MURRAY–DARLING BASIN AUTHORITY

Review of Cap Implementation 2010–11

Report of the Independent Audit Group

October 2011
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October 2011
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.

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Auditors’ foreword

October 2011

Dr R Dickson
Chief Executive
Murray–Darling Basin Authority
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Dear Dr Dickson


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 2011-12 should see models for all major valleys either approved or submitted for audit and accreditation.

The availability of environmental water in 2010–11 highlighted the need to implement Cap adjustments for environmental water and the Independent Audit Group (IAG) supports the need for a consistent approach to Cap adjustment.

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

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

WALLY COX
Chairman
CLAUDE HIGGINS
Member
TERRY HILLMAN
Member
Contents

Executive summary .............................................................................................................................................. 1
1. Introduction .................................................................................................................................................. 5
2. Background ................................................................................................................................................ 6
3. Audit process ............................................................................................................................................. 10
4. Audit of 2010–11 Cap implementation ...................................................................................................... 11
   4.1 South Australia ................................................................................................................................... 11
       4.1.1 The Cap ......................................................................................................................................... 11
       4.1.2 2010–11 usage ............................................................................................................................ 11
       4.1.3 Administration of the Cap ........................................................................................................... 15
       4.1.4 Monitoring and reporting ........................................................................................................... 17
       4.1.5 IAG assessment ......................................................................................................................... 17
       4.1.6 Conclusions and recommendations ......................................................................................... 18
   4.2 Victoria .................................................................................................................................................. 19
       4.2.1 The Cap assessment tools ........................................................................................................... 19
       4.2.2 Comparison of annual diversions with the annual Cap targets ............................................... 20
       4.2.3 Administration of the Cap ........................................................................................................... 24
       4.2.4 IAG assessment .......................................................................................................................... 25
       4.2.5 Conclusions and recommendations ......................................................................................... 25
   4.3 New South Wales ................................................................................................................................ 26
       4.3.1 The Cap ......................................................................................................................................... 26
       4.3.2 2010–11 usage ............................................................................................................................ 26
       4.3.3 Monitoring and reporting ........................................................................................................... 31
       4.3.4 Administration of the Cap ........................................................................................................... 31
       4.3.5 IAG assessment .......................................................................................................................... 32
       4.3.6 Conclusions and recommendations ......................................................................................... 32
   4.4 Queensland ............................................................................................................................................ 33
       4.4.1 The Cap ......................................................................................................................................... 33
       4.4.2 2010–11 diversions ....................................................................................................................... 33
       4.4.3 Comparison of annual diversions with the annual Cap targets ............................................... 36
       4.4.4 Administration of the Cap ........................................................................................................... 43
       4.4.5 IAG assessment .......................................................................................................................... 43
       4.4.7 Conclusions and recommendations ......................................................................................... 44
   4.5 Australian Capital Territory ................................................................................................................... 44
       4.5.1 The Cap ......................................................................................................................................... 44
       4.5.2 Administration of the Cap ........................................................................................................... 45
       4.5.3 Monitoring and reporting ........................................................................................................... 46
       4.5.4 IAG assessment .......................................................................................................................... 46
       4.5.5 Conclusions and recommendations ......................................................................................... 46
5. Diversions from the Murray–Darling Basin in 2010–11 ......................................................................................... 47
   5.1 Summary of diversions ........................................................................................................................... 47
Appendix A: Responses by the five state and territory governments .............................................................................. 59
   South Australia .......................................................................................................................................... 58
   Victoria ..................................................................................................................................................... 60
   New South Wales .................................................................................................................................... 61
   Queensland ........................................................................................................................................... 62
   Australian Capital Territory ..................................................................................................................... 63
Appendix B: Status of Cap models under Schedule E ............................................................................................ 64
Appendix C: Issue Paper Prepared for IAG on Adjustment for Environmental Water Recovery ........................................ 65
Appendix D: Victorian Cap valleys compliance .................................................................................................. 67
6. Glossary ......................................................................................................................................................... 69
List of figures

Figure 1: Murray–Darling Basin diversions – 1983–84 to 2010–11 ........................................ 48
Figure 2: Murray–Darling Basin diversions – 1983–84 to 2010–11 ........................................ 48
Figure 3: Cap compliance – South Australian Country Towns ................................................. 49
Figure 4: Cap compliance – South Australian All Other Purposes and Lower Murray Swamps .......... 50
Figure 5: Cap compliance – Victorian Goulburn/Broken/Loddon ............................................. 50
Figure 6: Cap compliance – Victorian Murray/Kiewa/Ovens .................................................... 51
Figure 7: Cap compliance – Victorian Campaspe ................................................................. 51
Figure 8: Cap compliance – Victorian Wimmera–Mallee ......................................................... 52
Figure 9: Cap compliance – New South Wales Barwon–Darling ............................................... 52
Figure 10: Cap compliance – New South Wales Lower Darling .............................................. 53
Figure 11: Cap compliance – New South Wales Barwon–Darling/Lower Darling ...................... 53
Figure 12: Cap compliance – New South Wales Gwydir ........................................................ 54
Figure 13: Cap compliance – New South Wales Namoi/Peel .................................................. 54
Figure 14: Cap compliance – New South Wales Macquarie/Castlereagh/Bogan ......................... 55
Figure 15: Cap Compliance – New South Wales Lachlan ....................................................... 55
Figure 16: Cap compliance – New South Wales Murrumbidgee ............................................. 56
Figure 17: Cap compliance – New South Wales Murray ........................................................ 56
Figure 18: Cap compliance – Queensland Border Rivers ....................................................... 57
Figure 19: Cap Compliance – Queensland Border Rivers ....................................................... 57
Figure 20: Cap Compliance – Murray–Darling Basin ............................................................. 58
Figure 21: Victorian Cap Compliance: Goulburn/Broken/Loddon ........................................... 67
Figure 22: Victorian Cap Compliance: Murray ........................................................................ 67
Figure 23: Victorian Cap Compliance: Campaspe ................................................................. 68
Figure 24: Victorian Cap Compliance: Wimmera Mallee ........................................................ 68

List of tables

Table 1: 2010-11 River Murray Water Use ............................................................................. 12
Table 2: River Murray Interstate Temporary Water Trade 2010-11 ......................................... 13
Table 3: Exchange of Cap resulting from permanent entitlement trade .................................. 13
Table 4: Metropolitan Adelaide Cap Assessment .................................................................... 14
Table 5: Combined ‘All Other Purposes’ and Lower Murray Swamps use and Cap calculations ... 16
Table 6: Victoria Cap Auditing Model Status ........................................................................ 19
Table 7: Comparison of Diversions with Cap Targets ............................................................ 21
Table 8: New South Wales Cap Auditing Models Status ....................................................... 27
Table 9: NSW Annual Cap Accounting 2010-11 ..................................................................... 27
Table 10: Unregulated Use in NSW ....................................................................................... 31
Table 11: Summary for Queensland catchments 2010-11 ..................................................... 35
Table 12: Queensland Basin Stream Diversions (GL) ............................................................ 35
Table 13: Water Diversion by Sector ..................................................................................... 35
Table 14: Cross Border Flows ............................................................................................... 35
Table 15: Public Storages and their volumes across catchments as at 30 June 2011 ................ 36
Table 16: Annual diversions compared to Cap targets (GL) ................................................... 37
Table 17: Impact of Using Modelled Overland Flow Take on Cap Credits in 2010-11 .......... 37
Table 18: Diversions for Consumptive Use within the ACT and Queanbeyan (GL) ................ 45
Table 19: Murray–Darling Basin Diversions in 2010-11 ........................................................ 47
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.

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 recent pattern of low diversions, with the five lowest annual diversions since 1983 occurring in the last five years.

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.

The 2010–11 audit identifies important progress in each of the states and the Australian Capital Territory (ACT) in establishing and/or operationalising the Cap. The key developments or issues are:

- Caps have now been set or proposed for all valleys except for the New South Wales Intersecting streams.
- A Cap proposal has been received for the New South Wales Border Rivers and assessed by the IAG. It is subject to approval by the Murray–Darling Basin Ministerial Council.
- Following implementation of the Resource Operations Plan for the Condamine-Balonne in Queensland, a Cap proposal has been submitted and approved.
- Of the 24 Cap models required, 23 models have been developed and 20 have been submitted for audit; with 17 audited and 14 approved (See Appendix B: Status of Cap models under Schedule E).
- Recalibration of models continues – to better model extreme conditions and management responses not experienced during the period over which the models were calibrated.
- Action continues to develop climate— (and population— for ACT) adjusted models for Metropolitan Adelaide and the ACT. These are expected to be submitted in 2011–12.
- A Cap model for the New South Wales Border Rivers is expected to be submitted for assessment and accreditation in 2011–12, following approval of the Cap by the MDB Ministerial Council.

Development of Cap models continues and the IAG notes progress for a climate- adjusted model for Metropolitan Adelaide and a climate/population adjusted model for the ACT. Timely finalisation in 2011–12 will provide a more appropriate basis for assessing Cap compliance.

The IAG notes that there continues to be differences in interpretation of the ACT Cap, between the ACT and the Murray–Darling Basin Authority (MDBA), in terms of 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). If these differences cannot be resolved, the IAG recommends that a submission be made to the Ministerial Council.

Based upon a submission (see Appendix C), the IAG identified an issue with the Cap adjustment for environmental water that is relevant to NSW, Victoria and South Australia. It is discussed here as a generic issue.

Ministerial Council Meeting 45 – 23 May 2008 agreed to a protocol that removed the use of water for environmental purposes from the accounting for the Cap. Where the water used for environmental purposes came from entitlements that previously supplied diversions that were part of the Cap, the protocol specifies that the annual Cap targets should also be reduced. The protocol requires the states to propose the methods they plan to use to reduce the Cap targets and to submit those methods to the Murray–Darling Basin Authority for approval. Victoria has submitted its method, which was approved by the Authority on 30 October 2010. The other states have not yet formally submitted the methods that they propose to use. The basic method proposed by Victoria, and the method used to date by the other states, is to reduce the annual Cap targets by the use of the environmental entitlements in the year.

The experience of the last few years is that, in many ways, the use of environmental entitlements differs from the use for non-environmental purposes. Environmental entitlements purchased on unregulated streams (such as the purchase of
Toorale entitlement on the Barwon/Darling] are deemed to be using water when the flow is allowed to proceed downstream undiverted. In 2010–11, 34.3 GL of Victorian TLM supplementary access entitlement was deemed to be transferred from Victoria to South Australia and hence to the Coorong. In reality, flow was unregulated at the time and it could not have been stored in either Lake Victoria or the Lower Lakes. In both cases the environmental outcome was unaffected by the decision to deem the water to be used. Although it is expected that the active management of environmental entitlements will maximise the environmental benefits obtained, modelling shows that the environment benefits by a reduction in diversions, even if it is unmanaged. Unused water that is allowed to fill and spill from storage increases the frequency of all flood events. It is therefore an important environmental outcome that The Living Murray (TLM) and Commonwealth Environmental Water Holder (CEWH) achieve their target reduction in long-term average diversions.

An alternative to reducing the Cap by the use of the environmental allocation would be to scale down the annual Cap targets in such a way that, when tested against the long-term, the average annual Cap targets reduce by the desired Long-term Cap Equivalent (LTCE). An example could be the All Other Purposes (AOP) Cap in South Australia. The AOP Cap model has been prepared such that the average Cap over the long-term is 449.9 GL/year. In 2010–11, the effective volume of entitlement recovered by the TLM and CEWH (as determined by the allocations made to those entitlements) was 86.7 GL. Based upon a TLM Cap factor of 0.9, this entitlement is equivalent to a LTCE of 78.0 GL. The annual Cap target determined by the Cap Model was 404.1 GL. The scaling method would result in the annual Cap target in 2010–11 being reduced by 404.1*78.0/449.9 = 70.1 GL.

The IAG recommends that the option for reducing the Cap by scaling down the annual Cap targets in proportion to the LTCE recovered be considered by the States and approval sought from MDBA if deemed appropriate.

For the 2010–11 water year audit, the IAG’s reporting requirements have again necessitated the bringing forward of the timing for reports from each of the States and the ACT. The IAG is required to complete its report to the Authority in time to allow its findings to be presented to the November 2011 Ministerial Council meeting.

The IAG is aware that the requirement for earlier reporting stems from a report to the MDBA on an ‘Independent Review of Imbalances in Water Use’ under the Murray–Darling Basin Agreement. This report, among other things, recommended that the period for close-off of water accounts after the end of the water year be progressively reduced each year until that close-off is achieved within one or two months of the end of the water year. The IAG understands the need for more timely reporting of Cap compliance and of water reporting more generally, particularly given the development of a national water accounting framework based largely on the analogy with financial accounting and reporting.

In bringing forward the timing of the audit, the IAG has been conscious that there is likely to be implications for operational practices and the timeliness of updating of the Cap models and reporting water diversions for individual jurisdictions.

However, given the need to meet Ministerial Council requirements, the IAG recommends that the 2012 audit should again be conducted in the last week of September. Diversion reports should be forwarded to the IAG in the third week of September and the reporting time schedules kept under review.

In summary, the detailed conclusions and recommendations reached by the IAG for 2010–11 by State and Territory are:

**South Australia**

- Diversions in 2010–11 were 362 GL, which were the lowest diversion since the introduction of the Cap.
- Diversions in 2010–11 were low because of the wet conditions experienced and the general allocations remaining at 67%. The allocation was limited as the consumptive pool also included 228 GL irrigation carryover from 2009–10.
- Overall, South Australian diversions since July 1997 (excluding Metro Adelaide) have been 11.5% below the Cap targets.
- South Australia has a reliable measurement system for urban and irrigation uses.
- The South Australian ‘All Other Purposes’ Cap model was approved by the Authority in November 2004; and the climate-adjusted Cap for 2010–11 was adjusted down to account for water restrictions in the latest year.
- The IAG recommends that South Australia considers incorporating restrictions into the approved model for calculating Cap targets and submits a revised model for approval.
Executive summary

• The IAG notes that an adjustment for the use of TLM water recovered in South Australia has been allowed for in the 2010–11 Cap reporting. Also that the transfer of environmental water from interstate has been excluded from the temporary trade adjustment.

• The IAG notes the methods used for the estimation of diversions in the Lower Murray Swamps. The IAG understands that this has been necessary because of the difficulty in accessing meters. The IAG believes that South Australia has adopted an appropriate method for such circumstances.

• The IAG has previously recommended that South Australia develop a climate-adjusted model of diversions from the River Murray for Metropolitan Adelaide. The IAG notes that the finalisation of the model has been delayed due to the resolution of technical issues. The IAG understands that the model should now be submitted for accreditation and subject to approval, used for the 2011–12 water year.

• South Australia has provided an analysis of the proposed amalgamation of the remaining Lower Murray Swamps Cap components with the ‘All Other Purposes’ Cap, while retaining the Environmental Land Management Allocation as a non-tradeable component within the ‘All Other Purposes’ Cap. The IAG supports the amalgamation, subject to clear reporting each year to ensure the ELMA continues to be applied to the Lower Murray Swamps. The IAG notes that an amendment to Schedule E is required and a submission will be made to Ministerial Council during 2011–12.

Victoria

• Diversions in 2010–11 were 1,094 GL, compared to 1,810 GL in 2009–10.

• Above average annual rain and record summer rain reduced demand for diversions for irrigation.

• Diversions for the Murray/Kiewa/Ovens, Campaspe, Goulburn/Broken/Loddon and Wimmera-Mallee valleys in 2010–11 were below annual climate, environmental use and trade-adjusted Cap targets.

• Cumulative diversions since 1997 are in credit for all valleys.

• Overall Victorian diversions since July 1997 were 5.6% below the Cap targets.

• The 2010–11 Cap targets have been adjusted for the transfer and use of some environmental entitlements, but no adjustment has been made for the recovery of TLM supplementary access water. This has resulted in an over-estimate of Cap credits, particularly for the Lower Darling. This does not affect the conclusion that the combined Barwon-Darling/Lower Darling remains in credit and is not in breach of Cap.

• NSW is encouraged to seek approval for an appropriate method for Cap adjustment for environmental water.

• Cap models have been approved for five NSW valleys and are currently being audited for two of the remaining three NSW valleys. The Border Rivers model is still in preparation and is expected to be submitted to the MDBA later in 2011.

• New South Wales is encouraged to finalise Cap/models for the intersecting streams.

• 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.

• The IAG recommends independent validation and review of un-metered use estimates for the Namoi, Gwydir and NSW Border Rivers.

Queensland

• Total diversions in 2010–11 were estimated to be 1,445 GL, compared to 1,232 GL in 2009–10.

• The total includes 865 GL of stream diversions and an estimated 580 GL of overland flow harvesting.

• An exceptionally strong La Niña system caused well-above average rainfall from August 2010 to January 2011, triggering record flooding across the Queensland Murray–Darling Basin catchments and resulting in end-of-system flows totalling 9,367 GL. New maximum annual streamflow volumes were set in both the Condamine and Balonne and Border Rivers catchments.
The volume of water passing the key monitoring sites during the 2010–11 water year was generally in the order of three to six times the long-term annual average flow; with the exception of the Paroo, where the volume of water passing was 90% of the long-term annual average flow.

The Cap is set for all Queensland valleys and Cap targets were available for all valleys. Estimated use was below the relevant Cap target for all valleys.

The IAG recommends 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.

Overall Queensland diversions were 41.5% below the Cap targets (since the start of Cap accounting).

A metering program is being progressively rolled out as part of a Queensland state-wide project to meter all entitlements. The project will ensure reliable information on water use is available as the Resource Operation Plans are implemented. Flooding has delayed implementation but it is expected to be substantially completed in 2012.

Queensland is encouraged to finalise an agreed methodology to account for environmental water within the Cap framework.

Australian Capital Territory

Net diversions of 7.2 GL were a record low and well below the long-term diversion Cap target of 40 GL.

Progress has been made towards the inclusion of the Commonwealth diversions in the diversions reported by the ACT. The IAG understands that this matter will be finalised and the reporting requirements met during 2011-12, once the Commonwealth legislation is passed.

The IAG welcomes progress on the development of a model for calculating a climate-adjusted Cap and its submission for auditing and accreditation.

The ACT and the Authority need to resolve 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). Should the matter remain unresolved, the IAG recommends that a submission be made to the Ministerial Council.
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 to Cap the future level of diversions.

The Council, in finalising Schedule E1, 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 Living Murray audit is set out in a separate report – Audit of The Living Murray Implementation 2010–11.

The Review of Cap Implementation 2010–11 by the IAG has been prepared in response to the Council’s request, and is based upon information made available to the IAG by each of the states and the Australian Capital Territory (ACT). 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 Cap target for the New South Wales’s Intersecting Streams still needs to be established.

The IAG team wishes to acknowledge and thank all states and the ACT 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 the officers of the MDBA in the preparation of this report. The findings, however, continue to be entirely those of the IAG.

1 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.
2. Background

The Council, at its June 1995 meeting, 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:

1. To maintain and, where appropriate, improve existing flow regimes in the waterways of the Murray–Darling Basin, to protect and enhance the riverine environment.

2. 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; and
  - 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 ACT, the Cap will be defined following a review by the IAG and negotiations with the ACT 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.

For Queensland, the Council agreed that the WRP process should ensure that Queensland balances consumptive and in-stream use. The IAG has supported the WRP process, noting that:

- it must accommodate in-stream use not only in Queensland, but also in the Border Rivers under the control of the Border Rivers Commission and the rest of the Murray–Darling Basin
- a management regime needs to be developed that includes pricing, property rights, and measuring and reporting
- the WRP must be fully implemented, including assessment of downstream impacts in New South Wales
- the Precautionary Principle must be applied through the establishment of an allocation, to be held in reserve to minimise the risk of over-allocation for consumptive use; and
- the final independent audit of the WRP process is conducted, including modelling of impacts on downstream Basin flows.

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 that 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.

Following the Inter-Governmental Agreement to establish The Living Murray initiative, the IAG (with an expanded membership) was asked to undertake both audits. The Living Murray initiative will lead to modifications in setting and modifying Cap targets to reflect water saved and/or purchased for environmental use.

- The 2009–10 Review of Cap Implementation identified that:
  - At 5,472 GL, diversion from rivers in the Murray–Darling Basin was the fourth lowest since 1983-84, reflecting continuing severe drought conditions throughout most of the Basin. While higher than the record low of 4,119 GL in 2008–09, the results for 2009–10 continue the recent pattern of low diversions.
  - Diversions in 2009–10 in South Australia were 480 GL compared to diversions of 485 GL in 2008–09. Diversions in 2009–10 continue to be constrained as a result of restrictions due to ongoing drought conditions. They were well within the annual Cap targets for Metropolitan Adelaide, Country Towns, Lower Murray Swamps and ‘All Other Purposes’ Cap valleys.
  - Diversions in Victoria in 2009–10 were 1,810 GL, compared to diversions of 1,503 GL in 2008–09.
  - Diversions for the Murray/Kiewa/Ovens, Goulburn/Broken/Loddon, Campaspe and Wimmera-Mallee valleys were below annual climate, environment use and trade-adjusted Cap targets.
  - Diversions in 2009–10 in New South Wales were 1,932 GL, compared to 1,729 GL in 2008–09. Cumulative Cap credits exist for all valleys in NSW with the exception of the Barwon-Darling; although, as for the combined Barwon-Darling and Lower Darling, a cumulative Cap credit exists for this valley.
  - The total diversions (including overland flow harvesting) in 2009–10 from the Queensland section of the Murray–Darling Basin were 1,229 GL, compared to 383 GL in 2008–09.
  - Net diversions of 20.7 GL for the ACT in 2009–10 were well below the long-term diversion Cap target of 40 GL.
  - Caps have now been set or proposed for all valleys, except for the New South Wales intersecting streams.
  - A Cap proposal has been received for the New South Wales Border Rivers and assessed by the IAG.
  - Following implementation of the Resource Operations Plan for the Condamine-Balonne in Queensland, a Cap proposal has been submitted to MDBA.
  - Models have been developed for 21 of the 22 valleys for which models are required. 20 have been submitted for audit, with 17 audited.
  - Recalibration of models continues, to better model extreme conditions and management responses not experienced during the period over which the models were calibrated.
  - Action continues to develop climate (and population for ACT) adjusted models for metropolitan Adelaide and the ACT. These are expected to be submitted in 2010–11.
  - Cap models for the New South Wales Border Rivers and Queensland Condamine-Balonne are expected to be submitted for assessment and accreditation in 2011-12 following finalisation of Caps.

