



Determining water allocations in the regulated Murrumbidgee Valley

September 2013

Introduction

The NSW Office of Water is responsible for sharing water between consumptive users and the environment throughout NSW.

Within NSW, the sharing arrangements are typically undertaken in accordance with the statutory water sharing plan for the respective water source. In some valleys, including the Murray, Murrumbidgee and Lower Darling Rivers, NOW must also consider interstate water sharing arrangements and the operations of the Snowy Hydro Scheme.

During severe water shortages, a statutory water sharing plan may be suspended, during which time the priorities for water sharing are undertaken in accordance with the *Water Management Act 2000*.

Due to severe drought, the Murrumbidgee water sharing plan was suspended between on 10/11/06 and recommenced on 16/9/11. Since the drought has broken, water sharing has been undertaken in accordance with the Plan.

While the process for determining water availability and announcing available water determinations (typically referred to as allocation) is straight forward, climate variability, seasonal circumstances and a number of operating variables can make it difficult to understand how increases in water availability are made.

This factsheet provides an overview of how water availability is determined in the Murrumbidgee Valley and how water is shared in line with the water sharing plan.

Determining starting allocations at the beginning of the year

Immediately prior to the new water year 1 July, the NSW Office of Water calculates the minimum volume of water that will be available for consumptive use during the coming year.

This includes:

- How much water is available in the storages, plus
- What are the minimum natural inflows into storages expected during the year that can be allocated for consumptive use, plus
- Required annual releases by Snowy Hydro Limited into Blowering Dam, minus
- The volume required to run the river, that includes meeting end of system flows, transmission and evaporation losses.
- The forecast volume of carryover in accounts.

The opening allocation (1 July) is therefore the minimum volume of water that can be confidently made available and delivered across the entire year to licensed users.

The determination of water availability is typically very conservative but there are a number of variables that can have an impact, including:

- The forecast inflows are the minimum inflows experienced in the 120 years of records. However, a new 'worst-drought' can be experienced, as was the case in many NSW valleys in 2006/07, where the inflows were well below the previously recorded minimums.
- During drought years, the volume required to run the river, transmission and evaporation losses are much higher than average.
- While Snowy Hydro Limited must deliver required annual releases, the timing of releases is up to Snowy Hydro Limited and is not known to NOW in advance.
- Arrangements under the Snowy Water Licence enable Snowy Hydro Limited to deliver greater than their Required Annual Release in any year, and this is reduced from their Required Annual Release in the following year. This is known as 'flex' release.

From the remaining water available the Office of Water then:

- Reduces available water by the volume of any outstanding inter-valley transfers into the Murray Valley, that have not been delivered in the previous year, then
- Sets-aside town and domestic and stock water, then
- Progressively allocates water to high security water accounts, then
- Allocates any remaining water to general security accounts.

Typically, the volume of water available for allocation for consumptive use at the beginning of the water year is low, and will increase throughout the year as inflows into the storages, higher than forecast minimums, occur.

In the Murrumbidgee Valley it is only in very dry years that water availability for high security users is less than 95 percent of entitlement at the commencement of the year.

By comparison, there will never be enough water available at the commencement of the year to announce 100 percent of water availability for licensed general security users. Increases in general security allocation will always depend on inflows during the year.

When there is sufficient water to announce 95 percent for general security users, then further improvements are allocated equally to high security and general security entitlement holders until both reach the maximum 100 percent.

Increasing allocations

As the year progresses regular assessments of water availability are undertaken. Improvements, usually from better than minimum inflows and less than forecast transmission losses, allow for allocations to be increased incrementally and volumes credited to accounts of licensed users.

The Office undertakes monthly assessments and announcements are made mid-month. After significant rainfall events or during very critical times of the year, more frequent assessments and announcements can be made, typically the beginning of the month, until full allocations are reached.

The NSW Office of Water will continue to increase allocations for general security entitlement holders until 100 percent of entitlement is reached. However, when allocation plus average carry-over exceeds 80 percent of entitlement and after the end of the summer, water is proportionally set aside for commencing allocations the following year.

Why can't there be 100 percent of water availability if the dams are full?

In the Murrumbidgee valley there is approximately 2,700 gegalitres (GL) of high and general security entitlements and it takes about 1,170 GL to run the system to deliver water for the whole year and to maintain a minimum reserve.

