



Licence WU67 Monthly Environmental Flow Report November 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 November. Planned release variation was changed to +/-25% on 20 September to minimise dislodgement of Macquarie Perch eggs in downstream reaches. Releases were at licence requirements throughout November.
Bendora	Bendora Dam spilled throughout November. Planned release variation was changed to +/-25% on 20 September to minimise dislodgement of Macquarie Perch eggs in downstream reaches. Releases were at licence requirements throughout November.
Cotter	Cotter Dam spilled throughout November. The bi-monthly riffle release was achieved by spillway flows Releases were at licence requirements throughout November.
Googong	Googong Dam spilled throughout November. The bi-monthly riffle release was achieved by spillway flows The Googong mini-hydro generator operated for the majority of November. Releases 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 November.
Murrumbidgee To Cotter Eflow	M2C did not operate in November.
Murrumbidgee to Googong	M2G did not operate in November .
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 (+) *	80.6	127.1		
Monthly 75% of the 80 th %tile ML #	806	1270		
Additional release required?	No	No	No	No
Current month's release target	1097.4	1470.9	535	390

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										-129.0					
		1253	Tue 1-Nov-22	43.00		48.0		1789.7	43.0	1175.37	2103				410730 Gingera unverified data not available due to communication issues
		1001	Wed 2-Nov-22	43.00		48.0		1429.7	43.0	1042.71	1773				
		862	Thu 3-Nov-22	43.00		53.8		1231.2	43.0	893.77	1447				
		767.1	Fri 4-Nov-22	43.00		53.8		1095.6	43.0	784.19	1227				
		702.5	Sat 5-Nov-22	43.00		53.8		1003.4	43.0	711.3	1060				
		649.5	Sun 6-Nov-22	43.00		53.8		927.7	43.0	659.7	949.9				
		611.3	Mon 7-Nov-22	43.00		53.8		873.1	43.0	628.8	871.8				Rating table extrapolated
		552.8	Tue 8-Nov-22	43.00		53.8		789.6	43.0	604.6	813.8				Rating table extrapolated
		557.8	Wed 9-Nov-22	43.00		53.8		796.7	43.0	593.39	781.9				Rating table extrapolated
		494.9	Thu 10-Nov-22	43.00		32.3		706.9	43.0	573.38	736.3				
		440.3	Fri 11-Nov-22	43.00		32.3		628.9	43.0	531.1	632.4				
		405.4	Sat 12-Nov-22	43.00		32.3		579.0	43.0	495.0	562.1				
		609.2	Sun 13-Nov-22	43.00		32.3		870.1	43.0	594.3	780.8				
		675	Mon 14-Nov-22	43.00		32.3		964.1	43.0	708.2	1036				
		512.1	Tue 15-Nov-22	43.00		32.3		731.4	43.0	600.2	790.6				
		462.3	Wed 16-Nov-22	43.00		32.3		660.3	43.0	557.1	680.7				Rating table extrapolated
		431.4	Thu 17-Nov-22	43.00		53.8		616.2	43.0	529.8	620.8				
		398.5	Fri 18-Nov-22	43.00		53.8		569.2	43.0	491.14	543.6				
		380.8	Sat 19-Nov-22	43.00		53.8		543.9	43.0	477.45	523.4				
		484.5	Sun 20-Nov-22	43.00		53.8		692.0	43.0	544.98	644				
		568.1	Mon 21-Nov-22	43.00		53.8		811.4	43.0	584.75	734.3				Rating table extrapolated
		511.5	Tue 22-Nov-22	43.00		53.8		730.6	43.0	576.42	714.9				Rating table not available
		459.1	Wed 23-Nov-22	43.00		53.8		655.7	43.0	529.56	606.1				Rating table not available
		414.9	Thu 24-Nov-22	43.00		32.3		592.6	43.0	493.78	539.6				Rating table extrapolated
		383.8	Fri 25-Nov-22	43.00		32.3		548.2	43.0	461.92	495.8				Rating table extrapolated
		358.3	Sat 26-Nov-22	43.00		32.3		511.8	43.0	434.44	457.6				Rating table extrapolated
		342.3	Sun 27-Nov-22	43.00		32.3		488.9	43.0	415.96	432.3				
		325.1	Mon 28-Nov-22	43.00		32.3		464.3	43.0	400.30	410.8				
	297.8	301.9	Tue 29-Nov-22	43.00		32.3	425.4	431.2	43.0	378.32	382.4				
	287.2	289.1	Wed 30-Nov-22	43.00		32.3	410.3	412.9	43.0	358.95	358.9				
SUM	585.06	16205.5		1290.0	0.0	1300.0	835.6	23146.3	1161.0	17830.8	23710.8	80.6	2669.9%	33.0%	