The IAG made a number of recommendations in the ‘2009–10 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 made over the last eight years, and briefly notes the actions taken in response to the recommendations from the IAG.
<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Action taken</th>
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<tbody>
<tr>
<td><strong>2009–10</strong></td>
<td></td>
</tr>
<tr>
<td>The IAG recommended that NSW submit the Barwon-Darling model for accreditation.</td>
<td>Completed.</td>
</tr>
<tr>
<td>NSW 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 2010–11 audit review.</td>
<td>Models have been reviewed and the Murrumbidgee model approved. Macquarie has been recommended for approval.</td>
</tr>
<tr>
<td>NSW advise on the timing for the proposed capping of unregulated streams, given the expected completion of macro planning.</td>
<td>Advice has been provided on the macro-planning process.</td>
</tr>
<tr>
<td>The IAG recommends that a supplementary (desktop) audit be done when the collaborative modelling (with NSW) for the Border Rivers is completed late in 2010. A protocol should be developed, so that both NSW and Queensland are fully aware of the requirements and commitments of the other states.</td>
<td>The MDBA directed the IAG to undertake a supplementary audit. This was completed in January 2011.</td>
</tr>
<tr>
<td>The ACT and the MDBA need to resolve 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). Should the matter not be resolved, the IAG recommends that a submission be made to the Ministerial Council.</td>
<td>This issue remains unresolved as of 27 September 2011.</td>
</tr>
<tr>
<td>The ACT 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.</td>
<td>Work is progressing and a model is expected to be submitted to the Authority in 2011-12.</td>
</tr>
<tr>
<td>Finalisation of the Condamine-Balonne ROP together with the valley Cap and Cap model.</td>
<td>The Resource Operational Plan was finalised in 2010 and a Cap proposal was finalised. A Cap model has been submitted</td>
</tr>
<tr>
<td><strong>2007–08</strong></td>
<td></td>
</tr>
<tr>
<td>Action is still required to update models. Specifically, 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.</td>
<td>Ongoing. Some adjustments have been made to models for SA and Victorian valleys. Other States are still to address this issue, although the issue is more critical for the NSW valleys.</td>
</tr>
<tr>
<td>South Australia to develop a climate-adjusted model for Metropolitan Adelaide diversions.</td>
<td>Work has commenced on this modelling and is expected to be completed in 2011-12.</td>
</tr>
<tr>
<td>NSW to submit its ‘current conditions’ modelling for independent audit, given the relevance that is placed upon these models for reporting performance against the Cap.</td>
<td>NSW contends that this is not used for Cap compliance – this is for information only.</td>
</tr>
<tr>
<td>Treatment of diversions via the Goldfields Superpipe in Victoria to be standardised.</td>
<td>The IAG recommendation has been adopted.</td>
</tr>
<tr>
<td>Commonwealth and ACT to take action to allow reporting of Commonwealth diversions within the ACT.</td>
<td>ACT has passed legislation and is awaiting matching Commonwealth legislation.</td>
</tr>
<tr>
<td>Cap model and Cap estimate to be provided for the Border Rivers.</td>
<td>Queensland and NSW Border rivers Caps</td>
</tr>
<tr>
<td>Finalisation of the Condamine-Balonne ROP together with the valley Cap and Cap model.</td>
<td>The Resource Operational Plan was finalised in 2010 and a Cap proposal was finalised. A Cap model has been submitted.</td>
</tr>
</tbody>
</table>
### 2006-07

<table>
<thead>
<tr>
<th>Action</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>See comment above.</td>
</tr>
<tr>
<td>South Australia to develop a model of diversions from the River Murray for Metropolitan-Adelaide to be accredited by June 2009.</td>
<td>See comment above.</td>
</tr>
<tr>
<td>An allowance be included in the calculation of the annual diversion targets for Metropolitan Adelaide, Country Towns, the Lower Murray Swamps and the ʻAll Other Purposesʼ licence for the imposition of water restrictions.</td>
<td>Completed. See comment above for the Metro Adelaide Cap model.</td>
</tr>
<tr>
<td>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.</td>
<td>Council has not yet decided to allow the Mulwala Loss Allowance to be deducted from the New South Wales Murray Cap Diversion. An Authority Committee has recommended it to do so. In the meantime, The Mulwala loss Allowance is not being</td>
</tr>
<tr>
<td>Upon completion of the integrated 1993-94 and current conditions model for the Border Rivers, NSW should submit the proposed Cap for that system for assessment by the IAG – specifically of the appropriate allowance for the enlarged Pindari Dam.</td>
<td>Completed. See comment above.</td>
</tr>
</tbody>
</table>

### 2005-06

<table>
<thead>
<tr>
<th>Action</th>
<th>Status</th>
</tr>
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<tbody>
<tr>
<td>All models be audited and accredited with modified targets for completion by June 2007 for the Murray and Lower Darling (MDBC), July 2007 for Victoria and NSW, on completion of the Resource Operation Plans by Queensland, and prior to establishing a Cap for the ACT.</td>
<td>Out of 24 Cap valleys, the Cap has been defined for 23 valleys, with Caps still to be defined for the Intersecting Streams in New South Wales. Cap models have been approved for 14 valleys and 17 have been</td>
</tr>
<tr>
<td>Ministerial Council:</td>
<td></td>
</tr>
<tr>
<td>i Note that skills shortages are affecting the rate of water reform implementation including finalisation of Cap implementation.</td>
<td>Skill shortages are still evident in some jurisdictions.</td>
</tr>
<tr>
<td>ii Develop a strategy in partnership with other stakeholders to attract additional skilled resources into the water sector, for both the short and long-term.</td>
<td></td>
</tr>
</tbody>
</table>
3. Audit process

For the purposes of the 2010–11 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 2010–11, 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 in regard to the finalisation or implementation of the management rules.

The IAG met with representatives of each of the states, the Commonwealth and the ACT during the period 26 September to 30 September 2011. Water usage in 2010–11 was compared with Cap targets. Discussions were held on progress in establishing models and management frameworks to achieve targets, and issues of possible concern.

For the southern Murray-Darling Basin states (New South Wales, Victoria, South Australia), the Australian Capital Territory and Commonwealth, the IAG also discussed progress in implementing The Living Murray initiative. The results of these discussions are reported separately in the Audit of The Living Murray Implementation 2010–11.

The IAG drafted its observations and conclusions on progress being made within each state and the ACT and then invited the states and the ACT 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 ACT, 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 2010–11 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-tradable Environmental Land Management Allocation (ELMA); and
- an average of 449.9 GL per year for ‘All Other Purposes’ in South Australia; which is fully tradable, 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 years where water restrictions apply to entitlement holders, the Cap will be adjusted to reflect this restriction. In 2010–11, the final allocation was 67%.

However in 2010–11, the restriction was imposed due to the annual maximum limit of water that can be allocated under the River Murray Water Allocation Plan (WAP). This is 650 GL, consisting of 442 GL for entitlement holders and 228 GL of private carryover (excluding Critical Human Water Needs) from 2009–10. As the total volume available was equal to the maximum permissible, no restrictions were applied to the 2010–11 modelled Cap targets. This issue will be addressed through a review of the River Murray WAP and upon implementation of South Australia’s Storage Right, which will allow water to be carried over and not impact future allocation announcements for River Murray water entitlement holders.

South Australia has progressed a number of the actions identified by the IAG in its 2009–10 report. Additional work has progressed on the amalgamation of the ‘All Other Purposes’ and Lower Murray Swamps Cap valleys. This includes 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. The Department for Water (DFW) and SA Water have resolved a number of technical issues and a presentation on the operation of the proposed model was provided to the MDBA’s Water Audit Panel in May 2011. The Water Audit Panel raised a number of issues requiring clarification and additional technical investigation.

4.1.2. 2010–11 usage

Overview

The 2010–11 water year marked a significant change from extended drought conditions into a period of high flows and rapid recovery.

Water availability at the start of 2010–11 was low. Several heavy rainfall events from September 2010 onwards at key locations across the Basin generated significant flooding and inflow events into the River Murray system. This provided South Australia with a large volume of unregulated flow and its full Entitlement Flow of 1,850 GL for the first time since 2005-06.

South Australia received a total flow across the border of around 15,200 GL, which included Entitlement Flow, Additional Dilution Flow (for the first time since 2001), large volumes of environmental trades and a significant volume of unregulated flow. The total flow to South Australia was the highest 12-month flow since 1975-76. Daily flow peaked at 93.8 GL/day in February 2011, which was the highest flow peak since December 1993. The high flows resulted in significant areas of the River Murray floodplain being inundated, along with a free-flowing river downstream of Lock 11 as all of the lock/weirs were also inundated.
Significant restructuring of irrigation areas in the Riverland continued in response to low commodity prices and incentives for irrigators to exit the industry. The Lower Murray Reclaimed Irrigation Area (LMRIA) continued to suffer from the legacy of the drought. Many irrigated areas (former and active) were inundated as water levels in the River Murray recovered. This was due to water seeping through cracks in and underneath levee banks. This issue provided some significant problems for dairy farmers in this area.

River Murray water use for all diversion types in South Australia was low due to the wet conditions experienced during winter, spring and summer, and general allocations remaining at 67%. The allocation was limited as the consumptive pool also included 228 GL irrigation carryover from 2009–10, with the remaining volume available for general allocations. From September 2011, any carryover for South Australia will be administered under Schedule G (South Australia’s Storage Right) which will allow water to be carried over in addition to South Australia’s Entitlement Flow and therefore will not impact on future allocation decisions.

An allocation of 21% of entitlement for River Murray entitlement holders was announced on 1 July 2010, as a result of low water resource availability. As South Australia’s Entitlement Flow improved, the allocation was increased to 67% of entitlement on 1 October 2010.

Total South Australian diversions from the River Murray for 2010–11 were 362 GL, which is the lowest diversion since the introduction of the Cap. This comprised:

- 56.4 GL for Metropolitan Adelaide and associated country areas
- 34.1 GL for Country Towns
- 13.6 GL for the Lower Murray Swamps (including some estimated use and ELMA, which is restricted to the same percentage as irrigation allocations)
- 24.2 GL for metered consumption under the ‘All Other Purposes’ Cap component
- 13.7 GL for non-metered consumption under the ‘All Other Purposes’ Cap component

A total of 402.7 GL was carried over into 2011-12 including 228 GL of general allocations. This was the fourth consecutive time that carryover of unused allocation had been permitted in South Australia.

### Table 1: 2010–11 River Murray water use

<table>
<thead>
<tr>
<th>System</th>
<th>Original Long-Term Average Diversion Cap</th>
<th>Climate-adjusted annual Cap target</th>
<th>Cap target adjusted for low allocations</th>
<th>Adjustment to target for net permanent trade</th>
<th>Adjustment to target for Net Temporary Trade (excluding environmental transfers)³</th>
<th>Adjusted Cap target for 2010–11</th>
<th>Diversion for 2010–11</th>
<th>Diversion for last Five years</th>
<th>Cap Credits 2010–11</th>
<th>Cap Credits Cumulative since 1997-98</th>
<th>Schedule E Trigger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan Adelaide</td>
<td>650</td>
<td>-</td>
<td>650</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>56.4</td>
<td>555.3</td>
<td>-</td>
<td>-</td>
<td>-10.0</td>
</tr>
<tr>
<td>Country Towns</td>
<td>50</td>
<td>50</td>
<td>33.3</td>
<td>0</td>
<td>2.3</td>
<td>35.6</td>
<td>34.1</td>
<td>1.5</td>
<td>68.6</td>
<td>-18.8</td>
<td></td>
</tr>
<tr>
<td>Lower Murray Swamps</td>
<td>94.2</td>
<td>94.2</td>
<td>94.2</td>
<td>-47.2</td>
<td>-12.3</td>
<td>34.7</td>
<td>13.6</td>
<td>21.1</td>
<td>26.7</td>
<td>-18.8</td>
<td></td>
</tr>
<tr>
<td>All Other Purposes</td>
<td>449.9</td>
<td>404.1</td>
<td>404.1</td>
<td>79.6</td>
<td>-147.5</td>
<td>-70.1</td>
<td>264.1</td>
<td>257.9</td>
<td>8.2</td>
<td>770.0</td>
<td>-90.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>-</td>
<td>-</td>
<td>32.4</td>
<td>-159.8</td>
<td>-70.1</td>
<td>-362</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined AOP + LMS</td>
<td>544.1</td>
<td>498.3</td>
<td>498.3</td>
<td>32.4</td>
<td>-159.8</td>
<td>-70.1</td>
<td>300.8</td>
<td>271.5</td>
<td>29.3</td>
<td>796.7</td>
<td>-108.8</td>
</tr>
</tbody>
</table>
Significant trading of interstate temporary allocations into South Australia occurred during 2010–11. A total of 404 GL was traded to South Australia, which included water for general allocations and substantial volumes for the environment, resulting from the Multi-Site Environmental Watering Trials and other releases and spills from storages.

The environmental trades do not constitute a transfer of Cap and therefore they have been excluded from the diversion calculations under the ‘All Other Purposes’ Cap.

Table 2 below provides details of the temporary trades, including the sources for the 2010–11 water year.

In addition to temporary trades, permanent interstate trades prior to 2007 and inter-valley trades with SA have resulted in the exchange of Cap shown in Table 3:

Table 3: Exchange of Cap resulting from permanent entitlement trade

<table>
<thead>
<tr>
<th></th>
<th>(GL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Murray Swamps</td>
<td>-47.2</td>
</tr>
<tr>
<td>‘All Other Purposes’</td>
<td>79.6</td>
</tr>
<tr>
<td>Total to SA</td>
<td>32.4</td>
</tr>
</tbody>
</table>

Ignoring transfers of environmental water, South Australia had a net trade interstate of 157.5 GL. 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. South Australia was also used to shepherd a large volume of environmental water trades from NSW to Victoria late in the water year (after trade ceased between Victoria and NSW).

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
- 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. Inflows into the Mount Lofty Ranges Reservoirs improved during spring and a number of the storages experienced spills for the first time since 2005-06. As a result of the improved rainfall and the mild weather conditions, only 56.4 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 five-year rolling total diversion for Metropolitan Adelaide is 555.3 GL, which is 94.7 GL less than the 650 GL limit (refer Table 4). The 2006-07 diversion was high because of the additional 60 GL pumped during that year for use during 2007-08. 2008–09 pumping was correspondingly less.
Table 4: Metropolitan Adelaide Cap assessment

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rolling Diversion against 650 GL Cap</td>
<td>203.1</td>
<td>89.4</td>
<td>149.5</td>
<td>56.9</td>
<td>56.4</td>
<td>555.3</td>
</tr>
<tr>
<td>Five Year Cap</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>650.0</td>
<td></td>
</tr>
<tr>
<td>Amount Below Limit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>94.7</td>
</tr>
</tbody>
</table>

Country Towns water use

Country Towns used 34 GL, which is slightly below the average annual diversion of 37 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 therefore are totally reliant on River Murray water.

The Country Towns Cap valley is currently restricted on an annual basis from a base allocation of 50 GL to 31 GL of gazetted use. Country Towns had 2.3 GL of carryover from 2009–10. Because of this allocation, the 50 GL Cap was restricted to 33.3 GL. A further 2.3 GL traded in during 2010–11 increased the Cap target to 35.6 GL.

Lower Murray Swamps water use

The Lower Murray Reclaimed Irrigation Areas (LMRIA), located between Mannum and Wellington, were formerly wetlands that were permanently connected to the River Murray. The Cap on the Lower Murray Swamps was agreed in 2001 by Ministerial Council and was based on recognised best irrigation practice, applied to approximately 5,000 hectares of former wetlands irrigated for dairying, as well as an additional 780 hectares of the adjoining highland.

Until recently, the irrigated areas were un-metered, with a specific number of waterings being permitted each year. If water was transferred out, the appropriate portion of irrigated land was retired. The Cap has defined net water use, and no Cap credit has been claimed since the commencement of the Cap.

Metering is now complete; although some diversions were provided as ‘estimated use’ because access issues prevented meter readings at some locations. Where meter reading data is not available, the use is assumed to be equal to the water held by the entitlement holder. Given the wet conditions experienced during spring and summer, the estimation of use is considered to be on the high side.

Water allocations within the LMRIA have been treated in the same manner as all other irrigation licences, and were set at 67% for 2010–11. However, since the allocation was restricted only because of the large volumes of carryover and the limit on total water availability, the 94.2 GL basic Cap for the LMRIA was not restricted. A total of 13.6 GL was diverted for irrigation and ELMA use in 2010–11 and this includes some estimated non-metered use.

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.

Wet conditions were experienced throughout the Riverland district during 2010–11, with a total of 460 mm recorded at the Berri Post Office gauge. Isolated rainfall events of around 150 mm – 200 mm were recorded at locations during summer.

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 ‘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, 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 2010–11 based on this model was 404.1 GL, including the 9.3 GL transfer from the Lower Murray Swamps. The model figure is then adjusted for announced restrictions. In 2010–11 a maximum announcement of 67% was made. However, this announcement was not higher only because there was carryover of 228 GL which, with the allocation, reached the maximum permitted take of 650 GL. Because the maximum volume was made available, the Cap targets for ‘All Other Purposes’ and LMRIA were not restricted.

The ‘All Other Purposes’ Cap was also adjusted for environmental water recoveries. This was done by:

- excluding net transfers of environmental water into the State from the trade adjustments
- determining the effective volume of SA entitlement recovered. Although 111.5 GL in total was recovered for TLM and CEWH by June 30, only 86.7 GL of this resulted in water being allocated to the environment in 2010–11
- multiplying the effective entitlement by the appropriate Cap factor of 0.9 to determine the long-term Cap equivalent volume of 78 GL
- scaling this volume down by the ratio of the modelled 2010–11 Cap target to the 449.9 GL long-term Cap.
- The final adjustment was \(-78 \times 404.1 / 449.9 = -70.1\) GL.

Total usage under the ‘All other Purposes’ component of the Cap during 2010–11 was 258 GL (including 13 G for non-metered use). Diversions under the ‘All Other Purposes’ Cap were below the annual Cap target.

**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. 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 will no longer be necessary under an amalgamated Cap.

A new combined ‘All Other Purposes’ long-term annual diversion Cap would be 544.1 GL. The combined Cap will need to be adjusted for permanent trades, temporary allocation trade, use of environmental allocation and to include restrictions in years where the final announced allocation is less than 100%.

A summary table of the combined ‘All Other Purposes’ and Lower Murray Swamp Cap valley adjusted for trade and water restrictions is provided in Table 6. The table shows that diversions have remained under Cap and a cumulative Cap credit of 797 GL has been accrued since 1997-98.

**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 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 2011-12.

**Restrictions on allocations**

The ‘All Other Purposes’ and Lower Murray Swamp Cap valleys are currently administered under debit and credit arrangements. This means that when water use is below the annual Cap target, a credit is allocated to that valley and vice versa.

In its 2007–08 report, the IAG recommended that a restriction allowance be included in the calculation of annual Cap targets for both Cap valleys. This analysis shows that diversions have remained under Cap and a cumulative Cap credit of 797 GL has been accrued since 1997-98 (See Table 5).
In the years 1997-98 to 2006-07, diversions for the Lower Murray Swamps were assumed to be equal to the entitlement, which was reduced for both temporary and permanent trade. No Cap credits were generated from the Lower Murray Swamps during that period.

The Country Towns Cap valley has also been adjusted to include years where restrictions were implemented (Table 5).

Figures – Figure 3 and Figure 4 show the performance against Cap of the Country Towns and the ‘All Other Purposes’.

The Country Towns diversions have been relatively stable over the period, with cumulative Cap credits growing except when restrictions applied. Overall, the Country Towns diversions have been 11.6% below Cap.

The ‘All Other Purposes’ has been 12.7% below Cap over the period and the cumulative credit has grown – steadily with the exception of 2011-12, when the growth was cut because of the transfer of 157 GL upstream to take advantage of Victoria’s carryover rules.

