



MURRAY-DARLING BASIN AUTHORITY

Review of Cap Implementation 2007-08

Report of the Independent Audit Group

March 2009

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Independent Audit Group Members

Denis Flett (chair)

Paul Baxter

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March 2009

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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Prepared by the Murray–Darling Basin Authority, Canberra, as per the requirement of the *Murray–Darling Basin Agreement* (Schedule E, Clause 15).

In December 2008, the Murray–Darling Basin Authority assumed responsibility for all functions of the former Murray–Darling Basin Commission.

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(left) Chifley Dam, Bathurst NSW © Irene Dowdy
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AUDITORS' FOREWORD

March 2009

Mr Rob Freeman
Chief Executive
Murray–Darling Basin Authority
GPO Box 1801
Canberra ACT 2601

Dear Mr Freeman

We have pleasure in submitting to you our *Review of Cap Implementation 2007–08. Report of the Independent Audit Group.*

Council established the Cap in 1995 and set the operating framework in 1996.

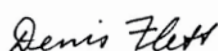
It is pleasing to report that there has been some important progress in the implementation of the Cap, particularly in the finalisation of the Cap for the ACT, and the submission of a Cap proposal for the Queensland component of the Border Rivers which we have recommended be approved by Council. A Cap proposal for the NSW section of the Border Rivers is expected to be finalised in 2008–09. However, it is still not possible to report on the timing for finalisation of a Cap for the Condamine–Balonne.

Our initial assessment of Cap compliance for the 2007–08 year has identified that the cumulative diversions in the combined Barwon–Darling Lower Darling Cap valley has exceeded the trigger for a special audit. Consequently, we have undertaken a special audit of this valley and have now determined that the combined Barwon–Darling Lower Darling is in breach of the Cap.

The continuation of the severe drought conditions has reinforced the previously identified need for the recalibration of models to better reflect the extreme conditions and management responses not experienced during the period over which the models were calibrated. The IAG has also expressed some concern that the application of water restrictions and their treatment in the modelling has resulted in the calculation of significant apparent cap credits.

We also advise that a number of specific additional matters and issues are raised in the report and highlighted via conclusions and recommendations in the Executive Summary.

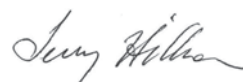
Yours sincerely



DENIS FLETT
Chairman



PAUL BAXTER
Member



TERRY HILLMAN
Member

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EXECUTIVE SUMMARY

Following the adoption of Schedule E by the Council for operationalising, monitoring and reporting on Cap implementation, this audit was conducted in line with the requirements of Clause 15 of the Schedule.

At 4,482 GL, diversion from rivers in the Murray–Darling Basin was the lowest on record reflecting drought conditions throughout most of the Basin. The results for 2007–08 continue the pattern of lowest diversions on record for the Basin, notwithstanding the high level of diversions in Queensland following significant rainfall events over the water year.

The 2007–08 audit identifies progress in each of the states and the ACT in establishing and/or operationalising the Cap. The key issues are:

- the submission and consideration of a Cap proposal for the Queensland part of the Border Rivers valley
- ongoing delays in finalising a Cap for the Condamine–Balonne
- the prospect that a Cap for the NSW section of the Border Rivers being finalised in 2008–09
- the continuing need for recalibration of models to better model extreme conditions and management responses not experienced during the period over which the models were calibrated
- the impacts of the application of water restrictions on the calculation of Cap credits and concerns regarding the apparent Cap credits that have been generated by failing to make adjustments for these restrictions in the models
- the cumulative debits for the combined Barwon–Darling Lower Darling designated river valley exceeded the trigger for a special audit. Subsequently, following a special audit, the IAG determined the combined Barwon–Darling Lower Darling to be in breach of the Cap.

Queensland has submitted a proposal for a Cap for the Queensland component of the Border Rivers valley. The IAG has considered this Cap proposal against the six principles established in its 1996 *Setting The Cap Report* and also considered the process adopted by Queensland to derive the Cap. The IAG considers that the Queensland proposal is consistent with these principles, and accordingly has recommended that the proposed climate-adjusted Cap be adopted by Ministerial Council. The IAG has also determined that the process adopted

was fully transparent, consultative, and sought to take in to account the views of all stakeholders and interests. The Cap will be administered through the use of a yet to be accredited IQQM model. The model is expected to be submitted for accreditation under the Schedule E arrangements during the 2008–09 year, with the first Cap results being available for audit review at the end of the 2008–09 year.

An interim Inter-Governmental Agreement that deals with interstate water sharing and access arrangements for the Border Rivers catchment has been negotiated between Queensland and New South Wales although final signing of this agreement has been delayed until later in 2008. The provisions in the Inter-Governmental Agreement are reflected in Queensland's Resource Operations Plan and the New South Wales Water Sharing Plan. The NSW *Border Rivers Regulated River Water Sharing Plan* is progressing and a Cap proposal is expected to be submitted to MDBA in 2008–09 with accounting against this Cap to commence for the 2008–09 year.

The Resource Operations Plan (ROP) for the Condamine–Balonne was released in draft form in April 2007 with finalisation expected by early 2008. However, a judicial review action has delayed finalising of the plan. Queensland has committed to submitting a Cap proposal no later than six months after a resource operations plan is in place for the whole of the Condamine Balonne catchment. It is expected that the ROP will be finalised and the Cap proposal submitted during 2009.

Further progress has been made on the finalisation and submitting of models for independent assessment and accreditation. As previously reported, the IAG recognises that models may need to be recalibrated if conditions are experienced that are outside those that occurred during the period over which the model was originally calibrated.

Recognising the impact on the models that restrictions on water may have on the generation of Cap credits, the IAG has previously recommended that all Cap models used to calculate annual diversion targets, as required by Schedule E, should incorporate mechanisms to account for water restrictions.

Furthermore, the IAG has drawn attention to the need for, and recommended that action be taken to recalibrate models to take into account the more recent unprecedented water availability and diversion experience as the drought across the Basin

has worsened. **The IAG again calls for action to review and adjust models for the impact of water restrictions on Cap credit outcomes, and the need to make adjustments to models in the context of the current severe drought conditions.**

While the IAG continues to have confidence in the models, it acknowledges the need to recalibrate the models. It is therefore of some concern that as part of the current audit, the IAG has found that some jurisdictions have not undertaken the recalibration and upgrading of their relevant models not withstanding previous commitments to do so.

The audited and accredited Cap models provide the base upon which all parties can have confidence in the operation of the Cap as agreed by Ministerial Council. It is therefore of some concern that the models should be allowed to become outdated and less reliable as a means of monitoring performance and ensuring compliance under the Cap.

The IAG has considered issues arising from the updating of the models, and in particular the issue of the impact of changes in historical Cap calculations or diversion data as more up to date information becomes available. In considering this matter, the IAG has taken the view that it is required under Schedule E to undertake an audit of the most recent water year, and for that purpose it should use the most up to date information that is available in terms of model calculations and diversion data.

The IAG expects that jurisdictions will be timely in their updating of their models and historical data so as to allow full transparency of all information, and thereby strengthen trust in the Cap reporting and auditing process. To this end, the IAG will in future years report on changes in historical data or model results on Cap outcomes on a valley by valley basis, and expects updating of models and historical data to be undertaken when the need for an amendment becomes apparent. The IAG would expect that all amendments will occur when they are identified, and will only accept as an excuse for a delay if it can be demonstrated that:

- the change is immaterial
- the change required will be part of a significant model or data change planned over the next 12 months, or
- there is insufficient data upon which to make a change

Where a change has not been made, the IAG will reserve the right to make qualitative comments on the information that is available, and thereby provide full transparency to readers of the IAG's Report to allow informed debate and action on the evidence available.

In the context of possible amendments to the Cap models or to historical data, the IAG has been asked to consider what action it may take given the possibility that such changes could alter a valley's compliance with the Cap in a previous year. The IAG has taken the view that it is the most recent year that it is auditing, and it is in the context of all available data for that year that it is asked to give a report on whether or not there has been compliance with the Cap. However, it is of interest to all parties, and can be of assistance in considering the implications of the most recent year's outcomes, to consider the latest historical information based upon updated data and models. Thus, the IAG will from this year include in its Report a series of updated graphical presentations highlighting the past performance of each valley in terms of the climate-adjusted Cap, and the extent to which there are debits or credits against the Cap for that valley.

In summary, the detailed conclusions and recommendations reached by the IAG for 2007–08 by State and Territory are:

South Australia

- Diversions in 2007–08 were 416 GL compared to diversions of 627 GL in 2006–07.
- Diversions in 2007–08 were constrained as a result of restrictions due to ongoing drought conditions and were within the annual Cap targets for Metropolitan Adelaide, Country Towns and *All Other Purposes* Cap valleys.
- Diversions for the Lower Murray Swamps Cap valley are currently not fully metered and are assumed to equal the allocation. In 2007–08 the Lower Murray Swamps were subject to 32% allocations and diversions were assumed to equal 32% of the allocation less temporary trade. Full metering is expected to be completed in 2008–09.
- South Australia has a reliable measuring system for urban and irrigation use.
- The South Australian *All Other Purposes* Cap model was approved by the Authority in November 2004.
- **The IAG recommends that South Australia develop a model of diversions from the River Murray for Metropolitan Adelaide. This model should simulate urban demand, inflows from the local Adelaide Hills Catchments and the operation of the supply system. It should be used to generate annual Cap targets, and make allowances for water restrictions which would otherwise result in the artificial growth in Cap credits. The model should be accredited by June 2009.**

- In the interim should South Australia continue to require a 'First Use Licence' to cover growth; these growth estimates should be provided to the IAG.
- Although work on this matter has been delayed by commitment to the drought program, South Australia still proposes to amalgamate remaining Lower Murray Swamps Cap components with the *All Other Purposes* Cap, while retaining the Environmental Land Management Allocation as a non-tradable component within the *All Other Purposes* Cap. This is supported by the IAG, as it has no impact on the Cap volume within South Australia and is administratively more convenient.
- **The IAG recommends that an allowance be included in the calculation of the annual diversion targets for Metropolitan Adelaide, Country Towns, the Lower Murray Swamps and the All Other Purposes Cap valleys for the imposition of water restrictions. Desirably this adjustment should be incorporated in the models which calculate the Cap targets since this would be consistent with the practice used in the other States. However, to ensure equity between the restriction-adjusted Cap diversion targets prepared for valleys in other States and those applying in South Australia, the IAG recommends that an adjustment be made in 2008–09 by multiplying the annual diversion target by the relevant final announced allocations and by another appropriate adjustment method to be determined for Metropolitan Adelaide.**
- The IAG notes that:
 - since 1997 diversions for SA Country Towns have been 6 GL per year or 14% below Cap on average despite trade out in some years
 - diversions for *All Other Purposes* have been 46 GL per year or 11% below Cap on average. If these valleys were to increase usage up to Cap levels, additional strain would be put on the Lower Lakes.
- As a general conclusion, the IAG notes that where amendments are made to models used for purposes of determining the Cap or to historical data used in these models to derive Cap or diversion estimates, it is the IAG's intention that the IAG will publish the latest series of revised Cap and diversion data extending back over the period of the Cap. However, in terms of reporting on breaches with the Cap, the IAG will only report on the results for the most recent water year unless earlier years' results are relevant to interpreting the latest year's results.

Victoria

- Diversions in 2007–08 were 1,534 GL compared to diversions of 2,089 GL in 2006–07.
- Diversions for the Murray/Kiewa/Ovens, Campaspe and Goulburn/Broken/Loddon valleys in 2007–08 were below annual climate and trade-adjusted Cap targets.
- However, diversions for the Wimmera–Mallee valley were slightly above the annual Cap target for the year.
- Cumulative diversions since 1997 for all valleys are in credit and are still well short of exceeding the trigger for a special audit.
- The Murray, Campaspe and Goulburn/Broken/Loddon models have been updated or subjected to some modification during the year which has resulted in a slight reduction in the Cap for each of these valleys.
- **The IAG is proposing to review and report on changes in Cap outcomes on a valley by valley basis as and when these occur and expects updating of models and historical data to be undertaken when the need for an amendment becomes apparent unless it can be demonstrated that either the change is immaterial, or the change required will be part of a significant model or data change over the next 12 months, or there is insufficient data upon which to make a change (whereupon the IAG will make qualitative comments where required).**
- Water transferred out of the Goulburn/Broken/Loddon Cap valley by the Goldfields Superpipe should:
 - be treated as a return flow from the Goulburn system
 - reduce the annual Cap target in the Goulburn/Broken/Loddon Cap valley
 - increase the annual Cap target in the Campaspe Cap valley.
- All water used by Bendigo by the Superpipe should be treated as a Campaspe diversion.
- All water transferred to Ballarat via the Superpipe should be treated as a Campaspe diversion.

New South Wales

- Diversions in 2007–08 were 1,463 GL compared to 2,310 GL in 2006–07.
- Cap models have been approved for three NSW valleys, and audited or are in the process of being audited for an additional four valleys. Only the models for the Barwon/Darling and Border Rivers are outstanding.
- Notwithstanding the approval of most of the NSW models, there is a need to incorporate in the models recalibration adjustments reflecting the more recent drought experiences.
- Amendments to models should be approved by the Authority and amended historical data of Cap compliance should be reported annually by the IAG to provide full transparency of all data.
- NSW should submit its long-term ‘current conditions’ modelling for independent audit and assessment.
- The preliminary Schedule E accounting for 1997/98 – 2007/08 period indicates that the cumulative actual diversions in the combined Barwon–Darling/Lower Darling Cap valley are 86 GL above the cumulative annual diversions targets and also above the trigger for a special audit of 62 GL being 20% of the average annual long-term diversion.
- **Following the special audit on the basis of available information, the IAG determines that the combined Barwon–Darling/Lower Darling Cap valley to be in breach of the long-term diversion Cap.**
- **Given that the NSW capping method for the Barwon–Darling aims only to hold future diversions at Cap levels, it is unlikely that the 325 GL debit for this valley will be reduced in the near future.**
- The IAG is concerned that the size (173 GL) and particularly the manner in which the Cap has been applied by NSW to the Barwon–Darling, including unlimited carryover of allocated water from one year to the next, will not ensure that even over the long-term, the Cap will not be exceeded.
- Cumulative Cap credits exist for other valleys in NSW.
- The IAG has been unable to assess the Cap compliance of the NSW Border Review because the Cap has not been defined in that valley. However, the IAG notes that Queensland has now submitted its proposed Cap for the Queensland Border Rivers and it is expected that NSW will submit its Cap during 2008–09.

- 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 of the appropriate allowance for the enlarged Pindari Dam.

Queensland

- Including overland flow harvesting, the total diversion from the Queensland section of the Murray–Darling Basin was 1,055 GL in 2007–08.
- Excluding overland flow diversions, the diversion of 876 GL in 2007–08 was the highest Queensland diversion on record and is considerably higher than the 2006–07 diversions of 149 GL.
- Notwithstanding these high levels of diversion, there were very high flows of water across the border to NSW during the 2007–08 year, reflecting higher than average rains chiefly in the western portion of the Basin.
- Caps for Queensland Murray–Darling Basin valleys have now been set for the Warrego, Paroo, Nebine catchments and the Moonie River, and diversions within these systems have all been found to be within the annual diversion targets.
- A Resource Operation Plan for the Border Rivers is finalised and the proposed Cap for this system has been provided to the IAG for assessment.
- An interim Inter-Governmental Agreement that deals with interstate water sharing and access arrangements for the Border Rivers catchment has been negotiated between Queensland and New South Wales.
- A Resource Operations Plan for the Condamine Balonne system is expected to be finalised by 2009 and Queensland expects to submit the Cap proposals within six months of the finalisation of the Plan.
- A metering program is being progressively rolled out as part of a Queensland state wide project to meter all entitlements. The project includes the replacement of both public and privately owned meters, and will ensure reliable information on water use is available as the Resource Operations Plans are implemented.
- The IAG has reviewed the Queensland Border Rivers Cap proposal for a climate-adjusted Cap based on a long-term average diversion Cap of 250.3 GL per annum and to be administered and audited through a climate-adjusted IQQM for the Border Rivers. The IAG has concluded that this Cap is consistent with the six principles for considering Cap proposals established

by the IAG and endorsed by the Council, and accordingly recommends that Council approve the Cap proposal for the Queensland Border Rivers.

- The IAG also notes that the process adopted by Queensland to derive the Cap for the Border Rivers has been transparent and open to wide stakeholder participation and input thereby reflecting the views and interests of all parties.

Australian Capital Territory

- A climate-adjusted Cap for the ACT has now been agreed.
- Net diversions of 15.6 GL in 2007–08 are well within the agreed Cap.
- **The ACT needs to include surface and ground water diversions in the reporting of 'other diversions' under the agreed Cap.**
- Diversions by the National Capital Authority (NCA) should also be reported separately by the ACT as part of the use of the ACT Cap.
- **To meet the reporting requirement on Commonwealth controlled water in the ACT, the IAG recommends that the Commonwealth take appropriate action to require the National Capital Authority (or other Commonwealth agencies as appropriate) to report to the ACT on an annual water year basis the consumptive use of Commonwealth controlled water in the ACT, and also to report any trade in water to meet consumptive demand above current levels.**
- The ACT needs to bring forward its proposed mechanics for reporting growth in demand by industry, adjustments to the Cap for population growth, and the climate-adjusted model to be used to administer the Cap.

1. INTRODUCTION

In November 1996, the Independent Audit Group (IAG) submitted its report *Setting the Cap* (the IAG Report) to the Murray–Darling Basin Ministerial Council (the ‘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 until 2009.

In October 2005, the two person IAG comprising Dr Wally Cox and Paul Baxter was expanded to three members, with the addition of Denis Flett. This reflected the decision by Council to require the IAG to also undertake the audit of *The Living Murray* initiative and the need for succession planning. *The Living Murray* audit is set out in a separate report *Review of The Living Murray – Implementation Audit 2007–08*.

In August 2007, the Council requested that the IAG undertake an annual review of how the activities and processes that pose a risk to the shared water resources of the Murray–Darling Basin (the ‘risk factors’) are taken into account in water management arrangements for each valley and the Basin. The report of the IAG is provided in a separate report, *Review of Risks to the Shared Water Resources – IAG Review 2007–08*.

The Council has also asked the IAG to review the Queensland Water Resource Planning process, and subsequently the outcomes of the process. This process, which involves significant community participation in both Queensland and northern NSW, was due for completion around the middle of 1998

but has been delayed. It will be the foundation for determining the balance between consumptive and in-stream use in Queensland. The Council has supported the auditing of both the process and outcomes.

The *Review of Cap Implementation 2007–08* 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 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 then comments on the current status of compliance with the Cap in each of the five jurisdictions involved. It should be noted that Cap targets for the Queensland’s Condamine/Balonne and Border Rivers within New South Wales are still to be established. The IAG has recommended in the 2007–08 Report the acceptance of the proposed Cap for the Queensland component of the Border Rivers.

In October 2007, Dr Wally Cox resigned from the IAG. The 2006–07 Audit was conducted with assistance provided to the IAG by Terry Hillman and in 2008, subsequently Terry Hillman was formally appointed as a member of the IAG. The IAG for the 2007–08 review therefore consists of Denis Flett, Paul Baxter and Terry Hillman.

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 Murray–Darling Basin Authority (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 2007*.

2. BACKGROUND

The Council at its June 1995 meeting decided to introduce a Cap on diversion 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
 - 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 be fully implemented, including assessment of downstream impacts in NSW;
- the Precautionary Principle be applied through the establishment of an allocation to be held in reserve to minimise the risk of over allocation for consumptive use
- the final independent audit of the WRP process be 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 which occurred after 1993–94.

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

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

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 inclusion from 2007 of a requirement on the IAG to review jurisdictional responses to the *Risks to Shared Water Resources* project further extends the role of the IAG. It also brings greater focus to the operational rules and procedures used in the day to day management of the river system, and the role this plays in ensuring future availability and security of water for consumptive and environmental use.

The 2006–07 Review of Cap Implementation identified that:

- At 5,303 GL, diversion from rivers in the Murray–Darling Basin was the lowest in the period since 1983–84 reflecting drought conditions throughout most of the Basin. The last five years constitute five of the lowest seven years of diversion in the same period.
- Caps were still to be established for the Border Rivers and the Condamine and Balonne catchments in Queensland, and the Border Rivers in New South Wales. However, Caps had been accepted by the Authority for the Warrego, Nebine and Paroo systems and the Moonie valley in Queensland and these were used for the 2006–07 audit.
- A Cap has been proposed by the ACT, but the IAG, having considered it in the context of the six principles established for this purpose, has recommended that the proposal not be accepted by Council.
- Four models had been accredited to date and others are currently being modified or recalibrated to take into account the unprecedented drought conditions currently being faced in the Basin. The wide application of water restrictions across valleys in the Basin is resulting in an accumulation of credits against the Cap which, if the models were appropriately calibrated, would not be occurring under the Schedule E accounting. The IAG therefore recommends that 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.
- South Australia should develop a model of diversions from the River Murray for Metropolitan-Adelaide. This model should simulate urban demand, inflows from the

local Adelaide Hills Catchments and the operation of the supply system. It should be used to generate annual Cap targets, and make allowances for water restrictions which would otherwise result in the artificial growth in Cap credits. The model should be accredited by June 2009.

- NSW should submit its 'current conditions' modelling to independent audit.
- The Mulwala Loss Allowance should not be subtracted from the NSW Murray Cap Diversion under the current rule. As noted in the 2005–06 IAG Report, 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 IAG recommends that the Council give prior consideration to the consequences of the decision on the integrity of the Cap.
- In South Australia, diversions in 2006–07 were constrained as a result of restrictions due to ongoing drought conditions and were within the annual Cap targets for Metropolitan Adelaide, Country Towns and *All Other Purposes* Cap valleys.
- In Victoria, diversions for the Campaspe and Wimmera–Mallee in 2006–07 were below annual climate and trade-adjusted Cap targets. However, diversions for the Murray/Kiewa/Ovens valley and the Goulburn/Broken/Loddon valley were slightly above the annual Cap targets for the year although below the trigger for a special audit.
- In NSW, diversions in 2006–07 were 2,304 GL compared to 5,038 GL in 2005–06. The preliminary Schedule E accounting for the period 1997/98 – 2006/07 indicates that diversions in the combined Barwon/Upper Darling and Lower Darling Cap valley are cumulatively 57 GL above Cap, but below the combined trigger for special auditing which is set at 62 GL.
- In Queensland, diversions in 2006–07 are estimated at 140² GL, the lowest since 1993–94.
- In the ACT, net diversions of 25 GL in 2006–07 are consistent with the average net diversion between 1989 and 2006 of 31 GL and are also less than a possible climate-adjusted annual Cap target of 51.2 GL. The ACT would have a cumulative credit of 107 GL if the Cap of 40 GL proposed by the IAG had applied since July 1997.

2 Subsequent to the IAG Audit 2006–07, Queensland, based upon updated information, revised the diversion figure to 149 GL in the Water Audit and Monitoring Report 2006–07.

The IAG has made a number of recommendations in the 2007–08 Report. Many of these recommendations relate to the modelling that has been undertaken and the need for updating and recalibration of these models to maintain the integrity and the reliability of the Schedule E accounting for Cap performance reporting.

The IAG has addressed a number of these modelling issues in previous reports. The following provides a broad summary of recommendations that have been made over the last five years, and briefly notes the action that has been taken in response to the recommendations of the IAG.

| Recommendation | Action Taken |
|--|--|
| 2006–07 | |
| To ensure consistency, all Cap models used to calculate annual diversion targets as required by Schedule E, should incorporate mechanisms to account for water restrictions. | Action still awaited. |
| South Australia develop a model of diversions from the River Murray for Metropolitan-Adelaide to be accredited by June 2009. | Agreed by SA but awaiting action. |
| An allowance be included in the calculation of the annual diversion targets for Metropolitan Adelaide, Country Towns, the Lower Murray Swamps and the <i>All Other Purposes</i> licence for the imposition of water restrictions. | Agreed by SA but awaiting action. |
| The Mulwala Loss Allowance should not be subtracted from the NSW 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. | Council has not yet decided to allow the Mulwala Loss Allowance to be deducted from the NSW Murray Cap Diversion. An Authority Committee has recommended it to do so. |
| 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 of the appropriate allowance for the enlarged Pindari Dam. | Awaiting submission of the NSW Border Rivers Cap proposal. |
| 2005–06 | |
| All models be audited and accredited with modified targets for completion of June 2007 for the Murray and Lower Darling (MDBIC), July 2007 for Victoria and New South Wales, and on completion of the Resource Operation Plans by Queensland and prior to establishing a Cap for the ACT. | Out of 24 Cap valleys, the Cap has not been defined for 4 valleys. SA currently does not intend to use Cap models for three of its four Cap Valleys. Of the remaining 17 Cap valleys, Cap models have been approved for seven; and eight Cap models are currently being audited. There are only two valleys where a Cap model has not been submitted for audit. One is the ACT, where the Cap has recently been agreed, but a model is not ready. The other is Wimmera–Mallee, where a Cap model is ready but not yet submitted for audit (the valley has a significant Cap credit because of the replacement of open channel supplies with piped distribution systems). |
| Ministerial Council: i. note that skills shortages are affecting the rate of water reform implementation including finalisation of Cap implementation; and 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. | Skill shortages continue to be an issue facing the effective monitoring of Cap. |

| Recommendation | Action Taken |
|---|---|
| South Australia develop a model of diversions from the River Murray for Metropolitan-Adelaide. | See comment above. |
| Treatment of the Mulwala Loss Allowance. | See comment above. |
| Treatment of Pindari Dam. | See comment above. |
| Queensland will place a proposal for Cap figures for each valley before Council before finalising the statutory process. | Cap proposal for all catchments with exception of Condamine and Balonne have been presented to Council via the IAG. |
| 2004-05 | |
| The ACT, New South Wales and Queensland Governments finalise their Cap arrangements as a priority to provide confidence that there is accountability and transparency in performance against Ministerial Council objectives for the Murray-Darling Basin river systems. | Caps have now been agreed for the ACT, all NSW valleys except the Border Rivers, and all Queensland catchments with the exception of the Condamine and Balonne. |
| Audit and accreditation of all models with modified targets of July 2006 for Victoria and New South Wales (except for Border Rivers by June 2007) and December 2007 for Queensland. | See comment above. |
| Treatment of Pindari Dam. | See comment above. |
| 2003-04 | |
| Queensland and New South Wales finalise the Inter-Governmental Agreement and establish the framework to enable Cap targets to be established for the Border Rivers. | Intergovernmental Agreement (IGA) yet to be formally signed, but Queensland Border Rivers Cap now endorsed by IAG. |
| South Australia and Victoria have all models accredited by 30 June 2005, New South Wales by June 2006 and Queensland by June 2007. | See comments above. |
| 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 of the appropriate allowance for the enlarged Pindari Dam. | See comments above. |
| 2002-03 | |
| A Cap still needs to be finalised for the NSW Border Rivers and the IAG recommends that in cooperation with Queensland, environmental flow rules and water sharing be finalised and a Cap determined in 2004. This also requires a submission from NSW on an appropriate allowance for the Pindari Dam. | See comment above. |
| The IAG recommends that each State and the ACT, where relevant, submit valley models for independent verification with a view to 50% of the models being accredited by 30 June 2004 and 100% compliance by 30 June 2005. | See comment above. |
| The IAG recommends that the only way to accommodate real growth in demand for metropolitan Adelaide is to acquire additional water by way of permanent trade. This water could be by way of a separate licence and would be the first water used, thereby retaining the integrity of the original Cap target of 650 GL rolling average over five years. | See comment above. |
| 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 of the appropriate allowance for the enlarged Pindari Dam. | See comment above. |

3. AUDIT PROCESS

For the purposes of this 2007–08 audit of progress with the implementation of the Cap, the IAG has adopted, where relevant, a consultative approach, designed to:

- clarify expected Cap outcomes where applicable for each State
- gather available statistical information on actual levels of diversions in 2007–08 as a means of quantifying overall diversions and commenting on Cap compliance
- identify progress made in implementing the proposed management rules for capping water diversions
- highlight particular problems being encountered by the relevant jurisdictions as regards the finalisation or implementation of the management rules
- update the status of the Queensland Water Resource Plans and finalisation of Cap figures for Queensland and the Border Rivers in New South Wales.

The IAG met with representatives of each of the States (with the exception of Queensland), the Commonwealth and the ACT during the period 27 to 31 October 2008. The IAG met with representatives from Queensland on 11 November 2008. In relation to the Cap, the format of each meeting was to compare water usage in 2007–08 with Cap targets, to discuss progress with the establishment of models and management frameworks to achieve targets and to discuss issues of possible concern.

For the southern Murray–Darling Basin States (New South Wales, Victoria, South Australia), the ACT and Commonwealth, the IAG also discussed progress in implementing the *Living Murray* initiative. The results of these discussions are reported separately in the *Review of The Living Murray – Implementation Audit 2007–08*.

The IAG drafted its observations and conclusions on progress being made within each State and the ACT and then invited the States concerned 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 MDBA staff, the findings and conclusions presented in this report are entirely those of the IAG.

4. AUDIT OF CAP IMPLEMENTATION 2007–08

4.1 South Australia

4.1.1 The Cap

As a result of decisions by the Ministerial Council in December 1996 and March 2001 and the amendment of Schedule E in March 2008, the components of the South Australian Cap unadjusted for trade 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)
- an average of 449.9 GL per year for *All Other Purposes* in South Australia which is fully tradable including 9.3 GL per year for what was previously the Highlands associated with the Lower Murray Swamp.

A Cap model for the *All Other Purposes* valley has been approved by the Authority and is used to determine the annual climate-adjusted Cap target for this category of diversion. For all other categories there has not been a need for a climate-adjusted Cap model. However, as discussed further below, there is general acceptance for both a refinement of the *All Other Purposes* model to account for current restrictions on use under this category, and the development of a Metropolitan Adelaide model to replace the existing five year rolling average Cap with a Cap similar to other designated valleys which will enable trade to address growth in population in metropolitan Adelaide.

4.1.2 2007–08 Usage

River Murray flows to South Australia were severely constrained during 2007–08 as a result of the ongoing drought conditions and the subsequent low inflows and Basin storage levels. Restrictions on River Murray water use in South Australia were applied again. This was the fifth consecutive year when allocations have been restricted from 1 July.

With the advent of ongoing low inflows and restricted availability, South Australia's diversions from the River Murray were at the lowest level since the implementation of the Cap. The priority for water sharing during 2007–08 was to ensure that each state could guarantee to meet its critical human needs and thereafter water was made available for other consumptive purposes. A total of 1,080 GL was available to South Australia by the end of May 2008, however 200 GL for critical human needs and 60 GL for private irrigation carryover was held back in the upper Murray storages to meet critical needs and carryover in 2008–09.

The South Australian River Murray Drought Water Allocation Policy was suspended due to the implementation of alternative water sharing arrangements agreed by First Ministers and the Murray–Darling Basin Ministerial Council.

An initial allocation of 4% for River Murray irrigators was announced on 1 July 2007 as a result of the low autumn rainfall. As South Australia's allocation from the shared resources of the Southern Murray–Darling Basin increased, the allocation was increased to 32% of entitlement on 14 December 2007. This compares to a final allocation of 60% for 2006–07.

In addition to the 32% allocation, a total of 30 GL that had been carried over from 2006–07 was distributed to eligible irrigators. This was the first time that carryover of unused allocation had been permitted in South Australia. As there was no provision for quarantining the unused water from 2006–07 from the agreed water sharing arrangements the additional water provided to irrigators was from the 2007–08 allocation to South Australia.

As a consequence of ongoing drought and the low flows into South Australia, the pool level downstream of Lock 1 fell to record low levels. River Murray irrigators downstream of Lock 1 were constrained by low water levels and salinity, necessitating measures that included the modification of infrastructure, the dredging of channels within Lake Alexandrina and Lake Albert and the installation of portable desalination plants to provide potable stock water.

Water levels in both Lake Alexandrina and Lake Albert dropped to new record low levels, from 0.17 m AHD (June 2007) to –0.48 m AHD in April 2008, approximately half a metre below sea level. Salinities increased significantly due to a combination of factors including leakage through and over the barrages.

The low water levels raised a number of water security issues and also exposed sulfidic soils that may acidify if not managed properly. Water levels in Lake Albert are currently being maintained through a Murray–Darling Basin Authority funded pumping initiative which is pumping water from Lake Alexandrina in order to reduce the risk of acidification of Lake Albert. As a result of the physical limitation downstream of Lock 1, significant amounts of water were traded out of this reach during 2007–08.

