



Review of Cap Implementation 1996/97

*Report of the Independent
Audit Group*



AUGUST 1997

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Independent Audit Group Members

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Acknowledgments

The Independent Audit Group appreciated the tremendous support provided by officers of State and Government agencies.

There was a universal commitment to the principles of a cap and agencies, although heavily committed, provided ready cooperation including the opportunity to share views on the issues faced in implementing the cap.

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Auditors Foreword

29 August 1997

The Hon John Anderson 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 1996/97'.

States are committed to implementing the Cap (South Australia, Victoria and New South Wales) or in the case of Queensland progressing the Water Allocation and management Planning Process to define the Queensland cap.

There has been significant progress since we commenced our initial audit in July 1996. Climate adjusted caps have been or are being developed for the major regulated valleys and will be developed in 1997/98 for unregulated valleys. Management, monitoring and reporting systems are in place or under development.

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 appear to have exceeded cap targets, however, in each case changes to management systems have been proposed to, manage diversions in 1997/98 within the Cap.

The WAMP process is expected to produce draft reports for consideration by Council in June 1998. These draft reports will be accompanied by our audit report of the process and outcomes. A timetable and process has been agreed for the audit of WAMP with Queensland.

Yours Sincerely



DR WALLY COX
Chairman



PAUL BAXTER
Member

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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). 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 for implementing of the Cap'.

The MDBMC has now requested the IAG to review the performance of each State in progressing the implementation of the Cap during 1996/97.

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, is due for completion about the middle of 1998. 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.

The following report 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.

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.

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:

- 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;
- 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.

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.

3. Audit Process

For the purposes of this interim 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 1996/97 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; and
- highlight particular problems being encountered by the relevant jurisdictions as regards the finalisation or implementation of the management rules.

As a starting point for this review, the Ministerial Statements made by the respective State Ministers to the July 1997 Council meeting have been used as a 'status report'. At individual meetings arranged with senior officers from each State over the week 11-15 August 1997, comments upon these State positions were invited including further elaboration or expansion on the points raised. The IAG took the opportunity at each of these

meetings to raise a number of matters with State representatives and to seek clarification of each State's position on particular matters of possible concern. The latest statistical data from each State was also sought at these meetings.

Within the time frame available, 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 the 1996/97 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
- an average usage, equivalent to 90% of the 573 GL allocation for irrigation (this is an increase of 69 GL per year above average usage at the 1993/94 level of development).

• *1996/97 Usage*

South Australia in 1996/97 maintained its record of utilising less than the Cap in both the urban and irrigation sectors (Table 1) with 93 % of country water, 59% of the rolling five year average in Adelaide and 83% of irrigation water.

• *Administration of the Cap*

South Australia is well placed to manage the Cap. In the urban sector water diverted from the Murray River is reliably measured and licences are to be issued to SA Water for an allocation of 50 GL per year for country water and a non-tradeable 650 GL over a rolling five-year period for Adelaide. The licences are for five years. SA Water is interested in a review of the trading restriction at the end of the five-year period.

The irrigation scene is more complex. To assess properly whether irrigation diversions in 1996/97 exceeded the Cap requires the development of climate adjusted Cap relationships. These relationships have not yet been developed although initial analysis conducted for the IAG suggest that irrigation diversions in 1996/97 were well below the agreed Cap.

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 consumption. As a consequence diversion estimates probably exceed real diversion and further build in conservatism in terms of meeting Cap targets.

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.

South Australia supports the Water Audit Working Group reporting framework but suggests that consumption for Adelaide should be reported on a rolling five-year total basis to enable comparison against the 650 GL per 5-year Cap target.

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 similar approach is also desirable for the irrigation component of the Cap.

• *Proposals to refine implementation in 1997/98*

South Australia proposes to introduce 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.

A climate adjusted model for Adelaide water consumption is under consideration.

Table 1 — South Australian Diversions for 1996/97

	<i>Entitlement</i>	<i>Use</i>	<i>% Use of entitlement</i>
Adelaide			
— current year		53 869	
— rolling 5 years	650 000	380 298	59%
Country Towns	50 000	46 588	93%
Irrigation (includes Private Industrial and Stock and Domestic)	572 839	477 706	83%
Total		578 163	

• ***IAG Assessment***

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

Consumption in 1996/97 was within the Cap in both urban and irrigation areas.

In terms of urban water use licences which will restrict trading in Adelaide allocations in the initial 5-year period are expected to be allocated shortly to SA Water.

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. The IAG suggests that

this work be extended to include climate-adjusted models for Adelaide and irrigation consumption to provide early trends on consumption changes.

CONCLUSIONS/RECOMMENDATIONS

- Diversion in 1996/97 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 IAG supports the development of climate adjusted models for Adelaide and for irrigation consumption.

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 System	2094 GL per year
Murray System	1621 GL per year

These figures will be refined when the modelling is completed.

The Cap figures above include all water diverted at river off-takes less irrigation returns. By contrast the diversion figures for the Goulburn-Murray Irrigation District (GMID) below are the on-farm delivery figures exclusive of system losses.

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 1997.

• *1996/97 Diversions*

For the Goulburn and Murray Gravity Irrigation Districts which account for more than 80% of Victoria's water use, the on-farm water deliveries in 1996/97 were 2,511,917 ML which was the third highest on record after 1994/95 with 2,706,571 ML and 1990/91 with 2,566,060. Victoria advise that this resulted from a wet winter followed by a very dry late spring, summer and autumn. An analysis by Victorian officials indicated that the GMID water use in the November to April period was the highest on record, with 2,251,005 ML delivered compared to the next highest of 2,153,329 in 1990/91. While no climate-adjusted Cap is available the above analysis suggests that water consumption in 1996/97 could have increased compared to equivalent prior dry periods and that the Cap could have been exceeded. Management measures have been proposed for 1997/98 to manage any growth in consumption.

The preliminary estimate for overall Victorian diversions in 1996/97 is 4130 GL which would be the fifth highest diversion in the last fourteen years. There is no whole of state Cap available to enable a comparison to be made.

• *Administrative Arrangements*

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. 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) — Consultation has been in progress for 18 months and is expected to be complete at the end of 1997. Bulk entitlements will not be granted until River Murray flow management issues are resolved by the MDBC (scheduled June 1998).

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

Ovens River — Scheduled to be completed in 1998.

Broken Basin — Scheduled to be completed in 1998.

Campaspe Basin — Consultation has been in progress for 18 months and is expected to be complete at the end of 1997.

Loddon Basin — Scheduled to be completed in 1998.

Wimmera-Mallee System — Scheduled to be completed in 1998.

While the final arrangements to manage the Cap will not be complete until 1998 when all bulk entitlements are granted, Victoria is proceeding to implement the Murray-Darling Basin Cap by adjusting irrigation sales allocations and trading rules.

• *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 use records and to report annually on compliance with the Bulk Entitlement. A Resource Manager for each river valley reports annually on water 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.

It is the view of Victoria and supported by the IAG that reporting should be on a valley by valley basis as well as against the total state Cap.

- **Proposals to Refine Implementation in 1997/98**

In response to use in 1996/97, changes have been introduced for 1997/98 including:

- reduced allocation as the water resource is constrained
- a ban on temporary trading of above 30% sales entitlement in the gravity irrigation districts
- no access to sales entitlement above 30% by any individual if any of their water entitlement is temporarily traded
- maximum usage under off-quota allocation is to be limited to 30% of water right or licence volume for any individual
- off-quota for the Murray system will only be made available when surplus flow is declared in the Hume to Yarrawonga reach of the River Murray.

