

## Introduction

This is a summary guide on the current water allocation method for the NSW Murray regulated river water source. It is a concise document aiming to provide public information on the water sharing framework and how water is allocated according to entitlement priority.

While this guide provides the context and approach to implementing NSW water sharing and allocations, it does not provide the detail and data needed for individuals to determine allocations independently.

The rules and processes described in this guide implement the legislative requirements of the Murray Darling Basin Agreement (Schedule 1 of the *Water Act 2007* [Commonwealth]) and the *Water Sharing Plan for the New South Wales Murray and Lower Darling Regulated Rivers Water Sources 2016*.

The Department of Planning, Industry and Environment periodically assesses available water resources. This resource assessment identifies the total volume of water available within the regulated river system and how much can be allocated to the different categories of water access license (WAL), as required by the water sharing plan.

The process of formally allocating water to WAL holders is known as an Available Water Determination (AWD)<sup>1</sup>. The results of the resource assessment and allocation process are advised through Water Allocation Statements published on the department's website. Water accounts are credited accordingly.

The allocation process can only increment water accounts with available water. It cannot withdraw water from accounts. The department is therefore very careful to avoid over-allocating water. The intent is that account water is assured in all but the worst droughts and that water users can confidently plan ahead, counting on using their account water when needed.

The water allocation statement sets out the sharing of available water across all commitments and entitlements in each category of WAL. The announced allocation reflects the proportion of entitlement that is available for use and credited to accounts.

For the NSW Murray, water allocation statements are normally published mid-monthly with an interim statement at the start of each month, until full allocation is reached for all WAL categories.

This summary guide presents key considerations behind the resource assessment and water allocation process. An example of a past resource assessment and allocation (assessed as of 15 September 2021) is also provided in this guide.

## Rights, entitlements and allocations

It is important to appreciate the distinction between rights, entitlements and allocations:

**Rights** are statutory or rules-based privileges to take a volume of water without the need to hold a WAL. Rights are typically conferred based on proximity to the river and are for non-commercial purposes. These are small in volume, but high priority, and are met from the bulk resource. They include cultural and basic land holder rights.

**Entitlements** are privileges to a share of the water source (subject to priority based on access licence category). They are expressed as a volume for specific purpose licences or unit shares for all other licences. Entitlements are held by individuals/entities in the form of

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<sup>1</sup> *Water Management Act 2000*, Clause 59.

a WAL, which states the licence type or category (and hence the priority of the WAL) and the volume/share (or size) of the entitlement.

**Allocations** are the result of an available water determination, based on calculations performed regularly to determine if resources since the last assessment have produced more available water that can be distributed to entitlement holders through their WALs. Allocations are made in accordance with the rules of the water sharing plan.

Therefore, if the entitlement is the 'bucket' (a constant asset of fixed size), then the allocation is the water placed in the bucket (variable with seasons), usually expressed as megalitres (ML)/share or percentage of entitlement. Despite holding entitlement, in dry times water users can have empty 'buckets'. An allocation announcement of 50% of entitlement will half fill an empty 'bucket'.

For example, a licence holder with 1 share of water entitlement in a water source where the available water determination is 0.5 ML per unit share, also known as a 50% allocation, will have their water account credited with 0.5 ML.

## The Murray Darling Basin Agreement

The Murray Darling Basin Agreement was established in the 1960's to share the bulk Murray resource between NSW, Victoria and South Australia.

The Agreement is administered by the Murray Darling Basin Authority, on behalf of states. The Authority also provides river operations and accounting in the Murray under guidance and agreement from the states.

In simple terms, NSW and Victoria share the physical Murray system and resources upstream of the South Australian border. NSW and Victoria equally provide from each state's respective shares of resource an agreed share to South Australia. Each state has sovereignty over the management of its resource.

Changes to the Agreement are difficult and relatively rare because they require all states to agree.

The focus of this guide is on how NSW distributes its share of Murray resource in accordance with the water sharing plan. The complex rules under the Agreement that outline NSW obligations to the Murray system and to South Australia, as well as provide for the NSW share of available Murray resource, are beyond the scope of this summary guide.

Nevertheless, some key commitments and volumes required of NSW toward the running of the Murray and the supply of South Australia's entitlements before it receives its share of resource from the Authority to distribute to NSW water users are provided in Table 1.

**Table 1. Key annual bulk commitments under the Agreement**

Items	Volume	Comments
Transmission Loss	900 gigalitres (GL) <sup>2</sup> x ½*	<p>An annual volume of expected losses (assuming drying conditions) for river operations and delivery of water orders to the South Australian border. This loss budget is distributed in a monthly pattern with higher volumes in warmer and peak irrigation months.</p> <p>The monthly budget is adjusted to actual losses with each assessment and any unused loss budget is liberated for allocation. In this way any conservatism in the budget is progressively released to water users as increased allocation. The NSW share was 493 GL as at the 15 September 2021 assessment (Annex).</p>
Evaporation Loss	300-900 GL x ½	<p>Represents evaporation anticipated from water held in storage for remainder of the water year.</p> <p>NSW share was 433 GL (as at 15 September 2021 assessment). Most of this is from a full Menindee system. When Menindee is excluded from Murray resources, Murray evaporation totals around 300 - 500 GL.</p>
South Australia Entitlements <sup>3</sup>	1850 GL x ½	Includes 1,154 GL entitlement, plus 696 GL for dilution and loss. Less under Special Accounting, more when Additional Dilution Flow is triggered, as per the Agreement.
MDBA Conveyance Reserve <sup>4</sup>	225 GL x ½	For delivery of critical water needs next year should extreme drought conditions occur.
MDBA Min Reserve <sup>5</sup>	835 GL x ½	End of year reserve. Built after South Australia's share for the rest of the year is met. Remains NSW water.

\* NSW and Victoria ½ each.

<sup>2</sup> One gigalitre (GL) = 1,000 megalitres (ML) = 1,000,000,000 litres (L) or 1 billion litres.

<sup>3</sup> Murray Darling Basin Agreement Clause 88.

<sup>4</sup> Murray Darling Basin Agreement Clause 102D.

<sup>5</sup> Murray Darling Basin Agreement Clause 103.

## NSW Murray water users

There are different priorities for water allocation, including the environment, basic land holder rights and licence (WAL) holders. The principles and hierarchy of allocating available water to the different categories of licences are prescribed in the *Water Management Act 2000* and the water sharing plan. The Act states<sup>6</sup> that sharing of water from a water source must protect the water source, its dependent ecosystems and basic landholder rights.

The maximum annual volumes that can be assigned to NSW Murray licences are 100% of their entitlement (110% for general security). The corresponding total volumes for full allocations are therefore as follows:

Domestic and stock WALs	17.1 GL
Town water supply <sup>7</sup> WALs	45.4 GL
High security (HS) WALs	191.7 GL
NSW Conveyance WALs	330.0 GL
General security (GS) WALs	1,843.0 GL

There are also supplementary WALs with a combined entitlement of 252.6 GL. Supplementary WALs can only be used in periods of announced supplementary flow, which typically occur when inflows from tributaries and/or spills from storages cannot be captured (re-regulated) and flows within the river are higher than regulated commitments. Water for use by supplementary access WALs is not met by ordering a release from storage, but can only be met from unregulated flows. Water used by supplementary WAL is inclusive of NSW share of Murray resources.

At the commencement of the water year, supplementary WALs usually receive a full 100% allocation<sup>8</sup>, but that account water can only be used when there are unregulated flows declared. This ensures that the regulated supply for other water users is not affected.

Apart from the entitlements listed above, there are a number of other obligations on the NSW share of Murray resources, including rules-based Planned Environmental Water (PEW) requirements and rights as shown in Table 2 (in no particular order).

