



MURRAY-DARLING BASIN
MINISTERIAL COUNCIL

Review of Cap Implementation 2002/03

*Report of the
Independent Audit
Group*

*Including Special Audits of
the Lachlan and Macquarie
Valleys and Responses by
the Five State and Territory
Governments*



M A R C H 2 0 0 4

Integrated catchment management in the Murray–Darling Basin

A process through which people can develop a vision, agree on shared values and behaviours, make informed decisions and act together to manage the natural resources of their catchment: their decisions on the use of land, water and other environmental resources are made by considering the effect of that use on all those resources and on all people within the catchment.

Our values

We agree to work together, and ensure that our behaviour reflects the following values.

Courage

- We will take a visionary approach, provide leadership and be prepared to make difficult decisions.

Inclusiveness

- We will build relationships based on trust and sharing, considering the needs of future generations, and working together in a true partnership.
- We will engage all partners, including Indigenous communities, and ensure that partners have the capacity to be fully engaged.

Commitment

- We will act with passion and decisiveness, taking the long-term view and aiming for stability in decision-making.
- We will take a Basin perspective and a non-partisan approach to Basin management.

Respect and honesty

- We will respect different views, respect each other and acknowledge the reality of each other's situation.
- We will act with integrity, openness and honesty, be fair and credible, and share knowledge and information.
- We will use resources equitably and respect the environment.

Flexibility

- We will accept reform where it is needed, be willing to change, and continuously improve our actions through a learning approach.

Practicability

- We will choose practicable, long-term outcomes and select viable solutions to achieve these outcomes.

Mutual obligation

- We will share responsibility and accountability, and act responsibly, with fairness and justice.
- We will support each other through necessary change.

Our principles

We agree, in a spirit of partnership, to use the following principles to guide our actions.

Integration

- We will manage catchments holistically; that is, decisions on the use of land, water and other environmental resources are made by considering the effect of that use on all those resources and on all people within the catchment.

Accountability

- We will assign responsibilities and accountabilities.
- We will manage resources wisely, being accountable and reporting to our partners.

Transparency

- We will clarify the outcomes sought.
- We will be open about how to achieve outcomes and what is expected from each partner.

Effectiveness

- We will act to achieve agreed outcomes.
- We will learn from our successes and failures and continuously improve our actions.

Efficiency

- We will maximise the benefits and minimise the costs of actions.

Full accounting

- We will take account of the full range of costs and benefits, including economic, environmental, social and off-site costs and benefits.

Informed decision-making

- We will make decisions at the most appropriate scale.
- We will make decisions on the best available information, and continuously improve knowledge.
- We will support the involvement of Indigenous people in decision-making, understanding the value of this involvement, and respecting the living knowledge of Indigenous people.

Learning approach

- We will learn from our failures and successes.
- We will learn from each other.

Review of Cap Implementation 2002/03

Report of the Independent Audit Group

Including Special Audits of the Lachlan and Macquarie Valleys and Responses by the Five State and Territory Governments



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Acknowledgments

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This report may be cited as:
Review of Cap Implementation 2002/03, Report of the Independent Audit Group

MDBC Publication No. 13/04

ISBN 1 876830 79 4

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Design and typesetting: Ideas and Directions

Cover photograph: Barwon River near Walgett NSW,
Arthur Mostead Photographer

Printing: National Capital Printing

This publication is printed on Monza Satin, a 50% recycled and coated paper.

Auditors' Foreword

March 2004

The Hon. Warren Truss MP
Chairman
Murray-Darling Basin Ministerial Council
Parliament House
CANBERRA ACT 2600

Dear Minister

We have pleasure in submitting to you our *Review of Cap Implementation 2002/03*.

The Ministerial Council in August 2000 formally adopted Schedule F which specifies the Audit arrangements and this Audit has been carried out in accordance with these provisions.

The IAG advises that Cap arrangements have still not been finalised by the ACT and Queensland Governments and for the Border Rivers within New South Wales.

Yours sincerely



DR WALLY COX
Chairman



PAUL BAXTER
Member





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Executive Summary

Following the adoption of Schedule F by the Council for operationalising, monitoring and reporting on Cap implementation, this audit was conducted in line with the requirements of Clause 13 of the Schedule.

The 2002/03 audit identified progress in each of the States and the ACT in establishing and/or operationalising the Cap. There is however a number of strategic issues that need to be addressed. These are:

- the establishment of Cap targets in Queensland, New South Wales and the ACT; and
- accreditation of models for Cap assessment.

Work is progressing in Queensland and the ACT to establish Cap targets and in New South Wales for establishing a Cap target for the Border Rivers. In Queensland, final Water Resource Plans for the Border Rivers, Moonie and Paroo/Warrego/ Nebine have become law in December 2003. A revised draft Water Resource Plan for the Condamine/Balonne has been released for public comment in December 2003 with a view to finalisation in mid-2004.

Resource Operations Plans for each valley are in preparation and these provide the basis for the establishment of valley Caps. These will not be in place before 2005.

The IAG notes progress between the Queensland and New South Wales Governments over the Border River arrangements and encourages early finalisation on environmental flow rules and water sharing.

Finalisation of a Cap for the ACT is dependent on the establishment of a water trading framework including rules, exchange rates, recording of entitlements and Cap adjustments. A Cap submission is expected in early 2004.

The IAG recommends that the ACT and New South Wales representatives establish the necessary framework to enable trade between them and to enable the ACT to finalise its Cap.

In New South Wales the Lachlan continues to exceed the Cap trigger. The IAG notes that the changed management rules proposed to reduce diversions initially proposed for 2002/03 were not implemented until water year 2003/04.

The Gwydir was in breach of the Cap in 2001/02, however it is back within Cap limits in 2002/03. The IAG however is concerned that the present models for the Gwydir may not accurately reflect the levels of on-farm storage, floodplain harvesting and the cropping areas.

As Cap management and auditing is very reliant on reliable models, the IAG recommends that priority including additional resources be provided to re-calibrate and validate the Schedule F and current condition models to provide a more definitive basis for Cap management of the Gwydir.

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.

Accreditation of models has commenced with four models assessed and one approved by the Commission with three requiring some adjustments.

As Cap compliance is determined by comparing diversions against modelled targets, it is essential that the models be independently verified and accredited. Increased emphasis is required on achieving accreditation.

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.

The 2002/03 audit identified a number of one-off management actions by water resource managers in response to low flows and storage levels. It is suggested that the MDBC Water Audit Working Group address these in terms of inclusion in models and accounting treatments. The IAG has provided some principles to support these deliberations.

The conclusions and recommendations reached by the Audit Group for the 2002/03 year by State and Territory are:

South Australia

- Diversions in 2002/03 were within the annual Cap targets for metropolitan Adelaide and the irrigation areas, but marginally higher than the annual Cap target for Country Towns. The Country Towns diversions however, are in cumulative credit.
- South Australia has a reliable system of measurement for urban and irrigation use.



- South Australia is developing a Quality Management System including a new Water Information and Licensing Management Application.
- Models have been developed to compare seasonal water use for the Highland Irrigation and Country Towns with the climate-adjusted Cap, which have been submitted for verification and accreditation.
- 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.

Victoria

- Diversions for the Goulburn/Broken/Loddon were above the climate-adjusted annual Cap targets for 2002/03.
- Diversions from the Murray/Kiewa/Ovens, Campaspe and Wimmera-Mallee were below the 2002/03 Cap targets.
- Cumulative diversions for all Victorian valleys are in credit.
- Models for all Victorian valleys should be completed by January 2004 and accreditation for the Goulburn/Broken/Loddon and Campaspe models is expected before July 2004.
- All bulk water entitlements are expected to be completed by July 2004.

New South Wales

- Diversions in 2002/03 were 4132 GL compared to 6735 GL in 2001/02.
- IQQM Cap models have now been prepared for all river valleys, with the exception of the Murray and the Peel Rivers, and these models now await calibration and/or approval under Schedule F by the Commission.
- The Lachlan IQQM model has been approved by the Murray-Darling Basin Commission under the Schedule F procedures; the first model across the Basin to achieve this milestone.
- The Lachlan cumulative debit is 80 GL and exceeds the trigger of 67 GL for a Special Audit to be undertaken. NSW proposed, via its Water Sharing Plans, actions necessary to ensure Cap compliance in the Lachlan Valley, but this action was postponed in 2002/03.

- Following the Special Audit, on the basis of available information, the IAG determines that the Lachlan Valley continues to be in breach of the long-term diversion Cap.
- The Gwydir cumulative debit is 29 GL and technically no longer exceeds the trigger for a Special Audit. However, there is some concern with the reliability of the modelling and the IAG cannot determine whether or not it has exceeded the Cap trigger requiring a Special Audit.
- The Namoi Valley has exceeded the Schedule F trigger for the Cap. However, combined with the Peel, the joint Namoi/Peel has not exceeded the Cap. The IAG has expressed some concern that with better data for the Peel it may become clearer just how close the Namoi/Peel is to exceeding the Cap.
- The trigger has not been exceeded for the combined Barwon-Darling and Lower Darling, although recalculation of the Lower Darling diversions indicates that the trigger could be exceeded in the next one to two years. The IAG notes that the foreshadowed reduced allocations for the Barwon-Darling were not implemented in 2002/03.
- The IAG has been unable to assess the Cap compliance of the NSW Border Rivers because the Cap has not been defined in that valley. The IAG expresses concern that the Border Rivers will be found to be in breach once a Cap is defined.
- NSW should as a matter of urgency, assign appropriate additional resources to the verifying and obtaining of data to allow the IQQM models used in the State to be reassessed, refined and re-calibrated as appropriate. As an initial measure – the NSW Government should give attention to the verification and ground truthing of data used in the Gwydir IQQM model to enable the IAG to form a view as to whether the Cap trigger has been exceeded.
- 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.
- The IAG was unable to assess the Cap compliance for the Macquarie Valley because the Cap target for 2002/03 was not made available.
- The IAG encourages NSW to complete negotiations with the ACT over trading rules and other related matters in order to allow a Cap for the ACT to be defined.



- NSW should submit a monitoring report on the Intersecting Streams as required under Schedule F.
- MDBC Water Audit Working Group should develop procedures to guide treatment of 'one-off' or low probability events in the Cap models and accounting of diversions.

Queensland

- Diversions are estimated at 212 GL and are the second lowest since 1993/94. This follows below average rainfall in all valleys and a very poor flow year.
- Growth in off-stream storages stopped since the introduction of a moratorium on construction in September 2000 and remains at 1878 GL.
- Queensland has made substantial progress in 2003 with the final Water Resource Plans for the Border Rivers, Moonie and Paroo/Warrego/Nebine becoming law in December 2003.
- A revised draft Water Resource Plan for the Condamine/Balonne was released for public comment in December 2003 and likely to be finalised by mid-2004.
- Work on the Resource Operations Plans has commenced. These will set environmental and other flow rules and the valley caps. These are unlikely to be available before 2005.

- Given the outcome based Water Resource Plans the IAG requests Queensland to submit models/methods for auditing compliance against Cap targets as in other States, and progress against the end-of-valley flow or environmental objective targets.

Australian Capital Territory

- No Cap presently exists for the ACT.
- Net diversions of 40.1 GL in 2002/03 exceed the average usage between 1989 and 2001 of 31 GL but were less than a climate adjusted annual Cap target of 48.7 GL. The ACT would have a cumulative credit of 35.7 GL if the Cap of 38 GL proposed by the IAG had applied since July 1997.
- The IAG encourages the ACT and NSW to complete their negotiations on trading rules and a regional NSW/ACT Cap in order to allow the finalisation of a Cap for the ACT.
- The IAG draws the ACT's attention to its comments on the extra principles proposed by the ACT and to the precedent set by other States in agreeing to a Cap consistent with the overall aims and objectives of the June 1995 Council resolution.





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 cap the future level of diversions.

The Council in finalising Schedule F, agreed that the IAG should have an ongoing role in auditing the implementation of the Cap.

The Council has also asked the IAG to review the Queensland Water Resource Planning process, and in time the outcomes of the process. This process, which involves significant community participation in both Queensland and northern NSW, was due for completion about the middle of 1998 but has been delayed. It will be the foundation for determining the balance in Queensland between consumptive and in-stream use and the Council has supported the auditing of both the process and outcomes.

Thus the *Review of Cap Implementation 2002/03* 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 ACT, Queensland and Border Rivers within New South Wales are still to be established.

The IAG team wishes to 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 Commission (MDBC) in the preparation of this report. The findings however are entirely those of the IAG.





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; and
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.

In unregulated rivers this Cap may be expressed as an end-of-valley flow regime

with the following criteria:

- 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 be equivalent to 1993/94 levels of development;
- under the Cap, the amount of water that States would be entitled to divert from regulated streams in any year would be quantified using analytical models that incorporate weather conditions and which take into account:
 - the water supply infrastructure in place in 1993/94;
 - the water allocation and system operating rules which applied in 1993/94;
 - the entitlements that were allocated and the extent of their utilisation at 1993/94 levels of development;
 - the underlying level of demand for water in 1993/94; and
 - the system operating efficiency in 1993/94; and
- in unregulated rivers, end-of-valley flows may be used to define the Cap using analytical models incorporating the same points as above.

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; and
- 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 has 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; and
- the final independent audit of the WRP process is conducted, including modelling of impacts on downstream Basin flows.

After considering a number of equity issues, the 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.



In Queensland for unregulated rivers with high seasonal variability, the Council agreed that the Cap may be described in terms of end-of-valley flows and supporting flow management rules including diversion entitlements until December 2002. After this the Cap in Queensland, as in all other States and the ACT, will be specified as diversion limits on a valley by valley basis.

The 2001/02 Review of Cap Implementation identified that:

- Caps were still to be finalised for the ACT, Queensland and Border Rivers of New South Wales;
- Diversions for South Australia were within the Cap, as were diversions from the Murray/Kiewa/Ovens systems in Victoria;
- Diversions from the Goulburn/Broken/Loddon and Campaspe in Victoria were above the climate-adjusted Cap target;
- Diversions from the Macquarie and Lachlan, Namoi/Gwydir, Barwon-Darling/Lower Darling in New South Wales exceeded the climate-adjusted Cap;
- The Lachlan and Gwydir exceeded the long-term Cap and were declared in breach of Cap;
- The Lachlan IQQM model was the first to be accredited by the MDBIC;
- Draft Water Resource Plans had been released for the Border Rivers, Moonie and Paroo/Warrego/Nebine in Queensland;
- The proposals for the Border Rivers and Moonie did not meet the Precautionary Principle and would result in further growth in diversions and possible adverse downstream impacts;
- There was a need to finalise models for annual diversions including accreditation.

3. Audit Process

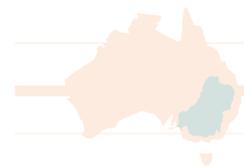
For the purposes of this 2002/03 audit of progress with the implementation of the Cap, the IAG has adopted a consultative approach designed to:

- clarify expected Cap outcomes for each State;
- gather available statistical information on actual levels of diversions in 2002/03 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; and
- update the status of the Queensland Water Resource Plans and finalisation of Cap figures for the ACT, Queensland and the Border Rivers in New South Wales.

The IAG met with representatives of each of the States and the ACT during the period 28 to 30 October 2003. The format of each meeting was to compare water usage in 2002/03 with Cap targets, to discuss progress with the establishment of models and management frameworks to achieve targets and to discuss issues of possible concern.

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 and the members of the MDBC staff, the findings and conclusions presented in this report are entirely those of the IAG.





4. Audit of 2002/03 Cap Implementation

South Australia

• The Cap

As a result of decisions by the Ministerial Council in December 1996 and March 2001 and the finalisation of Schedule F, the components of the South Australian Cap are:

- a five year rolling non-tradeable allocation of 650 GL for metropolitan Adelaide;
- a tradeable allocation of 50 GL per year for country towns;
- an allocation of 103.5 GL per year for the lower Murray Swamps with the following components:
 - 9.3 GL per year for highlands with unrestricted trade;
 - 72 GL per year for swamp use with unrestricted trade; and
 - 22.2 GL per year non-tradeable environmental entitlement
- an average of 440.6 GL per year for other uses in South Australia which is tradeable.

• 2002/03 Usage

South Australian diversions in 2002/03 were within the annual Cap targets for Metropolitan Adelaide, Lower Murray Swamps and Other Diversions. The diversion for the Country Towns marginally exceeded the annual target (39.2 versus Cap of 39 GL), however the Country Towns remain in cumulative Cap credit of 56 GL. (Table 1).

• Administration of the Cap

South Australia continues to be well placed to manage the Cap. Water diverted from the Murray River for urban use is reliably measured and licences have been issued to SA Water for an allocation of 50 GL per year for country urban water and a non-tradeable 650 GL over a rolling five-year period for Adelaide.

The issue of Quality Assurance is being addressed. Licensing and diversion data has been audited, a Water Licensing Manual documents processes and a new software package is under development (WILMA – Water Information and Licensing Management Application). It is expected to be operational by 1 July 2004.

Cap models for calculating the climate-adjusted annual Cap targets for the Country Towns and the Highland of irrigation have been developed and submitted for independent audit and ultimately accreditation by the Murray-Darling Basin Commission.

Interstate net permanent trading of 40 ML into South Australia in 2002/03 was down compared to 1.4 GL in 2001/02. A preliminary estimate of net interstate temporary trade out of 9.1 GL in 2002/03 was up against 6.2 GL of temporary trade moving out in 2001/02.

For permanent interstate trade only, the South Australian Cap increases or decreases by 0.9 GL for every 1 GL traded into or out of the State.