Total South Australian diversions from the River Murray for 2007–08 were 415.9 GL, which is the lowest diversion since the implementation of the Cap. The diversions comprised:

- 89.4 GL for Metropolitan Adelaide and associated country areas
- 36.7 GL for Country Town
- 8.5 GL for the Lower Murray Swamps (including ELMA, which is restricted to the same percentage as irrigation allocations)
- 266.8 GL for metered consumption under the *All Other Purposes* Cap component
- 14.4 GL for non-metered consumption under the *All Other Purposes* Cap component.

The total diversion was only 67% of the annual average diversion since 1997.

River Murray water trading of interstate temporary allocations into South Australia were at the highest level in South Australia in 2007–08 for both volume traded and number of trades. Ongoing drought conditions leading to a 32% allocation and the ability to carry over unused water in South Australia resulted in a net 145.25 GL of water being traded to South Australia from interstate. South Australian irrigators temporarily traded in 147.58 GL and only temporarily traded out 2.33 GL. The majority of the temporary traded water was sourced from New South Wales.

There is now very limited capacity to permanently trade water entitlements between States based on exchange rates. In 2007–08 these arrangements were replaced with tagged trading and zero tagged trades were processed.

Table 2 provides details on the temporary trades including the sources for the 2007–08 water year.

Table 1: South Australian Diversions for 2007–08 (GL)

| System | Original Long-term Average Cap Diversion | Climate-Adjusted Annual Cap Target ⁵ | Adjustment to Target due to Net Permanent Trade | Adjustment to Target due to Net Temporary Trade | Adjusted Cap Target for 2007–08 | Diversion for 2007–08 | Diversion for last Five Years | Cap Credits (Cap Target less Diversion) | | |
|----------------------------------|--|---|---|---|---------------------------------|-----------------------|-------------------------------|---|--------------------------|--------------------|
| | | | | | | | | 2007–08 | Cumulative since 1997–98 | Schedule F Trigger |
| Metropolitan Adelaide | | | | | | | | | | |
| First Use Licence ^{1,2} | 0 | 0 | 0 | 0 | 0 | 0 | 33.8 | 0 | 0 | 0 |
| Remainder | 650 | - | - | - | - | 89.4 | 486.3 | 163.7 | - | - |
| Total | - | - | - | - | - | 89.4 | 520.1 | - | - | - |
| Country Towns | 50 | 50 | 0 | 6.1 | 56.1 | 36.7 | | 19.4 | 109.1 | -10 |
| Lower Murray Swamps | 94.2 | 94.2 | -40.4 | -8.7 | 45.1 | 8.5 | | 36.6 | 63.9 | -18.8 |
| All Other Purposes | 449.9 ³ | 466.6 | 72.8 ⁴ | 147.9 | 687.2 | 281.3 | | 405.9 | 1088.3 | -90 |
| TOTAL | - | - | 32.4 | 145.3 | - | 415.9 | | - | - | - |

1. This is temporary transfer against a first use Metro Adelaide Licence held in *All Other Purposes* Cap valley.

2. The diversion includes the volume of temporary transfer described in 1.

3. The original long-term average Cap diversions have been updated to account for the March 2008 Schedule E. (9.3 GL of highland usage was transferred from Lower Murray Swamps Cap to the *All Other Purposes* Cap).

4. This includes 3.1 GL of permanent trade from the Lower Murray Swamps in 2007–08.

5. The climate-adjustment does not reduce the Cap because of low resource availability.

Table 2: River Murray Interstate Water Trade 2007–08

| Interstate Trade | Temporary Trade (GL) |
|------------------------|---------------------------------|
| From SA to Victoria | 2.04 GL (30 Trades) |
| From SA to NSW | 0.29 GL (6 Trades) |
| Total out of SA | 2.33 GL (36 Trades) |
| Into SA from Victoria | 47.55 GL (1,692 Trades) |
| Into SA from NSW | 100.03 GL (1,967 Trades) |
| Total into SA | 147.58 GL (3,659 Trades) |

A total of 275.69 GL of trade was recorded within South Australia with 259.82 GL recorded as temporary trade. The temporary trade recorded includes 193.95GL of water traded by the nine irrigation trusts managed by the Central Irrigation Trust to a single licence for flexibility in water management and accounting as a drought response measure. Permanent trade within South Australia in 2007–08 was 15.87 GL including 3.1 GL from the Lower Swamps.

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 portion of the recorded diversion was not metered. All diversions remained within the annual Cap targets and all valleys remain in cumulative Cap credit.

For 2007–08, as part of the negotiated position agreed by First Ministers, normal water sharing rules were suspended and South Australia was allocated 201 GL for critical human needs. Of this allocation, 150 GL was for Metropolitan Adelaide and associated country areas.

As agreed to by First Ministers, 60 GL of this allocation was pre-pumped into Mount Lofty Ranges storages for water quality purposes in late 2006–07, leaving a

balance of 90 GL for extraction in 2007–08.

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

- natural catchment intakes from the Mount Lofty Ranges
- the River Murray.

The Mount Lofty Ranges is the primary source of water because of the significant costs of pumping water from the River Murray over the Mount Lofty Ranges. The status of the Mount Lofty Ranges storages is the major factor influencing the amount of water 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.

SA Water currently holds two licences associated with its extraction of water from the River Murray for water supply purposes to Metropolitan Adelaide and Associated Country Areas:

- Metropolitan Adelaide Extraction Licence of 650 GL over five years; and
- Metropolitan Adelaide 'First Use Licence' to provide for any growth in the Metropolitan Adelaide River Murray extractions from the year 2000 level of development conditions.

Growth in River Murray extractions resulting from growth in demand has, pending the development of an agreed model to account for growth, been covered by the transfer of entitlement into a Metropolitan Adelaide 'First Use Licence' which is included in the *All Other Purposes* Cap component.

Water from the 'First Use Licence' was not used during 2007–08.

The five year rolling total (excluding the 'First Use Licence' component) diversion is 486.3 GL leaving an unused portion of 163.7 GL. This rolling total includes under the 2006–07 diversion the additional 60 GL pumped during 2006–07 for use during 2007–08.

Table 3: Metropolitan Adelaide Cap Assessment

| | 2003–04 | 2004–05 | 2005–06 | 2006–07 | 2007–08 | Total |
|--------------------------------------|---------|---------|---------|---------|---------|-------|
| Gross Diversion | 82.1 | 71.6 | 73.9 | 203.1 | 89.4 | 520.1 |
| First Use Licence | 9.4 | 8.4 | 16.0 | 0.0 | 0.0 | 33.8 |
| Rolling Diversion Against 650 GL Cap | 72.7 | 63.2 | 57.9 | 203.1 | 89.4 | 486.3 |
| Five Year Cap | | | | | | 650.0 |
| Credit | | | | | | 163.7 |

The Cap will be adjusted when an agreed mechanism has been developed to account for the reduction in water entitlements in both 2006–07 and 2007–08 imposed in response to the continued extreme drought conditions. The IAG's 2006–07 Report discussed possible options for an agreed mechanism and recommended that South Australia develop a model of diversions from the River Murray for Metropolitan Adelaide.

The ability to trade water allocations (temporary trade) into the 'First Use Licence' and use this to offset growth in Metropolitan Adelaide water usage has been agreed on an interim basis by the IAG until the Ministerial Council agrees to a new formal arrangement to account for growth in demand in this Cap component. This increase in demand may occur either as a result of an increase in population served through the Metropolitan Adelaide and associated country areas water supply system or changes in per capita demand. The IAG has previously indicated that it considers that water should be traded permanently into this 'First Use Licence' based on the estimate in the growth in demand by Metropolitan Adelaide. This situation has been complicated over the past two years as a result of the ongoing drought conditions and subsequent reduction in entitlement for Metropolitan Adelaide. This has led to a situation where both per capita demand and total demand have decreased and the 'First Use Licence' was not used to supplement Metropolitan Adelaide and Associated Country Districts during both 2006–07 and 2007–08.

Diversion of limited staff resources to high priority water security management tasks has meant that South Australia has not been able to develop a proposed method for Cap adjustment to account for growth for this year's IAG report although initial discussions have occurred with the MDBA.

The Country Towns supplied with River Murray water have a fully tradeable annual entitlement of 50 GL. Prior to 2007–08, Country Towns have been treated in the same manner as are irrigators. For example, in 2006–07 they were restricted to 60% of entitlement, or an allocation of 30 GL.

For 2007–08, as part of the position agreed by First Ministers, South Australia was allocated 201 GL for critical human needs. Of this allocation 31 GL was for Country Towns.

Country Towns used 36.7 GL in 2007–08. To cover the shortfall between the First Ministers endorsed allocation of 31 GL and the total water used, SA Water leased a total of 6.1 GL of unused allocation on the temporary water market. This resulted in a total usable allocation of 37.1 GL.

Outdoor watering restrictions applied to all Country Towns water customers. Many of the Country Towns do not have an alternative water supply and are therefore totally reliant on River Murray water.

The Lower Murray Reclaimed Irrigation Areas, which lie between Mannum and Wellington, were formerly wetlands that were permanently connected to the River Murray. The wetland areas were reclaimed for irrigation early last century by the construction of levy banks. The Cap on the Lower Murray Reclaimed Irrigation Areas was agreed in 2001 by Ministerial Council and was based on recognised best irrigation practice applied to approximately 5,000 ha of former wetland irrigated for dairying as well as an additional 780 ha 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. Net water use has been defined by the Cap and no Cap credit has been claimed.

In order to meet the agreed Cap requirements as well as to reduce environmental impact on the River Murray, to monitor water use and on-farm efficiency, and to improve farm productivity, it has been necessary to rehabilitate the Lower Murray Reclaimed Irrigation Areas and to improve the management of these areas. A number of options were identified for irrigators including restructuring and rehabilitation of land and if necessary retirement.

The final irrigation area previously administered by Government moved to self-management in 2006–07. Since the beginning of the program in 2002, significant consolidation of properties has occurred. In 2007–08, 115 meters were installed and as of 30 June 2008, 460 ha remained to be rehabilitated. At this stage, South Australia expects that all metering and mandatory drainage works will be completed by the end of 2008 with the overall program being finalised during 2009. Delays occurred as a result of ongoing drought conditions and uncertainty from some irrigators about the long-term future of irrigation on the Lower Murray Swamps.

Water allocations within the Lower Murray Reclaimed Irrigation Areas have been treated in the same manner as all other irrigation licences, and were subject to 32% of allocation in 2007–08.

Due to the substantial trade of water entitlement out of this area before the start of the 2007–08 water year, the non-restricted entitlement was 58.8 GL (down from 94.2 GL in 2001) including the non-tradeable 22.2 GL Environmental Land Management Allocation. In 2007–08 a total of 8.5 GL was diverted for irrigation, the volume being estimated from watering events and

metered diversions. A further 11.82 GL was traded out of the Lower Murray Reclaimed Irrigation Area comprising 8.7 GL of temporary trade and 3.1 GL of permanent trade to the *All Other Purposes* Cap. Thus total water use (diversions plus trade) was well below the Cap for this component.

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 Areas.

Included in this component are some small environmental diversions including any water donations for environmental purposes.

Total usage under the *All Other Purposes* component of the Cap was 281.3 GL in 2007–08 compared to a long-term average use of approximately 400 GL. This reflects the impact of the restrictions applied to this Cap component. Due to significantly reduced water availability, a maximum allocation of 32% was made for South Australian River Murray irrigators in November 2007. After the end of November 2007, no further irrigation allocations were announced due to the requirement to secure a reserve for critical human needs for 2008–09.

In addition to the 32% allocation, a total of 30 GL was carried over and distributed to irrigators that were eligible for carryover.

A Cap Model for the *All Other Purposes* diversions has been developed to enable a comparison of diversions with an annual climate-adjusted Cap target. The Cap model for the *All Other Purposes* is a regression model in which the historical monthly demands are adjusted (de-trended) to reflect 1993–94 levels of development. An annual Cap target is then derived through regression of the de-trended data with rainfall and temperature data from Berri and Loxton.

The Authority approved this model in November 2004 as a Cap model under Schedule E.

The climate-adjusted annual Cap target for 2007–08 based on this model was 466.6 GL. As a result of the significant amount of temporary interstate trade to South Australia, the Cap adjusted for trade was 687.2 GL. The recorded diversion of 281.3 GL was significantly less than the climate and trade adjusted Cap 687.2 GL resulting in the creation of Cap credits of 405.9 GL.

South Australia is proposing that a restriction policy be incorporated into the Cap model to limit the volume of Cap credits in the future. The methodology will be negotiated with the Murray–Darling Basin Authority during 2008–09 with the intention of implementing it for 2008–09 annual reporting. If appropriate, the method will be backdated to account for the impacts of restrictions on Cap credits in all years when restrictions have applied.

4.1.4 Monitoring and Reporting

Urban consumption (Metropolitan Adelaide and Country Towns) and irrigation consumption under the *All Other Purposes* Cap component is reliably metered (97% 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 nearly complete and the program is expected to be finalised in 2009.

Growth in Metropolitan Adelaide extractions from the River Murray from increased demand in past years has been covered by the temporary transfer of entitlement into a Metropolitan Adelaide 'First Use Licence' which is debited against *All Other Purposes* (see **Table 1** and **Table 3**).

Due to the ongoing drought for 2007–08, as part of the negotiated position by First Ministers and Senior Official Group, South Australia was allocated 201 GL for critical human needs. This consisted of:

- 150 GL Metropolitan Adelaide
- 31 GL Country Towns
- 20 GL direct extraction (i.e. licensed Stock and Domestic, licensed industry and non-licensed riparian).

The restriction applied to the Metropolitan Adelaide and associated country areas has negated the potential for growth during 2007–08.

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

4.1.5 Proposals to Refine Implementation in 2008–09

South Australia will continue to improve its capacity to manage Cap targets and implement measures to reduce the reliance on the River Murray. Current initiatives by the South Australian Government under the Waterproofing Adelaide program incorporate recycling of treated wastewater and stormwater and further development of conservation measures

for industry and households. The construction of a desalination plant at Port Stanvac on the Gulf of St Vincent to supply potable water to Metropolitan Adelaide will supplement the Mount Lofty catchments and lessen the city's dependence on the River Murray.

In addition, in 2007–08 the South Australian Home Rebate scheme was expanded to encourage South Australian households to achieve greater water savings inside and outside the home. Rebates available for approved water efficient products purchased on or after 1 November 2007 include low flow showerheads, retrofitting dual flush toilet suites, specified water efficient garden goods, purchase of new water efficient washing machines, home water audits and purchasing and plumbing of rainwater tanks into homes. Home water audits were also made available from 1 January 2008. These policies will also impact on the potential for growth in per capita demand in the Metropolitan Adelaide Cap component.

The method by which to incorporate a restriction policy into the Cap Model for the *All Other Purposes* diversions to limit the volume of Cap credits will be discussed with the Murray–Darling Basin Authority in 2008–09 with the intention of implementing a method to account for both increased demand due to growth and the impacts of restriction policies for the 2008–09 annual report.

The IAG has previously expressed the view that South Australia has applied the Precautionary Principle in providing a 'First Use Licence' to accommodate possible growth. The implementation of the recommendation in last year's IAG report to amalgamate the Lower Murray Swamp and *All Other Purposes* Cap has been deferred due to the reduced capacity to reassign staff.

4.1.6 IAG Assessment

As in 2006–07, consumption in South Australia in 2007–08 was significantly constrained. Diversions for Country Towns, Metropolitan Adelaide and *All Other Purposes* were below Cap. Diversions for the Lower Murray Swamps are not currently fully metered and assumed to equal the allocation. It is expected that metering arrangements will be in place for the 2008–09 year for the Lower Murray Swamps.

Metropolitan Adelaide consumption over the last five years was 486.3 GL (excluding the 'First Use Licence') compared with the target of 650 GL. This level of usage includes the 60 GL pumped during 2006–07 for use in 2007–08. Compliance with this Cap has been enhanced by the transfer over the last five years, of 33.8 GL, from *All Other Purposes* valleys and Country Towns designated valleys to the 'First Use Licence'.

Effect of Restrictions on Credits

The decision by the SA authorities to continue to apply allocations restriction in 2007–08 in the face of the continuing drought conditions highlights an acknowledged problem with the modelling that has been used in South Australia. Currently the modelling assumes a full allocation of the Cap, whereas the application of restrictions on allocations effectively ensures that there is a growing Cap credit against each of the licensed allocations. While this does not present a problem during a period of continuing drought, once the drought breaks SA could be holding significant Cap credits when in fact these credits represent an artificial constraint on usage during the period of drought rationing rather than an underlying reduction in use below the climate-adjusted modelled outcome.

As previously noted by the IAG, with the exception of the modelling for the Lower Darling, other States have, where appropriate, included in their modelling an allowance for water restrictions. There is a need to make similar adjustments to the modelling for *All Other Purposes*, and the Cap for Country Towns and Lower Murray Swamps in South Australia. This would better reflect the impact of water restrictions on the effective size of the Cap during periods of extended water shortages, and would remove the artificial growth in Cap credits that otherwise occurs. A similar adjustment should also be made to the Metropolitan Adelaide Cap.

The IAG has suggested that an interim method for allowing for the restriction would be to factor down the annual diversion target by the final announced allocation percentage. Under this arrangement, it would also be necessary to factor down the trade adjustment caused by the permanent transfer of water from the swamps to the *All Other Purposes* Cap. The application of this adjustment and its impact on the Country Towns, Lower Murray Swamps, *All Other Purposes* Cap credits is shown in **Table 4**.

With no adjustment to annual Cap targets for restrictions, the Country Towns, Lower Murray Swamps and *All Other Purposes* Cap valleys all generate large Cap credits in the last two years. These large credits do not reflect any underlying reduction in use. They are a consequence of the model not incorporating restrictions in years of low water availability. With restriction, the annual credits are much more realistic as can be seen from **Figure 5A** in **Chapter 5**. After allowing for restrictions in this way, South Australian Country Towns is on average 6 GL/year (14%) and *All Other Purposes* 46 GL/year (11%) below the climate-adjusted and restricted Cap.

Table 4: Method Proposed by IAG for Reducing SA Caps in Years of Restriction

| CURRENT METHOD | | | | | | |
|---|---|---|---------------------------|------------------------|------------------------------|---|
| Cap Valley | Annual Diversion Target from Cap Model (GL) | Adjustment to Cap for Trade (GL) | Adjusted Cap 2007–08 (GL) | Diversion 2007–08 (GL) | Cap Credits for 2007–08 (GL) | Cumulative Cap Credits since 1997–98 (GL) |
| Country Towns | 50 | 6.1 | 56.1 | 36.7 | 19.4 | 109.1 |
| Lower Murray Swamps | 94.2 | -49.1 | 45.1 | 8.5 | 36.6 | 63.9 |
| All Other Purposes | 466.6 | 220.6 | 687.2 | 281.3 | 405.9 | 1088.3 |
| PROPOSED METHOD – RESTRICT CAP BY THE ANNOUNCED RESTRICTION | | | | | | |
| Cap Valley | Annual Diversion Target from Cap Model Reduced by the 60% Allocation (GL) | Adjustment to Cap for Trade (GL) (Permanent trade adjustment from swamps to AOP also reduced) | Adjusted Cap 2007–08 (GL) | Diversion 2007–08 (GL) | Cap Credits for 2007–08 (GL) | Cumulative Cap Credits since 1997–98 (GL) |
| Country Towns ¹ | 31.0 | 6.1 | 37.1 | 36.7 | 0.4 | 67.6 |
| Lower Murray Swamps ² | 30.1 | -21.6 ³ | 8.5 | 8.5 | 0.0 | 0.0 |
| All Other Purposes ³ | 149.3 | 193.2 ³ | 342.5 | 281.3 | 61.2 | 509.6 |

1. Announced allocation 62%.

2. Announced allocation 32%.

3. Cap adjustment for permanent trade with swamps reduced to 32%.

South Australia has acknowledged the need for an adjustment mechanism to take into account the impact of the restrictions on the credits currently being generated, although it has not been possible to advance work on this adjustment mechanism over the last twelve months. The IAG is still of the view that this work needs to be undertaken, and notes the commitment of South Australia to progressing this matter over the next twelve months, thereby ensuring that there is not the potential of the need for an adjustment being overlooked amongst all the other tasks being undertaken to manage the operation of the Basin.

Any amendment to the currently approved model on the development of a new model for Metropolitan Adelaide, would need to be subjected to an independent audit under the Schedule E provisions.

Reporting of Model Changes and Historical Data

In making amendments to the models, either to account for restrictions on use or as a result of improved input data or availability, the question arises as to what change should be made to the historical results from the models. If changes in historical Cap series are accepted, this raises the further question of whether a valley's historical performance should

be judged on the basis of the revised figures (for example, a valley that was not previously considered to be in breach of the Cap, is subsequently found to have breached the Cap at some time in the past).

In considering this issue, the IAG is of the view that full transparency of all available and relevant data is consistent both with good governance in terms of the operation of the Cap and good Cap management practice. At the same time, the IAG recognises that it is required to form a judgment on the reliability of the diversion data and model results available at the time of the annual audit (or at the time of a special audit if so required). In terms of the reliability of the diversion data, the IAG believes that this task could be improved (and the potential for misinterpretation reduced) if the data that is used in the annual Water Audit Monitoring (WAM) Report and the IAG report was common. This may require States completing their data compilation for the WAM by the end of September each year rather than up to 9 months after the end of the year.

In addition, the IAG is of the view that where amendments to models (or data) have been necessary, then the historical records should be adjusted and the revised Cap and performance against the Cap should be reported. Effectively this has been the case for a number of valleys over the

period for which the Cap has operated. At the same time, the IAG in its annual review and report would be reporting against the performance in the most recent water year, although any changes to the historical series may help to inform the IAG (and the Ministerial Council) should it be necessary to undertake a Special Audit.

To assist in this process, the IAG has this year included in **Chapter 5** of this report, graphical presentations of the historical performance of each valley against the relevant Cap. It is proposed that this will be a regular part of any future IAG reports on annual performance under the Cap.

Where changes have been made in modelled Cap outputs or performance results against the Cap, it is the IAG's responsibility to form a view as to whether the revised model outputs or diversion estimates are sufficiently reliable to allow the IAG to assess whether or not the Cap targets have been met. Thus, part of the role of the existing IAG is to report to Council on the reliability or otherwise of the diversion data provided and upon which any recommendation from the IAG as to the need for a special audit is made. This needs to include consideration of whether or not the model results are sufficient and appropriate to allow informed advice to be provided to Council.

First Use Licence

The establishment of the 'First Use Licence' was intended as an interim arrangement to allow for growth in demand in metropolitan Adelaide. Water from the 'First Use Licence' was not used during 2007–08 or 2006–07. The approval for the 'First Use Licence' was on the basis that it was needed to address population growth in Metropolitan Adelaide. As well, it was intended that this arrangement would be an interim one subject to the development of an appropriate revised model for Metropolitan Adelaide. The IAG encourages South Australia to address this issue so as to either remove the requirement for the 'First Use Licence' or justify why it should continue to be available.

South Australia remains best placed of all the States to quantify the Cap and reliably report against it. Reliable consumption measurement is in place for both SA Water and the rehabilitated Lower Murray Swamps irrigation areas and it is expected that metering arrangements will be in place for the Lower Murray Swamps by the end of 2008.

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

4.1.7 Conclusions/Recommendations

- Diversions in 2007–08 were 416 GL compared to diversions of 627 GL in 2005–06.
- Diversions in 2007–08 were constrained as a result of restrictions due to ongoing drought conditions and were within the annual Cap targets for Metropolitan Adelaide, Country Towns and *All Other Purposes* Cap valleys.
- Diversions for the Lower Murray Swamps Cap valley are currently not fully metered and are assumed to equal the allocation. In 2007–08 the Lower Murray Swamps were subject to 32% allocations and diversions were assumed to equal 32% of the allocation less temporary trade. Full metering is expected to be completed in 2008–09.
- South Australia has a reliable measuring system for urban and irrigation use.
- The South Australian *All Other Purposes* Cap model was approved by the Authority in November 2004.
- The IAG recommends that South Australia develop a model of diversions from the River Murray for Metropolitan Adelaide. This model should simulate urban demand, inflows from the local Adelaide Hills Catchments and the operation of the supply system. It should be used to generate annual Cap targets, and make allowances for water restrictions which would otherwise result in the artificial growth in Cap credits. The model should be accredited by June 2009.
- In the interim, should South Australia continue to require a 'First Use Licence' to cover growth. These growth estimates should be provided to the IAG.
- Although work on this matter has been delayed by commitment to the drought program, South Australia still proposes to amalgamate remaining Lower Murray Swamps Cap components with the *All Other Purposes* Cap while retaining the Environmental Land Management Allocation as a non-tradable component within the *All Other Purposes* Cap. This is supported by the IAG because it has no impact on the Cap volume within South Australia and is administratively more convenient.
- The IAG recommends that an allowance be included in the calculation of the annual diversion targets for Metropolitan Adelaide, Country Towns, the Lower Murray Swamps and the *All Other Purposes* Cap valleys for the imposition of water restrictions. Desirably this adjustment should be incorporated in the

models, which calculate the Cap targets since this would be consistent with the practice used in the other States. However, to ensure equity between the restriction-adjusted Cap diversion targets prepared for valleys in other States and those applying in South Australia, the IAG recommends that an adjustment be made in 2008–09 by multiplying the annual diversion target by the relevant final announced allocations and by another appropriate adjustment method to be determined for Metropolitan Adelaide.

- The IAG notes that:
 - since 1997 diversions for SA Country Towns have been 6 GL per year or 14% below Cap on average despite trade out in some years
 - diversions for *All Other Purposes* have been 46 GL per year or 11% below Cap on average. If these valleys were to increase usage up to Cap levels, additional strain would be put on the Lower Lakes.
- As a general conclusion, the IAG notes that where amendments are made to models used for purposes of determining the Cap or to historical data used in these models to derive Cap or diversion estimates, it is the IAG's intention that the IAG will publish the latest series of revised Cap and diversion data extending back over the period of the Cap. However, in terms of reporting on breaches with the Cap, the IAG will only report on the results for the most recent water year unless earlier years' results are relevant to interpreting the latest year's results.

4.2 Victoria

4.2.1 Status of Model Used to Calculate Annual Cap Targets

Victoria is using computer simulation models, calibrated to 1993–94 level of development, to calculate annual Cap targets for the major regulated systems. Regression models are being used for the smaller systems (see **Table 5**).

The model for Goulburn/Broken/Loddon and Campaspe valleys was accredited by the Murray–Darling Basin Authority at Meeting 93 on 4 September 2007. This model has been used to calculate the 2007–08 Cap targets and the cumulative credits for these valleys presented in this report.

MDBA has 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 Authority at Meeting 96 on 26 August 2008. These models have been used to calculate the 2007–08 Cap target and the cumulative credits since 1997.

Grampians Wimmera Mallee Water (GWMW) is in the final stages of developing a Cap model for the Wimmera Mallee system and is in process of preparing a Cap model report. The preliminary results from the model have been used to calculate Cap targets from July 1997 to June 2008, cumulative credits since 1997 and the long-term Cap for this valley.

As a result of revised estimates of model input data for May and June 2007, the 2006–07 Cap target for Goulburn/Broken/Loddon valley has changed slightly (less than 0.5% of the long-term Cap) compared to figures reported in last year's report.

The REALM software was upgraded to address restriction errors that occurred in the model at zero allocations. This produced a lower Cap target for the Campaspe valley in 2006–07 which experienced a zero allocation for the whole season. This caused the cumulative Cap credit up to June 2007 to reduce by 24 GL.

Outflows from the Goulburn and Murrumbidgee Cap models from July 1997 to June 2008 were input to the Murray model to simulate tributary flows under 1993–94 level of development. Previously, recorded outflows adjusted for trade releases were used. This caused a small change to the cumulative Cap credit for Victorian Murray (less than 0.7% of the long-term Cap).

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

4.2.2 2007–08 Diversions

Overview

Irrigation areas supplied from the Murray, Broken and Bullarook Creek systems experienced extremely low water availability during 2007–08. Final allocations for the Goulburn, Loddon and Campaspe systems were the second lowest on record. The low allocations were due to a combination of very low carryover storage volumes and well below average inflows.

At the start of July 2007, a zero allocation was announced by Goulburn–Murray Water (G–MW) for all systems. By 1 October 2007, a small allocation was available to all systems except the Bullarook Creek system. Allocations progressively increased on all systems except the Loddon which remained on 5% of High Reliability Water Share (HRWS) and the Bullarook Creek system which stayed on zero allocation for the entire year. Final allocations were Murray 43%, Goulburn 57%, Broken 71%, Campaspe 18% and Loddon 5% of HRWS. No allocation was available to Low Reliability Water Shares.

The Minister for Water, as for the previous four years, qualified the rights to water for a number of systems early in the year to enable essential supplies to continue until conditions improved. Qualification of rights was also extended to the provision of minimum environmental flows for the Campaspe, Loddon and at times for the Goulburn systems.

July 2007 rainfall was generally better than average but the following three months were dry in all areas. Late spring and the summer were wet with most areas recording above average rainfall. At a number of locations, monthly rainfall totals were more than twice

Table 5: Victoria Cap Auditing Models Status

| Valley | Auditing Tool | Comment |
|------------------------|---------------------------------|---|
| Goulburn/Broken/Lodden | REALM (Final) | Accredited |
| Campaspe | REALM (Final) | Accredited – corrections to be approved |
| Murray | Murray Simulation Model (Final) | Accredited |
| Kiewa/Owens | Regression Model | Accredited |
| Wimmera Mallee | Preliminary REALM Model | Under development |

and even three times the average during the summer. With a few exceptions, rainfall for the remainder of the year was well below average.

The major storages on the Goulburn, Campaspe, Loddon and Broken systems all remained at very low levels. Unlike the previous year, both Lake Buffalo and Lake William Hovell on the Ovens system spilled during the spring.

Pumps were re-installed to access additional water from Waranga Basin at supply rates not possible under gravity releases. This was the third time since 2003 that pumps have been used at Waranga Basin. At Tullaroop reservoir, pumps were used to maintain a small flow in Tullaroop Creek when an adequate gravity supply was not possible.

Inflows to the Campaspe and Loddon systems were 12% and 7% of average respectively. Eildon, Hume and Dartmouth storages all received annual inflows well below average. The inflow to Lake Eildon since

November 1996, when the storage was last full, has been the lowest on record for this sequence.

All storages on major irrigation systems were drawn down to very low levels by the end of April 2008. Lake Hume was drawn down to 7.3% of capacity by late April 2008, the third lowest on record. At the end of June 2008, Lake Dartmouth was holding only 17.8% of capacity.

Diversions from the Murray/Kiewa/Ovens, Goulburn/Broken/Loddon and Campaspe valleys were below their Cap targets for 2007–08 and those from the Wimmera–Mallee valley were above the interim Cap target for 2007–08. All four Victorian valleys have accumulated Cap credits up to 30 June 2008. A comparison of diversions with Cap targets since 1997–98 is shown in **Table 6** and **Table 7**. These values are preliminary, as trade data needs to be reconciled with other valleys and final accuracy checking is yet to be undertaken.

