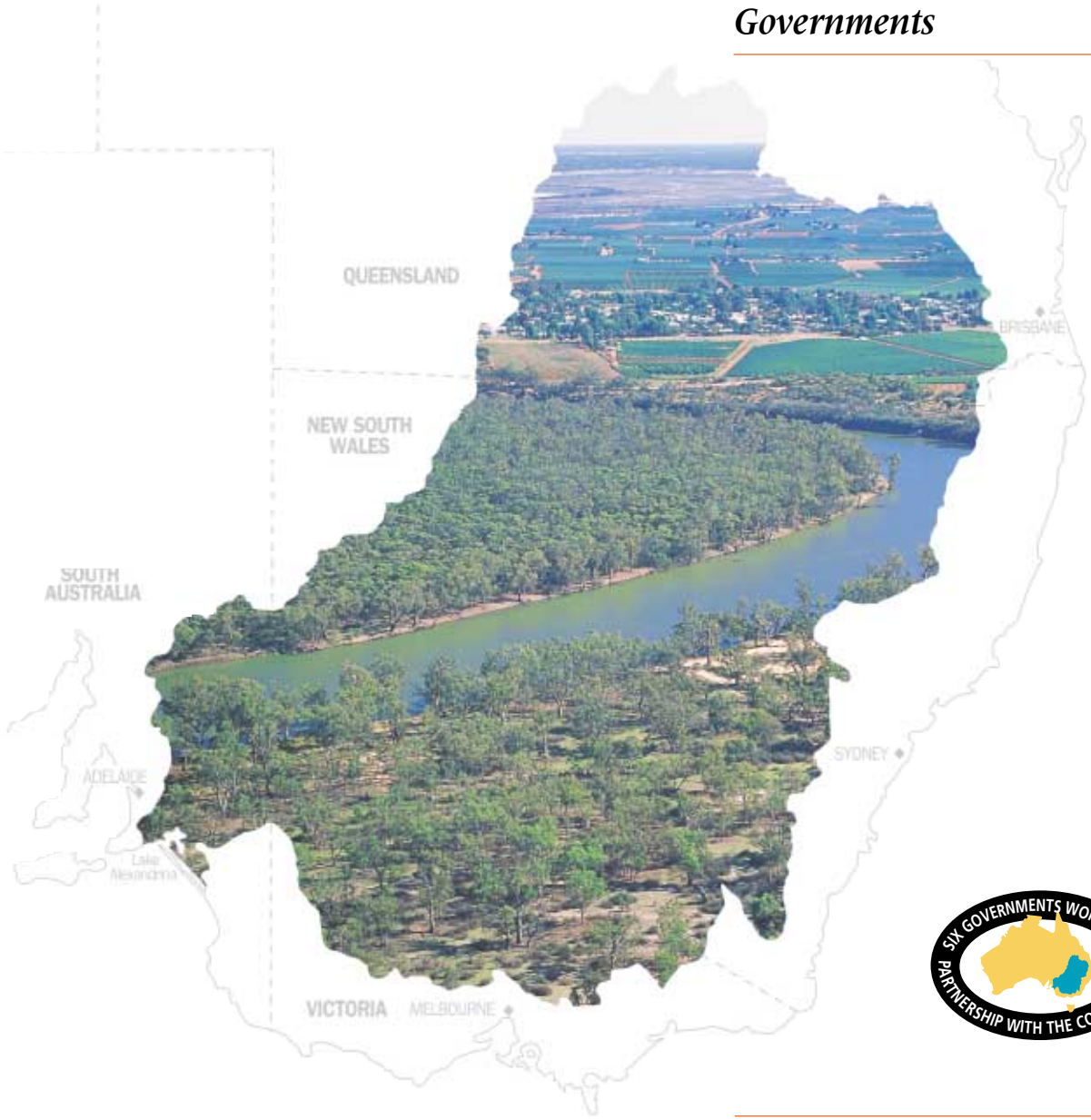
MURRAY-DARLING BASIN

MINISTERIAL COUNCIL

Review of Cap Implementation 1999/00

Report of the Independent Audit Group

Including Responses by Five State and Territory Governments



SIX GOVERNMENTS WORKING IN PARTNERSHIP WITH THE COMMUNITY

MARCH 2001

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.

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Including Responses by Five State and Territory Governments

Independent Audit Group Members

Dr Wally Cox (Chair)
Paul Baxter

MARCH 2001

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 options for resolving them were discussed openly.

Murray-Darling Basin Commission
GPO Box 409
Canberra ACT 2601

Tel: (02) 6279 0100
Fax: (02) 6248 8053
E-mail: info@mdbc.gov.au
Web site: http://www.mdbc.gov.au

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Auditors' Foreword

March 2001

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 1999/2000.*

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.

With the agreement by Council to Schedule F there is now an urgent need for the states and the ACT to accredit models used to establish valley Caps.

This year's audit also highlighted the need for Quality Management Systems to be introduced to ensure reliable collection and management of diversion data.

Yours sincerely

DR WALLY COX
Chairman

PAUL BAXTER
Member

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Council has agreed to adopt Schedule F for operationalising, monitoring and reporting on Cap implementation and this audit was conducted in line with the requirements of Clause 13 of the Schedule.

With finalisation of the Schedule and the establishment of Caps on a valley-by-valley basis, there is now an urgent need to finalise Cap determinations, to accredit models for Cap assessment and to ensure a Quality Management System is in place for the collection and reporting of diversion data.

The conclusions and recommendations reached by the Independent Audit Group (IAG) for the 1999/00 year by State and Territory are:

South Australia

- Diversion in 1999/00 was within the Cap.
- South Australia has a reliable system of measurement for urban and irrigation use (rehabilitated areas).
- There are proposals to further improve reliability of measurement in the lower Murray and in non-rehabilitated areas.
- Models in preparation to compare seasonal water use for irrigation and the climate-adjusted Cap should be finalised in 2000/01.
- A quality management system needs to be developed for the management of all data on diversions.
- The South Australian country towns Cap should remain at the level of 50 GL determined in 1996.
- South Australia has proposed a revised Cap for the Lower Murray Swamps of 103.5 GL/year comprising 84.7 GL/year fully tradeable and 18.8 GL/year for environmental management and non-tradeable. The IAG supports the revision and adoption of the 103.5 GL/year with modifications and recommends to Council a three-component Cap for the Lower Murray Swamps comprising (unadjusted for trade):

  9.3 GL/year for highlands with unrestricted trade

  72 GL/year for swamp use with unrestricted trade

  22.2 GL/year non-tradeable environmental entitlement

This recommended modification is river-flow volume and salt-loading neutral while irrigation is retained in the swamps and protects the environmental value of the swamps in the event that irrigation ceases.

Victoria

- Diversions from the Murray, Goulburn, Campaspe and Wimmera-Mallee systems in 1999/00 were all below 1999/00 climate-adjusted Cap targets.
- Cumulative diversions up to 1999/00 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.

Australian Capital Territory

- Net diversions of 26.5 GL in 1999/00 fall below the long-term average usage of 30 GL and a possible Cap of 38 GL.
- No Cap presently exists for the ACT.
- The IAG believes that consideration should be given to an interim arrangement that could apply until a final Cap is agreed and that this interim Cap would comprise 61 GL of non-tradeable entitlement.
- Once the trading rules are agreed for the Murrumbidgee to the satisfaction of the ACT the IAG recommends the automatic transformation of the final Cap for the ACT to 38 GL fully transferable water allocation should apply.
- Trading rules should be developed by June 2001 to enable finalisation of the ACT Cap.

New South Wales

- Diversions in 1999/00 were 5029 GL compared to 6350 GL in 1998/99.
- IQQM Cap models have now been prepared for four river valleys, and these now await calibration and/or approval under Schedule F by the Commission. Three other valleys have an IQQM Cap scenario that is close to completion.
- Significant cumulative Cap debits had built up for the Border Rivers and the Gwydir River by the end of the 1998/99 season and following a Special Cap Audit undertaken at the request of the Commission, it is now confirmed that diversions have exceeded the climate-adjusted Cap in these valleys in 1999/00.

- The IAG recommends that, as per Schedule F, NSW now be requested to report to the July meeting of Council on how it intends to comply with the Cap for the Border Rivers and the Gwydir River.
- Exceedance of the Cap in the Barwon-Darling is balanced by the below-Cap results for the Lower Darling.
- NSW should complete the re-calibration of its interim IQQM models as soon as possible and submit these to the Commission for approval under Schedule F.

Queensland

- Diversions were of an estimated 547 GL compared with 608 GL in 1998/99.
- There was further growth in on-farm storages with the Lower Balonne alone increasing by 340 GL representing an estimated 140 GL previously unaccounted for and 200 GL of new growth in 1999/00.
- A moratorium notice was issued under the new *Queensland Water Act 2000* for the Condamine-Balonne and Border Rivers that will limit growth in diversions and the construction of new storages.
- The draft plans for the Condamine-Balonne, Moonie, Warrego/Nebine/Paroo are currently out for public consultation.
- Additional assessments are underway to address issues previously identified in the IAG's June 2000 report on the audit of the draft water-resource plans. These include the Queensland EPA assessment of the Condamine-Balonne Environmental Flows Technical report and draft plan, the modelling of downstream impacts of the Condamine-Balonne draft plan and the Moonie draft plan.
- The final water-resource plans and Cap targets should be finalised for the Moonie and Warrego/Nebine/Paroo early in 2001.
- The final water-resource plan for the Condamine-Balonne should be available in mid-2001, and the Border Rivers draft plan in early 2001.
- The IAG considers that the Condamine-Balonne water-resource plan should be finalised as soon as possible to establish a Cap target, to provide certainty to irrigators and to provide a river-flow management regime that minimises the risk of further environmental degradation.

1. Introduction

In November 1996, the Independent Audit Group (IAG) submitted its report *Setting the Cap* to the Murray-Darling Basin Ministerial Council (MDBC). 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 Allocation and Management Planning (WAMP) 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 instream use and Council has supported the auditing of both the process and outcomes.

Thus the Review of Cap Implementation 1999/00 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 MDBMC 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 Council's decision to adopt the Cap. The Council agreed with all but four of the 49 recommendations in the 1996 IAG Report. The others were accepted at the July 1997 meeting of 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 that take into account:
  - the water supply infrastructure in place in 1993/94;
  - the water allocation and system operating rules that applied in 1993/94;
  - the entitlements that were allocated and the extent of their utilisation at 1993/94 levels of development;
  - the underlying level of demand for water in 1993/94;
  - the system operating efficiency in 1993/94; 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 NSW, 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 WAMP process being undertaken by that state, the outcome of which will be subject to consideration by Council.

For Queensland, Council has agreed that the WAMP process should ensure that Queensland balances consumptive and instream use. The IAG has supported the WAMP process noting that:

- it must accommodate instream 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, 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 *1998/99 Review of Cap Implementation* identified that:

- significant progress continues to be made in Cap implementation;
- diversions in 1998/99 were below the Cap in South Australia and Victoria;
- in NSW using draft Schedule F criteria the reporting provisions have been triggered for the Lachlan and Barwon-Darling Valleys.
- a supplementary audit in February 2000 confirmed that diversions in the Barwon-Darling were in excess of the annual and long-term Cap but not those in the Lachlan;
- diversions exceeded the climate-adjusted annual Cap for the Murrumbidgee;
- the Queensland WAMPs for the Condamine-Balonne and Border Rivers were to be available before late 2000; and
- the draft WMPs for the Warrego/Paroo/Nebine and Moonie were expected to be available early in 2000.

Activation of existing licences in Queensland had resulted in significant growth in diversions which, in the view of the IAG, were not sustainable. The IAG called for a moratorium on water diversions.

3. Audit Process

For the purposes of this 1999/00 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 1999/00 as a means of quantifying overall diversions and commenting on Cap compliance;
- identify progress made in implementing the proposed management rules for Capping water diversions;
- highlight particular problems being encountered by the relevant jurisdictions as regards the finalisation or implementation of the management rules; and
- update the status of the Queensland WAMPs and WMPs.

The IAG met with representatives of each of the states and the ACT between 23 and 26 October 2000. The format of each meeting was to compare water usage in 1999/00 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 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 downstream impacts of WMP and WAMP outcomes on downstream flows and river-health issues.

The unresolved Pindari Dam issue in NSW was also discussed.

In South Australia specific issues for resolution included the Cap target for country water supplies and revised information on net water usage on the Lower Murray swamps.

In Queensland the focus was on progress with the WAMPS, WMPS and flow management 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. Clause 9 of Schedule F 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 five (two by Victoria and three by N S W) have been submitted to the Commission for assessment.

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 that 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 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, that 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 1999/00 Cap Implementation

South Australia

• The Cap

As a result of decisions by the Ministerial Council in December 1996 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 fixed allocation of 50 GL per year for country towns;
- a partially tradeable 83.4 GL per year for the Lower Murray Swamps; and
- an average of 440.6 GL per year for other uses in South Australia, which is tradeable.

Following uncertainty of the data provided to determine the Cap for country towns a review has been undertaken. South Australia has agreed not to trade the country water allocation until it is finalised.

• 1999/00 Usage

South Australia in 1999/00 maintained its record of utilising less than the Cap in both the urban and irrigation sectors (**Table 1**) with 100 per cent for the reclaimed swamps, 73 per cent of the country urban water, 89 per cent of the rolling five-year average in Adelaide and 81 per cent of the Cap for the other water uses in South Australia.

• 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 now 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.

In our 1997/98 IAG report, we recommended that the country-urban water supply Cap be reviewed in light of advice that some of the historic water supply data had been included in both the country-urban and Adelaide supply data as a result of confusion over accounting for water supplied from the Swan Reach pump station.

The IAG received a detailed report on this issue from South Australia incorporating historic water-diversion records for Murray-pumped water for Adelaide and country towns. These records indicate that the advice received in 1996 by the IAG was based on all of the Swan Reach/Stockwell diversion being allocated to Adelaide consumption. This method aligns with Schedule F of the *Agreement*. In view of this, the IAG recommends to Council that the Cap for country towns be confirmed at 50GL/year and that the voluntary ban on trading imposed by South Australia be removed.

A preliminary study has been conducted into the relationship between climatic factors and diversion for irrigation purposes. The study shows a good relationship between temperature and water use and on refinement could provide a basis for comparisons between seasonal diversion and Cap targets. It is expected that this modelling will be completed in 2000/2001.

Table 1: South Australian Diversions for 1999/00 (GL)

	Long-term Cap adjusted for permanent trade	*Adjustment to Cap as a result of temporary trade*	*Diversion*	*Cap Credits (Cap target less diversion) 1999/00 Cumulative since 1 July 1997*		*20% Schedule F Trigger*
Adelaide						
- current year			138.7		-	
- rolling 5 years	650		577.5	+72.5	-	
Country towns	50		36.5	+13.5	+41.9	-10
Reclaimed Swamps	79.7	-0.6	79.1	+0.0	0.0	-16
Other	452.5	-1.1	364	+87.4	+186.5	-90
Total	**712.2**	**-1.7**	**618.3**			

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 1999/00 compared to 1998/99 with 5.2 GL of net permanent trades into South Australia and a preliminary estimate of 1.7 GL of net temporary trades out of South Australia. This compares with a net 4.0 GL and 0.6 GL of permanent and temporary entitlements moving into the State in 1998/99.

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

Work continues on developing management systems including measurement for the Murray Swamps. An indicative Cap target of 83.4 GL was set for the Lower Murray Swamps. This has been reduced to 79.7 GL as a consequence of permanent trade.

South Australia, through SA Water, transports water from the Murray to other Basins, ie Barossa and Clare Valleys. 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.

• *Lower Murray Swamps*

South Australia has conducted a major review of water utilisation in the Lower Murray Swamps as the basis of developing policies for the rehabilitation of on and off-farm infrastructure. Part of the proposal is to increase the 1996 Cap for the Lower Murray Swamps from 83.4 GL/year to 103.5 GL/year. Of this total, it is proposed that 84.7 GL would be tradeable while 18.8 GL would be a non-tradeable entitlement that must be retained in the swamp to maintain its environmental amenity.