Table 1: South Australian Diversions for 2002/03 (GL)

	Long-term Cap adjusted for permanent trade	Adjustment to Cap as a result of temporary trade	Diversion	Cap Credits (Cap target less diversion)		20% Schedule F Trigger
				2002/03	Cumulative since 1 July 1997	
Adelaide						
- current year	—	—	164.7	—	—	—
- rolling 5 years	650	+23	642.4	30.6	—	—
Country towns	50	-11	39.2	-0.2	56.2	-10
Reclaimed Swamps	98.9	-0.4	98.5	—	—	-20.7
Other	458.1	-9.1	448	+1.4	271	-88

South Australia, through SA Water, transports water from the Murray to other Basins, i.e. Barossa Valley, Clare Valley. The IAG supports the accounting of diversions and trades as specified in Schedule F and notes that South Australia debits this against the originating allocation.

A temporary trade of 12 GL in 2001/02 and a further temporary trade of 11 GL in 2002/03 was made from Country Towns to Adelaide.

• **Monitoring and Reporting**

The IAG was advised that a modified computer based system for licensing and monitoring of water use (WILMA) will provide the basis for reporting water use in the future.

Urban consumption and consumption in rehabilitated irrigation areas are reliably metered (97% metered). In non-rehabilitated areas, metering is at the main river pump stations and it is estimated that this exceeds actual extraction. As a consequence, diversion estimates probably exceed real diversion and further build in conservatism in terms of meeting Cap targets. South Australia continues to make improvements to ensure that the standard of metering of direct diversions is brought to a satisfactory level.

It is also proposed to meter all diversions from the Lower Murray Swamps as part of a rehabilitation program currently underway.

• **Proposals to Refine Implementation in 2003/04**

South Australia will continue to improve its capacity to manage diversions to Cap targets. In particular it is proposed to finalise a water management and allocation system, including direct measurement of water supply, for the Murray Swamps.

• **IAG Assessment**

Consumption in South Australia in 2002/03 was within the annual Cap targets for Adelaide and the irrigation areas but marginally higher than the annual Cap target for Country Towns (39.2 versus 39 GL). The Country Towns diversions however, are in cumulative credit of 56 GL.

Adelaide's diversion was greater than the nominal annual average of 130 GL/year (actual diversions 164.7 GL). Total diversions over 5 years at 642.4 GL were within the rolling 5 year Schedule F Cap of 650 GL.

A temporary trade of 11 GL was made in 2002/03 from Country Towns to Adelaide. This raises the issue of how SA Water Corporation copes with periods of high demand from the Murray.

The rolling target of 650 GL over a five year period assumes a 99% reliability of water supply for Adelaide. Any growth in consumption arising from a growth in demand or reduced yield from the Adelaide catchments will reduce the reliability of supply unless additional water is purchased from other users and transferred as permanent Cap.

This issue was raised by the IAG in 2001/02:

'As the Cap for Adelaide is an inflexible upper limit, SA Water Corporation would be required to acquire additional water with the same level of security as the present supply to Adelaide (99% security). It would be inappropriate to meet any shortfall through temporary trade.'

Since the 2001/02 audit, correspondence between South Australian representatives and the IAG has resulted in an in-principle agreement that:

- the 12 GL in 2001/02 and 11 GL in 2002/03 temporary transfers would be recognised for use against metropolitan Adelaide consumption;
- a separate licence is to be maintained for any water traded to the Adelaide system;
- first water used each water year to metropolitan Adelaide should be accounted as use by the separate licence; and
- reporting should be in accordance with Clause 11 of Schedule F.

This issue was discussed again during the 2002/03 audit with South Australian representatives. The IAG remains of the view 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.

As a result of these discussions the IAG expects that South Australia will forward a submission before the 2003/04 audit that identifies the average annual growth in demand, the base line year (2000 versus 1993/94) and other issues.

A policy decision on this issue needs to be taken.

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 irrigation areas with improvements projected for the non-rehabilitated and lower Murray irrigation areas.

The IAG again commends South Australia for the work that has been done in implementing the Cap and putting in place the necessary administrative framework.

• **Conclusions/Recommendations**

- Diversions in 2002/03 were within the annual Cap targets for metropolitan Adelaide and the irrigation areas, but marginally higher than the annual Cap target for Country Towns. The Country Towns diversions however, are in cumulative credit.
- South Australia has a reliable system of measurement for urban and irrigation use.
- South Australia is developing a Quality Management System including a new Water Information and Licensing Management Application.
- Models have been developed to compare seasonal water use for highland irrigation and the climate-adjusted Cap which have been submitted for verification and accreditation.
- 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.



Victoria

• The Cap

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.

The model used to calculate Cap targets for the Goulburn/Broken/Loddon and Campaspe valleys has been reviewed by the model auditor. Revised documentation of model assumptions and final calibration results are being prepared as required by the auditor. This model has been used to calculate the 2002/03 Cap targets and the cumulative credits since 1997.

The model used to calculate the Murray component of the Murray/Kiewa/Ovens valley Cap target is being re-calibrated by the MDBC to reflect revised estimates of historical diversions. An interim version of this model has been used to calculate the 2002/03 Murray component of the Cap target. Regression relationships with rainfall and temperature have been developed by the MDBC to calculate the Kiewa and Ovens components of the Cap targets. The three models were used to calculate the 2002/03 Cap target and the cumulative credits since 1997.

A model of the Wimmera-Mallee system has been developed and calibrated to represent diversions at 1993/94 level of development. Model input data needs to be updated and

specification of the environmental entitlements existing in 1993/94 needs to be agreed and built into the model before it can be used for Cap purposes.

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

The current estimate of the long-term Cap in each system is shown in **Table 2**.

• 2002/03 Diversions

The severe drought in the Goulburn, Campaspe and Wimmera-Mallee systems continued into its sixth year and allocations in these systems were the lowest on record. Carryover storage in Dartmouth enabled the Murray allocations to be higher than in the other systems although inflows during the season were extremely low and the final allocation was the lowest on record.

Diversions from the Murray/Kiewa/Ovens and Campaspe valleys were below their Cap targets while those from the Goulburn/Broken/Loddon valley were marginally above the 2002/03 target. While Cap targets are not available yet for the Wimmera valley, water savings from pipelining and increased environmental flows have ensured that diversions have been less than Cap.

All four Victorian valleys have cumulative Cap credits up to 30 June 2003.

A comparison of diversions with Cap targets is shown in **Table 2**.

Table 2 – 2002/03 Diversions (preliminary values) compared with Schedule F Targets (GL/year)

Valley	Long-term Cap	2002/03 Cap target	Net adjustment to Cap because of trade	Diversion	Cap Credits (Cap target less diversion)		
					2002/03	Cumulative since 1 July 1997	20% Schedule F Trigger
Goulburn/Loddon/ Broken	2058	1041	—	1069	-28	12	-412
Murray/Kiewa/ Ovens	1665	2070	—	1789	281	412	-333
Campaspe	122	86	—	73	13	33	-24
Wimmera-Mallee	162	N/A	—	62		N/A	-33
Interim Mokoan allowance	22	22	—	—	22	132	—
Total	4029	—	—	2993	—	—	—

Goulburn/Broken/Loddon

Resource availability

Inflows to Lake Eildon were again well below average during 2002/03. The storage started the year at 21% of capacity, reached a maximum of 24% in August and by May had fallen to its lowest ever level of 8.6% of its 3390 GL capacity. Run-off from the Goulburn River catchment between Lake Eildon and Goulburn Weir was the lowest on record.

The initial seasonal allocation for the Goulburn system was 34% of water right or licensed volume and no sales. The allocation gradually increased to 57% of water right or licensed volume on 17 March 2003. Neither sales nor off-allocation water was available during the year. This was the lowest allocation on record and it followed four irrigation seasons in a row which were equal second lowest on record.

Pumps were used to access water from below the minimum normal operating level in the Waranga Basin. The Waranga Basin, which is a 411 GL off-stream storage, was drawn down to 4.1% of capacity. Pumps were last used for this purpose in 1939 and though it was a relative expensive operation, it increased the water available to irrigators in the Goulburn system during this severe drought.

Broken system inflows were close to minimum on record. Lake Nillahcootie reached 49% in September 2002 and was drawn down to 22% of capacity in April 2003. Lake Mokoan reached 42% in early August 2002 and fell to 20% in May 2003. This was its lowest level since the 1982/83 drought when it reached 4.5%. The final seasonal allocation was 100% of licensed volume and no sales.

Cairn Curran and Tullaroop reservoirs on the Loddon system peaked at 22% and 27% of capacity respectively. Inflows to these storages for the year were only 10% and 4% respectively of the long-term average. Both storages were drawn down to the lowest levels ever, with Cairn Curran reaching 6% and Tullaroop 12% of capacity in the autumn. The final allocation was 57% of licensed volume and no sales.

Cap compliance

Diversion from the Goulburn/Broken/Loddon valley was 1069 GL, which is 28 GL (3%) above the Cap target of 1041 GL (no adjustment for trade). Diversions were 48% below the long-term Cap of 2058 GL/year.

This valley has a cumulative Cap credit of 12 GL since accounting commenced in July 1997.

The above calculations do not include the 22 GL/year interim allowance for the full utilisation of Lake Mokoan.

Murray/Kiewa/Ovens

Resource availability

Inflows to both Lake Dartmouth and Lake Hume were 39% of average for the year and there was virtually no inflow to the Menindee Lakes. Lake Dartmouth peaked at 84% of capacity in July 2002 and Lake Hume reached 31% in mid-August 2002. By the end of the irrigation season, Lake Hume had been drawn down to 18% and Lake Dartmouth was 30%. No Darling resources were available for the Murray system due to the low levels in the Menindee Lakes.

The reserves in Lake Dartmouth enabled an initial seasonal allocation of 100% water right or licensed volume and 29% sales (no sales water was allocated to private diverters except those on the Mitta Mitta). Seasonal allocations did not increase during the season.

Filling of Lake Buffalo was restricted to one metre below design full supply level for the third year because of dam safety considerations. The storage was drawn down to 20% of capacity in April 2003. Lake William Hovell filled in September and was subsequently drawn down to 29% of capacity. Inflows to both storages were about one third of average.

Cap compliance

Diversion from the Murray/Kiewa/Ovens valley was 1789 GL, which is 281 GL (14%) below the Cap target of 2070 GL (no adjustment for trade). Given the climatic conditions, this difference is surprising and warrants further investigation. The diversion was 7% above the long-term Cap of 1665 GL/year.

This valley has a cumulative Cap credit of 412 GL since accounting commenced in July 1997.

Campaspe

Resource availability

Lake Eppalock started the year at 28% of capacity and fell continuously to its lowest ever level of 6% in May 2003. Inflows to Lake Eppalock for the year were the lowest on record at only 3% of average.



Due to the carryover storage, irrigators in the Campaspe system received an initial seasonal allocation of 85% of water right or licensed volume. The allocation slowly increased to 100% in early March 2003, but no sales water was available. This was the lowest ever allocation on the Campaspe system.

No supplement was provided to the Goulburn system.

Inflows to the Coliban system were extremely low and the Coliban storages had risen marginally to 48% of capacity in September 2002. Total volume in storage had reduced to only 16% in June 2003. Restrictions in the Coliban urban system had increased to level 3, of a 4 stage policy, by the end of the year.

Cap compliance

Diversion from the Campaspe valley was 73 GL, which is 13 GL (15%) below the Cap target of 86 GL (no adjustment for trade is necessary). Diversions were 40% below the long-term Cap of 122 GL/year.

This valley has a cumulative Cap credit of 33 GL since accounting commenced in July 1997.

Wimmera-Mallee

Resource availability

Inflows to the Wimmera-Mallee system were second lowest on record. Storages in May 2002, at the start of the winter domestic and stock season, were holding only 19% of capacity and fell continuously throughout the year.

Restrictions were imposed on domestic and stock customers in the winter season, with these customers being able to fill 50% of the dams on their properties. For the fourth year in a row, no supply went to recreation lakes. By the end of December 2002 the storage levels had reduced to 10% of capacity.

No allocation was available for irrigation but farmers in irrigation areas and the summer domestic and stock supply was restricted to filling house dams only. The environmental allocation was set at 3% of allocation, which enabled 1 ML to be allocated to the combined Wimmera and Glenelg catchments.

These restrictions aimed at preserving enough water in Wimmera-Mallee Water reservoirs to ensure supply to town storages in the 2003 winter season. Some relief from the extreme conditions occurred in late February with widespread rain of 50 to 75 millimetres.

However, this rain caused only a temporary improvement and by May reservoirs held 6.1% of capacity. By early July 2003 the reservoirs had risen to only 7.3%, still well short of the volume needed to enable a supply to house dams on farms as well as supply for town storages. Plans for water carting to rural households were activated.

Cap compliance

Diversion from the Wimmera-Mallee valley was 62 GL in 2002/03. An annual Cap target has not been calculated for this valley as, although a model has been built, it has not been fully calibrated to 1993/94 level of development. The model was provisionally developed at 1990/91 level of development and the best estimate of the long-term Cap is 162 GL/year.

Diversions for 2002/03 were 62% below the long-term Cap. Usage has remained within Cap as there have been considerable savings since 1993 through construction of the Northern Mallee Pipeline. The pipelining has resulted in reduced diversions and enabled increased allocations for environmental flows.

Completion of the Northern Mallee Pipeline up to Stage 7 has enabled additional entitlement to be created for environmental flows in the Wimmera and Glenelg rivers. The environment's entitlement from savings was 34.7 GL/year at the end of the 2002/03 financial year.

• 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; and
- limits on the issuing of new entitlements.

Monitoring of the effectiveness of the water management policies is undertaken on an ongoing basis. No new capping policies were introduced for the 2002/03 year and none are proposed for the 2003/04 year as these measures have continued to be effective. There is no evidence of any growth in diversions in any of the Victorian valleys.

Victoria remains committed to the Cap through the continued establishment and implementation of Bulk Entitlements and Stream-flow Management Plans and the licensing of irrigation farm dams.

Bulk Entitlements

Victoria continued to implement the Cap on regulated systems by establishing Bulk Entitlements in accordance with the *Water Act 1989*.

The current status of Bulk Entitlements in the Victorian portion of the Murray-Darling Basin is:

Goulburn Basin – Bulk Entitlements were granted in 1995.

Murray (Victorian system) – Bulk Entitlements were granted in July 1999.

Campaspe Basin – Bulk Entitlements were granted in May 2000.

Kiewa River – Bulk Entitlements were granted in the Upper Kiewa in May 2000.

Broken Basin – nearing completion.

Ovens River – expected to be completed in December 2003.

Wimmera-Mallee – progressing.

Loddon Basin – progressing with expected completion mid-2004.

Stream-flow Management Plans

Interim capping arrangements were put in place in 1995 to constrain diversions on unregulated streams until stream-flow management plans could be developed. The two key rules were:

- no new diversion licences, except through transfer of existing ones (this had largely been in place for some years, but it was now extended to winter-fill licences);
- trade must be downstream and there is a 20% reduction in volume, unless the resulting licence is a winter-fill one.

The stream-flow management planning process is very similar to the one used for the Bulk Entitlements, but the outcome is a plan for managing a number of user entitlements to meet agreed environmental flows. The plans are implemented as policies, which affect the issuing of, and condition set in licences, rostering rules in dry periods, metering and monitoring, and the transfer of licences.

Metering of diversions on all unregulated streams will be necessary to adequately monitor use and detect changes in diversions over time. Programs are being developed that, subject to funding, will see most of the diversions from unregulated streams metered within nine years.

Stream-flow management plans will ensure diversions do not increase. They consider what extra development should be allowed into their valleys given local conditions, but any extra development has to be via acquisition of existing rights so that flows in the Murray are not ultimately affected.

The new legislative framework recently introduced has provided for increased certainty in the management of unregulated streams in Victoria. However new procedural arrangements (e.g. tabling of SFMPs in Parliament) have been put into place and the scope of consultation in the development of these plans has increased. The transition to meeting this new legislative and consultative approach, and the need to retrofit existing plans, has meant that while commencement of the development of these plans are to schedule, finalisation may take longer than originally anticipated.

Stream-flow management plans are at various stages of completion on the following twelve unregulated streams:

Ovens River. above Myrtleford
Yea River
King Parrot Creek
Kiewa River
Sevens Creeks
Delatite River
Nariel Creek
Loddon River above Cairn Curran
Upper Wimmera River
Avoca River
Avon/Richardson
Upper Mt. William Creek

Public consultation has been completed for three plans (Kiewa, Yea and King Parrot Creek) and they are currently being amended to ensure they meet current legal requirements before being submitted to the Minister. An additional plan is expected to be finalised in 2004 (Upper Wimmera), development of the Upper Ovens River basin plan is well advanced, and the remainder are included in the overall state-wide schedule. Plans for more high priority streams will be developed by Catchment Management Authorities under the Victorian River Health Strategy, which will also promote improved management in all unregulated systems.



• ***Irrigation Farm Dams***

When water is stored off waterways in catchment dams for irrigation and commercial purposes, farmers and the environment downstream can be affected. The water available downstream can be reduced, the security of downstream farmers can be lessened and environmental flows can be reduced. In addition, compliance with the MDBC Cap would be an issue if the construction of new farm dams were not controlled.

The Government has addressed this issue by passing the *Water (Irrigation Farm Dams) Act* in April 2002.

The main outcomes of this legislation are:

- licensing of all new irrigation and commercial use of water, whether the dam is located on a waterway or not;
- 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;
- establishment of Permissible Annual Volumes for catchments across the State to ensure that water use is sustainable;
- establishment of exchange rates to ensure Cap is preserved when licences are traded;
- legislative backing for locally developed Stream-flow Management Plans.

• ***Monitoring and Reporting***

Reporting against the Cap requires a reliable system of measuring water use. Victoria is well placed in this respect as the bulk entitlement imposes legal obligations to keep accurate diversion records and to report annually on compliance with the bulk entitlement. A resource manager for each river valley reports annually on water diversions and use. The reporting format is compatible with Schedule F reporting.

