

Licence WU67 Monthly Environmental Flow Report March 2022

Version number 1 Effective date 14 April 2022

Document management

Document summary

Title	Licence WU67 Monthly Environmental Flow Report March 2022
Version	1.00
Document status	Final
Date of issue	14 April 2022

Version control

Version	Author	Date	Description	Checked by
1.00	C. Martin	14/3/21	Report for March 2022	S. McLaren

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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

Reservoir	Notes
Corin	Corin Dam spilled throughout March.
	Releases were at licence requirements throughout March.
Bendora	Bendora Dam spilled for the majority of March.
	Releases from the dam 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 to the end of March and into April.
Cotter	Cotter Dam spilled throughout March.
	Releases were at licence requirements throughout March.
	The bi-monthly riffle release was achieved via spillway flow
Googong	Googong Dam spilled throughout March.
	The bi-monthly riffle release was achieved via spillway flow
	Googong mini-hydro operated for the majority of March. Releases were above licence requirements while the mini-hydro was operating.

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

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 March.
Murrumbidgee To Cotter Eflow	M2C did not operate in March.
Murrumbidgee to Googong	M2G did not operate in March.
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 (+) *	45	72		
Monthly 75% of the 80 th %tile ML #	450	720		
Additional release required?	No	No	No	No
Current month's release target	810	1026	450	300

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

	410730 Gingera	410730 Gingera (verified)	Environmental flow release below Corin Date	Daily base flow		+/- 50%	Natural Flow.	Calculated Natural Flow. (Verified)	Adjusted daily base flow. EOM = Revised monthly target	410752 Corin D/S (Unverified)	410752 Corin D/S (Verified)	EOM Excess (+) / Shortfall (-) to carry forward	EOM Correction to 410730 , Verified Vs unverified	EOM Correction to 410752 , Verified Vs unverified	Comments
Previo	ous months a	liustment			,		, ,	, ,	-34.1	· · /	<u>, ,</u>				
	212.29	•	Tue 1-Mar-22	11.00		16.5	303.2	280.4		287.89	292.2				
	223.04		Wed 2-Mar-22	11.00		16.5									
	188.39		Thu 3-Mar-22			5.5		279.1							
	167.52		Fri 4-Mar-22			5.5									
	269.6	221.5	Sat 5-Mar-22	11.00		5.5	385.1	316.4	11.0	305.7	310.5				
	251.5	286.3	Sun 6-Mar-22	11.00		5.5	359.2	408.9	11.0	433.5	438.4				
	216.4		Mon 7-Mar-22	11.00		5.5		314.2					1		
	216.4	262.9	Tue 8-Mar-22	11.00		5.5	309.1	375.5	11.0	428.5	369.7				
	300.14	322.2	Wed 9-Mar-22	11.00		5.5	428.7	460.2	11.0	355.83	427.2				
	296.72	248.7	Thu 10-Mar-22	11.00		16.5	423.8	355.2	11.0	324.97	355.8				
	241.19	219.4	Fri 11-Mar-22	11.00		16.5	344.5	313.4	11.0	304.1	324.8				
	215.00	200.1	Sat 12-Mar-22	11.00		16.5	307.1	285.8	11.0	286.2	304.1				
	196.40	183.3	Sun 13-Mar-22	11.00		16.5	280.5	261.8	11.0	262.9	286.2				
	180.15	169.7	Mon 14-Mar-22	11.00		16.5	257.3	242.4	11.0		261.9				
	160.96	161.7	Tue 15-Mar-22	11.00		16.5	229.9	231.0	11.0	250.8	3 248.9				
	158.23	158	Wed 16-Mar-22	11.00		16.5	226.0	225.7	11.0	244.2	242.3				
	155.19	157	Thu 17-Mar-22	11.00		5.5	221.7	224.2	11.0	245.9	244				
	163.78	155.9	Fri 18-Mar-22	11.00		5.5	233.9	222.7	11.0	253.19	251.6				
	151.21	160.9	Sat 19-Mar-22	11.00		5.5	216.0	229.8	11.0	302.06	300.8				
	136.04	138.1	Sun 20-Mar-22	11.00		5.5	194.3	197.2	11.0	248.71	243.5				
		129.8	Mon 21-Mar-22	11.00		5.5		185.4	11.0	221.45	5 220				
	122.00	122.7	Tue 22-Mar-22	11.00		5.5	174.3	175.3	11.0	208.50	207.1				
	123.43	124.3	Wed 23-Mar-22	11.00		5.5	176.3	177.5	11.0	204.14	202.8				
	117.25	117.6	Thu 24-Mar-22	11.00		16.5	167.5	168.0	11.0	193.87	7 192.6				
	111.68	113.9	Fri 25-Mar-22	11.00		16.5	159.5	162.7	11.0	189.21	187.9				
	107.98	109.1	Sat 26-Mar-22	11.00		16.5	154.2	155.8	11.0	180.52	2 178.7				
	106.15	107.1	Sun 27-Mar-22	11.00		16.5	151.6	153.0	11.0	176.71	174.4				
	108.46	108.2	Mon 28-Mar-22	11.00		16.5	154.9	154.5	11.0	178.89	176.5				
	103.08	105.8	Tue 29-Mar-22	11.00		16.5	147.2	151.1	11.0	184.71	182.2				
	100.24	100.9	Wed 30-Mar-22	11.00		16.5	143.2	144.1	11.0	172.83	3 170.5				
	98.09	99.13	Thu 31-Mar-22	11.00		7.5	140.1	141.6	11.0	184.03	3 178.7				
SUM	5,198.53	5298.1		341.0	0.0	348.5	7425.1	7567.3	306.9	7928.1	8269.4	45.0	1.9%	4.3%	

