



## NSW Submission to the Senate Standing Committee on Rural and Regional Affairs and Transport

### Inquiry into water management in the Coorong and Lower Lakes

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#### NSW Water Legislation

The management of the surface water and groundwater resources of NSW, including the allocation of water entitlements, is undertaken under the *Water Act, 1912* and the *Water Management Act 2000*.

The NSW Government is progressively transitioning water management from the *Water Act 1912* to the *Water Management Act 2000*. The vast majority of water extraction in the NSW portion of the Murray-Darling Basin is covered by statutory water sharing plans under the *Water Management Act 2000*. The legislation and rules in the water sharing plans provide the framework for the implementation of the COAG-agreed water reforms, including:

- the provision of water entitlements specifically for the environment;
- the separation of water entitlements from land; and
- clearly identified tradeable water entitlements.

The priority for water sharing under the legislation is:

- |            |   |
|------------|---|
| Priority 1 | Water for the environment and basic landholder rights (e.g. domestic and stock rights);                             |
| Priority 2 | Town water supply, domestic and stock and major utility licences (e.g. power generation, major urban water supply); |
| Priority 3 | High security licences (e.g. for permanent plantings);  |
| Priority 4 | General security or unregulated river licences (e.g. for irrigation of annual crops); and                           |
| Priority 5 | Supplementary licences (e.g. to access high flows).   |

However, in times of severe water shortage the priority of water for domestic purposes (i.e. either under a basic landholder right or licence) is elevated above the environment.

In the Murray and Lower Darling River valleys, the management of water resources is also undertaken in accordance with the Murray-Darling Basin Agreement. Similarly, in the Border Rivers, the management of water resources is undertaken consistent with the Border Rivers Agreement.

## Water Sharing Plans

Under the Act, statutory water sharing plans (WSPs) are prepared for each water source. Ninety percent of water extraction in NSW is now undertaken consistent with approved WSPs.

The main components of WSPs are to:

- provide water for the environment by protecting a proportion of the water available for fundamental ecosystem health and/or including specific environmental rules;
- allow licensed water to be committed for environmental purposes – this can arise from water recovery projects or by buying water licences;
- protect the water required to meet basic landholder rights;
- set annual limits on water extractions to ensure that water extractions do not increase and therefore erode the water for the environment and also the security of supply to water users;
- determine what type of additional licences can be granted e.g. local water utility access licences (for town water supplies) and Aboriginal cultural access licences;
- determine how water is to be shared among the different types of licensed users by setting the priorities of supply;
- provide flexibility for licence holders in the way they can manage their water accounts through institutional arrangements such as the ability to carry-over unused water from one year to the next or through group rostering;
- specify rules in groundwater plans to minimise impacts on other groundwater users, dependent ecosystems, water quality and the stability of the aquifer;
- specifies the rules for water trading;
- set out the mandatory conditions that apply to licence holders;
- specify which parts of the plan can be changed without triggering the compensation provisions of the Act; and
- set out the monitoring and reporting requirements, including indicators against which the performance of the plans is to be monitored.

## Responsibility for water management

Within NSW, the management of water is undertaken by three separate agencies:

**The Department of Water and Energy (DWE)** is responsible for water resource management functions including the implementation of water sharing plans, determination of water availability, allocation of water resources between consumptive uses and the environment, licensing and compliance. DWE is the lead agency in managing water under interstate agreements. DWE is also undertaking a number of infrastructure projects that save water such as the Cap and Pipe the Bores program in the Great Artesian Basin, overseeing the investigations into infrastructure and operational improvements at Menindee Lakes and proposals to pipe domestic and stock supplies.

**State Water Corporation** is responsible for asset management, including the major water storage facilities and weirs within the Murray-Darling Basin, for regulating releases from these storages into the State's river systems, managing water accounts of licence holders and metering. State Water also undertakes these functions on behalf of the

Murray-Darling Basin Commission (MDBC) at Hume Dam and the locks and weirs at Euston and Wentworth in south-west NSW.

**The Department of Environment and Climate Change (DECC)** is responsible for the recovery of water for the environment mainly through water purchases. DECC also manages licensed environmental water entitlements in conjunction with the Minister for Water.

### **Water use in the Basin**

About 5,000 GL on average is extracted from the State's regulated rivers in the Murray-Darling Basin, where flows are controlled by large rural water storages operated by State Water. However, because of the ongoing drought over the last 5 years, actual extractions have been significantly less than this.

