

Licence WU67 Monthly Environmental Flow Report February 2021

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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.
	On 3 February ALS observed a rock barrier had formed in the Cotter River upstream of the control weir for gauging site 410752 Cotter Below Corin. ALS advised that flow data from site 410752 will be inaccurate for as long as the barrier has been in place. The barrier has formed sometime between early January 2021, when ALS last visited the site, and February 3.
	The rock barrier was removed by ALS on 3 March. Once the barrier was removed a difference in flow of 250l/s was determined but this only applies to this stage range. Without several gauging's across the range of flows during the period the rocks were there, it is difficult to accurately determine flow during the period.
	Because controlled releases from the Corin discharge system are initially set using a flow meter located within the outlet pipework, and Corin spilled throughout February, Icon Water is confident that releases met licence requirements for February.
Bendora	Bendora Dam started spilling on 6 February and continues to spill for the remainder of the month.
	The bi-monthly riffle release was achieved on 15 February from a combination of controlled release and spillway flow.
	Releases were at licence requirements throughout February.
Cotter	Cotter Dam spilled throughout February.
	The bi-monthly riffle release was achieved on 21 February from a combination of controlled release and spillway flow.
	Releases were at licence requirements throughout February.
Googong	Googong Dam did not spill in February.
	Googong mini-hydro was operated through all 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 operated from 9 to 12 February for maintenance of the pumps.
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 (+) *	34.1	58.9		
Monthly 75% of the 80 th %tile ML #	341.0	589.0		
Additional release required?	No	No	No	Yes
Current month's release target	306.9	530.1	465	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

	410730 Gingera (unverified)	410730 Gingera	Environmental flow release below Corin Date	Daily base flow	Additional release (pool / riffle)	+/- 50% release	Calculated Natural Flow. (Unverified)	Calculated Natural Flow. (Verified)	Adjusted daily base flow. EOM = Revised monthly target	Corin D/S	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	us month	s adjustme	nt						-28.0						
	110.6	86.86	Mon 1-Feb-21	10.00		7.5	158.0	124.1	10.0	215.2	215.2				
	105.0	125.6	Tue 2-Feb-21	10.00		7.5		179.4	10.0	282.7	281				
	75.0	77.38	Wed 3-Feb-21	10.00		7.5	107.1	110.5	10.0	201.2	198.5				
	69.1	69.42	Thu 4-Feb-21	10.00		15.0	98.7	99.2	10.0	171.3	168.5				
	225.0	83.82	Fri 5-Feb-21	10.00		15.0	321.4	119.7	10.0	218.5	213.8				
	773.1	833.4	Sat 6-Feb-21	10.00		15.0	1104.2	1190.3	10.0	880.9	872.3				
	343.4	377.5	Sun 7-Feb-21	10.00		15.0	490.5	539.2	10.0	680.2	670.5				
	256.0	268.2	Mon 8-Feb-21	10.00		15.0	365.6	383.1	10.0	489.4	477.6				
	217.21	223.2	Tue 9-Feb-21	10.00		15.0	310.2	318.8	10.0	430.97	414				
	191.96	196.9	Wed 10-Feb-21	10.00		15.0	274.2	281.2	10.0	367.56	345.8				
	169.34	173.8	Thu 11-Feb-21	10.00		5.0	241.9	248.2	10.0	337.61	318.8				
	160.49	160	Fri 12-Feb-21	10.00		5.0	229.2	228.5	10.0	312.03	297.7				
	147.57	152.7	Sat 13-Feb-21	10.00	150	5.0	210.8	218.1	150.0	297.51	278.1				
	131.25	133.9	Sun 14-Feb-21	10.00	150	5.0	187.5	191.2	150.0	270	249.1				
		123.4	Mon 15-Feb-21	10.00	150	5.0		176.3	150.0	258.93	236.5				Riffle release achieved
	118.96	119.8	Tue 16-Feb-21	10.00		5.0	169.9	171.1	10.0	227.35	204.7				
	106.8	109.5	Wed 17-Feb-21	10.00		5.0	152.5	156.4	10.0	207.97	184.7				
	101.38	101.9	Thu 18-Feb-21	10.00		15.0	144.8	145.5	10.0	198.18	174.6				
	102.08	102.3	Fri 19-Feb-21	10.00		15.0	145.8	146.1	10.0	197.14	172.1				
	94.87	96.57	Sat 20-Feb-21	10.00		15.0	135.5	137.9	10.0	194.98	169				
	95.19	91.6	Sun 21-Feb-21	10.00		15.0	136.0	130.8	10.0	187.56	160.8				
	94.66	99.19	Mon 22-Feb-21	10.00		15.0	135.2	141.7	10.0	197.35	168.3				
	86.21	86.58	Tue 23-Feb-21	10.00		15.0	123.1	123.7	10.0	176.03	148.5				
	85.19	85.25	Wed 24-Feb-21	10.00		15.0	121.7	121.8	10.0	165.03	137.5				
	86.12	86.12	Thu 25-Feb-21	10.00		5.0	123.0	123.0	10.0	169.63	140.5				
	78.1	80.22	Fri 26-Feb-21	10.00		5.0	111.6	114.6	10.0	164.55	133.7				
	73.35		Sat 27-Feb-21	10.00		5.0		105.8	10.0	151.3					
	68.94		Sun 28-Feb-21	10.00		5.0		99.8	10.0	147.37					
UM	4166.8			280.0			5951.5		672.0	7798.5	11692.7	34.1	2.9%	49.9%	