It is expected that these measures will prevent further growth and reduce diversions observed in 1996/97. It is recognised further refinement in management may be required in future years to reduce consumption below the final Cap particularly as sleeper and dozer licences are activated or traded. There is a clear commitment to introduce the necessary changes.

The process to establish bulk entitlements involves extensive public consultation, the establishment of hydrologic models and understanding of environmental flows. Where diversion use is in excess of the Cap, adaptive management is proposed to ensure Cap compliance.

Despite the considerable progress, it is not possible at this time to compare 1996/97 usage with a climate adjusted Cap target. Climate adjusted models for the main valleys still need to be finalised and agreed upon. In particular the growth adjustments to elevate the 1990/91 models to 1993/94 levels of development need to be validated to ensure there is agreement on the Victorian Cap targets. These models are expected to be in place by December 1997.

To ensure confidence in the models it is also suggested that a system of accreditation be established to ensure quality assurance. It is suggested that the Murray-Darling Water Audit Working Group become the custodian for accreditation and quality assurance for models and the monitoring and reporting process. Funds will need to be made available for the Water Audit Working Group to seek independent advice if required.

- ***IAG assessment***

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

Since 1990/91 Victoria has undertaken substantial water reform. This includes the allocation of Bulk Entitlements for water management authorities. These Bulk Entitlements will include a requirement to comply with Cap conditions.

1996/97 diversions from the Murray-Goulburn system could have exceeded the Cap. There is, however, a clear commitment to introduce necessary management changes to reduce diversions in 1997/98 and future years to ensure Cap compliance.

Following the July 1997 Ministerial decision to operate to a final Cap from 1 July, there is action required in the following areas:

- finalise models for each of the major regulated valleys to enable end of year comparisons between consumption and the climate adjusted Cap
- finalise the Bulk Entitlement process including management rules to ensure Cap compliance
- establish systems for monitoring, recording use on non-regulated rivers & establishing Caps for non-regulated rivers
- establish with the MDBC a quality assured process for monitoring, reporting utilisation against the Cap and accredit Cap models. It is the view of the IAG that by the end of 1997/98, and for the majority of water use, Victoria will have the systems in place to enable usage to be reliably monitored, for valid comparisons to be made with the climate adjusted Cap for that particular year, and for the ability to be able to adjust the management rules to ensure Cap compliance.

The main area of risk in the view of the IAG is the activation/trading of sleepers and dozers in the gravity areas. This is a real risk, recognised by Victoria, which could result in potentially significant increases in consumption. Management tools are, however, available to minimise the impact of this on total consumption as it becomes evident. Options under consideration include reducing sales and reduced base allocations.

CONCLUSIONS/RECOMMENDATIONS

Farm water deliveries in 1996/97 from the Murray-Goulburn system could have exceeded the Cap.

Victoria is committed to the introduction of management changes to ensure Cap compliance. Victoria has a reliable monitoring and reporting system in place for regulated valleys.

Substantial work has been done on developing climate adjusted models for the major valleys and the IAG has been advised that these will be finalised in 1997/98.

NEW SOUTH WALES

- **The Cap**

NSW has prepared preliminary estimates of the Cap based on simple climate adjusted diversion relationships for the Murray, Murrumbidgee, Lachlan and Macquarie. These valleys represent about 80% of the total Murray-Darling Basin water use in NSW.

For the more northerly regulated valleys (Namoi, Gwydir and Border Rivers) the high use of on-farm storage requires more sophisticated modelling which has yet to be completed. Thus it has not been possible to produce a Cap assessment tool for these valleys as yet. It is expected that model development will take up to a further 12 months to meet this objective.

Table 2 provides a summary of the current auditing tools available in NSW to both define the Cap and to measure performance against the Cap. These interim tools will ultimately be replaced by hydrologic models for each of the valleys.

- **1996/97 Usage**

1996/97 usage results can only be presented in terms of the actual diversions recorded for the year measured against the interim assessment models. Because of the incomplete nature of these models and the lack of diversion data for unregulated rivers, it will be necessary to rely upon a broader 'indicator' approach in assessing whether the Cap has been met.

For those lower valleys for which some form of climate adjusted model exists, the preliminary results suggest that with the possible exception of the Murrumbidgee

(excluding Lowbidgee) and the Lachlan, the 1996/97 diversions fall within the Cap. For the Murrumbidgee, diversions exceeded the confidence limits provided by the interim climate adjusted model. This outcome is believed to have been influenced by a decision taken to allow unlimited off allocation during the year in response to the flooding of the Murray. For the Lachlan, the indicators are that usage may have been at the outer edge of the Cap range but this may have reflected exceptional climatic circumstances in the year. Thus, while there is some basis for concern about 1996/97 diversions on the Lachlan, the partial indicators are inconclusive but suggestive of the need to take corrective action.

For the northern regulated valleys an indicator approach has been used for the Namoi and Gwydir valleys. These indicators include planted areas and on-farm storage data. When considered in the context of changes in environmental flow rules which have now taken effect it appears that the Cap has been met on these rivers in 1996/97.

For the Border Rivers and the Barwon-Darling, without an adequate model, it is not possible to determine whether the Cap has been met. A preliminary model for Border Rivers is expected to be available by the end of the 1996/97 water year in October. Finalisation of the Barwon Darling will take at least until the end of 1997.

- **Administration of the Cap**

For NSW, administration of the Cap occurs on a valley by valley basis. As noted above, individual valley models reflecting 1993/94 levels of development and climate adjusted usage patterns will be developed and ultimately

Table 2 — NSW Interim Auditing Tools

Valley	Current climate Diversion	Comment
Murray	Simple Climate Diversion Relationship	MDBC Developing Model available 6 months
Murrumbidgee	Simple Climate Diversion Relationship	Daily Model Available in 1 Year
Lachlan	Simple Climate Diversion Relationship	Daily Model refined in 6 Months
Macquarie	IQQM Model	
Namoi	Simple Climate Diversion Relationship	Daily Model available in 1 Year
Gwydir	None at Present	Daily Model available in 3 Months
Border Rivers	None at Present	Daily Model available in 3 Months
Barwon Darling	None at Present	Daily Model available in 6 Months

used as they become available. It is intended that the simple climate diversion relationship models currently in use for the major areas of water diversion will be replaced by hydrologic models that take into account factors such as inflow and periods of restricted supply. However the development of these hydrologic models will take 12 months to complete.

For regulated rivers, NSW has undertaken a number of steps to reduce the gap between the quantity of water allocated to users and the actual usage. These measures include:

- removing all allowances in allocation announcements for probable underuse by sleepers and dozers;
- allocation announcements in the Murray, Murrumbidgee and Lachlan are no longer permitted to exceed 100% in normal seasons;
- with the exception of the Gwydir, limits are applied to off-allocation diversions;
- on the Gwydir, users are restricted to no more than 50% of the off-allocation water available;
- high security licence holders no longer have access to off-allocation water and carryover;
- no retrospective announcements of off-allocation will be made; the access to 'borrow' from subsequent years' supply has been reduced;
- no waiving of borrows on dam spill; and
- gradual introduction of carryover to reduce late season 'use it or lose it' diversions

These measures have been implemented following a lengthy and ongoing process of discussions with irrigators and stakeholders in the relevant valleys. Effectively they are seeking to reduce the gap between water availability for diversion and actual usage whilst minimising impacts on existing usage patterns.

Data on usage on 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. It is therefore anticipated that major reforms in both the monitoring and management of use on these rivers will be necessary. Existing embargoes on applications for new entitlements are being maintained and an embargo will also be placed on applications for 10-hectare small entitlements. Applications which predate the embargo but have not yet been dealt with will be refused for all types of licence. Sleepers and dozers will be allowed to remain but, to remove the possibility of speculative retention of such licences, trade will be prevented in these licences if and when a water transfer market is established.

