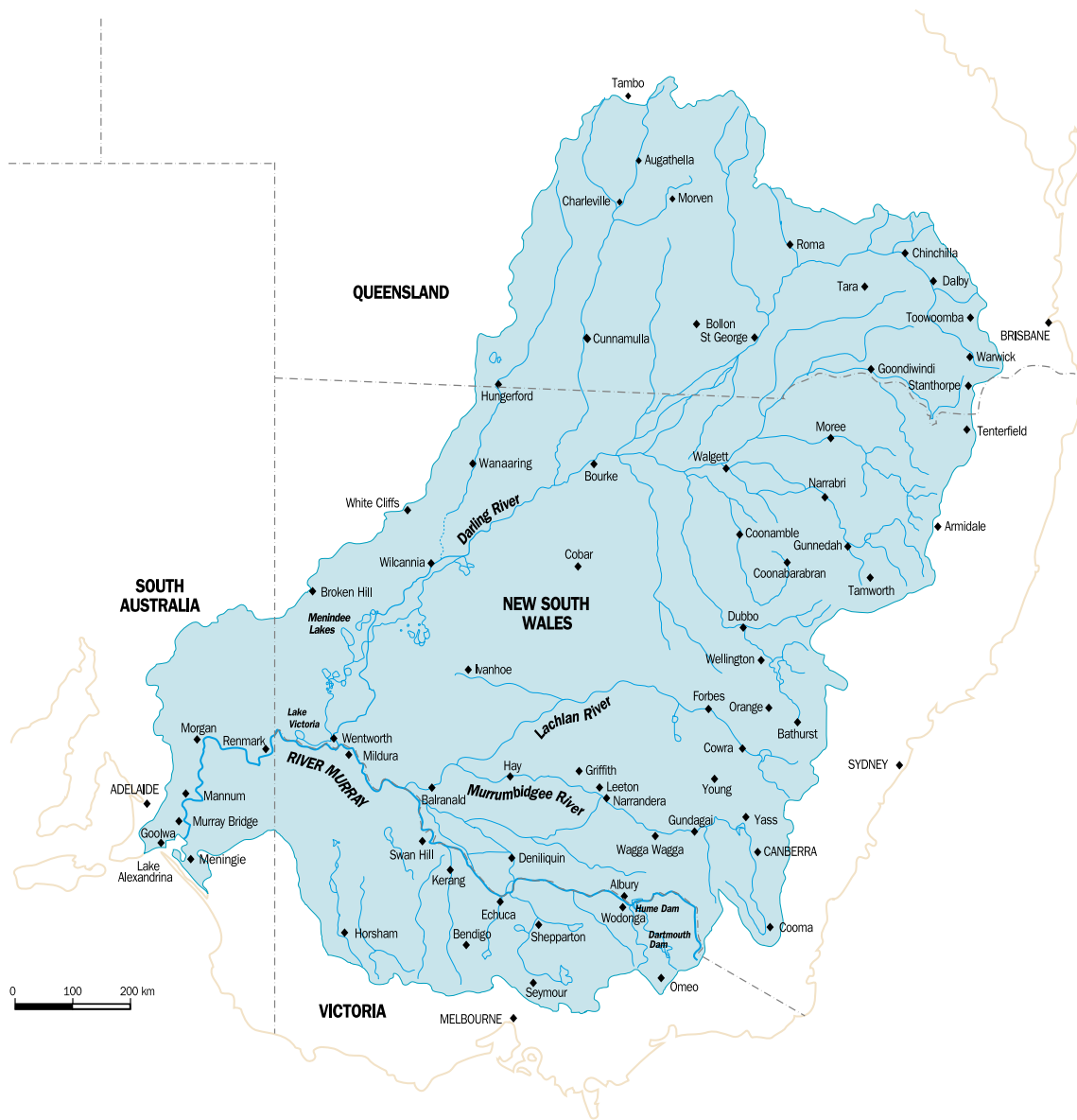


Review of Cap Implementation 2000/01

Report of the
Independent Audit
Group

Including Responses by Five
State and Territory
Governments



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
2000/01*

*Report of the
Independent Audit
Group*

*Including Responses by
Five State and Territory
Governments*



Independent Audit Group Members

Dr Wally Cox (Chair)
Paul Baxter

M A R C H 2 0 0 2

Acknowledgments

The Independent Audit Group appreciated the cooperation of State and Territory Government agencies and the Murray-Darling Basin Commission.

The implementation of the Cap continues to challenge the ingenuity and resources of Government administrators.

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

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Auditors' Foreword

March 2002

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 2000/01*.

We note that in September 2000 the Ministerial Council formally adopted Schedule F which specifies the Audit arrangements. This Audit has been carried out in accordance with these provisions.

The IAG notes that policy decisions are still required by the ACT and Queensland Governments to finalise Cap arrangements within their respective jurisdictions.

The audit identified a number of issues that require attention by the Commission and/or Council. These include Quality Management Systems, a framework for water trading, accreditation of models and arrangements for managing the Border Rivers. Recommendations on each of these issues are included in the report.

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 2000/01 audit identified progress in each of the States and the ACT in establishing and/or operationalising the Cap. There are 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;
- accreditation of models for Cap assessment;
- quality management systems for collection and reporting of diversion data;
- a framework for water trading within and between valleys including interstate trade; and
- finalisation of Border Rivers arrangements.

The current audits by the IAG are done by comparing diversions in 2000/01 against fixed Cap targets or modelled targets. None of the models have been accredited to date and until the models have been independently verified and accredited there will be ongoing changes to Cap targets.

The IAG recommends that each of the States and the ACT, where relevant, submit valley models for independent verification with a view to all models being accredited by 30 June 2002.

It was again evident that there were issues with diversion data quality and access. The IAG noted progress on this issue in South Australia but consider that Quality Management Systems for licensing and diversion data need to be established in each State and the ACT.

The IAG recommends that each of the States and the ACT develop Quality Management Systems for licensing and collection, storage and retrieval of diversion data.

Similarly with the growth of trade and further expansion anticipated it is critical that a trading framework be established including rules, exchange rates, timeliness of decision making, recording and retrieval of data and adjustment of valley caps. Such a system is the basis on which rural industries can improve their economic efficiency and profitability.

The IAG recommends that the Water Trading Project Management Board be allocated responsibility for developing a proposal to progress this key issue.

The IAG noted that both NSW and Queensland were independently developing Water Resource Plans as a basis for establishing Cap targets for their respective areas of the Border Rivers.

The IAG is of the view that environmental outcomes, and associated environmental flow regimes can only be developed through cooperation. If inter-agency cooperation is problematic the MDBC could take on a leadership role to ensure an equitable outcome is achieved.

The IAG recommends that, should the interstate planning process under the Border Catchments Ministerial Forum not prove successful, the MDBC develop a framework with NSW and Queensland for the resolution of outstanding issues in the development of Water Resource Plans including environmental outcomes for the Border Rivers.

The conclusions and recommendations reached by the IAG for the 2000/01 year by State and Territory are:

South Australia

- Diversion in 2000/01 was within the Cap.
- 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.
- Diversions for Metropolitan Adelaide are projected to run close to the rolling five-year average Cap limit of 650 GL during the 2001/02 water year. If the Metropolitan Adelaide Cap is at risk of breach the IAG recommends that SA Water acquire, by way of permanent trade, water with the same level of security.
- A model has been developed to compare seasonal water use for highland irrigation and the climate adjusted Cap which should now be submitted for verification and accreditation.

Victoria

- Diversions from the Goulburn, Campaspe and Wimmera-Mallee systems in 2000/01 were all below 2000/01 climate adjusted Cap targets.
- Diversions from the Murray/Kiewa/Ovens were above the climate adjusted Cap target for 2000/01.
- Cumulative diversions up to 2000/01 are in credit in all systems.



- Substantial progress has been made in developing climate adjusted models and implementing management frameworks to achieve Cap compliance.
- Victoria has a reliable monitoring and reporting system in place for regulated valleys.
- Bulk water entitlements need to be finalised for the Ovens River, Broken and Loddon Basins and the Wimmera-Mallee system.
- A national water trading management and recording system needs to be established and it is recommended that the Water Trading Project Management Board be given responsibility to develop this proposal.

New South Wales

- Diversions in 2000/01 were 7134 GL compared to 4962 GL in 1999/00.
- 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.
- After conducting a Special Cap Audit of the Namoi, Lachlan and Barwon-Darling/Lower Darling designated river valleys in February 2002, the IAG has determined that the long-term diversion Caps have been exceeded in all of these valleys.
- 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.
- Revised modelling of the 1999/00 water year has removed the need for a Ministerial statement on the Gwydir for that year as the results suggest that up to 1999/00 at least, the Cap had not been exceeded in that valley.
- NSW needs to submit its interim IQQM models to the independent auditor for verification and subsequent accreditation by the MDBC.
- NSW should submit the proposed Cap for the Border Rivers for assessment by the IAG.
- In view of the importance of the environmental flow rules and the NSW position that it will meet Cap requirements in the longer term, the IAG recommends that :
 - the assumptions adopted in the current conditions model run be audited by an independent expert; and

- NSW investigate methods of detecting growth in diversions in valleys affected by changed environmental flow rules that are more reliable than an annually updated current conditions run.

Queensland

- Diversions of an estimated 654 GL were the second highest recorded since 1993/94 and followed an above average flow year for the Border Rivers and a very poor flow year (20% of average) for the Condamine-Balonne.
- The moratorium has slowed construction of new storages with an estimated increase from 1726 GL to 1872 GL. This compared with a documented increase as a result of improved information and new construction from 1246 GL to 1726 GL in the previous 12 months.
- Revised draft Water Resource Plans for the Moonie, Condamine-Balonne and Paroo/Warrego/Nebine were expected to be released for public comment in December 2001 with a view to finalising the plans and establishing Caps by 30 June 2002.
- A draft Water Resource Plan for the Border Rivers was expected to be released in December 2001 with a view to also finalising this Plan and establishing a Cap by 30 June 2002.
- The IAG will audit these revised and new draft plans and supporting documentation and provide a separate report by February 2002 (subject to release of reports in December 2001).
- It is the view of the IAG that the Queensland Department of Natural Resources and Mines and the NSW Department of Land and Water Conservation should integrate their development of Water Resource Plans for the Border Rivers to ensure environmental outcomes are identified and flow regimes and diversion targets are established to achieve these outcomes.
- The Murray-Darling Basin Commission should facilitate the integrated planning process for the Border Rivers, should the interstate planning process under the Border Catchments Ministerial Forum not prove successful.
- A Queensland EPA assessment conducted for the EPA and the IAG identifies that scenarios A, B and C in the Condamine-Balonne Water

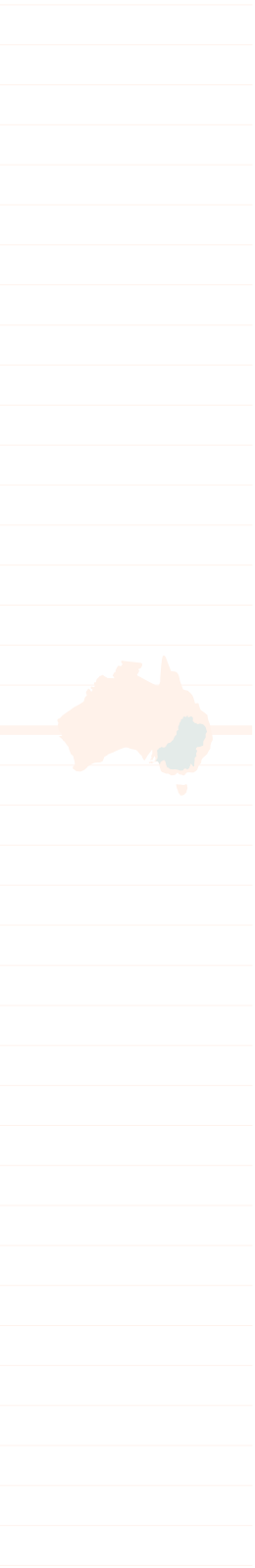
Resource Draft Plan did not deliver environmental outcomes for Narran lakes and a number of key sites. The report also concludes that *“from an ecological perspective, water is already over-allocated, and associated with increasing risks of unacceptable degradation.... There is no evidence that the proposed developments have been set on a precautionary basis, taking into account risks of environmental degradation”*.

- The technical report produced by the Murray-Darling Basin Commission, (Economic and Environmental Impacts of Development on the Condamine, Moonie and Border Rivers in Queensland on the Murray and Lower Darling Rivers, December 2000), identified that Mean Annual Flows reduced by 79, 94 and 119 GL per year for the Darling at Bourke for scenarios C, B and A respectively combined with Moonie and Border Rivers scenarios, and flow to South Australia reduced by 36, 41 and 51 GL per year for the same scenarios. The impact on diversions from the lower Darling was negligible with total diversions reduced by 1.7, 2.2 and 3.4 GL per year.

Australian Capital Territory

- No Cap presently exists for the ACT.
- Net diversions of 33.8 GL in 2000/01 exceed the average usage between 1989 and 2001 of 31 GL and a possible climate adjusted Cap of 32 GL. However, the ACT would have a cumulative credit of 28.6 GL if the proposed Cap of 38 GL had applied since July 1997.
- The IAG recommends that priority be given by the Council, to the resolution of the trading rules across the Basin.
- Once the trading rules are agreed for the Basin to the satisfaction of the ACT the IAG recommends that consideration be given to an average long-term Cap for the ACT of 38 GL/year which should be fully transferable.





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.

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 Council has supported the auditing of both the process and outcomes.