Table 5 - Monthly Environmental Flow release data for Bendora dam

SUM	Gingera	410730 Gingera (verified)	Environmental flow release below Bendora Date	Daily base flow		+/- 50%	Natural Flow.	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
Previo	us months a	adjustmer	nt						-58.9						
	212.29	196.3	Tue 1-Mar-22	19.00	i i	9.5	467.0	431.9	19.0	218.6	220.1				
	223.04	231.2	Wed 2-Mar-22	19.00	1	28.5	490.7	508.6	19.0	262.9	260.4				
	188.39	195.4	Thu 3-Mar-22	19.00	1	28.5	414.5	429.9	19.0	264.2	262.4				
	167.52	171	Fri 4-Mar-22	19.00	1	28.5	368.5	376.2	19.0	208.9	212.4				
	269.6	221.5	Sat 5-Mar-22	19.00	1	28.5	593.1	487.3	19.0	201.1	204.5				
	251.5	286.3	Sun 6-Mar-22	19.00	1	28.5	553.3	629.9	19.0	380.2	372.3				
	216.4	220	Mon 7-Mar-22	19.00	1	28.5	476.1	484.0	19.0	345.3	337.3				
	216.4	262.9	Tue 8-Mar-22	19.00	1	28.5	476.1	578.4	19.0	274.2	274.2				
	300.14	322.2	Wed 9-Mar-22	19.00	1	9.5	660.3	708.8	19.0	342.5	339.4				
	296.72	248.7	Thu 10-Mar-22	19.00		9.5	652.8	547.1	19.0	299.7	291.4				
	241.19	219.4	Fri 11-Mar-22	19.00		9.5	530.6	482.7	19.0	251.9	247.5				
	215.00	200.1	Sat 12-Mar-22	19.00	1	9.5	473.0	440.2	19.0	222.8	221.8				
	196.40	183.3	Sun 13-Mar-22	19.00	1	9.5	432.1	403.3		200.6					
	180.15	169.7	Mon 14-Mar-22	19.00	1	9.5	396.3	373.3	19.0	178.8	178				
	160.96	161.7	Tue 15-Mar-22	19.00		9.5	354.1	355.7	19.0	157.5	156.1				
	158.23	158	Wed 16-Mar-22	19.00		28.5	348.1	347.6	19.0	139.5	138.9				
	155.19	157	Thu 17-Mar-22	19.00		28.5	341.4	345.4	19.0	138.3	137.5				
	163.78	155.9	Fri 18-Mar-22			28.5				136.25					
	151.21	160.9	Sat 19-Mar-22			28.5		354.0		179.04					
	136.04	138.1	Sun 20-Mar-22	19.00		28.5	299.3	303.8	19.0	169.52	166.5				
		129.8	Mon 21-Mar-22	19.00		28.5		285.6	19.0	135.26	135				
	122.00	122.7	Tue 22-Mar-22			28.5		269.9		109.35					
	123.43	124.3	Wed 23-Mar-22	19.00		9.5	271.5	273.5	19.0	155.18	154.3				Dam release increased to reduce reservoir level to facilitate Dam Safety inspection of stilling basin
	117.25	117.6	Thu 24-Mar-22	19.00		9.5	258.0	258.7	19.0	204.05	194.9				
	111.68	113.9	Fri 25-Mar-22	19.00		9.5	245.7	250.6	19.0	241.48	229.3				
	107.98	109.1	Sat 26-Mar-22	19.00		9.5	237.6	240.0	19.0	253.76	240.3				
	106.15	107.1	Sun 27-Mar-22	19.00		9.5	233.5	235.6	19.0	252.29	237.7				
	108.46	108.2	Mon 28-Mar-22	19.00		9.5	238.6	238.0	19.0	244.85	231.3				
	103.08	105.8	Tue 29-Mar-22	19.00		9.5	226.8	232.8	19.0	240.57	226.8				
	100.24	100.9	Wed 30-Mar-22	19.00		36.0	220.5	222.0	19.0	237.38	224.4				
	98.09	99.13	Thu 31-Mar-22	19.00		36.0	215.8	218.1	19.0	239.31	222.5				
SUM	5.198.53	5298.1		589.0	0.0	613.5	11436.8	11655.9	530.1	6885.4	6742.9	72.0	1.9%	-2.1%	

