



# **Water Audit Monitoring Report 1994/95**

*A Preliminary Report of the Murray-Darling Basin Commission on  
Diversions*

**June 1997**

## Introduction

The Murray-Darling Basin Ministerial Council has agreed that:

- a balance needs to be struck between consumptive and instream uses of water in the rivers of the Murray-Darling Basin;
- diversions must be capped; and
- leaving aside equity issues, the level at which diversions should be capped is the volume of water that would have been diverted under 1993/94 levels of development.

With regard to reporting and monitoring for the Cap, the Independent Audit Group (IAG) recommended in its report to the Ministerial Council in November 1996 that:

- the draft format that has been developed for the Water Audit Monitoring Report be implemented and reports considered annually by the Murray-Darling Basin Commission;
- a body be identified in each State which has clear responsibility for collating water audit information;
- information on performance against the Cap be made widely available; and
- all States allocate enough resources to satisfy their monitoring responsibilities.

The form of the Cap agreed on by the Ministerial Council requires that reliable measurements be made of the quantities of water diverted in each State. It is also necessary for determinations to be made each year of the volume of water that would have been diverted in that year under 1993/94 levels of development. Any differences between the volume of water used and the Cap have to be fed back into the States' allocation process to ensure that, in the long term, diversions are held to the agreed Cap.

The aims of the Murray-Darling Basin Commission's Water Audit Monitoring Report are to ensure that:

- diversion data from all States are available in a timely manner;
- there is an appropriate level of quality assurance of the data supplied;
- each State's performance with regard to the Cap is auditable;
- the capping process is transparent; and
- the results are widely available.

This report on diversions for the 1994/95 season is a preliminary attempt by the Murray-Darling Basin Commission to meet those aims. However the task has proved more difficult than originally envisaged which is the reason why this report is still preliminary. The reasons for this report not being complete are:

- diversion data in the past has in many instances not been collected in a systematic fashion and new methods of collecting and reporting on diversions have had to be developed and quality assured;
- in some instances the definition of what constitutes a diversion has been unclear and has had to be sorted out. (This applies in particular to net diversions from districts which have large return flows and also to diversions into systems such as the Yanco Creek on the Murrumbidgee and the Great Anabranche on the Darling which are a mixture of artificial diversions and natural flows);
- diversion data for previous years have had to be reprocessed according to the latest definitions; and
- methods for determining the diversion that would have occurred in any year under 1993/94 levels of development have had to be developed and tested.

Key items that are missing from this report are quality assured data from New South Wales and estimates from New South Wales and Victoria of what diversions would have been under 1993/94 levels of development.

## **Diversions for 1994/95**

Valley by valley diversions for 1994/95 are presented in Table 1. Of the 12 131 GL diverted in 1994/95, 94 % was for irrigation.

The distribution of diversions between the States was:

New South Wales	53.3 %
Victoria	39.8 %
South Australia	5.3 %
Queensland	1.5 %
ACT	0.3 %

Diversions in 1994/95 are plotted against diversions in previous years in Figure 1. This figure shows that diversions in 1994/95 were marginally less than the record diversion in 1991/92. However data is incomplete in 1993/94 and estimates of diversions in previous years need to be re-estimated using the diversion definitions developed for monitoring the Cap.