Table 6: Comparison of Diversions with Cap Targets

| System | Long-term Diversion Cap (GL) | This year's Cap Target (GL) | Cap adjustment for trade ¹ (GL) | This year's net ² diversion (GL) | Cap Credits (Target less diversion) | | | Trigger Exceeded | Storage Difference |
|-----------------------------|------------------------------|-----------------------------|--|---|-------------------------------------|------------------------------|---------------------------|------------------|------------------------------|
| | | | | | This year (GL) | Cumulative since 1/7/97 (GL) | 20% schedule Trigger (GL) | | Simulated less Observed (GL) |
| Goulburn/Broken/Loddon | 2034 | 995 | -220 | 683 | 93 | 180 | -407 | No | -282 |
| Murray/Kiewa/Ovens | 1702 | 896 | 164 | 782 | 278 | 865 | -340 | No | -428 |
| Campaspe | 123 | 23 | 22 | 26 | 19 | 135 | -25 | No | -4 |
| Wimmera–Mallee ³ | 162 | 36 | 0 | 43 | -7 | 84 | -32 | No | n/a |
| Total | 4021 | 1950 | 34 | 1534 | 382 | 1265 | | | |

1. Permanent trade to 30/6/07 plus temporary trade and Goldfields Superpipe in 2007–08 + Snowy Annual Allocations.

2. Diversion net of return flows to other Cap valleys.

3. Based on preliminary results from the Wimmera–Mallee Cap model.

Table 7: Victorian Usage Compared with Cap Targets – 2007–08

| Location | Cap Targets | | | | Diversions | | | Cap Credits | | | | |
|------------------------|-----------------|-------------------------|-----------------------------------|-------|-----------------|----------------------|-------|---------------------|---|--|-------------------|-------------|
| | Model Component | Outside Model Component | Adjustment for Trade ⁴ | Total | Model Component | Upper Trib Component | Total | Current Year Credit | Cumulative Credits from last years WAM Report | Correction to last years Cumulative Credit | Cumulative Credit | 20% Trigger |
| Goulburn/Broken/Loddon | 987 | 8 | -220 | 775 | 675 | 8 | 683 | 93 | 91 | -4 | 180 | -407 |
| Campaspe | 23 | 0 | 22 | 44 | 25 | 0 | 25 | 19 | 141 | -25 | 135 | -25 |
| Wimmera/Mallee | 36 | 0 | 0 | 36 | 43 | 0 | 43 | -7 | 91 | n/a* | 84 | -32 |
| Murray/Kiewa/Ovens | 887 | 9 | 164 | 1060 | 773 | 9 | 782 | 278 | 588 | -1 | 865 | -340 |

1. All volumes in gigalitres.

2. Goulburn model used: GOULQ821.sys.

3. Not applicable since Cap model was not available for earlier audits.

4. Table last updated on 25 November 2008.

Carryover of unused allocation contributes to Cap credits in the year the water was allocated. The total unused allocation carried over to 2008–09 was 168 GL in Victorian Murray, 108 GL in Goulburn/Broken/Loddon and 13 GL in the Campaspe valley (including 11 GL traded in via the Goldfields Superpipe). The corresponding figures for 2007–08 were 103 GL for Victorian Murray and 25 GL for the Goulburn system.

Goulburn/Broken/Loddon

Resource availability

Annual rainfall at Eildon was 70% of average for 2007–08 and the annual inflow to Lake Eildon was only 51% of average. The cumulative inflow to Lake Eildon from October 1996 to the end of June 2008 was the lowest on record for this 140 month sequence. After peaking at 24.9% of capacity in mid-November 2007, Lake Eildon was drawn down to 13.4% by mid-May 2008.

The unregulated inflow between Eildon and Goulburn Weir for 2007–08 was only 21% of average. The diversion efficiency at Goulburn Weir for the year was 98% taking account of regulated downstream commitments. There were two periods of high unregulated flows passing the weir, one in December 2007 and another in January 2008. Maintenance works on the Cattanach Canal prevented water being harvested into Waranga Basin during January 2008.

During 2007–08 40 GL of traded water was transferred from the Goulburn Valley to the River Murray. The bulk of this transfer occurred during the period mid-December 2007 to mid-February 2008. Thirty (30) GL was transferred to the River Murray from the Goulburn River. With agreement of River Murray Water, 8 GL was passed via the Broken Creek and a further 2 GL was transferred via the lower Campaspe River for environmental purposes.

The initial 2007–08 allocation on the Goulburn system was zero but it increased to 15% of HRWS by 15 August 2007 and then incrementally to a final allocation of 57% by 1 April 2008. No Low Reliability Water Share allocation was announced for the tenth consecutive year in a row.

Lake Nillahcootie annual inflow for 2007–08 was 11% of average and the storage reached a maximum of 37.6% in late December 2007. In late August 2007, Lake Mokoan reached 13% of capacity and was drawn down to 3.9% by late June 2008, the lowest on record. Releases from Lake Mokoan continued for most of the year and the total release was 15 GL. None of this was used to supplement supplies to diverters on the lower Goulburn River. The opening allocation on the Broken system was 0% of HRWS increasing to a final allocation of 71% by 1 April 2008.

Very low carryover volumes combined with inflows well below average resulted in the Cairn Curran and Tullaroop reservoirs reaching only 7.8% and 9.8% of capacity respectively. Cairn Curran and Tullaroop reservoirs at the end of the year were respectively the second lowest and lowest on record. The natural flow at Laanecoorie reservoir was only 7% of the long-term average.

Water was made available for essential needs in the Loddon system and an allocation of 5% HRWS for irrigation but no supplement to the Boort Irrigation Area. The Minister for Water qualified the minimum environmental flow provision for all reaches of the Loddon River and Tullaroop Creek.

The Waranga Western Channel (WWC) supply to the Wimmera–Mallee system commenced on 8 May 2008, stopped on 13 May 2008 and then resumed on 2 June 2008. The total volume supplied for the year ending 30 June 2008 was 3 GL at daily flow as high as 124 ML/day.

A total volume of 634 ML was transferred from the Murray Bulk Entitlement (BE) (Flora and Fauna) account for wetland watering on the Goulburn system. A small volume of 100 ML was supplied to Little Lake Boort from the Loddon BE environmental account. An additional 200 ML was supplied to Little Lake Boort as a result of a reallocation of environmental water under the control of the North Central CMA.

Cap Compliance

Diversion from the Goulburn/Broken/Loddon valley was 683 GL, which is 93 GL below the Cap target of 775 GL (with preliminary adjustment for trade and inter-valley transfers). Diversions were 66% below the long-term Cap of 2,034 GL/year. The cumulative Cap credit to July 2008 is 180 GL. This credit indicates that diversions since 1997 have been 1.1% below the climate-adjusted Cap.

While the model again operated outside the hydrological conditions under which it was calibrated, an assessment of model performance over 2006–07 showed that the model estimates of diversions and irrigation system losses reasonably represented actual conditions during that severe year. However some of the model relationships are running close to their limits of accuracy and refinements may be required in the future if allocations lower than 2006–07 levels are experienced.

Murray/Kiewa/Ovens

Resource availability

Inflows to Dartmouth and Hume reservoirs were 33% and 40% of the annual average respectively. Lake Dartmouth reached 18.3% of capacity in mid-November 2007 and at the end of June 2008 the

reservoir was 17.8% full. Lake Hume was 28.8% in early October 2007 and by late April 2008 the storage had been drawn down to 7.3% of capacity.

Despite the poor recovery of Lake Hume, transfers from Lake Dartmouth to satisfy commitments downstream of Hume Dam were relatively low compared to the previous year. During the irrigation season, there were a number of rain interruptions requiring a rapid reduction in releases from Lake Hume, the largest of these being after late December 2007 and late January 2008 rainfall events.

Lake Victoria was 82.1% full during early spring and had been drawn down to 39.5% by the start of May 2008. Inflows to the Menindee Lakes were low although greater than the previous year. The total maximum volume in the Menindee Lakes was 37 GL below the trigger volume of 640 GL required to provide a regulated supplement to the River Murray under River Murray Water (RMW) control. This is the sixth year in a row that there has been no RMW supplement to the Murray from the Menindee Lakes.

There was a zero opening allocation on the Murray system which increased to a final allocation of 43% of HRWS by early March 2008. The final Murray allocation was the lowest on record, previous lowest being 95% in 2006–07.

In total, 9.8 GL from Murray Flora and Fauna BE account was supplied to a number of wetlands and red gum forests between Yarrawonga and the South Australian border. An additional 6 GL was supplied to the Gunbower and Lindsay Wallpolla red gum forests from the Snowy River Murray Increased Flow (RMIF) account. There was also a small volume of water donated to the environment by individuals.

At the 30 June 2008 there was 8 GL of carryover in the Murray BE (Flora and Fauna) account and a zero balance in the Snowy RMIF account.

Cap Compliance

Diversion from the Murray/Kiewa/Ovens valley was 782 GL, which is 278 GL below the Cap target of 1,060 GL (with preliminary adjustment for trade). The diversion was 54% below the long-term Cap of 1,702 GL/year. The cumulative Cap credit since July 1997 is 865 GL. This credit indicates that diversions since 1997 have been 4.8% below the climate-adjusted Cap. These results are summarised in **Table 6** and **Table 7**, and also shown graphically in **Chapter 5**.

Campaspe

Resource availability

Inflows to Lake Eppalock excluding the Coliban system were the lowest on record at only 12% of average. The storage held 0.9% of capacity at the start of the year and reached 6.7% of capacity after the

commissioning of the Goldfields Superpipe (which transfers water from the Goulburn system) and harvesting of inflows following a short period of heavy rain. The Goldfields Superpipe supplied 10.7 GL into Lake Eppalock, 10.4 GL directly to Sandhurst reservoir at Bendigo and a further 0.8 GL was transferred out of the Campaspe valley to White Swan reservoir in the Ballarat system. By the end of the year Lake Eppalock was 6.5% full.

As in recent years, the Campaspe system was highly regulated apart from a period of high flows downstream of Lake Eppalock during December 2007 following heavy rain. Campaspe Weir was operated below full supply level to minimise losses due to evaporation and spills. The unregulated flows that passed Campaspe Weir during December 2007 were the first since February 2005. Despite these flows there was no harvesting of unregulated water as allowed under the Campaspe Bulk Entitlement (BE).

Due to the extremely poor resource position, the Minister for Water qualified rights to provide a limited supply for essential needs. The irrigation allocation progressively increased from 1% of HRWS on 1 October 2007 to maximum allocation of 18% on 3 March 2008.

The Campaspe BE minimum flow requirement downstream of the Campaspe Siphon, which is tied to natural flows, was effectively zero for most of the year.

After consultation with the Department of Sustainability and Environment (DSE) and River Murray Water (RMW), G-MW commenced transferring 10 ML/day from the Goulburn trade account to the River Murray via the Waranga Western Channel (WWC) and the lower Campaspe River to maintain environmental values in the lower Campaspe River. This transfer continued until mid-May 2008 with few interruptions. There were short periods when the injection from the WWC increased to as high as 100 ML/day following requests from the North Central CMA. The total trade water transferred to the River Murray via the lower Campaspe River was 2.4 GL.

Cap Compliance

Diversion from the Campaspe valley was 25 GL, which is 19 GL below the Cap target of 45 GL (with adjustment for trade to supply the Goldfields Superpipe). Diversions were 80% below the long-term Cap of 123 GL/year. The cumulative Cap credit since July 1997 for the Campaspe valley is 135 GL. This credit indicates that diversions since 1997 have been 16% below Cap.

An investigation of Cap model performance over the last few years revealed a problem with the way the model was restricting demands at zero allocations. The REALM software was upgraded to fix the problem and the Cap model was re-run. This produced a lower

Cap target for the Campaspe valley in 2006–07 which experienced a zero allocation for the whole season. The cumulative Cap credit from July 1997 to June 2007 has subsequently been revised downwards by 24 GL as shown in **Table 7**.

Work is continuing on an assessment of the loss functions in the model to determine whether improvements can be made to the simulation of losses during extreme droughts.

Wimmera–Mallee

Resource availability

The 2007–08 season was dominated by below average inflows, resulting in a continued need to restrict supplies. This was the eleventh year of below average inflows to the system. The storages remained low with five remaining empty and the others at very low levels. The maximum storage volume for the system was 9.5% in August 2007 and the minimum was 3.3% in mid-May 2008.

This period also saw the fourth year of operation of the Wimmera–Glenelg Bulk Entitlement. The Bulk Entitlement operates over a water allocation year of November to October with the first allocation year being November 2004 – October 2005.

The total Bulk Entitlement allocation at the start of November 2007 was 15.7 GL. An available water volume of 208 GL is required before all entitlements defined within the Bulk Entitlement are met in full. Because of very low levels of available water and continuing drought conditions, a qualification of rights was put in place and effective from January 2008. Over the year, allocations increased slowly to only 30 GL at the start of August 2008. These volumes were sufficient for a restricted supply only over the 2007–08 period and a reserve for towns supplied direct from headworks for the 2008–09 summer.

The level of restriction applied in 2007–08 was for a supply to towns only as part of the winter channel run. All rural customers were provided access to water under an emergency carting program. All rural customers were on stage 4 restrictions for the duration of the 2007–08 season.

Customers holding specific ‘supply by agreement (SBA)’ licences were restricted to 2.3% (supplied off headworks) or 1.6% (supplied by channel) of their licensed volume as of August 2008. There was no supply to irrigation during 2007–08.

The environment received no allocation under the Bulk Entitlement during 2007–08 due to the changed sharing arrangements under the qualification of rights. However, 745 ML of carryover water was available as of August 2008. Just 8 ML was delivered to McKenzie Creek as an environmental release during 2007–08.

Fifty megalitres of compensation flow was made available to domestic and stock customers downstream of Rocklands as part of an emergency carting program.

Cap Compliance

Diversion from the Wimmera–Mallee valley was 43 GL in 2007–08. GWMW is in the final stages of developing a Cap model for the Wimmera–Mallee system and is in process of preparing a Cap model report for the model auditor. Based on preliminary results from this model, the 2007–08 Cap target is 36 GL and the long-term average Cap is 162 GL/year.

Diversions for 2007–08 were 27% of the long-term Cap. There has been significant water savings since 1993 through construction of the Northern Mallee Pipeline. The cumulative Cap credit over the period from July 1997 to June 2008 is 84 GL based on the preliminary modelling. This credit indicates that diversions since 1997 have been 8% below Cap.

4.2.3 Administration of the Cap

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 2007–08 and none are proposed for 2008–09 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, Streamflow Management Plans (SFMPs) and the licensing of irrigation farm dams.

Bulk Entitlements

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

- Birch creek – progressing and expected to be completed December 2008; and
- Snowy Environmental Reserve – An environmental entitlement for the Snowy Environmental Reserve was granted in June 2004. To date 7.7 GL of high reliability savings has been transferred from the Murray and

14.8 GL from the Goulburn. The volume of environmental entitlements in these Bulk Entitlements will be increased as other water savings projects are undertaken.

Streamflow Management Plans

The Victorian Government's *Our Water Our Future* set the strategic direction for where Stream Flow Management Plans (SFMPs) are required to improve environmental flows through the reduction of summer low flow stress. SFMPs set out clear objectives and actions for achieving sustainable Environmental Water Reserves.

In many cases, this will be through investing with farmers in offset measures to achieve increased environmental flows, e.g. building off-stream winter-fill dams. Plans will also clarify levels of reliability of supply for water users and include rules for rostering, trading and the granting of any new licences. Each SFMP is developed on behalf of the Minister for Water by a consultative committee consisting of water users, community, environmental and government agency representatives and in accordance with *Water Act 1989* provisions.

Our Water Our Future 2004 identified the following priority unregulated rivers in northern Victoria:

- Upper Ovens River
- Kiewa River
- Yea River
- King Parrot Creek
- Seven Creeks
- Upper Wimmera River³.

As part of the Northern Sustainable Water Strategy, the priority rivers for SFMPs in northern Victoria are being reassessed. Three plans, Upper Ovens, Yea River and King Parrot Creek, are currently underway, with consultative committees expected to be appointed in the near future.

Irrigation 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 MDBA Cap is preserved when licences are traded.

Over 6,000 catchment dams in the Basin south of the Murray River have been or are in the process of being licensed. New licence applications for catchment dams are subject to the MDBA Cap and new developers are required to purchase an existing entitlement before approval is provided.

Northern Victoria Irrigation Renewal Project (NVIRP)

Victoria is focussed on improving the efficiency of irrigation delivery systems from about 70% to 85%. These efficiency gains will free up resources to be used for commercially productive and environmental purposes underpinning future growth and confidence in the region.

During 2006–07 the Victorian Government committed to the Food Bowl Modernisation Project as part of a \$4.9 billion investment in major infrastructure projects announced as part of its *Our Water Our Future* – The next stage of the Government's Water Plan. The Food Bowl Modernisation Project encompasses the reconfiguration, rationalisation and modernisation of the Goulburn Murray irrigation system. The first stage of Modernising Victoria's Food Bowl is aimed to deliver up to 225 GL of water through efficiency improvements by 2012.

In late 2007, the Victorian Government appointed a community-based Steering Committee to consult with the community in northern Victoria and make recommendations on how best to deliver the project and achieve the savings. The Government has carefully considered the Steering Committee's recommendations, and as part of its response created a new state owned entity, the Northern Victoria Irrigation Renewal Project (NVIRP), to deliver this project.

The NVIRP will work closely with Goulburn–Murray Water, irrigators and other stakeholders to optimise the full benefits for the region.

The savings from stage 1 will be shared one third each by Melbourne, irrigators and the environment which each group getting an average of 75 GL/annum over the long-term.

The Commonwealth Government has given in-principle agreement to fund up to \$1 billion for stage 2 of the NVIRP, subject to due diligence. Stage 2 could secure about 200 GL of water savings to be shared equally between irrigators and the environment.

Victoria proposes to reduce the Cap by the amount of water allocated to the environment.

³ The Upper Wimmera River is currently managed under sustainable diversion levels and is a capped system. New water allocation will only occur through savings associated with the Wimmera–Mallee pipeline and through water trading.

4.2.4 Proposals to Refine Implementation in 2008–09

A Cap model for the Wimmera–Mallee valley is expected to be completed and gain Authority approval by June 2009.

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 the Victoria's commitment to working with the MDBMC and the other Basin states to implement the MDB Cap and the Living Murray initiative.

Adjustments to the Cap will be required to account for water saved through water savings projects and the delivery of environmental water as part of White Paper initiatives, which include:

- decommissioning Lake Mokoan
- water recovered for increased Snowy environmental flows
- water recovered for The Living Murray initiative.

Schedule E of the *Murray–Darling Basin Agreement 1992* has been amended to allow the Murray–Darling Basin Ministerial Council to adopt a protocol for adjusting the Cap for the recovery and use of environmental water. In May 2008, Council adopted the protocol. Victoria actively participated in discussions and developing methodologies to implement this protocol.

4.2.5 IAG Assessment

Diversions for the Murray/Kiewa/Ovens, Goulburn/Broken/Loddon, and Campaspe valleys were all below Cap for the year. For the Wimmera–Mallee valley, diversions were marginally above Cap for the year, although below the long-term Cap. There is no requirement for a special audit for this valley.

All valleys have accumulated credits since 1997, although a review of the input data for the Goulburn/Broken/Loddon and Murray/Kiewa/Ovens models and a software upgrade of the Campaspe valley model, has resulted in some downward adjustments in the annual Cap targets for these valleys. As noted in last year's report, any changes to the Cap models require the models to be reapproved by the Authority. It is anticipated that in a period in which unprecedented drought conditions are being experienced, changes to the Cap models will be required in future years. Therefore, it should not be unexpected to find that Cap estimates for individual valley Caps will change.

As discussed above, the IAG intends to provide a plot of the historical Cap and performance against the Cap on a valley by valley basis. **Chapter 5** of this report

includes the relevant graphs updated to June 2008. The IAG will, however, make recommendations on compliance with the Cap based on the cumulative performance up to the latest year, and will not retrospectively assess compliance in past years.

The Cap models and the historical data upon which they are based, including the historical diversion data, are fundamental to the operation and transparent reporting of performance under the Cap. All stakeholders have a right to believe that the mechanics of reporting under the Cap produces fair and reasonable data against which individual jurisdictions can be held accountable. Thus, it is fundamental to the successful operation of the Cap that the models and data used are as up-to-date and statistically robust as possible.

Therefore, given the centrality of the models and historical data to the operation of the Cap and the assurance that the IAG can provide on individual valley performance, the test of whether amendments should be made should be a test based on why should amendments not be made. The IAG is of the view that amendments to models and historical data (including Cap credit/debit calculations) should occur as a matter of course unless it can be demonstrated that:

- the amendment will not materially alter the current year's Cap performance or the accumulated Cap credits/debits
- the amendment forms part of a larger model/data amendment activity which is scheduled to be undertaken in the following year
- the amendment, while recognised, is dependent on data not currently available.

The IAG will seek a report from each of the jurisdictions on this issue as part of the 2008–09 IAG review, and will consider whether or not its assessment of the performance of individual valleys should be accompanied by qualitative comments on the reliability of the Cap estimates or the data provided. Essentially this is in line with the approach currently taken by the IAG. However, by formally stating the proposed approach to its Cap auditing task, the IAG is seeking to remove any doubt as to the importance it places upon the data and models that are used in the Cap auditing process.

As part of the 2007–08 review, Victoria has sought advice from the IAG on the Cap accounting treatment of water diverted from the Goulburn River via the Goldfields Superpipe.

Some of this diversion was supplied to Bendigo in the Campaspe valley, some was transferred out of the Basin to supply Ballarat while some was stored in Lake Eppalock from where it will be diverted in subsequent seasons. Although this water was physically diverted from the Goulburn River, the

issue is complicated by the fact that the use of water stored in Eppalock in future years would normally be treated next year as a Campaspe diversion unless a complicated system of accounts is kept.

Victoria has proposed that:

- diversion into the Superpipe be treated as a return from the Goulburn system and be subtracted from the gross diversion at Goulburn Weir
- the annual Cap target for the Goulburn/Broken/Loddon Cap valley be reduced by the volume diverted by the pipeline
- the annual Cap target for the Campaspe Cap valley be increased by the volume diverted by the pipeline
- all use of water supplied to Bendigo be treated as a Campaspe diversion
- extra supply to Ballarat be treated as a Campaspe diversion.

The IAG supports the Victorian proposal.

Victoria continues to operate and further develop a strong legal and policy framework and supporting processes to manage the Cap and the requirements of Schedule E.

The IAG acknowledges the timely receipt of information from Victoria and the full coverage of relevant issues in the submission provided.

4.2.6 Conclusions/Recommendations

- Diversions in 2007–08 were 1,534 GL compared to diversions of 2,089 GL in 2006–07.
- Diversions for the Murray/Kiewa/Ovens, Campaspe and Goulburn/Broken/Loddon valleys in 2007–08 were below annual climate and trade-adjusted Cap targets.

- However, diversions for the Wimmera–Mallee valley were slightly above the annual Cap targets for the year.
- Cumulative diversions since 1997 for all valleys are in credit and are still well short of exceeding the trigger for a special audit.
- The Murray, Campaspe and Goulburn/Broken/Loddon models have been updated or subjected to some modification during the year which has resulted in a slight reduction in the Cap for each of these valleys.
- The IAG is proposing to review and report on changes in Cap outcomes on a valley by valley basis as and when these occur and expects updating of models and historical data to be undertaken when the need for an amendment becomes apparent unless it can be demonstrated that the change is immaterial, the change required will be part of a significant model or data change over the next 12 months, or there is insufficient data upon which to make a change (whereupon the IAG will make qualitative comments where required).
- Water transferred out of the Goulburn/Broken/Loddon Cap valley by the Goldfields Superpipe should:
 - be treated as a return flow from the Goulburn system
 - reduce the annual Cap target in the Goulburn Broken/Loddon Cap valley
 - increase the annual Cap target in the Campaspe Cap valley.
- All water used by Bendigo by the Superpipe should be treated as a Campaspe diversion.
- All water transferred to Ballarat via the Superpipe should be treated as a Campaspe diversion.

4.3 New South Wales

4.3.1 The Cap

Assessment of Cap performance in NSW 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 NSW 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 NSW, including the NSW Murray and Lower Darling, Murrumbidgee, Lachlan, Macquarie, Namoi, and Gwydir valleys. These Plans are considered by NSW as representing a major milestone in the NSW water reform process, and a significant change in the nature of water licences. 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, continuation of severe drought conditions, particularly in the southern valleys, has resulted in the suspension of the Water Sharing Plans and the adoption of special emergency arrangements for these valleys.

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

The status of the various models used for annual cap auditing in NSW is given in **Table 8** below.

4.3.2 2007–08 Usage

For New South Wales the continuation of drought conditions have impacted the availability of water for consumptive diversion and thus the performance of individual valleys against the valley Cap.

Particularly of note this year is:

- The changed Cap targets for the NSW Murray and Lower Darling, following use of modelled tributary inflows from upstream Cap models, rather than observed inflows. NSW Cap targets up to last year (2006–07) have reduced by 104 GL.
- The combined Barwon–Darling and Lower Darling valley has exceeded the trigger for special auditing.
- Embargoes were placed on supplementary diversion in the Namoi and Gwydir Valleys from July to December 2007 to ensure sufficient water reached Menindee Lakes to meet critical water requirements for Broken Hill.
- Water Sharing Plans for the Murray and Lower Darling, Murrumbidgee, Lachlan and Macquarie Valleys remain suspended due to continuous drought and the need to make special arrangements to secure critical human needs.

Table 9 provides a summary of NSW diversions by river valleys. This table provides diversions, Cap targets and trade adjustment for 2007–08 along with accumulated credit or debit and identifies those valleys where accumulated debits have exceeded the Schedule E trigger. Some amendments have been made to the Cap targets, and accumulated credits or debits from previous years based on refinements and recalculations of the models.

Table 8: NSW Cap Auditing Models Status

| Valley | Auditing Tool | Comment |
|------------------------|---------------------------------|--|
| Murray / Lower Darling | Murray Monthly Simulation Model | Murray – approved for use under Schedule E Lower/Darling – audited but to be reviewed |
| Murrumbidgee | IQQM | Submitted for audit |
| Lachlan | IQQM | Approved for use under Schedule E |
| Macquarie | IQQM | Submitted for Audit |
| Peel | IQQM | Audited – recommended for approval |
| Namoi | IQQM | Approved for use under Schedule E |
| Gwydir | IQQM | Audited – recommended for approval |
| Border Rivers | IQQM (Interim) | Preliminary results yet to be finalised |
| Barwon–Darling | IQQM | Preliminary results available |

Table 9: NSW Annual Cap Accounting 2007–08

| System | Long-term Diversion Cap | 2007–08 Cap Target | Net trade from valley ¹ | 2007–08 diversion | Cap Credits (Target less diversion) | | 20% schedule trigger | Trigger Exceeded | Storage Difference |
|---|-------------------------------|-----------------------|--|----------------------|--|-------------------------------|----------------------------|---------------------|-----------------------|
| | | | | | 2007–08 | Cumulative since 1/7/97 | | | |
| Barwon–Darling | 173 | 154 | 0 | 206 | -52 | -325 | 31 | Yes | n/a |
| Lower Darling | 137 | 50 | 0 | 13 | 37 | 239 | 27 | No | -13 |
| Combined Barwon– Darling and Lower Darling | 310 | 204 | 0 | 219 | -15 | -86 | 62 | Yes | -13 |
| Intersecting Streams | n/a | n/a | 0 | 3 | n/a | n/a | n/a | n/a | n/a |
| Border Rivers | n/a | n/a | n/a | 129 | n/a | n/a | n/a | n/a | n/a |
| Gwydir | 344 | 72 | 0 | 89 | -17 | 81 | 69 | No | 22 |
| Namoi/Peel | 338 | 164 | 0 | 142 | 22 | 85 | 67 | No | 80 |
| Macquarie/Castlereagh/ Bogan | 468 | 222 | 0 | 76 | 147 | 210 | 93 | No | -151 |
| Lachlan | 334 | 95 | 0 | 46 | 49 | 114 | 66 | No | -122 |
| Murrumbidgee | 2358 | 1030 | 144 | 515 | 371 | 1466 | 471 | No | -521 |
| NSW Murray | 1880 | 426 | 20 | 244 | 162 | 192 | 376 | No | -510 |
| Total | 6033 | | 164 | 1463 | | 2061 | | | |

1. Includes water transferred to Snowy River Increased Flows.

Murray Valley

Resource availability

Water availability in 2007–08 reduced to critically low levels, following the lowest ever recorded annual inflows to the valley in the previous 12 months. The climatic conditions eased from the previous year, with slightly above average summer rainfall keeping the annual totals near average, and temperature ranging from near average to slightly above average. However, the cumulative impact of low rainfall over the five previous years resulted in only minor improvements in inflows during 2007–08. Towns, stock and domestic users, high employment industries, and permanent plantings were allocated restricted volumes of water to ensure critical needs were met and permanent plantings survived. The Critical Survival Water Program provided limited volumes of water direct to these critical users, initially on a month-by-month basis, based on an assessment of individual requirements for that month.

Minor improvements to water availability did accrue during the water year, leading to a 50% allocation for towns, stock and domestic users, and a 25% allocation for high security entitlements. In addition, access to all account water suspended in 2006–07 and water carried over to 2007–08 was finally permitted in March 2008, representing 17% of general security entitlement and 50% of high security entitlement.

Cap compliance

Cap compliance for the regulated sections of the Murray Valley has been assessed using the Murray Simulation Model (MSM) that has been approved for use under Schedule E. Cap modelling excludes all Snowy borrows, which has the effect of reducing the current Cap credits. For the first time, the Murray Cap modelling has used the modelled outflows from upstream valleys under Cap conditions, rather than observed outflows from these valleys adjusted manually for trade.

The Schedule E accounting for the 1997/98 – 2007/08 water years indicates that the NSW Murray valley is cumulatively 192 GL below Cap. This is slightly higher than the cumulative credits reported last year, but does not include the effect of drought management rules adopted in recent years within the Cap model. The Cap credit includes an initial allowance for transfers to the Snowy for environmental flows.

Long-term modelling undertaken by NSW prior to recalibration indicated that, if current development and water access rules remain, the average annual diversions for the future will be 4% below the average annual Cap diversions. It is argued by NSW that this provides an assurance as to this valley's performance within the Cap.

The cumulative Cap credit of 192 GL indicates that diversions since 1997 have been 1.2% less than the climate-adjusted Cap targets.

Murrumbidgee Valley

Resource availability

As for the Murray Valley, water availability in 2007–08 was reduced to critically low levels, following the lowest ever recorded annual inflows to the valley in the previous 12 months. The climatic conditions eased from the previous year, with slightly above average summer rainfall keeping the annual rainfall near average, and temperature ranging from near average to slightly above average. However, the cumulative impact of low rainfall over the five previous years resulted in only minor improvements in inflows during 2007–08. The Water Sharing Plan remained suspended for 2007–08, with environmental accounts under the Plan remaining suspended, along with 'translucent' and 'transparent' releases from Burrinjuck and Blowering Dams. Where possible, unregulated tributary inflows were used to meet critical environmental requirements. Nine (9) GL was diverted into wetlands containing critically endangered wildlife.

To provide towns, stock and domestic users, high employment industries, and permanent plantings with restricted volumes of water a Critical Survival Water Program was implemented. The Critical Survival Water Program provided limited volumes of water direct to these critical users, initially on a month-by-month basis, based on an assessment of individual requirements for that month. However, with improvements during the water year, full allocations to towns, stock and domestic users and permanent plantings were able to be made by November 2007, and for access to all previously suspended account water to be restored. Moderately wet conditions over the summer period allowed allocations of 13% to be made to general security users, although the Water Sharing Plan remained suspended.

Cap compliance

Representation of the Lowbidgee district is included within the Murrumbidgee IQQM, which has been submitted for audit. The results presented here exclude Snowy borrows from the Cap modelling, which has the effect of reducing the current Cap credits.

The Schedule E accounting for the 1997/98 – 2007/08 seasons indicates that the total Murrumbidgee Valley is cumulatively 1,466 GL below Cap. This indicates that diversions since 1997 have been 6.6% less than the climate-adjusted Cap. Despite recalibration of losses in the Murrumbidgee IQQM over recent years, the high river transmission losses that have been observed in recent years continue to be underestimated by the model, which has the effect of increasing Cap credits. It is possible that this under-estimation of losses within the model represents

about half of the volume of credit currently accounted. The results presented here are yet to include the effect of including representation of drought management rules within the Cap model. Current modelling indicates that long-term diversions would be around 2% below Cap.

Lachlan Valley

Resource availability

The Lachlan Valley inflows since 2002–03 have been at record low levels, and the Valley has been almost continuously subject to drought contingency planning through this period. Low inflows in 2006–07 required that the severe water sharing provisions between towns, high security, and stock and domestic users that have been in place since 2003 (with the exception of 2005–06) continued in 2007–08. Towns received an allocation of 70%, stock and domestic users 50%, and high security users 30%. General security users were allowed access to 40% of the account water to which access had previously been suspended. This represented approximately 3% of entitlement.

Slightly wetter spring and summer conditions this year had little impact on inflows, with the record-breaking sequence of low inflows continuing. Inflows since 2002–03 have been a record low, being cumulatively below the previous six year minimum inflow sequence, as well as setting record minimums for shorter periods (three–five years).

In September 2003, provisions to address the severe water shortage were introduced including the suspension of the rules relating to the environmental 'translucent' releases (a proportion of inflows to Wyangala dam), reduced end-of-system flow requirements. Differential water sharing arrangements between high security water users based on water requirements were also introduced. The Water Sharing Plan has been suspended since it commenced in July 2004.