An estimated 95% of diversions are metered and plans are in place to progressively introduce meters for the unregulated stream diversions.

Victoria supports the Data Management Systems Protocol including periodic audits.

• ***Proposals to Refine Implementation in 2003/04***

In mid-2003 the policy of announcing off-quota allocations when unregulated flows occur downstream of storages was discontinued and replaced on an interim basis with a new 'advance arrangement' which only allows access to unregulated flow in years of severe water shortage. This new arrangement applies until 31 December 2004 and would then be subject to review.

Under this arrangement, advances will be announced when allocations are less than water right, but these must be paid back when the allocation reaches 100% of water right. It will also be available when the sales allocation is less than 30%, but must be paid back when the allocation reaches this level. It is also a requirement that the period when the advance is available on the River Murray, it must provide equal access to all Victorian Murray users.

This will result in a significant reduction in usage during periods of 'declared surplus' in the future.

Other proposed refinements to the management of the Cap in 2003/04 are:

- Model for Goulburn/Broken/Loddon and Campaspe valleys expected to gain Commission approval by July 2004;
- Re-calibration and auditing of the Murray model expected to be completed by June 2004;
- Final calibration of the Wimmera model expected to be completed by January 2004;
- Bulk Entitlement process for Broken expected to be completed December 2003;
- Bulk Entitlement process for Ovens expected to be completed December 2003;
- Bulk Entitlement process for Wimmera-Mallee expected to be completed March 2004;
- Bulk Entitlement process for Loddon expected to be completed July 2004.

No major management changes are proposed for 2003/04, as usage is within Cap in each of the four valleys.

• ***IAG Assessment***

Diversions for the Murray/Kiewa/Ovens Valley, the Campaspe and Wimmera-Mallee were all below annual Cap targets while those for the Goulburn/Broken/Loddon were marginally above target in 2002/03.

All valleys have accumulated credits. Models for the Goulburn/Broken/Loddon and Campaspe have been audited and are expected to be formally accredited by July 2004. The re-calibration of the Murray model and auditing is expected to be completed by June 2004.

The Bulk Entitlement process for all valleys is expected to be completed by July 2004. Substantial progress has been made in developing Stream-flow Management Plans for the unregulated sections of valleys and policies and practices for upstream irrigation farm dams and off-quota allocations are in place.

Victoria continues to develop a strong legal and policy framework to manage the Cap and the requirements of Schedule F.

• ***Conclusions/Recommendations***

- Diversions for the Goulburn/Broken/Loddon were above the climate-adjusted annual Cap targets for 2002/03.
- Diversions from the Murray/Kiewa/Ovens, Campaspe and Wimmera-Mallee were below the 2002/03 Cap targets.
- Cumulative diversions for all Victorian valleys are in credit.
- Models for all Victorian valleys should be completed by January 2004 and accreditation for the Goulburn/Broken/Loddon and Campaspe models is expected before July 2004.
- All bulk water entitlements are expected to be completed by July 2004.



New South Wales

• The Cap

Assessment of Cap performance has been conducted on a valley-by-valley basis according to the requirements of Schedule F to the Murray-Darling Basin *Agreement*. Cumulative performance from 1997/98 relative to the Cap is assessed for those valleys in the south of the State, where the water year runs from July to June. For those valleys in the north of the State, the water year will change from October–September to July–June upon implementation of the Water Sharing Plans to be introduced by the NSW Government. Consequently, this assessment of Cap performance has been undertaken for the period October 2002–June 2003, so that future reporting will be over the same July–June period across the NSW portion of the Murray-Darling Basin. This shortened water year has been allowed for in the assessment of performance of valleys in the north of the State.

The Department of Infrastructure, Planning and Natural Resources (DIPNR) has developed a suite of Integrated Quantity/Quality Models (IQQMs) for each of its major regulated valleys and the Barwon-Darling. The IQQM for the Lachlan has now been approved for use under Schedule F and the IQQM for the Macquarie is currently undergoing audit. Interim and final IQQMs are also available for Cap auditing in the Murrumbidgee, Namoi, Gwydir, Border Rivers and Barwon-Darling Valleys. (See **Table 3**).

For the Murray and Lower Darling, the MDBC's Monthly Simulation Model is used for Cap auditing. For the 2002/03 year, pending completion of the IQQM model for the Peel valley, an informal assessment of the level of annual water extraction has been made using a climate-diversion relationship.

• 2002/03 Usage

The IQQM models in interim form have primarily been used to determine whether individual valley diversions have exceeded the Cap. The difference between the annual diversion target or climate-adjusted Cap and the actual recorded diversion for each valley is recorded as either a credit or a debit for the year. This is then added to the previous year's debit or credit, which is then compared to the Schedule F exceedance trigger. This exceedance trigger is 20% of the long-term average diversion generated from the analytical model.

Preliminary information on some of the diversion estimates, particularly for the northern valleys, was initially provided to the IAG. More up-to-date information made available by late February 2004 has been incorporated into the IAG's report.

Table 4 provides a summary of NSW diversions by river valleys. This table identifies those valleys where diversions are in credit or in debit against annual Cap values and whether or not those in debit have exceeded the Schedule F trigger.

Table 3 – NSW Cap Auditing Models Status 2002/03

<i>Valley</i>	<i>Auditing Tool</i>	<i>Comment</i>
Murray/Lower Darling	Murray Monthly simulation Model (Interim)	Undergoing re-calibration
Murrumbidgee	IQQM (Interim)	Preliminary results available
Lachlan	IQQM (Final)	Approved for use under Schedule F
Macquarie	IQQM (Final)	Undergoing audit for Commission approval
Peel	Awaiting IQQM	Under development
Namoi	IQQM (Interim)	To be presented for Commission approval
Gwydir	IQQM (Interim)	Preliminary results available
Border Rivers	IQQM (Interim)	Definition of Cap not complete
Barwon-Darling	IQQM (Final)	To be presented for Commission approval

Border Rivers

For this report, a shorter water year from October to June has been used, to bring reporting into line with the new water year definition in Water Sharing Plans. Future reporting will cover the July to June period.

The water year commenced in the NSW Border Rivers with water in individual accounts equivalent to 50% of the valley general security entitlement. However, dry conditions have prevailed during 2002/03, and only 13.5% of additional water was made available during the year.

A survey of on-farm storage capacity within the NSW Border Rivers in 2002/03 indicated that there was a marginal increase to 159 GL in the valley storage total from the on-farm storage capacity found in the corresponding survey for 2001/02. State Water surveys indicate that around 27000 ha was irrigated from the

regulated system during 2002/03, with cotton areas estimated at 26500 ha. This represents a reduction of approximately one-third in cotton areas, with almost no irrigation of other crops.

There were no significant changes to management rules for the regulated NSW Border Rivers system during 2002/03. However, due to the critical supply situation for Broken Hill from Menindee Lakes, off-allocation (or supplementary) access to flow events in February and March 2003 was withheld from water users. This resulted in flows of approximately 50 GL reaching the Barwon-Darling system, most of which would most likely have been otherwise diverted.

Queensland and NSW are currently working towards consolidation of their respective IQQMs into a single agreed model for the Border Rivers, and establishing an agreement on environmental flow provisions and water sharing. An end-of-system flow target of 61% of natural flows has been agreed.

Table 4 – NSW Valley Diversions 2002/03 (GL)

Designated river valley	Long-term diversion Cap	2002/03 Cap target	Net trade in to valley	2002/03 diversion	Cap credits (Cap target less diversion)		20% Schedule F trigger	Trigger exceeded
					2002/03	Cumulative since 1 July 97		
Barwon-Darling	173	24	0	20	4	-210	-35	Yes
Lower Darling	137	96	0	107	-11	157	-27	No
Combined Barwon-Darling and Lower Darling	310	120	0	127	-7	-53	-62	No
Border Rivers	N/A	N/A	-13	138	N/A	N/A	N/A	N/A
Gwydir	344	435	0	238	197	-29	-69	No
Namoi/Peel	320	256	0	294	-38	-42	-64	No
Macquarie/Castlereagh/Bogan	468	N/A	0	411	N/A	N/A	-94	N/A
Lachlan	334	252	0	253	-1	-80	-67	Yes
Murrumbidgee	2358	2070	-14	1793	262	615	-472	No
NSW Murray	1926	452	32	879	-396	121	-385	No
TOTAL	6061	3584	4	4132	18	532	-1213	—

- Note: a) All volumes are shown in Gigalitres (GL); N/A indicates estimate is not available.
b) A positive difference indicates a Cap credit, and a negative difference indicates a Cap debit.
c) Long-term Diversion Caps do not include floodplain harvesting components to maintain consistency with observed diversions.
d) Table 4 includes estimates of unregulated diversions for the valleys concerned.



Until definition of the Cap for the Border Rivers is agreed, it is not possible to give a final opinion on performance at this time. The IAG has previously expressed concern that, once a Cap is agreed it will be determined that diversions in the Border Rivers exceed that Cap. The IAG is pleased to see the progress that has been made between NSW and Queensland on the development of end-of-system flow targets and awaits advice on the successful completion of current negotiations on environmental flow rules and water sharing. The IAG again notes that a Cap on the Border Rivers for NSW should indicate an appropriate allowance for Pindari Dam.

Allowing for 14 GL of unregulated stream diversion, total diversions in the NSW Border Rivers was 138 GL.

Gwydir Valley

As with the Border Rivers, a shorter water year from October to June has been used, to bring reporting into line with the new water year definition in the Water Sharing Plans. Future reporting will cover the July to June period. Allowing for 10 GL unregulated stream diversion in 2002/03, total diversions in the Gwydir Valley for the year were 238 GL.

The water year commenced in the Gwydir Valley with water in individual accounts equivalent to 45% of the valley general security entitlement. However, dry conditions have prevailed during 2002/03, and no additional water was made available during the year.

No estimates of cropped areas or on-farm storage capacity are currently available for 2002/03. On-farm storage estimates for 2001/02 indicated a total of 430 GL, up 23% on the 1999/00 estimate.

There were no significant changes to management rules for the regulated Gwydir system during 2002/03. However, due to the critical supply situation for Broken Hill from Menindee Lakes, off-allocation (or supplementary) access to flow events in February and March 2003 was withheld from Gwydir Valley water users. This resulted in flows of approximately 60 GL reaching the Barwon-Darling system, most of which would most likely have been otherwise diverted.

The NSW Government also accepted a Water Sharing Plan (WSP) for the Gwydir Valley, and this was gazetted in February 2003 but will not apply until 1 July 2004. This will provide the regulation basis for the management rules and define a level of consumptive water access below Cap for a 10 year period.

A number of issues have become apparent in assessing Cap compliance in the Gwydir Valley. The DIPNR has cause for concern that reported on-farm storage capacity and irrigated areas over recent years have been highly variable, and at odds with the industry estimates. In addition, the Gwydir Valley Irrigators Association has supplied remote sensed data of on-farm storage capacity as well as developed and irrigated areas. This new information is significantly different from DIPNR survey data, and is currently being reviewed for accuracy.

The Gwydir IQQM is currently being re-calibrated to assess the impacts of new remote sensing information for irrigated areas and on-farm storage capacities. A model reflecting some elements of the new remote sensing data has been prepared to estimate Cap targets for Schedule F accounting, and the preliminary results have been used for this report. The results indicate a large Cap credit in 2002/03. This is due principally to the impact that excess use in 2001/02 had on system storage volumes. Consequently there was less water available for use in 2002/03 than there would have been under Cap conditions. Hence diversion was restricted and a Cap credit resulted.

The preliminary Schedule F accounting for the period 1997/98–2002/03 indicates that the Gwydir Valley is cumulatively 29 GL above Cap, but below the 69 GL trigger for Special Auditing. On this basis, the Gwydir Valley is no longer in breach of the trigger for Special Auditing. However, the development of large Cap debits in previous years indicates problems with the Gwydir model, in particular with its handling of unmetered diversions from the floodplain. The development of these large debits is of concern, since the modelling of current conditions suggests that with the environmental flow rules in place, such debits have a low probability of occurring. These data problems, when considered in conjunction with the large increases in on-farm storage capacity and areas developed for irrigation that have occurred since 1993/94, causes the IAG serious concern as they limit the reliability of the modelling. Significant further verification of data and re-calibration of the model is now required as a matter of some urgency.

Given the apparent problems with the models, the IAG has little confidence in forming a view one way or the other on Cap performance. Until the model input data is appropriately validated and reviewed and the model itself re-calibrated and verified, there can be little confidence placed in the results obtained from the model. There is a need for the NSW Government to give greater priority to gathering reliable, verifiable data, including the measurement of floodplain harvesting, for use on these models given the important role that they play in major water resource allocation decisions.

Namoi/Peel Valley

As for other northern valleys in the State, a shorter water year from October to June has been used, to bring reporting into line with the new water year definition in Water Sharing Plans. Future reporting will cover the July to June period. After allowing 78 GL for unregulated stream diversions, diversions in the Namoi/Peel Valley in 2002/03 were 294 GL.

The water year commenced in the Namoi Valley with a relatively high level of water, equivalent to 90% of the valley general security entitlement, in individual accounts. However, dry conditions have prevailed during 2002/03, and only 4% of additional allocation was made available during the year. The Manilla system received an annual allocation of 100%, and the Peel Valley received an annual allocation of only 60%.

A survey of on-farm storage capacity in the Namoi Valley in 2002/03 indicated that there was a marginal increase in the valley storage total from the on-farm storage capacity found in the corresponding survey for 2001/02. State Water surveys indicate that around 43500 ha was irrigated from the regulated Namoi/Manilla system during 2002/03, with cotton areas estimated at 38700 ha. This is a slight reduction in cotton areas, but is a significant reduction in the area of other crops irrigated from the previous year.

There were no significant changes to management rules for the Namoi/Peel system during 2002/03. A minor increase was made to allowances for delivery losses as well as the manner in which losses are accounted within the continuous accounting process.

Diversions in 2002/03 were above the annual Cap target by 38 GL. The combined Namoi/Peel Valley has a cumulative Cap debit since 1997/98 of 42 GL, which is below the trigger for Special Auditing of 64 GL. The Namoi IQQM has been re-calibrated to better represent Split-Rock-Keepit transfers, and has been used for long-term and annual Cap simulations to assess Cap compliance. For Cap purposes, results are considered preliminary at present, until the model is independently audited under the provisions of Schedule F of the Murray-Darling Basin *Agreement*.

The MDBC had declared the Namoi Valley in breach of Cap following preliminary Schedule F accounting for the 1997/98–2000/01 seasons. However, last year, following re-calibration of the Namoi IQQM, the MDBC found that the combined Namoi/Peel system was no longer in breach of Cap. The Namoi/Peel remains below the trigger for Special Auditing following the 2002/03 water year. Once the Peel IQQM is completed it should be possible to review the performance of the Namoi/Peel Valley, given that on current estimates the valley is getting close to the Cap trigger. The IAG notes the probability assessment of the Cap being breached prepared by DIPNR, and the Department's view based on its long-term simulations, that the valley is below the Cap, given current management rules.

Macquarie Valley

The performance of the Macquarie Valley relative to the Cap is being monitored using the DIPNR IQQM for the valley.

Dry conditions prevailed throughout the 2002/03 water year, resulting in low levels of water availability. No allocation was announced during the year, and the only water available was that carried over from the previous year. There were no significant changes to the management rules from the 2001/02 season. The environmental flow rules (EFRs) remained unchanged from the previous season.

State Water surveys indicate that around 53000 ha of crops were irrigated in 2002/03, with the cotton area estimated at 29200 ha. This is down considerably on previous years.

While there have been no formal surveys of on-farm storage development, on-farm storage capacity is thought to have increased over the previous year, with estimated capacity of 110 GL being 10% up on the previous year.



Difficulties in determining observed inflows to Burrendong during the Schedule F accounting period have become apparent, and no Cap target updates are available as yet. However, the Macquarie Valley has a cumulative Cap credit from 1997/98 to 2001/02 of 106 GL. The Macquarie IQQM is available for long-term and annual Cap simulations to assess Cap compliance. For Cap purposes, results are considered preliminary at present, until the model is independently audited under the provisions of Schedule F of the Murray-Darling Basin *Agreement*. The independent auditor appointed by the MDBC, is currently reviewing the Macquarie IQQM Cap scenario modelling.

The preliminary Schedule F accounting for the 1997/98–2001/02 seasons indicates that the Macquarie Valley is cumulatively 106 GL below Cap. Long-term simulations undertaken by DIPNR indicate that average annual current conditions diversions are 10% below Cap diversions. The IAG conducted a Supplementary Audit of the Macquarie Valley in February 2004. No Cap target was made available to the IAG at the time of the Supplementary Audit. The Supplementary Audit report is given at the back of this report.

Barwon-Darling/Lower Darling

Following the 1999/00 review of Cap implementation, the Barwon-Darling Valley was formally declared in breach of the Cap. At the August 2000 Ministerial Council meeting, agreement was obtained to report the Barwon-Darling and Lower Darling Valleys as one, although the two would be managed separately by NSW.

In July 2002, following the breach of the Cap, a reduction in volumetric quotas of 5% was announced for the 2002/03 water year. Further reductions of 15% and 10% were announced for 2003/04 and 2004/05 respectively, subject to further socio-economic assessment. The initial 5% reduction in quotas has been delayed following the results of socio-economic studies and due to the extreme drought conditions.

2002/03 was a particularly dry year, with only about 20 GL of diversions occurring in the Barwon-Darling, and almost no irrigation undertaken.

An embargo on development at year 2000 levels continues to be in place for the Barwon-Darling and any minor increase reflects works already in progress at the time of the embargo or works to improve crop rotation. The current State Water estimate of irrigated area is 44534 ha and that of on-farm storage is 306 GL.