The IAG assessed this proposal against four major criteria: equity with other irrigation areas, impact on river flows, 'Precautionary Principle' and whether the analysis reflects best-available information.

The current interim Cap of 83.4 GL/year was based on the estimated area under irrigation, and licensed per-hectare allocations for the swamps (72.1 GL) and highland (11.3 GL).

South Australia has now developed an improved basis for determining a final Cap. This includes use of crop water-use data and a leaching factor to ensure salts do not accumulate below the root zone.

The proposed Cap, based on best-practice irrigation requirements at 1993/94 levels of development is:

	Swamps	Highland
pasture/crop requirements	61.2 GL	7.9 GL
leaching factor	15%	15%
total water requirement	72 GL	9.3 GL

Based upon this model, the IAG supports a fully tradeable crop allocation of 81.3 GL for the Lower Murray (that is, 72 GL for the Swamps and 9.3 GL for the Highlands). This compares with the current interim Cap of 83.4 GL and the South Australian proposal of 84.7 GL.

It is the view of the IAG that the figure of 81.3 GL is based on the best available information and is equitable as to method with other irrigation areas.

While the swamps operate it is also recognised that an additional leaching factor is required to counter highly saline ground-water inflows and severely cracking clay soils. This is estimated at an additional 20 per cent above the 15 per cent included in the table above for management of this unique environment. This is equivalent to an additional 22.2 GL.

Analysis of the water balance at 1993/94 levels of development and after rehabilitation indicates that there is no change in net diversions **(Table 2)**. Reduced diversions after rehabilitation of the swamps are offset by reduced drainage and return to the river. The salt load in the return water would remain the same but be more concentrated as the volume of return water reduces from an estimated 109 to 38 GL/year.

Table 2: Water Balance 1993/94 and after rehabilitation

	1993/94	*Proposed*
Total diversion	173 GL	103 GL
Cap water use from swamp	61 GL	61 GL
Cap water use from highland	8 GL	8 GL
Drainage below root zone (swamp)	103 GL	31 GL
Drainage below root zone (highland)	2 GL	2 GL
Groundwater inflow	5 GL	5 GL
Returns to river	109 GL	38 GL
Net river loss	64 GL	64 GL
Entitlement	83.4 GL	103.5 GL
Monitoring method	Not measured	Measured

South Australia has recognised that if water is traded out of the swamps there would be environmental impacts. As a consequence South Australia has proposed that part of the current diversions estimated at 173 GL be recognised as a formal component of the Cap and retained for environmental management purposes. The water requirement for environmental management was estimated by South Australia to be 18.6 to 22.2 GL/year. It was therefore proposed by South Australia to allocate 18.8 GL/year and use it to mimic the natural regime of five flooding events in 10 years comprising:

- two events over 1/3 area to a depth of 300 mm for two months
- two events over 1/2 area to a depth of 500 mm for three months
- one event over all the area to a depth of 600 mm for four months

The events would occur mid-spring to mid-summer.

In assessing this proposal the IAG was of the view that if the swamps were abandoned for agricultural production that the precautionary principle should apply and that the full leaching factor of 22.2 GL/year should be retained for environmental management.

Under these extreme conditions with all water traded out there is likely to be a small impact on river flows as a result of in-swamp consumptive and evaporative losses.

Thus, the total Cap proposed by South Australia is 103.5 GL/year with 75.4 GL/year fully tradeable for the swamps 9.3 GL/year for the highland and 18.8 GL/year non-tradeable. However, the IAG does not accept the 18.8 GL/year non-tradeable component, but on the basis of the discussions above supports a fully tradeable component of 81.3 GL/year (72 GL/year for swamps and 9.3 GL/year for highland) and a non-tradeable component of 22.2 GL/year for a total Cap allocation for the Lower Murray of 103.5 GL/year.

• *Monitoring and Reporting*

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

Urban consumption and consumption in rehabilitated irrigation areas is reliably metered (97 per cent 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.

In line with earlier reports, the IAG is of the view that a Quality Management System needs to be introduced for the management of all data on diversion including water trading. A Quality Management System is defined as 'a system that documents the flow of information and identifies responsibilities and includes elements of quality control and periodic audit.'

With regard to Adelaide's consumption, the IAG is still of the view that it is desirable to develop a climate-adjusted model to enable early detection of any growth in consumption.

• *Proposals to Refine Implementation in 2000/01*

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

It is also proposed to finalise climate-adjusted models for water consumption in the irrigation areas to enable seasonal comparisons of water use and the climate-adjusted Cap.

• *IAG Assessment*

Consumption in South Australia in 1999/00 was within the Cap in both country, urban and irrigation areas.

While Adelaide's diversion was greater than the nominal annual average of 130 GL/year (actual diversions 138 GL) diversions were within the rolling five-year Schedule F Cap of 650 GL.

South Australia is best placed of all the States to quantify the Cap and reliably report against it.

On the basis of information provided by South Australia, the issue of possible double counting of diversions to country towns and Adelaide has been resolved. The information provided to the IAG in 1996 allocated all diversions from Swan Reach/Stockwell to Adelaide and as such the suggested 1996 Cap target of 50 GL/year for country towns is confirmed. In view of the clarification there is no longer a need to maintain the self-imposed ban on trading of water from this component of the Cap.

The proposals for the Lower Murray Swamps to increase the Cap to 103.5 GL/year comprising a tradeable component of 84.7 GL and a non-tradeable environmental component of 18.8 GL/year has been assessed by the IAG against four criteria: equity with other irrigation areas, 'Precautionary Principle', impact on river flows and the use of best available information.

On this basis the IAG is of the view that the allocation for Swamps should be 72 GL/year and 9.3 GL/year for Highland, both fully tradeable. This compares with the interim Cap figures of 72.1 and 11.3 GL/year.

The revised Cap allocations have no impact on river-flow volumes and total salinity loads while the swamps remain utilised. In the event that swamps are no longer irrigated, which is not foreshadowed in the near future with a major rehabilitation program proposed, it is important that water be allocated for environmental management. South Australia proposed that a non-tradeable amount of 18.8 GL/year be set aside for environmental-management purposes. Advice from South Australia indicated that from 18.6 to 22.2 GL/year could be required for this purpose. The IAG considers that the precautionary principle should apply and that 22.2 GL/year be included in the Cap allocation for the Lower Murray for environmental management purposes. The 22 GL/year would not be tradeable. The tradeable figure of 81.3 GL/year needs to be adjusted for trade out of the Swamps since 1995/96.

This effectively establishes a three-component entitlement comprising (unadjusted for trade):

- 9.3 GL/year for Highlands with unrestricted trade
- 72 GL/year for Swamp use with unrestricted trade
- 22.2 GL/year non-tradeable environmental management

The provision of a non-tradeable entitlement of 22.2 GL/year provides insurance to enable management of the Swamps for environmental purposes in the event a whole swamp is no longer utilised for irrigation purposes.

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 1999/00 was within the Cap.
- South Australia has a reliable system of measurement for urban and irrigation use (rehabilitated areas).
- There are proposals to further improve reliability of measurement in the lower Murray and in non-rehabilitated areas.
- Models in preparation to compare seasonal water use for irrigation and the climate-adjusted Cap should be finalised in 2000/01.
- A Quality Management System needs to be developed for the management of all data on diversions.
- The South Australian country towns' Cap should remain at the level of 50 GL determined in 1996.
- South Australia has proposed a revised Cap for the Lower Murray Swamps of 103.5 GL/year comprising 84.7 GL/year fully tradeable and 18.8 GL/year for environmental management and non-tradeable. The IAG supports the revision and adoption of the 103.5 GL/year with modifications and recommends to Council a three-component Cap for the Lower Murray Swamps comprising (unadjusted for trade):

  9.3 GL/year for highlands with unrestricted trade

  72 GL/year for swamp use with unrestricted trade

  22.2 GL/year non-tradeable environmental entitlement

This recommended modification is river-flow volume and salt-loading neutral while irrigation is retained in the swamps and protects the environmental value of the swamps in the event that irrigation ceases.

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 is in the process of calibrating a model for the fourth valley.

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 MDBC for accreditation.

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. As this model also calculates the Cap for the NSW portion of the Murray Valley, calibration cannot be completed until revised diversion data is provided by NSW.

A methodology that uses regression relationships with rainfall and temperature is being developed to calculate Cap targets for the Kiewa and Ovens components 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 but has not yet been calibrated to 1993/94 level of development.
Work commenced on updating the model input data and calibrating the model in September 2000 and 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 3.

The current estimates of the long-term Cap in each system are: -

Goulburn/Broken/Loddon System	2084 GL per year
Murray/Kiewa/Ovens System	1656 GL per year
Campaspe	122 GL per year
Wimmera-Mallee	162 GL per year

The interim Cap of 22 GL for Lake Mokoan has not been included in the Goulburn or Murray long-term average Caps at this time.

• 1999/00 Diversions

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

As a result of the continuing drought, the Goulburn, Campaspe and Wimmera-Mallee systems were severely resource-constrained during 1999/2000. The Murray system benefited from high inflows from the Darling Basin as well as improved flows in the Upper Murray tributaries, and allocations were close to maximum by the end of the season.

Diversions from all Victorian valleys were within Cap targets for 1999/2000. All the valleys remain in credit since Cap accounting commenced in 1997, as shown in **Table 3.**

Table 3: 1999/00 Diversions (preliminary values) compared with Schedule F Targets (GL/year)

Valley	*Long-term Cap*	*1999/00 Cap target*	*Net adjustment to Cap because of trade*	*Diversion*	*Cap Credits (Cap target less diversion) 1999/00*	*Cumulative since 1 July 1997*	*20% Schedule F Trigger*
Goulburn/Loddon/ Broken	2084	1659	-10	1555	+94	+120	-417
Murray/Kiewa/ Ovens	1656	1590	-1	1573	+16	+140	-331
Campaspe	122	75	4	74	+5	+51	-22
Wimmera-Mallee	162	N/A		135			-32

Goulburn/Broken/Loddon

Resource availability

Lake Eildon, the main water resource for the Goulburn system, was at 27 per cent of capacity at the beginning of the irrigation season as inflows over the previous two years were the second lowest on record. Inflows remained well below average during the season and the storage rose to 37 per cent in October 1999 before falling to a record low of 14 per cent in May 2000.

The initial allocation in August 1999 for the Goulburn system was 35 per cent of water right or licence volume and no sales. This was the lowest ever initial Goulburn allocation. The allocation gradually increased to 100 per cent of water right or licence volume in January 2000. No sales allocation was available during 1999/00. This was the equal-lowest allocation ever announced for the Goulburn system, being the same final allocation as in 1998/99.

Cap compliance

Diversion from the Goulburn/Broken/Loddon Valley was 1555 GL, which was 94 GL under the Cap target of 1659 GL after allowing for trade out of the valley.

This valley has a cumulative Cap credit of 120 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/year interim allowance for the full utilisation of Lake Mokoan.

Murray/Kiewa/Ovens

Resource availability

Lake Hume was at 36 per cent of capacity at the beginning of the season while Dartmouth was at 47 per cent of capacity. These resources are shared with NSW.

Inflows were about average in the upper Murray catchment during the season. Lake Hume rose to a peak of 59 per cent in November 1999 and Dartmouth peaked at 56 per cent in January 2000. High inflows to Menindee Lakes from the Darling catchment contributed greatly to resource improvements during the summer.

The initial allocation for gravity irrigation areas and private diverters was 100 per cent of water right or licence volume and no sales. The allocation increased to 100 per cent of water right/licence volume plus 90 per cent sales by April 2000 (60 per cent sales for private diverters not on the Mitta Mitta).

No off-quota periods were declared for Murray-system irrigators during 1999/2000.

Cap compliance

Diversion from the Murray/Kiewa/Ovens Valley was 1573 GL which was 16 GL under the annual diversion target of 1590 GL after allowing for trade out of the valley.

This valley has a cumulative Cap credit of 140 GL since accounting commenced in July 1997. The trigger for Cap exceedance is a debit of 331 GL.

Campaspe

Resource availability

Continuing dry conditions meant that Lake Eppalock commenced the season at 35 per cent of capacity and rose to a peak capacity of 42 per cent in October. It finished the year at 26 per cent of capacity. There was no supplement available to the Waranga Western Channel from the Campaspe system due to the low resource position.

Irrigators in the Campaspe system received an initial allocation of 100 per cent of water right or licence volume, and this did not change for the remainder of the season.

The Coliban storages were 38 per cent of capacity at the start of the year and finished at 47 per cent. There were no restrictions imposed in the Coliban system during the year.

Cap compliance

Diversion from the Campaspe Valley was 74 GL which was 5 GL under the annual diversion target of 75.0 GL after allowing for trade into the valley. Diversions were 40 per cent below the long-term Cap of 122.3 GL/year.

This valley has a cumulative Cap credit of 51 GL since accounting commenced in July 1997. The trigger for Cap exceedance is a debit of 22 GL.

Wimmera-Mallee

Resource availability

The 1999/00 season commenced with storages holding only 32 per cent of capacity, the lowest May volume since 1978. The 1999 winter and spring resulted in well-below average inflows with some key catchments producing their third lowest annual inflow on record.

Restrictions were not imposed to domestic and stock customers in the 1999 winter, however no supply was made to recreation lakes during the winter-spring season.

Significant restrictions were imposed in the summer period with domestic and stock supplies limited to 50 per cent of entitlement and irrigators received a 100 per cent allocation but no sales allocation. The environmental allocation was restricted to 30 per cent, which resulted in 3.45 GL being released down the Wimmera River and 2.0 GL released down the Glenelg River. The 2000 winter domestic and stock season commenced with a continuation of the 50 per cent restrictions that had been initiated for the summer run.

At the end of the financial year Wimmera Mallee Water storages were holding 13 per cent, their lowest combined volume since all 12 reservoirs have been constructed, and the lowest total volume since the 1940s.

Cap compliance

Diversion from the Wimmera-Mallee Valley was 135 GL in 1999/00. 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/year.

Diversions for 1999/00 were 17 per cent 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 stages four and five 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 7.2 GL to 24.9 GL/year at the end of the 1999/00 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 1999/00 year and none are proposed for the 2000/01 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 1989 Act.

The current status of bulk entitlements in the Victorian portion of the Murray-Darling Basin is:

Goulburn Basin – bulk entitlement process completed in 1995

Murray (Victorian system) - bulk entitlements were granted in July 1999

Campaspe Basin - bulk entitlements were granted in May 2000.

Kiewa River – bulk entitlements have been granted in the Upper Kiewa.

Ovens River – commenced and expected to be completed August 2001.

Broken Basin - commenced and expected to be completed December 2001

Wimmera-Mallee - commenced and expected to be completed July 2002

Loddon Basin – to commence July 2001 and to be completed July 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 per cent 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.

The plans are implemented as policies that 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 these nine streams:

Ovens River above Myrtleford	Yea River	King Parrot Creek
Kiewa River	Sevens Creeks	Delatite River
Nariel Creek	Loddon River above Cairn Curran	Upper Wimmera River

• *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 per cent of diversions are metered and plans are in place to progressively introduce meters for the unregulated stream diversions.

• *Proposals to Refine Implementation in 2000/01*

Further changes proposed in 2000/01 include:

- re-calibration of the Murray/Kiewa/Ovens model, which is expected to be completed by June 2001;
- the bulk-entitlement process for Loddon is expected to be started July 2001 and completed July 2003;
- the bulk-entitlement processes for the Ovens and Broken are expected to be completed in August and December 2001 respectively;
- the Wimmera-Mallee bulk-entitlement process is expected to be completed July 2002; and
- the 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 2001.

No major management changes are proposed in 2000/01 as usage is in line with Cap targets.

• *IAG Assessment*

In 1999/00, diversions for the Goulburn/Loddon/Broken, Murray/Ovens/Kiewa and Campaspe were all within the climate-adjusted Cap. All valley systems are in credit.

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/Loddon/Broken 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 Murray, Goulburn, Campaspe and Wimmera-Mallee systems in 1999/00 were all below 1999/00 climate-adjusted Cap targets.
- Cumulative diversions up to 1999/00 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.

