	111.4	Wed 16-Feb-22	10.00		15.0	157.2	159.1	10.0		174.3				Power fail to intake tower ALS datalogger
	106.78	107.3	Thu 17-Feb-22	10.00		5.0	152.5	153.3	10.0		170				
	101.41	102.7	Fri 18-Feb-22	10.00		5.0	144.8	146.7	10.0		161.4				
	99.46	99.46	Sat 19-Feb-22	10.00		5.0	142.1	142.1	10.0		148.2				
	98.73	98.86	Sun 20-Feb-22	10.00		5.0	141.0	141.2	10.0		149.7				
	94.00	95.55	Mon 21-Feb-22	10.00		5.0	134.3	136.5	10.0	145.41	146.5				
	94.38	93.48	Tue 22-Feb-22	10.00		5.0	134.8	133.5	10.0	140.51	141.6				
	122.20	112.3	Wed 23-Feb-22	10.00		5.0	174.5	160.4	10.0	165.13	166.3				
	132.91	129	Thu 24-Feb-22	10.00		15.0	189.8	184.3	10.0	208.84	210.3				
	151.76	154	Fri 25-Feb-22	10.00		15.0	216.8	220.0	10.0	255.10	257				
	268.04	212.8	Sat 26-Feb-22	10.00		15.0	382.8	303.9	10.0	314.89	316.8				
	203.13	256	Sun 27-Feb-22	10.00		15.0	290.1	365.6	10.0	417.93	420.4				
	155.18	152.6	Mon 28-Feb-22	10.00		15.0	221.6	218.0	10.0	284.42	288.3				
SUM	4,169.56			280.0	450.0	280.0	5955.4	5959.1	672.0	5609.2	6435.3	34.1	-100.0%	6 14.7%	

	110700	440700	Environmental flow release				Calculated	Calculated	Adjusted daily	410747	410747	EOM Excess (+) /		EOM Correction	
		410730			release		Natural	Natural	base flow.	Bendora	Bendora	Shortfall (-)	to 410730 ,	to 410747 ,	
		Gingera	below Bendora	Daily base	(pool /		Flow.	Flow.	EOM = Revised	D/S	D/S	to carry	Verified Vs	Verified Vs	-
SUM	(unverified)	(verified)	Date	flow	riffle)	regime	(Unverified)	(Verified)	monthly target	(Unverified)	(Verified)	forward	unverified	unverified	Comments
Previo	us months a	djustment	t						-44.8						
	248.67	235.8	Tue 1-Feb-22	16.00		24.0	547.1	518.8	16.0	364.7	344.8				
	230.73	239.6	Wed 2-Feb-22	16.00		24.0	507.6	527.1	16.0	378.6	351.3				
	196.67	200.4	Thu 3-Feb-22	16.00		24.0	432.7	440.9	16.0	300.4	278.3				
	183.89	185.4	Fri 4-Feb-22	16.00		24.0	404.6	407.9	16.0	247.2	230.3				riffle achieved with overflows
	174.4	176.4	Sat 5-Feb-22		150	24.0	383.6	388.1	150.0	210.7	196.1				
	165.8	167.5	Sun 6-Feb-22	16.00	150	24.0	364.7	368.5	150.0	188.1	174.4				
	159.6	160.7	Mon 7-Feb-22		150		351.1			162.6					
	154.6	155.6	Tue 8-Feb-22			24.0	340.2			131.7					
	147.79	149.4	Wed 9-Feb-22			8.0	325.1	328.7	16.0	125.77	126.4				
	141.90	143	Thu 10-Feb-22			8.0	312.2	314.6	16.0	112.89	115.7				
	137.46	138.3	Fri 11-Feb-22			8.0	302.4	304.3		115.3	116.8				
	130.96	132.5	Sat 12-Feb-22			8.0	288.1	291.5		113.0					
	125.59	126.7	Sun 13-Feb-22			8.0	276.3			99.2					
	118.85	120.3	Mon 14-Feb-22			8.0	261.5			88.8					
	114.61	115.1	Tue 15-Feb-22			8.0	252.1	253.2		74.8					
	110.07	111.4	Wed 16-Feb-22			24.0	242.2			47.0					
	106.78	107.3	Thu 17-Feb-22			24.0	234.9			20.8					
	101.41	102.7	Fri 18-Feb-22			24.0	223.1			11.51					
	99.46	99.46	Sat 19-Feb-22			24.0	218.8			9.16					
	98.73	98.86	Sun 20-Feb-22			24.0	217.2			9.12					
	94.00	95.55	Mon 21-Feb-22			24.0	206.8			9.86					
	94.38	93.48	Tue 22-Feb-22			24.0				9.50					
	122.20	112.3	Wed 23-Feb-22			8.0				7.74					
	132.91	129	Thu 24-Feb-22			8.0				28.29					
	151.76	154	Fri 25-Feb-22			8.0				118.26					
	268.04	212.8	Sat 26-Feb-22			8.0				200.31					
	203.13	256	Sun 27-Feb-22			8.0				377.80					
	155.18	152.6	Mon 28-Feb-22			8.0				289.43					
SUM	4,169.56			448.0	450.0	464.0	9173.0	9178.7	805.2	3852.4	3780.0	58.9	-100.0%	6 -1.9%	

