

Australian Government





# Review of Cap Implementation 2011–12

## Report of the Independent Audit Group

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Independent Audit Group Members

Wally Cox (Chair) Claire Higgins

October 2012

### Acknowledgments

The Independent Audit Group appreciated the cooperation of state and territory Government agencies and the Murray–Darling Basin Authority.

Information continues to be freely provided and the issues and the options for resolving them were discussed openly.

Published by Murray–Darling Basin Authority.

MDBA Publication No 84/12 ISBN 978-1-922177-19-3 (print) ISBN 978-1-922177-20-9 (online)

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## Auditors' foreword

October 2012

Dr R Dickson Chief Executive Murray–Darling Basin Authority GPO Box 1801 CANBERRA Australian Capital Territory 2601

Dear Dr Dickson

Attached is our report Review of Cap Implementation 2011-12 Report of the Independent Audit Group.

The Murray–Darling Basin Ministerial Council established the Cap in 1995 and set the operating framework in 1996.

We are pleased to advise that, for all Schedule E valleys for which Caps have been established, there has been no exceedance of the Cap trigger.

The States and Australian Capital Territory continue to progress Cap implementation. This only leaves Cap proposals to be submitted for the New South Wales Intersecting Streams Cap valley.

Model development and accreditation also continues and 2012–13 should see models for all major valleys either approved or submitted for audit and accreditation.

The IAG in this report identified four issues that need to be addressed to refine the operations of the Cap:

- accounting for environmental water
- adjustments to the trigger for special audits
- resourcing water planning
- accounting for floodplain/overland flow harvesting in the northern Basin valleys.

The early (last week of September) audit placed considerable pressure on some States to produce information on diversions and Cap targets. Their cooperation was appreciated by the IAG, as this timing reflects the need to meet Ministerial Council requirements.

The IAG wishes to put on record the cooperation of the states and Australian Capital Territory officers and the assistance of Authority staff.

The audit was done in a spirit of cooperation while recognising the right of the IAG to form its own conclusions and recommendations.

Yours sincerely

W.J.Cox

WALLY COX Chairman

CLAIRE HIGGINS Member

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## **Executive Summary**

The Murray–Darling Basin Ministerial Council adopted Schedule E to the Murray–Darling Basin Agreement to operationalise, monitor and report on Cap implementation. This audit was conducted in line with the requirements of Clause 15 of the Schedule.

While higher than the 2010–11 diversion of 6311 GL, the 2011–12 diversion of 7,975 GL from the rivers in the Murray–Darling Basin was seventh lowest since 1983–84. Higher than average rainfall in the Basin created lesser demand for water, resulting in lower diversions.

All Schedule E valleys, with the exception of the New South Wales Border Rivers, were within Cap targets in 2011–12. All valleys have cumulative credits and no valley exceeded the trigger for a special audit.

The 2011–12 audit identifies further significant progress in each of the states and the Australian Capital Territory in finalising and/or operationalising the Cap.

The key developments or issues are:

- Caps have now been set for 23 of the 24 valleys identified in Schedule E. A Cap remains to be established for the New South Wales Intersecting Stream valley.
- Of the 23 Cap models required, 23 have been developed and 21 submitted for audit; with 16 audited and 16 accredited (See **Appendix B**: Status of Cap models under Schedule E).
- The Australian Capital Territory has now submitted a Cap model, and a climate adjusted model for Metropolitan Adelaide is undergoing further refinement before being submitted for audit during 2012–13.
- A Cap model for the New South Wales Border Rivers is expected to be submitted for assessment and accreditation by December 2012. This will then enable the Queensland Border Rivers model to be audited concurrently.

### **Key issues**

The 2011–12 audit identified a number of issues relevant to the administration and operationalising of the Cap. These are:

- accounting for environmental water
- adjusting the 20% trigger Cap exceedance level when developing new Cap/models for valleys where significant environmental water has been acquired
- resourcing of the water planning/ administration roles
- accounting for floodplain/overland flow harvesting within the Cap.

Each of the issues is discussed here as they have relevance to the Basin as a whole or affect at least two states.

#### Cap adjustment for environmental water

The 2010–11 audit report identified an issue with Cap adjustment for environmental water. It recommended that the states consider the option for reducing the Cap by scaling down the annual Cap targets in proportion to the Long-term Cap Equivalent recovered; and approval sought from MDBA if deemed appropriate.

The IAG notes that considerable work has been done by the Water Audit Panel to examine the benefits/ disbenefits of various methods that could be used to adjust the Cap. No consensus on a preferred method has been reached.

The IAG notes that only Victoria has submitted a method for Cap adjustment for environmental water which was approved by the Authority on 30 October 2010. Victoria's method is to reduce the annual Cap targets by the use of the environmental entitlements in that year; except for in the case of Lake Mokoan and Wimmera–Mallee, where adjustments are made through model amendments. A similar method is used by New South Wales and South Australia, while Queensland reduces the Cap by the entitlement assuming full use in an unregulated system. The Executive Summary of the IAG's 2010–11 report explored some of the unintended consequences of the present methodology and examined the impact of the scaling-down method on an example valley.

It is the view of the IAG that, as water is acquired for the environment in increasing quantities, that appropriate adjustments be made to the Cap to avoid unintended consequences including artificially inflating credit/debit balances.

As a consequence, the IAG recommends that the Water Audit Panel continues to explore methods that provide appropriate Cap adjustments and that states formally submit their proposed methods to the Authority for approval. In considering proposals, the MDBA should take into account the value of consistency across states.

The IAG also recommends that South Australia, New South Wales and Queensland submit/finalise proposals for their methods to adjust Caps for environmental water.

## **Trigger for special audit**

Victoria has proposed that the trigger level for a special audit for the revised Wimmera–Mallee valley be set at 30% of the post-pipeline long-term Cap and 35% for the post-pipeline/post-irrigation long-term Cap. This compares to the 20% trigger for all valleys set by the Ministerial Council in Schedule E. Only the Ministerial Council can approve a change in the trigger.

This issue is fully discussed in the Victorian section of this report (**Section 4.2.4**). It is raised here as a generic issue.

Caps for valleys are set on the basis of models that simulate the Cap level of development, including user behaviour and climate. Such models have inevitable errors associated with them. In statistical terms, allowance for such errors can be made using standard deviations, and leading up to the finalisation of Schedule E it was proposed that the trigger for special audits be set at three standard error of models. At the time, the IAG considered that, in terms of transparency and building public trust in the Cap setting and management process, it would be more appropriate to use a flat percentage of the Cap. Following work by MDBC staff, the IAG proposed 20%. This would appear to have worked successfully, in that only a limited number of valleys have triggered special audits and all valleys have cumulative credits.

The issue, however, is that with significant water being recovered for environmental use (or in the case of the Wimmera–Mallee, with significant change in the system) the Cap is reduced significantly, while the error term may not.

A principled approach suggests that now that the Cap process has reached maturity and public trust has been built up, it could be appropriate to revert to the original concept of a trigger set at three standard deviations. Such a change would require Ministerial Council approval.

From a pragmatic point of view, all Basin valleys have substantial credits and it is unlikely that valleys where significant Cap adjustments need to be made (including the Wimmera–Mallee) would trigger a special audit before the proposed Basin Plan is implemented.

The IAG recommends that the MDBA examine the cost/benefit of a statistical trigger compared to the current 20% trigger for a special audit as it applies to potential breaches of the Cap.

## Floodplain/overland flow harvesting

In its 2010–11 report, the IAG identified that Queensland modelled and reported on compliance with the Cap set for river diversions; and reported on estimates of floodplain/overland flow harvesting. New South Wales has not yet included overland flow/ floodplain harvesting it its northern valley Caps.

In both cases the IAG understands that difficulties in estimating/measuring overland flow/floodplain harvesting underpin their respective approaches.

The IAG were advised by New South Wales that the Healthy Floodplain Project would provide the basis for estimating overland flow/floodplain harvesting and as a consequence it would be possible to establish entitlements and account for these diversions under the Cap. Queensland advised that there is a project underway in the Lower Balonne to measure changes in storages and, through water balance methodology, better estimates of water harvested from floodplains/ overland flows. The project is expected to be completed in October 2012.

#### It is recommended that New South Wales incorporate overland/floodplain flows in their northern valley Caps.

### Resourcing of water planning/ administration

It was evident to the IAG during the 2011–12 audit that most jurisdictions were under considerable pressure to manage the complexities and workload associated with finalising, operationalising and managing Cap implementation. This issue has been further accentuated by the work undertaken and still to be done for the proposed Basin Plan.

Although all governments are under budget pressure, it is essential that the water resource planning and management task be adequately resourced to enable timely and effective implementation of plans—but also to ensure that staff are not put under undue pressure.

#### The IAG recommends that each jurisdiction ensures adequate resourcing to enable Cap implementation to be finalised and the transition to a Basin Plan to be implemented.

In summary, the detailed conclusions and recommendations reached by the IAG for 2011–12 by state and territory are:

## South Australia

- Diversions in 2011–12 were 421 GL and continue to be at historically low levels.
- South Australia has a reliable measurement system for urban and irrigation uses.
- The IAG notes that South Australia is yet to resolve the accounting for ELMA in Lower Murray Swamps Cap and is therefore including the non-use of ELMA as a credit.
- The IAG notes that South Australia has revised its methodology and is no longer adjusting the Cap for restrictions to the Lower Murray Swamps Cap. The IAG considers that this change is generating inappropriate credits for the years 2003–2009.
- South Australia has developed a climaticallyadjusted model for Metropolitan Adelaide. This model is expected to be submitted to the MDBA for accreditation during 2012–13.
- The IAG continues to support the amalgamation of the Lower Murray Swamps and the 'All Other Purposes' Cap and encourages South Australia to propose amendment to Schedule E.
- The IAG encourages South Australia to consider developing a Cap Model for the amalgamated Cap which incorporates the River Murray restriction policy; and submit the new model for approval.

- The IAG notes that South Australia has submitted a draft proposal for approval regarding the treatment of environmental water in the adjustment to the Cap. Further, the IAG understands that, following discussion at the Water Audit Panel, an amended proposal is required. The IAG encourages South Australia to submit the amended proposal for approval and application for 2012–13.
- The IAG recommends that the proposal for the merger of the Lower Murray Swamps and the 'All Other Purposes' Cap include adjustments to the Cap for the non-use of ELMA water.

## Victoria

- Diversion in 2011–12 were 2,335 GL; compared to 1,094 GL in the 2010–11 IAG report and 1,210 GL in the 2009–10 IAG report. This reflected high allocations following good inflows to storages and carryover from 2010–11.
- Diversions for the Murray-Kiewa-Ovens, Campaspe, Goulburn-Broken-Loddon and Wimmera-Mallee valleys in 2011–12 were below annual climate, environmental use and tradeadjusted Cap targets.
- Cumulative diversions since 1997 are in credit for all valleys.
- Model modifications and inputs have resulted in changes to Caps and Cap credits for some valleys for previous years.
- A new Wimmera–Mallee model has been developed for the post-pipeline conditions and a draft proposal submitted to the MDBA for audit and accreditation. It proposes a 30% trigger for special audits as opposed to the Schedule E 20% rule that applies to other valleys in the Basin.
- The IAG recommends that the MDBA:
  - examines the cost/benefits of moving to a trigger level of three standard error of the model for existing valleys
  - recommends to the Ministerial Council an amendment to Schedule E to provide for flexibility in setting special triggers.
- Updated models have been used to calculate 2011–12 Cap targets and the cumulative credits presented.
- Victoria continues to apply itself to the successful implementation of, and compliance with, the Cap.

### **New South Wales**

- Diversions in 2011–12 were 4,197 GL; compared to 3,268 GL in the 2010–11 IAG report.
- Diversions in 2011–12 were below Cap targets for all Schedule E valleys, except for Border Rivers.
- Cumulative Cap credits exist for all Schedule E valleys in New South Wales.
- Caps are now in place for eight of the nine valleys in New South Wales, with only the Intersecting Streams requiring a Cap to be established.
- Cap models have been approved for the Murrumbidgee, Lachlan, Macquarie, Peel, Namoi and Gwydir valleys. The recalibrated Lower Darling model is in the process of being submitted for audit and accreditation. The Barwon–Darling model is currently being audited and the Border Rivers model is expected to be submitted to the MDBA for audit and accreditation later in 2012.
- In terms of finalising/improving Cap administration, it is recommended that New South Wales:
  - finalise a Cap model for the Intersecting Streams
  - finalise Caps for the unregulated streams
  - incorporate floodplain/overland flow harvesting in Caps for the relevant northern valleys
  - seek approval from MDBA for an appropriate methodology for Cap adjustment for environmental water.

## Queensland

- Total diversions in 2011–12 were estimated to be 1,012 GL; compared to 1,445 GL in the 2010–11 IAG report and 1,232 GL in the 2009–10 IAG report.
- The total includes 717 GL of stream diversions and an estimated 294 GL of overland flow harvesting.
- Well above-average rainfall between December 2011 and February 2012, which triggered flooding in the central and western QMDB catchments, combined with above-average rainfall for much of the year, resulted in end-of-system flows totalling 7,015 GL. A new maximum annual volume was set for the Maranoa River at Cashmere.
- In central and western QMDB catchments, the volume of water passing key monitoring sites during 2011–12 was generally around twice the long-term average. The exceptions were the Nebine, where the volume of water passing was half the long-term annual average flow; and the

Maranoa, which had nearly nine times the longterm average. In the east of the QMDB, the volume of water passing the key monitoring sites was less than the long-term annual average.

- The Cap is set for all QMDB valleys and Cap targets were available for all valleys.
- Diversions are within Cap targets for all QMDB catchments.
- Cap models for the Warrego, Paroo, Nebine and Moonie River have been accredited. The Condamine–Balonne model has been submitted for audit and is expected to be accredited during 2012–13. The Border Rivers model has been submitted, but will not be audited until the New South Wales Border River Cap model is available for audit.
- Estimates of overland flow/floodplain diversions continue to be enhanced through an instrumentation project in the Lower Balonne.
- The IAG recommends that Queensland submit a proposal to the MDBA for approval for the Cap adjustment for the allocation/use of environmental water.

### Australian Capital Territory

- Net diversions of 9 GL remain well below the annual cap target of 22 GL under the proposed Cap model. The Australian Capital Territory cumulative credit is 142 GL.
- Little progress has been made towards the inclusion of the Commonwealth diversions in the diversions reported by the Australian Capital Territory. The IAG understands that this matter remains outstanding until such time as Commonwealth legislation is passed.
- The IAG welcomes the development of a model for calculating a climate-adjusted Cap and its submission for auditing and accreditation.
- The IAG also welcomes the resolution of the outstanding interpretive differences between the Ministerial Council decision of 23 May 2008 and Schedule E to the Murray–Darling Basin Agreement (Schedule 1 of the Water Act 2007).

## 1. Introduction

In November 1996, the IAG submitted its report Setting the Cap (the IAG Report) to the Murray– Darling Basin Ministerial Council (Council). This report addressed a number of issues arising out of the Council's decision to introduce an immediate moratorium on further increases in diversions of water from the rivers of the Murray–Darling Basin and Cap the future level of diversions.

In finalising Schedule E<sup>1</sup>, the Council agreed that the IAG should have a role in auditing the implementation of the Cap.

In March 2005, the Murray–Darling Basin Commission agreed to continue the role of the IAG in auditing Cap compliance.

In 2006, Council requested the IAG also undertake the audit of The Living Murray (TLM) initiative. The IAG undertook this task from 2006–07 to 2010–11 inclusive. In 2011–12, this task was included in the audit of Independent River Operations Review Group (IRORG) and Dr Terry Hillman, while remaining part of the IAG, joined this group.

The IAG *Review of Cap Implementation 2011–12* is based upon information made available to the IAG by each of the states and the Australian Capital Territory. The report sets out the broad background to the review and the process used by the IAG in forming its views and final conclusions. It comments on the current status of compliance with the Cap in each of the five jurisdictions involved. It should be noted that a Cap target for the New South Wales Intersecting Streams still needs to be established.

The IAG team wishes to acknowledge and thank all states and the Australian Capital Territory for their cooperation in making both the data and officers available, and for the open and frank way in which the review was conducted. The IAG also wishes to acknowledge the assistance provided by officers of the MDBA in the preparation of this report. The findings, however, continue to be entirely those of the IAG.

<sup>1</sup> This was previously Schedule F to the *Murray–Darling Basin Agreement* [the agreement] prior to the amendment to the *Water Act 2007* in 2008, where an amended agreement was appended to the *Water Act 2007* 

## 2. Background

At its June 1995 meeting, the Council decided to introduce a Cap on diversions of water from the Murray–Darling Basin. A Cap on the volume of diversions associated with the 1993–94 level of development was seen as an essential first step in establishing management systems to achieve healthy rivers and sustainable consumptive uses.

The two primary objectives driving the decisions to implement the Cap were:

- To maintain and, where appropriate, improve existing flow regimes in the waterways of the Murray–Darling Basin to protect and enhance the riverine environment.
- To achieve sustainable consumptive use by developing and managing Basin water resources to meet ecological, commercial and social needs.

The adopted definition of the Cap on diversions, leaving aside equity issues, is:

## The Cap is the volume of water that would have been diverted under 1993–94 levels of development:

- to protect water quality and preserve the health of the river system, the Cap should ensure there is no net growth in diversions from the Murray–Darling Basin
- the level of development against which to test for growth in water diversions should be equivalent to 1993–94 levels of development
- under the Cap, the amount of water that states would be entitled to divert from regulated streams in any year would be quantified using analytical models that incorporate weather conditions and which take into account:
  - the water supply infrastructure in place in 1993–94
  - the water allocation and system operating rules which applied in 1993–94
  - the entitlements that were allocated and the extent of their utilisation at 1993–94 levels of development
  - the underlying level of demand for water in 1993–94
  - the system operating efficiency in 1993-94.

The Council also acknowledged that:

- for South Australia, Victoria, and New South Wales, Cap management will be in accordance with the agreed outcomes as specified by the Cap definition above
- for the Australian Capital Territory, the Cap will be defined following a review by the IAG and negotiations with the Australian Capital Territory government
- for Queensland, any final agreement for the targeted outcomes will need to await the completion of the Water Allocation and Management Planning (WAMP) (now called Water Resource Plans—WRP) process being undertaken by that state—the outcome of which will be subject to consideration by the Council.

The Queensland Water Resource Planning process and setting of Caps was completed in 2011.

After considering a number of equity issues, the IAG previously advised its view that, subject to independent assessment by the IAG and advice to the Council, the Cap may be adjusted for certain additional developments which occurred after 1993–94.

The Cap should restrain diversions, not development. With the Cap in place, new developments should be allowed, provided that the water for them is obtained by improving water use efficiency or by purchasing water from existing developments.

Because irrigation demand varies with seasonal conditions, the diversions permitted under the Cap will vary from year to year. The system used to manage diversions within the Cap will therefore need to be flexible.

Schedules E and F provide the framework for establishing Caps and adjusting Caps on diversions for environmental entitlements and uses. This includes a requirement for states to seek the MDBA's approval for a proposed method for estimating Cap adjustments for environmental entitlements and use. To date only Victoria has submitted a proposal and received approval. The 2010–11 review of Cap Implementation identified that:

- At 6,177 GL, diversion from rivers in the Murray–Darling Basin was the fifth lowest since 1983–84. Heavy summer rains constrained demand – especially in the south of the Basin where diversions were even lower than in the recent drought when supply was constrained. While higher than the record low of 4,197 GL in 2008–09, the Basin diversions in 2010–11 continue the pattern of low diversions.
- Diversions in 2010–11 in South Australia were 362 GL—the lowest diversion since the introduction of the Cap. The low diversions were due to wet conditions and the general allocations remaining at 67%.
- Victorian diversions in 2010–11 were 1,094 GL; compared to diversions of 1,810 GL in 2009–10.
- Diversions in New South Wales were 3,268 GL; compared to 1,979 GL in 200910.
- Queensland diversions in 2010–11 were estimated to be 1,445 GL; compared to 1,232 GL in 2009–10. This included 865 GL of stream diversions and an estimated 580 GL of overland flow harvesting.

- Net diversions in the Australian Capital Territory of 7.2 GL were a record low and well below the long-term average diversion Cap target of 40 GL.
- All Schedule E valleys, with the exception of the Murrumbidgee, were within Cap targets in 2010–11 and no valley exceeded the trigger for a special audit.
- Caps have been set for all valleys except for the New South Wales Intersecting Streams.
- Of the 24 Cap models required, 23 models have been developed and 21 submitted for audit. Sixteen have been approved (See Appendix B: Status of Cap models under Schedule E).
- The issue of accounting within the Cap for environmental water was raised. The IAG recommended that the states consider the option for reducing the Cap by scaling down the annual Cap targets in proportion to the Longterm Cap Equivalent recovered; and approval sought from the MDBA if deemed appropriate.