For unregulated rivers the existing control via limits on pump size and area will progressively be replaced by volumetric limits. Meter installation will be part of this process.

The implementation of the Cap by reducing the level of diversions and controlling growth within a modelled climate adjusted environment is one form of action being undertaken by the NSW authorities. The NSW Government, in consultation with valley stakeholder groups, has also foreshadowed the adoption of environmental flow rules which would effectively ensure greater volumes of water being allocated to environmental use. It is proposed that this policy will be introduced on a valley by valley basis, with particular attention being given to regulated rivers and stressed unregulated rivers, including the Barwon Darling. Environmental flow rules are already in place for the regulated sections of the Macquarie and Gwydir valleys and these are estimated to result in average water usage levels at about 10% to 12% below 1993/94 development levels. It is also proposed that reductions in use up to 10% will occur in the Namoi, Lachlan, Murrumbidgee and Barwon/Darling rivers as a result of application of new environment flow provisions starting in 1998/99 water year.

In all regulated valleys other than the Macquarie, these initial rules will be reviewed by local committees who may make recommendations to Government to vary the rules for 1998/99 or subsequent seasons. Over the next five years no variation will be allowed that will result in a reduction of more than 10 percent of the water that would have been diverted under 1993/94 levels of development.

• **Monitoring and Reporting**

The monitoring of current 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 are expected to be completed at least in their interim form in the next 6 to 12 months.

For unregulated rivers, the process of introducing metering on pump off-takes will continue over time and is likely to be introduced on a Pareto basis (the initial 20 percent of the effort produces 80 percent of the results), with larger users being the first required to install metering.

Processes are still being formalised for the collection and verification of individual diversion data. It is apparent that the present systems require some further quality control if

data are to be available speedily at the end of the water year and to be of sufficient reliability to allow aggregation and use in the valley models. This issue needs to be addressed by NSW officials but the IAG does not feel that it will be a significant problem in future years.

The issue of quality assurance as regards both the data input and the veracity of the valley models being used is a matter of concern for NSW as it is for the IAG. NSW recognises that it is both incumbent on that State to ensure that there is general acceptance of the models used in NSW, and in NSW's own interest to ensure that the models and monitoring arrangements adopted in other States are also quality tested. Accordingly NSW expressed support for a concept whereby a quality audit of the models used by each of the States could be undertaken through the Water Audit Working Group of the MDBC. This quality audit would primarily focus upon the technical veracity of the models used both to establish the climate adjusted Cap (where required) and the measurement of performance against that Cap.

The IAG recognises that reliance upon models for purposes of setting the Cap in quantitative terms and performance measurement against the Cap can potentially lead to debate over the reliability of those models and the need for updating of the models as better data becomes available. The Water Audit Working Group could provide an appropriate technical body for accreditation and resolution of technical matters.

• ***Proposals to refine implementation in 1997/98***

The measures undertaken by NSW to date have primarily been to reduce the opportunity for growth in diversions by reducing the access to off-allocation water and reducing the gap between announced allocations and the water actually diverted. On the Macquarie, the Macquarie Marshes Plan provides a substantial share of the available supply directly to the wetlands and restricts off-allocation use. It thus effectively restricts average diversions on the river and it is expected that, even with increased development, diversions in this river will continue to be within the Cap. The embargo on the issuing of new entitlements for diversions on all streams will continue and no new irrigation entitlements will be issued. Any growth in town water requirements will be offset by reduced access for other users. New industrial developments requiring water in towns will be required to purchase entitlements from existing entitlement holders.

The combination of the restrictions on allocation supply availability and off-allocation use are expected to contain the potential for growth in demand in 1997/98, and that

this will be substantially strengthened by new environment rules in 1998/99. These actions should control use of the Murrumbidgee and the Lachlan where, based upon the interim auditing tools currently in place, it may be argued that the Cap was exceeded in 1996/97.

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 of usage which of itself is incomplete. The IAG has sympathy for this argument but is equally concerned that in this interim period, while more reliable hydrologic models of the Cap and usage are being developed, that the relevant States do not fail to exercise caution when the existing interim estimates of permissible Cap usage suggest that the Cap may have been exceeded. 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 any indication of usage above the Cap levels be taken as a warning that further tightening is required in the next year rather than waiting for several years for more accurate data and models and before corrective action is taken.

It is the IAG's assessment that NSW recognises its possible problem areas in diversions in 1996/97. Although the current indicators of performance in 1996/97 are imperfect, corrective action has been taken and this could be augmented by the application of environmental river flow rules.

• ***IAG Assessment***

The IAG is of the view that the NSW Government is committed to the Cap and over the last 12 months has made considerable progress in implementing it. This is reflected both in the action taken to consult with stakeholders at all levels to discuss and explain the purpose of the Cap and its implementation, and the direct action taken by the NSW authorities to reduce the previous high levels of water allocation. The introduction of environmental river flow rules will further underpin the NSW commitment to the Cap and the likelihood that the Cap will be met.

Given the number of valley systems involved, substantial progress has been made in NSW in developing the tools that will be required to define and monitor performance against the Cap. However, the IAG recognises that the present models and monitoring systems are only interim and in some instances have yet to be determined. Work will continue during 1997/98 on the development of interim models for the remainder of the valleys. However, this can not be taken as the final outcome. Further work will be required to devise more reliable hydrologic models which can be used both for Cap determination and performance monitoring.

The difficulty faced by NSW is one of access to resources and the need to maintain a focussed program of activity directed towards better matching water availability to actual use and determining environmental river flows while at the same time developing the tools necessary to monitor outcomes. The IAG acknowledges the desire by NSW authorities not to be distracted from the 'doing' tasks if this is the trade-off required to complete more sophisticated models for monitoring purposes. However, the IAG must also respect the desire of other States, (and presumably those of stakeholders in NSW), to have some assurance as to what is the Cap in that State and how effective the present control measures are in achieving this Cap.

Thus, the IAG is of the view that the NSW Government will need to give further attention to the resource needs of its water management group, and seek to augment these resources at least over the next two to three years while progress is made both in implementing the Cap and in setting up procedures to monitor performance.

The IAG notes the continual need for some form of measurement of diversions on unregulated streams and the need for an estimate of what constitutes the Cap on these streams. A commitment is in place to address this outstanding issue by mid 1998, and given the relatively small level of diversions, estimated at less than 5%, that are involved, the IAG is prepared to accept this as a satisfactory outcome at this time.

The IAG also notes that NSW, despite a slightly different public presentation, has linked any further growth in water allocation for urban areas to population growth. Urban areas will not be required to buy entitlements from existing users to meet population demand. However the State Government will reduce usage elsewhere to avoid any overall increase in diversions. Water needed for new industrial development will need to be purchased. This action brings NSW broadly into line with the intentions of the IAG recommendations on urban water allocations and with the practice adopted in Victoria.

The major outstanding issue for the IAG concerns progress with setting the Cap and future diversions for the cross border rivers with Queensland.

The IAG is of the view that the existence of the NSW/Queensland State border and the different policy objectives and processes being adopted by the two relevant governments should not obscure the fact that the rivers which cross the border are effectively part of one valley and the management policies adopted for these rivers ultimately impact on the Murray-Darling system for its total progress to the sea. Thus, there will need to be a willingness by both the Queensland and NSW Governments to give consideration to the wider outcomes from their future use and management decisions for these rivers. The WAMP process being undertaken and environmental flow rules being implemented in Queensland and NSW respectively cannot be carried out in isolation when applied to these river systems.