<sup>6</sup> *Water Management Act 2000*, Clause 60(3).

<sup>7</sup> Local water utility, Broken Hill pipeline and high security (town) WALs.

<sup>8</sup> Water sharing plan, Clauses 42 and 49.

**Table 2. Annual operational and rules-based NSW obligations**

Items	Volume	Comments
Basic land holder rights <sup>9</sup>	1.9 GL	Landowners with river frontage can take water without a licence for domestic and stock purposes.
NSW Barmah-Millewa Environmental Water Allowance* (EWA) <sup>10</sup> PEW	350 GL (max)	Credited up to 75 GL per year. Account balance must be borrowed and allocated to water users if general security allocation <30%. Must be repaid when general security allocation reaches 30%. Account withdrawn upon physical spill from Hume. Account balance 230 GL as of 15 Sept 2021 assessment.
Murray Additional Allowance PEW	30 GL(max)	3% of high security entitlement (about 6GL), credited 1 July but nil if high security < 97%. Account limit is 15% of high security entitlement. Account withdrawn upon physical spill from Hume. Account balance 6 GL as at 15 September 2021 assessment.
Wakool Allowance	70 GL	To maintain Wakool system connectivity and deliver water orders. Can be reduced down to 40 GL if conditions permit.
Critical Human Needs Reserve <sup>11</sup>	61 GL	For NSW critical human needs.
River Murray Increased Flow*	Variable	Volume based on annual Snowy water savings.  Accumulates in the Snowy Scheme then released by Snowy Hydro to Hume Dam for use in the Murray.  Account balance 25 GL as at 15 September 2021.

\* Half provided by NSW and half by Victoria.

## Opening allocation

Opening allocations must be provided at the beginning of each water year, as required by the water sharing plan, for the following licence holders: domestic and stock, local water utility and high security.

These entitlements are commonly referred to as high priority needs and are small relative to the general security entitlement pool. They are typically depleted through steady usage across the year. Their account balance for the outgoing water year is forfeited and new allocations are made at the commencement of the new water year (on 1 July).

<sup>9</sup> While this water is set aside, Basic Landholder Rights is not a licensed entitlement (WAL) and does not receive an allocation.

<sup>10</sup> Environmental Water Allowance.

<sup>11</sup> Murray Darling Basin Plan Clause 11.03.

The opening water allocations on 1 July and subsequent increments are based on the volumes of water that can be confidently made available for the entire year to NSW licensed water users and the environment.

The following allocations are directed by the water sharing plan<sup>12</sup> for high priority entitlements at the start of each water year, if enough water is available:

- Domestic and stock, local water utility licences: 100%
- High security [sub-categories] licences: 100%
- High security licences: 97%
- Conveyance licences: 50%

If a year starts with insufficient water to make these high priority allocations, then they are met with the next available water. Only when these opening allocations have been made, can allocations be made to general security licences. Once general security allocations commence, commensurate incremental allocations to conveyance entitlements are also made. The water sharing plan also requires commitments to PEW be met (listed in Table 2).

When general security allocations reach 97% of entitlement, then allocation to both high and general security licences can proceed to 100% concurrently, after which NSW Murray general security allocations can further proceed to a maximum 110% of entitlement.

## Major steps in water allocation process

The major steps in the resource assessment process for water allocations in all regulated river systems in NSW include:

- 1) Identifying the accessible water in storages.
- 2) Adding future assured minimum inflows.
- 3) Deducting all existing commitments, inclusive of reserves for next year's high priority needs.
- 4) Setting aside water for system operation and minimum releases.
- 5) Distributing any excess available water for allocation as directed by the water sharing plan.

This can be further illustrated using Equation (1) below.

$$\text{Available Water} = \text{Current Resource} + \text{Future Inflow} - \text{Commitments} - \text{Overheads} \quad (1)$$

Water allocation is based on a very conservative budget of future inflow. As the year progresses, regular assessments of water availability are undertaken. Improvements, usually from greater than budgeted inflows and less than forecast transmission losses, allow for allocations to increment.

*Available water* in Equation (1), is identified from each assessment and becomes the next water to be allocated. It can include borrowed BM-EWA if general security allocation is less than 30% of entitlement.

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<sup>12</sup> Water sharing plan Clauses 29(1), 44(2), 46(3), 47(2).

Unlike other NSW water sources, the Authority is responsible for the shared Murray system and undertakes the resource assessment to determine NSW's shares of the resource in accordance with the Murray Darling Basin Agreement.

When NSW receives its bulk share, after the Authority has removed NSW's obligation to South Australia, loss budgets and mandatory reserves, NSW distributes the remaining available water in accordance with the water sharing plan.

The Authority repeats the resource assessment fortnightly until maximum allocations are reached, and states continue to distribute incremental improvements to respective entitlements.

The arrangement of line items in the resource assessments for each NSW water source is different (see Table 4), however; in broad terms, balance sheets conform to Equation (1).

The four items shown on the right-hand side of Equation (1) are described below.

## Current resource

Water resources in the River Murray are shared between NSW, Victoria, and South Australia under the Agreement (see Figure 1 below). NSW shares half of the inflows into Hume Dam, Dartmouth Dam and from the Kiewa River with Victoria. NSW receives all the inflow from its tributaries including the Murrumbidgee and Billabong systems. NSW shares half of the Menindee Lakes resource with Victoria, except when it is below 480 GL and is controlled by NSW for local needs only. Menindee returns to shared resource when the system next rises above 640 GL.

In a dry year, if it is forecasted that NSW will be unable to achieve its 1,250 GL mandatory reserve by 31<sup>st</sup> May under the Agreement<sup>13</sup>, then NSW is deemed to be in Special Accounting with South Australia. Under Special Accounting NSW does not receive its 50% share of the headwater inflow and also need not to supply the entire annual 1850 GL x 50% to South Australia. Instead, NSW gets 1/3<sup>rd</sup> of the headwater inflow and another 1/6<sup>th</sup> of inflow contributes towards South Australian entitlement.

The Authority determines the NSW share of current resources using a monthly resource assessment model. An example is set out in Table 4 where the Authority assessed that the NSW gross share of stored water was 3,340 GL at the end of August 2021.

