



Review of Cap Implementation 1997/98

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

***Including Responses by the
Four State Governments***



NOVEMBER 1998

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Independent Audit Group Members

Dr Wally Cox (Chair)

Paul Baxter

NOVEMBER 1998

Acknowledgments

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

The implementation of the Cap has not been without difficulty and has challenged the ingenuity and resources of Government administrators.

Information was freely provided and the issues and the options for resolving them were discussed openly.



Auditors' Foreword

November 1998

The Hon Mark Vaile 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 1997/98'.

Diversions in 1997/98 were within Cap limits in South Australia, the Goulburn/Broken and Murray/Ovens/Kiewa systems in Victoria, and the Murray and Macquarie systems in New South Wales.

Diversions in the Lachlan in New South Wales exceeded the Cap for the second year in a row. Additional management responses are also required to ensure Cap compliance for other valleys in NSW.

End of valley flow Caps in Queensland have not been established and the WAMPs and WMPs for the Condamine-Balonne, Border Rivers, Warrego/Paroo/Nebine and Moonie are significantly behind schedule.

The WAMP for the Condamine-Balonne is unlikely to be available for Council until June 1999. The IAG expects to audit progress with this WAMP during December 1998 – February 1999 and the remaining WAMPs and WMPs in December 1999.

Yours sincerely



DR WALLY COX
Chairman



PAUL BAXTER
Member



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Executive Summary

1997/98 was the first formal year of the implementation of the Cap. To assist in operationalising arrangements, Council has agreed to Schedule F to operate on a trial basis until March 1999. The IAG has adopted Schedule F and the intent behind it to guide the audit for the 1997/98 year.

Each Government has dedicated resources to implement the Cap within their jurisdictions. Generally States have under-estimated the resources necessary given the complexity and breadth of issues associated with implementation. The IAG believes that each Government should review the resources being provided to this activity and increase resources in those areas where the timetable for implementation has not been met.

The IAG has been exposed to a range of issues that have been brought to the surface as a result of the decision to Cap water use. The discussion and debate on these issues is both necessary and healthy to ensure a balance is struck between consumptive and instream water use.

The conclusions and recommendations reached by the Audit Group for the 1997/98 year by State are:

South Australia

- Diversion in 1997/98 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.
- The South Australian country towns Cap should be amended following the completion of modelling.
- There should be no trading of country towns diversions until a new Cap has been established.
- The country towns, irrigation and lower Murray allocations should be treated as a single Cap for compliance purposes.
- A management framework should be developed to ensure long term Cap compliance for pumped irrigation.

Victoria

- Diversions from the Murray and Goulburn systems in 1997/98 were below climate adjusted Cap targets.
- Substantial progress has been made in:
 - developing climate adjusted models,
 - community consultation on bulk water entitlements; 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 Murray system, the Ovens River, Broken, Campaspe and Loddon Basins and the Wimmera-Mallee system.

New South Wales

- The Murray was resource constrained and within the Cap in 1997/98.
- The Murrumbidgee was at the upper end of the confidence limit of the diversion model. The other indicators suggest growth in diversions and the need for an appropriate management response which is not evident from the material provided to the IAG.
- For the Lachlan in the last two years, diversions have exceeded the Cap. An urgent management response is required to bring diversions within the Cap limits.
- For the Barwon-Darling and the Border Rivers, on the evidence available, it would be difficult to come to a conclusion that diversion was not occurring at levels in excess of 1993/94 diversions.
- For the Namoi and Gwydir Valleys, care will be required in future management in the light of crop plantings to ensure Cap compliance. The Peel is within the Cap.
- Macquarie is Cap compliant in 1997/98.
- While the provision of environmental flow rules is in accord with the principles underlying the Cap and is supported, evidence on the effectiveness of the current rules in achieving the Cap on a valley-by-valley basis has yet to be delivered. A higher priority must be given to monitoring performance in this area if the Cap and environmental flow objectives are to be achieved.



- Again it is clear that the level of resources available to manage this complex issue in NSW are not adequate to bring these matters to a satisfactory and early conclusion, and to achieve a time frame that will meet community expectations.

Queensland

- Diversions of 611 GL were at a record following a high flow year and a substantial growth in on-farm storage.
- The WAMP for the Condamine-Balonne is now not expected to be completed until June 1999 with a draft WAMP for the Border Rivers unlikely to be available until December 1999.
- The draft WMPs for the Warrego/Paroo/Nebine and Moonie are unlikely to be completed until June 1999.
- Management rules and a statutory basis for implementing the WAMPs are still required and it is expected that legislation may be introduced into the Queensland Parliament in March 1999.
- It is recommended that this legislation include the management of floodplain harvesting.
- The IAG also recommends that diversions by individual licence holders be capped at 1997/98 levels until the WAMPs and WMPs are completed.

The IAG has suggested modifications to the implementation of Schedule F to provide a higher level of confidence in the way Cap compliance is assessed and reviewed. The main

change is to supplement the reliance on the computer models with other measures to assist in determining whether or not there has been growth in diversion above the 1993/94 level of development. This may require the creation of the position of an independent regulator or supervisor who would have responsibility for consideration of all the evidence on water diversions by valley and adjudicate on whether direct management intervention was required to restrain future diversions.

The IAG are of the view that if Schedule F with these modifications were to be applied to the 1997/98 audit then it would have triggered the reporting provisions of Schedule F for the following New South Wales valleys:

- Murrumbidgee;
- Lachlan;
- Barwon-Darling;
- Border Rivers; and
- possibly in the Gwydir and Namoi.

It is therefore appropriate to ensure a robust and transparent process that reports be sought for these valleys from the appropriate contracting Government on the management response to ensure Cap compliance in future years. The report should be provided to both the Commission and Council in accordance with the Schedule F provisions.

It is the strongly held view of the IAG that unless an open and transparent process is continued then there will be a lack of confidence in Cap implementation.



1. Introduction

In November 1996, the Independent Audit Group (IAG) submitted its report 'Setting the Cap' (the IAG Report) to the Murray-Darling Basin Ministerial Council ("MDBMC"; or the "Council"). This report addressed a number of issues arising out of the MDBMC'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 agreed that the IAG should have an ongoing audit role in the implementation of the Cap.

Council has indicated to the IAG that it is important that an assessment be made of compliance with the Cap to ensure an accountable and transparent process is in place. While preliminary monitoring data is available for all streams, the final hydrographic data used for the formal reporting will not be completed until later this year. The IAG in carrying out this assessment has done so by reviewing with each State their arrangements for Cap implementation.

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 1997/98 by the IAG has been prepared in response to the MDBMC's request and is based upon information made available to the IAG by each of the States. 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 four principal jurisdictions involved. It should be noted that, for the purposes of this report, the ACT was not included in the deliberations undertaken by the IAG. A separate report covering the ACT will be prepared following discussions with ACT representatives.

The IAG team wishes to thank all States 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 views expressed however are those of the Independent Audit Group.



2. Background

The MDBMC at its June 1995 meeting decided to introduce a Cap upon diversions of water from the Murray-Darling Basin. A Cap on the volume of diversions associated with the 1993/94 level of development was seen as an essential first step in establishing management systems to achieve healthy rivers and sustainable consumptive uses.

The two primary objectives driving the decisions to implement the Cap are:

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

The November 1996 report of the IAG sought to resolve a number of practical and equity issues arising out of the MDBMC's decision to adopt the Cap. The MDBMC agreed with all but four of the forty-nine recommendations in the 1996 IAG Report. The others were accepted at the July 1997 meeting of Council in modified form.

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

The adopted definition of the Cap on diversions, leaving aside equity issues, is:

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

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

within the following criteria:

- to protect water quality and preserve the health of the river system, the Cap should ensure there is no net growth in diversions from the Murray-Darling Basin;
- the level of development against which to test for growth in water diversions be equivalent to 1993/94 levels of development;
- under the Cap, the amount of water that States would be entitled to divert from regulated streams in any year would be quantified using analytical models that incorporate weather conditions and which take into account:

- the water supply infrastructure in place in 1993/94;
- the water allocation and system operating rules which applied in 1993/94;
- the entitlements that were allocated and the extent of their utilisation at 1993/94 levels of development;
- the underlying level of demand for water in 1993/94; and
- the system operating efficiency in 1993/94; and
- in unregulated rivers, end-of-valley flows may be used to define the Cap using analytical models incorporating the same points as above.

The MDBMC also acknowledged that

- for South Australia, Victoria, and New South Wales, this will be in accordance with the agreed outcomes as specified by the Cap definition above; 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 the MDBMC.

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 River 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.

For unregulated rivers with high seasonal variability, the Cap may be described in terms of end-of-valley flows and supporting flow management rules including diversion entitlements.

The 1996/97 Review of Cap Implementation identified that:

- significant progress had been made in Cap implementation. Climate adjusted caps had been or were under development for the major regulated valleys and were to be developed for

unregulated valleys in 1997/98. Management, monitoring and reporting systems were in place or under development; and

- diversions in 1996/97 fell well below the Cap in South Australia and in the majority of valleys in New South Wales. Diversions in the Murray, Goulburn, Murrumbidgee and Lachlan appeared to have exceeded cap targets.

The WAMP process underway in Queensland was expected to produce a draft report for consideration by Council in June 1998. An interim audit of progress with the WAMPs in February 1998 however indicated significant delays as a result of delays in completing and validating models and the complexities of the community consultation process.

In our 9 February 1998 report we indicated that the WAMP reports were unlikely to be available for consideration by Council until December 1998 (Condamine-Balonne) and March 1999 (Border Rivers). The Water Management Plans (WMPs) were also not expected to be available before December 1998.



3. Audit Process

For the purposes of this 1997/98 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 1997/98 as a means of quantifying overall diversions and making some preliminary observations in terms of 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
- define the status of the Queensland WAMPs and WMPs.

The IAG met with representatives of each of the States during the period 14-16 September 1998. The format of each meeting was to compare water

usage in 1997/98 with Cap targets, to discuss progress with the establishment of models and management frameworks to achieve targets and to discuss issues of possible concern.

The IAG drafted its observations and conclusions on progress being made within each State and then invited the States concerned 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 timeframe has prevented a second round of face to face meetings with individual State representatives prior to the finalisation of the report. However, through the factual review process and the meetings with State representatives the opportunity has been provided for the States to bring forward additional material which may be of assistance to the IAG.

While acknowledging the valuable contribution made by each of the States and the members of the MDBC staff, the findings and conclusions presented in this report are those of the IAG.



4. Audit of 1997/98 Cap Implementation

South Australia

- The Cap*

As a result of decisions by the Ministerial Council in December 1996 the components of the South Australian Cap are:

- a fixed allocation of 50 GL per year for country towns;
- a five year non tradeable rolling allocation of 650 GL over the five year period (notionally 130 GL per year) for metropolitan Adelaide; and
- an average of 524 GL per year allocation for irrigation including industrial, stock and domestic (524 GL includes 90% of the 489.6 GL irrigation allocation and 83.4 GL for lower Murray swamps).
- 1997/98 Usage*

South Australia in 1997/98 maintained its record of utilising less than the Cap in both the urban and irrigation sectors (**Table 1**) with 70% of country water, 86% of the rolling five year average in Adelaide and 94% of irrigation water.

- 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.

An anomaly has been identified in the Cap targets agreed to by the Ministerial Council for South Australia.

A 50 GL Cap was supported by the IAG for country urban water supplies on the basis of

TABLE 2 — River Murray Diversions for Country towns GL/year

<i>Year</i>	<i>Diversion GL/year</i>
1992/93	29.5
1993/94	29.2
1994/95	36.1
1995/96	33.6
1996/97	35.1
1997/98	35.2

information provided by South Australia that historic consumption was up to 45 GL and that an allowance of 5 GL would be provided for seasonal fluctuations and growth.

