

SPECIAL CAP AUDIT OF MOONIE RIVER
CAP COMPLIANCE 2014/15 AND 2015/16

Report of the Independent

Audit Group

Dr Wally Cox (Chair)

Claire Higgins

Garry Smith

30 November, 2017

Introduction

Under Schedule E of the Murray-Darling Basin Agreement each state reports on annual diversions from designated river valleys under their control.

For water years 2014/15 and 2015/16, diversions in the Moonie River valley exceeded the annual diversion target. This triggers, under sub-clause 14 (1) of Schedule E, the appointment of an Independent Audit Group (IAG) to undertake a special audit.

The Murray-Darling Basin Authority (MDBA) appointed the IAG on 26 October 2017 with the following Terms of Reference:

- a) As directed by the Authority under clause 16 of Schedule E, the IAG will conduct a special audit in line with clause 17 of Schedule E. Clause 17 requires the IAG to consider:
 - i. data on diversions and annual diversion targets recorded on the Cap Register; and
 - ii. data submitted by the relevant State Contracting Government, including, for example, data about areas under irrigation, storage capacities, crop production, irrigation technology and the conjunctive use of groundwater in the designated river valley; and
 - iii. the impact that policies implemented by the State Contracting Government may have on the expected pattern of annual diversions; and
 - iv. whether the diversion for all years on the Cap Register exceeds the diversion expected under the long-term diversion Cap for those years, and
 - v. any other matter which the Independent Audit Group considers relevant.
- b) The IAG must:
 - i. determine whether the long term diversion Cap has been exceeded in the designated river valley; and
 - ii. report to the Authority on the special audit and advise the Authority of its determination within six months after a direction given under clause 16.
- c) The IAG will report its determination to the MDBA by the end of November 2017.
- d) The IAG will have no decision-making role.

This is the report of the IAG on the special cap audit of the Moonie River valley.

Audit Process

The IAG considered the Cap Register submitted by the MDBA and a statement provided by the Queensland Department of Natural Resources and Mines on 4 August 2017 (attachment 1).

In forming its views the IAG examined the Water Resource (Moonie) Plan 2003, the Moonie Resource Operations Plan 2006, additional information provided by the Department and the MDBA and clarified aspects of the Queensland statement by way of a conference call on 17 November 2017.

A draft report was made available to the Queensland Department of Natural Resources and Mines for comment prior to finalisation of the report.

Performance Against Cap

Table 1. Moonie Water Diversion, Cap and Flow data
2006/07 – 2016/17

Water Year	Annual Cap (GL)	Environment (GL)	Adjusted Annual Cap (GL)	Cap Credit/Debit (GL)	Annual Diversion (GL)	Flow at Fenton (GL/yr)*
2006/07	12.4	-	12.4	3.04	9.36	8.80
2007/08	84.80	-	84.80	43.34	41.46	132.34
2008/09	35.93	-	35.93	6.93	29.00	62.50
2009/10	75.84	-	75.84	33.24	42.60	471.71
2010/11	76.84	-	76.84	47.63	29.21	542.98
2011/12	81.57	-1.30	80.27	61.67	18.60	617.95
2012/13	42.93	-1.30	41.63	8.01	33.62	197.83
2013/14	14.92	-1.30	13.62	0.75	12.86	15.73
2014/15	2.69	-1.30	1.39	-2.32	3.72	4.46
2015/16	0.66	-0.20	0.46	-0.32	0.78	1.09
2016/17	65.04	-1.30	63.74	37.35	26.39	102.34

* Fenton is the location of the most downstream flow gauging station on the Moonie River.

The data in Table 1 indicates that diversions in 2014/15 and 2015/16 exceeded the environmental water adjusted Cap by 2.32 and 0.32 GL respectively. In the case of the Moonie River valley (and Warrego, Paroo and Nebine) Cap compliance is not based on a cumulative Cap credits or debits.

Schedule E provides that for those valleys, compliance is assessed annually on the basis of actual diversions compared with a modelled Cap target for that year. The Department previously advised the IAG that for the Moonie (and Warrego, Paroo and Nebine) take diversions should not exceed the annual modelled Cap target as compliance with the Resource Operations Plan management rules would ensure compliance with the modelled Cap. This assumes the model fully reflects all the management rules and compliance with the rules.

The Department uses the Integrated Quantity and Quality Modelling program (IQQM) to manage and monitor Cap compliance. The IQQM Moonie Cap model was given provisional accreditation by the MDBA in 2010 until 2012. Although accreditation has now lapsed it remains the best available model for assessing Cap compliance.

In terms of measuring water extraction from the Moonie the Department advised that 0% of actual take was metered during the period 2012/13 to 2014/15. In 2015/16 100% of water course diversions were metered however this is only about 2% of the actual take as most of the take is from overland flow. Most water taken is assessed on the basis of pump size and hours of operation.

Conclusion 1

The annual diversion Cap for the Moonie River Valley was exceeded by 2.32 GL in 2014/15 and 0.32GL in 2015/16. There was no exceedance in the other water years 2006/07 – 2016/17 inclusive.