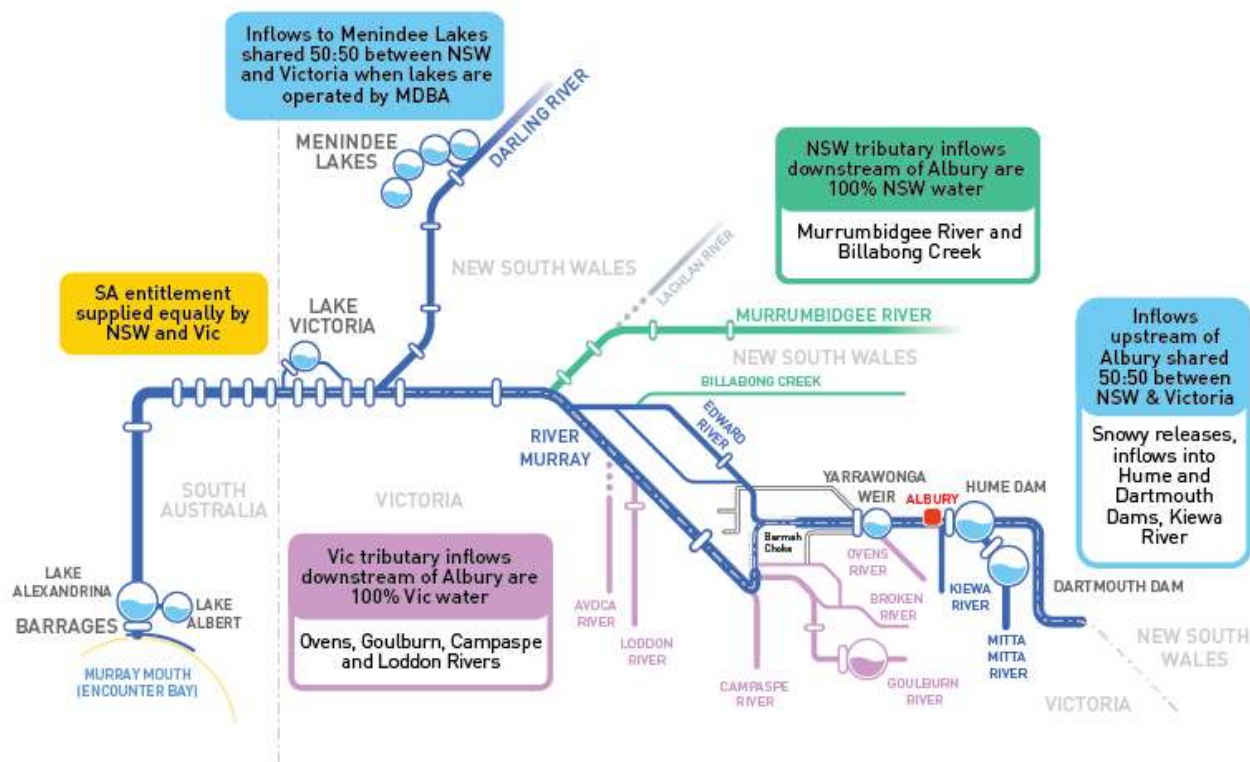
After accounting for future inflows and NSW obligations under the Agreement, NSW was provided 2,270 GL to distribute in its mid-September allocation announcement. This assessment found that, once all prior commitments had been met, 335 GL remained for new allocations.

This was assigned as 234 GL for general security licences, some 14% of entitlement, plus 18 GL for conveyance licences or some 5% of entitlement, in accordance with the water sharing plan. The remainder went to paying back water borrowed from the Barmah-Millewa EWA in accordance with the water sharing plan.

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<sup>13</sup> Murray Darling Basin Agreement Clause 123.

Figure 1. The shared River Murray system<sup>14</sup>



## Future inflow

The resource assessment considers future inflow which, as implied, has yet to accrue in storage. There is a small risk that some of this assumed future inflow, already allocated to water users, will not eventuate, meaning that water has been credited to accounts that cannot be delivered.

This circumstance unfolded in the Millennium drought and caused significant crop failures when water credited to accounts was not available when most needed. It also occurred during the recent record drought of 2018-20 across northern inland NSW. Water managers are required to be risk-averse in dealing with uncertain future conditions, particularly unknowable future inflows and transmission losses that affect future water availability.

In maintaining system supply, as required under clause 32 of the water sharing plan, water managers must assume the current river levels and inflows will recede to a repeat of the lowest historical inflows as known at the commencement of the plan (2004).

That is, they must assume drought conditions will imminently set in and must manage the system to assure water supply to high priority needs is maintained. To the extent that actual conditions are better than assumed, the next resource assessment will incorporate these better than assumed conditions and likely identify more available water to allocate.

## Inflow into storages

Inflows into Dartmouth, Hume, and shared Menindee storages are included in the resource assessment. Hume Dam also receives regulated discharges from Snowy Hydroelectric Scheme,

<sup>14</sup> <https://www.mdba.gov.au/water-management/allocations-states-mdba/water-sharing>



which is discussed later. Apart from the shared Kiewa River, inflows below Albury belong to the state from which they come as they are considered state tributary inflows.

The NSW resource assessment secures water through a repeat of the driest observed inflow period<sup>15</sup> up to 1 July 2004 (the commencement of the inaugural water sharing plan). This is the agreed level of risk as specified in the water sharing plan. The budgeted volume of future inflow balances the competing interests of water allocation for productive use versus water security for drought.

The driest observed inflow scenario prior to 2004 has been interpreted as the 99-percentile volume out of the full period of inflows, from 1891, used by the MDBA, or the second lowest annual volume in the over 100-year simulation.

The 99-percentile case used by NSW therefore omits the Millennium drought. The NSW government chose not to become more conservative in allocating water following the new record (Millennium) drought in the southern basin, rather opting to use drought management strategies when water shortages recur. Other states are more conservative and adopt more extreme scenarios with a smaller additional volume. This means that in most years, NSW allocates extra water, but in severe drought when inflows are less than assumed, NSW Murray water users can expect tighter water conditions than other states.

Determining the inflow volume requires setting a future planning horizon period. In the NSW Murray, the planning horizon is the remainder of the current water year to June. As the water year progresses and resource assessments are required to look forward to assuring supply for the second year, the planning horizon is extended to the end of the subsequent water year.

The inflow budget ending in May (the end of the Authority's water-year), progressively decreases as the remaining water year shortens. The actual historical years of minimum inflow volume varies depending on duration.

No future inflows to the Menindee system is budgeted in the assessment, as the Darling River experienced zero to minimal inflow for extended periods in the past.

Table 3 below shows the inflow budget at three distinct months<sup>16</sup> and their corresponding historical references.

**Table 3. Future inflows budgeted by NSW, combined for Dartmouth, Hume (unregulated) and Kiewa**

Assessment horizon, 3 examples	1890 to 2011 99 <sup>th</sup> Percentile	Closest year in history
June to May: 12 months	760 GL x ½	6/1914 to 5/1915, 860 GL
September to May: 9 months	423 GL x ½	9/1914 to 5/1915, 620 GL
January to May: 5 months	93 GL x ½	1/1998 to 5/1998, 129 GL

<sup>15</sup> Water sharing plan Clause 32 (1).

<sup>16</sup> Murray-Darling Basin Authority Technical Report to BOC 22, Water Resource Assessment Process, 29 July 2013, Appendix A.

### Snowy hydroelectric releases

Hume Dam receives a significant volume of water from the Snowy Mountains Hydroelectric Scheme – the proceeds of power generation, as well as inflows from the downstream natural catchment. The capture and release of water by Snowy Hydro Limited is regulated under the Snowy Water Licence.

Snowy Hydro Limited contributes a guaranteed volume to the Murray through the Snowy water-year (May to April), whilst operating the scheme to maximise the economic return from electricity markets. This is known as Required Annual Releases (RAR).

There are adjustments to the base RAR volume of 1,062 GL per year, with releases potentially affected by:

- Dry Inflow Sequence Volume
- Pre-Release
- Relaxation Volume
- Discretionary Above Target Release
- Snowy Savings Volumes

The details of these complex adjustments are beyond the scope of this summary guide. However, all water expected from Snowy Hydro Limited in a year is included in the resource assessment and allocated as soon as it is known, often on 1 July.

For example, from May 2020 to April 2021, the regulated discharge from the scheme was 1,232 GL<sup>17</sup>. Each resource assessment budgets for the full forecast adjusted RAR volume, regardless of when the volume is physically released during the year from the scheme. Snowy Hydro Limited releases of water to the Murray are shared equally with Victoria.

### Commitments

Every resource assessment check to see if more water has become available since the last assessment, primarily through additional rainfall and runoff. If the assessment shows more water has become available beyond that already assigned for this year's use, as well as next year's high priority commitments, it is allocated in accordance with the water sharing plan rules.

Commitments for a given water year include water in accounts, planned environmental water volumes and reserves (see Table 4). The complex rules under the Agreement that determines the NSW share of Murray resources are beyond the scope of this summary guide.