Thus the Review of Cap Implementation 2000/01 by the IAG has been prepared in response to 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 and Queensland 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 November 1996 report of the IAG sought to resolve a number of practical and equity issues arising out of the Council's decision to adopt the Cap. The Council agreed with all but four of the forty-nine recommendations in the 1996 IAG Report. The others were accepted at the July 1997 meeting of the Council in modified form.

Significantly, the Council agreed with the definition of the Cap and the proposed implementation arrangements to be adopted in each of the then four main jurisdictions.

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

within 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 Management Planning (WAMP) process being undertaken by that State, the outcome of which will be subject to consideration by Council.

For Queensland, the Council has agreed that the WAMP process should ensure that Queensland balances consumptive and in-stream use. The IAG has supported the WAMP 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 WAMP 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 WAMP 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 1999/00 Review of Cap Implementation identified that:

- Significant progress continues to be made in Cap implementation;
- Diversions in 1999/00 were below the Cap in South Australia and Victoria;
- In NSW, using Schedule F criteria the reporting provisions have been triggered for the Gwydir and Border Rivers Cap Valleys;
- A supplementary audit confirmed that diversions in these valleys were in excess of the annual and long-term Cap;
- Climate adjusted models needed to be accredited to provide a formal basis for future testing of actual versus predicted diversions;
- Caps were still to be finalised for the ACT and Queensland;
- The Queensland draft WAMP for the Condamine-Balonne was out for public consultation;
- The final Water Resource Plans and Cap targets for the Condamine-Balonne and Border Rivers were expected to be finalised by June 2001;
- The draft Water Management Plans (WMP) for the Warrego/Paroo/Nebine and Moonie were expected to be finalised early in 2001;
- There was further growth in on-farm storages in Queensland with the lower Balonne alone increasing by 340 GL; and
- The Queensland Government issued a moratorium notice under the new Water Act 2000 for the Condamine-Balonne and Border Rivers that will limit growth in diversions and the construction of new storages.

The IAG recommended a revised Cap for the Lower Murray Swamps in South Australia of 103.5 GL per year comprising 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.

3. Audit Process

For the purposes of this 2000/01 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 2000/01 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 to the finalisation or implementation of the management rules; and
- update the status of the Queensland Water Resource Plans (WRP) and finalisation of Cap figures for the ACT and Queensland.

The IAG met with representatives of each of the States and the ACT during the period 22 to 25 October 2001. The format of each meeting was to compare water usage in 2000/01 with Cap targets; to discuss progress with the establishment of models and management frameworks to achieve targets; and to discuss issues of possible concern.

In Victoria, discussion raised the issue of the need to establish a national trading system including recording Cap adjustments arising from trade.

In the case of the ACT, an additional purpose of the meeting was to clarify the ACT's progress in establishing a Cap target and the proposed management framework to achieve this.

In NSW, discussion focussed on impacts of Queensland Water Resource Plan outcomes on downstream flows and river health issues and validation of the IQQM models developed to date. The unresolved Pindari Dam issue in NSW was also discussed.

In Queensland the focus was on progress with the Water Resource Plans.

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.

The Audit identified two major process issues that need to be addressed as a matter of urgency to ensure integrity of Schedule F. Schedule F Clause 9 requires that models must be developed for determining annual diversion targets and that the analytical models must be approved by the Commission. A number of analytical models have been developed but only 3 (2 by Victoria and 1 by New South Wales) have been submitted to the Independent Technical Auditor appointed by the Commission to review the Cap models.

The IAG considers that models need to be finalised for each valley and that the models be formally assessed and accredited to ensure a valid Cap target is established which is auditable. In the interim, the IAG is auditing against interim Cap targets. Independent scrutiny of the models will give the Basin community confidence in the Cap management process.

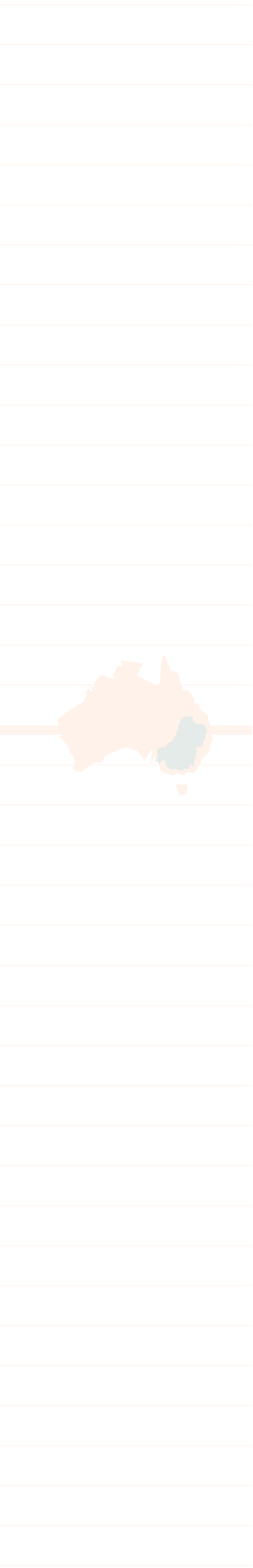
A related issue is that of data quality. The IAG observed a number of cases where diversion data for a given year and valley changed between years and varied from information provided in the Water Audit Monitoring Report required under Clause 11 of Schedule F.

The IAG has previously suggested that each State and the ACT implement a Quality Management System for the collection and management of diversion data. A nominated person in each State and the ACT should have responsibility for the system and any changes in data from that provided to the annual Water Audit Report should be authorised by the relevant State and the MDBC data custodian.

Through the factual review process and the meetings with State representatives, the opportunity has been provided for the States to bring forward additional material, which may be of assistance to the IAG.

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 2000/01 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 non-tradeable rolling allocation of 650 GL over the five-year period 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.

• 2000/01 Usage

South Australia in 2000/01 maintained its record of utilising less than the Cap in both the urban and irrigation sectors (**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).

A preliminary study has been conducted into the relationship between climatic factors and diversion for highland irrigation purposes. The study found a good relationship between year, temperature and water use and could provide a basis for comparisons between seasonal diversion in highland irrigation areas and Cap targets. It is suggested that the model now be validated, trialed and in time adopted under Schedule F. South Australia will decide whether to submit this model to the Commission as the basis for defining a climatically adjusted Cap once the work is completed.

Interstate trading was up in 2000/01 compared to 1999/00 with 4.5 GL of net permanent trades and a preliminary estimate of 3.3 GL of net temporary trades into South Australia. This compares with a net 5.2 GL of permanent moving into the State and 1.7 GL of temporary moving out in 1999/00.

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.

South Australia, through SA Water, transports water from the Murray to other Basins, i.e. Barossa Valley and 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.



Table 1: South Australian Diversions for 2000/01 (GL)

	<i>Long-term Cap adjusted for permanent trade</i>	<i>Adjustment to Cap as a result of temporary trade</i>	<i>Diversion</i>	<i>Cap Credits (Cap target less diversion) 2000/01 Cumulative since 1 July 1997</i>	<i>20% Schedule F Trigger</i>
Adelaide					
- current year			103.6	-	
- rolling 5 years	650		614.8	+35.2	-
Country towns	50		37.8	-	-
Reclaimed Swamps	99.6	-0.7	98.9	-	-
Other	457.2	4	421.3	+39.9	+226.4
					-90

• *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 of water use in the future.

Urban consumption and consumption in rehabilitated irrigation areas is 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 proposed rehabilitation program.

• *Proposals to Refine Implementation in 2000/01*

South Australia will continue to improve its capacity to manage the 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 1999/00 was within the Cap in country, urban and irrigation areas.

Adelaide's diversion was less than the nominal annual average of 130 GL/year (actual diversions 107 GL). Total diversions over 5 years at 615 GL were within the rolling five-year Schedule F Cap of 650 GL.

There is however, a risk that Adelaide could exceed the five-year rolling Cap target of 650 GL in 2001/02. In the four-year period 1997/98 to 2000/01 inclusive, diversion from the Murray was 549 GL leaving 101 GL before the Cap is exceeded. 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.

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

• *Conclusions/Recommendations*

- Diversion in 2000/01 was within the Cap.
- 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.
- Diversions for Metropolitan Adelaide are projected to run close to the rolling five-year average Cap limit of 650 GL during the 2001/02 water year. If the Metropolitan Adelaide Cap is at risk of breach, the IAG recommends that SA Water acquire, by way of permanent trade, water with the same level of security.
- A model has been developed to compare seasonal water use for highland irrigation and the climate adjusted Cap which should now be submitted for verification and accreditation.

Victoria

• The Cap

Victoria is using computer models, calibrated to 1993/94 level of development, to calculate annual Cap targets for three designated valleys and calibration of a model for the fourth valley is well advanced.

A model has been calibrated to 1993/94 level of development to calculate Cap targets for the Goulburn/Broken/Loddon and Campaspe valleys and a Cap calibration report has been prepared. This model has been submitted to the Murray-Darling Basin Commission for accreditation and the process of auditing this model has commenced.

The model used to calculate the Murray component of the Murray/Kiewa/Ovens valley Cap target is run by the MDBC and has been provisionally calibrated to 1993/94 level of development.

A methodology that uses regression relationships with rainfall and temperature is being developed to calculate Cap targets for the Ovens component of the Murray/Kiewa/Ovens valley. It is proposed to use this method to calculate the annual Cap targets for these valleys in the future as the cost of updating the Ovens model annually is very high compared with the small amount of diversion from that catchment.

A model of the Wimmera-Mallee system has been developed and is in the final stages of calibration. It is expected that the model will be calibrated by July 2002.

Victoria remains committed to the ongoing development and improvement of Cap models.

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

• 2000/01 Diversions

The gravity fed Goulburn and Murray Irrigation Districts account for more than 80% of Victoria's water use.

As a result of the continuing drought, the Goulburn and Wimmera-Mallee systems were severely resource constrained during 2000/01. The Murray system benefited from high inflows from the Darling River as well as above average flows into the upper Murray storages. Maximum allocations were announced for the Murray system.

Diversions from the Goulburn and Campaspe were within their Cap targets for 2000/01. Those for the Murray were 5% above target. All valleys remain in credit since Cap accounting commenced in 1997 as shown in **Table 2**.

Goulburn/Broken/Loddon

Resource availability

Inflows to Lake Eildon, the main water resource for the Goulburn system, were above average in each of the spring months but were below average in all other months for the year. The storage commenced the year at a record low level due to extremely low inflows in the previous year and reached a maximum of only 53% of capacity in early December 2000. By the end of April 2001, Lake Eildon had been drawn down to 31% of capacity.

The initial allocation in August 2000 for the Goulburn system was 48% of Water Right or licence volume and no sales. This was only

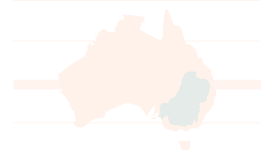


Table 2: 2000/01 Diversions (preliminary values) compared with Schedule F Targets (GL/year)

Valley	Long-term Cap	2000/01 Cap target	Net adjustment to Cap because of trade	Diversion	Cap Credits (Cap target less diversion) 2000/01 Cumulative since 1 July 1997		20% Schedule F Trigger
Goulburn/Loddon/ Broken	2084	1681	-6	1573	+102	+234	-417
Murray/Kiewa/ Ovens	1656	1643	-11	1716	-85	+56	-331
Campaspe	122	113	1	111	+2	+53	-24
Wimmera- Mallee	162	N/A		94		N/A	-32
Total	4024		-16	3494			

slightly better than the previous year, which was the lowest ever initial Goulburn allocation. Off-allocation was announced in early spring when rainfall over the lower Goulburn catchment caused flows above regulation capacity in the lower river. During the year 23 GL of off-allocation water was used.

As in the previous year, the allocation gradually increased to 100% of Water Right or licence volume in October 2000. No sales allocation was available during 2000/01 as any additional inflows were reserved to supply high security rights in the following year. This was the third year in a row where the final allocation was the equal lowest on record.

Cap compliance

Diversions from the Goulburn/Broken/Loddon valley was 1573 GL which was 102 GL under the Cap target of 1675 GL after allowing for trade out of the valley. Diversions were 25% below the long term Cap of 2084 GL per year.

This valley has a cumulative Cap credit of 234 GL since accounting commenced in July 1997. The trigger for Cap exceedance is a debit of 417 GL.

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

Murray/Kiewa/Ovens

Resource availability

High spring inflows caused Lake Hume to spill in October, which provided much needed watering of the riverine wetlands downstream. The duration of wetland flooding was enhanced by releasing 341 GL of Victorian and NSW environmental water from Hume Dam. This was achieved by calling on all the accumulated Barmah-Millewa entitlement, by bringing forward the Victorian entitlement for 2001/02 and by allocating some additional environmental water. This was the first time, the environmental entitlement had been fully used and it resulted in an extremely successful bird-breeding event in the Barmah-Millewa forest.

Resources in Lake Hume were sufficient to meet irrigation requirements and there were no irrigation releases from Lake Dartmouth during the year. However, a minimum release of 400 ML/d was made for most of the year from Lake Hume to satisfy riparian and irrigation requirements as well as to improve water quality. Consequently Lake Hume fell to 41% of capacity at the end of the year while Dartmouth rose to 79%.

On the Darling River, the Menindee Lakes filled to capacity during the year and were used extensively to augment supplies to South Australia, thereby reducing the draw on Lake Hume.

The initial allocation was 100% of Water Right or licence volume and 100% sales (70% sales for private diverters not on the Mitta Mitta) which is the maximum possible for the Murray system.

Cap compliance

Diversions from the Murray/Kiewa/Ovens valley was 1716 GL, which was 85 GL over the annual diversion target of 1631 GL after allowing for trade out of the valley. Diversions were 4% above the long-term Cap of 1656 GL per year.