New South Wales

• The Cap

Performance relative to the 1999/00 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 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 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, Macquarie and Border Rivers IQQMs to the MDBC for review and approval. Draft reports for the Macquarie and NSW Border Rivers have been provided to the Water Audit Working Group (WAWG) for comment on content and style. The Lachlan report has not been presented. Final reports for all three valleys will be presented in the near future for independent review.

For the Murray and Lower Darling, the MDBC's Monthly Simulation Model is used for Cap auditing. For the 1999/00 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 4** provides a summary of the current auditing tools used in NSW.

• 1999/00 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 Cap exceedance trigger. This exceedance trigger is 20 per cent 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 in 2000 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. NSW is investigating options to reduce this delay time in completing its data gathering.

The IAG notes the concerns expressed by NSW and recognises the difficulties that are being encountered. It is important to recognise that the audit process is still at a stage of transition, and it is to be hoped that further improvements will be made in the collection and manipulation of data as part of the Cap administration and assessment process.

Table 4: NSW Audit Tools 1999/00

Valley	*Auditing Tool*	*Comment*
Murray/Lower Darling	Murray Monthly Simulation Model (Interim)	Awaiting recalibration
Murrumbidgee	IQQM (Interim)	Preliminary results available
Lachlan	IQQM (Interim)	Awaiting Commission approval
Macquarie	IQQM (Interim)	Awaiting Commission approval
Peel	Climate-diversion relationship	IQQM under development
Namoi	IQQM (Interim)	Preliminary results available
Gwydir	IQQM (Interim)	Preliminary results available
Border Rivers	IQQM (Interim)	Awaiting Commission approval
Barwon-Darling	IQQM (Interim)	Preliminary results available, model finalisation by February 2001

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. These procedures involve the following steps:

- at the end of year one – actual extractions are compared with extractions expected with on-farm development, management and flow rules in place at the time flow rules were determined. If extractions are above those expected, areas being planted and other factors that may influence growth are closely monitored during the first half of year two, to see if changes persist. Models can then be used to assess the long-term impact of these changes on extractions;
- by December of year two – DLWC determines whether they believe growth in extractions have occurred and the degree of that growth. If the long-term Cap is judged to have been exceeded a response directed at reducing available water for extraction is determined; and
- in year three – the adopted proposals are implemented.

The adoption of the 20 per cent trigger mechanism within the Cap provides the NSW authorities with some warning of a likely exceedance of the Cap and in this way could potentially allow a more rapid response to an actual exceedance.

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. NSW acknowledges that whilst these rules ensure that long-term diversions are within the Cap, they do allow for diversions within individual years to exceed the Cap. Thus there is a need for timely and accurate reporting of actual diversions and climate-adjusted Cap estimates in order to allow early warning of longer-term Cap exceedance.

Table 5 provides a summary of NSW diversions by river valleys. This table identifies those valleys where diversions are in credit or in debit against Cap values and whether or not those in debit have exceeded the Cap trigger.

Table 5: NSW Valley Diversions 1999/00 (GL)

					Cap Credits (Cap Target less Diversion)			
Designated river valley	*Long-term diversion Cap*	*1999/00 Cap target*	*Net trade in to valley*	*1999/00 diversion*	*1999/00*	*Cumulative since 1 July 97*	*20% Schedule F trigger*	*Trigger exceeded*
Border Rivers	204	150	0	198	-48	-87	-41	Yes
Gwydir	348	397	0	445	-48	-121	-70	Yes
Namoi/Peel	254	299	0	299	0	114	-51	No
Macquarie	479	471	0	417	54	147	-96	No
Barwon-Darling	177	144	0	175	-31	-93	-35	Yes
Lower Darling	147	174	10	76	108	308	-29	No
Lachlan	350	241	0	296	-55	71	-70	No
Murrumbidgee	2521	2136	-117	1909	110	99	-504	No
NSW Murray	1877	1849	114	1214	749	869	-375	No
TOTAL	**6357**	**5861**	**7**	**5029**	**839**	**1306**		

Border Rivers

An allocation of 60 per cent was announced in late November which, when combined with 40 per cent carryover from the 1998/99 season, provided a total resource availability of 265 GL, not including off-allocation. The 1999/00 season was quite wet during the first few months, with off-allocation available from October through to January, and then again for a short period in March. This resulted in a total of 60.5 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 in 1999/00, falling in the 8th to 9th decile range of historical records for the valley.

The estimated total on-farm storage capacity in the NSW Border Rivers has increased by 13 per cent since 1993/94. The total capacity of 146 GL at the start of the 1999/00 season is almost three per cent higher than the previous year.

The total diversion in the Border Rivers Valley was 198 GL for the 1999/00 water year 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 NSW 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 later in the year.

Cap accounting has been performed using the recently calibrated Border Rivers IQQM. The estimates for the 1997/98 and 1999/00 seasons indicate that the NSW Border Rivers have accumulated a Cap debit of 87 GL, which is above the 41 GL trigger for Cap exceedance based on 20 per cent the estimated long-term average Cap diversion, confirming that the Cap has been exceeded in the latest year.

Gwydir Valley

A Continuous Accounting (CA) allocation system was introduced in the Gwydir in 1998/99. The new system provides licensees with an individual account that can be credited with up to 150 per cent allocation. The Gwydir Valley commenced the season with an average of 121 per cent in the individual accounts. Good inflows in the first few months resulted in all accounts reaching 150 per cent by early December. This provided a maximum on-allocation resource availability of 529 GL, not including off-allocation. There were eight incremental allocation increases, totalling 49 per cent of entitlement during the season. Combined with a total usage of 67 per cent of entitlement during the season, this provided a closing balance across the valley of 104 per cent of entitlement.

There were two off-allocation events announced for the Gwydir Valley during 1999/00. This resulted in a total of 86.5 GL of off-allocation diversions. Diversions from the unregulated streams in the valley have been estimated in recent years to be 11 GL.

Rainfall across the Gwydir Valley over the six month long principal irrigation season (October to March) was above average in 1999/00, falling in the 8th to 9th decile range of historical records for the valley. Crop information available for the Gwydir Valley indicates that the total area irrigated over the last two seasons has been estimated at 65,000 ha, with approximately 90 per cent of this total area being cotton.

The recorded on-farm storage capacity in the Gwydir Valley in 1999/00 was approximately 350 GL, representing a five per cent increase from the last available estimate (1997/98) and an 11 per cent increase since 1993/94.

The diversions in the Gwydir Valley were 445 GL for the 1999/00 water year.

Cap accounting has been performed using the recently calibrated Gwydir IQQM. The estimates for the 1997/98 and 1999/00 seasons indicate that the Gwydir Valley has accumulated a Cap debit of 121 GL which is greater than the 70 GL trigger for Cap exceedance. This confirms that the Cap has been exceeded on the Gwydir.

Namoi/Peel Valleys

A CA allocation system was introduced in the Namoi in 1998/99. The new system provides licensees with an individual account that can be credited with up to 150 per cent allocation. The valley commenced the season with all accounts at the maximum 150 per cent. This provided a resource availability of 264 GL, not including off-allocation. There were eight incremental allocation increases, totalling 64 per cent of entitlement during the season. Combined with a total usage of 77 per cent of entitlement during

the season, this provided a closing balance across the valley of 136 per cent of entitlement. Announced allocations for the Peel and Upper Namoi/Manilla water users of 100 per cent were made in early October, providing a resource availability of 48 GL and 10 GL respectively.

There were three off-allocation events announced for the Namoi River during 1999/00 and resulted in a total of 23.7 GL of off-allocation diversions. The maximum off-allocation Cap for the Namoi Valley was 110 GL.

Monthly net evaporation was below the long-term median in most of these months of the 1999/00 water year and was comparatively very low overall.

The diversions in the Namoi/Manilla portion of the Namoi Valley were 250 GL for the 1999/00 water year. This figure comprises approximately 192 GL of on-allocation usage and 24 GL of off-allocation usage. Diversions for the Peel Valley for 1999/00 (July – June) of 5.1 GL has been recorded for irrigation. A further 2.2 GL was used to supply Tamworth City as town water supply. This resulted in a total usage in the Peel system for 1999/00 of 7.3 GL. Diversions from the unregulated streams in the valley have been estimated in recent years to be 42 GL. In total, the 1999/00 diversion for the Namoi/Peel valley was 299 GL.

A survey of on-farm storage capacity in the Namoi Valley in 1999/00 indicated that the valley-storage total was approximately 179 GL. This represents a 12.5 per cent increase from the on-farm storage capacity found in the corresponding survey for 1998/99 and a 50 per cent increase over 1993/94.

There were no significant changes to management rules for the Namoi/Peel system during 1999/00.

Cap accounting has been performed using the provisional Namoi IQQM. In 1999/00 diversions were exactly equal to the Cap target. The estimates for the 1997/98 and 1999/00 seasons indicate that the Namoi Valley is cumulatively 114 GL in credit and well within the 51 GL debit trigger for Cap exceedance.

Macquarie Valley

The first official allocation announcement for the Macquarie Valley of 45 per cent was made in August 1999, with a 60 per cent carryover from the 1998/99 water year. Following significant inflows, the announced allocation was increased to 100 per cent, and all carryover was spilled and reset to zero. This gave a water resource availability of 670 GL, not including off-allocation.

There were six off-allocation events announced for the Macquarie Valley during 1999/00 between November and May that resulted in a total of 11.5 GL of off-allocation diversions. The maximum off-allocation Cap for the Macquarie Valley was 50 GL.

The 1999/00 season was moderately wet in late spring and early summer and much wetter than average in late summer and autumn. Rainfall during the whole October to April period was much higher in 1999/00 than the long-term median. An estimated 63900 ha of crops were irrigated in the Macquarie Valley in 1999/00, of which approximately 52400 ha were irrigated cotton. Diversions from the unregulated streams in the valley have been estimated in recent years to be 31 GL. The total valley diversion is estimated at 417 GL in the 1999/00 water year.

During the water year, the water accounting rules were modified to increase the maximum carryover limit to 100 per cent, with a maximum individual carryover plus allocation limit of 160 per cent. Otherwise, there were no significant changes to the management rules from the 1998/99 season. The environmental flow rules (EFRs) remained unchanged from the previous season.

The estimated diversion of 417 GL in 1999/2000 is 54 GL less than the preliminary estimate of the annual Cap estimate of 471 GL. Since 1997, the Macquarie Valley has accumulated a Cap credit of 147 GL.

Barwon-Darling

Metered diversions in the Barwon-Darling during 1999/00 were 175 GL. These exceeded the annual diversion target by 31 GL. Since 1997 the valley has accumulated a Cap debit of 93 GL which is well above the 35 GL trigger for Cap exceedance for the Barwon-Darling.

On-farm storage capacity in the Barwon-Darling grew by 11 per cent over the last year and is now 59 per cent greater than 1993/94. Crop areas irrigated in 1999/00 were 18 per cent higher than the maximum area irrigated up to 1993/94.

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.

Lower Darling

The Lower Darling system has a small entitlement, which has received a full allocation every year since the volumetric allocation scheme commenced in 1981. For 1999/00, this provided irrigators with a resource availability of 48 GL (100 per cent entitlement) plus a net inter-valley transfer to the valley of 10 GL, yielding a total of 58 GL of regulated water available to the valley, not including water available during periods of off-allocation. There were no off-allocation periods during 1999/00.

Rainfall in the Lower Darling Valley during the six-month long principal irrigation season (October to March) was above average in 1999/00, falling in the 8th to 10th decile range of historical records for the valley.

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 1999/00 was 76 GL. Flow conditions in the main stem of the Darling River in 1999/00 were never sufficiently high that any of this diversion was by way of floodplain harvesting into the Tandou property.

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 being recalibrated to better represent 1993/94 conditions.

Under 1993/94 conditions, off-allocation access would have been permitted at those times when the Menindee Lakes storage exceeded the original full supply of 1682 GL. Since this access was not allowed in 1999/00, diversions were 108 GL below the annual diversion target. The Lower Darling has accumulated a Cap credit of 308 GL since 1997.

Combined Barwon-Darling and Lower Darling

Since 1997, the Barwon-Darling has accumulated a Cap debit of 93 GL and the Lower Darling a Cap credit of 308 GL. At its August 2000 meeting, the MDBMC agreed to amalgamate these two valleys for the purposes of reporting on Cap compliance. Since 1997 the combined valleys have a Cap credit of 215 GL.

Lachlan Valley

The first official allocation announcement for the Lachlan Valley of 55 per cent was made in August 1999 and increased in December and February resulting in a final allocation of 74 per cent. There was sufficient carryover from the 1998/99 water year to provide the equivalent of 100 per cent allocations. This provided a water resource availability of 665 GL, not including water accessible during off-allocation periods.

There was only one off-allocation period announced during 1999/00. This resulted in a total of 8.7 GL of off-allocation diversions for 1999/00. The maximum off-allocation Cap for the Lachlan Valley was 30 GL.

The 1999/00 year was very wet, with 630 mm of rainfall between July and April. The area irrigated in the Lachlan Valley is estimated to be about 85000 ha, noticeably higher than the corresponding estimate for the previous year of about 76000 ha, but well below the 1996/97 and 1997/98 seasons. The diversion from the regulated sections of the Lachlan Valley in 1999/00 was 285 GL. Diversions from the unregulated streams in the valley have been estimated in recent years to be 11 GL. The total diversion from the valley was therefore estimated at 296 GL.

There were no significant changes to the management rules from the 1998/99 season. The environmental flow rules remained unchanged from the previous season.

Estimated diversions in the Lachlan Valley during 1999/00 were 296 GL. These exceeded the annual diversion target by 55 GL. However, since the previous two years were below Cap, the valley has accumulated a Cap credit of 71 GL. The trigger for Cap exceedance in the Lachlan Valley is a debit of 70 GL.

Murrumbidgee Valley

Lowbidgee

In previous reports, the Lowbidgee district was reported separately from the rest of the Murrumbidgee Valley. However, under Schedule F, Lowbidgee is part of the Murrumbidgee Cap.

Controlled diversions through regulators into the Lowbidgee district for 1999/00 were 192 GL. There is no indication of any upward trend in diversions in the Lowbidgee. The management rules regarding access to flows are currently being formalised. There was no significant change in these rules in 1999/00.

Development of an IQQM for the Murrumbidgee Valley is continuing, and it is expected that the module for Lowbidgee will provide a tool for assessing Cap in this part of the Murrumbidgee Valley. The Lowbidgee module is expected to be available during 2000/01. In its absence, the Cap compliance of the Murrumbidgee Valley has been assessed assuming that the Lowbidgee diversions since 1997 have equalled the Cap.

Other Murrumbidgee Diversions

The 1999/00 season in the Murrumbidgee Valley was moderately wet, with a combined net evapotranspiration for the July to June period of 1249 mm.

The first official allocation announcement for the Murrumbidgee Valley of 50 per cent was made in August 1999 and gradually increased as the season progressed to 78 per cent in February. This was the lowest final allocation since the introduction of the volumetric allocation scheme in the valley in 1980/81. The final announcement gave irrigators in the Murrumbidgee Valley a water resource availability of 2300 GL, excluding water available in off-allocation periods.

Off-allocation was first announced for the 1999/00 season in September 1999, with another three subsequent off-allocation events in October, December/January and February. This resulted in a total of 118 GL of off-allocation diversions for 1999/00. The maximum off-allocation Cap for the Murrumbidgee Valley was 220 GL.

In the 1999/00 season, 89227 ha of rice were irrigated in the Murrumbidgee Valley. This represents a two per cent decrease from the area planted in 1998/99, but is still the second highest rice area total for the Murrumbidgee Valley.

Diversions from the unregulated streams in the valley have been estimated in recent years to be 6 GL. By the end of the 1999/2000 water year, 1909 GL of water had been diverted in the Murrumbidgee Valley. There was also a net temporary transfer out to other valleys, Victoria and South Australia of 117 GL, which is accounted against the Murrumbidgee Cap.

