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GENERAL PURPOSE WATER ACCOUNTING REPORT

Murrumbidgee Catchment

2018–19



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Abbreviations

| Abbreviation | Description |
|--------------|---|
| ARCGIS | mapping and spatial analysis platform for designing and managing solutions through the application of geographic knowledge |
| AWAS 1 | Australian Water Accounting Standard 1 |
| AWD | available water determination |
| BoM | Bureau of Meteorology |
| CAIRO | computer-aided improvements to river operations |
| DRB | Daily release balance |
| ECA | environmental contingency allowance |
| GIS | geographic information system |
| GPWAR | general purpose water accounting report |
| IQQM | integrated quantity and quality model |
| MDBA | Murray–Darling Basin Authority |
| ML | megalitres (1,000,000 litres) |
| ML/d | megalitres per day |
| MODFLOW | modular, three-dimensional, finite-difference groundwater flow model |
| PSV | Provisional storage volume |
| SILO | climatic data provision system run by the Queensland Government for the provision of both measured and modelled data |
| WAS | Water accounting system |
| WASB | Water Accounting Standards Board |
| WaterNSW | WaterNSW is a New South Wales Government–owned statutory corporation that is responsible for supplying the state’s bulk water needs, and operating the state’s river systems and dams |
| WLS | Water licencing system |
| WSP | water sharing plan |

Glossary

| Term | Meaning |
|---|--|
| allocation | the specific volume of water allocated to water allocation accounts in each season, defined according to rules established in the relevant water plan |
| allocation assignments | the transfer of water between licence holder allocation accounts as a result of a trade agreement The assignment becomes part of the receiver's current year allocation account water. |
| allocation account | water account attached to an access licence used to track the balance of account water |
| available water determination (AWD) | the process by which water is made available for use and shared amongst water users who hold a water access licence It determines the volume of water that is to be added to an individual's licence allocation account. |
| Australian Water Accounting Standard (AWAS) | a national standard that prescribes the basis for preparing and presenting a general-purpose water accounting report (GPWAR) It sets out requirements for the recognition, quantification, presentation and disclosure of items in a GPWAR. |
| back-calculation | a calculation approach using a mass balance to determine an unknown variable (used to calculate storage inflows based on balancing the change in storage volume where inflow is the only unknown) |
| basic rights | the non-licensed right to extract water to meet basic requirements for household purposes (non-commercial uses in and around the house and garden) and for watering of stock It is available for anyone who has access to river frontage on their property. |
| computer-aided improvements to river operations (CAIRO) | a spreadsheet-based water balance model used for optimising river operations (orders and releases) |
| carryover | the volume or share component that may be reserved by a licence holder for use in the subsequent year |
| catchment | the areas of land that collect rainfall and contribute to surface water (streams, rivers, wetlands) or to groundwater A catchment is a natural drainage area, bounded by sloping ground, hills or mountains, from which water flows to a low point. |
| dead storage | the volume in storage that is generally considered unavailable for use (e.g. water level below release valves) due to access and often poor water quality |
| effective storage | the total volume of storage minus the dead storage component—the volume generally considered as useable |
| effluent | flow leaving a place or process Sewage effluent refers to the flow leaving a sewage treatment plant. An effluent stream is one which leaves the main river and does not return. |
| entity | a defined geographical area or zone within the accounting region Transactions and reports are produced for each entity. |

| Term | Meaning |
|---|--|
| end of system | the last defined point in a catchment where water information can be measured and/or reported |
| environmental water | <p>water allocated to support environmental outcomes and other public benefits</p> <p>Environmental water provisions recognise the environmental water requirements and are based on environmental, social and economic considerations, including existing user rights.</p> |
| evaporation | <p>the process by which water or another liquid becomes a gas</p> <p>Water from land areas, bodies of water, and all other moist surfaces is absorbed into the atmosphere as a vapour.</p> |
| evapotranspiration | the process by which water is transmitted as a vapour to the atmosphere as the result of evaporation from any surface and transpiration from plants |
| extraction | <p>the pumping or diverting of water from a river or aquifer by licensed users for a specific purpose (irrigation, stock, domestic, towns, etc.)</p> <p>The volume is measured at the point of extraction or diversion (river pump, diversion works, etc.).</p> |
| general purpose water accounting report (GPWAR) | <p>a report prepared according to the Australian Water Accounting Standard</p> <p>It comprises several components including a contextual statement, a statement of water assets and water liabilities, a statement of change in water assets and water liabilities, a statement of physical water flows, notes and disclosures, and an assurance and accountability statement.</p> |
| general-security licence | <p>a category of water access licence implemented under the <i>Water Management Act 2000</i></p> <p>This forms the bulk of the water access licence entitlement volume in NSW and is a low-priority entitlement (i.e. it only receives water once essential and high-security entitlements are met in the available water determination process).</p> |
| groundwater | water location beneath the ground in soil pore spaces and in the fractures of rock formations |
| high-security licence | <p>a category of water access licence implemented under the <i>Water Management Act 2000</i></p> <p>It receives a higher priority than general-security licences but less priority than essential requirements in the available water determination process.</p> |
| HYDSTRA database | a database used by NSW Department of Planning, Industry and Environment to store continuous, time-series data such as river flow, river height, and water quality |
| inflows | surface water runoff and deep drainage to groundwater (groundwater recharge) and transfers into the water system (both surface and groundwater) for a defined area |
| inter-valley trade | trade of licence holder allocation account water via allocation assignment from one catchment to another catchment (or state) |
| intra-valley trade | trade of licence holder allocation account water via allocation assignment within the same catchment |
| median | the middle point of a distribution, separating the highest half of a sample from the lowest half |

| Term | Meaning |
|--------------------------|---|
| non-physical transaction | an accounting transaction representing a process that is not a component of the water cycle (e.g. an available water determination) |
| physical transaction | an accounting transaction representing a process of the water cycle (e.g. an extraction) |
| regulated river | a river system where flow is controlled via one or more major man-made structures such as dams and weirs For the purposes of the <i>Water Management Act 2000</i> , a regulated river is one that is declared by the minister to be a regulated river. Within a regulated river system, licence holders can order water against a held entitlement. |
| share component | an entitlement to water specified on the access licence, expressed as a unit share or, in the case of specific purpose licences (e.g. local water utility, major water utility and domestic and stock), a volume in megalitres The amount of water a licence holder is allocated as a result of an available water determination and the amount they can take in any year is based on their share component. |
| storage | a state-owned dam, weir or other structure that is used to regulate and manage river flows in the catchment and the water bodies impounded by these structures |
| storage reserve | proportion of water in a storage reserved in the resource assessment process for future essential or high-security requirements (e.g. town water) |
| storage volume | the total volume of water held in storage at a specified time |
| supplementary water | unregulated river flow available for extraction under a supplementary licence |
| surface water | all water that occurs naturally above ground including rivers, lakes, reservoirs, creeks, wetlands and estuaries |
| tributary | a smaller river or stream that flows into a larger river or stream Usually several smaller tributaries merge to form a river. |
| ungauged catchment | a catchment without a flow gauge to accurately record stream flows Modelled estimates must be used to approximate the contribution of ungauged catchments to the main river. |
| water accounting | the systematic process of identifying, recognising, quantifying, reporting, assuring and publishing information about water, the rights or other claims to that water, and the obligations against that water |
| water assets | the physical water held in storage, as well as any claims to water that are expected to increase the future water resource (e.g. external water entering the system through inter-valley trading) |
| water licencing system | Database system administered by waternsw to manage NSW licence water licences, approvals and associated dealings |
| water liabilities | claims on the water assets of the water report entity, including water that has been allocated to licence holder accounts or environmental accounts, yet to be taken at the end of the reporting period |
| water sharing plan | a water management plan that defines the rules for sharing of water within a region under the <i>Water Management Act 2000</i> |

Directors foreword

This is the tenth annual release of the general-purpose water accounting report (GPWAR) for the Murrumbidgee Regulated River Water Source. It has been prepared for the accounting period 1 July 2018 to 30 June 2019 (the reporting period), under the Australian Water Accounting Standard 1 (WASB, 2012).

The GPWAR provides stakeholders with a consolidated, comparable and publicly accessible set of water accounting information for the water source. The information presented is also used internally for a range of water planning functions and legislative reporting obligations.

Included in the GPWAR are

- a contextual statement, summarising the climatic conditions, water resources, environmental holdings, water trading market and water resource management in the water source for the reporting period
- a physical flow diagram illustrating changes in storage volumes and the associated inflows and outflows
- water accounting statements presenting the opening and closing balances, and itemised changes to these balances for available water resources (water assets), licenced allocation accounts (water liabilities) and planned environmental water accounts (water liabilities)
- disclosure notes (linked to the figures within the water accounting statements) providing detailed information of accounting components including:
 - access licence account balances
 - planned and held environmental water account balances
 - a detailed available water determination report
 - temporary trading by licence category
 - supplementary announcements and usage by river reach
 - physical inflows and outflows to the system for the water year

While groundwater has not been directly included in this GPWAR (aside from those processes that directly affect the regulated river), annual groundwater summary reports by water source are published separately and accessible via the department's website at www.industry.nsw.gov.au/water

As Director Water Analytics, NSW Department of Planning, Industry and Environment, I declare:

- the information presented in these accounts as a faithful representation of the management and operation of the Murrumbidgee Regulated River Water Source for the reporting period
- all data presented in this report is based on the best available information at the time of publication
- NSW Department of Planning, Industry and Environment has, to the best of its ability, prepared this GPWAR in accordance with the Australian Water Accounting Standard 1.

Danielle Baker

Director Water Analytics

NSW Department of Planning, Industry and Environment

Contextual statement

The Murrumbidgee catchment covers 84,000 square kilometres of southern New South Wales. It is bordered by the Great Dividing Range to the east, the Lachlan catchment to the north and the Murray catchment to the south.

The Murrumbidgee River spans almost 1,600 kilometres, rising in the Monaro Plains near Cooma and flowing westward towards its junction with the Murray River near Balranald. The climate is extremely diverse ranging from alpine conditions in the Snowy Mountains where elevations are over 2,200 metres to semi-arid conditions on the Riverina plains where elevations are less than 50 metres.

The Murrumbidgee River is regulated by Burrinjuck Dam located near Yass at the junction of the Yass and Goodradigbee Rivers. The valley also receives water from the Snowy Mountains Scheme which is stored in Blowering Dam on the Tumut River. Downstream of Narrandera the major effluent of Yanco Creek leaves the river, feeding a series of regulated creeks that flow southwest to eventually join the Murray River. The lower end of the Murrumbidgee River is known as the Lowbidgee, a broad floodplain where the river degrades into a complex area of effluent channels and swamps.

The Murrumbidgee River flows through lands previously occupied by the Wiradjuri people, the largest Aboriginal nation in NSW. Today the Murrumbidgee catchment supports a population of approximately 520,000 people. It includes the Australian Capital Territory and national capital Canberra (314,000 people) and Wagga Wagga, the largest inland city in NSW (57,000 people). The catchment also supports numerous regional cities and towns including Cooma, Tumut, Narrandera, Griffith, Leeton, Hay and Balranald.

Major irrigation districts have developed around Griffith, Leeton and Coleambally producing fruit, vegetables, wine and rice. Water is delivered to these areas from the river through offtakes at Berembed and Gogeldrie Weirs. Outside of these areas, the dominant agricultural land uses are grazing and dryland cropping.

Groundwater is also an important source of water for industry and agriculture in the catchment. The groundwater and surface water systems in the catchment have a range of connectivity which varies from being highly connected on a permanent or seasonal basis to being permanently disconnected. The interaction is influenced by surface and groundwater use, climate and flood frequency, significance and duration.

Supporting a complex range of natural ecosystems, the Murrumbidgee catchment contains many significant wetland habitats such as the extensive Lowbidgee wetlands and the Tuckerbill and Fivebough Swamps listed under the international Ramsar Agreement for their ecological importance. Extensive areas of riparian river red gum forest along the middle and lower reaches of the river provide valuable riparian habitat for waterbirds and a variety of threatened fauna species.

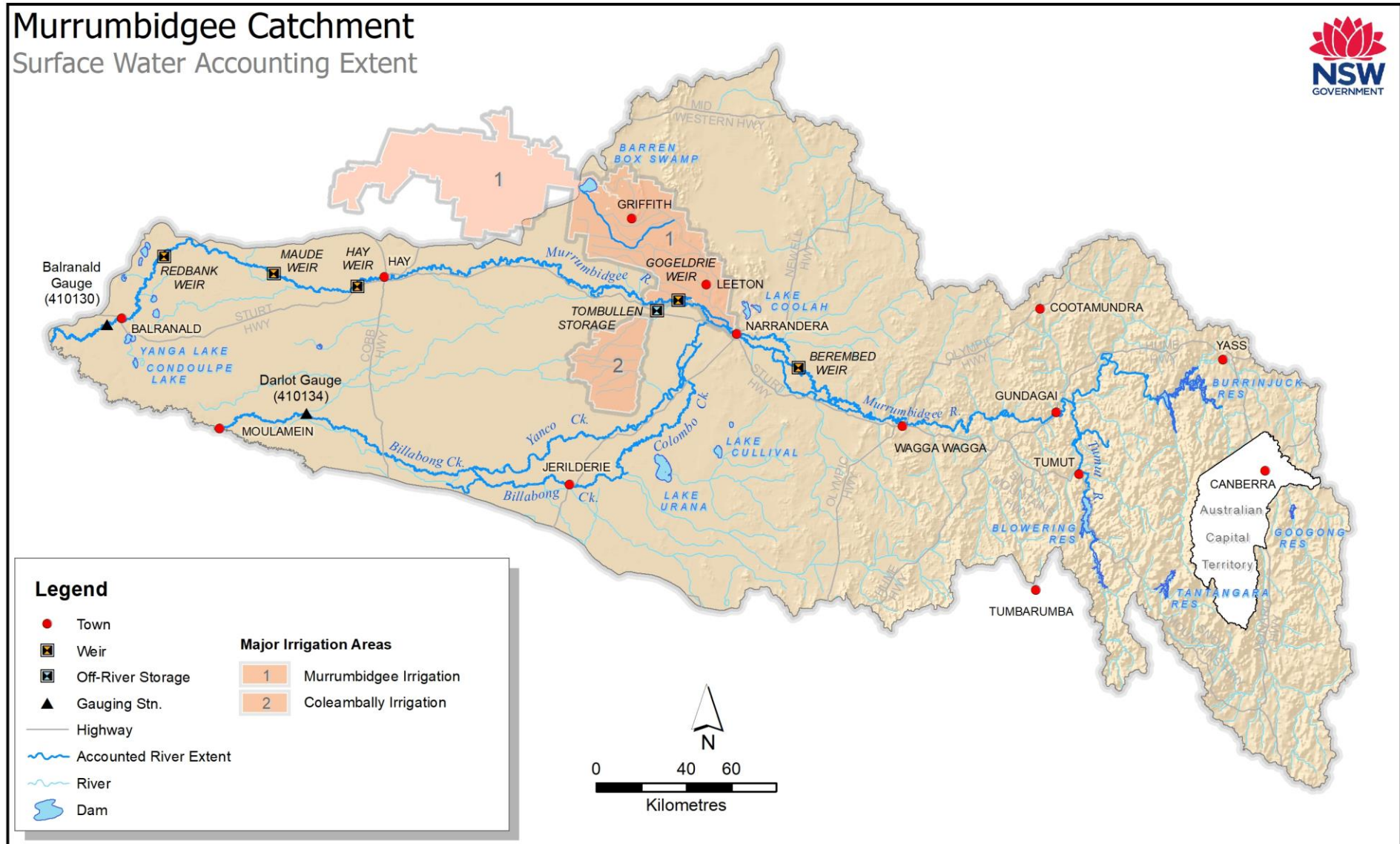
More detailed information on the catchment is available in the report *Water resources and management overview: Murrumbidgee catchment* available from the department's website at www.industry.nsw.gov.au/water

Accounting extent

This report covers the extent illustrated in Figure 1 and details the water management associated with that area. It includes; the Tumut River from Blowering Dam to the river's confluence with the Murrumbidgee River, the Murrumbidgee River from Burrinjuck Dam to its confluence with the Murray River (downstream of Balranald), Billabong Creek to its junction with the Edward River downstream of Darlot, Yanco Creek and Colombo Creek. A full list of the water courses considered to be part of the regulated Murrumbidgee River can be obtained in the *Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016* (see www.industry.nsw.gov.au/water).

While physical groundwater volumes that interact with the regulated river are included in GPWAR statements where possible (and any interactions not directly estimated form part of the unaccounted difference) all other groundwater flows and groundwater management are excluded from the GPWAR.

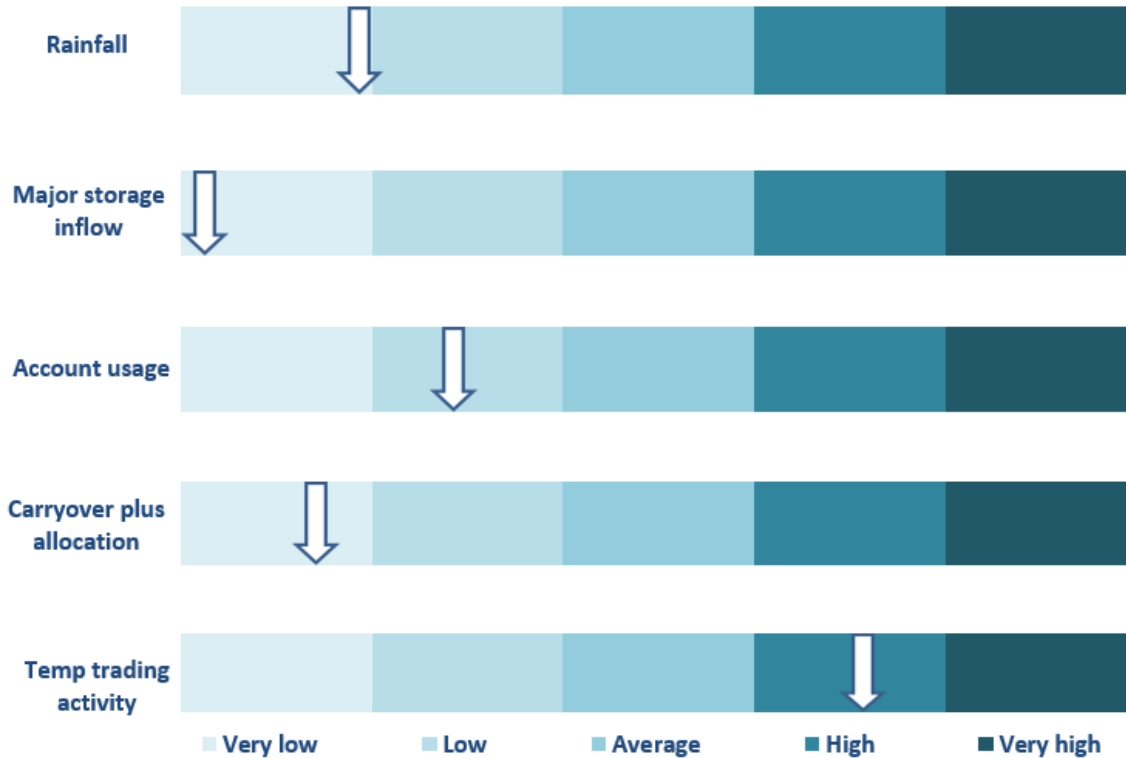
Figure 1: Surface water geographical extent of the accounts



Snapshot

The key indicators for 2018–19 relative to other years under water sharing plan management conditions are presented in Figure 2.

Figure 2: Summary indicators for the reporting period



Climate

At Tumbarumba (upper catchment) 824 mm of rainfall was recorded in the reporting period (Table 1). Comparatively this volume of rainfall is:

- 85% of the long-term historical median rainfall for this location
- 50% of the highest annual (July-June) volume on record at the location.

The majority of rainfall fell in November 2018 (127 mm) and May 2019 (125 mm) (Figure 3 and Figure 4).

At Hay (lower catchment) 246 mm of rainfall was recorded in the reporting period (Table 2). Comparatively this volume of rainfall is:

- 71% of the long-term historical median rainfall for this location
- 28% of the highest annual (July-June) volume on record at the location.

The majority of rainfall fell in November 2018 (73 mm) and May 2019 (56 mm) (Figure 3 and Figure 4).

A spatial comparison of rainfall in the reporting period against a longer term comparison period is presented Figure 5 (2018–19) and Figure 6 (average annual rainfall 1961–1990), indicating significantly drier than average conditions across the full extent of the catchment.

Figure 3: 2018–19 monthly rainfall compared to historical median at Tumbarumba and Hay

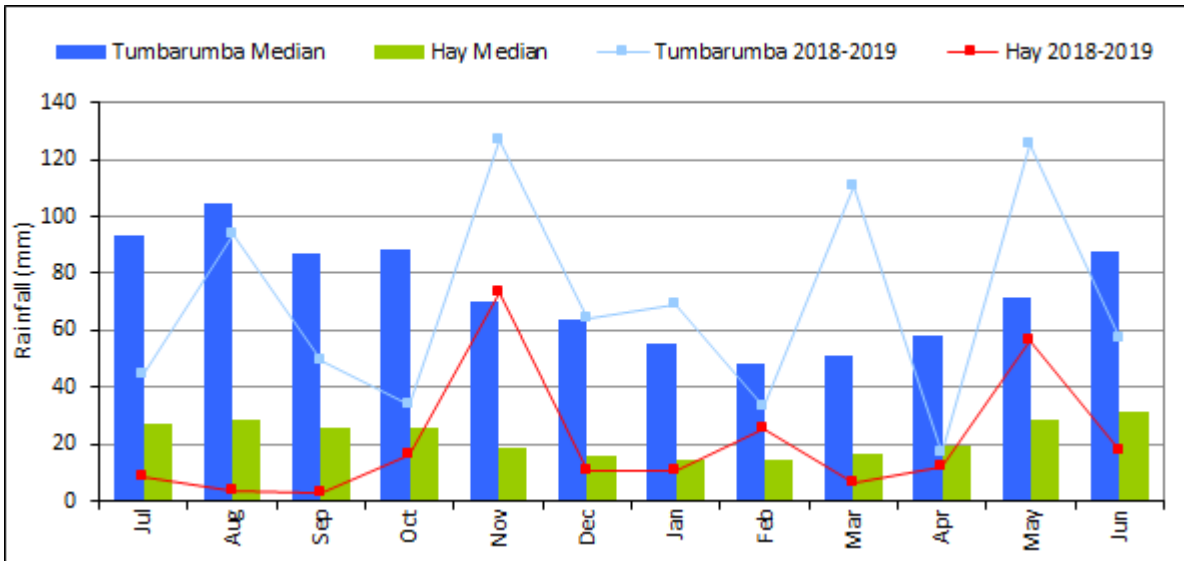


Figure 4: 2018–19 deviations from historical median rainfall at Tumbarumba and Hay

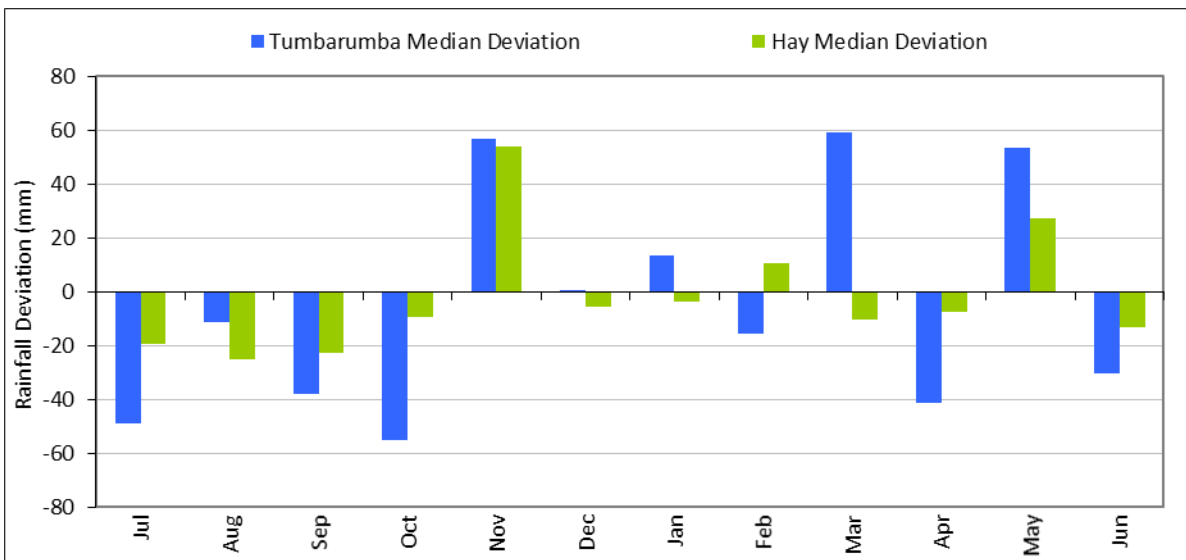


Table 1: Monthly rainfall and historical monthly statistics at Tumbarumba¹

| Tumbarumba | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Annual |
|------------------------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|-------------|--------------|-------------|--------------|-------------|--------------|
| 2018–19 | 44.6 | 93.4 | 49.2 | 33.8 | 126.6 | 64.2 | 69.0 | 33.2 | 110.4 | 17.0 | 125.0 | 57.2 | 823.6 |
| Historical statistics | | | | | | | | | | | | | |
| Mean | 104.6 | 106.6 | 90.0 | 94.7 | 75.6 | 71.2 | 62.7 | 54.0 | 66.2 | 65.6 | 82.5 | 101.7 | 977.0 |
| Median | 93.4 | 104.5 | 87.0 | 88.7 | 69.8 | 63.8 | 55.7 | 48.6 | 51.3 | 58.1 | 71.3 | 87.4 | 969.8 |
| Lowest | 14.2 | 8.6 | 9.6 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 6.0 | 523.6 |
| Highest | 254.6 | 246.6 | 225.3 | 259.7 | 240.2 | 212.4 | 203.2 | 252.2 | 260.4 | 224.6 | 295.4 | 322.1 | 1663.2 |
| Highest Year | 1985-86 | 1938-39 | 1959-60 | 1975-76 | 2010-11 | 1918-19 | 1896-97 | 2010-11 | 1905-06 | 1973-74 | 1941-42 | 1922-23 | 1955-56 |

Table 2: Monthly rainfall and historical monthly statistics at Hay¹

| Hay | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Annual |
|------------------------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|------------|-------------|-------------|-------------|--------------|
| 2018–19 | 8.4 | 3.8 | 3.4 | 16.5 | 73.0 | 10.5 | 11.0 | 25.8 | 6.7 | 12.3 | 56.2 | 18.0 | 245.6 |
| Historical statistics | | | | | | | | | | | | | |
| Mean | 30.7 | 32.0 | 30.8 | 34.5 | 26.9 | 27.5 | 27.7 | 28.4 | 28.6 | 27.6 | 35.2 | 35.6 | 364.4 |
| Median | 27.5 | 28.7 | 25.9 | 25.7 | 18.9 | 15.9 | 14.8 | 15.0 | 16.8 | 19.9 | 29.0 | 31.2 | 345.2 |
| Lowest | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | 142.1 |
| Highest | 100.8 | 107.5 | 105.9 | 150.2 | 152.2 | 152.4 | 191.2 | 203.7 | 199.7 | 151.2 | 133.5 | 115.6 | 892.5 |
| Highest Year | 1955-56 | 1888-89 | 1902-03 | 1974-75 | 1911-12 | 1991-92 | 1973-74 | 1972-73 | 1955-56 | 1973-74 | 1987-88 | 1922-23 | 1973-74 |

¹ Long-term statistics are derived from the Bureau of Meteorology—climate data online. The data presented is collected from stations '72043—Tumbarumba Post Office' and '75031—Hay (Miller Street)'. Historical statistics uses data from June 1886 to June 2018 for Tumbarumba and June 1881 to June 2018 for Hay.