This valley has a cumulative Cap credit of 56 GL since accounting commenced in July 1997. The trigger for Cap exceedance is a debit of 331 GL.

Campaspe

Resource availability

At the start of July 2000, Lake Eppalock was only 26% full due to very low inflows in the previous years. Winter inflows to Lake Eppalock were well below average but exceptionally high inflows during October and November almost filled the storage. By the end of June 2001, releases for irrigation had reduced Lake Eppalock to 64% of capacity, still well above the starting point for the year.

Irrigators in the Campaspe system received an initial allocation of 100% of Water Right or licence volume and no sales. In late October the sales allocation increased 120% which is the maximum possible and the supplement to the Goulburn system also reached the maximum allocation of 24.7 GL.

The Coliban storages commenced the year at 47% of capacity and finished at 68%. There were no restrictions imposed in the Coliban system during the year.

Cap compliance

Diversions from the Campaspe valley was 111.2 GL which was 2.3 GL under the annual diversion target of 113.5 GL after allowing for trade into the valley. Diversions were 9% below the long-term Cap of 122.3 GL/year.

This valley has a cumulative Cap credit of 53 GL since accounting commenced in July 1997. The trigger for Cap exceedance is a debit of 24 GL.

Wimmera-Mallee

Resource availability

The 2000/01 season started in May 2000 with storages holding only 16% of capacity, the lowest May volume since 1968. The 2000 winter and spring again produced below average inflow to Wimmera-Mallee Water storages, with the combined inflow over the four years ending December 2000 the lowest since records began in 1903.

Restrictions were imposed on domestic and stock customers in the 2000 winter season, with these customers being able to fill only half the dams on their properties. Similar restrictions had applied to customers during the 1999/00 summer domestic and stock run. For the second year in a row, no supply went to recreation lakes.

Although winter was relatively dry, some inflow to Wimmera-Mallee Water storages during spring led to the storages recovering to hold 19% of capacity in late November 2000, compared with 23% at the same date the previous year.

This low volume at the start of summer meant that irrigators were limited to 30% of Water Right and no sales allocation. In effect this was only 15% of their normal allocation. The summer domestic and stock run was restricted to filling one dam for 200 hectares of property, resulting in about 38% of dams being supplied. The environmental allocation was set at 25% of allocation.

Continuing dry conditions saw the 2001 winter domestic and stock season start with customers able to only fill one-third of dams on their properties. At the end of the financial year, Wimmera-Mallee Water storages held 11.6%, the lowest July volume since 1968.

Cap compliance

Diversion from the Wimmera-Mallee valley was 94 GL in 2000/01. An annual diversion target has not been calculated for this valley, as although a model has been built, it has not been calibrated to 1993/94 level of development and the input data has not been updated. The model was provisionally developed at 1990/91 level of development and the best estimate of the long-term Cap is 162 GL per year.

Diversions for 2000/01 were 42% below the long-term Cap. Usage has remained within the Cap as there have been considerable savings since 1993 through construction of the Northern Mallee Pipeline, which has resulted in reduced diversions and increased allocations for environmental flows.

Completion of Stage 6 of the Northern Mallee Pipeline enabled additional entitlement to be created for environmental flows in the Wimmera and Glenelg Rivers. The environment's entitlement from savings increased by 5.2 GL to 30.1 GL per year at the end of the 2000/01 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 policies were introduced for the 2000/01 year and none are proposed for the 2001/02 year, as these measures have continued to be effective and 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 Streamflow Management Plans.

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 Entitlementment process completed in 1995.

Murray (Victorian system) - Bulk Entitlementments were granted in July 1999.

Campaspe Basin - Bulk Entitlementments were granted in May 2000.

Kiewa River - Bulk Entitlementments were progressively granted from 1997 to May 2000 in the Upper Kiewa.

Ovens River - commenced and expected to be completed March 2002.



Broken Basin - commenced and expected to be completed May 2002.

Wimmera-Mallee - commenced and expected to be completed December 2002.

Loddon Basin - to commence December 2001 and to be completed December 2003.

Streamflow Management Plans

Interim capping arrangements were put in place in 1995 to constrain diversions on unregulated streams until streamflow 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 streamflow management planning process is very similar to the one used for Bulk Entitlements, but the outcome is a plan for managing a number of user entitlements to meet environmental flows. The plans are implemented as policies which affect the issuing of and conditions 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. However, as metering is expensive, this will take many years to implement.

Streamflow 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 rights from further downstream so that flows in the Murray are not ultimately affected.

Streamflow management plans have commenced and are at various stages of preparation on the following twelve streams:

Ovens River above Myrtleford

Yea River

King Parrot Creek

Kiewa River

Sevens Creeks

Delatite River

Nariel Creek

Avoca River

Loddon River above Cairn Curran

Avon/Richardson

Upper Wimmera River

Upper Mt William Creek

• 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 was not controlled.

To address the issue, the Minister established an independent Committee in June 2000 to undertake a review. Don Blackmore, Chief Executive of the MDBC, chaired the Committee. Extensive consultation over 12 months was undertaken, involving:

- release of discussion paper and fact sheets;
- 2 rounds of public submissions - about 850 submissions received;
- 5 public hearings; and
- over 40 public meetings around the State.

The Committee produced a draft report, put it out for public comment in December 2000 and then produced a final report, which was submitted to the Victorian Minister for Environment and Conservation in April 2001. The Government released its response to the report in July 2001, and legislation was introduced in late September 2001 to change the Water Act. The Bill was expected to be debated in early November 2001.

The main outcomes will be:

- licensing of all irrigation and commercial use of water, whether the dam is located on a waterway or not (existing irrigation dams will be either licensed or registered and, as no new licences will be issued, existing diversion licences will need to be purchased to construct new dams);
- establishment of Permissible Annual Volumes for catchments across the State to ensure that water use is sustainable;
- legislative backing for locally developed Stream Flow Management Plans; and

- improving the ability to manage conjunctive use of surface and groundwater.

• *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. However, further improvement may be required to streamline the processing of water trading information.

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

• *Proposals to Refine Implementation in 2001/02*

Further changes proposed in 2001/02 include:

- recalibration of the Wimmera model is expected to be completed by July 2002;
- the Bulk Entitlement processes for the Ovens and Broken are expected to be completed in March and May 2002 respectively;
- the Wimmera-Mallee Bulk Entitlement process is expected to be completed December 2002; and
- Streamflow Management Planning process on the Ovens River, above Myrtleford, Kiewa River, Yea River and King Parrot Creek are expected to be completed by July 2002; and
- licensing provisions of the Farm Dam legislation is expected to be fully implemented by July 2002.

No major management changes are proposed in 2001/02 as usage is in line with Cap targets in each of the four valleys.

• *Trading Management and Recording*

Following the establishment of valley-by-valley Caps and individual property rights, it was always envisaged that trading of water rights would improve irrigation industry efficiency and economic efficiency.

Significant trading is currently occurring within and between valleys and intra and interstate. It is

evident from discussions with the State and the ACT representatives that the volume of trade is such that a framework now needs to be established to manage trades to agreed rules; to document such trades so as to provide evidence of ownership; to record changes in Caps within and between States and the ACT; and to formally register the changes in the National Cap Register. Lack of such a framework given the current level of trade will, within a few years, lead to difficulty in reconciling actual diversions and Cap targets and will inevitably lead to a lack of accountability in managing to Cap targets.

• *Elements of a Trading Management and Recording Framework*

Discussions with the State and the ACT officers suggest that some of the elements of a trading management and recording framework could include:

- States/ACT to establish registers to record licence details particularly volume and access conditions;
- States/ACT to establish rules for trading water within valleys and between valleys (where applicable) within their own jurisdiction;
- Relevant States/ACT to establish jointly through MDBC rules for trading of water within or between valley that cross state boundaries;
- For trade between valleys, develop a system for adjusting Cap targets for valley receiving or losing water;
- For all changes to valley Cap targets, arrange periodic updates of the National Register; and
- A Quality Management System be put in place to manage the process supported by annual audits to reconcile all Cap adjustments.

The framework outlined above needs substantial development and it would be appropriate for it to be established as a project under the jurisdiction of the Water Trading Project Management Board.

The IAG has addressed this issue specifically with a view to ensuring that the National Register has up-to-date and accurate information of Cap targets for each valley capable of providing the basis on which the IAG audits. It is also clear to the IAG however, that lack of trading rules in a number of jurisdictions is preventing optimum resource utilisation and economic efficiencies being realised.



• *IAG Assessment*

In 2000/01, diversions for the Goulburn/Broken/Loddon, Wimmera-Mallee and Campaspe were all within the climate adjusted Cap. Murray diversions were above the annual and the average long-term Caps. However all valley systems are in credit for the period since July 1997.

The allocation of Bulk Entitlements for water management authorities and the associated management and accountability provisions enables monitoring of performance against Cap targets and management responses in cases of adverse trends.

Action is still required in the following areas, although it is acknowledged that this is of lower priority than the initial definition of Cap targets and allocation of Bulk Entitlements:

- recalibration of the Murray system models by the MDBC;
- finalisation of Bulk Entitlements for the Ovens River, Broken and Loddon Basins and the Wimmera-Mallee system;
- development of Cap targets for the Wimmera-Mallee; and
- management arrangements consistent with the Cap for the unregulated components of the Goulburn/Broken/Loddon and Murray/Kiewa/Ovens.

Victorian implementation of the Cap has been exemplary with models developed for the main systems and a management regime based on Bulk Entitlements for the major users. The Governor-in-Council Orders provides the legal

basis for implementation including a requirement for monitoring and reporting to Schedule F targets.

The processes and information presented indicates that Victoria remains committed to holding diversions equivalent to those associated with the 1993/94 level of development.

• *Conclusions/Recommendations*

- Diversions from the Goulburn, Campaspe and Wimmera-Mallee systems in 2000/01 were all below 2000/01 climate adjusted Cap targets.
- Diversions from the Murray/Kiewa/Ovens were above the climate adjusted Cap target for 2000/01.
- Cumulative diversions up to 2000/01 are in credit in all systems.
- Substantial progress has been made in developing climate adjusted models and implementing management frameworks to achieve Cap compliance.
- Victoria has a reliable monitoring and reporting system in place for regulated valleys.
- Bulk water entitlements need to be finalised for the Ovens River, Broken and Loddon Basins and the Wimmera-Mallee system.
- A national water trading management and recording system needs to be established and it is recommended that the Water Trading Project Management Board be given responsibility to develop this proposal.

New South Wales

• The Cap

Performance relative to the 2000/01 Cap is assessed for those valleys in the south of the State on the basis of a water year that runs from July to June. In the north of the State the water year runs from October to September. The timing of the IAG's review of performance has been set to coincide with the end of the water year in the north of the State. However, there remains a problem with the delivery of diversion outcomes for these valleys, and thus some of the estimates provided initially to the IAG are preliminary.

The Department of Land and Water Conservation (DLWC) has developed a suite of Integrated Quantity/Quality Models (IQQMs) for each of its major regulated valleys and the Barwon-Darling. Interim and final IQQMs are now available for Cap auditing in the Murrumbidgee, Namoi, Gwydir, Border Rivers, Macquarie, Barwon-Darling and Lachlan Valleys. Preliminary results only are available from the IQQMs for each of these valleys and MDBC review and approval is still required. NSW has forwarded the calibration reports for the Lachlan IQQM to the independent auditor for review and approval. Draft reports for the Macquarie and Barwon-Darling are now also available to be audited.

For the Murray and Lower Darling, the MDBC's Monthly Simulation Model is used for Cap auditing. For the 2000/01 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. **Table 3** provides a summary of the current auditing tools used in NSW.

• 2000/01 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.

NSW notes that it is still having difficulty in providing the data needed by the IAG even though the audit has been delayed until after the end of the October-September water year in the northern river valleys. NSW notes that it can take more than six months to update the daily and monthly hydrological models with the climatic information necessary for carrying out a 1993/94 run to generate an annual diversion target.

The IAG has noted the concerns expressed by NSW and recognises the difficulties that are being encountered. The significance of the audit procedure and the need to link this with the day-



Table 3: NSW Audit Tools 2000/01

<i>Valley</i>	<i>Auditing Tool</i>	<i>Comment</i>
Murray/Lower Darling	Murray Monthly Simulation Model (Interim)	Awaiting recalibration
Murrumbidgee	IQQM (Interim)	Preliminary results available
Lachlan	IQQM (Final)	Awaiting Commission approval
Macquarie	IQQM (Final)	To be presented to the Commission for approval
Peel	Climate-diversion relationship	IQQM under development
Namoi	IQQM (Interim)	Preliminary results available
Gwydir	IQQM (Interim)	Preliminary results available
Border Rivers	IQQM (Interim)	Definition of the Cap not complete
Barwon-Darling	IQQM (Final)	To be presented to the Commission for approval

to-day management of the river systems should ultimately result in more timely provision of data. However, the IAG notes that NSW continues to have resourcing difficulties in terms of meeting all of its administration requirements.

This issue is particularly relevant for NSW where the long-term water use management arrangements built around the operation of the Cap involve a number of checks and balances potentially running over three or more years once a breach of the Cap has been identified.

The mechanisms that are expected by NSW to help prevent diversions from exceeding the Cap are the environmental flow rules (EFRs) and other operational rules introduced for most valleys in 1998/99. Whilst not specifically designed as Cap management measures, NSW contends that these processes have the side effect of keeping long-term average diversions below the Cap. As previously noted by the IAG, the use of this mechanism in NSW places even greater emphasis on the need for timely and accurate reporting of actual diversions and climate adjusted Cap estimates. NSW advised that from 2002 the water year would run from 1 July to 30 June for all valleys.

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.

Following is a valley-by-valley assessment.

