



Licence WU67 Monthly Environmental Flow Report April 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 April. Releases were at licence requirements throughout April. The bi-monthly riffle release was achieved via spillway flow.
Bendora	Bendora Dam spilled for the majority of April. Releases from Bendora were increased above the licence requirement on 23 March to reduce the reservoir level and prevent the dam from spilling to facilitate a Dam Safety inspection of the Bendora stilling basin. Additional releases continued up to 6 April. Bendora started spilling on 10 April and continue for the remainder of the month. The bi-monthly riffle release was achieved via spillway flow.
Cotter	Cotter Dam spilled throughout April. Releases were at licence requirements throughout April.
Googong	Googong Dam spilled throughout March. Googong mini-hydro operated for the first week of April. Releases were above licence requirements while the min-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 April.
Murrumbidgee To Cotter Eflow	M2C did not operate in April.
Murrumbidgee to Googong	M2G did not operate in April.
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 ML)

	Corin	Bendora	Cotter	Googong
Previous month's shortfall (-) or Excess (+) *	58.9	96.1		
Monthly 75% of the 80 th %tile ML #	589	961		
Additional release required?	No	No	No	No
Current month's release target	530.1	864.9	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

SUM	410730 Gingera	410730 Gingera	Environmental flow release below Corin Date	Daily base flow	Additional release (pool / riffle)	Planned +/- 50% release regime	Calculated Natural Flow. (Unverified)	Calculated Natural Flow. (Verified)	Adjusted daily base flow. EOM = Revised monthly target	410752 Corin D/S	410752 Corin D/S	EOM Excess (+) / Shortfall (-) to carry forward	EOM Correction to 410730, Verified Vs unverified	EOM Correction to 410752, Verified Vs unverified	Comments
	(unverified)	(verified)								(Unverified)	(Verified)				
Previous months adjustment															
	97.26	98.29	Fri 1-Apr-22	15.00		7.5	138.9	140.4	15.0	170.46	158.3				
	111.63	105.2	Sat 2-Apr-22	15.00		7.5	159.4	150.3	15.0	145.86	134.5				
	118.96	122.8	Sun 3-Apr-22	15.00		7.5	169.9	175.4	15.0	159.27	157.1				
	106.63	110	Mon 4-Apr-22	15.00		7.5	152.3	157.1	15.0	167.31	166.5				
	97.18	99.04	Tue 5-Apr-22	15.00		7.5	138.8	141.5	15.0	161.94	160.8				
	96.61	94.75	Wed 6-Apr-22	15.00		7.5	138.0	135.3	15.0	157.48	155.8				
	179.13	159.5	Thu 7-Apr-22	15.00		22.5	255.8	227.8	15.0	218.91	215.9				
	277.72	249.9	Fri 8-Apr-22	15.00		22.5	396.7	356.9	15.0	354.55	350.4				
	273.00	291.6	Sat 9-Apr-22	15.00		22.5	389.9	416.5	15.0	436.72	433.4				
	216.10	225	Sun 10-Apr-22	15.00		22.5	308.7	321.4	15.0	389.39	386.6				
	185.27	189.2	Mon 11-Apr-22	15.00		22.5	264.6	270.2	15.0	345.82	339.2				
	169.96	173.2	Tue 12-Apr-22	15.00		22.5	242.8	247.4	15.0	311.47	305.4				
	156.51	159.2	Wed 13-Apr-22	15.00		22.5	223.5	227.4	15.0	291.91	283.8				
	146.85	148.5	Thu 14-Apr-22	15.00	150	7.5	209.7	212.1	150.0	259.27	252.7				
	139.88	141.2	Fri 15-Apr-22	15.00	150	7.5	199.8	201.7	150.0	246.36	239.8				
	132.87	134.5	Sat 16-Apr-22	15.00	150	7.5	189.8	192.1	150.0		228.4				Riffle release achieved
	127.36	128.3	Sun 17-Apr-22	15.00		7.5	181.9	183.3	15.0		215.7				
		124	Mon 18-Apr-22	15.00		7.5		177.1	15.0		206.6				
	228.21	152.3	Tue 19-Apr-22	15.00		7.5	326.0	217.5	15.0	239.4	230.4				
	240.64	303.8	Wed 20-Apr-22	15.00		7.5	343.7	433.9	15.0	413.4	402.9				
	165.98	171.6	Thu 21-Apr-22	15.00		22.5	237.1	245.1	15.0	320.0	308.6				
	152.77	155.5	Fri 22-Apr-22	15.00		22.5	218.2	222.1	15.0	270.3	256.6				
	144.52	146.9	Sat 23-Apr-22	15.00		22.5	206.4	209.8	15.0	246.7	234.6				
	137.91	140	Sun 24-Apr-22	15.00		22.5	197.0	200.0	15.0	232.6	222				
	133.41	134.8	Mon 25-Apr-22	15.00		22.5	190.5	192.5	15.0	224.4	213.1				
	132.45	133.3	Tue 26-Apr-22	15.00		22.5	189.2	190.4	15.0	219.83	208.6				
	141.93	135.7	Wed 27-Apr-22	15.00		22.5	202.7	193.8	15.0	230.02	217.8				
	153.41	158.7	Thu 28-Apr-22	15.00		7.5	219.1	226.7	15.0	270.27	252.6				
	139.49	137.9	Fri 29-Apr-22	15.00		7.5	199.2	197.0	15.0		229.3				
	227.53	224.2	Sat 30-Apr-22	15.00		7.5	325.0	320.2	15.0		330.8				
SUM	4631.2	4748.9		450.0	450.0	435.0	6614.7	6782.8	810.0	6483.6	7498.2	58.9	2.5%		