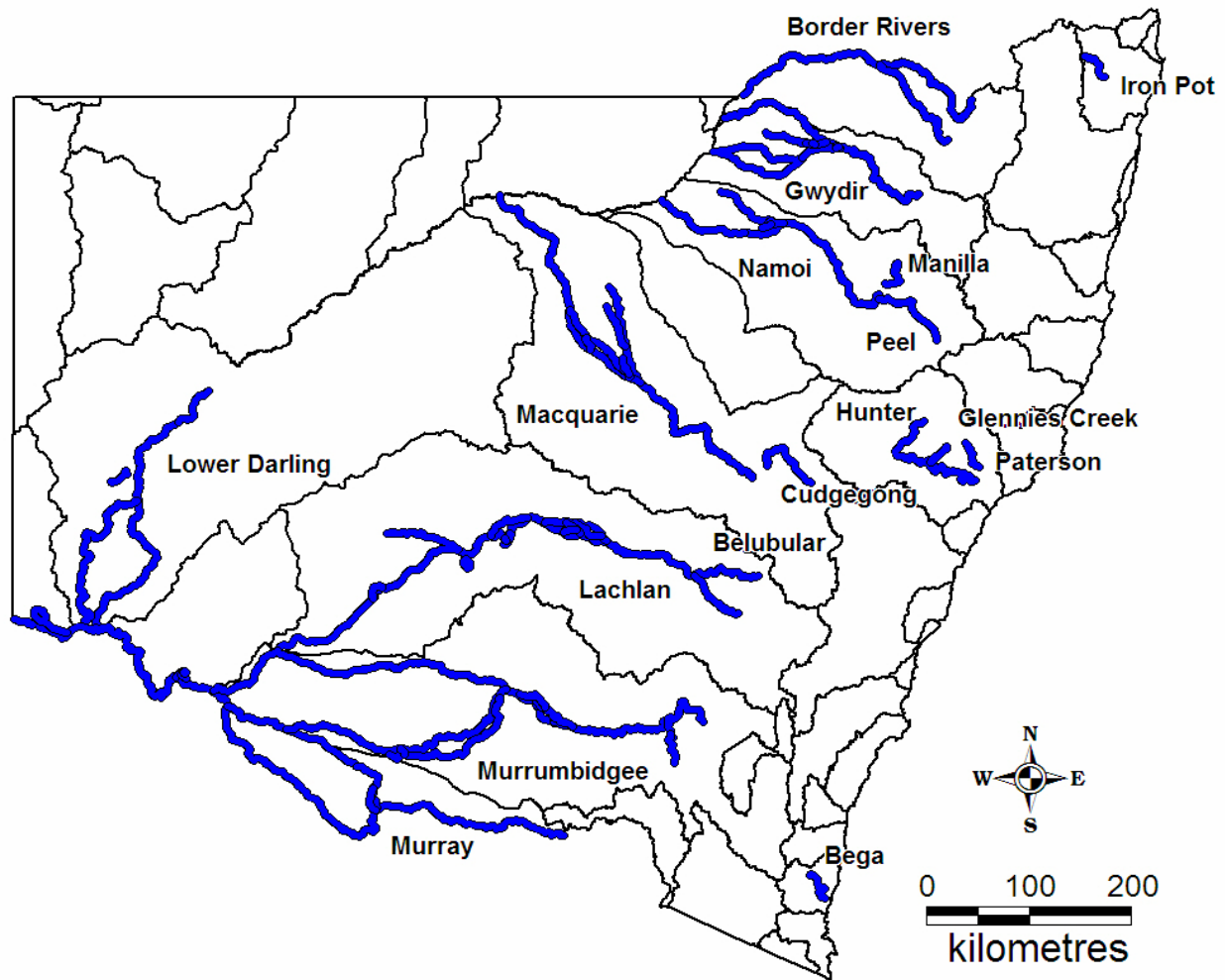
About 600 GL on average is extracted from the State's unregulated river systems in the Basin, which are typically those rivers and streams where water is not supplied by releases from major water storages but is dependent on rainfall runoff and natural river flow. These include the creeks and streams upstream of large water storages and smaller tributaries downstream of dams. A major unregulated river system is the Barwon-Darling that extends from the Queensland-NSW border to the Menindee Lakes, near Broken Hill.

About 900 GL is extracted from groundwater sources in the Basin, predominantly from the major inland alluvial groundwater systems and the Great Artesian Basin.

The majority of water extraction in NSW portion of the Basin is used for irrigated agriculture. Industrial water use is typically included within high security entitlements on regulated river systems or within town water supply or utility licences.

Town water supply accounts for less than two percent of average water extractions.

# NSW Regulated Rivers



NSW has often been criticised for its over-allocation of water resources in the Murray-Darling Basin. It should be noted that NSW constitutes almost 57 percent of the land area of the Basin and 55 percent of the allowable long-term diversions under the Murray-Darling Basin Cap (excluding Queensland) but accounted for just 44 percent of the Basin's surface water diversions in 2006-07. Some 75 percent of NSW is within the Basin which includes the majority of the State's agriculture.

By comparison, the Victorian portion of the Basin comprises 12 percent of the Basin's land area, but accounted for 43 percent of the Basin's surface water diversions in 2006-07 and South Australia with 6.5 percent of the land area accounted for over 8 percent of diversions.

	<b>MDB Cap (GL)</b>	<b>Surface Water Diversions in 2006/07 (GL)</b>	<b>Basin Land Area %</b>
NSW	5 861	2 304	56.65
Victoria	4 045	2 206	12.32
South Australia	724	425	6.49
ACT	42	51	0.22
Queensland	NA (yet to be fully reported)	140	24.55
<b>TOTAL</b>		<b>5 126</b>	

(Cap and diversion figures taken from the IAG review published March 2008 of the cap implementation in 2006-07).

### **NSW water access entitlements on regulated rivers**

Unlike Victoria or South Australia, NSW administers a *tiered* water entitlement system. The majority of water entitlements are distributed in high security or general security entitlements.

In NSW, irrigation licences are held privately. In the Murray-Darling Basin, most of the State's water entitlement is managed by privatised Irrigation Corporations in the south-west of the State.

There are a range of licensed entitlements for water supply in regulated river valleys that include:

High security	High reliability of water availability in every year. Includes town water, stock and domestic, industrial needs and irrigation. Most permanent plantings including horticulture and viticulture have high security licences. Typically, water is reserved at the start of the year in the dam to ensure two years' supply for high security needs. In the case of the Murray and Murrumbidgee Valleys, this reserve is normally provided by the Snowy Hydro-Electricity Scheme.
General security	Variable water availability where licensed entitlement holders get a proportion of their entitlement depending on seasonal conditions. Typically used for annual crops and pasture production.
Conveyance	Water needed to deliver water to individual licensees within the NSW irrigation corporations to cover channel losses and evaporation.
Supplementary	Opportunistic water that can only be accessed by licensed entitlement

	holders during periods of high flow usually originating from tributaries downstream of a dam and where flows are in excess of normal requirements. The periods are declared by the Department of Water and Energy.
Adaptive Environmental Water	Entitlements dedicated for specified environmental purposes, and may be traded under certain conditions. These licences are the result of water recovery programs or licence purchases.