In addition to its commitments under the Agreement, NSW reserves a volume from this year's resource to ensure the required allocation to next year's high priority needs. The maintenance of water supply from year to year is directed by the plan<sup>18</sup>. This is explained next.

### Second year reserve

The second year reserve is necessary to ensure the required opening allocation to high priority commitments<sup>19</sup> in NSW can be made every 1 July. The new opening allocation each year requires

<sup>17</sup> Snowy Hydro, Annual Operating Plan 2021 | 2022, page 4

<sup>18</sup> Water sharing plan, clause 32.

<sup>19</sup> Water sharing plan Clauses 29(1), 44(2), 46(3), 47(2).

over 415 GL which if cannot be met from new resources, must be met from reserves in preceding year.

Often the second year reserve can be built late in the water year from autumn resource improvements, however for dry conditions, the building of the reserve should commence earlier.

In the 2020-21 water year, the reserve commenced at 30 GL in the 15/10/20 assessment, which then increased to 161 GL by the 17/5/21 assessment, with the balance accruing in June. The uncertainty of future weather and inflows, and resource improvements, makes the exercise of balancing allocations now with the need to maintain future water supply across years particularly challenging.

### Other reserves

There are reserves that the Authority considers as indicated in Table 1, prior to bulk allocation to NSW. In addition, NSW sets aside in the current year 61 GL<sup>20</sup> for critical human needs from its own resource and guarantee that it is available if needed in the following year.

## System overheads

System overheads include water that is required to operate the regulated river. This includes water evaporated from the storages and water lost during deliveries.

### Evaporation loss

Storage evaporation loss is a direct function of the storage's surface area which changes over time with storage levels and drawdown patterns. Evaporation loss from storages is proportional to the balance each state holds and therefore, is not required to be equal.

The resource assessment simulates future storage behaviour and estimates the evaporative loss volume. The assessment uses the historically high evaporation losses experienced during 1982-83 which include an annual evaporation of 974 mm and 758 mm from Hume and Dartmouth surfaces respectively. Similarly, high historical rates are budgeted from Menindee lakes. The drawdown is based on the total diversion volume for the remainder of the year, distributed monthly to four river sections<sup>21</sup> to Wentworth, and transfer volumes between storages. The department supplies the expected total diversion volume by its users to the Authority for the assessment.

### Transmission loss

Transmission loss is defined as water released from the storages in addition to the demand at the pump site. It is often described as 'water to run the river system'. The volume is the water lost through seepage and river surface evaporation, net of any gain from tributary inflow meeting the demand.

NSW and Victoria equally share the transmission losses incurred in operating the regulated Murray system up to the South Australian border, regardless of the relative proportions of demand between NSW and Victoria. The assessment model apportions a fixed annual loss<sup>22</sup> of 900 GL along the six river sections and distributes it monthly.

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<sup>20</sup> Murray Darling Basin Plan Clause 11.03.

<sup>21</sup> Upstream of Yarrowonga, Yarrowonga to Euston, Euston to Wentworth and Edward Wakool system.

<sup>22</sup> Conservatively high loss. Dry year of 2015-16 losses were 849 GL.

To the extent that actual losses are less than budget after each resource assessment, unused 'loss' water is liberated for allocation, meaning any conservatism in the loss budget is progressively returned during the year to water users as allocation.

Transmission loss downstream of South Australian border is met by the South Australia dilution and loss provision of 696 GL. This volume is part of 1,850 GL entitlement for South Australia in Table 2.

It should be noted that transmission losses increase significantly with over-bank (flood) flows as they inundate extensive (floodplain) areas. However, this is often unregulated water with limited adverse impact to the regulated supply upon which most licensed water users depend.

The transmission losses within the Murray Irrigation Limited system are provided for under a Conveyance entitlement. The initial Conveyance WAL has since been reduced after investment in irrigation efficiencies and the associated savings transferred to environmental water holders.

When Murray Irrigation Limited infrastructure is used to augment the Barmah Choke capacity in the transfer of water from upstream to downstream of the choke, a 10% transmission loss is incurred, met equally by NSW and Victoria, in part to remunerate Murray Irrigation Limited.

NSW manages and operates the Wakool system, which has several inflow points from the Murray and Edward Rivers. This typically requires 40 - 70GL (dependent on conditions) each year to be set aside to ensure connectivity and delivery to water users through the Wakool system.

The actual Wakool System losses are estimated throughout the season and debited by Murray-Darling Basin Authority against the NSW share of Murray resource.

## Water allocation example of 15 September 2021

As an example, the resource assessment behind water allocation statement published on 15 September 2021 is provided in Table 4. The assessment determined a 14% allocation to general security and 5% to conveyance WALs.

Surplus volume was distributed among eligible shares, based on the formula shown at the bottom of the table.

**Table 4. Detailed allocation balance sheet for 15 September 2021**

Key Items	Items (GL)	Balance (GL)
<b>Annual 2021/22 resource budget (7/21 to 6/22)</b>	<b>2270</b>	<b>2270</b>
Dartmouth, Hume, L Victoria & Menindee (31/8/21)	3340	
Future inflow including Snowy unreg (Sep to May)	1094	
Usage, trade, 30 GL supplementary take (Jul to Aug)	149	
<i>less future evaporation and transmission losses (Sep to May)</i>	- 946	
<i>less unreg to SA, tributary surplus, basic rights</i>	- 190	
<i>less remaining (Sept - May) South Australia dilution and loss</i>	- 757	
<i>less MDBA conveyance and minimum reserves</i>	- 418	
<b>Planned environmental water</b>	<b>261</b>	<b>2009</b>
Barmah Millewa EWA	230	
Environmental RMIF	25	
Murray Additional Allowance	6	
<b>Reserves</b>	<b>86</b>	<b>1923</b>
Wakool loss reserve (min 40 GL, max 70 GL)	70	
Critical human need 21/22, (max 61GL)	16	
Year 2 Reserve	0	
<b>Commitments (1/9/21)</b>	<b>1671</b>	<b>252</b>
Domestic and stock	17	
Local water utility	45	
High security (97%, 100% subcategory)	184	
Conveyance	203	
General security carried over on 1/7/21	720	
General security 2021/22 (30%)	502	
<b>Available for Allocation</b>	<b>252</b>	<b>Nil</b>
General security 14%	234	
Conveyance 5%	18	

## Disclaimer

Allocations are based on a conservative future inflow budget. However, during extended dry periods, inflow may be less than that budgeted with higher delivery loss, creating a shortfall in allocated resources. The management of a deficit to meet allocated water during extreme drought is beyond the scope of this summary guide. Readers are referred to the [NSW Extreme Events Policy](#) for more detail on managing resources through severe water shortages.

In the event of a shortfall where there is insufficient physical water to match all water in accounts, and if it is in the public interest to do so, a temporary water restriction may be imposed to prevent access to account water. This is one drought management tool, akin to a temporary negative water allocation, used to protect supplies for critical needs.

The routine water allocation computation broadly follows this guideline, however; it can be subject to wider hydrological considerations not covered in this summary document. This document serves as a guide only and is subject to improvements and changes over time. Water users should use this information with caution and are encouraged to seek their own expert advice as needed.

## Version History

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Reviewed for Approval	November 2021	D Singh, B Graham
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© State of New South Wales through Department of Planning, Industry and Environment 2021 The information contained in this publication is based on knowledge and understanding at the time of writing (December 2021) However, because of advances in knowledge, users should ensure that the information upon which they rely is up to date and to check the currency of the information with the appropriate departmental officer or the user's independent adviser.