For the Lower Darling, the water year commenced with full allocation levels, as has been the case in all years since the introduction of a volumetric allocation scheme.

No estimates of cropped areas or on-farm storage capacity are currently available for the Lower Darling for 2002/03. Nearly all of the on-farm storage capacity totalling 160 GL is located on one property and is in natural lakes. There has been no increase in on-farm storage.

There were also no significant changes to management rules for the regulated Lower Darling system for 2002/03. Under revised rules applying to the Lower Darling, the annual limit of supplementary use (previously known as off-allocation use) has been increased from 70 GL to 250 GL. Essentially this will be used by the Tandou property and reflects the actual off-allocation usage that has been allowed in recent years.

The limit to the net inter-valley trade into the Lower Darling Valley was increased from 20 GL to 80 GL in 2000/01, but due to low water availability in the southern areas of the Murray-Darling Basin generally (and low storage levels in Menindee Lakes), it has not yet affected water use.

The Barwon-Darling IQQM has undergone further improvements over the last year, and is available for long-term and annual Cap simulations to assess Cap compliance. Further studies of irrigated areas have suggested the possibility of some input data problems and these are being rectified. For Cap purposes, results are considered preliminary at present, until the model is independently audited under the provisions of Schedule F of the Murray-Darling Basin *Agreement*.

The preliminary Schedule F accounting for the 1997/98–2002/03 period indicates that the Barwon-Darling Valley is cumulatively 210 GL above Cap, and well above the 35 GL trigger for Cap exceedance based on 20% the estimated long-term average Cap diversion.

The Cap for the regulated sections of the Lower Darling is currently audited on a provisional basis using the Murray Simulation Model (MSM). The MSM is currently being re-calibrated to better represent 1993/94 and current conditions. Preliminary assessments indicate that long-term current diversions are very close to those that would have occurred under Cap conditions.

The IAG notes that there has also been some discussion between the DIPNR and the Commission concerning the accounting of water diverted to replenish the Anabranh. Water released for replenishing storages in the Anabranh is accounted as a diversion for the purposes of the Cap. Water released during periods of surplus flow to provide environmental flows are not counted as a diversion under the Cap. Rules have been developed for counting some environmental releases which replenish Anabranh storages as replenishment releases. This ensures that there is a much closer calibration between modelled and observed replenishment flows. This change has reduced the previous estimate of the Lower Darling credit by 6 GL.

After adjustment for the treatment of the Anabranh replenishment, the preliminary Schedule F accounting for the 1997/98–2002/03 period indicates that the Lower Darling Valley is cumulatively 157 GL below Cap.

From a combined Barwon-Darling/Lower Darling perspective, the preliminary Schedule F accounting for the 1997/98–2002/03 period indicates that the combined valleys are cumulatively 53 GL above Cap, but that the debit does not exceed the 62 GL Schedule F trigger.

Lachlan Valley

The Cap for the regulated sections of the Lachlan Valley is currently audited on an annual basis using the results of the Lachlan Valley IQQM. This model has been recommended for approval under Schedule F, the first IQQM model to achieve this status.

The 2002/03 water year saw record low levels of water availability. The announced allocation was only 3% of entitlement, combined with water carried over in individual accounts from the previous year equivalent to 28% of entitlement.

Allowing for estimated unregulated stream diversions of 15 GL, total diversions of 253 GL were above the annual Cap target of 252 GL by 1 GL. The Schedule F accounting for the 1997/98–2002/2003 seasons indicates that the Lachlan Valley is cumulatively 80 GL above Cap, and 13 GL above the trigger for special auditing by the IAG.

An Annual Allocation Plan (AAP) was produced for the 2002/03 season, outlining the management rules that would apply. For the Lachlan Valley, carryover rules have been changed so that water carried over is no longer forfeited at the end of the second year. The restrictions to carryover for sleeper licences

(licences that had not either used or transferred water in that year) were also removed.

In response to the extreme drought conditions, and the record low levels of water availability, the rules relating to the 'translucent' releases (a proportion of inflows to Wyangala dam) were suspended until storage levels reach 50% of capacity. This is currently an interim measure and an account has been kept of releases foregone due to the suspension of the translucent releases. The volume of water in this account must be set aside from inflows when the storage reaches 75% of capacity.

Under the currently agreed Water Sharing Plan (WSP) 'translucent' releases are suspended whenever storage levels fall below either:

- 50% of capacity between 15 May and 15 November; or
- 30% of capacity between 15 June and 15 October.

The major change to the management rules since the commencement of Cap accounting in 1997/98 remain the introduction of the environmental flow rules in 1998.

The Lachlan Valley was declared in breach of Cap by the IAG following the 2001/02 review of Cap performance. NSW has developed management rules that target long-term outcomes in addition to annual outcomes. The NSW Water Reforms process has consequently been based on long-term modelling of management rules. For the Lachlan Valley, the upgraded IQQM has been configured to represent:

- the 1993/94 water use development, 1993/94 water access rules and all operation flow rules that existed at that time;
- the 1999/00 development and its associated water management and environmental flow rules;
- the Water Sharing Plan rules to apply from January 2004.

Each of these scenarios are analysed using 104 years of climatic data. The resultant diversions from the river are compared to ensure Cap compliance in the long-term.



Analysis of this data indicates a change in the prevailing climatic regime during the late 1940s in the Lachlan Valley. It is not yet clear whether this is part of a cyclic climatic process or not. The long-term modelling indicates that diversions under current conditions will be below Cap by 4%. However, the sequencing of the impacts of the current environmental flow rules is clearly biased towards the first half of the climatic sequence which has significantly lower inflows. It was recognised that the current rules would provide for extended periods of high impact to irrigation, should a return to the climatic conditions experienced during 1898–1945 recur. Additionally, there would be extended periods of diversions in excess of Cap.

It was thus considered important by DIPNR that a more robust set of rules were required to maintain diversions closer to Cap on an annual basis, irrespective of climatic conditions.

The NSW Government has developed a WSP for the Lachlan Valley, which will provide a legislative basis for the management rules and define a level of consumptive water access for the next 10 years. The WSP does not include the Belubula River system, which is also part of the Lachlan Valley defined under Schedule F of the Murray-Darling Basin Agreement. The WSP includes changes to the current environmental flow rules as well as other management rules.

The significant changes from the current management rules are:

- An annual use limit of 75% of the valley entitlements at year 1 of the Plan (2003/04). This may be altered during the life of the Plan (upwards or downwards) to ensure long-term diversions remain at the level indicated by the WSP. The use limit may not be increased beyond 100% during the life of the Plan.
- Continuous accounting will be introduced, with a maximum account limit of 136%.
- The removal of off-allocation access (currently a 30 GL limit applies)
- The period under which translucent releases are made from Wyangala storage has been extended from 1 June–31 October to 15 May–15 November each water year.
- A requirement that the total inflow to Wyangala must exceed 250 GL each calendar year prior to commencement of any translucent releases.
- A Water Quality Allowance of 20 GL to be set aside for salinity dilution and algal bloom mitigation.

The Lachlan WSP was gazetted on 21 February 2003, but will not take effect until 1 July 2004. However, the management rules in the plan have been adopted for the 2003/04 season.

NSW is of the opinion that the new rules of access and operational rules contained in the Lachlan Valley Regulated Water Sharing Plan will constrain diversions over the next ten years. The rules of the plan, subject to irrigation development not increasing, will result in long-term diversions some 4% below the long-term cap. Furthermore, it is expected that the rules will also result in annual diversions that only rarely exceed annual cap targets.

The plan contains ‘growth management rules’ which, in the case of growth, will automatically reduce access to water to the extent that the long-term diversions reduce back to the plan ‘diversion limit’.

The IAG notes that NSW was to introduce changes in the rules in 2002/03 to address problems previously identified in terms of Cap breaches. However, these rule changes will now not take effect until the 2003/04 water year.

Murrumbidgee Valley

The 2002/03 water year saw record low levels of water availability and very dry and hot conditions. The allocations were the lowest ever recorded in the Murrumbidgee Valley. Additional releases from the Snowy scheme were made available from future inflows to irrigators on a commercial basis. A total of 220 GL of borrow from future releases was offered, and 156 GL was taken up by irrigators. A further 75 GL of releases that would most likely have occurred late in the water year were also advanced into the main irrigation season on a commercial basis. Rice areas were less than half of the normally observed levels.

Cap accounting has been performed using the provisional Murrumbidgee IQQM. Allowing for an estimated 42 GL of unregulated stream use, total diversions for the Murrumbidgee Valley were 1793 GL including 65 GL for the Lowbidgee. These diversions are below the 2002/03 annual Cap target of 2055 GL including 96 GL for the Lowbidgee. The preliminary Schedule F accounting for the 1997/98–2002/03 seasons indicates that the Murrumbidgee Valley is cumulatively 615 GL below Cap.

The current results of the long-term and annual Cap simulations using the Murrumbidgee IQQM have been used to assess Cap compliance.

A preliminary representation of the Lowbidgee district is now available in the Murrumbidgee IQQM. The results for both the regulated diversions and Lowbidgee must still be considered preliminary at present until the review of river transmission losses is undertaken, and the model is independently audited under the provisions of Schedule F of the Murray-Darling Basin Agreement.

Remote sensing of rice areas indicates 37553 ha of rice were irrigated in the Murrumbidgee Valley in the 2002/03 season. This represents a significant reduction in irrigated areas which in previous years exceeded 80000 ha of rice production. No estimates are available of irrigated areas for the Lowbidgee.

There is no significant on-farm storage development within the Murrumbidgee Valley although latest estimates of storage outside the main Irrigation Corporations are at least 35 GL, up from 19 GL in 1997.

There were no significant changes to the management rules from the 2001/02 season. The environmental flow rules (EFRs) remained unchanged from the previous season. However, due to the extremely dry conditions, environmental releases from Burrinjuck dam were suspended from April to the end of the water year to ensure ongoing supply for towns immediately below the storage. The access rules for the Lowbidgee district remain unchanged from 1993/94. The introduction of environmental flow rules for the Murrumbidgee Valley will affect the level of access available to Lowbidgee, which may require changes to its access rules.

In response to the record low allocation levels, an agreement was struck between Snowy Hydro Ltd, the NSW Government and Murrumbidgee Irrigation Corporation to advance future releases from the Scheme on a commercial basis. The offer was made to all general security users in the valley to purchase additional water via three options. The options and their associated costs were:

- Option A: An increase of up to 75 GL of scheme releases above progressive 'Required Annual Releases' (888 GL).
Option Fee: \$5/ML
Exercise Fee: \$45/ML
- Option B: borrow up to 200 GL of future year releases, to be released prior to 28 February 2003.
Option Fee: \$90/ML (1st 100 GL), or \$100/ML (2nd 100 GL)
Exercise Fee: \$20/ML (all 200 GL)

- Option C: purchase the release of up to 124 GL, depending on storage levels, of water from Tantangara storage into the upper Murrumbidgee River.

This option was not exercised, and no cost was formally determined.

The agreement resulted in two separate changes to Snowy Hydro releases:

- an additional 75 GL of releases that would most likely have occurred late in the 2002/03 water year were also advanced to the period before the end of February under Option A, and
- 136 GL of future year inflows were brought forward under Option B.

The 136 GL borrowed from future year Snowy Hydro releases under Option B will be repaid by participating irrigators when either dry or wet conditions are sufficient for the borrow to affect Snowy Hydro operations. Under continued dry conditions, the Snowy Scheme storage may reduce to the point where (due to the borrow) it cannot meet the annual release requirements, and participants would repay the borrow and reduce Snowy release obligations. Under wetter conditions, the Scheme storages would refill to the point where 'above target' (or discretionary) water, would have been generated had the borrow not occurred, and participants would repay the borrow – providing Snowy Hydro with above target water.

Late in the water year, a further agreement was entered into by Snowy Hydro, NSW and Murrumbidgee Irrigation Corporation to borrow an additional 20 GL of future Snowy releases. This late season borrow was repayable the following year, and has been debited against Murrumbidgee Irrigation at the commencement of 2003/04 water year.

Diversions were well below the estimated annual Cap target by 262 GL, resulting in a cumulative Cap credit since 1997/98 of 615 GL. Over 900 GL of additional environmental releases have been made from storages during the Cap accounting period that would not have been made under 1993/94 management rules. This volume of additional release, and the continuing draw-down of Murrumbidgee storages since 1997/98 have resulted in the large accumulation of Cap credits. However, the extremely dry conditions over recent years have produced record high river transmission losses, which the Murrumbidgee IQQM has under-estimated. A review of the model calibration for such dry periods will be undertaken, and is likely to result in a significant reduction in both the modelled Cap targets and the current large cumulative Cap credit.



Murray Valley

The Cap for the regulated sections of the Murray Valley is currently audited on an annual basis using the Murray Simulation Model (MSM). Re-calibration of MSM to better represent 1993/94 conditions commenced during 2002/03, and will continue in 2003/04. However, these modelling results may be reviewed to exclude the Snowy borrow from the Cap modelling, which would reduce the Cap credits (see discussion below). The Murray Valley water year runs from 1 July to 30 June.

Allowing for an estimated 28 GL of unregulated stream diversions, total diversions for 2002/03 year were 879 GL, compared with an annual Cap diversion target of 432 GL. This outcome partly reflects diversions of underuse from previous years that had been carried over. After allowing for trade, diversions in 2002/03 were 396 GL above the Cap, decreasing the cumulative credit to 121 GL. The preliminary Schedule F accounting for the 1997/98–2002/03 seasons indicates that the NSW Murray Valley is cumulatively 121 GL below Cap. Long-term modelling prior to re-calibration indicates that, were development and water access rules to remain as they currently are, the average annual diversions for the future will be 4% below the average annual Cap diversions if there is no further increase in the underlying demand.

The 2002/03 water year saw a return to low levels of water availability and use – lowest end of year allocation on record. Satellite imagery measurements of rice areas indicate only 5529 ha of rice was irrigated in the Murray Valley in the 2002/03 season, which is less than 10% of the average area irrigated, and indicates the severity of the drought on water access. Additional releases from the Snowy scheme were made available from future inflows to irrigators on a commercial basis. A total of 165 GL of borrow from future releases was offered, and 139 GL was taken up by irrigators.

Collection of irrigated crop area information across the NSW Murray Valley stopped in 1992. Since that time, only rice areas have been collected, as part of environmental monitoring programs, using aerial photography and satellite imagery. However, collection of area information for all crops irrigated by the licensed river pumpers along the Murray River system outside of the Irrigation Corporations (which represent around 30% of the valley entitlements) has recommenced via a new automated telephone water ordering system. Information collected via the new system is not yet available.

There is no significant on-farm storage development in the NSW Murray Valley.

The 2002/03 Annual Allocation Plan for the Murray and Lower Darling Valleys outlines the management rules that would apply during the water year. The changes to water management rules from the 2001/02 water year were:

- Previously, borrow of water allocated to the NSW Barmah-Millewa account for general security users was permitted until allocations reached 50% (August), 60% (September), 70% (October) and 80% (November). These limits have been replaced with a single limit of 30%.
- Changes to trade rules:
 - the annual limit to the combination of water use and outward trade, previously set at 90% of entitlement, has been removed;
 - all licences that have been converted from general security to high security may not trade allocated water (temporary trade) for 5 years; and
 - environmental water accounts may not trade more than 50% of their allocated water in any three year period.
- a penalty for overuse of twice the volume taken above the authorised level now applies in the following water year.

In response to the record low allocation levels, an agreement was struck between Snowy Hydro Ltd, the NSW Government and Murray Irrigation Limited to advance future releases from the Scheme on a commercial basis. The offer was made to all NSW general security users in the valley above the Barmah Choke to purchase additional water. The only option considered financially viable for NSW Murray water users was an option to borrow up to 160 GL of releases from 2003/04, to be released prior to 30 April 2003.

Under the agreement, no option fee was applicable and options were to be exercised by 13 December 2002 at a cost of \$24/ML. The offer resulted in 133 GL of 2003/04 Snowy releases being brought forward.

Of the 133 GL borrowed, 9 GL was paid back prior to the end of the 2002/03 water year by participants with sufficient remaining water to do so.

Late in the water year, a further agreement was entered into by Snowy Hydro and NSW (the Ministerial Corporation) to borrow an additional 5 GL of future Snowy releases. These additional releases were offered up to 11 April 2003 to all General Security users at \$46/ML, and the releases would be made by 30 April 2003. This late season borrow was virtually fully taken up and is repayable the following year.

Both agreements also provided for 'good faith' negotiations for a further borrow in the next water year (2003/04) of up to 160 GL and up to 5 GL respectively, from 2004/05. The proviso for these further negotiations was that the announced allocation to general security users had not reached 30% by 31 August 2003. This effectively provided a 'rollover' option for payback in the event that water allocations for 2003/04 were also poor.

• **Administration of the Cap**

NSW has adopted a series of water management and allocation rules for the purpose of managing the level of diversions within the Cap requirement. These rules, in conjunction with the Environmental Flow Rules, are designed to ensure that diversions from the various valleys comply with the Cap in the longer-term.

NSW has introduced a number of management rules in recent years, although in 2002/03 there have been few changes to these rules.

NSW has also developed Water Sharing Plans for a number of valleys. These plans provide the legislative basis for the implementation of management rules, and define a level of consumptive water access for the next 10 years. The WSP includes a number of changes to environmental flow rules and other management rules for individual valleys which will take effect from the 2003/04 water year.

Anomalies Arising from Drought

New South Wales has requested that the IAG establish principles for the revision of Cap targets arising from management actions undertaken as a consequence of the severe drought.