Border Rivers

An allocation of 25% was announced at the commencement of the water year which was combined with a carryover of 52% of entitlement from the 1999/00 season (out of a maximum allowable carryover of 100%). In December, an allocation of 40% was announced, providing a total resource availability of 244 GL, not including off-allocation.

During the 2000/01 season there were seven off-allocation events, the first one in November 2000 lasting for 16 days and the last event in August 2001 lasting for just one day. These events resulted in a total of 117 GL of off-allocation diversions. The maximum off-allocation Cap for the NSW Border Rivers was 120 GL.

Rainfall across the NSW Border Rivers Valley over the six-month-long principal irrigation season (October to March) was above average to

Table 4: NSW Valley Diversions 2000/01 (GL)

<i>Designated river valley</i>	<i>Long-term diversion Cap</i>	<i>2000/01 Cap target</i>	<i>Net trade in to valley</i>	<i>2000/01 diversion</i>	<i>Cap Credits (Cap Target less Diversion)</i>			<i>Trigger exceeded</i>
					<i>2000/01</i>	<i>Cumulative since 1 July 97</i>	<i>20% Schedule F trigger</i>	
Barwon-Upper Darling	177	186	0	242	-56	-161	-35	Yes
Lower Darling	119	151	20	232	-61 ¹	24 ¹	-24	No
Total Barwon Darling	296	337	20	474	-117 ¹	-137 ¹	-59	Yes
Border Rivers	204	N/A	N/A	248	N/A	-90 ²	-41	Yes ²
Gwydir	345	N/A	0	425	N/A	5 ²	-69	No ²
Namoi	284	251	0	315	-64	-61	-57	Yes
Macquarie	474	512	0	495	17	199	-95	No
Lachlan	339	389	0	418	-29	-69	-68	Yes
Murrumbidgee	2289	2688	-30	2711	-53	-17	-458	No
NSW Murray	1877	2061	-6	2048	7	873	-375	No
TOTAL	6108		-16	7134		713		

- 1 An allowance has been made in the calculation of these figures for modelled trade under Cap conditions.
- 2 Figures for the latest year not available. Trigger exceedance estimate based on past performance and activity in valley during 2000/01.

very much above average in 2000/01, falling in the 8th to 9th decile range of historical records for the valley.

In 2000/01 DLWC surveys estimate that 36650 ha of crops were irrigated, with 36200 ha being cotton. This is a decrease of 8% from the total irrigated area in 1999/00.

The estimated total on-farm storage capacity in the NSW Border Rivers at the start of the 2000/01 season was 154500 ML. This is an increase of about 6% from 1999/00 and 18% from 1993/94.

The total diversion in the Border Rivers Valley was at 248 GL which includes an estimated 16 GL use by unregulated stream licences in the valley.

The estimates of unregulated stream licence usage in the Border Rivers and in the other New South Wales valleys are based on the estimates made in previous years. The IAG has included them in the valley totals to ensure that this year's diversions are comparable with the previous years' diversions recorded in the Water Audit Monitoring Reports. Because NSW has recently collected more detailed information as part of the volumetric conversion process, more accurate estimates of unregulated stream diversion will be available soon.

The Border Rivers IQQM is available for Cap simulation. The IAG report *Setting the Cap* (1996) indicated that an allowance should be made within the Cap for the enlargement of Pindari storage. NSW has made some preliminary estimates of the Cap for the NSW Border Rivers in its Cap model scenario. However, further development of the proposed Cap level is still being undertaken.

Previous assessments of Cap performance by the IAG indicated that diversions in the NSW Border Rivers were above the Cap. The definition of the Cap within the NSW Border Rivers (which includes enlarged Pindari Dam) is still to be finalised and this is the reason that no annual Cap target has been calculated for 2000/01. However, on the basis of the previous extent of excess diversion above the annual Cap targets and a continuing high level of diversion in 2000/01, the IAG has formed a preliminary view that the Border Rivers remain above the notional Schedule F trigger point.

Gwydir Valley

The Gwydir Valley commenced the season with a total of 104% of entitlement in accounts, out of a maximum 150%. This provided a resource

availability of 549 GL, not including off-allocation. The accounts were assessed monthly throughout the water year, with account increments for the water year totalling an additional 44% of entitlement during the season. This combined with a total usage of 51% of entitlement during the season provided a closing balance across the valley of 97% of entitlement. In any particular season, each licensee is limited to a maximum on-allocation usage of 100%.

There were five off-allocation events announced for the Gwydir Valley during 2000/01. The first three events resulted in a total of 116 GL of off-allocation diversions and figures for the last two events (in July and August 2001) provided a further 30 GL.

Rainfall across the Gwydir Valley over the six-month long principal irrigation season (October to March) was above average in 2000/01, falling in the 8th to 9th decile range of historical records for the valley.

In 2000/01 DLWC surveys estimate that 70092 ha of crops were irrigated, with approximately 65539 ha (94% of the total area) of cotton, a small increase on the previous season. No estimates of on-farm storage capacity are currently available for the 2000/01 water year.

The diversions in the Gwydir Valley were 425 GL which includes an estimated 11 GL use by unregulated stream licences in the valley.

There were no significant changes to management rules for the regulated Gwydir system during 2000/01. However, operational audits have indicated that there has been some difficulty in applying parts of the environmental flow rules, and that there have been instances where some rules were not adhered to.

Last year a preliminary IQQM was available for Cap auditing of the Gwydir Valley, which indicated that the valley was in breach of the Cap. The Gwydir IQQM has since been recalibrated during 2000/01, and the provisional results of the long-term and annual Cap simulations have been used to re-assess Cap compliance. The model has been tested for robustness and has been used to provide modelling for the development of the Gwydir Water Sharing Plan. 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 recalibrated model indicates that a breach of the Schedule F trigger did not occur in water year 1999/00 and in view of this no further action is required by NSW under Schedule F.



Cap accounting has been performed using the recalibrated Gwydir IQQM. The preliminary Schedule F accounting for the 1997/98 - 1999/00 seasons indicates that the Gwydir Valley is in fact cumulatively 5 GL in credit. Runoff data is not yet fully available to allow simulation of 2000/01. Long-term simulations indicate that average annual current conditions diversions are 4% below Cap diversions. The IAG will await the availability of further data for 2000/01 before reaching any conclusions on the Gwydir's performance in the current year.

Namoi/Peel Valley

The Namoi Valley commenced the season with a total of 132% of entitlement in accounts, out of a maximum 200%. This provided a resource availability of 348 GL, not including off-allocation. The accounts were assessed monthly throughout the water year, with account increments for the water year totalling an additional 112% of entitlement during the season. This combined with a total usage of 65% of entitlement during the season. A reconciliation of announced increments and water available indicated that 8% had been under-allocated to accounts (due to issues with administration of continuous accounting), which was subsequently made available. This provided a closing balance across the valley of 171% of entitlement. In any particular season, each licensee is limited to a maximum on-allocation usage of 100%.

An initial allocation for the Peel Valley of 80% was made in July 2000, and was later increased to 100% in October 2000. This gave irrigators 31.2 GL of general security and 17 GL of high security. The Upper Namoi/Manilla water users have not been included in the trial. Accordingly, an allocation for the 2000/01 season of 100% was announced in October 2000. This provided a resource availability of 10 GL.

There were five off-allocation events announced for the Namoi system downstream of Keepit Dam during 2000/01. These events resulted in a total of 48 GL of off-allocation diversions. The maximum off-allocation limit for the Namoi Valley was 110 GL.

Climatic conditions were generally wet during 2000/01, with monthly net evaporation below the long-term median (in the main Namoi Valley) and rainfall in the Peel over the whole summer period was much higher than the long-term median.

A survey of on-farm storage capacity in the Namoi Valley in 2000/01 indicated that the

valley storage total was approximately 186 GL. This represents a 4% increase from the on-farm storage capacity found in the corresponding survey for 1999/00. DLWC surveys indicate that around 75500 ha were irrigated from the regulated Namoi/Manilla system during 2000/01, with cotton areas estimated at 50000 ha. This is similar to surveyed areas in 1999/00, although cotton represents a higher proportion of the total area in 2000/01.

The diversions in the Namoi/Peel system were 315 GL, which included an estimated 42 GL use by unregulated stream licences in the valley.

There were no significant changes to management rules for the Namoi/Peel system during 2000/01.

The Namoi IQQM has recently become available, and the provisional results of the long-term and annual Cap simulations have been used to assess Cap compliance. The model has been tested for robustness and has been used to provide modelling for the development of the Namoi Water Sharing Plan. 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 - 2000/01 seasons indicates that the Namoi Valley is cumulatively 61 GL in debit and 4 GL above the trigger for further accounting by the IAG. Long-term simulations indicate that average annual current conditions diversions are 3% below Cap diversions.

Macquarie Valley

The first official allocation announcement for the Macquarie Valley of 45% was made in August 2000, with 98% out of a maximum of 100% of entitlement carried over from the 1999/00 water year. Following significant inflows and spilling of all remaining carryover, all allocations were reset to 100% by early October. For the 2000/01 water year the water accounting rules were modified to increase the maximum carryover plus allocation limit from 160% to 200% for individual licensees.

The storage capacity at Burrendong and Windamere dams generally limits the maximum available resource (carryover + allocation) to around 150% for the valley in total. For 2000/01, this gave a water resource availability of 940 GL not including off-allocation.

There were four off-allocation events announced for the Macquarie Valley during 2000/01,

between 4 September and 14 December 2000. All these events were of short to medium duration and resulted in total off-allocation diversions of 28 GL. The maximum off-allocation limit for the Macquarie Valley was 50 GL.

The 2000/01 season experienced a substantially wetter than average spring and wetter than average autumn. An estimated 66200 ha of crops were irrigated in the Macquarie Valley in 2000/01, of which approximately 53800 ha was irrigated cotton (a slight increase on the previous year). These combined to produce a diversion of 495 GL in the 2000/01 water year which includes an estimated 31 GL use by unregulated stream licences in the valley.

During the water year the water accounting rules were modified to increase the maximum carryover plus allocation limit from 160% to 200%. Otherwise, there were no significant changes to the management rules from the 1999/00 season. The environmental flow rules (EFRs) remained unchanged from the previous season.

The Macquarie IQQM has been recalibrated during 1999/00 to take advantage of upgrades to the IQQM software. Further enhancements have also been made during 2000/01 to improve representation of Cap and current conditions. The model has been tested for robustness and has been used to provide modelling for the development of the Macquarie Water Sharing Plan. 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 - 2000/01 seasons indicates that the Macquarie Valley is cumulatively 199 GL in credit. Long-term simulations indicate that average annual current conditions diversions are 18% below Cap diversions.

Barwon-Darling

The Barwon-Darling system does not receive a formal allocation of resources, and only access to unregulated flows as they occur is available. There is a system of annual quotas that operates within the valley, limiting the total annual extraction to 518 GL.

During 1999/00, it was determined that the Barwon-Darling Valley had exceeded the Cap in 1998/99, and the 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.

The Barwon-Darling IQQM has been recalibrated during 2000/01 to reflect the newly available results from the joint DLWC/NSW Agriculture study, the "Barwon-Darling History of Development Project". Significantly, this project has used remote sensing techniques, as well as farmer survey data, to help quantify attributes including on-farm storage development, cropping history and irrigation infrastructure.

Metered diversions in the Barwon-Darling during 2000/01 were 242 GL compared with a Cap target for the year of 186 GL.

The preliminary Schedule F accounting for the 1997/98 - 2000/01 seasons indicates that the Barwon-Darling Valley is cumulatively 161 GL in debit, and well above the 35 GL Schedule F trigger for special audit, based on 20% of the estimated long-term average Cap diversion.

Lower Darling

The Lower Darling system has a small entitlement, receiving a full allocation every year since the volumetric allocation scheme commenced in 1981, which is equivalent to 48 GL. Net intervalley trade of up to 20 GL into the valley have occurred each water year since the commencement of Cap auditing.

There were extensive off-allocation periods during each water year in the Cap accounting period, with the exception of 1999/00. In particular, there were significant flows during 1998 and 2001.

Rainfall across the Lower Darling Valley over the six-month-long principal irrigation season (October to March) was generally close to average in 2000/01, falling in the 4th to 7th decile range of historical records for the valley.

As yet, no cropped area estimates for the Lower Darling are available for 2000/01. Nearly all of the on-farm storage capacity in the Lower Darling Valley is located on the Tandou property, totalling approximately 160 GL in natural lakes.

The total diversion in the Lower Darling Valley in 2000/01 was 232 GL, of which 42 GL was for the Darling Anabranch replenishment. There was also a temporary trade of 20 GL into the valley. New South Wales has also reviewed the method used to determine diversions in the Lower Darling and this has resulted in the revision of diversion data published in recent years.



There were no significant changes to the management rules in the Lower Darling during 1999/00.

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 recalibrated to better represent 1993/94 conditions. The preliminary Schedule F accounting for the 1997/98 - 2000/01 seasons indicates that the Lower Darling Valley is cumulatively 24 GL in credit.

Combined Barwon-Darling & Lower Darling Cap Accounting

The preliminary Schedule F accounting for the 1997/98 - 2000/01 seasons indicates that the combined Barwon-Darling and Lower Darling Valleys are cumulatively 137 GL in debit which exceeds the 59 GL trigger for special audit, based on 20% of the estimated long-term average Cap diversion.

Lachlan Valley

Lachlan Valley allocations for the 2000/01 water year began at 59% in August 2000 and increased in December to 84%. A total 41% of entitlement was carried over from the 1999/00 water year, providing an effective allocation of 100%. The carryover was reduced to 16% of entitlement across the valley (100% less 84%) as additional allocation was made available during December. This provided a water resource availability of 665 GL, not including water accessible during off-allocation periods.