**Table 1. Murray-Darling Basin Diversions in 1994/95**

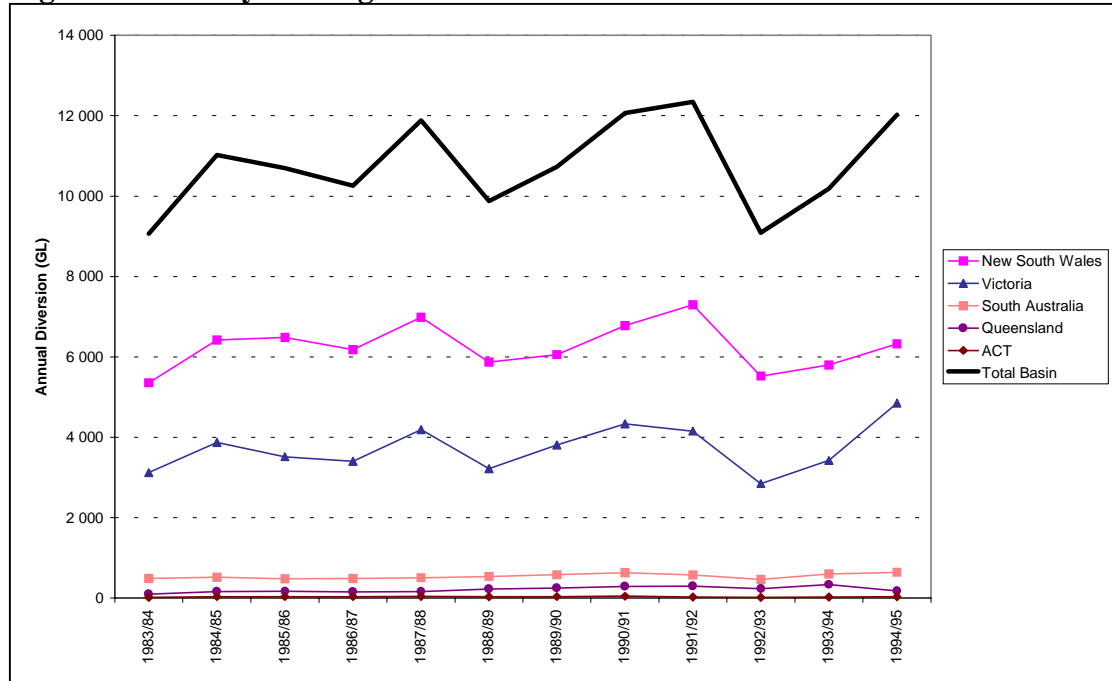
System	Irrigation Diversion (GL)	Other <sup>2</sup> Diversion (GL)	Total Diversion (GL)
<b>New South Wales<sup>1</sup></b>			
Border Rivers	56	1	57
Gwydir	87	3	90
Namoi	47	5	52
Macquarie/Castlereagh/Bogan	523	14	537
Upper Darling	14	4	19
Lachlan	414	26	440
Murrumbidgee	2 990	11	3 001
Lower Darling	61	23	84
Murray	2 126	56	2 181
<b>Total NSW</b>	<b>6 319</b>	<b>143</b>	<b>6 462</b>
<b>Victoria</b>			
Kiewa	8	1	9
Ovens	10	11	21
Goulburn/Broken	2 382	30	2 413
Campaspe	83	41	124
Loddon	68	8	76
Wimmera-Mallee	35	179	214
Murray	1 922	46	1 968
<b>Total Victoria</b>	<b>4 508</b>	<b>316</b>	<b>4 823</b>
<b>South Australia</b>	<b>448</b>	<b>190</b>	<b>638</b>
<b>Queensland</b>			
Border Rivers	54	2	56
MacIntyre Brook	4	0	4
Condamine/Balonne	106	4	110
Warrego/Paroo	2	0	2
Moonie	3	0	3
<b>Total Queensland</b>	<b>169</b>	<b>6</b>	<b>176</b>
<b>Australian Capital Territory<sup>3</sup></b>	<b>0</b>	<b>32</b>	<b>32</b>
<b>Total Basin</b>	<b>11 444</b>	<b>687</b>	<b>12 131</b>

1. NSW Diversions have not been quality assured

2. Other Diversions include Urban, Domestic & Stock, Town & Industrial and Other.

3. This is a net diversion figure. The primary usage in the ACT is for urban supply that has a high return component (approximately 50 %), thus it is the net diversion that is reported.

**Figure 1. Murray-Darling Basin Diversions – 1983/84 to 1994/95**



NB: ACT diversions prior to 1994/95 are, in part, based upon extrapolations from more recent data.

## Accuracy of Diversion Estimates

An attempt has been made to assess the accuracy of the diversion estimates in each river valley. Many of the diversions are measured reliably using either metered pumps or gauged offtake channels. However a second category of diversions are estimated from regional surveys of areas planted and a third category of estimates is based only on user returns which has proved to be very inaccurate. Table 2 contains the results of this report on the confidence the State's have in their diversion estimates. To develop the figures in the table, metered diversions have been assumed to have an accuracy of  $\pm 5\%$ , regional surveys  $\pm 20\%$  and user returns  $\pm 40\%$ . Table 2 shows that, although there are some areas for improvement in measuring diversions, most of the large diversions are currently being metered and the estimate of basinwide diversions should be accurate to  $\pm 7\%$  which is an acceptable level of accuracy.

## Use Versus Allocations in 1994/95

The 1995 report to the Ministerial Council, 'An Audit of Water Use in the Murray-Darling Basin', found that water users had only diverted 63% of the water that they had been authorised to use in the previous 5 years. This highlighted the fact that the States' allocation systems have evolved to encourage development of the Basin's water resources and were not well suited to impose a Cap on diversions.