The IAG has now been advised that the estimates provided to the IAG in 1996/97 were in error and included about 10 GL (average of 9.7 GL over the past 5 years) which was also included in the Adelaide consumption data for extraction at the Swan Reach No 1 Pump Station and that actual diversions in recent years had peaked at 36.1 GL (see **Table 2**).

In view of this double counting it is recommended that Schedule F for South Australia be amended following a review to determine the new Cap.

A preliminary study has been conducted into the relationship between climatic factors and diversion for irrigation purposes. This could provide the basis for the development of a climate adjusted Cap which would enable seasonal comparisons of diversion and Cap targets in aggregate on a climate adjusted basis.

An active trading market has been established with some 20.4 GL of permanent entitlement and 4.4 GL of temporary entitlement sold within South Australia in 1997/98. A net 16.0 GL of temporary entitlement moved interstate.



TABLE 1 — South Australia Diversions for 1997/98 (GL)

	<i>Cap</i>	<i>Adjustments to Cap as a result of temporary trade</i>	<i>Use</i>	<i>% use of adjusted Cap</i>
Adelaide				
- current year			154.3	
- rolling 5 years	650		556.0	86%
Country towns	50*		35.2	70%
Irrigation (includes Private Industrial and Stock and Domestic)	524	-16.0	478.1	94%
Total			667.6	

*Under review.

With additional trading and growth in consumption within irrigation Cap targets South Australia faces the issue of managing grower expectations as diversions are limited to 90% of entitlements.

In terms of Cap triggers for Schedule F, it was suggested that irrigation diversions and country towns should be aggregated. This is supported.

While current usage is considerably below the Cap, in a full trading environment and with the advent of interstate trade, usage may increase and South Australia needs to consider strategies to ensure long term compliance with the Cap.

- **Monitoring and Reporting**

Urban consumption and consumption in rehabilitated irrigation areas is reliably 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 proposed further improvements to ensure that the standard of metering of direct diversions is brought to a satisfactory level.

Flood irrigation areas in the Lower Murray area are not metered and consumption is estimated to be equal to the entitlement. This entitlement was estimated based on areas and crop/pasture usage and is currently undergoing refinement.

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

A quality management system for the collection, recording and reporting of diversion data is also considered appropriate to ensure reliable monitoring and reporting for management and Cap performance. This should include periodic audits.

- **Proposals to Refine Implementation in 1998/99**

South Australia proposes to continue to develop more reliable water measurement in the lower Murray as part of a strategy to improve water use efficiency, on-farm productivity and return-water quality.

- **IAG Assessment**

Consumption in 1997/98 was within the Cap in both urban and irrigation areas.

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

The Cap target of 50 GL/year set for country towns was based on double counting of about 10 GL water diversion from the Swan Reach No 1 Pump Station. This was included both in the Adelaide and country figures.

The IAG suggests that the Cap for country towns in Schedule F be amended to reflect the real level of historic and potential diversion. A simulation model similar to that prepared for Metro Adelaide consumption is being developed which will allow an assessment of the allocation required to provide different levels of security of supply. This should be tied to 1993/94 levels of development and the country urban water Cap should be renegotiated when the modelling is completed. In the interim the 10 GL of water should not be used or traded.

With diversions capped at 90% of entitlement for pumped irrigation, on a climate adjusted basis a management framework is required in the near future to ensure future Cap compliance given the growth that has occurred in the interstate trade in temporary water entitlements.

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 they have done in implementing the Cap and putting in place the necessary administrative framework.

Conclusions/Recommendations

- Diversion in 1997/98 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.
- The South Australian country towns Cap should be amended following the completion of modelling.
- There should be no trading of country towns diversions until a new Cap has been established.
- The country towns, irrigation and lower Murray allocations should be treated as a single Cap for compliance purposes.
- A management framework should be developed to ensure long term Cap compliance for pumped irrigation.

Victoria

- **The Cap**

The Victorian Cap has been defined in-principle for a number of river valleys on the basis of long term average diversion associated with 1993/94 levels of development. The current estimates of the long term Cap in each system is:

Goulburn/Broken/Loddon System	1972 GL per year
Murray/Kiewa/Ovens System	1621 GL per year
Campaspe	122 GL per year
Wimmera/Mallee	162 GL per year

These figures will be refined when the modelling is completed.

Caps for diversions from unregulated rivers still need to be defined although these account for less than 5% of diversion. Climate adjusted Caps that enable year by year comparisons between actual consumption and the predicted Cap are under development and will be finalised in 1998 for the major river system.

- **1997/98 Diversions**

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

In 1997/98, diversion from the Goulburn/Loddon/Broken rivers was 1883 GL compared with a climate adjusted Cap target of 1953 GL for the regulated system (Table 3).

In the Murray/Kiewa/Ovens 1644 GL was diverted compared to a climate adjusted Cap of 1808 GL.

Although climate adjusted Cap targets are not yet available for the Campaspe, Wimmera/Mallee and unregulated components of the river systems it is

clear that diversion in 1997/98 was within Cap targets for the main river systems in the State. It should be noted, however, that all valleys excepting the Wimmera/Mallee were resource constrained in 1997/98

- **Administration of the Cap**

Victoria has been working on a water reform package since 1990/91 and is establishing Bulk Entitlements for all users. It is also establishing stream flow management plans to control water extraction on unregulated rivers not covered under bulk entitlements. The Bulk Entitlements will specify a Cap on water use. This is complemented by a system of licences covering high and low security water, and management, monitoring and reporting systems to ensure Cap compliance.

The IAG has been advised that the Bulk Entitlement process has reached the following stages:

Goulburn Basin – Process completed and bulk entitlements granted.

Murray (Victorian System) – The 'Sharing the Murray' report has provided the basis for establishing bulk water entitlements. The entitlements are expected to be granted in 1998.

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

Ovens River – Scheduled to be completed in 1999.

Broken Basin – Scheduled to be completed in 1999.

Campaspe Basin – Consultation has been in progress for 30 months and is expected to be complete at the end of 1998.

Loddon Basin – Scheduled to be completed in 1999.

Wimmera-Mallee System – A working model is expected to be completed in 1999.



TABLE 3 — 1997/98 Usage Compared with Cap Targets (preliminary values)

Location	Regulated system		Unregulated system	
	Diversion GL	Cap target GL	Diversion GL	Cap target GL
Goulburn/Loddon/Broken	1 883	1 953	21	N/A
Campaspe	96	122*	2	N/A
Murray/Kiewa/Ovens	1 644	1 808	57	N/A
Wimmera/Mallee	153	162*	2	N/A

* long term Cap

While the final arrangements to manage the Cap will not be complete until 1999 when all bulk entitlements are granted, Victoria is proceeding to implement the Murray-Darling Basin Cap by adjusting irrigation sales allocations and trading rules.

External stakeholders had expressed concern to the IAG over the allocation of 10 GL/year of water to landholders in the upper northeast. This was seen as a possible breach of the Victorian Cap.

The IAG was advised that this allocation to be implemented at 1000 ML/year applied to on-farm dam storage of stream flow from the landholders' catchment. These allocations are non-tradeable.

The 10 GL/year allocation will be debited against water savings arising out of improvements to water system efficiencies and will not increase the Victorian Cap.

- **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.

Water use data have previously been compiled for regulated rivers using the MDBC Water Audit Monitoring Report format. Victoria supports the introduction of a Quality Assurance process to ensure maintenance of quality monitoring and reporting.

- **Proposals to Refine Implementation in 1998/99**

Further changes proposed in 1998/99 include:

- recalibration of the Murray/Kiewa/Ovens model which is expected to be completed in November 1998;
- recalibration of the Goulburn/Loddon/Broken model to be completed by November 1998;
- bulk entitlements for the Murray to be based on the water sharing principles established in 'Sharing the Murray';
- trading in the Ovens to be confined to within valley trades only to minimise downstream impacts as sleepers and dozers are activated; and
- development of exchange rules for trading between unregulated and regulated catchments.

- **IAG Assessment**

In 1997/98 diversions for the Goulburn/Loddon/Broken and Murray/Ovens/Kiewa were within the climate adjusted Caps.

The allocation of bulk entitlements for water management authorities and the associated management and accountability provisions will enable 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 and Goulburn system models;
- finalisation of bulk entitlements for the Murray system, Ovens River, Broken, Campaspe, Loddon Basin and the Wimmera-Mallee system;
- development, with the Murray-Darling Basin Commission, of Schedule F trigger mechanisms for possible breaches of the Cap;
- development of exchange rates for trading; and
- development of Cap targets for the Campaspe, Wimmera/Mallee and the unregulated components of the Goulburn/Loddon/Broken and Murray/Kiewa/Ovens.

The main area of risk in the view of the IAG continues to be activation/trading of sleepers and dozers in the gravity irrigation areas. This risk is recognised by Victoria and management tools are in place to minimise the impact on total consumption while recognising historic equity issues.

Victoria remains committed to holding diversions equivalent to those associated with the 1993/94 level of development.

Conclusions/Recommendations

- Diversions from the Murray and Goulburn systems in 1997/98 were below climate adjusted Cap targets.
- Substantial progress has been made in:
 - developing climate adjusted models;
 - community consultation on bulk water entitlements; 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 Murray system, the Ovens River, Broken, Campaspe and Loddon Basins and the Wimmera-Mallee system.

New South Wales

• The Cap

Performance relative to the 1997/98 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. Cap progress is reported for those valleys in the north of the State on the basis of a water year that runs from October to September.

The tools being used to evaluate seasonal diversions relative to 1993/94 level of development or the “benchmark” consist of:

- (i) Monthly and daily hydrologic models; and
- (ii) Climate-diversion relationships.

In the Macquarie Valley the Department of Land and Water Conservation (DLWC) has developed a hydrologic model which can simulate 1993/94 development levels against current streamflow and diversion conditions. The Macquarie Integrated Quantity and Quality Model (IQQM) has been used since 1995 to assist with the management of flows into the Macquarie Marshes and to audit extractions against the environmental flow rules established for the Marshes on a monthly and daily basis. In the Gwydir Valley a

monthly model has been used for the assessment of the implementation of the environmental flow rules. More recently an IQQM for the Gwydir has been developed and some initial model runs have been undertaken. These models have been used to assist in auditing the Cap for 1997/98 in the Macquarie and Gwydir Valleys.

For the other valleys, hydrologic models are not yet available. Therefore, as an interim auditing tool, the DLWC has established “*climate-diversion relationships*”. These are the models which were in use at the time of the 1996/97 IAG review.

Climate-diversion relationships have been established for the Murray, Murrumbidgee, Lachlan, Namoi and Peel Valleys, and also for the Macquarie Valley as a check against the IQQM model results. Data for the Border Rivers and Barwon-Darling River systems has so far proved inadequate in establishing formal auditing tools. For these valleys Cap auditing is based on an ‘informed assessment’ of the level of annual water extractions.

Table 4 provides a summary of the current auditing tools used in NSW and the latest advice on the timing for the development of more sophisticated models for relevant valleys.



TABLE 4 — NSW Interim Audit Tools

<i>Valley</i>	<i>Auditing Tool</i>	<i>Comment</i>
Murray	Monthly simulation model	Recalibrated by October 1998
Murrumbidgee	Climate-diversion relationship	IQQM model to be completed by June 1999
Lachlan	Climate-diversion relationship & IQQM	IQQM model to be completed by March 1999
Macquarie	IQQM plus climate-diversion relationship	Completed
Peel	Climate-diversion relationship	Auditing method to be completed by August 1999
Namoi	Climate-diversion relationship	IQQM model to be completed by August 1999
Gwydir	Monthly Model plus initial IQQM runs & crude model based climate-diversion relationships	Auditing method to be completed by August 1999
Border Rivers	None	IQQM model to be completed by November 1999
Barwon-Darling	None	Auditing method to be completed by November 1999
Lower Darling	Monthly simulation model	Recalibrated by October 1998

- **1997/98 Usage**

For most valleys a Cap band has been determined based on the climate-diversion relationship. If diversions fall above the band in any year, the Cap is considered by NSW to have been exceeded, unless there were peculiar circumstances in that year.