Figure 5: Annual rainfall for the reporting period

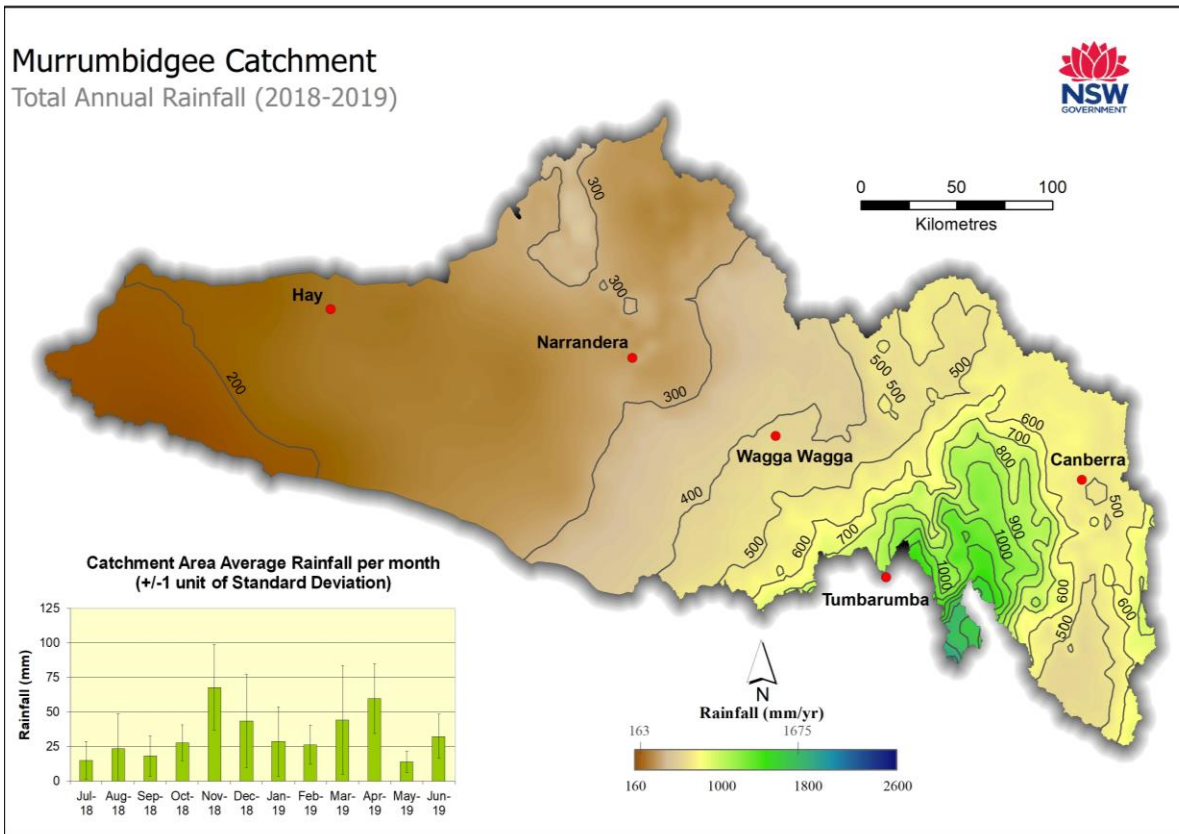
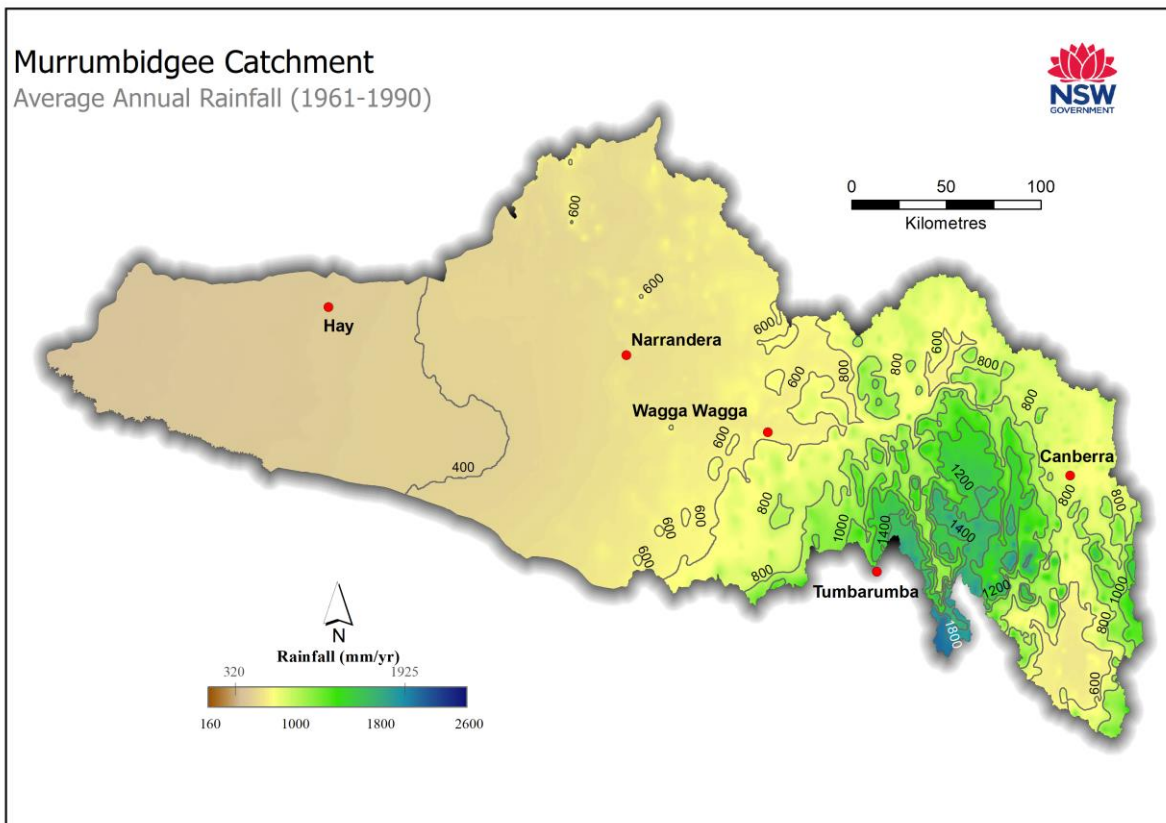


Figure 6: Average annual rainfall (1961–1990)



Dam inflows

Historically, the long-term average annual flow (inflow) at the Burrinjuck Dam site has varied significantly cycling through prolonged periods of wet and dry flow regimes. Broadly, the data (Figure 7) illustrates predominantly:

- dry conditions 1900 to 1950
- wet conditions 1950 to 1990
- dry conditions 1990 to present

For the reporting period, the inflow to Burrinjuck Dam was 233,182 megalitres (Figure 8) which is:

- 19% of the long-term average annual inflow (1,241,484 megalitres per year)
- Very low relative to the historical record, exceeding 17% of years on record (1890–91 to 2018–19)
- the 2nd consecutive year of below average inflow

The maximum mean daily inflow rate for the reporting period was 7,187 megalitres, occurring on 15 December 2018 (Figure 9).

Daily inflow figures for Blowering Dam (which receives regulated inflows from the Snowy Mountains Scheme) are presented in Figure 10.

Storage volume

Burrinjuck

- Volume at the commencement of the reporting period was 412,708 megalitres or 40% of full supply capacity (Figure 11)
- Volume held at the end of the reporting period was 314,745 megalitres or 31% of full supply capacity
- The maximum volume held during the reporting period was 457,723 megalitres or 45% of full supply capacity on 25 December 2018

Blowering

- Volume at the commencement of the reporting period was 1,111,550 megalitres or 68% of full supply capacity (Figure 12)
- Volume held at the end of the reporting period was 726,469 megalitres or 45% of full supply capacity
- The maximum volume held during the reporting period was 1,278,067 megalitres or 78% of full supply capacity on 31 August 2018

Figure 7: Long-term annual flow upstream of Burrinjuck Dam cumulative deviation from the mean

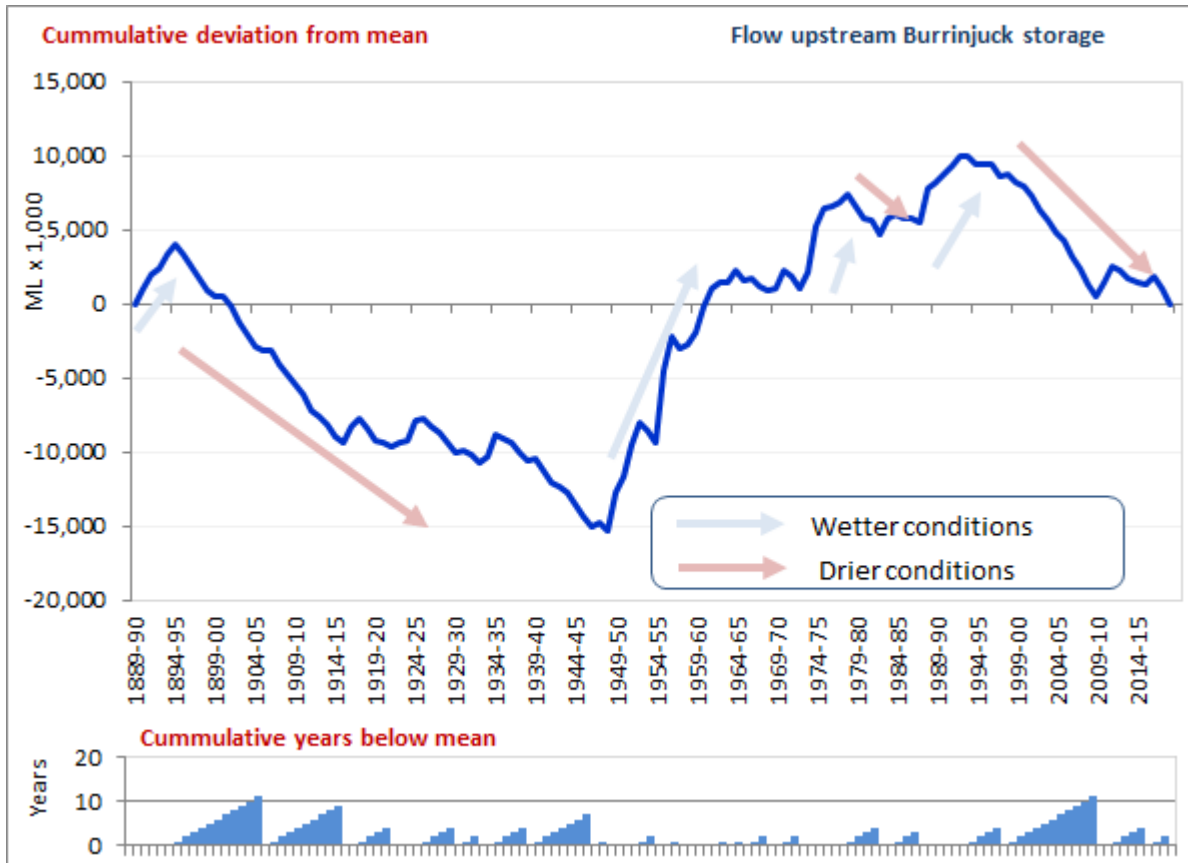


Figure 8: Long-term inflows to Burrinjuck Dam against mean and reporting year inflow

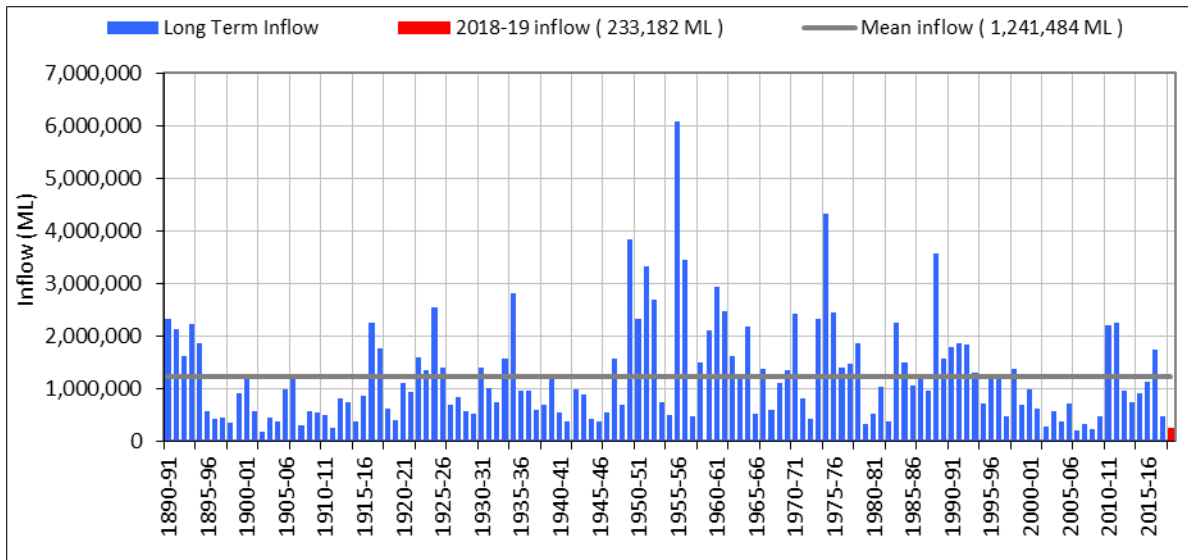


Figure 9: Daily inflows to Burrinjuck Dam and rainfall (reporting period)

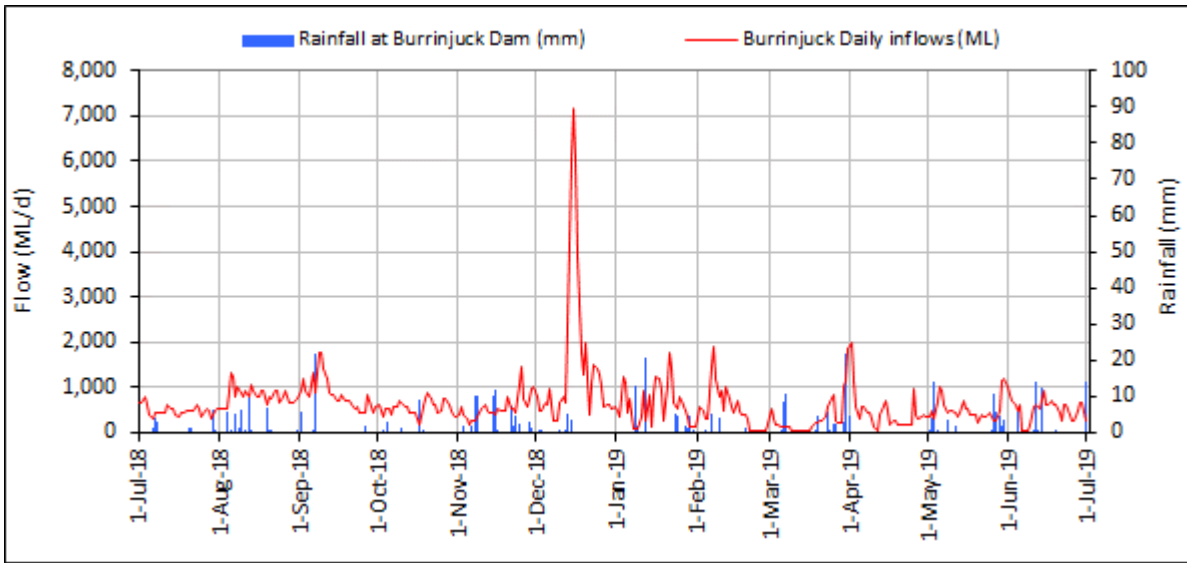


Figure 10: Daily inflows to Blowering Dam (reporting period)

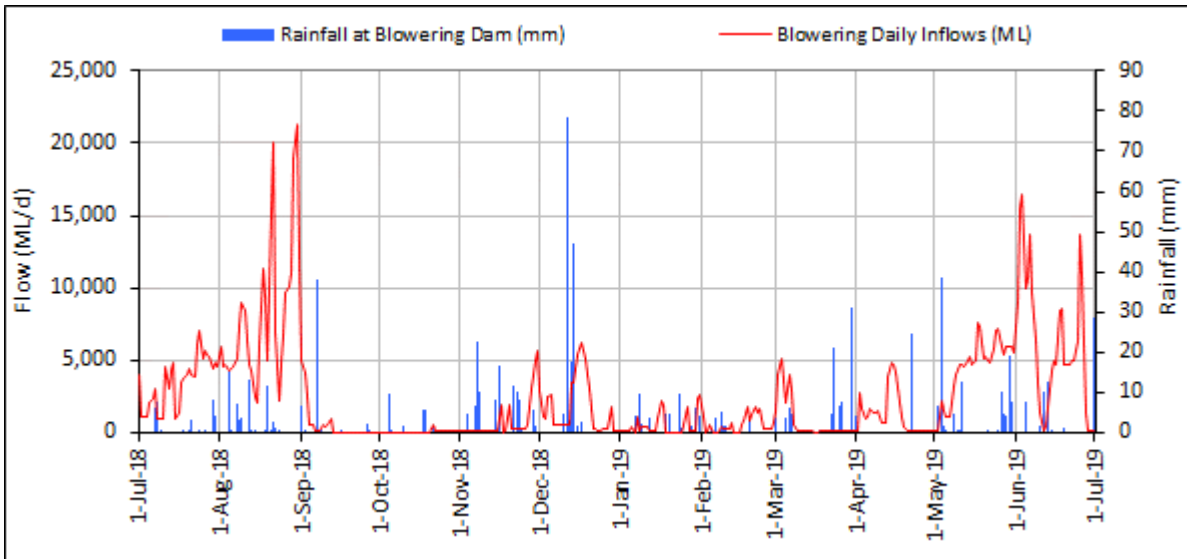


Figure 11: Burrinjuck Dam storage volume and percentage full for the period, and historical storage volumes

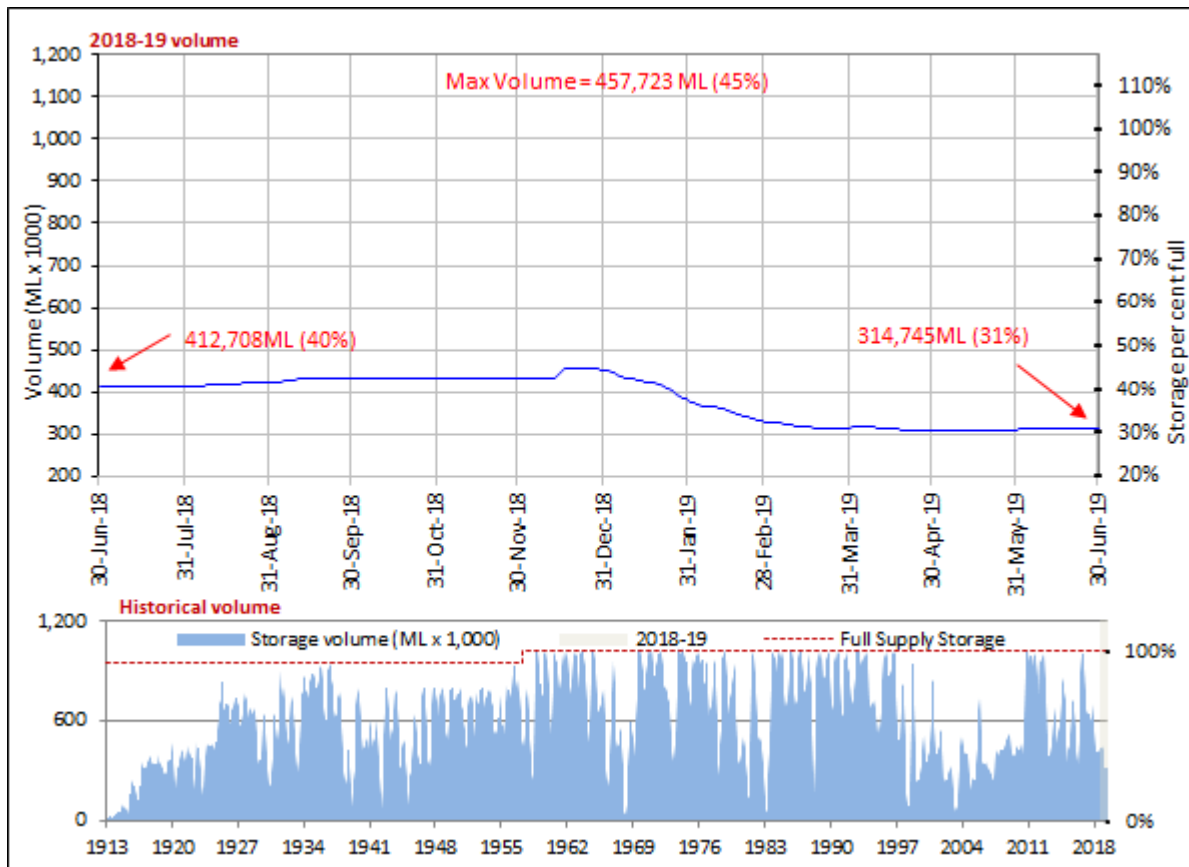
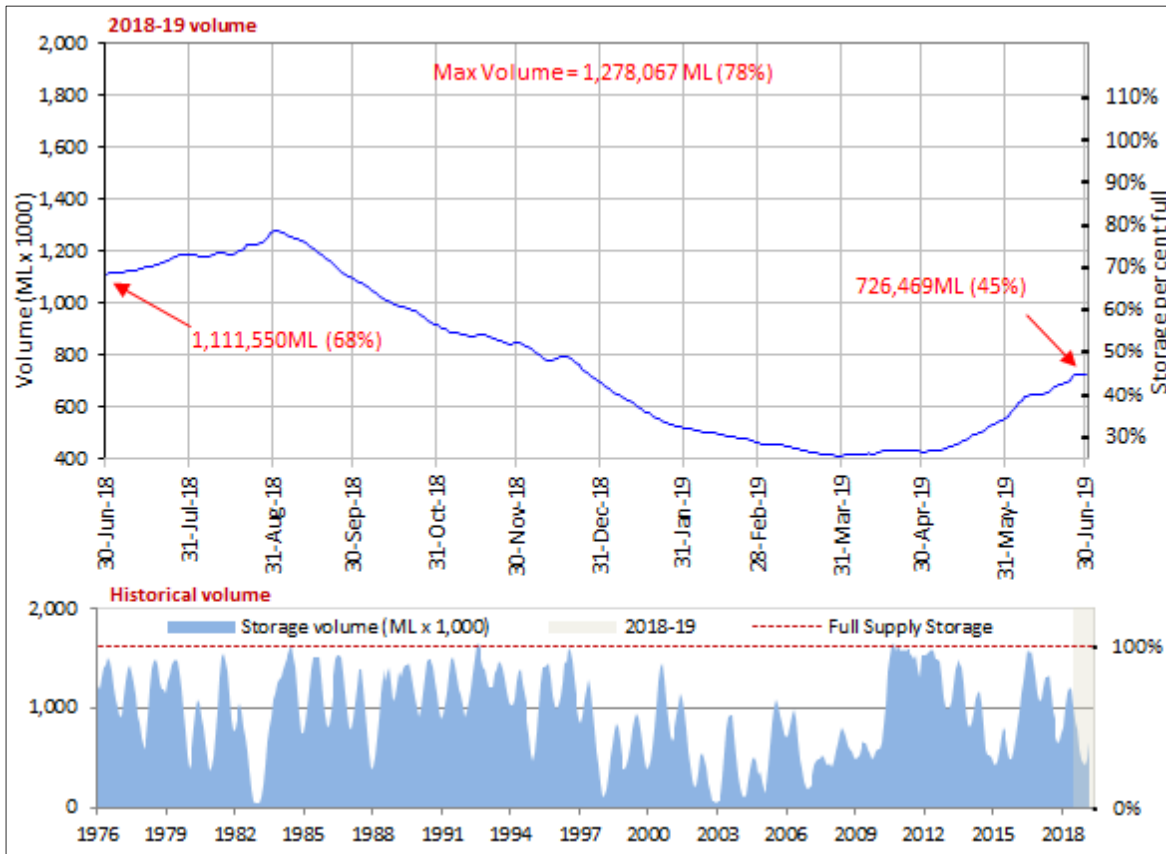


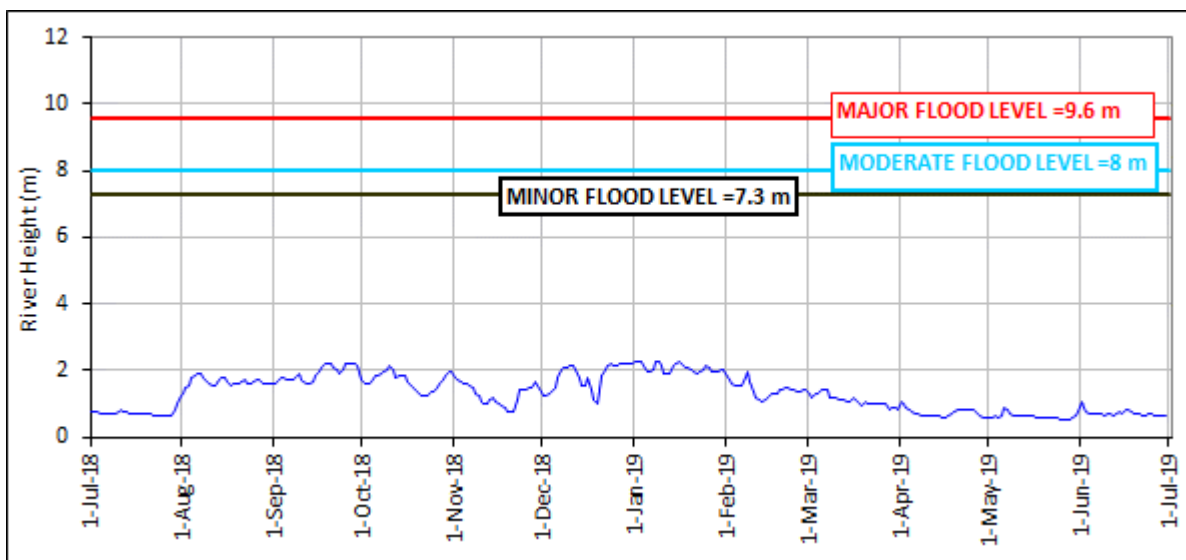
Figure 12: Blowering Dam storage volume and percentage full for the period and historical storage volumes



Major high flow events

No high flow events occurred in the Murrumbidgee during the reporting period (Figure 13). River height at Wagga Wagga remained below 2.5 metres for the entirety of the water year, well below the minor flood level of 7.3 metres.