Most environmental water is provided, not through a licenced entitlement, but by rules in the respective water sharing plan, such as ensuring certain proportions of dam inflows are released and passed through the river system, environmental contingency releases from the storage or rules that protect certain levels of natural high flows from extraction and end of system flows.

### **Other water rights on regulated rivers (no licence required)**

Basic Water Rights	Water for stock and domestic needs where the property is adjacent to a river, or can be diverted from an aquifer. This includes the right of land owners to harvest water (rainfall runoff on their property) in a farm dam up to a specified capacity.
Native title rights	Non-exclusive rights to take water for personal, domestic and non-commercial purposes

### **Allocation policy in NSW regulated rivers**

The allocation policy adopted in NSW regulated river valleys is typically:

- i. Ensure sufficient water is held in reserve to meet domestic needs for two years, then
- ii. Provide water to meet environmental health needs of the river, then
- iii. Provide for unused water carried over from the previous year, then
- iv. Provide high security entitlements (up to 100 percent of entitlement or as specified in the water sharing plan), then
- v. Provide for initial conveyance losses in Irrigation Corporations, then
- vi. Provide for general security entitlement holders
- vii. (Provide supplementary water when available. Access to supplementary water is opportunistic and may be available from tributaries downstream of storages before high security or general security entitlements)

The majority of water entitlements in regulated rivers are held as high security or general security entitlements.

In the Murray, Murrumbidgee and Lower Darling Rivers high security entitlements constitute between 10 and 15 percent of total water use entitlements. Water is provided to high security entitlement holders before any water is allocated for general security purposes. This two tiered entitlement approach differs from Victoria and South Australia which basically have a single licence type.

Consequently, NSW can guarantee a higher reliability of water supply to its high value water users than other states. For example, as of the 1<sup>st</sup> September 2008, NSW had allocated 25 percent of high security entitlement to its Murray Valley water users, 60 percent in the Murrumbidgee Valley and 100 percent in the Lower Darling River valley.

By comparison, South Australia had allocated 6 percent of entitlement to its users while Victoria had not allocated any water to its irrigators.

General security users have a zero allocation in NSW's major regulated river valleys as a consequence of drought and reduced water availability.

In the current drought, this has meant that opportunistic water use on annual crops and pasture has been extremely low. In 2007-08 the rice harvest was only 19,297 tonnes, most of which was produced using groundwater or small volumes of unused water carried over from previous years. This was the lowest harvest since 1929. Average harvest is around 1.3 million tonnes.

The two tiered system of water entitlements and allocation makes NSW far more adaptable to annual and seasonal variation in water availability or able to adapt to longer term reduction in water availability due to climate change. However, it does make general security licences vulnerable to long drought periods.

For example, although the long term average diversions in the NSW Murray Valley are 1,870 GL compared with average diversion by South Australia of 701 GL, in 2006-07 and 2007-08 NSW diversions in the Murray Valley were significantly less than diversions in South Australia.

### **Access Licences on Unregulated Rivers**

Unregulated rivers are typically those rivers and streams where water is not supplied by releases from major water storages but is dependent on rainfall runoff and natural river flow. These include the creeks and streams upstream of dams and smaller tributaries downstream of dams. These also include the rivers below Sydney and many other urban water storages where water is mostly pumped direct from the dam to the town.

Most coastal rivers are unregulated, outside of the Hunter Valley. The majority of coastal towns, and many significant industries depend on unregulated rivers.

Licensed entitlements exist for town water supply, major utilities, and irrigation.

Where there is little extraction, the environment and basic landholder rights are protected by licence conditions that specify river levels that stop pumping..

Where there is a high level of extraction and competition between users, for example town water supply, mining and irrigation, there are quite complex sharing arrangements.

The most significant unregulated river in inland NSW is the Barwon-Darling, from which large volumes are diverted into on-farm storages during periods of high flows.

Licensed irrigators on the Barwon-Darling River have different classes of licence that enable diversion at different flow levels.

A	for domestic and stock and small area irrigation including horticulture at low flow levels
B and C class	for large scale irrigation at significantly higher flow levels

### **Allocation announcements for regulated rivers**

When there is insufficient water available to meet the full entitlement, the Department of Water and Energy will publish an Available Water Determination (AWD) that specifies the proportion of the licensed entitlement that is available. This is generally known as the "allocation".

For example, an AWD of 1.0 means there is 100 percent of the entitlement available. An AWD of 0.2 means there is 20 percent of the entitlement available.

AWDs are based upon the amount of water currently available for allocation within the respective river valleys, and the minimum inflows likely to occur throughout the season. These are the minimum modelled inflow sequences that have occurred during all years of records. In the NSW Murray and Murrumbidgee Valley, this sequence also includes the minimum diversions (Required Annual Releases) from the Snowy Mountains Scheme in the respective valleys.

Allocations for high security (HS) and general security (GS) users over the previous five years were:

Valley	07/08 %	06/07 %	05/06 %	04/05 %	03/04 %
<b>Belubula<sup>1</sup></b>					
HS	100	50	20	20	100
GS	0	0	0	0	0
<b>Bega<sup>1</sup></b>					
HS	100	100	100	100	100
GS	50	80	40	45	60
<b>Border Rivers<sup>2,3</sup></b>					
HS	100	100	100	100	100
GS	38	25	38	17	54
<b>Cudgegong<sup>1</sup></b>					
HS	100	100	100	100	100
GS	5	0	44	9	19
<b>Lower Darling<sup>1</sup></b>					
HS	100	100	100	100	100
GS	50	0	100	100	30
<b>Glennies<sup>1</sup> Creek (Hunter Valley)</b>					
HS	100	92	100	100	100
GS	84	35	100	100	100
<b>Gwydir<sup>2</sup></b>					
HS	100	100	100	100	100
GS	24	0	22	5	31
<b>Hunter<sup>1</sup></b>					
HS	100	92	100	100	100
GS	84	35	100	100	100
<b>Lachlan<sup>1</sup></b>					
HS	30	80	100	30	70
GS	0	0	19	0	0
<b>Namoi<sup>2</sup></b>					
HS	100	100	100	100	100
GS	14	0	31	14	47
<b>Macquarie<sup>1</sup></b>					
HS	100	100	100	100	100
GS	5	0	44	9	19
<b>Manilla<sup>1</sup></b>					
HS	100	100	100	100	100
GS	50	100	100	100	100
<b>Murray<sup>1</sup></b>					
HS	25	69	55	97	-
GS	0	0	63	49	55
<b>Murrumbidgee<sup>1</sup></b>					
HS	90	90	95	95	95
GS	13	10	54	40	41