There was only one off-allocation event during 2000/01 for the entire Lachlan and Belubula River Valleys commencing on 16 November 2000, which continued until 14 December 2000. This event resulted in a total of 22 GL of off-allocation diversions for 2000/01. The maximum off-allocation limit for the Lachlan Valley was 30 GL.

Rainfall during 2000/01 was close to median conditions with 332 mm of rainfall falling between July and April, compared to an average of 330 mm. DLWC survey estimates indicate an irrigated area in 2000/01 of 88000 ha, which is similar to the previous two seasons. Also of note is the continued increase in cotton areas. The estimated total cotton area for 2000/01 was approximately 21000 ha, an increase of around 3500 ha (25%) from the previous season. Prior to 1998/99 there was generally less than 1000 ha of cotton irrigation per year.

The Lachlan Valley diverted 418 GL during 2000/01. This includes:

- A net diversion by Jemalong Irrigation Limited of 86 GL, including losses within the Corporation.
- A diversion by regulated irrigation, stock, domestic, and miscellaneous licences of 320 GL.
- Unregulated stream diversions estimated at 11 GL.

There were no significant changes to the management rules from the 1999/00 season. The environmental flow rules (EFRs) remained unchanged from the previous season.

The Lachlan IQQM has been recalibrated during the last 12 months to improve Cap representation, and the results of the long-term and annual Cap simulations have been used to assess Cap compliance. The model has been tested for robustness and has been used to provide modelling for the development of the Lachlan Water Sharing Plan. 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 - 2000/01 seasons indicates that the Lachlan Valley is cumulatively 69 GL in debit and 1 GL above the trigger for further auditing by the IAG. The IAG notes that long-term simulations indicate that average annual current conditions diversions are 4% below Cap diversions. There remains some outstanding questions about the effectiveness of the current environmental rules given that climatic condition changes were tailored into the model. This issue will need to be addressed as part of a supplementary audit now required for this valley.

Murrumbidgee Valley

Allocations were initially low, with the first official allocation announcement for the Murrumbidgee Valley of 51% made in July 2000, with an additional 9% of entitlement carried over from 1999/00. The announced allocation increased as the season progressed to reach 90% in late November, providing a total water availability of 99% for the season or around 2740 GL, excluding water available in off-allocation periods.

Close to median climatic conditions during winter and spring resulted in periods of off-allocation access from August to November. As the announced allocation gradually increased, off-allocation extractions by irrigators without a

History of Use (HOU) quota were converted to on-allocation usage. This resulted in a total of 173 GL of off-allocation diversions for 2000/01. The maximum off-allocation limit for the Murrumbidgee Valley was 220 GL.

The 2000/01 season in the Murrumbidgee Valley was close to long-term median conditions, with a combined net evapotranspiration for the July to June period of 1474 mm.

Aerial photography of rice areas indicates 101222 ha of rice were irrigated in the Murrumbidgee Valley in the 2000/01 season. This represents a 13% increase from the area planted in 1999/00 and, is the highest rice area total for the Murrumbidgee Valley on record.

The Murrumbidgee Valley diverted 2124 GL during 2000/01. This includes:

- A net diversion by Murrumbidgee Irrigation of 1048 GL, including losses within the Corporation. Escape flows are not included in this total, as they are considered to be negligible and have not been modelled.
- A net diversion by Coleambally Irrigation of 417 GL, including losses within the Corporation. This results from a gross diversion of 564 GL, and a return flow of 149 GL.
- A diversion by regulated irrigation, stock, domestic, and miscellaneous licences of 655 GL, which includes 46 GL by Special Additional Licences (also known as high flow licences).
- Unregulated stream diversions estimated at 11 GL.

There was a net temporary trade of 30 GL out of the Murrumbidgee Valley.

The Murrumbidgee IQQM has been developed and tested for robustness during the last 12 months, and the results of the long-term and annual Cap simulations have been used to assess Cap compliance. A preliminary representation of the Lowbidgee district is now available in the Murrumbidgee IQQM, and its results are shown separately for information. The results for both the regulated diversions and Lowbidgee must still be 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 - 2000/01 seasons indicates that the Murrumbidgee Valley is cumulatively 17 GL in debit, but well below the 400 GL trigger for Schedule F exceedance based on 20% of the

estimated long-term average Cap diversion. Long-term simulations indicate that average annual current conditions diversions are 3% below Cap diversions.

Murray Valley

The initial allocation in this valley was only 9%, in addition to a carryover of around 15% of allocation from late season improvements in the previous season. However, late winter and spring conditions were quite wet, and significant inflows occurred into the major storages, with all carryover from the previous season spilled. A particularly wet spring period saw a minor to moderate flood event occur in the Murray, with Lake Hume spilling (including pre-releases) 608 GL of NSW resources over August to early November. By mid-December the announced allocation reached 95%. This effectively represents a maximum of 100% as the remaining 5% of water was borrowed in previous seasons from the Barmah-Millewa environmental account (in accordance with the Annual Allocation Plan). The repaid water was used during 2000/01 to extend flooding in the Barmah-Millewa Forest.

There was one off-allocation period announced for the year from late August, which was extended until early November 2000. This resulted in 287 GL of off-allocation diversions for 2000/2001. The maximum off-allocation limit for the Murray Valley was 250 GL. However due to low allocations at the commencement of the water year, general access to off-allocation was made available, provided the total of announced allocation, carryover and off-allocation use did not exceed 100% for any licence.

Murray Valley monthly rainfall in 2000/01 was very close to median, with rainfall during the main irrigation season (October - April) being higher than median.

The NSW Murray Valley diverted 2048 GL during 2000/01. This includes:

- A net diversion by Murray Irrigation Limited of 1558 GL, including losses within the Corporation.
- A net diversion by Western Murray Irrigation of 31 GL, including losses within the Corporation.
- A total diversion of 97 GL by Irrigation Trusts and group licences.
- A diversion by regulated irrigation, stock, domestic, and miscellaneous licences of 357 GL.



- Unregulated stream diversions estimated at 11 GL.

There was a net temporary trade of 1 GL out of the Murray Valley to other NSW valleys, South Australia and Victoria plus an accumulated 5 GL of adjustments for permanent trade out of the NSW Murray Valley.

The Cap for the regulated sections of the Murray Valley is currently audited on a provisional basis using the Murray Simulation Model (MSM). The MSM is currently being recalibrated to better represent 1993/94 conditions.

The preliminary Schedule F accounting indicates that the NSW Murray Valley was 7 GL in credit in 2000/01 and that it has accumulated 873 GL of Schedule F credits since July 1997.

• *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 EFRs, are designed to ensure that diversions from the various valleys comply with the Cap in the longer-term. Current management rules are estimated to reduce diversions to irrigators by a long-term average of around 4% against the 1993/94 benchmark year. However, with IQQM expected to be able to model current management rules in the near future, estimates of the impact of current management rules on long-term average diversions may change.

New South Wales has introduced a number of management rules in recent years including lower allocation announcements; limiting allocation announcements to a maximum of 100%; reduced access to off-allocation; the gradual introduction of carryover to reduce late season ‘use it or lose it’ diversions; and reducing irrigators access to borrow from the subsequent year’s supply. These along with the EFRs are projected to keep diversions within the Cap, notwithstanding that there may be movement around the long-term Cap average on a year to year basis.

In order to administer the Cap and adjust its management rules in an appropriate fashion without causing a “boom or bust” approach to economic activity in the State, DLWC use a three-year management cycle.

The importance placed upon the use of models in the NSW management methodology highlights the need to complete the IQQM modelling for all valleys and have these authorised under the

terms of Schedule F of the Murray-Darling Basin *Agreement*. It is noted that NSW currently has three of these models awaiting appraisal by the independent auditor and has completed interim models for most other valleys over the last 12 months.

• *Monitoring and Reporting*

NSW recently sought agreement from the Ministerial Council for the annual numerical process of auditing Cap compliance to be examined and replaced with a process that assesses performance against a long-term cap diversion target. However, the Ministerial Council believes that Schedule F is flexible enough to allow for this change in approach without a corresponding change to the Schedule. NSW will therefore still need to meet its annual reporting requirements under Schedule F. However, the NSW authorities now also propose to report Cap compliance using models that compare the long-term diversions (generally 100 years) that would occur with the current development, including environmental and operational flow rules, against the 1993/94 benchmark. The results of this modelling were presented to the IAG as part of the current year’s review and reference is made to this data above where appropriate.

The IAG notes the use of these long-term models by NSW. While these can assist in providing some comfort to the Council as to the performance of NSW in terms of the Cap, the IAG is of the view that there is a need for a common approach to be used by all jurisdictions and that Schedule F and subsequent audit and review of this data provides the appropriate benchmark to assess performance on an annual basis.

• *IAG Assessment*

NSW has provided a very detailed report to the IAG together with data in line with the Schedule F format. There are still data problems mainly due to the timing of the delivery of reports. The further work on the IQQM models during the year and the use of these models in the assessment of the 2000/01 outcomes represents an important next stage in the Cap reporting process.

Diversions exceed the estimated Schedule F trigger mechanism for the Barwon-Darling, Lachlan, Namoi and in all probability for the Border Rivers. The Council’s decision to combine

the Barwon-Darling and Lower Darling removed the need for corrective action following the 1999/00 review, but has not removed the need for appropriate action based on this latest review. The NSW authorities will also have to consider an appropriate response to the exceedance of the Schedule F trigger by the Border, Namoi and Lachlan Rivers.

In the valleys where diversions exceed or are likely to exceed the estimated Schedule F trigger, it is noticeable that access given to water is high compared to diversions and the long-term average Cap (**Table 5**)

The model for the Border Rivers has now been completed but NSW has yet to finalise the Cap for this valley. No annual Cap target has been produced for the NSW Border Rivers for 2000/01 because of the uncertainty over the final Cap. Last year the capacity of on-farm storage on the NSW Border Rivers grew by 6%. NSW is urged to submit a proposal for the Border Rivers for assessment by the IAG as soon as possible.

NSW stresses the importance of their current conditions runs as the final indication of Cap compliance. For these runs, the model is run with the current operating rules (including environmental flow rules) and estimates of the current levels of demand. Compliance with the Cap is determined by comparing the modelled average diversion for this case with the modelled diversions under 1993/94 conditions with both cases run over the same 108 year climatic sequence. This approach is formalised in the NSW Water Sharing Plans. The IAG has received advice that there are difficulties with this method including:

- The independent data input to the models to define current conditions are difficult to obtain.
- Industry crop area estimates for 2000/01 for the Namoi and Gwydir were about 40% greater than the DLWC estimates. In many cases only key crops are surveyed and there is the additional difficulty of separating areas supplied by surface water and groundwater

and in some cases areas serviced from adjacent valleys.

- Crop mix varies from year to year in some valleys.
- On-farm storage surveys are not conducted every year and it is not always clear whether storage growth is for water harvesting, pollution control or flood plain harvesting.
- A key input parameter is the risk taken by irrigators when selecting areas to be planted for a given water availability. This relationship is likely to be reasonably volatile and would require several years of data before a change could be identified.
- Irrigator behaviour in operating storages is also likely to significantly affect diversions and this would also be difficult to identify.
- The efficacy of the environmental flow rules depends on them operating as planned every year. The NSW submission notes a number of instances where the rules have not been fully implemented.

In view of this, the IAG recommend that the assumptions adopted in the current conditions model run be audited each year by an independent expert.

It is also suggested that a more reliable way to account for the change to the pattern of diversions brought about by environmental flow rules would be to develop a model run which incorporates the new flow rules but which has demand factored up so that the long-term diversion is equal to the Cap run. This model could then be run each year at the same time as the run to determine the annual Cap targets. By comparing the annual diversion against the output of this run, it may be possible to detect growth in diversions more reliably.

• **Conclusions/Recommendations**

- Diversions in 2000/01 were 7134 GL compared to 4962 GL in 1999/00.
- IQQM Cap models have now been prepared for all river valleys, with the exception of the



Table 5: Water use in 2000/01 for selected NSW valleys

<i>River Valley</i>	<i>Water Authorised for use in 2000/01 (GL)</i>	<i>Diversion in 2000/01 (GL)</i>	<i>Cap Credit 2000/01 (GL)</i>	<i>Long Term Average Cap (GL)</i>
Border Rivers	364	232	N/A	204
Namoi	370	272	-63	284
Lachlan	687	407	-29	339
Barwon-Darling	518	242	-56	177

Murray and the Peel Rivers, and these models now await calibration and/or approval under Schedule F by the Commission.

- After conducting a Special Cap Audit of the Namoi, Lachlan and Barwon-Darling/Lower Darling designated river valleys in February 2002, the IAG has determined that the long-term diversion Caps have been exceeded in all of these valleys.
- 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.
- Revised modelling of the 1999/00 water year has removed the need for a Ministerial statement on the Gwydir for that year as the results suggest that up to 1999/00 at least, the Cap had not been exceeded in that valley.
- NSW needs to submit its interim IQQM models to the independent auditor for verification and subsequent accreditation by the MDBC.
- NSW should submit the proposed Cap for the Border Rivers for assessment by the IAG.
- In view of the importance of the environmental flow rules and the NSW position that it will meet Cap requirements in the longer term, the IAG recommends that:
 - the assumptions adopted in the current conditions model run be audited by an independent expert; and
 - NSW investigate methods of detecting growth in diversions in valleys affected by changed environmental flow rules that are more reliable than an annually updated current conditions run.