Figure 13: Murrumbidgee River at Wagga Wagga maximum daily flow heights²



² Flood indicator levels sourced from the Bureau of Meteorology

Surface water resources and management

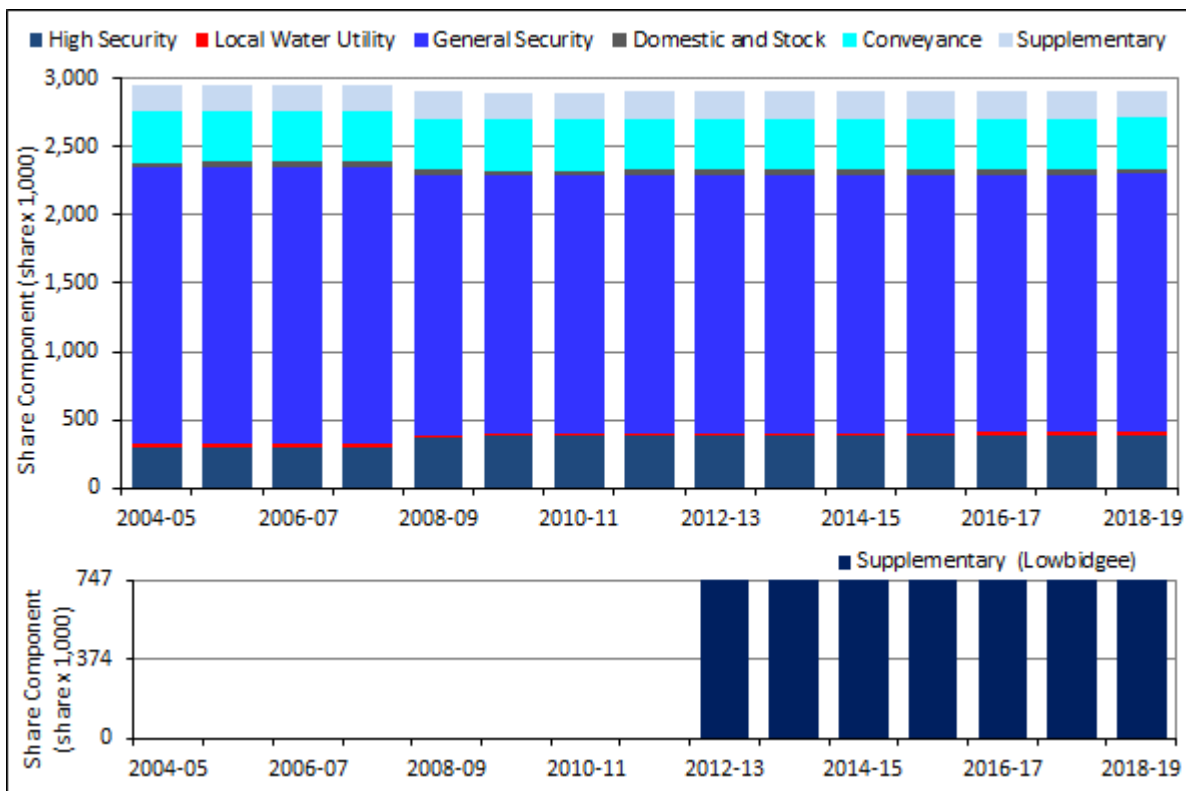
Policy and management

The Murrumbidgee Regulated River Water Source was managed under the conditions set out in the Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016. This plan commenced on 1 July 2016 and will remain active until 30 June 2026. The water sharing plan was produced to meet the water management principles outlined in the water Management Act 2000.

Access rights

- Access licence share components increased in the reporting period by 3,395 shares (Figure 14) resulting from the cancellation of 6 Domestic and Stock shares and the issue of 3,401 High Security shares (environmental efficiency works)
- Total issued share on 30 June 2019 was 3,657,615, which includes 198,780 shares of supplementary access licences and 747,000 shares of supplementary (Lowbidgee) access licences (Table 3).

Figure 14: Murrumbidgee share component since the commencement of the water sharing plan ^[3]



³ Includes all access licences issued under the water sharing plan and therefore held environmental water.

Table 3: Issued share component on 30 June 2019

| Licence category | Share component |
|---------------------------|------------------|
| Domestic and Stock | 34,139 |
| Local Water Utility | 23,816 |
| High Security | 385,917 |
| General Security | 1,891,995 |
| Conveyance | 375,968 |
| Supplementary | 198,780 |
| Supplementary (Lowbidgee) | 747,000 |
| Total | 3,657,615 |

Access licence account management

An annual accounting (with carryover) procedure is implemented in this water source allowing for general security (and conveyance) access licence holders to mitigate the risk of future shortfalls and carryover up to 0.30 megalitres per share (30%). A limit of 1 megalitre per share (100%) for carryover plus water received from available water determinations applies.

Additionally, general security account holders have access to a provision under the water sharing plan (uncontrolled flow access) to further mitigate potential shortfalls in dry years with low allocations. During periods of announced access, general security holders are eligible to extract water from unregulated events downstream of the major storages, without debit to the access licence balance. Should allocations improve part or all of any unregulated take may revert to become accountable against the licence. The triggers and limits for access to this water are summarised in Table 5. Further information on uncontrolled flow access is available in note 23 of this GPWAR.

All other categories of licence have a maximum credit of 100% or 1 ML per share, and do not have any carryover provisions available. The access licence accounting rules are summarised in Table 4.

Table 4: Murrumbidgee licenced allocation accounting rules

| Licence Category | AWD plus Carryover Limit | Carryover Limit | Annual Use Limit | Maximum AWD |
|--|--------------------------|-----------------|------------------|-------------|
| Coleambally Irrigation (Conveyance) | 1 ML/share | 0.30 ML/Share | N/A | 1 ML/share |
| Domestic and Stock [All categories] | N/A | 0% | N/A | 100% |
| Local Water Utility | N/A | 0% | N/A | 100% |
| Murrumbidgee Irrigation (Conveyance) | 1 ML/share | 0.30 ML/Share | N/A | 1 ML/share |
| Regulated River (Conveyance) | 1 ML/share | 0.30 ML/Share | N/A | 1 ML/share |
| Regulated River (General Security) | 1 ML/share | 0.30 ML/Share | N/A | 1 ML/share |
| Regulated River (High Security) [All categories] | N/A | 0% | N/A | 1 ML/share |
| Supplementary Water | N/A | 0 ML/Share | N/A | 1 ML/share |
| Supplementary Water (Lowbidgee) | N/A | 0 ML/Share | N/A | 1 ML/share |

Table 5: Murrumbidgee uncontrolled flow access provision

| Uncontrolled Flow Access (UCF) Licence Category | AWD limit for UCF | AWD plus Carryover Limit for UCF | AWD plus UCF usage limit | AWD plus Carryover plus UCF Limit |
|---|-------------------|----------------------------------|--------------------------|-----------------------------------|
| Regulated River (General Security) | 0.70 ML/share | 0.85 ML/Share | 0.85 ML/share | 1 ML/share |

Extreme events stage and temporary water restrictions

The NSW Extreme Events Policy was released in October 2018 to provide a framework for managing extreme events in the major river systems of the NSW Murray-Darling Basin. This framework is based on a staged approach, providing a range of measures for water managers to implement as conditions deteriorate.

Temporary water restrictions are an example of the type of measures that can be implemented to manage a water shortage. These restrictions are issued under section 324 of the *Water Management Act 2000* and have been implemented in several river valleys in the current drought to preserve water for critical needs.

Table 6 outlines the conditions that may be associated with different stages of criticality for surface water quality. Further information is available at industry.nsw.gov.au/water/what-we-do/legislation-policies/eep

Table 6: Determination of stages of criticality for surface water quantity

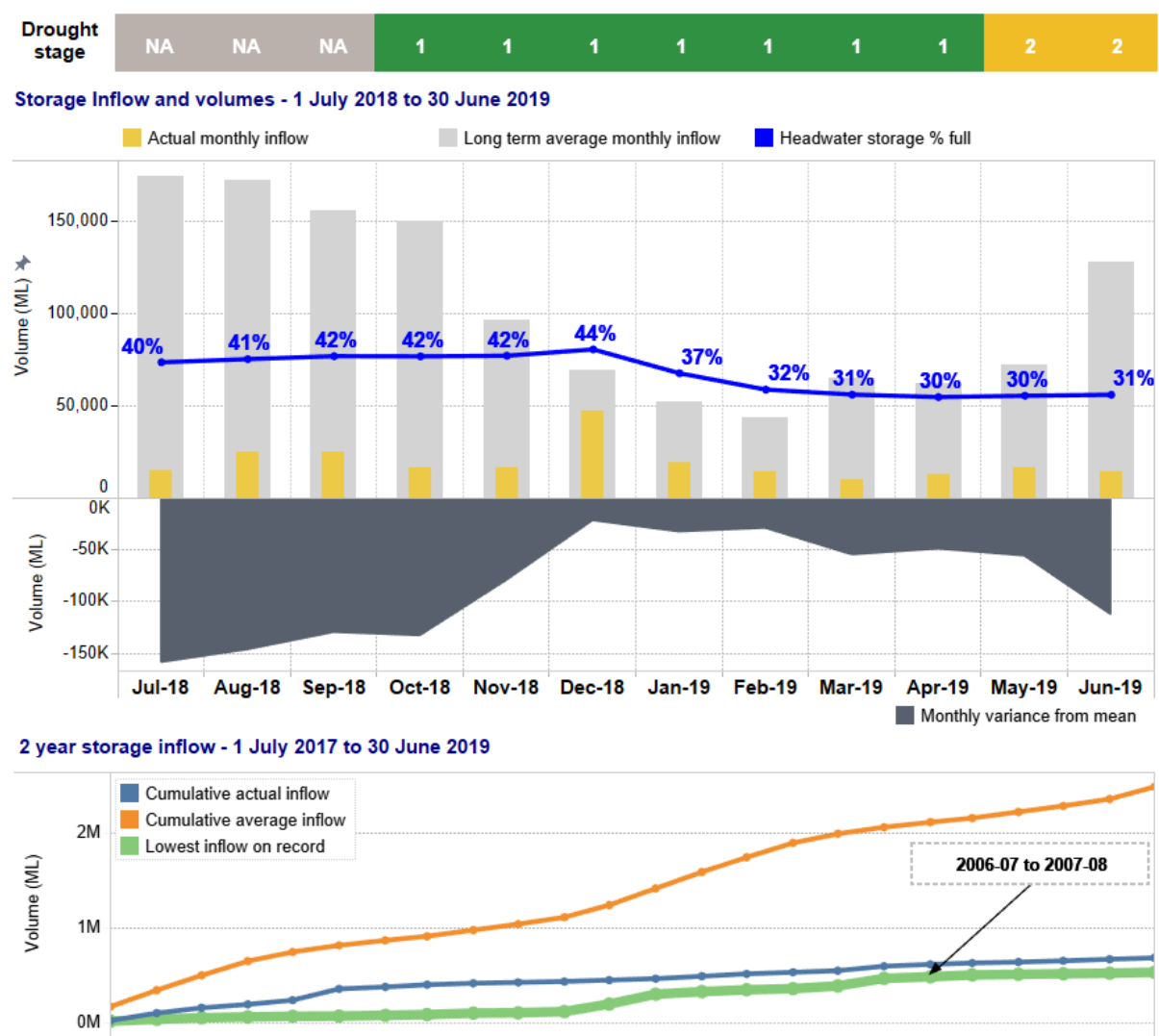
| Stage | Stage description | Stage evidence base |
|-------|-------------------|---|
| 1 | Normal management | Can deliver all account water under normal river operations practices. |
| 2 | Emerging drought | Unable to deliver 100% of high priority account water and maximum expected use of general security under normal river operations practices. |

| Stage | Stage description | Stage evidence base |
|-------|-------------------|---|
| 3 | Severe drought | Only able to deliver restricted high priority demands and restricted remaining general security account water. |
| 4 | Critical drought | Only able to deliver restricted town water supply, stock and domestic and other restricted high priority demands. |

Extreme events stage

- Following release of the NSW Extreme Events Policy in October 2018, the Murrumbidgee regulated river was declared as being in stage 1.
- The Murrumbidgee regulated river was subsequently declared as being in Stage 2 in May 2019 following deteriorating resource conditions.
- The 2-year inflow sequence to 30 June 2019 was 685,943 megalitres, a deficit of 1,794,3258 megalitres relative to long-term average 2-year inflows (1890–2019) (Figure 15). The 2-year sequence was slightly higher however than the lowest in the historical dataset which occurred in the 2006–07 to 2007–08 water years (534,731 megalitres).

Figure 15: Drought stage for the reporting period referenced with monthly headwater storage inflows, monthly storage inflow variance from mean and two-year cumulative inflow sequence



Temporary water restrictions

No restrictions on access licences occurred in the reporting period.

Water resources and availability

- Domestic and Stock, Local Water Utility and subcategories of High Security licences received an opening available water determination (AWD) of 100%, the maximum allowable under the water sharing plan.
- Supplementary access licences including the sub-category of Supplementary Water (Lowbidgee) received an opening AWD of 1 ML per share, the maximum allowable under the water sharing plan.
- High Security Access licences (no subcategory) received an opening AWD of 0.95 megalitres per share (95% equivalent). No further increase was applied throughout the year due to restricted general security allocations
- Regulated River (Conveyance), Murrumbidgee Irrigation (Conveyance) and Coleambally Irrigation (Conveyance) received equivalent opening AWD's of 3% (plus carryover 2.7%), 62.5% (plus carryover 2.3%) and 85.2% respectively (plus carryover 3.5%). The total opening effective allocation (carryover plus AWD) was 5.7%, 64.8% and 88.7% respectively.
- Three further announcements throughout the reporting period to Regulated River (Conveyance) and Murrumbidgee Irrigation (Conveyance) increased the effective allocations to 9.7% and 65.7% respectively by 17 September 2018.
- General security access licences had a carryover of 398,015⁴ megalitres into the reporting period, equating to 21% of share.
- General security access licences received an opening AWD of 0.03 megalitres per share (3%).
- Three additional AWD announcements were made to general security access licences, taking total water availability to 27% of issued share component by 1 August 2018 and a maximum availability of 28% by 17 September 2018 (Figure 16).
- Across all categories, by volume, this was the lowest water availability since 2007-08 (Figure 17)
- Announcement details are available in note 2 of this GPWAR.

⁴ Carryover figure presented prior to adjustments for snowy transfer licences presented in the account balances report presented in Table 7.

Figure 16: Incremental available water determinations and carryover volumes for general security as a proportion of share component

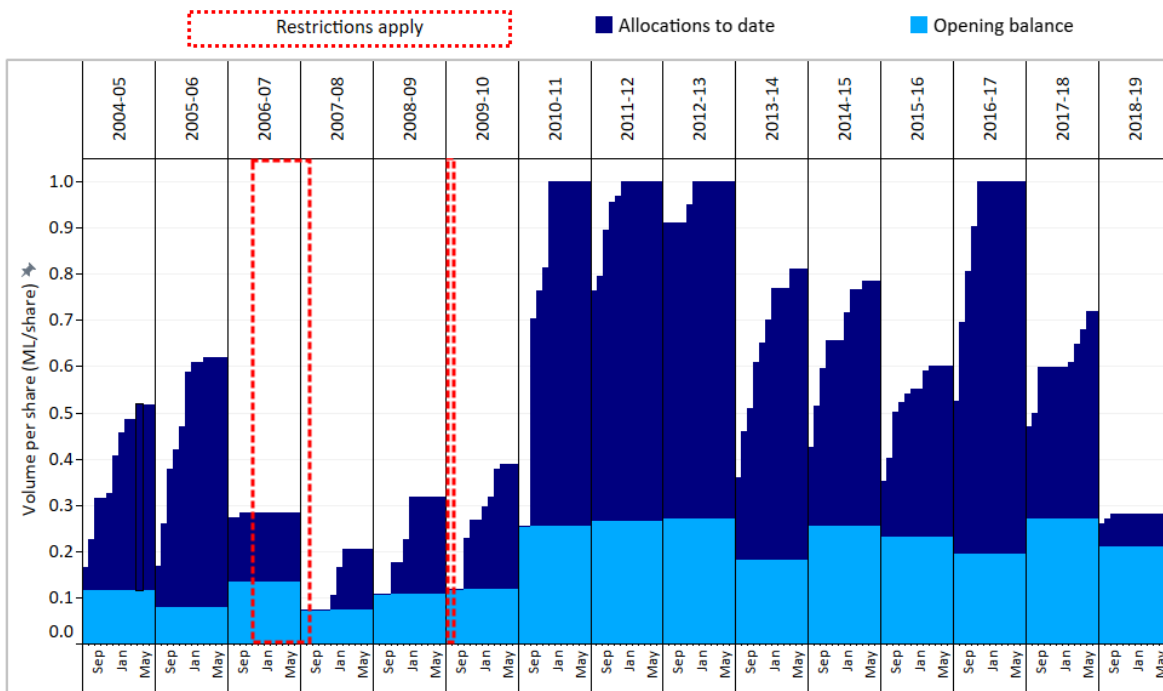
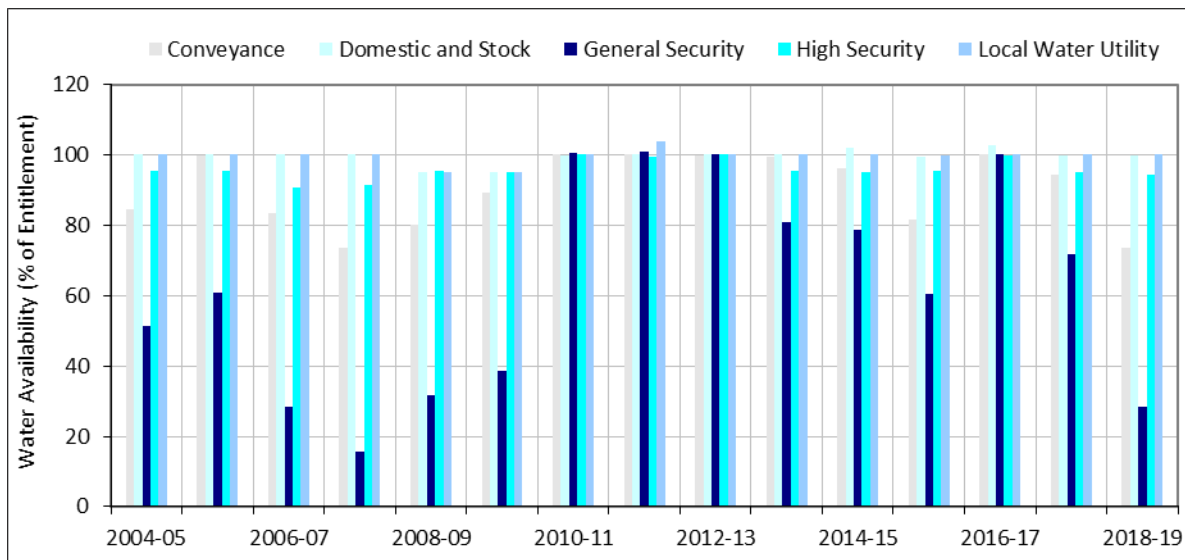


Figure 17: Murrumbidgee water availability (carryover plus available water determinations)⁵



Account usage

- Usage from regulated supply totalled 1,065,107 megalitres of which 72,879 megalitres was recredited⁶ (net account usage 992,228 megalitres) (Figure 18)
- Additionally:

⁵ Water availability refers to the sum of water that was made available in accounts and does not take into account annual use limits. It is calculated as the total carryover for a licence category plus the total available water determinations for the year.

⁶ Diversions from Coleambally main canal (the usage measurement for Coleambally holdings) that are requested by the operator for delivery to Tom Bullen storage, or to be passed through the irrigation area are subject to recredits

- Nil megalitres were extracted by general security licence holders using the uncontrolled flow access provisions⁷ (Figure 19)
- Nil megalitres were used by Supplementary access licence holders
- Nil megalitres were used by Supplementary (Lowbidgee) access licence holders
- Net usage (all forms of take) totalled 992,228 megalitres, the 5th lowest under water sharing plan management conditions and the lowest since 2009–10 (Figure 20).
- The average usage (all forms of take) increased to 1,440,509 (2004–05 to 2018–19)

Figure 18: Net Murrumbidgee account usage from regulated supply (excluding supplementary and uncontrolled flow access) by licence category

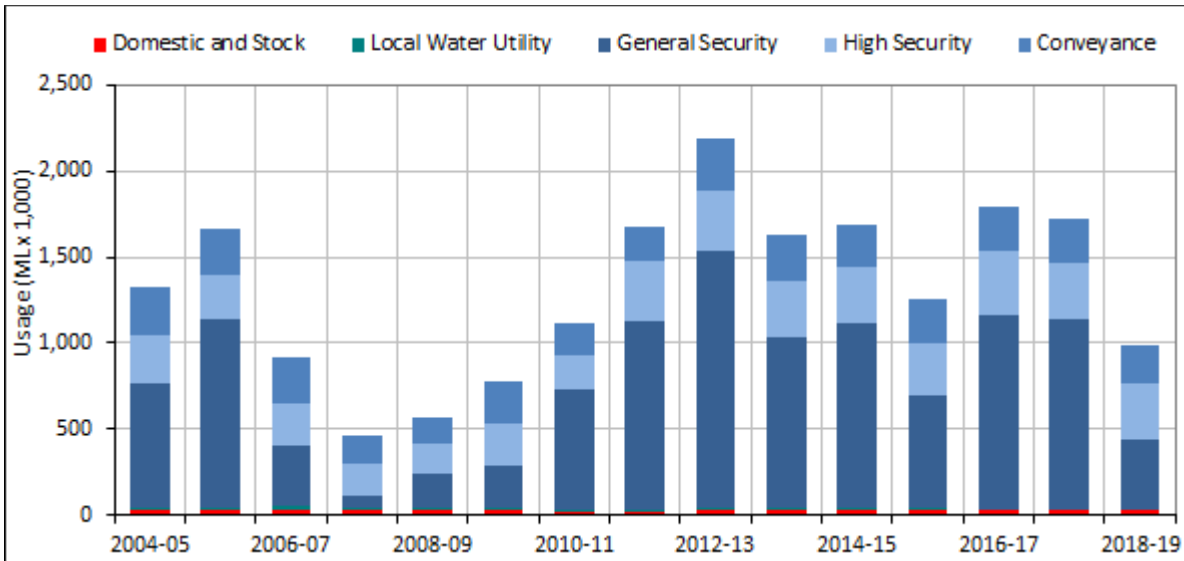
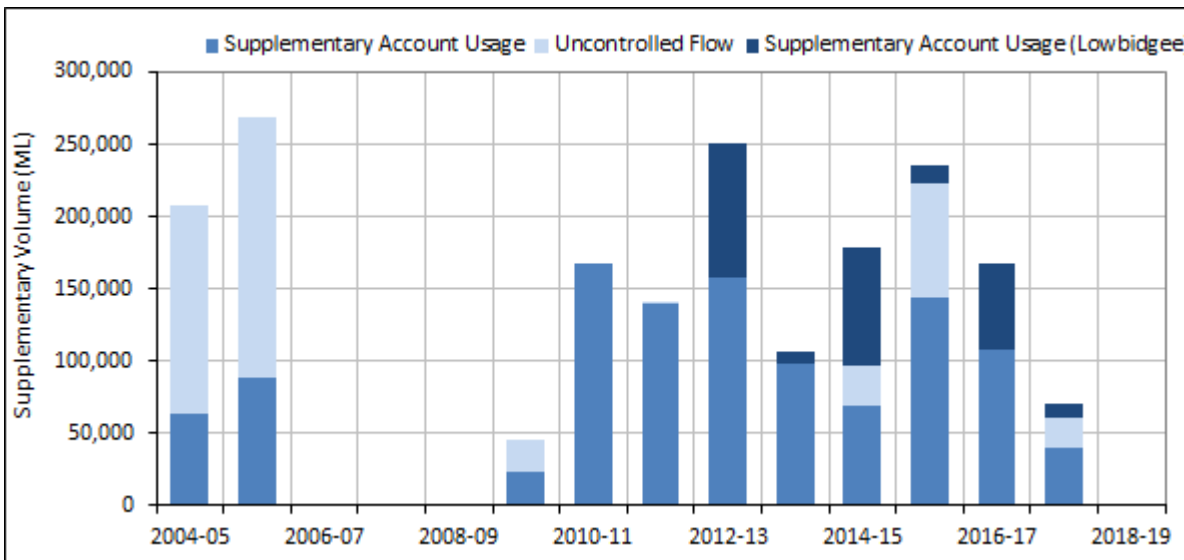


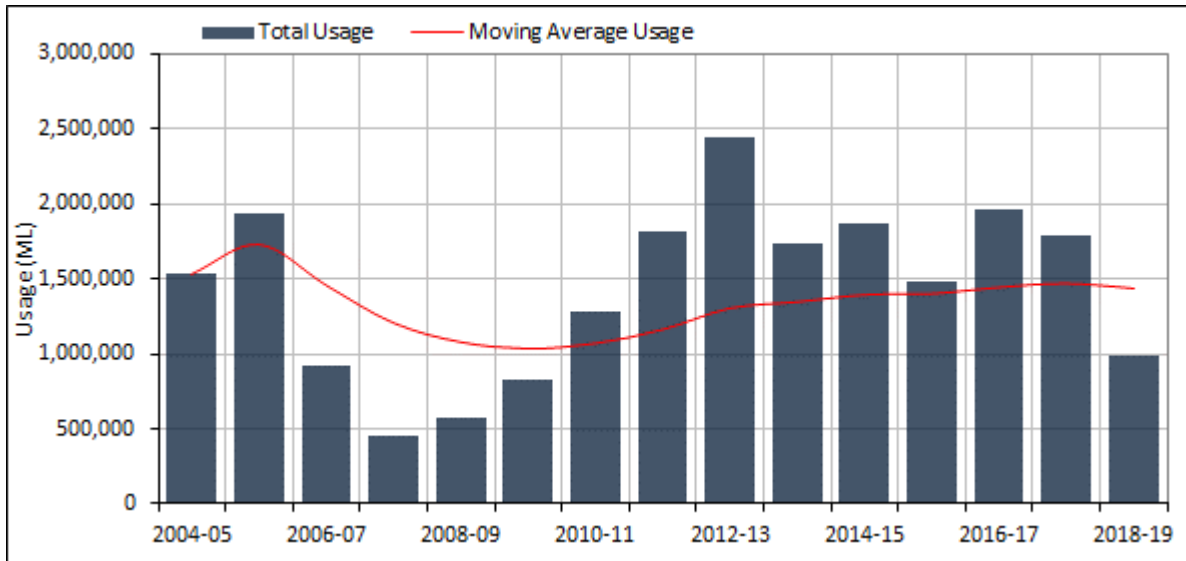
Figure 19: Murrumbidgee supplementary and uncontrolled flow usage⁸



⁷ Figures are reported at GPWAR data close off date. Holder accounts have since been revised and all 839 megalitres has been considered accountable against a general security access licence.

⁸ Supplementary Water (Lowbidgee) licences were introduced in 2012-13 water year.

Figure 20: Total account and moving average usage relative to the long-term annual extraction limit

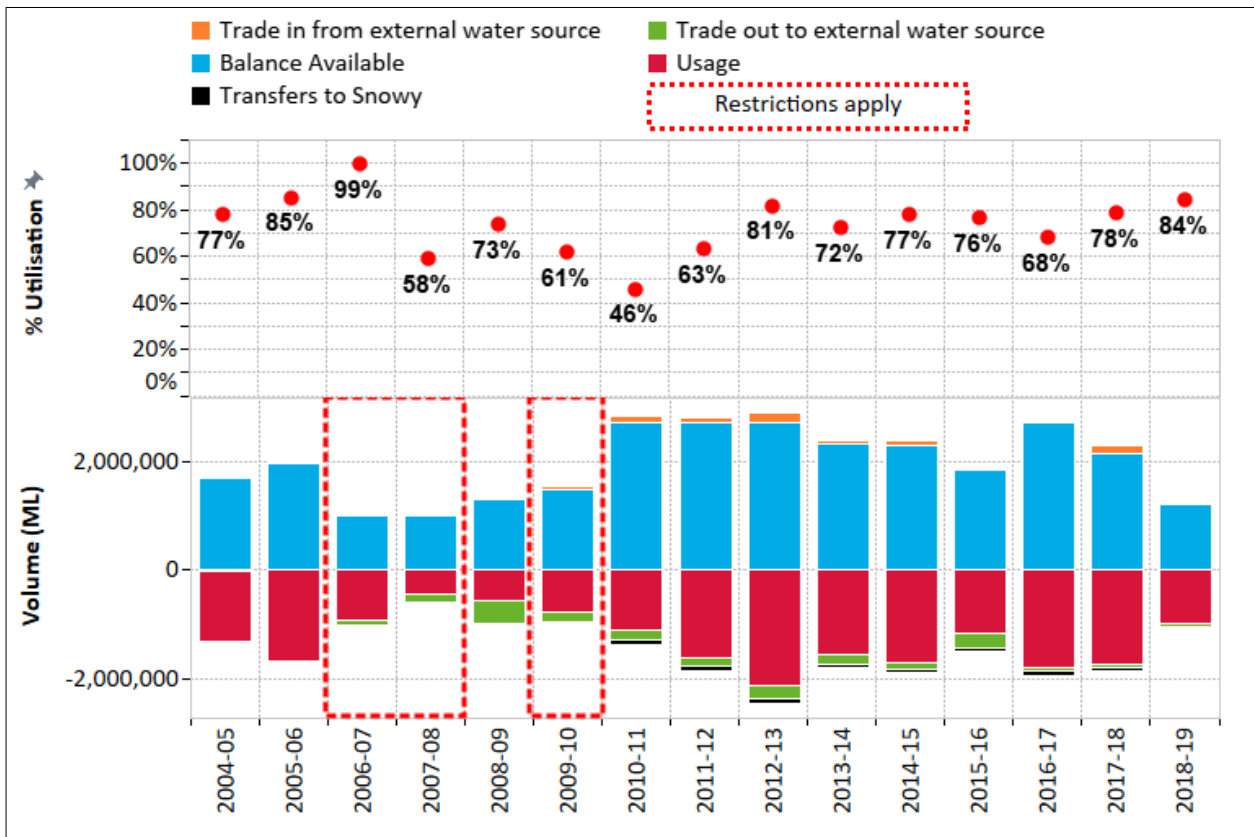


Utilisation and inactive share

An access licence is considered to be inactive if the holding does not use water or access the temporary trade market for the reporting period. Utilisation reflects the amount of water used, relative to the maximum amount available for use.