Paterson <sup>1</sup>					
HS	100	100	100	100	100
GS	100	100	100	100	100

Notes: <sup>1</sup> End of season allocation announcement. Does not include carry-over or drought payback.  
<sup>2</sup> Continuous accounting accrued announcements as a percentage of valley entitlements.  
<sup>3</sup> Does not include water in accounts at start of season. <sup>3</sup> Water year from October through to September.

### Current Allocations

The following shows the dam storage levels and the current allocations for the regulated rivers:  
**Dam Storage Volumes and Allocations – as at 1 September 2008**

Valley	Full Storage Capacity GL	Current Storage Level %	Current Storage Volume GL	Allocations for 2007/08		
				High Security %	General Security %	Carryover Available %
<b>Border Rivers</b>						
Glenlyon Dam	254	29%	<b>74</b>	100	0	30
Pindari Dam	312	29%	<b>90</b>			
<b>Lower Darling</b>						
Menindee Lakes	1 678	30%	<b>511</b>	100	0	58
<b>Gwydir Valley</b>						
Copeton Dam	1 361	19%	<b>273</b>	100	0	21
<b>Namoi Valley</b>						
Keepit Dam	425	20%	<b>89</b>	100	0	12
Split Rock Dam	397	5%	<b>24</b>	100	50	0
Chaffey Dam	61	83%	<b>52</b>	100	30	0
<b>Macquarie Valley</b>						
Burrendong Dam	1 188	17%	<b>232</b>	100	0	7
Windamere Dam	368	24%	<b>89</b>	100	0	50
<b>Lachlan Valley</b>						
Wyangala Dam	1 220	10%	<b>126</b>	20 TWS = 70	0	1
Carcoar Dam	36	8%	<b>3</b>	50	0	0
<b>Murrumbidgee Valley</b>						
Burrinjuck Dam	1 026	45%	<b>465</b>	60 d/s = 50	0	13
Blowering Dam	1 631	49%	<b>805</b>			
<b>Murray Valley</b>						
Dartmouth Dam	3 908	18%	<b>764</b>	25 TWS = 50 d/s = 505	0	10
Hume Dam	3 038	18%	<b>544</b>			
<b>Hunter Valley</b>						
Glenbawn Dam	750	56%	<b>420</b>	100	100	10
Glennies Creek	283	61%	<b>174</b>			
Lostock Dam	20	100%	<b>20</b>			
<b>Coast</b>						
Toonumbar Dam	11	100%	<b>11.1</b>	100	100	0
Brogo Dam	9	100%	<b>9</b>	100	40	0

TWS = town water supply  
d/s = domestic & stock

## **Groundwater Licences**

In the groundwater systems there are three types of entitlements:

1. High priority – covers town water supplies and “domestic and stock” users – as for regulated systems;
2. Aquifer access licences – which are essentially for all commercial purposes; and
3. Supplementary access licences – which are temporary licences that have specified volumetric entitlements that will be phased out over the term of the water sharing plan to return the over-allocated inland aquifer systems back to sustainable levels of extraction. This is part of the \$135 million joint Commonwealth-State “Achieving Sustainable Groundwater Entitlements” program.

## **Drought management in recent years relevant to the Lower Lakes and Coorong**

### ***i. Murray River***

NSW allocates water, assuming a repeat of the worst drought inflow sequence previously recorded from the time of the assessment to the end of the season.

In September and October 2006, as a consequence of drought, the minimum inflow sequence into the Murray Valley was lower, by approximately 40 percent, than the previous minimum inflow sequence.

At the same time, Snowy Hydro advised that it would reduce its diversions into the Murray River as it was also experiencing record dry inflows into the Snowy Mountains scheme water storages. Reduction in diversions below the Required Annual Release (RAR) is allowed, consistent with the operating licence, during prescribed dry inflow sequences.

As a consequence, NSW suspended access to water that had previously been made available to NSW water users, as this had been allocated based on the previous worst inflow sequence and diversion of RAR by Snowy Hydro, but could not be guaranteed to be delivered during the season. This water was subsequently re-credited to users as inflows occurred.

The likelihood of a repeat of the need to suspend access to water allocated is low as the inflow sequence experienced in 2006-07 and reduced diversions from Snowy Hydro is now the ‘new’ worst inflow sequence adopted by NSW in the assessment of water availability.

In November 2006, the former Prime Minister convened a water summit, to address the critical water shortage. An outcome of the summit was the establishment of the Senior Officers Group on Dry Inflow Contingency Planning.

The Senior Officers Group subsequently recommended temporary changes to the normal water sharing arrangements under the Murray-Darling Basin Agreement to ensure that the critical human needs of communities in the southern Murray-Darling Basin would be provided.

As a consequence of those changes, the critical human needs of most of the communities in the southern Murray-Darling Basin have been met. The exception has been the inability to provide a continuous water supply for stock and domestic purposes to landowners or for environmental purposes in the Wakool River system west of Deniliquin where only short-term pulses of water have been provided in the past two years.