If diversions fall within the band, the Cap is considered by NSW to have been met, unless use was within the top half of the band and there is other evidence for growth in use (ie. increased area or changed cropping).

For those valleys where a climate-diversion relationship is available it is possible to monitor that valley's progress in relation to the Cap throughout the year. This is done by plotting the current position of the valley in terms of its diversions and climate on the climate-diversion graph. The likely position of the valley at the end of the season can then be estimated using the diversion and climate likely under dry, median and wet conditions. Therefore, a valley's Cap performance is assessed during and at the end of a season. The NSW authorities introduce measures, such as further restrictions on access to off-allocation flows, during the season if it appears likely that the Cap will be exceeded. For each valley where the Cap has been or may have been

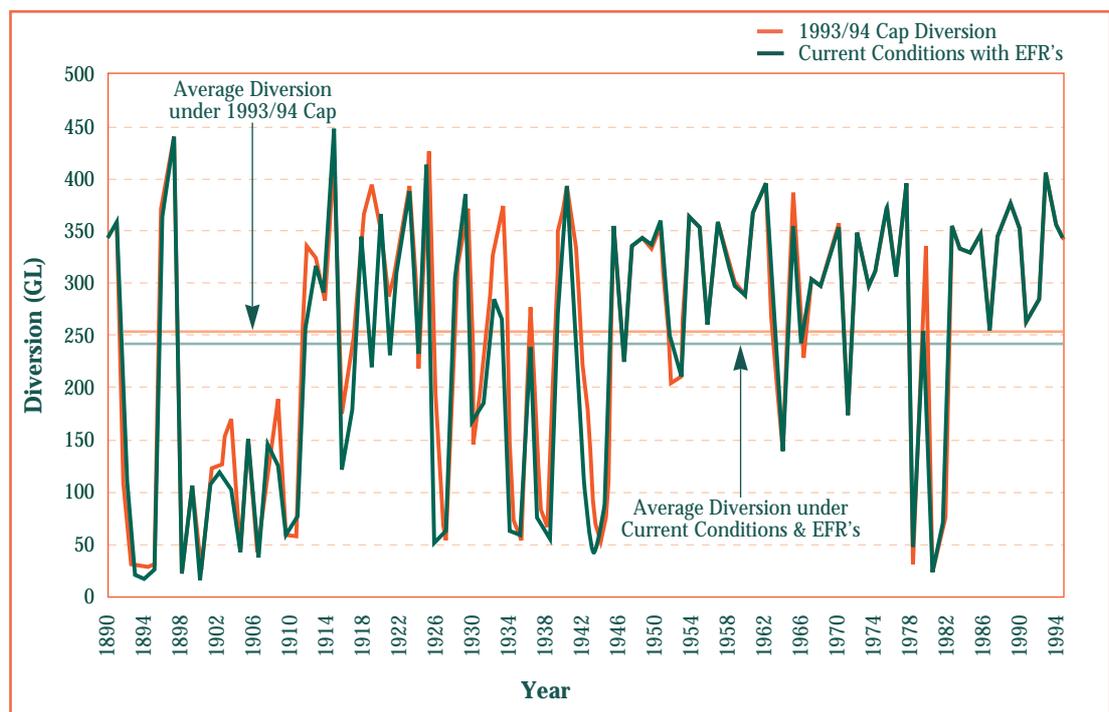
exceeded, NSW authorities were anxious to point out that a NSW response is currently being determined notwithstanding the introduction of the environmental rules. Based on these modelling tools, the following outcomes for 1997/98 diversions have been determined.

Murray/Murrumbidgee/Lachlan

For the **Murray Valley** where there was a resource constraint in 1997/98, the model suggests that usage was well within the Cap. However, for the **Murrumbidgee** and **Lachlan** valleys, the application of the simple climate-diversion relationship models suggests that usage was at the upper end of the confidence limits for the Murrumbidgee model and well above the Cap for the Lachlan model. In 1996/97 the IAG reported that for both these valleys the usage was over the Cap or at the outer edge of the confidence limits that can be applied to the climate-diversion relationship models used. At that time it was noted that there had been some particular exceptional circumstances which may have explained these results. However, the results for 1997/98 appear to confirm an over allocation problem for both of these valley systems.

For the Lachlan, the NSW authorities have

FIGURE 1 — Lachlan Valley - Comparison between 1993/94 Cap and Current Conditions with Environment Flow Rules (EFR'S)



acknowledged that there is a need for corrective action, although this does not include any change in the off-allocation limit, and the announced allocation is in itself likely to be higher in 1998/99 than in the previous year when the Cap was exceeded. Environmental flow rules (which it is claimed will keep long-term diversions below the Cap) will also be introduced in the Lachlan valley in 1998/99. For 1998/99 these include:

- release of selected Wyangala inflows targeted to achieve flows in a set flow range in the lower Lachlan;
- high security contingency allocation of 20,000 ML/annum; and
- minimum flow of 50 ML/day at Booligal while maintaining a visible flow at Geramy.

NSW authorities believe that if current development levels are maintained, this action within the environmental flow rules should result in a lowering of long-term average diversions and long-term Cap compliance (see **Figure 1** for the Lachlan Valley). However, in written correspondence to the IAG, NSW acknowledges that “the environmental flow rules introduced by NSW into most regulated river systems have not been specifically designed as Cap management measures”. The IAG notes that management of the Lachlan has been complicated by the large proportion of sleeper and dozer licences which have now become activated. This will continue to put pressure on the Cap unless a management response beyond that proposed is developed which inhibits trading of sleeper licences.

For the Murrumbidgee Valley, NSW authorities are not as convinced that further corrective action is required at this time, arguing that the apparent exceedance of the Cap in 1997/98 is within the confidence limits of the model used and that the resource constraint on the Murrumbidgee should ensure that 1998/99 use remains within the Cap. However, if there are further substantial inflows and allocations are allowed to rise, NSW acknowledges that diversions will go above the Cap in 1998/99. In these circumstances, NSW authorities argue that the environmental flow rules which will be introduced in the Murrumbidgee valley in 1998/99 will keep long-term average diversions below the Cap.

The IAG does not share the view of the NSW authorities that no further action is required in the Murrumbidgee Valley in 1998/99. While

acknowledging that the environmental flow rules will have an impact on average diversions in the long-term, the IAG is concerned by the apparent strong growth in rice plantings in the valley on average over the last three years (up by 22% on 1993/94 plantings) and the exceeding of the Cap in 1996/97. It is generally acknowledged by the NSW authorities that the introduction of the environmental flow rules will not of themselves bring valley diversions in 1998/99 within the Cap. There is however a heavy reliance by NSW on the modeling of the valley diversions under their environmental flow rules which suggests that average usage will be below the Cap over the longer term. The IAG is of the view that in response to the latest diversion data and the pattern of development, and that rather than allow growth in development within the valleys to continue unchecked for a further year, for overall water use management purposes it would be in the interest of all parties, including Murrumbidgee irrigators, if a clear signal was sent as soon as possible that growth in diversions will not be sustainable in the longer term. This is consistent with the aims of the NSW authorities in introducing environmental flow rules for the Murrumbidgee in 1998/99. To avoid any misinterpretation by irrigators of the long-term impact of these rules, however, an appropriate management response at this time would be to encourage a more conservative approach to development and diversions in 1998/99.

Macquarie

For the Macquarie Valley, the usage in 1997/98 was within the Cap and the introduction of environmental flow rules in 1998/99 (as an extension of the 1996 Macquarie Marshes management plan) should ensure that diversion levels remain consistent with the Cap objectives.

Namoi and Peel

For the Namoi Valley where there was extensive flooding late in the season, it was argued that the Cap is unlikely to be exceeded. However, on a climate-adjusted basis this may not improve the overall outcomes. Cap performance will need to be confirmed at the end of the irrigation year which ends on 30 September. The allocation, Cap action and rules for the 1998/99 season will also be determined at this time. Environmental flow rules will be introduced in the Namoi Valley in 1998/99.



For the Peel Valley where the total resource availability was 48 GL, the 1997/98 diversions were 8 GL which is well within the Cap of 10 GL.

Gwydir

For the Gwydir Valley, final performance for 1998/99 will need to be confirmed at the end of September. However, based on preliminary data using the crude climate-diversion relationship model and despite an 8% increase in crop areas and a 6% increase in on-farm storage capacity since 1993/94, the NSW authorities believe that the final outcomes will be within the Cap. Environmental flow rules based on 1995/96 environmental flow provisions, will be introduced in the Gwydir in 1998/99. Monthly model studies (which will be checked using the Gwydir Valley IQQM) indicate that these rules should keep long term average diversions below the Cap.

Border Rivers

An adequate model has yet to be developed for the Border Rivers. In addition, a joint Flow Management Plan with Queensland is still being undertaken. Thus, it is not possible at this time to specify the Cap or determine whether the Cap has been met.

Nevertheless, there is some concern about the record usage of water being reported from the Border Rivers in the period October to July. The timing for the completion of the Border Rivers IQQM and the WAMP process will delay final consideration of performance in this valley. At this time no attempt has been made to prepare environmental flow rules for the valley. Continued close monitoring of diversions within this valley will be required until the appropriate models are available. The IQQM model is not expected to be completed till November 1999.

Barwon-Darling

For the Barwon-Darling, without an adequate model, it is not possible to determine whether the Cap has been met. However, there is some concern about the 42% increase in on-farm storage capacity and 33% increase in area planted that has occurred since 1993/94 in the Barwon-Darling River system. With the completion of the Barwon-Darling IQQM there will be some opportunity to audit diversions against the Cap for this system. However, the completion of this model is not expected until November 1999. The

available evidence indicates that it is highly likely that when the model is complete it will demonstrate that the Cap has been exceeded. The management response needs to be developed now to provide appropriate signals to irrigators and the community in general. The NSW response at this time is to introduce environmental flow rules that will result in a lowering of diversions although not, as acknowledged by NSW authorities, to below Cap levels.

• Administration of the Cap

To meet the valley by valley Cap administration arrangements, NSW will need to build individual valley models reflecting 1993/94 levels of development and estimate adjusted usage patterns. However, as noted in **Table 4**, the timetable for the completion of these more sophisticated hydrologic models has been extended from that reported in the 1996/97 IAG Report on the Cap. This has reflected in part data difficulties and the complexities of building these models. NSW has also encountered some difficulties due to human resource constraints. These delays have complicated the management process for authorities who have had to rely upon less sophisticated models and growing public debate on aspects of the water allocation policies adopted by the State.

Notwithstanding these difficulties NSW has introduced a number of water management and allocation measures in recent years to assist with keeping water diversions within the Cap. These include:

- removing all allowances in allocation announcements for probable under-use by some licensed users;
- limiting allocation announcements to a maximum of 100%;
- setting limits on off-allocation diversions and in some valleys basing off-allocation access on history of use;
- gradual introduction of carryover to reduce late season "use it or lose it" diversions;
- reducing irrigators access to borrow (overdraw) from subsequent years supply; and
- not permitting high security users to access off-allocation.

Environmental flow rules currently being introduced into most valleys, are intended to keep long-term average diversions below the Cap.