Cap compliance

The Lachlan IQQM Cap model has been independently audited and approved for use under Schedule E of the *Murray–Darling Basin Agreement*. Schedule E accounting for the 1997/98 – 2007/08 seasons indicates that the Lachlan Valley is cumulatively 114 GL below Cap. This indicates that diversions since 1997 have been 4.4% less than the climate-adjusted Cap. The results presented here are yet to include the effect of including representation of drought management rules within the Cap model. This is likely to reduce the overall Cap credits, but is not expected to result in the Valley exceeding the Cap.

Long-term simulations undertaken by NSW indicate that average annual current conditions diversions under the Water Sharing Plan are 3% below Cap diversions. The more conservative water use restrictions will further ensure that the average annual conditions diversions are below the Cap diversions.

Macquarie Valley

Resource availability

Towards the end of 2006–07, intensifying drought conditions led to the suspension of the regulated Water Sharing Plan, and water availability at the commencement of 2007–08 was only sufficient to provide for limited supplies to towns, stock and domestic users, and high security water users. Towns received an allocation of 70%, stock and domestic users 50%, and high security users 10%.

Generally mild conditions through the spring and summer period allowed an allocation of 100% to be made to towns, stock and domestic, and high security users by January 2008. By February 2008, improved water availability permitted allocation increases to the environmental account and general security of 5% and 7% respectively. Due to ongoing dry conditions the Water Sharing Plan remains suspended.

Cap compliance

The Cap for the regulated sections of the Macquarie Valley has been audited using the Macquarie Valley IQQM that has been submitted for audit by the independent reviewer.

The Schedule E accounting for the 1997/98 – 2007/08 seasons indicates that the Macquarie Valley is cumulatively 210 GL below Cap, although the difference between observed storage levels and those simulated under Cap conditions at 30 June 2008 indicate that up to 151 GL of Cap debits may occur in the near future, if the storages do not spill. The credit of 210 GL indicates that diversions since 1997 have been 5.4% less than the climate-adjusted Cap. The results presented here are yet to include the effect of including representation of drought management rules within the Cap model.

Long-term simulations conducted by NSW indicate that average annual current conditions diversions under the Water Sharing Plan are 12% below Cap diversions.

Namoi/Peel Valley

Resource availability

The Namoi Valley consists of three distinct systems: the main Lower Namoi Valley, the smaller Peel River system and Manilla River/Upper Namoi system. Dry climatic conditions over the previous 18 months

eased during 2007–08 with summer rainfall events producing useful inflows.

Following continuing dry conditions over the preceding water years, water availability in the Lower Namoi Valley commenced in 2007–08 with no carryover volume in storage. High security, domestic and stock, and town water users commenced the year with 100% allocations in all systems. Inflows in the Namoi, Manilla and Peel systems during the summer period resulted in a general security allocation of 13%, 50%, and 70% respectively.

Because of the needs to provide critical water supplies to Broken Hill access to supplementary water was restricted from July 2006 to December 2007 in the Namoi and Gwydir Valleys.

Cap compliance

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 recommended for accreditation by the independent auditor. Diversions for the combined valleys are below the annual Cap targets since 1997–98 by a cumulative total of 85 GL. This indicates that diversion since 1997 have been 2.9% below the climate-adjusted Cap. The difference between observed storage levels and those simulated under Cap conditions at 30 June 2008 (for the combined storages) indicate that up to 80 GL of Cap credits may occur in the near future, if the storages do not spill.

This year the approved Cap model has been provisionally adjusted to include the effect of restricted access during some unregulated events during 2006–07 and 2007–08. These restrictions were to ensure that sufficient flows reached Menindee Lakes to provide critical water supplies to Broken Hill. This has the effect of reducing Cap credits by 58 GL. A proposal to modify the approved Cap model will be developed and put forward for consideration.

Long-term simulations undertaken by NSW continue to indicate that average annual current conditions diversions are 6% below Cap diversions for the Namoi and Peel regulated systems.

Gwydir Valley

Resource availability

Dry climatic conditions over the previous 18 months eased during 2007–08 with summer rainfall events producing some useful inflows to the system.

Following very dry conditions over the preceding water years, the Gwydir Valley commenced with a carryover volume equivalent to 2% of general security entitlement. High security, domestic and stock, and

town water users commenced the year with 100% allocations. Inflows during the summer period resulted in a general security allocation equivalent to 23% of entitlement.

Because of the need to provide critical water supplies to Broken Hill access to supplementary water was restricted from July 2006 to December 2007 in the Namoi and Gwydir Valleys.

Cap compliance

The Cap for the regulated sections of the Gwydir Valley has been audited using the Gwydir IQQM that has been recommended for accreditation by the independent reviewer. The results indicate that diversions are cumulatively 81 GL below Cap since 1997–98. This indicates that diversions since 1997 have been 2.5% less than the climate-adjusted Cap.

This year the Cap model submitted for approval has been provisionally adjusted to include the effect of restricted access during some unregulated events during 2006–07 and 2007–08. These restrictions were to ensure that sufficient flows reached Menindee Lakes to ensure critical water supplies to Broken Hill. This has the effect of reducing Cap credits by a similar amount to that assessed for the Namoi Valley.

Long-term simulations conducted by NSW continue to indicate that average annual current conditions diversions are 13% below Cap diversions for the Gwydir regulated system.

NSW Border Rivers

Resource availability

Dry climatic conditions over the previous 18 months eased during 2007–08 with summer rainfall events producing some useful inflows to the system.

Following very dry conditions over the preceding water years, the NSW Border Rivers commenced with a carryover volume equivalent to 7% of general security entitlement. High security, domestic and stock, and town water users commenced the year with 100% allocations. Inflows during the spring and summer period resulted in a general security allocation of 45% of entitlement.

Cap compliance

A formal Inter-Governmental Agreement (IGA) on water sharing arrangements in the Border Rivers has now been recommended to the NSW and Queensland premiers. The draft IGA would see each state limited to its long-term diversion as existed under 2002 levels of development, with the application of 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.

It is intended that the provisions of the IGA will be embedded in the NSW Water Sharing Plan, (and referred to in the Resource Operations Plan for Queensland), and that this would result in a Plan Limit of around 191 GL/year for the NSW Border Rivers regulated system. This is approximately 4% below the long-term average diversions under the Cap that is to be proposed by NSW.

NSW and Queensland have now agreed on modelling that describes state shares. NSW will now prepare a Cap model reflecting this work, and the proposed allowance for the enlargement of Pindari Dam. It is expected that a Cap proposal and modelling will be finalised during 2008–09.

Intersecting Streams

Cap Compliance

The Warrego, Paroo, Culgoa, Narran and Moonie Rivers flow across the NSW–Queensland border, and reaches of these rivers that are within NSW 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 NSW 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 details water access rules for sub-catchments where there is significant competition for resources – either between consumptive users, or users and the environment.

These Macro Plans will apply to the intersecting streams, as well as the unregulated areas of other valleys.

No Schedule E accounting is currently available for the intersecting streams. The IAG was advised that there was some water available from these streams during 2007–08.

Barwon–Upper Darling Valley

Resource availability

Flooding in the upper reaches of the Basin during 2007–08 produced significant inflows into the Barwon–Darling system from December 2007 to March 2008. This provided users with their first access to water since 2005, with a total diversion of 206 GL.

NSW has implemented a new Cap strategy, similar to those applied in other unregulated streams in NSW to ensure Cap compliance in the Barwon–Darling

Valley. The water entitlements and access rules have been restructured to ensure that long-term average diversions do not exceed the long-term Cap. It is acknowledged, however, that, as the Barwon–Darling is an unregulated river, water availability will vary significantly between years. Similarly, annual diversions will vary, with higher than average diversions in some years and lower than average diversions in others. The new Cap arrangements applied from 1 July 2007 and include:

- the reduction of existing licensed entitlements to the volume of the long-term diversion Cap, which is currently assessed at 173 GL/year
- a commencing account volume that represents the volume that would have been available had the licence restructure occurred in 1993–94 (170 GL)
- unlimited carryover of allocated water from one water year to the next, and the introduction of a trading framework.

NSW has commenced development of a Water Sharing Plan for the Barwon–Darling valley, which will incorporate this proposed Cap strategy to protect volumetric growth, as well as event-based access rules that will protect important flows for the environment and downstream users.

Cap compliance

The Barwon–Darling IQQM Cap model has been calibrated, and is available for long-term and annual Cap simulations to assess Cap compliance. Results are considered preliminary at present until the model is independently audited under the provisions of Schedule E of the *Murray–Darling Basin agreement*. The modelling also includes the impact of restricted access during some unregulated events to ensure that sufficient flows reached Menindee Lakes to provide critical water supplies to Broken Hill. This has occurred in the Barwon–Darling Valley in a number of years since 1997–98.

The preliminary Schedule E accounting for the 1997/98 – 2007/08 period, using observed inflows from upstream valleys, indicates that cumulative actual diversions in the Barwon–Darling Valley are 325 GL above the cumulative annual diversions targets, and remains well above the 35 GL trigger for special auditing based on 20% of the estimated average annual long-term Cap diversion. The 325 GL Cap debit indicates that, since 1997, diversions from the Barwon–Darling have been 23% above the climate-adjusted Cap.

Whilst diversions have exceeded the cumulative annual Cap targets, they have averaged 158 GL over the 1997/98 – 2007/08 period, which NSW argues is below the long-term average diversion of 173 GL.

The new licensing arrangements that commenced in 2007 are designed to ensure that future diversions also remain within this average long-term Cap.

Lower Darling Valley

Resource availability

At the commencement of 2007–08, volumes stored in the Menindee Lakes had fallen to critical levels. Water availability for consumptive use was restricted to a 50% allocation to towns, domestic and stock users. Flows to the Lower Darling River downstream of Menindee Lakes ceased. However, flooding in the upper reaches of the Murray–Darling Basin resulted in significant inflows to Menindee Lakes over the summer months. This enabled full allocations to be made to towns, domestic and stock, and high security users, and a 50% allocation to general security entitlements. There was no supplementary access available during 2007–08.

Cap compliance

The Cap for the Lower Darling has been audited using the Murray Simulation Model (MSM). However, the independent auditor has recommended that either further work is undertaken to improve the quality of the model's calibration, or that the required standards be reviewed. The main issue is the ability to model the recorded behaviour of the largest single irrigation enterprise in the Lower Darling at Lake Tandou. Despite more specific representation of physical processes in the model to simulate irrigation operations at Lake Tandou, a consistent calibration of diversions across the half dozen years of larger diversions has not been possible. At present, work is underway to verify historical records to better understand Lake Tandou's operations in these years.

The preliminary Schedule E accounting for the 1997/98 – 2007/08 period indicates that the Lower Darling Valley is cumulatively 239 GL below Cap. This indicates that since 1997 diversions have been 20% below the climate-adjusted Cap. Preliminary assessments indicate that long-term current diversions are very close to those that which would have occurred under Cap conditions.

Combined Barwon/Upper Darling and Lower Darling Cap Accounting

Cap Compliance

The preliminary Schedule E accounting for the 1997/98 – 2007/08 period indicates that the cumulative actual diversions in the combined Barwon–Darling and Lower Darling Valleys are 86 GL above the cumulative annual diversions targets and also above the combined trigger for a special audit of 62 GL, being 20% of the average annual long-term diversion.

Thus in accordance with the provisions of Schedule E, the IAG recommends that the combined Barwon/Upper Darling and Lower Darling be subject to a special audit.

The IAG notes that NSW has implemented a management plan for this combined valley which is based upon the annual allocation (with carryover) of 173 GL/year regardless of climate conditions. NSW also notes that based on its long-term modelling, an annual allocation of 173 GL would still result in a long-term outcome at the average of 173 GL. It is argued that given the episodic nature of flows in this valley, an annual allocation at the agreed average Cap will, in the long-term, result in the Cap being met. However, this outcome will only be achieved in the 'long-term' and it is not clear over what timeframe the long-term applies. In 2007–08 diversion in the Barwon/Darling was 206 GL which was 52 GL or 25% higher than the annual Cap target of 154 GL. The new capping arrangements limited total diversion last year to 514 GL.

4.3.3 Monitoring and Reporting

NSW has now submitted all but two of its models for audit. Three have been approved by the Authority and four have been or are in the process of being audited.

The use of IQQM models (and NSW's own long-term modelling as a measure of the likely exceedence of the Cap by an individual valley under current management rules) are tasks which are highly data intensive. These models have proven to be particularly sensitive not only to availability of water in past periods and off-take statistics but also to other key drivers of valley behaviour including on-farm storage levels, crop areas, inflows from unregulated streams, climatic conditions and rainfall patterns.

The IAG recognises that models will often need to be recalibrated particularly in conditions which are outside those that occurred during the period over which the model was originally calibrated. The IAG has confidence in the models but recognises that the need to recalibrate the models raises some concern about the reliability of the models that are used to measure performance against the Cap. To maintain the integrity of the models particularly as the unprecedented drought conditions deepen, the reliability of the models requires constant review. This is a resource intensive process, but will be imperative if the current Schedule E accounting arrangements are to be relied upon by all interested parties to ensure the Cap is being enforced.

The IAG notes that the Water Sharing Plans in NSW have largely been suspended during this time of exceptional drought conditions, and that to facilitate possible partial amendments to the Water Sharing Plans in the future, new legislation has been

foreshadowed that will allow partial suspension of these Plans. The Water Sharing Plans draw heavily upon the long-term modelling that NSW has undertaken and that is referenced by NSW when Cap outcomes are reviewed by the IAG on an annual basis. The Water Sharing Plans are, however, essentially long-term management tools and may not be appropriate for short-term action that is envisaged under the Cap compliant arrangements. The IAG has, therefore, been anxious to ensure that there is not undue reliance on long-term modelling for NSW valleys when it appears that there is an ongoing exceedence of the Cap using Schedule E accounting requiring potentially more immediate and significant action than might otherwise be taken based on the long-term modelling used by NSW.

Given that NSW is committed to the use of current conditions modelling to manage to its Water Sharing Plan limits and to guide its policy response to allocation issues, the IAG has previously proposed that these 'current conditions' models should be independently reviewed and assessed. In this way, the Council and Authority could be given additional assurance as to NSW's compliance with Cap and the Water Sharing Plan limits.

In its 2002–03 Report, the IAG identified the issue of monitoring diversions under the volumetric licences on unregulated streams. Diversions from unregulated streams within NSW are generally not metered, and the majority have only been converted from area-based to volumetric licences in recent years. 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. The metered diversions from these users, along with estimates of the un-metered use in each valley are listed in **Table 10**. These diversion have been included in the valley diversions that have been reported elsewhere in this report. Because they are not included in the Cap models, they have also been added to the annual Cap targets for each valley that have been reported in **Table 10**.

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

The estimates of un-metered diversion have not been changed for the last few years. In this year of low resource availability they constitute 22% of the total NSW diversion.

NSW intends to cap unmetered users according to the average 1993/94–1998/99 diversion estimate arising from the volumetric conversion process.

Table 10: Unregulated Use in NSW

| | Unmetered Use (GL) | Metered Use (GL) | | | | | | | | | | |
|----------------------|--------------------|------------------|---------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| | | 1997–98 | 1998–99 | 1999–2000 | 2000–01 | 2001–02 | 2002–03 | 2003–04 | 2004–05 | 2005–06 | 2006–07 | 2007–08 |
| Murray | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lower Darling | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Barwon–Darling | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Murrumbidgee | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lachlan | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Macquarie | 35 | 3 | 22 | 16 | 21 | 15 | 0 | 9 | 3 | 10 | 1 | 9 |
| Namoi | 78 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gwydir | 10 | 1 | 1 | 4 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 0 |
| NSW Border Rivers | 14 | 0 | 4 | 2 | 2 | 2 | 0 | 5 | 3 | 4 | 0 | 5 |
| Intersecting Streams | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

4.3.4 Administration of the Cap

NSW relies primarily upon its Water Sharing Plans for ensuring that the Cap requirements are met. However, the record drought conditions, particularly in the southern NSW valleys, have resulted in the continued suspension of regulated Water Sharing Plans for the NSW Murray, Lower Darling, Murrumbidgee and Macquarie/Cudgegong Valleys. The Water Sharing Plan for the Lachlan valley also remains suspended. This has allowed critical drought relief measures to be continued, including:

- suspending access to water in individual users accounts to ensure supply to critical urban and industrial users
- suspension of most environmental releases
- individual allocations to critical industrial users and permanent plantings on a month-by-month basis
- suspension of flows into some effluent creek systems
- new accounting arrangements for users (carryover for high security users, lifting of trade restrictions)
- limits to supplementary flows in the Namoi and Gwydir Valleys.

The impacts of record low inflows to many valleys have been fully felt this year, and a number of measures have continued into 2008–09 to ensure water security for higher priority water users such as towns and intensive use industries.

NSW will revert to the Water Sharing arrangements once the immediate drought crisis has passed.

4.3.5 IAG Assessment

Extreme drought conditions have continued across NSW valleys in 2007–08. With the exception of the combined Barwon–Darling/Lower Darling Valley, all other NSW valleys are within Cap for 2007–08.

The issue of the currency of the models being used in NSW and the need for amendments to those models has again arisen. This is a repeat of observations made in the 2006–07 IAG report where the IAG noted the impact of the drought on calculated Cap credits (an apparent artificial inflation of those credits) and the need to make full allowance in all climate-adjusted modelling for the impact of water restrictions. These adjustments have not been made.

The IAG has discussed in more detail above its proposed future review arrangements whereby it will be seeking to ensure that models have been brought up to date for all States and valleys as appropriate and the annual audit reports on the currency of the models and the historical performance of each valley against the relevant valley Cap. The IAG's intention is both to encourage the various jurisdictions to maintain the most up to date model and Cap performance records, and to strengthen stakeholders' compliance in the Cap reporting and auditing process.

The IAG has commented in previous reports on the long-term modelling undertaken by NSW.

NSW continues to place a high reliance upon this long-term modelling as the appropriate guide as to whether or not the Cap is being exceeded. As part of the special audit of the Barwon–Darling/Lower Darling valley that is triggered by the performance of this valley in 2007–08, it is expected that NSW will argue that the Water Sharing Plan that is now in place for that valley (although currently suspended from operation during the present drought crisis) will ensure that diversions on this valley will fall below the Cap requirement in the long-term.

The IAG does not believe that a reliance upon a long-term model which has not been subjected to independent assessment, and which does not address the shorter term imperatives of Cap adherence that is part of the Cap assessment and compliance arrangements applying to other valleys in the Basin, is fully within the spirit of the Cap. Although not a requirement of Schedule E, the IAG would encourage NSW in consultation with MDBA staff to submit all their long-term models for independent assessment and verification. NSW might also wish to consider what modifications need to be made to their long-term modelling in the context of the prolonged drought conditions.

Notwithstanding that NSW will argue that ‘by definition’ the adoption of a long-term average Cap will meet the Cap requirements, the IAG is still of the view that such a reliance gives little, if any, guarantee that the 325 GL debit that already exists in the Barwon–Darling will ever be repaid. Rather it is more likely that consumption in this valley will gravitate to the long-term average, but not repay past outstanding debits.

The IAG notes that an initial attempt has been made, in accordance with Schedule G of the *Murray–Darling Basin Agreement*, to adjust the Cap for water transferred to the Snowy Scheme to provide environmental flows. The IAG recommends that the process for making this adjustment be finalised.

The IAG acknowledges the timely receipt of an informative report from NSW together with data in line with the Schedule E format.

4.3.6 Conclusions/Recommendations

- Diversions in 2007–08 were 1,463 GL compared to 2,310 GL in 2006–07.
- Cap models have been approved for three NSW valleys, and audited or are in the process of being audited for an additional four valleys. Only the models for the Barwon/Darling and Border Rivers are outstanding.
- Notwithstanding the approval of most of the NSW models, there is a need to incorporate in the models recalibration adjustments reflecting the more recent drought experiences.
- Amendments to models should be approved by the Authority and amended historical data of Cap compliance should be reported annually by the IAG to provide full transparency of all data;
- NSW should submit its long-term ‘current conditions’ modelling for independent audit and assessment.
- The preliminary Schedule E accounting for 1997/98 – 2007/08 period indicates that the cumulative actual diversions in the combined Barwon–Darling/Lower Darling Cap valley are 86 GL above the cumulative annual diversions targets and also above the trigger for a special audit of 62 GL, being 20% of the average annual long-term diversion.
- Given that the NSW capping method for the Barwon–Darling aims only to hold future diversions at Cap levels, it is unlikely that the 325 GL debit for this valley will be reduced in the near future.
- Cumulative Cap credits exist for other valleys in NSW.
- The IAG has been unable to assess the Cap compliance of the NSW Border Review because the Cap has not been defined in that valley. However, the IAG notes that Queensland has now submitted its proposed Cap for the Queensland Border Rivers and it is expected that NSW will submit its Cap during 2008–09.
- 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 of the appropriate allowance for the enlarged Pindari Dam.

4.4 Queensland

4.4.1 The Cap

The Queensland Cap is to be established in accordance with the provisions of Schedule E of the *Murray–Darling Basin Agreement* following the completion of the water resource planning processes.

Following finalisation of Water Resource Plans (WRP) in all Queensland Murray–Darling Basin valleys, which form part of the statutory framework for Caps on diversions from water courses, lakes, springs and overland flows, Cap proposals for the Warrego, Paroo, Nebine and Moonie valleys were approved by the Ministerial Council at Meeting 42 – 25 May 2007. The year 2007–08 is the second year of water use accounting where outcomes from running these models has been incorporated into Cap reporting.

Under the *Water Act 2000* (Qld), Resource Operations Plans (ROPs) are developed to implement the provisions of the Water Resource Plans. Diversion Caps for Queensland valleys are implemented as part of the monitoring, auditing and reporting provisions of the Resource Operations Plans.

A Cap proposal for the Queensland Border Rivers has been submitted to the Murray–Darling Basin Authority and is discussed further below. Following review by the IAG, the proposal is to be then be submitted to the Ministerial Council for approval.

Subject to the finalisation of the Resource Operations Plan, a Cap proposal for the Condamine and Balonne valley will also be submitted. This is to occur within 6 months of the completion of that water planning process, although it is understood that this deadline might need to be altered in response to a Judicial Review that has been initiated in relation to the ROP determination process.

The finalisation of a Resource Operations Plan for the Border catchment has resulted in a shortened reporting period (nine months) for this catchment so as to align with the 1 July to 30 June water year applicable to other valleys. Although the Resource Operations Plan for the Condamine and Balonne catchment is yet to be finalised, the decision has also been made to shorten the reporting period for this catchment to align with the 1 July to 30 June water year.

Accordingly, a nine month transitional year is reported below for the Border Rivers and Condamine and Balonne catchments. Reporting for the Moonie, Warrego, Paroo and Nebine catchments are for the 1 July to 30 June period.

Administrative holds on the issuing of new licences have been in place in all Queensland Murray–Darling valleys since prior to March 1995 (major sections of

the Lower Balonne have had administrative holds in place since October 1991 and other sections including the majority of the Border Rivers since 1992).

Following the introduction of the *Water Act 2000* in September 2000, the administrative holds were replaced by moratoriums on the issue of new licences and the development of new works associated with those licences. The moratorium on taking water for other than stock and domestic purposes also applied to new overland flow works since September 2000 (Condamine and Balonne and Border Rivers) and June 2001 (all other valleys).

Accreditation of Cap models for the Warrego, Nebine, Paroo and Moonie valleys is presently underway and the first full Cap audit for these valleys was undertaken for the 2006–07 water year. The IQQM model being developed for the Border Rivers will be submitted for accreditation once the Cap has been formalised. This model has been used in conjunction with the ROP to inform the operation of the Border Rivers during 2007–08. The Cap model for the Condamine and Balonne system will be submitted once the ROP for this valley system is finalised.

4.4.2 2007–08 Diversions

Overview

The summer rainfall period (November 2007 to March 2008) saw a return to better than average rainfall in many parts of the Queensland section of the Murray–Darling Basin. This resulted in stream flow across most catchments. In particular, the more western valleys of the Warrego and the Paroo Rivers experienced moderate to major flooding events. The winter/spring and subsequent autumn/winter periods have been characterised by generally continuous dry conditions with little associated runoff.

The 2007–08 rainfall and resultant stream flows resulted in a range of beneficial outcomes including:

- much needed replenishment in the streams themselves and their dependent aquatic ecosystems
- flows to key floodplain and wetland systems
- opportunities to capture and store water for consumptive purposes in accordance with the prevailing water sharing rules contained in the catchment based Water Resource Plans
- substantial flow across the border into New South Wales.

A feature of the 2007–08 summer was the continuity of flow that occurred due to multiple rainfall events occurring over December, January and February in many areas. While Queensland streams are episodic by nature and large volumes of water can be generated and pass through the system over

short periods of time, the more sustained stream flow resulted in both multiple refreshment to key aquatic ecosystems and extended access to water for consumptive purposes.

An example of the beneficial effect, this has on the environment, is evident in the three flows over three months passing out of the Condamine and Balonne system into the Ramsar listed Narran Lakes system. Here a significant bird breeding event has taken place and, with the additional benefit of a special environmental water purchase, a successful outcome has been realised.

This is in marked contrast to the pattern of the last eight years which has been characterised by enduring drought conditions with stream flow conditions at historic lows or at no flow levels for long periods in a number of instances.

An analysis of the data in **Table 11** reveals the differential flow stories that occurred over the year. Observations include:

- the relatively high levels of flow that have occurred in the western valleys where the Maranoa, Warrego and Paroo each have experienced flows in the order of 3 to 4 times their respective annual average
- the Moonie catchment performed at about its average
- the eastern catchments of the Border and Condamine Balonne experienced slightly below average rainfall and runoff conditions.

As diversion Caps have only been approved for the Warrego, Paroo, Nebine and Moonie valleys, Cap

auditing was only undertaken for these valleys. For the Queensland Border Rivers and the Condamine and Balonne, only diversion volumes have been given.

Table 12 summarises diversions from the Queensland section of the Murray–Darling Basin. For those valleys, where Caps have been approved, annual diversions are significantly less than target diversions.

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

The assessed diversion across all valleys is 1,055 GL comprising supplemented (allocation take from regulated flow associated with public storages) and unsupplemented (take primarily from waterharvesting practices) diversions. This is the highest level of diversion since reporting under the Murray–Darling water audit process commenced in 1994–95. At 876 GL excluding overland flow harvesting, the diversion in 2007–08 exceeds the previous highest level of diversion of 815 GL reported in 2003–04.

The Caps for the Moonie, Nebine and the proposed Cap for the Border Rivers include overland flow harvesting. The estimate of overland flow harvesting in 2007–08 in the Murray–Darling Basin in Queensland is 179 GL. However, it should be noted that the derivation of the overland harvesting estimate has for some parts of the relevant valleys relied upon ‘irrigator estimates’. This is a measurement issue that has some implications for the operation of the models that are in use or are being prepared.

Table 11: Summary for Queensland Catchments 2007–08

| Valley | Flow at key sites (GL) | Mean Annual Flow (GL) | Diversion (Excluding Overland Flow harvesting) (GL) |
|--------------------------|------------------------|-----------------------|---|
| Condamine Balonne | | | |
| • Condamine | 231 | 523 | 105 |
| • Maranoa | 355 | 109 | 1 |
| • Balonne | 780 | 1009 | 562 |
| Border | | | |
| • Granite Belt | 26 | 7 | 11 |
| • Macintyre/Barwon | 281 | 903 | 106 |
| • Weir | 91 | 137 | 53 |
| Moonie | 134 | 140 | 28 |
| Nebine | 50 | only recently gauged | <1 |
| Warrego | 1765 | 305 | 12 |
| Paroo | 1450 | 490 | <1 |

Table 12: Annual Diversions Compared to Cap Targets (GL)

| System | Long-term Diversion Cap | This year's diversion excluding Overland Flow Harvesting | Overland Flow Harvesting (GL) | Total Diversion (GL) | This year's Cap Target | Net trade from valley | Cap Credits (Target less diversion) This year | Trigger Exceeded | Diversion as a % of Cap Target |
|-----------------------------|-------------------------------|--|--|----------------------------|---------------------------------|--------------------------------|--|---------------------|--------------------------------------|
| Warrego | 47.9* | 12.1 | 11 | 23.1 | 66* | 0 | 54 | No | 18% |
| Paroo | 0.18* | 0.01 | 4 | 4.01 | 0.09* | 0 | 0.08 | No | 11% |
| Nebine | 6.4 | 0.01 | 0.1 | 0.11 | 5.8 | 0 | 5.7 | No | 0.3% |
| Moonie | 34.9 | 27.8 | 13.7 | 41.5 | 84.8 | 0 | 43.3 | No | 33% |
| Queensland Border Rivers | n/a | 169.7 | 40 | 209.7 | n/a | -14.1 | n/a | n/a | n/a |
| Condamine and Balonne | n/a | 666.0 | 110 | 776 | n/a | 0 | n/a | n/a | n/a |
| Total | n/a | 875.6 | 179 | 1055 | n/a | -14.1 | n/a | n/a | n/a |

* Values do not include all overland flow.

Diversions (other than overland flow harvesting) over the last 15 years for the total Queensland section of the Murray–Darling Basin are summarised in **Table 13** below.

Table 13: Queensland Basin Diversions (excluding overland flow harvesting) (GL)

| Year | Diversions (GL) |
|---------------------------|-----------------|
| (1) 1993–94 | 336 |
| (2) 1994–95 | 176 |
| (3) 1995–96 | 528 |
| (4) 1996–97 | 467 |
| (5) 1997–98 | 741 |
| (6) 1998–99 | 609 |
| (7) 1999–00 | 541 |
| (8) 2000–01 | 688 |
| (9) 2001–02 | 341 |
| (10) 2002–03 | 214 |
| (11) 2003–04 | 815 |
| (12) 2004–05 | 392 |
| (13) 2005–06 ⁴ | 306 |
| (14) 2006–07 | 149 |
| (15) 2007–08 ⁵ | 876 |

Notes

1. Water year reported prior to 2006 was 1 October to 30 September.
2. Water year reported post 2008 is 1 July to 30 June.
4. Reporting for the Moonie, Nebine Warrego and Paroo catchments is for period 1 October 2005 to 30 June 2006. Remainder of catchments reported as per previous years (1 October to 30 September).
5. Reporting for the Border Rivers and Condamine/Balonne catchments is for period 1 October 2007 to 30 June 2008. Remainder of catchments reported as per previous year (1 July to 30 June).

The end-of-system flow from Queensland valleys for the year is estimated at 3,271 GL with the majority of this coming from the Warrego and Paroo valleys. Lesser contributions have been evident from the more eastern valleys owing to their continuing below average rainfall and flow conditions, and more developed state where flow has been such that access to water in accordance with the prevailing water sharing rules has been possible. The eastern landscapes of the Queensland Murray–Darling continued to largely miss out on significant runoff producing rain over this 2007–08 summer.

Warrego

Resource Availability

The 2007–08 year was characterised by above average summer rainfall which led to major flooding. Rainfall was nearly triple the average at Cunnamulla and was markedly above average for the Warrego catchment as a whole. A 630 mm rainfall was recorded at Cunnamulla against an average of 227 mm. Eighty five per cent (85%) of this total fell over the summer period (November 2007 to February 2008).

Average annual flow at Wyandra, which is a key monitoring station between Charleville and Cunnamulla, is 474 GL while further downstream at Cunnamulla the annual average is 305 GL. Streamflow for the Warrego River at Cunnamulla for the 2007–08 water year was 1,765 GL. This is the highest annual volume recorded at this station since recording began in 1992.

The Warrego River has a relatively reliable summer flow pattern. The summer flow this year ran from mid-November 2007 through to mid-March 2008 with a major peak flow of over 127 GL/day recorded in late January 2008. The entire catchment experienced good flows during the 2007–08 period.

Supplemented water diversion in this valley is limited

to a small water supply scheme based on a 4.77 GL weir on the Warrego River at Cunnamulla.

The generous flow situation for the year enabled 100% allocation to be announced. Supplemented diversion was 1.5 GL out of a total entitlement of 2.6 GL.

The majority of take is associated with water allocations with flow conditions (waterharvesting). Unsupplemented diversion for 2007–08 was 10.6 GL.

Water take is measured by metered works. However, formal metering of some of the larger works has been deferred until further development of the National Metering Standards has occurred and it is clear what criteria and specifications apply to this category of diversion. Water use assessments are completed for each of these works based primarily on 'irrigator estimates' although there are some independent estimates made.

Cap Compliance

Annual diversion was only 18% of the Cap target (excluding overland flow harvesting). Water entitlement holders did not fully avail themselves of the access opportunities provided during the year.