The IAG made a number of recommendations in the 'Review of Cap Implementation 2010–11 Cap Audit Report'. Many of these recommendations related to the modelling that has been undertaken; and the need for updating and recalibration of these models to maintain the integrity and the reliability of the Schedule E accounting for Cap performance reporting.

The IAG has addressed a number of these modelling issues in previous reports. The following provides a broad summary of recommendations that have been made over the period 2006–07 to 2010–2011, and briefly notes the action that has been taken in response to the recommendations from the IAG.

Recommendation	Action taken
2010-11	
The IAG recommended that South Australia consider incorporating restrictions into the approved model for calculating Cap targets; and submit a revised model for approval.	Agreed in principle.
New South Wales was encouraged to seek approval for an appropriate method for Cap adjustment for environmental water.	See below.
New South Wales needs to finalise Cap models for the Intersecting Streams.	Cap still to be set. Because of the small volume of diversions it is not a priority.
New South Wales needs to advise the timing for the proposed Capping of unregulated streams, noting that the macro-planning project on Intersecting Streams is nearing completion.	See above.
The IAG recommends independent validation and review of un-metered use estimates for the Namoi, Gwydir and New South Wales Border Rivers.	New South Wales does not support this. It intends to address through the introduction of metering.
Queensland was encouraged to finalise an agreed methodology to account for environmental water within the Cap framework.	A methodology has been developed but not yet submitted for approval.
The IAG recommended that Queensland standardises its methodology for determining Cap credits; by using modelled overland flow take rather than estimated take in calculating the annual Cap targets.	Queensland acknowledged the issue and will investigate alternate methodologies for accounting for overland flow.
The Australian Capital Territory and MDBA need to resolve the outstanding interpretive differences between the Ministerial Council decision of 23 May 2008 and Schedule E to the <i>Murray–Darling Basin Agreement</i> (Schedule 1 of the <i>Water Act 2007</i> ). Should the matter remain unresolved, the IAG recommends that a submission be made to the Ministerial Council.	This issue has been addressed in finalising a Cap model proposal for Australian Capital Territory.
The IAG recommends that the option for reducing the Cap by scaling down the annual Cap targets in proportion to the Long-term Cap Equivalent be considered by the States and approval sought from MDBA if deemed appropriate.	Addressed by the Water Audit Panel with further work to be undertaken in 2012–13.
2009-10	
The IAG recommended that New South Wales submit the Barwon–Darling model for accreditation.	Completed.
New South Wales is encouraged to complete the process of having the Macquarie and Murrumbidgee Cap models reviewed and accredited for use under Schedule E by the end of 2010 to allow these models to be formally used for 2011–12 audit review.	Models have been reviewed and approved.
New South Wales advise on the timings for the proposed Capping of unregulated streams given the expected completion of macro planning.	Advice has been provided on the macro- planning process.
The IAG recommends that a supplementary (desktop) audit be done when the collaborative modelling (with New South Wales) for the Border Rivers is completed late in 2010 and a protocol be developed so that both New South Wales and Queensland are fully aware of the requirements and commitments of the other States.	The MDBA directed the IAG to undertake a supplementary audit. This was completed in January 2011.
The Australian Capital Territory and the MDBA need to resolve the outstanding interpretive differences between the Ministerial Council decision of 23 May 2008 and Schedule E to the <i>Murray–Darling Basin Agreement</i> (Schedule 1 of the <i>Water Act 2007</i> ). Should the matter not be resolved, the IAG recommends that a submission be made to the Ministerial Council.	See above.
The Australian Capital Territory needs to bring forward its proposed mechanism for reporting growth in demand by industry and adjustments to the Cap for population growth as part of the finalisation of the climate- adjusted model to be used to administer the Cap.	Australian Capital Territory has agreed to eliminate population growth in their model proposal.
Finalisation of the Condamine Balonne ROP together with the valley Cap and Cap model.	The Resource Operational Plan was finalised in 2010 and a Cap proposal was finalised. A Cap model has been submitted.

Recommendation	Action taken			
2008-09				
South Australia should remove from the 'All Other Purposes' Cap the 50 GL transferred from interstate for purposes of meeting environmental needs in the Lower Lakes.	Completed.			
For states/territories participating in or benefitting from environmental water improvement programs such as TLM and the Commonwealth buy- back, methods for Cap adjustment for environmental water entitlements, allocations and use will need to be developed, agreed by the MDBA and applied in future.	Completed. Victoria submitted a proposed protocol which was approved by MDBA in October 2010.			
Upon completion of the integrated 1993–94 and 'current conditions' model for the Border Rivers, New South Wales should submit the proposed Cap for that system for assessment by the IAG of the appropriate allowance for the enlarged Pindari Dam.	Completed.			
New South Wales needs to advise on the timing and arrangements for the proposed Capping of diversions on unregulated streams.	See above.			
The Australian Capital Territory needs to include all surface and groundwater diversions in the reporting of 'other diversions' under the agreed Cap.	Australian Capital Territory agreed to report on all diversions but differs on the interpretation of its Cap including groundwater.			
The Australian Capital Territory needs to bring forward its proposed mechanism for reporting growth in demand by industry and adjustments to the Cap for population growth, as part of the finalisation of the climate- adjusted model to be used to administer the Cap.	Australian Capital Territory Cap model submitted. Australian Capital Territory decided to forego Cap adjustment for population growth.			
Finalisation of the Condamine–Balonne ROP together with the valley Cap and Cap model	The Resource Operational Plan was finalised in 2010 and a Cap proposal was finalised. A Cap model has been submitted for audit.			
2007-08				
Action is still required to update models to address concerns regarding data input and its continuing relevance in a period of unprecedented drought conditions across the Basin, and to adjust Cap credit calculations for the impact of water restrictions on water diversion outcomes.	Ongoing. Some adjustments have been made to models for South Australia and Victorian valleys. Other states are still to address this issue, although the issue is more critical for the New South Wales valleys.			
South Australia to develop a climate-adjusted model for Metropolitan Adelaide diversions.	Work has commenced on this modelling and is expected to be completed in 2013–14.			
New South Wales to submit its "current conditions" modelling for independent audit, given the relevance that is placed upon these models for reporting performance against the Cap.	New South Wales contends that this is not used for Cap compliance – this is for information only.			
Treatment of diversions via the Goldfields Superpipe in Victoria to be standardised.	The IAG recommendation has been adopted.			
Commonwealth and Australian Capital Territory to take action to allow reporting of Commonwealth diversions within the Australian Capital Territory.	Australian Capital Territory has passed legislation and is awaiting matching Commonwealth legislation			
Cap model and Cap estimate to be provided for the Border Rivers.	Queensland and New South Wales Border rivers Caps have been set.			
Finalisation of the Condamine–Balonne ROP together with the valley Cap and Cap model.	The Resource Operational Plan was finalised in 2010 and a Cap proposal was finalised. A Cap model has been submitted.			

Recommendation	Action taken			
2006–07				
To ensure consistency, all Cap models used to calculate annual diversion targets, as required by Schedule E, should incorporate mechanisms to account for water restrictions.	See comment above.			
South Australia to develop a model of diversions from the River Murray for Metropolitan Adelaide to be accredited by June 2009.	See comment above.			
An allowance be included in the calculation of the annual diversion targets for Metropolitan Adelaide, Country Towns, the Lower Murray Swamps and the 'All Other Purposes' licence for the imposition of water restrictions.	A climate-adjusted Cap model for Metropolitan Adelaide is being finalised (see comment above). Modelling restrictions are being investigated as part of that. SA applies restriction to calculate targets for the Country Towns and 'All Other Purposes' valleys. However, restriction is not being applied for the Lower Murray Swamps valley.			
The Mulwala Loss Allowance should not be subtracted from the New South Wales Murray Cap Diversion under the current rule. Should the Council choose to change the rule by amending the Register of Diversion Definitions in future to allow the Mulwala Loss Allowance subtraction, the Council should give prior consideration to the consequences of the decision on the integrity of the Cap.	New South Wales currently does not subtract Mulwala Canal allowance from the diversions within the Cap.			
Upon completion of the integrated 1993–94 and current conditions model for the Border Rivers, New South Wales should submit the proposed Cap for that system for assessment by the IAG of the appropriate allowance for the enlarged Pindari Dam.	Completed. See comment above.			

## 3. Audit process

For the purposes of the 2011–12 Cap implementation audit, the IAG has adopted a consultative approach designed to:

- clarify expected Cap outcomes where relevant for each state
- gather available statistical information on actual levels of diversions in 2011–12 as a means of quantifying overall diversions and commenting on Cap compliance
- identify progress made in implementing the proposed management rules for Capping water diversions
- highlight particular problems being encountered by the relevant jurisdictions as regards the finalisation or implementation of the management rules.

The IAG met with representatives of each of the states, the Commonwealth and the Australian Capital Territory during the period 24 September to 27 September 2012. Water usage in 2011–12 was compared with Cap targets. Discussions were held on progress in establishing models and management frameworks to achieve targets and issues of possible concern.

The IAG drafted its observations and conclusions on progress being made within each State and the Australian Capital Territory and then invited the states and the Australian Capital Territory to make comments of a factual nature upon the IAG's findings. These observations on factual points were then considered by the IAG prior to finalising the report.

While acknowledging the valuable contribution made by each of the states, the Australian Capital Territory, the Commonwealth, and the members of the MDBA staff, the findings and conclusions presented in this report are entirely those of the IAG.

## 4. Audit of 2011–12 Cap implementation

## 4.1. South Australia

#### 4.1.1. The Cap

As a result of decisions of Ministerial Council in December 1996 and March 2001 and the amendment of Schedule E in March 2008, the components of the South Australian Cap are:

- a five-year rolling non-tradeable allocation of 650 GL for Metropolitan Adelaide;
- a fully tradeable allocation of 50 GL per year for Country Towns;
- an allocation of 94.2 GL per year for the Lower Murray Swamps with the following components;
  - 72 GL per year for swamp use with unrestricted trade;
  - 22.2 GL per year non-tradeable Environmental Land Management Allocation (ELMA); and
- an average of 449.9 GL per year for 'All Other Purposes' in South Australia which is fully tradeable including 9.3GL per year for what was previously the Highlands associated with the Lower Murray Swamps.

A Cap model for the 'All Other Purposes' approved by the Murray–Darling Basin Commission (now Authority) is used to determine the annual climate adjusted Cap target for this category of diversion.

In 2011–12, there were no restrictions.

South Australia continues to progress a number of the actions identified by the IAG in its 2010–11 report. Work has continued on the amalgamation of the 'All Other Purposes' and Lower Murray Swamps Cap valleys. This will include a process for adjusting annual Cap targets for the use and trade of environmental entitlements.

A climate adjusted model for Metropolitan Adelaide has been previously discussed with the IAG and development of the model continues. South Australia continue to work to resolve technical issues within the model which resulted in modelled inflows that are higher than recorded inflows associated with the Mt Lofty Ranges. South Australia expects to submit the model for audit and accreditation during 2012–13.

### 4.1.2. 2011–12 usage

#### **Overview**

The 2011–12 water year provided South Australia with its full annual Entitlement Flow of 1,850 GL and an extended duration of unregulated and Additional Dilution Flow. River Murray I water access entitlement holders received 100% allocation and no carryover was available from the 2010–11 water year.

South Australia received a total flow across the border of 10,250 GL, including the delivery of a large volume of environmental water trade (353 GL) from New South Wales and Victoria. The flow to South Australia peaked at just under 60 GL/day in late March 2012 and provided for follow up watering on sections of the River Murray flood plain which received higher flows and inundation in 2011–12 when the flow peaked at 93 GL/day in February.

Diversions from the River Murray for all South Australian Cap valleys remained low due to above average rainfall during spring and summer. A comparison of the annual diversions against the Cap targets is provided in **Table 1**. South Australia has adopted a methodology of adjusting for environmental water usage in 2011–12. This methodology is different from that applied in 2010-11 where environmental water entitlement rather than use was used to adjust the Cap, however it is consistent with the proposed methodology submitted to the MDBA for approval in 2010. The MDBA had suggested a different approach to the method currently used by South Australia, which is consistent with Victoria. The IAG noted that South Australia supported a common process being implemented across all jurisdictions.

Total South Australian consumptive diversions from the River Murray for 2011–12 were 421 GL, This comprised:

- 59 GL for Metropolitan Adelaide and associated country areas;
- 35.7 GL for Country Towns;
- 13.1 GL for the Lower Murray Swamps; and
- 313.4 GL for metered and un-metered consumption under the "All Other Purposes" Cap component.

System	Long- term Diversion Cap	Annual Cap Target	Cap adjustment for permanent trade	Annual temporary trade	Cap adjustment for total trade	Cap adjustment for env. water used	This year's diversion	Cap Credits (Target less diversion) (this year)	Cumulative since 1/7/97	20% schedule trigger	Trigger Exceeded
	(GL)	(GL)	(GL)	(GL) #		(GL)*	(GL)	(GL)	(GL)	(GL)	
Metropolitan Adelaide and Associated Country Areas	650*	297.7	0.0	0.0	0.0	0.0	59.0	-	-	-	-
Country Towns	50	50.0	0.0	-14.0	-14.0	0.0	35.7	0.3	68.8	10.0	no
Lower Murray Swamps*	94.2	94.2	-48.1	-9.1	-57.2	0.0	13.1	24.0	98.9	18.8	no
All Other Purposes	449.9	426.1	80.5	-52.4	28.2	-3.3	313.4	137.6	1136	90.0	no
TOTAL	594.1	868.0	32.4	-75.5	-43.0	-3.3	421.2	161.8	1,303.7	-	-

#### Table 1: 2011–12 River Murray Water Use in South Australia

\*Includes no credit generated prior to full metering

Significant trading of interstate temporary allocations into South Australia occurred during 2011–12. A total of 506.6 GL was traded to South Australia, which included water for general allocations and substantial volumes for the environment.

On 23 March 2012 the Minister for Water and the River Murray announced the South Australian Government would immediately suspend water trade from New South Wales into South Australia until 30 March 2012. This action was undertaken to protect South Australia's Entitlement Flow in 2012–13. The suspension followed the Victorian Government's announcement on 19 March 2012 of an embargo on the trade of some water allocations for the remainder of the 2011–12 water year from New South Wales and a subsequent move by New South Wales to suspend water allocation trade with South Australia between April and 30 June 2012.

**Table 2** provide details of the temporary allocationtrades including the sources for the 2011–12 water year.

#### Table 2: SA River Murray interstate temporary water allocation trade 2011–12

	Temporary	Environmental	Non-Environmental
	Trade	Trade	Trade
	(GL)	(GL)	(GL)
Interstate trade			
From South Australia to Victoria	-152.3	0	-152.3
From South Australia to New South Wales	-76.5	0	-76.5
Total out of South Australia	-228.8	0	-228.8
Into South Australia from Victoria	332.7	226.8	106.0
Into South Australia from New South Wales	173.9	126.5	47.4
Total into South Australia	506.6	353.3	153.4
Net Trade into South Australia	277.8	353.3	-75.4

Ignoring transfers of environmental water, South Australia had a net trade interstate out of South Australia of 75.4 GL and this was partially due to the cessation by South Australia of carryover into 2011–12 and the subsequent transfer of water into Victoria due to the favourable carryover rules.

#### Metropolitan Adelaide and Associated Country Areas water use

The Metropolitan Adelaide Water Supply System utilises two major water resources:

- catchment inflow from the Mount Lofty Ranges; and
- the River Murray.

Normally the Mount Lofty Ranges are the primary source of water because of the significant costs of pumping water from the River Murray over the Mount Lofty Ranges. The Mount Lofty Ranges storage level is the major factor influencing the amount of water to be pumped from the River Murray. As a result of the improved rainfall and the mild weather conditions, only 59 GL was pumped from the River Murray.

In an average year approximately 45% of the water is sourced from the River Murray, but depending on climatic conditions this can be up to 90% in extremely dry years. The usable Mount Lofty Rages natural inflow for 2011–12 was 86.1 GL and the total consumption in the Metropolitan Adelaide Licence supply area was 158 GL.

The five-year rolling total diversion for the Metropolitan Adelaide is 411.2 GL which is 238.7 GL less than the 650 GL limit (**Table 3**).

#### **Country Towns water use**

The Country Towns have a fully tradeable 50 GL Cap. All of the Country Town diversions are metered and this valley does not use a model to calculate annual Cap targets. Each year a volume is gazetted by the South Australia Government, which establishes a maximum diversion limit for Country Town use. The Country Towns were gazetted a use of 50 GL for 2011–12.

Table 3 : Metropolitan Adelaide Cap assessment

	2007–08	2008–09	2009–10	2010-11	2011-12	Total
Rolling Diversion against 650 GL Cap	89.4	149.5	56.9	56.4	59.0	411.3
Five Year Cap						650.0
Amount Below Limit						238.7

Diversions from the River Murray for Country Towns water use were 36 GL with 14 GL traded from Country Towns to the 'All Other Purposes' Cap and also interstate to Victoria. The annual Cap adjusted for trade is 36 GL. Diversions were slightly below the average annual Cap of 36 GL. Permanent water conservation measures continued to apply to Country Towns water customers. Many of the Country Towns do not have an alternative water supply and are therefore totally reliant on River Murray water.

#### Lower Murray Swamps water use

One of Australia's earliest large-scale irrigation developments took place by reclaiming nearly all of the wetlands adjacent to the River Murray between Wellington and Mannum. This area today is known as the Lower Murray Swamps. The Lower Murray Swamps irrigation areas include former Government and private owned irrigation districts of Cowirra, Neeta, Pompoota, Wall Flat, Mypolonga, Burdett, Long Flat, Monteith, Mobilong and Jervois. Levee banks protect these areas as the irrigation areas are generally below the river level. This makes possible flood irrigation of extensive areas of highly productive pasture.

Improved irrigation practices, included laser-levelling of paddocks, have provided opportunities for improved water use efficiency and pasture production. Together with areas around the Lower Lakes, the Lower Murray Swamps previously supported much of South Australia's dairy industry. This has significantly changed over the last eight years as a result of the drought, low commodity prices and high costs associated with remediating pasture and infrastructure damaged by low water levels in the River Channel during the drought.

The Cap for the Lower Murray Swamps is currently 94.2 GL/year (including 22.2 GL/year non-tradeable ELMA water) and adjusted for trade. The Lower Murray Reclaimed Irrigation Area rehabilitation project (completed in 2009–10) required meters to be installed at all diversion points in each Irrigation Trust area. Prior to the rehabilitation project, not all usage was measured and the entire entitlement usage was accounted for each year. A total of 13.1 GL was diverted for irrigation in 2011–12, including some estimated non-metered use. This compares to an adjusted Cap of 37 GL.

#### 'All Other Purposes' water use

The 'All Other Purposes' Cap component encompasses all diversions from the River Murray within South Australia with the exception of:

- Diversions for Metropolitan Adelaide and associated country areas from the Mannum– Adelaide, Murray Bridge–Onkaparinga, Swan Reach–Stockwell and Morgan–Whyalla pipelines
- Diversions for Country Towns (including the Morgan –Whyalla and Tailem Bend –Keith pipelines)
- Diversions for Lower Murray Reclaimed Irrigation Area.

'All Other Purposes' includes stock, domestic, environmental, industrial and recreation entitlements. Annual water restrictions apply to all purposes with the exception of industrial, stock and domestic that equates to approximately 20 GL; however restrictions were not applied during 2011–12.

Wet conditions were experienced throughout the Riverland districts during 2011–12, with a total of 325 mm recorded at the Berri Post Office gauge.

A Cap model for the 'All Other Purposes' diversions has been developed to enable a comparison of diversions with an annual climate adjusted Cap target. The Cap model for the 'All Other Purposes' is a regression model in which the historical monthly demands are adjusted (de-trended) to reflect 1993–94 levels of development. An annual Cap target is then derived through regression of the de-trended data with rainfall and temperature data from Berri and Loxton and scaled up by 449.9/440.6 GL to account for the transfer of 9.3 GL from the Lower Murray Swamps Cap.

The climate adjusted Annual Cap Target for 2011–12 based on this model was 417.3 GL. There was a net trade out of the 'All Other Purposes' Cap valley of 57.5 GL and an environmental use of 3.3 GL, which has also been excluded from the calculation of the annual Cap target. A further adjustment occurs for permanent trade, which increases the annual Cap to 389.8 GL and this compares to an annual diversion of 313.4 GL.

#### Merger of the 'All Other Purposes' and Lower Murray Swamps Cap valleys

Currently both Cap valleys are accounted for separately under Schedule E Cap on diversions and the current long-term diversion Caps as outlined under clause 7 are:

- 94.2 GL for the Lower Murray Swamps (including 22.2 GL for the ELMA which is non-tradeable);
- 449.9 GL for the 'All Other Purposes'. The 'All Other Purposes' Cap was amended to include the 9.3 GL Highland irrigation allocations of the Lower Murray Swamps in March 2008 and the Cap subsequently was increased from 440.6 GL to 449.9 GL.