The IAG is therefore of the view that if a satisfactory compromise on issues of principle in relation to the future flow management rules cannot be achieved between the governments concerned by the end of November then the MDBC should facilitate resolution consistent with its broader Basin responsibilities.

CONCLUSIONS/RECOMMENDATIONS

- NSW is committed to full implementation of the Cap.
- The pursuit of river flow objectives to achieve environmental outcomes will ensure diversions below the Cap.
- Climate adjusted Caps have been established for a number of valleys and will be replaced by models for all valleys.
- 1996/97 consumption on the Murrumbidgee and Lachlan appeared to exceed the Cap. On other valleys, diversions are within Cap limits.
- Management regimes are in place to ensure Cap compliance.
- Monitoring and reporting methods need to be improved to ensure auditing of compliance.

QUEENSLAND

- **The Cap**

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 process (WAMP).

- **1996/97 Usage**

Provisional diversion information for 1996/97 is summarised in Table 3 above.

The 1996/97 diversions of 420 GL compares with 520 GL in 1995/96, 176 GL in 1994/95 and 336 GL in 1993/94. The Cap in Queensland will be defined as end-of valley flow objectives. Currently it is not possible to compare end-of-valley flows in 1996/97 against those objectives as they are still to be established. It can be noted however that diversions in 1996/97 were only 10 percent of the recorded flow.

- **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**

Queensland has committed to produce Water Allocation and Management Plans and Water Management Plans for the majority of Queensland Basin Rivers by June 1998. The exception is for the Border Rivers where the expected final plans are due to be completed by August 1998. Progress has been slower than was originally intended because Queensland has given priority to resourcing the WAMP in the Fitzroy River Basin. The WAMP process is currently underway for the Condamine/Balonne and Borders Rivers and the statutory but less complex Water Management Plans (WMP) have already commenced, or will shortly commence for the Warrego/Paroo and Moonie catchments.

In the case of the Condamine/Balonne, a Community Reference Panel and a technical Advisory Panel have been formed and have each met several times. Progress has been slower than hoped due to the time taken to develop the hydrologic model, which is much more comprehensive than previous models. The development of a calibrated daily time-step IQQM hydrologic model is due for completion by the end of September 1997. A meeting with Community Reference Panel members will be held in October 1997 to explain the assumptions, structure, and capability of the model. The Technical Advisory Panel (TAP) has proposed environmental flow strategies for assessment of the hydrologic impacts in the model. These strategies have

Table 3: 1996/97 Queensland Basin Diversions

Diversion Category	1996/97
Irrigation Area channels	49 620
Private Diversions	43 526
Water Harvesting	297 038
Unregulated Stream Licenses	20 610
Urban And Industrial	8981
Total	419 775

necessitated further development of the IQQM software to enable their adequate representation in the model. This further development (the 'E-mode') is now underway with New South Wales DLWC and is planned for completion by the end of October 1997. The overall progress is dependent on completion of this further model development. Initial modelling of the environmental flow strategies is planned to be undertaken in November and December 1997 and following further TAP input in January 1998 the Options and Impacts Report will be drafted in February 1998 for discussion and consideration by the community Reference Panel.

In the case of the Border Rivers a Community Reference Panel and a Technical Advisory Panel have been formed and have each met several times. The development of the calibrated daily time-step IQQM model is being conducted by the New South Wales Department of Land and water Conservation and is expected to be completed by the end of September 1997. The progress to develop the Options and Impacts report mirrors that described above for the Condamine-Balonne, except that it is expected to be some one to two months later.

There is an issue in the joint development of the Border Rivers process and in dealing with the downstream considerations of all the planning processes, with NSW and Queensland having some different water management policy directions. The IAG was advised that NSW and Queensland agencies have agreed to establish a joint policy coordination forum to address areas of policy differences. It is understood that this will proceed in September 1997 in the expectation that NSW's current development of the Water Reform Package will have been resolved by then.

The Border Rivers Commission provides a statutory framework to address formally policy differences as they relate to water sharing between the two States. But in the event that differences over the Border Rivers cannot be resolved, there may be a role for the MDBC to facilitate resolution consistent with its broader Basin responsibilities.

It is the view of the IAG that Queensland is committed to having draft plans for end-of-valley river flow objectives for the Queensland Rivers in the Basin available for Council consideration by mid 1998.

- **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 understands that while the current legislative framework is adequate, changes are required to assign a property right system as a basis for introducing a full trading environment and to manage diversions on floodplains. The IAG feel that the current system for controlling floodplain diversions through licensing works in designated areas is, by itself, not sufficient.

- **Monitoring and Reporting**

While metering is prevalent on regulated rivers, metering is not universal on non-regulated rivers. Queensland's estimated diversion of 420 GL in 1996/97 is estimated to have a (12-15% confidence limit. This is expected to improve following the completion of the WAMP and WMP processes with a requirement for metering all significant diversions.

Floodplain harvesting remains a concern as it has been estimated to constitute about 10 percent of the total Queensland diversion and it is currently not metered or licensed. Queensland proposes to raise this issue with the community at a suitable time after the completion of the WAMP process.

The Department of Natural Resources is expected to be the accountable authority in Queensland to report on Cap performance. It is suggested that a Quality Assured system be introduced and that Queensland negotiate with the Commission an appropriate reporting framework to report flow achievements against objectives and compliance with management rules to achieve these objectives.

- **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 WMP for the Moonie, Warrego and Paroo rivers.

The IAG 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 4.

Table 4 — Preferred Audit Process for WAMP/WMP

WAMP	Audit Criteria
Technical Advisory Panel Report	Quality of expertise, range of environmental indicators used
River Modelling	Validity of model
Options and Impacts Report	Is the full range of options 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?
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?

The proposed audit process also incorporates a site familiarisation visit to coincide with one of the Community Reference Panel meetings. The audits will be conducted at key stages of the process in a schedule to be agreed with Queensland. A similar process is proposed for the Water Management Plans.

It is the IAG's understanding, confirmed by Queensland, that the final draft plans together with the audit report(s), will be submitted to Council by June 1998.

CONCLUSIONS/RECOMMENDATIONS

The IAG is encouraged by the Queensland commitment, although resource constrained, to the WAMP and WMP process for the Queensland Basin rivers. Timelines provided by Queensland indicate completion of the plans by June 1998 with the exception of the Border Rivers (August 1998).

An Audit methodology of WAMP and WMP processes is proposed that would progressively audit key process outputs and the final plans, with the objective of having draft plans and the audit report available for Council consideration in June 1998.

A key issue that needs to be addressed is the resolution of the philosophical differences between Queensland and New South Wales about environmental objectives for the Border Rivers. Failing resolution by end of November the MDBC should facilitate resolution.

The IAG also considers that a reporting framework to monitor annual performance against Cap end-of-valley river flows, needs to be negotiated with the MDBC.

5. Diversions from the Murray-Darling Basin in 1996/97

A total of 11800 GL was diverted from the Murray-Darling Basin in 1996/97. From Figure 1 it can be seen that this is the third highest diversion on record after 1991/92 and 1990/91. This reflects high availability of water and extended dry periods during summer and autumn. However, diversion totals for New South Wales are not available for 1993/94 and 1995/96.

Of the total water usage in 1996/97, New South Wales diverted 56%, Victoria 35%, South Australia 5%, Queensland 4% and the Australian Capital Territory 0.5%. Diversions from the individual valleys are presented in Table 5.