SUM		Environmental flow release below Cotter Date	Daily base flow	Additional release (pool / riffle)	EOM = Revised monthly target		410700 Cotter D/S (Verified)	EOM Excess (+) / Shortfall (-)	EOM Correction to 410700 , Verified Vs unverified	Comments
Previo	us n	nonths adjustmen	t		0.0					
		Tue 1-Mar-22			15.0	323.9	323.9			
		Wed 2-Mar-22	15		15.0	318.8	318.8			
		Thu 3-Mar-22	15		15.0	334.8	334.8			
		Fri 4-Mar-22	15		15.0	304.5	304.5			
		Sat 5-Mar-22	15		15.0	329.2	329.2			
		Sun 6-Mar-22	15		15.0	483.4	483.4			
		Mon 7-Mar-22	15		15.0	471.0	471			
		Tue 8-Mar-22	15		15.0	395.5	395.5			
		Wed 9-Mar-22	15		15.0	375.1	362.9			
		Thu 10-Mar-22	15		15.0	372.7	356.8			
		Fri 11-Mar-22	15	100	100.0	325.5	313.6			
		Sat 12-Mar-22	15		15.0	292.1	283.7			
		Sun 13-Mar-22	15		15.0	270.8	263.3			
		Mon 14-Mar-22	15		15.0	248.3	241.8			
		Tue 15-Mar-22	15		15.0	225.4	219.8			
		Wed 16-Mar-22	15		15.0	204.0	199			
		Thu 17-Mar-22	15		15.0	197.8	193.4			
		Fri 18-Mar-22	15		15.0	198.3	194.6			
		Sat 19-Mar-22	15		15.0	209.0	205.8			
		Sun 20-Mar-22	15		15.0	224.2	221.6			
		Mon 21-Mar-22	15		15.0	205.5	203.5			
		Tue 22-Mar-22	15		15.0	178.7	177.3			
		Wed 23-Mar-22	15		15.0	150.6	150			
		Thu 24-Mar-22			15.0	198.10	198.1			
		Fri 25-Mar-22			15.0	226.41				
		Sat 26-Mar-22	15		15.0	260.72				
		Sun 27-Mar-22			15.0	269.80				
		Mon 28-Mar-22			15.0	292.46				
		Tue 29-Mar-22			15.0	291.36				
		Wed 30-Mar-22			15.0	276.89				
		Thu 31-Mar-22			15.0	263.4				
SUM			465.0	100.0	550.0	8718.3	8645.8	8095.8	-0.8%	