Transfer of the 9.3 GL Highland irrigation allocations was agreed in March 2008 when the Murray–Darling Basin Ministerial Council adopted the new Schedule E (formerly Schedule F). These diversions were metered and it was therefore administratively convenient to account for this water as part of the 'All Other Purposes' Cap valley.

There has been a significant amount of permanent entitlement trade from the Lower Murray Swamps to the 'All Other Purposes' Cap since 2004 and an annual adjustment has occurred to adjust the Cap for this permanent trade. This annual transfer process would no longer be necessary under an amalgamated Cap.

The amalgamation process is currently underway and several issues relating to the adjustment mechanism for environmental water recover needs to be resolved before this process can be finalised and a proposal to amend Schedule E be submitted.

#### 4.1.3. Administration of the Cap

South Australia continues to be well placed to manage diversions within the respective Caps. The majority of water diverted from the River Murray is metered and only a small amount of the diversion is estimated usage. All diversions remained within their annual Cap targets and all valleys remain in Cumulative Cap credit.

South Australia did not impose any water restrictions on water access entitlement holders during 2011–12.

South Australia is undertaking a merger of the remaining Lower Murray Swamp Cap into the 'All Other Purposes' Cap.

Although this merger is administratively simple, it will require an amendment to Schedule E of the Murray– Darling Basin Agreement. A formal proposal will be submitted to the MDBA in 2012–13.

#### Metropolitan Adelaide Cap Model development

South Australia is progressing the development of the new climate-adjusted Cap model for Metropolitan Adelaide, which will be submitted for auditing and accreditation in 2012–13. It is anticipated that this model will be used for the 2013–14 Cap assessment.

#### Cap adjustment for environmental water

In November 2011, the Water Audit Panel discussed the Cap adjustment process for environmental water recovery. A number of methods have been put forward by the MDBA, including a method to scale down annual Cap targets in proportion to the long-term Cap equivalent. The Water Audit Panel asked the Authority to compare diversions under a current conditions run with the Cap targets which have been appropriately scaled down to allow for water recovered for the environment.

Once received, South Australia will consider the appropriateness of each method and submit a revised proposed method for further discussion. South Australia is currently applying their preferred method of reducing the Cap by the volume of environmental water used.

### 4.1.4. Monitoring and reporting

Urban consumption (Metropolitan Adelaide and Country Towns) and irrigated consumption under the 'All Other Purposes' Cap component, is reliably metered. South Australia continues to make improvements to ensure that the standard of metering of direct diversions is maintained at satisfactory levels.

Metering of the Lower Murray Swamp irrigation areas has been affected significantly by issues associated with the drought, in particular damage to infrastructure and laser levelled paddocks. South Australia uses estimation if meter reading is not available.

### 4.1.5. IAG assessment

Diversions for all valleys are below Cap for 2011–12.

In its 2007–08 Cap report, the IAG recommended that South Australia develop a climate-adjusted model for the Metropolitan Adelaide Cap. Work continues on this model and, following the resolution of technical issues, will be submitted for accreditation during 2012–13. This model is expected to be used for the 2012–13 Cap assessment.

Metropolitan Adelaide consumption over the last five years was 411.2 GL compared with the five-year rolling target of 650 GL.

There were no restrictions in place for the 2011–12 year and, therefore, South Australia has not adjusted this year's 'All Other Purposes' Cap for restrictions. In 2010–11 the IAG recommended that South Australia consider incorporating restrictions into the approved model for calculating Cap targets and submit a revised model for approval.

While diversions for the Lower Murray Swamps are now fully metered, some estimates had to be made for usage due to meter access problems. Diversions for the Lower Murray Swamps were below Cap.

The IAG notes that South Australia has reversed its earlier decision to adjust the Lower Murray Swamp Cap targets for restrictions. As a consequence it is now claiming credits between 2003 and 2009 by not adjusting the LMS Cap for restrictions.

The IAG notes that South Australia has not adjusted the cumulative credits for the Lower Murray Swamps for restrictions and that ELMA water not used is also treated as a credit. The intent of the Ministerial Council decision of May 2008 was to adjust the annual Cap targets or restrictions. While South Australia acknowledges that unused ELMA water flows downstream it has not yet adjusted the annual Cap target for this component thereby inflating the cumulative credits South Australia is progressing the amalgamation of the remaining Lower Murray Swamps Cap components with the 'All Other Purposes' Cap. It is expected that a submission for the required amendment to Schedule E will be made to the Ministerial Council during the 2012-13 year to enable the amalgamated valley to be reported from the 2012-13 year onward. The IAG expects that the issues identified above would be addressed as part of the submission. A model to support the amalgamated cap could be based on the MSM-Bigmod model used to generate caps for NSW Murray, Victorian Murray, and the Lower Darling. This model incorporates the regression demand model that SA already uses but restricts supply in the dry years. This model has already been used to determine the SA Sustainable Diversion Limit for the Basin Plan. The IAG encourages SA to use this model.

South Australia continues to be well placed to quantify the Cap and reliably report against it. Reliable consumption measurement is in place for both urban and non-urban (irrigation) uses. Metering arrangements are now in place for the Lower Murray Swamps, and whilst their use has been affected by access concerns, an appropriate methodology for estimation has been applied where necessary.

#### 4.1.6. Conclusions and recommendations

- Diversions in 2011–12 were 421 GL and continue to be at historically low levels;
- South Australia has a reliable measurement system for urban and irrigation uses;
- The IAG notes that South Australia is yet to resolve the accounting for ELMA in Lower Murray Swamps Cap and is therefore including the non-use of ELMA as a credit.
- The IAG notes that South Australia has revised its methodology and is no longer adjusting the Cap for restrictions to the Lower Murray Swamps Cap. The IAG considers that this change is generating inappropriate credits for the years 2003–2009.
- South Australia has developed a climatically adjusted model for Metropolitan Adelaide. This model is expected to be submitted to the MDBA for accreditation during 2012–13.

- The IAG continues to support the amalgamation of the Lower Murray Swamps and the 'All Other Purposes' Cap and encourages South Australia to propose amendment to Schedule E.
- The IAG encourages South Australia to consider developing a Cap Model for the amalgamated Cap which incorporates the River Murray restriction policy and submit the new model for approval.
- The IAG notes that South Australia has submitted a draft proposal for approval regarding the treatment of environmental water in the adjustment to the Cap. Further, the IAG understands that, following discussion at the Water Audit Panel, an amended proposal is required. The IAG encourages South Australia to submit the amended proposal for approval and application for 2012–13.
- The IAG recommends that the proposal for the merger of the Lower Murray Swamps and the "All Other Purposes" Cap include adjustments to the Cap for the non-use of ELMA water.

## 4.2. Victoria

#### 4.2.1. The Cap assessment tools

Victoria has used computer simulation models calibrated to a 1993–94 level of development to calculate Cap targets for all major regulated systems. Regression models have been used for smaller systems. All the models used have been approved by the MDBA and in the case of the Wimmera–Mallee valley the previously approved model has been updated for post-pipeline conditions and a draft proposal submitted to the Water Audit Panel. The models used for the Goulburn–Broken–Loddon and Campaspe valleys and the Wimmera–Mallee valley were developed by Victoria while the models used for the Victorian Murray–Kiewa–Ovens valleys were developed by the MDBA.

Data inputs for all the models are extended annually in order to undertake the Cap audit. As part of the data extension process improvements to data estimation techniques are included where possible. Any changes that impact on Cap assessment are reported. The model used for the Goulburn–Broken–Loddon and Campaspe valleys was approved by the then Murray–Darling Basin Commission at meeting 93 on 4 September 2007. This model was re-calibrated for improved Campaspe Irrigation District diversion data and re-approved by the MDBA on 10 May 2012 prior to Cap reporting for the 2011–12 water year.

In extending data inputs to 2011–12 for the Goulburn-Broken-Loddon and Campaspe Cap model, the rating curve for a gauge used to estimate flow inputs for Lake Eildon, Goulburn Weir and Trawool was updated. This led to a net reduction of 10 GL in the Goulburn-Broken-Loddon cumulative Cap credit from 1997–98 to 2010–11, or approximately -0.5% of the long-term average Cap. The update did not however result in a significant correction in the cumulative Cap credit to 2010–11 for the Campaspe valley.

Regression models are used for the Kiewa and Ovens valleys and these were developed by the MDBA as part of their development of a hydrological Cap model for the River Murray System which includes the Victorian Murray. Both the regression models and the hydrological Cap model, excluding the Lower Darling component, were approved by the then Murray–Darling Basin Commission at meeting 96 on 26 August 2008. The Murray Cap model has since undergone a number of updates and an updated model has been used for the 2011-12 assessment. Input data extension to 2011–12 for the Victorian Murray-Kiewa-Ovens models has led to a net increase of 117 GL to the 1997-98 to 2010-11 cumulative Cap credit which is +6.9% of the longterm average Cap. Capacity tables for Hume and Dartmouth were also updated in 2011-12 but this did not have a significant effect.

The Wimmera–Mallee computer simulation model used for 2010–11 Cap reporting was approved by the MDBA on 5 November 2011. Since then an updated computer simulation model has been developed to represent fully pipelined conditions following completion of the Northern Mallee and Wimmera– Mallee pipelines and as recommended by the MDBA independent model auditor. Victoria submitted a draft proposal to the Water Audit Panel at meeting 3–12 on 11 September 2012 to initiate approval of the updated post-pipeline model and its adoption as the Wimmera–Mallee Cap model. The proposed post-pipeline Wimmera–Mallee Cap model has been used to calculate the 2011–12 Cap target for Wimmera–Mallee valley. The draft submission for this model reports a long-term average Cap of 67.6 GL over the simulation period of July 1891 to June 2008 (the period approved for the Cap model). Victoria proposes that the trigger for a special audit is reduced from 32 GL to 20 GL which is 30% of the reduced long-term average Cap. The cumulative Cap credit until June 2011 will flow through to the new model. A proposal to change the trigger requires Ministerial Council approval and the IAG in **Table 4** have retained the historic 20% trigger, although at a lower absolute level of 13 GL.

Victoria's proposal to reduce Cap for environment flows was approved by the MDBA in 2010, as is required by the protocol 'Adjusting Caps on Diversions for Environmental Entitlements and Uses' under Schedule E of the *Murray–Darling Basin Agreement*. This method has been applied to 2011 12 Cap targets to account for water recovered for the environment through initiatives such as Snowy environmental flows, The Living Murray including decommissioning of Lake Mokoan, and Commonwealth purchases.

Victoria remains committed to the ongoing development and improvement of Cap models for calculating annual Cap targets.

## 4.2.2. Comparison of annual diversions with the annual Cap targets

#### **Overview**

For the second consecutive season, entitlement holders in all systems received allocations of 100% of high-reliability water shares (HRWS). Allocations in the Campaspe, Broken and Bullarook systems also reached 100% of low-reliability water shares (LRWS). All systems received an allocation at the opening announcement on 1 July 2012 for the first time since 2002–03.

In addition to 2011–12 allocations, large volumes were carried over from the previous season. Victoria's carryover rules in the Murray, Goulburn and Campaspe systems allow entitlement holders to carryover any unused allocation into the following season, but any water above their entitlement volume is subject to a risk of spill from Lake Dartmouth, Lake Eildon and Lake Eppalock. The volume held above entitlement volumes is held in Spillable water accounts until a low risk of spill declaration is made. This occurs when the probability that the storage will spill is less than 10%. The volumes carried over into 2010–11 were equivalent to 100% HRWS in each of the VIC Murray, Goulburn and Campaspe River Valleys. Entitlement holders in the Broken, Loddon and Bullarook systems can carryover up to 50% of their entitlement volume, but their access to water is limited to 100% of their entitlement volume.

For all areas managed by Goulburn–Murray Water, rainfall for the year ending 30 June 2012 was overall above average. However, rainfall in October was significantly below average ranging from 24 to 81% of average. Rainfall at the end of the year in May and June 2012 was also lower than average. Above average rainfall was received in most areas in August 2011 and from November 2011 to March 2012.

Many locations in the Goulburn, Murray, Ovens and Broken catchments recorded their highest March rainfalls on record. The summer seasonal rainfall was considerably wetter than average across all locations with a range of 109% of average at Kerang to 231% of average at Yarrawonga. In contrast to the 2010–11 season, the only flooding immediately downstream of a storage in 2011–12 occurred at Lake Buffalo during March 2012 where flows exceeded the minor flood threshold for a short period. Heavy rainfall over the Murray Valley and Shepparton Irrigation Areas in March 2012 resulted in flooding across these irrigation districts and along the lower Broken Creek. Towns including Katamatite, Tungamah, Tallygaroopna, Nathalia and Numurkah experienced flooding during this period.

Inflows to the Campaspe and Loddon systems were 48% and 27% of average respectively. Lake Eildon, Lake Hume and Lake Dartmouth storages had annual inflows 84%, 133% and 101% of average respectively. Overall, 2011–12 inflows were significantly lower than the 2010–11 season.

During 2011–12, diversions from all four valleys (Goulburn–Broken–Loddon, Campaspe, Murray– Kiewa–Ovens and Wimmera–Mallee) were below their Cap targets (**Table 4**). All these valleys have cumulative Cap credits since 1997–98 with further substantial increases in credits in 2011–12 (**Table 4** and **Appendix C**)

#### Table 4: Comparison of diversions with Cap targets in Victoria

Carlan	Long-term diversion	This year's Cap Target	Cap adjust't for trade <sup>1</sup>	Cap adjust't For Env. use (GL)	This year's net <sup>2</sup> diversion (GL)	Cap Credi	ts (target less	Trigger Exceeded	Storage Difference	
System	Cap (GL)	(GL)	(GL)			This year (GL)	Cumulative since 1/7/97 (GL)	% schedule trigger (GL)	(S 0	(Simulated less Observed) (GL)
Goulburn/ Broken³/ Loddon	2,034	2,017	- 107	- 208	1,017	685	1,852	- 407	No	- 44
Murray/ Kiewa/ Ovens	1,702	1,667	64	- 161	1,278	293	2,147	- 340	No	- 336
Campaspe	122	105	0	- 14	28	63	248	- 24	No	- 18
Wimmera– Mallee	67	75	0	04	13	62	71	- 13	No	- 78
TOTAL	3,925				2,336					

Notes:

1. Includes Goldfields Superpipe transfers

2. Diversion net of transfers to other Cap valleys

3. Cap adjusted for decommissioning of Lake Mokoan

4. Adjustment for environmental flows not required as updated post pipeline model was used.

#### Goulburn-Broken-Loddon

#### **Resource availability**

Although annual rainfall at Eildon was 111% of the average rainfall, inflows were 84% of average; considerably less than the 149% inflows in 2010–11. The volume of Lake Eildon rose from 88% to just below 100% in late October, before being drawn down to 84% in mid May 2012. Waranga Basin was filled from 82% of capacity from catchment inflows during July and was drawn down to 52% of capacity at the end of February; before refilling to 77% by the end of the irrigation season on 15 May 2012.

The contribution from the unregulated catchment between Eildon and Goulburn Weir during 2011–12 was 92% of average, ranging from 40% in September to 489% in March. Releases from Goulburn Weir were supported by deliveries of environmental water. A total of 195 GL from the TLM entitlements and the Commonwealth Environmental Water Holder were used to provide additional environmental flows downstream of Goulburn Weir.

The total transfer from the Goulburn Valley Account (GVA) to the River Murray via the Goulburn River was 56 GL. A total of 9 GL from the Goulburn Water Quality Reserve was delivered to the lower Broken Creek in March because of low dissolved oxygen issues from floodwater.

Although deliveries were the highest in more than five years, there were limited opportunities to release water from Lake Eildon to meet demand requirements. Pre-releases from Lake Eildon commenced in March and continued until early May so that target filling arrangements in the winter and spring of 2011–12 could be met. These releases resulted in unregulated flows in the lower Goulburn River. Many of the other storages were at or near capacity and demand for water did not require releases from the storages to be made.

Annual inflow at Lake Nillahcootie for 2011–12 was 78% of average. The storage reached 105% of capacity at the end of September 2011 and was drawn down to a minimum of 91% of capacity in late February 2012. Cairn Curran and Tullaroop reservoirs remained relatively full for the year, with the storages drawn down to 87% and 84 % of capacity respectively. These storages had relatively low inflows, only receiving 29% and 38% of average annual inflows. Despite overall low inflows, Tullaroop filled to capacity and spilled and Cairn Curran approached full capacity at the end of October. A supplement to the Goulburn system was available from the Loddon system. Only 1 GL was delivered as unregulated flows in the Goulburn system were available to meet demand in the Boort irrigation area.

Newlyn Reservoir began the year at 100% of capacity, was drawn down to 72% in May, and refilled to 84% by the end of the year. After starting the season at 97% of capacity, Hepburn's Lagoon was lowered to 61% in mid June, before recovering and reaching 70% by the end of June 2012.

The first non-zero allocations were announced for all systems at the start of July, which is the first time since 2002 that this has occurred prior to the start of the irrigation season. This was an improvement on the previous year, which did not receive allocations until August. All systems reached 100% of HRWS, with the Broken and Bullarook systems also reaching 100% of LRWS. On 12 December 2011, a declaration was made that the risk of spill at Lake Eildon was low, which enabled water held in spillable water accounts to be accessed.

The total unused allocation in the Goulbourn, Broken and Loddon (including Rochester) that was carried over from 2011–12 to 2012–13 was 1,070 GL. This included 46 GL carried over from the environment. The unused allocation that had been carried over from 2010–11 to 2011–12 was 1,090 GL.

#### Cap compliance

Diversion from the Goulburn–Broken–Loddon River Valleys was 1,017 GL; which is 685 GL less than the Cap target of 1,702 GL (with preliminary adjustment for trade, environmental releases, decommissioning of Lake Mokoan and inter-valley transfers). Diversions were 50% below the long-term Cap of 2,034 GL/year. The cumulative Cap credit for the period from July 1997 to June 2012 is 1,852 GL (**Table 4**).

#### Murray-Kiewa-Ovens

#### **Resource availability**

Inflows to Dartmouth and Hume reservoirs were 101% and 130% of the annual average respectively. Lake Dartmouth was 64% of capacity at the start of the season and by the end of June 2012 the reservoir was 86% full. Lake Hume was 93% at the start of the season and reached a maximum of 99% of capacity in early October, before being drawn down to 63% by the end of February. The storage refilled rapidly in early March to 90% capacity and by 30 June 2012 Lake Hume was 95% of capacity.

High inflows in the Ovens system resulted in the continuation of spill at Lake William Hovell for the entire season, as it has done since June 2010. Because of high unregulated flows, water from Lake Buffalo was not required to meet delivery requirements in the Buffalo and Ovens Rivers. In April, 5.5 GL was released from Lake Buffalo to lower the storage ahead of annual winter maintenance.

The Menindee Lakes started the 2011–12 season at 95% of capacity and fell to 72% in March, before refilling to 93%. As the Lakes were above 640 GL for the entire season, control of the Lakes remained with the MDBA.

Lake Victoria was 72% full at the start of July 2011 and rose to a maximum of 99% in mid November 2011. By the 30 June 2012 the storage was holding 71% of capacity. Lake Victoria held 481 GL at the 30 June 2012 and Victoria's share was 241 GL (71%).

In 2011–12, unregulated River Murray flows were harvested into Lake Charm in August and into Lake Boga in September and October. Kow Swamp and Kangaroo Lake were filled by harvesting flows in August and September.

The Murray system allocation started with 21% HRWS on 1 July 2011. Water availability continued to improve over the next few months and on 15 November 2011 the final allocation of 100% HRWS was announced. Once again, entitlement holders in the Murray system did not receive allocation against their LRWS. On 1 July 2011, a declaration was made that the risk of spill at Lake Dartmouth was low, which enabled water held in spillable water accounts to be accessed. During the year, the total volume supplied from the River Murray to the Northern Mallee Pipeline was 3.7 GL.

A total of 141 GL was delivered to the Barmah Forest from the Barmah Environmental Water Allocation. A further 30 GL was delivered to the Barmah Forest from the Victorian Environmental Water Holder (10 GL) and the Living Murray entitlements (20 GL).

The total unused allocation carried over from 2011–12 to 2012–13 is 1,417 GL, which includes 192 GL carried from the environment. The total unused allocation that had been carried over from 2010–11 to 2011–12 was 1,387 GL.

#### Cap compliance

Diversion from the Murray–Kiewa–Ovens valley was 1,278 GL, which is 293 GL less than the Cap target of 1,571 GL (with preliminary adjustment for trade and environmental releases). The diversion was 25% below the long-term Cap of 1,702 GL/year. The cumulative Cap credit since July 1997 is 2,147 GL (**Table 4**).