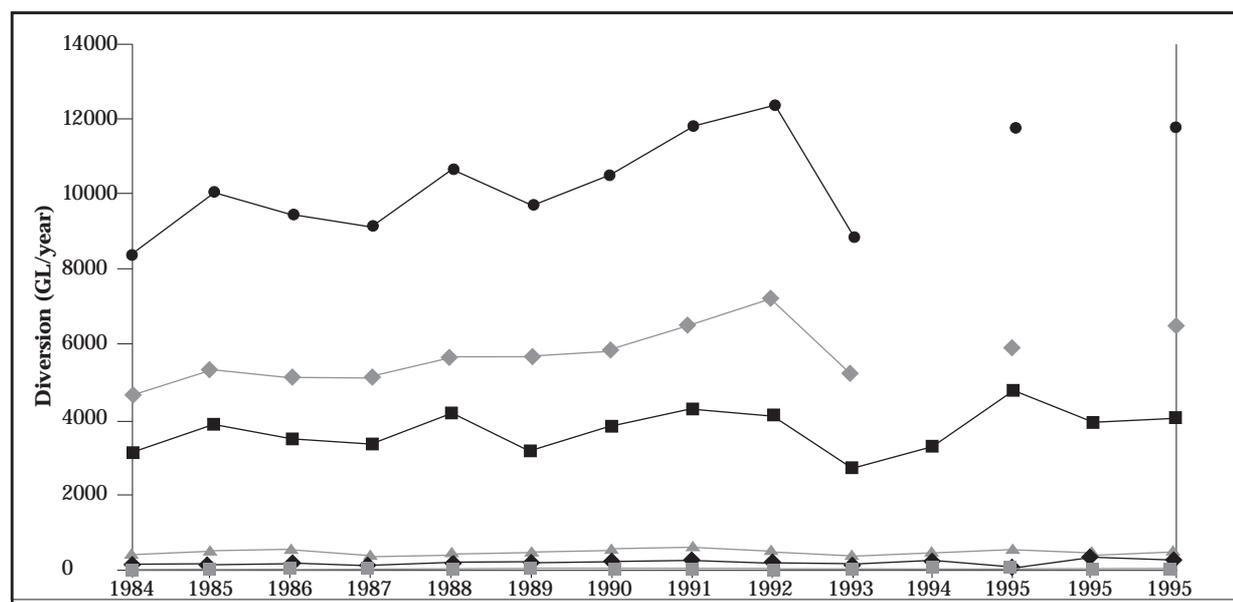
In many northern streams the water year runs from October to September and, of necessity, the data for these streams is incomplete for 1996/97. However diversions in these streams from July to September are typically low. Data for some other streams is also not available at this time and therefore the diversions in the 1996/97 water Cap monitoring report will differ slightly from those in Table 5.

Table 5 — Murray-Darling Diversions in 1996/97

System	Total Diversion (GL)	Percentage of Basin Diversion %
New South Wales		
Border Rivers	140	
Gwydir	395	
Namoi	154	
Macquarie	348	
Peel	6	
Barwon/Darling	210	
Lachlan	436	
Murrumbidgee	2646	
Murray/Lower Darling	2260	
Total NSW	6595	56.0%
Victoria		
Kiewa	12	
Ovens	27	
Broken	25	
Goulburn	1848	
Campaspe	123	
Loddon	170	
Wimmera/Mallee	175	
Murray	1751	
Total Victoria	4130	35.0%
South Australia	578	4.9%
Queensland	420	3.6%
Australian Capital Territory	62	0.5%
Total Basin	11785	100.0%

◆ New South Wales
 ■ Victoria
 ▲ South Australia
 ◆ Queensland
 ■ Australian Capital Territory
 ● Total Basin

Figure 1: Murray-Darling Basin Diversions



6. Monitoring, Auditing and Reporting

Recommendations 18, 19, 20 and 21, in the IAG Report deal with issues associated with the establishment of appropriate monitoring performance assessment and communications.

The following comments are made with regard to progress on these recommendations:

Recommendation 18 : the draft format that has been developed for the Water Audit Monitoring Report be implemented and reports considered annually by the MDBC

Council, at their July meeting, agreed the format for future detailed reports. The IAG has reviewed the format and supports it. Discussions with each State indicated that processes are in train to provide the necessary quality assured data to complete the monitoring reports. It is important that these assessments be established so there is certainty and confidence associated with the published data. The IAG supports the activities underway but would be disappointed if final reports for the 1994/95 through 1996/97 water years were not available by the first quarter of 1998.

In the case of Queensland at the end of the WAMP process the Cap will be defined as end of valley flows and it is recommended that a reporting format be negotiated between Queensland and the MDBC that enables performance to be compared with Cap targets.

Recommendation 19 : a body be identified in each State which has clear responsibility for collating water audit information.

The body in each State with the responsibility for this matter is:

South Australia :	The Department of Environment and Natural Resources
Victoria :	The Department of Natural Resources and Environment
New South Wales:	The Department of Land and Water Conservation
Queensland:	The Department of Natural Resources

Recommendation 20 : information on performance against the Cap be made widely available.

There is little published information on compliance with the Cap. This report is the first comprehensive report to be prepared. In discussions with States, it is clear that information is being regularly provided to community groups on this matter. However, formal reporting arrangements need to be clearly established. The IAG strongly recommends that such arrangements be developed within each jurisdiction and that audited compliance reports be published within four (4) months of the end of the water year.

Recommendation 21 : all States allocate enough resources to satisfy their monitoring responsibilities.

Each State is clearly trying to progress implementation of the Cap, but assessment techniques and the development of the necessary models have been found to be more complex and have demanded significant resources. In South

Australia there appears to be adequate resources being put to this issue. In Victoria the resources appear adequate, although increased effort is needed to complete all the models and assessment routines. In NSW, given they have the largest number of valleys with different climatic conditions, further resources will be necessary to monitor and assess performance adequately. The IAG understands that the necessary resources have been identified as part of the NSW Water Reform package. In Queensland resources being put to the WAMP process for Basin rivers are constrained and as the process deals with complex issues, some slippage can be expected. Every effort should be made to bring the draft plans to Council for the June 1998 meeting.

To assist in future audits the IAG has suggested that the monitoring assessment and reporting environment should have the following characteristics. The primary responsibility to implement the Cap with all of the necessary monitoring assessment and reporting rests with the States. The role of the Commission and Council is to ensure that a fully transparent and auditable process is in place. This is to establish confidence between Governments and water users that the Cap is working.

Monitoring

- All significant diversions should be metered.
- Collection, review and storage of monitoring data should have appropriate quality assurance processes.

Assessment

- Appropriate assessment systems (models — regression analysis etc) must be established for each valley
- Accreditation of the models should occur with the Murray-Darling Basin Commission Water Audit Working Group acting as the custodian. A budget should be provided for independent advice
- An agreed process within each State should be established to 'sign-off' any amendments to the management or administrative arrangements which affect water use. These include changes to the seasonal allocation, off-allocation, licensing, environmental flow issues on streams

Reporting

- Reports should be prepared on a valley by valley basis and aggregated by State
- This information should be provided to the Commission for aggregation into a Basin report as agreed by Council
- Each State should publish an annual report within four (4) months of the completion of the water year (see recommendation 20 above)

The IAG recommends that the Commission develop performance indicators against each of these characteristics to assist future audits of the Cap.

7. Conclusions

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.

Commitment

There is a high level of commitment to Cap implementation (South Australia, Victoria and New South Wales) and to completion of the Water Allocation and Management Planning process to define the Cap in Queensland.

This is demonstrated by the considerable progress in each State to quantify the Cap on a valley basis and to put in place management systems to achieve Cap implementation.