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									-201.0						
		1253	Tue 1-Nov-22	67.00		75.0		2756.6	67.0	2663.40	2559				410730 Gingera unverified data not available due to communication issues
		1001	Wed 2-Nov-22	67.00		83.8		2202.2	67.0	2420.78	2365				
		862	Thu 3-Nov-22	67.00		83.8		1896.4	67.0	1864.85	1884				
		767.1	Fri 4-Nov-22	67.00		83.8		1687.6	67.0	1512.11	1556				
		702.5	Sat 5-Nov-22	67.00		83.8		1545.5	67.0	1279.1	1321				
		649.5	Sun 6-Nov-22	67.00		83.8		1428.9	67.0	1107.9	1154				
		611.3	Mon 7-Nov-22	67.00		83.8		1344.9	67.0	1003.4	1043				
		552.8	Tue 8-Nov-22	67.00		83.8		1216.2	67.0	905.4	950.3				
		557.8	Wed 9-Nov-22	67.00		50.3		1227.2	67.0	804.26	850.3				
		494.9	Thu 10-Nov-22	67.00		50.3		1088.8	67.0	787.34	833.6				
		440.3	Fri 11-Nov-22	67.00		50.3		968.7	67.0	675.2	722.7				
		405.4	Sat 12-Nov-22	67.00		50.3		891.9	67.0	600.5	641.4				
		609.2	Sun 13-Nov-22	67.00		50.3		1340.2	67.0	689.8	746.6				
		675	Mon 14-Nov-22	67.00		50.3		1485.0	67.0	1092.0	1153				
		512.1	Tue 15-Nov-22	67.00		50.3		1126.6	67.0	900.9	958				
		462.3	Wed 16-Nov-22	67.00		83.8		1017.1	67.0	760.2	806.5				
		431.4	Thu 17-Nov-22	67.00		83.8		949.1	67.0	678.6	730.8				
		398.5	Fri 18-Nov-22	67.00		83.8		876.7	67.0	610.37	657.3				
		380.8	Sat 19-Nov-22	67.00		83.8		837.8	67.0	571.57	613.9				
		484.5	Sun 20-Nov-22	67.00		83.8		1065.9	67.0	630.94	671.4				
		568.1	Mon 21-Nov-22	67.00		83.8		1249.8	67.0	718.79	757.5				
		511.5	Tue 22-Nov-22	67.00		83.8		1125.3	67.0	769.19	806.6				Rating table extrapolated
		459.1	Wed 23-Nov-22	67.00		50.3		1010.0	67.0	659.22	699.7				Rating table extrapolated
		414.9	Thu 24-Nov-22	67.00		50.3		912.8	67.0	593.27	631.9				
		383.8	Fri 25-Nov-22	67.00		50.3		844.4	67.0	533.40	572.5				
		358.3	Sat 26-Nov-22	67.00		50.3		788.3	67.0	476.35	515.9				
		342.3	Sun 27-Nov-22	67.00		50.3		753.1	67.0	442.42	481.6				
		325.1	Mon 28-Nov-22	67.00		50.3		715.2	67.0	416.13	450.9				
	297.8	301.9	Tue 29-Nov-22	67.00		50.3	655.2	664.2	67.0	389.37	425.5				
	287.2	289.1	Wed 30-Nov-22	67.00		51.3	631.9	636.0	67.0	352.17	385.8				
SUM	585.07	16205.5		2010.0	0.0	2002.3	1287.1	35652.1	1809.0	26908.9	27945.7	127.1	2669.9%	3.9%	