However this will only apply if development remains at current levels. Environmental flow rules are designed to ensure that long-term diversions are within the Cap. Given the inexperience in operating with these new rules, it will be imperative that the NSW authorities make an annual assessment of their effectiveness in ensuring that they are still an effective tool for keeping long-term usage within the Cap. This will require assessment of the full range of indicators on irrigation demand which will include areas of planting, installed diversion capacity, on-farm capacity etc.

The environmental flow rules are estimated by the NSW authorities to result in reductions in diversions in all valleys in the long-term once they are introduced. These reductions range from 4% to 10%.

Data on usage in unregulated rivers in NSW are poor and it is recognised by the NSW authorities that existing management arrangements are not satisfactory as a means of controlling growth in use. Further reforms in both monitoring and management of use on these rivers will be necessary. However, the priority has continued to be upon the monitoring and modelling on those river systems for which data are available and some form of regulation exists.

- ***Monitoring and Reporting***

The monitoring of diversions across valleys using a climate-adjusted model is currently limited to the southern valley rivers in the State. However, this covers most of the State's current diversions. For other regulated valleys, the monitoring of performance against the Cap is more problematic and will need to await the formalisation of appropriate models. These have been delayed in terms of earlier expectations and are not now expected to be completed at least in their interim form for at least another 12 to 15 months.

For unregulated rivers, the process of introducing metering on pump off-takes will continue over time.

NSW authorities have participated with the MDBC in the development of a schedule of rules and data requirements for reporting on diversions from the Basin (Schedule F to the Agreement). The concept of Schedule F is to provide an agreed mechanism whereby the various States can report and have assessed their diversion results for each 12 month period. The Schedule F methodology relies heavily upon the various climate-adjusted models in use across the Basin.

While there is general acceptance of the need for climate adjusted models which incorporate a degree of latitude in their interpretation to allow for statistical error in the model estimates, the NSW authorities have some concern about the extent to which these models should act as a trigger for corrective action. NSW points to the IAG's acceptance of the Cap not being a restraint on development, but rather on diversions. Furthermore, the IAG has accepted that, after allowing for seasonal conditions, diversions permitted under the Cap will vary from year to year. NSW is concerned that, even with the climate adjusted modelling envisaged by the IAG and Schedule F, reliance solely upon these models to trigger a management response to a perceived growth in diversions may result in inappropriate decisions. The NSW authorities have a preference for using their environmental flow rules which, based on their modelling will in the long-term result in average diversions which fall within the Cap. This would remove the need for any additional management response beyond the application of environmental flow rules, to those situations where it was clear from consideration of a wider range of indicators in addition to the climate adjusted models, that the level of diversions had exceeded the Cap.

Thus, for purposes of monitoring of the Cap, NSW continues to support the collection of data and modelling of climate adjusted diversions outcomes, but believes that these model results should be considered in the context of a suite of indicators rather than as the sole indicator of compliance with the Cap. While not being definitive on what might constitute this suite of indicators, suggestions include the area planted, the size of pumps licensed in the valley and the extent of on-farm water storage. While an individual State could take a decision to make management adjustments based upon any evidence of potential or actual exceedance of the Cap that it wished, for purposes of compliance reporting, the NSW authorities support the concept of an 'independent regulator' similar to the IAG that would consider all the evidence and arrive at an independent and informed view of whether the suite of indicators supported the need for a management response to existing water diversions in order to remain within the Cap. NSW is of the view that such a reporting and monitoring process, combined with the adoption of its environmental flow management rules, will ensure that the integrity of the Cap is maintained in their State.



- ***Proposals to Refine Implementation in 1998/99***

The primary focus for refinement of the Cap implementation in 1998/99 is the introduction of the environmental flow rules in those valleys yet to have such rules, and the further development of the climate adjusted models. The NSW authorities are also proposing to tighten up on the management rules in the Lachlan Valley, but no change in the on-allocation and/or off-allocation rules is proposed for other valleys despite signs that there has been over allocation in the northern rivers and in the Murrumbidgee Valley.

NSW has reaffirmed its view that based on its modeling, the environmental flow rules will, over the long-term ensure that diversions remain at or below the Cap. However, there is acceptance of the view that the 'long-term' may not mean that diversions will be reduced to or below the Cap in the subsequent year. Rather, from the modelling undertaken, the NSW authorities have concluded that ultimately the level of diversions will step down to be under the Cap. Where there is clear evidence that the level of diversions has exceeded the Cap, it could be argued that short-term management solutions involving adjustments to the on-allocation and/or off-allocation levels will bring the level of diversions more swiftly back to the Cap levels. However, because of the vagaries in the statistical and other models being used, NSW is not anxious to use these management tools because of the perceived danger of over reaction and potential negative impact on economic activity within the State.

Nevertheless, despite concern about the potential for an over reaction to a single compliance indicator, there is general acceptance by the NSW authorities for the use of a suite of indicators together with the statistical models in order to check and verify whether actual diversions have exceeded the Cap.

Similarly to last year, NSW has argued that in any assessment of its performance over the last 12 months caution is needed less undue emphasis be placed upon reading too much into the results from only one indicator which of itself is incomplete. While giving support for this position in last year's report, the IAG has less sympathy for this interpretation of the results for 1997/98. The IAG has previously stated that States should not fail to exercise caution when the existing estimates of permissible Cap usage suggest that

the Cap may have been exceeded. As previously noted by the IAG in relation to NSW's 1996/97 performance it is the IAG's view that it would be in the best interest of the spirit of the Cap and the longer term management of river flows that indications of usage above the Cap levels be taken as a warning that further tightening is required.

It is the IAG's view that the proposed implementation policies being adopted by NSW do not include this precautionary approach and that the clear warning issued by the IAG in its 1996/97 Report has not been acted upon by NSW in its 1998/99 management program.

- ***IAG Assessment***

The IAG remains of the view that the NSW Government is committed philosophically to the Cap and that it is making endeavours to encourage greater acceptance of the Cap by irrigators and to implement the Cap. However, the IAG has considerable concern about the practical effect of the reliance of the NSW Government upon its environmental flow rules to ensure adherence to the Cap in the spirit of the agreement reached with other MDBC members.

Given the number of valley systems involved, there was always going to be a delay in NSW meeting the objectives of having full climate based diversion models for each valley. Nevertheless, progress in developing these models has been particularly slow over the last 12 months. Indications are now that it will be more than 12 months before significant progress will be made in completing this task. Administration of management tools to arrest the apparent continuing growth in diversions, particularly in the Murrumbidgee, Gwydir, Barwon-Darling and Border River valleys cannot be delayed any further awaiting for the completion of these hydrological models and refining their operation. More immediate action is required for these valleys (together with continuing constraint on diversions in the Lachlan valley) if the integrity of the Cap and its application in NSW is not to be brought into question.

The IAG in its 1996/97 report highlighted the need for additional human resources if the NSW authorities were to meet their State's obligations to the other MDBC members under the Cap. This need continues and clearly has been exacerbated by the response of the irrigation communities to the NSW Government's attempts to introduce environmental flow rules to valleys across the

State, and the need to manage an amnesty program for water users who have failed to obtain the appropriate approvals, and to handle the irrigators' reaction to changes in the water market. However, in addition to the environmental benefits that are available from better water management within the State, there are also important water security issues for irrigators which do not appear to be widely recognised in the irrigation community. The NSW authorities are currently endeavouring to make more widely known these benefits of the Cap and as a consequence to encourage greater support for the concept.

In recognition of the difficulties being encountered by NSW in its development of appropriate models and to guard against a mechanistic approach which relies solely upon these models, the IAG supports a monitoring approach which incorporates a suite of indicators of which the model diversion results would be but one. The IAG notes that in order to retain the confidence of each member of the MDBC that individual States are giving appropriate consideration to the signals sent by such a suite of indicators, it may be necessary to retain the services of an independent regulator or supervisor who would have responsibility for consideration of all the evidence and adjudicate on whether direct management intervention was required to restrain future diversions. The outputs from the statistical models (and, in NSW's case, other models) would still be an indicator of possible exceedence of the Cap. However, the other indicators would also be considered in conjunction with the statistical models.

NSW also needs to give further consideration to the monitoring and management of floodplain harvesting. NSW authorities indicated that they have moved to licence this activity and the IAG will be examining this matter further as part of its ongoing review of the Cap.

Conclusions/Recommendations

- The Murray was resource constrained and within the Cap in 1997/98.
- The Murrumbidgee was at the upper end of the confidence limit of the diversion model. The other indicators suggest growth in diversions and the need for an appropriate management response which is not evident from the material provided to the IAG.
- For the Lachlan in the last two years, diversions have exceeded the Cap. An urgent management response is required to bring diversions within the Cap limits.
- For the Barwon-Darling and the Border Rivers, on the evidence available, it would be difficult to come to a conclusion that diversion was not occurring at levels in excess of 1993/94 diversions.
- For the Namoi and Gwydir Valleys, care will be required in future management in the light of crop plantings to ensure Cap compliance. The Peel is within the Cap.
- Macquarie is Cap compliant in 1997/98.
- While the provision of environmental flow rules is in accord with the principles underlying the Cap and is supported, evidence on the effectiveness of the current rules in achieving the Cap on a valley-by-valley basis has yet to be delivered. A higher priority must be given to monitoring performance in this area if the Cap and environmental flow objectives are to be achieved.
- Again it is clear that the level of human resources available to manage this complex issue in NSW are not adequate to bring these matters to a satisfactory and early conclusion, and to achieve a time frame that will meet community expectations.



Queensland

- **The Cap**

In line with earlier Council decisions the Queensland Cap is to be established in terms of end of valley flow objectives following the completion of the Water Allocation and Management Planning (WAMP) and Water Management Planning (WMP) processes. The IAG has supported the WAMP/WMP 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;
- a management regime needs to be developed that includes pricing, property rights and measuring and reporting;
- WAMP is fully implemented, including assessment of downstream 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
- final independent audit of the WAMP process is conducted, including modelling of impacts on downstream Basin flows.

- **1997/98 Diversions**

Provisional diversion information for 1997/98 is summarised in **Table 5** below.

The provisional 1997/98 diversions of 611 GL compares with 467 GL in 1996/97, 520 GL in 1995/96, 176 GL in 1994/95 and 338 GL in 1993/94.

The Cap in Queensland will be defined as end-of valley flow objectives and management rules and

TABLE 5 — 1997/98 Queensland Basin Diversions

<i>Diversions Category</i>	<i>1997/98 (GL)</i>
Irrigation Area Channels	35
Private Diversions	63
Water Harvesting	480
Unregulated Stream Licences	21
Urban and Industrial	12
Total	611

it is not possible to compare end-of-valley flows in 1997/98 against those objectives as they are still to be established. Diversions in 1997/98 were about 15% of the recorded flow.

Diversions in 1997/98 were a record and reflected a particularly wet winter and growth in on-farm storages from 360 GL in 1993/94 to 684 GL in 1996/97.

The growth in storages and diversions is within licence capacity 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 are being activated and in high run-off years this has led to a significant increase in diversion.

- **Progress with the WAMP process**

The IAG has been asked by the MDBMC to audit the WAMP process and outcomes.

In this report an update of the status of the WAMP process on Basin rivers and a proposed audit process is provided.

- **Water Resource Plans**

In the February 1998 "Progress Report on Queensland Water Allocation and Management Planning (WAMP) Implementation" the IAG advised that the WAMP reports were likely to be unavailable for consideration by Council until December 1998 (Condamine-Balonne) and March 1999 (Border Rivers). Schedule F adopted by the Council for trial implementation during the 1998/99 season includes sub-clause 7(3) "on or before 30 June 1999 the Government of Queensland will prepare and publish water management plans and water allocation plans for all river valleys in Queensland".