#### Campaspe

#### **Resource availability**

Inflows to Lake Eppalock were 48% of the annual average, more than six times lower than inflows during 2010–11. At the beginning of the season the storage capacity was 97% and the storage filled by the end of July 2011. Lake Eppalock remained at capacity until the end of October and it gradually fell to 89% capacity by the end of the 2011–12 season.

Opening allocations on 1 July 2011 in the Campaspe system were 100% HRWS and 47% LRWS. By the beginning of October 2011, allocations to LRWS had reached to 100%. On 12 December 2011, a declaration was made that the risk of spill at Lake Eppalock was low which enabled water held in spillable water accounts to be accessed.

The Campaspe Irrigation District has been decommissioned and there were no diversions through the East and West Channel in 2011–12. A total of 1.6 GL was diverted from the Waranga Western Channel via the Goldfields Superpipe by Coliban Water and Central Highlands Water. Coliban diverted 0.4 ML from its share of Lake Eppalock. Lake Eppalock held more than 200 GL for the whole season. In this case the Campaspe Bulk Entitlement minimum flow requirement downstream of the Campaspe Siphon was set at the higher requirement of 70 ML/day; however the requirement did fall occasionally due to periods when natural inflows were low. Water from the Commonwealth Environmental Water Holder was supplied from July to December and in June to provide environmental flows below Lake Eppalock. A total of 7 GL from The Living Murray entitlements was used in the Campaspe system. This is the first time water from the entitlements was delivered.

There was 0.9 GL of water transferred to the lower Campaspe River from the Goulburn Valley Account via the Waranga Western Channel in order to meet environmental flow commitments. The supplement to the Goulburn system was not required in 2011–12 as demand in the Goulburn system was able to be met from available water in that system.

The total unused allocation in Campaspe (excluding Rochester irrigation area) that was carried over from 2011–12 to 2012–13 is 40 GL which includes only 0.1 ML carried over from the environment. The total unused allocation that had been carried over from 2010–11 to 2011–12 is 46 GL.

#### Cap compliance

Diversion from the Campaspe valley was 28 GL, which is 63 GL below the Cap target of 92 GL (with adjustment for trade to supply the Goldfields Superpipe). Diversions were 77% below the long-term Cap of 122 GL/year. The cumulative Cap credit for the Campaspe valley from July 1997 to June 2012 is 248 GL (**Table 4**).

#### Wimmera-Mallee

#### **Resource availability**

The 2011–12 water year was reasonably dry with 130 GL of inflows received or about 70% of the long-term average. These inflows were only 34% of the inflows received during the very wet 2010–11 water year. The inflows resulted in the Wimmera– Mallee total water supply system storage reaching a maximum of 385 GL in September 2011 and being drawn down to a minimum of 286 GL in June 2012. The Wimmera–Mallee Pipeline Project was completed in May 2010. The Wimmera Glenelg Bulk Entitlements were revoked in October of 2010 and replaced with new Bulk and Environmental Entitlement Orders. Grampians Wimmera–Mallee Water was also appointed both the Storage Manager and Resource Manager for the Wimmera–Mallee system headworks.

Opening allocations at 1 June 2011 were 55 GL (43%) with the final allocation for the 2011–12 water year being 126 GL (100%). A system reserve volume of 95 GL was also created during this period.

Deliveries to entitlement holders totalled 36 GL. Eighteen GL of this was delivered to GWMWater, 0.1 GL to Coliban Water, 0.1 GL to Wannon Water and 18 GL to the environment as part of its regulated entitlement.

The Environment is now entitled to passing flows from Lake Lonsdale to the Mt William Creek, Huddleston's Weir to the Wimmera River and Rocklands Reservoir to the Glenelg River. However these are not considered part of the total system diversion reportable under the MDBA Cap. These volumes form a large part of the volumes returned to the environment as required by contract under the Wimmera–Mallee Pipeline Project. In total, these passing flow rules provided a total of 30 GL of water to the environment for the 2011–12 period.

The total unused allocation carried over from 2011–12 to 2012–13 was 106 GL for consumptive use plus 44 GL carried over from the environment. The total unused allocation that had been carried over from 2010–11 to 2011–12 was 61 GL.

#### Cap compliance

Diversion from the Wimmera–Mallee River Valley in 2011–12 was 13 GL, which is 62 GL less than the Cap target of 75 GL. Diversions were 81% below the longterm Cap of 67 GL/year. The cumulative Cap credit for the Wimmera–Mallee valley since July 1997 is 71 GL (**Table 4** and **Appendix C**).

#### 4.2.3. Administration of the Cap

#### Measures taken during the year

Between 1995 and 1997 Victoria introduced and refined the following changes to water management in response to the Murray–Darling Basin Ministerial Council decision to Cap water use:

- restrictions on temporary and permanent water trading;
- reductions on allocations for a given resource; and
- limits on the issuing of new entitlements.

Monitoring of the effectiveness of the water management policies is undertaken on an ongoing basis. No new Capping policies were introduced in 2011–12 and none are currently proposed for 2012–13, as existing measures have continued to be effective. There is no evidence of growth in diversions in any of the Victorian valleys.

Victoria remains committed to the Cap through the continued establishment and implementation of Bulk Entitlements (BEs), Streamflow Management Plans (SFMPs) and the licensing of irrigation farm dams.

#### **Bulk entitlements**

Victoria continued to implement the Cap on regulated systems by establishing Bulk Entitlements in accordance with the *Victorian Water Act 1989*. Bulk Entitlements being developed for the Victorian portion of the Murray–Darling Basin are as follows:

- Wimmera BE amendment completed in October 2010
- Snowy Environmental Reserve–An environmental entitlement for the Snowy Environmental Reserve was granted in June 2004. As of 2011, 1,230 GL of high reliability savings has been transferred from the Murray and 38 GL from the Goulburn. The volume of environmental entitlements in these Bulk Entitlements will be increased as other water savings projects and entitlement purchases are undertaken

- TLM Water recovered under TLM initiative has been transferred into environmental entitlements in the Murray, Goulburn, Campaspe and Broken Creek systems. As of 2011–12 the following entitlements have been transferred:
  - Murray 5.7 GL of High Reliability and 99 GL of Low Reliability
  - Broken Ck 3 GL of Low Reliability
  - Goulburn 40 GL of High Reliability and 157 GL of Low Reliability
  - Campaspe 0.1 GL of High Reliability and 5 GL of Low Reliability.

#### Streamflow management plans

The Victorian Water Act 1989 prescribes the statutory mechanism for establishing management arrangements for priority unregulated surface water and groundwater systems, known as management plans. Statutory management plans are developed for highly stressed or utilised systems if:

- there is a need to amend licence volumes or conditions
- permanent or ongoing restrictions on licensed extractions are required to protect consumptive licences, domestic and stock use or the environment
- the overall licence volume needs to be reduced.

Statutory management plans are developed on behalf of the Minister for Water by a consultative committee consisting of water users, community, environmental and government agency representatives, in accordance with *Water Act 1989* provisions.

The Northern Sustainable Water Strategy reassessed, in consultation with stakeholders and the broader community, previously identified priority areas requiring the development of a management plan. At this time, the Upper Ovens River is the only system where a statutory management plan is required and this is an integrated surface water and groundwater management plan. The Upper Ovens River Water Supply Protection Area Water Management Plan was approved in January 2012.

Local Management Plans have been prepared by Goulburn-Murray Water for all other river systems and are available on their website. The plans are prepared by water authorities in consultation with stakeholders and publicise and formalise the existing water management arrangements, including the management of environmental flows, trading rules, rosters and restriction arrangements.

#### Farm dams

Victoria not only manages water in waterways, but also licenses the use of water for irrigation and commercial purposes in catchment dams under the Water Act 1989, as amended by the Water (Irrigation Farm Dams) Act 2002. All existing dams used for irrigation or commercial purposes were required to be either licensed or registered during the period 1 July 2002 to 30 June 2003. All new irrigation and commercial use of water must be licensed. whether the proposed dam is located on a waterway or not. Changes to the legislation have also led to the establishment of Permissible Consumptive Volumes for catchments across the state and the establishment of exchange rates to ensure that the Murray-Darling Basin Cap is preserved when licences are traded.

Over 6000 catchment dams in the Murray–Darling Basin south of the Murray River have been licensed. New licence applications for catchment dams are subject to the Murray–Darling Basin Cap and new developers are required to purchase an existing entitlement before approval is provided.

All new or altered domestic and stock dams on properties of less than eight hectares (20 acres) in peri-urban areas must be registered. Any growth in the use of surface water for domestic and stock purposes permitted by Section 8 of the *Act* will inform decisions on whether any further regulatory action is needed.

Victoria will need to consider how the Murray–Darling Basin Plan will impact on domestic and stock water use to determine the extent to which tighter monitoring and management of domestic and stock use may be required in the future.

#### Measures proposed during next year

Victoria will continually work with the MDBA to improve the method to reduce Cap for environmental flows.

Victoria will also work with the MDBA towards approval of the post-pipeline Wimmera–Mallee valley Cap model.

#### 4.2.4. IAG assessment

Diversions from the Victorian Murray–Darling Basin valleys totalled 2,336 GL; compared to 1,094 GL in 2010–11 IAG report and 1,810 GL in 2009–10 IAG report.

This reflected high allocations following good inflows to storages and carryover from 2010–11.

Diversions in 2011–12 in all valleys were below the Cap targets for the year and all valleys have a cumulative Cap credit since 1 July 1997.

Victoria has accredited models for all of the Victorian valleys. However, there continues to be refining of models and inputs. In the case of the Wimmera– Mallee with the completion of the pipeline project, a new model has been developed which will be submitted to the MDBA for audit and accreditation. In each valley the most recent model and best available data has been used to derive the 2011–12 targets. The effect of model and/or data changes was as follows:

- Goulburn–Broken–Loddon: the cumulative Cap credit reduced by 10 GL from 1997–98 to 2010–11
- Campaspe: no significant change in cumulative Cap credits
- Victorian Murray–Kiewa–Ovens : cumulative Cap credit increased by 117 GL for the period 1997–98 to 2010–11, which is 6.9% of the long-term average Cap
- Wimmera-Mallee: the revised model proposes long-term average Cap of 67 GL/year.

The proposed post-pipeline Wimmera–Mallee Cap model and supporting information (that will be submitted to the MDBA for audit and accreditation) proposes that the trigger for a special audit be reduced from the present 32 GL under the old model to 20 GL. This is different to the Schedule E rule applied across other valleys in the Murray–Darling Basin where the trigger is set at 20% of the long-term average Cap. As per the current Schedule E rule, the trigger would be 13.4 GL. Victoria argues that the 20 GL trigger, which is 30% of the long-term average Cap is more appropriate because of model uncertainty and lack of performance data on how the new pipe system and environmental water management will operate. The Victorian submission on the Wimmera–Mallee post-pipeline Cap model advised:

'Clause 16(c) of Schedule E provides for an allowance of 20% of the long-term Cap before a special audit is triggered. This allowance recognises that there will be errors in Cap accounting as models contain significant uncertainties and diversion data cannot be measured perfectly. If this 20% allowance applies to the reduced Cap, the margin for error will be less than half of the previous allowance. While it could be argued that measurement error associated with diversions will reduce with the pipelining, model uncertainty which forms the biggest component of the error term will certainly not have halved.

The pre-pipeline model was calibrated to many years of diversions and operational behaviour which helped to reduce model uncertainty in the old model. The post pipeline model contains many new, as yet untested, assumptions about how the pipelines will run, how storages will be operated and how the environmental managers will use their new entitlement. These new assumptions will tend to increase model uncertainty. On the plus side, the errors in the estimate of pipeline losses should be lower in absolute terms that the errors in channel losses estimated by the pre-pipeline model. Therefore, it is proposed that the trigger for a special audit in the Wimmera–Mallee valley is reduced by 11.6 GL from 31.9 GL to 20.3 GL which represents 30% of the new long-term average Cap.'

The IAG was also advised that another model will be submitted to the MDBA for the post-pipeline/ post-irrigation scenario to apply from July 2013; and that under this model it is proposed that the trigger be reduced by a further 4.9 GL to 15.4 GL, which is 35% of the revised Cap.

The IAG following the Murray–Darling Basin Ministerial Council decision to establish a Cap on diversions recommended that 20% of the Cap be used as a trigger for a special audit. This was accepted by the Ministerial Council and is now part of Schedule E. An amendment to clause 16(c) of the Schedule E is required if a different trigger is to be used.

As environmental water is being recovered across the Basin, the long-term Cap will reduce for most valleys and, as a consequence, so will the absolute volumetric trigger volume. The IAG sees this as a generic issue that needs to be addressed. A principled approach would be to revert to the initial advice provided to the IAG; which was to set the trigger for a special audit at three standard error of a Cap model. At the time, the IAG did not support this, as the Cap was new to the Basin community and, to build trust, the IAG considered that an easily recognisable, quantifiable measure should be used. This has been successful and as the models become mature and management practices have demonstrated no on-going breaches of Cap, there could be value in reverting to the original proposed trigger of three standard error of a Cap model. Where models are developed for systems with no performance data, such as the proposed Wimmera-Mallee model, a transition arrangement could be put in place for an interim trigger such as the levels proposed by Victoria for the Wimmera-Mallee model. As a consequence the IAG recommends that the MDBA (where there are significant reductions in Cap proposed):

- examines the cost/benefits of moving to a trigger level of three standard error of models for existing valleys
- recommends to the Ministerial Council an amendment to Schedule E to provide for flexibility in setting special triggers.

It should be noted that, as a result of the existing credits and current and projected usage, it is unlikely that the Wimmera–Mallee would trigger a need for a special audit before the proposed Basin Plan is implemented.

Victoria continues to professionally apply itself to the successful implementation of, and compliance with, the Cap.

The IAG acknowledges the detailed submission on water use and Cap compliance.

#### 4.2.5. Conclusions and recommendations

- Diversion in 2011–12 were 2,336 GL, compared to 1,094 GL in the 2010–11 IAG report and 1,210 GL in 2009–10 IAG report. This reflected high allocations following good inflows to storages and carryover from 2010–11.
- Diversions for the Murray-Kiewa-Ovens, Campaspe, Goulburn-Broken-Loddon and Wimmera-Mallee valleys in 2011–12 were below annual climate, environmental use and tradeadjusted Cap targets.
- 3. Cumulative diversions since 1997 are in credit for all valleys.
- Model modifications and inputs have resulted in changes to Caps and Cap credits for some valleys for previous years.
- 5. A new Wimmera–Mallee model has been developed for the post-pipeline conditions and a draft proposal submitted to the MDBA for audit and accreditation. It proposes a 30% trigger for special audits as opposed to the Schedule E 20% rule that applies to other valleys in the Basin.
- 6. The IAG recommends that the MDBA:
  - Examines the cost/benefits of moving to a trigger level of three standard error of the model for the existing valleys.
  - Recommends to the Ministerial Council an amendment to Schedule E to provide for flexibility in setting special triggers.
- Updated models have been used to calculate 2011–12 Cap targets and the cumulative credits presented.
- 8. Victoria continues to apply itself to the successful implementation of, and compliance with, the Cap.

## 4.3. New South Wales

#### 4.3.1. The Cap

Assessment of Cap performance in New South Wales has been conducted on a valley-by-valley basis according to the requirements of Schedule E to the Murray–Darling Basin Agreement. Cumulative performance from 1997–98 relative to the Cap is assessed for all New South Wales valleys, which now have a common water year from July to June.

On 1 July 2004, Water Sharing Plans commenced in most of the major regulated valleys in New South Wales, including the New South Wales Murray and Lower Darling, Murrumbidgee, Lachlan, Macquarie, Namoi, and Gwydir valleys. Each of the Plans sets in place a long-term diversion limit below Cap, and provides for a range of environmentally focused water management rules.

The annual Cap Targets, and the long-term average Cap, are estimated in New South Wales using valley-scale hydrologic models that have been developed using the IQQM (Integrated Quantity-Quality Model) software developed by the New South Wales government. Hydrologic models have been developed using IQQM for all major regulated river systems within the New South Wales portion of the Murray–Darling Basin, with the exception of the New South Wales Murray and the Lower Darling valleys, which are modelled by the MDBA using the Murray Simulation Model (MSM).

The status of the various models used for annual Cap auditing in New South Wales is given in (**Table 5**).

Valley	Auditing Tool	Comment				
Murray / Lower Darling	Murray Monthly Simulation Model (Final)	Approved for use under Schedule E / Lower Darling model recalibrated and is in the process of being submitted to an independent auditor				
Murrumbidgee	IQQM (Final)	Approved for use under Schedule E				
Lachlan	IQQM (Final)	Approved for use under Schedule E				
Macquarie	IQQM (Final)	Approved for use under Schedule E				
Peel	IQQM (Final)	Approved for use under Schedule E				
Namoi	IQQM (Final)	Approved for use under Schedule E				
Gwydir	IQQM (Final)	Approved for use under Schedule E				
Border Rivers	IQQM (Interim)	Model and report being finalised for submission before end of 2012				
Barwon-Darling	IQQM (Submitted for accreditation)	Additional information submitted following initial review.				

#### Table 5: New South Wales Cap auditing models status

#### Table 6: New South Wales annual Cap accounting 2011-12 (GL)

System	Long-term Diversion Cap <sup>5</sup>	2011–12 Cap Target²	Net trade from valley <sup>8</sup>	Environ- mental Water Use	2011–12 diversion <sup>1</sup>	Cap Credits 2011-12 <sup>5</sup>	Cumulative Cap Credits since 1/7/1997	20% schedule trigger	Trigger Exceeded	Storage Difference <sup>7</sup>
Barwon-Darling	188	129	0	0	102	27	53	-40	No	n/a
Lower Darling	133	203	20	-102	67	54	354	-27	No	423
Combined Barwon– Darling & Lower Darling	331	332	20	-102	169	81	407	-66	No	n/a
Intersecting Streams	n/a	n/a	0	0	3	n/a	n/a	n/a	n/a	n/a
Border Rivers #	234	159	-26	0	134	-1	374	-44	No	28
Gwydir	350	207	0	-1	199	8	289	-70	No	-53
Namoi/Peel	364	199	0	0	80	119	370	-73	No	34
Macquarie/ Castlereagh/Bogan	492	441	0	-63	231	147	904	-98	No	-95
Lachlan	335	244	0	-25	189	30	223	-67	No	75
Murrumbidgee	2358	2363	6	-125	1824	420	1078	-472	No	-194
NSW Murray	1908	1958	56	-350	1369	295	873	-382	No	-307
TOTAL	6372	5903	55	-666	4198	1098	4519			

Notes

1. The consumptive diversion excludes environmental water usage.

2. The Cap targets are unadjusted for environmental entitlement.

3. Preliminary adjustments have been made for recovery of TLM water (incl. the purchase of the supplementary water entitlement from Tandou Ltd)

4. Cap credits are calculated by deducting; net trade from the valley (Cap target adjustment) and, environmental water use (Cap target adjustment) and,

consumptive diversion -from the unadjusted Cap target. [Cap debits are illustrated by a negative.]
5. Long-Term Diversion Caps do not include floodplain harvesting components to maintain consistency with observed diversions.
6. A positive storage difference represents a potential Cap credit in future water years.

7. Net trade from the New South Wales Murray valley includes cumulative permanent trades to other states since 1/7/1997.

8. n/a indicates estimate is not available

#### 4.3.2. 2011–12 usage

Wet conditions and flooding in many valleys during 2010–11 resulted in most valleys commencing 2011–12 with high water levels in major storages, and high water availability. Continuing wet conditions during 2011–12 resulted in further extended periods of high flows, and reduced the demand for water. Flooding across much of the Murray–Darling Basin in early March 2012 ensured that the major storages finished the water year with water levels near full capacity.

Total diversions in 2011–12 were 4,198 GL, compared to 3,268 GL in the 2010–11 IAG report (**Table 6**).

There was also significant environmental water use in 2011–12 (665 GL) although significantly less than the 991 GL used in 2010–11.

**Table 6** provides a summary of New South WalesCap accounting by river valley. This table providesdiversions, Cap targets and trade adjustments for2011–12 along with accumulated credit or debit.The valley diversions include estimated unregulatedstream usage and these estimates have also beenadded to the Cap targets.

Comparison of actual diversions with modelled 2011–12 Cap targets indicates diversions were significantly less than the Cap target for each valley, with the exception of the Border Rivers which had a debit of 1 GL and the Gwydir which had a credit of only 8 GL.

All valleys have substantial accumulated credits.

No valleys designated under Schedule E have exceeded the trigger for special audit (**Table 6**)

#### 4.3.3. Cap compliance

#### Murray Valley

Water availability increased quickly to 100% for all water users in the New South Wales Murray Valley, although continuing wet conditions resulted in relatively low diversions of water for irrigation.

Cap compliance for the regulated sections of the Murray Valley has been assessed using a version of the Monthly Simulation Model (MSM) that has been revised since the model was accredited for use.