Table 5 - Monthly Environmental Flow release data for Bendora dam

SUM	410730 Gingera (unverified)	410730 Gingera (verified)	Environmental flow release below Bendora Date	Daily base flow	Additional release (pool / riffle)	Planned +/- 50% release regime	Calculated Natural Flow. (Unverified)	Calculated Natural Flow. (Verified)	Adjusted daily base flow. EOM = Revised monthly target	410747 Bendora D/S (Unverified)	410747 Bendora D/S (Verified)	EOM Excess (+) / Shortfall (-) to carry forward	EOM Correction to 410730 , Verified Vs unverified	EOM Correction to 410747 , Verified Vs unverified	Comments
Previous months adjustment									-72.0						
	97.26	98.29	Fri 1-Apr-22	24.00		36.0	214.0	216.2	24.0	240.27	222.2				
	111.63	105.2	Sat 2-Apr-22	24.00		36.0	245.6	231.4	24.0	292.45	265.8				
	118.96	122.8	Sun 3-Apr-22	24.00		36.0	261.7	270.2	24.0	322.90	292				
	106.63	110	Mon 4-Apr-22	24.00		36.0	234.6	242.0	24.0	214.85	194.1				
	97.18	99.04	Tue 5-Apr-22	24.00		36.0	213.8	217.9	24.0	106.30	106.3				
	96.61	94.75	Wed 6-Apr-22	24.00		12.0	212.5	208.5	24.0	40.66	41.38				Dam Safety inspection complete. Releases back to licence requirement
	179.13	159.5	Thu 7-Apr-22	24.00		12.0	394.1	350.9	24.0	11.07	12.38				
	277.72	249.9	Fri 8-Apr-22	24.00		12.0	611.0	549.8	24.0	11.30	12.36				
	273.00	291.6	Sat 9-Apr-22	24.00		12.0	600.6	641.5	24.0	11.01	12.3				
	216.10	225	Sun 10-Apr-22	24.00		12.0	475.4	495.0	24.0	69.45	68.76				
	185.27	189.2	Mon 11-Apr-22	24.00	150	12.0	407.6	416.2	150.0	326.30	301				
	169.96	173.2	Tue 12-Apr-22	24.00	150	12.0	373.9	381.0	150.0	336.44	310.6				
	156.51	159.2	Wed 13-Apr-22	24.00	150	36.0	344.3	350.2	150.0	313.19	286.5				Riffle release achieved
	146.85	148.5	Thu 14-Apr-22	24.00		36.0	323.1	326.7	24.0	279.46	261.7				
	139.88	141.2	Fri 15-Apr-22	24.00		36.0	307.7	310.6	24.0	262.95	244.9				
	132.87	134.5	Sat 16-Apr-22	24.00		36.0	292.3	295.9	24.0	246.50	232.2				
	127.36	128.3	Sun 17-Apr-22	24.00		36.0	280.2	282.3	24.0	232.74	220.9				
		124	Mon 18-Apr-22	24.00		36.0		272.8	24.0	223.93	209.5				
	228.21	152.3	Tue 19-Apr-22	24.00		36.0	502.1	335.1	24.0	233.31	215.9				
	240.64	303.8	Wed 20-Apr-22	24.00		12.0	529.4	668.4	24.0	423.22	388				
	165.98	171.6	Thu 21-Apr-22	24.00		12.0	365.2	377.5	24.0	400.74	369.1				
	152.77	155.5	Fri 22-Apr-22	24.00		12.0	336.1	342.1	24.0	316.81	290.4				
	144.52	146.9	Sat 23-Apr-22	24.00		12.0	317.9	323.2	24.0	274.52	255.3				
	137.91	140	Sun 24-Apr-22	24.00		12.0	303.4	308.0	24.0	259.39	241.2				
	133.41	134.8	Mon 25-Apr-22	24.00		12.0	293.5	296.6	24.0	250.59	233.7				
	132.45	133.3	Tue 26-Apr-22	24.00		12.0	291.4	293.3	24.0	243.39	226.1				
	141.93	135.7	Wed 27-Apr-22	24.00		36.0	312.3	298.5	24.0	245.20	227.1				
	153.41	158.7	Thu 28-Apr-22	24.00		36.0	337.5	349.1	24.0	287.96	264.9				
	139.49	137.9	Fri 29-Apr-22	24.00		36.0	306.9	303.4	24.0	285.88	269.1				
	227.53	224.2	Sat 30-Apr-22	24.00		36.0	500.6	493.2	24.0	373.51	342.9				
SUM	4,631.18	4748.9		720.0	450.0	744.0	10188.6	10447.5	1026.0	7136.3	6618.6	96.1	2.5%	-7.3%	