The current status is:

Condamine-Balonne

Queensland provided to the IAG a summary report on progress with the WAMPs and WMPs. (**Table 6**)

The Condamine-Balonne WAMP has seen the completion of the IQQM hydrologic model, development of a range of flow management and consumption scenarios and extensive consultation with the Community Reference Panel.

TABLE 6 — Queensland Water Resource Plans Progress report as at 16/9/98

	<i>Condamine-Balonne</i>	<i>Border Rivers</i>	<i>Warrego/Paroo/Nebine</i>	<i>Moonie</i>
Process	WAMP Draft Plan due March 1999	WAMP Draft Plan due 1999	WMP Process likely to be announced late 1998	WMP Process likely to be announced late 1998
Hydrologic Analysis	*Calibrated models (IQQM & specific) June 1998 by DNR *Entitlement modelling *2 regulated areas plus significant waterharvesting in unregulated areas	*Calibrated IQQM model due Nov 1998 - by DLWC & DNR *Calibrated crop models and entitlement modelling *Regulated areas modelled, plus sensitivity on unregulated Granite Belt area	*IQQM models in initial development stage - by DNR *Entitlement modelling *Unregulated	*Calibrated model completed by DLWC *Entitlement modelling with calibrated crop models *Unregulated
Environmental Analysis	*Environmental Scan completed Report on Index of Stream Condition due latter 1998 *Expert panel workshops held	*Environmental Scan completed *Expert panel workshops held	Overview document to be completed by Dec 1998	Overview document to be completed by Dec 1998
Economic Analysis	*Data collected from ABARE *2 out of 8 case studies completed, all to be completed by October	*Data is being collected from ABARE *Linear programming model to be reviewed	N/A	N/A
Consultation	*Community Reference Panel of key stakeholders formed and meetings have been held *Issues paper produced *Indigenous consultant appointed and clan meetings held	Community Reference Panel of key stakeholders formed and meetings have been held *Issues paper produced *Indigenous consultant appointed	Advisory committee to be formed	Advisory committee to be formed
WAMP: Water Allocation and Management Planning • WMP: Water management Plan • IQQM: Integrated Quantity Quality Model				

It is expected that Technical Reports will be available by December 1998 covering the areas of hydrology, environmental flows and economic impacts. The draft WAMP and an information paper covering issues and responses are expected to be available for release in March 1999 for public consultation. A modified draft WAMP is expected to be available by June 1999.

The Technical Reports, Model and preliminary draft WAMP are expected to be audited by the IAG in December 1998 - February 1999. This advice is expected to be available to Council at its March 1999 meeting.

Border Rivers

The IAG was advised that significant delays have occurred in developing the calibrated IQQM model for 1998. It is now expected that the model will be completed in November 1998.

Although a Community Reference Panel has been established it has been unable to make significant progress in the absence of a model to develop scenarios and impacts.

The IAG was advised that it is unlikely that a draft WAMP and Information Paper for the Border Rivers will be available before December 1999. These will be audited by the IAG.

Warrego/Paroo/Nebine and Moonie WMPs

In its February 1998 Progress Report the IAG advised that water management plans were unlikely to be available before December 1998.

The IAG was advised that the Water Management Plans had not formally commenced although significant development work had been undertaken. It is not expected that the draft Water Management Plans would be available before June 1999.

- **Management Issues Following Establishment of the Cap**

While the Cap is established as end of valley river flow objectives a management framework integrating licensing, metering, and operating rules will be required to achieve Cap objectives.

The IAG was advised that drafting instructions for a legislative framework for WAMP implementation were in preparation. This would provide the basis for establishing bulk water entitlements, transfer rules and a management framework.

The IAG considered that any new legislation should provide the basis for regulating floodplain harvesting in the context of total water resource management. This comment is made on the basis of significant growth in floodplain harvesting storage (from 44 GL in 1993/94 to 71 GL in 1997), the issue of security of access and the environmental flow impacts.

- **Auditing WAMP and WMP**

The MDBMC resolved at its July 1997 meeting for the IAG to undertake an Audit of the WAMP (and by inference the WMP) processes and outcomes.

This present report has indicated progress and timelines for completion of WAMP on the Condamine-Balonne and Border Rivers and WMPs for the Warrego/Paroo/Nebine and Moonie rivers.

The IAG in 1997 discussed the proposed audit of the WAMP (WMP) process and outcomes with the Queensland Department of Natural Resources officers and agreed on an audit methodology.

The proposed process comprises audits of key stages of the WAMP against the criteria summarised in **Table 7**.

The only component audited to date is progress on the Community Consultation process. This was reported on in the IAG February 1998 Progress Report. The IAG now expects to audit the preliminary draft Condamine-Balonne WAMP and Technical papers in December 1998 – February 1999 and the Border Rivers WAMP in December 1999. The draft Water Management Plans for the Warrego/Paroo/Nebine and Moonie are expected to be available for audit in June 1999.

TABLE 7 — Preferred Audit Process for WAMP/WMP

WAMP Output/Process	Audit Criteria
Technical Reports	Quality of expertise Range of environmental, economic and other indicators used
River Modelling	Validity of model
Information Paper	Are the full range of issues covered? Does implied value system cover full range? Downstream impacts been considered?
Community Consultation Process and Report	Did Panel adequately represent all community interests? Was a representative and transparent value system used by the Panel?
Preliminary Draft Plan	Does plan reflect TAP and Community Consultation? Have downstream impacts been considered? Has the precautionary principle been applied?
Modified draft plan	Do changes reflect previous principles?
Final Plan	Does the final plan reflect previous principles?

- **IAG Assessment**

The WAMPs for the Condamine-Balonne and Border Rivers are at least 12 months behind on the original schedule provided to Council and 6 and 9 months respectively behind the dates provided in the IAG February 1998 Progress Report.

Reasons for the delays include the priority given to completing the draft WAMP for the Fitzroy (released in September 1998), difficulties in completing calibrated flow models and the complexities of the community consultation process.

Queensland has a stated desire to produce quality WAMPs and has recently increased the resources for developing WAMPs and WMPs including secondment of an officer to the NSW Department of Land & Water Conservation to expedite modelling.

The present growth in diversions and on-farm storages, while compliant with the interim moratorium announced as part of the process in establishing the Caps, will increase the difficulty of, and reduce management flexibility in determining Cap outcomes.

Given that there has been from 1993/94 to 1996/97:

- an increase of 90% in on-farm storages;
- an increase of over 50% in diversions; and
- no formal constraints on floodplain storage;

there is a definite risk that development that occurs before the WAMPs are complete could impact on the primary objective of the WAMP process (ie to achieve a balance between consumptive use and instream use).

It is the view of the IAG that diversions should be 'capped' until the WAMPs and WMPs are completed.

As an overall comment, an overview of the draft Fitzroy WAMP suggested to the IAG that the same process applied to the Condamine-Balonne and Border Rivers would provide a sound basis for establishing water entitlements and end-of-valley flows.

Conclusions/Recommendations

- Diversions of 611 GL were at a record following a high flow year and a substantial growth in on-farm storage.
- The WAMP for the Condamine-Balonne is now not expected to be completed until June 1999 with a draft WAMP for the Border Rivers unlikely to be available until December 1999.
- The draft WMPs for the Warrego/Paroo/Nebine and Moonie are unlikely to be completed until June 1999.
- Management rules and a statutory basis for implementing the WAMPs are still required and it is expected that legislation may be introduced into the Queensland Parliament in March 1999.
- It is recommended that this legislation include the management of floodplain harvesting.
- The IAG also recommends that diversions by individual licence holders be capped at 1997/98 levels until the WAMPs and WMPs are completed.



5. Diversions from the Murray-Darling Basin in 1997/98

Murray-Darling Basin diversion in 1997/98 is estimated to be 11,374 GL. From **Figures 2 and 3** it can be seen that this is about 925 GL/year less than the record diversion in 1996/97 and that there have been five years with higher diversions. The reduction in diversion from 1996/97 is primarily due to the water supply restrictions caused by the drought in the southern valleys. Diversions in Queensland in 1997/98 were the highest on record. This reflects both a particularly wet season and the growth in on farm storages.

Of the total water usage in 1997/98, New South Wales diverted 55%, Victoria 34%, South Australia 6%, Queensland 5% and the Australian Capital Territory 0.4%. Diversions from the individual valleys are presented in **Table 8**.

In many northern streams the water year runs from October to September and, of necessity, the data for these streams are incomplete for 1997/98. However diversions in these streams for September are typically low. For this reason the diversions in **Table 8** will differ slightly from those that will eventually be published in the 1997/98 water Cap monitoring report.

TABLE 8 — Murray-Darling Basin Diversions in 1997/98

<i>System</i>	<i>Total Diversion (GL)</i>	<i>Percentage of Basin Diversion %</i>
New South Wales		
Border Rivers	190*	
Gwydir	411**	
Namoi/Peel	208*	
Macquarie	390	
Barwon-Darling	200	
Lachlan	419	
Murrumbidgee	2479	
Lower Darling	64	
Murray	1833	
Total NSW	6194	54.5%
Victoria		
Goulburn/Loddon/Broken	1904	
Campaspe	98	
Wimmera/Mallee	155	
Murray/Kiewa/Ovens	1701	
Total Victoria	3858	33.9%
South Australia		
Country Towns	35	
Metro-Adelaide	154	
Other	478	
Total South Australia	667	5.9%
Queensland	611#	5.4%
Australian Capital Territory	44	0.4%
Total Basin	11374	100.0%

* total diversion to 31 August 1998 (water year for Border River and Namoi ends on 30 September 1998)

** total diversion to 30 June 1998 (water year ends on 30 September 1998)

total diversion for Queensland is a provisional figure only (water year ends on 30 September 1998)