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					
	Tue 1-Nov-22	15		15.0	5044.57	5045				
	Wed 2-Nov-22	15		15.0	4948.13	4949				
	Thu 3-Nov-22	15		15.0	3979.99	3986				
	Fri 4-Nov-22	15		15.0	3031.27	3031				
	Sat 5-Nov-22	15		15.0	2395.50	2393				
	Sun 6-Nov-22	15		15.0	2042.79	2039				
	Mon 7-Nov-22	15		15.0	1730.49	1730				
	Tue 8-Nov-22	15		15.0	1567.13	1566				
	Wed 9-Nov-22	15		15.0	1409.62	1404				
	Thu 10-Nov-22	15		15.0	1283.59	1280				
	Fri 11-Nov-22	15		15.0	1163.88	1158				
	Sat 12-Nov-22	15	100	100.0	1049.05	1040			Riffle release achieved	
	Sun 13-Nov-22	15		15.0	1159.26	1147				
	Mon 14-Nov-22	15		15.0	1653.76	1641				
	Tue 15-Nov-22	15		15.0	1538.94	1523				
	Wed 16-Nov-22	15		15.0	1284.34	1270				
	Thu 17-Nov-22	15		15.0	1148.38	1131				
	Fri 18-Nov-22	15		15.0	1048.87	1033				
	Sat 19-Nov-22	15		15.0	973.58	962.2				
	Sun 20-Nov-22	15		15.0	1028.63	1009				
	Mon 21-Nov-22	15		15.0	1066.38	1044				
	Tue 22-Nov-22	15		15.0	1105.79	1088				
	Wed 23-Nov-22	15		15.0	1023.89	1006				
	Thu 24-Nov-22	15		15.0	928.80	911.2				
	Fri 25-Nov-22	15		15.0	855.44	840.2				
	Sat 26-Nov-22	15		15.0	772.54	755.3				
	Sun 27-Nov-22	15		15.0	708.66	694.8				
	Mon 28-Nov-22	15		15.0	685.04	670.7				
	Tue 29-Nov-22	15		15.0	608.52	592.7				
	Wed 30-Nov-22	15		15.0	572.20	552.5				
SUM		450.0	100.0		535.0	47809.03	47492.6	46957.6	-0.7%	

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
Previous months adjustment														
	3533.93	4355	Tue 1-Nov-22	10.00		4523.4	5574.4	10.0	7287.42	7246				
	1472.82	1682	Wed 2-Nov-22	10.00		1885.2	2153.0	10.0	3713.95	3714				
	976.12	1038	Thu 3-Nov-22	10.00		1249.4	1328.6	10.0	1880.58	1881				
	774.64	806.5	Fri 4-Nov-22	10.00		991.5	1032.3	10.0	1235.01	1235				
	662.29	679.5	Sat 5-Nov-22	10.00		847.7	869.8	10.0	948.63	948.6				
	600.89	612.9	Sun 6-Nov-22	10.00		769.1	784.5	10.0	795.04	795				
	733.9	691.6	Mon 7-Nov-22	10.00		939.4	885.2	10.0	792.51	790.9				
	666.4	706.1	Tue 8-Nov-22	10.00		853.0	903.8	10.0	912.26	902.6				
	558.8	567.5	Wed 9-Nov-22	10.00		715.3	726.4	10.0	776.56	774				Rating table extrapolated
	490.6	508.1	Thu 10-Nov-22	10.00		627.9	650.4	10.0	658.90	658.1				Rating table extrapolated
	438.1	445.8	Fri 11-Nov-22	10.00		560.8	570.6	10.0	570.75	570.7				
	415.6	419.2	Sat 12-Nov-22	10.00	100	531.9	536.6	100.0	522.01	522				Riffle release achieved
	1016.57	759	Sun 13-Nov-22	10.00		1301.2	971.5	10.0	641.00	641				
	1340.26	1468	Mon 14-Nov-22	10.00		1715.5	1879.0	10.0	1561.62	1532				
	715.47	808.1	Tue 15-Nov-22	10.00		915.8	1034.4	10.0	1353.16	1331				
	519.1	539	Wed 16-Nov-22	10.00		664.5	689.9	10.0	893.41	888.6				
	452.2	465	Thu 17-Nov-22	10.00		578.8	595.2	10.0	712.83	712.2				
	407.0	415.6	Fri 18-Nov-22	10.00		520.9	532.0	10.0	541.24	540.6				
	380.9	384	Sat 19-Nov-22	10.00		487.6	491.5	10.0	464.47	464.5				
	380.4	380.2	Sun 20-Nov-22	10.00		486.9	486.7	10.0	449.88	449.2				
	369.8	371.7	Mon 21-Nov-22	10.00		473.3	475.8	10.0	420.30	419.6				
	351.4	355.1	Tue 22-Nov-22	10.00		449.8	454.5	10.0	403.82	404				Rating table extrapolated
	321.32	329.1	Wed 23-Nov-22	10.00		411.3	421.2	10.0	361.03	361				Rating table extrapolated
	299.09	303.4	Thu 24-Nov-22	10.00		382.8	388.4	10.0	378.17	379.2				
	300.86	299.2	Fri 25-Nov-22	10.00		385.1	383.0	10.0	349.88	350.9				
	291.35	295.6	Sat 26-Nov-22	10.00		372.9	378.4	10.0	343.83	343.8				
	264.73	269.2	Sun 27-Nov-22	10.00		338.9	344.6	10.0	310.03	309.6				
	256.99	258.3	Mon 28-Nov-22	10.00		328.9	330.6	10.0	300.23	300.2				
	245.95	248.8	Tue 29-Nov-22	10.00		314.8	318.5	10.0	209.05	209.1				
	232.12	234.6	Wed 30-Nov-22	10.00		297.1	300.3	10.0	226.87	226.9				
SUM	19469.5	20696.1		300.0	100.0	24921.0	26491.0	390.0	30014.5	29901.3	80.6	6.3%	-0.4%	