A key step in the process to implement the Cap will be the adjustments that are made to the States' allocation systems. In the process, existing water users who are disadvantaged by the implementation of the Cap will invariably look at the changes that are being made in other systems and highlight any inconsistencies. To make this comparison easier and to make Cap implementation more transparent, Table 3 has been produced which compares the water actually diverted with the quantities allocated for use by the States. In calculating the authorised quantities, allowance has been made of the announced allocations and overdraws in the regulated systems and the announced availability of off-allocation and water harvesting.

In summary the utilisation of authorised diversions in 1994/95 in each State was:

New South Wales	85 %
Victoria	82 %
South Australia	61 %
Queensland	90 %
ACT	100 %
<b>Total Basin</b>	<b>83 %</b>

By comparison, 1994/95 was a relatively dry year with limited scope for off-allocation use in the south of the Basin. This is the main reason why the utilisation of the authorised diversion was relatively high. Action to reduce allocations to implement the Cap did not commence until after the 1994/95 year.

**Table 2. Accuracy of Diversion Estimates in 1994/95**

System	Diversion (GL)	Accuracy ± GL	Accuracy ± %
<b>New South Wales</b>			
Border Rivers	57	3	5 %
Gwydir	90	7	8 %
Namoi	52	7	14 %
Macquarie/Castlereagh/Bogan	537	31	6 %
Upper Darling	19	6	34 %
Lachlan	440	26	6 %
Murrumbidgee	3 001	178	6 %
Lower Darling	84	6	7 %
Murray	2 181	167	8 %
<b>Total NSW</b>	<b>6 462</b>	<b>432</b>	<b>7 %</b>
<b>Victoria</b>			
Kiewa	9	1	15 %
Ovens	21	3	15 %
Goulburn/Broken	2 413	131	5 %
Campaspe	124	7	5 %
Loddon	76	8	11 %
Wimmera-Mallee	214	13	6 %
Murray	1 968	134	7 %
<b>Total Victoria</b>	<b>4 823</b>	<b>297</b>	<b>6 %</b>
<b>South Australia</b>	<b>638</b>	<b>68</b>	<b>11 %</b>
<b>Queensland</b>			
Border Rivers	56	4	8 %
MacIntyre Brook	4	0	7 %
Condamine/Balonne	110	14	12 %
Warrego/Paroo	2	1	28 %
Moonie	3	1	40 %
<b>Total Queensland</b>	<b>176</b>	<b>20</b>	<b>11 %</b>
<b>Australian Capital Territory<sup>1</sup></b>	<b>32</b>	<b>3</b>	<b>10 %</b>
<b>Total Basin</b>	<b>12 131</b>	<b>820</b>	<b>7 %</b>

1. The accuracy of ACT diversions (metered) is calculated as 5 % of gross diversions and expressed as a percentage of net diversions.

**Table 3. Use of Valley Allocations in 1994/95**

System	Diversion from Valley (GL)	Diverted from other Valleys (GL)	Total Use in Valley (GL)	Authorised use in Valley (GL)	Use as a % Authorised Valley use (%)
<b>New South Wales</b>					
Border Rivers	57	0	57	77	74 %
Gwydir	90	0	90	716	13 %
Namoi	52	0	52	158	33 %
Macquarie/Castlereagh/Bogan <sup>1</sup>	537	0	537	511	105 %
Upper Darling	19	0	19	19	100 %
Lachlan	440	0	440	485	91 %
Murrumbidgee	3 001	0	3 001	3 134	96 %
Lower Darling <sup>1</sup>	84	0	84	82	103 %
Murray	2 181	0	2 181	2 420	90 %
<b>Total NSW</b>	<b>6 462</b>	<b>0</b>	<b>6 462</b>	<b>7 601</b>	<b>85 %</b>
<b>Victoria</b>					
Kiewa	9	0	9	11	78 %
Ovens	21	0	21	54	38 %
Goulburn/Broken	2 413	-821	1 592	1 729	92 %
Campaspe	124	292	416	581	72 %
Loddon	76	467	543	661	82 %
Wimmera-Mallee	214	6	220	236	93 %
Murray	1 968	55	2 023	2 607	78 %
<b>Total Victoria</b>	<b>4 823</b>	<b>0</b>	<b>4 823</b>	<b>5 879</b>	<b>82 %</b>
<b>South Australia</b>					
Metro-Adelaide <sup>2</sup>	151	0	151	357	42 %
Other SA	487	0	487	617	79 %
<b>Total South Australia</b>	<b>638</b>	<b>0</b>	<b>638</b>	<b>974</b>	<b>61 %</b>
<b>Queensland</b>					
Border Rivers	56	0	56	61	92 %
MacIntyre Brook	4	0	4	7	57 %
Condamine/Balonne	110	0	110	119	93 %
Warrego/Paroo	2	0	2	4	59 %
Moonie	3	0	3	3	100 %
<b>Total Queensland</b>	<b>176</b>	<b>0</b>	<b>176</b>	<b>194</b>	<b>90 %</b>
<b>Australian Capital Territory</b>	<b>32</b>	<b>0</b>	<b>32</b>	<b>32</b>	<b>100 %</b>
<b>Total Basin</b>	<b>12 131</b>	<b>0</b>	<b>12 131</b>	<b>14 680</b>	<b>83 %</b>