FIGURE 2. Murray-Darling Basin Diversions - 1983/84 to 1997/98

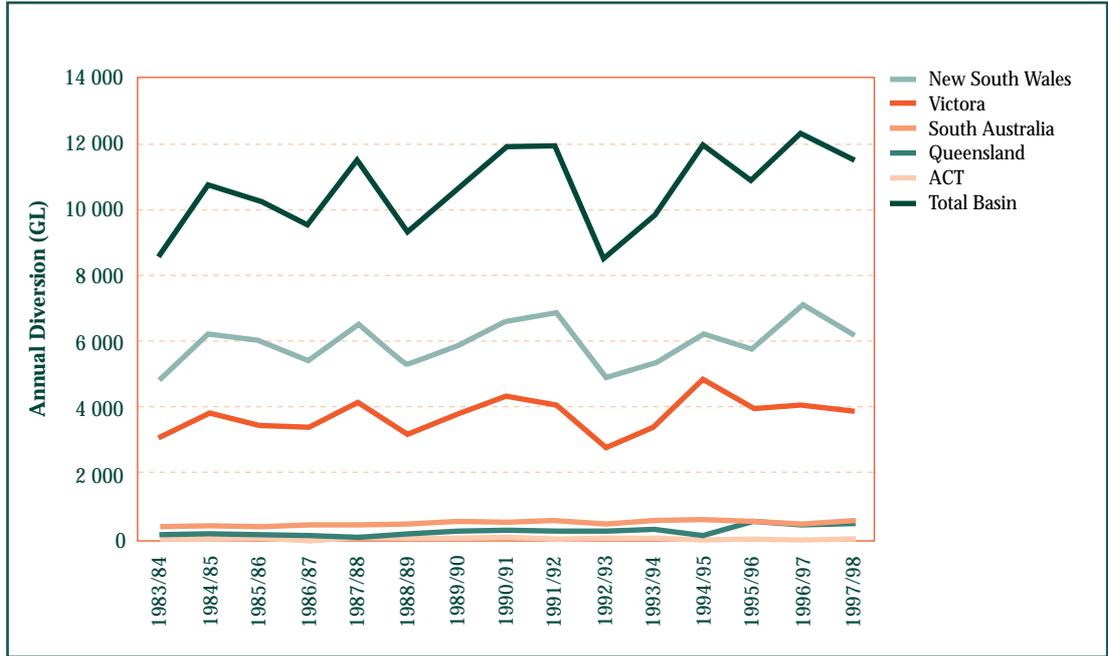
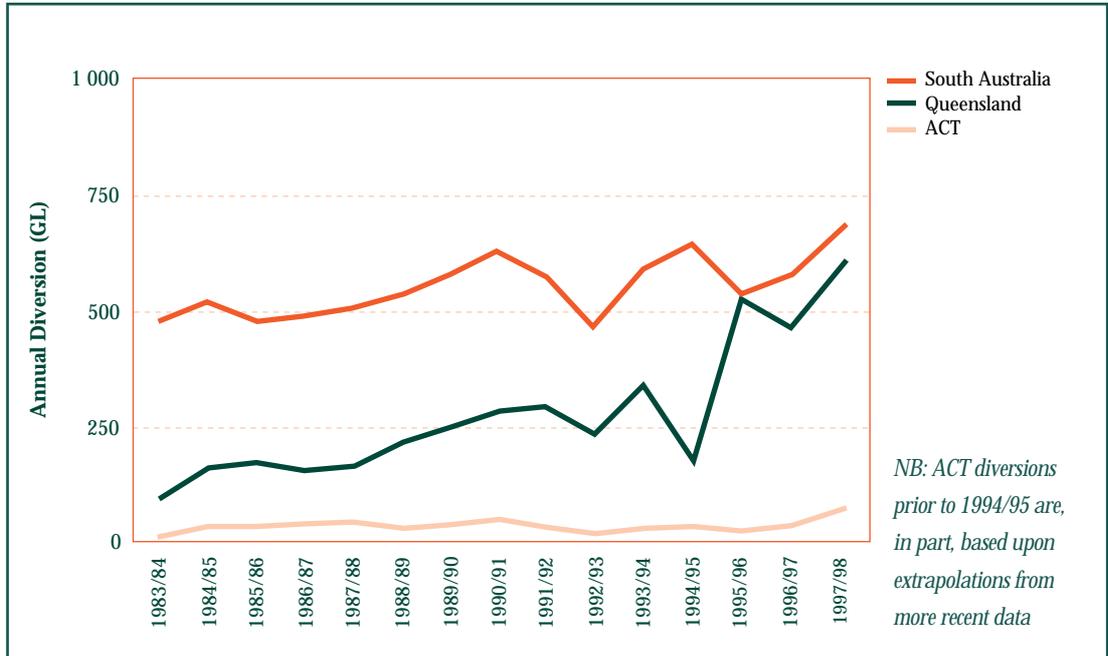


FIGURE 3. Murray-Darling Basin Diversions - 1983/84 to 1997/98 (usage under 1 000 GL/yr)



6. Schedule F: Comments on Trial Implementation

Schedule F was adopted by the Ministerial Council for trial implementation during the 1998/99 season. During discussions on the implementation of the Cap in 1997/98 a number of comments were raised concerning the future implementation of Schedule F.

There is generally broad scale support for Schedule F. However, there is some concern about Clause 12 which deals with the declaration that the diversion Cap has been exceeded. In particular the concern relates to whether it is appropriate to trigger this provision if the cumulative difference exceeds 3 times the standard deviation of the error determined by the analytical models. The issue of whether in the first instance this should be reported to the Ministerial Council is also of concern. The problem is that the models cannot perfectly replicate both the biophysical and market situation occurring valley by valley across the Basin. While they provide an excellent representation of water use versus climate it is nevertheless always within some tolerance level. Therefore, there is a risk that this provision, Clause 12, will be triggered inappropriately and thus lead to a lack of confidence in Cap implementation. On the other hand without such a trigger there is the potential for continued incremental growth in diversions which will not be picked up until it is too late for a reasoned and reasonable management response.

While the Independent Audit Group has not been specifically asked to review Schedule F implementation, we believe it is appropriate to bring this matter to the attention of the

Commission and Council. It is imperative that there be a robust, creditable and repeatable methodology for determining compliance. Our view is that it should have the following characteristics:

- be triggered by the method shown in Clause 12 but instead of using 3 times the standard deviation of the model error it should be 2 times;
- if the trigger is exceeded then the management agency would be asked to report on the reasons for the trigger being exceeded. The report must include:
 - model error/calibration
 - area planted by crop type
 - changes in irrigation technology
 - conjunctive use of groundwater
- this report would then be forwarded to an Independent Audit Group (to be formally constituted under Schedule F) who will provide independent advice to the Commission and Council; and
- if the IAG assesses that the Cap has been breached or on the weight of evidence it is likely to have been breached, then the respective government would be required to provide a formal response to the Ministerial Council on the actions being taken to remedy the situation.

This process, while increasing the cost of management, will also improve the confidence in the Cap and its implementation.



7. Conclusions and Recommendations

The IAG, on the basis of discussion with State officers and analysis of information provided by each of the States, has drawn the following conclusions and developed the following recommendations for the 1997/98 year by State:

South Australia

- Diversion in 1997/98 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.
- The South Australian country towns Cap should be amended following the completion of modelling.
- There should be no trading of country towns diversions until a new Cap has been established.
- The country towns, irrigation and lower Murray allocations should be treated as a single Cap for compliance purposes.
- A management framework should be developed to ensure long term Cap compliance for pumped irrigation.

Victoria

- Diversions from the Murray and Goulburn systems in 1997/98 were below climate adjusted Cap targets.
- Substantial progress has been made in:
 - developing climate adjusted models;
 - community consultation on bulk water entitlements; 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 Murray system, the Ovens River; Broken, Campaspe and Loddon Basins and the Wimmera-Mallee system.

New South Wales

- The Murray was resource constrained and within the Cap in 1997/98.

- The Murrumbidgee was at the upper end of the confidence limit of the diversion model. The other indicators suggest growth in diversions and the need for an appropriate management response which is not evident from the material provided to the IAG.
- For the Lachlan in the last two years, diversions have exceeded the Cap. An urgent management response is required to bring diversions within the Cap limits.
- For the Barwon-Darling and the Border Rivers, on the evidence available, it would be difficult to come to a conclusion that growth in diversion was not occurring at levels in excess of 1993/94 diversions.
- For the Namoi and Gwydir Valleys, care will be required in future management in the light of crop plantings to ensure Cap compliance. The Peel is within the Cap.
- Macquarie is Cap compliant in 1997/98.
- While the provision of environmental flow rules is in accord with the principles underlying the Cap and is supported, evidence on the effectiveness of the current rules in achieving the Cap on a valley-by-valley basis has yet to be delivered. A higher priority must be given to monitoring performance in this area if the Cap and environmental flow objectives are to be achieved.
- Again it is clear that the level of resources available to manage this complex issue in NSW are not adequate to bring these matters to a satisfactory and early conclusion, and to achieve a time frame that will meet community expectations.

Queensland

- Diversions of 611 GL were at a record following a high flow year and a substantial growth in on-farm storage.
- The WAMP for the Condamine-Balonne is now not expected to be completed until June 1999 with a draft WAMP for the Border Rivers unlikely to be available until December 1999.
- The draft WMPs for the Warrego/Paroo/Nebine and Moonie are unlikely to be completed until June 1999.
- Management rules and a statutory basis for implementing the WAMPs are still required and it is expected that legislation may be introduced into the Queensland Parliament in March 1999.



- It is recommended that this legislation include the management of floodplain harvesting.
- The IAG also recommends that diversions by individual licence holders be capped at 1997/98 levels until the WAMPs and WMPs are completed.

The IAG has suggested modifications to the implementation of Schedule F to provide a higher level of confidence in the way Cap compliance is assessed and reviewed. The main change is to supplement the reliance on the computer models with other measures to assist in determining whether or not there has been growth in diversion above the 1993/94 level of development.

The IAG are of the view that if Schedule F with these modifications is to be applied to the 1997/98 audit then it would have triggered the reporting provisions of Schedule F for the following New South Wales valleys:

- Murrumbidgee;
- Lachlan;
- Barwon-Darling;
- Border Rivers; and
- Possibly in the Gwydir and Namoi.

It is therefore appropriate to ensure a robust and transparent process that reports be sought for these valleys from the appropriate contracting Government on the management response to ensure Cap compliance in future years. The report should be provided to both the Commission and Council in accordance with the Schedule F provisions.

It is the strongly held view of the IAG that unless an open and transparent process is continued then there will be a lack of confidence in Cap implementation.



Responses by the Four State Governments

The four State Governments prepared written responses to the Independent Audit Group's Report which were tabled at Meeting 25 of the Murray-Darling Basin Ministerial Council on 20 November 1998. The Council agreed to publish these responses as an appendix to the Independent Audit Group's Report.



SOUTH AUSTRALIA

South Australian Response to IAG Conclusions and Recommendations

The IAG Report concludes that diversions in South Australia for the 1997-98 water year were within the Cap and that South Australia has a reliable system of measurement for urban and irrigation water use. The report draws attention to two issues - the Cap for Country Town Diversions and the need to establish a management framework to ensure long term Cap compliance for irrigation diversions.

Country Towns Diversions Cap

The Cap for country towns diversions was originally based on data which indicated a peak usage over the past 20 years of 44.7 GL. A Cap figure of 50 GL was agreed on the basis of this peak usage, with some allowance being made for the very high security required for urban supplies. It was recognised that this may provide a small amount for expansion in use, reflecting equity considerations.

Over the past 6 years diversions for country towns has varied between 29.2 GL and 36.1 GL per year. The IAG is now proposing an amendment to the Cap figure for South Australian Country Towns on the basis of these recent use figures and has suggested that the Cap be reduced to 40 GL. This is substantially less than the peak recorded use of 44.7 GL in 1982-83.

In contrast to the justification provided for the Cap allowance for urban water supplies, no long term modelling was undertaken to underpin the Cap volume for country towns at the time that the Cap was initially set. That modelling is now being undertaken and it is anticipated that this will demonstrate that a Cap of 50 GL is justified to ensure the high level of security necessary for these supplies. This modelling will be completed by March 1999 at which time an informed review

of the Cap for country towns can be undertaken.

In addition, the body of the IAG report makes a recommendation that until this allocation has been amended, the 'extra' 10 GL should not be used or traded. This is considered to be an unnecessary constraint for two reasons. It is expected that the 50 GL allocation will be found to be justified and be retained following further investigation and review and it is, in any case, highly unlikely that SA Water would dramatically increase usage over the next year. Moreover, it would be unreasonable and legally problematic to require SA Water to refrain from using water to which they are legally entitled pursuant to a licence issued under the Water Resources Act 1997 in accordance with the Cap figure (this is not recognised in the IAG report).

Framework for Compliance

The recommendation that South Australia develop a management framework to ensure long term compliance with the Cap for irrigation relates to discussions regarding the impact interstate trade may have on the ability to manage irrigation diversions to within the Cap volume. The potential difficulties presented by unrestricted temporary interstate trade of water allocations are recognised and are being addressed. Policy responses will be developed to ensure that trade does not result in the Cap for irrigation being exceeded.

Summary

South Australia has continued to comply with the Cap in 1997-98, and is working towards improving the already high standard of monitoring and reporting procedures. Modelling to better define the requirement for country towns will be completed by March 1999 and policy responses are being developed to ensure long-term compliance with the Cap for irrigation diversions.





VICTORIA

Victoria remains committed to implementing the cap. The interim capping measures adopted by Victoria - trading rules and tighter “sales” allocations - have ensured that Victorian diversions were within cap targets in 1997/98.