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</thead>
<tbody>
<tr>
<td>ADP Cap Targets from Model (446.8 GL/yr)</td>
<td>418</td>
<td>429</td>
<td>430</td>
<td>444</td>
<td>438</td>
<td>469</td>
<td>466</td>
<td>418</td>
<td>416</td>
<td>478</td>
<td>457</td>
<td>470</td>
<td>476</td>
<td>395</td>
</tr>
<tr>
<td>Scaled up Cap Targets from Model (449.9 GL/yr)</td>
<td>426</td>
<td>438</td>
<td>439</td>
<td>453</td>
<td>447</td>
<td>478</td>
<td>476</td>
<td>427</td>
<td>425</td>
<td>488</td>
<td>467</td>
<td>480</td>
<td>486</td>
<td>404</td>
</tr>
<tr>
<td>LMS Annual Cap Target</td>
<td>94</td>
<td>94</td>
<td>94</td>
<td>94</td>
<td>94</td>
<td>94</td>
<td>94</td>
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<td>94</td>
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<tr>
<td>Combined Annual Cap Target (449.9+94.2)</td>
<td>521</td>
<td>532</td>
<td>534</td>
<td>548</td>
<td>541</td>
<td>573</td>
<td>570</td>
<td>521</td>
<td>519</td>
<td>582</td>
<td>561</td>
<td>561</td>
<td>574</td>
<td>580</td>
</tr>
<tr>
<td>Announced Allocation(*)</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>95%</td>
<td>95%</td>
<td>100%</td>
<td>60%</td>
<td>32%</td>
<td>18%</td>
<td>62%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>20 GL unrestricted use</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
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<td></td>
</tr>
<tr>
<td>Combined Cap targets based on final allocation</td>
<td>521</td>
<td>532</td>
<td>534</td>
<td>548</td>
<td>541</td>
<td>573</td>
<td>570</td>
<td>521</td>
<td>519</td>
<td>582</td>
<td>561</td>
<td>561</td>
<td>574</td>
<td>580</td>
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<tr>
<td>Cap Adjustment from Permanent Interstate Trade</td>
<td>0</td>
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<td>8</td>
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<td>14</td>
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<td>19</td>
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<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
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<tr>
<td>Temporary Allocation trade (inc carryover)</td>
<td>-17</td>
<td>0</td>
<td>-2</td>
<td>3</td>
<td>-7</td>
<td>-9</td>
<td>6</td>
<td>-5</td>
<td>-32</td>
<td>29</td>
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<td>Total trade adjustment</td>
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<td>4</td>
<td>6</td>
<td>15</td>
<td>6</td>
<td>5</td>
<td>19</td>
<td>14</td>
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<td>62</td>
<td>171</td>
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<td>Environmental adjustment</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-1</td>
<td>-50</td>
<td>-81</td>
<td>-70</td>
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<tr>
<td>Final ADP and LMS Cap Target</td>
<td>504</td>
<td>536</td>
<td>540</td>
<td>563</td>
<td>547</td>
<td>577</td>
<td>562</td>
<td>510</td>
<td>507</td>
<td>419</td>
<td>363</td>
<td>432</td>
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<td>298</td>
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<tr>
<td>Recorded diversion</td>
<td>476</td>
<td>500</td>
<td>467</td>
<td>520</td>
<td>503</td>
<td>532</td>
<td>490</td>
<td>510</td>
<td>476</td>
<td>382</td>
<td>296</td>
<td>298</td>
<td>386</td>
<td>271</td>
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<tr>
<td>Annual cap credit/debit</td>
<td>28</td>
<td>36</td>
<td>73</td>
<td>43</td>
<td>44</td>
<td>45</td>
<td>72</td>
<td>-1</td>
<td>31</td>
<td>37</td>
<td>66</td>
<td>134</td>
<td>158</td>
<td>27</td>
</tr>
<tr>
<td>Cumulative Cap credit</td>
<td>28</td>
<td>64</td>
<td>137</td>
<td>180</td>
<td>224</td>
<td>269</td>
<td>341</td>
<td>341</td>
<td>371</td>
<td>408</td>
<td>475</td>
<td>608</td>
<td>766</td>
<td>793</td>
</tr>
</tbody>
</table>

Note: number are rounded
(*) Announced Allocation plus carryover from 2010-11
Metropolitan Adelaide Cap model development

The IAG has recommended South Australia develop a new climate-adjusted annual Cap model of diversions from the River Murray for Metropolitan Adelaide, taking into account urban demand, local catchment inflows, system operations and allowances for water restrictions.

Work has progressed on the climate-adjusted Cap model for Metropolitan Adelaide and associated Country Areas. The development to date has used an approach consistent with other Cap models across the Murray–Darling Basin. However, the complexity and variability of the South Australian system has resulted in a number of technical issues being identified. These require further consideration and resolution to ensure that the most robust and appropriate model is used for determining River Murray extraction under 2000 Level of Development conditions.

South Australia presented details of a draft report that describes the proposed model to the Water Audit Panel (WAP) of the MDBA in May 2011. The model is being developed under Clause 11 of Schedule E to the Murray–Darling Basin Agreement. The WAP provided a detailed list of comments on the draft and a further detailed modelling report will be provided for review by the WAP on completion of the work.

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 is now complete; although there continues to be some loss of meters due to riverbank slumping.

South Australia, through SA Water, transports water from the Murray to other basins for irrigation. These diversions and trades are accounted for as specified in Schedule E, and South Australia debits this water against the originating allocation.

4.1.5. IAG assessment

South Australia came out of severe drought conditions over 2010–11. Diversions for Country Towns, Metropolitan Adelaide and ‘All Other Purposes’ were below Cap.

The IAG notes that South Australia has chosen not to adjust the combined ‘All Other Purposes’ and Lower Murray Swamps Cap for the 2010–11 water restrictions, which were determined at 67%. This anomaly has occurred because the total volume available was equal to the maximum permissible.

Conversely, calculation of the restrictions has been applied to the Country Towns Cap.

If South Australia had adjusted the combined ‘All Other Purposes’ and Lower Murray Swamps Cap for the 2010–11 water restrictions, the Cap target for 2010–11 would have been exceeded.

The IAG notes that South Australia intends to address this for future Cap adjustments by:

- removing the effect of carry-forward water on future allocation announcements
- implementation of the new Storage Right (Schedule G) for South Australia.

Given that, in years where water restrictions apply to entitlement holders, the Cap will be adjusted to reflect this restriction, the IAG believes that South Australia should incorporate these restrictions into the approved model for calculating the Cap.

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

Metropolitan Adelaide consumption over the last five years was 555.3 GL compared with the five-year rolling target of 650 GL.

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. Subject to approval, subsequent application of the model for the 2011–12 year is expected on the recommendation of IAG.
South Australia has also taken into account the impact of water restrictions on the determination of Cap credits. The ‘All Other Purposes’ model has been adjusted in years, in which water restrictions have applied. However, in 2010–11 it was determined that, although an allocation of only 67% was announced, the volume of carryover available meant that irrigators were not restricted.

In its 2008–09 report, the IAG recommended that South Australia reflect the Long-Term Cap Equivalent values of water held for TLM purposes. In 2010–11, South Australia has excluded environmental transfers from its trade adjustment. It has also scaled down its annual Cap Targets to allow for the water recovered for the environment from within South Australia.

South Australia is progressing the amalgamation of the remaining Lower Murray Swamps Cap components with the ‘All Other Purposes’ Cap, and has provided indicative reporting in their submission for the 2010–11 year. Under an amalgamated regime, the annual transfer process of permanent entitlement trade from the Lower Murray Swamps to the ‘All Other Purposes’ Cap will no longer be required. In addition, the non-tradeable ELMA will be merged into the ‘All Other Purposes’ component; however it will remain non-tradeable and designated for lower valley environmental use only.

The IAG notes that the amalgamation is administratively more convenient, and has no impact on the Cap volume within South Australia. The combined cumulative Cap credit has been calculated as 797 GL. This is equal to the cumulative Cap credits of 770 GL and 27 GL currently calculated for the ‘All Other Purposes’ Cap and the Lower Murray Swamps respectively. It is expected that a submission for the required amendment to Schedule E will be made to the Ministerial Council during the 2011-12 year to enable the amalgamated position to be reported for the 2011-12 year forward.

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 while their use has been affected by access concerns, an appropriate method for estimation has been applied where necessary.

The IAG acknowledges the full and clear presentation of data on water use under the Cap provided by South Australia.

4.1.6. Conclusions/recommendations

- Diversions in 2010–11 were 362 GL, which were the lowest diversion since the introduction of the Cap.
- Diversions in 2010–11 were low because of the wet conditions experienced and the general allocations remaining at 67%. The allocation was limited as the consumptive pool also included 228 GL irrigation carryover from 2009–10.
- Overall, South Australian diversions since July 1997 (excluding Metro Adelaide) have been 11.5% below the Cap targets.
- South Australia has a reliable measurement system for urban and irrigation uses.
- The South Australian ‘All Other Purposes’ Cap model was approved by the Authority in November 2004 and the climate-adjusted Cap for 2010–11 was adjusted down to account for water restrictions in the latest year.
- The IAG recommends that South Australia considers incorporating restrictions into the approved model for calculating Cap targets and submit a revised model for approval.
- The IAG notes that an adjustment for the use of TLM water recovered in SA has been allowed for in the 2010–11 Cap reporting by South Australia and that the transfer of environmental water from inter-state has been excluded from the temporary trade adjustment.
- The IAG notes the method used for the estimation of diversions in the Lower Murray Swamps. The IAG understands that this has been necessary due to the difficulty in accessing meters. The IAG believes that South Australia has adopted an appropriate method for such circumstances.
- The IAG has previously recommended that South Australia develop a climate-adjusted model of diversions from the River Murray for Metropolitan Adelaide. The IAG notes that the finalisation of the model has been delayed due to the resolution of technical issues. The IAG understands that the model should now be submitted for accreditation and subject to approval, used for the 2011-12 year.
- South Australia has provided an analysis of the proposed amalgamation of the remaining Lower Murray Swamps Cap components with the ‘All Other Purposes’ Cap while retaining the Environmental Land Management Allocation as a non-tradeable component within the ‘All Other Purposes’ Cap. The IAG supports the amalgamation, subject to clear reporting each year to ensure the ELMA continues to be applied to the Lower Murray Swamps. The IAG notes that an amendment to Schedule E is required and a submission will be made to Ministerial Council during 2011-12.
4.2. Victoria

4.2.1. The Cap assessment tools

Victoria is using computer simulation models, calibrated to 1993-94 levels of development, to calculate annual Cap targets for all the major regulated systems. Regression models are being used for the smaller systems [see Table 6].

The model for Goulburn/Broken/Loddon and Campaspe valleys was accredited by the then Murray–Darling Basin Commission on 4 September 2007. The model has been used to calculate 2010–11 Cap targets and the cumulative credits for the Goulburn/Broken/Loddon reported by Victoria.

As a result of revised model input data for May and June 2010 and re-calibration of the Campaspe component of the model, the cumulative Cap credit for the Goulburn/Broken/Loddon valley from 1997-98 to 2009–10 increased by 10.2 GL (approximately 0.5% of the long-term Cap).

Responding to recommendations in the commissioned Water Audit Panel (WAP) report ‘Improvement in accuracy of measurements of diversions and returns under the Cap’, it is concluded that the flow records provided by the ultrasonic flow gauge in the Campaspe West channel (which commenced operation in 1989) were more accurate than the System Planning Module (SPM) data used in past modelling. It is estimated that the use of this data (Eastern channel data suitably adjusted) would increase the total diversions by about 5 GL/annum and the Campaspe irrigation district losses from 13% to 23%.

The WAP agreed that the more accurate data for Campaspe irrigation diversions should be used for Cap compliance in the Campaspe valley, and also endorsed Victoria’s proposal to re-calibrate the Campaspe Cap model. The Campaspe Cap model has been re-calibrated with the more accurate data and used to calculate 2010–11 Cap targets and the cumulative credits for the Campaspe valley.

As a result of revised model input data for May and June 2010 and re-calibration of the Campaspe Cap model, the cumulative Cap credit for Campaspe valley for the period from 1997-98 to 2009–10 reduced by around 5 GL.

The MDBA developed a simulation model for the Murray and regression relationships with rainfall and temperature for the Kiewa and Ovens components of the Murray/Kiewa/Ovens valley Cap. These models, excluding the Lower Darling component, were accredited by the Murray–Darling Basin Commission on 26 August 2008.

In the past, the accredited model has been updated to address various issues. These are:

1. Modifications to the Lower Darling diversion and Tandou modelling, Lower Darling restriction policy, revised estimates of Hume inflows and 1993-94 level of development Snowy releases.
2. Minor modifications such as revised dead storages, outlet capacities, handling of Lakes Tandure, Copi Hollow and Speculation and a correction to the methodology used to set diversions to historical values prior to 1997.
3. Lindsay River allowance reduction.

This model was further improved during 2010–11 to incorporate changes in data for the Lower Darling, Murrumbidgee and Campaspe systems. The latest version of the model was used to calculate the 2010–11 Cap targets and cumulative credit to June 2011. The model improvements undertaken during 2010–11 increased the Victorian cumulative Cap credit up to June 2010 by 14 GL.

Table 6: Victoria Cap auditing model status

<table>
<thead>
<tr>
<th>Valley</th>
<th>Auditing Tool</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goulburn/Broken/Loddon</td>
<td>GSM REALM Model</td>
<td>Accredited</td>
</tr>
<tr>
<td>Campaspe</td>
<td>GSM REALM Model</td>
<td>Accredited – further modifications proposed and to be submitted later in 2011</td>
</tr>
<tr>
<td>Murray</td>
<td>Murray Simulation Model</td>
<td>Accredited – modifications still to be approved</td>
</tr>
<tr>
<td>Kiewa/Ovens</td>
<td>Regression Model</td>
<td>Accredited</td>
</tr>
<tr>
<td>Wimmera–Mallee</td>
<td>REALM Model</td>
<td>Recommended for accreditation and replacement model proposed</td>
</tr>
</tbody>
</table>
The Cap model for the Wimmera-Mallee valley, developed by Grampians Wimmera-Mallee Water (GWMWater) was submitted to the MDBA for accreditation. The Water Audit Panel recommended on 15 June 2011 that the MDBA approve the model. This model has been used to calculate the 2010–11 Cap targets and the cumulative credits for the Wimmera-Mallee valley since 1997-98. It is planned to replace this model with an updated post-pipeline condition model as per the model auditor’s recommendation. The cumulative credit/debit would be carried over with the new model and also the current compliance trigger volume retained.

As recommended by the independent auditor of the Wimmera-Mallee Cap model, the Waranga Western Channel inflows to the model were made consistent with those assumed in the Goulburn/Broken/Loddon Cap model. In addition, the last year’s cumulative Cap credit is also reduced to take into account past environmental flow usage. As a result of these updates and revised model input data for May and June 2010, the cumulative Cap credit up to June 2010 for the Wimmera-Mallee valley reduced by 182 GL.

A paper describing Victoria’s proposal to adjust the Cap for environmental flows was submitted to the Murray-Darling Basin Authority in August 2009 and subsequently approved.

This is a requirement of the protocol ‘Adjusting Caps on Diversions for Environmental Entitlements and Uses’, created under Schedule E of the Murray-Darling Basin Agreement. Similar to last year, this method has been applied to 2010–11 Cap targets to account for water recovered for the environment through initiatives such as Snowy environmental flows and TLM, including decommissioning of Lake Mokoan.

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

In 2010–11, irrigators supplied from all systems received allocations of 100% of high-reliability water shares (HRWSS) – for the first time since 2001-02 season. Allocations in the Campaspe, Broken and Bullarook systems also reached 100% of low-reliability water shares (LRWSS).

Despite allocations reaching their highest levels in many years, allocations started at zero for the fourth consecutive year on 1 July 2010.

Two-year ‘Qualifications of Right’ were implemented on 1 July 2009 in the Murray, Goulburn, Campaspe, Loddon and Broken systems. The Qualifications in the Murray, Goulburn and Broken systems were revoked by the Minister for Water after available resources improved.

The summer of 2010–11 was the wettest season on record in Victoria, encompassing several significant rainfall and flooding events. Flooding occurred downstream of several major storages in the Goulburn, Loddon, Campaspe, Broken, Murray and Ovens systems. There were five distinct flood events in September, November and December 2010, and January and February 2011.

For all areas managed by Goulburn-Murray Water, rainfall for the year ending 30 June 2011 was well above average. The months of August 2010 and March 2011 were wetter than average in nearly all areas and well above average in the majority of areas.

The summer seasonal rainfall was considerably higher than average across all locations, with a range of 252% average at Eildon to 411% of average at Tatura. Many locations recorded their highest summer rainfall on record including: Rushworth, Boort, Cobram, Lake Eppalock, Lake Buffalo, Goulburn Weir, and Swan Hill.

The high annual rainfall in 2010–11 was reflected by a higher percentage annual average rainfall (ranging from 147% at Dartmouth to 205% at Bendigo). There were very few locations and months where the monthly average rainfall was not exceeded this year.

During 2010–11, diversions from all four valleys (Goulburn/Broken/Loddon, Campaspe, Murray/ Kiewa/Ovens and Wimmera-Mallee) were below their Cap targets. All these valleys have cumulative Cap credits up to 30 June 2011. A comparison of cumulative diversions with Cap targets since 1997-98 is shown in Table 7. These values are preliminary, as trade and environmental data need to be reconciled with other valleys.

Carryover of unused allocation contributes to Cap credits in the year the water was allocated. The total unused allocation carried over from 2010–11 to 2011-12 was 1,388 GL in Victorian Murray, 1,048 GL in Goulburn/Broken/Loddon and 42 GL in Campaspe. The corresponding carryovers for the start of 2010–11 were 501 GL, 364 GL and 1.1 GL for Victorian Murray, Goulburn/Broken/Loddon and Campaspe valleys respectively. Victoria changed its carryover policy from the end of the 2010–11 season to a system where unused allocation can carryover without limit – until Lake Eildon in the Goulburn system, or
Audit of 2010–11 Cap Implementation

Table 7: Comparison of diversions with Cap targets

<table>
<thead>
<tr>
<th>System</th>
<th>Long-term diversion Cap (GL)</th>
<th>This year’s Cap target (GL)</th>
<th>Cap adjust’t for trade 1 (GL)</th>
<th>Cap adjust’t for env. use (GL)</th>
<th>This year’s net 2 diversion (GL)</th>
<th>Cap credits (Target less diversion)</th>
<th>Storage difference</th>
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<tr>
<td>Goulburn/Broken/Loddon</td>
<td>2,034</td>
<td>1,415</td>
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<td>525</td>
<td>733</td>
<td>-407</td>
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<td></td>
<td></td>
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<tr>
<td>Murray/Kiewa/Ovens</td>
<td>1,702</td>
<td>987</td>
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<td>Campaspe</td>
<td>122</td>
<td>59</td>
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<td>Wimmera-Mallee</td>
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<td>1,094</td>
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</tr>
</tbody>
</table>

1 Also includes Goldfields Superpipe transfers
2 Diversion net of transfers to other Cap valleys
3 Cap target adjusted for decommissioning of Lake Mokoan

Dartmouth Reservoir in the Murray system, spill. These rules are more progressive than in NSW, where access to carryover plus allocation is limited to 100% of entitlement, or in South Australia where no carryover to 2011-12 was permitted.

Figures in Appendix D (Figures 21-24) show a sharp increase in cumulative Cap credits in the Victorian Murray and Goulburn, a sharp decline in the NSW Murrumbidgee, and a flattening-off in the SA ‘All Other Purposes’ valleys. When considered in light of the trade that occurred, it is reasonable to conclude that the commencement of the new carryover rules in Victoria has affected the distribution of Cap credits in the southern Murray–Darling Basin.

Victoria has advised that, because of changes to model inputs and re-calibration of Campaspe Cap model, the Cap targets [and therefore Cap credits] back to 1997-98 have changed, compared with figures reported in previous years’ reports.

Goulburn/Broken/Loddon

Resource availability

Annual rainfall at Eildon was recorded as a total of 1,304 mm, which is 252% of the average rainfall. Annual inflow to Lake Eildon was 149% of average, more than twice the total inflows in 2009–10. From 1 July 2010 to 30 June 2011, the storage volume of Lake Eildon continued to rise from 28% to 87%. Waranga Basin filled from catchment inflows during August 2010 and was only drawn down to 80% of capacity by the end of the irrigation season on 15 May 2011.

The contribution from the unregulated catchment between Eildon and Goulburn Weir during 2010–11 was 191% of average and contributed to significant spills at Goulburn Weir. Water from TLM and Flora and Fauna entitlements plus water from the Commonwealth Environmental Water Holder and the Goulburn Water Quality Reserve was used to provide additional passing flows downstream of Goulburn Weir.

Annual inflow to Lake Nillahcootie for 2010–11 was 207% of average value compared to 2009–10 when it received only 22% of the average. The minimum capacity was 28.7% on 1 July 2010 and filled to full capacity in late August 2010.

Cairn Curran and Tullaroop Reservoirs started the season at 5% and 6% of capacity respectively. These storages also increased in spring with Tullaroop Reservoir filling in September 2010 and Cairn Curran Reservoir in November 2010. Cairn Curran Reservoir passed the largest flood on record (80,000 ML/d) in January 2011. In the same month, Laanecoorie Reservoir passed the second largest flood on record (194,000 ML/d).

Newlyn Reservoir reached 100% of capacity after starting the season at 18% of capacity and Hepburns Lagoon also filled.

The first non-zero allocations were announced for all systems in August – which is the first time since 2002 that this has occurred prior to the start of the irrigation season. All systems reached 100% of HRWS, with the Broken and Bullarook systems reaching 100% of LRWS.
Due to high rainfall and inflows in the 2010–11 season, water use was relatively low and allocations high across the majority of systems. At the end of the season, all storages were close to full, as releases from the storages were not required to supply demands.

**Cap Compliance**

Diversions from the Goulburn/Broken/Loddon valley was 525 GL, which is 733 GL less than the Cap target of 1,259 GL (with preliminary adjustment for trade, environmental releases, decommissioning of Lake Mokoan and inter-valley transfers). Diversions were 74% below the long-term Cap of 2,034 GL/year. The cumulative Cap credit for the period from July 1997 to June 2011 is 1,189 GL.

These results are summarised in Table 7. Diversions have been 6.3% below the Cap targets since July 1997.

**Murray/Kiewa/Ovens**

**Resource availability**

Inflows to Dartmouth and Hume reservoirs were 138% and 161% of the annual average respectively. Lake Dartmouth was 32.9% of capacity at the start of the season and by the end of June 2011 the reservoir was 63.8% full. Lake Hume was 27.0% at the start of the season, reached 98% in late October 2010, and maintained a capacity above 97% until early January 2011.