Table 6 - Monthly Environmental Flow release data for Cotter dam

	410781 Upstream Googong (Unverified)	410781 Upstream Googong (Verified)	Environmental flow release below Googong Date	Daily base flow	Additional release (pool / riffle)	Calculated Natural Flow. (Unverified)	Calculated Natural Flow. (Verified)	EOM = Revised monthly target	410760 Wickerslack (Unverified)	410760 Wickerslac k (Verified)	EOM Excess (+) / Shortfall (-)		EOM Correction to 410760 , Verified Vs unverified	Comments
Previo	us month	s adjustm	ent											
	1713.8	1584	Tue 1-Mar-22	2 10.0		2193.7	2027.5	10.0	2059.42	2059				
	2581.6	2313	Wed 2-Mar-22	2 10.0)	3304.4	2960.6	10.0	2225.05	2225				
	4360.2	4301.0	Thu 3-Mar-22	2 10.0)	5581.0	5505.3	10.0	4003.86	4004				
	2935.5	3170.0	Fri 4-Mar-22	2 10.0		3757.5	4057.6	10.0	4311.9	4312				
	2551.8	2390.0	Sat 5-Mar-22	2 10.0)	3266.3	3059.2	10.0	3058.2	3058				
	3738.1	3819.0	Sun 6-Mar-22	2 10.0)	4784.8	4888.3	10.0	4151.9	4152				
	2224.3	2360.0	Mon 7-Mar-22	2 10.0	1	2847.0	3020.8	10.0	3582.9	3583				
	2224.2		Tue 8-Mar-22		1	2847.0			2791.3					
	2995.86	3769.0	Wed 9-Mar-22)	3834.7			4182.2					
	3573.55	2382.0	Thu 10-Mar-22	2 10.0)	4574.1	3049.0	10.0	3463.2	3463				
	2140.6	1634.0	Fri 11-Mar-22	2 10.0	100	2740.0	2091.5	100.0	2228.2	2228				
	1555.4	1315.0	Sat 12-Mar-22			1990.9			1660.5					
	1266.0	1105.0	Sun 13-Mar-22			1620.5	1414.4	10.0	1332.8					
	1069.6	956.0	Mon 14-Mar-22	2 10.0)	1369.0	1223.7	10.0	1131.1	1131				
	823.9	837.5	Tue 15-Mar-22		1	1054.5			977.18					
	765.2	780.6	Wed 16-Mar-22)	979.4			875.28					
	739.8	739.9	Thu 17-Mar-22	2 10.0		947.0	947.1	10.0	809.15	809.2				
	658.61	681.1	Fri 18-Mar-22	2 10.0	1	843.0	871.8	10.0	800.76	800.8				
	610.02		Sat 19-Mar-22			780.8			709.10					
	533.71	545.6	Sun 20-Mar-22	2 10.0		683.2	698.4	10.0	640.58	640.6				
		495.0	Mon 21-Mar-22	2 10.0)		633.6	10.0	570.44	570.5				
	453.20	457.8	Tue 22-Mar-22			580.1	586.0		520.81					
	430.55	434.7	Wed 23-Mar-22			551.1	556.4		491.13					
	413.21	416.6	Thu 24-Mar-22			528.9	533.2	10.0	461.99					
	398.97	402.9	Fri 25-Mar-22			510.7			416.49					
	376.25		Sat 26-Mar-22			481.6			440.46					
	366.62		Sun 27-Mar-22			469.3			397.97					
	365.14		Mon 28-Mar-22			467.4			381.46					
	364.73		Tue 29-Mar-22			466.9			386.40					
	334.63		Wed 30-Mar-22			428.3			368.59					
	319.17	322.8	Thu 31-Mar-22	2 10.0		408.5	413.2	10.0	356.81	356.8				
SUM	42884.0	42306.2		310.0	100.0	54891.6	54151.9	400.0	49787.2	49786.9	49386.9	-1.3%	0.0%	