Examples include but are not limited to:

- advances in 2002/03 from the Snowy Hydro Scheme to Murrumbidgee and Murray irrigators;
- 'pass through' of water from the Gwydir and Border Rivers to Menindee Lakes.

In analysing this issue the IAG referred back to the definition of the Cap in the IAG Report *Setting the Cap*, adopted by the Council in 1996:

"The Cap is the volume of water that would have been diverted under 1993/94 levels of development".

Under the Cap, the amount of water that States would be entitled to divert in any year be quantified using analytical models that incorporate weather conditions and the water allocation and system operating rules which applied in 1993/94.

A number of criteria were also established as outlined in Section 2 of this report to deal with equity consistency and priority of property rights.

Climate adjusted models incorporating water allocation and system operating rules which applied in 1993/94, have been or are being developed in New South Wales, Victoria and Queensland to define the Cap and to enable actual diversions to be compared with annual climate adjusted targets.

The drought conditions in 2002/03 led to a series of management responses which were not included in the model. The IAG consider that these issues should be addressed by the MDBC Water Audit Working Group as similar situations would arise in all States. In addressing these issues the IAG considers that the outcome must be no long-term increase in diversions, that is compliance with the Cap objectives.

A number of principles could guide decision making. These include:

- actions based on infrastructure, systems or policies that were in place in 1993/94 should be included in the Cap models;
- new initiatives based on new infrastructure, systems or policies since 1993/94 should not be included in the Cap models.

In terms of the specific issues raised with the IAG by NSW, the IAG understands that downstream through flow events from the Gwydir and Border Rivers to Menindee Lakes were conducted during previous drought events, although at lower levels. As such, these flows should be incorporated in the models for the Cap for the Gwydir, Border Rivers and Lower Darling.

There appears to be no overwhelming evidence that transfers from the Snowy Hydro Scheme have been conducted pre-1993/94. As such they would not be included in the Cap models.



There is, however, a significant issue with the transfers from the Snowy Hydro to the Murrumbidgee. In the case of the transfers to the Murray, 165 GL was brought forward into 2002/03, with payback occurring within the year or in 2003/04. In contrast, in the Murrumbidgee, 156 GL was borrowed and payback can occur over an extended period of time, including when significant spills are occurring, thereby borrowing high security water and repaying with low security water.

It is the view of the IAG that to maintain consistency with Cap objectives, such borrowings should be short-term and repaid with water with the same level of security. Any risk and consequence of increasing the Cap should rest with the irrigation community.

• *Monitoring and Reporting*

The issue of monitoring and reporting on the Cap has been discussed in previous reports by the IAG. The practical difficulty created by the later water year (October to September) that applies to the northern rivers, will now be resolved by the adoption of a July–June year under the WSP's that take effect from 2003/04.

The use of IQQM models and NSW's own long-term modelling as a measure of the likely exceedance of the Cap by an individual valley under current management rules, are highly data intensive tasks. These models have proven to be particularly sensitive, not only to past period water availability 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 has noted that the level of confidence that can be placed on some of the IQQM modelling is limited by the poor quality and conflicting nature of input data used in the modelling. As these models are ultimately relied upon to make decisions affecting not only water allocation and diversion management within individual valleys, but the sharing of the water resource at a national level across State (and Territory) borders, there is a need for a greater degree of reliability to be built into these models.

To this end, and as a matter of some urgency, the NSW Government needs to prioritise resources for use in verifying and obtaining reliable accurate data for use in these models. Ultimately, the credibility of the operation of the Cap and the confidence that governments and the community in general can have concerning the Cap's operation relies upon the veracity of these models. Increased effort is needed within NSW to verify and confirm all aspects of these models not only to allow the IAG to undertake its task, but also to allow the NSW Government to properly undertake its water management responsibilities.

To date, the IAG has not received a report from NSW on diversions for the Intersecting Streams. Schedule F lists the NSW Intersecting Streams as a designated river valley. Diversion on these streams is believed to be small, although it is understood that entitlements exceed current usage. Uptake of these entitlements could become an issue within the Council as Queensland moves to cap the streams (including the Narran River) upstream.

There has also been little progress made on the issue of monitoring diversions under the volumetric licences on unregulated streams. There is some concern that here again, granted licensed volumes may exceed historic use. Monitoring and reporting on these streams needs to occur. Reporting however, may need to await the introduction of metering which is expected to occur over the next three years.

Reporting on floodplain diversions is also not clear. It is understood that these diversions have notionally been included but not reported in the IQQM modelling undertaken in some valleys. However, data on floodplain diversions is not available. The Water Sharing Plans for many valleys endorses a policy for metering floodplain diversions and this policy is supported by the IAG.

• *IAG Assessment*

The IAG acknowledges receipt of an informative report from NSW, together with data in line with the Schedule F format. With the introduction of the WSPs, previous problems with a water year for the northern valleys that ended around the time the IAG was undertaking its annual audit review, should now no longer cause a problem.

Some further progress has been made on the preparation of IQQM models, but the IAG is concerned to note that the significant impact of the drought on water availability and use, has served to identify some problems with some of the data used in the IQQM models. There is an urgent need to review and reaffirm the data used in these models and where necessary to re-calibrate and verify the results produced by the models. This should be a priority area for attention by the NSW Government over the next 12 months if the performance of NSW under the Cap is to be capable of being independently assessed and verified.

The IAG also notes that there have been some instances where the characteristics of the models used have resulted in large shifts in what had previously been assumed to be significant hedges against being in breach of the Cap. In particular, attention is drawn to the shifts in accumulated credits recorded for the Murray and Murrumbidgee Valleys, where these credits have been reduced significantly during the year as a consequence of the way in which the models operate.

If governments and the communities involved are to have any confidence in the administration and operation of the Cap, there needs to be a clear explanation of these shifts and if possible, adjustments made to the modelling and reporting to avoid any future misinterpretation of unexpected shifts in Cap credits, as a consequence of the way in which the models operate.

Notwithstanding these difficulties with the models that have become more apparent during the 2002/03 year, and the lack of IQQM models for some valleys, the IAG confirms that the Lachlan Valley is in breach of the trigger for a Special Audit. The IAG also notes that once there is a final agreement on the Cap to apply to the Border Rivers (including Pindari), the IAG expects to be able to confirm that the Border Rivers are in breach of the Cap. The IAG also draws attention to the Barwon-Darling/Lower Darling performance, particularly after adjustments have been made in order to correct the treatment of replenishment water used in the anabranches. The IAG is concerned that not only the Barwon-Darling, but the combined Barwon-Darling/Lower Darling could be found to be in breach within the next two years.

The IAG highlighted the breach by the Lachlan in 2001/02 and also expressed concern about the Barwon-Darling in that year's report. The NSW Government advised in a response to a Special Audit that it was introducing new rules under its Water Sharing Plans to address these problems. The IAG notes that these new rules were not implemented in the 2002/03 water year, but were held over until the 2003/04 water year, largely in response to the severity of the drought.

As the Lachlan Valley exceeded the trigger in terms of Schedule F reporting, the IAG formally conducted a Special Audit for the Lachlan Valley in February 2004. The report of this Special Audit is given at the back of this report.

The IAG is pleased to see progress in the negotiations between NSW and Queensland on the Cap for the Border Rivers. The development of management flow rules and the formal specification of a volumetric Cap for both sides of the border with Queensland, will now be a matter for some urgency, particularly given the concern the IAG has regarding the possible exceedance of any Cap that is set for the Border Rivers.

The IAG also encourages NSW in its discussions and negotiations with the ACT Government on the question of a possible combined ACT/NSW Cap for the area surrounding the ACT, where it is likely ACT catchment resources will be called upon to provide domestic water. The development and agreement to trading rules will be paramount to the successful conclusion of these negotiations. These trading rules should give the ACT long-term security of supply over water that may be purchased from water users within NSW.

Resolution of the question of unused entitlements for Intersecting Streams and Unregulated Streams has not progressed during 2002/03. This is an area that still requires urgent attention and the IAG is seeking some form of advice on this matter for reporting in the 2003/04 report.

The 2002/03 water year was severely drought affected and this resulted in a number of anomalies being identified which have not to date been accommodated in the Cap models. Although there is a relatively low probability of such events occurring, it is important that agreed procedures are put in place to ensure consistency between States and to protect the Cap.

The IAG has suggested some principles and recommends that the MDBC Water Audit Working Group develops detailed procedures to guide model development and accounting for diversions.



• **Conclusions/Recommendations**

- Diversions in 2002/03 were 4132 GL compared to 6735 GL in 2001/02.
- IQQM Cap models have now been prepared for all river valleys, with the exception of the Murray and the Peel Rivers, and these models now await calibration and/or approval under Schedule F by the Commission.
- The Lachlan IQQM model has been approved by the Murray-Darling Basin Commission under the Schedule F procedures, the first model across the Basin to achieve this milestone.
- The Lachlan cumulative debit is 80 GL and exceeds the trigger of 67 GL for a Special Audit to be undertaken. NSW proposed, via its Water Sharing Plans, actions necessary to ensure Cap compliance in the Lachlan Valley, but this action was postponed in 2002/03.
- The Gwydir cumulative debit is 29 GL and technically no longer exceeds the trigger for a Special Audit. However, there is some concern with the reliability of the modelling and the IAG cannot determine whether or not it has exceeded the Cap trigger requiring a Special Audit.
- The Namoi Valley has exceeded the Schedule F trigger for the Cap. However, combined with the Peel, the joint Namoi/Peel have not exceeded the Cap. The IAG has expressed some concern that with better data for the Peel, it may become clearer just how close the Namoi/Peel is to exceeding the Cap.
- The trigger has not been exceeded for the combined Barwon-Darling and Lower Darling, although re-calculation of the Lower Darling diversions indicates that the trigger could be exceeded in the next one to two years. The IAG notes that the foreshadowed reduced allocations for the Barwon-Darling were not implemented in 2002/03.
- The IAG has been unable to assess the Cap compliance of the NSW Border Rivers because the Cap has not been defined in that valley. The IAG expresses concern that the Border Rivers will be found to be in breach once a Cap is defined.
- NSW should as a matter of urgency, assign appropriate additional resources to the verifying and obtaining of data to allow the IQQM models used in the State to be reassessed, refined and re-calibrated as appropriate. As an initial measure – the NSW Government should give attention to the verification and ground truthing of data used in the Gwydir IQQM model, to enable the IAG to form a view as to whether the Cap trigger has been exceeded.
- 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.
- The IAG was unable to assess the Cap compliance for the Macquarie Valley because the Cap target for 2002/03 was not made available.
- The IAG encourages NSW to complete negotiations with the ACT over trading rules and other related matters, in order to allow a Cap for the ACT to be defined.
- NSW should submit a monitoring report on the Intersecting Streams as required under Schedule F.
- MDBC Water Audit Working Group should develop procedures to guide treatment of 'one-off' or low probability events in the Cap models and accounting of diversions.

Queensland

• The Cap

In line with the Council's earlier decisions, the Queensland Cap is to be established in accordance with the provisions of Schedule F, following the completion of the Water Resource Planning processes.

Three draft water resource plans (for the Border Rivers, Moonie and Warrego/Paroo/Bulloo/Nebine catchments) were released in July 2002 for public review and comment in accordance with the *Water Act 2000*. These plans have now become law following gazettal in early December 2003.

A new draft Water Resource Plan for the Condamine/Balonne catchment, has been released for public review and comment early in December 2003. The draft Plan will implement the outcomes of the independent review by eminent scientists and has been developed with extensive input from stakeholders. It is expected to be finalised in mid-2004.

Under the *Water Act 2000*, draft Resource Operations Plans are being developed to implement the provisions of the Water Resource Plans. Diversion Caps for Queensland valleys will be developed and implemented as part of the monitoring, auditing and reporting provisions of the Resource Operations Plans. Draft Resource Operations Plans for the Border Rivers, Moonie and Warrego/Paroo/Bulloo/Nebine are expected to be released in mid-2004 and finalised in late 2004. For the Condamine/Balonne, it is expected that a draft Resource Operations Plan will be released in mid-2004 and finalised in 2005.

In the meantime, moratoria are in place in all Queensland Murray-Darling valleys to prevent further storages, pumps etc. (including works authorised under licence) from being constructed until the water resource plans have been finalised and implemented. When implemented, operational rules including flow rules, will maintain diversions at moratorium levels.

• 2002/03 Diversions

The diversion profile over the last 10 years for the total Queensland section of the Basin is summarised in **Table 6** below:

Table 6 – Queensland Basin Diversions (GL)

<i>Year</i>	<i>Diversions</i>
1993/94	336
1994/95	176
1995/96	528
1996/97	467
1997/98	741
1998/99	609
1999/00	541
2000/01	688
2001/02	339
2002/03	212

The categories of 2002/03 diversions are summarised in **Table 7**.

Table 7 – Queensland Basin Diversions Categories (GL)

<i>Diversion category</i>	<i>Diversion (GL)</i>
Irrigation Area Channels	42
Private Diversions	80
Water Harvesting	62
Unregulated Stream Licences	11
Urban, Industrial and Stock	17
Total (GL)	212

The pattern of low rainfalls observed in 2001/02 continued into the 2002/03 water year, with below average rainfall across most of the Queensland section of the Murray-Darling Basin, particularly in the Granite Belt and far west where rainfall was less than two thirds of average. The water year started with most of the major dams in the Queensland section of the Basin around 50% of capacity with little to no inflows during winter in 2002. The exception was Leslie Dam in the Upper Condamine which started the year at 10% capacity. Off-stream storages (ring tanks) in the Condamine started the year at only around 30% of capacity, whilst storages in the Lower Balonne were generally dry.



Storages in the Queensland section of the Border catchment were in a slightly better position at around 60% of capacity, following some water-harvesting opportunity in April 2003.

The low observed rainfalls in 2002/03 were reflected in corresponding stream-flows for the year, with recorded flows in all catchments except the Warrego River far below the long-term mean and median flows.

Flows in the Border Rivers continued to be well below average with total volume of flow passing Goondiwindi only around 20% of the long-term annual average of 1047 GL.

The Condamine/Balonne catchment performed slightly better than in 2001/02, but the total volume of flows below St George was still less than 10% of the long-term average of 1103 GL. Flows in the upper parts of the catchment were almost negligible with only 1.7 GL passing Chinchilla for the year, where long-term annual average volume of flow is 561 GL.

The Moonie catchment continued its poor records of 2001/02 flow with total volume of flow again less than 10% of the average annual figure of 143 GL.

The Warrego River catchment performed similar to 2001/02 with total volume of flows around 80% of the annual average figure of 389 GL.

The Paroo catchment delivered less than 12% of the average annual volume of flow (529 GL) for the year.

The very low stream-flows have resulted in the second lowest total diversions recorded for the Queensland section of the Murray-Darling Basin since 1993/94 and a record low of 62 GL estimated water-harvesting diversions.

Flows and related water-harvesting are described in detail for the various valleys as follows.

Condamine-Balonne

Upper Condamine (Darling Downs)

Flows in the Condamine River upstream of Chinchilla Weir were limited to a small event in February/March 2003. This flow peaked at only 2000 ML/day at Cecil Plains upstream of Dalby and provided very limited water-harvesting opportunity and inflow to Chinchilla Weir. Water-harvesting diversions upstream of Chinchilla were limited to less than 4 GL and Chinchilla Weir capacity increased in the order of 5 GL. Flows below Chinchilla were limited to compensation flows passed through the outlet works of the weir.

Balonne

The downstream section of the catchment benefited from a rainfall event in the north-west in April 2003, with inflows from the Balonne River to Beardmore Dam peaking at almost 30000 ML/day. Beardmore Dam filled and passed approximately 89 GL downstream, with the peak downstream of St George slightly less than 18000 ML/day. Access to this flow was managed to provide flow to replenish stock and domestic supplies through to the Barwon River in New South Wales. A total of 37 GL was harvested from this flow, 5 GL between Chinchilla and Beardmore storage, and 32 GL from Beardmore storage downstream.

Long-term average annual volume of flow at St George is 1103 GL.

Border Rivers

There were no significant water-harvesting events in the Macintyre River during the year. The most significant flow occurred in late February 2003, peaking at 18000 ML/day, but under the extreme drought conditions was largely protected from water-harvesting to provide relief for downstream essential water supplies in New South Wales. Queensland provided limited water-harvesting access (1 day/8 GL diversion) whilst New South Wales did not allow access to the flow other than to take some water into 'in-stream' storage. Further limited access was allowed in both States (2 GL diversion in Queensland) in the downstream section of the catchment from the recession phase of a smaller event in May. A further 2 GL is estimated to have been taken from isolated events in the Granite Belt.

Total volume of flow through Goondiwindi for the year was 239 GL, with very little additional contribution (3 GL) from the Weir River downstream of Goondiwindi. Average annual volume of flow past Goondiwindi is 1047 GL.

Moonie

There were several smaller flows in the Moonie throughout the year, with peaks up to 1500 ML/day in the mid section of the catchment. These attenuated to less than 600 ML/day at the Fenton gauging station just upstream of the Queensland-New South Wales border. The flows provided limited access for water-harvesting throughout the catchment.

Table 8 – Water-harvesting

<i>Location</i>	<i>Average annual flow volume (GL)</i>	<i>2002/03 recorded flow volume (GL)</i>	<i>Approximate volume harvested (GL)</i>
Condamine River @ Chinchilla (Condamine River U/S of Chinchilla)	561	2	4
Balonne River @ St George (Condamine/Balonne from Chinchilla to the Qld–NSW border)	1103	89	37
Macintyre River @ Goondiwindi (Inflow includes Weir River) (Border Rivers Catchment)	1047	242	12
Total			53

Diversion by the limited water-harvesting development in the Moonie has been estimated at 5 GL for the year. A net total volume of 9 GL flowed past the Fenton gauge during the year. Average annual volume of flow at this gauging station is 143 GL.