An Annual Allocation Plan (AAP) was produced for each valley in 1999/00 outlining the management rules that will apply. New rules introduced for the Murrumbidgee Valley in 1999/00 included some changes to the EFRs, the introduction of carryover provisions and further changes to off-allocation areas. Changes were also made to transfer rules with a facility to 'borrow' against the following year's allocation.

Cap accounting has been performed using the provisional Murrumbidgee IQQM.

After taking into account 117 GL of temporary trade out of the valley, the total diversion in 1999/00 of 1909 GL was 110 GL less than the annual diversion target. Since 1997, the Murrumbidgee Valley has accumulated a Cap Credit of 99 GL.

Murray Valley

Overall announced water allocations for the Murray in 1999/00 were the lowest since the introduction of the formal valley-wide volumetric allocation scheme in 1977/78. At the commencement of the 1999/00 season there was a zero allocation for general security water users. The allocation improved gradually throughout the season, with the announced allocation reaching 35 per cent by the end of April, two months before the end of the water year.

In addition to the announced allocation, Murray irrigators had access to further resources including a 20 per cent carryover of entitlement from the 1998/99 water year, a 100 GL advance on 2000/01 minimum flows from the Snowy Scheme, and a net temporary transfer into the valley of 114 GL. These combined to give a total water resource availability of 1268 GL, not including water accessible during off-allocation periods. The sole off-allocation period announced for the year during September 1999 resulted in 43 GL of off-allocation diversions for 1999/00.

Murray Valley monthly rainfall in 1999/00 was generally lower than median with the exception of October, which was significantly wetter than normal.

The Murray Valley consumptive use for 1999/00 was 1214 GL including an estimated 6 GL in diversions from unregulated streams in the valley. Based on the provisional Cap model and after allowing for the 114 GL traded into the valley, this was 749 GL less than the annual diversion target for 1999/00. Since 1997, the Murray Valley has accumulated a Cap credit of 869 GL.

An analysis by the Commission of the reasons for the high levels of under-usage of Cap in 1999/00 has concluded that:

(a) About 170 GL is due to

  (i) the draw down of Lake Victoria to 21.5 m AHD in July 1999 to satisfy the NSW National Parks consent conditions and

(ii) the Commission decision in November 1997 to reduce the surcharge level in Menindee Lakes,

These actions led to a lower announced allocation early in the season which consequently reduced usage;

(b) About 110 GL is due to the transfer, late in the season, of allocations from other valleys to be carried over to 2000/01. This transfer increased the Cap figure against which usage is measured. Since the water was not ultimately required for use it resulted in elevated levels of carryover thus developing a credit against the Cap;

(c) About 210 GL is due to the unexpected degree of under-usage below the announced allocation. This is as a consequence of the development of the carryover rules and the decision by irrigators to carry over water to 2000/01 rather than to use it to water pasture in autumn. This is a valid credit against the Cap as it reflects irrigators' voluntary underuse against the Cap; and

(d) The remaining 260 GL is due to the decision to increase reserve in February and March to guarantee high security entitlements in 2000/01. The degree to which this reserve policy was in place in 1993/94 is currently being reviewed.

• *Administration of the Cap*

NSW has adopted a series of water-management and allocation rules for purposes 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 four per cent 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.

NSW has introduced a number of management rules in recent years including lower allocation announcements, reduced access to off-allocation and the gradual introduction of carryover to reduce late season 'use it or lose it' diversions. 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 that has been outlined above.

The importance placed upon the use of models in the NSW management methodology highlights the need to complete the IQQM modelling and have these authorised under the terms of Schedule F of the Murray-Darling Basin *Agreement* for all valleys. It is noted that NSW currently has three of these models awaiting MDBC appraisal and has completed interim models for most other valleys over the last 12 months.

• *Monitoring and Reporting*

The IAG has been pleased to note the progress that has been made on the completion of the IQQM modelling over the last 12 months. There is still further calibration of a number of these models required and the MDBC needs to complete its appraisal of the models for the Lachlan, Macquarie and Border Rivers.

The IAG notes the concern expressed by NSW concerning the time that it is taking to gather and confirm data for the Schedule F reporting and IAG assessment. While it is recognised that over the last two years there has been significant improvements in the gathering and processing of data, it is evident that there is still room for further improvements in these administrative tasks. As noted above, if NSW is to apply its management tools effectively, it requires early access to the results from the most recent water year.

The IAG has concerns about the accuracy of some of the information that is provided and the IAG's ability to confirm the accuracy of data prior to reporting to the Ministerial Council. Elsewhere in the report, the IAG has outlined its views on a process whereby greater assurance can be given as to the accuracy of the information provided as part of the audit, and an appropriate probity process can apply to any amendments to data previously provided to the IAG and upon which the IAG has reported to the Ministerial Council. It is the IAG's view that there is a need for a transparent and independently verified process by which data is amended for inclusion in the Schedule F register. The inability of NSW to confirm its diversion results for all valleys in that state at the time of the IAG review highlights the need for further improvements to the data capture and reporting process currently in use

both by NSW and the office of the Commission. Ultimately, the integrity of the Cap itself will depend upon the confidence that all stakeholders have in the information reviewed and reported on by the IAG.

• *IAG Assessment*

NSW has again provided data in line with the Schedule F format with useful background information upon which the IAG could make an assessment of its performance. There are still data problems mainly due to the timing of the delivery of reports. The completion of work on the IQQM models during the year and the use of these models in the assessment of the 1999/00 outcomes represents a significant step forward in NSW's reporting on the Cap.

Diversions exceed the estimated Cap trigger mechanism for the Gwydir River, Border Rivers and Barwon-Darling River. The Council's decision to combine the Barwon-Darling and Lower Darling removes the need for corrective action on the Barwon-Darling Cap exceedance. However, NSW authorities need to give urgent consideration to an appropriate response to the exceedance of the Cap for the Gwydir and Border Rivers.

• *Conclusions/Recommendations*

- Diversions in 1999/00 were 5029 GL compared to 6350 GL in 1998/99.
- IQQM Cap models have now been prepared for four river valleys, and these now await calibration and/or approval under Schedule F by the Commission. Three other valleys have an IQQM Cap scenario that is close to completion.
- Significant cumulative Cap debits had built up for the Border Rivers and the Gwydir River by the end of the 1998/99 season and, following a Special Cap Audit undertaken by the Commission, it is now confirmed that diversions have exceeded the climate-adjusted Cap in these valleys in 1999/00.
- The IAG recommends that as per Schedule F, NSW now be requested to report to the July meeting of Council on how it intends to comply with the Cap for the Border Rivers and the Gwydir River.
- Exceedance of the Cap in the Barwon-Darling is balanced by the below Cap results for the Lower Darling.
- NSW should complete the recalibration of its interim IQQM models as soon as possible and submit these to the Commission for approval under Schedule F.

Queensland

• The Cap

Valley Caps for Queensland have yet to be established. Council agreed in 1996 that the Queensland Cap would be established following the completion of the water allocation and management planning (WAMP) and water management planning (WMP) processes. Queensland's new legislation, Water Act 2000, will mean that these processes will in the future be termed water resource plans (WRPs). The IAG has supported the water resource planning process noting:

- it must accommodate instream 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;
- it must include both licensed diversions from streams and the currently unlicensed floodplain water harvesting;
- a management regime needs to be developed that includes pricing, property rights and measuring and reporting;
- there needs to be assessment of downstream flow and diversion impacts in NSW;
- the 'Precautionary Principle' is 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 water resource planning process should be conducted, including modelling of impacts on downstream Basin flows.

In August 2000 Council agreed to retain references to end-of-valley flows as an optional interim measure for Queensland compliance with the Cap until December 2002 (Clause 7(2) of Schedule F). It agreed that from December 2002 compliance will be on the basis of diversions on the same principles as other States.

• 1999/00 Diversions

Diversions for 1993/94 to 1999/00 are summarised in **Table 6.** The provisional diversions for 1999/00 at 547 GL reflects a year, which started with near full storages in most parts of the catchment, average rainfall early and drought in winter. The categories of diversions are summarised in **Table 7.** Water harvesting continues to be the main category of diversion (347 GL) and this would be even higher if unlicensed floodplain diversions were included.

Table 6: Queensland Basin Diversions (GL)

Year	*Diversions*
1993/94	338
1994/95	175
1995/96	520
1996/97	467
1997/98	741
1998/99	609
1999/00	547(estimate)

Table 7: Queensland Basin Diversions Categories (GL)

Diversion Category	*1999/00 (Estimate)*
Irrigation Area Channels	47
Private Diversions	108
Water Harvesting	347
Unregulated Stream Licences	32
Urban and Industrial	13
Total	**547**

On an interim basis, the Cap in Queensland will be defined as end-of-valley flow objectives and management rules. Unfortunately it is not possible to compare end-of-valley flows in 1999/00 against those objectives as they are still to be established. Water harvesting diversions in 1999/00 were about 50 per cent of the total flow in the Upper Condamine.

Diversions in 1999/00 were below the 1998/99 levels and considerably below the 1997/98 levels and reflected full storages in most areas coming into the year and a below-average water harvesting opportunity. Further growth in on-farm storages occurred during the year. More refined estimates are now available for ring-tank storages for river and floodplain diversions following an audit of the Condamine-Balonne catchment to provide more accurate information for the IQQM. A similar audit of ring-tank storage capacity is currently underway for the Border Rivers and only provisional figures are available. The data in summary is provided in **Table 8.**

There has been an apparent significant increase in storages in the Beardmore Dam to the Border

section of the valley with an estimated 340 GL increase that Queensland officers estimate is due to the improved accuracy of recording (140 GL), but also as a result of a further 200 GL of new storages. Smaller growth has occurred in the upper Balonne and Condamine and Border Rivers. Total on-farm storage in the Queensland part of the Basin has now increased from an estimated 360 GL in 1993/94 to 1600 GL in 1999/00.

Table 8: Estimates of on-farm storage capacity (GL)

Valley	*1998/99*	*1999/00*
Condamine Balonne		
- Beardmore Dam to Border	720	1060
- Upper Balonne and Condamine	110	170
- Floodplain upper catchment	120	160
Condamine Balonne Sub Total	**950**	**1390**
Border rivers	190	210
Total	**1140**	**1600**

The growth in storages and diversions is within the legal and administrative arrangements that existed at the 1993/94 benchmark used to establish the Cap. Queensland has complied with the interim moratorium of not issuing new licences. Sleeper and dozer licences, however, have been activated and in high run-off years this has led to a significant increase in diversion. On 14 August 2000, the Queensland Minister for Environment and Heritage and Natural Resources announced a moratorium on new water-diverting works pending the outcome of the water resource planning processes. Following assent being given on 13 September 2000 to the new *Water Act 2000*, on 20 September a moratorium notice under the Water Act 2000 was issued for both the Condamine-Balonne Basin and Border Rivers plans. This issue is raised again later.

• *Progress with the WAMP process*

The IAG has been asked by the MDBMC to audit the water resource planning process and outcomes.

In this report, an update of the status of the water resource planning process on Basin rivers is provided.

Queensland has prepared draft WMPs for the Moonie River and the Warrego/Paroo/Nebine catchments and a draft WAMP for the Condamine-Balonne. In the future these will be termed WRPs.

The IAG provided an interim audit report for each of these draft plans advising that:

(i) the proposed arrangements for the Warrego, Paroo and Nebine catchments met all the audit criteria; and

(ii) the 'Precautionary Principle' should be applied to the findings of the Moonie River WMP.

The Condamine-Balonne draft plan is currently out for public comment and incorporates three scenarios representing three levels of water diversions and corresponding flow outcomes. These scenarios are:

> *Scenario A*: end-of-system flows no lower than those associated with full utilisation of the mid-1999 level of development;
>
> *Scenario B*: partial improvement of end-of-system flows;
>
> *Scenario C:* further improvement of end-of-system flows similar to that associated with full utilisation of the 1997 level of development.

The IAG in its preliminary assessment made these observations:

(a) The preliminary view of the IAG is that the Technical Advisory Panel's (TAP) Condamine-Balonne Environmental Flows Technical Report provides the basis for value judgements to be made on the current status of river health and the future impacts of development scenarios. The TAP report highlights that the Lower Balonne is generally in poor health with the Narran Lakes, a Ramsar wetland, at risk as a result of increased diversions;

(b) Pending the IAG assessment of the QEPA review, it is the view of the IAG that the draft plan inadequately considers the downstream impacts on Narran Lakes;

(c) It is also the view of the IAG that in setting the environmental flow levels and in testing a number of scenarios that a value judgement has been made that a higher risk of environmental impact is acceptable;

(d) The IAG notes that further increases in diversions are unsustainable and an immediate moratorium on further increases in diversion is warranted to prevent further environmental degradation and significant reduction of the security of existing developed licences;

(e) Given the current stage of knowledge on resource utilisation and environmental impacts it would not be appropriate for a further increase in diversions through the activation of sleeper and dozer licences, estimated at seven to 10 per cent by volume, to occur; and

(f) Proposals for metering monitoring and reporting are in line with best practice recommendations for Cap implementation.

The IAG was to provide a further report once additional information was available. This includes an analysis of downstream (of the Queensland border) flow impacts of the scenarios, a more detailed assessment on Narran Lakes and the associated Ramsar wetlands and an assessment by the Queensland EPA of the Technical Advisory Panel's Condamine-Balonne Environmental Flows Technical report.

The IAG had been advised that the period for receiving public submissions to the draft Condamine-Balonne plan had been extended to 15 December 2000.

• *Current Status*

The status for each WRP is summarised in Table 9. Comments are provided for each plan.

Condamine-Balonne

A draft plan was released for public comment on 14 June 2000 and a final plan is expected to be available in 2001.

The IAG has provided a preliminary audit report on the draft plan and is to provide a further report when the following information is available:

a) Queensland EPA review of *Environmental Flows Technical Report* due in December 2000

b) Independent review of IQQM model due end of 2000

c) Modelling of downstream impacts by MDBC. This was expected to be available by December 2000

d) Additional information on environmental status of Narran Lakes and associated management requirements.

The issue of floodplain flows continues to be important and needs to be included in the final plan. The IAG understands that the moratorium notice should limit growth of floodplain diversions. During the moratorium period the issues associated with floodplain harvesting and impacts on downstream flows need to be addressed.

Table 9: Queensland Water Resource Plans Progress Report as at 26 October 2000

	Condamine-Balonne	*Border Rivers*	*Warrego/Paroo/Nebine*	*Moonie*
Draft Plan release	14 June 2000	Due early 2001	22 June 2000	9 May 2000
Public submissions close	15 December 2000	2-3 months following draft plan release	11 August 2000	21 July 2000
Finalise plan (subject to Cabinet approval)	Mid-2001 (estimated)	Mid-to-late 2001 (estimated)	Early 2001 (estimated)	Early 2001 (estimated)
Hydrologic analysis	Streamflow data (IQQM output) has been provided to DLWC and MDBC to model downstream impacts and awaiting analysis results Independent review of IQQM model due end 2000	Calibrated daily flow model (IQQM) and reports completed Information paper released Aug 2000 containing condition and trend data	Daily flow models (IQQM) completed late 2000	Draft Plan aims to maintain greater than 70 per cent of natural mean annual discharge at NSW border Stream-flow data (IQQM output) has been provided to DLWC and MDBC to model downstream impacts and awaiting analysis results
Environmental analysis	QEPA review of Environmental Flows Technical Report due end 2000	Current ecological condition report completed Nov 1999 TAP report on environmental risk assessment advice due end 2000	Overview document completed Science forum held Nov 1999	Overview document completed Aug 1999 Science forum held Nov 1999
Economic analysis	Social and economic assessments of draft planned for early 2001	Social and economic assessment methodologies agreed to between DNR & DLWC Data collection commenced	N/A	N/A
Consultation	20 public and stakeholder meetings and consultation with stakeholders following release of draft plan	Four public meetings with release of information paper and report on issues raised	Preparation of report on 57 submissions	Preparation of report on 20 submissions

DLWC: NSW Department of Land and Water Conservation
DNR: QLD Department of Natural Resources
IQQM: Integrated Quantity Quality Model
QEPA: QLD Environmental Protection Agency

It is the view of the IAG that the plan now needs to be finalised to establish a Cap and provide certainty for producers and a flow regime that minimises further risk of environmental degradation.