Similarly, the provision of stock and domestic water in some channels within the Murray Irrigation Area and West Corungan Private Irrigation District has been restricted.

During both 2007-08 and 2008-09, the 696 GL dilution flow provided for in accordance with the Murray-Darling Basin Agreement to South Australia has been delivered. Under normal circumstances, this volume together with local run-off would maintain the adequacy of levels of the Lower lakes.

**ii. Darling River and the Menindee Lakes**

**How the Menindee Lakes storage scheme works**

The Menindee main weir raises the level of the Darling River by 14 metres which inundates the floodplain upstream of the main weir and connects the smaller lakes, Malta, Balaka, Bijiji and Tandure with the Darling River, which is confined on the eastern side by a constructed levee. Collectively the inundated floodplain and connected lakes is called Lake Wetherell.

Water from Lake Wetherell can be released directly to the Darling River or diverted via gravity into Lake Pamamaroo.

Water from Lake Pamamaroo can then be released back to the Darling River via an outlet regulator or passed into Lake Menindee via a constructed interconnecting channel.

Water from Lake Menindee will pass naturally into Lake Cawndilla when the level exceeds the natural sill between the two lakes. Water from Lake Menindee can be diverted to the Darling River.

Water from Lake Cawndilla can be diverted back to the Darling River through Lake Menindee when the level exceeds the natural sill level between the lakes, or can be diverted through an outlet regulator and channel to Tandou Creek and the Great Anabranch.

**Storage levels and capacity**

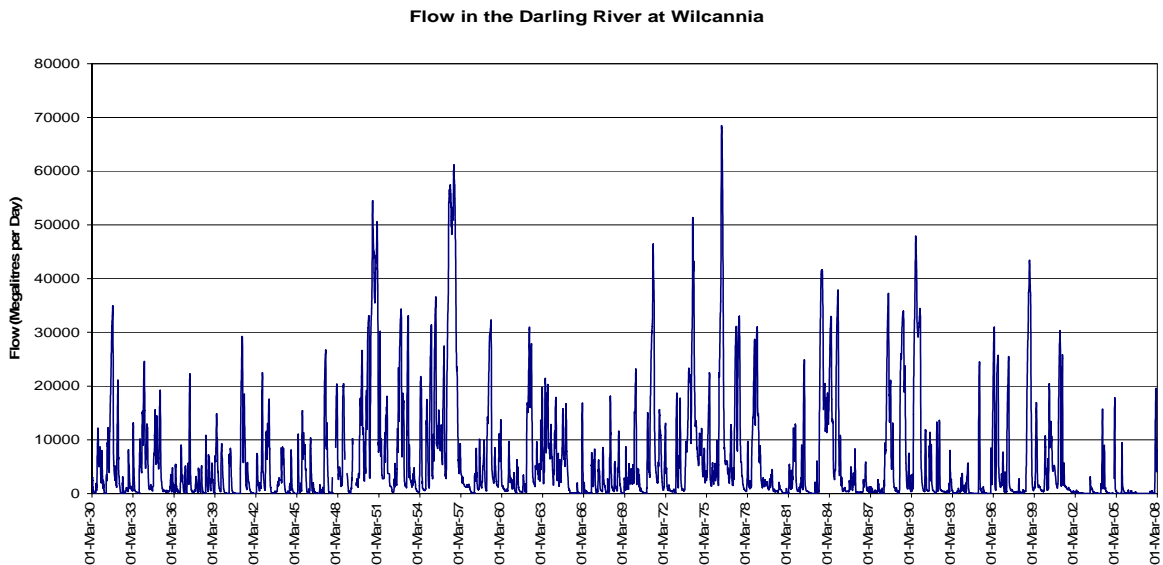
The combined storage capacity of the Menindee Lakes at full supply level is 1,610 GL. However, during floods the lakes may be surcharged to provide a combined surcharge capacity of 1,920 GL. After being surcharged, controlled releases are made from the lakes to reduce the volume to its full supply level.

<b>Lake</b>	<b>Full Supply Level Metres (AHD)</b>	<b>Full Supply Volume (GL)</b>	<b>Surcharge Volume (GL)</b>
Wetherell	61.7	193	262
Pamamaroo	60.4	270	345
Menindee	59.8	596	699
Cawndilla	59.8	547	610
<b>Total storage</b>		<b>1,610</b>	<b>1,920</b>

(Volumes are rounded)

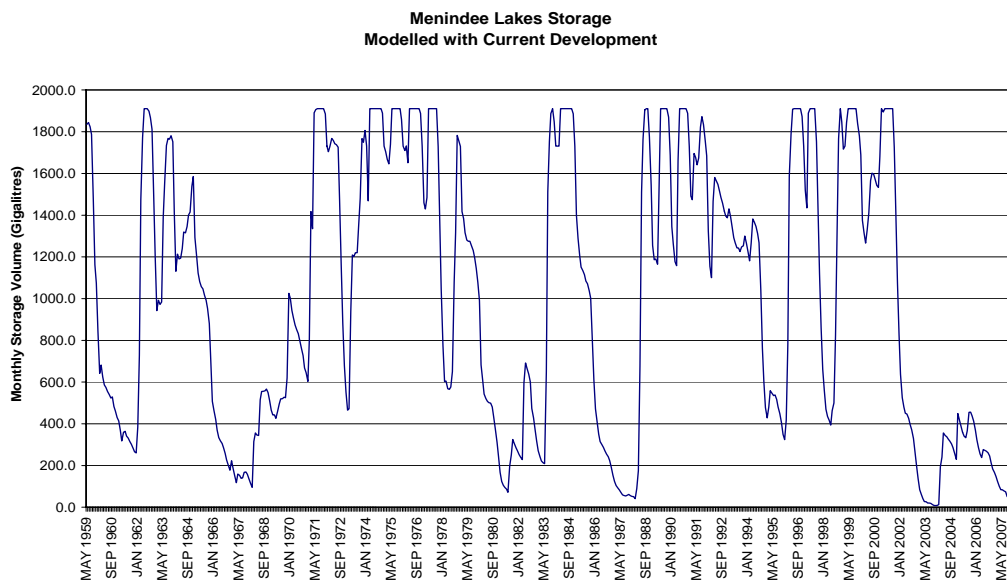
## Inflows and storage volumes

Hydrograph of the Darling River at Wilcannia from 1930 to present demonstrates extreme variability.