Warrego

Flows in the Warrego were not dissimilar to the previous year, with most of the flow contained in a single flow event in February 2003, peaking at 80000 ML/day at Cunnamulla. Total volume of flow in this event was 308 GL, with a further 4 GL in a small flow during June and July 2003.

Water-harvesting diversion is estimated at 4 GL for the year into the estimated available 13 GL of storage.

Flow records at Cunnamulla are limited (10 years) and probably give a biased long-term average annual flow volume of 389 GL. An upstream gauge with longer records in the Warrego suggests that the average is more likely to be in the order of 500 GL.

Paroo

Flows in the Paroo River were very low for the year, with only one significant event in February, peaking at 9000 ML/day at Caiwarro, approximately 60 km upstream of the Queensland–New South Wales border.

Total volume of flow through Caiwarro for the year was 60 GL, compared to an average annual flow of 529 GL. There is no water-harvesting development on the Paroo and negligible irrigation development.

Water-harvesting

Volumes water-harvested from the more developed catchments in the October 2002 to September 2003 period are summarised in **Table 8**.

The limited stream-flow, related access opportunity, and protection of flows for downstream water supply needs in the Border River, saw water-harvesting diversion from the system slightly less than the 79 GL recorded for the 1994/95 drought year, despite a marked increase in infrastructure.

**Table 9 – Growth in Stream Based Ring Tank Capacity (GL)**

<i>Catchment</i>	<i>Sept 1999</i>	<i>Sept 2000</i>	<i>Sept 2001</i>	<i>Sept 2002 and 2003</i>
Condamine/Balonne	822	1273	1330	1333
Border	188	267	329	332
Moonie	10	18	21	21
Warrego/Paroo	6	8	12	12
Overland Flow	120	160	180	180
Total	1146	1726	1872	1878

Queensland advises that the moratorium has now reached full impact on the development of irrigation infrastructure. Extensions of time for completion of works were provided to a limited number of individuals, but all works were required to be complete by mid-2003. Storage capacities provided in October 2002 included works sanctioned under the moratorium and continue to be the most accurate figures available. The moratorium does provide an exception for construction of storage for the capture of agricultural effluent and there has been minor growth, less than 2 GL in this area. No increase in previously reported storage capacity has been identified (Table 9).

Irrigation

With the exception of Leslie Dam in the upper Condamine, which was at only 10% capacity, most of the major in-stream storages came into the 2002/03 water year at approximately 40–50% of capacity. The St George Water Supply Scheme (Beardmore Dam) and the Dumaresq Water Management Area (Glenlyon Dam) operate under capacity share and continuous accounting arrangements respectively, with no annual announced allocation. The storage capacity in these schemes is an indicator of available allocation. Announced allocations in the other schemes ranged from nil for the Upper Condamine Water Supply Scheme (Leslie Dam) and Chinchilla Water Supply Scheme (Chinchilla Weir) to 60% for the Macintyre Brook Water Supply Scheme (Coolmunda Dam). Allocations were announced upwards for Chinchilla Weir following inflows during 2003 and also rose to 85% in the Macintyre Brook later in the year. Leslie Dam storage continued to decline during the year with only minimal allocation water supplied from natural flows in the Condamine River.

The capacity share arrangements at St George assign storage and delivery losses to individual accounts, rather than holding these as a separate shared component of the storage. With the dry outlook at the start of the year and the exceptionally dry conditions in the Balonne River, most river allocation holders elected to seasonally assign their shares upstream into the irrigation area adjacent to the dam to avoid high delivery losses in the dry river channel downstream of Beardmore.

There was very little replenishment of storages during the year, other than Beardmore which filled from almost empty in flows during April 2003, Cunnamulla Weir which filled in the February 2003 flows in the Warrego, and minor inflows to Chinchilla Weir during March and April 2003. All other storages are at critical levels as at October 2003.

Approximately 122 GL of a total nominal allocation of 212 GL was delivered through the major irrigation schemes for the year. A further 11 GL was transferred from New South Wales for use on the Queensland side of the Border Rivers.

Unregulated Irrigation

This usage is small in comparison with water diverted by water-harvesting or captured in scheme storages. Unregulated irrigation largely depends on the availability of water from naturally flowing streams and naturally occurring waterholes, with most usage from the perennially flowing streams on the western slopes of the Great Dividing Range. The prolonged drought conditions have seriously affected flows in these streams and most have been under severe restriction arrangements during the year to try and preserve base-flows. In the Border Rivers, access to unregulated irrigation has been generally banned in the Granite Belt for the full year, other than for individual arrangements allowing irrigators to access private in-stream weirs. A similar situation has existed in the upper Condamine and tributaries, except that restrictions were lifted for up to a month during the year.

Estimated usage for the 2002/03 year is approximately 30% of previous years at only 11 GL.

Urban, industrial, and stock usage remains fairly static in the catchment, as it is generally allocated as high security water and is normally able to be reliably supplied. Total usage for the 2002/03 year is estimated at 17 GL, most of which (12 GL) is accounted for as town water supply.

• Progress with the Planning Process

The Minister for Natural Resources and Mines released draft Water Resource Plans on 8 July 2002 for public review and comment in accordance with the *Water Act 2000* in the Warrego/Paroo/Bulloo/Nebine, the Moonie and the Border Rivers catchments. The IAG has commented on these plans in its 2001/02 report.

Following consideration of formal submissions and the Border Catchments Ministerial Forum (in accordance with the Border Catchments Intergovernmental Memorandum of Understanding), the Plans were finalised and became subordinate legislation following the signature by the Governor-in-Council in early December 2003.

The plans are a package of strategic-level proposals such as the sharing of water between consumptive use, the environment and downstream use, the conversion of entitlements to volumetric water allocations and managing the take of overland flow water. In addition, they provide for monitoring and reporting on achieving the plan outcomes and for a water trading system to be established.

A new draft Water Resource Plan for the Condamine/Balonne catchment was released for public review and comment in early December 2003. The draft Plan will implement the outcomes of the independent review by eminent scientists and has been developed with extensive input from stakeholders.

A moratorium on new works has existed in all Queensland Murray-Darling valleys since 20 September 2000. This moratorium prevents further storages, pumps etc. (including works authorised under licence) from being constructed until the Water Resource Plans have been implemented. The moratoria will have effect until the water resource plans have been finalised and implemented.

• **Current Status of Water Resource Plans**

The status for each Water Resource Plan is provided below.

Condamine-Balonne

The Queensland Government commissioned an independent review of the science underpinning the assessment of the current and future ecological condition of the Lower Balonne River system in 2002.

The review was undertaken by a Scientific Review Panel, consisting of Chairman Professor Peter Cullen, Professor Russell Mein and Dr Richard Marchant, in consultation with the Community Reference Group facilitated by Mrs Leith Bouilly. In January 2003, the panel released its findings in the report entitled '*Review of Science Underpinning the Assessment of the Ecological Condition of the Lower Balonne River System*'.

The recommendations included the introduction of more sophisticated 'event-based management' and associated targets for identified important ecological assets, rather than simple mean annual flow targets.

During 2003, the Community Reference Group developed a proposal to implement the review outcomes. The effectiveness of the proposed strategies is contingent on there being no increase in water extraction throughout the Condamine/Balonne catchment above moratorium levels (September 2000). The proposed flow event management rules aim to reduce the impacts of water extraction on medium or low flows. This is aimed at optimising outcomes in regard to the ecological assets as determined in the recommendations of the scientific review. The proposed flow event management rules modify access to low and medium flow events that may be offset by providing greater opportunity at appropriate times to access higher flow events.

A new draft Water Resource Plan was developed in conjunction with the Community Reference Group to implement the review outcomes and recommendations. The new draft Water Resource Plan was released for public review and comment in early December 2003, with a view of finalising the Plan by mid-2004. It is understood the Plan will license overland flows (but not make these licences tradeable); convert sleepers and dozers to tradeable allocations without increasing diversions (that is reduce security of supply to other users); and have a five year review to take into account the results of studies into Narran Lakes and Culgoa National Park.

Border Rivers

In finalising Queensland's Water Resource Plans for the Border Rivers, Moonie and Warrego/Paroo/Bulloo/Nebine catchments, the Queensland Government has paid particular regard to principles established by the Border Catchments Standing Committee that relate to environmental protection, and water sharing and access, in relation to:

- **Environmental protection** – agreed-upon environmental outcomes will enhance and sustain identified environmental values. These outcomes will be protected against impact from increases in water use. The States will develop coordinated joint access management rules for the common streams and will ensure rules on the other streams support the agreement outcomes.



- **Water sharing and access** – water sharing arrangements between the States will recognise the current water sharing arrangements. Access to water entitlements will be in accordance with the States’ planning and legislative frameworks. Management of access by water users in one State will not impact on the allowed access by water users in the other State.

In summary, the Statement of Principles proposes that a new Intergovernmental Agreement between Queensland and New South Wales for the Border Rivers will:

- Establish State water sharing arrangements;
- Provide each State with surety to its right to use water;
- Establish common environmental flow management on those streams that are shared between the States;
- Establish adaptive approach to extraction and environmental flow management that ensures environmental protection while supporting economic output;
- Provide for adequate flows to the Darling Basin downstream of Mungindi;
- Establish a framework for interstate trading of water entitlements; and
- Ensure consistency with the Murray-Darling Basin *Agreement* and initiatives.

Accordingly, Queensland anticipates that the final Water Resource Plan for the Border Rivers will give effect to these principles by:

- Adopting a common end-of-system flow target for the Border Rivers catchment of not less than 61 percent of natural flow for the purposes of developing and assessing the effect of joint water sharing and flow event management rules, as per the in-principle agreement reached by the Chief Executives of the Queensland Department of Natural Resources and Mines and NSW Department of Infrastructure, Planning and Natural Resources (This will replace and supersede the previous proposal within the draft Plan to adopt an end-of-system flow objective that is not less than the lesser of 60% and/or November 1999 flow conditions).
- Removing the provision contained within the draft Border Rivers Water Resource Plan that allowed for existing levels of development in Queensland to continue, regardless of any interstate agreements on water sharing, for up to five years. Consultation with water users from Queensland and New South Wales have suggested that this approach is likely to lead to inequities between groups of water users,

and that they instead support the up-front specification of event-based sharing rules that build on, and clarify, existing access rules and specifically include event-based environmental flow provisions. This will also be consistent with ensuring that the States’ primary focus is on equitably sharing the opportunity to take water during each river flow event, after the environmental flow requirements relevant to the particular event have been allowed for.

- Developing, through the Resource Operations Plans, extraction Caps on all water entitlements in accordance with the Murray-Darling Basin *Agreement*. This will include the specification of maximum rates and volumetric limits for all water allocations in the Plan areas.
- Maintaining the tight control on all overland flow extractions by making any development that involves, or could involve, an increase in the taking of overland flow water (other than for stock and domestic purposes), an assessable development under the *Integrated Planning Act 1997*. In addition, the Plans will provide for the future licensing of such extractions where this is considered necessary in order to ensure the achievement of planning outcomes.
- Requiring Resource Operations Plans to give effect to any agreement between Queensland and New South Wales about water within the Plan areas. This means that any agreed positions relating to joint management of water resources (including, for example, environmental flow rules, water sharing or access rules, and water trading and accounting systems) must be operationalised in Queensland through its Resource Operations Plans.

In addition, in dealing with any unallocated water under the Water Resource Plans, Department of Natural Resources and Mines must consider any possible environmental impacts, including whether it is likely that further allocation could lead to the degradation of land or downstream watercourses throughout the Murray-Darling Basin. Such assessments would be undertaken through the Resource Operations Planning process, and the Water Resource Plans include the provision for Resource Operations Plans to give effect to any interstate agreements about water (as noted above). This would effectively mean that Queensland would demonstrate to New South Wales whether there would be any impacts of proposed new allocations downstream of the border.



Moonie

The final Water Resource Plan for the Moonie has the same end-of-system flow and strategic reserve provisions as in the draft plan, i.e. 70% of pre-development flows and 1200 ML/year including town water supplies. In addition, provisions for event-based environmental flow and water sharing rules, extraction Caps, management of overland flow extractions and dealing with unallocated water, are expected to be as outlined above in the Border Rivers section.

Warrego/Paroo/Bulloo/Nebine

The final Water Resource Plan for the Warrego/Paroo/Bulloo/Nebine has the same end-of-system flow and strategic reserve provisions as in the draft Plan, i.e. 89% and 8100 ML/year for the Warrego, 99% and 100 ML/year for the Paroo, 99% and 600 ML/year for the Bulloo and 87% and 1100 ML/year for the Nebine. The strategic reserves include water for town water supplies. It should be noted that the Bulloo River is not in the Murray-Darling Basin. In addition, provisions for event-based environmental flow and water sharing rules, extraction Caps, management of overland flow extractions and dealing with unallocated water are expected to be as outlined above in the Border Rivers section.

• IAG Assessment

Diversions at 212 GL were the second lowest recorded since 1993/94 and resulted from below average flows in all rivers.

The introduction of a moratorium on the construction of new water-harvesting storage capacity in September 2000 has been effective with capacity stabilised at 1878 GL.

There has been significant progress in finalising the Water Resource Plans and work has commenced on the Resource Operations Plans, which will lead to diversion Caps being established for each valley, but probably not before 2005.

In the meantime, the final Water Resource Plans for the Border Rivers, Moonie River and Warrego/Paroo/Bulloo/Nebine have become law in December 2003.

The report of the independent expert scientific panel '*Review of Science Underpinning the Assessment of the Ecological Condition of the Lower Balonne River System*' and the subsequent proposal from the Lower Balonne Community Reference Group have resulted in the release of a revised draft

Water Resource Plan for the Condamine/Balonne in December 2003, with the stated aim of finalising the Plan by mid-2004.

The IAG is aware that there has been considerable discussion and agreement between New South Wales and Queensland Government representatives. While this is substantial progress, there still needs to be agreement on environmental flow rules and water sharing before each State is in a position to finalise its Cap.

In developing the Resource Operation Plans, the IAG is also of the view that a rules based framework, followed by the setting of Cap diversion targets does not in itself ensure that the outcomes are achieved, that is the 61% flow target on the Border Rivers and possibly environmental objectives for Narran Lakes and Culgoa National Park in the Condamine/Balonne Plan.

The IAG suggests that as a second priority, models be developed and triggers established to monitor progress against the desired outcomes.

• Conclusions/Recommendations

- Diversions are estimated at 212 GL and are the second lowest since 1993/94. This follows below average rainfall in all valleys and a very poor flow year.
- Growth in off-stream storages stopped, since the introduction of a moratorium on construction in September 2000 and remains at 1878 GL.
- Queensland has made substantial progress in 2003, with the final Water Resource Plans for the Border Rivers, Moonie and Paroo/Warrego/Nebine becoming law in December 2003.
- A revised draft Water Resource Plan for the Condamine/Balonne was released for public comment in December 2003 and likely to be finalised by mid-2004.
- Work on the Resource Operations Plans has commenced. These will set environmental and other flow rules and the valley Caps. These are unlikely to be available before 2005.
- Given the outcome-based Water Resource Plans, the IAG requests Queensland to submit models/methods for auditing compliance against Cap targets as in other States, and progress against the end-of-valley flow or environmental objective targets.



Australian Capital Territory

• The Cap

The ACT became a participant in the Murray-Darling Basin Commission in March 1998. At that time, the ACT Government undertook to participate in the Cap initiative. However, there is yet to be a decision as to what is to be the ACT's Cap. 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 31 GL per year, with an additional 5 GL per year estimated for all other consumptive diversions (see **Table 10**).

Around 50% of the urban water diversions in the ACT are returned to the Basin by way of the Lower Molonglo Water Quality Control Centre (WQCC) and Queanbeyan Sewage Treatment Works (STW). As a consequence, net diversions are currently used as the accepted means of assessing the use of water for consumptive purposes in the Territory.

• Administration of the Cap

The *ACT Water Resources Act 1998* 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 completed a metering program, so that both groundwater and surface water is now metered. Work is still continuing on the testing of metered usage results, which will allow the ACT Government to report directly on groundwater extractions. This in turn will allow confirmation of the 'other diversion' usage reported in **Table 10** below. Currently an estimate has been used. The *Act* also requires that environmental flows must be provided for before any other use. Environmental flow guidelines provide for the protection of flows up to the 80th percentile and, except in water catchments, only 10% of flows over the 80th percentile are available for consumptive use. Of the total ACT water resources of 465 GL per year, these guidelines allocate an average of over 272 GL to the environment, leaving around 193 GL (gross) notionally available for consumptive use.

Table 10 – Diversions for Consumptive Use within the ACT and Queanbeyan (GL/year)

Year	Gross diversion	Less returns to system		Other diversions	Net diversion
		Lower Molonglo WQCC	Queanbeyan STW		
1989/90	65.4	29.9	3.4	5.0	37.2
1990/91	77.3	33.1	3.4	5.0	45.8
1991/92	60.0	33.3	3.4	5.0	28.4
1992/93	50.2	34.8	3.4	5.0	17.0
1993/94	59.4	32.7	3.4	5.0	28.3
1994/95	60.6	30.1	3.4	5.0	32.1
1995/96	53.3	32.2	3.5	5.0	22.5
1996/97	61.8	33.7	3.4	5.0	29.7
1997/98	73.1	30.7	3.2	5.0	44.2
1998/99	54.4	32.7	3.4	5.0	23.2
1999/00	58.0	32.6	3.9	5.0	26.5
2000/01	63.0	30.3	3.9	5.0	33.8
2001/02	70.9	30.6	3.8	5.0	36.4
2002/03	65.8	28.4	2.3	5.0	40.1

• **Issues with Adoption of the Cap**

In December 2002, the ACT Government announced that it would develop a comprehensive Water Resources Strategy to be formalised as a new Water Resources Management Plan under the *Water Resources Act*. A draft Policy was released during the year, in which the ACT Government reconfirmed its commitment to the Cap. This commitment to the Cap has been further reinforced by the ACT Government’s announcement that it wishes to renegotiate its membership of the Murray-Darling Basin Commission, so that it be given full membership recognition.