The Schedule E accounting for the 1997–98 to 2011–12 water years indicates that the New South Wales Murray valley is cumulatively 872 GL below Cap. The observed storage levels at 30 June 2012 were 307 GL higher than those simulated under Cap conditions. If this stored water is used before the storage next spills, up to 307 GL of Cap debits could be generated.

#### Murrumbidgee Valley

The combination of carryover water from the previous year and initial allocations gave Murrumbidgee water users an average availability of 74% at the start of the water year. Both Blowering and Burrinjuck Dams started and finished the year at around 90% of capacity.

Representation of diversions into the Lowbidgee district is included within the Murrumbidgee IQQM, which has now been approved for use under Schedule E. The Schedule E accounting for the 1997–98 to 2011–12 seasons indicates that the total Murrumbidgee Valley is cumulatively 1,078 GL below Cap.

The observed storage levels at 30 June 2012 were 194 GL higher than those simulated under Cap conditions. If this stored water is used before the storage next spills, up to 194 GL of Cap debits could be generated.

#### Lachlan Valley

Lachlan water users commenced the year with zero allocations. However, with Wyangala Dam at above 90% of capacity, water users had access to an average water availability of 117% through carryover provisions. Wyangala Dam finished the year slightly higher at 95% of capacity.

The Lachlan IQQM Cap modelling has been independently audited and approved for use under Schedule E of the *Murray–Darling Basin Agreement*. Schedule E accounting for the 1997–98 to 2011–12 seasons indicates that the Lachlan Valley is cumulatively 223 GL below Cap. Although the Cap model has not yet been reviewed to include representation of the management rules under extreme drought conditions, this is not expected to significantly change the outcomes of the current Cap accounting.

The observed storage levels at 30 June 2012 were 75 GL lower than those simulated under Cap conditions. If this stored water is used before the storage next spills, up to 75 GL of Cap credits could be generated.

#### Macquarie Valley

Water availability in the Macquarie–Cudgegong system averaged 82% at the start of the water year. This was also made possible through the carryover rules under the water sharing plan and the initial allocation of 28% on 1 July 2011. Water levels in both Burrendong Dam and Windamere Dam at the end of the year were 73% and 59% respectively.

The Cap for the regulated sections of the Macquarie Valley has been audited using the Macquarie Valley IQQM accredited for use under Schedule E. The Schedule E accounting for the 1997–98 to 2011–12 season indicates that the Macquarie Valley is cumulatively 903 GL below Cap; although the Cap model does not include drought management rules. The observed storage levels at 30 June 2012 were 95 GL higher than those simulated under Cap conditions. If this stored water is used before the storage next spills, up to 95 GL of Cap debits could be generated.

#### Namoi/Peel Valley

The Namoi Cap valley consists of three distinct systems: the main Lower Namoi Valley, the smaller Peel River system and Manilla River/Upper Namoi system.

Water availability in the Namoi /Peel systems in 2011–12 was very good. Upper Namoi water users have 100% allocations while Peel water users initially had an allocation of 78%, which quickly increased to 100%. Lower Namoi water users did not have any new allocations at the start of the water year, however, under the continuous accounting rules; they had access to carryover averaging 105% of general security entitlement.

The Namoi IQQM Cap model (covering both the Namoi and Manilla/Upper Namoi systems) has been independently audited and approved for use under Schedule E of the Murray–Darling Basin Agreement. A Peel IQQM Cap model has also been accredited by the Murray–Darling Basin Authority for use under Schedule E of the MDB Agreement. Diversions for the combined valleys are below the annual Cap targets since 1997–98 by a cumulative total of 370 GL. The observed storage levels at 30 June 2012 were 34 GL lower than those simulated under Cap conditions. If this stored water is used before the storage next spills, up to 34 GL of Cap credits could be generated.

#### **Gwydir Valley**

The Gwydir Valley experienced major floods in 2011–12 in both November and February 2012. Initial water allocations were zero, however, availability through carryover provisions averaged to be 65% at the commencement of the water year. Copeton Dam finished the year at 95% of capacity and, accordingly all water users' allocation accounts were also full at the end of the year.

The Cap for the regulated sections of the Gwydir Valley has been audited using the Gwydir IQQM that has been accredited under the provisions of Schedule E. The results indicate that diversions are cumulatively 289 GL below Cap since 1997–98. The observed storage levels at 30 June 2012 were 53 GL higher than those simulated under Cap conditions. If this stored water is used before the storage next spills, up to 53 GL of Cap debits could be generated.

#### **New South Wales Border Rivers Valley**

Water users in the New South Wales Border Rivers had 100% allocations for 2011–12 which included further allocation announcements throughout the year to 'top-up' allocation accounts as needed. Pindari Dam finished the water year slightly lower at 89% of capacity.

A formal Inter-Governmental Agreement (IGA) on water sharing arrangements in the Border Rivers is in place after being signed by the New South Wales and Queensland Premiers. The IGA limits each state to the long-term diversion resulting from 2002 levels of development, with the application of the environmental flow rules described in the IGA. Subject to agreement on floodplain harvesting activities, this is estimated to provide an end-of-system flow at Mungindi of around 61% of the natural flow.

The provisions of the IGA are embedded in the Water Sharing Plan for the New South Wales Border Rivers, (and referred to in the Resource Operations Plan for Queensland), which commenced in July 2009. Modelling indicates this results in a Plan Limit (on diversions) of around 191 GL/year for the New South Wales Border Rivers regulated system. According to New South Wales this is approximately 2% below the long-term average diversions under the Cap that is to be proposed by New South Wales.

Following agreement between New South Wales and Queensland on the modelling that describes the states' shares, New South Wales proposed an allowance for modelling the enlargement of Pindari Dam, which has been approved. A Cap model has been developed which is expected to be submitted for accreditation before the end of 2012.

The preliminary Cap accounting from this model shows the valley has a cumulative credit of 374 GL since 1997–98.

#### Intersecting Streams

The Warrego, Paroo, Culgoa, Narran and Moonie Rivers flow across the New South Wales–Queensland border, and reaches of these rivers that are within New South Wales are designated as the 'Intersecting Streams' valley under Schedule E to the Murray–Darling Basin Agreement, for Cap accounting purposes. Presently, no Cap has been formally established for these rivers, and there is no monitoring of usage. No Schedule E accounting is currently available for the Intersecting Streams. There are 24 GL of entitlements under the Water Sharing Plan for the Intersecting Streams Unregulated and Alluvial Water Sources and the estimated usage of 3 GL last year is based on a survey conducted in 2000.
Some of the entitlement from the Warrego River was purchased by the Commonwealth Environmental Water Holder (CEWH) as part of the Toorale property acquisition. Potential Cap adjustments to a future Cap for the environmental use of the CEWH environmental entitlement are being assessed.

# Barwon–Upper Darling Valley

Significant rainfall in southern Queensland and northern New South Wales resulted in substantial flooding through the Barwon–Darling system in 2011–12. The total volume of extractions in the Barwon–Darling in 2011–12 was 102 GL.

New South Wales implemented a Cap Management Strategy to ensure Cap compliance in the Barwon– Darling valley in 2007. The restructured water entitlements and access rules have operated since 2007, and will ensure that long-term average diversions do not exceed the long-term Cap. As the Barwon–Darling is an unregulated river it is acknowledged that water availability will vary significantly between years, and carryover of allocations between water years is a significant feature of these access rules.

The new Cap arrangements that applied from 1 July 2007 include the reduction of licensed entitlements to the volume of the (then) estimated long-term diversion Cap of 173 GL, and unlimited carryover of allocated water from one water year to the next.

New South Wales has also previously indicated that, if the trend towards increasing Cap debits continued, it would further reduce water made available each year from 173 GL to 143 GL.

As an interim measure for 2010–11, access to water in accounts that was carried over from previous water years was suspended, and water users were limited to the 173 GL annual allocation.

Until model accreditation is complete, the interim arrangements announced for 2010–11 remained in place for 2011–12, with the exception that the limit for extractions was increased to 198 GL for the 2011–12 water year to reflect the latest estimate of the longterm Cap available.

Accordingly the interim allocation arrangements for Barwon–Darling water users for 2011–12 were revised to reflect the same proportional share of the revised Cap. Access to accrued account water remained temporarily suspended.

The Barwon–Darling IQQM Cap model was submitted for independent review and accreditation in 2011. Following the initial review, additional work to include representation of drought measures to ensure supply of water to Broken Hill was identified. This additional work has now been completed, and has also been submitted for independent review.

The Barwon–Darling IQQM has recently undergone a review and an upgrade to incorporate new information covering the drought-dominated years of the last decade. As a result, the modelled figures have changed and, at the commencement of 2011–12, the estimated long-term Cap was (then) 198 GL. The revised modelling indicates that the valley has an accumulated credit of 53 GL since 1997–98.

A water sharing plan for the Barwon–Darling River has been developed by the New South Wales Office of Water, in consultation with the local community over a period of two years. This plan is expected to commence in October 2012. The Plan is based around the 2007 Cap management strategy, but provides for reductions in access to water should Cap exceedance occur. As the revised modelling and the interim arrangements in recent years have combined to bring cumulative diversions since 1997–98 back within Cap, the plan will see a transition from the interim arrangements of the last two years back to the 2007 Cap strategy.

#### Lower Darling Valley

The Lower Darling portion of the MSM–Bigmod model has been upgraded to include a more detailed representation of the behaviour of the largest irrigator, Tandou farms. The behaviour of Tandou farms has also been extensively recalibrated with additional data and appears to better match historical behaviour in very large diversion years. A number of bug fixes and refinements to the representation of Menindee Lakes operations have been included on an ongoing basis. The improved model is in the process of being submitted to the independent reviewer as part of the accreditation process.

The preliminary Schedule E accounting for the 1997–98 to 2011–12 period indicates that the Lower Darling Valley is cumulatively 354 GL below Cap.

# Combined Barwon/Upper Darling and Lower Darling Cap accounting

For the purpose of Cap accounting, the Barwon– Darling and the Lower Darling valleys are considered together.

The preliminary Schedule E accounting for the 1997–98 to 2011–12 period indicates that the cumulative actual diversions in the combined Barwon–Darling and Lower Darling Valleys are 407 GL below the cumulative annual diversions targets.

#### Diversions in unregulated river systems

Diversions from unregulated streams within New South Wales have been converted from area-based to volumetric licences. They are generally not yet metered. There are a small number of larger unregulated users below the regulated parts of the Macquarie, Gwydir and Border Rivers systems, close to the Barwon–Darling system, that have metered diversions available.

These users received annual volumetric diversion limits prior to the general volumetric conversion process that occurred in 2000, and were metered similarly to Barwon–Darling users. The metered diversions from these users have not been included in diversions reported for either the regulated systems or the Barwon–Darling, however, they will be included in **Table 7** when available.

Un-metered use estimates, also shown in **Table 7**, are taken from the volumetric conversion process (2000), based on the crop areas survey and assessed

irrigation requirements. The volumetric conversion process was not completed in 2000, and a significant number of conversions have occurred progressively up to the present. Completion of water sharing plans for unregulated portions of each designated valley has resulted in much of the remaining conversions being completed. This has also resulted in revised estimated components of each valley's Cap for diversions in unregulated streams. These conversions do not represent increases in diversions, but are diversions that had not been included in previous Cap reporting.

New South Wales intends to Cap un-metered users according to the estimated average diversions from 1993–94 to 1998–99 arising from the volumetric conversion process.

The Federal Government-funded New South Wales Metering Project and Healthy Floodplains Project will improve water management of unregulated streams, and enable a more extensive implementation of the Cap on diversions.

		Metered use (GL)													
	Unmetered use estimates	1997–98	1998–99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2009-10	2010-11	2011-12
Murray	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lower Darling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barwon–Darling*															
Murrumbidgee	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachlan	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Macquarie	35	3	22	16	21	15	0	9	3	10	1	9	3	n/a	n/a
Namoi	113 #	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gwydir	44 #	1	1	4	0	2	0	0	2	1	0	0	0	n/a	n/a
NSW Border Rivers	23 #	0	4	2	2	2	0	5	3	4	0	5	7	n/a	n/a
Intersecting Streams	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0

#### Table 7: Unregulated use in New South Wales

Notes:

\* - The Barwon-Darling is reported with the other regulated rivers.

# - The un-metered use estimates for the Namoi, Gwydir and Border Rivers were revised in 2011 to recognise that volumetric conversion of licences were not able to be completed as part of the initial volumetric conversion process. This does not represent an increase in actual water use.

n/a -The metered use for the Macquarie, Gwydir and Border Rivers were not available (25 September 2012).

# 4.3.4. Administration of the Cap

Continuing wet conditions during 2011–12 resulted in further extended periods of high flows, and increasing levels in major water storages. Flooding across much of the Murray–Darling Basin in 2011–12 ensured that the major storages finished the water year with water levels near full capacity. The year was also generally characterised by suppressed demand, resulting in large amounts of water being available for allocations to commence the 2012–13 water year.

#### Measures taken during the year

- The Lower-Darling portion of the MSM model has been refined and is in the process of being resubmitted for accreditation.
- The Barwon–Darling IQQM Cap model was submitted for independent review and accreditation in 2011. Following the initial review, additional work was identified to include representation of drought measures to ensure supply of water to Broken Hill. This additional work has now been completed, and has also been submitted for independent review.
- On 4 June 2012, the Australian Government signed the deeds for state priority projects that would see approximately \$500 million invested across New South Wales to help 'bridge the gap' (water recovery) or 'reduce the gap' (SDL adjustments) required to meet the sustainable diversion limits in the Basin Plan.
- Two state Priority Projects of relevance to the implementation of Cap formally commenced during 2011–12:
  - New South Wales Metering Project \$197 million: The New South Wales Metering Project will assist the installation or upgrade of meters to regulated, unregulated and groundwater water sources in the New South Wales Murray–Darling Basin. This follows on from a \$22 million pilot project in the Upper Murray. The project will commence in the southern valleys while implementation in the northern New South Wales valleys is yet to be agreed. The project will create efficiency gains through better matching of extractions to water releases.
  - New South Wales Healthy Floodplains
    Project \$50 million: The New South Wales
    Healthy Floodplains Project will ultimately
    see floodplain extractions given a volumetric
    entitlement and the development of valley-wide
    floodplain management plans. On completion
    of this project NSW proposes to include
    floodplain harvesting in its Cap accounting.

# Update on water sharing plans

New South Wales has completed a Water Sharing Plan for the Barwon–Darling valley, which incorporates this proposed Cap strategy to protect against volumetric growth. The plan also continues event-based access rules that will protect important flows for the environment and downstream users. It is expected that the Water Sharing Plan will commence in October 2012.

A Water Sharing Plan for the Belubula Regulated River Water Source has been prepared and it is also expected to commence in October 2012.

New South Wales has also been working towards amending the Water Sharing Plan for the Murrumbidgee Regulated River Water Source. The proposed amendments expand the plan area to include the Lowbidgee Flood Control and Irrigation District. These amendments formalize the rules for managing Lowbidgee diversions as a new category of supplementary water access licence within the plan. This is not expected to alter Cap accounting under Schedule E. It is expected that these amendments will take place in early October 2012.

New South Wales continues to progressively develop Water Sharing Plans for rivers and groundwater systems across the state. Several more plans for unregulated rivers are at varying stages ranging from the development phase to public exhibition.

# 4.3.5. IAG assessment

Diversions in 2011–12 were 4,198 GL, compared with 3,268 GL in the 2010–11 IAG report. This reflected high availability of stored water and flows, following significant rainfall throughout most of the New South Wales Murray–Darling Basin.

Environmental water managers also used significant amounts of water held for the environment (665 GL) although this was less than the 991 GL in the 2010–11 IAG report.

All New South Wales valleys (with the exception of the Border Rivers) are in credit for 2011–12; and all valleys have a cumulative credit. There are no valleys requiring a special audit.

New South Wales has approved Caps for all valleys other than the Intersecting Streams.

Models have been accredited for the Murray, Murrumbidgee, Lachlan, Macquarie, Peel, Namoi and Gwydir valleys. The Barwon–Darling model has been submitted for accreditation and additional information requested by the auditor has been provided by New South Wales. The Lower Darling model has been recalibrated and is in the process of being submitted to the independent auditor. The Border Rivers' model and report are being finalised for submission to the auditor before the end of 2012. This will then enable the audit of the Queensland Border Rivers model.

New South Wales accounts for environmental water on the basis of use. The Cap target for the year is adjusted for environmental use (and net trade) before determining diversions.

New South Wales does not, at present, include overland flow/floodplain harvesting in the long-term Cap for valleys in the models for the northern New South Wales valleys. Neither does it report on the volume of water harvested/diverted through overland flow/floodplain harvesting because of the difficulty in estimating the quantities of water involved.

The IAG notes that the New South Wales Healthy Floodplains Project will improve estimates of floodplain extraction, enabling volumetric entitlements to be established. This will also lead their inclusion in Cap accounting.

The New South Wales Metering Project will lead to the installation of meters to regulated, unregulated and groundwater sources, initially in the southern New South Wales Murray–Darling Basin. This will, in turn, increase the reliability of unregulated flow measurement (**Table 7**)

# 4.3.6. Conclusions and recommendations

- Diversions in 2011–12 were 4,198 GL, compared to 3,268 GL in the 2010–11 IAG report.
- Diversions in 2011–12 were below Cap targets for all Schedule E valleys, except for the Border Rivers.
- Cumulative Cap credits exist for all Schedule E valleys in New South Wales.
- Caps are now in place for eight of the nine valleys in New South Wales with only the Intersecting Streams requiring a Cap to be established.
- Cap models have been approved for the Murrumbidgee, Lachlan, Macquarie, Peel, Namoi and Gwydir valleys. The recalibrated Lower Darling model is in the process of being submitted for audit and accreditation. The Barwon–Darling model is currently being audited and the Border Rivers model is expected to be submitted to the MDBA for audit and accreditation later in 2012.

- In terms of finalising/improving Cap administration, it is recommended that New South Wales:
  - finalise Cap for the unregulated streams
  - finalise a Cap model for the Intersecting Streams
  - incorporate floodplain/overland flow harvesting in Caps for the relevant northern valleys
  - seek approval from MDBA for an appropriate methodology for Cap adjustment for environmental water.

# 4.4. Queensland

# 4.4.1. The Cap

The Queensland Caps have been established in accordance with the provisions of Schedule E of the *Murray–Darling Basin Agreement* following the completion of the water resource planning processes.

Caps are now in place for all Queensland valleys.

Accreditation of Cap models for the Warrego, Nebine, Paroo and Moonie valleys is complete and the first full Cap audit for these valleys was undertaken for the 2006–07 water year. The Cap model for the Condamine and Balonne is being audited and is expected to be approved during 2012–13. The audit of the Border Rivers model has been deferred pending final submission of the New South Wales Border Rivers Cap.

The Queensland valley Caps have been based on an extensive period of consultation and analysis undertaken across each valley. This has involved the preparation of Water Resource Plans (WRP) and under the provisions of the *Water Act 2000 (Qld)*, the development of Resource Operations Plans (ROP) for each valley to implement the provisions of the WRPs. Diversion Caps for Queensland valleys are implemented as part of the monitoring, auditing and reporting provisions of the ROPs.

Usage in all valleys in Queensland is now reported for a 12 month water year running from July to June.

Water resource plans include the provision that no decision can be made that could increase the average volume of water available to be taken in the plan area. Any applications for additional take must be refused.

# 4.4.2. 2011-12 diversions

### Climate and hydrology

The Queensland section of the Murray–Darling Basin (QMDB) experienced another wet year in 2011–12 with rainfall above average for much of the year, particularly in the more western catchments (Warrego, Paroo, Nebine, Maranoa, Lower Balonne and Moonie).

The major flow events commenced in late January 2012 with heavy rainfall over southwest Queensland catchments and subsequent flood flows in the western streams in early to mid-February 2012.

The major streams in the Queensland section of the Murray–Darling Basin, including the Condamine, Moonie, Warrego, Paroo and Bulloo rivers and Nebine Creek, all contributed considerable flows into New South Wales during this single flow event.

The high flows in February 2012 resulted in major flood levels being reached at Charleville and Cunnamulla on the Warrego River. Record flood levels were seen at Mitchell on the Maranoa River, at Roma on Bungil Creek and at St George on the Balonne River. The largest flood since the record flood of 1990 was recorded in the Warrego River at Charleville, with levels just below the top of the recently completed levee.

Minor to moderate flood levels were recorded along the Paroo catchment in early March.

The above-average flows in most of Queensland's streams provided good water-harvesting opportunities, particularly in the Balonne and Border rivers, with total stream diversions estimated at 717 GL. Of this, 39% was taken from the Lower Balonne and 25% from the Border Rivers catchment. Flooding in the Condamine and Balonne between December 2011 and February 2012 also provided extensive overland flow with an estimated 294 GL taken by floodplain harvesting.