## Annexure

Example: Water allocation statement - 15 September 2021

15 September 2021

## NSW Murray and Lower Darling

### Water allocation update

There is a **14% increase to general security** water allocations in the **NSW Murray** regulated river water source. The total cumulative allocation to general security licences in the NSW Murray is now at 44% of entitlement for this water year. Incorporating carryover, average general security water availability is now approximately 87% of entitlement. All **Lower Darling** regulated river entitlements, including **general security**, received their full allocation (100%) on 1 July 2021.

Rainfall continues to provide significant inflows into the River Murray System. The resource available to NSW has improved by approximately 335,000 megalitres (ML) since the last assessment. Airspace releases have resulted in approximately 120,000 ML of the Barmah-Millewa Environmental Water Allowance (BMEWA) spilling, with the revised balance now 230,000 ML. With the BMEWA liability now settled, general security allocation can continue to accrue.

General security water users have been exercising their uncontrolled flow access provisions taking water without-debit. This will further boost allocations as they become available. This is because the usage, coupled with private carryover already credited to accounts, causes account limits to be reached earlier and therefore allocations to go further.

It is estimated that future improvements equating to around 22% increase in general security is all that is needed to reach full general security allocations. This statement includes indicative forecast improvements to general security under various inflow conditions.

Airspace releases and tributary inflows continue to create unregulated flow conditions across the Murray valley and provide supplementary access. The unregulated flows are also being used to meet Additional Dilution Flow requirements to South Australia, as required by the Murray Darling Basin Agreement. Supplementary access details can be found at <https://waterinsights.watarnsw.com.au/>.

Menindee Lakes System (MLS) has filled for the first time since 2012, with the current combined storage holding around 1,760,000 ML (as of 14 September 2021). Inflows from the upstream systems are expected to continue for the coming months. Under current forecasts, the MLS will be surcharged and then drawn down to full supply level (100%) during summer. Where possible, any drawdown releases will be used to meet demands. Updates can be found on the WaterNSW website (<https://waterinsights.watarnsw.com.au/>).

2021-22	High Security	General Security	Average Carryover
Murray	97%	44%	43%
Lower Darling	100%	100% <sup>#</sup>	2%

<sup>#</sup> Availability of allocation on individual licences is subject to account limits as per the rules in the Water Sharing Plan



### Murray storage levels (as at 14 September 2021)\*

- Dartmouth Dam is 77% full – rising – holding 2,965,000 ML.
- Hume Dam is 97% full – falling – holding 2,910,000 ML.
- Lake Victoria is 97% full – stable – holding 655,000 ML.
- Menindee Lakes System is 101% full – rising – holding 1,760,000 ML.

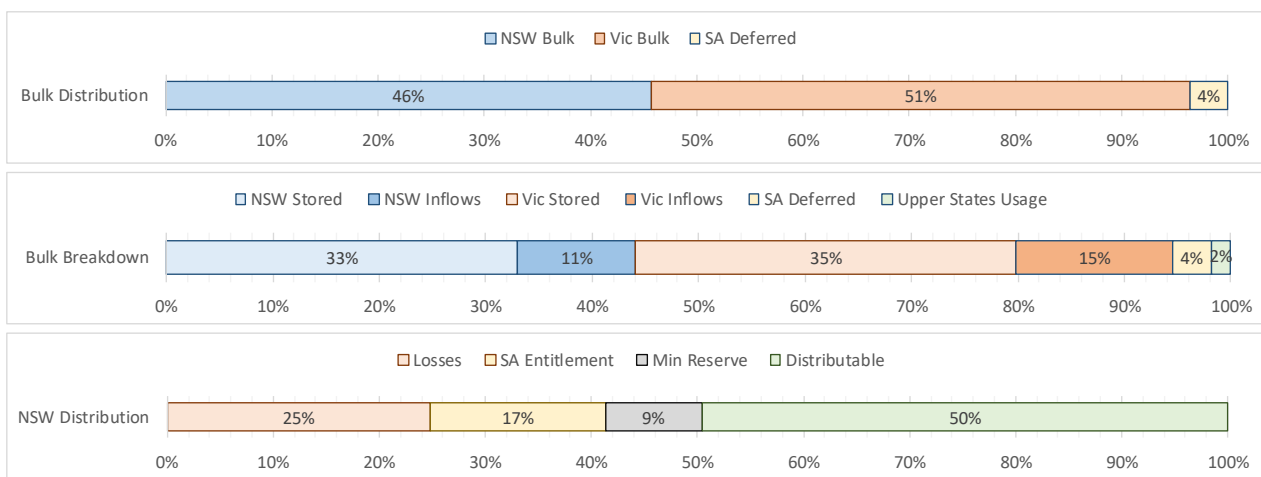
\* The NSW share of this water is approximately 35%, 49%, 42% and 39% for these storages respectively, or 42% in total (averaged across all storages).

### State sharing of the Murray resource

The bulk accounts assessment indicates that around 9,960 gigalitres (GL) of total shared Murray resource is available in the extreme dry (99<sup>th</sup> percentile) case. The NSW share of this resource is approximately 4,580 GL based on the rules in the Murray-Darling Basin (MDB) Agreement. After removing commitments required under the MDB Agreement, including losses in operating the River Murray System, South Australia’s entitlement flow and the minimum reserve, the assessment results in a volume of **Murray resource for NSW to allocate of 2,270 GL.**

The bulk resource assessed by the Murray Darling Basin Authority (MDBA) includes supplementary and uncontrolled flow diversions in the NSW usage. Therefore, the assessed share of the Murray resource must be reduced by this unregulated use to account for water used from unregulated water sources. The unregulated water usage does not adversely impact regulated allocations. In this assessment, the notional resource of 2,300 GL has been adjusted down to an actual resource of 2,270 GL.

### Distribution of Murray Resources



The breakdown of the Murray resources is provided in the graphs above. It is provided on a trial basis to provide NSW Murray water users with more information on the distribution of resources within the Murray regulated system. The breakdown is based on the 99% inflow scenario, which is the scenario used by NSW for its allocations and water sharing framework. The NSW government’s acceptable risk, on behalf of all water users including towns and the environment, is given in the water sharing plan. NSW is required to work to the minimum inflow scenario prior to the commencement of the plan (2004). The MDBA’s 99% scenario closely aligns with the minimum pre-Millennium drought scenario. Therefore, NSW distributes the volume provided by the MDBA’s 99% scenario to satisfy the water sharing plan.

It is important to note that other jurisdictions make allocations based on their own water sharing framework and risk appetite. Therefore this 99% (extreme dry) scenario should not be used to infer allocation announcements by other jurisdictions.

Additional notes for the graphs are provided below:

- **Bulk Distribution Graph** – distribution of bulk resource into NSW’s bulk share, Victorian bulk share and South Australia’s deferred storage. **Of the total resource available in the Murray under the 99% scenario, NSW is entitled to approximately 46% of it.**
- **Bulk Breakdown** – breakdown of distribution of bulk resource, as per the Bulk Distribution Graph, by state and resource source (i.e. stored water vs future inflow). **Of the 46% of the total bulk resource which NSW is entitled to (under the Bulk Distribution Graph), approximately 33% is sourced from stored water and 11% is sourced from future inflows, with the remainder coming from usage to date.**
  - Future inflow includes minimum inflows into major storages, expected tributary inflows and un-delivered IVT balance.
  - As the distributable resource is comprised of usage to date, usage in NSW and Victoria contributes to the total resource made available to date. Note, other jurisdictions may report on remaining account balances, which does not require the incorporation of usage to date. NSW reports on total water made available to date, which must include water which has been used to date.
- **NSW Distribution** – breakdown of the resource which NSW is entitled to (i.e. the 46% component of the bulk resource under the Bulk Distribution Graph).
  - 25% of the resource NSW is entitled to is required for losses.
  - 17% of the resource NSW is entitled to is required to meet commitments to South Australia (dilution and non-dilution) as per the Murray Darling Basin Agreement.
  - 9% of the resource NSW is entitled to is required to meet minimum reserve requirements as per the Murray Darling Basin Agreement.
  - Leaving **50% of the resource NSW is entitled to for distribution amongst its water users as per the Water Sharing Plan. Distributable resource includes usage to date.**

## Climatic outlook

The Bureau of Meteorology’s seasonal outlook for October to December indicates that rainfall is likely to be above average across the catchment. Temperatures are likely to be near or warmer than average.