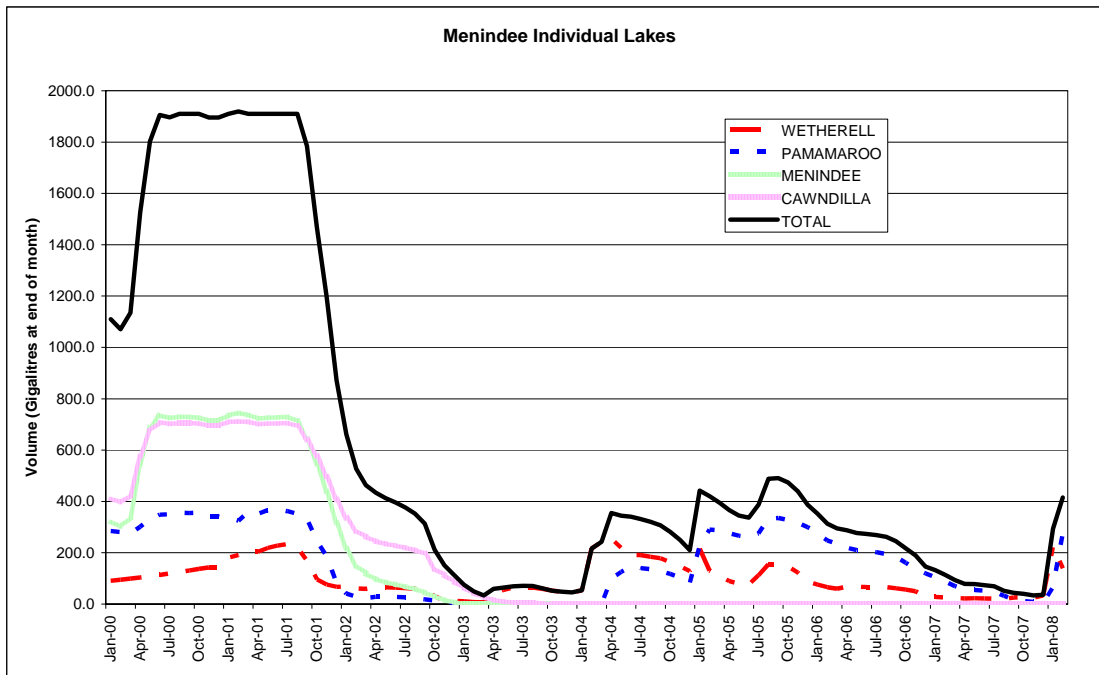


Since completion, the storage volume in the Menindee Lakes has varied in response to climate and variable inflows.

Storage volumes in the Menindee Lakes from 1959 to present, show the severity of the current drought.



The lakes were last full in August 2001 and were drawn down quickly in spring and summer of 2001-2002 to provide water into South Australia, as high spring flows in the Murray Valley that would normally meet SA demand and fill Lake Victoria did not eventuate.



Monthly storage volumes in each of the lakes since 2000.

### NSW Entitlement to water from the Menindee Lakes

Under Section 92(1) of the Murray-Darling Basin Agreement, 'Whenever water in the Menindee Lakes Storage falls below 480,000 megalitres, NSW may use the stored water as it requires until the volume next exceeds 640,000 megalitres.'

Storage volumes fell below 480,000 ML in March 2002, and have not since risen to exceed the 640,000 ML trigger when management of the storage volumes reverts to MDBC control.

When the Menindee Lakes are operated as an MDBC storage water sharing is subject to the normal storage accounting rules. That is, releases and losses are debited against one of the upper states (NSW, Qld.). The imbalance between the Basin States' accounts when the 480 GL trigger was reached in March 2002 was 199 GL in favour of Victoria. That is, of the 480 GL remaining NSW "owned" 141 GL and Victoria 339 GL.

Clause 120 of The Agreement specifies that when control of the lakes reverts to MDBC control, the account imbalance at the time the lakes reached 480 GL is reinstated. In the current situation, if the lakes reached 640 GL the accounts would be set to NSW 221 GL and Victoria 419 GL, significantly reducing the volume of water currently available to NSW.

### Management of flows from the Menindee Lakes since 2007

Since 2002, because of extreme drought, flows from the Menindee Lakes to the Darling River have been ceased on three occasions to save water to secure Broken Hill's water supply:

1. 5 January 2004 - 21 January 2004. This was the first occasion the Lower Darling River has stopped flowing in over 50 years;
2. 5 May 2007 - 2 August 2007; and
3. 12 October 2007 - 8 January 2008.

At the commencement of 2007, volumes stored in the Menindee Lakes were critically low. The length of time that water could be supplied to Broken Hill from the Lakes was less than 18 months.

Access to unregulated flows by NSW users in the Darling Basin upstream of Menindee was restricted and releases from the Lakes to the Darling River downstream of Menindee ceased on 5 May 2007 to conserve the remaining water to meet town water supplies. Water availability downstream of Menindee was reduced to residual pools.



The Darling River at Whurlee Station showing domestic and stock pumping from a residual pool - December 2007.

On 1 August 2007, minimum flows from the Menindee Lakes were recommenced to provide a small fresh to replenish pools prior to the coming summer. The releases continued until 12 October, when they ceased once again.