**Table 8** summarises the diversions from the QMDBcatchments and the annual flow volumes for 2011–12as measured at the key sites. Flows were well abovethe long-term average in the west of the Basin.

Annual rainfall in 2011–12 was generally above average across the QMDB. In the west of the Basin, rainfall was generally well above average in November 2011 to March 2012, resulting in high flows in December 2011 and flooding in February 2012.

Stream diversion across all catchments is estimated to be 717 GL, made up of a combination of supplemented diversion (take from regulated flow associated with public storages under the authority of a water allocation) and unsupplemented diversion (take primarily from water-harvesting practices).

Overland flow, in the form of upland flow capture and on-farm rainfall runoff, is not included in the diversion figures in **Table 8**, except in the Granite Belt due to their inclusion in the Cap model. Floodplain diversion has been assessed from regional appraisal in the key areas where water-harvesting and floodplain diversion operate together. It has been estimated that a further 294 GL of overland flow take (floodplain diversion plus upland flow capture in the Granite Belt) has occurred.

Total diversions across all QMDB catchments from streams and overland flow for 2011–12 are estimated to be 1,012 GL.

**Table 9** shows total stream diversions for the QMDBcatchments over the past 19 years.

Diversion in the QMDB is characterised by greater volumes of unsupplemented water compared to supplemented water (water provided through water supply schemes) see **Table 10**. Overland flow take, which is predominately made up of floodplain harvesting, is based on estimates only.

As **Table 11** shows, the end of system flows for QMDB catchments during the year totalled 7,015 GL, compared with 9,367 GL in 2010–11 IAG report and 6,242 GL in 2009–10 IAG report and 391 GL in 2008–09 IAG report. This highlights the extreme variability inherent in this part of the Basin.

Due to the high rainfalls over the summer months, the level of flow was well above average in the west and central parts of the QMDB. Rainfall in the catchments of the upper reaches of the Condamine and Border rivers was lower and flows were below average in the east.

#### Table 8: Summary for Queensland catchments 2011–12

Catchment (Gauging station)	Flow 2011–12 (GL)	Mean annual flow (GL)	Stream diversion 2011–12 (GL)	Floodplain harvesting 2011-/12 (GL)
Condamine and Balonne				
Condamine (Chinchilla)	171	581	158	139
Condamine-Balonne (Weribone)	2,338	1,297	73	n/a
Maranoa (Cashmere)	1,546	173	2	n/a
Lower Balonne (St George)	3,380	1,297	277	115
Border Rivers				
Granite Belt (Farnbro)	29	82	12	15
Macintyre/Barwon (Goondiwindi)	857	976	130	13
Weir (Talwood)	266	153	40	4
Moonie (Fenton)	618	169	12	7
Nebine (Roseleigh)	22	*	0	1
Warrego (Cunnamulla)	1,474	564	14	n/a
Paroo (Caiwarro)	1,104	563	<1	n/a
		TOTAL	717	294

\*Only gauged since 2007

# Table 9: Queensland Murray-Darling Basin stream diversions (GL)

# Table 10: Water Diversion by sector in Queensland

Water Year <sup>1,2</sup>	Diversions <sup>3</sup>
	(GL)
1993–94	336
1994–95	176
1995–96	528
1996–97	467
1997–98	741
1998–99	609
1999-00	541
2000-01	688
2001-02	341
2002–03	214
2003–04	815
2004–05	392
2005–06	306
2006–07	149
2007–08	876
2008–09	321
2009–10	819
2010-11	865
2011-12	717

Sector	Diversions (GL)			
Unsupplemented	548			
Supplemented	169			
Overland Flow	294			
Total	1012			

# Table 11: Cross border flows

Valley	Flow (GL)
Paroo	1104
Warrego	1,474
Nebine	22
Condamine-Balonne	2,952
Moonie	618
Border Rivers	845
Total	7,015

Notes: 1. Water year reported prior to 2006–07 was 1 October to 30 September 2. Water year reported post 2007–08 is 1 July to 30 June. 3. Does not include overland flow.

Public storages are comparatively small in number and storage volume across the QMDB. Around one third of these storages are used solely for urban supplies, with the other storages supplying multiple needs.

Storages benefited from the high level of rainfall and resultant stream flows during the 2011–12 water year, with the majority of storages finishing the year at over 80% capacity. **Table 12** shows the level of storage as at 30 June 2012.

# 4.4.3. Comparison of annual diversions with the annual Cap targets

# **Overview**

The long-term diversion Cap was established for the Warrego, Paroo, Nebine and Moonie catchments in May 2007 and the Queensland Border Rivers catchment in 2009. The Condamine and Balonne Cap proposal was submitted to the Murray–Darling Basin Authority in October 2010 and reporting against Cap commenced in 2010–11. The Cap targets for all QMDB catchments have been determined for the 2011–12 water year and are specified in **Table 13**.

**Table 13** also summarises annual diversionscompared to Cap targets for the QMDB catchments.For all catchments annual diversions are well belowthe Cap targets.

As a consequence of the rules-based approach adopted in Queensland, diversions are compared with Cap targets on an annual basis. There is no cumulative accounting of Cap credits/debits for the Warrego, Paroo, Nebine, or Moonie catchments.

#### Table 12: QMDB public storages and their volumes across catchments as at 30 June 2012

Storage	% full at 30 June 2012	Full storage capacity (GL)	Notes
Condamine and Balonne			
Cooby Dam	98	23	Toowoomba urban water supply
Leslie Dam	83	106	Warwick urban water supply and Upper Condamine WSS
Connolly Dam	90	2.4	Warwick urban water supply
Chinchilla Weir	100	10	Chinchilla urban water supply and Chinchilla Weir WSS
Beardmore	99	81	St George WSS
Jack Taylor Weir	76	10	St George urban water supply and St George WSS
Neil Turner Weir	100	1.5	Maranoa River WSS
Border Rivers			
Storm King Dam	100	2.4	Stanthorpe urban water supply
Glenlyon Dam	96	254	Supports New South Wales / Qld supplemented water system
Coolmunda Dam	61	69	Macintyre Brook WSS
Warrego			
Cunnamulla Weir	100	4.8	Cunnamulla WSS

WSS refers to a supplemented water supply scheme operated by SunWater and where most of the water use is for irrigation.

System	Cap	it.	.c.		ade	trade	sion	Cap credits (target less diversion)			
	Long-term diversion (	This year's Cap targ	Overland flow include target	Cap adjustment for environmental wate	Cap adjustment for tr	Cap target adjusted for and environment	This year's total Divers	2011–12 water year	Cumulative since 1/7/2008	20% schedule trigger	Trigger exceeded
Warrego	47.9	93.3	0.0	-14.9	0.0	78.4	13.7	64.7	n/a	n/a	No
Paroo	0.18	0.08	0.0	0	0.0	0.08	0.06	0.02	n/a	n/a	No
Nebine <sup>1</sup>	6.4	8.32	1.0	-3.8	0.0	4.5	1.0 <sup>3</sup>	3.5	n/a	n/a	No
Moonie <sup>1</sup>	34.9	81.62	7.0	-1.3	0.0	80.3	18.6 <sup>3</sup>	61.7	n/a	n/a	No
Border Rivers¹ (Qld)	250.3	238.82	32.0	-9.1	26.1	255.8	214.6 <sup>3</sup>	41.3	302.0	-50	No
Condamine and Balonne <sup>1</sup>	729.0	1020.62	254.2	-11.5	0.0	1009.1	763.7 <sup>3</sup>	245.4	910.4	n/a	No
TOTAL	1068.7	1442.6	294.2	-40.5	26.1	1428.2	1011.7	416.5	n/a	n/a	n/a

#### Table 13: Queensland Annual diversions compared to Cap targets (GL)

<sup>1</sup> Long-term diversion Caps include modelled overland flow component

<sup>2</sup> Cap target includes estimated overland flow <sup>3</sup> Diversion includes estimated overland flow

A comparison between modelled and estimated overland flow diversion in 2011–12 is shown in **Table 14.** 

# **Environmental water**

In Queensland, water resource planning incorporates provisions for balancing the often competing interests in water between human consumptive needs and the environment. Environmental water requirements are primarily met through the various water sharing rules specified in the water resource plans. In addition, there is held environmental water. This consists of water allocations gifted by the Queensland Government to the Commonwealth from unallocated water; and water which purchased by the Commonwealth from water allocation holders through the Water for the Future programs of buyback and investment in on-farm water use efficiency works.

Cap targets are reduced by the volume of held environmental water entitled to be taken, as shown in **Table 13**.

# Warrego catchment

#### **Resource availability**

Monthly rainfalls were generally above average. The highest rainfall at Cunnamulla was recorded in January, with nearly a third of the annual rainfall falling in this month. Total rainfall for the 2011–12 year recorded at Cunnamulla was 680 mm compared to an average annual rainfall of 374 mm.

Streamflow for the Warrego River at Cunnamulla for the 2011–12 water year was 1,474 GL, well above the average annual flow of 564 GL and the fourth highest flow on record. A total of 1,209 GL, over 80% of the 2011–12 annual flow, passed the gauging station in February 2012, peaking at over 130 GL/day and causing major flooding.

The normal summer flow pattern in the Warrego River continued, with the main flows occurring between December 2011 and February 2012, and additional smaller flows in March and April 2012.

Supplemented water diversion in this catchment is limited to the Cunnamulla Weir Water Supply Scheme. The scheme is based on conserving and supplying water allocations from a 4.7 GL weir on the Warrego River at Cunnamulla. The announced allocation for the 2011–12 water year from the Cunnamulla Weir Water Supply Scheme was 100%. Supplemented water diversion was 1.6 GL, from an available entitlement of 2.6 GL.

The take of unsupplemented water within this catchment is set by flow conditions at specified reference points. Diversion of unsupplemented water for the 2011–12 water year totalled 12 GL.

There were three periods of announced flow in the Lower Warrego Water Management Area for allocations with flow conditions of 1 GL/day. These occurred in December 2011 and late January to April 2012.

Overland flow take is not included in the Cap target for the Warrego catchment.

All stream based works currently in use have compliant meters installed as of December 2011.

The Commonwealth Environmental Water Holder holds two unsupplemented entitlements in the Warrego catchment.

A total of 16 GL (the total volumetric limit associated with the entitlements) of Commonwealth-held in-stream (non-regulated) environmental water was retained within the Warrego system as environmental flow during the 2011–12 water year. The following water contributed to the enhancement of environmental assets in the Warrego:

- In the Upper Warrego, Commonwealth-held in-stream environmental water complemented natural flow events that occurred in December 2011 and January 2012.
- In the Lower Warrego, Commonwealth-held in-stream environmental water contributed to the first inflow connecting the main river to the nationally significant waterbird breeding and feeding habitat in the Cuttaburra Basin.

Held environmental water is not included in the Cap target.

Annual diversion of 14 GL was significantly lower than the Cap target of 78 GL. Water entitlement holders did not fully avail themselves of access opportunities provided during the year for a number of reasons; including that property infrastructure and entitlements were not fully developed.

# Paroo catchment

#### Resource availability

Rainfall recorded for 2011–12 at Hungerford in the southern part of the Paroo catchment was 465 mm, well over the average of 298 mm. The peak monthly rainfall received was in March, with 152 mm falling compared to the long-term average for March of 35 mm.

The volume of flow passing the Caiwarro gauging station, which is located on the Paroo River upstream of the Queensland/New South Wales border, was recorded as 1,104 GL for the 2011–12 water year. This is double the average annual flow at Caiwarro of 563 GL (1967 to 2012) but still significantly less than the 2,040 GL recorded in the 2009–10 water year. The main flows occurred between December 2011 and March 2012

There are no supplemented water allocations in this catchment.

There are only two unsupplemented water allocations in the Paroo catchment.

Diversion for irrigation was 0.02 GL. An additional 0.04 GL was taken for urban purposes. Overland flow take is not included in the Cap target for the Paroo catchment.

Water diverted in the Paroo catchment is metered.

The annual diversion of 0.06 GL was less than the 2011/12 Cap target of 0.08 GL.

# Nebine catchment

# Resource availability

Rainfall was above average in the Nebine catchment with 672 mm recorded in the south of the catchment at Mulga Downs for the 2011–12 water year, against an average of 404 mm. Rainfall was well above average from September 2011 to March 2012.

The mean annual flow from the Nebine catchment (including the Noorama and Widgeegoara creeks) is estimated at 33 GL per year. Flows either terminate on floodplains or discharge into the Culgoa River in New South Wales.

The new gauging station installed at Roseleigh Crossing (on Nebine Creek) now has five full years of recording. This gauging station is 10.5 km upstream of the Queensland/New South Wales border. Flows in Wallam Creek at Cardiff and Nebine Creek at Roseleigh for 2011–12 totalled around 137 GL and 22 GL respectively, considerably less than the 2009–10 water year's flows of 314 GL and 130 GL. However, the flow at Cardiff was the second highest in the twelve years of record for that gauging station.

The main flows occurred in late January and early February 2012 causing major flooding at Bollon on Wallam Creek.

No supplemented water supply exists in this catchment.

There are only four unsupplemented water allocations in the Nebine catchment.

There was 1 GL of overland flow diverted in the catchment but no diversion of unsupplemented water from any watercourse. Overland flow take is included in the Cap target for the Nebine catchment.

All stream based works currently in use have a compliant meter installed as of December 2011.

The Commonwealth Environmental Water Holder holds one unsupplemented entitlement in the Nebine catchment. The flow levels needed to trigger access under Commonwealth water allocations were met in December 2011 and 0.1 GL was made available for in-stream benefits in the 2011/12 water year.

Held environmental water is not included in the Cap target.

Annual diversion of 1 GL (from overland flow take) was significantly lower than the Cap target of 5 GL.

# Moonie catchment

#### **Resource availability**

Rainfall was well above average from September 2011 to February 2012. Rainfall at Nindigully, located on the Moonie River in the south west of the catchment, was 913 mm for the year; compared to the average of 505 mm. The peak monthly total of 213 mm was recorded in February.

Streamflow for the Moonie River at Fenton, the most downstream gauge in Queensland, was 618 GL in 2011–12. This was more than three times the recorded annual average (of 169 GL) at this site.

There were a number of flows from November 2011 through to March 2012, with the main flow of 418 GL occurring in February.

No supplemented water supply exists in this catchment.

The majority of the 33 water allocations in the catchment have flow conditions that relate to take from watercourses (i.e. water-harvesting).

Those allocations downstream of Flinton had opportunity to take water between late November 2011 and the end of February 2012.

Diversion for 2011–12 has been estimated at 12 GL, with take primarily occurring in December 2011.

Overland flow harvesting from floodplain flows in the catchment is estimated at 7 GL based on a broad assessment of infrastructure development and opportunity. Overland flow take is included in the Cap target for the Moonie catchment.

All works currently in use (with the exception of two installations requiring further investigation) have compliant meters installed as of December 2011.

The Commonwealth Environmental Water Holder holds one unsupplemented entitlement in the Moonie catchment.

During December 2011, 1.4 GL of Commonwealth held environmental water was allowed to remain in-stream, to support the first significant post-winter flow event in the system and associated migration and spawning cues for native fish.

Held environmental water is not included in the Cap target.

The 2011–12 annual diversion for the Moonie catchment was 19 GL (including the floodplain component of overland flow), well below the Cap target of 80 GL.

# **Border Rivers catchment**

# **Resource availability**

Rainfall was close to average across the Border Rivers catchment for the year. The upper catchment around Stanthorpe recorded 697 mm of rainfall, compared to an average of 757 mm. The lower catchment around Goondiwindi recorded 792 mm of rainfall for the year, compared to an average of 618 mm; with 184 mm falling in December.

Flows in the Border Rivers during the 2011–12 water year were generally below average.

The flow passing Farnbro on the Dumaresq River during the 2011–12 water year was 29 GL, a third of the average annual flow at Farnbro of 82 GL. The highest monthly flow of 12 GL passed the gauging station in February 2012.

A total of 18 GL passed the Booba Sands gauging station on the Macintyre Brook during the water year compared to an average annual flow of 104 GL. The highest monthly flow occurred in June 2012, with 8 GL passing the gauging station.

Flows in the Macintyre River at Goondiwindi for the 2011–12 water year totalled 857 GL; less than the average of 976 GL. The passing flow was highest in December 2011 at 255 GL.

The flow passing Talwood on the Weir River was 266 GL during the water year; compared to an average annual flow of 153 GL. The highest monthly flow was in December 2011 and totalled 109 GL.

There are two major water supply storages in the Queensland part of the Border Rivers catchment. At 1 July 2011, Glenlyon Dam, the major storage for the Borders Rivers Water Supply Scheme, was at 99% of capacity with around 70 GL available for general use from the Queensland share of the storage. The storage finished the year at 96% of capacity, with 70 GL available for general use from the Queensland share.

Coolmunda Dam on Macintyre Brook is the major storage for the Macintyre Brook Water Supply Scheme. This scheme now operates on continuous accounting. Coolmunda Dam started the year at 87% of capacity (60 GL) and reached a maximum for the water year of 90% capacity in November 2011. The dam finished the year at 61% of capacity (42 GL).

In the 2011–12 water year, 42 GL of supplemented water was diverted within the Border Rivers Water Supply Scheme. This included supplemented take from releases from Glenlyon Dam and run of the river flows. There were 2.5 GL of bulk water supply provided from the Macintyre Brook Water Supply Scheme to the Border Rivers Water Supply Scheme in 2011–12. The take of water transferred from New South Wales (26 GL net) is also included in the total.

A total of 16 GL of supplemented water was diverted in the Macintyre Brook Water Supply Scheme.

Between October 2011 and February 2012, flows triggered water-harvesting access under the water sharing rules on the Border Rivers, with 71 GL diverted over six events. Water-harvesting thresholds were also triggered in the Weir River, with 40 GL diverted in this catchment. A further 12 GL was diverted for direct irrigation purposes or stored for later use in the Granite Belt.

An additional 0.9 GL was taken for urban use and an estimated 32 GL of overland flow water was taken through floodplain harvesting, taking the total unsupplemented diversions in the Border Rivers to 155 GL for 2011–12.

The majority of diversion in this catchment is metered. Essentially all take under water allocations is metered and take under water licences (mostly area-based licences in the Granite Belt) is primarily unmetered.

During the 2011–12 water year, the Commonwealth Environmental Water Holder held one unsupplemented entitlement and 19 supplemented entitlements in the Border Rivers catchment.

In accordance with the access conditions on their water allocations, the Commonwealth was entitled to take 2 GL of unsupplemented water in the Border Rivers catchment. One GL of unsupplemented water was used to support natural flows that promote native fish movement and to maintain high value waterholes and riparian vegetation within the Sundown National Park.

There were 8.8 GL of supplemented water available under Commonwealth entitlements in the Border Rivers Water Supply Scheme and 0.2 GL available in the Macintyre Brook Water Supply Scheme. This water was not ordered but, under continuous accounting rules, remains available for use in future years when it can provide a greater environmental benefit. This held environmental water has been excluded from the Cap target.

The 2011–12 annual diversion for the Border Rivers catchment was 215 GL (including the floodplain component of overland flow), below the Cap target of 256 GL.

# Condamine and Balonne catchments (Condamine sub-catchment)

### **Resource availability**

Rainfall was generally average across the Condamine area. Annual rainfall at Warwick was 557 mm compared to an average of 679 mm, while annual rainfall at Chinchilla was 734 mm compared to an average of 665 mm. Chinchilla had unseasonably high rainfall in June 2012.

Flows in the Condamine River were below average in the 2011–12 water year.

A total of 69 GL passed Warwick, in the upper reaches of the system, compared to an average of 95 GL. The highest monthly flow occurred in February 2012 with 18 GL passing the gauging station.

The flow passing Cecil Plains Weir during the 2011–12 water year was 144 GL compared to an average of 348 GL. The highest monthly flow of 49 GL passed the gauging station in December 2011.

Flows in the Condamine River at Chinchilla totalled 171 GL for the 2011–12 water year, less than a third of the average annual flow of 581 GL. The passing flow was highest in December (at 71 GL).

A total of 462 GL passed Cotswold at the end of the Condamine system, compared to an average of 740 GL. The highest monthly flow of 201 GL occurred in January 2012.

The major storage for the Upper Condamine Water Supply Scheme is Leslie Dam, which commenced the year at 99% capacity. The dam level remained at close to 100% until December 2011, then declined to finish the year at 86% capacity. Announced allocations in the Upper Condamine Water Supply Scheme are based on storage in Leslie Dam. An announced allocation of 100 % was made for medium priority water allocations at the start of the water year.

The Chinchilla Weir, on the mid Condamine River, started the year at 100% capacity and has remained at 100% capacity since. Announced allocations for the Chinchilla Weir Water Supply Scheme were 100%.

A total of 26 GL of supplemented water was diverted in the Condamine catchment in 2011–12, with 23 GL diverted in the Upper Condamine scheme and 3 GL at Chinchilla.