The Bureau’s El Niño-Southern Oscillation is neutral. Models indicate that negative Indian Ocean Dipole (IOD) conditions have developed and may persist until summer. Negative IOD conditions increase the chances of above average rainfall in winter-spring.

For further details: [www.bom.gov.au/climate/outlooks/#/overview/summary](http://www.bom.gov.au/climate/outlooks/#/overview/summary)

## Trade

In the Murray, trade across the Barmah choke remains restricted to ‘**no net trade downstream**’. Downstream trade opens to the extent of the volume of any upstream trade. Water users are advised to monitor the Murray-Darling Basin Authority (MDBA) website ([www.mdba.gov.au](http://www.mdba.gov.au)) for information about the trade balance and status of trade across the Barmah choke.

Temporary trade between the Lower Darling and the Murray is now open and will likely remain open until the system next falls below 480 GL. Trade within the Lower Darling regulated river water source remains open.

The normal operating range for the Murrumbidgee IVT account is between 0 GL and 100 GL. Trade **out** of the Murrumbidgee is **closed**, while trade **into** the Murrumbidgee valley is **open** (as of 14 September 2021). Water users should monitor the WaterNSW website ([www.waternsw.com.au](http://www.waternsw.com.au)) for daily information about the IVT account balance, the status of trade,

and other information. The IVT account balance at the end of the previous water year has carried forward into this water year.

## Next announcements

The next water allocation statement will be published on **Friday 1 October 2021**. It will be a short statement, updating any improvements in resource and allocations.

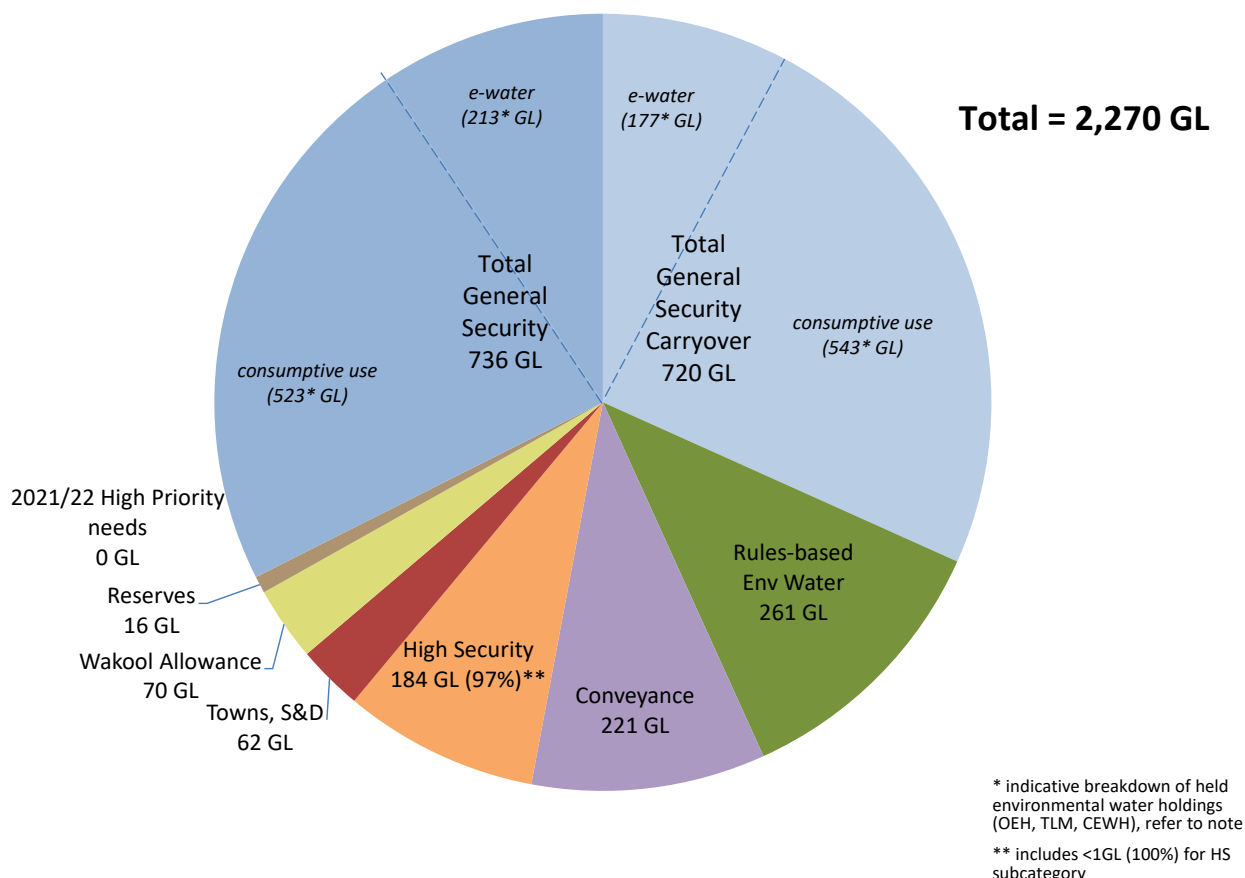
The next comprehensive statement, including likely improvements in general security allocations under various inflow scenarios, will be published on Friday 15 October 2021.

## NSW Murray resource assessment data sheet

Resource Distribution* (15 September) for 2021-22	Volume (GL)
Total Available Resource <sup>(1)</sup>	2,270
<i>less</i>	
Carryover <sup>(2), (8)</sup>	720
Rules based Environmental Water <sup>(3)</sup>	261
Towns, Stock, Domestic <sup>(4)</sup>	62 (100%)
Announced High Security subcategory <sup>(4)</sup>	<1 (100%)
Announced High Security <sup>(4)</sup>	184 (97%)
Conveyance <sup>(5)</sup>	221 (67%)
Wakool Allowance <sup>(6)</sup>	70
Reserves <sup>(7)</sup>	16
Announced General Security <sup>(8)</sup>	736 (44%)
Year 2 (2022-23) high priority needs <sup>(9)</sup>	0