Table 6 - Monthly Environmental Flow release data for Cotter dam

SUM	Environmental flow release below Cotter Date	Daily base flow	Additional release (pool / riffle)	EOM = Revised monthly target	410700	410700	EOM Excess (+) / Shortfall (-)	EOM Correction to 410700 , Verified Vs unverified	Comments
					Cotter D/S (Unverified)	Cotter D/S (Verified)			
Previous months adjustment					0.0				
	Fri 1-Apr-22	15		15.0	246.16	251.1			
	Sat 2-Apr-22	15		15.0	256.06	261.9			
	Sun 3-Apr-22	15		15.0	313.73	322.5			
	Mon 4-Apr-22	15		15.0	307.28	316.5			
	Tue 5-Apr-22	15		15.0	204.40	204.4			
	Wed 6-Apr-22	15		15.0	158.56	158.9			
	Thu 7-Apr-22	15		15.0	131.48	131.5			
	Fri 8-Apr-22	15		15.0	147.21	147.2			
	Sat 9-Apr-22	15		15.0	140.83	140.7			
	Sun 10-Apr-22	15		15.0	132.62	131.9			
	Mon 11-Apr-22	15		15.0	229.85	229			
	Tue 12-Apr-22	15		15.0	383.90	382.3			
	Wed 13-Apr-22	15		15.0	392.39	390.6			
	Thu 14-Apr-22	15		15.0	365.56	364.1			
	Fri 15-Apr-22	15		15.0	334.70	333.5			
	Sat 16-Apr-22	15		15.0	315.13	313.6			
	Sun 17-Apr-22	15		15.0	300.19	298.4			
	Mon 18-Apr-22	15		15.0	286.29	284.6			
	Tue 19-Apr-22	15		15.0	299.71	297.6			
	Wed 20-Apr-22	15		15.0	464.86	460.3			
	Thu 21-Apr-22	15		15.0	524.83	519.6			
	Fri 22-Apr-22	15		15.0	443.03	438.8			
	Sat 23-Apr-22	15		15.0	368.50	364.6			
	Sun 24-Apr-22	15		15.0	331.61	328			
	Mon 25-Apr-22	15		15.0	311.31	308			
	Tue 26-Apr-22	15		15.0	299.45	296.8			
	Wed 27-Apr-22	15		15.0	299.67	296.9			
	Thu 28-Apr-22	15		15.0	335.10	331.4			
	Fri 29-Apr-22	15		15.0	349.52	345.4			
	Sat 30-Apr-22	15		15.0	540.27	530.3			
SUM		450.0	0.0	450.0	9214.20	9180.4	8730.4	-0.4%	