There were eleven water-harvesting events announced between August 2011 and July 2012 in the Upper Condamine Water Management Area. Two events were announced for the Condamine River North Branch, with the first in October 2011 and the second in December 2011. Unsupplemented water taken in the Condamine catchment over 2011–12 is estimated at 202 GL, with the majority of take (133 GL) occurring upstream of Chinchilla Weir. About 10 GL of this was taken from flows supplemented by treated waste water discharged from Toowoomba's Water Reclamation Facility at Wetalla into Gowrie Creek. An additional 3 GL were taken for urban use.

An estimated additional 139 GL of overland flow water was taken through harvesting of water on the Upper Condamine Floodplain, bringing the total take of unsupplemented water in the Condamine catchment to 344 GL.

About 50% by volume of water-harvesting diversion in the Condamine catchment area is metered. Surface water take from downstream of Cecil Plains to Beardmore Dam was metered in early 2012.

# **Balonne and Maranoa sub-catchment**

# **Resource availability**

Rainfall in the Balonne and Maranoa was above average for the 2011–12 water year with 815 mm falling at St George (on the Balonne River) compared to an average of 521 mm. At Mitchell (on the Maranoa River) 1,156 mm was recorded compared to an average of 572 mm. Rainfall totals in December and February in Mitchell were the second highest on record for those months.

Heavy rainfall in the Balonne catchment from November 2011 to February 2012 resulted in high flows in the Balonne. The passing flow at Weribone (on the Balonne River) was 2,338 GL, compared to an average annual flow of 1,297 GL, while the flow passing St George was 3,380 GL compared to an average flow of 1,297 GL. The main flows occurred in February 2012 with 1,431 GL passing Weribone in the month and 2,434 GL passing St George. A record (instantaneous) flood peak of 320 GL/day was recorded at St George on 8 February 2012.

The Maranoa River contributed significantly to flows in the Lower Balonne with a record flood at Mitchell in February 2012. The annual flow of 1,546 GL was the highest on record, with 1,154 GL passing in February. Annual flow was nearly nine times the long-term average of 173 GL.

Beardmore Dam started the year at 100% capacity. The storage dropped to 75% Capacity in April 2012 but re-filled the following month. Inflows up to 730 ML a day may be passed downstream for environmental, stock and domestic purposes, or are sometimes held in storage for later release to maximise the benefit to downstream water users. Inflows occurred throughout the year, with all inflows up to 730 ML/day passed downstream for environmental, stock and domestic purposes and none stored for later release.

A total of 84 GL (including 0.02 GL from the Maranoa Water Supply Scheme) was diverted from the water supply schemes.

High flows in the Balonne River between October and April resulted in the triggering of take under flow condition-based water allocations. Total estimated take in the Lower Balonne was 191 GL, taken over eight announced periods, plus 2 GL taken for urban use. Flooding in the Lower Balonne in December and February allowed an additional take of 115 GL in floodplain harvesting.

An additional 2 GL of water was taken in the Maranoa catchment.

Approximately 70% of the water-harvesting diversion in the Lower Balonne catchment is metered with a compliant water meter. Some works are still to be metered due to delays caused by substantial flooding in the area in 2011–12. The overland flow measurement project commenced in July 2012 and is scheduled to be completed by October 2012, with 60 storages to be monitored for overland flow take under an entitlement.

During the 2011–12 water year, the Commonwealth Environmental Water Holder held eight unsupplemented entitlements in the Lower Balonne.

Between December 2011 and April 2012, 3 GL of unsupplemented water was taken in the Balonne River and downstream distributaries, including for the support of the Ramsar-listed Narran Lakes Nature Reserve and the Culgoa Floodplain National Park.

This held environmental water has been excluded from the Cap target.

The Condamine and Balonne Resource Operations Plan was amended on 26 March 2010 to include the Lower Balonne part of the catchment and a Cap proposal was submitted to the MDBA in October 2010.

The 2011–12 annual diversion for the Condamine and Balonne catchment was 764 GL (including the floodplain component of overland flow), well below the Cap target of 1,009 GL.

# 4.4.4. Administration of the Cap

A Cap proposal for the Queensland Border Rivers was noted by the MDBA (Chief Executive acting as the Authority) on 26 March 2009 and further noted by the Murray–Darling Basin Ministerial Council at Meeting 1 on 29 May 2009. The Cap model has been submitted to the MDBA for review (by an independent auditor) and accreditation. The audit of the Border Rivers model has been deferred pending final submission of the New South Wales Border Rivers Cap model.

A Cap proposal for the Condamine and Balonne was submitted to the MDBA in October 2010 and noted by the MDBA on 30 March 2011. The Condamine and Balonne model has been finalised and was submitted for accreditation in May 2011. The audit of the Condamine and Balonne model is currently underway.

Cap proposals for the Warrego, Paroo, Nebine and Moonie catchments were approved by the Ministerial Council at Meeting 42 (25 May 2007) and compliance against Cap has been reported since 2006–07. The Cap models for these catchments have been reviewed by the independent auditor and approved by the Authority.

A metering program is being progressively rolled out as part of a state-wide project to meter all surface water diversions from streams and rivers.

# 4.4.5. IAG assessment

Total diversions in 2011–12 were estimated to be 1,012 GL; compared to 1,445 GL in the 2010–11 IAG report and 1,232 GL in the 2009–10 IAG report. The total includes 717 GL of stream diversions and an estimated 294 GL of overland flow harvesting. Comparable figures for the 2010–11 IAG report were 865 GL of stream diversions and 580 GL of overland flow harvesting.

Caps have now been established for all Queensland Murray–Darling valleys and Cap models have been accredited for the Warrego, Paroo, Nebine and Moonie. A Cap model for the Condamine–Balonne has been submitted to the MDBA for audit and is expected to be accredited during 2012–13. The Cap model for the Queensland Border Rivers has also been submitted; but audit is deferred until the New South Wales Border Rivers model is available for audit—this is expected to be submitted before the end of 2012.

The 2011–12 diversions in all valleys were below Cap targets.

In its 2010–11 audit, the IAG identified that Queensland used estimated overland flow take, rather than modelled overland flow take, to define the annual Cap targets. As a result there is scope for overestimating credits. Queensland, in its response, acknowledged the issue:

# 'Improving overland flow take reporting

Queensland acknowledges the issues raised by the IAG in relation to the use of estimated overland flow rather than modelled overland flow in determining the cap target. There are a range of uncertainties in hydrologic modelling with the error band increasing in the largely ephemeral river systems in Queensland. Whilst Queensland makes an attempt to include some components of overland flow take in their hydrologic models, there is little information in relation to flows and related take, that allow calibration of this component of the model. Added to this, estimates of overland flow take, in consultation with irrigators, raise concerns about the validity of modelled overland flow take. Under these circumstances, Queensland believes cap compliance is best monitored through maintaining a strong regulatory framework around overland flow development and reporting overland flow take as that estimated to be taken by authorised works.

Queensland recognises the interaction between overland flow take and watercourse take and accepts the current methodology could lead to an inflated cap target for the watercourse component. Over the long-term, refinement of the model and improvements in assessment of actual take as a result of metering will increase accuracy. In the meantime, Queensland undertakes to investigate alternative methodologies for accounting for overland flow. Queensland also provided the IAG with modelled and estimated overland flow diversions for all valleys and the IAG has focused on the two main valleys Condamine–Balonne and Border Rivers (**Table 14**); as in the other valleys there are no cumulative credits and the actual overland take is much smaller.

Similar to 2010–11, the Cap credits using estimated overland flow take would be 41 GL and 11 GL higher for the Condamine–Balonne and Border Rivers respectively. While significantly less than the 85 GL and 142 GL for the Condamine–Balonne and Border Rivers in 2010–11, the cumulative impact over time will lead to significant differences.

The IAG acknowledges that improved measurement of overland take over time will enable this issue to be addressed. In this regard the IAG were advised that a project is underway to measure water in Lower Balonne farm storages. The project, when completed in October 2012, will enable water balance studies to be undertaken on a farm-by-farm basis to more accurately estimate overland flow/ floodplain harvesting.

The IAG in 2010-11 also raised the issue of accounting for environmental water. Queensland has addressed this issue and advised that water gifted to the Commonwealth from unallocated water set aside in the Warrego, Nebine, Moonie, and Border Rivers catchments is included in the Cap model. However, in the past it was not included in the annual Cap targets. In 2011–12, water gifted to the Commonwealth has been included in the Cap and then the Cap reduced by the volume of gifted water entitled to be taken. Where water has been recovered from water allocation holders and has therefore previously been included in Cap targets, the targets are also reduced by the volume of held water entitled to be taken. As a consequence, no adjustment is required. Where water has been recovered from water allocation holders which have previously been included in Cap targets, the targets are reduced by the volume of held water entitled to be taken.

# Table 14: Overland flow – modelled and estimated in Queensland (GL)

Valley	Overland		
	Modelled	Estimated	Difference
Upper Condamine	64	139	87
Lower Balonne	161	115	- 46
Sub-total			41
Border Rivers	17	28	11

Queensland has not yet submitted a formal proposal to the MDBA for approval as required under the Ministerial Council approved protocol. Queensland is encouraged to submit a proposal.

The IAG compliments Queensland on its detailed submission on water use, management and Cap compliance.

# 4.4.6. Conclusions and recommendations

- Total diversions in 2011–12 were estimated to be 1,012 GL compared to 1,445 GL in 2010–11 IAG report and 1,232 GL in 2009–10 IAG report.
- The total includes 717 GL of stream diversions and an estimated 294 GL of overland flow harvesting.
- Well-above average rainfall between December 2011 and February 2012, which triggered flooding in the central and western QMDB catchments, combined with above average rainfall for much of the year, resulted in end of system flows totalling 7,015 GL. A new maximum annual volume was set for the Maranoa River at Cashmere.
- In central and western QMDB catchments, the volume of water passing key monitoring sites during 2011–12 was generally around twice the long-term average. The exceptions were the Nebine, where the volume of water passing was half the long-term annual average flow, and the Maranoa, which had nearly nine times the longterm average. In the east of the QMDB, the volume of water passing the key monitoring sites was less than the long-term annual average.
- The Cap is set for all QMDB valleys and Cap targets were available for all valleys.
- Diversions are within Cap targets for all QMDB catchments.
- Cap models for the Warrego, Paroo, Nebine and Moonie River have been accredited. The Condamine-Balonne model has been submitted for audit and is expected to be accredited during 2012–13. The Border Rivers model has been submitted but will not be audited until the New South Wales Border River Cap model is available for audit.
- Estimates of overland flow/floodplain diversions continue to be enhanced through an instrumentation project in the Lower Balonne.
- The IAG recommends that Queensland submit a proposal to the MDBA for approval for the Cap adjustment for the allocation/use of environmental water.

# 4.5. Australian Capital Territory

# 4.5.1. The Cap

At its meeting 45 on 23 May 2008, the Ministerial Council:

 defined the Cap for the Australian Capital Territory as:

'Until the Basin Plan in the *Water Act 2007* (Commonwealth) comes into effect, the Australian Capital Territory Cap is:

- 40 GL (42 GL minus 2 GL saving allocated to TLM) climate-adjusted as recommended by the IAG; plus
- ii. Australian Capital Territory Cap is reviewed and increased by 0.75 of the current per capita consumption of water for population growth of Canberra and Queanbeyan

with the conditions that:

- no urban water will be traded out other than that purchased from interstate;
- any growth in demand for water for industry and future Commonwealth use will be provided by trade; and
- existing Cap credits (based on the assumption that 40 GL Cap applied since 1 July 1997) are recognised.
- noted that the Commonwealth and the Australian Capital Territory need to settle the management arrangement for the water controlled and used by the Commonwealth and its agencies.
- noted the concerns raised by South Australia regarding the effect of the growth factor on the South Australia Cap.'

Following this, Schedule E to the *Murray–Darling Basin Agreement* (Schedule 1 of the *Water Act 2007*), has defined the long-term diversion Cap for the Australian Capital Territory as:

 The Government of the Australian Capital Territory must ensure that diversions from the designated river valley in the Australian Capital Territory do not exceed 40 GL per annum (being 42 GL minus 2 GL saving allocated to the Living Murray), varied as required by sub-clause (2).

- 2. The long-term diversion Cap referred to in sub-clause (1) is to be annually adjusted:
  - a. for the prevailing climate during the water year by reference to the model developed under subclause 11(4); and
  - b. to account for growth in population, in accordance with the following formula:

0.75 multiplied by:

2006–07 per capita consumption of the population of Canberra and Queanbeyan, multiplied by:

the difference between the population of Canberra and Queanbeyan in 2006–07 and the population of Canberra and Queanbeyan for each year in consideration.

- 3. The Government of the Australian Capital Territory must ensure that no water or water entitlement that is used for urban purposes will be transferred for use outside the Australian Capital Territory unless that water or water entitlement has been transferred for use within the Australian Capital Territory from another State.
- 4. If demand for water for industrial uses or uses by the Commonwealth grows beyond the level of demand in 2006–07, that growth in demand will be met by transferring water or water entitlements from another State.
- The Authority must, for the purposes of maintaining the Cap Register referred to in subclauses 13(7) and 13(8), take into account 107 GL of cumulative Cap credit existing at the end of 2006–07.

As required, the IAG has audited against Schedule E.

The Australian Capital Territory has reported on its diversion of water against the long-term diversion Cap.

Diversions and returns for 2011–12 are provided in **Table 15**.

The Australian Capital Territory Water has now developed a Cap model that has been submitted to the MDBA for approval.

The proposed Cap model does not incorporate a population growth component as originally provided in the Cap decision of May 2008.

The Australian Capital Territory performance against the Cap for 2011–12 is shown in **Table 16**.

Diversions reported in **Table 15** relate only to those made under licences issued by the Australian Capital Territory Government. Data for diversions controlled by the Commonwealth (chiefly from Lake Burley Griffin and estimated at less than 1 GL/year) and not licensed by the Australian Capital Territory Government are not included in the diversions table.

The Territory Government and the Commonwealth have discussed the transfer of water planning and management of Lake Burley Griffin (responsibility of the National Capital Authority) to the Australian Capital Territory. To expedite this transfer, the Australian Capital Territory enacted related legislative amendments in August 2010 to enable it to manage Commonwealth water resources. At this stage the Australian Capital Territory does not have the legal capacity to account for and manage the Commonwealth water resources within its borders until such time as the Commonwealth passes legislation to enable this.

# Table 15: Diversions for Consumptive Use within the Australian Capital Territory and Queanbeyan (GL)

System	Long-term diversion Cap	ACTEW diversion	Direct diversion	LMWQCC return	QSTP return	Net diversion	Net trade
ACT	40	41.8	1.2	30.6	3.4	8.9	Nil

LMWQCC – Lower Molonglo Water Quality Control Centre QSTP – Queanbeyan sewage treatment plant

#### Table 16: Australian Capital Territory annual Cap accounting 2011–12 (GL)

Long-term diversion Cap	Annual Cap Target	Cap adjust- ment for total trade and environment	Adjusted Annual Cap Target	2011-12 diversion	Cap Credits (Target less diversion) 2011–12	Cumulat-ive credit since 1/7/97	20% schedule trigger	Trigger Exceeded
40.0	22.2	0.0	22.2	8.9	13.3	142.0	8.0	No

# 4.5.2. Administration of the Cap

Rainfall for the 2011 calendar year was above average at 640 mm, which in turn affected water consumption across Australian Capital Territory sectors and improved rainfall runoff and returns into the Molongo system.

The net diversions of 9 GL were well below its annual climate-adjusted Cap target of 22 GL for 2011–12 under the proposed Cap model. This is due to the combination of above-average rainfall in the region and government demand management initiatives, including the continuation of permanent water conservation measures. Direct diversions are an estimate at this stage.

There was no new industrial use or new Commonwealth water requirements, and therefore no calls for additional water to be traded into the ACT under the Australian Capital Territory Cap provisions.

There was no external water trading by the Australian Capital Territory; and four small internal entitlement trades.

Water restrictions were not imposed during 2011–12 and therefore permanent water conservation measures continue to apply as an internal management measure on water demand.

ACTEW Water (the water service provider in the Australian Capital Territory) has embarked on a number of infrastructure and water purchasing projects to ensure future water security for the Australian Capital Territory region. ACTEW Water reports to the Australian Capital Territory Government on these projects and obtains support for the undertaking.

The enlarged Cotter Dam (capacity of 78 GL) is due to be completed in about April 2013. The delay in completion is because of the heavy rainfall events in early 2012.

The Murrumbidgee to Googong pump/pipeline project was completed in August 2012.

ACTEW Water has purchased 4.145 GL of high security water entitlements and 12.523 GL of general security entitlements and, as part of the Tantangara Dam, is currently finalising contractual arrangements with Snowy Hydro Limited for water management and availability.

# 4.5.3. Monitoring and reporting

The Australian Capital Territory has established a system of volumetric licences for all users of water in the territory. The Australian Capital Territory is able to report its consumptive usage against information provided by licence holders. ACTEW Water is the main licensed user of water from the system and the level of accuracy from this monitoring process is high. The issuing of licences to groundwater and other surface water users, the licensing of catchment infrastructure on small catchments (such as farm dams) and the reporting of water controlled and consumed by the Commonwealth, fills any possible gap in the collection of data on water use in the Australian Capital Territory.

Despite the growth in population, the Australian Capital Territory's internal water use has fallen dramatically from the high of 46 GL (net) in 1990–91 to 8.9 GL, which is reported to be the result of longterm water conservation measures and a significant increase in rainfall runoff.

Dam storage levels have been well above 90 % throughout the year.

# 4.5.4. IAG assessment

Net diversions of 9 GL in the Australian Capital Territory during 2011–12 remain at historically low levels. These results do not include Commonwealth diversions which, in gross terms, are possibly no more than 1 GL. The Australian Capital Territory has a cumulative credit of 142 GL.

The Australian Capital Territory is currently awaiting Commonwealth legislation to be able to manage and report Commonwealth water use.

A climate-adjusted model has been developed and submitted to the MDBA for audit and accreditation. The IAG welcomes progress on this matter.

# 4.5.5. Conclusions and recommendations

- Net diversions of 9 GL remain well below the annual cap target of 22 GL under the proposed Cap model. The Australian Capital Territory cumulative credit is 142 GL.
- Little progress has been made towards the inclusion of the Commonwealth diversions in the diversions reported by the Australian Capital Territory. The IAG understands that this matter remains outstanding until such time as Commonwealth legislation is passed.
- The IAG welcomes the development of a model for calculating a climate-adjusted Cap and its submission for auditing and accreditation.
- The IAG also welcomes the resolution of the outstanding interpretive differences between the Ministerial Council decision of 23 May 2008 and Schedule E to the Murray–Darling Basin Agreement (Schedule 1 of the Water Act 2007).

# 5. Diversions from the Murray–Darling Basin in 2011–12

# 5.1 Summary of diversions 2011–12

Murray–Darling Basin diversions in 2011–12 totalled 7,975 GL. This was the seventh lowest annual diversion since 1983–84 and was only 83% of the average diversion over the same period. Diversions for the individual valleys in the Murray–Darling Basin are presented in **Table 17**.

System	Total diversion	Percentage of Basin diversion
New South Wales		
Intersecting Streams	3	0.0%
Border Rivers	134	1.7%
Gwydir	199	2.5%
Namoi/Peel	80	1.0%
Macquarie/Castlereagh/Bogan	231	2.9%
Barwon-Darling/Lower Darling	169	2.1%
Lachlan	189	2.4%
Murrumbidgee	1,824	22.9%
Murray	1,369	17.2%
Total New South Wales	4,197	52.6%
Victoria		
Goulburn–Broken–Loddon Cap Valley	1,017	12.7%
Campaspe	28	0.4%
Wimmera-Mallee	13	0.2%
Murray–Kiewa–Ovens Cap Valley	1,278	16.0%
Total Victoria	2,335	29.3%
South Australia		
Metro-Adelaide & Associated Country Areas	59	0.7%
Lower Murray Swamps	13	0.2%
Country Towns	36	0.4%
All Other Uses of Water from the River Murray	313	3.9%
Total South Australia	421	5.3%
Queensland		
Condamine-Balonne	764	9.6%
Border Rivers/Macintyre Brook	215	2.7%
Moonie	19	0.2%
Nebine	1	0.0%
Warrego	14	0.2%
Paroo	0.06	0.0%
Total Queensland	1,012	12.7%
Australian Capital Territory	9	0.1%
Total Basin	7,975	100.0%

# Table 17: Murray-Darling Basin diversions in 2011-12

Of the 29 years since 1983–84, total Basin diversions in 2011–12 ranked 23; diversions in New South Wales ranked 23, Victoria 24, South Australia 28; the Australian Capital Territory ranked 28 (being the second lowest in that time); and Queensland ranked 4. Of the total water diverted, New South Wales diverted 53%, Victoria 29%, Queensland 13%, South Australia 5% and the Australian Capital Territory 0.1%. Annual diversions since 1983 are plotted in **Figure 1** and **Figure 2**.