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 b	pelow Cotter Dam	
Date	E-flow sourced from Murrumbidgee via M2C	E-flow sourced from Cotter Dam release/spill	Comments
Tue 1-Mar-22	0.0	323.9	
Wed 2-Mar-22	0.0	318.8	
Thu 3-Mar-22	0.0	334.8	
Fri 4-Mar-22	0.0	304.5	
Sat 5-Mar-22	0.0	329.2	
Sun 6-Mar-22	0.0	483.4	
Mon 7-Mar-22	0.0	471	
Tue 8-Mar-22	0.0	395.5	
Wed 9-Mar-22	0.0	362.9	
Thu 10-Mar-22	0.0	356.8	
Fri 11-Mar-22	0.0	313.6	
Sat 12-Mar-22	0.0	283.7	
Sun 13-Mar-22	0.0	263.3	
Mon 14-Mar-22	0.0	241.8	
Tue 15-Mar-22	0.0	219.8	
Wed 16-Mar-22	0.0	199	
Thu 17-Mar-22	0.0	193.4	
Fri 18-Mar-22	0.0	194.6	
Sat 19-Mar-22	0.0	205.8	
Sun 20-Mar-22	0.0	221.6	
Mon 21-Mar-22	0.0	203.5	
Tue 22-Mar-22	0.0	177.3	
Wed 23-Mar-22	0.0	150	
Thu 24-Mar-22	0.0	198.1	
Fri 25-Mar-22	0.0	226.9	
Sat 26-Mar-22	0.0	261.9	
Sun 27-Mar-22	0.0	271.6	
Mon 28-Mar-22	0.0	295.4	
Tue 29-Mar-22	0.0	294.9	
Wed 30-Mar-22	0.0	280.9	
Thu 31-Mar-22	0.0	267.9	
Total	0.0	8645.8	

Table 8 – Monthly flow data for Cotter River Environmental Flows

Date	M2G Flow	Comments
Tue 1-Mar-22	0.0	
Wed 2-Mar-22	0.0	
Thu 3-Mar-22	0.0	
Fri 4-Mar-22	0.0	
Sat 5-Mar-22	0.0	
Sun 6-Mar-22	0.0	
Mon 7-Mar-22	0.0	
Tue 8-Mar-22	0.0	
Wed 9-Mar-22	0.0	
Thu 10-Mar-22	0.0	
Fri 11-Mar-22	0.0	
Sat 12-Mar-22	0.0	
Sun 13-Mar-22	0.0	
Mon 14-Mar-22	0.0	
Tue 15-Mar-22	0.0	
Wed 16-Mar-22	0.0	
Thu 17-Mar-22	0.0	
Fri 18-Mar-22	0.0	
Sat 19-Mar-22	0.0	
Sun 20-Mar-22	0.0	
Mon 21-Mar-22	0.0	
Tue 22-Mar-22	0.0	
Wed 23-Mar-22	0.0	
Thu 24-Mar-22	0.0	
Fri 25-Mar-22	0.0	
Sat 26-Mar-22	0.0	
Sun 27-Mar-22	0.0	
Mon 28-Mar-22	0.0	
Tue 29-Mar-22	0.0	
Wed 30-Mar-22	0.0	
Thu 31-Mar-22	0.0	
Total	0.0	

Day	Stromlo WTP ML			Googong WTP ML	Transfer from SWTP to Googong res.
	M'bidgee	Cotter	Bendora		
1	0.0	0.0	112.8	0.0	0.0
2	0.0	0.0	119.9	5.7	0.0
3	0.0	0.0	122.0	0.0	0.0
4	0.0	0.0	124.7	0.0	0.0
5	0.0	0.0	123.0	0.0	0.0
6	0.0	0.0	120.7	0.0	0.0
7	0.0	0.0	112.2	0.0	0.0
8	0.0	0.0	125.5	0.0	0.0
9	0.0	0.0	136.9	0.0	0.0
10	0.0	0.0	135.8	0.0	0.0
11	0.0	0.0	131.9	0.0	0.0
12	0.0	0.0	123.1	0.0	0.0
13	0.0	0.0	125.4	0.0	0.0
14	0.0	0.0	125.1	0.0	0.0
15	0.0	0.0	127.4	0.0	0.0
16	0.0	0.0	141.0	0.0	0.0
17	0.0	0.0	147.2	0.0	0.0
18	0.0	0.0	137.4	0.0	0.0
19	0.0	0.0	134.4	0.0	0.0
20	0.0	0.0	131.1	0.0	0.0
21	0.0	0.0	126.0	0.0	0.0
22	0.0	0.0	131.5	0.0	0.0
23	0.0	0.0	151.6	0.0	0.0
24	0.0	0.0	141.5	11.3	0.0
25	0.0	0.0	153.9	0.0	0.0
26	0.0	0.0	147.1	0.0	0.0
27	0.0	0.0	133.3	0.0	0.0
28	0.0	0.0	146.9	0.0	0.0
29	0.0	0.0	154.7	0.0	0.0
30	0.0	0.0	145.4	0.0	0.0
31	0.0	0.0	104.5	49.5	0.0
Total	0.0	0.0	4093.9	66.5	0.0

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

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