The storage was drawn down to 85% capacity before refilling to 98% by late February 2011. By 30 June 2010, Lake Hume had fallen to 92.4% of capacity.

The Menindee Lakes started the 2010–11 season at 74% of capacity and as the Lakes were above 640 GL for the entire season, control of the Lakes remained with the MDBA.

Early in 2010–11, unregulated River Murray flows were harvested into Lake Boga, Lake Charm, Kow Swamp and Kangaroo Lake. These lakes now form part of the Victorian mid-Murray storages and were operated under the operating arrangements for the storages for the first time in 2010–11.

The opening allocation on the Murray system was 0% of HRWS. An allocation of 2% of HRWS was announced on the 2 August 2010. There were then five allocation increases until the final allocation of 100% of HRWS was announced on the 15 October 2010. An allocation to LRWS was not available.

During the year, the total volume supplied from the River Murray to the Northern Mallee Pipeline was 2,729 ML.

In total, 26,697 ML of water from the Murray Bulk Entitlement (BE) Flora and Faunal account was supplied to Kinnaird’s Swamp, Richardson’s Lagoon, Gunbower Forest, McDonald’s Swamp, Round Lake, Hattah Lakes, Cardross Lakes and Lower Murray River Red Gum forests. There was 99,960 ML of TLM water supplied to the Lower Murray River Red Gum forests. In addition, a total of 21,817 ML of environmental water was delivered to lakes within the Kerang Lakes from unregulated flows in the River Murray – and it was accounted as water outside Victorian Murray Cap.

**Cap compliance**

Diversions from the Murray/Kiewa/Ovens valley was 537 GL, which is 456 GL less than the Cap target of 993 GL (with preliminary adjustment for trade and environmental releases). The diversion was 69% below the long-term Cap of 1,702 GL/year. The cumulative Cap credit since July 1997 is 1,545 GL. These results are summarised in Table 7. Diversions have been 7.8% below the Cap targets since July 1997.

**Campaspe**

**Resource availability**

Inflows to Lake Eppalock were 324% of average which enabled the storage to rise from 8.8% of capacity on 1 July 2010 to fill to capacity in late November 2010, for the first time in ten years. During the January 2011 floods, the storage increased to 128% of capacity – which was the highest level ever recorded since the storage was constructed. At the end of June 2011, Lake Eppalock held 96.7% of capacity because of a very low demand for water.

Catchment inflows to Lake Eppalock were assisted by spills from the storages on the Coliban River. With these storages and the storages managed by Central Highlands Water being full, only 899 ML of water was used by Coliban Water and Central Highlands Water from the Goulburn system via the Goldfields Superpipe. This volume is small compared to the 26,431 ML supplied from the Waranga Western Channel during 2009–10. There was no supplement delivered from the Campaspe into the Goulburn in 2010–11.

Irrigation allocation was zero at start of the season, but increased to 100% of HRWS by 15 September 2010 for the first time since 2003-04. Allocations to low-reliability water shares also reached 100% in November 2010.

As Lake Eppalock was above 200,000 ML for most of the season, the Campaspe Bulk Entitlement...
minimum flow requirement downstream of the Campaspe Siphon was set at the higher requirement of 70 ML/d. However, the requirement did fall occasionally during some periods when the natural inflows were low. Water from the Commonwealth Environmental Water Holder was used in June 2011 to provide environmental flows below the Campaspe Siphon.

In 2010–11, there was no water transferred to the lower Campaspe River from the Goulburn Valley account via the Waranga Western Channel.

**Cap compliance**

Diversion from the Campaspe valley was 22 GL, which is 38 GL below the Cap target of 59 GL [with adjustment for trade to supply the Goldfields Superpipe]. Diversions were 83% below the long-term Cap of 122 GL/year. The cumulative Cap credit for the Campaspe valley from July 1997 to June 2011 is 179 GL. These results are summarised in Table 7. Diversions have been 17.6% below the Cap targets since July 1997.

**Wimmera-Mallee**

**Resource availability**

In 2010–11, like much of the rest of the state, floods dominated water resource management activities on many occasions, and there were rapid increases to the volume held in storage.

Inflows to storages for the year were 389,645 ML compared to 93,644 ML in 2009–10. This resulted in the total volume held in store increasing from 36,170 ML in July 2010 to 322,612 ML by June 2011 – this was the most water held in the system since 1998. The large inflows received also contributed to spills in a number of reservoirs including Moora Moora, Lonsdale and Wartook.

Completion of the Wimmera-Mallee Pipeline Project in May 2010 means this is the first full year the Wimmera-Mallee Pipeline has been operated within a reporting period. The Wimmera-Glenelg Bulk Entitlements were revoked in October 2010 and replaced with new Bulk Entitlement Orders and an Environmental Entitlement.

Grampians-Wimmera-Mallee Water (GWMWater) was also appointed both the Storage Manager and Resource Manager for the Wimmera-Mallee system headworks.

Importantly for the current reporting period, the water year was changed with the introduction of new water sharing arrangements, from the historic November to October arrangement, to a July to June arrangement. This new water year now aligns with MDBA reporting periods and is consistent with other valleys within the MDB.

For the purposes of the Cap reporting, diversions for the year July 2010 to June 2011 totalled 9.6 GL.

2010–11 Wimmera-Glenelg Bulk Entitlement and Environmental Entitlement water year

The revised Bulk and Environmental Entitlements were not introduced until October 2010. However, transitional arrangements allowed for retrospective accounting of water for the period July to October 2010 under the new water sharing arrangements. This means that all water delivered during the 2010–11 period has been accounted for against the seasonal allocations of the 2010–11 water year.

Opening allocations were 118.3 GL (determined in November 2010) with the final allocation for the 2010–11 water year being 125.5 GL. A reserve volume of 95 GL was also created during this period.

Deliveries to entitlement holders totalled 18.7 GL: 9.4 GL of this was delivered to GWMWater, 0.1 GL to Coliban Water, 0.1 GL to Wannon Water and 9.0 GL to the environment as part of its regulated entitlement.

Although not considered part of the total system diversion reportable under the MDBA Cap, the environment is now also entitled to unregulated ‘passing’ flows from Lake Lonsdale to the Mt William Creek, Huddleston’s Weir to the Wimmera River and Rocklands Reservoir to the Glenelg River. 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 35.3 GL of unregulated water to the environment for the 2010–11 period.

**Cap compliance**

Diversion from the Wimmera-Mallee valley in 2010–11 was 10 GL, which is 33 GL less than the Cap target of 44 GL [with preliminary adjustment for environmental releases]. Diversions were 94% below the long-term Cap of 159 GL/year. The cumulative Cap credit for the Wimmera-Mallee valley since July 1997 is 8 GL. These results are summarised in Table 7. Diversions have been 1.0% below the Cap targets since July 1997.
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
- 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 2010–11 except adjusting for environmental flows according to protocol – and none are proposed for 2011-12 as these 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 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 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. To date 29,794 ML of high reliability savings has been transferred from the Murray and 16,812 ML from the Goulburn. The volume of environmental entitlements in these BEs will be increased as other water savings projects and entitlement purchases are undertaken.
- TLM – Water recovered under The Living Murray initiative has been transferred into environmental entitlements in the Murray, Goulburn, Campaspe and Broken Creek systems. To date the following entitlements have been transferred:
  - Murray – 5,710 ML high-reliability and 98,835 ML low-reliability
  - Broken Ck – 3,010 ML low-reliability
  - Goulburn – 39,625 ML high-reliability and 156,980 ML low-reliability
  - Campaspe – 5,085 ML 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 being developed, and this is an integrated surface water and groundwater management plan. The draft plan has been completed and the final plan will be approved by December 2011.

Local management plans are proposed for all other river systems. These are prepared by water authorities in consultation with stakeholders and will 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 MDB Cap is preserved when licences are traded.

Over 6,000 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 MDB Cap and new developers are required to purchase an existing entitlement before approval is provided.
Through the Northern Region Sustainable Water Strategy (2009), Victoria has introduced new policy that requires all new or altered domestic and stock dams on properties of less than eight hectares (20 acres) in peri-urban areas to be registered. This will help track the growth in domestic and stock water use. Victoria will commence a review of domestic and stock water management after the release of the draft Murray–Darling Basin Plan.

**Measures proposed during next year**

Proposed refinements to the management of the Cap in 2011-12 include:

- reducing the Wimmera-Mallee Cap to better reflect the completion of the pipeline projects and resultant reduction
- an updated post-pipeline Cap model for the Wimmera-Mallee valley (as per the model auditor’s recommendations). This should be submitted to MDBA approval by June 2012.

In June 2004, the Victorian Government released a White Paper ‘Securing Our Water Future Together’, which outlines a comprehensive, integrated approach to managing Victoria’s water resources over the next 50 years. The initiatives in the White Paper reinforce Victoria’s commitment to working with the MDBA and the other Basin states to implement the MDB Cap and The Living Murray initiative.

**4.2.4. IAG assessment**


Above average annual rainfall and record summer rainfall caused significant flooding, but also significantly reduced demand for water for irrigation.

Diversions in 2010–11 in all valleys were below the Cap targets for the year and all valleys have a cumulative Cap credit since 1 July 1997.

Victoria and the MDBA have accredited models for all of the Victorian valleys. However, there continues to be refining of models and inputs. In each valley the most recent model and best available inputs have been used to derive the 2010–11 Cap targets. The effect of model and/or input changes was as follows:

- Goulburn/Broken/Loddon: the cumulative Cap credit from 1997-98 to 2009–10 increased by 10.2 GL.
- The Murray/Kiewa/Ovens: cumulative Cap credit increased by 14 GL.
- The Cap credit for the Wimmera-Mallee be reduced by 182 GL.

The IAG notes that Victoria proposes further refinements to the Cap and Cap management – including a proposal for reducing the Wimmera-Mallee Cap, to better reflect the completion of the pipeline projects and an updated post-pipeline model to be accredited by June 2012.

As foreshadowed in the 2009–10 IAG report, Victoria has created a 40 GL environmental entitlement on the Murray, in recognition of historic practices using unregulated flows to areas of environmental importance such as Gunbower Forest, Hattah Lakes and the Lindsay-Wallpolla areas. This reflects historic use and was taken into account in the Murray Cap modelling using 1993-94 as the baseline. As such, it falls outside the Cap.

Victoria continues to 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**

- Diversions in 2010–11 were 1,094 GL, compared to 1,810 GL in 2009–10.
- Above average annual rain and record summer rain reduced demand for diversions for irrigation.
- Diversions for the Murray/Kiewa/Ovens, Campaspe, Goulburn/Broken/Loddon and Wimmera-Mallee valleys in 2010–11 were below annual climate, environmental use and trade-adjusted Cap targets.
- Cumulative diversions since 1997 are in credit for all valleys.
- Overall Victorian diversions since July 1997 have been 7.2% below the Cap targets.
- Model modifications and inputs have resulted in changes to Caps and Cap credits for previous years.
- The updated models have been used to calculate 2010–11 Cap targets and the cumulative credits presented.
- 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. However, as reported, in recent years severe drought conditions, particularly in the southern valleys, resulted in the suspension of the Water Sharing Plans and the adoption of special emergency arrangements for these valleys. In 2010–11 the majority of the provisions of the Water Sharing Plans for the regulated New South Wales Murray, Lower Darling, Murrumbidgee, Lachlan and Macquarie/Cudgegong valleys were reapplied.

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 Integrated Quantity-Quality Model (IQQM) 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 Monthly Simulation Model (MSM).

The status of the various models used for annual Cap auditing in New South Wales is given in Table 8 below.

The Barwon-Darling model has been recalibrated to recognise recent dry and drought conditions, and submitted for accreditation. Further recalibration may be required to reflect wet conditions, although this is not proposed at this time. However, the need for recalibration reflects the episodic nature of water availability for irrigation purposes in this valley.

4.3.2. 2010–11 Usage

High rainfall resulted in major flooding in most valleys with many storages filling and spilling. This resulted in full allocations in most valleys with large amounts of carryover available for 2011-12.

There was also a significant increase in environmental water use in 2010–11 at 412 GL compared with the 74 GL across all valleys in 2009–10. The majority was in the NSW Murray and Murrumbidgee -318 GL.

Table 9 provides a summary of New South Wales Cap accounting by river valley. This table provides diversions, Cap targets and trade adjustments for 2010–11, along with accumulated credit or debit. The valley diversions include estimated unregulated stream usage and these estimates have also been added to the Cap targets. Interim Cap modelling is available for the NSW Border Rivers and for the first time a long-term diversion Cap and a 2010–11 Cap target are available. This Cap is still subject to Ministerial Council approval.

The 2010–11 Cap targets have been adjusted for some environmental usage and transfers but no adjustment has been made for the recovery by TLM of 100 GL of Supplementary Access entitlement in the Murray and 250 GL in the Lower Darling in a year when there was access to these entitlements for most of the year. The 2010–11 total diversions do not include environmental water usage.

The impact of this is that the credit for the Lower Darling is substantially over estimated (by as much as 230 GL). This does not change the conclusion that the combined Barwon-Darling/Lower Darling remains in credit and not in breach of the Cap. The credit on the Murray is likely to be about 45 GL too large.

It is the view of the IAG that NSW needs to address the issue of environmental water usage (including TLM supplementary access water recovered) through Cap adjustment and that a proposal should be submitted for approval. This issue is discussed in detail in Appendix C and summarised in the Executive Summary.

Comparison of actual diversions with modelled 2010–11 Cap targets indicates diversions were significantly less than the Cap target for each valley, with the exception of the Murrumbidgee which had a debit of 345 GL. There were significant Cap credits for other valleys in 2010–11. Although cumulative diversions in the Barwon-Darling component of the combined Barwon-Darling and Lower Darling valley remain over Cap, the combined Barwon-Darling/Lower Darling Schedule E valley remains in credit. No valleys designated under Schedule E have exceeded the trigger for special audit.

Total diversions in 2010–11 were 3,268 GL compared to 1,979 GL in 2009–10.
Table 8: New South Wales Cap auditing models status

<table>
<thead>
<tr>
<th>Valley / Lower Darling</th>
<th>Auditing Tool</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Murray / Lower Darling</td>
<td>Murray Monthly Simulation Model (Final)</td>
<td>Approved for use under Schedule E. Lower Darling model has been reviewed and is in the process of being resubmitted to the independent auditor</td>
</tr>
<tr>
<td>Murrumbidgee</td>
<td>IQQM (Final)</td>
<td>Approved for use under Schedule E</td>
</tr>
<tr>
<td>Lachlan</td>
<td>IQQM (Final)</td>
<td>Approved for use under Schedule E</td>
</tr>
<tr>
<td>Macquarie</td>
<td>IQQM (Final)</td>
<td>Recommended for accreditation</td>
</tr>
<tr>
<td>Peel</td>
<td>IQQM (Final)</td>
<td>Approved for use under Schedule E</td>
</tr>
<tr>
<td>Namoi</td>
<td>IQQM (Final)</td>
<td>Approved for use under Schedule E</td>
</tr>
<tr>
<td>Gwydir</td>
<td>IQQM (Final)</td>
<td>Approved for use under Schedule E</td>
</tr>
<tr>
<td>Border Rivers</td>
<td>IQQM (Interim)</td>
<td>Model being prepared for submission</td>
</tr>
<tr>
<td>Barwon-Darling</td>
<td>IQQM (Interim)</td>
<td>Submitted for accreditation</td>
</tr>
</tbody>
</table>

Table 9: NSW Annual Cap Accounting 2010–11

<table>
<thead>
<tr>
<th>System</th>
<th>Long-term diversion Cap</th>
<th>2010/11 Cap target</th>
<th>Net trade from valley</th>
<th>Environmental water usage</th>
<th>2010/11 diversion</th>
<th>Cumulative since 1/7/97</th>
<th>20% schedule trigger</th>
<th>Trigger exceeded</th>
<th>Storage difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barwon-Darling</td>
<td>198</td>
<td>164</td>
<td>0</td>
<td>-8</td>
<td>95</td>
<td>61</td>
<td>-93</td>
<td>-40</td>
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<tr>
<td>Lower Darling</td>
<td>133</td>
<td>305</td>
<td>37</td>
<td>-48</td>
<td>28</td>
<td>265</td>
<td>462</td>
<td>-27</td>
<td>No</td>
</tr>
<tr>
<td>Combined Barwon-Darling &amp; Lower Darling</td>
<td>331</td>
<td>468</td>
<td>37</td>
<td>-56</td>
<td>123</td>
<td>326</td>
<td>368</td>
<td>-66</td>
<td>No</td>
</tr>
<tr>
<td>Intersecting Streams</td>
<td>3</td>
<td>n/a</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>n/a</td>
<td>n/a</td>
<td>-1</td>
<td>n/a</td>
</tr>
<tr>
<td>Border Rivers #</td>
<td>195</td>
<td>254</td>
<td>-20</td>
<td>0</td>
<td>187</td>
<td>48</td>
<td>375</td>
<td>-39</td>
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<tr>
<td>Gwydir</td>
<td>342</td>
<td>400</td>
<td>0</td>
<td>-18</td>
<td>271</td>
<td>111</td>
<td>281</td>
<td>-68</td>
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</tr>
<tr>
<td>Namoi/Peel</td>
<td>243</td>
<td>381</td>
<td>0</td>
<td>0</td>
<td>275</td>
<td>106</td>
<td>246</td>
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<tr>
<td>Macquarie/ Castlereagh/ Bogan</td>
<td>444</td>
<td>648</td>
<td>0</td>
<td>-60</td>
<td>178</td>
<td>409</td>
<td>757</td>
<td>-89</td>
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</tr>
<tr>
<td>Lachlan</td>
<td>306</td>
<td>131</td>
<td>0</td>
<td>-9</td>
<td>89</td>
<td>33</td>
<td>207</td>
<td>-61</td>
<td>No</td>
</tr>
<tr>
<td>Murrumbidgee</td>
<td>2,568</td>
<td>1,481</td>
<td>-57</td>
<td>-294</td>
<td>1475</td>
<td>-345</td>
<td>684</td>
<td>-514</td>
<td>No</td>
</tr>
<tr>
<td>NSW Murray</td>
<td>1,908</td>
<td>1,386</td>
<td>-50</td>
<td>-299</td>
<td>667</td>
<td>371</td>
<td>663</td>
<td>-382</td>
<td>No</td>
</tr>
</tbody>
</table>

1 All volumes are shown in gigalitres (GL).
2 Unregulated stream diversions have been added to both the river diversions and the Cap targets.
3 # interim modelled results for Border Rivers.
4 n/a indicates estimate is not available.
5 Adjustments have been made for the transfer and use of some environmental water. However no adjustments have been made for the recovery of TLM supplementary access water in the Murray and the Lower Darling.
6 A positive difference indicates a Cap credit, and a negative difference indicates a Cap debit.
7 Long-Term Diversion Caps do not include floodplain harvesting components to maintain consistency with observed diversions. A positive storage difference represents a potential Cap credit in future water years. Net trade from the NSW Murray valley includes cumulative permanent trades to other States since 1/7/1997.
8 It has been identified that some environmental water use may have been included in the diversion figures for the 2009–10 water year report. The Murrumbidgee environmental figures have been updated and further information shall be provided if necessary.
Cap compliance

Murray Valley
Cap compliance for the regulated sections of the Murray Valley has been assessed using the MSM that has been accredited for use. Cap modelling excludes all Snowy borrows, which has the effect of reducing the current Cap credits.

The Schedule E accounting for the 1997-98 to 2010–11 water years indicates that the New South Wales Murray valley is cumulatively 663 GL below Cap; although no adjustment was made for 100 GL of supplementary access recovered from Murray Irrigation Limited for TLM, which might reduce credits by 45 GL. The observed storage levels at 30 June 2011 were 91 GL higher than those simulated under Cap conditions. If this stored water is used before the storage next spills, 91 GL of Cap debits would be generated. Diversions since July 1997 have been 3.8% below Cap.

Murrumbidgee Valley
Representations of diversions in the Lowbidgee district are included within the Murrumbidgee IQQM, which has been accredited. The Schedule E accounting for the 1997-98 to 2010–11 seasons indicates that, though the diversion exceeds the Cap target by 345 GL, Murrumbidgee Valley is cumulatively 684 GL below Cap.

The observed storage levels at 30 June 2011 were 246 GL higher than those simulated under Cap conditions. If this stored water is used before the storage next spills, 246 GL of Cap credits would be generated. Diversions since July 1997 have been 2.8% below Cap.

Lachlan Valley
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 2010–11 seasons indicates that the Lachlan Valley is cumulatively 207 GL below Cap – although the Cap model does not include representation of the drought management rules.

The observed storage levels at 30 June 2010 were 107 GL higher than those simulated under Cap conditions. If this stored water is used before the storage next spills, 107 GL of Cap debits would be generated. Diversions since July 1997 have been 7.3% below Cap.

Macquarie Valley
The Cap for the regulated sections of the Macquarie Valley has been audited using the Macquarie Valley IQQM that has been recommended for accreditation by the independent model auditor.

The Schedule E accounting for the 1997-98 to 2010–11 period indicates that the Macquarie Valley is cumulatively 757 GL below Cap although the Cap model does not include drought management rules. The observed storage levels at 30 June 2011 were 250 GL higher than those simulated under Cap conditions. If this stored water is used before the storage next spills, 250 GL of Cap debits would be generated. Diversions have been 15.7% below the Cap targets since July 1997.

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

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 MDBA for use under Schedule E of the MDB Agreement.

Diversions for the combined valleys are 246 GL below the cumulative Cap targets since 1997-98. The observed storage levels at 30 June 2011 were 30 GL lower than those simulated under Cap conditions. If this stored water is used before the storage next spills, 30 GL of Cap credits would be generated. Diversions have been 5.8% below the Cap targets since July 1997.