Table 5 - Monthly Environmental Flow release data for Bendora dam

	410730	410730	Environmental flow release		Additional release	Planned +/- 50%	Calculated Natural	Calculated Natural	Adjusted daily base flow.	410747 Bendora	410747 Bendora	EOM Excess (+) / Shortfall (-)	EOM Correction to 410730 ,	EOM Correction to 410747 ,	
	Gingera	Gingera	below Bendora	Daily base	(pool /	release	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							-44.8						
	110.6	86.86	Mon 1-Feb-21	16.00		11.5	243.3	191.1	16.0	10.3	14.16				
	105.0	125.6	Tue 2-Feb-21	16.00		11.5	231.0	276.3	16.0	14.3	14.29				
	75.0	77.38	Wed 3-Feb-21	16.00		24.0	164.9	170.2	16.0	17.7	21.26				
	69.1	69.42	Thu 4-Feb-21	16.00		24.0	152.0	152.7	16.0	19.5	25.16				
	225.0	83.82	Fri 5-Feb-21	16.00		24.0	495.0	184.4	16.0	19.9	25.26				
	773.1	833.4	Sat 6-Feb-21	16.00		24.0	1700.8	1833.5	16.0	20.5	26.4				
	343.4	377.5	Sun 7-Feb-21			24.0	755.5	830.5	16.0	888.3					
	256.0	268.2	Mon 8-Feb-21			24.0	563.1	590.0		871.0					
	217.21	223.2	Tue 9-Feb-21	16.00		24.0	477.9	491.0	16.0	557.2	523.9				
	191.96	196.9	Wed 10-Feb-21	16.00		8.0	422.3	433.2	16.0	396.95	380.5				
	169.34	173.8	Thu 11-Feb-21	16.00		8.0	372.5	382.4	16.0	320.28	312.2				
	160.49	160	Fri 12-Feb-21	16.00		8.0	353.1	352.0	16.0	267.16	259				
	147.57	152.7	Sat 13-Feb-21	16.00	150	8.0	324.7	335.9	150.0	224.4	223.2				
	131.25	133.9	Sun 14-Feb-21				288.8	294.6	150.0	187.8	187.7				
		123.4	Mon 15-Feb-21		150			271.5	150.0	153.54	153.6				Riffle release achieved
	118.96	119.8	Tue 16-Feb-21	16.00		8.0	261.7	263.6	16.0	111.76	114.3				
	106.80	109.5	Wed 17-Feb-21	16.00		24.0	235.0	240.9	16.0	88.03	90.57				
	101.38	101.9	Thu 18-Feb-21	16.00		24.0	223.0	224.2	16.0	72.9	75.96				
	102.08	102.3	Fri 19-Feb-21	16.00		24.0	224.6	225.1	16.0	68.36	72.79				
	94.87	96.57	Sat 20-Feb-21			24.0				59.41					
	95.19	91.6	Sun 21-Feb-21			24.0				43.12					
	94.66	99.19	Mon 22-Feb-21			24.0				33.61					
	86.21	86.58	Tue 23-Feb-21			24.0				37.92					
	85.19	85.25	Wed 24-Feb-21			8.0				22.72					
	86.12	86.12	Thu 25-Feb-21	16.00		8.0	189.5	189.5	16.0	22.47	27.48				
	78.10	80.22	Fri 26-Feb-21			8.0	171.8			19.78					
	73.35	74.08	Sat 27-Feb-21	16.00		8.0	161.4	163.0	16.0	12.67	17.32				
	68.94	69.86	Sun 28-Feb-21	16.00		8.0	151.7	153.7	16.0	11.29	15.59				
SUM	4,166.84	4289.1		448.0	450.0	455.0	9167.0	9435.9	805.2	4572.8	5525.6	58.9	2.9%	20.8 %	