Table 5 - Monthly Environmental Flow release data for Bendora dam

SUM	Environmental flow release below Cotter Date	Daily base flow	Additional release (pool / riffle)	EOM = Revised monthly target	410700 Cotter D/S (Unverified)	410700 Cotter D/S (Verified)	EOM Excess (+) / Shortfall (-)	EOM Correction to 410700 , Verified Vs unverified	Comments
Previous	s months adjustment			0.0		ĺ			
	Tue 1-Feb-22	15		15.0	465.1	465.1			
	Wed 2-Feb-22	15		15.0	400.6	400.6			
	Thu 3-Feb-22	15		15.0	367.1	367.1			
	Fri 4-Feb-22	15		15.0	307.0	307			
	Sat 5-Feb-22	15		15.0	271.2	271.2			
	Sun 6-Feb-22	15		15.0	239.9	239.9			
	Mon 7-Feb-22	15		15.0	215.3	215.3			
	Tue 8-Feb-22	15		15.0	196.7	196			
	Wed 9-Feb-22	15		15.0	199.1	199.1			
	Thu 10-Feb-22	15		15.0	185.5	185.4			
	Fri 11-Feb-22	15		15.0	164.7	164.7			
	Sat 12-Feb-22	15		15.0	159.6	159.6			
	Sun 13-Feb-22	15		15.0	153.2	153.2			
	Mon 14-Feb-22	15		15.0	140.0	140			
	Tue 15-Feb-22	15		15.0	123.3	123.3			
	Wed 16-Feb-22	15		15.0	109.0	109			
	Thu 17-Feb-22	15		15.0	89.8	89.84			
	Fri 18-Feb-22	15		15.0	70.1	70.13			
	Sat 19-Feb-22	15		15.0	37.7	37.7			
	Sun 20-Feb-22	15		15.0	42.1	42.14			
	Mon 21-Feb-22	15		15.0	38.1	38.11			
	Tue 22-Feb-22	15		15.0	26.8	26.79			
	Wed 23-Feb-22	15		15.0	34.4	34.44			
	Thu 24-Feb-22	15		15.0	61.44	61.44			
	Fri 25-Feb-22	15		15.0	129.14	129.1			
	Sat 26-Feb-22	15		15.0	262.09	262.1			
	Sun 27-Feb-22	15		15.0	495.20	495.2			
	Mon 28-Feb-22	15		15.0	434.58	434.6			
SUM		420.0	0.0	420.0	5418.9	5418.1	4998.1	0.0%	