Border Rivers

Flow modelling has been completed and it was expected that the Technical Advisory Panel report on environmental risk assessments was due in December 2000.

Preparation of the flow management plan is being conducted jointly with NSW and is addressing the following issues:

i) environmental flow targets in the regulated systems
ii) setting of diversion limits in the regulated system
iii) determination of goals and mechanisms for protection of inflows from tributary streams originating in each of the States
iv) determining the principles that will govern interstate trading of water
v) monitoring and auditing processes

There are also several processes that need to be jointly determined and implemented that could bring significant environmental improvements along the shared sections of stream. These are:

vi) setting of dam and weir operation rules for major structures
vii) processes for review of weirs in the regulated streams

Items (i), (ii) and (vi) are being jointly developed by modelling possible management scenarios using the daily flow model (IQQM).

The IAG suggests the two States contemporaneously address the issue of the appropriate response if either State breaches Schedule F.

In November 1999 the Queensland and NSW Governments decided not to support increases in water use in the Border Rivers that will cause further deterioration in the flow regime at Mungindi and not to allow further growth in diversions in the regulated sections of the River.

The draft plan is expected to be released in early 2001.

Warrego/Paroo/Nebine

A draft plan was released in June 2000. The plan is being amended to conform to the provisions of the *Water Act 2000* and if approved will become the Warrego/Paroo/Nebine Catchments WRP.

This plan will specify outcomes, including ecological outcomes, as well as water and ecosystem monitoring requirements. Hydrologic models of the catchments have recently been completed and will be used to determine the impacts of water extractions.

A final plan including the proposed Cap is expected to be available early in 2001.

Moonie

A draft WMP was released in May 2000. The draft plan allows for additional water supplies to be provided for towns and rural stock and domestic purposes and additional harvesting extractions of an average of 5290 ML/annum.

Through the imposition of restrictions, the draft plan aims to maintain the mean annual discharge of the Moonie River at the NSW border at greater than 70 per cent of the natural mean annual discharge at this location.

The IAG in its June 2000 report considered that the proposals for increased diversion did not align with the precautionary principle.

The IAG has been advised that additional work is underway to ensure the accuracy of current water use and the IQQM.

Downstream flow impacts will be determined by modelling to be done by the Murray-Darling Basin Commission in cooperation with the NSW Department of Land and Water Conservation.

The draft plan is being amended to conform to provisions of the *Water Act 2000* and if approved will become the Moonie River WRP.

• *Management Issues Following Establishment of the Cap*

The IAG was advised that the *Water Act 2000* was assented to on 13 September 2000. It provides the basis for establishing the regulatory framework for management of various aspects of water resource management including licence volumetric conversions, property rights, and trading. The Act also addresses the issue raised in previous IAG reports regarding the ability to manage and control water diversion from overland flow, including floodplain harvesting. Growth in diversions from overland flow has the potential to significantly affect downstream flows including security of access and environmental flow impacts.

Queensland has advised that the WRPs will include a requirement for metering and the IAG consider this critical in providing comfort to irrigators on the actual quantities used by individual irrigators, but also as an accountability mechanism for management of the Cap.

The IAG also considers that Queensland should take the opportunity to establish a Quality Management System for the management and reporting of diversion data.

Queensland is also considering appropriate assessment tools to assess Cap compliance including IQQM or simple hydrologic input-output correction measures.

• *IAG Assessment*

There has been considerable progress towards establishing Cap targets and management rules in Queensland.

Draft plans have been released for the Moonie, Warrego/Nebine/Paroo and Condamine-Balonne. A draft WRP for the Border Rivers is expected to be released early in 2001.

Additional studies are underway to address issues raised by the IAG in its June 2000 report *Audit of Queensland Draft Water Resource Plans*. These include the Queensland EPA assessment of the draft plans and modelling of downstream impacts by the MDBC in cooperation with the NSW Department of Land and Water Conservation.

A further Audit report will be provided by the IAG early in 2001 before the final WRP is released.

Queensland, with the assent of the *Water Act 2000,* now has the statutory capacity to implement a management framework to establish and implement the Cap. Importantly the Act provides the capacity to manage floodplain harvesting and the basis for a trading regime including the establishment of water entitlements that are separate from land title.

The *Water Act 2000* also provided the basis for the issue of moratorium notices for the Border Rivers and the Condamine-Balonne Basin planning which occurred on 20 September 2000, and addresses the issue of rapid increase in storages and diversions reported on in IAG audit reports from 1996/97 to 1998/99. A copy of the Condamine-Balonne Basin notice is attached as Appendix 2. The notice for the Border Rivers is very similar.

There was further growth in on-farm storages in 1999/00. Information from a detailed survey to the Condamine-Balonne has shown that storages in the Lower Balonne have increased by 340 GL. On-farm storage capacity also increased by 60 GL in the Upper Balonne and Condamine and 20 GL in the Border Rivers.

It is estimated that the 340 GL increase in the Lower Balonne was partly due to the survey identifying storages previously not counted but an estimated 200 GL reflects growth in storages.

The moratorium formalised on 20 September 2000 should now provide a brake on growth while the WRPs are finalised. The IAG considers it critical, however, that the WRPs be finalised urgently to ensure Cap targets are established, to provide certainty to irrigators and to establish EFRs that minimise the risk of further environmental degradation.

• *Conclusions/Recommendations*

- Diversions of an estimated 547 GL compared with 608 GL in 1998/99.
- There was further growth in on-farm storages with the Lower Balonne alone increasing by 340 GL, representing an estimated 140 GL previously unaccounted for and 200 GL of new growth in 1999/00.
- A moratorium notice was issued 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 draft plans for the Condamine-Balonne, Moonie, Warrego/Nebine/Paroo are currently out for public consultation.
- Additional assessments are underway to address issues previously identified in the IAG's June 2000 report on the audit of the draft WRPs. This includes Queensland EPA assessment of the *Condamine-Balonne Environmental Flows Technical Report* and draft plan and the modelling of downstream impacts of the Condamine-Balonne draft plan and the Moonie draft plan.
- The final WRPs and Cap targets should be finalised for the Moonie and Warrego/Nebine/Paroo early in 2001.
- The final WRP for the Condamine-Balonne should be available in mid-2001, and the Border Rivers draft plan in early 2001.

- The IAG considers that the Condamine-Balonne WRP should be finalised as soon as possible to establish a Cap target, to provide certainty to irrigators and to provide a river-flow management regime that minimises the risk of further environmental degradation.

Australian Capital Territory

• The Cap

The ACT became a participant in the MDBC 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 ACT's Cap is to be, although this has been the subject of discussion at the August 2000 Ministerial Council meeting. Net ACT consumption is approximately 0.3 per cent 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 Corporation. Net diversions since the mid-1980's for urban water supply have been around 30 GL per year with an additional 5 GL per year estimated for all other consumptive diversions (see **Table 10**). Around 50 per cent of the urban water diversions in the ACT are returned to the Basin by way of the Lower Molonglo Water Quality Control Centre (LMWQCC) 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 although a further 12-month licence is expected to 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 per cent 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.

• Issues with Adoption of the Cap

The ACT Government has reconfirmed 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 submission to the August 2000 meeting of the MDBMC, in which a Cap of 61 GL was proposed, the ACT Government argued for a balance between environmental flow needs and the

TABLE 10: Diversions for Consumptive Use within the ACT and Queanbeyan

(GL/year)

		Less returns to system			
Year	Gross diversion	Lower Molonglo WQCC	Queanbeyan STW	Other diversions	Net diversion
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

needs of the largely urban water use of the ACT, recognising that the ACT has already implemented water-resource management legislation that ensures sustainable management of the water under its control.

These comments were made in response to a report prepared by the IAG (*Setting the Cap for the ACT*) in June 2000 which recommended that a Cap of 38 GL be set for the ACT and that water under this Cap be fully tradeable.

The issue of the ability to access water under some form of acceptable trading rules is central to the ACT Government's concern about agreeing to a final Cap for the Territory. It has been advised that the finalisation of trading rules between NSW and the ACT will need to await amendments to appropriate legislation in NSW as part of a more general review being undertaken by NSW of the operation of the water market in the Murrumbidgee Valley. The ACT has also indicated that it would not agree to a trading regime that was limited to the Murrumbidgee River. A wider trading market is being developed that could eventually enable the ACT to trade with the River Murray in NSW, Victoria and South Australia. However, the arrangements for this market are unlikely to be developed for at least two years. To await completion of this review would mean that the ACT Cap would remain unspecified for a further two years. The IAG does not believe that this timeframe would be in the interest of the ACT or of the general operation of the Cap.

• *Discussion of Issues*

In its November 1996 Report, *Setting the Cap*, the IAG outlined six principles or 'tests' against which to assess equity and consistency issues. These six principles were:

1. no further change be made to flow regimes that would contribute to deterioration of water quality and environment protection (instream, floodplain or estuarine);
2. water allocations be made with extreme sensitivity to the effects on the environment ('Precautionary Principle');
3. water is allocated to the highest value use (allocative efficiency);
4. statutory and agreed property rights be recognised;
5. water management processes be transparent and auditable; and
6. a system of administration be implemented that is easily understood and that minimises time and costs (administrative efficiency).

The ACT has argued in favour of a Cap of 61 GL. The IAG has reviewed this proposal and concluded that using the six principles outlined above, the ACT Cap should be set at 38 GL, with this Cap assessed on a climate-adjusted model of water usage in the ACT.

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 climate-adjusted Cap of 34.4 GL been agreed prior to the current annual audit by the IAG, the ACT would have been entitled to a credit of around 8 GL based on its diversions in 1999/00 of 26 GL.

• *Monitoring and Reporting*

The ACT proposes to use a climate-adjusted Cap based upon a model jointly developed with the MDBC. The ACT has established a system of licences for all users of water in the ACT although final details of these licences have yet to be agreed. These will be climate-adjusted volumetric licences and 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.

• *1999/00 Diversions*

Net diversions by the ACT in 1999/00 was 26.5 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. The 1999/00 diversion is 7.9 GL below the 34.4 GL climate-adjusted target. Table 11 summarises the ACT's performance against the 38 GL Cap since July 1997. It reveals that if the ACT adopted a Cap based on 38 GL, it would have already built up a credit of 29.7 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 LMWQCC and the Queanbeyan STW.

Table11: An example Cap applied to the ACT - Diversions since July 1997 compared with the 38 GL target

			Credits (Proposed Climate Adjusted Cap Target less diversion)		
Proposed long-term diversion	*1999/00 climate-adjusted target**	*Diversion*	*1999/00*	*Cumulative since 1 July 97*	*20% long-term Cap diversion trigger*
38	34.4	26.5	7.9	+29.7	-7.6

* Annual climate-adjusted 38 GL

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. 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 that lie outside 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. It also notes the current action within the ACT to licence existing and future water users and to collect relevant information on water use. This monitoring and reporting system will provide appropriate data for completion of Schedule F.

The determination of what constitutes the Cap for the ACT should be addressed as a matter of priority by the ACT Government in order to meet the Council's requirement that this matter be resolved and a report delivered to the next meeting of the Council. The IAG recognises that the need to resolve the trading rules to apply on the Murrumbidgee creates difficulties for the ACT. The IAG therefore suggests that consideration be given to a staged approach to the adoption of a final Cap. A two-step approach could be adopted whereby:

- a 61 GL non-tradeable Cap for the ACT would apply until such time as the trading rules for the Murrumbidgee are resolved to the ACT's satisfaction; and
- once the trading rules are agreed an automatic transformation to a 38 GL fully tradeable Cap be adopted.

• *Conclusions/Recommendations*

- Net diversions of 26.5 GL in 1999/00 fall below the long-term average usage of 30 GL and a possible Cap of 38 GL.
- No Cap presently exists for the ACT.
- The IAG believes that consideration should be given to an interim arrangement that could apply until a final Cap is agreed and that this interim Cap would comprise 61 GL of non-tradeable entitlement.
- Once the trading rules are agreed for the Murrumbidgee to the satisfaction of the ACT the IAG recommends the automatic transformation of the final Cap for the ACT to 38 GL fully transferable water allocation should apply.
- Trading rules should be developed by June 2001 to enable finalisation of the ACT Cap.

5. Diversions from the Murray-Darling Basin in 1999/00

Murray-Darling Basin diversions in 1999/2000 totalled 9557 GL. From **Figures 1 and 2** it can be seen that this is the lowest Basin diversion since 1992/93 being only 73 per cent of the record diversion of 12 940 GL in 1996/97. The diversion by NSW of 5029 GL was the lowest since 1975/76 and is only 65 per cent of the peak NSW diversion of 7750 GL in 1996/97. The very low diversions this year are due to the water supply restrictions caused by low initial storage levels in the Goulburn, Murray and Murrumbidgee valleys.

Of the total water diverted, NSW diverted 52 per cent, Victoria 35 per cent, South Australia 7 per cent, Queensland 6 per cent and the ACT 0.3 per cent. Diversions for the individual valleys are presented in **Table 12.**

Because this data was collected so close to the end of the water year in the northern rivers, the diversions in **Table 12** will differ from those that will eventually be published in the 1999/00 *Water Audit Monitoring Report.*

TABLE 12: Murray-Darling Basin Diversions in 1999/00

System	*Total diversion (GL)*	*Percentage of Basin diversion (%)*
NSW		
Border Rivers	198	
Gwydir	445	
Namoi/Peel	299	
Macquarie	417	
Barwon-Darling	175	
Lachlan	296	
Murrumbidgee	1909	
Lower Darling	76	
Murray	1214	
Total NSW	**5029**	**52.6%**
Victoria		
Goulburn/Loddon/Broken	1555	
Campaspe	74	
Wimmera-Mallee	135	
Murray/Kiewa/Ovens	1573	
Total Victoria	**3337**	**34.9%**
South Australia		
Metro-Adelaide & Associated Country Areas	139	
Country Towns	37	
Lower Murray Swamps	79	
All Other Uses of Water from the River Murray	364	
Total South Australia	**618**	**6.5%**
Queensland		
Condamine/Balonne		
Border Rivers		
Macintyre Brook		
Moonie		
Warrego		
Paroo		
Total Queensland	**547**	**5.7%**
Australian Capital Territory	**27**	**0.3%**
Total Basin	**9557**	**100.0%**