Gwydir Valley
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 281 GL below Cap since 1997-98. The observed storage levels at 30 June 2011 were 104 GL higher than those simulated under Cap conditions. If this stored water is used before the storage next spills, 104 GL of Cap credits would be generated. Diversions have been 6.4% below the Cap targets since July 1997.

New South Wales Border Rivers Valley
A formal Inter-Governmental Agreement (IGA) on water sharing arrangements in the Border Rivers has been signed by the New South Wales and Queensland Premiers. The IGA limits each state to the long-term diversion at the 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.

New South Wales submitted a Cap proposal for the Border Rivers in 2009–10 which will be the subject of consideration by the MDB Ministerial Council in late 2011.

Interim modelling results, subject to approval of the proposed Cap for the Border Rivers, indicate a long-term Cap of 195 GL and a 2010–11 Cap target of 234 GL. Modelled results indicate a cumulative credit of 375 GL since 1997-98. Diversions have been 13.5% below the Cap targets since July 1997.

NSW is preparing a Cap model report for submission to the MDBA later in 2011 for audit by the independent auditor and ultimately accreditation.

**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. However, ‘Macro’ Water Sharing Plans for unregulated areas within New South Wales are currently being established, which will:

- facilitate conversions of licences to the new Water Management Act 2000
- provide a framework for establishing Caps
- allow for more detailed water access rules for sub-catchments where there is significant competition for resources – either between consumptive users, or users and the environment.

No Schedule E accounting is currently available for the Intersecting Streams. There are 18 GL of entitlements associated with the New South Wales Intersecting Streams and the estimated usage of 3 GL is based on a survey conducted in 2000.

Some of the entitlement from the Warrego River was purchased by the New South Wales Government (with significant funding assistance from the Commonwealth) as part of the Toorale property acquisition. Given the estimated low level of usage of the existing entitlements, Cap adjustments for environmental use need to be considered when a Cap is established.

**Barwon-Darling Valley**

Major flooding in southern Queensland, combined with significant inflows from NSW tributaries, have provided substantial flows for the Barwon-Darling throughout 2010-11. The total diversions in the Barwon-Darling in 2010–11 was 95 GL compared to a Cap target of 156 GL.

Since 1997-98 the Barwon-Darling has a cumulative Cap debit of 93 GL which exceeds the 20% trigger of 40 GL. This does not, however, trigger a special audit; as for Schedule E purposes the valley is the combined Barwon-Darling/Lower Darling.

NSW has implemented a Cap management strategy to ensure Cap compliance in the Barwon-Darling valley. 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.

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.

NSW 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. NSW will continue to review the Cap modelling and consider if this proposed reduction in water availability remains appropriate.

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.

Model reviews for the Barwon-Darling IQQM have included the improved treatment of tributary inflows and simulation of diversions, including restricted access during some flow events, to ensure that sufficient flows reached Menindee Lakes to provide critical water supplies to Broken Hill.

The review of the model has increased the long-term Cap from 173 GL to 198 GL and, consequently, Cap debits are lower. The interim arrangements for 2010–11 will continue for 2011-12, with the exception that the limit for extractions increased to 198 GL for the 2011-12 water year. Because the model is yet to be accredited, it is anticipated that these interim arrangements will apply for the 2011-12 water year only.
New South Wales has completed a Water Sharing Plan for the Barwon-Darling valley, which incorporates this proposed Cap strategy to prevent volumetric growth, as well as event-based access rules that will protect important flows for the environment and downstream users. The draft plan has been approved by the NSW Minister and it is expected to be finalised in 2011-12. Diversions have been 4.6% above the Cap since July 1997.

**Lower Darling Valley**

The Cap for the regulated sections of the Lower Darling has been audited using the MSM.

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 been extensively recalibrated with additional data to better match historical behaviour in very large diversion years. A number of corrections and refinements of the representation of Menindee Lakes operations has been included. The improved model is expected to be submitted for independent review as part of the accreditation process.

The preliminary Schedule E accounting for the 1997-98 to 2010–11 period indicates that the Lower Darling Valley is cumulatively 462 GL below Cap. Diversions have been 31.8% below the Cap targets since July 1997. It should be emphasised that this does not include the impacts of TLM-recovered supplementary access water, which could reduce the credits by as much as 230 GL.

**Combined Barwon/Upper Darling and Lower Darling Cap accounting**

The preliminary Schedule E accounting for the 1997-98 to 2010–11 period indicates that the cumulative actual diversions in the combined Barwon-Darling and Lower Darling Valleys are 414 GL below the cumulative annual diversions targets.

The IAG notes that the variation in Cap performance of this combined valley in recent years has been the subject of some debate. The IAG notes the action and further action foreshadowed by New South Wales. It is keen to see the modelling for this valley in particular accredited, to assure all parties that the valley will remain within Cap under the Water Sharing Plan management rules. The Barwon-Darling model has been submitted for independent review and the IAG looks forward to the model report. It considers the model audit important in ensuring all parties have confidence in the Cap outcome.

**Diversions in unregulated river systems**

Diversions from unregulated streams within New South Wales are generally not metered, and the majority have only recently been converted from area-based to volumetric licences. However, 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.

Unmetered usage estimates are taken from the volumetric conversion process (2000) based on crop areas survey and assessed irrigation requirements. The estimated average usage over the years 1997-98 to 2010–11 is presented in Table 10.

The unmetered use estimates for the Namoi, Gwydir and NSW Border Rivers were revised in 2011. As a consequence, the estimates increased from 78 GL to 113 GL for the Namoi, from 10 GL to 44 GL for the Gwydir and from 14 GL to 23 GL for the NSW Border Rivers. These significant increases will have impacts on the long-term Cap for these valleys. In view of this, it would be appropriate to validate these numbers and subject them to independent review.

Metered use totals are from time-event meters as used in the Barwon-Darling system.

New South Wales intends to cap unmetered users according to the average 1993-94 to 1998–99 diversion estimate arising from the volumetric conversion process, although this process has yet to be completed.

Estimates of unregulated stream usage (both metered and unmetered) have been included in the diversions reported in Table 10 and have been added to the Cap Targets generated by the models.
Table 10: Unregulated use in NSW

<table>
<thead>
<tr>
<th>(Units are in GL)</th>
<th>Unmetered use estimates</th>
<th>Metered use (GL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Murray</td>
<td>28.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Lower Darling</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Barwon-Darling*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murrumbidgee</td>
<td>42.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Lachlan</td>
<td>15.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Macquarie</td>
<td>35.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Namoi</td>
<td>113 *</td>
<td>0.0</td>
</tr>
<tr>
<td>Gwydir</td>
<td>44 *</td>
<td>1.0</td>
</tr>
<tr>
<td>NSW Border Rivers</td>
<td>23 *</td>
<td>0.0</td>
</tr>
<tr>
<td>Intersecting Streams</td>
<td>3.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

* The Barwon-Darling is reported with the other Regulated Rivers.
# The un-metered use estimates for the Namoi, Gwydir and Border Rivers have been revised (2011).
n/a The metered use for the Macquarie, Gwydir and Border Rivers were not available at the time of writing.

4.3.3. Monitoring and reporting

New South Wales has now submitted for audit models for seven of its nine designated Cap valleys. Five have been approved by the Authority and two are in the process of being audited and accredited.

A Model for the Border Rivers is expected to be submitted to the MDBA for formal audit later in 2011, with a view to accreditation in 2012-

In 2010–11 the unmetered use estimates in the unregulated NSW Border, Gwydir and Namoi valleys were updated and this led to substantial adjustments (see Table 10)

4.3.4. Administration of the Cap

New South Wales relies primarily upon its Water Sharing Plans to ensure that the Cap requirements are met. The record drought conditions in previous years, particularly in the southern New South Wales valleys, resulted in suspension of regulated Water Sharing Plans for the New South Wales Murray, Lower Darling, Murrumbidgee, Lachlan and Macquarie/Cudgegong Valleys.

Early in 2010–11 the drought was broken as a result of substantial and widespread rainfall across NSW; resulting in major flooding in most valleys.

The breaking of the drought enabled:

- recommencement of nearly all sharing and management rules (some relaxation of trade rules continued) under the regulated Water Sharing Plans for the NSW Murray, Lower Darling, Murrumbidgee, Lachlan and Macquarie/Cudgegong Valleys
- lifting of suspensions on water in individual accounts
- resumption of environmental releases and sharing rules
- lifting of suspension on flows to effluent creek systems.
4.3.5. IAG assessment

High rainfall in most valleys resulted in flooding and in many storages filling and spilling. It also enabled NSW to recommence the majority of the provisions for Water Sharing Plans for the regulated NSW Murray, Lower Darling, Murrumbidgee, Lachlan and Macquarie/Cudgegong valleys. There were full allocations in most valleys with large amounts of carryover available for 2011-12.

Diversions across all valleys were 3,268 GL, compared to 1,979 GL in 2009-10.

For all valleys, except the Murrumbidgee, diversions in 2010–11 were within the Cap targets. With the exception of the Barwon-Darling, all remain within the cumulative Cap from 1 July 1997. The Barwon-Darling cumulative debit is 93 GL – which exceeds the trigger of 40 GL. However, for Cap accounting purposes under Schedule E, the valley is the combined Barwon-Darling/Lower Darling, which remains in credit.

The 2010–11 Cap targets have been adjusted for the transfer and use of some environmental entitlements but no adjustment has been made for the recovery of TLM supplementary access water (including the purchase of 250 GL of supplementary water entitlement from Tandou and 100 GL from Murray Irrigation Limited). The impact of this is that the credit for the Lower Darling is substantially over-estimated (by as much as 230 GL). This does not change the conclusion that the combined Barwon-Darling/Lower Darling remains in credit and not in breach of the Cap.

It is the view of the IAG that NSW needs to address the issue of environmental water usage (including water recovered through TLM) through Cap adjustment and that a proposal should be submitted for approval.

Significant work continues for finalising/upgrading Cap models. The Murrumbidgee model was approved for use under Schedule E. The Lower Darling model was recalibrated and is expected to be submitted to the MDBA for independent audit.

A proposed Cap for the NSW Border Rivers was put forward for consideration in 2009-10. It is based on the 1993-94 development conditions and includes:

- the enlarged Pindari Dam and new environmental rules associated with the enlarged Pindari Dam
- the irrigated cropping and pump infrastructure associated with the enlarged dam that corresponds with the 1999–2000 level of development.

A decision from the Murray–Darling Basin Ministerial Council on the Cap proposal is imminent.

In the interim, a model has been developed which sets a long-term Cap of 195 GL and gives a 2010–11 Cap target of 231 GL. The model will be submitted to the MDBA late in 2011 for subsequent independent audit.

The Barwon-Darling model has been updated and is now showing that the long-term Cap is 198 GL, an increase from the original 173 GL. The model has been submitted to the MDBA for independent review. Interim allocation arrangements have been implemented for 2011-12 pending consideration and approval of the model.

NSW now has in place Caps (final/interim) for eight out of nine valleys; and models finalised for five valleys, with the remaining three expected to be finalised in 2011-12. This only leaves the Intersecting Streams where Caps need to be finalised. This has been a low priority with estimated use based on a 2000 survey of only 3 GL.

Estimates for unmetered use in the Namoi, Gwydir and NSW Border Rivers were updated in 2011. The result was significant increases from 78 GL to 113 GL for the Namoi, from 10 GL to 44 GL for the Gwydir and from 14 GL to 23 GL for the NSW Border Rivers. This will significantly impact on the Cap for each of these valleys. In view of this, the IAG recommends independent review and validation to provide confidence to any Cap adjustment.

4.3.6. Conclusions/recommendations

- Diversions in 2010–11 were 3,268 GL, compared to 1,979 GL in 2009–10.
- Caps (final/interim) are now in place for eight out of nine valleys in New South Wales.
- Diversions in 2010–11 were below Cap targets for all Schedule E valleys, except the Murrumbidgee.
- Cumulative Cap credits exist for all Schedule E valleys in New South Wales.
- Overall NSW diversions since July 1997 have been 5.6% below the Cap targets.
- The 2010–11 Cap targets have been adjusted for the transfer and use of some environmental entitlements, but no adjustment has been made for the recovery of TLM supplementary access water. This has resulted in an over-estimate of Cap credits, particularly for the Lower Darling. This does not affect the conclusion that the combined Barwon-Darling/Lower Darling remains in credit and not in breach of Cap.
- NSW is encouraged to seek approval for an appropriate methodology for Cap adjustment for environmental water.
• Cap models have been approved for five New South Wales valleys, and are currently being audited for two of the remaining three New South Wales valleys. The Border Rivers model is still in preparation and is expected to be submitted to the MDBA later in 2011.

• New South Wales is encouraged to finalise Cap/model for the intersecting streams.

• 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.

• The IAG recommends independent validation and review of unmetered use estimates for the Namoi, Gwydir and NSW Border Rivers.

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 models for the Border Rivers and Condamine and Balonne have been submitted in 2010–11 for accreditation.

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 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. 2010–11 diversions

El Niño conditions in the Pacific through the 2009–10 water year underwent a rapid transition to La Niña in autumn 2010. By the start of the 2010–11 water year, La Niña conditions were well established. The 2010 La Niña was exceptionally strong, as measured by the Southern Oscillation Index. Rainfall was generally well above average from August to December 2010 across the Queensland section of the MDB. Persistent heavy rainfall on wet catchments culminated in extensive and severe flooding in December 2010 and January 2011. Flooding continued to a lesser extent and degree through into May 2011.

The main flows occurred in December 2010 and January 2011. Record flood levels occurred at a number of locations in 2010–11. In some cases these flood peaks broke records which had been set during the February–March 2010 event.

The main events included:

• A significant rain and storm band late in July produced flooding that persisted into August 2010 in the lower Macintyre and Paroo rivers.

• In the second week of September 2010, heavy rainfall in the upper reaches of the Warrego catchment produced minor-to-moderate flooding of the Warrego River. Heavy rainfall in the Border Rivers catchment caused flooding in the lower Macintyre River at Goondiwindi, followed by minor to moderate flooding in the lower Weir River as a result of the breakout of floodwaters from the Macintyre River. Goondiwindi recorded its highest ever September rainfall.

• Continued rainfall through October 2010 produced a major flood peak at Goondiwindi, the seventh peak above minor flood level since August 2010. Minor-to-moderate flooding was also recorded in the Condamine and Weir rivers and the Paroo, Moonie and Warrego river catchments.

• Minor-to-moderate flooding in the Warrego River and tributaries and minor flooding in the Paroo River persisted through November 2010.

• Queensland experienced yet another month of widespread rainfall in December 2010, following the wettest spring on record. A weak category one tropical cyclone, Tasha, crossed the coast south of Cairns early on Christmas morning and continuing active monsoonal activity led to a wet Christmas period, culminating in some of the most widespread and significant flooding in Queensland’s history. By the end of December 2010, flood warnings had been issued for the Condamine, Balonne, Moonie, Paroo and Warrego rivers.
In January 2011, rainfall ranged from average or below average in the south to very much above average in the east and west of the Queensland Murray–Darling Basin (QMDB). Heavy rain on saturated catchments produced significant runoff and resulted in almost every river east of the Warrego reaching major flood level at some time between 23 December 2010 and 7 January 2011.

Although rain eased in February 2011, further moderate to heavy rainfall in the first week of March 2011 resulted in widespread moderate to major flooding that extended east into the Warrego River catchment. Moderate to major flooding affected the Condamine River in mid-March 2011, with floodwaters impacting the Lower Balonne by the end of March 2011.

Rainfall was generally average or below average across the QMDB catchments for the remainder of the water year.

Notable flood peaks included:

- Condamine River – record flows in the middle reaches of the Condamine River, with flows at Chinchilla Weir peaking at 389 GL/day, 1.4 metres higher than the previous record set in 1988. Total volume of flow passing for the December/January event was 4,177 GL.
- Maranoa River – passing flow at Cashmere was 300 GL higher than the 2009-10 flow, which was reported as causing the highest flooding in 20 years.
- Balonne River – the flow passing St George of 8,535 GL was more than six times the average flow, but still did not reach the maximum flow recorded in 1955-56.
- Border Rivers – the record flow of 3,005 GL at Goondiwindi was 400 GL higher than the previous record set in 1983-84.

Rain eased in April 2011, although flooding continued in the Balonne River system until late in the month.

The continuous flows in most streams through the 2010–11 water year provided exceptional water harvesting opportunities, particularly in the Balonne and Border Rivers, with total stream diversions in the QMDB estimated at 865 GL. Of this, 60 % was taken from the Lower Balonne and 27 % per cent from the Border Rivers catchment. The record flooding in January 2011 also provided extensive overland flow opportunity with an estimated total of 580 GL taken during floodplain harvesting in the year. Irrigators with overland flow water access were able to partially substitute take of overland flow for stream flow diversion.

Table 11 summarises stream diversions from the QMDB catchments and the annual flow volumes for 2010–11 as measured at key sites. Flows were well above the long-term average, except in the Paroo and Nebine rivers. The high stream flow and widespread flooding has resulted in the second highest stream diversion figures and the highest overall level of diversions (stream flow plus floodplain harvesting) since recording began in 1993.

Stream diversion across all catchments is estimated to be 865 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, on-farm rainfall runoff and floodplain diversions – is included separately in the above figures (Table 11). 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 580 GL of floodplain diversion has occurred.

Total diversions across all catchments from streams and overland flow for 2010–11 are estimated to be 1,445 GL.

Table 12 shows stream diversion levels for the total QMDB catchments over the past 18 years. The 865 GL diverted in 2010–11 had an associated cross border flow of 9,366 GL. In comparison, in 2007-08, 876 GL was diverted in the QMDB catchments, with 3,271 GL flowing into NSW.

Diversion in the Queensland Murray–Darling Basin is characterised by greater volumes of unsupplemented water compared to the quantity provided through water supply schemes (see Table 13). Overland flow take, in the form of floodplain harvesting, is based on estimates only.
Table 11: Summary for Queensland catchments 2010–11

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Condamine and Balonne</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condamine (Chinchilla)</td>
<td>4,722</td>
<td>588</td>
<td>57</td>
<td>201</td>
</tr>
<tr>
<td>Condamine/Balonne (Weribone)</td>
<td>8,163</td>
<td>1,238</td>
<td>15</td>
<td>n/a</td>
</tr>
<tr>
<td>Maranoa (Cashmere)</td>
<td>886</td>
<td>144</td>
<td>&lt;1</td>
<td>n/a</td>
</tr>
<tr>
<td>Lower Balonne (St George)</td>
<td>8,535</td>
<td>1,246</td>
<td>521</td>
<td>191</td>
</tr>
<tr>
<td>Maranoa (Cashmere)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower Balonne (St George)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Granite Belt (Farnbrol)</td>
<td>431</td>
<td>81</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>Macintyre/Barwon (Goondiwindi)</td>
<td>3,005</td>
<td>791</td>
<td>200</td>
<td>140</td>
</tr>
<tr>
<td>Weir (Talwood)</td>
<td>485</td>
<td>147</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Moonie (Fenton)</td>
<td>543</td>
<td>158</td>
<td>27</td>
<td>2</td>
</tr>
<tr>
<td>Nebine (Roseleigh)</td>
<td>8</td>
<td>Only Gauged since 2007</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Warrego (Cunnamulla)</td>
<td>1,301</td>
<td>517</td>
<td>11</td>
<td>n/a</td>
</tr>
<tr>
<td>Paroo (Caiwarro)</td>
<td>489</td>
<td>551</td>
<td>&lt;1</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>865</strong></td>
<td><strong>580</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 12: Queensland Basin stream diversions (GL)

<table>
<thead>
<tr>
<th>Report</th>
<th>Year</th>
<th>Diversions (GL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1993-94</td>
<td>336</td>
</tr>
<tr>
<td>2</td>
<td>1994-95</td>
<td>176</td>
</tr>
<tr>
<td>3</td>
<td>1995-96</td>
<td>528</td>
</tr>
<tr>
<td>4</td>
<td>1996-97</td>
<td>467</td>
</tr>
<tr>
<td>5</td>
<td>1997-98</td>
<td>741</td>
</tr>
<tr>
<td>6</td>
<td>1998-99</td>
<td>609</td>
</tr>
<tr>
<td>7</td>
<td>1999-00</td>
<td>541</td>
</tr>
<tr>
<td>8</td>
<td>2000-01</td>
<td>688</td>
</tr>
<tr>
<td>9</td>
<td>2001-02</td>
<td>341</td>
</tr>
<tr>
<td>10</td>
<td>2002-03</td>
<td>214</td>
</tr>
<tr>
<td>11</td>
<td>2003-04</td>
<td>815</td>
</tr>
<tr>
<td>12</td>
<td>2004-05</td>
<td>392</td>
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<tr>
<td>13</td>
<td>2005-06</td>
<td>306</td>
</tr>
<tr>
<td>14</td>
<td>2006-07</td>
<td>149</td>
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<tr>
<td>15</td>
<td>2007-08</td>
<td>876</td>
</tr>
<tr>
<td>16</td>
<td>2008-09</td>
<td>321</td>
</tr>
<tr>
<td>17</td>
<td>2009-10</td>
<td>819</td>
</tr>
<tr>
<td>18</td>
<td>2010-11</td>
<td>865</td>
</tr>
</tbody>
</table>

Table 13: Water Diversion by sector

<table>
<thead>
<tr>
<th>Diversions (GL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsupplemented</td>
</tr>
<tr>
<td>Supplemented</td>
</tr>
<tr>
<td>Overland Flow</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

Table 14: Cross border flows

<table>
<thead>
<tr>
<th>Valley</th>
<th>Flow (GL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paroo</td>
<td>489</td>
</tr>
<tr>
<td>Warrego</td>
<td>1,301</td>
</tr>
<tr>
<td>Nebine</td>
<td>8</td>
</tr>
<tr>
<td>Condamine-Balonne</td>
<td>5,631</td>
</tr>
<tr>
<td>Moonie</td>
<td>543</td>
</tr>
<tr>
<td>Border Rivers</td>
<td>1,395</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9,367</strong></td>
</tr>
</tbody>
</table>

1) Water year reported prior to 2006 was 1 October to 30 September and water year reported post-2008 is 1 July to 30 June.
2) Diversions does not include overland flow.
As Table 14 shows, the end-of-system flows for QMDB catchments during the year totalled 9,367 GL, compared with 6,242 GL in 2009–10 and 391 GL in 2008–09. This highlights the extreme variability inherent in this part of the basin.