This water was diverted from that remaining in Lake Pamamaroo that was above the level of the sill between the outlet regulator and lake bed. This water would have otherwise evaporated during the summer months.

Extensive rainfall throughout the Darling River catchment in December 2007 generated significant inflows into the Menindee Lakes during January 2008 and releases to the Lower Darling recommenced on 8 January 2008.



Flow commencing to fill a residual pool in January 2008.



Flow arriving at a pump site in January 2008 and “normal” river levels.

### **Flow Resumption**

Flows commenced 8 January at 500 megalitres per day (ML/d), were increased to 4,500 ML/d over 5 days and maintained at this level for 5 days. Flows were then reduced to 4000 ML/d for 12 days and have been progressively reduced to 650 ML/d on 26 February, by which time 124 000 ML had been released.

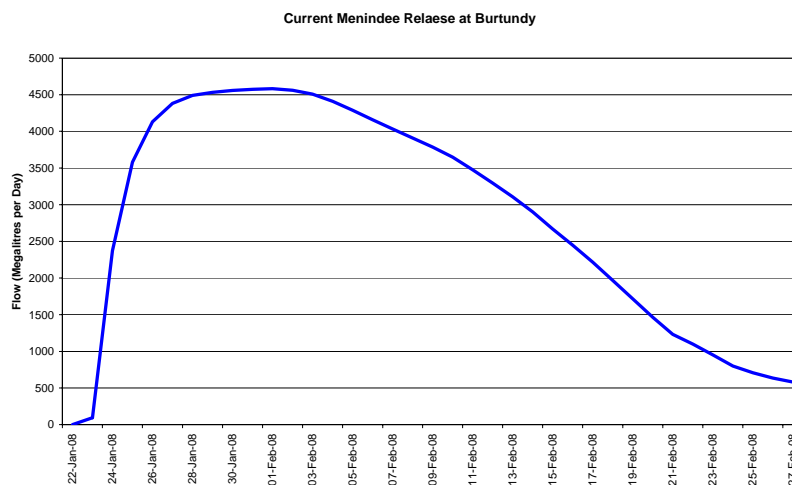
This release pattern was implemented for the following reasons:

- i) In January 2004, flows to the Lower Darling River were recommenced following a significant period of no flow when the river was also reduced to residual pools. The flow rate at this time was calculated to replenish pools but not push the residual water, which was relatively saline, into the upstream reaches of the Wentworth weir pool causing damage to irrigation orchards and vineyards.

The releases coincided with a two week period during which daytime temperatures exceeded 42°C. Extensive fish kills were observed along the River and thought may have been caused by the flows passing over the hot dry river bed, picking up organic material which passed into the residual pools causing them to deoxygenate.

The 4,500 ML/d flow rate selected in 2008 sought to reduce the potential for similar fish kills and to dilute the salinity to mitigate any impacts on irrigated agriculture. The saline spike was also passed into Lake Victoria to mitigate any downstream impacts.

- ii) The flows entering the Murray River were NSW tributary inflow and contribute to water availability in the NSW Murray Valley. This enabled water that had been made available to NSW users but suspended in 2006-07, to be re-credited.
- iii) Provide sufficient flow to meet demand after increasing high security allocation to 100 percent of entitlement and general security allocation to 50 percent of entitlement.



Hydrograph for the Lower Darling River at Burtundy (January – February 2008)

**Management of inflow and downstream flow since March 2008**

Since the widespread floods in Queensland in January, inflows into the Barwon-Darling River have progressively declined.

In early September 2008, flow upstream of the Menindee Lakes had ceased. Storage volumes in the Menindee Lakes have reduced to 511 GL.

Releases to the Lower Darling River from the Menindee Lakes have been reduced to levels that will ensure a flow at the Burtundy Weir of about 50 ML/d. This will ensure that flows will continue to the upstream extent of the Murray River weir pool.

It is proposed that up to 200 GL from the Menindee Lakes will be released to the Murray River, commencing in September 2008. This will provide the volumes needed to secure critical water needs, stock and domestic supply (currently insufficient to meet continuous stock and domestic supply in the Murray Valley), provide unused water that has been carried over from 2008-08 and the meet high security allocation for NSW Murray Valley water users.



Releases from the Menindee Lakes will be reviewed constantly. If significant inflows occur in the Murray Valley, releases from the Menindee Lakes will be reduced to conserve water in the Lower Darling system.

### **Managing to 640,000 ML storage volume**

Lakes Wetherell and Pamamaroo are capable of collectively storing 607 GL at maximum surcharge. The two options for managing inflows in excess of those required to reach this level are:

1. Release water into Lake Menindee, or
2. Pass water downstream to meet South Australia entitlement flow and for storage in Lake Victoria or to increase flows into South Australia.

Issues associated with releasing volumes in excess of those require to fill Lakes Wetherell and Pamamaroo into Lake Menindee include:

- Lake Menindee has been dry since February 2003 the resulting losses due to seepage will be significant. A reasonable estimate of seepage might be 2ML per hectare.
- The dead storage in Menindee is about 60 GL, at which level there is also about 210 GL in Lake Cawndilla. Therefore there needs to be about 290 GL in Lake Menindee and Lake Cawndilla before any water can be released to the Darling River. The surface area of Lakes Menindee and Cawndilla at this level is approximately 19 000 ha.

Water can be released from Lake Cawndilla via the Cawndilla Outlet Regulator but only to supply the Great Darling Anabranch, which now receives its domestic and stock supply via pipeline, and to Tandou Ltd. for irrigation.

At least 400 GL is required before any releases at worthwhile rates can be released to the Darling River.

Further, if MDBC water is subsequently released from Lakes Wetherell and Pamamaroo, large volumes will remain in dead storage in Lakes Menindee and Cawndilla, and constitute most of the remaining water available to NSW when the lakes reach 480 GL. In this case the security of supply to the city of Broken Hill is compromised.