The IAG also tested Cap compliance for the Moonie River Valley utilising the cumulative Cap credit/debit method. Addition of Cap credits/debits since 2006/07 (Table 1) results in a notional cumulative credit of 239 GL and as a consequence there is no exceedance of the long term diversion Cap. Further there is no evidence in the Cap Register of any recent change in water use behaviour that would see the long term Cap exceeded.

Conclusion 2

The long term diversion Cap for the Moonie River Valley was not exceeded. As at 30 June 2017 the cumulative annual take since 2006/07 is 239 GL lower than the sum of the annual Cap volumes.

Investigation As To Cause

The Department in its Statement to the MDBA advised that:

“Queensland’s investigation of the reasons for the exceedance of the annual diversion target in 2014/15 by 2.3 gegalitres revealed the following:

- (a) Actual take was compliant with water entitlement conditions (based on flows available at the point of take).
- (b) The discrepancy between actual take and permitted take is due to the representation of water allocations and licences in the model where full activation is assumed (i.e. all water entitled to be taken is being extracted). In reality, the management decisions of upstream users (including, but not limited to, the Commonwealth Environmental Water Holder) resulted in flow conditions being met for downstream water entitlements triggering take that is not represented in the model.
- (c) The flow conditions in the 2014/15 water year were unusual in that there were only two small flow events and the flows occurred principally in the consumptive

flow windows, with the bulk of the actual water taken by a single water entitlement holder in the lower part of the catchment.

- (d) At the time of reporting, the 2014/15 end of system flow in the Moonie was the lowest since cap reporting commenced (3 per cent of average annual flow).

Queensland's investigation of the reasons for the exceedance of the annual diversion target in 2015/16 by 0.3 gigalitres revealed the following:

- (a) Actual take was compliant with water entitlement conditions.
- (b) The discrepancy between actual take and permitted take is due to the legal pump down of the water entitlement holder's weir, which is not simulated by the model.
- (c) The 2015/16 water year had an even lower end of system flow than the 2014/15 water year at one percent of average annual flow. As the MDBA has noted, the gap between the actual and permitted take reduces in dry years.
- (d) A review of the model has identified that there are four water access entitlements with a weir pump down component which has not been included in the approved Cap model.

In both cases, Queensland considers the exceedances to be of a technical nature only and a result of the way in which permitted take is modelled."

The IAG further discussed these responses with representatives of the Queensland Department of Natural Resources and Mines in a conference call on 17 November, 2017.

2014/15 discussion

In 2014/15 there were only two low flow events in the Moonie River and total flow was only 3% of average annual flow.

Seasonal and flow conditions were such that many upstream users including the CEWH did not extract their entitlement. Because of the non-extraction of all the upstream entitlements, the higher flow threshold on the furthest downstream entitlement was triggered. This resulted in the actual take for this water entitlement to be greater than the modelled permitted take for all the entitlements.

The Cap model however assumes full activation upstream which in turn would limit downstream take.

There is no suggestion that there is non-compliance with licence conditions.

Conclusion 3

The Moonie River valley Cap model assumes full activation by all licence holders and non-use upstream resulted in a discrepancy in the model between take and permitted take.

Recommendation 1

Queensland, in updating the hydrologic model for the Moonie River valley, should consider amendments to address water take under low flow conditions.

The IAG noted that the 1100 ML/yr of unallocated water identified in the Resource Operations Plan and subsequently gifted by Queensland for environmental purposes, now managed by the Commonwealth Environment Water Holder, was a component of the unmodelled downstream take. The Department advised that the CEWH entitlement has a maximum rate of take of 86 ML/day and a flow condition of 43 ML/day passing flow at the point of take. The Moonie River is an unregulated system and non-use upstream is available to downstream users as long as the licence conditions of the downstream entitlement are met.

It would however, in the view of the IAG, be realistic for environmental water to stay in-stream to provide ecological benefits. This, the IAG understands, is the case under normal flow conditions.

Recommendation 2

Queensland examine, in its review of the Moonie River valley hydrological model, methods for maintaining environmental water in stream under low flow conditions.

2015/16 discussion

In 2015/16 exceedance of the cap of 0.32GL was attributed mainly to the pump down of weir and pool storages by one water entitlement holder which was not included in the Cap model.

The quantum of the weir and pool pump-down component is not known. The Department advised that for three of the water entitlement holders 'the combined nominal volume (is) only 252ML and rate of take of 23ML/day and the pump down component will only account for part of that'.

This would appear to be an issue only in low flow years with 1GL of end of system flow at Fenton in 2015/16 and the quantum is small compared to licensed entitlements in normal flow years.

Conclusion 4

The Moonie Cap model does not include allowance for the pump down of the weir and water holes permitted under a number of water entitlements.

Recommendation 3

In its review of the Moonie hydrologic model, the Department should assess if material in view of the small quantity of water, the possible inclusion of weir and pool pump down under low flow conditions.