Figure 1: Murray-Darling Basin diversions: 1983–84 to 2011–12

Figure 2 : Murray-Darling Basin diversions: 1983–84 to 2011–12 (Queensland, South Australia and Australian Capital Territory)



# 5.2 Historical Cap and Diversions

The IAG is of the view that full transparency of all relevant and available data is consistent with both good governance in terms of the operation of the Cap and good Cap management practice. Accordingly, the IAG has decided that when amendments to models (or data) have been necessary or undertaken for reasons outlined earlier in this report, then historical records should be adjusted and the revised Cap and performance against the Cap should be reported. Effectively this has occurred to some extent in previous reports of the IAG. However, from the 2007–08 report, the IAG has determined that it will publish historical series of all valley models and performance against the modelled Caps where the information is available. It is not the IAG's intention that the performance of any one state or valley should be judged on historical performance, other than for the most recent year. Rather, it is the intention to provide information which will help to inform the Ministerial Council and other readers of past performance—which may be of assistance in interpreting individual valley performance in the latest year.

The following graphs provide details of the climateadjusted Cap and diversion data, together with debits or credits held on a valley-by-valley basis. The IAG envisages that these graphs will be reproduced in its report each year and updated where more up-todate data has been provided, or where modelling adjustments have resulted in a change in the Cap and debit/credit outcomes.



#### Figure 3 : Cap compliance – South Australian Country Towns



# Figure 4 : Cap compliance – South Australian Lower Murray Swamps

# Figure 5: Cap compliance - South Australian 'All Other Purposes'





Figure 6 : Cap compliance – Victorian Goulburn-Broken-Loddon







Figure 8 : Cap compliance - Victorian Campaspe







Figure 10 : Cap compliance – New South Wales Barwon-Darling

Figure 11 : Cap compliance – New South Wales Lower Darling





Figure 12 : Cap compliance – New South Wales Barwon-Darling/Lower Darling

Figure 13 : Cap compliance - New South Wales Gwydir





Figure 14 : Cap compliance – New South Wales Namoi/Peel

Figure 15 : Cap compliance - New South Wales Macquarie/Castlereagh/Bogan





Figure 16 : Cap compliance – New South Wales Lachlan







Figure 18 : Cap compliance – New South Wales Murray







# Figure 20: Cap compliance - Queensland Border Rivers

# Figure 21: Cap compliance – Queensland Condamine and Balonne



# Figure 22: Cap compliance – Murray–Darling Basin

(Valleys without a defined Cap are assumed to be at Cap diversion levels).



# 6. Appendix A: Responses by the five state and territory governments

The five state and territory Governments prepared written responses to the IAG's report which was presented to the Murray-Darling Basin Ministerial Council in December 2010. The Council agreed to publish these responses as an appendix to the IAG's Report.

# **SOUTH AUSTRALIA**

# **South Australia**

After resolving a number of points of concern which arose with MDBA staff during the audit process to the State's satisfaction, South Australia is comfortable with the quantitative findings of the IAG Review on Cap Implementation 2011–12.

South Australia notes that the report confirms that the annual diversions in each of South Australia's four Cap valleys remained below the annual Cap targets in 2011–12. South Australia also notes that cumulative diversions across valleys in the upstream jurisdictions all remained in credit and that diversions were at low levels due to above average rainfall conditions and high inflows across many catchments.

In South Australia's initial written submission to the IAG of 19 September 2012, the State had been proactive in presenting Cap figures which incorporated certain changes that adopted previous IAG recommendations, but had not been approved by the Ministerial Council nor amended in Schedule E of the Agreement.

This was done in good faith to demonstrate the jurisdiction's willingness to implement reforms recommended by the IAG. It is important to note that this approach had been adopted without issue in previous IAG reporting periods. Under the specific direction of the Chair of the IAG, South Australia was required to withdraw its initial submission and present all Cap data in strict accordance with Schedule E. In re-submitting, South Australia believes it complied fully with this direction, but it has had the unexpected consequence of drawing criticism from the IAG in its report.

South Australia is not comfortable with certain assertions and recommendations that are repeated a number of times in the report, as they are considered to be either inconsistent with Ministerial Council decisions; inconsistent with the specific requirements of Schedule E of the Agreement; or factually incorrect.

These matters are addressed below in the order in which they are raised in the IAG report:

# References to South Australia revising methodology and no longer adjusting the Lower Murray Swamps Cap for restrictions to accumulate inappropriate credits for the years 2003–2009.

The currently agreed Ministerial Council position (23 May 2008) is that all Cap models should incorporate mechanisms to account for reduced water availability and generate consequent adjustment to Cap targets to prevent unrealistic Cap credits being generated. The Lower Murray Swamps Valley Cap is currently defined as a fixed long-term diversion Cap not exceeding 94.2 GL/year (i.e. not a climate adjusted Cap model).

South Australia supports the Ministerial Council decision and despite the fact that this valley does not have an approved Cap model (which is to be rectified when the valley is merged with the All Other Purposes Valley Cap), the State had proactively adopted a direct percentage restriction approach in reporting to the IAG on the Lower Murray Swamps Cap targets since 2003.

It is important to note that, to date, Schedule E has not been amended to incorporate the Council's decision and, in the event that it had been, there is no approved Cap model to provide the vehicle for implementing restriction adjustments.

Therefore, in response to the direction from the IAG Chair, South Australia was bound to retrospectively reverse the cumulative restriction adjustments which had previously been done in good faith.

As previously agreed by South Australia and discussed with the IAG during the 2011–12 review process, a detailed submission relating to the amalgamation of the All Other Purposes Cap and Lower Murray Swamps Cap valleys will be submitted to the MDBA in 2012–13. This is being developed collaboratively with MDBA staff and will include an allowance for restrictions, arrangements to manage carryover and processes for adjusting the annual Cap for environmental water recovery, use and trade.

This amalgamation will require an amendment to Schedule E.

# References to the inclusion of unused ELMA water being treated as a credit.

The Environmental Land Management Allocation (ELMA) comprises an annual allocation of 22.2 GL for the management of salinity in the Lower Murray Swamps. It is tied to the swamps and is not tradeable.

It was explained in detail, at the IAG meeting with South Australia of 24 September 2012, that any unused portion of the ELMA remains in the River Murray to flow to the sea. As is the case with all other unused South Australian entitlements, Cap credits for underuse are routinely claimed.

Claiming Cap credits for non-use of ELMA water is entirely consistent with the requirements of Schedule E and practices in place in the upstream jurisdictions.

In other words, ELMA underuse is treated in exactly the same way as most other access entitlements in the southern connected Basin.

On this basis, South Australia is of the view that the approach proposed by the IAG to apply a zero credit policy to the application of ELMA is inconsistent with the specific requirements of Schedule E and prior practice.

# References to South Australia's treatment of environmental water in the adjustment of the Cap.

South Australia has adjusted the All Other Purposes Cap in accordance with the State's preferred method as provided in a letter to the former Chief Executive, Murray-Darling Basin Authority on 19 February 2010. This preferred method is in accordance with the requirements of the protocol agreed at the Ministerial Council Meeting of 23 May 2008.

In the absence of any subsequent decision by the Ministerial Council, the jurisdiction's preferred method will continue to apply.

The method adjusts the Cap on the basis of actual diversions (use) rather than the total volume of environmental water recovered. As discussed in detail, and agreed at the IGA meeting with South Australia, this approach is consistent with the treatment of all other entitlements in South Australia (e.g. irrigation and industrial entitlements) and that of Victoria.

# VICTORIA

# Victoria

Victoria continued to manage the Cap on regulated systems using Bulk Entitlements in accordance with the Victorian Water Act 1989 and Streamflow Management Plans on unregulated streams. No new capping measures were introduced in 2011–12 as diversions in all Victorian valleys were well within Cap limits.

Annual Cap targets are estimated using hydrological models in accordance with the requirements of Schedule E to the Murray-Darling Basin Agreement. Cap models have been approved by the MDBA for all Victorian valleys. Approved Cap models or updated versions of these models were used to calculate the 2011–12 Cap targets and cumulative cap credits.

During 2011–12, diversions from each of Victoria's four designated valleys were below their Cap targets and significant Cap credits were generated. The reasons for this include reduced irrigation diversions due to the lingering influence of the recent prolonged drought plus large volumes of carryover of unused allocation. All the Victorian valleys have accumulated Cap credits to 30 June 2012.

Victoria proposes to continuously improve the performance of its hydrological models where practicable. The approved Wimmera-Mallee Cap model has been updated to simulate post pipeline conditions and a draft proposal for a reduced Cap was submitted to the Water Audit Panel. The IAG has noted Victoria's proposal to reduce the Wimmera-Mallee Cap by more than fifty percent and to vary the method applied for calculating the trigger level for a special audit. Victoria supports the IAG recommendations that the MDBA:

- Examines the cost/benefits of moving to a trigger level of three standard error of the model for the existing valleys.
- Recommends to the Ministerial Council an amendment to Schedule E to provide for flexibility in setting special triggers.

Victoria remains committed to the reduction of the Cap when environmental flows are increased. The methods proposed by Victoria for reducing the Cap to exclude environmental entitlements were approved by the Authority on 30 October 2010.

The data submitted to the IAG for 2011–12 has been adjusted for environmental use by applying the approved methods by the MDBA in 2010. Victoria will continue to work with the Authority to indentify improved methods to reduce the Cap to exclude environmental entitlements including for the Commonwealth purchase while minimising third-party impacts.

# **NEW SOUTH WALES**

# **New South Wales**

NSW ensures that diversions remain within Cap through the implementation of water sharing plans in each valley. These plans continue to provide and protect water for the environment and, as a direct result, diversions continue to be below Cap in all NSW valleys.

During the year, New South Wales continued to develop and implement water sharing plans for rivers and groundwater systems. In October 2012 New South Wales reached a milestone with all surface water sources in the Murray Darling Basin are now covered by a water sharing plan.

With another year generally of wet conditions and high flows, use of Environmental Water was again substantial. The IAG notes that adjustments to the Cap to reflect the purchase of environmental entitlements is a significant issue. The IAG acknowledges that the NSW approach is consistent with that applied by most other states. However, the number and type of entitlements that are being recovered for the environment across the Basin are increasing, and developing administratively efficient arrangements for the Cap on diversions that protect third parties remains a priority for NSW. Throughout 2011–12, NSW also made significant progress towards accreditation of valley Cap models, including additional work on the Barwon-Darling valley Cap model. The NSW Border Rivers Cap model is the only remaining Cap model for major river systems to be presented for accreditation.

The two State Priority Projects that NSW has entered into with the Commonwealth Government: the Healthy Floodplains project, and the NSW Metering project, are both intended to further the implementation of the Cap for floodplain diversions and diversions in unregulated rivers and streams.

# QUEENSLAND

# Queensland

Queensland has continued to enjoy good water availability for the third year in a row in the 2011–12 water year. This is reflected in significant crossborder flows and contribution to the Northern Murray Darling Basin. Unfortunately, flows in some catchments have been at record levels and whilst the water availability is a welcome relief, the flooding has caused widespread damage in many communities.

With water resource plans now implemented in all parts of the Queensland Murray Darling Basin, Queensland has in place a management framework which limits growth in diversions beyond planned levels. This includes the take of overland flow which is primarily limited by infrastructure based controls. Queensland is pleased the Internal Audit Group recognise the difficulties associated with modelling overland flow take and that further measurement and refinement of models and the cap reporting framework will address this over time. In the meantime, Queensland is confident that the current regulatory framework provides a firm basis for cap management. Queensland has developed a methodology for accounting for held environmental water but had deferred formal submission pending resolution of issues raised in Water Audit Panel discussions. Queensland believes it can now make a submission that will align with the direction being supported by the Water Audit Panel.

# **AUSTRALIAN CAPITAL TERRITORY**

# **Australian Capital Territory**

# Water use

The volume of gross diversions and net diversions for the ACT has continued to remain low compared to the pre-Millennium drought period. The volume of gross diversions and net diversions was the second lowest on record (i.e. since 1989–90). The low net use was assisted by the above average rainfall during 2011 and the maintenance of permanent water conservation measures.

# ACT Cap

The net diversions for 2011–12 of 9 GL are well within the agreed Cap. Following discussions with the Murray-Darling Basin Authority the ACT put forward a Cap model on potable water demand for the ACT and Queanbeyan to the Water Audit which was endorsed for review for the Cap model audit and accreditation process as required under the MDB Agreement. The proposed model is climate adjusted.

# Other comments

The ACT does not yet have the responsibility to manage and account for water under Commonwealth control as the ACT simply does not have the legislative power. Specifically, the Commonwealth has ownership and control over Lake Burley Griffin which is under 1 GL in terms of water use. The proposed legislation to enable the ACT to manage such water resources has been delayed in the Commonwealth Parliament. As mentioned in last year's report the ACT will manage this water but will not have rights to this water as such.

As reported in 2010–12, there has been no increase in the demand for water in the ACT for industrial use or by the Commonwealth and therefore no need to acquire additional water for the ACT.
## Appendix B: Status of Cap Models under Schedule E

Cap Valley	Cap set	Model needed	Model built	Status of Model			
				Model name	Submitted for audit	Audited	Approved
New South Wales							
Intersecting Streams	Х	х	х		-	-	-
Border Rivers	V	v	v	Border Rivers IQQM	Х	Х	Х
Gwydir	V	v	v	Gwydir IQQM	V	٧	V
		V	V	Namoi IQQM	V	V	V
Namoi/Peel	v	V	V	Peel IQQM	V	V	V
Macquarie/Castlereagh/Bogan	V	V	V	Macquarie IQQM	V	V	V
	r	V	V	Barwon-Darling IQQM	V	Х	Х
Barwon-Darling /Lower Darling	V	V	V	MSM	V	Х	Х
Lachlan	V	V	V	Lachlan IQQM	V	V	V
Murrumbidgee	V	V	V	Murrumbidgee IQQM	V	V	V
Murray	V	V	V	MSM	V	V	V
Victoria							
Goulburn/Broken/Loddon	V	V	V	GSM REALM	V	V	V
Campaspe	V	V	V	GSM REALM	V	V	V
Wimmera-Mallee	V	V	V	W-M REALM	V	V	V
Kiewa/Ovens/Murray	V	V	V	MSM	V	V	V
South Australia							
Metro-Adelaide & Associated Country Areas	V	v	V	НОМА	Х	х	Х
Lower Murray Swamps	V	Х	-		-	-	-
Country Towns	V	Х	-		-	-	-
All Other Uses of Water from the River Murray	V	v	v	Regression	V	v	V
Queensland							
Condamine-Balonne	V	V	v	Condamine IQQM	V	х	Х
Border Rivers & Macintyre Brook	V	V	V	Border Rivers IQQM	V	Х	Х
Moonie	V	V	V	Moonie IQQM	V	V	V
Nebine	V	V	V	Nebine IQQM	V	V	V
Warrego	V	V	V	Warrego IQQM	V	V	V
Paroo	V	V	V	Paroo IQQM	V	V	V
Australian Capital Territory	۷	v	۷	Regression	x	x	X
Summary of 24 Basin valleys	24	23	23		21	16	16

## Appendix C: Victorian Cap valleys compliance



Figure 23: Cap compliance: Victorian Goulburn-Broken-Loddon



Figure 24: Cap compliance – Victorian Murray



Figure 25: Cap compliance – Victorian Campaspe



## Figure 26: Cap compliance – Victorian Wimmera-Mallee

## Glossary

ACTEW	Australian Capital Territory Electricity and Water Corporation.
announced allocation	The percentage of water entitlement declared available for diversion from a regulated stream in a season.
annual allocation	The annual volume of water available for diversion from a regulated stream by an entitlement holder.
authorised use	Total of the water allocated in the valley plus off-allocation and water-harvesting use plus unregulated stream use not in allocation and system losses not in allocation.
Border Rivers	The rivers and tributaries forming, or intersecting the border between New South Wales and Queensland.
Bulk Entitlement	A perpetual entitlement to water granted to water authorities by the Crown of Victoria under the <i>Water Act 1989</i> .
carryover	An unused entitlement from one season that can be used in the next year.
channel capacity	The maximum rate at which water can be delivered through a river reach or an artificial channel.
COAG	Council of Australian Governments.
diversion	The movement of water from a river system by means of pumping or gravity channels.
diversion licence	Specified licences issued for a specified annual volume and diversion rate.
DNR	The Department of Natural Resources (of New South Wales).
DNRMW	The Department of Natural Resources Mines and Water (of Queensland).
DSE	The Department of Sustainability and Environment (of Victoria)
dozer allocation	An allocation that is not fully utilised.
DWLBC	The Department for Water, Land and Biodiversity Conservation (of South Australia).
EC (unit)	Electrical conductivity unit 1 EC = 1 micro-Siemens per centimetre measurement at 25° Celsius. Commonly used to indicate the salinity of water.
end-of-valley flows	The flow regime at the end of a valley.
floodplain harvesting	The diversion of water from a floodplain into storage(s).
FMIT	First Mildura Irrigation Trust.
gigalitre (GL)	One thousand million or 10° litres.

GL	Gigalitre: one thousand million or 10° litres.
G-MW	Goulburn-Murray Water (of Victoria).
gravity districts	Districts which use gravity to divert the flow of water from the river.
high security entitlement	An entitlement which does not vary from year to year and is expected to be available in all but the worst droughts.
HSWS	High Reliability Water Share
IAG	Independent Audit Group.
IGA	Inter-Governmental Agreement
LV	Licence Volume.
LRWS	Low Reliability Water Share
impoundment	The storage of water diverted from a watercourse.
irrigation	Supplying land or crops with water by means of streams, channels or pipes.
MDBA	Murray–Darling Basin Authority.
MDBC	The former Murray–Darling Basin Commission.
MDBMC	Murray–Darling Basin Ministerial Council.
megalitre (ML)	One million litres. One megalitre is approximately the volume of an Olympic swimming pool.
Ministerial Council, the	Murray–Darling Basin Ministerial Council.
ML	Megalitre: one million litres. One megalitre is approximately the volume of an Olympic swimming pool.
Murray–Darling Basin Agreement	The <i>Agreement</i> between the Governments the Commonwealth, New South Wales, Victoria, South Australia, Queensland and the Australian Capital Territory. The current <i>Agreement</i> is the 2008 <i>Agreement</i> .
MSM	Monthly Simulation Model
off-allocation	When unregulated tributary inflows or spills are sufficient to supply irrigation needs and downstream obligations.
on-farm storage	Privately owned storages used to harvest surplus flows or to store unused allocations for use in the following season.
overdraw	Water diverted in one season against a prospective allocation in the subsequent year.
overland flow	Water that runs off the land following rainfall, before it enters a watercourse, and floodwater that erupts from a watercourse or lake onto a floodplain.

permanent transfer	The transfer of water entitlements on a permanent basis. The right to permanent transfers allows irrigators to make long-term adjustments to their enterprise and enables new operators to enter the industry.	
private diverters	Licensed to operate privately owned pumps or diversion channels; includes river pumpers and diverters as well as town water supplies.	
property right	In this context, the right to ownership of allocated volumes of water.	
RAMSAR wetland	A wetland listed on the Register of internationally significant wetlands established by the Convention at Ramsar.	
regulated streams/ waterways	Streams where users are supplied by releases from a storage. A water licence for a regulated stream specifies a base water entitlement defining the licence holder's share of the resources from a stream.	
riparian	Of, inhabiting or situated on the bank and floodplain of a river.	
RIT	Renmark Irrigation Trust.	
sales water	In Victoria, water that may be purchased by an irrigator in addition to the basic water right. Access to sales water is announced each season as a percentage of Water Right depending on the available resource.	
salinity	The concentration of dissolved salts in groundwater or river water usually expressed in EC units.	
sleeper allocation	An allocation that does not have a history of water usage.	
SFMP	Streamflow Management Plans	
temporary transfer	Water entitlements transferred on an annual basis.	
unregulated streams	Streams that are not controlled or regulated by releases from major storages.	
utilisation	The amount of water available for diversion that is actually diverted.	
water entitlement	The legal right of a user to access a specified amount of water in a given period.	
Water -harvesting	The diversion of water from an unregulated stream in Queensland in which the access to water is defined only by a diversion rate and a starting flow in the stream.	
WAMP	Water Allocation and Management Planning. It is a process formerly under way in Queensland to enable the acceptable level of allocatable water to be determined for a river system. These plans have been superseded by Water Resource Plans.	
WR	Water Rights.	
WRP	Water Resource Plan. Plans developed under the Queensland <i>Water Act</i> 2000 for allocating water between consumptive use and the environment.	
WSP	Water Sharing Plan. Plans developed under the New South Wales <i>Water Management Act, 2000</i> for equitable sharing and management of New South Wales water resources.	
WUE	Water Use Efficiency.	



Australian Government