The IAG correctly notes that diversions from the Murray and Goulburn systems were below the climate adjusted targets. Diversions from the Campaspe system were also below the 1997/98 target, which has been calculated since the IAG reported.

A 17.7 GL/year increase in environmental flows to the Wimmera and Glenelg Rivers has been accruing in recent years from savings made through pipelining of the Wimmera/Mallee stock and domestic supply system. This has ensured that diversions from the Wimmera/Mallee system have continued to decline in 1997/98.

Substantial progress has been made in developing climate-adjusted models for the Goulburn, Campaspe and Murray systems. Work will continue on improvements to these models to enable cap targets to be determined with improved accuracy.

Conversion to bulk water entitlements has continued, involving extensive consultation with key water user and community stakeholders in the Campaspe and Murray systems.

This consultation has emphasised the benefits that a cap on diversions provides, not only for the environment, but also in protecting the security of supply to water users. This has resulted in a high

degree of community ownership of the Victorian framework adopted to achieve cap compliance.

Bulk entitlements will be finalised for the Murray and the Campaspe in the next few months and then progressively in the Broken, Ovens and Loddon basins and in the Wimmera/Mallee systems. The Victorian Government is committed to resourcing this program to ensure timely completion of these tasks.

The recent Darling system floods have illustrated that both the security of Victoria’s Murray allocations and the health of the lower River are reliant on Darling outflows. This has reinforced support from the Victorian community for the cap.

At the same time, irrigators have been hit by quite low allocations, especially on the Goulburn. To retain support for the cap, it is important that irrigation communities throughout the Basin are seen to be keeping within it.

Victoria notes the IAG’s comments in regard to Schedule F of the Murray Darling Basin Agreement and reiterates its commitment to ensuring incorporation of a robust and transparent reporting process into the Agreement to ensure cap compliance in future years. Victoria is committed to working through the issues necessary to finalise Schedule F.

The IAG has noted that Victoria has a reliable monitoring and reporting system in place for the regulated valleys. Victoria will continue to provide accurate and timely water audit information.





NEW SOUTH WALES

For the past two years NSW has been determining valley usage relative to the Cap using a combination of climate-diversion relationships and numerical models. Upon implementation of the environmental flow rules for 1998/99 it has become apparent that Cap management on an annual basis is inappropriate. NSW's aim is to keep long term average diversions under the Cap with monitoring to be approached from a long term modelling perspective. This allows for the effects of climatic variation and multi-year storage effects to be considered.

The environmental flow rules for 1998/99 have not been specifically designed as Cap management measures. However, computer modelling assessments indicate (with the exception of the Barwon-Darling) that, with 97/98 levels of development, a byproduct of the adopted environmental flow rules is a long-term average diversion which is below the long term average diversion occurring for 1993/94 levels of development (i.e. the Cap). This is illustrated in attachment "A" which shows the results of computer modelling for the Macquarie River for the 1993/94 level of development and for the 1997/98 level of development with the environmental flow rules in place.

Key conclusions of the IAG report and DLWC's comments are as follows:

- **The Murray was resource constrained and within the Cap in 1997/98.**
- **The Murrumbidgee was at the upper end of the confidence limit of the diversion model. The other indicators suggest growth in diversions and the need for an appropriate management response which is not evident from the material provided to the IAG.**

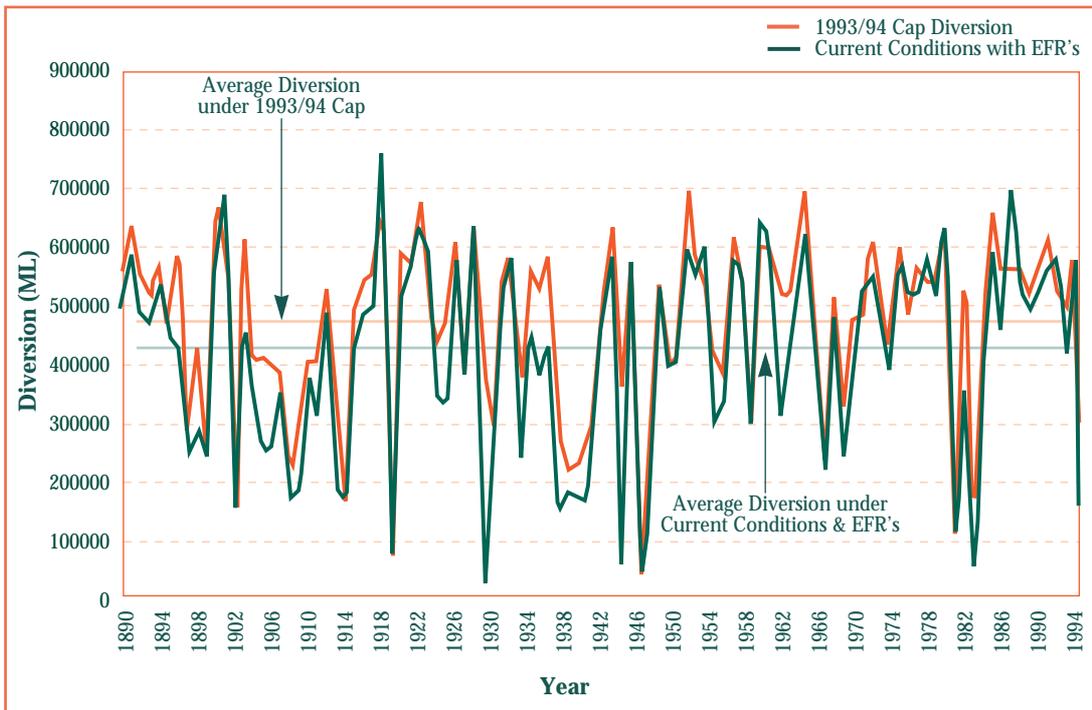
Agreed.

The Murrumbidgee diversion was slightly above the interim curve but well within the confidence limits. The IAG conclusion in this regard appears to be in error.

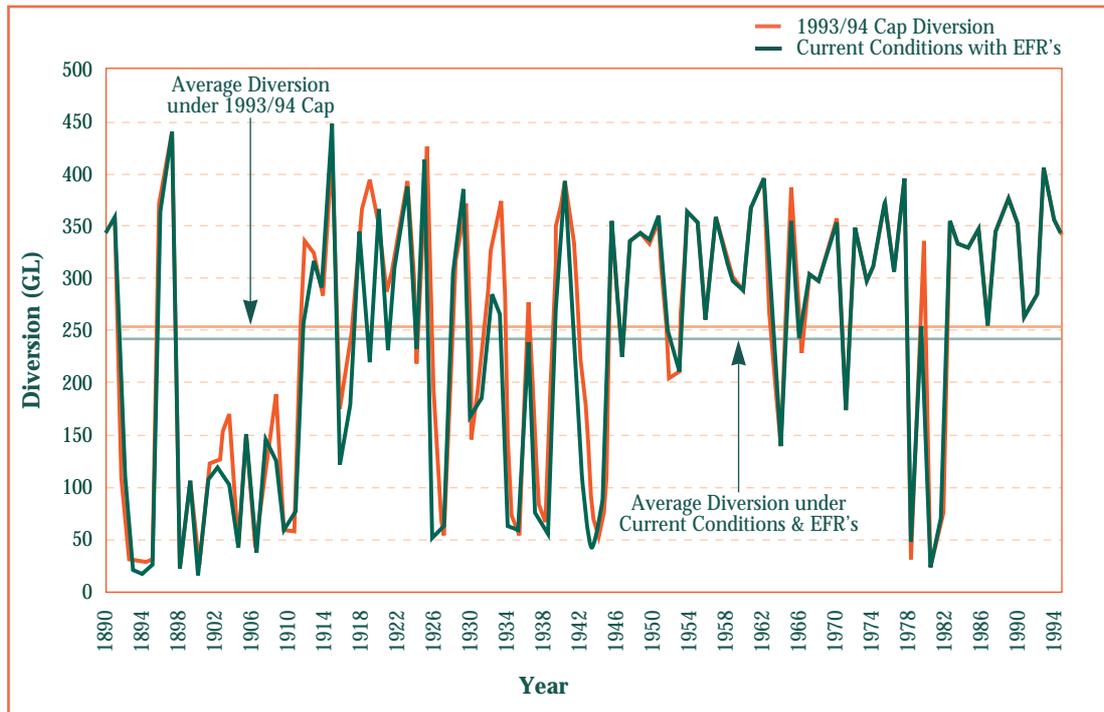
In accordance with IAG protocols, the management response to the previous year's behaviour (1996/97) was to reduce off-allocation availability by 150GL and to make off-allocation available only to licensees having a history of off-allocation use. As there was only a small amount of off-allocation access during the 1997-8 year, restrictions had limited effect in that year. The small amount of extra use in the year came from storage. Since the Blowering storage is still very low the valley is paying back the additional use by way of restrictions this year (1998/99).



Attachment A - Macquarie Valley - Comparison between 1993/94 Cap and Current Conditions Environment Flow Rules (EFR'S)



Attachment B – Lachlan Valley – Comparison between 1993/94 Cap and Current Conditions Environment Flow Rules (EFR'S)



- **For the Lachlan in the last two years, diversions have exceeded the Cap. An urgent management response is required to bring diversions within the Cap limits.**

Agreed. Flow rules that explicitly address environmental issues have been adopted. The by-product of this management regime is to lower the long-term average diversion below Cap. See Attachment B.

- **For the Barwon-Darling and the Border Rivers, on the evidence available, it would be difficult to come to a conclusion that diversion was not occurring at levels in excess of 1993/94 diversions.**

Agreed. Low flow rules for the Barwon Darling, which limit access at flows up to 2500 ML/d, have been agreed and are in operation for 1998/99. Upper flow rules are required to achieve Cap. The River Management Committee is working on these rules at present.

The Border rivers cap estimate is not yet available because its derivation depends on the Queensland WAMP process as well as the IAG “equity” deliberations arising from the MOU relating to the enlargement of Pindari

Dam. It is still unclear what the Cap should be for the Border Rivers as Pindari was constructed but had not filled in 1993/94 because of drought.

- **For the Namoi and Gwydir Valleys, care will be required in future management in the light of crop plantings to ensure Cap compliance. The Peel is within the Cap.**

Agreed

- **Macquarie is Cap compliant in 1997/98.**

Agreed

- **While the provision of environmental flow rules is in accord with the principles underlying the Cap and is supported, evidence on the effectiveness of the current rules in achieving the Cap on a valley-by-valley basis has yet to be delivered. A higher priority must be given to monitoring performance in this area if the Cap and environmental flow objectives are to be achieved.**

The environmental flow rules adopted for 1998/99 address explicit environmental objectives and are not aimed explicitly at Cap management. However, further modelling work has since confirmed the effectiveness of

these rules in maintaining the average long term diversion below Cap for 1997/98 levels of development for valleys other than the Barwon-Darling. Future growth beyond 1997/98 levels of development may require further management responses.

Agreement is acknowledged in regard to the conclusion on monitoring.

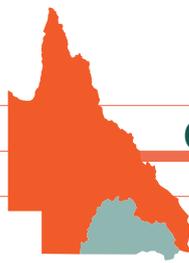
- *Again it is clear that the level of human resources available to manage this complex issue in NSW are not adequate to bring these matters to a satisfactory and early conclusion, and to achieve a time frame that will meet community expectations.*

DLWC has given a very high priority to these matters with substantial reallocation of internal resources. Recruitment action following the recent restructuring of the Department is nearing completion

NSW recognises the points made about the need for management responses to meet Cap requirements. Except for the Barwon-Darling, and for the Border Rivers where a Cap is yet to be determined, model runs with 97/98 levels of development indicate that under the present management arrangements, which include the adopted environmental flow rules, the average long-term diversion is below the average long-term Cap diversion in each valley.