Paroo

Resource Availability

Rainfall recorded for 2007–08 at Hungerford in the southern part of the Paroo catchment was over double the long-term average of 156 mm for the second consecutive year. The peak monthly rainfall received was in December 2007 with 93 mm falling against the long-term average for December 2007 of 15 mm.

Streamflow at Caiwarro, the last gauged location on the Paroo in Queensland, was 1,449 GL for 07/08. This compares with an average annual flow at Caiwarro of 493 GL (1968 to 2008).

This represents the fourth highest flow on record (gauging commenced in 1968) and the highest since the record flooding of 1989–90. The excellent summer rainfall resulted in the Paroo River running from mid-November 2007 through to mid-March 2008. The flow peaked at over 74 GL/day in late January 2008.

Despite the magnitude of the flow passing across the border into NSW, it is understood that flow did not pass through into the Darling system. However, the terminal lake system at the end of the Paroo benefited from substantial inflow. The cross border and end-of-valley flow outcomes for the Paroo were further enhanced by break-out water from the Warrego catchment which finds its way across to the Paroo primarily through the Cuttaburra Creek bifurcation.

No supplemented water supply exists in this catchment and there are only two unsupplemented water allocations in the Paroo catchment. Unsupplemented diversion was 10 ML, with 8 ML of that taken for town water supply at Hungerford.

Overland flow harvesting was estimated to be 4 GL. Similar to the Warrego system, there is no reliable independent metering of this overland flow harvesting, and this will have implications for the future calibration of the model for this valley once metering arrangements for this form of diversion are agreed and implemented.

Cap Compliance

Annual diversion was only 11% of the annual Cap target (excluding overland flow harvesting).

Nebine

Resource Availability

Rainfall was well above average in the Nebine catchment with 617 mm recorded at Mulga Downs for the 2007–08 water year against an average of 260 mm. Over 70% of the rain fell over the three month period from December 2007 to February 2008.

The mean annual flow from the Nebine catchment (including Noorama and Widgeegoara Creeks) is estimated at 33 GL per year. Flows discharge into the Culgoa River.

The new gauging station installed at Roseleigh Crossing (on Nebine Creek) completed its first full year of recording. This gauging station is 10.5 km upstream of the Queensland/New South Wales border.

Flows in Wallam Creek at Cardiff and Nebine Creek at Roseleigh for 2007–08 were around 23 GL each. In both cases, flows were primarily recorded in the period from November 2007 to February 2008. Records for the Nebine catchment are relatively recent, so recorded averages or medians are not discussed as figures and are not indicative of longer term values.

No supplemented water supply exists in this catchment. There are only four unsupplemented water allocations in the Nebine catchment. Unsupplemented diversion was 15 ML with over half of this volume taken for the town water supply at Bollon.

Overland flow take for the catchment is estimated at 100 ML based on a broad assessment of development and opportunity.

Cap Compliance

Annual diversion was less than 1% of the Cap target.

Moonie

Resource Availability

Rainfall was above average across the catchment during 2007–08. Rainfall in Nindigully, located along the Moonie River in the south west of the catchment, was 636 mm for the year compared to an average of 356 mm. Well above average rainfall was received across south western Queensland over the November 2007 to February 2008 period and this pattern reached as far east as the Moonie catchment area.

Streamflow for 2007–08 at Fenton, the most downstream gauge in Queensland, was 134 GL. The recorded annual average at this site is 141.3 GL.

A new gauging station was installed at Flinton (AMTD 231 km) in February 2006 to assist in Resource Operations Plan monitoring and was operational over the 2007–08 year. Streamflow measured for 2007–08 at Flinton was 124 GL.

There was a minor flow in August/September 2007 before the summer rainfall arrived which caused the river to flow from early November 2007 through to late March 2008. The peak flow occurred in February 2008 at over 16 GL/day at Fenton.

No supplemented water supply exists in this catchment.

The majority of the 32 water allocations in this catchment take from watercourses with flow conditions (waterharvesting). The summer flow period provided waterharvesting opportunity primarily in December 2007 and February 2008. Unsupplemented diversion was 27.8 GL.

Overland flow take for the catchment is estimated at 13.7 GL based on a broad assessment of infrastructure development and opportunity. Overland flow take is included in the Cap volume for the Moonie catchment.

Cap Compliance

Annual Diversion was only 33% of the Cap target.

Queensland Border Rivers

Resource Availability

Rainfall was generally slightly above average across the Border Rivers area over the period. Records at Stanthorpe (October 2007 to June 2008) indicate a wetter summer and drier winter than usual. The highest monthly rainfall recorded was 164 mm in January 2008 – nearly double the average. A similar pattern applies to rainfall recorded at Inglewood though the highest monthly total was in February 2008. Rainfall patterns at Goondiwindi (located centrally in the catchment) were characterised by sporadic storm events with over 150 mm falling in February 2008 against an average of 53 mm.

Flows in the 'Granite Belt' area (upper catchment) were widespread, and the second highest on record, with flow at the bottom of this system (Ballandean) comprising a major event in January 2008 and a small event in February 2008. The January 2008 event was the first flow event (over 1 GL/day) to pass through this system since February 2004.

Nearly 37 GL passed through the Macintyre Brook catchment (average flow is 36 GL) this year. Four small to moderate flows passed in the November 2007 to February 2008 period, and the stream remained wetted up through to the end of the year with a number of release flows (from Coolmunda Dam) passing through from January 2008 to June 2008.

The Weir River performed above average with nearly 100 GL passing Talwood in 3 moderate flows over the summer.

The trunk stream (Dumaresq/Macintyre/Barwon) recorded three minor flow events in each of December 2007, January 2008 and February 2008 with flow peaks between 7 GL and 17 GL/day. Less than 200 GL passed through Goondiwindi for the period commencing 1 October 2007 and finishing 30 June 2008. These flows include supplemented releases from the dam storages in the catchment. This is less than last year and well below the annual average of 903 GL.

Flow over Mungindi Weir for the same period totalled about 88 GL which is above the figure for the 2006–07 period.

There are two major water supply storages in the Queensland part of the Border Rivers catchment. At 1 October 2007, Glenlyon Dam, the major storage for the Borders Rivers Water Supply Scheme, was at 16% capacity with around 6 GL of water available for general use from the Queensland share of the storage. This increased with inflows in November 2007, December 2007, January 2008 and February 2008 taking the total storage volume to over 98 GL before depleting over the remainder of the year to finish at 35% capacity with 27 GL available for use from the Queensland share of the storage at 30 June 2008.

Coolmunda Dam on Macintyre Brook is the major storage for the Macintyre Brook Water Supply Scheme. This scheme converted from announced allocation to continuous accounting at the end of last year. At 1 October 2007, Coolmunda Dam was at just under 25% capacity with 5 GL in storage accounts. There were a number of small inflows over the summer months, and the volume in the storage accounts was adjusted upwards several times with 24.9 GL in storage accounts at 30 June 2008. The dam finished the year at just over 70% capacity (50 GL).

A total of 15.1 GL of supplemented water was diverted within the Border Rivers Water Supply Scheme over the 1 October 2007 to 30 June 2008 period. This included supplemented take from releases from Glenlyon Dam, run of the river flows and 7.0 GL provided from the Macintyre Brook Water Supply Scheme. Take of water transferred from NSW is also included in the total.

A total of 9 GL of supplemented water was diverted in the Macintyre Brook Water Supply Scheme.

The three minor flows over summer triggered waterharvesting access under the water sharing rules currently in place on the Border Rivers. Waterharvesting thresholds were also triggered in the Weir River. These events provided Queensland water entitlement holders with moderate waterharvesting opportunity and 145.7 GL was diverted, 52.8 GL of this total related to the Weir River subcatchment while unsupplemented diversion in the Macintyre Brook catchment is minor and totalled 31 ML. Eleven (11) GL of the total is estimated to have been taken for waterharvesting and irrigation in the Granite Belt area.

The majority of diversion is metered. A metering project under the umbrella of the state wide metering program was initiated on the 'Granite Belt' targeting the waterharvesting facilities in place.

Cap Compliance

It is not possible to report on Cap compliance at this stage as a Cap has not formally been agreed. A Cap proposal for the Queensland Border Rivers has been submitted to the Murray–Darling Basin Authority and is discussed further below. Following review by the IAG, the proposal will then be submitted to the Ministerial Council for approval.

Condamine and Balonne

Resource Availability

Condamine

Rainfall was generally average across the Condamine area. This was a significant improvement on the rainfall trend since 2000.

The highest monthly total was received in February 2008, with nearly double the average received at Warwick and Chinchilla, and nearly three times the average received at Dalby. Rainfall distribution was relatively even with only the north eastern escarpment area missing out. Rainfall was generally slightly above average over spring/summer (first half of the reporting period), and slightly below average from March 2008 through to June 2008. The return of 'normal' summer rainfall led to a number of stream flow events throughout the Condamine area.

The flow event in November 2007 recorded in the middle and lower Condamine area was the first flow event since November/December 2005 at the Cecil Plains and Chinchilla sites. This flow provided replenishment to the growing number of severely depleted, or dry town water supply weirs and enabled the waterharvesting 'ban', that had been in place since December 2006 for the middle and lower Condamine areas, to be lifted.

Follow-up rain resulted in further minor to moderate flow events in January 2008 and again in February 2008. Both these flow events passed through Cotswold (gauging station at downstream end of Condamine River) into the Balonne system. Flows were widespread across the catchment with many tributaries recording flow for the first time in many years. The northern section of the Oakey Creek subcatchment was the only area that missed out over this reporting period.

The major storage for the Upper Condamine Water Supply Scheme (UCWSS), Leslie Dam, was at 7% capacity on 1 October 2007 and was at 16% at 30 June 2008. Moderate inflow from late November 2007 through to early January 2008 brought the storage volume up to 26% which resulted in allocation being announced for the UCWSS for the first time since 2002.

Chinchilla Weir was at 40% capacity at 1 October 2007 and filled in the late November 2007 flow event. The weir overtopped again in December 2007, January 2008 and February 2008. Announced allocation for the Chinchilla Weir Water Supply Scheme was 100%. The storage was at 65% as of 30 June 2008.

Twenty-eight (28.4) GL of supplemented water was diverted in the Condamine catchment with 26.8 GL diverted in the Upper Condamine scheme and 1.6 GL at Chinchilla.

The three flows over summer triggered waterharvesting access along the trunk stream, with access also occurring in most tributaries at least once over the period. The volume taken over this period is estimated at 70.4 GL with the total split relatively evenly between the upper, middle and lower sections.

A further 5.9 GL was diverted for direct irrigation with around half of this total taken from flows supplemented by treated effluent discharged from Toowoomba city into the Gowrie–Oakey Creek system.

About half of waterharvesting diversion in the Condamine catchment area is metered.

Balonne

Rainfall in the Balonne and Maranoa was above average with 620 mm recorded at St George over the October 2007 to June 2008 period in comparison to an average of 312 mm. Above average rainfall in

November 2007 was followed by the highest recorded total for December 2007 at St George (215 mm) since recording began in 1889.

Mitchell experienced similar rainfall conditions with 188 mm received – over three times the average. The rainfall intensity for many of the summer falls was very high as is demonstrated by the extreme rainfall event in St George in December 2007.

Flow occurred in the upper Balonne (comprising flow through from the Condamine plus tributary inflow) in late November 2007. After Beardmore Dam overtopped in early December 2007, three moderate flows passed through the lower Balonne area in December 2007, January 2008 and February 2008. The highest flow since 1996–97 was recorded from the Maranoa, which contributed to the December 2007 filling of the dam, and to the December 2007 and January 2008 flows through the lower Balonne.

Beardmore Dam was at 15% capacity at 1 October 2007. Beardmore overtopped in early December 2007 and overflowed through to mid-March 2008. The storage volume at 30 June 2008 was 42%.

Inflows up to 730 ML/day may be passed downstream for stock and domestic supplies, or are sometimes held in storage for later release to maximise the benefit to downstream water users. Over the reporting period 15.2 GL of stock and domestic passflow was released downstream over six release events, with 13.4 GL passed in four release events prior to the dam filling in December 2007.

The Narran Lakes bird breeding event, which occurred as a result of the first significant inflow into the lake for many years, was further secured and enhanced by the Murray–Darling Basin Authority's decision to purchase 11 GL of previously harvested water from the property 'Clyde' on the Narran River. The release commenced on 22 March 2008 and ceased on 30 April 2008 with 9.9 GL released in total.

Sixty-three (63.1) GL of supplemented water (including 12 ML from the Maranoa Water Supply Scheme) was diverted, with the total taken split evenly between the channel and river irrigators in the St George Water Supply Scheme.

The flows through the system were the best since 1998–99. This resulted in the triggering of a range of waterharvesting accesses with 498.6 GL diverted.

Cap Compliance

The water planning process has not yet been completed for this valley; therefore it has not been possible to provide Cap target comparisons for 2007–08. However, it should be noted that the draft ROP rules were applied in managing access to water in this system over the water year.

4.4.3 Monitoring and Reporting

Cap models for the Warrego, Paroo, Nebine and Moonie valleys have been submitted for accreditation.

A Cap proposal for the Queensland Border Rivers has also been submitted to the Murray–Darling Basin Authority and is discussed further below. Following review by the IAG, the proposal will then be submitted to the Ministerial Council for approval.

Subject to the finalisation of the resource operations plan, a Cap proposal for the Condamine and Balonne valleys will be submitted within six months of the completion of the water planning process.

It is anticipated that the Border Cap proposal will be finalised during 2008–09 and it is intended that the Condamine Balonne Cap proposal will be substantially progressed.

Border Rivers

In the Border Rivers Catchment, an interim Inter-Governmental Agreement (IGA) that deals with interstate water sharing and access arrangements for the Border Rivers catchment has been negotiated between Queensland and New South Wales. The interim IGA was prepared in consultation with the Interstate Water Management Working Group, comprising of representatives of water user groups from each State, who provided advice to the Border Catchments Standing Committee on the development of the key elements of this agreement. The IGA is expected to be agreed by the relevant State Premiers within the next six months. The provisions in the Inter-Governmental Agreement will be reflected in Queensland's Resource Operations Plan and the New South Wales Water Sharing Plan. The Resource Operation Plans for the Border Rivers was finalised in March 2008 and its Cap proposal was forwarded to the IAG in September 2008. The ROP for the Border Rivers has been developed in consultation with the local community.

Council's original decision on the Queensland Cap was that Queensland Cap would be set by the Ministerial Council on the recommendation of the Commission (now Authority) as mentioned in the version of Schedule E adopted by the Council in August 2000. Subsequently Council in March 2008 adopted a new Schedule E, which (Clause 2 and 8) specifies that Queensland Cap is set by the relevant first gazetted Resource Operations Plan.

The revised Schedule E proposes that annual Caps for Queensland valleys will be set as the seasonally adjusted diversion limit based on the rules in the applicable valley's resource operations plan. This approach is known as a 'rules-based approach'. That is, the annual diversion target will be the extraction that could have occurred in the valley under the

climate conditions for the audit year under the water management rules in the relevant resource operations plan. This annual diversion target is to be compared with actual take of water for that water year to determine if more water has been extracted than would have been permitted under the water management rules. If the difference between measured and target diversions accumulates to a level which exceeds the trigger level then a special audit will be undertaken.

The long-term diversion Cap for the Queensland section of the Border Rivers valley is proposed to be the amount of water that can be extracted from the Queensland section of the Border Rivers valley under the water authorisations and water management rules detailed in the first Gazetted *Border Rivers Resource Operations Plan 2008*.

The annual diversion target is distinct from the long-term diversion Cap in that it is a modelled target based on both the rules of the resource operations plan and the water availability for that particular water year. Measured diversions will be compared with the annual diversion target (as determined by the Border Rivers IQQM) to determine if more water has been extracted than would have been permitted under the plan's water management rules. This process will be carried out in accordance with the revised Schedule E of the *Murray–Darling Basin Agreement*.

In accordance with the revised Schedule E if, the Murray–Darling Basin Authority determines that the cumulative debit recorded in the Cap register exceeds 20% of the long-term diversion Cap for the Border Rivers valley, a special audit will be conducted.

It is proposed that in the long-term diversion Cap for the Border Rivers valley will be 250.31 GL. This is based on the long-term average diversion for all types of water diverted between 1 July 1890 and 30 June 2000 (based on model run BOR0806A). The breakdown of this volume is shown in **Table 14**.

Unconverted licences are licences that have not been converted to water allocations but have had diversion estimates included in the Cap volume.

It should be noted that the volume attributed to overland flow diversions is an estimate based on the best available information. It is intended to further refine the overland flow take volume once sufficient metering data has been recorded to allow a review of this section of the audit model.

Table 14: Component volumes of the long-term diversion Cap for the Border Rivers valley

| Type of water | Mean annual diversions (GL) |
|----------------------------------|-----------------------------|
| Supplemented water allocations | 48.600 |
| Unsupplemented water allocations | 152.159 |
| Overland flow | 22.200 |
| Town water supply | 3.250 |
| Unallocated water | 5.000 |
| Unconverted licences | 19.100 |
| Total | 250.309 |

Subject to Council approval of the Cap, the Border Rivers Cap for Queensland will commence in the 2008–09 year.

As some entitlements in the Border Rivers plan area are not presently metered to a level that is consistent with Queensland's metering standards, it is proposed to report on diversions in three different categories.

Table 15 defines the three categories and their respective details.

Table 15: Reporting categories for the audit of the Border Rivers valley Cap

| Category | Description |
|----------|--|
| 1 | Metered diversions: Includes all metered diversions (water allocations and some unconverted licences). These will be reported as part of the Cap audit and will form part of the annual reported diversions. |
| 2 | Non-metered diversions: Includes non-metered diversions (overland flow authorisations, area based licences, non-metered water allocations and riparian stock and domestic take). These volumes will be reported as part of the Cap audit and form part of the annual reported diversions. |
| 3 | Non-accounted diversions: Unallocated water that has not been released. While this volume is a component of the long-term diversion Cap it will not be reported as part of the Cap audit and the volume will not form part of either the annual diversion target or the annual reported diversions. |

Entitlements not yet metered in the Border Rivers valley will be metered in accordance with Queensland's 'metering Water Extractions Policy'. Entitlements in the Stanthorpe area are currently in the process of being metered.

Over time as either metering of entitlements occur or unallocated water is released, the category of an entitlement will move to one of greater accuracy and reporting requirements (i.e. from Category 3

Table 16: Basis for assessing annual diversion targets and annual diversion volumes

| Category | Annual diversion target | Annual measured diversion |
|----------|---|--|
| 1 | Developed by the Border Rivers IQQM, based on recorded stream flow and the annual volumetric limits | Metering |
| 2 | Estimated by the IQQM using recorded stream flow | Estimated by farmer survey and diversion opportunity based on recorded stream flow |
| 3 | Not included | Not included |

to Category 2 to Category 1). **Table 16** summarises the basis for assessing the annual diversion target and the method of acquiring the annual measured diversions for the respective category.

The difference between the total annual measured diversion (usage) and the annual diversion target will be calculated for each water year. This calculation will be undertaken for diversions under Category 1 and Category 2 but not Category 3. Entitlements granted for unallocated water (currently Category 3) will fall under either Category 1 or Category 2 when granted.

Following its approval by the Murray–Darling Basin Authority, the Border Rivers IQQM will be used to audit the Border Rivers Cap and to model the authorised opportunities to divert water in accordance with the water sharing rules in the resource operations plan.

The Border Rivers IQQM has been developed by the Department of Natural Resources and Water and underpins the Border Rivers Water Resource Plan and Resource Operations Plan. The model is well advanced and has provided a ‘guide’ to the operation of the Border Rivers over the most recent water year. This model will be accredited by the Murray–Darling Basin Authority as part of the finalisation of the Cap.

The Queensland proposal envisages an annual accounting methodology. Annual accounting is a method employed in the *Border Rivers Resource Operations Plan 2008* to Cap growth in long-term average annual take of unsupplemented water. This method involves creating an individual water account for each water allocation. In accordance with the Resource Operations Plan, at the commencement of each water year, each water account will be credited with the nominal volume associated with that water allocation. As water is taken under the water allocation the water account will be debited accordingly.

To transition to an annual accounting process the *Border Rivers Resource Operations Plan 2008* details transitional provisions to moderate the impact of sleeper and dozer entitlements being activated within a ‘no-growth’ plan. In particular it contains provisions for an annual announced limit, which initially allows entitlements holders to take in excess of 100% of

their volumetric limit for at least the first two years with the exception of the Northern Weir River Water Management Area. This water management area has been limited to 100% due to the absence of development in the area.

The annual announced limit will be revised downwards as necessary to ensure that the long-term average annual take does not exceed that agreed to under the Interim Inter-Governmental Agreement.

This temporary increase in volumetric limit will not result in long-term growth in take as current infrastructure acts to limit take until growth in infrastructure occurs. Capacity for a growth in take will occur through the development of sleeper and dozer entitlements. In order to ensure that take does not increase, the annual announced limit will be revised annually as growth in this infrastructure occurs.

These arrangements effectively allow time for those water users who are heavily developed to either purchase water entitlements to support their level for development or to downscale their operations.

Where the annual announced limit is determined to be less than 100% for a water management area, the annual accounting management system will be introduced.

Condamine and Balonne

On 12 August 2004, the Water Resource Plan for the Condamine and Balonne catchment was released. The Plan was finalised after a long period of community consultation and incorporates advice from advisory committees, reference groups, community organisations, irrigators, graziers, members of the local community, industry groups, local councils and government agencies as well as independent scientists.

The Plan seeks to provide a framework for the sustainable management and use of water in the Condamine and Balonne catchment and allocates water to support the social, economic and environmental requirements of the catchment and downstream parts of the catchment.

A draft Resource Operations Plan was released for public submissions in April 2007 and the Plan was re-released in July 2007 in order to convert a number of entitlements in the Lower Balonne which were not able to be included in the initial draft Plan. It was expected that the Resource Operations Plan would be finalised by 2008 and a Cap proposal submitted within six months of finalisation of the Plan. However, a Judicial Review action has been instigated to consider the process by which the Department of Natural Resources and Water made the determination of the ROP. It is now expected that the ROP may be finalised in 2009 with a Cap proposal to be submitted within six months of its release.

For the 2007–08 year, the operation of the system has been informed by the draft ROP and the Water Resource Plan that is already in existence.

Metering

Queensland released a policy on metering water extractions in May 2005 providing a framework for metering across the State. The policy includes metering standards, details of ownership, maintenance and reading of meters, and proposed charging arrangements. In brief, the Department of Natural Resources and Water will organise the supply, installation and maintenance of water meters in accordance with standards provided in the policy. Ownership of water meters will remain with the department with costs associated with metering recovered from water users through an annual metering service charge.

The metering project will see the staged introduction of water metering for all un-supplemented water extractions across Queensland over the coming years. The development of a Resource Operation Plan in each water resource plan area will generally trigger implementation of metering. As far as possible, metering will be scheduled to be completed in each resource operations plan area at or near the finalisation of the Plan.

4.4.4 IAG Assessment

Excluding overland flow harvesting, the diversion of 876 GL in 2007–08 (excluding overland waterharvesting) was considerably higher than the 2006–07 diversions of 149 GL and reflects improved rainfall and stream flows during the 2007–08 year across the relevant catchments. This diversion is the highest level of diversions since the commencement of the Cap on the Murray–Darling Basin and exceeds the previous highest level of diversions of 815 GL in 2003–04. When the estimated 179 GL of overland flow harvesting is included, the total diversions in 2007–08 were 1,055 GL.

For those valleys, where Caps have been set, the diversions in 2007–08 were well within the Cap targets although some overland waterharvesting (particularly in the Warrego and Paroo) has not been fully accounted for in the modelling that has been undertaken. It is noted that the operation of the Cap on these valleys does not prevent investment in works designed to improve the efficiency of water use, but has effectively capped the diversion of water to levels within the agreed Cap.

The Caps for all systems in the State cannot be finalised until the planning process is completed. Those valleys with agreed Caps are the Warrego, Paroo, Nebine catchments and Moonie River.

The Water Resource Plans for the Border Rivers became law in December 2003 and for the Condamine–Balonne in August 2004. Since then work has progressed on developing the Resource Operations Plans. The current October 2008 status is:

- Border Rivers – An interim Inter-Governmental Agreement that deals with interstate water sharing and access arrangements for the Border Rivers catchment has been negotiated between Queensland and New South Wales. The Resource Operations Plan for Queensland together with the Cap has been finalised and the proposed Cap has been forward to the IAG for consideration (see below). The Border Rivers has operated over the last 12 months guided by the interim estimates derived from the current draft of the Border Rivers model.
- Condamine–Balonne – A draft Plan has been released for public submission, and the Plan is now scheduled to be finalised in 2009 with the Cap proposal to be submitted for approval by the Council within six months of a finalised Plan.

The IAG notes that the models that have been developed for the Queensland system (including those still to be accredited) 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.

While it is intended that the process of metering and adoption of new technology to capture offtake quantities will gradually result in improved data for these diversions, the modelling and monitoring processes will initially rely on information that still needs to be independently determined. 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 has now been substantially introduced for surface water diversions from streams and rivers, and the finalisation of the metering roll out will occur through the Statewide metering project.

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 and provide a sound 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 offtake of water in accordance with those licences.

Border Rivers Cap

Following a lengthy process involving extensive public debate and consultation, reviews of various water allocation options, and development of a Resource Operations Plan, Queensland has now submitted a proposal for a Cap to be applied to the Queensland Border Rivers. The proposed long-term Cap of 205.31 GL is predicated on the requirement that development for the take of water does not increase beyond the levels set by existing water entitlements. The existing water entitlements have been a product of some initial growth in development in the period immediately following the setting of the 1993–94 Cap target, followed by the implementation of a moratorium on new water licences and take by overland flow which took effect in 1999–2000. Thus the long-term average end-of-valley flow as at 1999–2000 has been used as the initialising value for the Cap.

In assessing the proposed Cap, the IAG has referred to the guiding principles originally established by the IAG for this purpose and endorsed by Council⁶. The Cap proposal is briefly considered in terms of each of these principles.

(a) No further changes be made to flow regimes that would contribute to deterioration of water quality and environment protection.

The Queensland proposal is based on retaining the long-term average end-of-valley flows at the level applicable in 1999–2000 under the moratorium placed on development on the Queensland side of the Border Rivers. Previously in 1995, an administrative hold on the licensing of new water entitlements had been introduced, and this was continued by the introduction of the moratorium in September 2000.

The settling of a long-term average flow at the end-of-system was used as an interim measure to

limit total water use in the valley until licences could be converted to volumetric allocations through the Resource Operations Plan. The rules in the Resource Operations Plan and the water allocation granted under this plan now place a limit on water diversions.

The Cap will be applied and monitored by way of a climate-adjusted IQQM model with similar trigger points for Cap compliance as is applied in other southern valleys in the Basin. Effectively the Cap and its operation will ensure that there are no further changes to flow regimes within the Border Rivers valley.

(b) Water allocations be made with extreme sensitivity to the effects on the environment (the Precautionary Principle).

The Precautionary Principle has been applied in that an administrative hold, followed by a moratorium, was placed on all new licence applications from the commencement of the Cap in 1995. Under the proposed operation of the Cap for the Border Rivers, there will be no opportunity for growth in allocations and this will be monitored by way of a climate-adjusted IQQM model as in most other valleys in the Basin.

Queensland's proposed management practices will also prevent any growth in diversion above the Cap as a consequence of the possible activation of sleeper and dozer licences. Thus the Cap will be managed in a manner that is consistent with the Precautionary Principle and that sets a limit on further growth in water take from the valley.

(c) Water is allocated to the highest value use (allocative efficiency).

Establishment of a Cap will contribute to the allocation of water to the highest value use to the extent that the market in water trading is allowed to operate. The interim administrative hold and moratorium on the issuing of new licences has in part created an environment where water is encouraged to be applied to the highest use. The formal introduction of the Cap will reinforce the market environment for water to move to the highest value use.

(d) Statutory and agreed property rights to be recognised.

The Border Rivers Cap has been developed in collaboration between Queensland and NSW. The Interim Inter-Governmental Agreement established between the two jurisdictions has sought to recognise the rights and obligations of each State and to ensure appropriate water sharing between the two States.

The adoption of the Cap and operation of the river management plans also provides greater security for water entitlement holders by providing security of a licence entitlement within the relevant valley and the

⁶ IAG 'Setting The Cap' Report, 1996.

opportunity for trading within the Basin.

(e) Water management provisions to be transparent and auditable.

The Border Rivers Cap proposal incorporates an accounting methodology similar to that applied in other valleys in the Basin. This incorporates cumulative accounting as well as annual reporting of debits and credits against the annual diversion targets.

Cap monitoring and operating will be undertaken in accordance with Section 13 of Schedule E. Queensland will report on modelled diversions (using a climate-adjusted IQQM model to be reviewed and approved by the Authority) and actual diversions on an annual basis. This information will be reviewed by the IAG and published as part of the IAG's annual audit of the Cap across all valleys.

(f) A system of administration be implemented which is easily understood and which minimises time and costs (administrative efficiency).

The Queensland proposal is similar to the arrangements that are applied in other valleys, and meets this requirement.

Having examined the Cap proposal in the context of the six principles previously established for this purpose, the IAG concludes that the Border Rivers Cap as proposed by Queensland meets the requirements for a valley Cap under the provisions of the agreement to establish a Cap on water diversions across the Murray–Darling Basin.

In addition, the IAG notes that the process used in deriving the Water Resource Plans and the Resource Operations Plan has involved extensive public discussion, review and debate, and in this process there has been due consideration given to issues relating both to the use of water for environmental as well as consumptive purposes. The application of the Precautionary Principle, as noted above, will ensure that cross border flows from Queensland will be within the range determined as being appropriate and consistent with good river health requirements. Accordingly, the IAG recommends to Council that the Queensland Border Rivers Cap and its associated operational arrangements be accepted for reporting on future water diversions in this valley. The IAG understands that the first report under the provisions of the Cap and an interim IQQM model which is being developed, will be for the 2008–09 year.

4.4.5 Conclusions/Recommendations

- Including overland flow harvesting, the total diversion from the Queensland section of the Murray–Darling Basin was 1,055 GL in 2007–08.
- Excluding overland flow diversions, the diversion of 876 GL in 2007–08 was the highest Queensland diversion on record and is considerably higher than the 2006–07 diversions of 149 GL.
- Notwithstanding these high levels of diversion, there were very high flows of water across the border to NSW during the 2007–08, reflecting healthy summer rainfalls in many catchments particularly in the western portion of the Basin.
- Cap figures for Queensland Murray–Darling Basin valleys have now been set for the Warrego, Paroo, Nebine Catchments and the Moonie River, and diversions within these systems have all been found to be within the annual diversion targets.
- A Resource Operations Plan for the Border Rivers is finalised and the proposed Cap for this system has been provided to the IAG for assessment.
- An interim Inter-Governmental Agreement that deals with interstate water sharing and access arrangements for the Border Rivers catchment has been negotiated between Queensland and New South Wales.
- A Resource Operations Plan for the Condamine Balonne system is expected to be finalised during 2009 and Queensland expects to submit the Cap proposal within six months of the finalisation of the plan.
- 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.
- The IAG has reviewed the Queensland Border Rivers Cap proposal for a climate-adjusted Cap based on a long-term average diversion Cap of 250.3 GL per annum and to be administered and audited through a climate-adjusted IQQM for the Borders Rivers. The IAG has concluded that this Cap is consistent with the six principles for considering Cap proposals established by the IAG and endorsed by the Council, and accordingly recommends that Council approve the Cap proposal for the Queensland Border Rivers.
- The IAG also notes that the process adopted by Queensland to derive the Cap for the Border Rivers has been transparent and open to wide stakeholder participation and input thereby reflecting the views and interests of all parties.

4.5 Australian Capital Territory

4.5.1 The Cap

The ACT became a participant in the Murray–Darling Basin Initiative in March 1998. At that time the ACT Government undertook to participate in the Cap initiative. This commitment to the Cap has been reaffirmed at subsequent Council meetings, most recently at the May 2008 Ministerial Council meeting when the ACT's Cap was agreed.

Net ACT consumption is approximately 0.3% of overall Basin water use. The major consumptive use of water in the ACT is the urban water supply to Canberra and Queanbeyan. Net diversions since the mid-1980s for urban water supply have been around 26 GL per year with an additional 5 GL per year estimated for all other consumptive diversions.