\*See notes below

### NSW Murray resource distribution 2021-22 – 15 September 2021

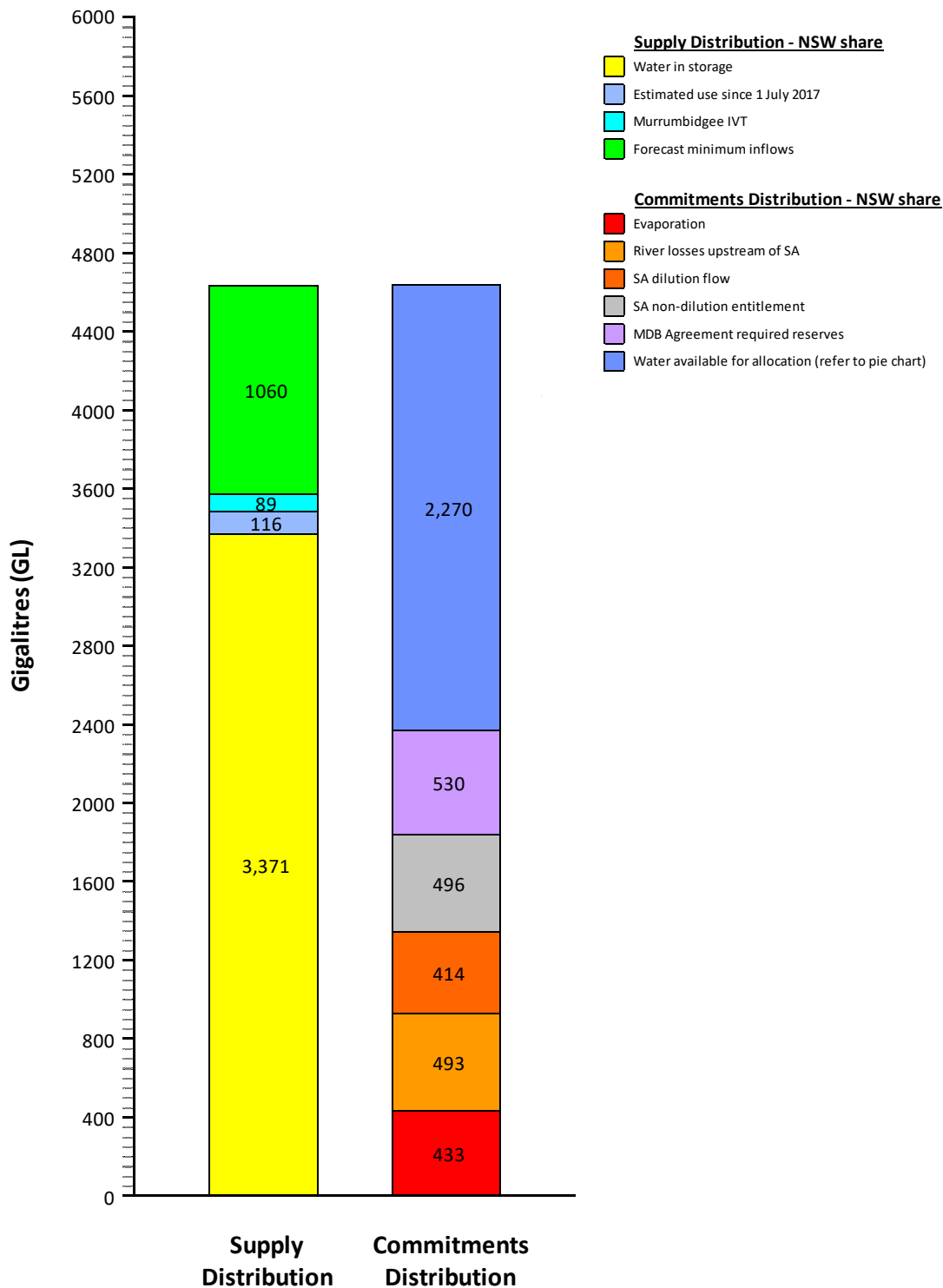


#### Data sheet notes

- (1) Total available resource - NSW's state share of active storage volume (Hume, Dartmouth, Menindee and Lake Victoria) as assessed and accounted for under the Murray-Darling Basin Agreement at the time of the assessment plus any usable flows in transit plus assumed (99%ile) inflows for the rest of the year plus Snowy Hydro's assured Required Annual Release (RAR) (including any flex (pre-release) from the prior year), as well as estimated usage to date. Snowy Hydro's M1 releases to date for this water year (2021-22) is estimated to be about 425 GL. NSW is not in Special Accounting with South Australia (SA) as of 15 September 2021. The details of Special Accounting can be found in the MDB Agreement clauses 123-129. Special Accounting is triggered when forecasts indicate that NSW will have an end of year reserve of less than 1,250 GL.
- (2) Carryover – NSW Murray General Security water users can carryover a maximum account balance of 50% of their entitlement into the following water year. The account limit is 110% of entitlement, meaning that account credits from allocation and/or carryover cannot exceed 110% of entitlement in any water year. The limit does not include allocation trade.
- (3) Primarily rules-based planned environmental water (PEW) – water required to be set aside to provide for riverine environments, as per the Water Sharing Plan and other inter-jurisdictional agreements. In the NSW Murray this includes the Murray Additional Allowance (MAA) (about 6 GL) and the Barmah-Millewa Allowance (B-MA) (230 GL – fully paid back). It also includes River Murray Increased Flows (RMIF) in Hume, accrued as part of the Snowy Water Initiative (currently 25 GL). The total commitments to B-MA and RMIF will decrease over the water year as they are released from Hume for use. Excludes 'licence-based' environmental water, known as held environmental water (HEW).
- (4) The *Water Sharing Plan for the New South Wales Murray and Lower Darling Regulated Rivers Water Sources 2016* has subcategories of High Security licences in the Murray Water Source. High Security subcategory licences under *Part 7 Division 2 Clause 46(2)* that are present in the Murray include community and education, research, and town water supply. At the commencement of each water year, these licences are to receive 100% allocation, while remaining High Security licences are to receive 97% allocation. For the purposes of this water allocation statement, the High Security town water supply allocation volume has been grouped as "Towns, S&D".

- (5) Conveyance entitlement – a category of access licence originally issued to Irrigation Corporations to facilitate delivery of water through their channel systems. Allocation to this category is prescribed in the Water Sharing Plan and is a function of current High and General Security allocation.
- (6) Wakool Allowance – a conveyance volume necessary for NSW to operate the Edward-Wakool system. Typically up to 70 GL.
- (7) Reserves – required primarily under statutory plans, up to 61GL; set aside for critical human needs in accordance with Clause 11.03 of the Basin Plan.
- (8) Held environmental water (HEW) – water administered by environmental water holders is reported here, with the associated portions of general security allocation and carryover also identified in the above pie chart. This reporting of held environmental water is limited to only NSW entitlements, reporting of credits to accounts (not usage or trade), and estimated to be 213 GL of GS, 177 GL of GS carryover, 24 GL of HS, 34 GL of conveyance allocation. These entitlements are held and/or managed either singly or jointly by various environmental holder groups, including the NSW Department of Planning, Industry and Environment (DPIE), The Living Murray (TLM) and the Commonwealth Environmental Water Holder (CEWH). Details on environmental holdings can be found on individual agency websites.
- (9) 2022-2023 high priority needs on 1 July 2022 - volume set aside to cover high priority needs on 1 July 2022, for 'Year 2'.

## NSW Murray water balance – 15 September 2021



### Water balance notes:

Supply and Commitments Distribution – The volumes in the categories shown are only those relating to NSW’s share of the resource, at the end of the preceding month. The categories include the following:

- Water in storage: Volumes in the dams at the end of the previous month. (Excludes water in storage unavailable to NSW under the water sharing arrangements of the Murray Darling Basin Agreement).
- Estimated use since 1 July: Estimated NSW usage to-date, reconciled periodically with hydrographic updates (meter

- readings).
- **Forecast inflows:** NSW's share of forecast inflows into the River Murray System based on assumed extremely dry future conditions (includes Snowy Hydro's guaranteed inflows for the water year, and Murrumbidgee end of system flows).
  - **IVT:** Total tributary system water bought by Murray system users that is yet to be delivered.
  - **Evaporation:** Water set aside for evaporation for the remainder of the year. This reduces as the year progresses.
  - **River losses upstream of SA:** Water budgeted for transmission losses from the River Murray system upstream of the South Australian border for the remainder of the year. Generally reduces as the water year progresses.
  - **SA non-dilution entitlement:** Water to supply South Australia's entitlement flow, as required under the Murray-Darling Basin (MDB) Agreement. Generally reduces as water year progresses.
  - **SA dilution flow:** Water to provide South Australia's dilution and conveyance component of flow, as required under the MDB Agreement. Reduces as the year progresses, unless Additional Dilution Flow (ADF) is triggered.
  - **MDB Agreement required reserves:** Includes conveyance reserve and minimum reserve to be set aside for use in the next water year, as required by the MDB Agreement in clause 102D and 103, respectively.
  - **Water available for allocation:** NSW's bulk share of the resource that can be assigned to NSW Murray entitlement holders based on the Water Sharing Plan. Allocation of this volume is provided in the above table and pie chart.