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 Cotter D/S (Unverified)	410700 Cotter D/S (Verified)	EOM Excess (+) / Shortfall (-)	EOM Correction to 410700 , Verified Vs unverified	Comments
Previous	months adjustment			0.0					
	Mon 1-Feb-21	15		15.0	78.4	74.81			
	Tue 2-Feb-21	15		15.0	77.4	77.45			
	Wed 3-Feb-21	15		15.0	59.4	59.45			
	Thu 4-Feb-21	15		15.0	50.6	50.64			
	Fri 5-Feb-21			15.0	61.2	61.24			
	Sat 6-Feb-21			15.0	313.3	313.3			
	Sun 7-Feb-21			15.0	563.2				
	Mon 8-Feb-21			15.0	1017.0	1017			
	Tue 9-Feb-21			15.0	794.62				
	Wed 10-Feb-21			15.0	587.85	587			
	Thu 11-Feb-21			15.0	450.09	447.9			
	Fri 12-Feb-21			15.0	368.19	366.7			
	Sat 13-Feb-21			15.0	317.3	316.2			
	Sun 14-Feb-21			15.0	269.13	268.3			
	Mon 15-Feb-21			15.0	226.37	225.6			
	Tue 16-Feb-21	15		15.0	185.06	184.3			
	Wed 17-Feb-21	15		15.0	153.23	152.5			
	Thu 18-Feb-21			15.0	124.18	123.5			
	Fri 19-Feb-21			15.0	108.75	108.1			
	Sat 20-Feb-21			15.0	107.44	106.8			
	Sun 21-Feb-21			15.0	107.35				riffle achieved
	Mon 22-Feb-21			15.0	96.33				
	Tue 23-Feb-21			15.0	61.37	60.81			
	Wed 24-Feb-21			15.0	52.58				
	Thu 25-Feb-21	15		15.0	54.13	53.25			
	Fri 26-Feb-21	15		15.0	56.35	55.26			
	Sat 27-Feb-21	15		15.0	38.39	37.37			
	Sun 28-Feb-21	15		15.0	36.68	35.76			
SUM		420.0	0.0	420.0	6416.1	6395.5	5975.5	-0.3%	

Table 7 - Monthly Environmental Flow release data for Googong dam

SUM	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 410781 , Verified Vs unverified	EOM Correction to 410760 , Verified Vs unverified	Comments
Previo	us months	adjustme	ent											
	92.1		Mon 1-Feb-21	10.0		117.9)	10.0	98.8	96.14				
	81.0		Tue 2-Feb-21	10.0		103.7	,	10.0	102.2	102.2				
	74.7		Wed 3-Feb-21			95.7		10.0	77.0					
	59.4		Thu 4-Feb-21	10.0		76.0)	10.0	73.1	73.09				
	50.8		Fri 5-Feb-21			65.0		10.0	73.4					
	85.357		Sat 6-Feb-21			109.3	3	10.0	160.5					
	145.134		Sun 7-Feb-21			185.8		10.0	96.0					
	111.429		Mon 8-Feb-21			142.6		10.0	94.1					
	77.48		Tue 9-Feb-21			99.2		10.0	83.59					
	63.6		Wed 10-Feb-21			81.4		10.0	80.38					
	54.16		Thu 11-Feb-21			69.3		10.0	79.46					
	49.22		Fri 12-Feb-21			63.0		10.0	80.78					
	45.36		Sat 13-Feb-21			58.1		10.0	81.82					
	42.27		Sun 14-Feb-21			54.1		10.0	80.29					
	39.09		Mon 15-Feb-21			50.0		10.0	79.46					
	35.71		Tue 16-Feb-21			45.7		10.0	79.84					
	33.46		Sat 20-Feb-21			42.8		10.0	79.97					
	32.85		Sun 21-Feb-21			42.0		10.0	75.11					
	34.34		Mon 22-Feb-21			44.0		10.0	64.94					
	35.81		Tue 23-Feb-21			45.8		10.0	64.1					
	35.85		Wed 24-Feb-21			45.9		10.0	64.08					
	43.60		Thu 25-Feb-21			55.8		10.0	64.72					
	124.71		Fri 26-Feb-21			159.6		10.0	64.82					
	154.82		Sat 27-Feb-21			198.2		10.0	63.66					
	91.86		Sun 28-Feb-21			117.6		10.0	66.60					
	68.09		Mon 1-Mar-21			87.2		10.0	63.94					
	55.31		Tue 2-Mar-21			70.8		10.0	61.73					
	46.61		Wed 3-Mar-21	10.0		59.7	1	10.0	61.03					
SUM	1864.1	0.0		280.0	0.0	2386.0	0.0	280.0	2215.5	2212.9	1932.9	-100.0%	6 -0.1 %	

Note: 410781 Upstream Googong verified data is provided every second month.