Due to the high rainfalls throughout the year, the level of flow experienced across all catchments, except the Paroo and Nebine, was well above average.

Public storages are comparatively small in number and storage volume. Around one third of these storages are used solely for urban supplies, with many of the other storages also used to supply multiple needs.

There was significant inflow into public storages in the QMDB during the 2010–11 water year. All storages benefited from the high level of rainfall and resultant stream flows, with the majority of storages finishing the year at close to 100 % capacity. Table 15 shows the level of storage as at 30 June 2011.

### Table 15: Public storages and their volumes across catchments as at 30 June 2011

<table>
<thead>
<tr>
<th>Storage</th>
<th>Percent full at 30 June 2011</th>
<th>Full storage capacity</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condamine-Balonne</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooby Dam</td>
<td>93%</td>
<td>23 GL</td>
<td>Toowoomba urban water supply</td>
</tr>
<tr>
<td>Leslie Dam</td>
<td>99%</td>
<td>106 GL</td>
<td>Warwick urban water supply and Upper Condamine WSS</td>
</tr>
<tr>
<td>Connolly Dam</td>
<td>100%</td>
<td>2.4 GL</td>
<td>Warwick urban water supply</td>
</tr>
<tr>
<td>Chinchilla Weir</td>
<td>100%</td>
<td>10 GL</td>
<td>Chinchilla urban water supply and Chinchilla Weir WSS</td>
</tr>
<tr>
<td>Beardmore</td>
<td>100%</td>
<td>81 GL</td>
<td>St George WSS</td>
</tr>
<tr>
<td>Jack Taylor Weir</td>
<td>99%</td>
<td>10 GL</td>
<td>St George urban water supply and St George WSS</td>
</tr>
<tr>
<td>Neil Turner Weir</td>
<td>100%</td>
<td>1.5 GL</td>
<td>Maranoa River WSS</td>
</tr>
<tr>
<td>Border rivers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storm King Dam</td>
<td>100%</td>
<td>2.4 GL</td>
<td>Stanthorpe urban water supply</td>
</tr>
<tr>
<td>Glenlyon Dam</td>
<td>99%</td>
<td>254 GL</td>
<td>Supports NSW/Qld supplemented water system</td>
</tr>
<tr>
<td>Coolmunda Dam</td>
<td>87%</td>
<td>69 GL</td>
<td>Macintyre Brook WSS</td>
</tr>
<tr>
<td>Warrego</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cunnamulla Weir</td>
<td>100%</td>
<td>4.8 GL</td>
<td>Cunnamulla WSS</td>
</tr>
</tbody>
</table>

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

#### 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; Queensland Border Rivers catchment in 2009; and the Condamine and Balonne in 2011. The Cap targets for all QMDB catchments have been determined for the 2010–11 water year and are specified in Table 16.

**Table 16** also summarises annual diversions compared to Cap targets for the QMDB catchments. For all catchments annual diversions are well below the 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 16: Annual diversions compared to Cap targets (GL)

<table>
<thead>
<tr>
<th>System</th>
<th>Long-term diversion cap</th>
<th>This year’s Cap target</th>
<th>Overland flow included in target</th>
<th>Cap adjustment for environmental water</th>
<th>Cap adjustment for trade and environment</th>
<th>Cap target adjusted for trade and environment</th>
<th>This year’s total diversion</th>
<th>Cap credits (target less diversion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warrego</td>
<td>47.9</td>
<td>93.6</td>
<td>0.0</td>
<td>n/a</td>
<td>0.0</td>
<td>93.6</td>
<td>11.4</td>
<td>82.2</td>
</tr>
<tr>
<td>Paroo</td>
<td>0.18</td>
<td>0.08</td>
<td>0.01</td>
<td>n/a</td>
<td>0.0</td>
<td>0.08</td>
<td>0.06</td>
<td>0.02</td>
</tr>
<tr>
<td>Nebine</td>
<td>6.4</td>
<td>3.1</td>
<td>0.1</td>
<td>n/a</td>
<td>0.0</td>
<td>3.1</td>
<td>0.2</td>
<td>2.9</td>
</tr>
<tr>
<td>Moonie</td>
<td>34.9</td>
<td>76.8</td>
<td>2.0</td>
<td>n/a</td>
<td>0.0</td>
<td>76.8</td>
<td>29.2</td>
<td>47.6</td>
</tr>
<tr>
<td>Border Rivers</td>
<td>250.3</td>
<td>587.11</td>
<td>187.1</td>
<td>-5.6</td>
<td>19.7</td>
<td>601.2</td>
<td>420.8</td>
<td>180.4</td>
</tr>
<tr>
<td>Condamine and Balonne</td>
<td>729</td>
<td>1656.01</td>
<td>391.1</td>
<td>n/a</td>
<td>0.0</td>
<td>1656.0</td>
<td>983.6</td>
<td>672.4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1068.7</td>
<td>2416.7</td>
<td>580.3</td>
<td>-5.6</td>
<td>19.7</td>
<td>2430.8</td>
<td>1445.3</td>
<td>985.5</td>
</tr>
</tbody>
</table>

1 Long-term diversion caps include modelled overland flow component
2 Cap target includes estimated overland flow
3 Diversion includes estimated overland flow

The Cap proposals for all Queensland valleys, other than the Warrego and the Paroo, included an estimate of overland flow harvesting which was output from the models of these valleys. It would be possible to test Cap compliance by comparing the estimated diversions including overland flow take with the modelled diversion including overland flow take. However, for the last two years, Queensland has replaced the modelled overland flow take with the estimated overland flow take before testing compliance (instead of reporting modelled overland flow as diverted overland flow as occurred previously). Thus, only the diversions from the river are effectively subject to audit.

In years such as 2010–11 access to overland flow was considerable, and the diversions of many irrigators were constrained by the size of their storage. Under these conditions, the Cap model will assume that the irrigator diverts from the river as much as possible. However, irrigators may find it more convenient to fill their storages with overland flow rather than diverting directly from the river. Under the accounting method adopted by Queensland, this will generate spurious Cap credits. The Queensland argument for not auditing against the modelled overland flow harvesting is that there is considerable uncertainty both in the estimation and the modelling of overland flow take.

To enable assessment of the sensitivity of this change to the calculation of Cap credits, Queensland provided the modelled overland flow takes to the IAG. The results are shown in Table 17.

Table 17: Impact of using modelled overland flow take on Cap credits in 2010–11

<table>
<thead>
<tr>
<th>Valley</th>
<th>River diversion</th>
<th>Overland flow take</th>
<th>Modeled river diversion</th>
<th>Modeled overland flow take</th>
<th>Cap credit using actual overland flow take</th>
<th>Cap credit using modelled overland flow take</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nebine</td>
<td>0.1</td>
<td>0.1</td>
<td>3.0</td>
<td>5.0</td>
<td>2.9</td>
<td>7.8</td>
<td>4.9</td>
</tr>
<tr>
<td>Moonie</td>
<td>27</td>
<td>2</td>
<td>75</td>
<td>15</td>
<td>48</td>
<td>61</td>
<td>13</td>
</tr>
<tr>
<td>Border Rivers</td>
<td>235</td>
<td>182</td>
<td>400</td>
<td>40</td>
<td>180</td>
<td>37</td>
<td>-142</td>
</tr>
<tr>
<td>Condamine/ Balonne</td>
<td>593</td>
<td>391</td>
<td>1265</td>
<td>306</td>
<td>672</td>
<td>586</td>
<td>-85</td>
</tr>
<tr>
<td>Total</td>
<td>855</td>
<td>575</td>
<td>1,743</td>
<td>366</td>
<td>903</td>
<td>692</td>
<td>-209</td>
</tr>
</tbody>
</table>
These results show that there is some scope for overestimating Cap credits by ignoring the modelled overland flow take. Similar issues will arise in NSW but in that State, no estimate is made of overland flow harvesting.

In Queensland, water resource planning incorporates provisions for sharing water between human consumptive needs and the environment. Environmental water requirements are met through a rules-based approach that essentially ensures that flows, as determined by specific flow metrics in the water resource plans, remain in the system. Consequently, held environmental entitlements are restricted to water allocations gifted by the Queensland Government to the Commonwealth Environmental Water Holder (CEWH) from unallocated water in the water resource plan area or recovered by the CEWH from water allocation holders.

Water gifted to the CEWH has been provided from unallocated water set aside in the Warrego, Nebine, Moonie and Border Rivers catchments. This previously unallocated water is not included in Cap targets. Water recovered by the CEWH has previously been included in Cap targets and Cap targets will now be adjusted to account for the volume of held environmental water entitled to be taken. A method is currently being considered by Queensland and will subsequently be submitted to the MDBA for approval.

**Warrego Catchment**

**Resource availability**

Monthly rainfalls from July 2010 through to March 2011 were generally above average. The highest rainfall was recorded in November 2010; with a quarter of the annual rainfall falling in this month. Total rainfall for the 2010–11 year recorded at Cunnamulla was 500 mm, compared to an average annual rainfall of 377 mm.

Stream flow for the Warrego River at Cunnamulla for the 2010–11 water year was 1,301 GL – well above the average annual flow of 517 GL and the fourth highest flow on record. A total of 618 GL, nearly half of the 2010–11 annual flow, passed the gauging station in December 2010.

The normal summer flow pattern in the Warrego River continued, with the main flows occurring in December 2010 and January 2011, and additional smaller flows in October 2010 and March 2011.

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 2010–11 water year from the Cunnamulla Weir Water Supply Scheme was 100 %. Supplemented water diversion was less than 1 GL, from an available entitlement of 2.6 GL.

The take of unsupplemented water within this catchment must be in accordance with stated flow conditions at a specified reference point. Diversion of unsupplemented water for the 2010–11 water year was 10.6 GL.

There were eight announced periods to take unsupplemented water in the Upper Warrego Water Management Area and six periods of announced flow in the Lower Warrego Water Management Area for 2010–11. The first events commenced in September 2010 and the last ended in April 2011.

While the majority of works are equipped with water meters, metering the larger works was deferred until National Standards had been finalised. The Department of Environment and Resource Management (DERM) intended to complete metering on these works in 2010. However, meter installation was delayed due to flooding and infrastructure damage in 2010 and the intent now is to complete these in September/October 2011. Meters will be installed in accordance with manufacturer’s specifications if pattern approvals are not available. Water use assessments are currently completed for each of these works.

The CEWH holds two unsupplemented entitlements in the Warrego catchment.

A total of 16 GL [total volumetric limit associated with entitlements] of Commonwealth-held in-stream (un-supplemented) environmental water was retained within the Warrego catchment as environmental flow during the 2010–11 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 between September 2010 and April 2011.
- In the Lower Warrego, Commonwealth-held in-stream environmental water contributed to the first post-winter flow in the system – which is known to be a critical spawning cue for native fish species.
- During March to April 2011, Commonwealth-held in-stream environmental water also contributed to an overbank flow that charged the nationally significant Warrego River distributary system and Yantabulla Swamp.

CEWH Held environmental water is not included in the Cap target.
Cap compliance
Annual diversion of 11 GL was significantly lower than the Cap target of 94 GL. Water entitlement holders did not fully avail themselves of the access opportunities provided during the year for a number of reasons, including that property infrastructure and entitlements were not fully developed. Diversions since the start of Cap accounting in this valley in July 2006 have been 76.8% less than the annual Cap targets.

Paroo Catchment
Resource availability
Rainfall recorded for 2010–11 at Hungerford in the southern part of the Paroo catchment was 673 mm. This was more than double the long-term average of 297 mm and well over the 2009–10 total of 463 mm. The peak monthly rainfall received was in February 2011 – with 142 mm falling against the long-term average for February of 36 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 489 GL for the 2010–11 water year. This is below the average annual flow at Caiwarro Gauging Station of 551 GL (1968 to 2011) and significantly less than the 2,040 GL recorded in the 2009–10 water year. As in the Warrego catchment, nearly half the annual flow (227 GL) passed the gauging station in December 2010.

There are no supplemented water allocations in this catchment. There are only two unsupplemented water allocations in the Paroo catchment. Diversion for irrigation was 0.01 GL. Water diverted in the Paroo catchment is metered. An additional 0.04 GL was taken for urban purposes.

Overland take from floodplain flows for the catchment is estimated at 0.01 GL; based on a broad assessment of infrastructure, development and opportunity.

The annual diversion of 0.06 GL was under the 2010–11 Cap target of 0.08 GL. Diversions since the start of Cap accounting in this valley in July 2006 have been 5.2% less than the annual Cap targets.

Nebine Catchment
Resource availability
Rainfall was above average in the Nebine catchment with 483 mm recorded at Mulga Downs in the south of the catchment for the 2010–11 water year, against an average of 401 mm. Rainfall was well above average in the first half of the water year but below average from January to June 2011.

The mean annual flow from the Nebine catchment (including the Noorana 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 four full years of recording. This gauging station is 10.5 km upstream of the Queensland/New South Wales border. A number of small flow events were recorded at the Roseleigh Crossing station and Wallam Creek at Cardiff (upstream of Bollon).

Flows in Wallam Creek at Cardiff and Nebine Creek at Roseleigh for 2010–11 totalled around 2 GL and 8 GL respectively, considerably less than the 2009–10 water year’s flows of 314 GL and 110 GL.

No supplemented water supply exists in this catchment. There are only four unsupplemented water allocations in the Nebine catchment. Diversion of unsupplemented water was 0.1 GL.

An additional 0.1 GL of overland flows were diverted in the catchment.

While some works are equipped with water meters, completion of meter installation has been delayed due to flooding and infrastructure damage in 2010. The intent now is to complete these in September/October 2011. Meters will be installed in accordance with manufacturer’s specifications if pattern approvals are not available. Water use assessments are currently completed for each of these works.

The CEWH holds one unsupplemented entitlement in the Nebine catchment. The flow levels needed to trigger access under Commonwealth water allocations were not met and therefore no Commonwealth-held environmental water was made available in the system in the 2010–11 water year. Held environmental water is not included in the Cap target.

Annual diversion of 0.2 GL (including overland flow take) was significantly lower than the Cap target of 3 GL. Diversions since the start of Cap accounting in this valley in July 2006 have been 93.9% less than the annual Cap targets.

Moonie Catchment
Resource availability
Rainfall was above average in the first half of the 2010–11 water year and below average in the second half. Rainfall at Nindigully, located on the Moonie River in the south west of the catchment, was 568 mm for the year, compared to the average of 504 mm. The peak monthly total of 90 mm was recorded in November 2010.
Stream flow for the Moonie River at Fenton, the most downstream gauge in Queensland, was 543 GL in 2010–11. This was more than three times the recorded annual average (of 158 GL) at this site.

There were a number of flows from October 2010 through to April 2011, with the main flow of 351 GL occurring in January 2011. Record flooding at this time provided an opportunity for floodplain harvesting.

No supplemented water supply exists in this catchment.

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

Diversion for 2010–11 has been estimated at 27 GL, with take primarily occurring in December 2010 and January 2011.

While the majority of works are equipped with water meters, metering the larger works was deferred until National Standards had been finalised. DERM intended to complete metering on these works in 2010. However, meter installation was delayed due to flooding and infrastructure damage in 2010, and the intent now is to complete these in September/October 2011. Meters will be installed in accordance with manufacturer’s specifications if pattern approvals are not available. Water use assessments are currently completed for each of these works.

Overland flow harvesting from floodplain flows in the catchment is estimated at 2 GL – based on a broad assessment of infrastructure development and opportunity. Overland flow take is included in the Cap target for the Moonie catchment.

The CEWH holds one unsupplemented entitlement in the Moonie catchment.

A total of 1.4 GL of Commonwealth-held environmental water remained in-stream in the Moonie catchment. Whilst this is a small volume compared to other river inflows, it complemented floodplain flows of the lower Moonie River.

Held environmental water is not included in the Cap target.

The 2010–11 annual diversion for the Moonie catchment was 29 GL (including the floodplain component of overland flow), well below the Cap target of 77 GL. Diversions since the start of Cap accounting in this valley (in July 2006) have been 46.9% less than the annual Cap targets.

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**Border Rivers Catchment**

**Resource availability**

Rainfall was above average across the Border Rivers catchment for the year. The upper catchment around Stanthorpe recorded 1,183 mm of rainfall compared to an average of 757 mm; with a total of 400 mm falling in December 2010 and January 2011. The lower catchment around Goondiwindi recorded 818 mm of rainfall for the year compared to an average of 600 mm, with 139 mm falling in September 2010. This was the highest September rainfall on record for this location.

Flows in the Border Rivers during the 2010–11 water year were well above average, with record flows in a number of locations. The main flows were recorded in January 2011.

The flow passing Farnbro on the Dumaresq River during the 2010–11 water year was 431 GL; the highest on record and more than five times the average annual flow (of 81 GL) at Farnbro. A total of 203 GL passed the gauging station in January 2011.

A total of 458 GL passed the Booba Sands gauging station on the Macintyre Brook during the water year, compared to an average annual flow of 108 GL. Nearly half of the annual flow (220 GL) passed the gauging station in January 2011.

Flows in the Macintyre River at Goondiwindi for the 2010–11 water year were 3,005 GL; the highest on record and nearly 400 GL higher than the previous record set in 1983-84. The passing flow was again highest in January 2011 at 1,029 GL.

The flow passing Talwood on the Weir River was 485 GL during the water year, compared to an average annual flow of 147 GL. In January 2011, the flow passing Talwood totalled 234 GL.

There are two major water supply storages in the Queensland part of the Border Rivers catchment. At 1 July 2010, Glenlyon Dam, the major storage for the Borders Rivers Water Supply Scheme (BRWSS), was at 22% of capacity. 11 GL was available for general use from the Queensland share of the storage. The storage finished the year at 99 % of capacity, with around 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 13 % of capacity (9 GL) and filled in September 2010. The dam finished the year at 87 % of capacity.
In the 12 months to 30 June 2011, 31 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. In 2010–11, no bulk water supply was provided from the Macintyre Brook Water Supply Scheme to the Border Rivers Water Supply Scheme. The take of water transferred from NSW (23 GL net) is also included in the total diversions.

A total of 10 GL of supplemented water was diverted in the Macintyre Brook Water Supply Scheme.

From early August 2010, flows triggered water harvesting access under the water sharing rules on the Border Rivers. 160 GL was diverted over multiple events. Water harvesting thresholds were also triggered in the Weir River, with 30 GL diverted in this catchment.

A further 2.6 GL was diverted for direct irrigation purposes or stored for later use in the Granite Belt.

An additional 0.8 GL was taken for urban use; taking the total unsupplemented diversions in the Border Rivers to 193 GL for 2010–11.

The majority of diversions in this catchment are 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. Area-based licences are scheduled for metering in 2012.

An estimated 187 GL of overland flow water was taken through floodplain harvesting in the Border Rivers and Weir River catchments.

During the 2010–11 water year, the CEWH held one unsupplemented entitlement and 17 supplemented entitlements in the Border Rivers catchment.

In accordance with the access conditions on their water allocations, the Commonwealth was entitled to take 3,000 ML of unsupplemented water in the Border Rivers catchment. This water remained in-stream, contributing to flows in the Border Rivers and further downstream.

There were 5.6 GL of supplemented water available under Commonwealth entitlements in the Border Rivers 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 2010–11 annual diversion for the Border Rivers catchment was 421 GL (including the floodplain component of overland flow); well below the Cap target of 601 GL. Diversions since the start of Cap accounting in this valley (in July 2008) have been 27.2% less than the annual Cap targets.

**Condamine and Balonne Catchment:**

**Condamine sub catchment**

**Resource availability**

Rainfall was generally above average across the Condamine area. Annual rainfall across the area was around 1,100 mm, against an average of 670 mm. The main falls were in December 2010, January 2011 and March 2011.

The main flow events in December 2010 and January 2011 (as well as a number of smaller flow events) passed along the entire Condamine system. Annual flows recorded at Cecil Plains Weir, Chinchilla and Cotswold were the highest on record, while the flow at Warwick was the second highest on record.

A total of 470 GL passed Warwick, in the upper reaches of the system, while 2,064 GL passed Cecil Plains Weir, 4,722 GL passed Chinchilla and 6,408 GL passed Cotswold at the end of the Condamine system over 2010–11.

The major storage for the Upper Condamine Water Supply Scheme is Leslie Dam, which commenced the year at 9% capacity. Inflows to the dam began in August 2010, with the dam level steadily increasing until, on 5 January 2011, the water level rose to spill-over point for the first time in over 20 years, releasing water from the dam. Dam levels have remained high, with the dam finishing the year at 99% 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 in November 2010.

The Chinchilla Weir, on the mid-Condamine River, started the year at 78% capacity and filled in September 2010. The weir has remained at 100% capacity since. Announced allocations for the Chinchilla Weir Water Supply Scheme were 100%.