FIGURE 1: Murray-Darling Basin Diversions – 1983/84 to 1999/00

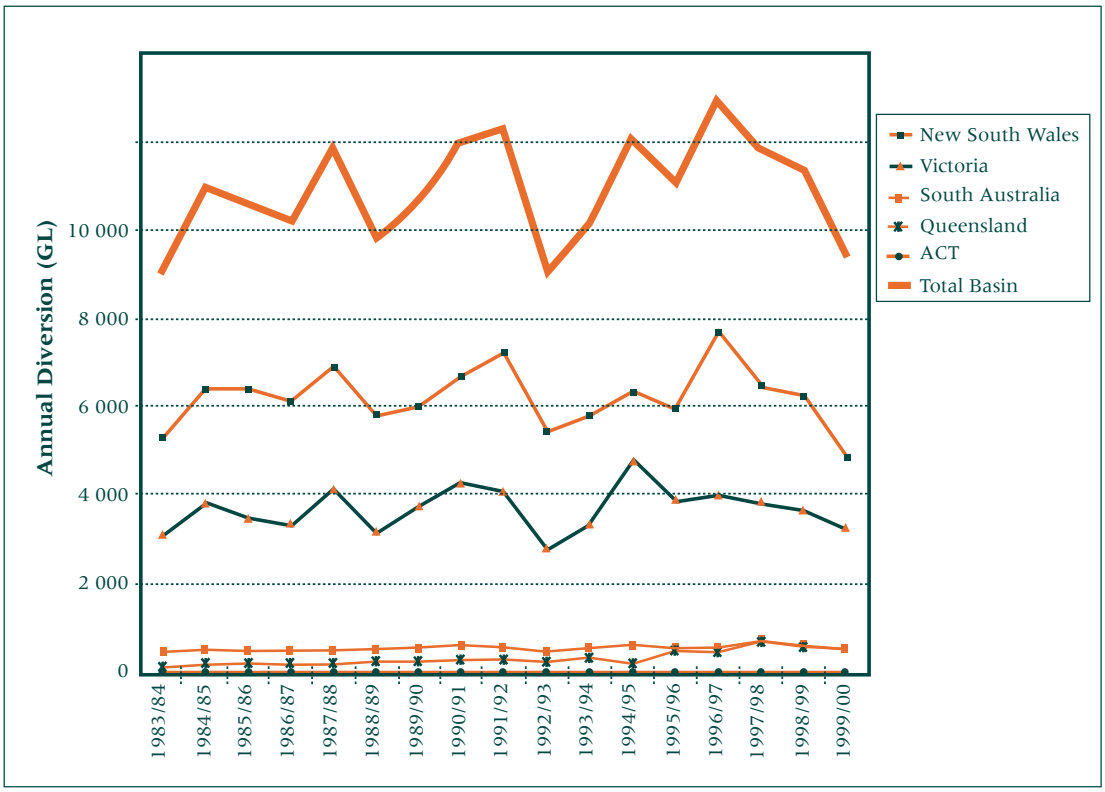
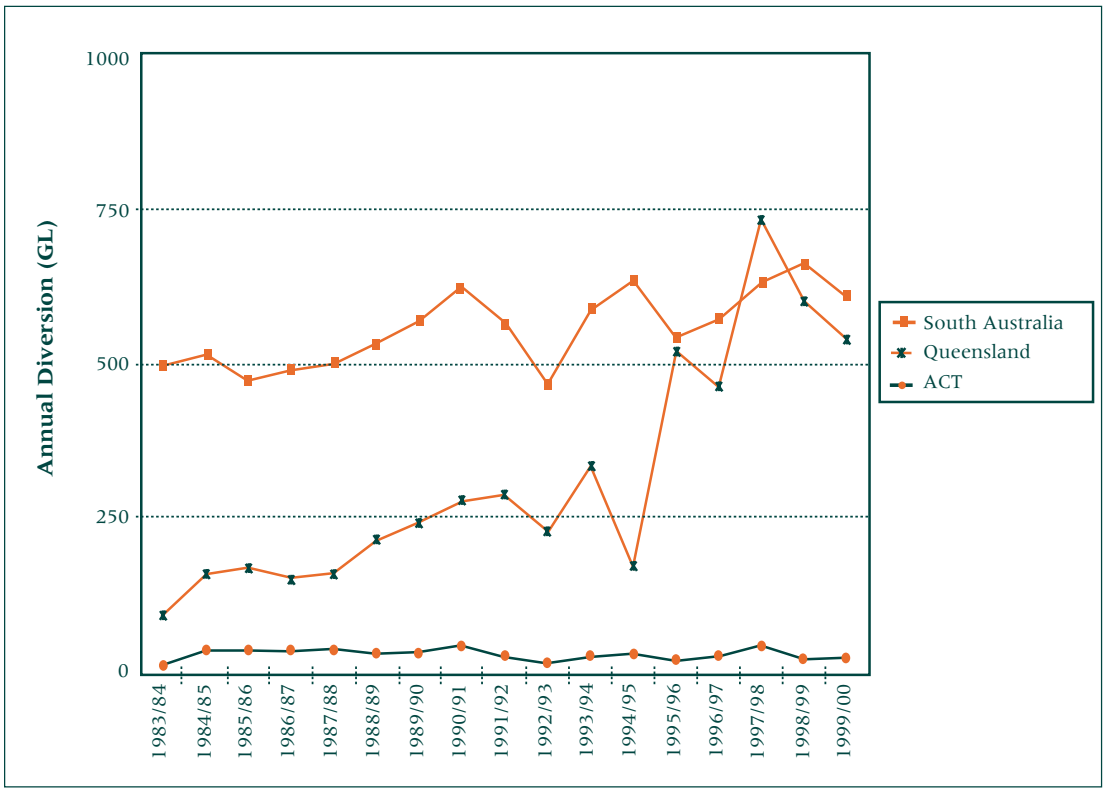


FIGURE 2: Murray-Darling Basin Diversions – 1983/84 to 1999/00 (Usage under 1,000 GL/year)



Appendix 1
Responses by the Five State and Territory Governments

The five State and Territory Governments prepared written responses to IAG's Report that was presented to the MDBMC in March 2001. The Council agreed to publish these responses as an appendix to the IAG's Report.

SOUTH AUSTRALIA

The IAG confirmed that all South Australian diversions from the River Murray for 1999/2000 were within the Cap and that a reliable system is in place to monitor these diversions.

In preparing their assessment the IAG specifically noted actions that had been undertaken by South Australia leading to the final confirmation of the Cap for country towns and Lower Murray Swamps, as requested from the 1998/99 *Review of Cap Implementation*. Further refinements identified by the IAG to be pursued for Cap implementation throughout 2000/2001 include progression of the metering of water supply for Lower Murray Swamps and completion of a climate-adjusted Cap. South Australia is firmly committed to these actions.

Country Towns Cap

The country towns Cap has been reviewed and the information subsequently provided to the IAG to facilitate an informed decision regarding the Cap's tradeable status and limit. South Australia welcomes the decision of the IAG to lift the self-imposed ban on trading for the country towns and that the Cap limit remains at 50 GL per year.

Lower Murray Swamps

The Cap for Lower Murray Swamps has been comprehensively assessed and the results of this assessment confirm that the Cap should be increased to 103.5 GL per year. South Australia accepts the decision of the IAG to support this increase with amendments to the breakdown of components to this figure.

Given the 'Precautionary Principle' and on the advice of South Australia to the IAG that environmental-management requirements for the Lower Murray Swamps could range from 18.6 to 22.2 GL, South Australia agrees that the environmental-management component be lifted from the initially proposed 18.8 GL to 22.2 GL.

South Australia accepts the three-component entitlement for Lower Murray Swamps consisting of:

- 9.3 GL/year for highlands with unrestricted trade
- 72.0 GL/year for swamp use with unrestricted trade
- 22.2 GL/year non-tradeable environmental management

South Australia also acknowledges that this new Cap figure will need to be adjusted for net trade that has occurred out of the swamps since 1995/96.

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

South Australia acknowledged the request of the IAG from the 1998/99 *Review of Cap Implementation* for an appropriate management framework to ensure that irrigation diversions remain within Cap in the longer term.

The development of a water allocation plan (WAP) by the River Murray Catchment Water Management Board will provide the framework for many management issues including long-term Cap compliance. Although this plan was expected for completion by mid-2000, an extension to the Catchment Board boundary to include the Murray Mallee and areas to the north of the river set back this time-line. The final plan is now expected to be submitted to the Minister for endorsement by June 2001.

Additionally, the careful monitoring of trends in diversions, improved metering, continued development of a new licensing system with enhanced reporting capabilities and progression of quality management guidelines for data handling will expand the capabilities of the South Australian Government to confidently meet its obligations.

South Australian Concerns About the Other States

ACT

South Australia is concerned that the recommended 61 GL non-tradeable Cap for the ACT, as an interim measure until the Murrumbidgee trading rules are finalised, promotes an inappropriate culture regarding acceptable water use. After trading rules are finalised and the IAG-recommended Cap of 38 GL is imposed, the ACT could be in a position where water allocations may need to be reclaimed from users. South Australia would like to see an assurance that such a situation could be effectively managed.

Although it is acknowledged that the ACT has been very conservative with regard to water use in the past, it is the view of the South Australian Government that this interim Cap sends an improper message to the broader community regarding the level of commitment to the Cap.

NSW

South Australia is particularly alarmed at the confirmation of Cap exceedance in the Border Rivers and Gwydir River and will await the report requested of NSW to the July Ministerial Council meeting on how NSW will comply with Cap in these valleys. South Australia remains particularly concerned at the commitment of NSW to bring 'back into balance' any Cap deficit as defined in Schedule F.

QLD

South Australia has been concerned at the rapidly increasing level of diversions, particularly as a result of growth in on-farm storage in the Lower Balonne consisting of 140 GL previously unaccounted for plus 200 GL of new growth in 1999/2000.

The moratorium that has now been issued under the new *Water Resources Act 2000* for the Condamine-Balonne and Border Rivers provides some relief as it will limit further growth in diversions and construction of new storages.

However, South Australia has lost some confidence in the Cap implementation process with the continued delays in Queensland completing their WRPs and subsequent Cap targets at a time when there is increasing evidence that across the Basin water resources have already been over-allocated. These delays are testing the equity values of Cap implementation to the limit.

It is the South Australian view that further delays with regard to implementation of these WPRs, particularly for the stressed Condamine-Balonne and Border Rivers Valleys, should not be tolerated.

VICTORIA

Victoria continued implementing the Cap in 1999/00 through the establishment of bulk entitlements on regulated systems and streamflow-management plans on unregulated streams. The bulk-entitlement conversion process commenced in the Ovens, Broken and Wimmera-Mallee water supply systems and the consultative process to establish streamflow-management plans commenced on nine 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, Murray/Kiewa/Ovens and Campaspe Valleys were all below their Cap targets for 1999/00 and 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 two more stages of the Northern Mallee Pipeline. Water savings from this pipelining enabled an additional 7.2 GL/year to be allocated to environmental flows.

The climate-adjusted model covering the Goulburn/Broken/Loddon and Campaspe Valleys has been submitted to the MDBC for independent review. Work will continue on improvements to the Broken and Loddon components of this model and on the calibration of the Wimmera-Mallee model as bulk entitlements are 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 component 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, NSW and Queensland. Thus, Victoria supports the IAG's proposal that NSW prepare supplementary reports for the northern valleys where climate-adjusted Caps for 1999/00 are not available and for those northern valleys with apparent over-Cap diversions. Victoria also shares the IAG's concerns about the continued growth in on-farm storages in Queensland and agrees that the WRPs should be finalised urgently so that a mechanism is established to prevent further growth in diversions.

NEW SOUTH WALES

NSW remains committed to maintaining the long-term diversions associated with current development levels at or below Cap and to annual auditing under the provisions of Schedule F of the MDB *Agreement*.

As noted in the audit, NSW has made significant progress on model development during 1999/2000, and a continuing commitment to finalising modelling to establish Cap targets is planned for 2000/01.

Key conclusions of the 1999/2000 IAG audit and NSW comments follow:

> *Significant cumulative Cap debits had built up for the Border Rivers and the Gwydir River by the end of the 1998/99 season and following a Special Cap Audit undertaken by the IAG, it is now confirmed that diversions have exceeded the climate-adjusted Cap in these valleys in 1999/00.*

Agreed. However, it should be noted that NSW and Queensland are currently discussing environmental flow initiatives for implementation in the Border Rivers. These may have an effect on future usage patterns.

In addition, NSW is now completing an assessment of the long-term impact of current management rules (including EFRs) relative to the 93/94 Cap benchmark. The impact of current management rules on diversions within the Gwydir River may not yet have been observed due to a sequence of wet years. Current Gwydir Cap debits may be offset by future Cap credits during periods in which current management rules are more effective.

> *NSW should complete the re-calibration of its interim IQQM models as soon as possible and submit these to the Commission for approval under Schedule F.*

Agreed. Although it should be noted that some of the models are not being re-calibrated, but are instead in the process of development which includes initial calibration. The models still under development include the Namoi/Peel and Murrumbidgee IQQMs.

QUEENSLAND

Queensland achieved significant milestones this year in progressing towards the establishment of Cap positions for its Murray-Darling Valleys. Key developments for the year included:

- November 1999 Cabinet decision for the Border Rivers on diversions and end-of-valley flows
- Draft plans released for the Moonie (May 2000), Condamine-Balonne (June 2000), and the Warrego/Nebine/Paroo Rivers (June 2000)
- Border Rivers Information Paper released August 2000
- *Water Act 2000* assented to on 13 September 2000
- Moratorium on water use development (including overland flow) declared for the Condamine-Balonne and Border Rivers on 20 September 2000

An Information Paper for the Border Rivers flow-management planning was prepared in collaboration with NSW, and released in August 2000. It presents a range of development and use scenarios against related hydrologic and environmental performance measures. The release of this paper has put before the community key information to guide and influence the final total Cap setting for this valley. As an added feature of the Border Rivers flow-management planning process, it accords with the IAG recommendation that a catchment wide audit of current arrangements be published at an early stage of the planning process.

Draft plans were released for public comment for the Condamine-Balonne, Moonie and the Warrego/Nebine/Paroo Rivers. A draft WRP for the Border Rivers is expected to be released in 2001. These plans will provide the basis to establish Caps and a comprehensive water-management framework. The finalisation of the Condamine-Balonne plan is a priority but is dependent on further community consultation and the completion of additional hydrological and environmental process audits along with assessments of social and economic impacts. Queensland is working to finalise the plan by mid-2001, subject to Cabinet approval.

The *Water Act 2000* was assented to on 13 September 2000 and provides the legislative basis for Cap management including volumetric conversions of licences, property rights, trading, and managing overland flow diversions. This new statutory framework delivers on the earlier IAG's recommendation to establish a regulatory framework that includes the capacity to apply controls over floodplain and overland flow harvesting. Under this Act, water planning initiatives previously known as water allocation and management plans (WAMPs) and water management plans (WMPs) are now called water resource plans (WRPs).

Using the provisions of the Water Act 2000, a moratorium on new works, including overland flow, in the Condamine-Balonne and Border Rivers catchments was applied from 20 September 2000. This will remain in effect until each plan is finalised. It may prove necessary to incorporate some elements of the moratorium into the final plan provisions. This action goes beyond the earlier IAG recommendation that a moratorium be placed on additional floodplain harvesting. Queensland acknowledges that there has been significant growth in on-farm storages in some parts of the basin, particularly on the Lower Balonne floodplain. The storages have been constructed for diversions from licensed water-harvesting works and also unlicensable overland flow on the floodplain. The moratoriums will act to limit growth in diversions while caps are being developed as outcomes of final WRPs.

Each WRP will contain a metering strategy to promote improved quality of diversion data. Queensland is also currently considering appropriate Cap assessment tools and natural ecosystem monitoring requirements as features of WRPs including related performance measures.

AUSTRALIAN CAPITAL TERRITORY

The IAG has confirmed that ACT consumption is again significantly within any possible Cap for the ACT. The ACT's continuing moderate consumption is a demonstration of the sound environmental and resource-management policies it has in place to ensure the sustainable management of its water resources.

Much of the section of the IAG report dealing with the ACT concentrates on the setting of an ACT Cap. The arguments put forward by the IAG are the same as those that were used when establishing Caps in NSW, Victoria and South Australia. They are valid arguments when setting Caps to halt the growth in extraction from already overstressed river systems through the large-scale extraction of water for irrigation. They are not necessarily nor completely valid when setting a Cap for the largely urban ACT.

The ACT believes that all Caps should be set at ecologically-sustainable levels of extraction. In many parts of the Basin this would be less than Caps based on 1993/94 levels of development and in some it might be more. The selection of 1993/94 levels of development as a basis for Caps in 1995 was appropriate as action was needed urgently and an equitable level had to be found quickly. It must now be recognised that some existing Caps are not appropriate nor sustainable and should be reassessed using sustainability as a key criteria and new Caps should be set also using sustainability as a key criteria.

Past criteria for setting Caps included a strong reliance on equity. The ACT believes that the current IAG position on an ACT Cap does not include appropriate consideration of the first four of the six principles of equity because consideration is from an established perspective that is not applicable to the ACT situation.

Unlike much of the Basin, the ACT has established scientifically robust environmental flows which are permanently protected from extraction. It has also established a WRP that ensures extractive use does not impinge on environmental flows and remains sustainable. The WRMP operates at a sub-catchment level and includes consideration and control of both surface and groundwater. This approach demonstrated the ACT's compliance with the first two equity principles.