Table 8 – Monthly flow data for Cotter River Environmental Flows

	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
Mon 1-Feb-21	0.0	74.81	
Tue 2-Feb-21	0.0	77.45	
Wed 3-Feb-21	0.0	59.45	
Thu 4-Feb-21	0.0	50.64	
Fri 5-Feb-21	0.0	61.24	
Sat 6-Feb-21	0.0	313.3	
Sun 7-Feb-21	0.0	563.2	Riffle release achieved
Mon 8-Feb-21	0.0	1017	
Tue 9-Feb-21	0.0	794.6	
Wed 10-Feb-21	0.0	587	
Thu 11-Feb-21	0.0	447.9	
Fri 12-Feb-21	0.0	366.7	
Sat 13-Feb-21	0.0	316.2	
Sun 14-Feb-21	0.0	268.3	
Mon 15-Feb-21	0.0	225.6	
Tue 16-Feb-21	0.0	184.3	
Wed 17-Feb-21	0.0	152.5	
Thu 18-Feb-21	0.0	123.5	
Fri 19-Feb-21	0.0	108.1	
Sat 20-Feb-21	0.0	106.8	
Sun 21-Feb-21	0.0	106.7	
Mon 22-Feb-21	0.0	95.7	
Tue 23-Feb-21	0.0	60.81	
Wed 24-Feb-21	0.0	52.06	
Thu 25-Feb-21	0.0	53.25	
Fri 26-Feb-21	0.0	55.26	
Sat 27-Feb-21	0.0	37.37	
Sun 28-Feb-21	0.0	35.76	
Total	0.0	6395.5	

Table 9 – Monthly flow data for Murrumbidgee to Googong

Date	Murrumbidgee at Angle crossing	M2G Flow	Comments
Mon 1-Feb-21	57.134	0.0	
Tue 2-Feb-21	93.814	0.0	
Wed 3-Feb-21	207.265	0.0	
Thu 4-Feb-21	231.267	0.0	
Fri 5-Feb-21	228.253	0.0	
Sat 6-Feb-21	1099.906	0.0	
Sun 7-Feb-21	698.903	0.0	
Mon 8-Feb-21	411.71	0.0	
Tue 9-Feb-21	446.291	14.05	Operated for pump maintenance
Wed 10-Feb-21	489.657	40.95	
Thu 11-Feb-21	407.516	48.95	
Fri 12-Feb-21	333.893	23.74	
Sat 13-Feb-21	288.183	0.0	
Sun 14-Feb-21	257.13	0.0	
Mon 15-Feb-21	235.852	0.0	
Tue 16-Feb-21	215.09	0.0	
Wed 17-Feb-21	202.848	0.0	
Thu 18-Feb-21	190.457	0.0	
Fri 19-Feb-21	169.46	0.0	
Sat 20-Feb-21	153.832	0.0	
Sun 21-Feb-21	141.185	0.0	
Mon 22-Feb-21	141.452	0.0	
Tue 23-Feb-21	133.339	0.0	
Wed 24-Feb-21	134.156	0.0	
Thu 25-Feb-21	150.341	0.0	
Fri 26-Feb-21	145.423	0.0	
Sat 27-Feb-21	140.613	0.0	
Sun 28-Feb-21	136.759	0.0	
Total	4201.951	0.0	

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

Day	Stromlo WTP ML			Googong WTP ML
	M'bidgee	Cotter	Bendora	WII IVIL
1	0.0	0.0	112.1	0.0
2	0.0	0.0	131.9	0.0
3	0.0	0.0	137.7	0.0
4	0.0	0.0	132.0	0.0
5	0.0	0.0	132.8	0.0
6	0.0	0.0	133.6	0.0
7	0.0	0.0	126.8	0.0
8	0.0	0.0	119.9	0.0
9	0.0	0.0	136.1	0.0
10	0.0	0.0	138.6	0.0
11	0.0	0.0	138.5	0.0
12	0.0	0.0	129.6	0.0
13	0.0	0.0	139.4	0.0
14	0.0	0.0	132.3	0.0
15	0.0	0.0	127.0	0.0
16	0.0	0.0	156.1	0.0
17	0.0	0.0	152.6	0.0
18	0.0	0.0	164.7	0.0
19	0.0	0.0	150.2	0.0
20	0.0	0.0	161.1	0.0
21	0.0	0.0	168.0	0.0
22	0.0	0.0	178.5	0.0
23	0.0	0.0	160.7	0.0
24	0.0	0.0	162.2	0.0
25	0.0	0.0	155.4	0.0
26	0.0	0.0	157.8	0.0
27	0.0	0.0	165.4	0.0
28	0.0	0.0	141.1	0.0
29				
30				
31				
Total	0.0	0.0	4042.1	0.0

Transfer from SWTP to Googong res.				
1001				
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