The total volume of Blowering and Burrinjuck Dams is about 2,650 GL.

Therefore, even if the dams were full at the start of the year there is insufficient water to announce full general security allocation at the beginning of the year. Increases in general security allocation will depend on above minimum inflows into the dams that can be stored for release later.

Why doesn't allocation increase much, or at all, when the storages are full?

The water stored in Burrinjuck and Blowering dams at any time up to the end of summer is fully allocated to meet the volumes needed to run the river to the end of the year, and meet all environmental requirements, and announced high and general security allocations.

If the dams are full, any inflows cannot be stored for release later and so effectively pass straight through. This means that they cannot contribute to meeting any additional future demand than that which is already stored and allocated.

The flows that pass straight through will usually allow periods of supplementary flow to be made available, where licensed users may divert water if required, consistent with the rules in the WSP that limit total use in any year.

The supplementary flows including downstream tributary inflows during any month will reduce the call on stored water to run the river for that month and so there is usually a small increase in allocation.

Offsetting this, however, is that the Office of Water assumes a pattern of inflows of Required Annual Releases (RAR) from Snowy Hydro Limited into Blowering Dam as part of its minimum inflow sequence. If Snowy Hydro releases water into a full Blowering Dam, this water cannot be stored for later use and the assumed RAR benefit toward allocations is lost.

Often, when this happens for an extended period, as occurred in 2012/13, it is the result of wet climatic conditions, and the wet weather flows compensate for the loss of RAR meaning that allocations already announced should not have to be withdrawn.

In summary, when the dams are full early in the year it will usually require water to be released to meet downstream demand and then new inflows to be captured before allocations can be significantly increased.

What delivery constraints exist in the Murrumbidgee?

Constraints are physical or operational "blockages" that limit the volumes of water that can be delivered.

Channel capacity constraints are outlined in the Water Sharing Plan as follows:

- 9,000 ML/day in Tumut River at Oddys Bridge
- 9,300 ML/day in Tumut River at Tumut
- 32,000 ML/day in Murrumbidgee River at Gundagai
- 1,400 ML/day in Yanco Creek at the off-take.

If the flow rates are taken above these volumes, the water will break out of the channels. This can impact public and private property and will significantly increase operational losses.

The Tumut River constraint is perhaps the most significant because it limits the rate at which water can be released from Blowing Dam.

Peak summer irrigation demand can be in excess of 20,000 ML/day, meaning that Burrinjuck Dam must supply more than half this daily requirement.

How do these constraints impact on allocation?

Remembering that release rates from Blowering Dam are constrained to a maximum flow in the Tumut River of around 9,000 ML/day, and that Blowering receives the reliable Required Annual Release from Snowy Hydro.

Burrinjuck Dam relies on **catchment rainfall**, and in dry period after a season of very large water deliveries means that levels in Burrinjuck storage are likely to be low, whilst Blowering can be nearly full.

Without significant inflows in the Burrinjuck Dam, summer of high demand will mean that Burrinjuck could empty whilst water remains in Blowering because it can only be released at **rates of maximum channel capacity**.

This has been the case as we approach the summer of 2013/14, however recent improvements in water levels in Burrinjuck Dam reduces the prospect of this imbalance occurring during summer.

In summary, there may be water available in Blowering Dam for an allocation increase, but it may not be deliverable until after the peak irrigation period has passed because of the Tumut River channel constraint.

The deliverability constraint can be overcome with improvement in the volume stored in Burrinjuck Dam, or by water use outside of the period of peak summer demand.

The Office of Water will only credit accounts with water that can be delivered with certainty, but will advise of any additional resource available for crediting as the deliverability constraint eases.

How does carry-over impact off allocation announcements?

The maximum allowable carryover for general security entitlement holders in the Murrumbidgee valley is **30 percent of entitlement**.

Under the Murrumbidgee Water Sharing Plan, water licence holders can receive and use up to 100 percent of entitlement, plus any water purchased that year. The usage can be made up of carry-over, allocation or supplementary access but altogether cannot exceed 100 percent of entitlement.

Carry-over, is set-aside first on 1 July. Allocations are then made according to water availability in accordance with the Water Sharing Plan. If an individual irrigator has carried over 30 percent of entitlement, as general security allocation increases above 70 percent, that user cannot benefit from any allocation increases because they have received their maximum account credit (100 percent of entitlement). Available water will instead be distributed to users accounts that are not yet full.