- 5% of general security access licence share component was inactive for the reporting period an increase of 1% on the prior year (Table 7)
- Considering all categories of licence for regulated supply 6% of share component was inactive
- 32% of supplementary water (including Lowbidgee access) was inactive. Access to this water is from unregulated supply (opportunistic access) and activity is largely climate driven. For the reporting period there was no access to supplementary events, and the activation rates are depicting trade activity only.
- Utilisation of available water from regulated supply was 84%, an increase of 6% on the prior reporting period and the highest in a 12 year sequence (Figure 21).

Figure 21: Murrumbidgee utilisation of regulated water available ⁹



⁹ Water usage excludes water taken under a supplementary access licence or under uncontrolled flows access. Total water availability excludes supplementary access licences.

Table 7: Murrumbidgee inactive licence summary

| Licence category | Inactive licences (number) 2018–19 | Inactive share component 2018–19 | Inactive share % of total 2018–19 | Inactive share % of total prior year (2017–18) |
|--------------------------------------|------------------------------------|----------------------------------|-----------------------------------|--|
| Coleambally Irrigation (Conveyance) | 1 | 3,500 | 3% | 3% |
| Domestic and Stock | 167 | 12,171 | 58% | 11% |
| Domestic and Stock [Domestic] | 36 | 102 | 38% | 65% |
| Domestic and Stock [Stock] | 96 | 2,816 | 22% | 24% |
| Local Water Utility | 4 | 9,010 | 38% | 38% |
| Murrumbidgee Irrigation (Conveyance) | 1 | 20,000 | 8% | 8% |
| Regulated River (Conveyance) | 2 | 1,000 | 34% | 34% |
| General Security | 336 | 95,825 | 5% | 4% |
| High Security | 99 | 13,394 | 4% | 1% |
| High Security [Aboriginal Cultural] | 0 | 0 | 0% | 100% |
| High Security [Research] | 0 | 0 | 0% | 0% |
| High Security [Town Water Supply] | 0 | 0 | 0% | 0% |
| Total | 742 | 157,818 | 6% | 5% |
| Unregulated supply | | | | |
| Supplementary Water | 222 | 100,486 | 51% | 17% |
| Supplementary Water (Lowbidgee) | 21 | 201,382 | 27% | 14% |
| Total | 243 | 301,868 | 32% | 15% |

Temporary Trading

- The total volume of allocation assignments into Murrumbidgee licences was 361,308 megalitres¹⁰ (Figure 22).
- The total volume of allocation assignments out of Murrumbidgee licences was 398,202 megalitres resulting in a net assignment out of the Murrumbidgee of 36,894 megalitres
- The majority of water moved out of the Murrumbidgee was to the NSW Murray regulated river water source (Figure 23).

¹⁰ Excluding trade between supplementary licences

Figure 22: Allocation assignments and net trade out of the Murrumbidgee¹¹

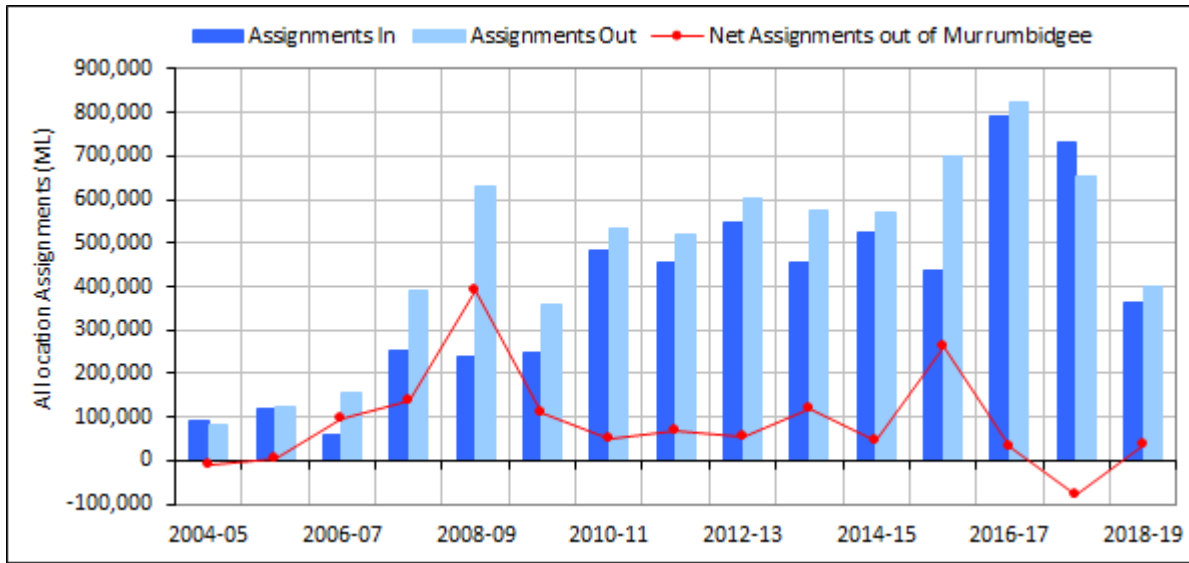
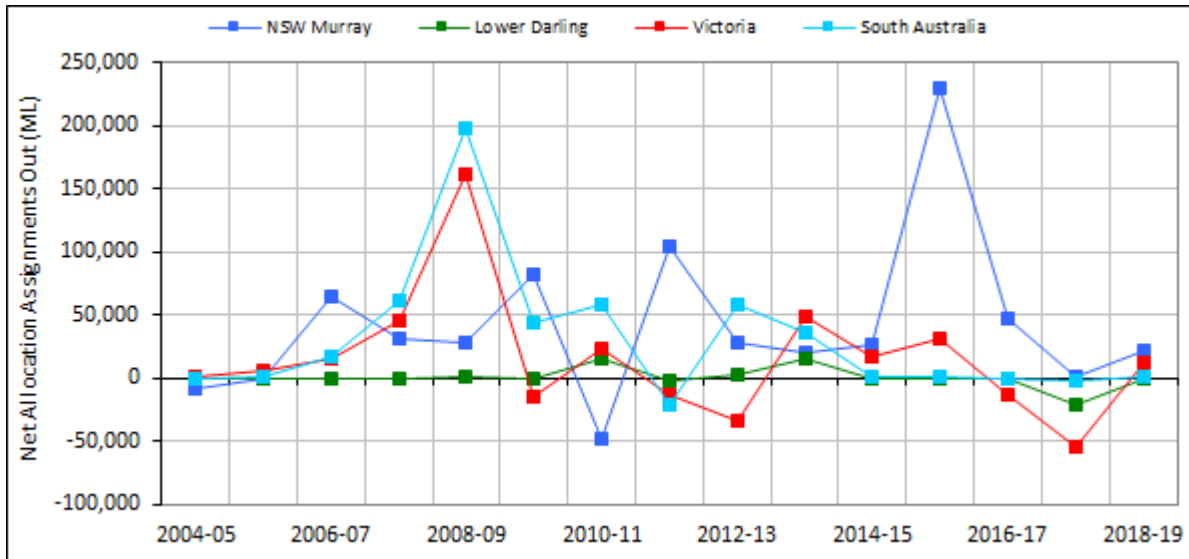


Figure 23: Net assignment out of the Murrumbidgee by water source location



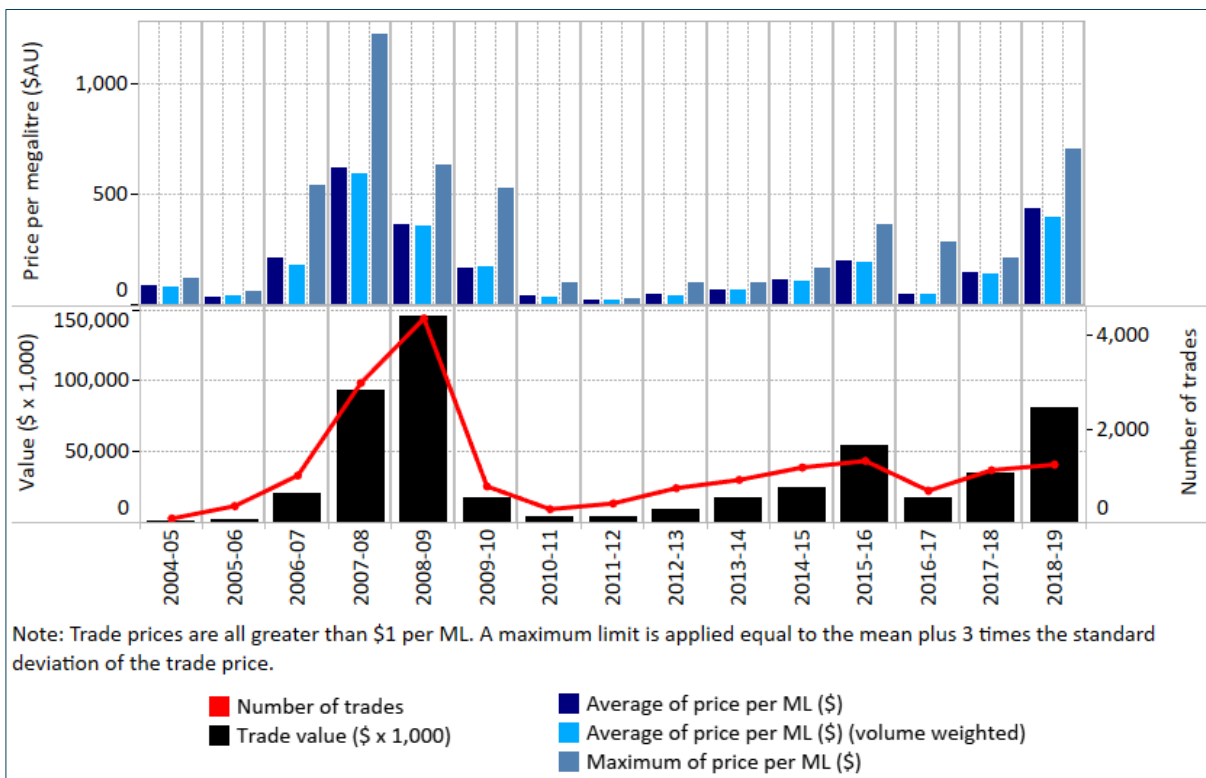
Temporary Commercial statistics

For the reporting period, considering commercial trades only (considerations greater than \$1 per megalitre), 1,239 transactions were processed (Figure 24) with the following characteristics:

- the average price for water was \$436 per megalitre (volume weighted average \$395) a 207% increase on the prior reporting period and the highest since 2007–08
- the maximum price for water was \$705 per megalitre
- the total trade value was \$80,947,000, a 130% increase on the prior reporting period and the highest since 2008–09 (millennium drought)

¹¹ Excludes supplementary trading but including intravalley, intervalley and interstate trades.

Figure 24: Allocation assignment commercial statistics



Permanent Commercial statistics

For the reporting period, considering commercial trades only (> than \$1 per megalitres), 34 general security share assignment transactions (Figure 25) were processed with the following characteristics:

- the average price for general security was \$2,126 per share (weighted average \$2,137)
- the maximum price was \$2,350 per share
- the total trade value was \$20,301,000 which was a 27% decrease relative to the prior reporting period
- price was the highest on record indicating the increasing trend in value of shares

A total of 19 high security commercial transactions were processed (Figure 26) with the following characteristics:

- the average price was \$5,453 per share (weighted average \$5,555)
- the maximum price was \$7,000 per share
- the total trade value was \$5,516,000 which was a 41% decrease relative to the prior reporting period
- price was the highest on record indicating the increasing trend in value of shares

Considering all categories of licence 21,061 shares were assigned for commercial purpose, 9,682 (45%) of which were associated with environmental purchases (Figure 27).

In addition to share assignments, a total of 30,241 shares (all categories of licence considered) were subject to a change of holder for commercial purposes through 27 transactions (Figure 28). Note, reliable pricing information for change of holder dealings are unavailable as often the sale is bundled with land.

Figure 25: Share assignments commercial statistics—General Security

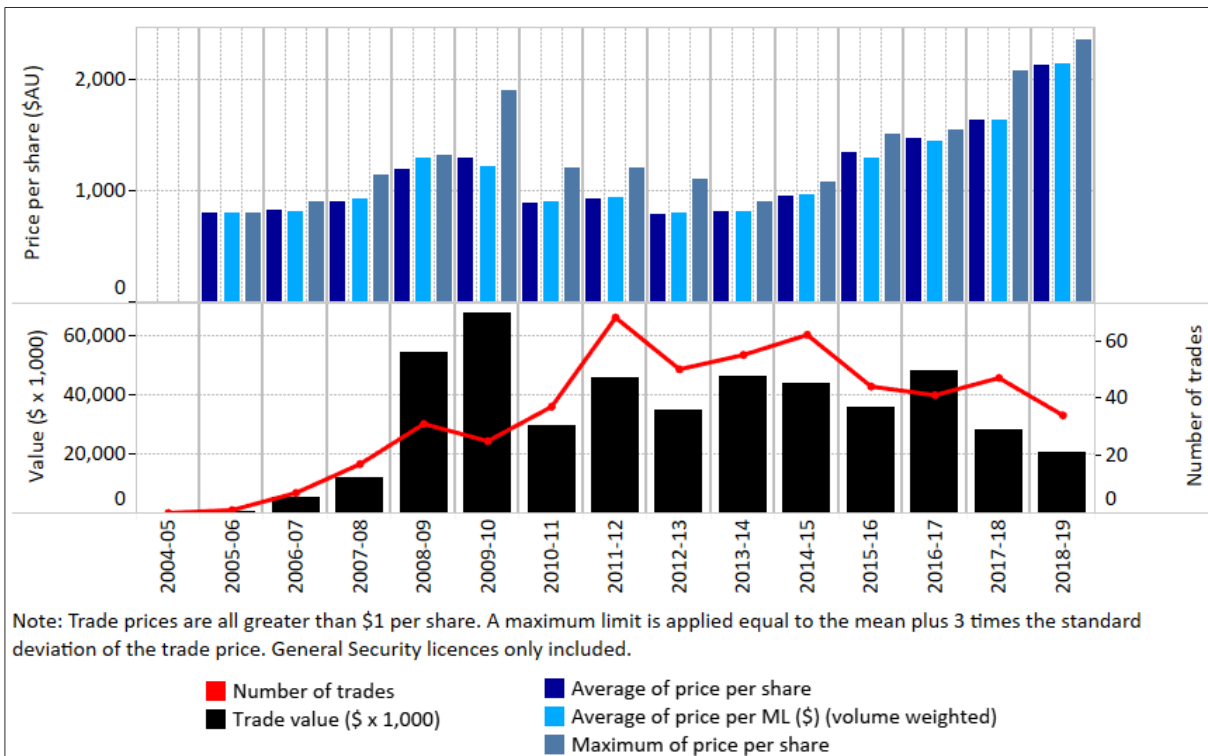


Figure 26: Share assignments commercial statistics—High Security

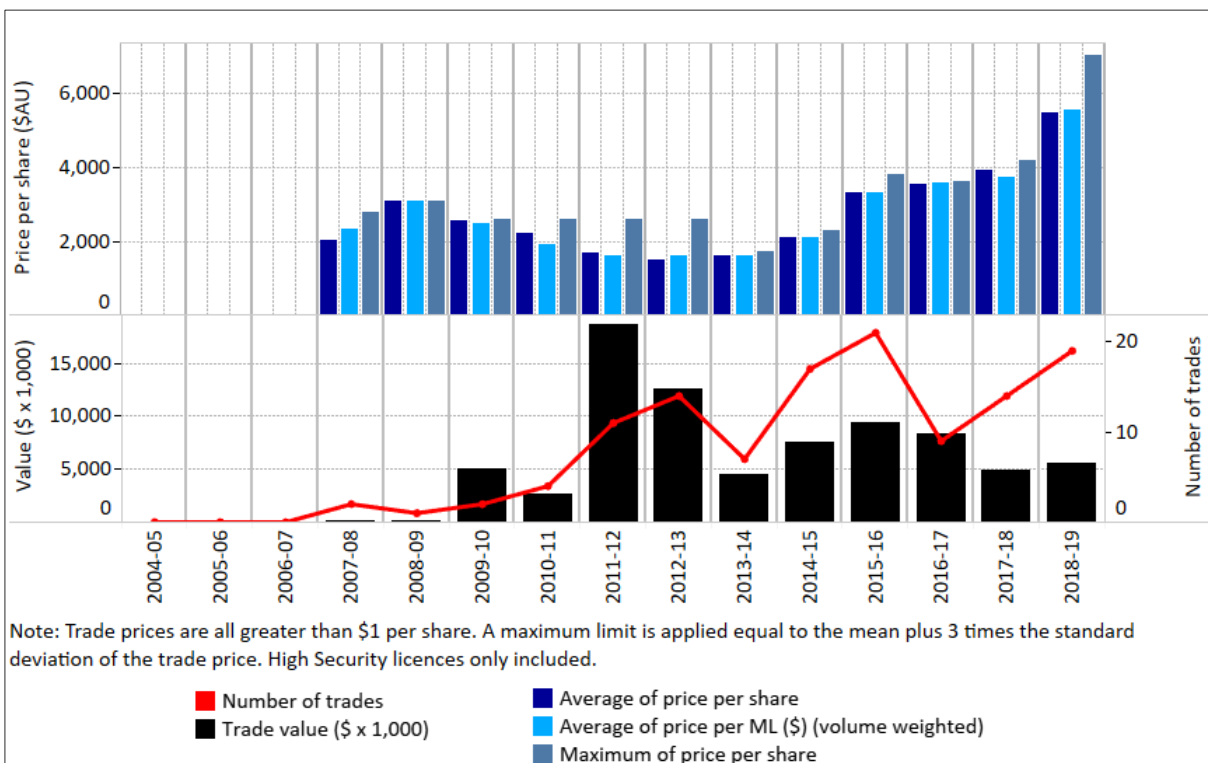


Figure 27: Total share assignments and held environmental purchases

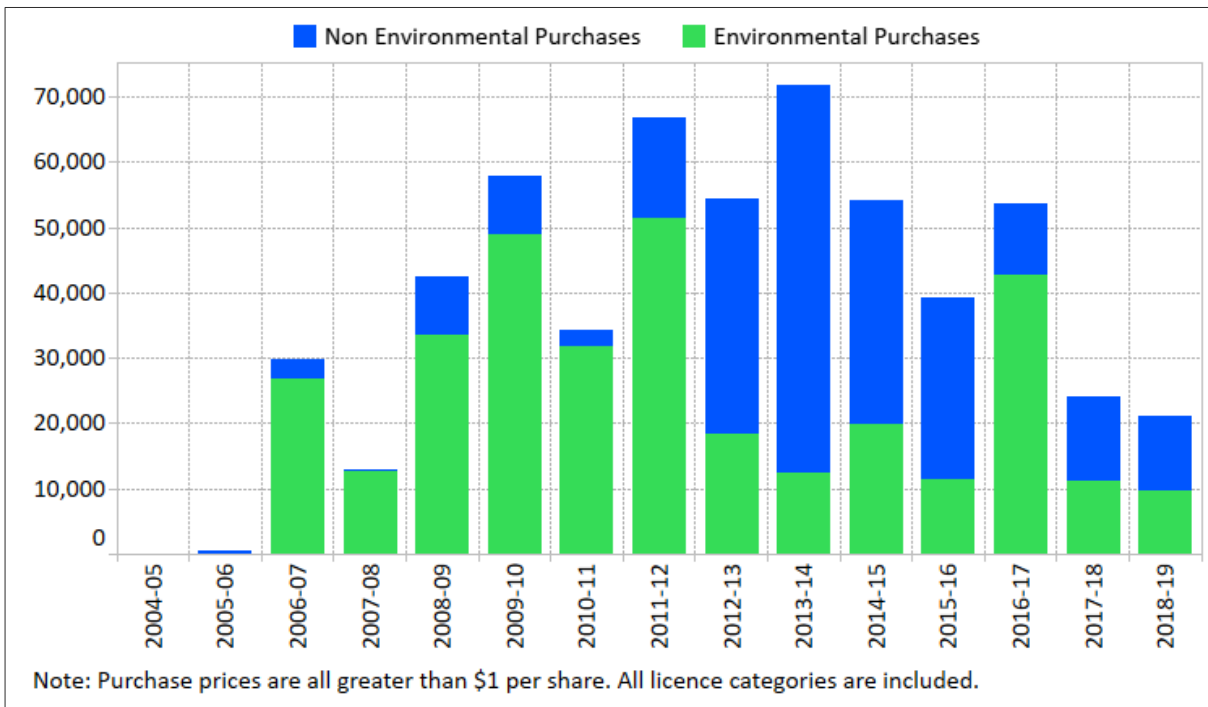
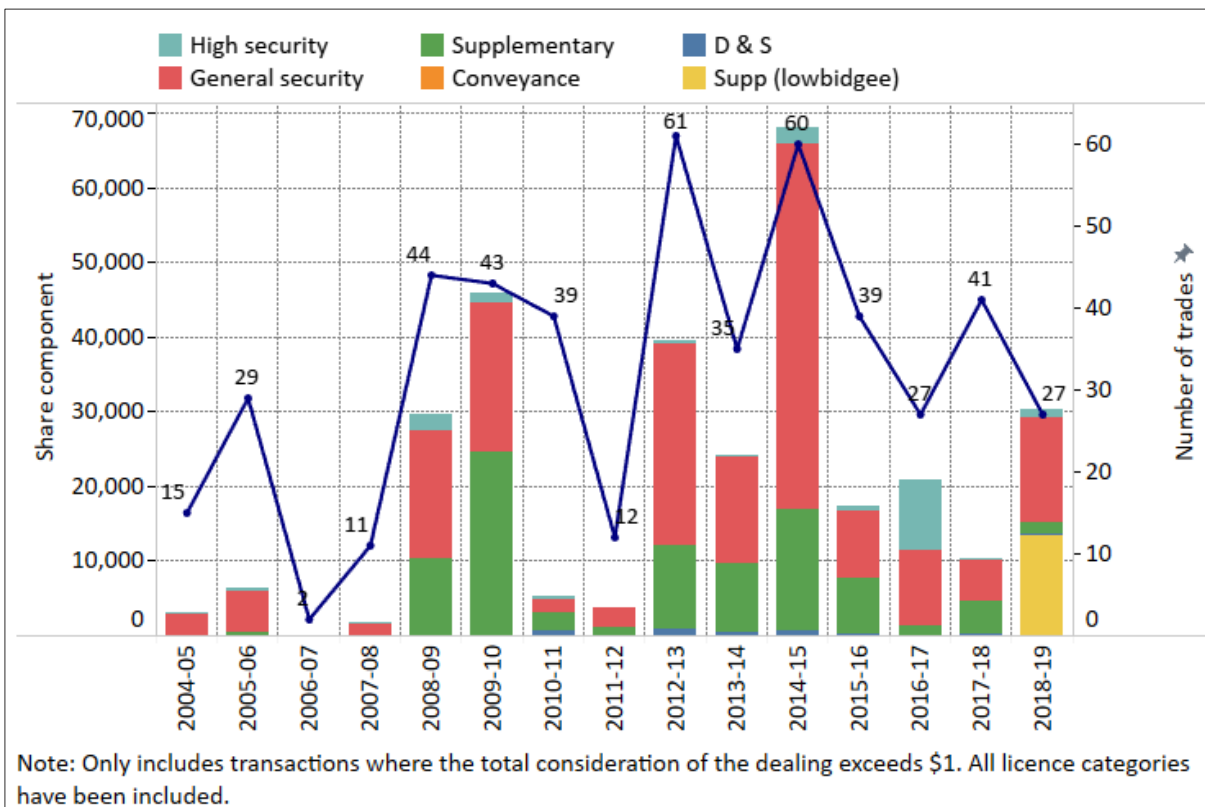


Figure 28: Change of holder commercial statistics

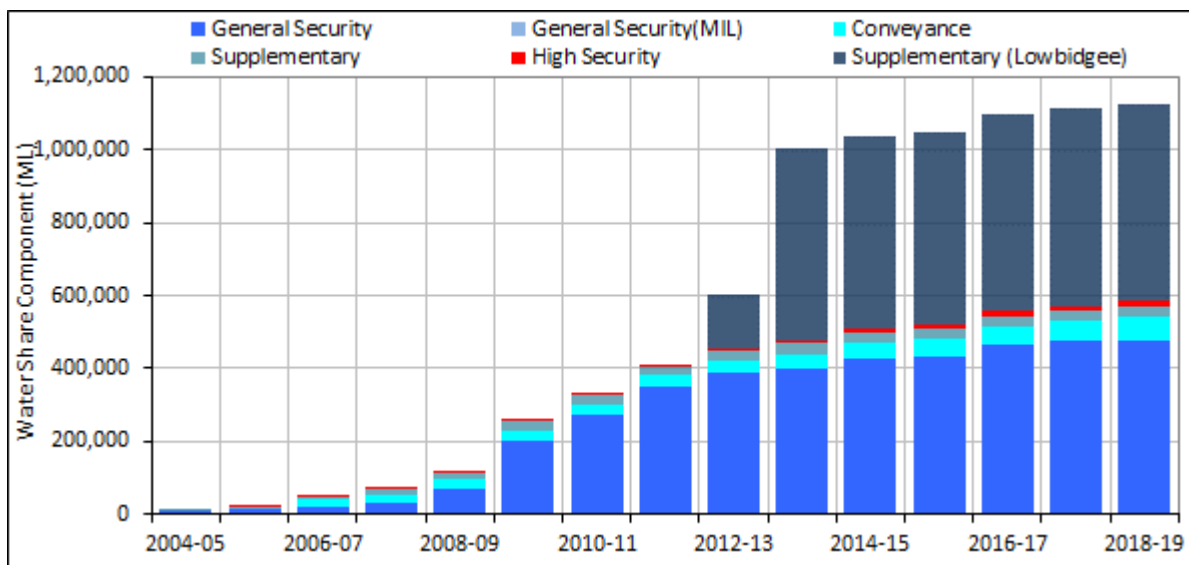


Held environmental water

- The held environmental water portfolio increased by 13,313 shares in the reporting period (Figure 29)

- A total of 1,126,258 shares (across all categories of access licence) were managed for environmental purposes as of 30 June 2019¹².
- A total of 67,405 megalitres (usage) was debited against held environmental licences, down significantly on the prior reporting period (Figure 30).
- In addition to account usage in the Murrumbidgee, 33,776 megalitres of allocation accumulated in Murrumbidgee held environmental access licences was withheld for environmental releases in the Snowy River (or River Murray Increased Flows (RMIF) program) (Figure 31)¹³.
- Further details on held environmental account water is available in Note 6 of this document, while detailed information on where the water was used and the benefits achieved is available on the NSW Office of Environment and Heritage webpage (www.environment.nsw.gov.au) and the (Commonwealth) Department of Sustainability, Environment, Water, Population and Communities webpage (www.environment.gov.au).