Table 7 - Monthly Environmental Flow release data for Googong dam

SUM	410781 Upstream Googong (Unverified)	410781 Upstream Googong (Verified)	Environmental flow release below Googong	Daily base flow	Additional release (pool / riffle)	Calculated Natural Flow. (Unverified)	Calculated Natural Flow. (Verified)	EOM = Revised monthly target	410760 Wickerslack (Unverified)	410760 Wickerslack (Verified)	EOM Excess (+) / Shortfall (-)	EOM Correction to 410781, Verified Vs unverified	EOM Correction to 410760, Verified Vs unverified	Comments
Previous months adjustment														
	311.25	311.5		Fri 1-Apr-22	10.00		398.4	398.7	10.0	308.93	308.9			
	321.79	318.7		Sat 2-Apr-22	10.00		411.9	407.9	10.0	240.65	240.6			
	405.03	374.1		Sun 3-Apr-22	10.00		518.4	478.8	10.0	176.90	176.9			
	486.19	489.6		Mon 4-Apr-22	10.00		622.3	626.7	10.0	250.68	250.7			
	382.40	407.2		Tue 5-Apr-22	10.00		489.5	521.2	10.0	342.55	342.5			
	311.13	317.4		Wed 6-Apr-22	10.00		398.2	406.3	10.0	301.89	301.9			
	532.5			Thu 7-Apr-22	10.00		681.6		10.0	256.30	254.7			
	1671.9			Fri 8-Apr-22	10.00		2140.0		10.0	677.79	674.6			
	1900.4			Sat 9-Apr-22	10.00		2432.5		10.0	1567.40	1562			
	1667.0			Sun 10-Apr-22	10.00		2133.7		10.0	1884.57	1873			
	1179.5			Mon 11-Apr-22	10.00		1509.7		10.0	1567.83	1557			
	983.7			Tue 12-Apr-22	10.00		1259.1		10.0	1136.28	1128			
	851.44			Wed 13-Apr-22	10.00		1089.8		10.0	933.37	921.8			
	704.18			Thu 14-Apr-22	10.00		901.4		10.0	772.03	761.2			
	614.32			Fri 15-Apr-22	10.00		786.3		10.0	642.94	633.3			
	555.6			Sat 16-Apr-22	10.00		711.2		10.0	563.22	551.7			
	509.3			Sun 17-Apr-22	10.00		651.9		10.0	498.00	486.9			
	474.5			Mon 18-Apr-22	10.00		607.4		10.0	450.74	440.2			
	543.7			Tue 19-Apr-22	10.00		696.0		10.0	453.88	441.1			
	1806.2			Wed 20-Apr-22	10.00		2311.9		10.0	1088.76	1067			
	925.8			Thu 21-Apr-22	10.00		1185.0		10.0	1491.87	1466			
	601.6			Fri 22-Apr-22	10.00		770.1		10.0	911.65	888.8			
	514.53			Sat 23-Apr-22	10.00		658.6		10.0	609.25	590.6			
	475.76			Sun 24-Apr-22	10.00		609.0		10.0	491.37	475			
	440.69			Mon 25-Apr-22	10.00		564.1		10.0	425.65	408.3			
	422.23			Tue 26-Apr-22	10.00		540.4		10.0	390.51	373.9			
	422.39			Wed 27-Apr-22	10.00		540.7		10.0	369.42	353.6			
	496.43			Thu 28-Apr-22	10.00		635.4		10.0	380.74	362.5			
	475.92			Fri 29-Apr-22	10.00		609.2		10.0	423.76	403.7			
	576.54			Sat 30-Apr-22	10.00		738.0		10.0	633.13	607.5			
SUM	21563.9	2218.5			300.0	0.0	27601.8	2839.7	-49086.9	20242.1	19903.9	58.9	-89.7%	-1.7%

Note:

410781 Upstream Googong verified data is provided every second month.

Table 8 – Monthly flow data for Cotter River Environmental Flows

Date	Cotter River e-flows below Cotter Dam		Comments
	E-flow sourced from Murrumbidgee via M2C	E-flow sourced from Cotter Dam release/spill	
Fri 1-Apr-22	0.0	251.1	
Sat 2-Apr-22	0.0	261.9	
Sun 3-Apr-22	0.0	322.5	
Mon 4-Apr-22	0.0	316.5	
Tue 5-Apr-22	0.0	204.4	
Wed 6-Apr-22	0.0	158.9	
Thu 7-Apr-22	0.0	131.5	
Fri 8-Apr-22	0.0	147.2	
Sat 9-Apr-22	0.0	140.7	
Sun 10-Apr-22	0.0	131.9	
Mon 11-Apr-22	0.0	229	
Tue 12-Apr-22	0.0	382.3	
Wed 13-Apr-22	0.0	390.6	
Thu 14-Apr-22	0.0	364.1	
Fri 15-Apr-22	0.0	333.5	
Sat 16-Apr-22	0.0	313.6	
Sun 17-Apr-22	0.0	298.4	
Mon 18-Apr-22	0.0	284.6	
Tue 19-Apr-22	0.0	297.6	
Wed 20-Apr-22	0.0	460.3	
Thu 21-Apr-22	0.0	519.6	
Fri 22-Apr-22	0.0	438.8	
Sat 23-Apr-22	0.0	364.6	
Sun 24-Apr-22	0.0	328	
Mon 25-Apr-22	0.0	308	
Tue 26-Apr-22	0.0	296.8	
Wed 27-Apr-22	0.0	296.9	
Thu 28-Apr-22	0.0	331.4	
Fri 29-Apr-22	0.0	345.4	
Sat 30-Apr-22	0.0	530.3	
Total	0.0	9180.4	

Table 9 – Monthly flow data for Murrumbidgee to Googong

Date	M2G Flow	Comments
Fri 1-Apr-22	0.0	
Sat 2-Apr-22	0.0	
Sun 3-Apr-22	0.0	
Mon 4-Apr-22	0.0	
Tue 5-Apr-22	0.0	
Wed 6-Apr-22	0.0	
Thu 7-Apr-22	0.0	
Fri 8-Apr-22	0.0	
Sat 9-Apr-22	0.0	
Sun 10-Apr-22	0.0	
Mon 11-Apr-22	0.0	
Tue 12-Apr-22	0.0	
Wed 13-Apr-22	0.0	
Thu 14-Apr-22	0.0	
Fri 15-Apr-22	0.0	
Sat 16-Apr-22	0.0	
Sun 17-Apr-22	0.0	
Mon 18-Apr-22	0.0	
Tue 19-Apr-22	0.0	
Wed 20-Apr-22	0.0	
Thu 21-Apr-22	0.0	
Fri 22-Apr-22	0.0	
Sat 23-Apr-22	0.0	
Sun 24-Apr-22	0.0	
Mon 25-Apr-22	0.0	
Tue 26-Apr-22	0.0	
Wed 27-Apr-22	0.0	
Thu 28-Apr-22	0.0	
Fri 29-Apr-22	0.0	
Sat 30-Apr-22	0.0	
Total	0.0	

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

Day	Stromlo WTP ML			Googong WTP ML	Transfer from SWTP to Googong res.
	M'bidgee	Cotter	Bendora		
1	0.0	0.0	69.3	61.7	0.0
2	0.0	0.0	20.6	110.0	0.0
3	0.0	0.0	0.0	128.5	0.0
4	0.0	0.0	0.0	118.7	0.0
5	0.0	0.0	0.0	59.1	0.0
6	0.0	0.0	0.0	118.4	0.0
7	0.0	0.0	0.0	138.5	0.0
8	0.0	0.0	0.0	138.0	0.0
9	0.0	0.0	0.0	136.5	0.0
10	0.0	0.0	0.0	123.6	0.0
11	0.0	0.0	0.0	102.2	0.0
12	0.0	0.0	0.0	128.9	0.0
13	0.0	0.0	0.0	140.7	0.0
14	0.0	0.0	0.0	129.1	0.0
15	0.0	0.0	0.0	126.8	0.0
16	0.0	0.0	0.0	127.6	0.0
17	0.0	0.0	0.0	119.2	0.0
18	0.0	0.0	0.0	116.6	0.0
19	0.0	0.0	0.0	109.4	0.0
20	0.0	0.0	0.0	110.6	0.0
21	0.0	0.0	0.0	112.4	0.0
22	0.0	0.0	0.0	111.4	0.0
23	0.0	0.0	0.0	109.1	0.0
24	0.0	0.0	0.0	109.9	0.0
25	0.0	0.0	0.0	109.1	0.0
26	0.0	0.0	0.0	110.2	0.0
27	0.0	0.0	0.0	126.3	0.0
28	0.0	0.0	0.0	130.8	0.0
29	0.0	0.0	0.0	130.8	0.0
30	0.0	0.0	0.0	119.7	0.0
Total	0.0	0.0	89.9	3513.7	0.0

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