A total of 12 GL of supplemented water was diverted in the Condamine catchment in 2010–11; with 11.5 GL diverted in the Upper Condamine scheme and less than 1 GL at Chinchilla. The volume diverted in the Upper Condamine was from ‘run of the river’ flows, which are made available for diversion subject to minimum flow conditions.
There were twelve water harvesting events announced between August 2010 and June 2011 in the Upper Condamine Water Management Area. July 2010 was the only month of the water year in which no water harvesting access was announced. Eight events were announced for the Condamine River North Branch, with 3,450 ML of water extracted. In comparison, two events were announced in the 2009–10 water year, with 3,390 ML extracted.

The volume of unsupplemented water taken in the Condamine catchment over 2010–11 is estimated at 58 GL, with the majority of take (45 GL) occurring upstream of Chinchilla Weir. About 17 GL of unsupplemented water was diverted for direct irrigation. Of this 9.5 GL was taken from flows supplemented by treated effluent discharged from Toowoomba into the Gowrie-Oakey Creek system. An additional 1.1 GL was taken for urban use.

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 is intended to be metered by July 2012.

An estimated additional 201 GL of overland flow water was taken through harvesting on the Upper Condamine Floodplain; bringing the total take in the Condamine catchment to 272 GL.

**Condamine and Balonne Catchment: Balonne and Maranoa sub catchments**

**Resource availability**

Rainfall in the Balonne and Maranoa was above average for the 2010–11 water year, with 644 mm falling at St George (on the Balonne River) compared to an average of 518 mm. At Mitchell (on the Maranoa River) 932 mm was recorded, compared to an average of 567 mm. The December 2010 rainfall in Mitchell was the highest on record for that month and 60 mm greater than the previous December record.

The heavy rainfalls in the Condamine and Balonne catchment (recorded in December 2010 and January 2011) resulted in record flows in the Balonne (comprising flow through from the Condamine plus tributary inflow). The passing flow at Weribone (on the Balonne River) was 8,163 GL, compared to an average annual flow of 1,238 GL. The flow passing St George was 8,535 GL, compared to an average flow of 1,246 GL. The main flows occurred in January 2011, with 5,287 GL passing Weribone in the month and 5,953 GL passing St George.

The main flows in the Maranoa River were recorded in December 2010, with 524 GL out of the annual total of 886 GL passing in that month. Annual flow was well over the long-term average of 144 GL.

Beardmore Dam started the year at 85 % capacity. The first inflow into Beardmore Dam commenced in mid-September 2010 and filled the dam. Inflows continued throughout the year, with the dam remaining at 100 percent capacity.

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. From mid-September 2010, all inflows up to 730 ML/day were passed downstream for environmental, stock and domestic purposes.

A total of 57 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 mid-September 2010 and May 2011 resulted in the triggering of take under flow condition – based water allocations. Total estimated take in the Lower Balonne was 463 GL, taken over seven announced periods. Flooding in the Lower Balonne between September 2010 and April 2011 allowed an additional take of 191 GL in floodplain harvesting.

An additional 0.02 GL of water was taken in the Maranoa catchment.

Surface water take under water allocations in the Lower Balonne is metered to varying standards. A project is underway to bring all meters in line with the National Standard by July 2012. The project includes measurement of water in the Lower Balonne, taken under the authority of overland flow licences.

The Condamine and Balonne Resource Operations Plan was amended on 26 March 2010 to include the Lower Balonne part of the catchment. A Cap proposal was submitted to the MDBA in October 2010, and was noted by the MDBA as meeting the requirements of Schedule E in March 2011.

The 2010–11 annual diversion for the Condamine and Balonne catchment was 984 GL (including the floodplain component of overland flow); 40% below the Cap target of 1,656 GL.
4.4.4. Administration of the Cap

Measures taken during the year (2010–11)

A Cap proposal for the Queensland Border Rivers was noted by the MDBA (Chief Executive acting as the Authority) on 26 March 2009. It was 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.

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-Balonne and Border Rivers models will be undertaken once the audit of the Barwon-Darling model is completed.

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.

4.4.5. IAG assessment

Following above average rain in the majority of Queensland Basin valleys, total diversions, including overland flow harvesting, were 1,445 GL compared to 1,232 GL in 2009–10. This was the highest level of diversions recorded. Overland flow diversions are estimated to be 580 GL of this total.

The process of establishing Caps for Queensland Murray–Darling Basin valleys started in 1996 and was completed in 2011. The Condamine and Balonne Cap proposal was submitted to the MDBA in October 2010 and, following audit by the IAG was noted by the MDBA (the Chief Executive acting as the Authority) on 30 March 2011.

Cap models for the Warrego, Paroo, Nebine and Moonie (after review by the independent model auditor) have been approved by the Authority.

Cap targets were able to be set for 2010–11 for all valleys. Diversions were within targets in all valleys.

The IAG notes that the models that have been developed for the Queensland system have needed to rely upon a wide range of information. In part this has included ‘irrigator estimates’ of some diversions that have occurred off the flood plains. These are pre-existing works that are authorised under the moratorium on new works that has been applied.

Not all of these diversions have been fully accounted for at this stage.

It is intended that the process of metering and adoption of new technology to capture harvested quantities will gradually result in improved data for these diversions. This is not considered to be a major issue, but will have some implications for the models and the operating plans as more reliable information becomes available. For the larger flood plain diverters, there are estimates included in the models based on best available information, and these estimates continue to be checked and assessed.

Metering continues to be implemented for surface water diversions from streams and rivers. Programs are in place through the State-wide metering project to finalise metering in the remaining catchments. Implementation has been delayed by flooding but is expected to be finalised by mid-2012.

A strategy and resourcing for monitoring diversions is in place. This will enable relatively accurate measurement; other than for overland flow diversions and end-of-valley flows. It will also provide an appropriate basis for compliance audits. In addition, Queensland has introduced a strong compliance program across the whole State, which effectively monitors the operation of licences and off take of water in accordance with those licences.

Queensland, in developing the Water Resource Plans and Resource Operation Plans, has provided the framework for delivery and accounting for its own environmental water. The recent purchases (or gifting) of water that changes the use from ‘consumptive’ to ‘environmental’ now needs to be accommodated in terms of the Long-term Cap and Annual Cap targets. Queensland has developed a paper for internal consideration and subsequent consideration and approval through MDBA processes.
This issue is common to all of the States and the IAG encourages the States to develop agreed method/s for use in the Basin to ensure appropriate levels of transparency and accountability.

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

4.4.6. Conclusions/recommendations

- Total diversions in 2010–11 were estimated to be 1,445 GL compared to 1,232 GL in 2009–10.
- The total includes 865 GL of stream diversions and an estimated 580 GL of overland flow harvesting.
- An exceptionally strong La Niña system caused well-above average rainfall from August 2010 to January 2011, triggering record flooding across the QMDB catchments and resulting in end-of-system flows totalling 9,367 GL. New maximum annual stream flow volumes were set in both the Condamine and Balonne and Border Rivers catchments.
- The volume of water passing the key monitoring sites during the 2010–11 water year was generally in the order of three to six times the long-term annual average flow; with the exception of the Paroo, where the volume of water passing was 90% of the long-term annual average flow.
- The Cap is set for all Queensland valleys; and Cap targets were available for all valleys. Estimated use was below the relevant Cap target for all valleys. The IAG recommends that Queensland standardises its methods for determining Cap credits – by using modelled overland flow take, rather than estimated take, in calculating the annual Cap targets.
- Overall, Queensland diversions have been 41.5% below the Cap targets since the start of Cap accounting.
- A metering program is being progressively rolled-out as part of a Queensland state-wide project to meter all entitlements. The project will ensure reliable information on water use is available as the Resource Operation Plans are being implemented. Flooding has delayed implementation, but it is expected to be substantially completed in 2012.
- Queensland is encouraged to finalise an agreed method to account for environmental water within the Cap framework.

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 ACT as:
  
  Until the Basin Plan in the *Water Act 2007* (Commonwealth) comes into effect, the ACT Cap is:

  1. 40 GL (42 GL minus 2 GL saving allocated to TLM) climate-adjusted as recommended by the IAG; plus
  2. ACT Cap is reviewed and increased by 0.75 of the current per capita consumption of water for population growth of Canberra and Queanbeyan; with 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 ACT 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 SA 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 ACT as:

1. The Government of the ACT must ensure that diversions from the designated river valley in the ACT 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:

   - for the prevailing climate during the water year by reference to the model developed under sub-clause 11(4); and
   - 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 ACT must ensure that no water or water entitlement that is used for urban purposes will be transferred for use outside the ACT, unless that water or water entitlement has been transferred for use within the ACT 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.

5. The Authority must, for the purposes of maintaining the Cap Register referred to in sub-clauses 13(7) and 13(8), take into account 107 GL of cumulative Cap credit existing at the end of 2006-07.

While there are still issues of interpretation, as required, the IAG has audited against Schedule E.

The ACT has reported on its diversion of water against the long-term diversion Cap.

Diversions and returns for 2010–11 are provided in Table 18.

While the ACT Cap has been agreed; a Cap model to determine its annual Cap target has not been settled.

The ACT is proposing to use the potable demand modelling of the ACT and Queanbeyan water use currently used by the ACT’s utility, the ACTEW Corporation.

The ACT’s proposed model is adjusted for climate and also accounts for water restrictions and population growth.

The ACT has been working towards finalising its Cap with the MDBA by putting forward a model, supported by a number of related papers and data, presenting a complete picture of ACT’s position. ACT awaits a response from MDBA.

The inclusion of diversions controlled by the Commonwealth under the ACT Cap is an issue on which there is some disagreement between the ACT and the MDBA officials. Although the volumes are not large, this matter needs to be resolved to clarify future Cap reporting and auditing.

Diversions reported in Table 18 relate only to those made under licences issued by the ACT 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 ACT 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 ACT. To expedite this transfer, the Commonwealth has prepared amendments to the legislation; but Parliament is yet to pass the legislation. The ACT enacted related legislative amendments in August 2010 to enable it to manage Commonwealth water resources. At this stage the ACT does not have the legal capacity to account for and manage the Commonwealth water resources within its borders.

4.5.2   Administration of the Cap

During 2010–11, the ACT catchments received significant increase in rainfall runoff, easing pressure on supplies. The ACT was declared drought-free in November 2010. This resulted in the lifting of temporary water restrictions and the re-introduction of permanent water conservation measures.

Due to the combination of above average rainfall and government demand-management initiatives, the ACT’s net diversions were well below its long-term diversion Cap.

<table>
<thead>
<tr>
<th>System</th>
<th>Long-term Diversion Cap</th>
<th>ACTEW diversion</th>
<th>Direct diversion</th>
<th>LMWOQC return</th>
<th>QSTP return</th>
<th>Net diversion</th>
<th>Net trade</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT</td>
<td>40</td>
<td>40.9</td>
<td>1.2</td>
<td>32.3</td>
<td>2.6</td>
<td>7.2</td>
<td>Nil</td>
</tr>
</tbody>
</table>

LMWOQC – Lower Molonglo Water Quality Control Centre
QSTP – Queanbeyan sewage treatment plant
In May 2008, the ACT referred a proposal to enlarge the Cotter Dam to the former Murray–Darling Basin Commission under Clause 46 of the Murray–Darling Basin Agreement. The enlargement of the Dam is not expected to have a significant effect on the availability of flows in the remainder of the Murray–Darling River system. A report sent to the Commission in November 2008 on the impact of the enlarged Cotter Dam and was subsequently considered by its Natural Resources Management Committee. Construction is well underway and completion is expected by mid-2012.

There was no new industrial use and no future new Commonwealth water requirements in 2010–11; and hence no calls for additional water under the ACT Cap provisions.

There was no external water trading by the ACT and four small internal entitlement trades.

The Tantangara Transfer project involves transferring water from the regulated Murrumbidgee River to the ACT via the Snowy Mountains Scheme. The transfer will help combat the drastic effects of climate change on the ACT’s water supply, by providing access to a source of water not dependent upon local rainfall. ACTEW has completed the purchase of its water portfolio for the project. This included 4.15 GL of high security water entitlements and 12.52 GL of general security entitlements. Cap adjustments would be made as water comes into the ACT.

The Tantangara Transfer is dependent upon the Murrumbidgee to Googong Water transfer project currently under construction and due for completion in 2012. ACTEW expects the operational requirements of the project to be in place so that the Tantagara Transfer can be used from 2012-13 onwards.

4.5.3. Monitoring and reporting

The ACT has established a system of volumetric licences for all users of water in the territory. The ACT is able to report its consumptive usage against information provided by licence holders. As ACTEW Corporation (the water service provider in the ACT) is the main licensed user of water from the system, 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 ACT.

Despite the growth in population, ACT’s internal water use has fallen dramatically from the high of 46 GL (net) in 1990–91 to a record low of 7.2 GL. This is reported to be the result of long-term water conservation measures and a significant increase in rainfall runoff.

Dam storage levels were 98.6% in late August 2011.

4.5.4. IAG assessment

Net diversions of 7.2 GL in the ACT during 2010–11 were a record low. These results do not include Commonwealth diversions which, in gross terms, are possibly no more than 1 GL.

The ACT is currently awaiting Commonwealth legislation to be able to manage and report Commonwealth water use.

A climate-adjusted model has been developed. This model incorporates a population correction factor. It is expected that this model will be submitted to the MDBA for auditing and will be formally accredited by 30 June 2012. The IAG welcomes progress on this matter.

The IAG notes that it has previously recommended to Ministerial Council that the ACT model also include the provision for surface and ground water usage. While the ACT believes that these volumes can be measured with a fair degree of certainty, it holds the view that these flows are outside of the Cap.

The IAG also notes that its recommendations from the 2009–10 audit, regarding the difference in interpretation of Schedule E and the Ministerial Council decision, remains outstanding.

4.5.5. Conclusions/recommendations

- Net diversions of 7.2 GL were a record low and well below the long-term diversion Cap target of 40 GL.
- Progress has been made towards the inclusion of the Commonwealth diversions in the diversions reported by the ACT. The IAG understands that this matter will be finalised and the reporting requirements met during 2011-12 once the Commonwealth legislation is passed.
- The IAG welcomes progress on the development of a model for calculating a climate-adjusted Cap and its submission for auditing and accreditation.
- The ACT and the Authority need to resolve 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). Should the matter remain unresolved, the IAG recommends that a submission be made to the Ministerial Council.
5. Diversions from the Murray–Darling Basin in 2010–11

Summary of diversions 2010–11

Murray–Darling Basin diversions in 2010–11 totalled 6177 GL. This was the fifth lowest annual diversion since 1983-84 and was only 64% of the average diversion over the same period. Diversions for the individual valleys in the Murray–Darling Basin are presented in Table 19.

Table 19: Murray–Darling Basin diversions in 2010–11

<table>
<thead>
<tr>
<th>System</th>
<th>Total diversion (GL)</th>
<th>Percentage of Basin diversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>New South Wales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intersecting Streams</td>
<td>3</td>
<td>0.1%</td>
</tr>
<tr>
<td>Border Rivers</td>
<td>187</td>
<td>3.0%</td>
</tr>
<tr>
<td>Gwydir</td>
<td>271</td>
<td>4.4%</td>
</tr>
<tr>
<td>Namoi/Peel</td>
<td>275</td>
<td>4.4%</td>
</tr>
<tr>
<td>Macquarie/Castlereagh/Bogan</td>
<td>178</td>
<td>2.9%</td>
</tr>
<tr>
<td>Barwon-Darling/Lower Darling</td>
<td>123</td>
<td>2.0%</td>
</tr>
<tr>
<td>Lachlan</td>
<td>89</td>
<td>1.4%</td>
</tr>
<tr>
<td>Murrumbidgee</td>
<td>1475</td>
<td>23.9%</td>
</tr>
<tr>
<td>Murray</td>
<td>667</td>
<td>10.8%</td>
</tr>
<tr>
<td><strong>Total New South Wales</strong></td>
<td>3268</td>
<td><strong>52.9%</strong></td>
</tr>
<tr>
<td>Victoria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goulburn/Broken/Loddon Cap Valley</td>
<td>525</td>
<td>8.5%</td>
</tr>
<tr>
<td>Campaspe</td>
<td>22</td>
<td>0.3%</td>
</tr>
<tr>
<td>Wimmera-Mallee</td>
<td>10</td>
<td>0.2%</td>
</tr>
<tr>
<td>Murray/Kiewa/Ovens Cap Valley</td>
<td>537</td>
<td>8.7%</td>
</tr>
<tr>
<td><strong>Total Victoria</strong></td>
<td>1094</td>
<td><strong>17.7%</strong></td>
</tr>
<tr>
<td>South Australia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metro-Adelaide &amp; Associated Country Areas</td>
<td>56</td>
<td>0.9%</td>
</tr>
<tr>
<td>Lower Murray Swamps</td>
<td>14</td>
<td>0.2%</td>
</tr>
<tr>
<td>Country Towns</td>
<td>34</td>
<td>0.6%</td>
</tr>
<tr>
<td>All Other Uses of Water from the River</td>
<td>258</td>
<td>4.2%</td>
</tr>
<tr>
<td><strong>Total South Australia</strong></td>
<td>362</td>
<td><strong>5.9%</strong></td>
</tr>
<tr>
<td>Queensland</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condamine/Balonne</td>
<td>984</td>
<td>15.9%</td>
</tr>
<tr>
<td>Border Rivers/Macintyre Brook</td>
<td>421</td>
<td>6.8%</td>
</tr>
<tr>
<td>Moonie</td>
<td>29</td>
<td>0.5%</td>
</tr>
<tr>
<td>Nebine</td>
<td>0.20</td>
<td>0.0%</td>
</tr>
<tr>
<td>Warrego</td>
<td>11</td>
<td>0.2%</td>
</tr>
<tr>
<td>Paroo</td>
<td>0.01</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Total Queensland</strong></td>
<td>1445</td>
<td><strong>23.4%</strong></td>
</tr>
<tr>
<td>Australian Capital Territory</td>
<td>7</td>
<td>0.1%</td>
</tr>
<tr>
<td><strong>Total Basin</strong></td>
<td>6177</td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>
The diversions over the last five years all rank in the lowest five years of usage in the last 28 year period since 1983-84. Of the 28 years since 1983-84, total Basin diversions in 2010–11 ranked 24; diversions in New South Wales ranked 24, Victorian, SA and the ACT ranked 28 being the lowest in that time and Queensland ranked 1 being the highest on record. Of the total water diverted, New South Wales diverted 53%, Victoria 18%, Queensland 23%, South Australia 6% and the ACT 0.1%. Annual diversions since 1983 are plotted in Figure 1 and Figure 2.

Figure 1: Murray–Darling Basin Diversions – 1983-84 to 2010–11

![Figure 1: Murray–Darling Basin Diversions – 1983-84 to 2010–11](image1)

Figure 2: Murray–Darling Basin diversions – 1983-84 to 2010–11
[Queensland, South Australia and Australian Capital Territory]

![Figure 2: Murray–Darling Basin diversions – 1983-84 to 2010–11](image2)
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, as this may be of assistance in interpreting individual valley performance in the latest year.

The following graphs provide details of the climate-adjusted Cap and diversion data to 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-to-date data has been provided, or 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 ‘All Other Purposes’ and Lower Murray Swamps

Figure 5: Cap compliance – Victorian Goulburn/Broken/Loddon
Figure 6: Cap compliance – Victorian Murray/Kiewa/Ovens

Figure 7: Cap compliance – Victorian Campaspe
Figure 8: Cap compliance – Victorian Wimmera-Mallee

Figure 9: Cap compliance – New South Wales Barwon-Darling
Figure 10: Cap compliance – New South Wales Lower Darling

![Figure 10: Cap compliance – New South Wales Lower Darling](image)

Figure 11: Cap compliance – New South Wales Barwon-Darling/Lower Darling

![Figure 11: Cap compliance – New South Wales Barwon-Darling/Lower Darling](image)
Figure 12: Cap compliance – New South Wales Gwydir

Figure 13: Cap compliance – New South Wales Namoi/Peel
Figure 14: Cap compliance – New South Wales Macquarie/Castlereagh/Bogan

Figure 15: Cap compliance – New South Wales Lachlan
Figure 16: Cap compliance – New South Wales Murrumbidgee

Figure 17: Cap compliance – New South Wales Murray
Diversions from the Murray–Darling Basin in 2010–11

Figure 18: Cap compliance – NSW Border Rivers

Figure 19: Cap compliance – Queensland Border Rivers
**Figure 20: 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 continues to work on measures to refine implementation of the Murray—Darling Basin Ministerial Council Cap on Diversions and supports the ongoing development and updating of Cap models to take into account changed conditions, system operating rules, the restructuring of water entitlements and the recovery of water for the environment.

The annual diversions in each of South Australia’s four Cap valleys remained below the annual Cap targets in 2010—11. The All Other Purposes Cap was adjusted by South Australia for use of The Living Murray (TLM) water recovered in South Australia. Water recovered for the environment and all licensed environmental water use and trade was removed from the annual Cap calculations in accordance with the Cap Adjustment Protocol for Environmental Water, adopted by Ministerial Council at meeting 45 – 23 May 2008. This was noted by the IAG and included in the 2010—11 assessment.

The following further refinements to the Cap management arrangements in South Australia will occur during 2011—12.

South Australia will establish a process to account for long-term carryover arrangements currently being developed in accordance with the requirements of South Australia’s storage right under Schedule G of the Murray—Darling Basin Agreement 2008. Schedule G sets out the rules giving effect to, and accounting for, South Australia’s right to store (defer) Entitlement Flow in the Murray—Darling Basin Authority (MDBA) controlled storages for critical human water needs and private carryover and to subsequently deliver that water.

The Department for Water will continue to work co-operatively with the MDBA to modify the All Other Purposes Cap model to include a restriction function for when annual allocations are below 100% of water access entitlement. The restriction allowance is already included in Table 5, of the 2010—11 review report.