NSW also recognises that further management responses may be required to meet cap requirements in the face of growth in demand. The responses will include further development of flow rules to meet explicit environmental objectives. These rules may result in reduced long-term diversions and hence contribute to Cap management. Other management interventions aimed explicitly at Cap management may also be required. These issues will be examined by River Management Committees during 1998/99.





QUEENSLAND

Following the decision made by the Murray-Darling Basin Ministerial Council on 30 June 1995 to introduce a Cap on water diversions, an immediate moratorium was introduced in Queensland. This was revised and presented to the Ministerial Council meeting on 28 June 1996, when it became obvious that establishing the final Cap arrangements across the Basin would take longer than expected.

The revised moratorium still applies, and while work on finalising the diversion Cap continues, Queensland will continue to operate under the revised moratorium arrangements. It recognises Queensland's development history and equity position. The need to address the equity issue was clearly recognised by the Ministerial Council in its original decision to introduce a Cap. At the same time Queensland acknowledged the need to ensure that actions taken under the moratorium will not exceed the diversion limits that are likely to be established on completion of the current planning processes.

Development of a Cap on water diversions in Queensland's section of the Murray-Darling Basin is proceeding based on comprehensive water allocation planning processes accepted by the Ministerial Council's Independent Audit Group.

1. Interim Capping of Diversions

The IAG has recommended that diversions by individual licence holders be capped at 1997/98 levels until the WAMPs and WMPs are completed.

The issue of managing the total volumes of water diversions in Queensland's section of the Murray Darling Basin is currently being worked through in consultation with the community within the WAMP and WMP processes.

The comprehensive water allocation planning processes are progressively providing detailed information on the estimated impacts of the current levels of development as well as the predicted impacts of various future development scenarios and/or environmental flow management strategies. Information developed as part of these planning processes is assisting landholders, water users and other people within catchments to better understand the impacts of existing and future water use practices on downstream flow regimes,

environmental outcomes and other people's access to water.

Community Reference Panels have been meeting as part of these planning processes to examine this information and provide advice to the State Government on possible management responses that might be applied in each catchment.

Over the next year, information provided by the WAMP and WMP processes will be used to finalise catchment-wide management plans that will identify appropriate basin-wide water allocation and flow management strategies to be implemented.

There is strong support from the community to continue its involvement as partners with the Queensland Government in developing effective and practical management approaches to address water allocation and/or management issues within each catchment. Introducing a regulatory approach to managing total extractions is not considered to be appropriate at this advanced stage of the highly consultative WAMP and WMP planning exercises that presently underway.

In view of the unregulated and highly variable nature of Queensland's flow regimes, the end-of-valley flow objective approach is considered by Queensland to be the only practical way in which its river systems can be managed, both from the perspective of its water users and the system's environmental needs.

The approach proposed for catchments in other states of adopting a target annual outflow has no meaning in most Queensland systems where end-of-valley flows vary considerably from year to year. It is a characteristic of Queensland's primarily variable and unregulated river systems that there will be more water diversions possible in wetter years, and reduced water diversions in drier years.

The capacity of the WAMP process to establish end-of-valley flow objectives is recognised by the IAG [on page 23 of this] report:-

As an overall comment, an overview of the draft Fitzroy WAMP suggested to the IAG that the same process applied to the Condamine-Balonne and Border Rivers would provide a sound basis for establishing water entitlements and end-of-valley flows.



Queensland therefore considers it important to develop practical and effective approaches to managing extractions in consultation with all interests within the community, and is seeking to do so through its WAMP and WMP processes. The approaches currently being developed in these processes are consistent with Queensland's agreed Cap arrangements and will be based on implementing flow event sharing in combination with overall limits on diversions that might apply in the wetter years.

Queensland continues to operate under the revised moratorium arrangements (presented to the Ministerial Council meeting on June 1996) relating to the issue of further water licences within the Murray Darling Basin.

Accordingly, Queensland does not support the interim capping of diversions by individual licence holders at this advanced stage of its planning processes.

2. Legislative Basis for WAMPs and Floodplain Management

The IAG has noted that management rules and a statutory basis for implementing the WAMPs are still required and it is expected that legislation may be introduced into the Queensland Parliament in March 1999, and recommended that this legislation include the management of floodplain harvesting.

Work is underway to establish a statutory basis for WAMPs, and legislative amendments are expected to be introduced into the Queensland Parliament within the first half of 1999.

With respect to floodplain management, these proposed legislative amendments will not include the management of floodplain waterharvesting, as this would pre-empt a number of consultative management planning exercises that are presently underway to examine and address floodplain management issues. This includes work currently underway in the Upper Condamine and Lower Balonne areas.

Also through its WAMP and WMP processes, the State Government is working with the community to examine the significance and sensitivity of floodplain management issues at the basin wide scale and the appropriate long-term management responses. These planning processes

will ultimately establish the basin-wide boundary conditions or performance targets to assist in the subsequent development of floodplain management strategies.

The information produced through the WAMP and WMP processes will highlight the importance of floodplain management issues with the community. This will establish a sound basis for Government to formulate appropriate policy responses and necessary legislative actions over the next couple of years to address the issue.

In addition to issues associated with development of storages and other infrastructure on the floodplain, these management plans focus on the sharing of floodplain flows and will be consistent with the relevant basin-wide WMP or WAMP.

It is intended that these responses will be developed in a way that recognises the Council's Community Advisory Committee's request for an approach that provides a consistent policy framework across the Murray-Darling Basin.

3. Current Progress

The IAG has noted the WAMP for the Condamine-Balonne is now not expected to be completed until June 1999 with a draft WAMP for the Border Rivers unlikely to be available until December 1999.

Earlier this year, an IQQM model for the Condamine-Balonne Basin was calibrated and presented to the community through an extensive roadshow process around the catchment. This model is being currently used to simulate and demonstrate the results of a range of future "what-if" scenarios for the catchment.

In the case of the Border Rivers, delays have been experienced in calibrating the IQQM model for the Basin. Additional resources have been allocated as a joint effort between New South Wales and Queensland with the objective of calibrating the Border Rivers Model by November 1998.

Community reference panels in the Condamine-Balonne and Border Rivers Basins have been meeting over an extensive period of time to review the methodologies and outputs associated with the WAMP process, including economic analyses, hydrologic modelling, environmental studies, social issues and a range of future development scenarios.



Consultations with representatives of Indigenous Communities from within the region have also been underway to ensure that these communities are adequately represented on the community reference panels, and that information relating to the WAMP processes is effectively communicated between the communities and the Department.

Queensland will continue to progress its water allocation planning processes as quickly as possible in a way that provides for comprehensive community consultation.

Also the IAG has noted the draft WMPs for the Warrego/Paroo/Nebine and Moonie are unlikely to be completed until June 1999.

In November 1998, the Queensland Minister for Natural Resources formally gave notice of the commencement of Water Management Plans for the Moonie and Warrego/Paroo/Nebine catchments.

Work has been underway for some time in each catchment to prepare summary overview documents for use as inputs to the planning processes.

A calibrated model for the Moonie catchment was completed some time ago, and is being reviewed and updated for its use in the development of a Water Management Plan for the catchment. Data collection and development of an IQQM model for the Warrego/Paroo/Bulloo/Nebine WMP is underway.

The development of Water Management Plans for the Moonie and Warrego/Paroo/Nebine catchments will involve consultations with communities in each catchment as well as the undertaking a range of detailed technical analyses. Draft Plans are therefore expected to take some time to develop and thus release of draft Plans for public review and comment is anticipated to occur in mid-1999.



Glossary

<i>Announced allocation</i>	The percentage of water entitlement declared available for diversion from a regulated stream in a season.
<i>Annual allocation</i>	The annual volume of water available for diversion from a regulated stream by an entitlement holder.
<i>Border Rivers</i>	The rivers and tributaries forming, or intersecting the border between NSW and Queensland.
<i>Bulk entitlement</i>	A perpetual entitlement to water granted to water authorities by the Crown of Victoria under the Water Act 1989.
<i>Carryover</i>	Unused allocation that can be used in a subsequent year.
<i>Channel Capacity</i>	The maximum rate at which water can be delivered through a river reach or an artificial channel.
<i>Climate adjusted Cap</i>	The quantity of water that would have been diverted in a given year assuming a specified level of development (eg 1993/94) and estimated from the climatic data such as temperature and rainfall observed in that year.
<i>Diversion</i>	The movement of water from a river system by means of pumping or gravity channels.
<i>Diversion licence</i>	Specified licences issued for a specified annual volume and diversion rate.
<i>Dozer allocation</i>	An allocation that is not fully utilised.
<i>End-of-valley flows</i>	The flow regime at the end of a valley.
<i>GL</i>	Gigalitre: one thousand million or 10 ⁹ litres.
<i>Gravity districts</i>	Districts which use gravity to divert the flow of water from the river.
<i>High security entitlement</i>	An entitlement which does not vary from year to year and is expected to be available in all but the worst droughts.
<i>IAG</i>	Independent Audit Group
<i>IQQM</i>	The NSW daily timestep hydrological model – Integrated Quantity Quality Model.
<i>Irrigation</i>	Supplying land or crops with water by means of streams, channels or pipes.



<i>1993/94 level of development</i>	The development that was in place in 1993/94 that influenced water use including: water supply infrastructure, water entitlements allocated and the extent of their utilisation, water allocation rules, system operating rules, the underlying level of demand for water and the system operating efficiency.
<i>Irrigation</i>	Supplying land or crops with water by means of streams, channels or pipes.
<i>MDBC</i>	Murray-Darling Basin Commission.
<i>MDBMC</i>	Murray-Darling Basin Ministerial Council.
<i>Ministerial Council, the</i>	Murray-Darling Basin Ministerial Council.
<i>Murray-Darling Basin Agreement</i>	The agreement between the Governments of the four Basin States and the Commonwealth. The current Agreement is the 1992 Agreement.
<i>Off-allocation</i>	When unregulated tributary inflows or spills are sufficient to supply irrigation needs and downstream obligations periods of off-allocation can be declared. On such occasions, water used by irrigators with on-farm storage is not counted against an irrigator's allocation
<i>On-farm storage</i>	Privately owned storages used to harvest surplus flows or to store unused allocations for use in the following season.
<i>Permanent transfer</i>	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.
<i>Private diverters</i>	Licensed to operate privately owned pumps or diversion channels; includes river pumpers and diverters as well as town water supplies.
<i>Property right</i>	In this context, the right to ownership of allocated volumes or water.
<i>Regulated streams/waterways</i>	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.
<i>Riparian</i>	Of, inhabiting or situated on the bank and floodplain of a river.



<i>Sales water</i>	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.
<i>Schedule F</i>	The schedule to the Murray-Darling Basin Agreement containing the rules for monitoring and reporting on the Cap on diversions.
<i>Sleeper allocation</i>	An allocation that does not have a history of water usage.
<i>Standard deviation of model error</i>	A measure of the accuracy of the analytical models in determining the annual diversions.
<i>Temporary transfer</i>	Water entitlements transferred on an annual basis. Unregulated streams Streams which are not controlled or regulated by releases from major storages.
<i>Water entitlement</i>	The legal right of a user to access a specified amount of water in a given period.
<i>WAMP</i>	Water Allocation and Management Planning. It is a process currently underway 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.
<i>WMP</i>	Water Management Plan. This Queensland process is similar to the WAMP although it does not involve the same complexity and detail of hydrologic modelling and environmental studies and will not result in any changes to the way existing entitlements are made.