The Cap agreed for the ACT acknowledges that there may be some redefinition of the Cap once the Basin Plan as foreshadowed in the *Water Act 2007* comes into effect. Until this time, the ACT Cap is defined as:

- i. 40 GL climate-adjusted Cap (based on net diversions), plus
- ii. 0.75 times the 2006–07 current per capita consumption of water times the population growth of Canberra and Queanbeyan.

Under the agreed Cap, no urban water is to be traded out of the ACT other than that previously purchased from interstate, and any growth in demand for water for industry and future Commonwealth will be provided by trade. The Cap agreement also provided that existing Cap credits (based on the assumption that a 40 GL Cap applied since 1 July 1997) would be recognised.

Reflecting previous recommendations made by the IAG, the Council also decided that the Commonwealth and the ACT needed to settle the management arrangements for the water controlled and used by the Commonwealth and its agencies. The diversion by the Commonwealth of water controlled by the Commonwealth has not been accounted for in previous reports by the IAG, and precise numbers are not known. It is thought that diversions by the Commonwealth (primarily from Lake Burley Griffin) could be as much as 2 GL, but may be as little as 0.6 GL.

In 2007–08 as in recent years, net diversion was impacted by the implementation of water restrictions

introduced in response to the drought and the damage caused by the January 2003 bushfires on the catchment areas. During the 2007–08 year, ACT was on Level 3 restrictions for the whole of the year. The ACT Government has also introduced permanent water conservation measures as part of a broader policy to conserve water. Water held in storage at the end of the 2007–08 year was less than 50% of capacity although this had risen in response to wetter conditions. Dam levels had remained below 50% for the whole of the year.

Table 17 provides details of diversions and returns to the river system via the Lower Molonglo Water Quality Control Centre (LMWQCC) and the Queanbeyan Sewage Treatment Plant (QSTP). The gross diversions by the water distributor, ACTEW Corporation (ACTEW), were at a record low in over 20 years of 43.7 GL. Provision had previously been made in the IAG reports from up to 5 GL being diverted by other licence holders (including the taking of ground water). Based upon the metered information which is now available, only 0.98 GL has been diverted by this group (although ground water has not been included). The net diversions for the year were 15.6 GL which is around half of the normal net diversions, reflecting the impact of level 3 water restrictions.

The ACT Government's water strategy is embedded in its *Think Water, Act Water* policy statement (April 2004) in which it is proposing a 25% reduction in the *per capita* consumption of water in the ACT by 2023 and a greater use of recycled water to replace existing potable water use.

In August 2005, the ACT Government implemented a two year moratorium on the issuing of new surface and groundwater extraction licences. This was to allow the ACT Government time to examine the impact of the current use of groundwater and the basis on which any future licences should be allocated. During 2006–07, the ACT completed a process of metering groundwater and other diversions and in 2007–08 was able to report metered diversions under this category.

The ACT also provides water to NSW and in particular to Queanbeyan. Under agreements reached with NSW and the Commonwealth, and in conjunction with negotiating a 150 year base over the management of the Googong Dam, the ACT has committed to provide water to an enlarged Queanbeyan and this use is included in the ACT Cap.

Table 17: Diversions for Consumptive Use within the ACT and Queanbeyan

| System | Long-term Diversion Cap | ACTEW diversion | Direct diversion | LMWQCC return | QSTP return | Net diversion | Net trade | Storage Difference |
|--------|----------------------------|--------------------|---------------------|------------------|----------------|------------------|--------------|-----------------------|
| ACT | 40 | 43.694 | 0.98 | 25.707 | 3.379 | 15.588 | nil | |

4.5.2 Administration of the Cap

The *ACT Water Resources Act 1998* (the Act) has been revoked, and the relevant legislation governing the licensing and measurement of water is the *ACT Water Resources Act 2007*. This Act contains provision for the licensing and measurement of extractive water use from both groundwater and surface water. The ACT Government has implemented this licensing procedure and undertaken a metering program such that both groundwater and surface water diversions are now metered.

The National Capital Authority (NCA) which is responsible for the supply of water (other than potable water) provided to public parks and facilities in the Parliamentary Triangle, does not report its diversions to the ACT. The NCA authorises the pumping of water from Lake Burley Griffin. The IAG has previously identified the need for the NCA diversions to be accounted for under the Cap. Under the agreed ACT Cap, provision has been made for the accounting for these diversions and for the trade in of any increase in the diversions above current levels. However, there is a need to devise and implement a process whereby the water controlled and consumed by the Commonwealth is reported under the Schedule E provisions.

The ACT Cap will be administered against a model to be verified and approved by the Authority. The ACT is proposing to use the potable demand modelling of ACT and Queanbeyan water use as developed by ActewAGL. This model will need to be adjusted for the treatment of 'other diversions' as show in **Table 16**, which includes both licensed ground and surface water diversions. The model will also need to reflect the water controlled and consumed by the Commonwealth. Up to 5 GL per annum had been included in the calculation of the ACT Cap for these 'other diversions' which in previous years have included both ground water and surface water diversions.

4.5.3 Monitoring and Reporting

The ACT has established a system of volumetric licences for all users of water in the ACT. The ACT will be able to report its consumptive usage against information provided by licence holders. As ACTEW Corporation will be the main licensed user of water from the system, the level of accuracy from this monitoring process should be 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 will fill any possible gap in the collection of data on water use in the ACT.

4.5.4 IAG Assessment

The IAG welcomes the agreement to a Cap for the ACT and the ability to report on diversions against this Cap. For the 2007–08 year, with near record low gross diversions, it is possible to report that the net diversions for the ACT are 15.6 GL, well within the Cap.

In determining the Cap and in reporting annual diversions, the IAG notes that the wording of the May 2008 Council decision may have been a little imprecise. In referring to a 40 GL climate-adjusted Cap, the IAG has interpreted this to mean a Cap on the net diversions for the ACT. Reporting on a net diversions basis for the ACT has been the standard practice since the establishment of the Cap auditing process. Also, the determination of the 40 GL Cap itself was based on an assessment of net diversion data for the ACT. Thus, the IAG has interpreted the Council's decision to apply to a net diversion Cap of 40 GL (climate-adjusted).

The IAG also notes that in deriving the 40 GL Cap, the diversion of up to 5 GL of water under the heading of 'other diversions' had been recorded in the ACT's performance. Other diversions were identified as being diversions of both surface water and ground water in the ACT. Accordingly the IAG would expect that the ACT would continue to report metered (and unmetered) ground water use in its 'other diversions' category.

The diversions of Commonwealth controlled water for Commonwealth have not previously been reported to the IAG, but need to be identified and reported. Under the agreed Cap arrangements, any diversions above the 2006–07 level for this purpose will need to be traded into the ACT. Similarly under the terms of the agreed Cap, growth in demand for industry will also need to be provided by trade.

The IAG notes that the ACT Government does not have direct responsibility for water controlled and consumed by the Commonwealth even though this consumptive use of water is required to be reported as part of the ACT's Cap. In these circumstances, the IAG will recommend that the Commonwealth should require the NCA (as the main user of this water) to report on all diversions on an annual water year basis to the ACT authorities, including reporting on any trade in water into the ACT to meet increased demand above current levels.

The IAG encourages the ACT to provide advice on how it proposed to determine growth in industry demand. The IAG will also await advice on the design of the climate-adjusted Cap model and the mechanics by which the ACT proposes to make annual adjustments to the Cap for population growth.

The ACT has the licensing and administrative arrangements in place that will allow the reporting of its performance under the proposed climate-adjusted Cap. Subject to the matters discussed above, the ACT is expected to report against its Cap on an annual basis as envisaged under the provisions of Schedule E.

4.5.5 Conclusions/Recommendations

- A climate-adjusted Cap for the ACT has now been agreed.
- Net diversions of 15.6 GL in 2007–08 are well within the agreed Cap.
- The ACT needs to include surface and ground water diversions in the reporting of 'other diversions' under the agreed Cap.
- Diversions by the NCA should also be reported separately by the ACT as part of the use of the ACT Cap.
- To meet the reporting requirement on Commonwealth controlled water in the ACT, the IAG recommends that the Commonwealth take appropriate action to require NCA (or other Commonwealth agencies as appropriate) to report to the ACT on an annual water year basis the consumptive use of Commonwealth controlled water in the ACT, and also to report any trade in water to meet consumptive demand above current levels.
- The ACT needs to bring forward its proposed mechanics for reporting growth in demand by industry, adjustments to the Cap for population growth, and the climate-adjusted model to be used to administer the Cap.

5. DIVERSIONS FROM THE MURRAY–DARLING BASIN IN 2007–08

5.1 Summary of Diversions 2007–08

Murray–Darling Basin diversions in 2007–08 totalled 4,482 GL. This was the lowest annual diversion in the period since 1983–84 and was only 35% of the record diversion of 12,964 GL in 1996–97. Diversions for the individual valleys in the Murray–Darling Basin are presented in **Table 18**.

The diversions over the last six years constitute six of the lowest eight years of usage in the same 25 year period. Of the 25 years since 1983–84, total Basin diversions (in descending order) in 2007–08 ranked 25; diversions in NSW ranked 25; Victorian diversions ranked 25, SA 25, Queensland 1 and the ACT 24. Of

Table 18: Murray–Darling Basin Diversions in 2007–08

| System | Total Diversion (GL) | Percentage of Basin Diversion (%) |
|---|----------------------|-----------------------------------|
| New South Wales | | |
| Intersecting Streams | 3 | 0.1% |
| Border Rivers | 129 | 2.9% |
| Gwydir | 89 | 2.0% |
| Namoi/Peel | 142 | 3.2% |
| Macquarie/Castlereagh/Bogan | 76 | 1.7% |
| Barwon–Darling/Lower Darling | 219 | 4.9% |
| Lachlan | 46 | 1.0% |
| Murrumbidgee | 515 | 11.5% |
| Murray | 244 | 5.4% |
| Total NSW | 1463 | 32.6% |
| Victoria | | |
| Goulburn/Broken/Loddon cap valley | 683 | 15.2% |
| Campaspe | 26 | 0.6% |
| Wimmera–Mallee | 43 | 1.0% |
| Murray/Kiewa/Ovens Cap valley | 782 | 17.5% |
| Total Victoria | 1534 | 34.2% |
| South Australia | | |
| Metro–Adelaide and Associated Country Areas | 89 | 2.0% |
| Lower Murray Swamps | 9 | 0.2% |
| Country Towns | 37 | 0.8% |
| All other uses of water from the Murray River | 281 | 6.3% |
| Total South Australia | 416 | 9.3% |
| Queensland | | |
| Condamine/Balonne | 776 | 17.3% |
| Border Rivers/Macintyre Brook | 210 | 4.7% |
| Moonie | 41 | 0.9% |
| Nebine | 0.11 | 0.0% |
| Warrego | 23 | 0.5% |
| Paroo | 4.01 | 0.1% |
| Total Queensland | 1055 | 23.5% |
| Australian Capital Territory | 16 | 0.3% |
| Total Basin | 4482 | 100.0% |

the total water diverted, New South Wales diverted 33%, Victoria 34%, Queensland 24%, South Australia 9% and the Australian Capital Territory 0.3%. Annual diversions since 1983 are plotted in Figures 1 and 2.

Historical Cap and Diversions

The IAG is of the view that full transparency of all relevant and available data is consistent with both good governance in terms of the operation of the Cap and good Cap management practice. Accordingly,

the IAG has decided that when amendments to models (or data) have been necessary or untaken 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 this 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.

Figure 1: Murray–Darling Basin Diversions – 1983–84 to 2007–08

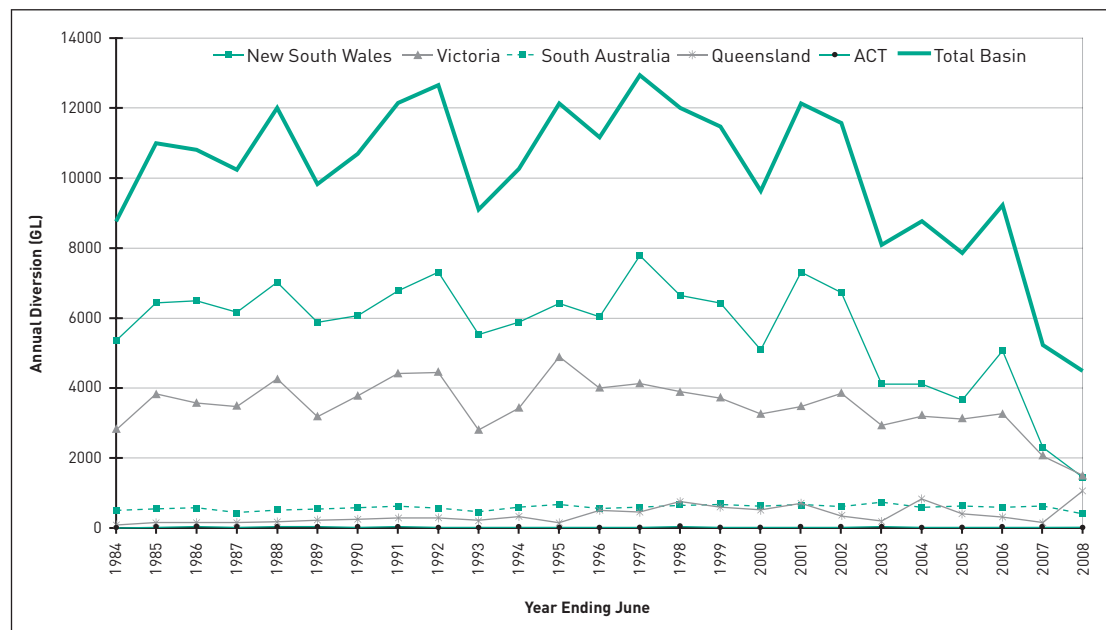
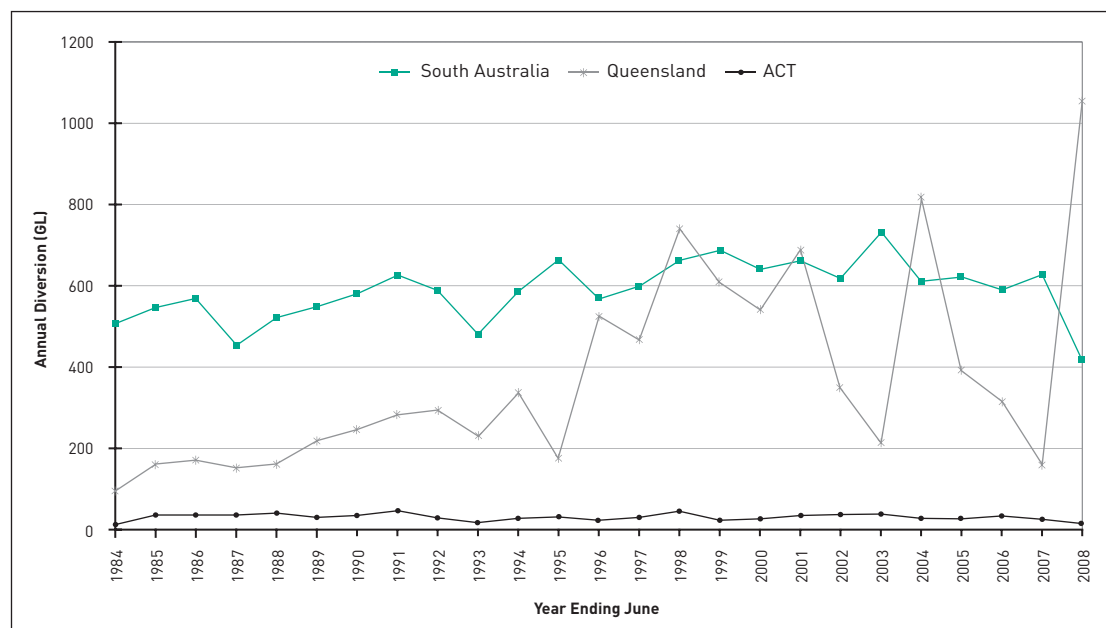


Figure 2: Murray–Darling Basin Diversions – 1983–84 to 2007–08 (Queensland, South Australia and ACT)



It is not the IAG's intention that the performance of any one State or valley should be judged on historical performance other than for the most recent year. Rather, it is the intention to provide information which will help to inform the Ministerial Council and other readers of past performance which may be of assistance in interpreting individual valley performance in the latest year.

The following graphs provide details of the climate-adjusted Cap and diversion data together with debits or credits held on a valley by valley basis. The IAG envisages that these graphs will be reproduced in its Report each year and updated where more up-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

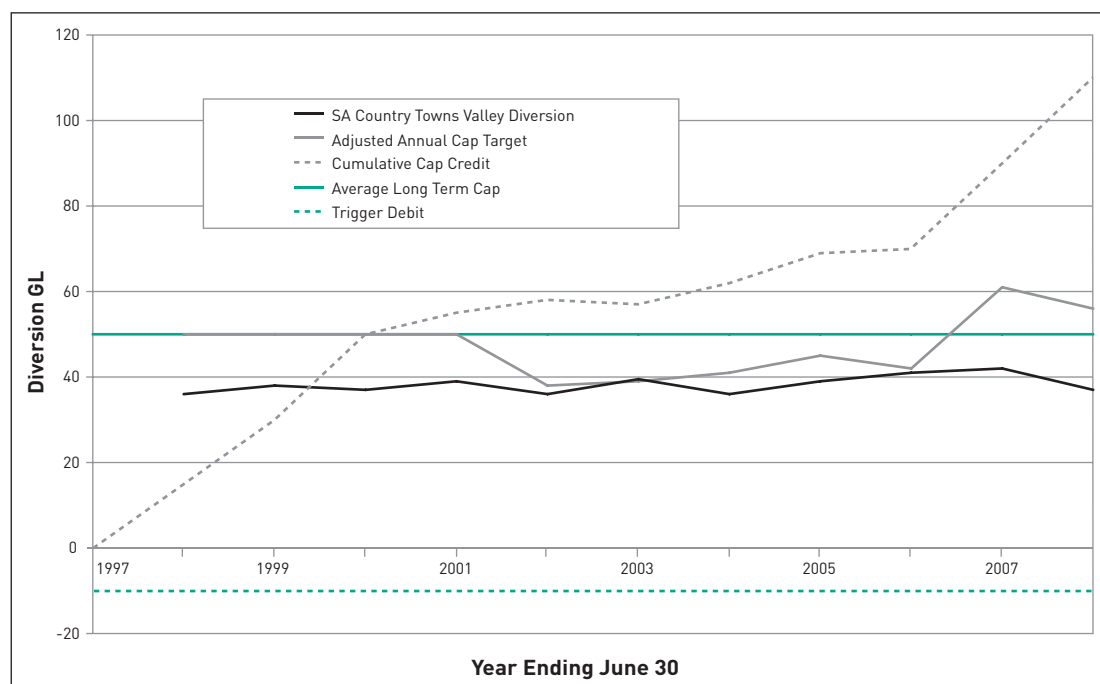


Figure 3A: Cap Compliance – South Australian Country Towns with annual Cap targets factored down by allocations

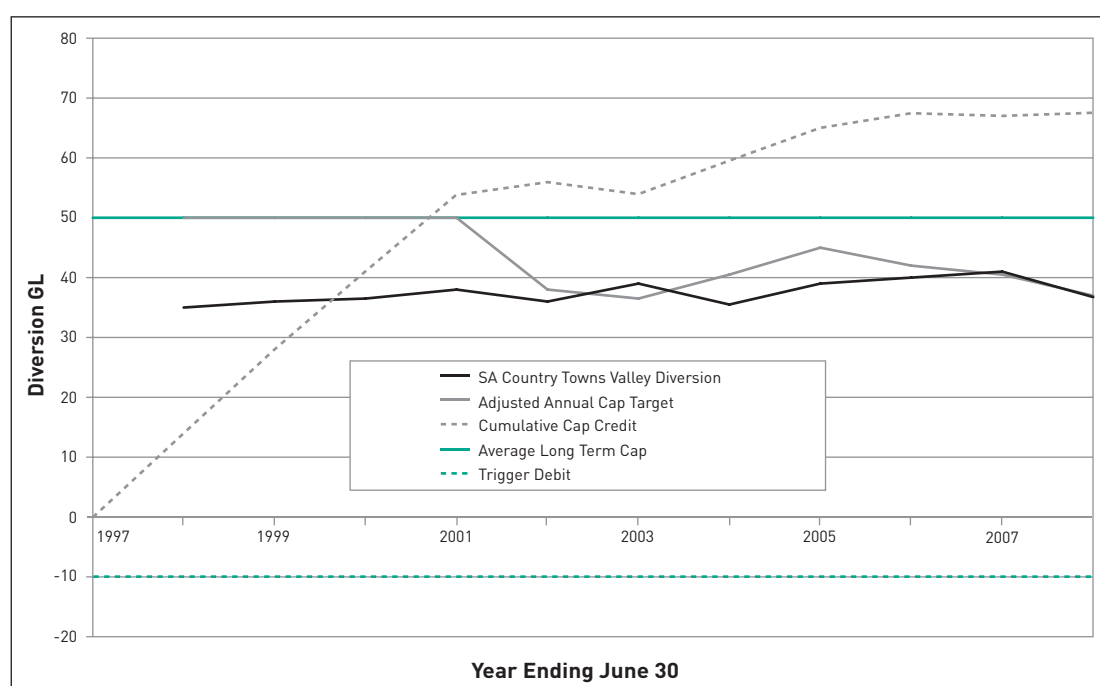


Figure 4: Cap Compliance – South Australian Lower Murray Swamps

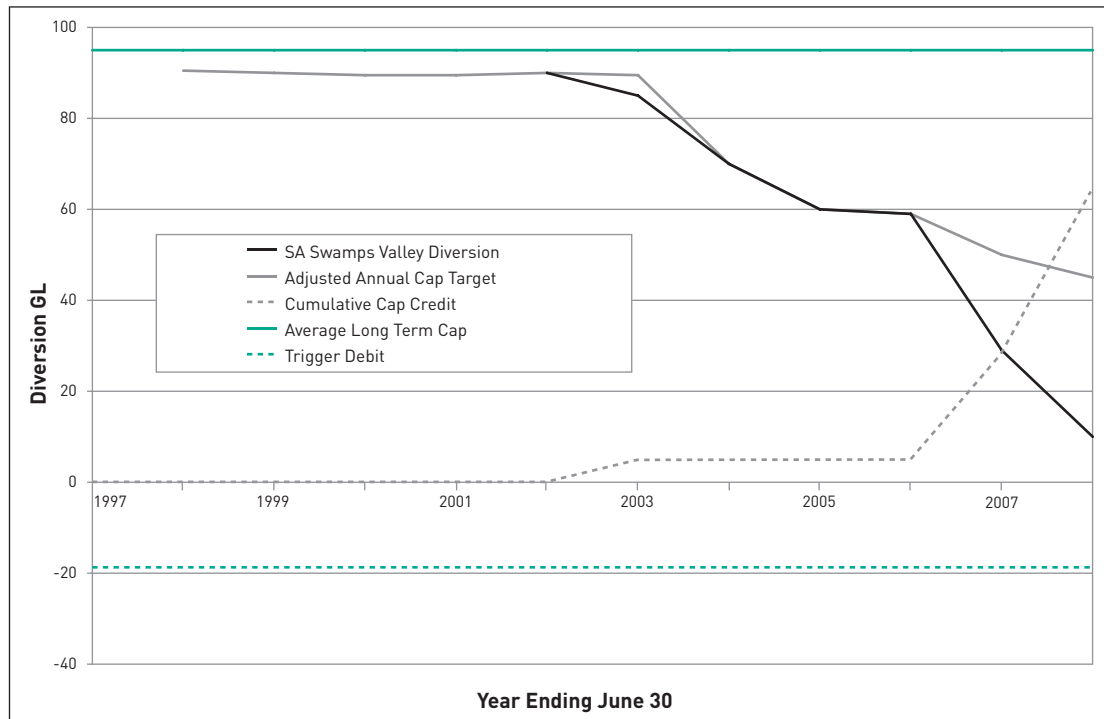


Figure 4A: Cap Compliance – South Australian Lower Murray Swamps with annual Cap targets factored down by allocations

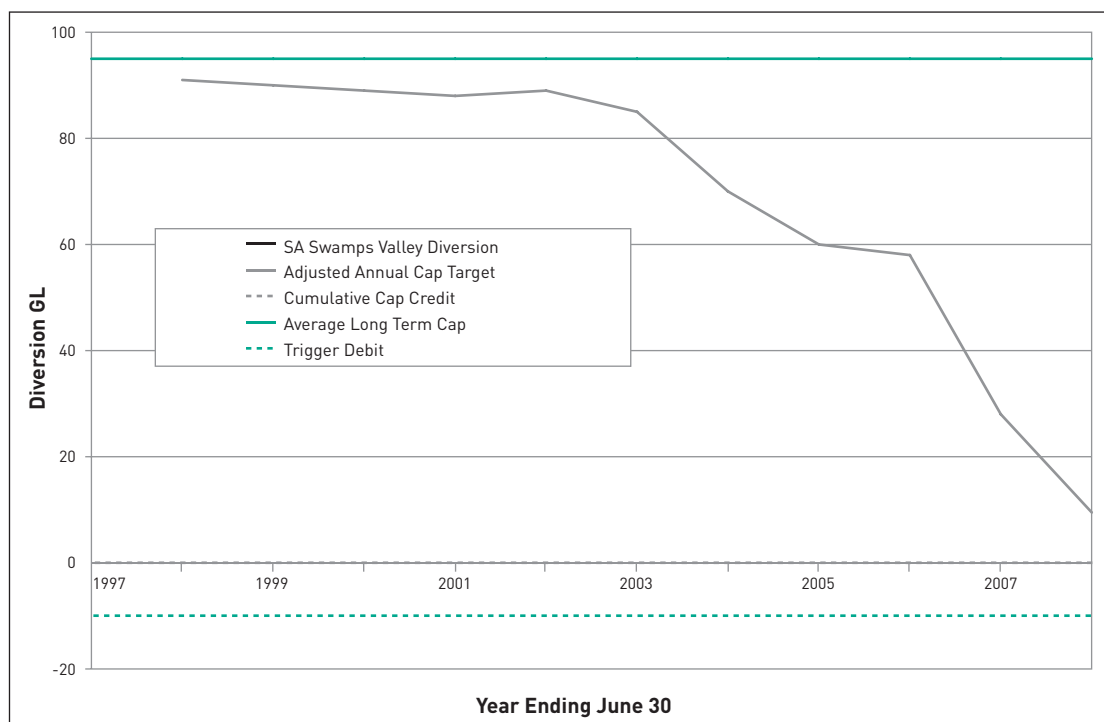


Figure 5: Cap Compliance – South Australian All Other Purposes

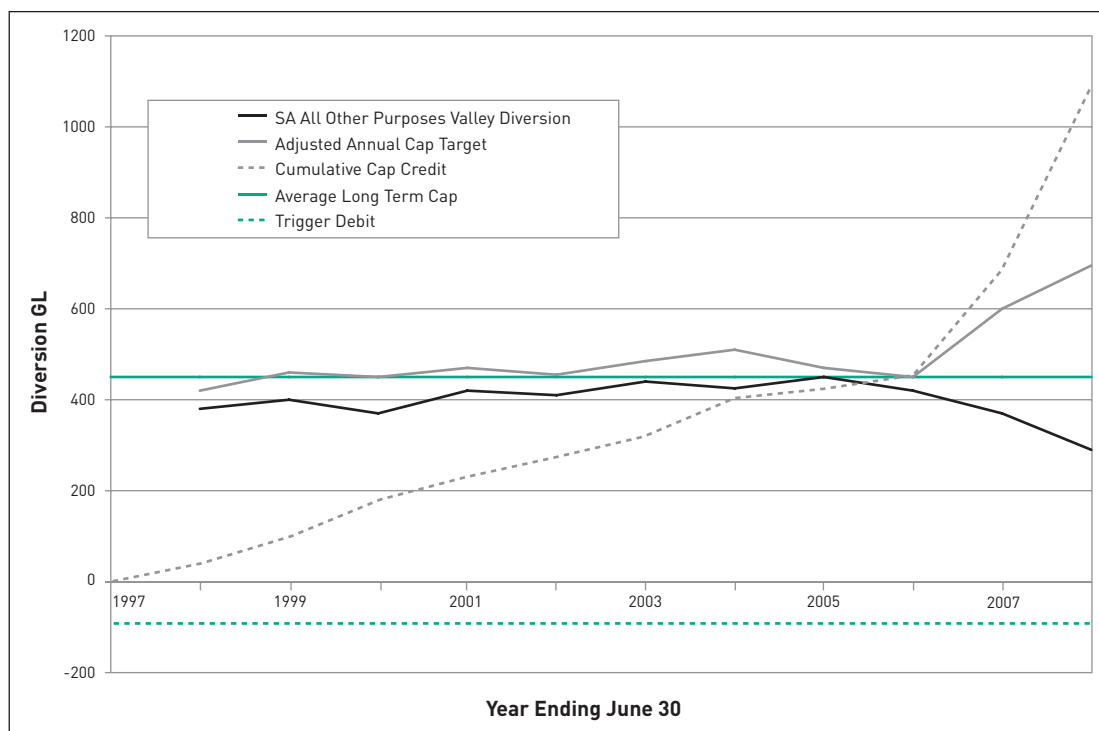


Figure 5A: Cap Compliance – South Australian All Other Purposes with annual Cap targets factored down by allocations