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	
Tue 1-Nov-22	0	5045	
Wed 2-Nov-22	0	4949	
Thu 3-Nov-22	0	3986	
Fri 4-Nov-22	0	3031	
Sat 5-Nov-22	0	2393	
Sun 6-Nov-22	0	2039	
Mon 7-Nov-22	0	1730	
Tue 8-Nov-22	0	1566	
Wed 9-Nov-22	0	1404	
Thu 10-Nov-22	0	1280	
Fri 11-Nov-22	0	1158	
Sat 12-Nov-22	0	1040	
Sun 13-Nov-22	0	1147	
Mon 14-Nov-22	0	1641	
Tue 15-Nov-22	0	1523	
Wed 16-Nov-22	0	1270	
Thu 17-Nov-22	0	1131	
Fri 18-Nov-22	0	1033	
Sat 19-Nov-22	0	962.2	
Sun 20-Nov-22	0	1009	
Mon 21-Nov-22	0	1044	
Tue 22-Nov-22	0	1088	
Wed 23-Nov-22	0	1006	
Thu 24-Nov-22	0	911.2	
Fri 25-Nov-22	0	840.2	
Sat 26-Nov-22	0	755.3	
Sun 27-Nov-22	0	694.8	
Mon 28-Nov-22	0	670.7	
Tue 29-Nov-22	0	592.7	
Wed 30-Nov-22	0	552.5	
Total	0.0	47492.6	

Table 9 – Monthly flow data for Murrumbidgee to Googong

Date	M2G Flow	Comments
Tue 1-Nov-22	0.0	
Wed 2-Nov-22	0.0	
Thu 3-Nov-22	0.0	
Fri 4-Nov-22	0.0	
Sat 5-Nov-22	0.0	
Sun 6-Nov-22	0.0	
Mon 7-Nov-22	0.0	
Tue 8-Nov-22	0.0	
Wed 9-Nov-22	0.0	
Thu 10-Nov-22	0.0	
Fri 11-Nov-22	0.0	
Sat 12-Nov-22	0.0	
Sun 13-Nov-22	0.0	
Mon 14-Nov-22	0.0	
Tue 15-Nov-22	0.0	
Wed 16-Nov-22	0.0	
Thu 17-Nov-22	0.0	
Fri 18-Nov-22	0.0	
Sat 19-Nov-22	0.0	
Sun 20-Nov-22	0.0	
Mon 21-Nov-22	0.0	
Tue 22-Nov-22	0.0	
Wed 23-Nov-22	0.0	
Thu 24-Nov-22	0.0	
Fri 25-Nov-22	0.0	
Sat 26-Nov-22	0.0	
Sun 27-Nov-22	0.0	
Mon 28-Nov-22	0.0	
Tue 29-Nov-22	0.0	
Wed 30-Nov-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	64.9	60.7	0.0
2	0.0	0.0	69.6	42.0	0.0
3	0.0	0.0	112.9	0.0	0.0
4	0.0	0.0	127.2	0.0	0.0
5	0.0	0.0	134.5	0.0	0.0
6	0.0	0.0	134.4	0.0	0.0
7	0.0	0.0	126.4	0.0	0.0
8	0.0	0.0	82.6	0.0	0.0
9	0.0	0.0	125.7	0.0	0.0
10	0.0	0.0	130.3	0.0	0.0
11	0.0	0.0	131.4	0.0	0.0
12	0.0	0.0	129.9	0.0	0.0
13	0.0	0.0	116.3	0.0	0.0
14	0.0	0.0	109.0	0.0	0.0
15	0.0	0.0	107.5	0.0	0.0
16	0.0	0.0	110.0	0.0	0.0
17	0.0	0.0	111.4	0.0	0.0
18	0.0	0.0	115.0	0.0	0.0
19	0.0	0.0	115.1	0.0	0.0
20	0.0	0.0	115.5	0.0	0.0
21	0.0	0.0	121.3	0.0	0.0
22	0.0	26.7	89.3	0.0	0.0
23	0.0	28.8	86.7	0.0	0.0
24	0.0	26.7	83.3	0.0	0.0
25	0.0	36.9	87.2	0.0	0.0
26	0.0	5.9	115.4	0.0	0.0
27	0.0	0.0	120.4	0.0	0.0
28	0.0	0.0	133.1	0.0	0.0
29	0.0	0.0	135.9	0.0	0.0
30	0.0	0.0	126.9	0.0	0.0
Total	0.0	125.0	3369.1	102.7	0.0

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