Forecasting water availability in 2013/14

A minimum volume of water is expected to be available as inflow during the year and this is incorporated into the calculations to maximise the announced commencing allocations.

On 1 July 2013 there was sufficient water to meet carryover requirements (18 percent on average) plus enable allocations of 100 percent town water and stock and domestic, 95 percent high security and 18 percent general security.

This is based on assumptions of minimum natural inflows into the storages in the coming months and releases into Blowering Dam from Snowy Hydro can be stored.

The resource balance sheet

Storages (at 27.09.13)

Burrinjuck Dam – (full capacity 1026 GL <i>currently</i>)	687 GL 66%
Blowering Dam - (full capacity 1631 GL <i>currently</i>)	1,473 GL 90%
Total	2,657 GL
	2,160 GL, 81%

Minor re-regulating weirs and storages downstream, total capacity approximately 50 GL, are used to manage (regulate) flows and maximise resource availability.

Maximum assured inflows during the year

Snowy RAR (plus flex) approx	800 GL
Minimum (new drought) inflows	300 GL (220 GL into storage plus 80 GL from d/s tributaries)
Total	1,100 GL (maximum, usefulness subject to timing of inflows)

Maximum entitlements

Conveyance	373 GL
TWS and D&S	80 GL
High Security	359 GL
General Security	1,890 GL
Total	2,702 GL

Commitments (as at 15 September 2013)

Carryover	340 GL (18%)
Undelivered IVT	0 GL
Balance EWA1, EWA2, EWA 3	92 GL
Towns, Stock, Domestic (100%)	80 GL
Conveyance	340 GL
High Security (95%)	340 GL
General Security (38%**)	718 GL
Total	1,910 GL

* There are three environmental water allowances in the Murrumbidgee Water Sharing Plan, that collectively provide water for environmental purposes in the Murrumbidgee Valley.

** Only 33% currently deliverable

Annual System Operational Requirements

Losses budget for full year	630 GL (550 GL transmission, 80 GL evaporation)
End of System Target for full year	220 GL
Storages Reserves*	320 GL
Total	1,170 GL

*includes the Provisional Storage Volumes required under the WSP.

Quick check:

Current storage	1,980 GL
Plus extra inflow	1,100 GL
	3,080 GL
Minus current commitment	1,910 GL
Minus annual ops requirement	1,170 GL
	3,080 GL

General Security allocation announcements in recent years

The recent years have been relatively wet, meaning demand for stored water has been reduced and storages have been relatively full. Prior to 2010/11 allocations were drought affected.

In 2013/14 general security allocation announcements have been;

(Average carryover 18%)

Date of announcement	Allocation %
16 Sept 13	33
2 Sept 13	28
15 Aug 13	28
1-Aug-13	25
16-Jul-13	18
1-Jul-13	18

In 2012/13

(Average carryover 27%)

Date of announcement	Allocation %
15-Apr-13	
15-Mar-13	
15- Feb-13	
15 Jan -13	
1/12/12	100
15-Nov-12	68
15 Oct-12	64
17-Sept-12	64
15-Aug-12	64
16-Jul-12	64
1-Jul-12	64

In 2011/12

(Average carryover 27%) Date of announcement	Allocation %
1-Dec-11	100
15-Nov-11	72
31-Oct-11	69
14-Oct-11	65
30-Sep-11	63
15-Sep-11	59
1-Sep-11	57
15-Aug-11	53
14-Jul-11	50
1-Jul-11	44

In 2009/10

(Average carryover 14%)

Date of announcement	Allocation %
1-Apr-10	27
15-Mar-10	26
1-Mar-10	24
15-Feb-10	20
15-Jan-10	18
30-Nov-09	15
2-Nov-09	14
23-Oct-09	11
15 -Oct- 09	4
1 July 09	0

In 2010/11

(Average carryover 25%)

Date of announcement	Allocation %
15-Dec-10	100
1-Dec-10	59
1-Nov-10	56
15-Oct-10	51
1-Oct-10	47
15-Sep-10	45
1-Sep-10	9
1-Jul-10	0

From 2004/09

During the drought years from 2004 to 2009 the final general security allocations were

Year	Allocation %	Average carry-over
2008 - 09	21	
2007 - 08	13	
2006 - 07	15	
2005 - 06	54	10%
2004 - 05	40	4%

More information

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