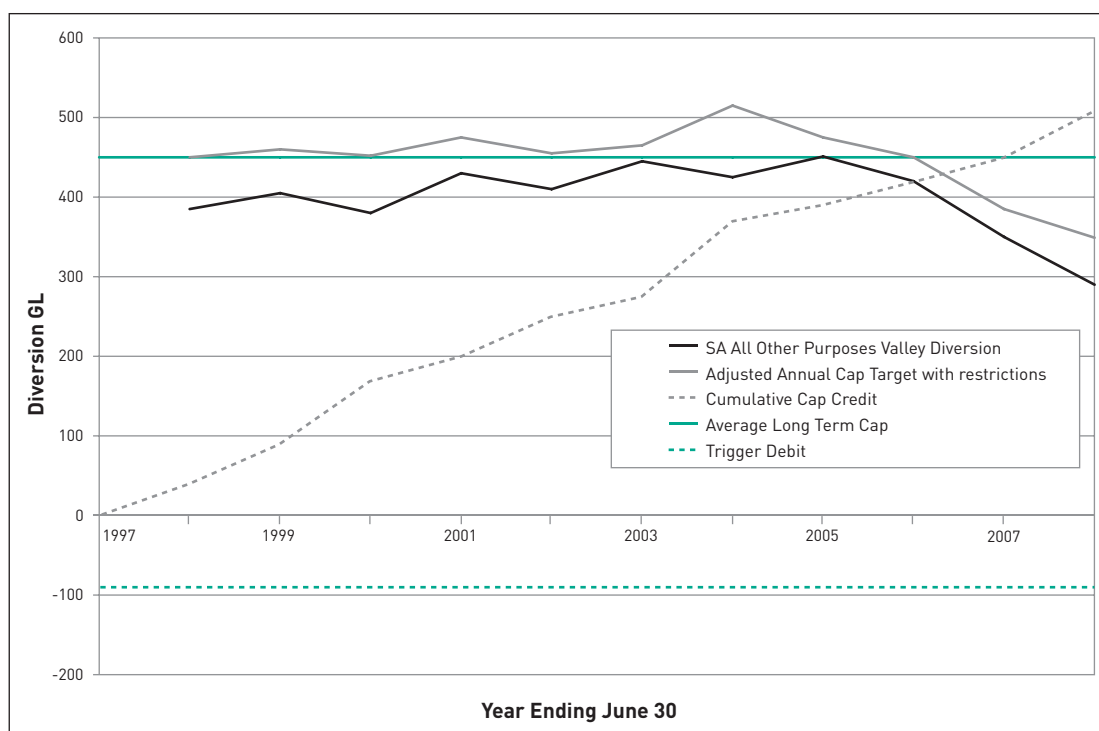


Figure 6: Cap Compliance – Victorian Goulburn/Broken/Loddon

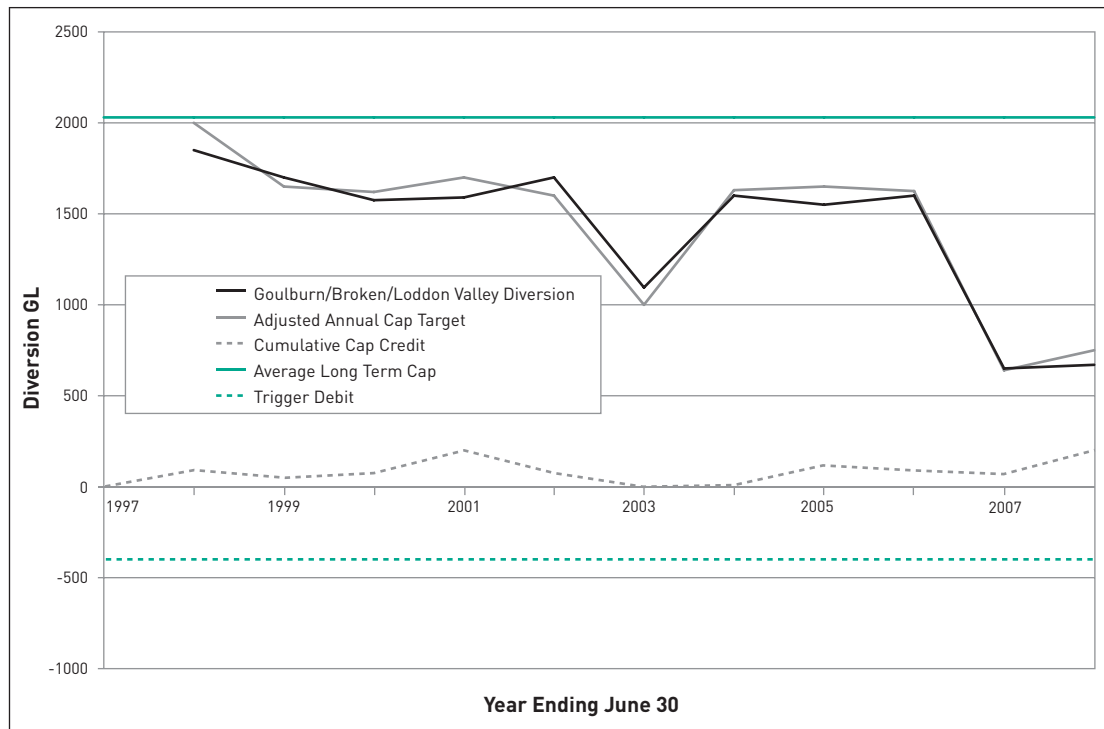


Figure 7: Cap Compliance – Victorian Murray/Kiewa/Ovens

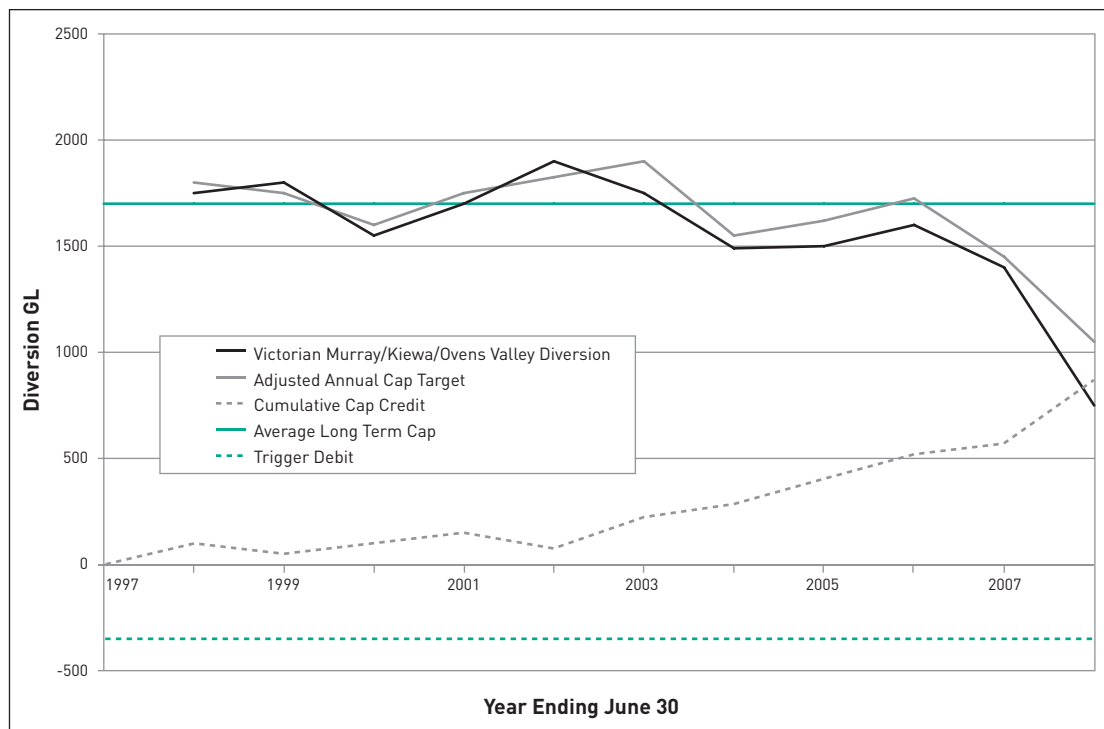


Figure 8: Cap Compliance – Victorian Campaspe

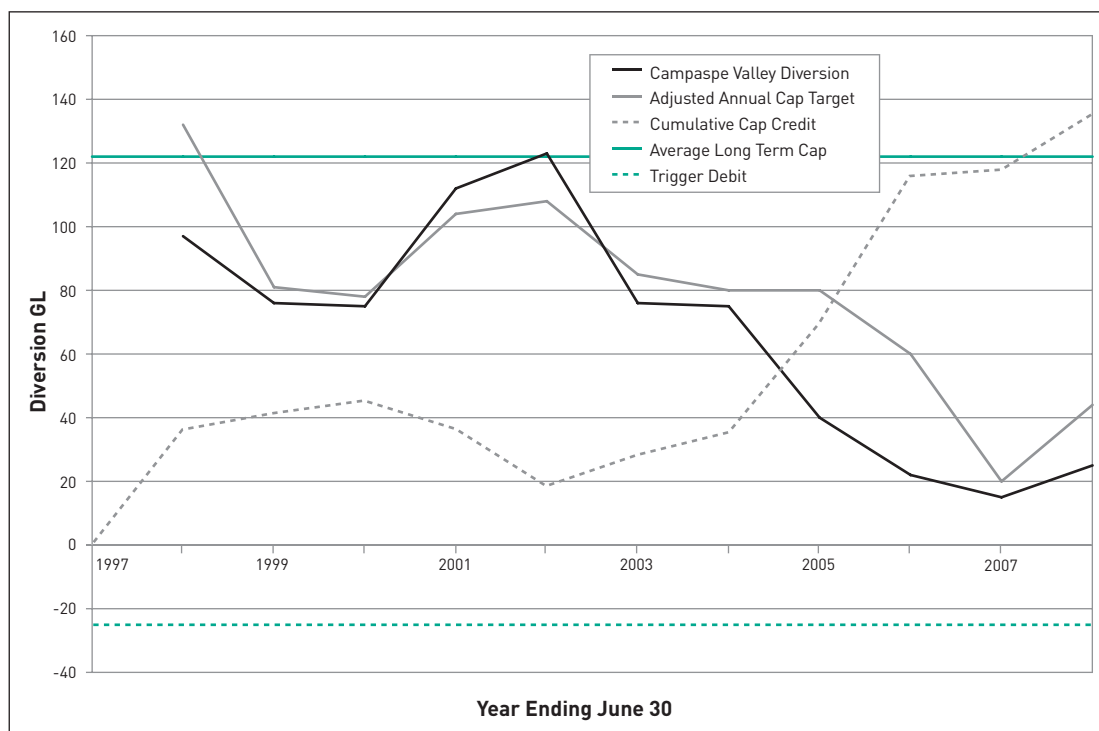


Figure 9: Cap Compliance – Victorian Wimmera–Mallee

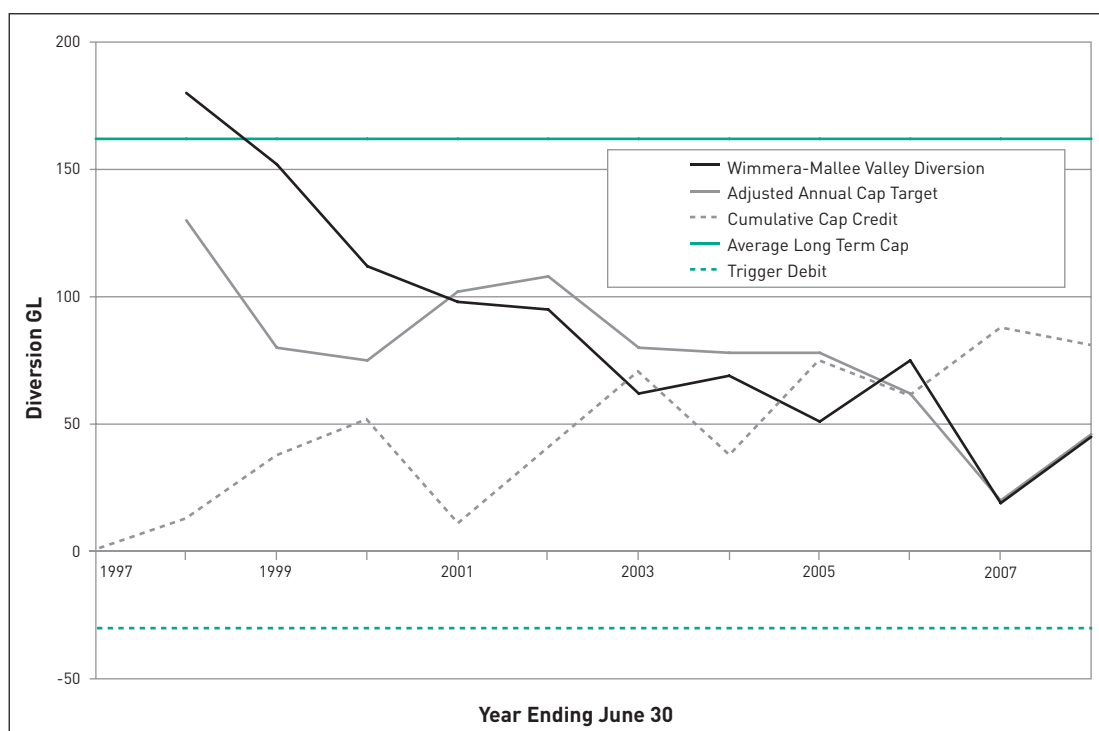


Figure 10: Cap Compliance – NSW Barwon–Darling

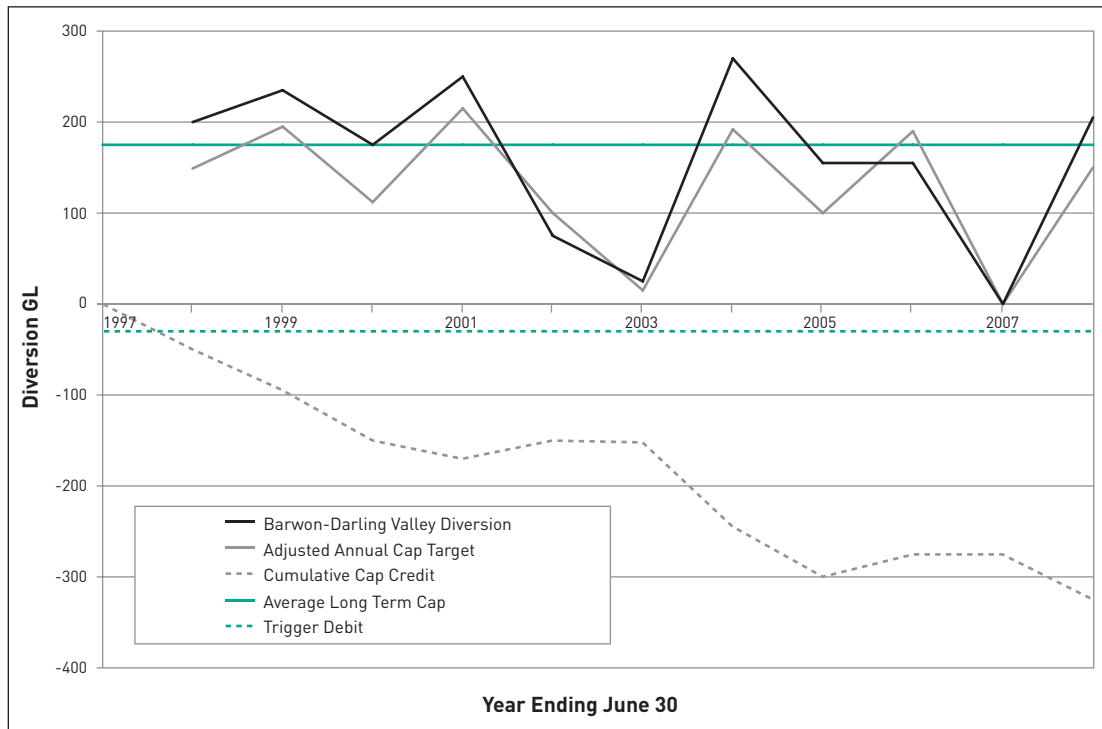


Figure 11: Cap Compliance – NSW Lower Darling

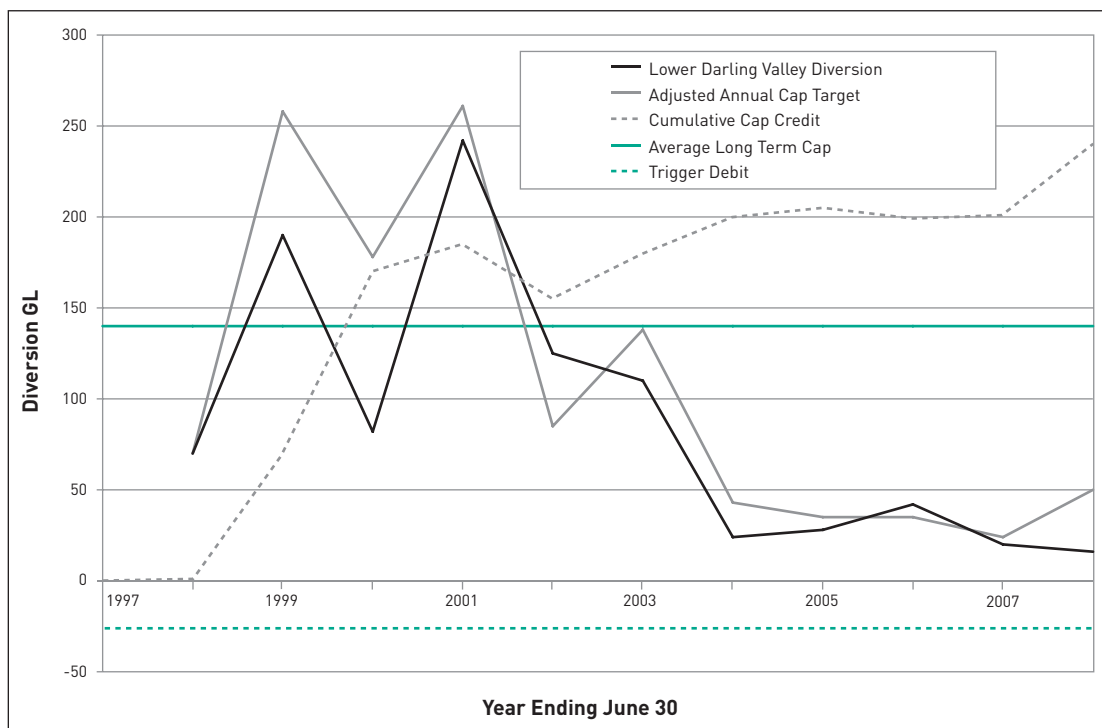


Figure 12: Cap Compliance – NSW Barwon–Darling/Lower Darling

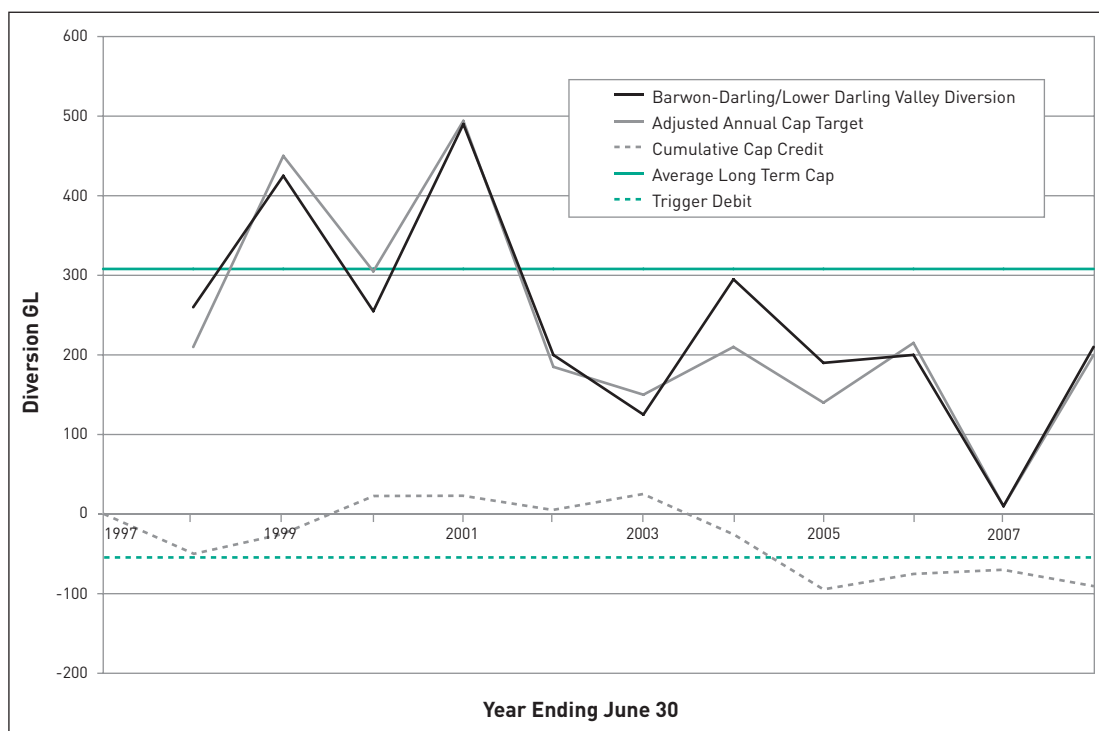


Figure 13: Cap Compliance – NSW Gwydir

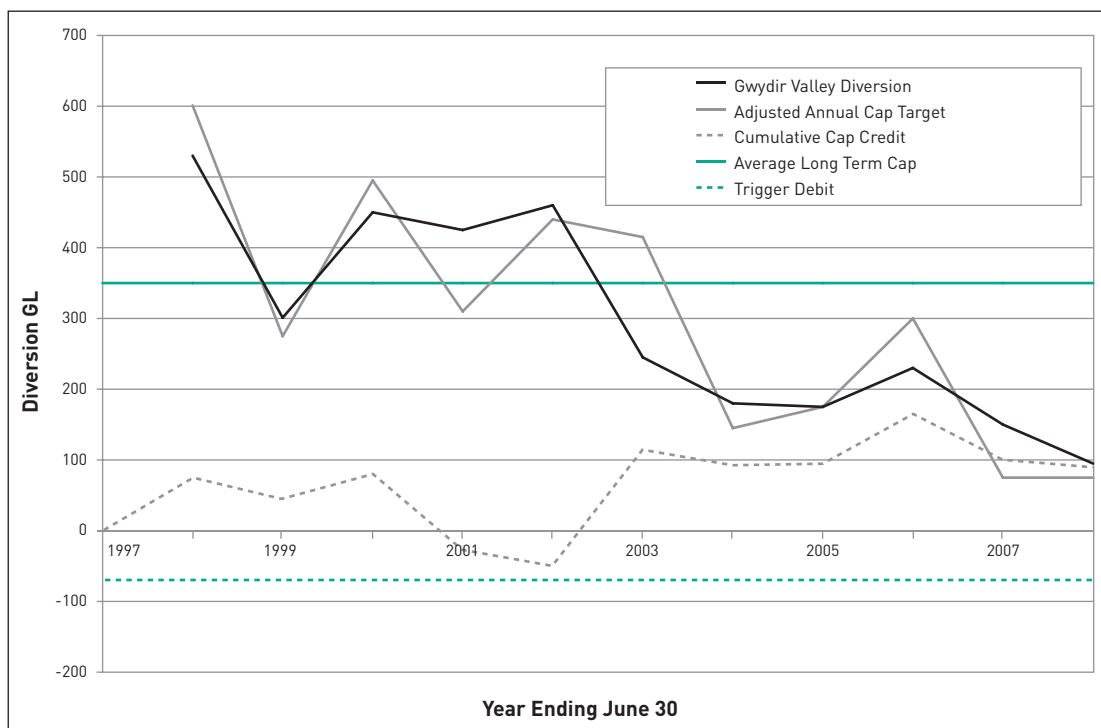


Figure 14: Cap Compliance – NSW Namoi/Peel

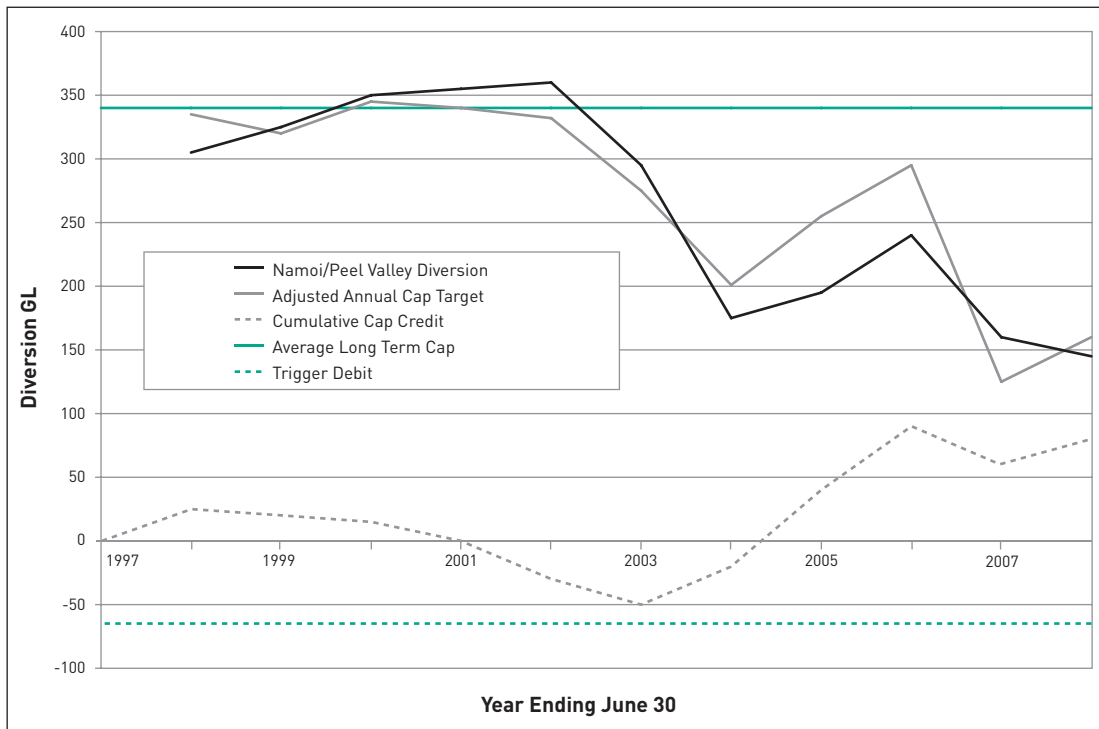


Figure 15: Cap Compliance – NSW Macquarie/Castlereagh/Bogan

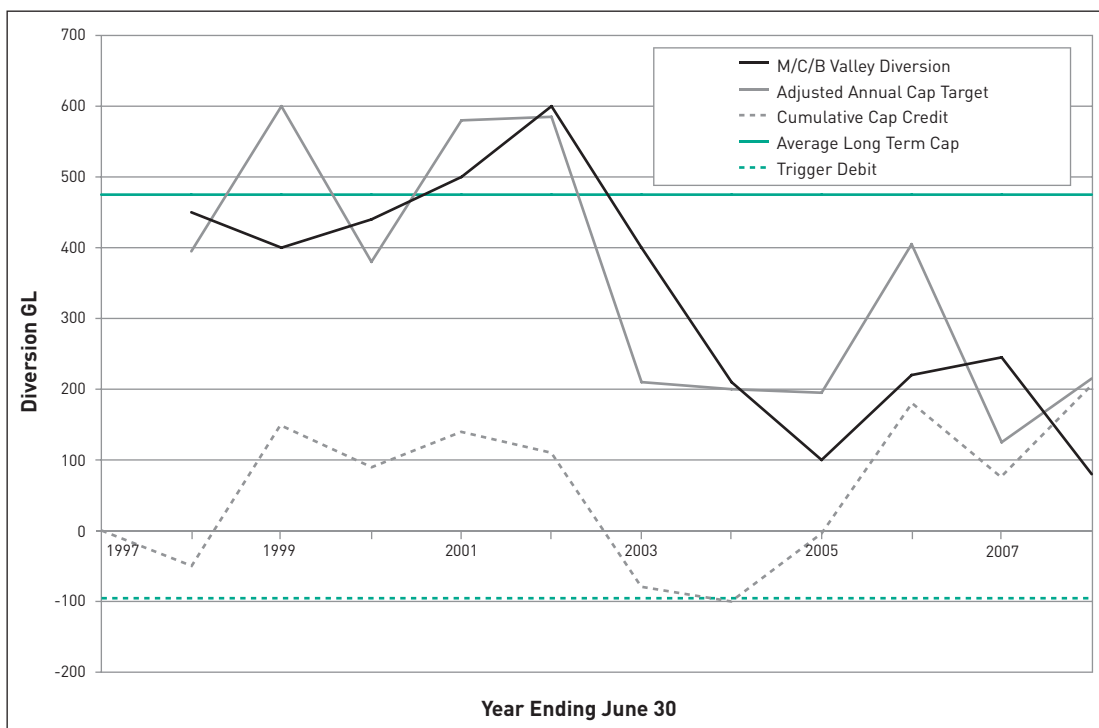


Figure 16: Cap Compliance – NSW Lachlan

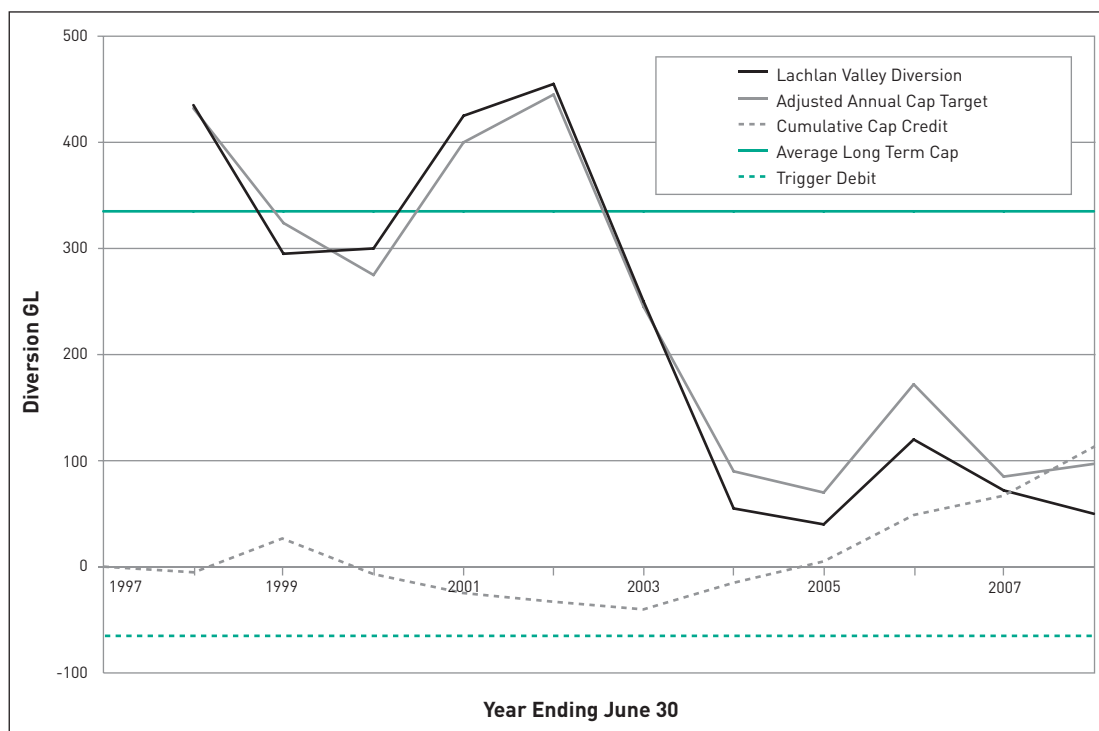


Figure 17: Cap Compliance – NSW Murrumbidgee

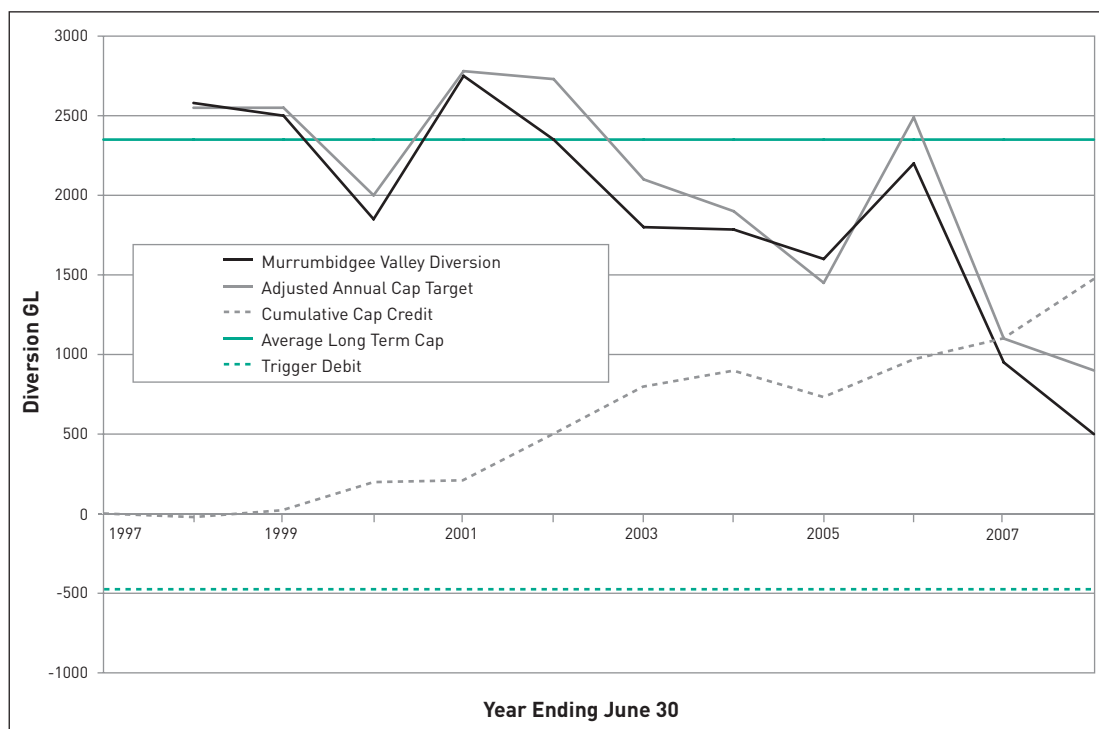
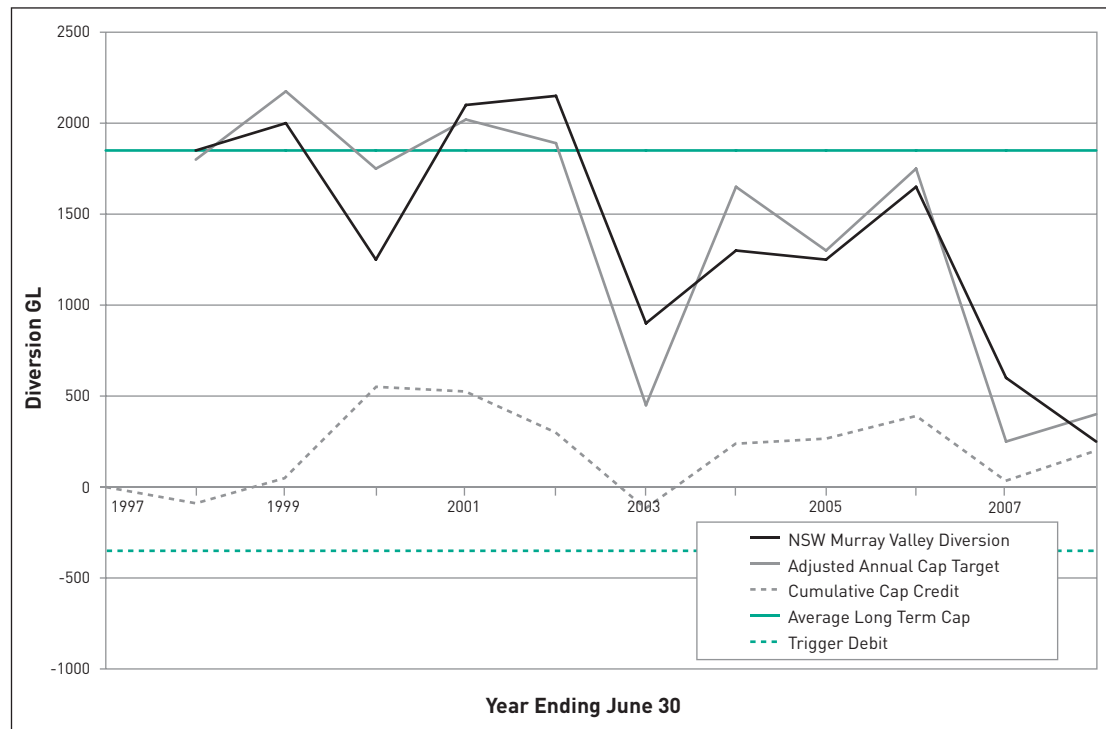


Figure 18: Cap Compliance – NSW Murray



APPENDIX A: RESPONSES BY THE FIVE STATE AND TERRITORY GOVERNMENTS

The five State and Territory Governments prepared written responses to the Independent Audit Group's Report which was presented to the Murray–Darling Basin Ministerial Council in March 2009. The Council agreed to publish these responses as an appendix to the Independent Audit Group's Report.