Queensland

• The Cap

In line with the Council's earlier decisions, the Queensland Cap is to be established in accordance with the pilot provisions of Schedule F following the completion of the Water Resource Planning processes (previously known as WAMPs and WMPs). Draft plans for all the Queensland Murray-Darling valleys except the Border Rivers were released in mid-2000 for public review and comment. No plans have yet been finalised and consequently valley Caps for Queensland have not been established.

The IAG are to audit the Plans in line with the principles endorsed by the Ministerial Council, noting in its November 1999 audit that:

- the planning process 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 Water Resource Plans (previously known as WAMPs) are 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
- a final independent audit of the planning process should be conducted, including modelling of impacts on downstream Basin flows.

In August 2000, the Ministerial Council agreed to retain references to end-of-valley flows as an optional interim measure for Queensland compliance with the Cap until December 2002. It agreed that from December 2002 compliance would be on the basis of diversions on the same principles as other States.

• 2000/01 Diversions

The diversion profile over the last 8 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	338
1994/95	176
1995/96	528
1996/97	467
1997/98	741
1998/99	608
1999/00	541
2000/01	654 (provisional)

The categories of 2000/01 diversions are summarised in **Table 7**:

Table 7: Queensland Basin Diversions Categories (GL)

<i>Diversion Category</i>	<i>1999/00 (Estimate)</i>
Irrigation Area Channels	56
Private Diversions	101
Water Harvesting	453
Unregulated Stream Licences	31
Urban and Industrial	13
Total	654

Rainfall throughout the year has been generally below average in the northern and eastern parts of the Basin, improving to average into the western and southern sections. Most of the major storages in the Queensland section of the Basin came into the water year at 50 to 60% of capacity following a winter with very little stream flow and significant pre-watering activity in September 2000. Ring tank storages in both the Condamine-Balonne and Border Rivers catchments started the season at only 20% to 30% of capacity following the limited water-harvesting opportunity in the 1999/00 water year.

This year has demonstrated the extreme variability of stream flows in the Queensland part of the Basin:

- The Border Rivers experienced major flooding in November 2000 followed by a series of smaller floods through to April 2001 with total flow passing Goondiwindi approximately 130% of the long-term annual average of 1030 GL.



- The Warrego River performed to almost double the long-term average (720 GL for the year compared with an annual average of 386 GL).
- The Condamine-Balonne catchment delivered only 20% of average with its Condamine sub-catchment performing at only 10% of average.
- The Moonie catchment performed to 50% of average.
- The Paroo catchment delivered only 30% of average flows.

The limited flows have restricted water harvesting in the Condamine-Balonne to slightly less than last year which was in itself a poor year of access opportunity. From a total Queensland section of the Basin performance perspective this has been offset by increased diversion opportunity and take up in the Border Rivers. Flows and related water harvesting are described in detail for the various valleys as follows.

Condamine-Balonne

Upper Condamine (Darling Downs)

Flow has once again been very limited at Chinchilla, peaking at around 9000 ML per day in a single flow event in February 2001. Bank full flows at this site are in the order of 70000 ML per day. Flows originated in the upstream end of the catchment and so have been impacted by water-harvesting diversions. Diversion above Chinchilla is estimated at 52 GL with a net measured annual volume of flow at Chinchilla of 56 GL. Long-term average annual recorded flow is 597 GL.

Balonne

The situation is only slightly improved at St George with a small flow of less than 30000 ML per day in November and the February flow at Chinchilla attenuating to less than a 5000 ML per day peak at St George. Total volume of flow measured below St George was 276 GL for the year. Total water-harvesting diversion for the Balonne is estimated at 175 GL. Of this about 47 GL (27%) was diverted upstream of the gauge.

Long-term average annual flow at St George is 1200 GL.

Border Rivers

There were four separate flood flows in the Macintyre River through the year. The first was a major flood in November 2000 peaking at over

105000 ML per day. This was followed by a further flood in February 2001 and two minor floods in March/April 2001. Water-harvesting diversion in the valley has been estimated at 209 GL, 146 GL (70%) of which was metered and related to diversions in the regulated section of the Macintyre-Dumaresq system. The balance was primarily associated with diversions from the Weir River system.

Total flow through Goondiwindi for the year was 1376 GL with a further 66 GL being contributed from the Weir River downstream of Goondiwindi. Average annual flow past Goondiwindi is 1030 GL.

Moonie

There were only two significant flows in the Moonie during the year with the February 2001 flow peaking at over 6000 ML per day and providing more than half of the total volume of flow for the year. It is estimated that the limited water-harvesting development in the Moonie catchment diverted approximately 10 GL from the system. A net total of 76 GL flowed past the Fenton gauge for the year. Recorded average annual flow is 156 GL.

Warrego

Although the volume of flow for the Warrego was almost double the long-term average, this was almost totally contained in a single flow event in November/December 2000. Water-harvesting diversion is estimated at 7 GL for the year into an estimated 12 GL of associated storage.

Total flow out of the system was 720 GL for the water year. There is only 9 years of records for this gauge so the recorded average annual flow of 386 GL needs to be treated with some caution. An upstream gauge with a 34-year period of records indicates a system annual average of 530 GL.

Paroo

The Paroo River was down on last year's performance with total volume of flow for the year at 173 GL. Average annual flow is 555 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 2000 to September 2001 period are summarised in **Table 8**.

Table 8: Water-harvesting

<i>Gauging Station</i>	<i>Average Annual Recorded Flow (GL)</i>	<i>Approx. Volume of Inflow (Gross GL)</i>	<i>Approx. Volume Harvested (GL)</i>
Condamine R @ Chinchilla	597	108	52
Balonne R @ St George	1210	323	175
Macintyre R @ Goondiwindi (Inflow includes Weir R)	1040	1442	209
Total	N/A	N/A	436

The significantly less than average flow and related access opportunity in the Condamine-Balonne catchment has kept diversion to less than 50% of ring tank capacity in the upper parts of the catchment reducing to as low as 25% in the Lower Balonne.

In the Border Rivers approximately 80% of completed ring tank capacity has been harvested from stream-based flows and given that there has been two major floods in the catchment, extraction from floodplain flows is likely to have made up the balance of capacity.

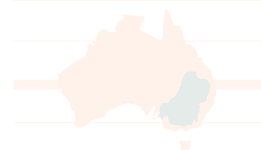
Estimates of ring tank capacities across Queensland valleys have been improved through a series of audit activities which took place over the last 12 months and are continuing. In addition, works constructed since the end of the last water year (September 2000) have been closely monitored and recorded as a feature of the moratorium requirements. The growth in stream-based ring tank capacity over recent years is summarised in **Table 9**.

Regulated Irrigation

With major storages drawn down to around 50% of capacity, available water for the water supply schemes was down on last year and generally in the order of 40-65% of nominal allocation. The exceptions were Beardmore Dam at St George starting the year at only 35% of capacity and

20% announced allocation; and Glenlyon Dam in the Dumaresq River Irrigation Project on the Border with an announced allocation of 10% because of significant carryover still held in the dam from the 1999/00 water year. Excepting the Dumaresq, most announced allocations were revised upwards to 100% during the year as inflow occurred.

Approximately 157000 ML of a total nominal allocation of 212000 ML was delivered through the major irrigation schemes for the year. This relatively high use is a reflection of the limited water-harvesting opportunity available in the Condamine-Balonne and a limit being placed on carryover in the Border prompting a movement of water from major on-stream storages to on-farm storages in January 2001. It is worth noting that two major water supply schemes in the Queensland section of the Basin have now moved away from announced allocation systems to either capacity share or continuous accounting so carryover will become less of an issue in annual water accounting in future years.



Unregulated Irrigation and Urban, Industrial and Stock

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

Table 9: Growth in Stream-Based Ring Tank Capacity (GL)

<i>Catchment</i>	<i>September 1999</i>	<i>September 2000</i>	<i>September 2001</i>
Condamine-Balonne	822	1273	1330
Border	188	267	329
Moonie	10	18	21
Warrego/Paroo	6	8	12
Overland Flow	120	160	180
Total	1246	1726	1872

occurring waterholes; and the irrigation need for the particular year. The estimated usage for the 2000/01 year is slightly lower than last year at 31 GL. This is due to the prevailing dry conditions, particularly in the Condamine-Balonne, which limited available supply particularly in the headwater tributary streams where the majority of this form of take usually occurs.

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 2000/01 year is estimated at 13 GL.

• *Progress with the Planning Process*

Work continues on developing the Water Resource Plans for the Queensland Murray-Darling Valleys. Draft plans for the Condamine-Balonne, Moonie and Warrego/Paroo/Nebine were released in mid-2000 prior to the *Water Act 2000* coming into effect in September 2000.

Subsequent work has been in response to public submissions received, consultation with stakeholders, updating development information from audits and satellite imagery assessments, updating hydrologic modelling (IQM), and further policy development in accordance with the *Water Act 2000* such as management of overland flow.

The IAG were advised that new draft plans for the Condamine-Balonne, Moonie and Warrego/Paroo/Nebine, as well as the initial draft plan for the Border Rivers are expected at the end of 2001. The release of the draft plans would be followed by a period of public review and comment, leading to the finalisation of the Water Resource Plans in 2002.

The IAG proposes to audit the draft plans when released.

Moratoriums on the starting of new works have been in place since September 2000 in the Condamine-Balonne and Border Rivers valleys. On 6 June 2001, these moratoriums were amended and also new ones declared for the Moonie and Warrego/Paroo/Nebine Valleys. These notices required that any outstanding works taking or interfering with the flow of water had to be completed by 20 September 2001. This action was taken to ensure that the planning process and plan outcomes would not be jeopardised by uncontrolled development. An amendment to the moratorium on 16 August 2001 revised the completion date to 30

November 2001 due to unavoidable delays being experienced by some landholders. The moratoriums will have effect until final approval of the Water Resource Plans.

• *Current Status of Water Resource Plans*

The status for each Water Resource Plan is provided below.

Condamine-Balonne

Extensive consultation on the draft plan released on 14 June 2000 was undertaken with all stakeholders over a six-month period. Submissions closed on 15 December 2000 with a total of 212 submissions being received.

The Queensland EPA also provided a review of the *Environmental Flows Technical Report* that was part of the information base considered in developing the draft plan as well as a review of the draft plan.

The Murray-Darling Basin Commission produced a technical report titled *Economic and Environmental Impacts of Development on the Condamine, Moonie and Border Rivers in Queensland on the Murray and Lower Darling Rivers* in December 2000.

A comprehensive and independent audit of the hydrologic model was undertaken by Pells Sullivan Meynink and released in May 2001. Recommendations from this audit are currently being implemented.

Further information on the condition and management requirements for Narran Lakes and the Lower Balonne Floodplain was gained through a scoping study commissioned by the MDBC. A report entitled *Scoping Study for the Narran Lakes and Lower Balonne Floodplain Management Study* was finalised in September 2001.

The moratorium on the construction of further water resource infrastructure remains until the plan is finalised.

The IAG in June 2001 reviewed the report prepared by the Queensland EPA on the Environmental Flows Technical Report and the draft plan. The report was prepared for joint use by the EPA and the IAG.

Key findings of the review of the draft plan are:

- Scenarios A, B and C in the draft Condamine-Balonne Water Resource Plan did not deliver environmental outcomes for Narran Lakes and a number of key sites.

- “From an ecological perspective, water is already over-allocated, and associated with increasing risks of unacceptable degradation ... There is no evidence that the proposed developments have been set on a precautionary basis, taking into account risks of environmental degradation”.

The IAG also reviewed the technical report produced by the Murray-Darling Basin Commission (*Economic and Environmental Impacts of Development on the Condamine, Moonie and Border Rivers in Queensland on the Murray and Lower Darling Rivers* - December 2000). The report estimates that Mean Annual Flows reduced by 79, 94 and 119 GL per year for the Darling at Bourke for scenarios C, B and A respectively combined with Moonie and Border Rivers scenarios, and flow to South Australia reduced by 36, 41 and 51 GL per year for the same scenarios. The impacts on diversions from the Lower Darling were negligible with total diversions reduced by 1.7, 2.2 and 3.4 GL per year. The IAG will re-examine this advice in the light of any changes that may be proposed in the revised draft Water Resource Plan for the Condamine-Balonne.

Border Rivers

Queensland advised the IAG that work this year has focused on developing a draft Water Resource Plan for the Queensland part of the Border Rivers, in accordance with the Water Act 2000. Queensland will determine its Cap for the Border Rivers subsequent to finalising its Water Resource Plan, noting that New South Wales is separately in the process of determining its Cap for the New South Wales part of the Border Rivers. When both State Caps are in place it is the Queensland view that joint planning will resume under direction from the Border Catchments Ministerial Forum to determine environmental flows in the trunk stream and a framework for interstate water trading.

The IAG understands the draft Water Resource Plan will include a number of scenarios. One of the scenarios will include the November 1999 joint Queensland and NSW Ministerial decision that increases in water use that will cause further deterioration in flow at Mungindi will not be supported and further growth in diversions in the regulated sections will not be allowed.

The IAG will audit the Border Rivers Draft Water Resource Plan and supporting documentation when it is released.

Moonie

To ensure the accuracy of model estimates of current water use, an investigation of major overland flow capturing works was undertaken late last year and early this year. These works were incorporated into the IQQM so that the impact of these diversions could be taken into account. Information on overland flow works and works associated with existing water-harvesting licences is currently being updated.

Investigations are continuing into the possibility of converting licences into water allocations to enable water trading to take place.

Warrego/Paroo/Nebine

An investigation of options that manage further development of existing water-harvesting licences through increases in off-stream storage capacity has been carried out. Investigations are continuing into the possibility of converting licences into water allocations to allow for water trading.

Information on major overland flow works and works associated with existing water-harvesting licences has been updated.