As part of its development of a proposed Cap for the ACT, the ACT Government has announced that it has entered into discussions with NSW on an MOU for a joint ACT/NSW Cap covering the ACT and surrounding areas such as Queanbeyan.

The ACT Government has advised the Murray-Darling Basin Commission that it rejects the use of historical information as the basis for the Cap, and has proposed the adoption of four additional principles to be read in conjunction with the seven principles adopted by the IAG for the purpose of assessing Cap targets. These principles are:

- at least, broad parity between jurisdictions and towns with equivalent conditions;
- efficiency (that is, the need to reinforce rather than undermine the incentive for responsible action);
- sustainable river environment throughout the Basin over the medium to long-term; and
- recognition of the legal position of the ACT and its legislative arrangements with the Commonwealth and NSW, including existing water rights.

The ACT Government has advised that it is proceeding with negotiations with NSW on cross-border issues as a matter of some urgency and that it envisages bringing forward to Council in early 2004 its proposed Cap for the ACT.

• **Discussion of Issues**

The IAG has discussed the issue of the setting of a Cap for the ACT in previous reports. The IAG is pleased to note the renewed commitment by the ACT to resolving this matter and the commencement of negotiations with NSW on various cross-border issues, including the important issue of water trading. Further discussion on the ACT’s proposed additional principles is provided below.

• **Monitoring and Reporting**

Once the setting of a Cap has been formalised, the ACT has indicated that it will use a climate-adjusted Cap based upon a model jointly developed with the Murray-Darling Basin Commission. The ACT has established a system of licences for all users of water in the ACT and these will be climate-adjusted volumetric licences. 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.

• **2002/03 Diversions**

Net diversions by the ACT in 2002/03 were 40.1 GL. As an example of the assessment that might be made in the future, this diversion has been compared with the level of diversion expected under a 38 GL climate-adjusted Cap which was recommended by the IAG in its 1999/00 Report.

The 2002/03 diversion is 8.6 GL below the 48.7 GL annual climate-adjusted Cap target. **Table 11** summarises the ACT’s performance against the 38 GL Cap since July 1997. It reveals that had the ACT adopted a Cap based on 38 GL, it would have already built up a credit of 35.7 GL.



Table 11 – An example of a Cap applied to the ACT – GLs Diversions since July 1997 compared with the 38 GL Cap proposed by the IAG

<i>Proposed Long-term diversion</i>	<i>2002/03 climate-adjusted target</i>	<i>Diversion</i>	<i>Credits (proposed climate-adjusted Cap target less diversion)</i>		<i>20% long-term Cap diversion trigger</i>
			<i>2002/03</i>	<i>Cumulative since 1 July 97</i>	
38	48.7	40.1	8.6	35.7	-7.6

It is acknowledged by the IAG that the ACT Government has rejected the 38 GL Cap proposed and that this table is used for illustration purposes only.

• **Other Issues**

The ACT has proposed the adoption of four additional principles for use in determining the level of the Cap. The IAG has considered these principles in the context of the existing principles established and used to set the Cap across the total Murray-Darling Basin.

The principles recommended by the IAG and adopted by the Council set the framework within which an assessment can be made regarding the setting of actual Cap values. The principles must be seen in the context of the overall aim and objectives of establishing the Cap. These were:

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

In considering the ACT's proposed additional principles, the IAG makes the following observations:

- ***broad parity between jurisdictions and towns with equivalent conditions***
 - the IAG supports this principle in general terms and notes that equity across the Basin has been one of the criteria that it has applied in considering volumetric Cap proposals;
 - the IAG notes that Adelaide represents perhaps the best comparable example of a major city within the Basin, and the decision taken by the SA Government when setting the Cap to forgo its entitlement to take up to 1150 GL for diversion purposes, confining itself to a Cap allocation of 650 GL on a five-year rolling average basis (non-tradeable) with any further water requirement to be purchased in the market;
 - the 650 GL five-year rolling average included a small component for growth, and that now having been used, SA Water is purchasing water to meet future growth requirements.

- ***efficiency, particularly in encouraging innovation in the use and reuse of water***
 - the issue for the ACT is the high standard of water treatment and high level of return to the river system of gross water taken for consumptive use in the ACT (and Queanbeyan);
 - currently, usage for consumptive purposes in the ACT has been measured in 'net' terms, that is after accounting for the return of water via the WQCC and STW;
 - however, greater reuse of water in the ACT may be a more efficient method of meeting the ACT's needs. As this would register as a reduction in water being returned to the river, such reuse may be discouraged by the use of net off-take as the Cap definition;
 - the IAG draws attention to the overall aims and objectives of the Cap, and notes that this is not inconsistent with an objective seeking to use water more efficiently and effectively;
 - the IAG also notes that in modelling the level of water that would have been diverted under 1993/94 levels of development for purposes of setting the Cap, the IAG takes into account the system operating efficiency in 1993/94. Thus, any efficiency improvements made by the ACT since 1993/94 would be available to the ACT.
- ***sustainable river environment throughout the Basin***
 - the IAG notes that this principle essentially corresponds with the existing objectives and principles underpinning the Cap and is consistent with the use of a net water diversions value for an ACT Cap.
- ***recognition of the legal position of the ACT***
 - the IAG notes that the issue of legal rights and entitlements is not unique to the ACT, but is part of the overall environment of water and entitlements that operates in each of the States represented on the Murray-Darling Basin Council;
 - in the context of the commitment made by these States to the aims and objectives of the Cap, there has been a willingness to put aside some of these rights and entitlements in the interests of the Basin as a whole;

- again the IAG draws attention to the South Australian example and the current need for SA to purchase water on the open market to meet future growth needs;
- the IAG acknowledges that a fundamental prerequisite for a commitment to the wider benefit of the Basin is the ability to trade water freely within the Basin, and welcomes the recent discussions between the ACT and NSW to determine trading and water sharing arrangements.

• **IAG Assessment**

The IAG notes the ACT's commitment to the Cap and to the principles behind the Cap. The IAG also notes the desire by the ACT to reach a resolution of the Cap for the ACT. Once the Cap is agreed, the ACT has the monitoring and reporting arrangements in place which will provide appropriate data for reporting under Schedule F.

The IAG draws the ACT's attention to the precedent set by South Australia in the acceptance of a Cap with some growth opportunities, and the preparedness of South Australia to buy water once these growth allowances have been used. The development of a 'Cap' for the ACT/NSW region as proposed by the ACT is not inconsistent with the objectives and aims of the Cap and highlights yet again the need for the ACT and NSW to work together, not only to agree to this 'Cap' arrangement but more importantly to the trading rules to apply between the ACT and NSW. It is only in as much as the ACT can feel secure in its rights to any water it buys from NSW that the type of fixed Cap and trading model used in South Australia becomes a viable proposition for the ACT.

The IAG also draws the ACT's attention to its comment on the extra principles that the ACT has proposed and the level of consistency between these principles and those already applied by the IAG. The IAG notes that efficiency savings achieved by the ACT since 1993/94 are eligible for inclusion in the Cap, consistent with the Cap determination arrangements used in other States.

• **Conclusions/Recommendations**

- No Cap presently exists for the ACT.
- Net diversions of 40.1 GL in 2002/03 exceed the average usage between 1989 and 2001 of 31 GL, but were less than a climate-adjusted annual Cap target of 48.7 GL. The ACT would have a cumulative credit of 35.7 GL if the Cap of 38 GL proposed by the IAG had applied since July 1997.
- The IAG encourages the ACT and NSW to complete their negotiations on trading rules and a regional NSW/ACT Cap, in order to allow the finalisation of a Cap for the ACT.
- The IAG draws the ACT's attention to its comments on the extra principles proposed by the ACT and to the precedent set by other States in agreeing to a Cap consistent with the overall aims and objectives of the June 1995 Council resolution.





5. Diversions from the Murray-Darling Basin in 2002/03

Murray-Darling Basin diversions in 2002/03 totaled 8127 GL. This total was only 63% of the record diversion of 12964 GL in 1996/97 and reflects the restrictions to supply caused by the severe drought. Of the total water diverted, New South Wales diverted 50.8%, Victoria 36.8%, South Australia 9.2%, Queensland 2.6% and the Australian Capital Territory 0.5%.

Diversions for the individual valleys are presented in **Table 12**. Annual diversions since 1983 are plotted in **Figures 1 and 2**. Diversion in 2002/03 were the lowest in the Basin since 1975/76 but were the highest on record in South Australia and 4th highest in the ACT.

Table 12 – Murray-Darling Basin Diversions in 2002/03

<i>System</i>	<i>Total diversion (GL)</i>	<i>Percentage of Basin diversion (%)</i>
New South Wales		
Border Rivers	137	
Gwydir	238	
Namoi/Peel	294	
Macquarie	411	
Barwon-Darling	20	
Lower Darling	107	
Lachlan	253	
Murrumbidgee	1793	
Murray	879	
Total NSW	4132	50.8%
Victoria		
Goulburn/Loddon/Broken	1069	
Campaspe	73	
Wimmera-Mallee	62	
Murray/Kiewa/Ovens	1789	
Total Victoria	2993	36.8%
South Australia		
Metro-Adelaide & Associated Country Areas	165	
Country Towns	39	
Lower Murray Swamps	99	
All Other Uses of Water from the River Murray	448	
Total South Australia	750	9.2%
Queensland		
Condamine/Balonne	119	
Border Rivers/Macintyre Brook	80	
Moonie	6	
Warrego/Paroo	7	
Total Queensland	212	2.6%
Australian Capital Territory		
	40	0.5%
Total Basin	8127	100.0%



Figure 1: Murray-Darling Basin Diversions - 1983/84 to 2002/03

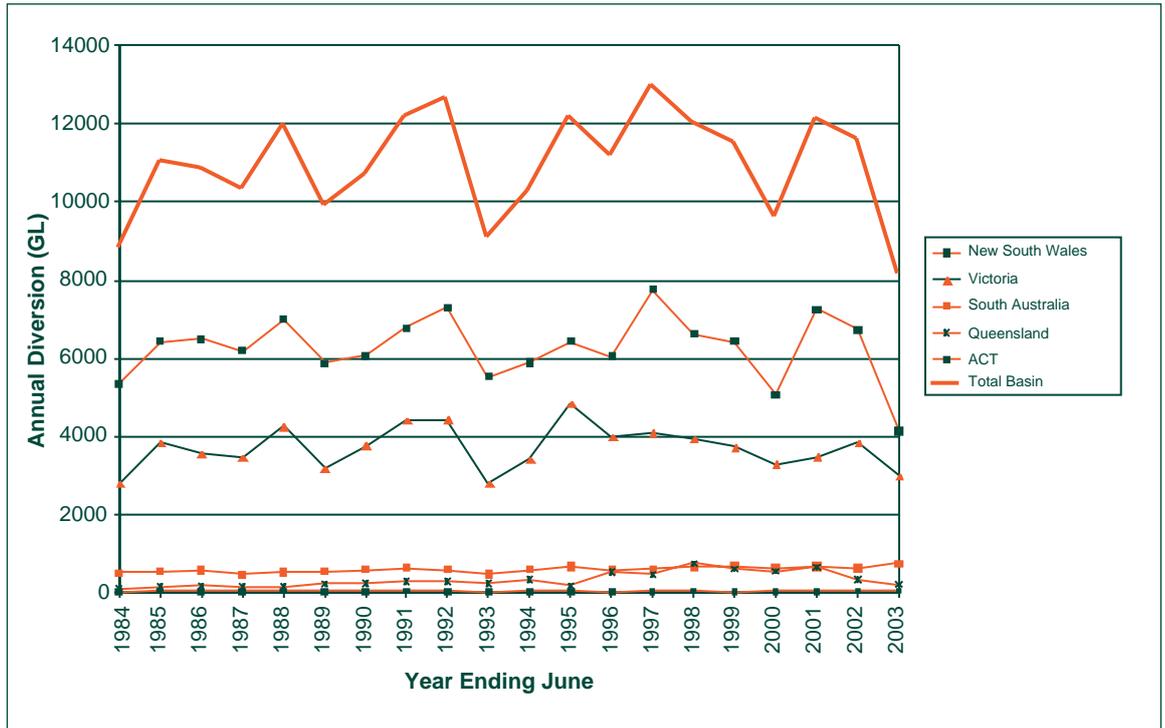


Figure 2: Murray-Darling Basin Diversions - 1983/84 to 2002/03 (Usage under 1000 GL/year)



Appendix 1

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 2004. The Council agreed to publish these responses as an appendix to the Independent Audit Group's Report.



SOUTH AUSTRALIA

The IAG confirmed that South Australian diversions for the 2002/03 water year were within Cap for all but the Country Towns component and that a reliable system is in place to monitor these diversions. The Country Towns diversion exceeded the Cap by only 0.2 GL and this was due to trade out of the licence rather than increased diversions. However, the Country Towns Cap is in credit of 56 GL since the advent of cumulative accounting on 1 July 1997. Action has been initiated to ensure that the Country Towns Cap is not exceeded in future.

South Australia remains firmly committed to the implementation of the Cap and has continued the development of management tools and initiatives to facilitate the best possible reporting of compliance under the Cap.

Initiatives being pursued in South Australia include the ongoing monitoring of trends in diversions, improved metering, continued development of the **Water Information and Licensing Management Application** with enhanced reporting capabilities, and progression of **quality management guidelines** for data handling. The development of these strategies will expand the capabilities of the South Australian Government to meet its obligations into the future.

South Australia monitors diversions closely and in the event of restricted resource conditions a drought policy can be implemented. At the start of the 2002/03 season it was not considered necessary to implement any restrictions based on the Commission forecast of a very high probability of receiving Entitlement Flow. This was in contrast to the decision taken in May 2003 regarding the 2003/04 water year.

Reduced volumes of water held in Commission storages by May 2003 resulted in SA being advised by the Commission that there was a significant risk that the Commission could not provide South Australia with its full annual Entitlement Flow during 2003/04. In response to this advice, and the near record low water levels and rising salinities in Lakes Alexandrina and Albert, the South Australian Government took the unprecedented step and announced that restrictions on the taking of water from the River Murray in South Australia would be introduced.

In 2002, the Minister adopted the Water Allocation Plan for the River Murray Prescribed Watercourse (WAP) prepared by the River Murray Catchment Water Management Board. The WAP provides the legal policy framework for the management of a number of issues including long-term Cap compliance. A significant management requirement under the WAP is irrigator annual reporting. All licence holders will, for the first time, be required to submit an annual irrigation report as a condition of their licence for the 2002/03 water year. Water use efficiency will be calculated and reported on a regional basis from these irrigator returns.

Irrigation annual reporting is a crucial tool in natural resource management and a vital factor in irrigators becoming more aware of the direct and non-direct impacts of their water use on the environment and their own agricultural production.

Climate-adjusted models have also been developed for Highland Irrigation and for Country Towns Cap components through the Commission Office and submitted to the Commission's independent auditor for verification and accreditation. However, South Australia is yet to endorse the models developed by the Commission office.





SOUTH AUSTRALIA

Future Cap reporting for Highland Irrigation will include climate adjustment factors after a final model has been accredited and approved for use. The need for a climate-adjusted model of the Country Towns Cap is yet to be fully considered by South Australia.

South Australia agrees with the IAG that growth in demand for metropolitan Adelaide will need to be accommodated and that any additional trade for metropolitan Adelaide should be dealt with on a separate licence to maintain the integrity of the 650 GL rolling average over five years. DWLBC, in conjunction with the metropolitan Adelaide licence holder, SA Water Corporation, will be seeking further discussion on details of this arrangement with the Commission and the IAG.

South Australia agrees with the IAG conclusions relating to each of the other States and the ACT.





V I C T O R I A

Victoria continued implementing the Cap in 2002/03 through the establishment of Bulk Entitlements on regulated systems and Stream-flow Management Plans on unregulated streams. The Bulk Entitlement conversion process progressed in the Loddon and Wimmera-Mallee basins and is almost complete in the Ovens and Broken water supply systems.

Work continued on developing Stream-flow Management Plans on twelve unregulated streams. Metering of diversions in all unregulated systems is an essential component of Cap implementation and metering programs are being developed to progressively meter these diversions over the next nine years.

Diversions since July 1997 from each of the four designated valleys continue to comply with the Cap. Diversions from the Murray/Kiewa/Ovens and Campaspe Valleys were below their Cap targets in 2002/03. Diversions from the Goulburn/Broken/Loddon Valley were marginally above the Cap target but cumulative diversions in this valley remain in credit.

The level of diversions from the Wimmera-Mallee system has remained below Cap due to the on-going water savings from the Northern Mallee Pipeline. These savings have enabled environmental entitlements to increase to 34.7 GL/year or about 20% of the long-term Cap.

The climate-adjusted model covering the Goulburn/Broken/Loddon and Campaspe Valleys is in the final stages of the independent review and is expected to gain accreditation in 2004. Work continued on improvements to the Loddon component of this model and on the calibration of the Wimmera-Mallee model as Bulk Entitlements progressed in these systems. Work progressed on examining future options for Lake Mokoan and a decision on an appropriate Cap allowance for this storage cannot be reached until this is resolved.

Victoria relies on the MDBC model of the Murray system to provide Cap targets for the Murray system, which is expected to gain accreditation in 2004. This model now includes a regression component to calculate Cap volumes for the Ovens and Kiewa portions of the Murray Cap Valley.

Victoria will continue to provide accurate and timely water audit information as required and supports the Data Management System Protocol and the proposed external audit of each State's Cap Data Management System.