Figure 29: Held environmental water share component in the Murrumbidgee¹⁴



¹² Does not include environmental savings acquired that have not been converted to an access licence.

¹³ For further details see note 26.

¹⁴ Figures represent share at the conclusion of the water year. The licence category Supplementary (Lowbidgee) was created in 2012-13. Figures represent share at the conclusion of the water year.

Figure 30: Held environmental water account usage in the Murrumbidgee

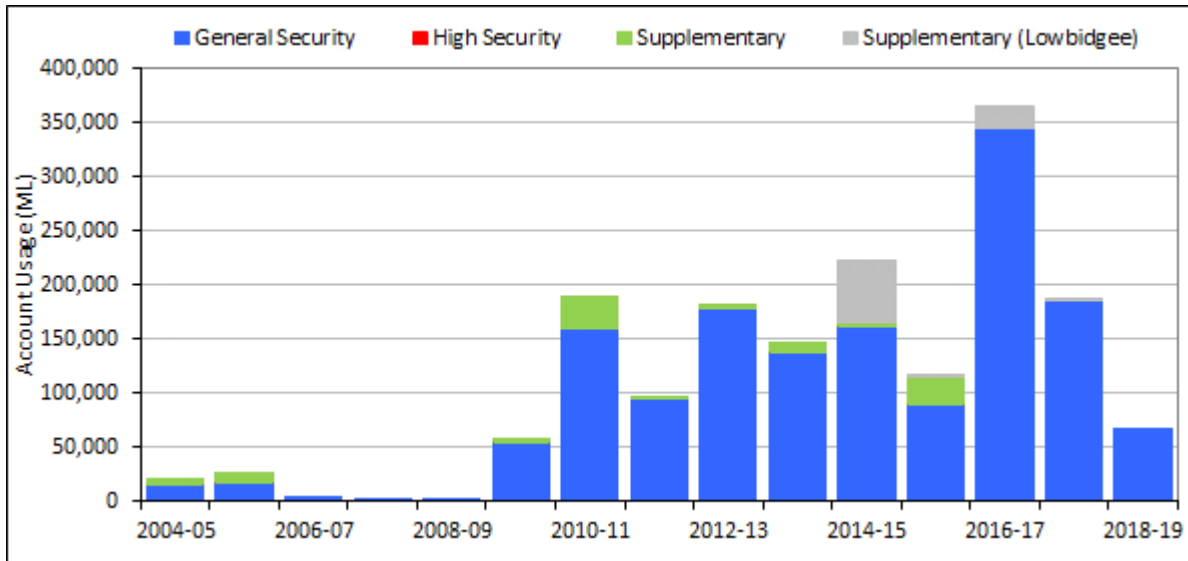
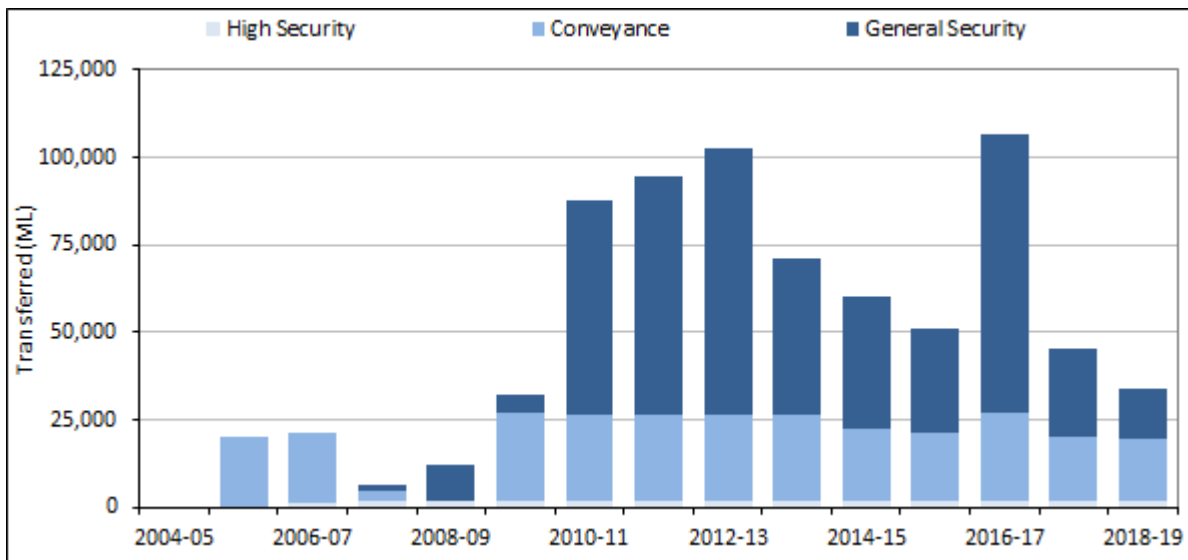


Figure 31: Murrumbidgee allocation transferred for environmental release in Snowy River



Planned environmental water

A wide range of environmental provisions including fixed volumetric targets (e.g. end of system targets), rules based (e.g. translucent storage releases), and account based (discretionally utilised for environmental assets, e.g. environmental water allowance accounts) are implemented through the water sharing plan. A full description of these provisions is provided in Note 7.

- A total of 124,682 megalitres of planned environmental water was delivered during the reporting period. This volume was made up of deliveries from the translucent/transparent under release account, the Environmental Water Allowance 1 account (EWA1) and the Environmental Water Allowance 2 (EWA2) account (Figure 32).
- The total water released from Burrinjuck Dam under the translucent/transparent rules of the water sharing plan was 117,201 megalitres (Figure 33).
- The required environmental releases from Burrinjuck storage for the reporting period are presented in Figure 34, along with the actual storage releases. All variations are within the practical allowances provided for storage operation.

- The end of system flow targets at Balranald was considered to be met in accordance with the Water Sharing Plan.
- For the end of system flow targets at Darlot there was one event, where the flow was less than 75% of the target for 7 consecutive days or more, and one month (August 2018) where the flow was less than 75% of the target for more than 10 days. End of system flow performance was reported to the Natural Resources Access Regulator. Refer to Note 19 for further details.

Figure 32: Total planned environmental water deliveries from Burrinjuck Dam 2004–05 to 2018–19¹⁵

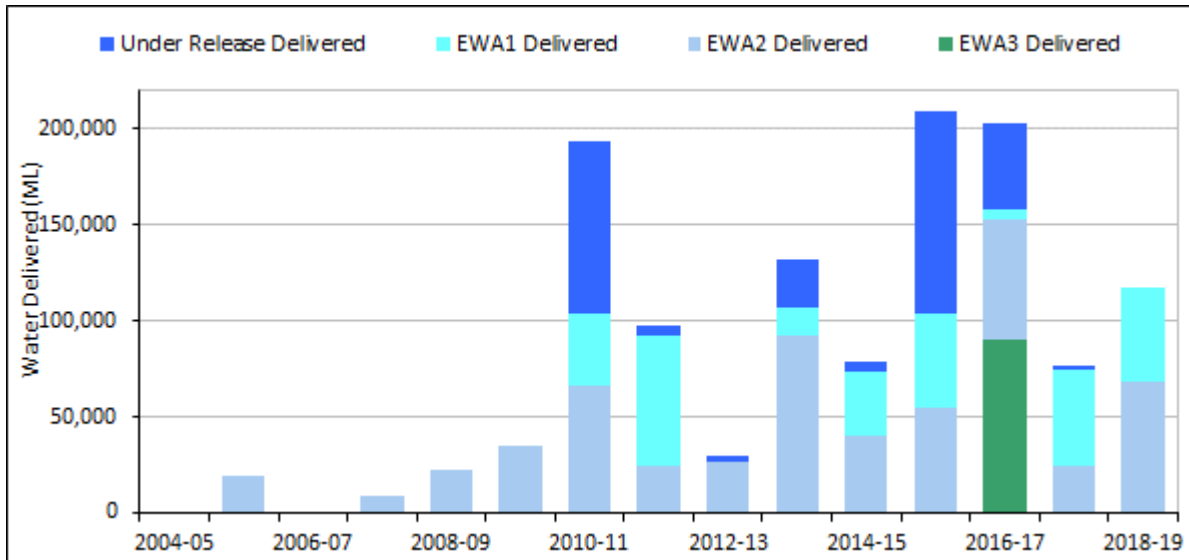
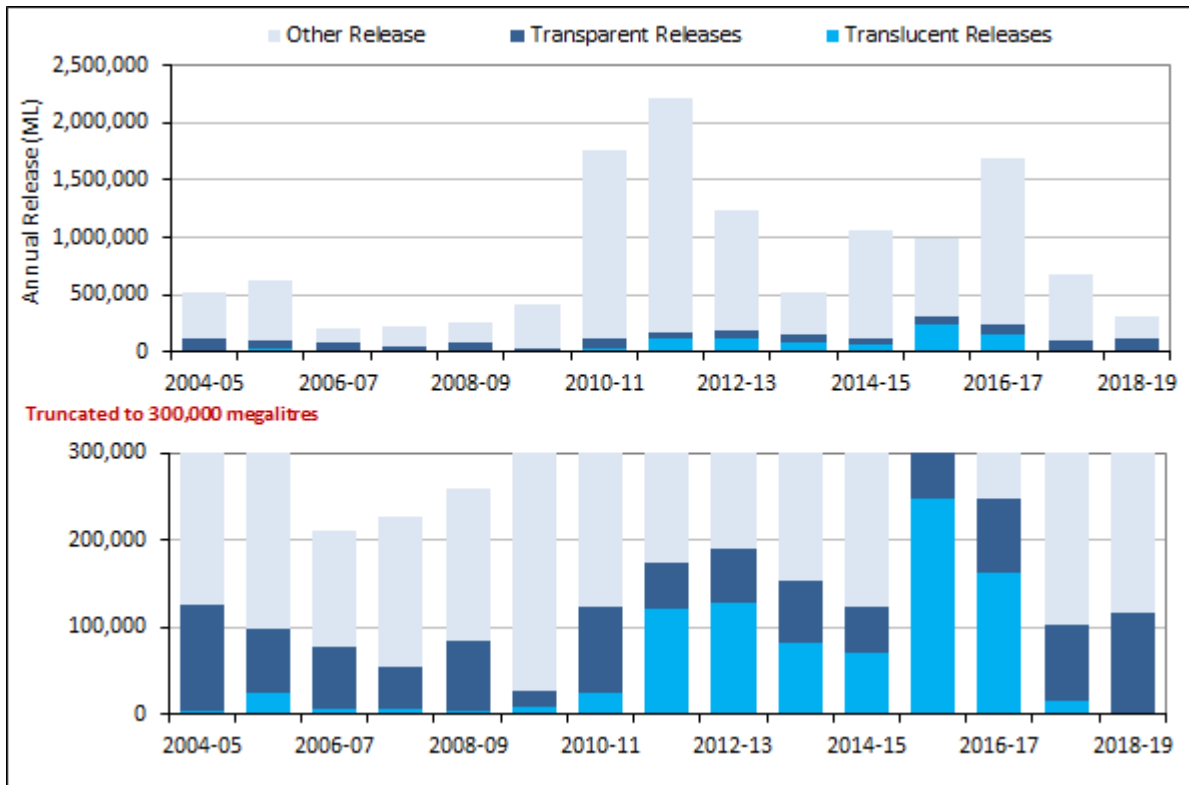
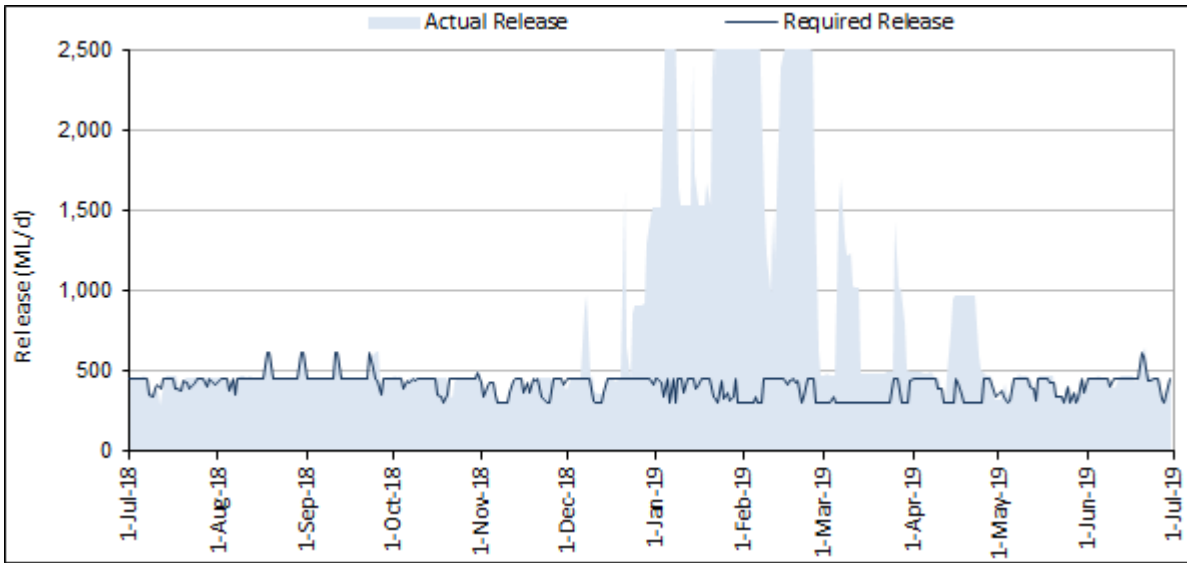


Figure 33: Transparent/translucent releases from Burrinjuck Dam 2004–05 to 2018–19



¹⁵ Under release delivered refers to releases made above the minimum required environmental translucent or transparent releases. The water is effectively used to offset any occurrences where the actual release was less than the required release.

Figure 34: Required environmental releases at Burrinjuck Dam vs actual releases



Water accounting statements

Significant water accounting policies

The water accounting statements in this GPWAR have been prepared using an accrual basis of accounting. All figures are in megalitres (ML).

The 'Statement of Physical Flows' has been excluded for this GPWAR as all transactions have been presented in the statements 'Water Assets and Liabilities' and 'Changes in Water Assets and Water Liabilities'.

A physical flow diagram that represents the physical movements of water has been included in order to provide a clearer picture of this process.

For general information on how to interpret the water accounting statements, refer to the *Guide to General Purpose Water Accounting Reports* available from the department's website at www.industry.nsw.gov.au/water

Quantification of data

Data accuracy

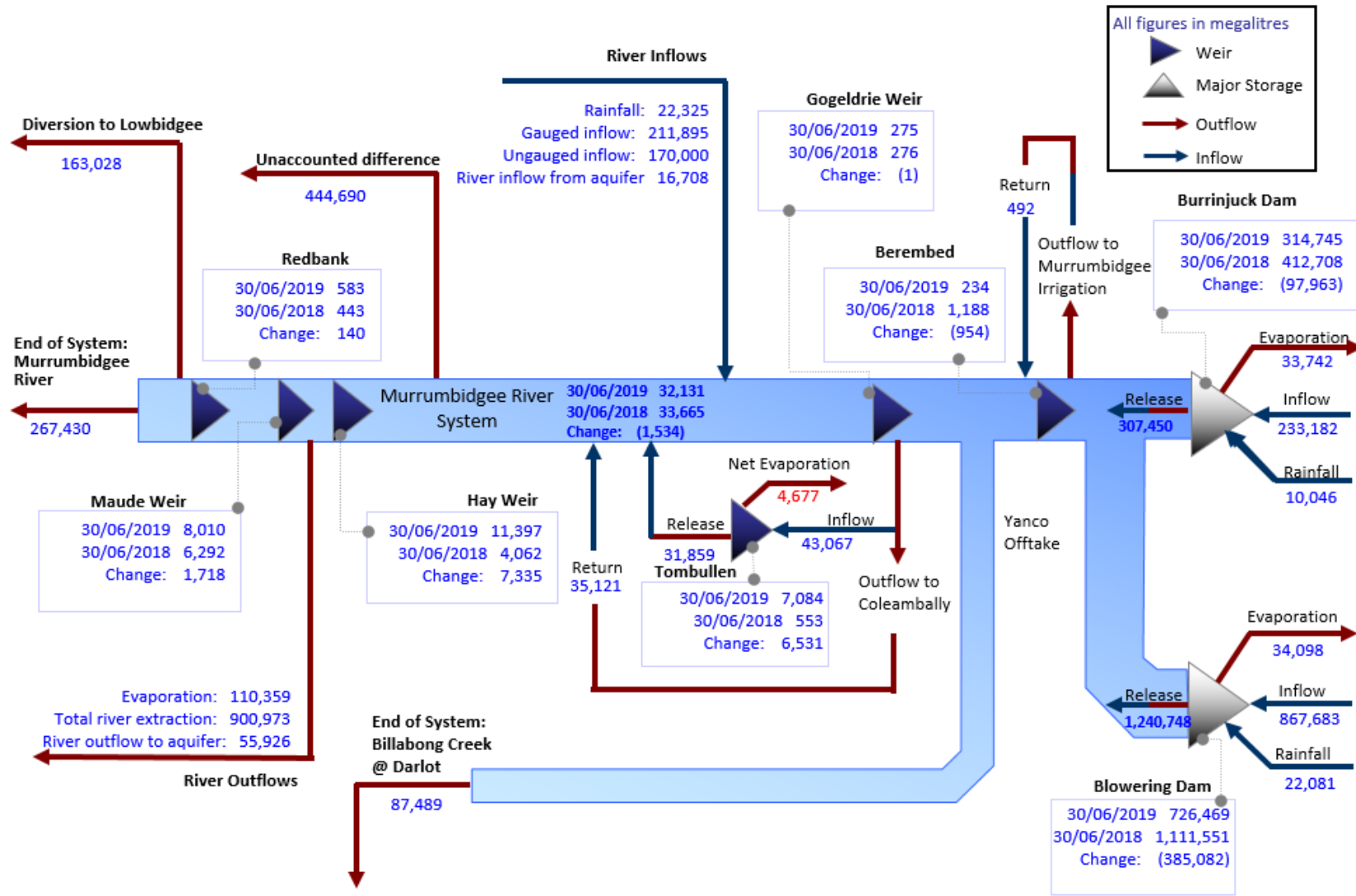
It is important to recognise that the data used to account for water movement and management in the reporting entity has been obtained from a variety of sources and systems. The data ranges from observed values where a high accuracy would be anticipated through to modelled results and estimates where accuracy can be highly variable depending on a range of factors. To address the inconsistencies in accuracy and prevent misuse of the data in the accounts, all figures in the water accounting statements will be accompanied by an assessment of accuracy (Table 8).

Table 8: Water account data accuracy estimates key

| Accuracy | Description |
|------------------|--|
| A1 ¹⁶ | +/- 0% Data is determined rather than estimated or measured. Therefore, the number contains no inaccuracies. |
| A | +/- 10% |
| B | +/- 25% |
| C | +/- 50% |
| D | +/- 100% |

¹⁶ Non-physical administration items, such as available water determinations, trading and carryover volumes are assumed to have no inherent error for the purposes of this report. Items are reported as extracted from the Department of Planning, Industry and Environment's Water group corporate database

2018–19 Murrumbidgee physical flows mass balance diagram



Note: Outflow to Coleambally and Murrumbidgee Irrigation is accounted in the total river extraction transaction

Statement of water assets and water liabilities

For the year ended 30 June 2019

In all tables (..) denotes a negative value.

Surface water assets

| 1. Surface water storage | Accuracy | Notes | 30-Jun-19 | 30-Jun-18 |
|---|----------|-------|------------------|------------------|
| Blowering Dam | A | 10 | 726,469 | 1,111,551 |
| Burrinjuck Dam | A | 10 | 314,744.00 | 412,708 |
| Berembled Weir | A | 10 | 234 | 1,188 |
| Gogeldrie Weir | A | 10 | 275 | 276 |
| Hay Weir | A | 10 | 11,397 | 4,062 |
| Redbank Weir | A | 10 | 583 | 443 |
| Maude Weir | A | 10 | 8,010 | 6,292 |
| Tom Bullen Storage | A | 10 | 7,084 | 553 |
| River | B | 11 | 32,131 | 33,665 |
| Total surface water storage (Asws) | | | 1,100,927 | 1,570,738 |
| <i>Change in physical surface water storage</i> | | | (469,811) | (399,241) |
| 2. Claims to water | Accuracy | Notes | 30-Jun-19 | 30-Jun-18 |
| Daily release balance (DRB) | A1 | 7 | 25,250 | 5,123 |

Surface water liabilities

| 3. Allocation accounts | Accuracy | Notes | 30-Jun-19 | 30-Jun-18 |
|--|----------|-------|------------------|------------------|
| General Security | A1 | 1 | 151,696 | 407,074 |
| High Security | A1 | 1 | (145) | (2) |
| Domestic and Stock | A1 | 1 | (36) | (21) |
| Coleambally Irrigation Conveyance | A1 | 1 | 0 | 4,692 |
| Murrumbidgee Irrigation Conveyance | A1 | 1 | 1 | 7,121 |
| Conveyance (Main River) | A1 | 1 | 0 | 199 |
| Total allocation accounts (Lsws) | | | 151,516 | 419,062 |
| <i>Change in allocation account</i> | | | (267,547) | (152,030) |
| 4. Environmental provisions | Accuracy | Notes | 30-Jun-19 | 30-Jun-18 |
| EWA1 Account | A1 | 7 | 482 | 50,000 |
| EWA2 Account | A1 | 7 | 12,464 | 30,431 |
| Translucent & transparent unmet releases | A1 | 7 | (6,875) | (1,002) |
| Total environmental provisions (EP) | | | 6,071 | 79,429 |
| <i>Change in environmental provisions</i> | | | (73,358) | 24,358 |
| 5. Intervalley trade account | Accuracy | Notes | 30-Jun-19 | 30-Jun-18 |
| Intervalley trade account (IVT) | A1 | 5 | 18,409 | (13,787) |

Surface water net assets

| 6. Net assets and changes | 30-Jun-19 | 30-Jun-18 |
|--|------------------|------------------|
| Net surface water assets (Asws + DRB – Lsws – EP – IVT) | 950,181 | 1,091,157 |
| <i>Change in net surface water assets</i> | (140,976) | (165,339) |

Changes in water assets and water liabilities

For the year ended 30 June 2019 (1 of 4)

1. Changes in surface water storage (physical water balance)

| Surface water storage increases | Accuracy | Notes | 2018–19 | 2017–18 |
|---|----------|--------|------------------|------------------|
| Blowering Dam | | | | |
| Inflow | | | | |
| Natural Component | A | 12 | 175,197 | 286,798 |
| Snowy Accountable Component | A1 | 8 & 12 | 629,486 | 1,079,260 |
| Snowy Accountable Pre-Release | A1 | 8 & 12 | 63,000 | 0 |
| Rainfall | B | 13 | 22,081 | 27,570 |
| Burrinjuck Dam | | | | |
| Inflow | A | 12 | 233,182 | 471,362 |
| Rainfall | B | 13 | 10,046 | 19,799 |
| Tombullen Storage | | | | |
| Inflow | | | 43,067 | 67,846 |
| River | | | | |
| Rainfall | B | 16 | 22,325 | 31,547 |
| Gauged Tributaries | A | 14 | 211,895 | 291,421 |
| Ungauged Tributaries | C | 15 | 170,000 | 360,000 |
| Return Flows | A | 17 | | |
| Coleambally Irrigation | | | 35,121 | 42,151 |
| Murrumbidgee Irrigation | | | 492 | 1,066 |
| River inflow from aquifer | C | 25 | 16,708 | N/A |
| River Inflow from Storage Releases | A | 18 | 1,580,057 | 2,250,608 |
| Total surface water storage increases (Isws) | | | 3,212,657 | 4,929,428 |

| Surface water storage decreases | Accuracy | Notes | 2018–19 | 2017–18 |
|---|----------|--------|------------------|------------------|
| Blowering Dam | | | | |
| Evaporation | B | 13 | 34,098 | 39,694 |
| Storage Release | A | 18 | 1,240,748 | 1,516,392 |
| Burrinjuck | | | | |
| Evaporation | B | 13 | 33,742 | 45,130 |
| Storage Release | | | | |
| Other | A | 18 | 190,249 | 568,736 |
| Translucency | A | 7 & 18 | 731 | 16,593 |
| Transparency | A | 7 & 18 | 116,470 | 88,999 |
| Tombullen Storage | | | | |
| Net Evaporation | B | 13 | 4,677 | 13,596 |
| Storage Release | A | 18 | 31,859 | 59,888 |
| River | | | | |
| Evaporation | B | 16 | 110,359 | 115,932 |
| End of System Flow | A | 19 | | |
| Balranald | | | 267,430 | 449,980 |
| Darlot | | | 87,489 | 94,835 |
| Diversions to Lowbidgee | A | 20 | 163,028 | 30,867 |
| Extractions from River | A | 21 | 896,413 | 1,836,126 |
| Basic Rights Extraction | C | 22 | 4,560 | 4,560 |
| Net River Outflow to Aquifer | C | 25 | 55,926 | 81,730 |
| Total surface water storage decreases (Dsws) | | | 3,237,779 | 4,963,058 |
| Unaccounted volume (balancing item) (Usws) | A | 24 | 444,690 | 365,611 |

| Net surface water storage changes | 2018–19 | 2017–18 |
|--|------------------|------------------|
| Net surface water storage inflow (Isws – Dsws – Usws) | (469,811) | (399,241) |

Changes in water assets and water liabilities

For the year ended 30 June 2019 (2 of 4)

2. Changes in claims to water

| Claims to Water Increases | Accuracy | Notes | 2018–19 | 2017–18 |
|--|----------|-------|---------------|--------------|
| Daily Release Balance Increase (Ictw) | A1 | 7 | 20,127 | 6,342 |
| Daily Release Balance Decrease (Dctw) | A1 | 7 | 0 | 2,180 |
| Net claims to water increases (Ictw – Dctw) | | | 20,127 | 4,162 |

3. Changes in allocation accounts

| Allocation account increases | Accuracy | Notes | 2018–19 | 2017–18 |
|---|----------|-------|------------------|------------------|
| Available Water Determinations | A1 | 2 | | |
| Domestic and Stock | | | 34,147 | 34,145 |
| General Security | | | 132,440 | 851,412 |
| High Security (Aboriginal Culture) | | | 2,150 | 2,150 |
| High Security | | | 342,284 | 342,284 |
| High Security (Research) | | | 300 | 300 |
| High Security (Town Water Supply) | | | 19,769 | 19,769 |
| Local Water Utility | | | 23,816 | 23,816 |
| Coleambally Irrigation Conveyance | | | 110,809 | 116,610 |
| Conveyance (Main River) | | | 208 | 1,336 |
| Murrumbidgee Irrigation Conveyance | | | 154,111 | 175,085 |
| Internal Trading—Buyers | A1 | 4 | 343,217 | 579,860 |
| Return Flow Recredits | A1 | 17 | 72,879 | 105,223 |
| Allocation account water trade in from Murray | A1 | 4 | 18,091 | 151,138 |
| Supplementary water | | | | |
| Murrumbidgee | A | 23 | 0 | 0 |
| Lowbidgee | A | 23 | 0 | 0 |
| Uncontrolled flow | A | 23 | 0 | 0 |
| Prior Year Account Adjustments - Increase | A1 | 9 | 0 | 0 |
| Total allocation increases (laa) | | | 1,254,220 | 2,403,128 |