Table 6 - Monthly Environmental Flow release data for Cotter dam

		410781 Upstream Googong (Verified)		Daily base flow	Additional release (pool / riffle)	Natural Flow.	Calculated Natural Flow. (Verified)	EOM = Revised monthly target	410760 Wickerslack (Unverified)	410760 Wickerslac k (Verified)	EOM Excess (+) / Shortfall (-)	EOM Correction to 410781 , Verified Vs unverified	EOM Correction to 410760 , Verified Vs unverified	Comments
Previo		adjustme												
	1082.7		Tue 1-Feb-22			1385.9			1078.36					
	527.2		Wed 2-Feb-22			674.9			902.91					
	430.6		Thu 3-Feb-22			551.1	569.1	10.0	609.09					
	369.8		Fri 4-Feb-22			473.3			502.1					
	346.3		Sat 5-Feb-22			443.3			431.6					
	348.8		Sun 6-Feb-22			446.5			369.8					
	328.3		Mon 7-Feb-22			420.2			347.7					
	310.9		Tue 8-Feb-22			397.9			312.41					
	307.37	311.3	Wed 9-Feb-22	10.0	1	393.4	398.5	10.0	302.93					
	293.05		Thu 10-Feb-22			375.1		10.0	300.03					
	422.2		Fri 11-Feb-22	10.0	1	540.4		10.0	326.81					
	313.1		Sat 12-Feb-22	10.0	1	400.8		10.0	359.87					
	267.8		Sun 13-Feb-22	10.0	1	342.8		10.0	286.48	286.5				
	243.1		Mon 14-Feb-22	10.0	1	311.2		10.0	252.20					
	223.0		Tue 15-Feb-22	10.0)	285.4		10.0	236.83					Data extrapolated
	209.1		Wed 16-Feb-22	10.0)	267.7		10.0	205.23	205.2				
	196.7		Thu 17-Feb-22	10.0)	251.7		10.0	184.79	184.8				
	193.06		Fri 18-Feb-22	10.0)	247.1		10.0	179.00	179				
	185.69		Sat 19-Feb-22	10.0)	237.7		10.0	162.85	162.9				
	182.86		Sun 20-Feb-22	10.0)	234.1		10.0	171.75	171.7				
	177.06		Mon 21-Feb-22	10.0		226.6		10.0	168.51	168.5				
	168.48		Tue 22-Feb-22	10.0	1	215.7		10.0	170.11	170.1				
	176.41		Wed 23-Feb-22	10.0	1	225.8		10.0	166.73	166.7				
	255.25		Thu 24-Feb-22	10.0)	326.7		10.0	229.17	229.2				
	401.56		Fri 25-Feb-22	10.0		514.0		10.0	332.35	332.3				
	1677.80		Sat 26-Feb-22	10.0	1	2147.6		10.0	712.09	712.1				
	4766.61		Sun 27-Feb-22	10.0	1	6101.3		10.0	6906.23	6906				
	1709.23		Mon 28-Feb-22	10.0		2187.8		10.0	4051.53	4052				
UM	16114.1	4209.6		280.0	0.0	20626.0	5388.3	280.0	20259.5	20281.3	20001.3	-73.9%	6 0.1%	

Table 7 - Monthly Environmental Flow release data for Googong dam

Note:

410781 Upstream Googong verified data is provided every second month.

	Cotter River e-flows I	below Cotter Dam		
Date	E-flow sourced from Murrumbidgee via M2C	E-flow sourced from Cotter Dam release/spill	Comments	
Tue 1-Feb-22	0.0	465.1		
Wed 2-Feb-22	0.0	400.6		
Thu 3-Feb-22	0.0	367.1		
Fri 4-Feb-22	0.0	307		
Sat 5-Feb-22	0.0	271.2		
Sun 6-Feb-22	0.0	239.9		
Mon 7-Feb-22	0.0	215.3		
Tue 8-Feb-22	0.0	196		
Wed 9-Feb-22	0.0	199.1		
Thu 10-Feb-22	0.0	185.4		
Fri 11-Feb-22	0.0	164.7		
Sat 12-Feb-22	0.0	159.6		
Sun 13-Feb-22	0.0	153.2		
Mon 14-Feb-22	0.0	140		
Tue 15-Feb-22	0.0	123.3		
Wed 16-Feb-22	0.0	109		
Thu 17-Feb-22	0.0	89.84		
Fri 18-Feb-22	0.0	70.13		
Sat 19-Feb-22	0.0	37.7		
Sun 20-Feb-22	0.0	42.14		
Mon 21-Feb-22	0.0	38.11		
Tue 22-Feb-22	0.0	26.79		
Wed 23-Feb-22	0.0	34.44		
Thu 24-Feb-22	0.0	61.44		
Fri 25-Feb-22	0.0	129.1		
Sat 26-Feb-22	0.0	262.1		
Sun 27-Feb-22	0.0	495.2		
Mon 28-Feb-22	0.0	434.6		
Total	0.0	5418.1		