1. New South Wales has yet to supply information on carryovers and intervalley trade which would explain utilisations > 100 %
2. The Metro-Adelaide entitlement is a five-year rolling average.



## **Comparison of 1994/95 Diversions with the Cap**

In future, a key component of the Water Audit Monitoring Report will be a comparison of the diversion in the year with the diversion expected under the Cap. Unfortunately, it is not yet possible to report on performance against the Cap except for a few parts of the Basin. To estimate the diversion that would have occurred during the year if development remained at 1993/94 levels, it is necessary to develop models between diversion and climatic variables such as rainfall, temperature and streamflow. These models may be complicated system models such as New South Wales' IQQM, Victoria's REALM or the Murray-Darling Basin Commission's MSM. Alternatively, simpler relationships between diversion and rainfall may be suitable. Before these models can be developed it is necessary to produce a historical record of diversions that has been determined in a consistent manner and extends for at least ten years to enable the model to be calibrated for 1993/94 development. Both New South Wales and Victoria are currently collating historical data and developing these models but they do not expect to have completed the process until early 1998.

Table 4 sets out the way that diversions would be reported against the Cap in the completed report. To date the diversions expected under the Cap have only been calculated for the Murray Valley in New South Wales where 1994/95 diversions exceeded the Cap by 145 GL and for South Australia where the Cap is set at the entitlement.

**Table 4. Comparison of Diversions with Cap Levels**

System	Total Diversion (GL)	Cap Diversion Target (GL) <sup>1</sup>	Difference between Diversion and Cap (GL) <sup>2</sup>
<b>New South Wales<sup>3</sup></b>			
Border Rivers	57	n/a	
Gwydir	90	n/a	
Namoi	52	n/a	
Macquarie/Castlereagh/Bogan	537	n/a	
Upper Darling	19	n/a	
Lachlan	440	n/a	
Murrumbidgee	3 001	n/a	
Lower Darling	84	n/a	
Murray	2 181	2 036	145
<b>Total NSW</b>	<b>6 462</b>	<b>n/a</b>	
<b>Victoria<sup>3</sup></b>			
Kiewa	9	n/a	
Ovens	21	n/a	
Goulburn/Broken	2 413	n/a	
Campaspe	124	n/a	
Loddon	76	n/a	
Wimmera-Mallee	214	n/a	
Murray	1 968	n/a	
<b>Total Victoria</b>	<b>4 823</b>	<b>n/a</b>	
<b>South Australia<sup>4</sup></b>			
Metro-Adelaide <sup>5</sup>	151	357	-206
Other SA	487	617	-130
<b>Total South Australia</b>	<b>638</b>	<b>974</b>	<b>-336</b>
<b>Queensland<sup>4</sup></b>			
Border Rivers	56	n/a	
MacIntyre Brook	4	n/a	
Condamine/Balonne	110	n/a	
Warrego/Paroo	2	n/a	
Moonie	3	n/a	
<b>Total Queensland</b>	<b>176</b>	<b>n/a</b>	
<b>Australian Capital Territory</b>	<b>32</b>	<b>n/a</b>	
<b>Total Basin</b>	<b>12 131</b>	<b>n/a</b>	

1. n/a denotes Cap model is not completed or a Cap target has not been able to be determined.

2. A positive difference between Diversions and Cap denotes an exceedance of Cap.

3. The Caps in NSW and Victoria are based on climate adjusted diversion levels under 1993/94 levels of development.

4. The Caps in South Australia and Queensland are based on diversion levels recommended by the Independent Audit Group (IAG).

5. The Cap for Metro-Adelaide is based on a 5 year rolling average.