Further work is required to identify climate adjusted Caps in NSW, Victoria and South Australia and to develop tools to ensure Cap compliance.

Resourcing the Process

The process of Cap implementation is complex and resource constraints are affecting the rate of implementation in NSW and finalisation of the WAMP process in Queensland. It is the view of the IAG that the necessary resources need to be provided in NSW and Queensland to achieve full Cap implementation by June 1998.

1996/97 Evaluation

Data for 1996/97 indicates that diversion in South Australia was below the Cap. In the case of Victoria diversion in the Murray-Goulburn system could have exceeded diversion expected under the Cap. In New South Wales diversion in the majority of valleys was within the Cap confidence limits. Usage on the Murrumbidgee exceeded the Cap and a similar trend was evident on the Lachlan.

In relation to Queensland, it is difficult to make meaningful comment as there is currently no cap target in Queensland against which to compare diversions. However, Queensland is still working towards and using the management systems committed to under the interim Cap targets. Queensland has provided a detailed report to Ministerial Council and the IAG on compliance with implementing the interim Cap arrangements.

South Australia has clearly defined Cap limits and has a reliable system of monitoring performance. Victoria has established Caps based on long term average diversions associated with the 1993/94 level of

development and is developing climate-adjusted Caps for each of the major regulated valleys to enable year by year monitoring of performance. Caps for unregulated rivers are still under development.

New South Wales has developed simple climate adjusted Cap models for the Murrumbidgee, Lachlan, Murray and Namoi and will develop more sophisticated models in 1997/98 for all major regulated valleys. Caps for unregulated rivers are still under development but are expected to be completed in 1997/98.

Proposals to Refine Implementation in 1997/98

South Australia is finalising licences for SA Water to cover the Cap allocations of 650 GL over 5 years for Adelaide and 50 GL per year for country towns.

Victoria, in response to possible growth in usage on the Goulburn-Murray has introduced measures to limit growth by reducing allocations and constraining trading rules. There is a commitment to further changes to ensure Cap compliance.

In New South Wales, Cap models will be refined in 1997/98 and management rules are under review to ensure Cap compliance in all valleys. Proposals are being considered to improve river flow conditions which would almost certainly reduce diversions below the Cap.

Water Allocation and Management Planning Process update and Audit

The WAMP process is underway for the Border Rivers and the Condamine/Balonne and the less complex Water Management Planning process is proceeding for the Moonie, Paroo and Warrego rivers.

These plans are expected to be finalised by June 1998 with the exception of the Border Rivers which has an August 1998 deadline. There are tensions between NSW and Queensland over environmental allocations which need to be resolved and it is recommended that the MDABC should facilitate resolution if the issue is unresolved by November.

The IAG was advised that modelling was nearing completion and that Technical Advisory Panels and Community Reference Groups had been established.

An Audit process to meet Council's requirement for a progressive audit of the WAMP process and outcomes has been agreed between the IAG and Queensland and should result in draft plans being submitted, along with the audit report, to Council in June 1998.

7. Attachments — 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 & 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 109 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>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. 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.
<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>sleeper allocation</i>	An allocation that does not have a history of water usage.
<i>temporary transfer</i>	Water entitlements transferred on an annual basis.
<i>unregulated streams</i>	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.

7. Attachments — Ministerial Presentations

IMPLEMENTATION OF THE CAP IN SOUTH AUSTRALIA

The Cap is now effectively implemented in South Australia.

As a result of the Capping initiative, South Australia now only allocates 40% of its minimum drought flow for consumptive use. The remaining 60% is left in-stream to maintain river health. Because South Australia's bulk consumptive water allocation is fixed, any flows received in excess of its entitlement flow also remain in-stream to maximise their environmental benefit. In addition, South Australia no longer declares periods of so called 'Surplus Flows'. This policy of not exploiting medium to high flows for consumptive use is considered a critical factor in maintaining river and floodplain health.

SA Water's urban offtakes are the only diversions from the River Murray in South Australia still to be formally licensed with a volumetric allocation. Under the Capping process this has been addressed and two separate licences will be issued to SA Water - one for diversions to Adelaide (650GL as a total over every 5 years, nominally 130GL per annum) and one for the 'country towns' diversions (50GL per annum). This separation is necessary because Adelaide's allocation, at least for the interim, will not be tradeable whereas the 50GL for the country towns will be fully tradeable.

Final negotiations on these allocations have been completed and appropriate licences will be issued under South Australia's Water Resources Act 1997 in the very near future.

No major impediments to implementing, reporting and enforcing the Cap are perceived in South Australia.

A lack of metering in the Lower Murray Reclaimed Swamp Districts is acknowledged as a monitoring problem. However water use is controlled in these districts by the rigid physical constraints governing the extent of reclaimed land. The integrity of the Cap will therefore be maintained. Nevertheless, the local community in conjunction with Government Agencies has already formed the Lower Murray Irrigation Action Group to address the metering issue. This will not only result in the provision of accurate water use data but will also facilitate further improvements in irrigation

efficiencies and reduce drainage water nutrient levels.

Another metering issue to be addressed is that of the Central Irrigation Trust (formally the Government Highland Irrigation Districts). Although accurate water use figures are supplied in the monitoring report, they represent 'water sold' at the farm gate rather than 'water pumped' from the river. Although the delivery losses in the CIT areas are negligible, because they almost all have state of the art piped delivery systems, total diversions from the river will ultimately need to be monitored.

South Australia's compliance with the Cap can be accurately reported once the water use data has been compiled at the end of each financial year.

The results for 1994-95 and 1995-96 are as follows:

For 1994-95 -

- SA Water diversions for Adelaide totalled 151GL for that year resulting in 443GL of the allowable 650GL being used for the five-year period ending in 1994-95. (representing 68% use).
- SA Water diversions for country towns totalled 46GL out of an allowable 50GL (representing 92% use).
- All other diversions (predominantly irrigation) totalled 447GL out of an allowable 570GL (representing 78% use).

Similarly for the 1995-96 season:

- SA Water diversions for Adelaide totalled 56GL for that year resulting in 404GL of the allowable 650GL being used for the five-year period ending in 1995-96. (representing 62% use).
- SA Water diversions for country towns totalled 44GL out of an allowable 50GL (representing 88% use).
- All other diversions (predominantly irrigation) totalled 448GL out of an allowable 570GL (representing 79% use).

Diversions in all other years will indicate similar results with total diversions below the 750GL Cap.

From the above figures it can be seen that South Australia is clearly complying with its Cap.

IMPLEMENTING THE CAP IN VICTORIA - PROGRESS REPORT - JULY 1997

VICTORIA'S COMMITMENT

The Victorian Government has committed itself to the Murray-Darling Basin Ministerial Council Agreement to impose an interim Cap on any increase in diversions within the Murray-Darling Basin and to establishing effective long-term Capping arrangements to ensure the sustainable management of the Basin's water resources. In coming to this agreement the Victorian Government also wished to ensure that the existing rights of Victorian water users were not eroded by increased water use within the Basin.

The Victorian Government believes that the implementation of the Cap is essential to provide the necessary certainty for water markets to be developed thereby providing the opportunity to transfer water from low to high value uses enabling new development and increasing export opportunities.

MORATORIUM ON DIVERSION GROWTH

Following the decision made by the Murray-Darling Basin Ministerial Council on 30 June 1995 to introduce a Cap on water diversions, Victoria immediately introduced a range of measures to limit the growth in diversions. These measures were introduced on an interim basis, and will generally remain in place, until the final Capping arrangements are developed and implemented.