Comments Pertaining to South Australia

South Australia remains committed to the Cap process and ensuring long-term diversions are maintained within the Murray–Darling Basin Ministerial Council Cap. The IAG has again confirmed that diversions for all four Cap components – Metropolitan Adelaide, Country Towns, *All Other Purposes* and Lower Murray Swamps were less than their respective Caps in 2007–08.

As with all basin jurisdictions, South Australia faced a difficult year in 2007–08. Record low inflows to the Murray–Darling Basin, and the statewide drought presented significant challenges in water resources management. A total of 416 GL was diverted in 2007–08 compared to an average diversion of 647 GL over the last 10 years and significantly less than 2002–03 when 737 GL was diverted. Included in this volume was 147.58 GL purchased from interstate.

The IAG report indicates that South Australia has a reliable measuring system for urban and irrigation use and continues to be well placed to manage diversions within respective Caps.

Metropolitan Adelaide Model

The IAG recommends that South Australia develop a climate-adjusted model of diversions from the River Murray for Metropolitan Adelaide, taking into account urban demand, local catchment inflows, system operations and making allowances for water restrictions. Work on an estimation of growth for Metropolitan Adelaide and the model has commenced. The current Cap is based on a 200 year simulation designed to provide a water supply with 99% security to a major urban city of over 1 million people and assumes South Australia never receives less than entitlement flow. Given the extra information

available from the current severe drought South Australia is reviewing the fundamental assumptions of the current simulation, the impact of this additional data and subsequent implications on the reliability of the water resource prior to further development of a model of diversions from the River Murray for Metropolitan Adelaide.

The complexity of the work is such that the model will not be able to be completed and accredited prior to June 2009. This delay will not result in any non-compliance with the Cap as growth since the 2000 base year has been covered by permanent water conservation measures, first implemented in 2002–03 and water subsequently traded onto the 'First Use Licence'.

Restrictions on Allocations

South Australia agrees in-principle that annual diversion targets should be adjusted to account for restrictions on allocations to ensure that inappropriate Cap credits are not generated by the implementation of restrictions.

The concept of adjusting the Cap to reflect the final announced level of restriction is seen as appropriate in the Country Towns and *All Other Purposes* Cap components and resources have been committed this financial year to develop appropriate water restriction policies for each Cap component. South Australia has chosen to give preference to the maintenance of the public water supply over irrigation so a blanket restriction policy that reduces the Country Towns Cap component by irrigation allocation is not appropriate.

Metropolitan Adelaide has a non-tradable five year rolling Cap of 650GL and South Australia does not agree with the contention that failure to make allowances for urban water restrictions will generate

artificial growth in Cap credits as the five year rolling Cap effectively limits the Cap credit to that accumulated during each five year rolling period. The allocation under the Cap is non tradable and there is no accumulation of Cap credits associated with this Cap. Current and past IAG Reports and Water Audit Monitoring Reports have never reported accumulated Cap credits; consequently there can be no artificial growth in Cap credits.

In addition, South Australia's diversions under the current water restrictions do not support the contention that there is an artificial growth in Cap credits associated with the Metropolitan Adelaide Cap. Total demand is 200 GL per year (River Murray and Mount Lofty Ranges inflows) and for the last three years rainfall and subsequently inflows in the Mount Lofty Ranges have been well below average. The Metropolitan Adelaide rolling Cap restricts diversions from the River Murray to a nominal diversion of 130 GL per year and South Australia imposed water restrictions on urban water users for the first time in 2006–07 which have continued to 2008–09. Diversions from the River Murray under the Metropolitan Adelaide Cap for the same period are 203.1 GL, 89.4 GL and 150 GL respectively. To ensure the five year rolling Cap of 650 GL is not breached and to maintain water for critical human needs, South Australia has had to purchase additional water for Adelaide and Country Towns.

It is South Australia's view that as there are no cumulative Cap credits associated with the Metropolitan Adelaide Cap there is no need to apply a restriction policy to this Cap as currently described. South Australia will review this position in the development of a model of diversions from the River Murray for Metropolitan Adelaide.

Full metering of the Lower Murray Swamps offtakes was completed in 2008 and with the exception of a contractual dispute with one individual, all mandatory drainage works are planned for completion in January/February 2009. Since full metering of swamps had not been completed, diversions for the Lower Murray Swamps in 2007–08 are determined to be equal to the licensed allocation held by a private irrigator and/or corporation. The South Australian submission to the IAG specifically stated that the State claimed no Cap credit for the Lower Murray Swamps and South Australia does not expect the IAG to assign credits to this Cap component in the annual report. It is South Australia's view that there are zero Cap credits associated with the Lower Murray Swamps at the end of 2007–08.

Amalgamation of Lower Murray Swamps and All Other Purposes Cap

Work to amalgamate the remaining Lower Murray Swamps Cap component and the *All Other Purposes* Cap has already commenced in anticipation of completion of the metering project and is expected to be implemented in 2009–10.

Strain on Lower Lakes

South Australia continues to commit to implementing initiatives to reduce reliance on the River Murray with construction of a desalination plant for Adelaide expected to begin around July 2009 and major upgrades underway at wastewater treatment plants that will contribute to Adelaide's long-term target of up to 45 per cent of wastewater recycled.

South Australia disagrees with the IAG's comments that if diversions for Country Towns and the *All Other Purposes* were to increase usage up to Cap levels, additional strain would be put on the Lower Lakes. If use increased to the Cap targets, an average of 52 GL per year under the IAG's proposed restriction policy would increase current Lower Lakes levels by seven centimetres.

Comments on other jurisdictions

South Australia notes that the drought continues to impact on resource availability in the other jurisdictions and is pleased that Queensland has finalised the Resource Operations Plan for the Border Rivers and provided to the IAG the proposed Cap.

South Australia is not surprised that a special audit of the Barwon–Darling/Lower Darling Cap valley is required and agrees with the IAG view that the 325 GL debit for this valley will be unlikely to be reduced in the near future. South Australia believes different management arrangements will need to be considered and would be supportive of any process to expedite management arrangements to address the issue of over-allocation in this part of the Murray–Darling Basin.



VICTORIA

Victoria continued to implement the Cap on regulated systems by establishing Bulk Entitlements in accordance with the *Water Act 1989* and Streamflow Management Plans on unregulated streams. No new capping measures were introduced in 2007–08 as diversions in all Victorian valleys are 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 for Goulburn/Broken/Loddon, Campaspe and Murray/Kiewa/Ovens Valleys were used to calculate the 2007–08 Cap targets and cumulative credits for these valleys. An interim model has been used for the first time to calculate Cap targets and cumulative credits for the Wimmera Mallee valley.

Diversions since July 1997 from each of Victoria's four designated valleys continue to comply with the Cap. Diversions from the Murray/Kiewa/Ovens, Goulburn/Broken/Loddon and Campaspe valleys were below their Cap targets in 2007–08, whilst diversions from the Wimmera–Mallee valley were slightly above the Cap target.

The extremely low water resource situation in recent years has caused the Campaspe valley Cap model to operate outside the hydrological conditions under which it was calibrated and some uncertainty in the simulation of transmission losses in the model has been identified. However, diversions in this valley are in credit and there is no indication that growth in diversions has occurred.

Victoria proposes to improve the performance of its hydrological models where practicable. Improvements will include recalibration of loss relationships using recent hydrological data and system operational characteristics to simulate system performance in the current severe drought. When Cap models are revised they will be re-submitted to the Murray–Darling Basin Authority for approval.

Victoria remains committed to the provision of additional water for the environment and the reduction of the Cap when environmental flows are increased. Victorian Caps will continue to be reduced as additional water is recovered for the environment under the Snowy and Living Murray Initiatives and the Northern Victoria Irrigation Renewal Project.



NEW SOUTH WALES

The continuing record drought conditions have forced significant changes to normal water management to remain in place during 2007–08, and a range of drought contingency measures remain in force to ensure optimal sharing of the very small volumes of water currently available. It is clear that the drought contingency measures will require adjustments to the Cap accounting process and, in particular, further development of the river models' ability to simulate these climatic extremes. NSW continues to support the IAG recommendations to take into account the impacts of this drought, to ensure that the MDB Cap assessment process continues to be robust.

NSW remains committed to the implementation of this MDB Cap on diversion. NSW supports the formal recognition of 'current conditions' modelling within the overall Cap process, together with the existing annual accounting process. We believe that the *Murray–Darling Basin Agreement* (Schedule E) requires this when it refers to the 'long-term Cap'. However, given resource constraints that have been recognised by the IAG previously, it is appropriate to require additional model accreditation only if accounting each year suggests that Cap may have been breached.

As with previous reports the 2007–08 report indicates that diversions in all NSW valleys are currently within Cap, with the exception of the NSW Border Rivers, where a Cap is currently being formalised, and the Barwon–Darling valley. NSW has implemented a new licensing framework in the Barwon–Darling valley that has restructured entitlements to water in the form of an average annual use that accords with the long-term Cap. This will ensure that future diversions cannot exceed Cap over the long-term while recognising significant variations from 'average annual use' that must be expected in our unregulated river system.

NSW continues to make significant progress towards accreditation of valley models under Schedule E for Cap auditing, with both the Lachlan and Namoi valley models now accredited by the independent auditor. NSW has also presented the Gwydir, Macquarie, Murrumbidgee and Peel (a sub-catchment of the Namoi) Valley Cap models to the independent auditor for auditing on subsequent accreditation by the Authority. Accreditation of the remaining NSW Cap models for the Barwon–Darling and NSW Border Rivers is a priority for NSW, and they are expected to be submitted for accreditation before the next IAG review.



QUEENSLAND

Queensland agrees with the IAG report outcomes and is pleased to see that the IAG will be recommending the proposed Cap for the Border Rivers catchment (Qld) be accepted by the Ministerial Council. Cap arrangements are complemented by environmental flow provisions in the Intergovernmental Agreement for the shared streams forming the border between the states of Queensland and New South Wales.

These provisions include access arrangements which protect natural low flows from extraction and also provide for 25% of flows which have previously been available for extraction from moderate flows to be protected. The long-term Cap for the Border Rivers catchment includes the impact of these access rules on the 1999–2000 levels of development and provides significant environmental benefits both within and downstream of the Border Rivers.

The 2007–08 water year has provided some relief to the ongoing drought conditions with increased rainfall, particularly in the western parts of the Queensland Murray–Darling Basin, providing benefits to both the River systems and water users. Estimated flows from Queensland valleys into New South Wales are in excess of 3,200 GL compared with the 1,055 GL of total diversions. The majority of the cross border flows were in the western streams but there were

significant environmental benefits as a result of increased flows and effective management regimes in the Lower Balonne system. The summer flows passed through the system into the Ramsar listed Narran Lakes system stimulating the first bird breeding event since 1999–2000. These flows were enhanced by the application of new water sharing rules introduced in the Lower Balonne ahead of the finalisation of the resource operations plan. The rules provide for a 10% reduction in the daily rate of take by waterharvesters if certain antecedent flow conditions exist. Reductions were applied across all three of the 2007–08 flow events.

Although 2007–08 saw the highest Queensland diversions since recording began in 1993, and there were significant improvements in the availability of water over previous years, water harvesters in the more developed Border Rivers and Condamine and Balonne catchments were still only able to access approximately 40% of total storage capacity. The return of more favourable flow conditions in these eastern streams will therefore see diversions reach new levels but within a framework that provides for improved protection of low and moderate flows in both catchments.



AUSTRALIAN CAPITAL TERRITORY

Water Use

The volume of gross diversions and net diversions for the ACT decreased significantly from 2006–07 and was in keeping with the trend since 2003. The volume of gross diversions and net diversions is the lowest on record (i.e. since 1989–90). This trend is itself due to Government initiatives to restrain use of potable water and the necessary water management to facilitate water use in the prolonged drought. The decrease in diversions is largely due to the ACT consumption being constrained by compliance to level 3 temporary water restrictions which have been applied since November 2006, and to some extent the application of water demand management programs.

Cap

The May 2008 decision by the Ministerial Council on the ACT Cap provided for an agreed climate-adjusted Cap for the ACT along with the provision that existing credits applied since 1 July 1997 would be recognised. It is noted as agreed that any growth in demand for water for industry and for future Commonwealth requirements will be provided by trade.

Net diversions for 2007–08 are well within the agreed Cap.

The ACT Cap will be administered against a model to be verified based on potable demand modelling of ACT and Queanbeyan water use. The model will be climate-adjusted and will incorporate adjustments for population growth.

Other comments

The ACT notes that diversions by the Commonwealth of water controlled by the Commonwealth have not been accounted for and supports the IAG view that these diversions should be accounted. These diversions are beyond the ACT Government's control. The ACT supports the need for the Commonwealth Government (and its agencies) to report on its diversions and where possible, the coordination with the ACT on its diversions from Lake Burley Griffin as additional diversions aggregated to the ACT diversions.

GLOSSARY

| | |
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| ACTEW | ACT Electricity and Water Corporation. |
| AHD | Australian Height Datum. |
| announced allocation | The percentage of water entitlement declared available for diversion from a regulated stream in a season. |
| annual allocation | The annual volume of water available for diversion from a regulated stream by an entitlement holder. |
| authorised use | Total of the water allocated in the valley plus off-allocation and water-harvesting use plus unregulated stream use not in allocation and system losses not in allocation. |
| Border Rivers | The rivers and tributaries forming, or intersecting the border between NSW and Queensland. |
| Bulk Entitlement | A perpetual entitlement to water granted to water authorities by the Crown of Victoria under the <i>Water Act 1989</i> . |
| carryover | An unused entitlement from one season that can be used in the next year. |
| channel capacity | The maximum rate at which water can be delivered through a river reach or an artificial channel. |
| CMA | Catchment Management Authority. |
| COAG | Council of Australian Governments. |
| diversion | The movement of water from a river system by means of pumping or gravity channels. |
| diversion licence | Specified licences issued for a specified annual volume and diversion rate. |
| DNR | The Department of Natural Resources (of NSW). |
| DNRMW | The Department of Natural Resources Mines and Water (of Queensland). |
| DSE | The Department of Sustainability and Environment (of Victoria). |
| dozer allocation | An allocation that is not fully utilised. |
| DWLBC | The Department for Water, Land and Biodiversity Conservation (of South Australia). |
| EC (unit) | Electrical conductivity unit 1 EC = 1 micro-Siemens per centimetre measurement at 25° Celsius. Commonly used to indicate the salinity of water. |
| ELMA | Environmental Land Management Allocation. |
| end-of-valley flows | The flow regime at the end of a valley. |
| floodplain harvesting | The diversion of water from a floodplain into storage(s). |
| FMIT | First Mildura Irrigation Trust. |
| gigalitre (GL) | One thousand million or 10 ⁹ litres. |
| GL | Gigalitre: one thousand million or 10 ⁹ litres. |
| G-MW | Goulburn-Murray Water (of Victoria). |
| GWMW | Grampians Wimmera Mallee Water. |
| gravity districts | Districts which use gravity to divert the flow of water from the river. |
| high security entitlement | An entitlement which does not vary from year to year and is expected to be available in all but the worst droughts. |
| HRWS | High Reliability Water Share. |
| IAG | Independent Audit Group. |

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| IQQM | Integrated Quantity Quality Model. |
| LV | Licence Volume. |
| impoundment | The storage of water diverted from a watercourse. |
| irrigation | Supplying land or crops with water by means of streams, channels or pipes. |
| MDBA | Murray–Darling Basin Authority. |
| MDBMC | Murray–Darling Basin Ministerial Council. |
| megalitre (ML) | One million litres. One megalitre is approximately the volume of an Olympic swimming pool. |
| Ministerial Council, the | Murray–Darling Basin Ministerial Council. |
| ML | Megalitre: one million litres. One megalitre is approximately the volume of an Olympic swimming pool. |
| Murray–Darling Basin Agreement | The <i>Agreement</i> between the Governments of the four Basin States and the Commonwealth. The current <i>Agreement</i> is the 1992 <i>Agreement</i> . |
| off-allocation | When unregulated tributary inflows or spills are sufficient to supply irrigation needs and downstream obligations. |
| on-farm storage | Privately owned storages used to harvest surplus flows or to store unused allocations for use in the following season. |
| overdraw | Water diverted in one season against a prospective allocation in the subsequent year. |
| overland flow | Water that runs off the land following rainfall, before it enters a watercourse and floodwater that erupts from a watercourse or lake onto a floodplain. |
| permanent transfer | The transfer of water entitlements on a permanent basis. The right to permanent transfers allows irrigators to make long-term adjustments to their enterprise and enables new operators to enter the industry. |
| private diverters | Licensed to operate privately owned pumps or diversion channels; includes river pumpers and diverters as well as town water supplies. |
| property right | In this context, the right to ownership of allocated volumes of water. |
| RAMSAR wetland | A wetland listed on the Register of internationally significant wetlands established by the Convention at Ramsar. |
| regulated streams/waterways | Streams where users are supplied by releases from a storage. A water licence for a regulated stream specifies a base water entitlement defining the licence holder's share of the resources from a stream. |
| RMIF | River Murray Increased Flow. |
| riparian | Of, inhabiting or situated on the bank and floodplain of a river. |
| RIT | Renmark Irrigation Trust. |
| RMW | River Murray Water. |
| ROPs | Resource Operations Plans. |
| sales water | In Victoria, water that may be purchased by an irrigator in addition to the basic water right. Access to sales water is announced each season as a percentage of Water Right depending on the available resource. |
| salinity | The concentration of dissolved salts in groundwater or river water usually expressed in EC units. |
| SBA | Supply By Agreement. |
| SFMPs | Streamflow Management Plans. |
| sleepier allocation | An allocation that does not have a history of water usage. |
| temporary transfer | Water entitlements transferred on an annual basis. |
| unregulated streams | Streams that are not controlled or regulated by releases from major storages. |
| utilisation | The amount of water available for diversion that is actually diverted. |

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| water entitlement | The legal right of a user to access a specified amount of water in a given period. |
| Water-harvesting | The diversion of water from an unregulated stream in Queensland in which the access to water is defined only by a diversion rate and a starting flow in the stream. |
| WAM | Water Audit Monitoring. |
| WAMP | Water Allocation and Management Planning. It is a process formerly under way in Queensland to enable the acceptable level of allocatable water to be determined for a river system. These plans have been superseded by Water Resource Plans. |
| WWC | Waranga Western Channel. |
| WMRWG | Water Market Reform Working Group. |
| WR | Water Right. |
| WRP | Water Resource Plan. Plans developed in under the Queensland <i>Water Act 2000</i> for allocating water between consumptive use and the environment. |
| WSP | Water Sharing Plan. Plans developed under the New South Wales <i>Water Management Act, 2000</i> for equitable sharing and management of NSW water resources. |
| WUE | Water Use Efficiency. |

SPECIAL AUDIT

NSW Barwon–Darling/ Lower Darling Cap Valley

Report of the Independent Audit Group

Independent Audit Group Members

Denis Flett (chair)

Paul Baxter

Terry Hillman

March 2009

Introduction

The performance of the Barwon–Darling Lower Darling Cap valley against the Cap has been the subject of three prior special audits (in 2005, 2006 and 2007), and in each case the valley has been determined to be in breach of the Cap. Consequently, the Murray–Darling Basin Commission (MDBC) has declared the valley in breach of the Cap for the 2003–04, 2004–05 and 2005–06 water years and required corrective action to be taken by NSW.

The 2003–04 Review of Cap Implementation by the Independent Audit Group (IAG) found that the preliminary Schedule E⁷ accounting for the 1997/98 – 2003/04 period indicates that diversions in the combined Barwon–Darling Lower Darling Valleys were cumulatively 124 GL above Cap, and above the combined trigger for special auditing of 62 GL.

The 2004–05 Review of Cap Implementation by the IAG identified that diversions for the combined Barwon–Darling Lower Darling Cap valley were cumulatively 154 GL above the Cap, and above the combined trigger for special auditing.

The 2005–06 Review of Cap Implementation by the IAG identified that diversions for the combined Barwon–Darling Lower Darling Cap valley were 143 GL above the Cap and above the combined trigger for special Cap auditing.

Having been found to have diversions above the trigger for a special audit in three of the last four years to 2006–07, the 2007–08 Review of Cap Implementation by the IAG has again identified that diversions for the combined Barwon–Darling Lower Darling Cap valley are cumulatively 86 GL above the Cap and above the combined trigger for a special audit of 62 GL. Thus, in accordance with Clause 16 of Schedule E, the IAG has been asked to undertake a special audit of this valley.

This report represents the findings of the IAG in undertaking this special audit, conducted as per the provisions of Clause 17 of Schedule E.

Audit Process

The IAG has adopted a similar audit process to that used in previous years. Initially it has considered the detailed report on usage, infrastructure developments, climate, and land use submitted by the NSW Department of Water and Energy (DWE) and provided as part of the 2007–08 Audit (October 2008 Report). The IAG has also considered the earlier

Audits, and special audits of the NSW Barwon–Darling Lower Darling Cap Valley. In response to the requirement for a special audit after the 2007–08 Cap review, the IAG received a letter from DWE (**Attachment A**) advising that there is little additional factual information available beyond that already provided to the IAG as part of these earlier reviews and recommending that the special audit be conducted on the basis of the previous submissions by NSW. Based upon this advice, the IAG considered the existing information when conducting the special audit and making the determination contained in this report. A draft report was made available to the DWE for comment prior to finalisation of the report.

Audit Outcome

In previous submissions, DWE (or its predecessor) has advised that survey estimates of irrigated areas and irrigation infrastructure in the Barwon–Darling Valley all indicate significant increases over the 1993–94 levels, indicating that users in the Barwon–Darling River system have exceeded climatically adjusted Cap targets. For the Lower Darling Valley, there does not appear to have been any significant increase in infrastructure, with most of the on-farm storage capacity located on the Tandou property in the form of a natural lake.

The Barwon–Darling Valley receives only unregulated flow from other valleys, and all supply is essentially opportunistic. The Lower Darling is a regulated system supplied from the Menindee Lakes. The growth in private farm storage capacity on the Barwon–Darling has increased the ability of irrigators to capture flows when these occur. In 2007–08, flooding in the upper reaches of the Murray–Darling Basin produced significant inflows into the Barwon–Darling system from December 2007 to March 2008. This provided users with their first access to water since 2005, and resulted in a total diversion of 206 GL.

For the Lower Darling, at the commencement of the 2007–08 water year, volumes stored in Menindee Lakes had fallen to critical levels. This restricted water availability for consumptive purposes at the commencement of the water year. After the inflow of significant volumes into Menindee Lakes over the summer months, it was possible to allow a full water allocation for towns, and domestic and stock use as well as for high security users, and towards the end of the water year, a 50% allocation was made under general entitlements.

NSW has again recognised and acknowledged that it is in breach of the Cap, although it notes that, as the Barwon–Darling is an unregulated river, water availability will vary significantly between years. In its submission to the IAG as part of the 2005–06 Audit, the predecessor to DWE advised that, in response

⁷ This was previously Schedule F to the *Murray–Darling Basin Agreement* (the agreement) prior to the amendment to the *Water Act 2007* in 2008, where an amended agreement was appended to the *Water Act 2007*.

to earlier declarations of breach of the Cap, it had announced and was implementing a new Cap strategy for the Barwon–Darling along similar lines to that applied in other unregulated streams in NSW. This strategy involved restructuring the water entitlements to ensure that future diversions do not exceed a long-term Cap. Under this strategy, irrigators' licences are credited annually with a total volume equivalent to the long-term average Cap (assessed as 173 GL). The use of water under this strategy is subject to continuous accounting. Under this arrangement, DWE argues that the long-term total average extractions (account debits) cannot exceed the long-term Cap, as account debits cannot exceed account credits.

For the Lower Darling, NSW advised that on 1 July 2004, a Water Sharing Plan for the Murray and Lower Darling valleys commenced, which included limits on supplementary water access (previously known as off allocation access). Thus, a capping mechanism has been introduced for the Lower Darling, and it is acknowledged that the Lower Darling is cumulatively below the Cap.

In response to the IAG Report for 2007–08, NSW has again referred to the adoption of the restructured licence entitlement arrangement to ensure that diversions remain within Cap. NSW advises that they are committed to this approach which will be included within the statutory Water Sharing Plan for the Barwon–Darling valley that is currently being prepared. It is the Barwon–Darling portion of the combined valley Cap that has continued to cause the above Cap outcomes for the combined Barwon–Darling Lower Darling valley. Under the Water Sharing Plan which is being developed, in addition to addressing the issue of volumetric growth, the Plan will also incorporate event based access rules that are intended to protect important flows for the environment and downstream use.

Although the restructuring of licences was announced in March 2006 and was expected to take effect from 1 July 2006, the new Cap arrangements for the Barwon–Darling only took effect from 1 July 2007. Thus, 2007–08 was the first year that these new arrangement applied.

The IQQM modelling for the Barwon–Darling has now been completed and is available for long-term and annual Cap simulations to assess Cap compliance. However, NSW considers that results from the model should be regarded as preliminary until the model has been independently audited under the provisions of Schedule E. NSW further notes that recalibration work on the Lower Darling cap modelling is continuing and that *'there is significant potential for the current Cap accounting to change'*⁸.

8 Correspondence to MDBA from Mark Duffy, Director-General DWE, 29 January 2009.

NSW notes that *'in consideration of the changes to previous assessments of cap compliance based on the recalibration of models and the relatively small exceedence of the trigger for special auditing, (NSW) would ask that more emphasis be made on long-term modelling outcomes'*.

Comments

The IAG has reviewed the material provide by DWE and confirms that there has again been a breach of the Cap in the combined Barwon–Darling/Lower Darling valley Cap.

NSW has acknowledged that there is a breach of the Cap, but has argued that, based upon its long-term modelling which has formed the basis for the decision to allocate 173 GL annually, the Cap will be met in the long-term.

The IAG has previously identified the growth in development works and irrigated areas in the Barwon–Darling Valley as the prime reason for breaches of the Cap. NSW has advised that it has now implemented a revision to the allocation for licences for that part of the combined valley, and that as a result, an allocation of 173 GL will be made each water year, with the opportunity for unlimited carryover of allocated water from one water year to the next, together with a trading framework to allow water to be shifted to the best productive use.

NSW has also argued that the further model recalibration work currently underway on the Lower Darling model may result in the usage across the combined valleys in 2007–08 not exceeding the Cap trigger. NSW notes the experience in 2006–07 when initially the IAG believed that the Cap had been exceeded but revised modelling resulted in amended Cap estimates such that, for diversions across the combined valleys, the Cap trigger had not been exceeded.

The IAG in its 2007–08 Review of Cap Implementation has discussed in some detail the issue of the long run modelling that NSW has relied upon to argue that the allocation of 173 GL per annum is appropriate and consistent with the Cap, ensuring that the Cap will be met 'in the long run'. The IAG also acknowledges that it has on previous occasions supported a move towards establishing an absolute Cap for the Barwon–Darling, and that in effect this capping arrangement has only been in operation since 1 July 2007 (although it was foreshadowed and announced to take effect from the 2006–07 water year).

However, the IAG has concerns about the consistency of the long run modelling undertaken by NSW and the derivation of an absolute cap of 173 GL based on past climate conditions. A constant allowance of 173 GL per annum with unlimited carryover may not

be appropriate to ensure that diversions remain within the Cap particularly if there is a continuation of the current sequence of dry years. The experience gained by NSW over the last five years and the opportunistic nature of the diversion of water in this valley highlights the need to reconsider the derivation of the 173 GL and its use in annual allocation. Irrigators on the Barwon–Darling are capable of diverting water rapidly when it is available, and in a year such as 2007–08 when there is a flow as a result of good rains in the upper reaches of the Darling system, they are able to divert water swiftly as it becomes available.

The annual allocation of the 173 GL with unlimited carryover would not appear to be a sufficient constraint on the diversion of water in the context of the spirit and intention of the Cap. Rather than maintain a system which has the potential to result in long periods of diversion above the Cap trigger, it may be more appropriate to adopt a precautionary approach to the setting of annual allocations. The irrigators directly impacted are already familiar with the vagaries of the climate and the availability of water in this valley. An amendment to the water allocation arrangements together with the operating rules to reflect a more realistic outcome, while of concern to irrigators during times when there is water available, may not have unreasonable consequences during extended dry periods when water flows are constrained by the lack of rain.

Conclusion

On the basis of available information the IAG determines that the combined Barwon–Darling/Lower Darling Cap valley to be in breach of the long-term diversion Cap. The IAG notes that NSW has now implemented its program to apply new licensing arrangements for the Barwon–Darling and its claim that as a result of this new arrangement, the average long-term Cap will not be exceeded over time.

The IAG is concerned that the size (173 GL) and particularly the manner in which the Cap has been applied by NSW to the Barwon–Darling, including unlimited carryover of allocated water from one year to the next, will not ensure that even over the long-term, the Cap will not be exceeded.

Attachment A



Mr Rob Freeman
Chief Executive
Murray-Darling Basin Authority
GPO Box 1801
CANBERRA ACT 2601

DG08/981
DG08/986

29 JAN 2009

Dear Mr Freeman

I refer to the former Murray-Darling Basin Commission's directive to the Independent Audit Group (IAG) to conduct a Special Audit of the combined Barwon-Darling and Lower Darling valley, following the 2007-08 review of Cap implementation.

The IAG has previously performed three Special Audits on the combined Barwon-Darling and Lower Darling, and there is little factual information that can be provided in addition to that already provided for the past Special Audits. Consequently, I am recommending that the current Special Audit be performed on the basis of the previous submissions that NSW provided to the IAG.

I understand that recalibration work on the Lower Darling Cap modelling is continuing and that there is significant potential for the current annual Cap accounting to change. In consideration of the changes to previous assessments of Cap compliance based on the recalibration of models and the relatively small exceedence of the trigger for Special Accounting, I would ask that more emphasis be made on long-term modelling outcomes when considering this matter.

As foreshadowed in the previous Special Audits, NSW has now restructured the licensed water entitlements in the Barwon-Darling Valley to ensure diversions will remain within Cap. The IAG's Special Audit reports in 2005 and 2006 supported the proposed actions. NSW remains committed to this approach and this will be included within the statutory water sharing plan for the Barwon-Darling River currently being prepared.

Should you have any further enquiries about this matter, I have arranged for Mr Paul Simpson, Manager, Interstate Programs Performance, to assist you. Mr Simpson can be contacted at the Department's Parramatta Office on telephone number (02) 9895 7480.

Yours sincerely

Mark Duffy
Director-General

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Australian Government



**MURRAY—
DARLING**
BASIN AUTHORITY