Changes in water assets and water liabilities

For the year ended 30 June 2019 (3 of 4)

| Allocation account decreases | Accuracy | Notes | 2018–19 | 2017–18 |
|--|----------|--------|------------------|------------------|
| Account forfeiture | A1 | 1 | | |
| Domestic and Stock | | | 6,870 | 5,725 |
| General Security | | | 623 | 5,813 |
| High Security (Aboriginal Culture) | | | 1,651 | 2,150 |
| High Security (High Security) | | | 1,168 | 1,368 |
| Local Water Utility | | | 14,355 | 14,888 |
| Murrumbidgee Irrigation Conveyance | | | 0 | 0 |
| Conveyance (Main River) | | | 0 | 0 |
| Transfer to Snowy for environmental releases | A1 | 1 & 26 | | |
| General Security | | | 14,343 | 24,911 |
| High Security (High Security) | | | 1,791 | 1,791 |
| Murrumbidgee Irrigation Conveyance | | | 14,312 | 15,038 |
| Conveyance (Main River) | | | 190 | 330 |
| Coleambally Irrigation Conveyance | | | 3,140 | 3,004 |
| Account usage | A | 3 | | |
| Domestic and Stock | | | 2,7283 | 28,416 |
| General Security | | | 473,646 | 1,213,367 |
| High Security (Aboriginal Culture) | | | 500 | 0 |
| High Security (High Security) | | | 302,841 | 295,883 |
| High Security (Research) | | | 300 | 300 |
| High Security (Town Water Supply) | | | 19,769 | 19,769 |
| Local Water Utility | | | 9,107 | 8,233 |
| Coleambally Irrigation Conveyance | | | 103,203 | 102,816 |
| Murrumbidgee Irrigation Conveyance | | | 128,458 | 157,252 |
| Supplementary Water: Murrumbidgee | A | 23 | 0 | 0 |
| Supplementary Water: Lowbidgee | A | 23 | 0 | 0 |
| Uncontrolled flow | | | 0 | 0 |
| Internal trading—Sellers | A | 4 | 343,217 | 579,860 |
| Allocation account trade out to Murray | A | 4 | 54,985 | 74,221 |
| Licence cancelled | | | 15 | 22 |
| Prior year account adjustments—Decreases | A1 | 9 | 0 | 0 |
| Total allocation decreases (Daa) | | | 1,521,766 | 2,555,158 |

| Net change in allocation accounts | 2018–19 | 2017–18 |
|--|------------------|------------------|
| Net allocation account balance increase (Iaa – Daa) | (267,547) | (152,030) |

Changes in water assets and water liabilities

For the year ended 30 June 2019 (4 of 4)

4. Changes in environmental provisions

| Environmental provisions changes | Accuracy | Notes | 2018–19 | 2017–18 |
|---|----------|-------|-----------------|---------|
| Environmental provisions increases (Iep) | A1 | 7 | 51,324 | 120,922 |
| Total decreases in environmental provisions (Dep) | A1 | 7 | 124,682 | 96,564 |
| Net environmental provision balance increase (Iep – Dep) | | | (73,358) | 24,358 |

5. Changes in intervalley trade account

| Intervalley trade account increase | Accuracy | Notes | 2018–19 | 2017–18 |
|--|----------|-------|---------------|---------|
| IVT increases: Net inflows from Murray | | | 583 | 0 |
| IVT increases: Water traded out | A1 | 5 | 54,985 | 74,221 |
| Total intervalley trade account increase (It) | | | 55,568 | 74,221 |

| Intervalley trade account decrease | Accuracy | Notes | 2018–19 | 2017–18 |
|--|----------|-------|---------------|---------|
| IVT decreases: IVT clearances | A1 | 5 | 0 | 0 |
| IVT decreases: Net tagged trade | A1 | 5 | 5,281 | 25,151 |
| IVT decreases: Water traded into Murrumbidgee | A1 | 5 | 18,091 | 151,138 |
| Total intervalley trade account decrease (Dt) | | | 23,372 | 176,289 |

| Net change in intervalley trade account | 2018–19 | 2017–18 |
|---|---------------|------------------|
| Net intervalley trade account increase (It – Dt) | 32,196 | (102,068) |

6. Overall changes

| Net water asset increase | 2018–19 | 2017–18 |
|---|------------------|------------------|
| Isws – Dsws – Usws + Ictw – Dctw – Iaa + Daa – Iep + Dep + It – Dt | (140,976) | (165,339) |

Note disclosures

Reconciliation and future prospect descriptions

This section contains reconciliation and future prospect descriptions for the Murrumbidgee regulated river water source.

| Reconciliation of change in net water assets to net change in physical water storage ¹⁷ | 2018–19 | 2017–18 |
|--|------------------|------------------|
| Change in net surface water assets | (140,976) | (165,339) |
| Apply non-physical asset and liability adjustments ¹⁸ | | |
| plus net <i>increase</i> in Allocation Accounts | (267,547) | (152,030) |
| plus net <i>increase</i> intervalley trade account | 32,196 | (102,068) |
| minus net <i>increase</i> in claims to water: Daily release balance | (20,127) | (4,162) |
| plus net <i>increase</i> in claims to water: EWA1 | (49,518) | 0 |
| plus net <i>increase</i> in claims to water: EWA2 | (17,967) | 23,711 |
| plus net <i>increase</i> in claims to water: Translucent/Transparent | (5,873) | 647 |
| total non-physical adjustments | (328,835) | (233,902) |
| <i>equals net change in physical surface water storage</i> | <i>(469,811)</i> | <i>(399,241)</i> |

| Reconciliation of closing water storage to total surface water assets | 30 June 2019 | 30 June 2018 |
|---|------------------|------------------|
| Closing water storage | | |
| surface water storage | 1,100,927 | 1,570,738 |
| plus: | | |
| other claims to water (DRB) | 25,250 | 5,123 |
| other claims to water (IVT) | (18,409) | 13,787 |
| less: | | |
| volume in river | 32,131 | 33,665 |
| Total surface water assets | 1,139,899 | 1,555,983 |

¹⁷ All figures can be derived from or found directly in the Water Accounting Statements of the General Purpose Water Accounting Report. All figures are in megalitres.

¹⁸ Non-physical changes to the water asset added back into the 'Change in Net Water Assets' to reflect the physical volumetric change in the water storage from the previous year. All figures are reported in megalitres and can be derived from or found directly in the Water Accounting Statements of this report

Water assets available to settle water liabilities and future commitments within 12 months of reporting date

Final datasets for reporting in the GPWAR, including meter readings by field staff, were not available in time to produce an informative 12-month forecast for report users.

In lieu of this, the links below give the latest water availability information for the Murrumbidgee River Water Source. This includes carryovers and available water determinations at the time of reporting, along with probability information about the Murrumbidgee system's reliability.

Latest water availability

You can find the latest information on water availability, including water allocation statements, water allocations summaries and 2019–20 available water determinations, on the NSW Department of Planning, Industry and Environment webpage at industry.nsw.gov.au/water/allocations-availability/allocations

You can also subscribe to receive the latest updates.

Allocations



How water is allocated

Water sharing plans are developed in consultation with the community to determine how much water can be extracted and set aside.



Summary of current water allocations

A listing of current water allocation for major regulated rivers.



Water allocation statements

Water allocation statements are issued to announce an increase in an allocation for a specific water source and licence category.



Available water determinations

Available water determinations inform licensed water users how much water they can extract. They are issued on 1 July and periodically throughout the year.



Outlook & forecasts

Read about how our yearly forecasting and outlook report for the southern basins.

Latest storage volumes

Real time information on current storage volumes are located at realtimedata.waternsw.com.au

Significant events since 2018–19

System inflows have been tracking well below historical averages since the closure of the reporting period. At the time of writing (March 2020) Burrinjuck and Blowering were 37 and 39% of full supply capacity respectively.

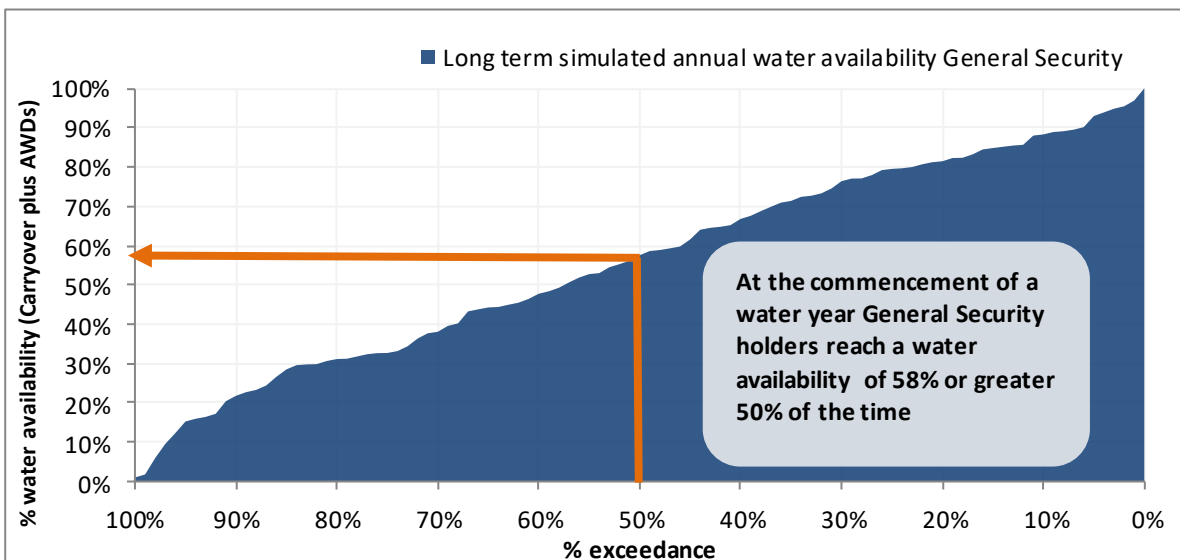
System reliability

The latest long-term planning model (Source) reflecting a water sharing plan management scenario in the Murrumbidgee provides indicative system reliability information for the commencement and closure of a watering season for General Security holders¹⁹.

At the commencement of the water year, the long-term simulation shows that General Security licence holders receive a water availability of 97% for 1% of the time and exceed 58% 50% of the time (Figure 35).

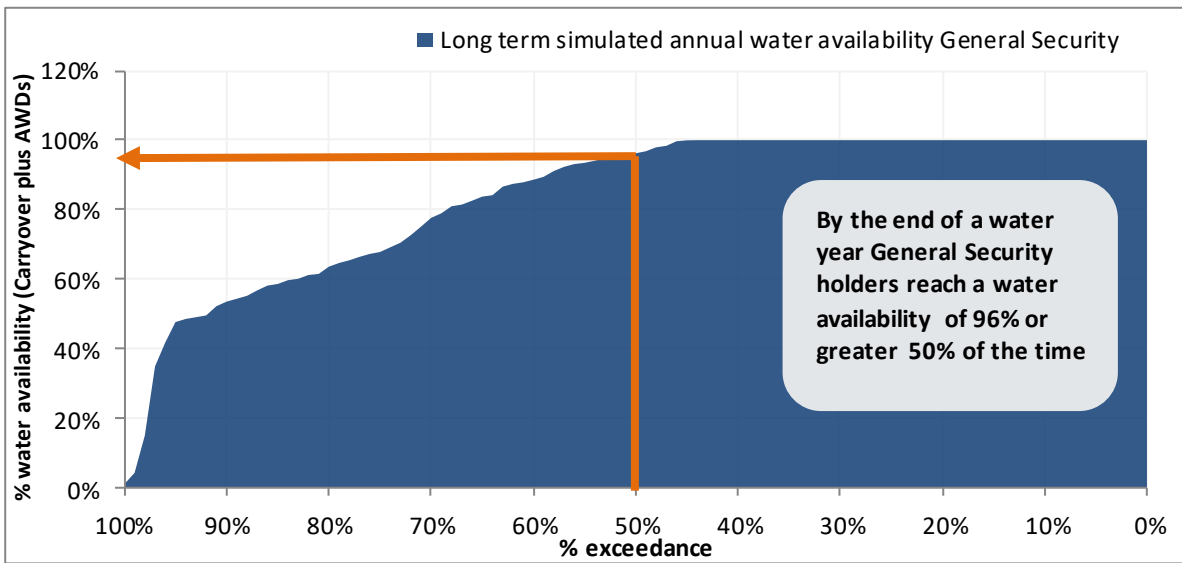
Availabilities significantly increase throughout the water year as storages are supplemented with new inflow. By the end of the water year, the simulation results indicate that a water availability of 100% is achieved, 44% of the time, 96% achieved 50% of the time and equalling or exceeding 35% 97% of the time (Figure 36).

Figure 35: Start of water year simulated availability for General Security access licences



¹⁹ Modelled data simulated as July to June water year. Simulation period 1 June 1890 to 30 June 2016, run rev.112

Figure 36: End of water year simulated availability for General Security access licences



Carryovers and available water determinations 2018–19

Table 9. Murrumbidgee carryovers and available water determinations 2019–20 (as of January 2020)

| Date | Individual announcement | Share component | Allocation volume (ML) | Cumulative volume (ML) | Allocation volume (%) | Cumulative volume (%) | Balance available (ML) | Balance not available (ML) | Balance total (ML) | Balance available (%) | Balance total (%) |
|---|-------------------------|-----------------|------------------------|------------------------|-----------------------|-----------------------|------------------------|----------------------------|--------------------|-----------------------|-------------------|
| Coleambally Irrigation (Conveyance) | | | | | | | | | | | |
| 1-Jul-19 | Opening | 130,000 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-19 | AWD 0.8585 ML per share | 130,000 | 111,605 | 111,605 | 85.9% | 85.9% | 111,605 | 0 | 111,605 | 85.9% | 85.9% |
| 15-Aug-19 | AWD 0.0 ML per share | 130,000 | 0 | 111,605 | 0.0% | 85.9% | 111,605 | 0 | 111,605 | 85.9% | 85.9% |
| 2-Sep-19 | AWD 0.0 ML per share | 130,000 | 0 | 111,605 | 0.0% | 85.9% | 111,605 | 0 | 111,605 | 85.9% | 85.9% |
| Domestic and Stock | | | | | | | | | | | |
| 1-Jul-19 | Opening | 20,985 | | | 0.0% | 0.0% | (20) | 0 | (20) | (0.1)% | (0.1)% |
| 1-Jul-19 | AWD 100.0 % | 20,985 | 20,985 | 20,985 | 100.0% | 100.0% | 20,966 | 0 | 20,966 | 99.9% | 99.9% |
| Domestic and Stock [Domestic] | | | | | | | | | | | |
| 1-Jul-19 | Opening | 271 | | | 0.0% | 0.0% | (16) | 0 | (16) | (5.9)% | (5.9)% |
| 1-Jul-19 | AWD 100.0 % | 271 | 271 | 271 | 100.0% | 100.0% | 255 | 0 | 255 | 94.1% | 94.1% |
| Domestic and Stock [Stock] | | | | | | | | | | | |
| 1-Jul-19 | Opening | 12,883 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-19 | AWD 100.0 % | 12,883 | 12,883 | 12,883 | 100.0% | 100.0% | 12,882 | 0 | 12,882 | 100.0% | 100.0% |
| Local Water Utility | | | | | | | | | | | |
| 1-Jul-19 | Opening | 23,816 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-19 | AWD 100.0 % | 23,816 | 23,816 | 23,816 | 100.0% | 100.0% | 23,816 | 0 | 23,816 | 100.0% | 100.0% |
| Murrumbidgee Irrigation (Conveyance) | | | | | | | | | | | |
| 1-Jul-19 | Opening | 243,000 | | | 0.0% | 0.0% | 1 | 0 | 1 | 0.0% | 0.0% |
| 1-Jul-19 | AWD 0.6183 ML per share | 243,000 | 150,247 | 150,247 | 61.8% | 61.8% | 150,247 | 0 | 150,247 | 61.8% | 61.8% |
| 15-Aug-19 | AWD 0.0068 ML per share | 243,000 | 1,652 | 151,899 | 0.7% | 62.5% | 151,900 | 0 | 151,900 | 62.5% | 62.5% |
| 2-Sep-19 | AWD 0.0068 ML per share | 243,000 | 1,652 | 153,552 | 0.7% | 63.2% | 153,552 | 0 | 153,552 | 63.2% | 63.2% |

| Date | Individual announcement | Share component | Allocation volume (ML) | Cumulative volume (ML) | Allocation volume (%) | Cumulative volume (%) | Balance available (ML) | Balance not available (ML) | Balance total (ML) | Balance available (%) | Balance total (%) |
|--|-------------------------|-----------------|------------------------|------------------------|-----------------------|-----------------------|------------------------|----------------------------|--------------------|-----------------------|-------------------|
| Regulated River (Conveyance) | | | | | | | | | | | |
| 1-Jul-19 | Opening | 2,968 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-19 | AWD 0.0 ML per share | 2,968 | 0 | 0 | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 15-Aug-19 | AWD 0.03 ML per share | 2,968 | 89 | 89 | 3.0% | 3.0% | 89 | 0 | 89 | 3.0% | 3.0% |
| 2-Sep-19 | AWD 0.03 ML per share | 2,968 | 89 | 178 | 3.0% | 6.0% | 178 | 0 | 178 | 6.0% | 6.0% |
| Regulated River (General Security) | | | | | | | | | | | |
| 1-Jul-19 | Opening | 1,891,995 | | | 0.0% | 0.0% | 151,721 | 0 | 151,721 | 8.0% | 8.0% |
| 1-Jul-19 | AWD 0.0 ML per share | 1,891,995 | 0 | 0 | 0.0% | 0.0% | 151,721 | 0 | 151,721 | 8.0% | 8.0% |
| 15-Aug-19 | AWD 0.03 ML per share | 1,891,995 | 56,766 | 56,766 | 3.0% | 3.0% | 208,487 | 0 | 208,487 | 11.0% | 11.0% |
| 2-Sep-19 | AWD 0.03 ML per share | 1,891,995 | 56,753 | 113,519 | 3.0% | 6.0% | 265,239 | 0 | 265,239 | 14.0% | 14.0% |
| Regulated River (High Security) | | | | | | | | | | | |
| 1-Jul-19 | Opening | 363,698 | | | 0.0% | 0.0% | (145) | 0 | (145) | 0.0% | 0.0% |
| 1-Jul-19 | AWD 0.95 ML per share | 363,698 | 345,516 | 345,516 | 95.0% | 95.0% | 345,371 | 0 | 345,371 | 95.0% | 95.0% |
| Regulated River (High Security) [Aboriginal Cultural] | | | | | | | | | | | |
| 1-Jul-19 | Opening | 2,150 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-19 | AWD 100.0 % | 2,150 | 2,150 | 2,150 | 100.0% | 100.0% | 2,150 | 0 | 2,150 | 100.0% | 100.0% |
| Regulated River (High Security) [Research] | | | | | | | | | | | |
| 1-Jul-19 | Opening | 300 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-19 | AWD 100.0 % | 300 | 300 | 300 | 100.0% | 100.0% | 300 | 0 | 300 | 100.0% | 100.0% |
| Regulated River (High Security) [Town Water Supply] | | | | | | | | | | | |
| 1-Jul-19 | Opening | 19,769 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-19 | AWD 100.0 % | 19,769 | 19,769 | 19,769 | 100.0% | 100.0% | 19,769 | 0 | 19,769 | 100.0% | 100.0% |
| Supplementary Water | | | | | | | | | | | |
| 1-Jul-19 | Opening | 198,780 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-19 | AWD 1.0 ML per share | 198,780 | 198,780 | 198,780 | 100.0% | 100.0% | 198,780 | 0 | 198,780 | 100.0% | 100.0% |
| Supplementary Water (Lowbidgee) | | | | | | | | | | | |
| 1-Jul-19 | Opening | 747,000 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-19 | AWD 1.0 ML per share | 747,000 | 747,000 | 747,000 | 100.0% | 100.0% | 747,000 | 0 | 747,000 | 100.0% | 100.0% |

Note 1—Allocation accounts

This note is reference for the volume held in the allocation accounts at the time of reporting but also relevant for the various processes that occur to either increase or decrease an allocation account throughout the water year.

The volume of water that is in the licence allocation accounts at the time of reporting is a net balance for the relevant licence category and represents that water that can be carried forward to the next water year as dictated by the carryover rules in place for that year or required under the water sharing plan.

A negative number for the carryover figure indicates that more usage has occurred than has been allocated to the account, and the deficit must be carried forward to the next season.

Water that is in accounts at the end of a water year but is not permitted to be carried over is forfeited and has been represented as a decrease in water liability. The accounting presented is relevant to licence category and therefore is inclusive of licences held by environmental holders (environmental holdings are specifically detailed in note 6)

Supplementary water was not strictly represented as a water liability in the accounting statements the same way other licence categories were. Details about supplementary usage and events can be found in Note 23.

Data type

Derived from measured data

Policy

Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016

Available on the department's website at www.industry.nsw.gov.au/water

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

Department of Planning, Industry and Environment

Data source

WaterNSW/Department of Planning, Industry and Environment—Water Accounting System (joint ownership)

Methodology

The carryover volume of water in the allocation account for each licence category is determined once all transactions and end of year forfeit rules have been applied. Below is list of typical transactions that can apply to an allocation account:

- Available water determination (detailed in note 2)
- Licenced usage (detailed in note 3)
- Forfeiture due to:
 - Carryover rules
 - Account spillage as a result of AWD
 - Licence conversions

- Allocation transferred for release in the Snowy River from environmental holdings (detailed in note 26).
- Trade of allocation water between accounts (detailed in notes 4 and 5)
- Determined carryover volume

Additional information

Table 11 provides a balanced summary²⁰ of the water allocation accounts for each category of access licence. Table 10 provides a description of each of the table components.

Table 10: Explanatory information for allocation account summary

| Heading | | Description |
|---|--------------|--|
| Share | | This is the total volume of entitlement in the specific licence category. |
| Opening | | The volume of water that has been carried forward from previous years allocation account. |
| AWD | | The total annual volume of water added to the allocation account as a result of allocation assessments. |
| Licences | New | Increased in account water as a result of the issuing of a new licence. |
| | Cancelled | Decrease in account water as a result of a licence cancellation. |
| Assignments | In | Increase in account water as a result of Temporary Trade in. |
| | Out | Decrease in account water as a result of Temporary Trade out. |
| Transfer to Snowy for environmental release | | Water effectively transferred from Murrumbidgee allocation accounts to allow environmental flows in the Snowy River. This physical delivery is allowed for by reducing the amount of water Snowy Hydro are required to release to the Murrumbidgee valley. |
| Snowy Borrow | In | Increase in account water as a result of a transfer of water in from another reporting entity e.g. Snowy Borrow. |
| | Out | Decrease in account water as a result of a transfer of water out of the reporting entity e.g. Snowy Borrow repayment. |
| Account Usage | Controlled | Volume of water that is debited against the allocation accounts and is accountable against the licence. |
| | Uncontrolled | Volume of water that is extracted under high flow conditions that is not accountable against the licence. This differs from Supplementary water in that it becomes accountable once specific allocation levels are exceeded. |
| Recredit | | That part of Coleambally Irrigation return flows credited back to their general security account. |
| Available Balance | | That part of the remaining account balance that is available to be taken at the conclusion of the water year. |
| Non-Available Balance | | That part of the remaining account balance that is not available to be taken at the conclusion of the water year. |
| End of Year Forfeit | | Account water that is forfeited at the end of the water year as a result of carryover rules that restrict the carry forward volume. |
| Carry Forward | | This represents the account water that is permitted to be carried forward into the next water year as determined by the carryover rules. |

²⁰ Balances include adjustments to carryover, AWD, end of year forfeit and carry forward to allow for the effect of removing allocation account water from a Murrumbidgee access licence in order to call that water for release in the Snowy River.

Table 11: Allocation account balance summary

| Share 30/6/2019 | Opening balance | AWD | Licences | | Assignments | | Snowy transfer | Recredit | Account usage | Net account usage | Uncontrolled flow usage | During year forfeit | End of year balance | | End of year forfeit | Carry forward |
|---|--------------------|---------|----------|-----------|-------------|---------|-------------------|----------|------------------|-------------------------|----------------------------|---------------------------|----------------------|------------------------|---------------------------|------------------|
| | | | New | Cancelled | In | Out | | | | | | | Available balance | Unavailable balance | | |
| Coleambally Irrigation (Conveyance) | | | | | | | | | | | | | | | | |
| 130,000 | 0 | 110,809 | 0 | 0 | 20 | 9,178 | 3,140 | 0 | 103,203 | 103,203 | 0 | 0 | 0 | 0 | 0 | 0 |
| Domestic and Stock | | | | | | | | | | | | | | | | |
| 20,985 | (1) | 20,993 | 0 | 0 | 0 | 0 | 0 | 0 | 16,098 | 16,098 | 0 | 0 | 4,886 | 0 | 4,905 | (19.5) |
| Domestic and Stock [Domestic] | | | | | | | | | | | | | | | | |
| 269 | (20) | 271 | 0 | 0 | 0 | 0 | 0 | 0 | 102 | 102 | 0 | 0 | 150 | 0 | 165.5 | (16) |
| Domestic and Stock [Stock] | | | | | | | | | | | | | | | | |
| 12,883 | 0 | 12,883 | 0 | 0 | 0 | 0 | 0 | 0 | 11,084 | 11,084 | 0 | 0 | 1,799 | 0 | 1,799 | 0 |
| Local Water Utility | | | | | | | | | | | | | | | | |
| 23,816 | 0 | 23,816 | 0 | 0 | 146 | 500 | 0 | 0 | 9,107 | 9,107 | 0 | 0 | 14,355 | 0 | 14,355 | 0 |
| Murrumbidgee Irrigation (Conveyance) | | | | | | | | | | | | | | | | |
| 243,000 | 7,121 | 154,111 | 0 | 0 | 0 | 18,461 | 14,312 | 0 | 128,458 | 128,458 | 0 | 0 | 1 | 0 | 0 | 1 |
| Regulated River (Conveyance) | | | | | | | | | | | | | | | | |
| 2,968 | 198.8 | 208 | 0 | 0 | 0 | 217 | 190 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| General Security | | | | | | | | | | | | | | | | |
| 1,891,995 | 407,074 | 132,440 | 0 | 7 | 345,446 | 317,523 | 14,343 | 72,879 | 473,646 | 400,767 | 0 | 0 | 152,319 | 0 | 623 | 151,696 |
| High Security | | | | | | | | | | | | | | | | |
| 360,297 | (2) | 342,284 | 0 | 0 | 15,696 | 52,323 | 1,791 | 0 | 302,841 | 302,841 | 0 | 0 | 1,024 | 0 | 1,168 | (144.7) |
| High Security (Aboriginal Culture) | | | | | | | | | | | | | | | | |
| 2,150 | 0 | 2,150 | 0 | 0 | 0 | 0 | 0 | 0 | 499.5 | 500 | 0 | 0 | 1,651 | 0 | 1,651 | 0 |
| High Security (Research) | | | | | | | | | | | | | | | | |
| 300 | 0 | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 300 | 300 | 0 | 0 | 0 | 0 | 0 | 0 |
| High Security (Town Water Supply) | | | | | | | | | | | | | | | | |
| 19,769 | 0 | 19,769 | 0 | 0 | 0 | 0 | 0 | 0 | 19,769 | 19,769 | 0 | 0 | 0 | 0 | 0 | 0 |
| Supplementary Water | | | | | | | | | | | | | | | | |
| 198,780 | 0 | 198,780 | 0 | 0 | 26,806 | 26,806 | 0 | 0 | 0 | 0 | 0 | 0 | 198,780 | 0 | 198,780 | 0 |
| Supplementary Water (Lowbidgee) | | | | | | | | | | | | | | | | |
| 747,000 | 0 | 747,000 | 0 | 0 | 393,117 | 393,117 | 0 | 0 | 0 | 0 | 0 | 0 | 747,000 | 0 | 747,000 | 0 |

Note 2—Available Water Determination (allocation announcement)

This is the process by which the regulated surface water asset available for use within the regulated system is determined and shared. It determines the volume of water that is to be added to an individual's licence allocation account. Announcements of allocations are made on a seasonal basis—usually corresponding with the financial year and are updated on a regular basis or following significant inflow events. Under the *Water Management Act 2000* the announcements are termed available water determinations, while prior to this under the *Water Act 1912* this process was known as an allocation announcement.

Data type

Derived from measured data.

Policy

Water Management Act 2000 (NSW).