These measures include the following -

1. *Private diversions from streams*

- Prohibiting the issue of new diversion licences
- On unregulated streams, water trading is subject to the conditions of an approved stream management plan. In the absence of a plan any water trade must be downstream (amended for 1996/97 to allow small volumes, normally for domestic and stock, to transfer upstream) and the transferee is only entitled to 80% of the licence volume transferred.
- On regulated streams the trading of 'sales' allocations is prohibited, and a licensee loses access to all 'sales' if any licence volume is temporarily traded.

2. *Pumped irrigation districts*

- Prohibiting the trading of any 'sales' made available in the districts
- Removing access to sales to any irrigator who temporarily or permanently sells water right

3. *Gravity irrigation districts*

- Maximum seasonal allocations limited to 100% of water right and 100% of 'sales' (in 1996/97 maximum sales allocation for the Campaspe system was reviewed as it was excessively constraining use. The limit was subsequently increased to 120%)
- A higher assumed utilisation of 'sales' resulting in lower 'sales' allocations
- Setting higher (more realistic) reserve provisions for River Murray commitments thereby lowering 'sales' allocations in restricted years.

4. *Interstate trade*

- Restricting temporary trade to the transfer of gravity district water only. The interstate trade of pumped district water right or diversion licences is prohibited.

DEVELOPING A FINAL CAP

Victoria will implement the Cap through the establishment of -

- bulk entitlements to all water authorities within the Victorian part of the Murray-Darling Basin; and
- through the progressive establishment of stream flow management plans as required to control licences on unregulated streams not covered under bulk entitlements.

Bulk entitlements will control over 98% of water diversions within the Victorian part of the Basin. These entitlements are (or will be) granted under the Victorian Water Act 1989 and clearly define the basis of sharing the available resources between other users and the environment. In each case the entitlements will specify a Cap on water use. In some cases the security of supply of entitlements will also be specified.

The entitlements also provide for the establishment of metering and environment management programs and contain explicit reporting requirements. The establishment of bulk entitlements, together with arrangements being put in place to monitor and report on resource use, will provide an effective long-term mechanism to Cap growth in diversions.

The process involved to establish bulk entitlements requires-

- extensive consultation with all stakeholder groups to gain ownership of the process and acceptance of the outcomes where trade-offs between competing users are required;
- a good understanding of the environmental flow issues within each river valley;
- hydrologic modelling of each river system to examine the implications of trade-off options, establish security of supply and provide the means to monitor resource use and regulate future trading of entitlements.

PROGRESS

Work to implement the final Capping arrangements is progressing as fast as possible within the constraints of the consultation processes necessary to ensure that the outcomes are accepted by the community. Through this process there has been a high success rate in increasing environmental flows without compromising water supplies to urban and agricultural industries. Victoria has produced an environmental brochure which highlights the importance of this process. Progress to date can be summarised as follows -

Goulburn Basin - Process completed and bulk entitlements granted.

Murray (Victorian System) - Consultation has been in progress for 18 months and is expected to be complete at the end of 1997. Bulk entitlements will not be granted until River Murray flow management issues are resolved by the MDBC (scheduled June 1998).

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

Ovens River - Scheduled to be completed in 1998.

Broken Basin - Scheduled to be completed in 1998.

Campaspe Basin - Consultation has been in progress for 18 months and is expected to be complete at the end of 1997.

Loddon Basin - Scheduled to be completed in 1998.

Wimmera-Mallee System - Scheduled to be completed in 1998.

While the final Capping arrangements will not be complete until 1998 when all bulk entitlements are granted, Victoria can effectively implement the Murray-Darling Basin Cap, at a State level, from 1 July 1997. Victoria has developed hydrologic models of all of its regulated river systems, which

will be used to monitor resource use, and through the control over irrigation sales allocations and trading rules, can ensure overall compliance with the Cap.

PRELIMINARY REVIEW OF 1996/97 SEASON

The 1996/97 season has recorded the third highest water use on record in the GMID, following an exceptionally dry summer and autumn. Only 1994/95 and 1990/91 have higher water use. However, even though the 1996/97 irrigation demand did not commence until mid October, the rate of water delivery between December to May was the highest on record.

Methodologies to establish what is allowable water use within a year under the Cap are yet to be finalised but will be assessed using the hydrologic models. This will take some time to complete. The rate of water delivery indicates that water use may have increased over equivalent very dry periods in the past and could have been higher than that allowed under the Cap. This being the case Victoria has taken further action to ensure that it controls any increase in water use in accordance with the agreed moratorium on water use. The changes introduced for the 1997/98 irrigation include the following -

- Temporary trading of above 30% sales entitlement in the gravity irrigation districts will not be allowed, and no irrigator will be allowed access to sales entitlement above 30% if any of their water entitlement is temporarily traded.
- Maximum usage under off-quota allocations is to be limited to 30% of water right or licence volume,
- Off-quota for the Murray System (including the Mitta Mitta River) will only be made available when surplus flow is declared in the Hume to Yarrawonga reach of the River Murray.

CONCLUSION

Victoria strongly supports the concept of striking an appropriate balance between consumptive and instream uses of water for the sustainable management of the Basin's water resources. Through the bulk entitlement process, and the interim rules it has put in place, Victoria will ensure that it achieves the objectives established by the Ministerial Council including holding diversions at the 1993/94 level of development.

WATER AUDIT - IMPLEMENTATION OF THE DIVERSION CAP IN NEW SOUTH WALES

The NSW Government remains totally committed to implementation of the Murray-Darling Basin Ministerial Council Cap on water diversions.

The NSW Government's implementation of the Cap is based on the following definitions:

- the volume of water that would have been diverted under the 1993/4 level of development

Development of Cap management policies and tools has been a significant task for NSW. It has seven major regulated valleys, the Barwon Darling and a considerable number of lesser unregulated valleys for which to develop and refine management policies and tools.

By a substantial margin NSW has had the most work of any of the States to undertake in developing these arrangements. NSW has devoted considerable intellectual effort and resources to the end. Work has been completed in those valleys which represent the vast bulk of water use within the NSW segment of the Murray-Darling Basin. Work is being progressed in other valleys. At the same time that it is implementing the Cap, the NSW Government is considering a major water reform package to further advance its water reform agenda which, amongst other outcomes, will assist NSW to meet the totality of its Cap commitments.

The outcomes of the water reform package are:

- to achieve long term sustainable water resource management
- to achieve objectives for clean, healthy productive rivers by 2000
- provide for movement of water to its most productive uses.

The reform package covers three different types of water system:

- regulated rivers
- unregulated rivers
- groundwater

The policy and management proposals for unregulated rivers will form the basis for NSW meeting its Cap obligations in terms of these rivers.

PROGRESS ON IMPLEMENTATION OF CAP

Climate/Use Relationship

A fundamental basis for Cap management in NSW is establishing a relationship between seasonal conditions and water usage.

Climate versus water use relationships for most valleys are being developed as an interim audit tools. These are presently available for the Murray, Murrumbidgee, Lachlan and Macquarie systems. These valleys represent about 80% of NSW Murray Darling Basin water use. A preliminary relationship has also been determined for the Namoi.

Work is continuing on developing audit methods for the Barwon Darling, Border Rivers and Gwydir (see Impediments comments below). For these valleys initial Cap relationships cannot be developed using climate relationships because of the high volume of on-farm storage development and variable diversion of unregulated (off allocation) water. A modelling approach will be needed, which first requires further model development and calibration.

In the longer term NSW is likely to move from use of climate vs use "initial" Cap relationships to computer model based reporting for most, if not all, of its valleys. Substantial model development and improvement work will be needed to achieve this. The changeover could therefore take 1 to 2 years to complete.