• IAG Assessment

Diversions at 654 GL were the second highest recorded since 1993/94 and were associated with flood events in the Border Rivers and less than 20% of average flow in the Condamine-Balonne.

The underlying capacity for growth in diversions is confirmed by growth in stream-based ring tank capacity from 1126 GL in September 1999, to 1566 GL in September 2000 and an estimated 1692 GL in September 2001.

The moratorium on construction has, however, slowed the rate of growth in capacity and further growth should cease by November 2001 when storages under construction are completed.

Queensland has undertaken considerable additional development work on the Water Resource Plans which are expected to be released as revised draft plans for the Condamine-Balonne, Moonie, Warrego/Nebine/Paroo and an initial draft for the Border Rivers.

Unless the revised draft plan for the Condamine-Balonne addresses issues raised in the EPA report it is unlikely that the plan would adequately address the equity issues that the IAG has been asked to audit against.



The IAG is concerned that development of Water Resource Plans for the Queensland Border Rivers and NSW Border Rivers are being conducted in isolation. While each State has to engage its own stakeholders it is difficult to see how environmental outcomes, particularly downstream and the associated flow regimes, can be developed in isolation. These in turn affect the desired level of diversion. It would seem desirable for planning to be undertaken on an integrated basis. If there are constraints to effective communication between State agencies it would appear appropriate for the MDBC to take on a leadership role at the invitation of the States.

The IAG expects to audit the revised plans and supporting papers and the new draft plans for the Border Rivers early in 2002.

• **Conclusions/Recommendations**

- Diversions of an estimated 654 GL were the second highest recorded since 1993/94 and followed an above average flow year for the Border Rivers and a very poor flow year (20% of average) for the Condamine-Balonne.
- The moratorium has slowed construction of new storages with an estimated increase from 1726 GL to 1872 GL. This compared with a documented increase as a result of improved information and new construction of 1246 GL to 1726 GL in the previous 12 months.
- Revised draft Water Resource Plans for the Moonie, Condamine-Balonne and Paroo/Warrego/Nebine are expected to be released for public comment in December 2001 with a view to finalising the plans and establishing Caps by 30 June 2002.
- A draft Water Resource Plan for the Border Rivers is expected to be released in December 2001 with a view to also finalising this Plan and establishing a Cap by 30 June 2002.
- The IAG will audit these revised and new draft plans and supporting documentation and provide a separate report by February 2002 (subject to release of reports in December 2001).
- It is the view of the IAG that the Queensland Department of Natural Resources and Mines and the NSW Department of Land and Water Conservation should integrate their development of Water Resource Plans for the Border Rivers to ensure environmental outcomes are identified and flow regimes and diversion targets are established to achieve these outcomes.

- The Murray-Darling Basin Commission should facilitate the integrated planning process for the Border Rivers, should the interstate planning process under the Border Catchments Ministerial Forum not prove successful.
- A Queensland EPA assessment conducted for the EPA and IAG identifies that scenarios A, B and C in the Condamine-Balonne Water Resource Draft Plan did not deliver environmental outcomes for Narran lakes and a number of key sites. The report also concludes that *“from an ecological perspective, water is already over-allocated, and associated with increasing risks of unacceptable degradation ... There is no evidence that the proposed developments have been set on a precautionary basis, taking into account risks of environmental degradation”*.
- The technical report produced by the Murray-Darling Basin Commission, (*Economic and Environmental Impacts of Development on the Condamine, Moonie and Border Rivers in Queensland on the Murray and Lower Darling Rivers*, December 2000), identified that Mean Annual Flows reduced by 79, 94 and 119 GL per year for the Darling at Bourke for scenarios C, B and A respectively combined with Moonie and Border Rivers scenarios, and flow to South Australia reduced by 36, 41 and 51 GL per year for the same scenarios. The impact on diversions from the lower Darling was negligible with total diversions reduced by 1.7, 2.2 and 3.4 GL per year.

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 to this time, there has been no decision as to what is to be ACT's Cap, although this has been the subject of discussion at Ministerial Council meetings. 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 managed by ACTEW/AGL Pty Ltd on behalf of ACTEW Corporation. Net diversions since the mid-1980's 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). The return of this water to the Basin has meant that the net diversions are 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* was passed in November 1998. The Act deals with both groundwater and surface water and contains provision for the licensing and measurement of extractive water use. The ACT Government is in the process of implementing this licensing procedure and in the last 12 months has completed a metering program such that both groundwater and surface water is now metered. In subsequent reports to the IAG, the ACT Government envisages being able to report directly on groundwater extractions. While it is proposed to issue longer-term licences for water extractions, it is envisaged that a further 12 month licence will be issued to ACTEW Corporation later this year. 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			Net diversion
		Lower Molonglo WQCC	Queanbeyan STW	Other diversions	
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	23.4
1999/00	58.0	32.6	3.9	5.0	26.5
2000/01	63.0	30.3	3.9	5.0	33.8

Table 11: An example of a Cap applied to the ACT - GLs Diversions since July 1997 compared with the 38 GL target

<i>Proposed long-term diversion</i>	<i>2000/01 climate-adjusted target*</i>	<i>Diversion</i>	<i>Credits (Proposed Climate Adjusted Cap Target less diversion)</i>		
			<i>2000/01</i>	<i>Cumulative since 1 July 97</i>	<i>20% long-term Cap diversion trigger</i>
38	32.0	33.8	-1.8	28.6	-7.6

• **Issues with Adoption of the Cap**

The ACT Government has again confirmed its commitment to the concept of the Cap and its willingness to be included in the Cap review process. However, the ACT Government has yet to agree to a Cap to be applied to the ACT. In its response to the 1999/00 report of the IAG, which had outlined arguments in favour of a 38 GL Cap for the ACT, fully tradeable, the ACT Government argued the special circumstances of the ACT and the need for definition of the trading conditions that would apply to the Cap.

The special circumstances of the ACT argued by the ACT Government relate to:

- the statutory rights held by the ACT over water under Commonwealth legislation;
- the scientifically robust environmental flow rules that are applied by the ACT; and
- the urban use focus of water extraction in the ACT and the inability to trade off urban and rural use in the ACT - an option available to other major urban areas in the Basin.

The need for fully transparent rules for water trading are acknowledged by the IAG and a resolution to this issue which would clarify the ACT's ability to trade in water from other parts of the Basin, is a major hurdle which must be resolved before a final sign-off on the ACT Cap can be achieved. Resolution of these trading terms is proving to be a protracted exercise and there is little to encourage or believe that this issue will be resolved in the next 12 months.

• **Discussion of Issues**

The IAG has discussed the issue of the setting of a Cap for the ACT in previous reports. For the moment this is a matter that is unlikely to be resolved until the trading rules for the Basin can be agreed. This will be a lengthy process. There is a danger that without continuing attention being given to these trading rules, this matter may remain unresolved for a further two years. In the

context of the commitment by all relevant governments to the Cap, the lack of resolution on this matter represents a flaw in the Cap's implementation.

It is the view of the IAG that a continuation of the current arrangement whereby the ACT Cap remains unspecified is not in the interest of the integrity of the Cap itself. Had a long-term average Cap of 38 GL been agreed prior to the current annual audit by the IAG, the ACT would have been over the Cap by 1.8 GL in 2000/01, but would have still had a credit on its diversions from July 1997 of 28.6 GL.

• **Monitoring and Reporting**

The ACT proposes to 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.

• **2000/01 Diversions**

Net diversions by the ACT in 2000/01 was 33.8 GL. As an example of the assessment that might be made in the future, this diversion was compared with the level of diversion expected under a 38 GL climate adjusted Cap which has been recommended by the IAG in its 1999/00 Report.

The 2000/01 diversion is 1.8 GL above the 32 GL climate adjusted 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 28.6 GL.

• *Other Issues*

The definition of the Cap, when agreed, will cover both ACT and Queanbeyan's use of water from the system. Their usage will be expressed in net terms as the ACT returns such a high proportion of its water back to the river system via the Lower Molonglo Water Quality Control Centre and the Queanbeyan Sewage Treatment Works. Reuse of water in the ACT is one option that is being progressively adopted, particularly for some industry purposes and also for the watering of parks and recreational areas. To the extent that such reuse reduces the return of water to the river system, it will be considered as consumption for the purposes of the Cap.

There have also been proposals whereby ACTEW would provide piped water from the Queanbeyan and Cotter River catchments to nearby country urban centres including Yass and Goulburn. These options are still under consideration and no policy decision has been taken at this time. However, they could impact upon the water available under the Cap for use within the ACT. It is generally accepted that any use of water for those centres which lie outside of the ACT would have to be made against water allocation acquired outside of the ACT Cap for that purpose.

• *IAG Assessment*

The IAG notes ACT's commitment to the Cap and to the principles behind the Cap. The IAG also notes the current action within the ACT to

licence existing and future water users and to finalise the metering of surface water and groundwater diversions. This monitoring and reporting system will provide appropriate data for completion of Schedule F.

The determination of what constitutes the Cap for the ACT is a matter still requiring resolution, but is dependent on matters that in part lie outside the control of the ACT Government. The IAG recognises that the need to resolve the trading rules to apply on the Murrumbidgee and across the Basin in general creates difficulties for the ACT. Greater priority needs to be given by the Council to the resolution of this issue as it also impacts on the Cap administration in other parts of the Basin.

• *Conclusions/Recommendations*

- No Cap presently exists for the ACT.
- Net diversions of 33.8 GL in 2000/01 exceed the average usage between 1989 and 2001 of 31 GL and a possible climate adjusted Cap of 32 GL. However the ACT would have a cumulative credit of 28.6 GL if the proposed Cap of 38 GL had applied since July 1997.
- The IAG recommends that priority be given by the Council, to the resolution of the trading rules across the Basin.
- Once the trading rules are agreed for the Basin to the satisfaction of the ACT the IAG recommends that consideration be given to an average long-term Cap for the ACT of 38 GL/year which should be fully transferable.





5. Diversions from the Murray-Darling Basin in 2000/01

Murray-Darling Basin diversions in 2000/01 totalled 11977GL.

Of the total water diverted, New South Wales diverted 59%, Victoria 29%, South Australia 6%, Queensland 6% and the Australian Capital Territory 0.3%. Diversions for the individual valleys are presented in **Table 12**.

Annual diversions since 1983 are plotted in Figures 1 and 2. Diversion in 2000/01 ranked fifth highest on record in the Basin, second highest in Queensland and third highest in New South Wales. Diversion last year was 92% of the record diversion of 12963 GL in 1996/97.

TABLE 12: Murray-Darling Basin Diversions in 2000/01

<i>System</i>	<i>Total diversion (GL)</i>	<i>Percentage of Basin diversion (%)</i>
NSW		
Border Rivers	248	
Gwydir	425	
Namoi/Peel	315	
Macquarie	495	
Barwon-Darling	242	
Lachlan	418	
Murrumbidgee	2711	
Lower Darling	232	
Murray	2048	
Total NSW	7134	59.6%
Victoria		
Goulburn/Loddon/Broken	1573	
Campaspe	111	
Wimmera-Mallee	94	
Murray/Kiewa/Ovens	1716	
Total Victoria	3494	29.2%
South Australia		
Metro-Adelaide & Associated Country Areas	104	
Country Towns	38	
Lower Murray Swamps	99	
All Other Uses of Water from the River Murray	421	
Total South Australia	662	5.5%
Queensland		
Condamine/Balonne	351	
Border Rivers/Macintyre Brook	285	
Moonie	10	
Warrego	10	
Paroo	0	
Total Queensland	654	5.5%
Australian Capital Territory		
	34	0.3%
Total Basin	11977	100.0%