- Chapter 3—Part 2 Access Licences.
 - Clause 59—Available Water Determinations.

Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016

- Part 7—Limits to the availability of water
 - Division 2—Available Water Determinations.

Available on the department's website at www.industry.nsw.gov.au/water

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

Department of Planning, Industry and Environment

Data source

WaterNSW/Department of Planning, Industry and Environment—Water Accounting System (Joint ownership of system).

Available Water Determination Register—Department of Planning, Industry and Environment website at www.industry.nsw.gov.au/water

Methodology

The AWD procedure itself is generally divided into two sections; the available water asset, and system commitments. Once system commitments have been met the available water asset is then available for distribution to the access licence categories in order of priority (see

Table 12). The volume of the announced allocation is expressed as the percentage of share component of the licence.

Table 12: Priority of access licence categories

| Licence Category | AWD Priority |
|----------------------------------|--------------|
| General Security | Low |
| High Security | High |
| Conveyance | Low |
| Domestic and Stock ²¹ | Very High |
| Local Water Utility | Very High |

Available Water Asset—this is calculated by summing the water currently available in storage, future (minimum) inflows to the system, and additional volumes due to recessions of inflows from the current levels to the minimum inflow levels. Also taken into consideration is the reduction of the total inflows to the system for those that arrive too late in the season to be useful.

System Commitments—this is an assessment of the existing commitments that must be delivered from the Available Water Asset in either the current or future years. Key components include:

- essential supplies include things such as town water supplies, stock and domestic requirements, industrial use and permanent plantings (e.g. orchards, vineyards) and environmental allowances
- undelivered account water is the water that is already in accounts that is yet to be provided
- end of system flow requirement is an estimate of the flow that to pass through the system as a result of operation of the system
- losses which are estimated as the amount of water that will be lost by the system either through evaporation or in the process of delivering the water via transmission losses

It should be noted that the AWD for supplementary licence accounts is a separate process and is not dependent on water asset available. It is made once at the start of the year and unless there is a management change due to the growth in use strategy it is maintained at the maximum value prescribed in the plan generally 100% of share component. Therefore, it is not considered to create a liability on the system and is only considered in terms of an extraction that reduces the water asset.

²¹ Domestic and Stock is further broken down into three subcategories: Domestic and Stock, Domestic and Stock (Domestic) and Domestic and Stock (Stock). For the purposes of this report and the general-purpose water account they have been aggregated.

Additional information

The following pages contain the annual allocation summary report. Below is a table containing report notes to help interpret the report.

Table 13: Allocation summary report descriptions

| Table heading | Description |
|--|--|
| Opening | Remaining allocation account balances at the conclusion of the previous season that can be carried forward to this season. |
| Individual announcement | Actual announcement made to each licence category |
| Share component (Entitlement) | Sum of the licensed volume of water within the licence category on the announcement date. |
| Announced volume | Volume of water credited to accounts within a licence category as a result of the announcement made. |
| Cumulative volume | Cumulative total of the announced volumes for the water year and licence category. |
| Percent of share component (Entitlement) | This is the announced volume expressed as a percentage of the entitlement applicable on the date. |
| Balance made available | Sum of water available in allocation accounts that has been made available to be taken during the season. |
| Non-available balance | Water allocated that is not accessible at this point in time. |
| Supplementary water | Water that is not a stored source of water and is only made available if an uncontrolled flow event occurs. |

Table 14: Murrumbidgee Regulated River Available Water Determination announcements for reporting period

| Date | Individual announcement | Share component | Allocation volume (ML) | Cumulative volume (ML) | Allocation volume (%) | Cumulative volume (%) | Balance available (ML) | Balance not available (ML) | Balance total (ML) | Balance available (%) | Balance total (%) |
|---|-------------------------|-----------------|------------------------|------------------------|-----------------------|-----------------------|------------------------|----------------------------|--------------------|-----------------------|-------------------|
| Coleambally Irrigation (Conveyance) | | | | | | | | | | | |
| 1-Jul-18 | Opening | 130,000 | | | 0.0% | 0.0% | 4,557 | 0 | 4,557 | 3.5% | 3.5% |
| 1-Jul-18 | AWD 0.8585 ML per share | 130,000 | 110,809 | 110,809 | 85.2% | 85.2% | 115,365 | 0 | 115,365 | 88.7% | 88.7% |
| Domestic and Stock | | | | | | | | | | | |
| 1-Jul-18 | Opening | 20,993 | | | 0.0% | 0.0% | (1) | 0 | (1) | 0.0% | 0.0% |
| 1-Jul-18 | AWD 100.0 % | 20,993 | 20,993 | 20,993 | 100.0% | 100.0% | 20,992 | 0 | 20,992 | 100.0% | 100.0% |
| Domestic and Stock [Domestic] | | | | | | | | | | | |
| 1-Jul-18 | Opening | 269 | | | 0.0% | 0.0% | (20) | 0 | (20) | (7.4)% | (7.4)% |
| 1-Jul-18 | AWD 100.0 % | 269 | 269 | 269 | 100.0% | 100.0% | 249 | 0 | 249 | 92.6% | 92.6% |
| Domestic and Stock [Stock] | | | | | | | | | | | |
| 1-Jul-18 | Opening | 12,883 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-18 | AWD 100.0 % | 12,883 | 12,883 | 12,883 | 100.0% | 100.0% | 12,883 | 0 | 12,883 | 100.0% | 100.0% |
| Local Water Utility | | | | | | | | | | | |
| 1-Jul-18 | Opening | 23,816 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-18 | AWD 100.0 % | 23,816 | 23,816 | 23,816 | 100.0% | 100.0% | 23,816 | 0 | 23,816 | 100.0% | 100.0% |
| Murrumbidgee Irrigation (Conveyance) | | | | | | | | | | | |
| 1-Jul-18 | Opening | 243,000 | | | 0.0% | 0.0% | 5,493 | 0 | 5,493 | 2.3% | 2.3% |
| 1-Jul-18 | AWD 0.6251 ML per share | 243,000 | 151,899 | 151,899 | 62.5% | 62.5% | 157,393 | 0 | 157,393 | 64.8% | 64.8% |
| 16-Jul-18 | AWD 0.0045 ML per share | 243,000 | 1,094 | 152,993 | 0.4% | 63.0% | 158,486 | 0 | 158,486 | 65.2% | 65.2% |
| 1-Aug-18 | AWD 0.0023 ML per share | 243,000 | 559 | 153,552 | 0.2% | 63.2% | 159,045 | 0 | 159,045 | 65.5% | 65.5% |
| 17-Sep-18 | AWD 0.0023 ML per share | 243,000 | 559 | 154,111 | 0.2% | 63.4% | 159,604 | 0 | 159,604 | 65.7% | 65.7% |
| Regulated River (Conveyance) | | | | | | | | | | | |
| 1-Jul-18 | Opening | 2,968 | | | 0.0% | 0.0% | 79 | 0 | 79 | 2.7% | 2.7% |
| 1-Jul-18 | AWD 0.03 ML per share | 2,968 | 89 | 89 | 3.0% | 3.0% | 168 | 0 | 168 | 5.7% | 5.7% |
| 16-Jul-18 | AWD 0.02 ML per share | 2,968 | 59 | 148 | 2.0% | 5.0% | 227 | 0 | 227 | 7.7% | 7.7% |
| 1-Aug-18 | AWD 0.01 ML per share | 2,968 | 30 | 178 | 1.0% | 6.0% | 257 | 0 | 227 | 8.7% | 8.7% |
| 17-Sep-18 | AWD 0.01 ML per share | 2,968 | 30 | 208 | 1.0% | 7.0% | 287 | 0 | 287 | 9.7% | 9.7% |

| Date | Individual announcement | Share component | Allocation volume (ML) | Cumulative volume (ML) | Allocation volume (%) | Cumulative volume (%) | Balance available (ML) | Balance not available (ML) | Balance total (ML) | Balance available (%) | Balance total (%) |
|--|-------------------------|-----------------|------------------------|------------------------|-----------------------|-----------------------|------------------------|----------------------------|--------------------|-----------------------|-------------------|
| Regulated River (General Security) | | | | | | | | | | | |
| 1-Jul-18 | Opening | 1,891,995 | | | 0.0% | 0.0% | 398,015 | 0 | 398,015 | 21.0% | 21.0% |
| 1-Jul-18 | AWD 0.03 ML per share | 1,891,995 | 56,766 | 56,766 | 3.0% | 3.0% | 454,781 | 0 | 454,781 | 24.0% | 24.0% |
| 16-Jul-18 | AWD 0.02 ML per share | 1,891,995 | 37,847 | 94,614 | 2.0% | 5.0% | 492,629 | 0 | 492,629 | 26.0% | 26.0% |
| 1-Aug-18 | AWD 0.01 ML per share | 1,891,995 | 18,905 | 113,518 | 1.0% | 6.0% | 511,533 | 0 | 492,629 | 27.0% | 27.0% |
| 17-Sep-18 | AWD 0.01 ML per share | 1,891,995 | 18,922 | 132,440 | 1.0% | 7.0% | 530,455 | 0 | 530,455 | 28.0% | 28.0% |
| Regulated River (High Security) | | | | | | | | | | | |
| 1-Jul-18 | Opening | 360,297 | | | 0.0% | 0.0% | (2) | 0 | (2) | 0.0% | 0.0% |
| 1-Jul-18 | AWD 0.95 ML per share | 360,297 | 342,284 | 342,284 | 95.0% | 95.0% | 342,283 | 0 | 342,283 | 95.0% | 95.0% |
| Regulated River (High Security) [Aboriginal Cultural] | | | | | | | | | | | |
| 1-Jul-18 | Opening | 2,150 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-18 | AWD 100.0 % | 2,150 | 2,150 | 2,150 | 100.0% | 100.0% | 2,150 | 0 | 2,150 | 100.0% | 100.0% |
| Regulated River (High Security) [Research] | | | | | | | | | | | |
| 1-Jul-18 | Opening | 300 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-18 | AWD 100.0 % | 300 | 300 | 300 | 100.0% | 100.0% | 300 | 0 | 300 | 100.0% | 100.0% |
| Regulated River (High Security) [Town Water Supply] | | | | | | | | | | | |
| 1-Jul-18 | Opening | 19,769 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-18 | AWD 100.0 % | 19,769 | 19,769 | 19,769 | 100.0% | 100.0% | 19,769 | 0 | 19,769 | 100.0% | 100.0% |
| Supplementary Water | | | | | | | | | | | |
| 1-Jul-18 | Opening | 198,780 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-18 | AWD 1.0 ML per share | 198,780 | 198,780 | 198,780 | 100.0% | 100.0% | 198,780 | 0 | 198,780 | 100.0% | 100.0% |
| Supplementary Water (Lowbidgee) | | | | | | | | | | | |
| 1-Jul-18 | Opening | 747,000 | | | 0.0% | 0.0% | 0 | 0 | 0 | 0.0% | 0.0% |
| 1-Jul-18 | AWD 1.0 ML per share | 747,000 | 747,000 | 747,000 | 100.0% | 100.0% | 747,000 | 0 | 747,000 | 100.0% | 100.0% |

Note 3—Allocation account usage

This is the volume of water that is extracted, diverted or measured as usage and is accountable against an access licence issued under the water sharing plan. This figure excludes that water accounted as uncontrolled flow which is accounted for separately (see Note 23).

Data type

Measured/administration data

Policy

Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016

Available on the department's website at www.industry.nsw.gov.au/water

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

Department of Planning, Industry and Environment

Data source

WaterNSW/ Department of Planning, Industry and Environment—Water Accounting System (Joint ownership of system).

Methodology

Usage information is determined by either on-farm meters that measure extraction, gauges on diversion works or orders/releases when the volume cannot be effectively metered, such as an environmental watering event.

Meter readings are collected for individual licence holders at intervals during the year and converted via a calibration factor to a volume of water extracted. Water diverted from the river is measured by recording the height at either the gauge or weir with the volume diverted being derived by passing these heights through a rating table. With potentially multiple categories of access licences being extracted through the same pumps additional information and methodologies are required to separate use under the various licence categories. Below is a description of these:

- Based on periods of announcement—during periods of supplementary water announcements extractions can be debited against the supplementary water licences
- Usage based on water orders—users place orders for water against an access licence and usages are debited against accounts in proportion to the orders placed.

Licence category apportionment—if no water orders are available water extracted is apportioned against categories of access licence in order of priority as set out in the table below. The prioritising is based on the nature of and rules around each of the licence categories.

Table 15 provides the order in which extractions are apportioned to access licence categories in the water accounting system. This is a generic list where not all categories will necessarily appear in this GPWAR. There are also various sub-categories of licence associated with some of the categories.

Table 15: Licence category metered usage apportionment table

| Priority | Surface water |
|----------|----------------------------------|
| 1 | Supplementary |
| 2 | Uncontrolled Flow |
| 3 | Domestic and Stock |
| 4 | Regulated River High Security |
| 5 | Regulated River General Security |
| 6 | Conveyance |
| 7 | Local Water Utility |
| 8 | Major Water Utility |

Table 16: Account usage summary

| Category | Recredit | Account usage | Net account usage |
|---|----------|---------------|-------------------|
| Coleambally Irrigation (Conveyance) | 0 | 103,203 | 103,203 |
| Domestic and Stock | 0 | 16,098 | 16,098 |
| Domestic and Stock [Domestic] | 0 | 102 | 102 |
| Domestic and Stock [Stock] | 0 | 11,084 | 11,084 |
| Local Water Utility | 0 | 9,107 | 9,107 |
| Murrumbidgee Irrigation (Conveyance) | 0 | 128,458 | 128,458 |
| Regulated River (Conveyance) | 0 | 0 | 0 |
| Regulated River (General Security) ²² | 72,879 | 473,646 | 400,767 |
| Regulated River (High Security) | 0 | 302,841 | 302,841 |
| Regulated River (High Security) (Aboriginal Cultural) | 0 | 499.5 | 500 |
| Regulated River (High Security) (Research) | 0 | 300 | 300 |
| Regulated River (High Security) (Town Water Supply) | 0 | 19,769 | 19,769 |
| Supplementary Water | 0 | 0 | 0 |
| Supplementary Water (Lowbidgee) | 0 | 0 | 0 |

²² Total account usage excludes uncontrolled usage which can be taken without debit to a holder's account (see note 23 on uncontrolled flow) and recredits for return flows (see note 17 on return flows).

Note 4—Allocation assignments (temporary trading)

This represents the temporary trading (allocation assignments) of water between allocation accounts within the regulated Murrumbidgee River, or between different water sources.

Data type

Administration

Policy

Water Management Act 2000

Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016

- Part 10 Access licence dealing rules
 - Clause 76 Assignment of water allocation dealings
 - Clause 77 Interstate access licence transfer and assignment of water allocation
 - Available on the Department of Planning, Industry and Environment Website at www.industry.nsw.gov.au/water

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

Department of Planning, Industry and Environment

Data source

WaterNSW/ Department of Planning, Industry and Environment—Water Accounting System (Joint ownership of system).

Water Ordering and Usage database

Methodology

Trading is permitted between certain categories of access licences and between certain water sources. This is detailed in the water sharing plan or stipulated under the licence holder's conditions.

The net effect of internal trading on committed water is zero for a water year, however these trades are still stipulated in the accounting statements to provide details on the volumes of water being traded.

Trade between water sources will either increase the committed liability for the year (trade into the Murrumbidgee) or decrease the committed liability for the year (trade out of the Murrumbidgee). The imbalance created from trading between water sources is monitored and managed with the intervalley trade account (see note 5).

Additional information

Table 17 shows the internal trading figures between licence categories. All figures represent a volume in megalitres.

Table 17: Total allocation assignments in the Murrumbidgee Regulated River Water Source for the reporting period

| From | | To | | | | | | | | | | Total |
|--------------|--------------------------------------|-------------------------------------|---------------------|------------------|---------------|---------------------|---------------------------------|------------------|-----------------|--------------------|--------------------|----------------|
| | | Murrumbidgee | | | | | NSW Murray | | South Australia | Victoria | | |
| | | Coleambally irrigation (conveyance) | Local water utility | General security | High security | Supplementary water | Supplementary water (Lowbidgee) | General security | High security | Interstate licence | Interstate licence | |
| Murrumbidgee | Coleambally irrigation (conveyance) | | | 9,178 | | | | | | | | 9,178 |
| | Local water utility | | | 500 | | | | | | | | 500 |
| | Murrumbidgee irrigation (conveyance) | | | 18,461 | | | | | | | | 18,461 |
| | Regulated river (conveyance) | | | 217 | | | | | | | | 217 |
| | General security | 20 | 37 | 255,659 | 14,842 | | | 33,872 | 2,811 | 810 | 9,472 | 317,523 |
| | High security | | 109 | 43,340 | 854 | | | 3,058 | 423 | 1,000 | 3,540 | 52,323 |
| | Supplementary water | | | | | 26,806 | | | | | | 26,806 |
| | Supplementary water (Lowbidgee) | | | | | | 393,117 | | | | | 393,117 |
| NSW Murray | Regulated river (conveyance) | | | 7,871 | | | | | | | | 7,871 |
| | General security | | | 10,034 | | | | | | | | 10,034 |
| | High security | | | 186 | | | | | | | | 186 |
| Total | | 20 | 146 | 345,446 | 15,696 | 26,806 | 393,117 | 36,930 | 3,234 | 1,810 | 13,011 | 836,216 |

Note 5—Intervalley Trade Account (IVT)

The intervalley trade account provides ongoing tracking of valley debts and claims to water due to the temporary trading of account water between the southern connected valleys of the Murray Darling Basin.

For the Murrumbidgee this is presented in the accounting statements as a liability account²³ whereby a positive balance is indicative of a future obligation (Murrumbidgee owes water), and a negative balance indicative of a claim to water (Murrumbidgee owed water).

Data type

Derived from measured data

Policy

Water Act 2007 (Federal)

The Murray Darling Basin Agreement (Schedule 1)—Transferring Water Entitlements and Allocations (Schedule D)

Water Management Act 2000 (NSW)

Dealings with access licences (Division 4)

- 71T Assignment of water allocations between access licences
- 71V Interstate assignment of water allocations

Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016

Part 10 Access licence dealing rules

- Clause 76 Assignment of water allocation dealings
- Clause 77 Interstate access licence transfer and assignment of water allocation

Available on Department of Planning, Industry and Environment website at www.industry.nsw.gov.au/water

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

Murray Darling Basin Authority, Department of Planning, Industry and Environment

Data Sources

Murray Darling Basin Authority provided spreadsheet

WaterNSW-provided spreadsheet and CAIRO

Department of Planning, Industry and Environment—Water Accounting System and HYDSTRA

Methodology

The balance of the IVT account is calculated by adjusting the carried forward balance of the IVT account from the previous year and applying a series of transactions to the account as outlined below. A positive balance indicates that the Murray System owes water to the Murrumbidgee

²³ Revised representation commencing 2017–18 GPWAR

System while a negative balance indicates that Murrumbidgee System owes water to the Murray System.

1. The volume of water traded into the Murrumbidgee Valley from the NSW Murray, NSW Lower Darling, Victoria or South Australia will result in the IVT being decreases
2. The volume of water traded out of the Murrumbidgee Valley to the NSW Murray, NSW Lower Darling, Victoria or South Australia will result in the IVT being increased
3. The Murray Darling Basin Authority (MDBA) requests that NSW deliver a proportion of the water that was traded to users outside of the Murrumbidgee. NSW supplies the requested volume and accounts for it by calculating the resulting addition volume of water passing the Murrumbidgee River at Balranald. The accounted volume supplied is agreed between WaterNSW and MDBA and the IVT account is increased accordingly.
4. On occasion Snowy Hydro Limited may be requested to transfer a portion of either the Murrumbidgee or Murray Required Annual Release (RAR) to assist with the settlement of the IVT account when it gets too far out of balance (although there is no legal obligation on them to perform such releases). These are often referred to as "notional" releases. The following points illustrate this process:
 - Excessive Trade from Murrumbidgee to Murray creates a need to transfer Murrumbidgee RAR via the Murray development thus reducing the IVT account (reducing Murrumbidgee debt to Murray).
 - Excessive trade from Murray to Murrumbidgee creates a need to transfer Murray RAR via the Murrumbidgee development thus increasing the IVT account (reducing Murray debt to Murrumbidgee).
5. Tagged trading is a dealing that occurs when a licence holder within a valley nominates to extract their allocation for that licence from a different water source. Any water delivered to a point of extraction within the Murrumbidgee to meet allocation associated with another water source therefore results in a decrease to the IVT.
6. During periods of high summer demand transfers of water can occur from the Murray to the Murrumbidgee via Murray Irrigation Limited (MIL) infrastructure to bypass delivery constraints in either the Murray (caused by the Murray choke) or the Yanco Creek System and the Coleambally Irrigation channel network. Water passed into the Murrumbidgee via MIL, subject to MIL ability to deliver via their channel system, can help to meet the demands in Billabong Creek. The net change in the IVT as a result is calculated by assessing the difference between the flow diverted from MIL to Billabong Creek (via Finley escape) and the water that leaves the Murrumbidgee via the Billabong Creek at Darlot for the corresponding period (i.e. estimating volume extracted by users on Billabong Creek). This figure is presented as 'Finley Borrow' in Table 18.

Additional information

The IVT Trade balance summary table provides information compiled from the best information available at the time of publication. These figures may change in the future as updated information becomes available. All figures in the table are in megalitres.

The note references in the table refer to the numbers associated with the text in the methodology above. The presentation of the IVT has been revised in the 2017–18 GPWAR to represent the IVT commitments as a liability on the resource (previously an asset). This means a positive IVT balance results in the Murrumbidgee owing water.

Table 18: Murrumbidgee intervalley trade account summary

| Water year ending 30 June | Starting balance | Murrumbidgee account trade | | | Murrumbidgee IVT account adjustments | | | | | Closing balance |
|---------------------------|------------------|------------------------------------|--------------------------------------|-----------------------|--|-------------------|----------------------|------------------|------------------------------|-----------------|
| | | | | | From Murrumbidgee—IVT Account decrease | | | | To Murrumbidgee IVT increase | |
| | | Into (1) Murrumbidgee IVT decrease | Out of (2) Murrumbidgee IVT increase | Net into Murrumbidgee | Via Snowy (4) | Via Balranald (3) | Total IVT clearances | Net tagged trade | Finley Borrow | |
| 2004-05 | 0 | 11,805 | 3,779 | 8,026 | 0 | 4,185 | 4,185 | 0 | 12,211 | 0 |
| 2005-06 | 0 | 16,646 | 21,748 | (5,102) | 0 | 20,282 | 20,282 | 0 | 10,162 | (5,018) |
| 2006-07 | (5,018) | 1,209 | 97,195 | (95,986) | 20,000 | 70,968 | 90,968 | 0 | 0 | 0 |
| 2007-08 | 0 | 2,729 | 141,825 | (139,096) | 0 | 63,500 | 63,500 | 0 | 728 | 76,324 |
| 2008-09 | 76,324 | 17,223 | 406,976 | (389,753) | 200,000 | 44,981 | 244,981 | 0 | 6,245 | 227,341 |
| 2009-10 | 227,341 | 55,659 | 166,443 | (110,784) | 200,000 | 119,567 | 319,567 | 0 | 5,318 | 23,876 |
| 2010-11 | 23,876 | 130,929 | 180,031 | (49,102) | 0 | 57,751 | 57,751 | 0 | 12,766 | 27,993 |
| 2011-12 | 27,993 | 85,062 | 151,880 | (66,818) | 78,000 | 12,083 | 90,083 | 0 | 965 | 5,693 |
| 2012-13 | 5,693 | 179,426 | 234,574 | (55,148) | (39,000) | 87,542 | 48,542 | 200 | 5,049 | 17,148 |
| 2013-14 | 17,148 | 59,917 | 180,850 | (120,933) | 0 | 40,282 | 40,282 | 0 | 1,389 | 99,188 |
| 2014-15 | 99,188 | 94,248 | 139,893 | (45,645) | 0 | 148,299 | 148,299 | (4,605) | 9,882 | 11,021 |
| 2015-16 | 11,021 | 14,059 | 275,373 | (261,314) | 0 | 202,431 | 202,431 | (23,080.70) | 3,654 | 96,638 |
| 2016-17 | 96,638 | 14,564 | 48,414 | (33,850) | 0 | 80,000 | 80,000 | (37,792) | 0 | 88,280 |
| 2017-18 | 88,280 | 151,138 | 74,221 | 76,917 | 0 | 0 | 0 | 25,151 | 0 | (13,788) |
| 2018-19 | (13,788) | 18,091 | 54,985 | (36,894) | 0 | 0 | 0 | 5,281 | 583 | 18,408 |

Note 6—Held environmental water

This represents that environmental water that is held as part of a licensed volumetric entitlement. These licences are held within the same licence categories as all other water access licences hence are subject to the same operating rules. Therefore, they are subject to the following key rules:

- Available Water Determinations (AWD) for their share of the entitlement to be added to accounts.
- Carryover rules hence the forfeiting of unused water that cannot be carried over.
- Provide water orders prior to use.

These licences are used to provide environmental benefit and outcomes to the catchment by either providing water to, or supplementing water requirements of, a specific environmental events or incidents. On occasion the environmental benefit is achieved by trading the water as opposed to ordering and recording the subsequent usage against the licence.

Data type

Measured

Policy

Water Management Act 2000

- Dealings with access licences (Division 4)
 - 71T Assignment of water allocations between access licences
 - 71V Interstate assignment of water allocations

Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016

Available on the Department of Planning, Industry and Environment website at www.industry.nsw.gov.au/water

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

Department of Planning, Industry and Environment

Data source

WaterNSW/ Department of Planning, Industry and Environment—Water Accounting System (Joint ownership of System).

Available Water Determination Register—Department of Planning, Industry and Environment website at www.industry.nsw.gov.au/water

Methodology

The water held for the environment represents a volume of water in corresponding allocation accounts. This allocation account represents the sum of the remaining volume of held environmental water at the conclusion of the water year once all transactions and forfeit rules have been applied to the accounts. These environmental balances are at the licence category level and represent the water that can be carried forward for use in the next year. Below is list of typical transactions that can apply to an environmental allocation account:

- AWD (including pro rata of AWD for new licences)

- Licensed extractions
- Forfeiture due to:
 - Carryover rules
 - Account spillage as a result of AWD
 - Licence conversions
 - Excess orders (where water order debiting is in place)
- Trade of allocation water between accounts

In addition, the trade and purchase of environmental water is tracked to capture the movement of environmental entitlement both in number of entitlements, and volume.

Additional information

Table 20 provides a summary of held environmental water for the reporting period. Definitions for the processes represented in the summary are defined in Table 19.

Table 21 presents changes to environmental holdings since the previous reporting period.

Table 22 present trading of temporary water associated with environmental holdings. While environmental holdings occasionally trade to non-environmental holders to achieve delivery of environmental water, this report is presented from a perspective of watering purpose i.e. a trade from an environmental holding to a non-environmental holding has transferred the expected use of that water to a consumptive purpose.