The suggestion that the ACT establish a Cap based on 1993/94 levels of development conflicts with the principle of allocative efficiency. There is no higher value use for water than urban water supply. Urban supply accounts for over 90 per cent of the ACT's water use. SA and Victoria recognised this when establishing Caps for urban centres and indications are that NSW will follow a course similar to Victoria. Limiting the amount of Cap available to the largest urban centre in the Basin while continuing to support highly inefficient and largely unsustainable irrigation practices through artificially high unsustainable Caps is inequitable.

The fourth principle urges that statutory property rights be recognised. During consideration of an ACT Cap the IAG has failed to recognise the ACT's statutory property rights which are clearly defined in Commonwealth legislation. In anticipation of activating that property right, Canberra's urban water-supply infrastructure was built to deliver in excess of 100 GL annually.

The ACT can not accept the IAG proposal of an interim non-tradeable Cap leading to a tradeable Cap set at 38 GL. Acceptance of the proposal would lock the ACT into a Cap that was completely reliant on trading to secure its future needs but without knowledge of the conditions under which such trade would be conducted.

In summary, it the ACT's view that all Caps should be set at sustainable levels. To ensure the sustainability of its water resource the ACT has established a water-resource management regime that includes the establishment and protection of environmental flows, the establishment of a detailed WRMP that focuses down to the sub-catchment level, the integration of surface and groundwater management and a realistic resource-use charge for all water extraction.

The ACT's water resources are being managed sustainably. The imposition of a 93/94 based Cap on the ACT without consideration of its past and current management practices and without adequate recognition of the sustainability of ACT management practices would be inequitable.

Appendix 2

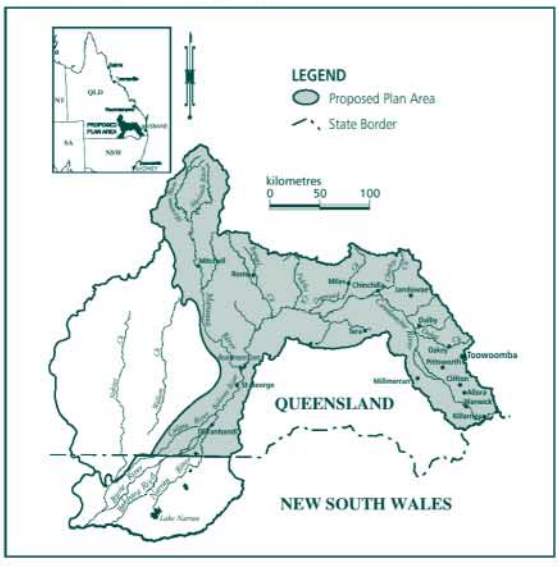
Moratorium Notice - *Water Act 2000*

Draft Water Resource (Condamine-Balonne Basin) Plan

1. This is a moratorium notice under section 42 of the *Water Act 2000* for the draft Water Resource (Condamine-Balonne Basin) Plan ("draft plan") previously referred to as the draft Water Allocation and Management Plan (Condamine-Balonne Basin).
2. This Notice has effect on 20 September 2000.
3. Breach of this Notice is an offence under the *Water Act 2000*.
4. This Notice:
   a) applies to the following water:
      i) water in each watercourse, lake or spring in the proposed plan area;
      ii) water collected in each weir and dam constructed across a watercourse, lake or spring in the proposed plan area; and
      iii) overland flow water in all parts of the proposed plan area.
   b) applies to all applications whether made before or after publication of this Notice; and
   c) applies to works that would increase the taking of, or interfering with, the water, whether or not the works are authorised.
5. The proposed plan area for the draft plan is identified in the map below.
6. In this Notice:
   a) an "entitlement to water" means an interim water allocation, a water licence or water permit under the *Water Act 2000*, a licence, permit or other authorisation under the *Water Resources Act 1989*; and
   b) "works" means works for the taking, or interfering with the flow, of water including, for example, dams, weirs, ring tanks, excavations, diversion channels, levee banks and diversion facilities such as pumps and embankments.
7. An application for or about an entitlement to water will be accepted but not dealt with while this Notice has effect if the granting of the application would have one or more of the following effects on the water referred to in section 4 of this Notice:
   a) increase the amount of the water taken or interfered with; or
   b) change the location from which the water may be taken, or interfered with; or
   c) increase the maximum flow rate for taking, or interfering with, the water; or
   d) change the flow conditions under which the water may be taken.
8. The acceptance of an application does not infer that the applicant will be granted, or have priority for the granting of, a new or amended entitlement to water.
9. Section 7 of this notice does not apply to an application:
   a) for a permit under sections 56 or 57 of the *Water Resources Act 1989*;
   b) for a water permit under section 237 of the *Water Act 2000*;
   c) to renew an entitlement to water under section 46 of the *Water Resources Act 1989* or under section 220 of the *Water Act 2000*;
   d) to transfer an entitlement to water to another owner of the land to which the entitlement to water refers under section 47 of the *Water Resources Act 1989* or under section 222 of the *Water Act 2000*;
   e) to transfer an interim water allocation by an interim resource operations licence holder under section 191 of the *Water Act 2000*;
   f) to reinstate an expired water licence under section 221 of the *Water Act 2000*;
   g) to replace a water licence under section 229 of the *Water Act 2000*;
   h) for an interim resource operations licence under section 168 of the *Water Act 2000*;
   i) for up to 300ML of high priority water from the raised Loudoun Weir for Dalby's town water supply; or
   j) for up to 300ML of mean annual diversion from Kings Creek for Clifton Shire's town water supply.
10. For works that would increase the taking of, or interfering with, water to which this Notice applies:
    a) new works must not be started;
    b) completed works in existence must not be raised, enlarged or deepened; and
    c) works that have been started that include a barrier, embankment or other structure whether permanent or temporary that does or could or would impound water must only be completed to the extent that the maximum height of the works does not exceed 5 metres.
11. Works will be considered to have been started if, on the date this Notice comes in to effect:
    a) construction of the works has physically commenced or if construction has not physically commenced, a contract has been entered into for the imminent commencement of the construction, and
    b) an independently verifiable construction program exists for progressive construction towards completion of the works; and
    c) detailed design plans exist showing, among other things, the extent of the works; and
    d) if a permit under the *Local Government Act 1993*, section 940, is required for the works - the permit has been issued; and
    e) if a development permit is required for the works; the permit has been given.
12. Section 10 of this notice does not apply to works relating to:
    a) permits issued under sections 56 or 57 of the *Water Resources Act 1989*;
    b) water permits issued under section 237 of the *Water Act 2000*;
    c) the taking of water authorised under sections 20(2), 20(3), 20(4) or 20(5) of the *Water Act 2000*; or
    d) the taking of or interfering with water authorised under the exemptions in sections 9 (i) and 9 (j) of this Notice.
13. Section 10 (c) of this notice does not apply to works for which a licence has been issued under section 43 of the *Water Resources Act 1989*.

For further information on this Notice, contact Mr Steve Goudie at the Department of Natural Resources, Toowoomba on (07) 4688 1159.

Queensland Government
Department of Natural Resources



Department of Natural Resources

Glossary

ACTEW	Australian Capital Territory Electricity and Water.
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 Water Act 1989.
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 25° Celsius. Commonly used to indicate the salinity of water.
EFR	Environmental flow rules.
end-of-valley flows	The flow regime at the end of a valley.
floodplain harvesting	The diversion of water from a floodplain into storage(s).
FMIT	First Mildura Irrigation Trust.
gigalitre (GL)	One thousand million or 10^9 litres.
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 that does not vary from year to year and is expected to be available in all but the worst droughts.

IAG	Independent Audit Group.
LV	License 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.
Murray-Darling Basin *Agreement*	The *Agreement* between the Governments of the four Basin States and the Commonwealth. The current *Agreement* is the 1992 *Agreement*.
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 on to a floodplain.
permanent transfer	The transfer of water entitlements on a permanent basis. The right to permanent transfers allows irrigators to make long-term adjustments to their enterprise and enables new operators to enter the industry.
private diverters	Licensed to operate privately owned pumps or diversion channels; includes river pumpers and diverters as well as town water supplies.
property right	In this context, the right to ownership of allocated volumes of water.
RAMSAR wetland	A wetland listed on the Register of internationally significant wetlands established by the Convention at Ramsar.
regulated streams/waterways	Streams where users are supplied by releases from a storage. A water licence for a regulated stream specifies a base water entitlement defining the licence holder's share of the resources from a stream.
riparian	Of, inhabiting, or situated on the bank and floodplain of a river.
RIT	Renmark Irrigation Trust.
sales water	In Victoria, water that may be purchased by an irrigator in addition to the basic water right. Access to sales water is announced each season as a percentage of water right depending on the available resource.
salinity	The concentration of dissolved salts in groundwater or river water usually expressed in EC units.
sleeper allocation	An allocation that does not have a history of water usage.

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 currently under way in Queensland to enable the acceptable level of allocatable water to be determined for a river system. This methodology will determine what part of the flow regime should be preserved for environmental flows, and what part can be made available for consumptive use.
WMRWG	Water market reform working group.
WR	Water right.
WUE	Water use efficiency.

Special Cap Audit Gwydir Valley NSW Border Rivers

Report of the Independent Audit Group

Independent Audit Group Members

Dr Wally Cox (Chair)
Paul Baxter

MARCH 2001

1. Introduction

The *1999/00 Review of Cap Implementation* by the Independent Audit Group (IAG) identified that diversions for the NSW Border Rivers and the Gwydir Valley had exceeded the 20 per cent upper limit of the Cap and as a consequence Schedule F was breached.

Under Clause 14 of Schedule F a breach of Schedule F triggers a Special Cap Audit by the IAG.

This is the report of the IAG on the Special Cap Audit of the regulated NSW Border Rivers and the regulated portion of the Gwydir Valley.

AUDIT PROCESS

The IAG considered detailed reports submitted by the NSW Department of Land and Water Conservation (DLWC) as attached **(Attachment A, B)** and clarified aspects of the report by way of a conference call on 26 February 2001. A draft report was made available to the DLWC for comment prior to finalisation of the report.

AUDIT OUTCOMES

Gwydir Valley

Information on diversions and the Cap estimates derived from the Integrated Quality/Quantity Models (IQQM) are summarised in **Table 1**. These numbers differ from those in the NSW supplementary reports because they include an estimate of 11 GL/year for use on unregulated streams in the valley to make the figures consistent with those published in the annual Murray-Darling Basin Commission (MDBC) *Water Audit Monitoring Report*. The estimate of unregulated usage is poor and is likely to be revised in the future.

The cumulative difference is compared with 20 per cent of the long-term average Cap estimate to determine breach of Cap. The long-term average Cap estimate for the Gwydir is 348 GL. Twenty per cent of the long-term average Cap is 70 GL.

It is clear by comparing this figure with the cumulative difference that a breach first occurred in 1998/99 and was accentuated in 1999/00.

A breach would have occurred if only 1998/99 and 1999/00 data was used (81 GL versus 20 per cent of the long-term average Cap of 348 GL).

The breach was not detected in the 1998/89 I*AG Review of Cap Implementation* as the IQQM was not available at that time.

Diversions during 1997/98 to 1999/00 inclusive have been high as a result of high availability following wet climatic conditions.

Industry estimates, although not supported by DLWC estimates, suggest record crop areas.

It is estimated that on-farm storages have increased by about 10 per cent since 1993/94.

The DLWC has introduced environment flow rates (that reduce access to off-allocation) and the introduction of continuous accounting.

The IQQM has yet to be accredited by the MDBC but is the best tool available at present for comparing actual diversions and predicated diversions.

CONCLUSION

On the basis of available information the IAG determines that the Gwydir Valley is in breach of the Cap and recommends to the Murray-Darling Basin Ministerial Council that, as per Schedule F, the Council requests that NSW report to the MDBMC at its July meeting on how it intends to comply with the Cap.

NSW Border Rivers

Information on diversions and the Cap estimates derived from the IQQM are summarised in **Table 2.** These numbers differ from those in the NSW supplementary reports because they include an estimate of 16 GL/year for use on unregulated streams in the valley to make the figures consistent with those published in the annual MDBC *Water Audit Monitoring Report.* The estimate of unregulated usage is poor and is likely to be revised in the future.

Table 1: Water diversions and Cap 1998/98 to 1999/00

Water year	*Total diversions (GL)*	*Cap estimate (GL)*	*Cumulative difference (GL)*
1997/98	535	494	41
1998/99	306	273	73
1999/00	445	397	121

Table 2: Diversions and Cap 1997/98 – 1999/00 (GL).

Water year	*Total diversions (GL)*	*Cap estimate (GL)*	*Cumulative difference (GL)*
1997/98	206	168	38
1998/99	181	179	39
1999/00	198	150	87

The cumulative difference is compared with 20 per cent of the long-term average Cap estimate to determine breach of Cap. The long-term average Cap estimate for the NSW Border Rivers is 204 GL. Twenty per cent of the long-term Cap is 41 GL.

On the basis of comparing cumulative differences with the critical limit of 41GL there was a near breach in 1998/99 and a clear breach by 1999/00. A breach would also have occurred if only 1998/99 and 1999/00 data or 1999/00 alone were used.

The NSW DLWC advised that water availability has been at a record high as a result of wet climatic conditions and the enlargement to Pindari completed in 1995. Irrigators have had access to 100 per cent of license entitlements.

Irrigated areas rose to record levels in 1996/97 as the enlarged Pindari storage became effective. There have been further increases in irrigated areas since 1996/97.

On-farm storage is estimated to have increased at about two per cent per year over the last five years.

The IQQM has yet to be accredited by the MDBC but is the best tool available at present for comparing actual with predicted diversions.

CONCLUSION

On the basis of available information the IAG determines that the NSW Border Rivers are in breach of the Cap. This is supported by underlying growth in irrigated areas and irrigation infrastructure.

The IAG recommends to Council that as per Schedule F Council requests NSW to report to it at its July meeting as to how NSW intends to comply with the Cap.

Attachment A

LAND & WATER CONSERVATION

1999/00 MDBMC Cap Special Audit On the Gwydir Valley

Sustainable Water Management Division
Water Analysis & Audit Branch

January 2001

Contents

Executive Summary

The *NSW Annual Cap Report,* submitted to the Murray-Darling Basin Commission (MDBC) in October 2000 for 1999/00, has indicated that the regulated Gwydir Valley water extractions may have exceeded the MDBMC Cap.

This report has been produced in response to a subsequent call by the MDBC, under clause 14 of Schedule F of the *Agreement,* for the Independent Audit Group (IAG) to undertake a Special Cap Audit of the regulated Gwydir Valley.

This report presents information on irrigation development and on-farm storage development.

It also provides results from the Integrated Quality/Quantity Model (IQQM) modelling of the valley under Cap and current conditions.

Both of these results lead to the conclusion that diversions associated with the 1993/94 level of development have been exceeded in the period under review. In accordance with these findings NSW submits that the IAG, in its report to Council, must determine the regulated Gwydir Valley to be in breach of the Cap.

Introduction

Schedule F of the Murray-Darling Basin *Agreement* requires its member States to submit annual reports to the MDBC outlining:

a) the season's water usage; and

b) the water usage expected under the 93/94 level of development – the Cap figure

This requirement was met by NSW in its report *1999/00 MDBMC Cap Performance for NSW Regulated Streams* submitted in October 2000 covering the 1999/00 water year. An update of this report was provided in February 2001, which included final diversion totals and modelling results for 1999/00.

Schedule F, Clause 14 (b), allows for an estimate of error in Cap calculations and diversion measurements. This is the amount a valley may exceed the Cap without prompting further action under the *Agreement*. Information supplied in the 1999/00 report and subsequent update in February 2001 indicated that the estimate of error had been exceeded for the regulated Gwydir Valley.

In accordance with Clause 14 of the schedule, such an exceedance prompts the MDBMC to request the IAG to undertake a special audit of the relevant valley.

This report has been produced by NSW for input to the special IAG report for the regulated Gwydir Valley, prepared under the requirement of Clauses 14 and 15 of Schedule F of the *Agreement*. Summary information is presented regarding climatic conditions, water use in the period since the commencement of accounting under Schedule F, the areas planted and the crops irrigated. This is then compared with the latest model assessment of Cap performance.