FIGURE 1: Murray-Darling Basin Diversions – 1983/84 to 2000/01

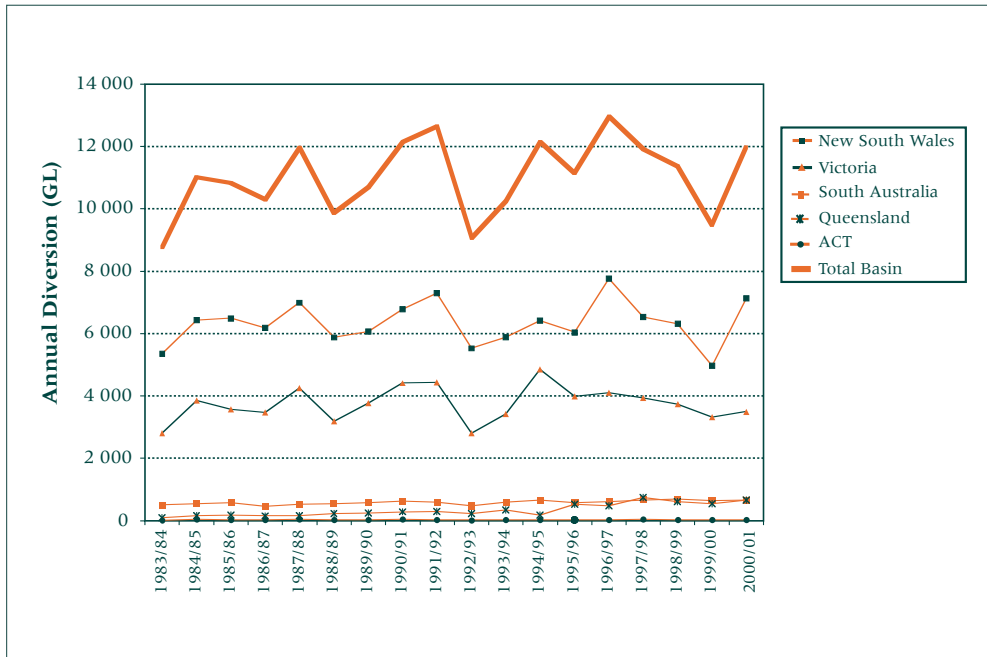
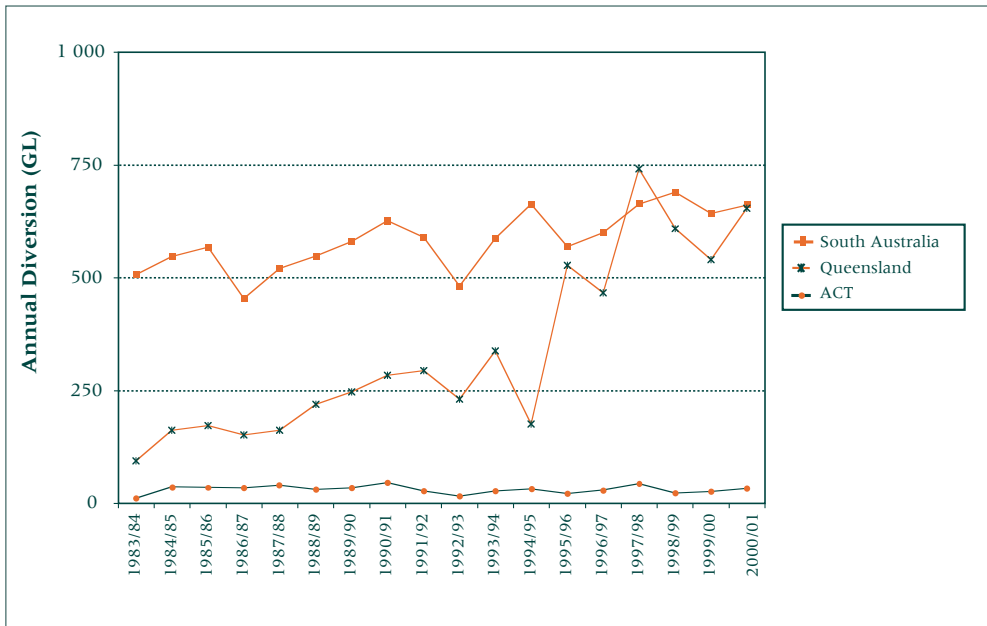


FIGURE 2: Murray-Darling Basin Diversions – 1983/84 to 2000/01 (Usage under 1,000 GL/year)



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 2001. 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 2000/01 water year were within the Cap and that a reliable system is in place to monitor these diversions.

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

Management Framework for Long-term Cap Compliance and Other Improvements to Cap Management

South Australia continues to pursue the development of Cap management tools to monitor long-term trends in diversions and to ensure that irrigation diversions remain within the Cap into the future.

South Australia has completed a draft Climate Adjustment model that has been submitted to the MDBC for review through the independent model assessment process.

The development of a Water Allocation Plan by the River Murray Catchment Water Management Board will provide the framework for many management issues including long-term Cap compliance. The final Plan is expected to be endorsed by the South Australian Minister for Water Resources by April 2002.

Other initiatives being pursued in South Australia include the careful monitoring of trends in diversions, improved metering, continued development of a new Water Licensing System 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 confidently meet its obligations into the future.

Interstate Concerns

NSW

South Australia is particularly concerned at the continued Cap exceedance which is evident from preliminary estimates in the Border Rivers and remains concerned about other valleys such as the Gwydir River, the Lachlan and the Barwon-Darling. These valleys have all been close to Cap exceedance or have exceeded the Cap over the 1999/00 and 2000/01 water years.

While it is appreciated that the IQQM's used to assess NSW Cap compliance have not been finalised through the independent verification process, South Australia remains concerned at NSW's ability to bring diversions back into balance with Cap limits into the future. It is understood that environmental flow rules are an important input to the IQQM's, however, these rules have been apparently insufficient to this point in time to instigate change.

QUEENSLAND

South Australia remains disappointed at the continued delays with the finalisation of the Queensland Water Resources Plans and subsequent delays in setting Caps for valleys in that State.

South Australia is very keen to see the plans finalised, particularly for the stressed Condamine-Balonne and Border River systems.

Finalisation of a Cap for the Queensland portion of the Border Rivers will also provide a critical input to the modelling requirements for the NSW portion of that River system.





V I C T O R I A

Victoria continued implementing the Cap in 2000/01 through the establishment of Bulk Entitlements on regulated systems and Streamflow Management Plans on unregulated streams. The Bulk Entitlement conversion process continued in the Ovens, Broken and Wimmera-Mallee water supply systems and work has commenced on developing Streamflow Management Plans on twelve high priority streams.

Diversions since 1997/98 from each of the four designated valleys continue to comply with the Cap. Diversions from the Goulburn/Broken/Loddon and Campaspe Valleys were below their Cap targets for 2000/01. Diversions from the Murray/Kiewa/Ovens Valley were slightly above the 2000/01 target but cumulative diversions from each of these valleys since 1997/98 are in credit compared with their Cap targets.

The level of diversions from the Wimmera-Mallee system continued to reduce with the completion of stage six of the Northern Mallee Pipeline. Water savings from this pipelining enabled environmental entitlements to increase by 5.2 GL to 30.1 GL/year.

The climate adjusted model covering the Goulburn/Broken/Loddon and Campaspe valleys has been submitted to the Murray-Darling Basin

Commission for independent review. Work continued on improvements to the Broken component of this model and on the calibration of the Wimmera-Mallee model as Bulk Entitlements progressed in these systems. Victoria will continue to rely on the MDBC model of the Murray system to provide Cap targets for the Victorian component of the Murray system and will work with the MDBC to develop a regression-based method to calculate the Cap for the Ovens and Kiewa components of this valley.

Victoria will continue to provide accurate and timely water audit information as required. The progressive metering of previously unmetered diversions is continuing, however it is recognised that it will take many years to meter all diversions.

Victoria agrees with the IAG conclusions relating to Victoria, South Australia, New South Wales and Queensland. Thus, Victoria supports the IAG's proposal that a "Special Cap Audit" of the Barwon-Darling Valley should be undertaken by the Commission and that New South Wales provide additional information to determine whether the Schedule F trigger has been exceeded in the Border and Lachlan River valleys.



NEW SOUTH WALES

The IAG has made a number of recommendations that significantly affect NSW in this year's review. NSW remains committed to maintaining the long-term diversions associated with current development levels at or below the Murray-Darling Basin Ministerial Council's Cap, and to annual auditing under the provisions of Schedule F of the Murray-Darling Basin Agreement. The following comments are offered with regard to specific recommendations of the audit for inclusion in the final review document:

After conducting a Special Cap Audit of the Namoi, Lachlan and Barwon/Darling/Lower Darling designated river valleys in February 2002, the IAG has determined that the long-term diversion Caps have been exceeded in all of these valleys.

NSW accepts that, over the four years since monitoring under Schedule 'F' began, the water diversions in these valleys has exceeded the accumulated annual Cap targets. However, NSW is confident that the implementation of the environmental flow rules and the water access rules as defined in these valleys' Water Sharing Plans will result in diversions below the long-term Cap as defined in the schedule. These outcomes were verified in the long-term studies provided to the IAG in accordance with the requirements of the special audit.

The IAG recommends that each of the States and ACT, where relevant, submit valley models for independent verification with a view to all models being accredited by 30 June 2002.

As noted in the audit, NSW has continued to make significant progress on model development during 2000/01, and a continuing commitment to finalising modelling to establish Cap targets is planned for 2001/02. The IAG recommendation to submit all models used to determine Cap targets for independent verification by June 2002 is a reflection of the key role that modelling plays in the Cap implementation process. In recognition of the importance of modelling in the Cap process, NSW has endeavoured to produce models capable of determining Cap targets as quickly as practicable.

However, NSW is concerned that the proposed deadline for model accreditation could result in the submission of models that are not yet finalised. It is therefore, vital that each model is assessed by the State as being capable and

defensible in this regard prior to being presented for external review.

NSW will continue its endeavours to finalise models for Cap purposes as quickly as possible, subject to State priorities. However, until Water Sharing Plans for the major regulated valleys have been implemented, documentation of all valley models for accreditation will not be possible. Consequently, it is proposed that NSW would undertake to present all major regulated Cap models before the close of the 2002/03 water year.

The IAG recommends that each of the States and the ACT develop Quality Management Systems for licensing, collection, storage and retrieval of diversion data.

The issue of data quality has been raised by the IAG, and NSW recognises that there have been difficulties in producing data to enable Cap auditing, both in timeliness and accuracy. These issues continue to be progressively addressed within NSW, and their significance is declining. The Department of Land and Water Conservation's database system is currently undergoing further development, which is expected to address many of the reporting difficulties that have been experienced to date.

The IAG recommendation to implement Quality Management Systems represents a major commitment of resources in each jurisdiction and has the potential to impact on the Cap implementation itself. NSW does not believe that a full Quality Management System will be worth the resources required to implement it, and would consider commitments to continual improvement of data collection and provision to be more appropriate.

The IAG recommends that the Water Trading Project Management Board be allocated responsibility for developing a proposal to progress a trading framework including rules, exchange rates, timeliness of decision-making, recording and retrieval of data and adjustments of valley Caps.

NSW agrees that the issue of a trading framework, including rules and exchange rates needs to continue to be addressed. However, some aspects of the trading framework, including determination of exchange rates and adjustments of valley Caps need to be addressed by an appropriate technical group with full jurisdictional representation. The issue is already





currently under consideration by the Water Audit Working Group, a technical panel chaired by the Murray-Darling Basin Commission, which has appropriate technical and jurisdictional membership. The Water Policy Committee is also quite capable of advising the Commission on this matter.

The IAG recommends that, should the interstate planning process under the Border Catchments Ministerial Forum not prove successful, the Murray-Darling Basin Commission develop a framework with NSW and Queensland for the resolution of outstanding issues in the development of Water Resource Plans, including environmental outcomes for the Border Rivers.

The lack of resolution of Cap targets for both NSW and Queensland in the Border Rivers region is acknowledged. Inter-governmental processes are currently in place between the jurisdictions to progress this issue.

NSW does not believe that an additional forum for interaction coordinated by the Commission, as proposed by the IAG, would be appropriate nor would it have any advantages over the current arrangements. When the Border Catchments Ministerial Forum was established in June 2000, both States intended to review the arrangements in three years' time with a view to handing over the Forum's functions to the Murray-Darling Basin Ministerial Council if considered appropriate.





QUEENSLAND

Queensland continues to work towards completing its statutory Water Resource Plans, which will form the basis for establishing the Cap position for its Murray-Darling Valleys. Considerable additional development work on the Water Resource Plans has been undertaken following the release last year of draft plans for three of its four valleys. This will result in new draft plans for the Condamine-Balonne, Moonie and Warrego/Paroo/Nebine valleys and the first draft plan for the Border Rivers being released for public review and comment and finalised in 2002.

In August 2000, the Ministerial Council agreed to retain references to end-of-valley flows as an optional interim measure for Queensland compliance with the Cap until December 2002. It agreed that from December 2002, compliance would be on the basis of diversions on the same principles as other States.

In the meantime, Queensland has further extended, amended and strengthened the moratoria under the Water Act 2000 on the starting of new works to take water (both from stream and overland flows) such as the construction of on-farm storages. The moratoria now cover all of Queensland's Murray-Darling Valleys and works are to be completed by November 2001. The moratoria will stay in place until the Water Resource Plans are implemented and management rules for the taking of water are in place.

Queensland valley models would not be completed and available for independent verification until the Resource Operation Plans have been finalised. This is expected to occur at the end of 2002. Until that time, Queensland would not be able to participate in the development of a Basin-wide trading framework. Regarding interstate trading on the Border Rivers, Queensland's view is that a management framework should be developed on the basis of local conditions in the Border Rivers and not a framework more suited to conditions in the Southern Basin.

In the Border Rivers, joint flow management planning with New South Wales will resume following determination of each State Cap. At their meeting on 9 August 2001, the Ministerial Forum established under the Intergovernmental Memorandum of Understanding for the Border Catchments, agreed that each State would determine its level of water diversions under its State legislation. Issues such as environmental flow rules and interstate trading would be more easily resolved once the State Caps has been determined.





AUSTRALIAN CAPITAL TERRITORY

The 2000/01 Review of Cap Implementation acknowledges the ACT's continuing moderate consumption and commitment to sound environmental and resource management.

The IAG's conclusions/recommendations in relation to the ACT concentrate on the need to establish robust interstate water trading conditions as a precursor to the establishment of an ACT Cap. It encourages the Ministerial Council to give the matter priority. The ACT supports these recommendations.

The report makes a general recommendation about the development of Quality Management Systems by jurisdictions for the management of Cap reporting data. The ACT has in place sound data management practices and reporting mechanisms, that allow it to be confident information on water consumption reported is as accurate as practical. It does not consider any further benefit would be gained by the implementation of additional quality management practices.



Glossary

<i>ACTEW</i>	ACTEW 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.
DLWC	The Department of Land and Water Conservation (of NSW).
DNR	The Department of Natural Resources (of Queensland).
DNRE	The Department of Natural Resources and Environment (of Victoria).
dozer allocation	An allocation that is not fully utilised.
DWR	The Department for Water Resources (of South Australia).
EC (unit)	Electrical conductivity unit 1 EC = 1 micro-Siemens per centimetre measurement at 25o 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 109 litres.
GL	Gigalitre: one thousand million or 109 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 under way in Queensland to enable the acceptable level of allocatable water to be determined for a river system. These plans have been superseded by Water Resource Plans.
WMRWG	Water Market Reform Working Group.
WR	Water Right.
WRP	Water Resource Plan. Plans developed in under the Queensland <i>Water Act 2000</i> for allocating water between consumptive use and the environment.
WUE	Water Use Efficiency.