Victoria agrees with the IAG conclusions relating to Victoria, South Australia, New South Wales, the ACT and Queensland. Thus, Victoria supports the IAG's recommendations regarding the finalisation of the ACT and Border Rivers Caps and the timelines for accreditation of Cap models.





NSW remains committed to the Cap process and, in particular, to ensuring that long-term diversions are maintained within the Murray-Darling Basin Ministerial Council's Cap.

The IAG has again declared the Lachlan Valley in breach of the long-term diversion Cap. NSW accepts that, over the six years since monitoring under Schedule F began, the water diversions remain in excess of the accumulated annual Cap targets. However, implementation of the water access rules in the Water Sharing Plan, that will result in diversions below the long-term Cap, has been delayed to ensure compatibility with the recently announced National Water Initiative.

NSW recognises the IAG concerns regarding the modelling of Cap limits in the Gwydir Valley, and has provided assurances that the use of new data to improve modelling has been given a high priority.

The IAG has made two recommendations regarding strategic issues, all of which impact upon NSW.

The IAG recommends that the ACT and NSW representatives establish the necessary framework to enable trade between them and to enable the ACT to finalise its Cap.

NSW agrees with this recommendation.

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 2003 and 100% compliance by June 2005.

Significant efforts have been made to achieve accreditation of NSW valley models under Schedule F for Cap auditing, with the Lachlan Valley being the first model in the Basin to achieve this. NSW expects to have additional valley Cap models presented for accreditation during 2003/04.

The IAG has also made a number of recommendations that specifically concern NSW. The following comments are offered in regard to the major recommendations:

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.

NSW agrees with this recommendation.

The IAG recommends that NSW and Queensland agree to a common approach to the preparation of models to apply to this system.

NSW and Queensland are committed to a common approach to modelling within the Border Rivers system. The first step in this process is the merging of modelling work completed to date. An interim agreed model is currently being used to progress the Inter-Governmental Agreement on flow management in the Border Rivers. A finalised model will be completed later in the process. It is intended to use the resulting common model for Cap reporting as well as Water Sharing Plan development.

NSW should submit a monitoring report on the Intersecting Streams as required under Schedule F.

NSW agrees with this recommendation, however, in view of the fact that NSW usage is minor on these streams, it would be a meaningless exercise were Queensland not to do the same. It would be far more effective for NSW to feed into the Queensland reporting process and by so doing contribute to a complete view of the stream status.



QUEENSLAND

In line with Council's earlier decisions, the Queensland Cap is to be established in accordance with the provisions of Schedule F, following the completion of the Water Resource Planning processes. Compliance will be on the basis of diversions on the same principles as other States.

A major milestone was reached on 4 December 2003, when the Queensland Governor-in-Council approved Water Resource Plans for the Border Rivers, Moonie, and the Warrego/Paroo/Bulloo/ Nebine plan areas. This followed advice and/or briefings to the Commission and the Ministerial Council and the Border Catchments Standing Committee and Ministerial Forum prior to the finalisation of the three Plans. In accordance with the *Water Act 2000*, three consultation reports were prepared in February 2004 that summarised the issues, including the IAG's issues, raised during the consultation process and how the issues were dealt with in the final Plans.

The final Plans outline objectives and strategies for managing water resources in a sustainable way, including the conversion of all existing water licences to secure, volumetrically specified tradeable water allocations. The plans amend and continue the effect of the moratoria, the purpose of which is to limit the development of works that would lead to more water being taken in the Plan area whilst the plans are being implemented. The Water Resource Plans are being implemented through the development of Resource Operations Plans currently being prepared by the DNRME in consultation with stakeholders.

Work with the New South Wales agencies and consultation with Queensland and New South Wales stakeholders on water sharing between the States, cross-border trading and agreed environmental flow rules are continuing.

Another major milestone was the release of a new draft Water Resource Plan for the Condamine/Balonne Valley on 3 December 2003, for a period of public review and submissions. The draft Plan was developed in close consultation with a Lower Balonne Community Reference Group (CRG) and with other advisory groups in other parts of the Basin valley. In particular the consultation with the CRG focused on implementing the recommendations of the Scientific Review Panel, chaired by Professor Peter Cullen.

Valley Caps are expected to be established progressively across the Queensland Murray-Darling valleys in late 2004 and into 2005, following finalising the Resource Operations Plans. In the meantime, moratoria are in place in all Queensland Murray-Darling valleys and prevent further works that would increase water extractions from being constructed until the Water Resource Plans have been implemented.





AUSTRALIAN CAPITAL TERRITORY

Water use in the ACT was above average for 2002/2003 as a result of a severe drought and hot summer. Extractions from storages for the urban supply was close to 66GL with returns from sewage treatment plants to the river system totalling 31GL resulting in net urban consumption of 35GL. Non urban consumption is estimated at 5 GL giving a total net consumption of 40GL. Consumption was significantly lower than would have been expected for the climatic conditions due to the early introduction of demand management arrangements. Domestic water restrictions were introduced on a voluntary basis in 16 November 2002 and mandatory level one restriction on 16 December 2002. Mandatory restrictions were up graded to level two on 29 April 2003 in line with previously published guidelines. The restrictions targeted reductions of 15% and 25% respectively in urban demand. In addition the urban water provider ACTEW has negotiated demand management agreements with significant non-domestic water users. Demand from the urban water supply has been significantly reduced as a result of the water restrictions and voluntary agreements. The ACT Government continues to demonstrate sound environmental and resource management practices and remains committed to the implementation of the Cap in the ACT.

The IAG has acknowledged the additional principles proposed by the ACT in relation to setting an ACT Cap without recognising the value of the principles in differentiating the ACT position. The IAG has again referred back to the precedent set by other States in agreeing to a Cap. This approach by the IAG does not acknowledge the significant different circumstances of the ACT.

The IAG has also recommended **“that the ACT and New South Wales representatives establish the necessary framework to enable trade between them and to enable the ACT to finalise its Cap”**. The ACT and NSW have begun discussions on a range of water related issues including Cap. The outcome of those discussions should be available for the next IAG report. An agreement with NSW is only one of the options being considered for the establishment of an ACT Cap.

Glossary

ACTEW	ACT Electricity and Water Corporation.
announced allocation	The percentage of water entitlement declared available for diversion from a regulated stream in a season.
annual allocation	The annual volume of water available for diversion from a regulated stream by an entitlement holder.
authorised use	Total of the water allocated in the valley plus off-allocation and water-harvesting use plus unregulated stream use not in allocation and system losses not in allocation.
Border Rivers	The rivers and tributaries forming, or intersecting the border between 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.
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.
DIPNR	Department of Infrastructure Planning and Natural Resources (of NSW).
DNRME	The Department of Natural Resources, Mines and Energy (of Queensland).
DSE	The Department of Sustainable Energy and Environment (of Victoria).
dozer allocation	An allocation that is not fully utilised.
DWLBC	The Department for Water, Land and Biodiversity Conservation (of South Australia).
EC (unit)	Electrical conductivity unit 1 EC = 1 micro-Siemens per centimetre measurement at 25° Celsius. Commonly used to indicate the salinity of water.
end-of-valley flows	The flow regime at the end of a valley.
floodplain harvesting	The diversion of water from a floodplain into storage(s).
FMIT	First Mildura Irrigation Trust.
gigalitre (GL)	One thousand million or 10 ⁹ litres.
GL	Gigalitre: one thousand million or 10 ⁹ litres.
G-MW	Goulburn-Murray Water (of Victoria).
gravity districts	Districts which use gravity to divert the flow of water from the river.
high security entitlement	An entitlement which does not vary from year to year and is expected to be available in all but the worst droughts.
IAG	Independent Audit Group.
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.
MDBC	Murray-Darling Basin Commission.
MDBMC	Murray-Darling Basin Ministerial Council.
megalitre (ML)	One million litres. One megalitre is approximately the volume of an Olympic swimming pool.
Ministerial Council, the	Murray-Darling Basin Ministerial Council.



ML	Megalitre: one million litres. One megalitre is approximately the volume of an Olympic swimming pool.
Murray-Darling Basin Agreement	The <i>Agreement</i> between the Governments 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.
riparian	Of, inhabiting or situated on the bank and floodplain of a river.
RIT	Renmark Irrigation Trust.
sales water	In Victoria, water that may be purchased by an irrigator in addition to the basic water right. Access to sales water is announced each season as a percentage of Water Right depending on the available resource.
salinity	The concentration of dissolved salts in groundwater or river water usually expressed in EC units.
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.
water entitlement	The legal right of a user to access a specified amount of water in a given period.
water-harvesting	The diversion of water from an unregulated stream in Queensland in which the access to water is defined only by a diversion rate and a starting flow in the stream.
WAMP	Water Allocation and Management Planning. It is a process formerly underway 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.
WMRWG	Water Market Reform Working Group.
WR	Water Right.
WRP	Water Resource Plan. Plans developed 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 Cap Audit
NSW Lachlan and
Macquarie Valleys*

***Report of the Independent
Audit Group***



Independent Audit Group Members

Dr Wally Cox (Chair)
Paul Baxter

M A R C H 2 0 0 4

INTRODUCTION

The 2002/03 Review of the Cap Implementation by the Independent Audit Group, identified that the cumulative diversions for the NSW Lachlan Valley since 1997/98 had exceeded the annual Cap targets by more than 20% of the long-term average diversion and that as a consequence the requirement in Clause 14 of Schedule F for a Special Audit had been triggered.

In addition, the IAG noted that a modelled annual Cap target for the Macquarie Valley for the 2002/03 year was not available at the time of its annual audit and thus advised that it would re-examine the Macquarie Valley early in 2004, as part of a Supplementary Audit at which time it was hoped the required target would be available.

This report is the report of the IAG on the Special Cap Audit of the NSW Lachlan Valley and an update on the audit for the Macquarie Valley for the 2002/03 water year.

AUDIT PROCESS

At the time of the audit in October 2003, the IAG considered the detailed information and reports on the Lachlan Valley, including details of crop plantings in the 2002/03 year and revisions to the Water Sharing Plan rules designed to counter diversions being over the long-term Cap. In a telephone conference with the Department of Infrastructure, Planning and Natural Resources (DIPNR) on 4 February 2004, the IAG was provided with an update on previously provided information and the application of the Water Sharing Plan rules.

For the Macquarie Valley, the IAG sought additional information on annual Cap target for the 2002/03 year at the 4 February 2004 teleconference.

A draft report was made available to DIPNR prior to the finalisation of the IAG's report to Council.

AUDIT OUTCOMES

Lachlan Valley

The DIPNR in its response to the Special Audit has advised that there is no further updated information on diversions using the IQQM model for the valley beyond that given to the IAG as part of its original 2003 audit. Although the 2002/03 water year saw record low levels of water availability, total diversions including unregulated streams has been assessed at 253 GL, which is above the annual cap by 1 GL. However, based on the Schedule F accounting for the 1997/98–2002/03 seasons, the Lachlan Valley is cumulatively 80 GL above Cap and 13 GL above the trigger for a Special Audit.

Following a Special Audit in 2003, NSW announced a new Water Sharing Plan (WSP) for the Lachlan. The revised rules under the new WSP were to take effect in the 2002/03 water year. However, DIPNR has confirmed that these rules have now commenced from January 2004, with the final announcement and implementation of the Water Sharing Plan not due until mid-2004. The Water Sharing Plan will change the current environmental flow rules as well as other management rules for the valley and will provide the legislative basis for the management rules to apply to the valley.

The DIPNR notes that it has not updated its 'Current Conditions' version of the IQQM model for the Lachlan because of a lack of modelling resources. The most up-to-date version of the current conditions model therefore remains the version developed for 1999/00 conditions. This 1999/00 version indicated that, in the long-term, diversions would be below the Cap by 4%. However, because the model has not been updated for over three years, it does not include the impacts of recent changes in area irrigated, crop mix or irrigator behaviour. Also there is growing concern that the conclusion regarding the 4% reduction in diversions may be affected by long-term climatic cycles. Work on the modelling of the current conditions has not progressed as quickly as necessary to allow finessing of the WSP rules to address the requirements of the current water year. The revised rules that apply from January 2004 will incorporate continuous accounting, an annual use limit of 75% of the valley entitlements of the Plan, the removal of off-allocations and the setting aside of a Water Quality Allowance of 20 GL for salinity dilution and algal bloom mitigation.

The IAG acknowledges the implementation of this tightening of the management rules to apply to the valley, but is concerned about the validity of the basis upon which these rules have been developed. Furthermore, the IAG notes that NSW did not act to amend its rules in the 2002/03 water year, and that the action being taken in the 2003/04 water year, in part, reflects the response to the Special Audit and findings of the IAG on the 2001/02 water year and does not incorporate any further action to address the 2002/03 breach of the Cap. Thus despite the intention of the new rules and WSP arrangements (although these have yet to be formally agreed and gazetted), the IAG is not convinced that the amended rules will necessarily bring the valley back with the Cap limits.

With doubt existing as to the veracity of the existing IQQM modelling, and the need to correct this model for current conditions, which appear to have changed since the model was first built, the IAG is looking for urgent action to be taken by NSW to address the modelling issue. It is only the review and as appropriate revision of the IQQM model that will provide any degree of assurance that the diversions currently being allowed under existing management plans are within the Cap requirements, and the overall level of diversions in the valley are returning to within Cap requirements.

CONCLUSION

On the basis of the available evidence, the IAG determines that the Lachlan Valley is in breach of the long-term diversion Cap. The IAG notes that NSW announced corrective action after the Special Audit in 2003, but that the changed rules have not been applied until the 2003/04 water year. Furthermore, the management plans under the new Water Sharing Plan, while implemented from January 2004, are based on the anticipated formal gazettal of the WSP expected later in 2004.

The IAG has some concern regarding the current state of the IQQM modelling for the Lachlan Valley and is concerned to note the apparent lack of progress in reviewing the current conditions modelling. The IAG notes that the future operation and acceptance of the IAG relies upon the goodwill and commitment of the various State and Territory authorities to the objectives and principles of the Cap and its administration. This requires a commitment to the collection of appropriate information, and the development of acceptable climate-adjusted IQQM models that form the basis of the Schedule F monitoring of the Cap. The IAG is concerned about the current state of the modelling of a number of the NSW

river systems, and in particular the northern rivers in the State, and the apparent delay in the collection of appropriate data and refinement of the IQQM models.

The IAG believes that it is imperative, if the Cap is to continue to command general acceptance and support across the Murray-Darling Basin, that NSW as a matter of urgency, allocate additional resources to the finalisation and reconfiguration of the models that are used to assess the performance of the State against the Cap and guide the relevant authorities in the development and application of appropriate management rules for the river systems concerned.

Macquarie Valley

At the October 2003 audit, the DIPNR advised the IAG that a modelled annual Cap target was not available to allow the Cap update for the year 2002/03. As part of the Supplementary Audit, the IAG has again sought this target for the 2002/03 year and has been advised by DIPNR that it is still not available.

DIPNR advises that their review of the data for the year suggests that there is a problem with both the input data and the calibration of the Macquarie IQQM model that has been developed. A review of the input data after the first run of the model for the year, suggested abnormalities in the results and indicated that some of the input data was incorrect. DIPNR also note that the climate conditions in recent years differ significantly from those used to calibrate river losses and this has impacted upon the reliability of the Macquarie Valley IQQM model.

The available evidence on crop plantings in the Macquarie Valley and development along the system, suggest that there has been some increase in on-farm storage capacity, although actual crop plantings for the year have been affected by the drought. Under the preliminary Schedule F accounting for the period 1997/98–2001/02, using Cap targets generated by the model which is currently under review, the Macquarie is cumulatively 106 GL below the Cap. Given the seasonal conditions in 2002/03, it is likely that the Macquarie is still below Cap on a cumulative basis. It is unlikely that NSW will be able to provide the final Schedule F figures for the 2002/03 year in time for the next Council meeting, although the IAG will still require an update on these figures once the present data and modelling problems are resolved.



Based on the current limited information, the IAG is of the view that the Macquarie Valley is probably still within the Cap on a cumulative basis for 1997/98–2002/03. In these circumstances the IAG proposes to review the 2002/03 results as part of the review of the 2003/04 water year to be undertaken in October 2004.

CONCLUSION

The IAG notes that NSW is still unable to provide an annual Cap target for the Macquarie Valley for the 2002/03 year and that this information is not likely to be available prior to the March 2004 MDBC meeting. However, on the basis of the available evidence, the IAG concludes that the Macquarie Valley is still within the Cap on a cumulative basis since 1997/98, and thus the IAG will next review diversions for this valley as part of the 2004 audit to be conducted in October of this year.

The IAG does however, express some grave concerns regarding the reliability and accuracy of the data and modelling that has been used for this valley. There is an urgent need to review this data and to correct what appear to be considerable problems with the underlying input data, and then re-calibrate the model to reflect what may be a climatic shift over recent years.

The IAG has expressed to the NSW authorities on a number of occasions, the need to ensure that there are sufficient resources allocated to the tasks of monitoring and managing the performance of the various valleys in this State that fall under the Cap arrangement. It is of increasing concern to the IAG that not only are there valleys in the State for which final modelling has not been undertaken, but the modelling that has been undertaken is now coming under serious questioning as to its accuracy. If there is a loss in confidence in the data and modelling upon which the Cap and the associated management arrangements for the Murray-Darling system are based, there will be a need to revise the way in which the Cap is to be administered and other forms of audit and review will need to be devised. At the same time, there is likely to be a decline in confidence in the ability of the MDBC and its member States and Territories to administer the overall usage of water in the Murray-Darling Basin, and as a consequence, pressure will mount for changes to the present willingness by all parties to abide by a Cap for the better long-term conservation and use of this valuable water resource.