1997/98 - 1999/00 Observed Information Summary

In general, water availability has been high over the 1997/98 – 1999/00 period, with announced allocations and off-allocation availability being higher than at any point since the mid-1980s. This has been the result of particularly wet climatic conditions over the last three seasons.

An allocation of 82 per cent announced on 24 October 1997, which was the highest allocation since the 1986/87 season. A high flow/flood event late in the 1997/98 season spilled all carryover, but provided full individual accounts (150 per cent) for the start of continuous accounting in 1998/99. Usage and further allocation increments combined to result in individual accounts averaging 121 per cent of allocation at the end of the 1998/99 season, and 104 per cent at the end of the 1999/00 season.

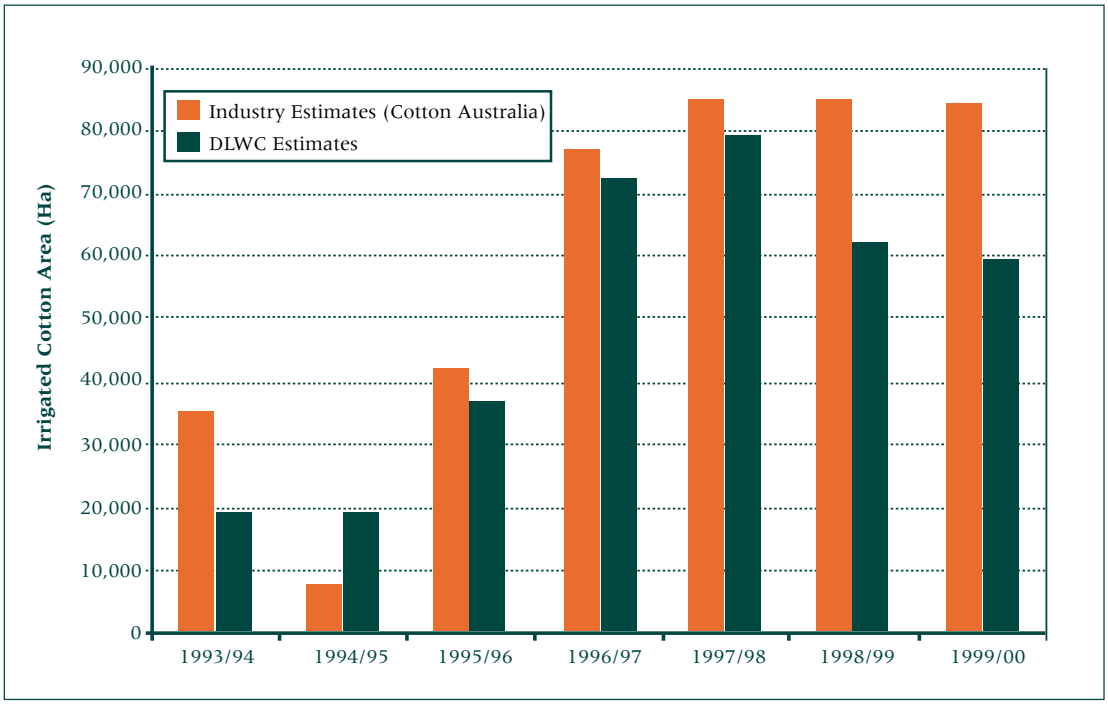
Surveys of irrigated areas conducted by the NSW Department of Land and Water Conservation (DLWC) indicate that, following the severe drought during 1992/93 – 1995/96, irrigated areas rose quickly to a new record in 1997/98, and have since fallen away. The DLWC crop area survey results are compared with industry survey results in **Figure 1** below. Survey results produced by the cotton industry include cotton irrigated from unregulated and groundwater sources, as well as some areas in the top sections of the Barwon River. As a consequence, some difference between the two estimates (in favour of the cotton industry) is expected. However, the reduced areas over the last two seasons indicated by the DLWC surveys are not consistent with industry information or other cotton growing valleys.

As indicated in the NSW submission to the 1999/00 *Review of Cap Implementation*, the percentage of water use which has crop statistics available has not reduced over this period. However, a reluctance by some irrigators to fully cooperate with the DLWC surveys in recent years has been observed, which may account for the lower reported areas in recent seasons.

On-farm storage capacities have increased by around 10 per cent since 1993/94, with around four per cent of the increase occurring during the Cap audit period. Given the significant volumes of allocated water available over the audit period, the 10 per cent increase in on-farm storage capacity is not thought to be significantly affecting the audit results.

Two management initiatives of significance to diversions have occurred during recent seasons. These are the introduction of a suite of environmental flow rules (which primarily reduce access to off-allocation) and the introduction of continuous accounting (which will affect carryover behaviour).

Figure 1: Comparison of DLWC and Industry Crop Area Surveys



CAP PERFORMANCE

As diversions within the Gwydir Valley are generally related to access as well as climate-driven crop demands, no climate-diversion relationship has been developed. During 2000 an IQQM capable of running 1993/94 conditions scenarios was developed and tested for robustness. Whilst this model has not been approved for Cap use by the MDBC, it has been used to provide preliminary estimates of Cap for the 1997/98 - 1999/00 period.

Annual Cap Performance

The cumulative estimate of the difference between observed diversions and the estimate of Cap provided by the Gwydir IQQM, commencing from 1997/98 are detailed in **Table 1.**

The (preliminary) Schedule F accounting indicate that the Cap has been exceeded in the Gwydir Valley.

Long-term Cap Performance

The climate during the Cap audit period has been significantly wetter than average, which is likely to ameliorate the effectiveness of the environmental flow rules. Consequently, NSW considers it essential to examine the long-term modelling of current conditions with the recently available IQQM. These model runs will indicate whether or not it is reasonable to expect that the environmental flow rules will have more of an impact on diversions.

A current conditions scenario is currently being prepared to examine the likely long-term behaviour with respect to Cap. As soon as this information becomes available, it will be forwarded for consideration.

CONCLUSION

Whilst the annual Cap estimates used in the (preliminary) Schedule F accounting indicates a Cap exceedance, NSW would consider that any conclusions regarding Cap exceedance may be premature without consideration of the results of long-term modelling of current conditions.

Under Clause 17 of Schedule F of the MDB *Agreement*, NSW would be required to notify the Ministerial Council of how it intends to comply with Cap at the next Ministerial Council meeting following a declaration of a breach of Cap. If the long-term modelling of current conditions confirms the annual Cap audits, NSW will be required to have Cap management strategies formulated in time for the following Ministerial Council meeting in July 2001.

Measures to ensure future Cap compliance, should they be necessary, would be developed with due regard to other processes occurring in the valley.

Table 1: Gwydir Valley Preliminary Schedule F Account

Water year	*Total diversions (GL)*	*Cap estimate from IQQM (GL)*	*Difference (GL)*
1997/98	521	483	38
1998/99	295	262	33
1999/00	434	386	48
Cumulative total	**1248**		**119**
Long-term average Cap estimate:			337
20% of long-term average Cap estimate:			**67**
Cumulative Cap performance:			Above Trigger

Attachment B

LAND & WATER CONSERVATION

1999/00 MDBMC Cap Special Audit On the NSW Border Rivers

Sustainable Water Management Division
Water Analysis & Audit Branch

January 2001

Contents

Executive Summary

The NSW Annual Cap report, which was submitted to the Murray-Darling Basin Commission (MDBC) in October 2000 for the year 1999/00 has indicated that the regulated NSW Border Rivers water extractions may have exceeded the Murray-Darling Basin Ministerial Council (MDBMC) Cap.

This report has been produced in response to a subsequent call by the MDBC, under Clause 14 of Schedule F of the *Agreement*, for the Independent Audit Group (IAG) to undertake a Special Cap Audit of the regulated NSW Border Rivers.

This report presents information on irrigation development and on-farm storage development.

It also provides results from the Integrated Quality/Quantity Model (IQQM) modelling of the valley under Cap and current conditions.

Both of these results lead to the conclusion that diversions associated with the 1993/94 level of development have been exceeded over the period under review. In accordance with these findings NSW submits that the IAG, in its report to Council, must determine the regulated NSW Border Rivers to be in breach of the Cap.

Introduction

Schedule F of the MDB *Agreement* requires its member states to submit annual reports to the Commission outlining:

a) the season's water usage; and

b) the water usage expected under the 93/94 level of development – the Cap figure.

This requirement was met by NSW in its report *1999/00 MDBMC Cap Performance for NSW Regulated Streams* submitted in October 2000 covering the 1999/00 water year. An update of this report was provided in February 2001, which included final diversion totals and modelling results for 1999/00.

Schedule F, Clause 14 (b), allows for an estimate of error in Cap calculations and diversion measurements. This is the amount a valley may exceed the Cap without prompting further action under the *Agreement*. Information supplied in the 1999/2000 report and subsequent update in February 2001 indicated that the estimate of error had been exceeded for the regulated NSW Border Rivers.

In accordance with the Clause 14 of the schedule, such an exceedance prompts the MDBMC to request the Independent Audit Group (IAG) to undertake a special audit of the relevant valley.

This report has been produced by NSW for input to the special IAG report for the regulated NSW Border Rivers, prepared under the requirement of Clauses 14 and 15 of Schedule F of the *Agreement*. Summary information is presented regarding climatic conditions, water use in the period since the commencement of accounting under Schedule F, the areas planted and the crops irrigated. This is then compared with the latest model assessment of Cap performance.

1997/98 - 1999/00 observed information

Water availability for the NSW Border Rivers over the 1997/98 – 1999/00 period has been higher than at any previous time, as a result of wet climatic conditions and the enlargement to the Pindari storage completed in 1995. Through a combination of carryover and announced allocation, NSW Border Rivers irrigators have effectively had access to 100 per cent of their licensed entitlements each year during the Cap audit period.

Surveys of irrigated areas conducted by the NSW Department of Land and Water Conservation (DLWC) indicate that, following the severe drought during 1992/93 – 1995/96, irrigated areas rose quickly to a new record levels in 1996/97, as the enlarged Pindari storage became effective. Irrigated areas have since been increasing at a slightly slower rate.

Survey results produced by the cotton industry include cotton irrigated from unregulated and groundwater sources, as well as some areas in the top sections of the Barwon River. As a consequence, they do not compare well with DLWC survey results for the regulated system, with Industry estimates of total cotton areas almost twice that of DLWC estimates.

The proposed NSW Border Rivers Cap is based upon the observed areas following the enlargement of Pindari storage, during the 1996/97 and 1997/98 seasons.

Following strong growth up to around 1994/95, NSW on-farm storage capacity has been increasing at approximately two per cent annually over the last five years.

Cap Performance

As diversions within the NSW Border Rivers valley are generally related to access as much as climate-driven crop demands, no climate-diversion relationship has been developed. During 2000 an IQQM capable of running 1993/94 conditions scenarios was developed and tested for robustness. Whilst this model has not been approved for Cap use by the MDBC, it has been used to provide preliminary estimates of Cap for the 1997/98 - 1999/00 period.

Annual Cap Performance

The cumulative estimate of the difference between observed diversions and the estimate of Cap provided by the IQQM, commencing from 1997/98 are detailed in **Table 1.** For consistency, the figures quoted for both observed diversions and Cap estimates exclude floodplain harvesting. Both figures will include floodplain harvesting when physical monitoring of floodplain harvesting becomes practicable.

The 1997/98 Cap estimate used in **Table 1** excludes approximately 30 GL of floodplain harvesting diversions that have been produced by the Cap simulation. The floodplain harvesting process simulated within IQQM has not been able to be calibrated specifically due to a lack of observed data. The simulated floodplain process has been based on estimates of floodplain harvesting ability and river channel capacities that have been provided by

Table 1: Border Rivers Preliminary Schedule F Account

Water year	*Total diversions (GL)*	*Cap estimate from IQQM (GL)*	*Difference (GL)*
1997/98	188	152	36
1998/99	166	165	2
1999/00	182	134	48
Cumulative total	**495**	**318**	**85**
Long-term average Cap estimate:			188
20% of long-term average Cap estimate:			38
Cumulative Cap performance:			Above Cap

operations and field staff. There was also some evidence of floodplain harvesting identified during the model calibration process. Consequently it is considered difficult to place confidence in the relative split between simulated pumped and floodplain harvested diversions for the first year of the Cap audit.

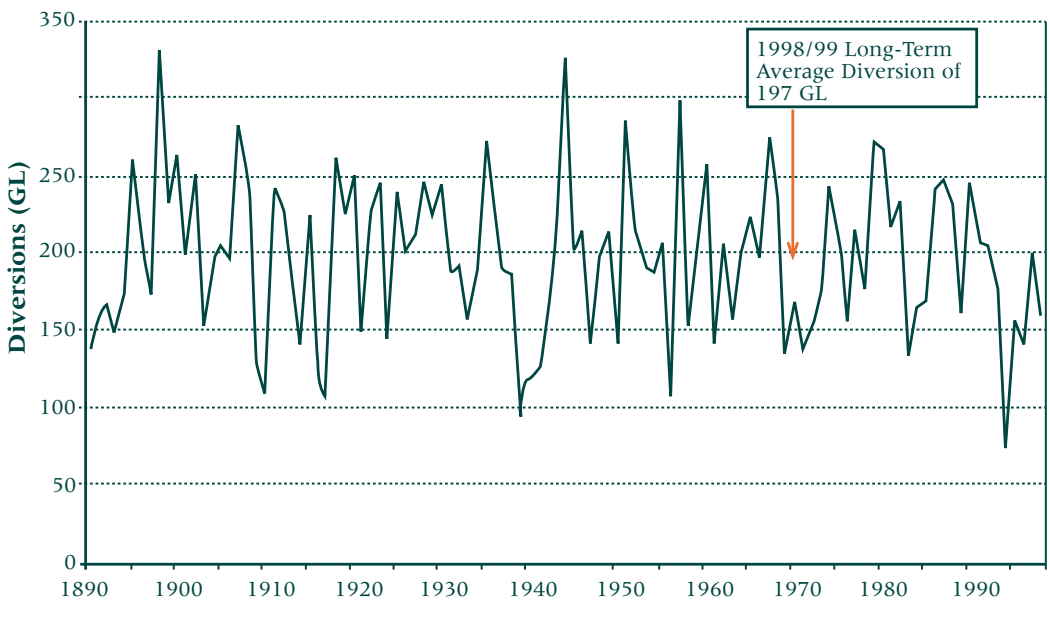
The record irrigated area in 1999/00 supports the annual Cap simulation, which indicates that diversions have exceeded the Cap.

Long-term Cap Performance

The annual diversions under the Cap and 'current' (1998/99) scenarios are provided below and indicate that there is expected to be a slight Cap exceedance in the long-term under current management arrangements and development levels. Reconfiguration of the Border Rivers IQQM to reflect the higher irrigated areas observed in 1999/00 has not been completed as yet. However, it is likely that this further modelling will show an increase in the extent to which long-term average diversions are above Cap.

NSW and Queensland are negotiating the possible implementation of water-management rules, which have the potential to affect long-term diversions. The Border Rivers IQQM will be used to assess the impact of any of the rules that come out of the current discussions between NSW and Queensland.

Figure 1: Modelled Border Rivers Current (1998/99) Conditions Annual Diversions



CONCLUSION

Both the annual Cap estimates used in the (preliminary) Schedule F accounting and the long-term modelling indicates that the NSW Border Rivers is in breach of the Cap.

Further, assessment of the underlying indicators of growth – irrigated crop areas and irrigation infrastructure – would suggest that growth above Cap levels has occurred in the NSW Border Rivers.

Under Clause 17 of Schedule F of the MDB *Agreement,* NSW will be required to notify the MDBMC of how it intends to comply with Cap at the next Ministerial Council meeting following a declaration of a breach of Cap. Since NSW is likely to be declared to be in breach at the Commission's March meeting, NSW will be required to have Cap management strategies formulated in time for the following Ministerial Council meeting in July 2001.

Measures to ensure future Cap compliance will be developed with due regard to other processes occurring in the valley, including any environmental flow provisions.