## Comparison with 2020/21

Item	Mid-September 2020 (GL)	Mid-September 2021 (GL)	Comments
NSW Share of total resources	1,165	2,270	Wet conditions boosting resources in 2020/21.
less			
Carryover	350	720	Higher carryover in 21/22 due to higher allocations in 20/21.
Environmental	7	261	230 GL of the BMEWA has been paid back in 2021.
Towns, Stock, Domestic	68	62	Approximately 6 GL of temporary critical conveyance licences are no longer required in 2021/22 due to improved conditions.
Conveyance	184	221	Commensurate with general security allocations.
Wakool Loss	70	70	
High Security	184	184	
General Security	251	736	44% allocation in 2021/22 vs 15% in 2020/21.
Reserves	51	16	Lower reserves required in 2021/22.

## Chances of improvement

Each resource assessment assumes that current river flows will reduce to extreme dry (99% AEP) conditions. This is a safe assumption, but water users can use the following inflow scenarios to plan for potential future allocation announcements. The chances of improved general security allocations, based on a repeat of historical inflows, are provided in the following table under a variety of conditions. The forecast is based on all available historical data, which is appropriate given the seasonal outlook, and gives a better outlook than using just the driest years on record

(dry tercile). To be clear, the analysis considers historical data and does not explicitly consider the likely wet conditions in the seasonal rainfall forecast.

It is important to note that these estimates are indicative improvements only and are not guaranteed allocations. Estimates may change based on weather conditions, water management decisions and river operations. This means water users should use this information with caution and at their own risk.

### Forecast General Security allocations (%)

(Any carryover water can be added to these indicative allocations)

Repeat of historical inflow conditions	1 Nov 2021	1 Feb 2022
99 chances in 100 (extreme) (99%)	44%	44%
9 chances in 10 (very dry) (90%)	44%	44%
3 chances in 4 (dry) (75%)	44%	57%
1 chance in 2 (mean) (50%)	51%	100%
1 chance in 4 (wet) (25%)	59%	100%

Note 1: Estimated values indicative only, not guaranteed and subject to change based on actual events unfolding.

Note 2: Statistical values reflect NSW share of inflows, not whole of system inflows.

Note 3: Forecast assumes 43% general security carryover.

Note 4: Forecast incorporates Murrumbidgee regulated end of system flows.

Note 5: Physical spills limit resource improvements as inflows are unable to be captured. Actual resource improvements will be highly dependent on the pattern of inflows and demands experienced over the coming months. With storages full, and future inflows at high risk of partial spill, there is high uncertainty in the numbers provided above.

Note 6: In the NSW Murray valley, general security (GS) account limit is 110% and carryover limit is 50%. Once allocations reach 60%, accounts start spilling, aiding in rapid allocation increases, resulting in 100% GS announcement for 50% and 75% inflow conditions by 1 February 2022.

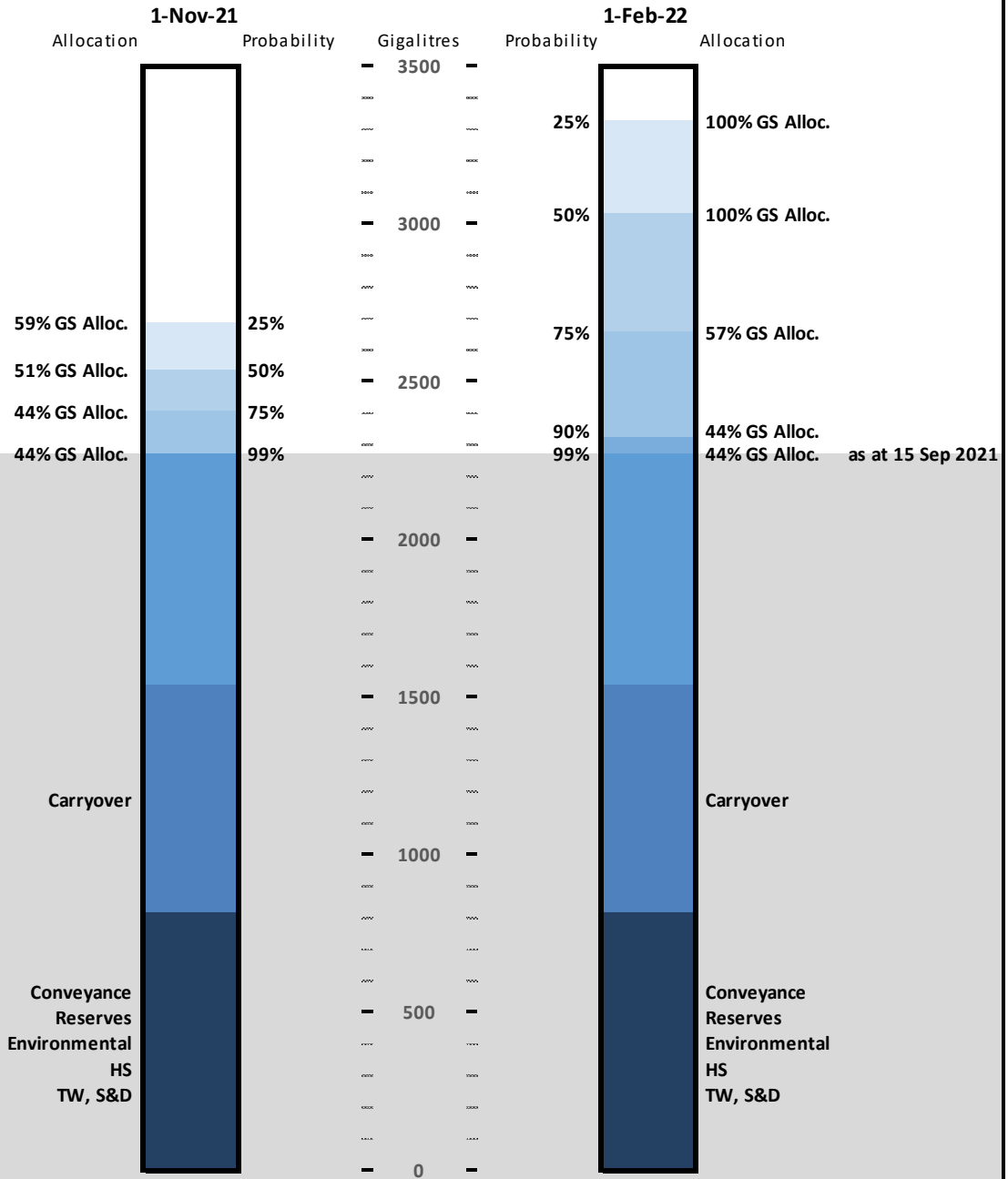
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## NSW Murray Valley Outlook

as at 15 September 2021



This figure provides indicative improvements in general security allocations for two forecast snapshots, 1 November 2021 and 1 February 2022. The allocation improvements are indicative only, and do not constitute guaranteed allocations. As of 15 September 2021, General Security allocation is at 44 per cent, and under 99% inflow conditions, will remain the same for the rest of the water year.