Conclusions:

1. The annual diversion Cap for the Moonie River valley was exceeded by 2.32GL in 2014/15 and 0.32GL in 2015/16. These exceedances trigger a special audit under paragraph 16 (b) of Schedule E of the Murray-Darling Agreement.
2. The long term diversion Cap for the Moonie River Valley was not exceeded. As at 30 June 2017 the cumulative annual take since 2006/07 is 239 GL lower than the sum of the annual Cap volumes. Further there is no evidence in the Cap Register of any recent change in water use behaviour that would see the long term Cap exceeded.
3. The Moonie River valley Cap model assumes full activation by all licence holders and non-extraction upstream resulted in a discrepancy in the model between take and permitted take.
4. The Moonie Cap model does not include allowance for the pump down of the weir and water holes permitted under a number of water entitlements..

Recommendations:

1. Queensland in updating the hydrologic model for the Moonie River valley should consider amendments to address water take under low flow conditions.
2. Queensland examine, in its review of the Moonie River valley hydrological model, methods for maintaining environmental water in stream under low flow conditions.
3. In its review of the Moonie hydrologic model the Department should assess, if material in view of the small quantity of water, the possible inclusion of weir and pool pump down under low flow conditions.

Note: The Department in its statement to the Authority advised that

'Queensland is currently updating the Moonie hydrologic model as part of its review of the water plans and the preparation of a Water Resource Plan for accreditation under the Commonwealth Water Act 2007. This includes reviewing the methods for determining actual and permitted take during development of the water accounting methods required under Chapter 10, Part 3, Divisions 2 and 3, of the Basin Plan. It is expected the updated model will be used from July 2019 to determine permitted take under the Basin Plan.'

Attachment 1

QUEENSLAND STATEMENT

Exceedance of the annual Moonie diversion target (section 16(b) Schedule E)

2014/15 and 2015/16

Description of the diversion exceedance

Queensland acknowledges that for the Moonie catchment:

- The annual diversion target for 2014/15 was exceeded by 2.3 gigalitres;
- The annual diversion target for 2015/16 was exceeded by 0.3 gigalitres;
- These minor exceedances trigger a special audit under paragraph 16(b) of Schedule E of the Murray-Darling Agreement; and
- These exceedances are not a result of illegal activity but are of a technical nature in how the permitted take is calculated in the accredited hydrologic cap model.

Queensland understands an exceedance of the annual diversion target in the Moonie valley may trigger the requirement for a special audit of the performance of the State in implementing the long-term diversion cap.

Explanation of the diversion exceedances

Note that for Schedule E of the Murray-Darling Agreement, a cumulative cap credit was not applied to the Moonie or the Warrego, Paroo and Nebine valleys because it was considered that diversions in these catchments should never exceed the annual diversion target if water was taken in accordance with the management rules in the relevant Resource Operations Plan, as determined by the approved cap model for the valley.

Queensland's investigation of the reasons for the exceedance of the annual diversion target in 2014/15 by 2.3 gigalitres revealed the following:

- (a) Actual take was compliant with water entitlement conditions (based on flows available at the point of take).
- (b) The discrepancy between actual take and permitted take is due to the representation of water allocations and licences in the model where full activation is assumed (i.e. all water entitled to be taken is being extracted). In reality, the management decisions of upstream users (including, but not limited to, the Commonwealth Environmental Water Holder) resulted in flow conditions being met for downstream water entitlements triggering take that is not represented in the model.
- (c) The flow conditions in the 2014/15 water year were unusual in that there were only two small flow events and the flows occurred principally in the consumptive flow windows, with the bulk of the actual water taken by a single water entitlement holder in the lower part of the catchment.

- (d) At the time of reporting, the 2014/15 end of system flow in the Moonie was the lowest since cap reporting commenced (3 per cent of average annual flow).

Queensland's investigation of the reasons for the exceedance of the annual diversion target in 2015/16 by 0.3 gigalitres revealed the following:

- (a) Actual take was compliant with water entitlement conditions.
- (b) The discrepancy between actual take and permitted take is due to the legal pump down of the water entitlement holder's weir, which is not simulated by the model.
- (c) The 2015/16 water year had an even lower end of system flow than the 2014/15 water year at one percent of average annual flow. As the MDBA has noted, the gap between the actual and permitted take reduces in dry years.
- (d) A review of the model has identified that there are four water access entitlements with a weir pump down component which has not been included in the approved Cap model.

In both cases, Queensland considers the exceedances to be of a technical nature only and a result of the way in which permitted take is modelled.

Queensland Actions:

Queensland is currently updating the Moonie hydrologic model as part of its review of the water plans and the preparation of a Water Resource Plan for accreditation under the Commonwealth Water Act 2007. This includes reviewing the methods for determining actual and permitted take during development of the water accounting methods required under Chapter 10, Part 3, Divisions 2 and 3, of the Basin Plan. It is expected the updated model will be used from July 2019 to determine permitted take under the Basin Plan.

However, even with no change to the accounting method, it is unlikely that assessment under section 6.12 of the Basin Plan will result in non-compliance in the Moonie SOL resource unit. This is because the compliance process of using annual diversion targets (paragraph 16(b) of Schedule E of the Murray-Darling Agreement will be superseded by the use of cumulative credits under the Basin Plan. The small volumes of exceedance and the rarity with which they occur mean that it is considered highly unlikely that non-compliance will occur under section 6.12 of the Basin Plan.