Table 8 – Monthly flow data for Cotter River Environmental Flows

Date	Murrumbidgee at Angle crossing	M2G Flow	Comments
Tue 1-Feb-22	1-Feb-22 5204		
Wed 2-Feb-22	5028	0.0	
Thu 3-Feb-22	3963	0.0	
Fri 4-Feb-22	3090	0.0	
Sat 5-Feb-22	2491	0.0	
Sun 6-Feb-22	2041	0.0	
Mon 7-Feb-22	1842	0.0	
Tue 8-Feb-22	1905	0.0	
Wed 9-Feb-22	1989	0.0	
Thu 10-Feb-22	1775	0.0	
Fri 11-Feb-22	1650	0.0	
Sat 12-Feb-22	1507	0.0	
Sun 13-Feb-22	1343	0.0	
Mon 14-Feb-22	1400	0.0	
Tue 15-Feb-22	1307	0.0	
Wed 16-Feb-22	1161	0.0	
Thu 17-Feb-22	1055	0.0	
Fri 18-Feb-22	948	0.0	
Sat 19-Feb-22	874	0.0	
Sun 20-Feb-22	825	0.0	
Mon 21-Feb-22	765	0.0	
Tue 22-Feb-22	733	0.0	
Wed 23-Feb-22	703	0.0	
Thu 24-Feb-22	676	0.0	
Fri 25-Feb-22	686	0.0	
Sat 26-Feb-22	761	0.0	
Sun 27-Feb-22	1801	0.0	
Mon 28-Feb-22	15333	0.0	
Total	62858	0.0	

Day	StromIo WTP ML			Googong WTP ML	Transfer from SWTP to Googong res.
	M'bidgee	Cotter	Bendora		
1	0.0	0.0	125.5	0.0	0.0
2	0.0	0.0	126.6	0.0	0.0
3	0.0	0.0	134.5	0.0	0.0
4	0.0	0.0	128.1	0.0	0.0
5	0.0	0.0	119.1	0.0	0.0
6	0.0	0.0	126.2	0.0	0.0
7	0.0	0.0	134.9	0.0	0.0
8	0.0	0.0	146.0	0.0	0.0
9	0.0	0.0	143.8	0.0	0.0
10	0.0	0.0	155.0	0.0	0.0
11	0.0	0.0	150.5	0.0	0.0
12	0.0	0.0	154.2	0.0	0.0
13	0.0	0.0	152.6	0.0	0.0
14	0.0	0.0	151.6	0.0	0.0
15	0.0	0.0	161.2	0.0	0.0
16	0.0	0.0	178.7	0.0	0.0
17	0.0	0.0	197.0	0.0	0.0
18	0.0	0.0	209.9	0.0	0.0
19	0.0	0.0	210.2	0.0	14.7
20	0.0	0.0	195.5	0.0	0.0
21	0.0	0.0	183.9	0.0	0.0
22	0.0	0.0	186.9	0.0	0.0
23	0.0	0.0	181.6	0.0	0.0
24	0.0	0.0	172.7	0.0	0.0
25	0.0	0.0	137.1	0.0	0.0
26	0.0	0.0	119.8	2.8	0.0
27	0.0	0.0	108.1	12.7	0.0
28	0.0	0.0	105.7	0.0	0.0
29					
30					
31					
Total	0.0	0.0	4296.9	15.5	14.7

Table 10 – Monthly water production data and water transferred to Googong reservoir

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