The Country Towns Cap is also subject to restrictions through allocation announcements made by the Minister for the River Murray. The methodology for imposing the Country Towns restrictions differs from that applied to the All Other Purposes and Lower Murray Swamps Cap valleys but is consistent with the methodology for determining the critical human water needs volume in the proposed Murray—Darling Basin Plan.

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 2011—12. This will include an allowance for restrictions, arrangements to manage carryover, and processes for adjusting the annual cap for environmental water recovery, use and trade. The amalgamation will require an amendment to Schedule E Cap on Diversions. The proposal must be submitted to the Basin Officials Committee for consideration and to the Legislative and Governance Forum on the Murray—Darling Basin (formerly Ministerial Council) for approval.

Work will continue on the development of a new climate adjusted model of diversions from the River Murray for Metropolitan Adelaide and Associated Country Areas to take account of demand, local Mount Lofty inflows, system operating rules and to include an allowance for the implementation water restrictions. South Australia will continue to liaise with the MDBA in the development, refinement and implementation of this new model.
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 2010–11 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. Accredited Cap models or updated versions of these models for Goulburn—Broken—Loddon, Campaspe and Murray—Kiewa—Ovens Valleys were used to calculate the 2010–11 Cap targets and cumulative cap credits for these valleys. An interim model, which the Water Audit [Cap] Advisory Panel (WAP) recommended for Murray—Darling Basin Authority (MDBA) approval, has been used to calculate Cap targets for the Wimmera—Mallee valley. This is the last of the Victorian Cap models to be accredited.

During 2010—11, diversions from each of Victoria’s four designated valleys were below their Cap targets. Above average annual rain and record summer rain reduced demand for diversion for irrigation. Carryover of unused allocation is the main contributor to the significant Cap credits generated in 2010—11. All the Victorian valleys have accumulated Cap credits to 30 June 2011.

Victoria proposes to continuously improve the performance of its hydrological models where practicable. The Campaspe and Murray models have been updated and all updated models will be reviewed by WAP before being considered for approval by the MDBA. The IAG has noted Victoria’s proposal to replace the Wimmera—Mallee Cap model with an updated post-pipeline condition model as per the model auditor’s recommendation.

The IAG also noted that Victoria has created a 40 GL environmental entitlement in the Murray in recognition of the historical practice of diverting unregulated flows into riverine wetlands such as Gunbower Forest. They also noted that usage against this entitlement falls outside the Cap.
There remain a large number of generally small water users on unregulated rivers and streams whose water use is not metered across the Basin, and states have generally been providing estimates of these comparatively small volumes of water use each year. For this year, NSW has updated these estimates for its northern valleys, continuing the practice of providing the best available information to the review of Cap implementation each year. In the future, NSW intends to bring forward further information as it becomes available, including as a result of the planned expansion of meters in unregulated streams that NSW will be undertaking with the support of the Commonwealth government. In this context NSW does not support the IAG’s recommendation to pursue review or validation of un-metered use estimates for a small subset of valleys in the short term.

The severe drought that has persisted over much of NSW during the last decade has been brought to a close with widespread flooding and one of the wettest summers on record in the 2010—11 water year. Most valleys in NSW have experienced major flooding, with many storages filling and spilling. This also meant that most valleys received full allocations and the suppressed demand for water in 2010—11 has resulted in large volumes of water available to carryover into 2011—12. With the breaking of the drought, the water sharing plans were largely recommenced, barring some water trade rules, and record volumes of environmental water use occurred throughout the year. Accordingly, the Cap accounting arrangements have increased in their complexity to ensure that environmental water use is excluded from both the recorded diversions and the modelled Cap estimates. The number and type of entitlements that are being recovered for the environment across the basin are increasing, and developing appropriate arrangements for the Cap on diversions remains a priority for NSW. In this context, NSW does not support the IAG recommendation to adjust annual Cap targets each year for water recovered for the environment, based on long-term averages. This approach could lead to significant over (or under) estimates of Cap in particular years.

Despite the many challenges that were brought about by the swift transition from managing droughts to floods, NSW continued to implement the Murray—Darling Basin Ministerial Council Cap on diversions. The Independent Audit Group’s report notes that cumulative diversions since the commencement of the Cap in 1997—98 are below Cap in all NSW valleys.

Throughout 2010—11, NSW continued to make significant progress towards accreditation of valley Cap models, including recalibration of the Barwon—Darling valley Cap model. The NSW Border Rivers is now the only remaining Cap model for major river systems to be presented for accreditation, and this is expected to occur in 2011—12.
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.

Developing an agreed methodology to account for environmental water

Queensland is developing a methodology for accounting for held environmental water and anticipates being in a position to discuss this with the Authority cap audit team over the course of 2011—12 with an expectation to have an agreed approach in place to support the 2011—12 reporting cycle.
Water use

The volume of gross diversions and net diversions for the ACT was again lower than average and was in keeping with the trend since 2003. In fact the volume of gross diversions for urban use at 40.9 was the lowest on record (ie since 1989—90). The ACT net diversions was also the lowest on record at 7.2 GL. This decrease is largely the result of above average rainfall in 2010 after a prolonged drought and the continued maintenance of conservative water use by the ACT community.

In November 2010 the temporary water restrictions scheme was suspended and the permanent water conservation measures scheme re-introduced. The ACT Government has continued to maintain its water demand management program which is designed to reduce consumer demand for potable water and in particular for outside water use.

Cap

The ACT net diversions for 2010—11 are well within the agreed Cap.

As reported in 2009—10 the ACT has been developing a Cap model on potable water demand for the ACT and Queanbeyan. It is essentially the model developed by ActewAGL for ACT and Queanbeyan water use. The model is climate adjusted and water restrictions adjusted. It also incorporates adjustments for population growth.

The ACT has put forward the model supported by a number of related papers and data and is currently awaiting comments and feedback on the model from the Murray—Darling Basin Authority. The ACT seeks to resolve this matter so that the ACT Cap model eventually becomes accepted. It does not include Commonwealth Government water resources within the ACT, namely Lake Burley Griffin as these water resources are outside ACT ownership.

Other comments

As stated in 2009 —10 the ACT does not yet have the responsibility to manage and account for water under Commonwealth controlled water as the ACT simply does not have that power and that responsibility is yet to be given to the ACT. During 2009—10 progress was made for the ACT to manage Commonwealth controlled water owned within the ACT. However in 2010—11 the proposed legislation has been delayed in the Commonwealth Parliament and is yet to be passed. The ACT will manage such water (under 1 GL) but this will be additional water owned and used by the Commonwealth for Commonwealth/ national water needs within the ACT, for example for national institutional watering requirements. The ACT will not have rights to this water as such.

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.
7. Appendix B: Status of Cap models under Schedule E

<table>
<thead>
<tr>
<th>Cap Valley</th>
<th>Cap set</th>
<th>Model needed</th>
<th>Model built</th>
<th>Model name</th>
<th>Submitted for audit</th>
<th>Audited</th>
<th>Approved</th>
</tr>
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<tbody>
<tr>
<td><strong>New South Wales</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Intersecting Streams</td>
<td>x</td>
<td>✓</td>
<td>X</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Border Rivers</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>Border Rivers IQQM</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Gwydir</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Gwydir IQQM</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Namoi/Peel</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Namoi IQQM</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Macquarie/Castlereagh/Bogan</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Macquarie IQQM</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Barwon-Darling / Lower Darling</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Barwon-Darling IQQM</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Lachlan</td>
<td>✓</td>
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<td>Lachlan IQQM</td>
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<tr>
<td>Murrumbidgee</td>
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<td>✓</td>
<td>Murrumbidgee IQQM</td>
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<tr>
<td>Murray</td>
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<td>✓</td>
<td>MSM</td>
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<td>✓</td>
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<tr>
<td><strong>Victoria</strong></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Goulburn / Broken / Loddon</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>GSM REALM</td>
<td>✓</td>
<td>✓</td>
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<td>Campaspe</td>
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<td>✓</td>
<td>✓</td>
<td>GSM REALM</td>
<td>✓</td>
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<tr>
<td>Wimmera-Mallee</td>
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<td>✓</td>
<td>W-M REALM</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
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<tr>
<td>Kiewa / Ovens / Murray</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>MSM</td>
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<td>Metro-Adelaide &amp; Associated Country Areas</td>
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<td>✓</td>
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<td>All Other Uses of Water from the River Murray</td>
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<td>✓</td>
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<td>Border Rivers &amp; Macintyre Brook</td>
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<td>✓</td>
<td>Border Rivers IQQM</td>
<td>✓</td>
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<td>Nebine IQQM</td>
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<td>Paroo IQQM</td>
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<td><strong>Summary of 24 Basin Valleys</strong></td>
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8. Appendix C: Issue paper prepared for IAG on adjustment for environmental water recovery

Ministerial Council Meeting 45 – 23 May 2008 agreed to a protocol that removed the use of water for environmental purposes from the accounting for the Cap. Where the water used for environmental purposes came from entitlements that previously supplied diversions that were part of the Cap, the protocol specifies that the annual Cap targets should also be reduced. The protocol requires the States to propose the methods they plan to use to reduce the Cap targets and to submit those methods to the Murray–Darling Basin Authority for approval. Victoria has submitted its method which was approved by the Authority on 30 October 2010. The other States have not yet formally submitted the methods that they propose to use.

The volume of entitlement that has been recovered has grown rapidly over the last few years. At 30 June 2011, TLM had recovered entitlements with a face value of 982 GL and the CEWH 992 GL. Adjusting for the recovery of these entitlements is now a major component in assessing Cap compliance.

The basic method proposed by Victoria and the method used to date by the other States is to reduce the annual Cap targets by the use of the environmental entitlements in the year. The logic behind this approach is that the entitlements purchased for the environment do not change their characteristics and that the environmental managers have the same right to fully utilise their allocations as other users.

However, a key aim of the water recovery for TLM and of the water recovery by the CEWH for the Basin plan is to reduce the long-term average diversion in the Basin by a target amount. For the TLM, the aim was to achieve a Long-term Cap Equivalent (LTCE) of 500 GL. For the CEWH, the aim is to bridge the gap between the Baseline Diversion Limits and the Sustainable Diversion Limit; both of which are defined as a long-term average diversion over an 1895-2009 benchmark period. The TLM business plan contained a list of Cap factors that related the volume of each type of entitlement purchased with the long-term average Cap reduction. A similar set of Long-term Diversion Limit Equivalent (LTDLE) factors is being developed to relate the entitlements purchased to the volume of ‘gap’ that has been bridged. In both cases, the factors have been developed to represent the ultimate diversion right associated with an entitlement, rather than its current usage.

The experience of the last few years is that, in many ways, the use of environmental entitlements differs from use for non-environmental purposes. Environmental entitlements purchased on unregulated streams (such as the purchase of Toorale entitlement on the Barwon/Darling) are deemed to be using water when the flow is allowed to proceed downstream undiverted. In 2010/11, 34.3 GL of Victorian TLM supplementary access entitlement was deemed to be transferred from Victoria to SA and hence to the Coorong. In reality, flow was unregulated at the time and it could not have been stored in either Lake Victoria or the Lower Lakes. In both cases the environmental outcome was unaffected by the decision to deem the water to be used. Although it is expected that the active management of environmental entitlements will maximise the environmental benefits obtained, modelling shows that the environment benefits by a reduction in diversions – even if it is unmanaged. Unused water that is allowed to fill and spill from storage increases the frequency of all flood events. It is therefore an important environmental outcome that TLM and the CEWH achieve their target reduction in long-term average diversions.

Basing the environmental adjustment to the Cap on use of environmental entitlements therefore is subject to two risks:

1. If the water used (or claimed to be used) by the environmental water holders is less, on average, than the LTCE of the entitlement purchased, then the full environmental benefit that has been paid for will not be achieved; or

2. If the environmental water holders use all their environmental allocation, then the long-term reduction in the Cap may exceed the planned LTCE, which could affect the rights of third parties. This could cause problems – especially if the deeming of water used was seen to be arbitrary or if the use of water was perceived to be aimed largely at reducing the diversion limit.
The experiences of 2010–11 highlight the difficulty that environmental water holders may have in using their entitlements in some years. A normal entitlement holder has the right to divert water at a site, but not to request a flow rate at that site, or to call for water to be released from storage. Once the limited sites which can be watered with offtakes or pumps have been addressed, opportunities for normal entitlement use may not exist. A normal entitlement holder may transfer his water to another valley by means of trade but, if flow out of the valley is unregulated, this may not result in additional flow being supplied in that year. Only when the volume of water traded exceeds the volume of unregulated flow would any increase in the flow occur. Best use of environmental entitlements may be obtained by carrying over water and using it in a large volume. However, carryover in some states incurs a 5% penalty, and in other years may spill before it can be used. All these issues could contribute to under-usage of environmental allocations if the environmental entitlements are to be treated the same as other users.

Even if changes were made to enable environmental allocations to be used to meet a target flow at a site, there may be an environmental reason not to use an allocation. Water released from storage in June, for example, may be little more than a pre-release of water which may have spilled from storage later in the year when the timing and magnitude of the flow is more beneficial.

An alternative to reducing the Cap by the use of the environmental allocation would be to scale down the annual Cap targets in such a way that, when tested against the long-term, the average annual Cap targets reduce by the desired LTCE. An example could be the All Other Purposes (AOP) Cap in South Australia. The AOP Cap model has been prepared such that the average Cap over the long-term is 449.9 GL/year. In 2010–11, the effective volume of entitlement recovered by the TLM and the CEWH (as determined by the allocations made to those entitlements) was 86.7 GL. Based upon a TLM Cap factor of 0.9, this entitlement is equivalent to a LTCE of 78.0 GL. The annual Cap target determined by the Cap Model was 404.1 GL. The scaling method would result in the annual Cap target in 2010–11 being reduced by $404.1 \times \frac{78.0}{449.9} = 70.1$ GL.

The advantage of the scaling approach to environmental adjustment is that the diversion limit will be reduced by the target amount, regardless of the way that environmental water holders manage their holding. This enables environmental water holders to manage that holding for the best interests of the environment, without consideration or criticism regarding the impact that management has on the diversion limit. It also reduces the practical difficulties of managing to a system based on environmental use – which over the last two years has proved difficult, not least because some environmental entitlement is inside Cap and some outside.
9. Appendix D: Victorian Cap valleys compliance

Figure 21: Cap compliance – Victorian Goulburn/Broken/Lodden
Figure 22: Cap compliance – Victorian Murray

**Victorian Murray**
Divisions and Cap Targets
(modelled component only)

**Murray / Kiewa / Oven Valley Cap Compliance**

- Cumulative Cap Credit
- Compliance Trigger (20% of long-term Cap)
Figure 23: Cap compliance – Victorian Campaspe
Figure 24: Cap compliance – Victorian Wimmera Mallee
10. Glossary

<table>
<thead>
<tr>
<th><strong>ACTEW</strong></th>
<th>Australian Capital Territory Electricity and Water Corporation.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>announced allocation</strong></td>
<td>The percentage of water entitlement declared available for diversion from a regulated stream in a season.</td>
</tr>
<tr>
<td><strong>annual allocation</strong></td>
<td>The annual volume of water available for diversion from a regulated stream by an entitlement holder.</td>
</tr>
<tr>
<td><strong>authorised use</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Border Rivers</strong></td>
<td>The rivers and tributaries forming, or intersecting, the border between New South Wales and Queensland.</td>
</tr>
<tr>
<td><strong>Bulk Entitlement</strong></td>
<td>A perpetual entitlement to water granted to water authorities by the Crown of Victoria under the Water Act 1989.</td>
</tr>
<tr>
<td><strong>carryover</strong></td>
<td>An unused entitlement from one season that can be used in the next year.</td>
</tr>
<tr>
<td><strong>channel capacity</strong></td>
<td>The maximum rate at which water can be delivered through a river reach or an artificial channel.</td>
</tr>
<tr>
<td><strong>COAG</strong></td>
<td>Council of Australian Governments.</td>
</tr>
<tr>
<td><strong>diversion</strong></td>
<td>The movement of water from a river system by means of pumping or gravity channels.</td>
</tr>
<tr>
<td><strong>diversion licence</strong></td>
<td>Specified licences issued for a specified annual volume and diversion rate.</td>
</tr>
<tr>
<td><strong>DNR</strong></td>
<td>The Department of Natural Resources (of New South Wales).</td>
</tr>
<tr>
<td><strong>DNRMW</strong></td>
<td>The Department of Natural Resources Mines and Water (of Queensland).</td>
</tr>
<tr>
<td><strong>DSE</strong></td>
<td>The Department of Sustainability and Environment (of Victoria)</td>
</tr>
<tr>
<td><strong>dozer allocation</strong></td>
<td>An allocation that is not fully utilised.</td>
</tr>
<tr>
<td><strong>DWLBC</strong></td>
<td>The Department for Water, Land and Biodiversity Conservation (of South Australia).</td>
</tr>
<tr>
<td><strong>EC (unit)</strong></td>
<td>Electrical conductivity unit; 1 EC = 1 micro-Siemens per centimetre measurement at 25°C. Commonly used to indicate the salinity of water.</td>
</tr>
<tr>
<td><strong>end-of-valley flows</strong></td>
<td>The flow regime at the end of a valley.</td>
</tr>
<tr>
<td><strong>floodplain harvesting</strong></td>
<td>The diversion of water from a floodplain into storage(s).</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>FMIT</td>
<td>First Mildura Irrigation Trust.</td>
</tr>
<tr>
<td>gigalitre [GL]</td>
<td>One thousand million or 10⁹ litres.</td>
</tr>
<tr>
<td>GL</td>
<td>Gigalitre: one thousand million or 10⁹ litres.</td>
</tr>
<tr>
<td>G-MW</td>
<td>Goulburn-Murray Water (of Victoria).</td>
</tr>
<tr>
<td>gravity districts</td>
<td>Districts which use gravity to divert the flow of water from the river.</td>
</tr>
<tr>
<td>high security entitlement</td>
<td>An entitlement which does not vary from year to year and is expected to be available in all but the worst droughts.</td>
</tr>
<tr>
<td>IAG</td>
<td>Independent Audit Group.</td>
</tr>
<tr>
<td>LV</td>
<td>Licence Volume.</td>
</tr>
<tr>
<td>impoundment</td>
<td>The storage of water diverted from a watercourse.</td>
</tr>
<tr>
<td>irrigation</td>
<td>Supplying land or crops with water by means of streams, channels or pipes.</td>
</tr>
<tr>
<td>MDBA</td>
<td>Murray-Darling Basin Authority.</td>
</tr>
<tr>
<td>MDBC</td>
<td>The former Murray-Darling Basin Commission.</td>
</tr>
<tr>
<td>MDBMC</td>
<td>Murray-Darling Basin Ministerial Council.</td>
</tr>
<tr>
<td>megalitre [ML]</td>
<td>One million litres. One megalitre is approximately the volume of an Olympic swimming pool.</td>
</tr>
<tr>
<td>Ministerial Council, the</td>
<td>Murray-Darling Basin Ministerial Council.</td>
</tr>
<tr>
<td>ML</td>
<td>Megalitre: one million litres. One megalitre is approximately the volume of an Olympic swimming pool.</td>
</tr>
<tr>
<td>Murray–Darling Basin Agreement</td>
<td>The Agreement between the Governments the Commonwealth, New South Wales, Victoria, SA, Queensland and the ACT. The current Agreement is the 2008 Agreement.</td>
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<tr>
<td>off-allocation</td>
<td>When unregulated tributary inflows or spills are sufficient to supply irrigation needs and downstream obligations.</td>
</tr>
<tr>
<td>on-farm storage</td>
<td>Privately owned storages used to harvest surplus flows or to store unused allocations for use in the following season.</td>
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<tr>
<td>overdraw</td>
<td>Water diverted in one season against a prospective allocation in the subsequent year.</td>
</tr>
<tr>
<td>overland flow</td>
<td>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.</td>
</tr>
<tr>
<td>permanent transfer</td>
<td>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.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>private diverters</td>
<td>Licensed to operate privately-owned pumps or diversion channels; includes river pumpers and diverters, as well as town water supplies.</td>
</tr>
<tr>
<td>property right</td>
<td>In this context, the right to ownership of allocated volumes of water.</td>
</tr>
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<td>RAMSAR wetland</td>
<td>A wetland listed on the Register of Internationally Significant Wetlands established by the Convention at Ramsar.</td>
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<tr>
<td>regulated streams/waterways</td>
<td>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.</td>
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<tr>
<td>riparian</td>
<td>Of, inhabiting, or situated on the bank and floodplain of a river.</td>
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<tr>
<td>RIT</td>
<td>Renmark Irrigation Trust.</td>
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<tr>
<td>sales water</td>
<td>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.</td>
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<td>salinity</td>
<td>The concentration of dissolved salts in groundwater or river water; usually expressed in EC units.</td>
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<td>sleeper allocation</td>
<td>An allocation that does not have a history of water usage.</td>
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<td>temporary transfer</td>
<td>Water entitlements transferred on an annual basis.</td>
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<tr>
<td>unregulated streams</td>
<td>Streams that are not controlled or regulated by releases from major storages.</td>
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<td>utilisation</td>
<td>The amount of water available for diversion that is actually diverted.</td>
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<td>water entitlement</td>
<td>The legal right of a user to access a specified amount of water in a given period.</td>
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<tr>
<td>Water -harvesting</td>
<td>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.</td>
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<tr>
<td>WAMP</td>
<td>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.</td>
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<td>WR</td>
<td>Water Rights.</td>
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<td>WSP</td>
<td>Water Sharing Plan. Plans developed under the New South Wales Water Management Act, 2000 for equitable sharing and management of New South Wales water resources.</td>
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<tr>
<td>WUE</td>
<td>Water Use Efficiency.</td>
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