In consideration of these issues, about 500 GL is required to be released into Lake Menindee and Lake Cawndilla before there can be a significant contribution to the MDBC shared resource, without compromising the NSW water requirements in the Lower Darling.

### **Proposed Management of Menindee Lakes 2007-2008**

- (i) Open the inlet regulator from Lake Wetherell to Lake Pamamaroo to enable fish passage from residual pool of Lake Pamamaroo to the Darling River upstream of Menindee. This will balance levels in both lakes.
- (ii) Reserve up to 200 GL to underwrite late season inflows into the Murray Valley to ensure that water is available to run the system in 2008-09 as agreed in the 7<sup>th</sup> report of the MDB Dry Inflow Contingency Planning (December 2007).
- (iii) Store inflows up to full surcharge volume in Lake Wetherell and Lake Pamamaroo.
- (iv) Make releases to the Lower Darling in advance of inflow which would cause storage volume to exceed 640,000 but be less than 1,100,000 ML. This means that up to 460GL may be diverted downstream of the Menindee Lakes rather than being diverted and stored in Lake Menindee and Cawndilla.

## **Water needs of the Coorong and Lower Lakes**

The NSW government is supportive of the arrangements being considered to provide water to the Lower Lakes to prevent long-term environmental damage that could eventuate from acidification.

NSW has supported the investment by the Murray-Darling Basin Commission to pump water from Lake Alexandrina to Lake Albert to maintain water levels above those that would otherwise lead to acidification of one or both of those lakes.

NSW recognises that the levels required to prevent long term environmental damage from acidification are significantly lower than those required to prevent temporary environmental impacts or to provide for the tourism industry around the Lakes that has developed opportunistically.

NSW understands that there is sufficient water required to maintain the levels in both Lake Alexandrina and Lake Albert, above the threshold levels to prevent acidification, available to South Australia until at least March 2009. This also assumes no local rainfall runoff and no improvement in the shared resources of the Murray Valley, which South Australia could unilaterally allocate for the environmental needs of the Lower Lakes.

## **Potential to provide water to replenish the Coorong and Lower Lakes**

### ***a. Menindee Lakes***

There have been suggestions made through the media that NSW should make releases of water from the Menindee Lakes to meet the needs of the Lower Lakes.

109GL of the volume remaining in the Menindee Lakes was previously committed by the NSW Government to underwrite the volumes required to convey water to meet the critical human needs of the communities along the Murray Valley.

As inflows into the Murray Valley, above the minimum inflow sequence used in planning by the Senior Officers Group, this volume (up to 200GL) has been redirected to provide the stock and domestic needs in the NSW Murray Valley, and to contribute to the provision of unused water carried over from 2007-08 and the announced high security water allocations in the Murray and Lower Darling River Valleys of 25 percent of entitlement and 100 percent of entitlement respectively.

The remaining volumes in the Menindee Lakes will be required to secure water supply to Broken Hill and users in the Lower Darling until autumn 2010, allowing for approximately 200 GL of evaporation losses during that period.

Consequently, any releases of additional volumes for the Lower Lakes would reduce the volumes already allocated for high security users, stock and domestic supplies reduce the security of supply for Broken Hill and other towns.

While the current assessment is conservative and assumes no inflows into the Menindee Lakes, it must be realised that flows in the Darling River are extremely variable. In 1902, there was 364 days of no flow at Wilcannia.

### ***b. Release of water from upstream storages***

The release of water from State-owned storages would reduce the available water for high security users in the northern river valleys of NSW, and reduce the security of supply for towns

unacceptably. Water currently stored in private on-farm storages in northern NSW is generally committed for finishing winter cereal crops. In addition most of the water released under current dry conditions would incur very high transmission losses.

The Barwon-Darling River now has only very small flows from Mungindi to near Louth where it has stopped flowing. To re-establish flow to Menindee Lakes will require an initial volume of at least 10 GL, plus an on-going loss component.

Similar situations exist throughout the system and the losses will increase as the water source moves upstream. It is estimated that the loss from Mungindi to Menindee would be about 20-25 percent after flows were established. The initial volume required to re-establish flows will increase with the increasing length of time that the river downstream of the source of flow has cease-to-flow conditions. If flows cease soon and flows do not occur until summer the initial loss to re-establish flows and the initial on-going loss will be higher. If flows cease now and are not re-established by January the losses from Mungindi to Menindee could require an initial volume of 50 GL. The ongoing loss is a greater proportion of a lower flow.

The on-farm-storages on the Barwon-Darling are designed for extraction from the river. To return water to the river may require substantial infrastructure changes and also require pumping to obtain significant volumes and useful rates.

Small rates and volumes would be completely consumed by river transmission losses and refilling of public fixed crest weirs if they are depleted when the flow occurs. The most efficient method of delivering purchased private water is to release it concurrently with a naturally occurring flow.

### ***c. Annual trade of allocated water***

The NSW Government would support the purchase of allocated water. The NSW Government has relaxed its 'normal' limitations on the temporary trade of allocated water from the Lower Darling River to the Murray-Murrumbidgee River system for 2008-09. This potentially provides an additional 9 GL on the annual water market.

### ***d. Allocate future increases in water availability for the Lower Lakes***

NSW has established clearly defined rights to water under its legislation, consistent with the requirements of the Council of Australian Governments (COAG).

The NSW allocation process is consistent with existing legislation and, where appropriate, Water Sharing Plans.

The allocation of available water outside of the existing legislation would be contrary to existing legislation and potentially incur claims for compensation by existing entitlement holders.

NSW will continue to consider cases for reallocation of available water where necessary. However, as there is no immediate threat to the Lower Lakes from acidification, NSW would consider allocation of improvements in water availability to the Lower Lakes as inappropriate and at the unnecessary expense of regional communities in the Murray Valley.