Development of agreed 1993/94 development and management criteria is already well advanced.

Controls on Growth in entitlements

NSW will be maintaining the existing embargos on new entitlements which have been in place on all regulated systems since the early 1980's, and on all unregulated Murray Darling streams since 1995. It will also be closing the 10 hectare small entitlement exemption on unregulated streams and it is expected that all existing applications for new entitlements which predated the embargos will be refused. There will be no immediate move to close the town water supply exemption; however, any growth in usage will be offset by reduced access for other users.

Management of Annual Availability of Water

Measures have already been applied to reduce the gap between water available for use and actual usage. Allocation announcements in the Murray, Murrumbidgee and Lachlan are no longer permitted to exceed 100% in normal seasons. Limits are now applied to off allocation diversions in all

valleys with the exception of the Gwydir where users are now restricted to taking no more than 50% of the off-allocation water available.

These measures are subject to on-going review and refinement in the light of user behaviour.

IMPEDIMENTS TO IMPLEMENTATION OF FINAL CAP

Gwydir

It will be six months before an adequate computer model is available for use in Cap development and auditing. However, environmental flow rules already in place should be restricting usage to below Cap levels.

Resolution of the Border Rivers Cap.

Resolution of the Border Rivers Cap has been delayed by the need to further develop the computer model of the system so that it can better estimate water diversions. This process is nearing completion. Once the model is available it will be used to determine appropriate "1993/94" development factors for the valley, taking into account the effects of Pindari Dam enlargement, and for future Cap auditing. This process should be completed by the end of the calendar year.

Resolution of the Barwon Darling Cap and future usage control.

The Barwon Darling system presents particular difficulties for NSW. Legally, it is an unregulated river with an upstream regulated section and with regulated tributaries. It also has a high level of off-stream storage developments.

Limited information on water diversions prior to 1995/96, the dynamic nature of flows and diversions and difficulties in developing an adequate computer model have made it impossible to determine interim Cap arrangements. The existing licensing arrangements also make it difficult to contain growth in usage. As well as developing the model and establishing the technical means for assessing the Cap, NSW will be revising management arrangements so that above Cap growth can be contained and offset. This could take 12 months to complete.

Use on unregulated streams.

Data on usage on unregulated NSW rivers is poor and existing management arrangements do not make it easy to control growth in use. It will therefore be necessary to institute major reforms in both monitoring and management of use. Consideration is being given by the Government to proposals for metering of use and

conversion of entitlements from an area basis to a volumetric basis. Controls will also be applied to reduce growth based on existing entitlements and these will be reviewed as firmer data on usage trends becomes available.

It is stressed that use on unregulated streams in NSW is only a minor component of overall use and growth is believed to be low. It is not expected that the time this process will take to yield final Cap auditing and management arrangements will jeopardise NSW compliance. Should any growth in use occur in the meantime, it should be more than offset by the reductions in use on regulated streams arising from existing and proposed environmental flow measures.

TIMELINES TO COMPLETE CAP IMPLEMENTATION

The tools to permit audit and management adjustments for most use by NSW are available. These should be completed for all regulated streams by December 1997. The unregulated Barwon-Darling should be completed by June 1998.

Finalisation of new management arrangements for the other unregulated streams within the Basin is likely to take several years, but it is again stressed that usage is relatively small and can be expected, with some confidence, to be more than off-set by reductions in use on regulated systems brought about by the NSW Government's own water reforms.

CAP MANAGEMENT IN 1996/97

Preliminary usage figures have only been calculated for the Murray, Murrumbidgee and Lachlan valleys.

At this stage it would appear that the Murray has met the Cap. The position in the Murrumbidgee and Lachlan is unclear. The simple, interim climate diversion relationships which have been developed indicate usage 5% to 10% above Cap. However, evidence from past years is that in dry years these simple relationships predict lower use than actually occurs. As well, no crop area information is available yet to confirm any change from past irrigation development.

It will be a month or so before firm data will be available.

Usage in the Macquarie was constrained by low water availability and the 1996 Macquarie Marshes Plan restricts average diversions to well within Cap limits.

The Namoi, Gwydir, Border Rivers and Barwon Darling water years do not finish for another two months and there are as yet no Cap relationships available against which to audit use (see comments in "Impediments to Implementation of Final Cap"). However, off allocation and other environmental flow measures on the Gwydir would be expected to have suppressed usage to below Cap levels.

MINISTERIAL STATEMENT ON IMPLEMENTING THE CAP IN 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 acknowledges 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 planning processes accepted by the Ministerial Council's Independent Audit Group.

Work on these planning processes is progressing as quickly as possible and at this stage the target date for completion is 30 June 1998. The timelines are being influenced by a number of factors, including:

The hydrologic modelling is much more comprehensive than previous approaches to water planning. It is being progressed as quickly as the available skilled resources in both States will allow.

Community consultation has already commenced but will require considerable time when the hydrology models and environmental flow options and impacts have reached a stage where detailed consultation can occur.

There is a need for coordination with New South Wales on the river flow objectives and management process for the Barwon-Darling system which are still developing

For the Warrego, Paroo, Bulloo and Moonie catchments Water Management Plans will be developed, with New South Wales community and agency representation as appropriate to the particular catchment. Initial interagency discussions between New South Wales and Queensland on the preparation of these plans have been held. In Queensland it is planned to formally commence preparation of these Plans later this year, in accordance with the statutory process prescribed in the Queensland Water Resources Act 1989. These plans will provide the policies and principles for making decisions on applications for new licences.

The Border Rivers Commission is providing specific oversight in the western intersecting stream planning processes and will be involved in any changes to the current water sharing arrangements between Queensland and New South Wales for all the border river systems.

Water diversions in the Queensland part of the Basin on average amount to some 4 to 5 percent of the total diversions in the Basin, and in some years are as little as 1.5 percent (as was the case in 1994/95). It is important to highlight some significant differences between Queensland and other Murray Darling States. These differences require a different response to the Cap than in other States.

New South Wales and Victoria are by far the major users of water in the Basin and it is acknowledged by these States that over allocation of water has occurred. Thus it is possible for them to immediately Cap at existing levels and then implement a number of environmental enhancement strategies over time to address instream and river health concerns.

Queensland believes there is still room for responsible water development within the State where historical reasons limited water use. Queensland's moratorium is based on allowing certain developments to progress in advance of the final Cap being developed. These developments may include several new weirs on the Condamine River as well as the already announced St George Offstream Storage. In the case of this latter development, no additional commitments will arise as the development relates to the creation of storage to support existing water use entitlements and practices. In addition and in accordance Queensland's current interim Cap arrangements adopted by the Council at the June 1996 meeting, consideration will be given to dealing with applications lodged prior to the Queensland initiated holds on licensing. The Queensland initiated holds were applied several years in advance of the Council's June 1995 Cap decision.

A comparison with other parts of the Basin on water use and river flows highlights another important difference between Queensland and the southern parts of the Basin. This is the fact that Queensland's part of the Murray Darling River system is largely unregulated, as opposed to southern parts of the Basin which are largely regulated. Diversions in drier years will be significantly less than in wetter years when higher streamflows occur. This is generally the reverse to the situation in the southern part of the Basin.

In conclusion, I would emphasise flows in the Queensland streams of the Basin are highly variable, both seasonally and in size. Thus a Cap definition built around river flow regime management is more relevant than any benchmarking against levels of development. Queensland is progressing with the planning processes necessary to establish the final Cap in Queensland, including considering cross border issues in northern New South Wales. At the same time certain developments will be allowed to occur prior to finalisation of a Cap, bearing in mind the equity issues, development expectations and social considerations