Table 19: Explanatory information for environmental account summary

| Heading | | Description |
|---------------------|-----|--|
| No. Licences | | This is the number of environmental licences held. |
| Share | | This is the total volume of share component (entitlement) in the specific licence category. |
| Opening | | The volume of water that has been carried forward from previous years allocation account. |
| AWD | | The total annual volume of water added to the allocation account as a result of allocation assessments. |
| Assignments | In | Increase in account water as a result of Temporary Trade in. |
| | Out | Decrease in account water as a result of Temporary Trade out. |
| Transfer to snowy | | Allocations recovered under snowy savings program and nominated for environmental releases |
| Account Usage | | Volume of water that is debit against the allocation account and is accountable against the licence. |
| During year forfeit | | Forfeit of allocation not relating to carryover provisions |
| Available balance | | Account balance that is available to be taken at the conclusion of the water year. |
| Unavailable balance | | Account balance that is currently not available for use (e.g. restricted due to drought conditions or annual use limit restrictions) |
| End of Year forfeit | | Account water that is forfeited at the end of the water year as a result of carryover rules that restrict the carry forward volume. |
| Carry forward | | This represents the account water that is permitted to be carried forward into the next water year as determined by the carryover rules. |

Table 20: Environmental Regulated River account summary²⁴

| Category | Share | Opening balance | AWD | Assignments | | Transfer to snowy | Account usage | During year forfeit | End of year balance | | End of year forfeit | Carry forward |
|--------------------------------------|---------|-----------------|---------|-------------|---------|-------------------|---------------|---------------------|---------------------|---------------------|---------------------|---------------|
| | | | | In | Out | | | | Available balance | Unavailable balance | | |
| Coleambally irrigation (conveyance) | 12,658 | 2,227 | 10,071 | 0 | 9,158 | 3,140 | 0 | 0 | 0 | 0 | 0 | 0 |
| Murrumbidgee irrigation (conveyance) | 50,130 | 7,121 | 25,652 | 0 | 18,461 | 14,312 | 0 | 0 | 0 | 0 | 0 | 0 |
| Regulated River (conveyance) | 2,968 | 199 | 208 | 0 | 217 | 190 | 0 | 0 | 0 | 0 | 0 | 0 |
| General security | 475,127 | 59,670 | 33,245 | 99,054 | 69,609 | 14,343 | 67,405 | 0 | 40,613 | 0 | 0 | 40,613 |
| High security | 15,485 | 0 | 11,480 | 0 | 9,689 | 1,791 | 0 | 0 | 0 | 0 | 0 | 0 |
| Supplementary water | 28,686 | 0 | 28,686 | 22,366 | 22,366 | 0 | 0 | 0 | 28,686 | 0 | 28,686 | 0 |
| Supplementary water (Lowbidgee) | 541,204 | 0 | 541,204 | 393,117 | 393,117 | 0 | 0 | 0 | 541,204 | 0 | 541,204 | 0 |

Table 21: Annual change summary for environmental licences and environmental holding adjustments

| Category | Share 30 June 2018 | Share 30 June 2019 | Volume change | No. licences 30 June 2018 | No. licences 30 June 2019 | No. licence change |
|--------------------------------------|--------------------|--------------------|---------------|---------------------------|---------------------------|--------------------|
| Coleambally irrigation (conveyance) | 12,658 | 12,658 | 0 | 2 | 2 | 0 |
| Murrumbidgee irrigation (conveyance) | 40,448 | 50,130 | 9,682 | 2 | 2 | 0 |
| Regulated River (conveyance) | 2,968 | 2,968 | 0 | 2 | 2 | 0 |
| General security | 474,897 | 475,127 | 230 | 13 | 13 | 0 |
| High security | 12,084 | 15,485 | 3,401 | 5 | 14 | 9 |
| Supplementary water | 28,686 | 28,686 | 0 | 7 | 7 | 0 |
| Supplementary water (Lowbidgee) | 541,204 | 541,204 | 0 | 2 | 2 | 0 |

²⁴ The account balance summary includes all licences where the registered holder or part holder is a Government department and the held component is wholly managed for environmental benefit. Water that has been purchased from consumptive users, but yet to be moved out to a government holding is not identified in this summary. Generally, in the situation the water is temporarily trade out to an environmental licence until the settlement has been finalised.

Table 22: Environmental trade report summary²⁵

| From | | | To | | | | | | Total |
|--------------|--------------|--------------------------------------|------------------|---------------|------------------|------------------|---------------------|---------------------------------|----------------|
| | | | Non-enviro | | | Enviro | | | |
| | | | Murrumbidgee | | NSW Murray | Murrumbidgee | | | |
| | | | General security | High security | General security | General security | Supplementary water | Supplementary water (Lowbidgee) | |
| Enviro | Murrumbidgee | Coleambally irrigation (conveyance) | | | | 9,158 | | | 9,158 |
| | | Murrumbidgee irrigation (conveyance) | | | | 18,461 | | | 18,461 |
| | | Regulated river (conveyance) | | | | 217 | | | 217 |
| | | General security | 1,699 | 400 | 500 | 68,265 | | | 70,864 |
| | | High security | | | | 8,834 | | | 8,834 |
| | | Supplementary water | | | | | 22,366 | | 22,366 |
| | | Supplementary water (Lowbidgee) | | | | | | 393,117 | 393,117 |
| | NSW Murray | Regulated river (conveyance) | | | | 7,871 | | | 7,871 |
| Total | | | 1,699 | 400 | 500 | 112,806 | 22,366 | 393,117 | 530,888 |

Total environmental allocation moved to consumptive holders for use = 2,599 megalitres (blue highlight)

²⁵ The environmental trading report represents movement of water from a 'purpose' perspective. Movement from an environmental licence to a consumptive user for the purpose of an environmental delivery is reported as environmental to environmental. Movement between environmental to consumptive pools indicate the likely purpose of use for that water has changed. Due to these adjustments, the trades will not match the actual assignments in and out on the environmental licence account balance summary.

Note 7—Environmental provisions

These were introduced as part of the water sharing plans with the aim of enhancing environmental benefits. They consist of a series of rules established around the concept of dam translucency and transparency releases, environmental water allowances (EWA), provisional storages and balancing storages and end of system flows. Below is a brief description of these:

Dam transparency—protects low flows immediately downstream of Burrinjuck and Blowering Dams by passing all inflows up to a defined limit.

Dam translucency—ensures that some degree of natural flow variability is restored downstream of Burrinjuck Dam by releasing a proportion of inflows based on the time of year and the catchment conditions.

End of system flows—maintain a flow of water to the end of the Murrumbidgee River and Billabong Creek ensuring its connectivity with the Murray River.

Environmental water allowances—three water allowances were created to provide direct benefits to the environment. The water is for discretionary environmental management such as wetland inundation, flushes to improve water quality, or providing habitat for waterbird breeding.

Provisional storage volumes—two provisional storage volumes are provided with the intent to increase the size and frequency of spill events for environmental benefits.

Daily release balance—this account maintains a record of the net difference between the minimum transparent dam release and the water credited to environmental water allowance (EWA2 allowance). The daily release balance (DRB), was introduced at the commencement of the water sharing plan to allow the existing translucent and transparent releases to be adopted while also providing for adaptive water. The DRB increases when transparent water releases are made triggering credits to the Environmental Water Allowance 2 (EWA2). The DRB balance is then used to reduce future requirements of translucent water releases.

For additional details on this refer to the environmental rules in the water sharing plan.

Data type

Derived from Measured Data

Policy

Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016

Part 4 Environmental water provisions

Available from the Department of Planning, Industry and Environment website at www.industry.nsw.gov.au/water

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

WaterNSW

Data source

EWA accounting spreadsheet—WaterNSW

Methodology

Methods for evaluating the environmental provisions can be found in the water sharing plan.

Translucency releases from Blowering Dam could not be implemented as data for Blowering Dam natural inflows on a daily basis are unavailable. As such it has been treated as a minimum storage release figure of 560 megalitres per day and hence not accounted for separately within this GPWAR.

The following tables show account summaries, water deliveries and balances for those accounts established as a result of the environmental provisions as set out in the water sharing plan.

Additional Information

The following group of tables provides a comprehensive summary of the Planned Environmental Water since the commencement of the water sharing plan. It should be noted that variations to numbers published in previous years may exist resulting from a review of the accounting process at the conclusion of the drought.

Table 23: Burrinjuck Dam translucent/transparent release summary and history

| Year | Translucent release required | Translucent releases | Transparent release required | Transparent releases | Other releases | Total releases |
|---------|------------------------------|----------------------|------------------------------|----------------------|----------------|----------------|
| 2004–05 | 2,454 | 3,401 | 105,192 | 121,447 | 394,130 | 518,978 |
| 2005–06 | 68,748 | 25,704 | 73,511 | 72,961 | 522,043 | 620,708 |
| 2006–07 | 25,476 | 6,462 | 76,739 | 71,770 | 132,647 | 210,879 |
| 2007–08 | 35,310 | 6,198 | 65,140 | 48,214 | 172,207 | 226,619 |
| 2008–09 | 7,609 | 3,281 | 110,130 | 80,769 | 174,983 | 259,033 |
| 2009–10 | 28,488 | 9,101 | 27,168 | 18,763 | 394,372 | 422,236 |
| 2010–11 | 92,707 | 24,636 | 103,785 | 99,968 | 1,631,538 | 1,756,142 |
| 2011–12 | 195,310 | 121,550 | 48,900 | 53,335 | 2,031,588 | 2,206,473 |
| 2012–13 | 148,099 | 127,526 | 62,780 | 63,192 | 1,043,919 | 1,234,637 |
| 2013–14 | 80,979 | 82,515 | 69,366 | 71,571 | 372,964 | 527,050 |
| 2014–15 | 74,002 | 71,831 | 52,532 | 51,972 | 944,616 | 1,068,419 |
| 2015–16 | 284,402 | 246,702 | 37,262 | 60,282 | 690,012 | 996,996 |
| 2016–17 | 169,175 | 161,737 | 58,875 | 85,599 | 1,439,130 | 1,686,466 |
| 2017–18 | 17,286 | 16,593 | 87,112 | 87,159 | 570,576 | 674,328 |
| 2018–19 | 708 | 731 | 110,620 | 116,470 | 190,249 | 307,450 |

Table 24: Environmental water accounts (EWA) summary and history²⁶

| Water Year | EWA1 ²⁷ | | | | | | EWA2 | | | | | EWA3 | | | | | |
|-----------------------|--------------------|-----------|--------|---------|---------------------|---------------|---------|-----------|---------|---------------------|---------------|---------|-----------|------------------|---------|---------------------|---------------|
| | Accrued | Delivered | Spill | Balance | End of Year Forfeit | Carry Forward | Accrued | Delivered | Balance | End of Year Forfeit | Carry Forward | Accrued | Delivered | Credited to PSV2 | Balance | End of Year Forfeit | Carry Forward |
| 2004–05 | 0 | 0 | 0 | 0 | 0 | 0 | 42,497 | 0 | 42,497 | 0 | 42,497 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2005–06 | 50,000 | 0 | 0 | 50,000 | 0 | 50,000 | 46,607 | 19,050 | 46,607 | 23,447 | 46,607 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2006–07 ²⁸ | 0 | 0 | 0 | 50,000 | 0 | 50,000 | 17,303 | 0 | 63,910 | 0 | 63,910 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2007–08 | 0 | 0 | 0 | 50,000 | 0 | 50,000 | 0 | 8,822 | 55,088 | 0 | 55,088 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2008–09 | 0 | 0 | 0 | 50,000 | 0 | 50,000 | 0 | 22,714 | 32,374 | 0 | 32,374 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2009–10 | 0 | 0 | 0 | 50,000 | 0 | 50,000 | 16,560 | 35,008 | 13,926 | 0 | 13,926 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2010–11 | 50,000 | 38,319 | 0 | 61,681 | 11,681 | 50,000 | 51,975 | 65,901 | 0 | 0 | 0 | 27,084 | 0 | 27,084 | 0 | 0 | 0 |
| 2011–12 | 50,000 | 67,683 | 25,000 | 7,317 | 0 | 7,317 | 32,760 | 24,255 | 8,505 | 0 | 8,505 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2012–13 | 50,000 | 0 | 7,317 | 50,000 | 0 | 50,000 | 40,301 | 26,511 | 22,295 | 0 | 22,295 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2013–14 | 50,000 | 14,868 | 35,132 | 50,000 | 0 | 50,000 | 76,280 | 91,834 | 6,741 | 0 | 6,741 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2014–15 | 50,000 | 33,499 | 16,501 | 50,000 | 0 | 50,000 | 52,459 | 39,569 | 19,631 | 0 | 19,631 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2015–16 | 50,000 | 48,860 | 1,140 | 50,000 | 0 | 50,000 | 49,636 | 54,753 | 14,514 | 0 | 14,514 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2016–17 | 50,000 | 5,667 | 25,000 | 69,334 | 19,334 | 50,000 | 54,186 | 61,980 | 6,720 | 0 | 6,720 | 149,673 | 90,480 | 59,194 | 0 | 0 | 0 |
| 2017–18 | 50,000 | 50,000 | 0 | 50,000 | 0 | 50,000 | 48,313 | 24,602 | 30,431 | 0 | 30,431 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2018–19 | 0 | 49,518 | 0 | 482 | 0 | 482 | 50,039 | 68,006 | 12,464 | 0 | 12,464 | 0 | 0 | 0 | 0 | 0 | 0 |

²⁶ For specific details about the rules around PSV please refer to the water sharing plan.

²⁷ 50,000 megalitres was borrowed from the EWA accounts and made available for consumptive use as part of the AWDs.

²⁸ The Water Sharing Plan was suspended on 9 November 2006 and was not reinstated until 16 September 2011.

Table 25: Provisional storage volume account summary and history²⁹

| Water year | PSV1 | | | PSV2 | | | | | | | |
|------------|----------------------|---------------------|---------------|---|--|---|--|---|---------|---------------------|---------------|
| | Credit ³⁰ | End of year forfeit | Carry forward | Credit up to previous years forfeit ³¹ | Credit not alloc'd EWA3 prev. year ³² | Credit Nov-Dec EWA3 forgone trans ³³ | Credit 1 Nov 50% unused EWA3 ³⁴ | Credit 1 Jan remaining EWA3 ³⁴ | Balance | End of year forfeit | Carry forward |
| 2004–05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2005–06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2006–07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2007–08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2008–09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2009–10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2010–11 | 200,000 | 200,000 | 0 | 0 | 0 | 27,084 | 0 | 27,084 | 54,168 | 54,168 | 0 |
| 2011–12 | 200,000 | 200,000 | 0 | 54,168 | 27,084 | 0 | 0 | 0 | 81,252 | 81,252 | 0 |
| 2012–13 | 200,000 | 200,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2013–14 | 33,750 | 33,750 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2014–15 | 25,000 | 25,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2015–16 | 25,000 | 25,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2016–17 | 0 | 0 | 0 | 59,194 | 0 | 59,194 | 59,194 | 0 | 0 | 0 | 0 |
| 2017–18 | 25,000 | 25,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2018–19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

²⁹ For specific details about the rules around PSV please refer to the water sharing plan.

³⁰ When general security AWD plus carryover volume exceeds 0.6 megalitres/share PSV1 receive 50,000 megalitres plus an additional 8,750 megalitres for every additional 0.01 megalitres/Share of AWD plus carryover volume in excess of 0.8 megalitres/share.

³¹ When general security AWD plus carryover volume exceeds 0.8 megalitres/share and requirements for EWA3 and PSV1 have been met any additional excess volume can be credited to PSV2 up to a limit of that water that was forfeited the previous year.

³² From 1 November when general security AWD plus carryover volume exceeds 0.8 megalitres/share the PSV2 account is credited up to a maximum limit of the sum of water not credited to EWA3 in the current year and any water that was not credited in the previous year.

³³ Between 1 November and 31 December EWA3 is credited with 50% of forgone translucent releases when AWD plus carryover volume exceeds 0.8 megalitres/share. The PSV2 account is credited with the other 50%.

³⁴ Water is moved from the EWA3 account to the PSV2 account 2 times each year. On the 1st November 50% of remaining account water is moved with any remaining account water moving on 1st January.

Table 26: Water delivered—planned environmental water held in Burrinjuck Dam

| Water year | EWA1 delivered | EWA2 delivered | Under release delivered ³⁵ | Planned environmental water delivered ³⁶ |
|-----------------------|----------------|----------------|---------------------------------------|---|
| 2004–05 | 0 | 0 | 0 | 0 |
| 2005–06 | 0 | 19,050 | 0 | 19,050 |
| 2006–07 ³⁷ | 0 | 0 | 0 | 0 |
| 2007–08 | 0 | 8,822 | 0 | 8,822 |
| 2008–09 | 0 | 22,714 | 0 | 22,714 |
| 2009–10 | 0 | 35,008 | 0 | 35,008 |
| 2010–11 | 38,319 | 65,901 | 89,798 | 194,018 |
| 2011–12 | 67,683 | 24,255 | 5,895 | 97,833 |
| 2012–13 | 0 | 26,511 | 2,843 | 29,354 |
| 2013–14 | 14,868 | 91,834 | 25,513 | 132,215 |
| 2014–15 | 33,499 | 39,569 | 6,130 | 79,198 |
| 2015–16 | 48,860 | 54,753 | 105,832 | 209,445 |
| 2016–17 | 5,667 | 61,980 | 44,594 | 112,241 |
| 2017–18 | 50,000 | 24,602 | 2,391 | 76,993 |
| 2018–19 | 49,518 | 68,006 | 7,158 | 124,682 |

Table 27: End of year balances for total EWA, DRB and translucency/transparency under release

| Year | Total EWA carry forward balance | DRB | | | Under Release ³⁸ | | | |
|-----------------------|---------------------------------|----------|----------|---------------------|-----------------------------|------------------------------------|-----------------------------------|--------------------------------|
| | | Increase | Decrease | End of year balance | Below target (credit) | Above target (debit) ³⁵ | Payed back from DRB ³⁹ | Net under releases EoY balance |
| 2004–05 | 42,497 | 22,232 | 238 | 21,994 | 0 | 0 | 0 | 0 |
| 2005–06 | 96,607 | 15,091 | 8,879 | 28,206 | 26,328 | 0 | 0 | 26,328 |
| 2006–07 ³⁷ | 113,910 | 12,654 | 1,271 | 39,589 | (26,328) | 0 | 0 | 0 |
| 2007–08 | 105,088 | 10,163 | 2,853 | 46,899 | 0 | 0 | 0 | 0 |
| 2008–09 | 82,374 | 25,479 | 911 | 71,466 | 0 | 0 | 0 | 0 |
| 2009–10 | 63,926 | 8,688 | 3,208 | 76,946 | 17,108 | 0 | 0 | 17,108 |
| 2010–11 | 50,000 | 33,000 | 11,097 | 98,849 | 72,690 | 89,798 | 0 | 0 |
| 2011–12 | 15,822 | 15,900 | 20,488 | 94,260 | 75,220 | 5,895 | 0 | 69,325 |
| 2012–13 | 72,295 | 9,956 | 96,193 | 7,875 | 25,059 | 2,843 | 87,886 | 3,655 |
| 2013–14 | 56,741 | 4,317 | 8,414 | 3,778 | 17,265 | 25,513 | 0 | (4,593) |
| 2014–15 | 69,631 | 2,875 | 8,446 | 0 | 8,913 | 6,130 | 0 | (1,810) |
| 2015–16 | 64,514 | 3,152 | 3,152 | 0 | 117,981 | 105,832 | 0 | 10,339 |
| 2016–17 | 56,720 | 1,595 | 634 | 961 | 27,852 | 44,594 | 0 | 6,387 |
| 2017–18 | 80,431 | 6,342 | 2,180 | 5,123 | 3,038 | 2,391 | 0 | (1,002) |
| 2018–19 | 12,464 | 20,127 | 0 | 25,250 | 1,285 | 7,158 | 0 | (6,875) |

³⁵ Under Release water delivered to meet environmental requirements.

³⁶ Total volume of water delivered for environmental purposes from planned environmental water provisions set aside in Burrinjuck Dam. It is the sum of EWA1 delivered, EWA2 delivered and Under Release delivered (does not include translucency/transparency releases).

³⁷ The Water Sharing Plan was suspended on 9 November 2006 and was not reinstated until 16 September 2011.

³⁸ Under Release is that water that was not delivered under the Translucent/transparency release rules in the Plan that will be paid back at a later date. The Under Release balance was zeroed once water sharing plan suspended.

³⁹ DRB balance was zeroed on 4 August 2012 to balance the borrowed volume accumulated since 1 July 2004. The figure used to zero accounts was 87,886 and was calculated based on corrected historical calculations of under release. These historical corrections have been retrospectively applied in the table.

Note 8—Snowy required annual release

Snowy Hydro Limited operates under a May to April accounting year, which is different to the water accounting period being considered in this report. Hence, this note will cover both the Snowy RAR and those adjusted to represent the reporting period.

Snowy Hydro Limited provides an annual fixed minimal accountable release, known as the Required Annual Release (RAR) to the Murrumbidgee (1,026,000 megalitres per year). However, in years of severe drought when the current inflow sequence is worse (drier) than the historical dry sequence, Snowy Hydro delivery of the RAR could put the Snowy Scheme at risk of running out of water. In those years the RAR may be reduced by the Dry Inflow Sequence Volume (DISV) being the measure of the cumulative difference between the historic dry sequence and the current inflow sequence. Any shortfall in the delivery of the DISV will be repaid in the future when annual inflows improve.

Further adjustments to the RAR can also be made each year as a result of pre-releases made in the previous year or for water savings in the Murrumbidgee that have been dedicated to Snowy River environmental flows. The RAR and those items that adjust it are monitored continually and updated whenever changes in the catchment dictate it.

The RAR delivered is assessed as Accountable Net Jounama Releases being the sum of:

- Actual Releases from Tumut 1 Power Station
- Total Montane Release
- Increase in storages at Talbingo and Jounama

Montane release is environmental water to support the high-altitude streams that have been impacted by the Snowy Mountains Scheme. It is diverted to Burrinjuck Dam catchment with the majority lost before reaching the Dam (hence not separated out in statements for the Burrinjuck Dam inflows). Hence the figure used for the accountable portion of Blowering Dam inflows in the accounting statements excludes Montane releases.

Policy

Snowy Water Licence 2010

Data type

Derived from measured data

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

Department of Planning, Industry and Environment

Data sources

Snowy Mountains Authority Water Operations Report

Methodology

Snowy Accounting Year (May–April)

RAR Deliverable for Snowy–Tumut Development is calculated as being:

- Annual fixed RAR
- plus DISV as at 1 March (previous water year)

- less water savings allocated to Snowy Tumut
- less pre-release (previous water year)

The **Adjusted RAR** for Snowy–Tumut Development is calculated as being:

- RAR Deliverable
- less DISV on 1 March (water year)
- less Murrumbidgee water deal paybacks
- less RAR permitted shortfalls and relaxations
- less Snowy-Tumut intervalley transfer settlement

Total RAR Delivered = Adjusted RAR plus Pre-release (next water year) plus Above Target Release

Reporting Period (July–June)

Delivered RAR = Sum Accountable Net Jounama Releases (July–June)

RAR Inflow to Blowering = Delivered RAR Less Montane release

Additional Information

The following tables provide detail into the calculation of the Snowy-Tumut RAR as well as the water delivered under RAR for the July-June water year.

Table 28: Snowy Tumut RAR summary table

| Water year | RAR Delivered | Montane release | RAR Inflow to Blowering |
|------------|---------------|-----------------|-------------------------|
| 2014–15 | 523,605 | (25,600) | 498,005 |
| 2015–16 | 1,300,627 | (22,931) | 1,277,696 |
| 2016–17 | 1,128,853 | (19,202) | 1,109,651 |
| 2017–18 | 1,119,427 | (40,167) | 1,079,260 |
| 2018–19 | 692,486 | (10,300) | 682,186 |

Note 9—Prior year account adjustment

This is a line item that is used to correct balances in the accounts. The double entry accounting being applied is a continuous process whereby the closing balance of one year is the opening balance for the following year. Occasionally corrections will be required for a variety of reasons including when an error is identified in prior year reporting or when a process that had previously been reported is unable to be supplied and the associated asset or liability must be removed to maintain the integrity of the statements. This is different to the unaccounted difference component which is a physical volume required to achieve mass balance after all the known processes have been accounted.

Data type

Calculated

Accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

Department of Planning, Industry and Environment

Data source

Not applicable

Methodology

A journal transaction is placed at the closing of the previous water year to either increase or decrease and account balance to align with the correct opening balances of the reporting year.

Additional Information

No prior year adjustment was required for the reporting period.

Note 10—Surface water storage

This is the actual volume of water stored in the individual surface water storages at the date of reporting. The volumes provided represent the total volume of water in the storage, including dead storage which is the volume of water which can't be accessed under normal operating conditions e.g. volume below low level outlet. It is assumed that the dead storage can be accessed if required via alternative access methods e.g. syphons.

Data type

Derived from measured data

Policy

Not applicable

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

Department of Planning, Industry and Environment

Data source

Department of Planning, Industry and Environment—HYDSTRA

Methodology

Storage volumes are calculated by processing a gauged storage elevation through a rating table that converts it to a volume.

Additional Information

The following table provides a breakdown of the storage capacities and dead storages.

Table 29: Capacity and dead storage summary table

| Name | Capacity (ML) | Dead storage (ML) |
|-------------------|------------------|-------------------|
| Burrinjuck Dam | 1,026,330 | 3,250 |
| Blowering Dam | 1,631,410 | 23,990 |
| Berembed Weir | 3,380 | 120 |
| Gogeldrie Weir | 7,400 | 200 |
| Hay Weir | 14,300 | 1,000 |
| Maude Weir | 8,028 | 300 |
| Redbank Weir | 5,580 | 400 |
| Tombullen Storage | 11,230 | 372 |
| Total | 2,704,470 | 29,632 |

Note 11—River channel storage

The volume of water stored in the river channel on the day of reporting.

Policy

Not applicable

Data type

Derived from measured data

Data accuracy

B—Estimated in the range +/- 25%

Providing agency

Department of Planning, Industry and Environment

Data sources

Department of Planning, Industry and Environment: HYDSTRA, CAIRO

Methodology

For each river section S(n):

$$V = Q \times T$$

The river channel storage will be equal to the sum of all river section volumes.

$$\text{River channel storage} = \sum S(n) V$$

Table 30: Summary of river volume calculation components

| Symbol | Variable | Data Source | Unit |
|--------|---|-------------|------|
| Q | Average flow in the river section. Calculated by averaging the daily flows at the upstream and downstream river gauges. | HYDSTRA | ML/d |
| V | Volume in each river section. | Calculated | ML |
| T | Average travel time for a parcel of water to travel through the river section. | CAIRO | days |

Assumptions and approximations:

- Travel times are estimated to the nearest day.
- Daily flow change between gauging sites assumed to be linear.

Note 12—Storage inflow

Storage inflow refers to the volume of water flowing into the major headwater storages—Burrinjuck and Blowering Dams or the off-river, reregulating storage of Tombullen. The storage inflow for Blowering Dam has been sub-categorised Snowy Accountable, Snowy Pre-release and Other/Natural.

Snowy accountable is inflow accredited against the Required Annual Release (RAR) from Snowy Hydro and pre-release is water that has been released on top of those requirements and will be accredited to the required annual release in the next season. Other/Natural includes natural runoff from the surrounding Blowering catchment, and any water released from Snowy that was not allowed to be accredited as RAR water. Further information on RAR is available in Note 8.

Policy

Not applicable

Data type

Derived from measured data

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

Department of Planning, Industry and Environment

Data sources

Department of Planning, Industry and Environment: HYDSTRA, SILO (Queensland government climatic information)

Methodology

For Blowering and Burrinjuck storages there is no direct measurement of inflows. However, it is possible to calculate inflows by using a mass balance approach (based on balancing the change in storage volume) where inflow is the only unknown. This is referred to a back-calculation of inflows. The back-calculation figures were derived using a one-day time step with the inflow calculated according to the equation below. The daily inflows are then summed to provide an annual inflow figure.

$$I = \Delta S + O + Se + ((E - R) * A) / 100$$

Table 31: Components for back-calculation of inflow

| Symbol | Variable | Unit |
|------------|--|--------|
| I | Inflow | ML/day |
| ΔS | Change in storage volume | ML |
| O | Outflow | ML/day |
| Se | Seepage | ML/day |
| R | Rainfall | mm/day |
| E | Evaporation (Mortons shallow lake estimation, SILO) | mm/day |
| A | Surface area—derived from height to surface areas lookup curve | ha |

Assumptions and approximations:

- Seepage was assumed to be zero
- For Tombullen storage, where inflows are regulated by diverting flow from the main river inflow is measured. The flows are obtained by measuring river heights at gauging stations along the river, and then passing these heights through a rating table that converts them to a daily flow volume. Inflow reported in this GPWAR was obtained directly from the river operations spreadsheet (CAIRO).

Note 13—Storage evaporation and storage rainfall

For the major storages of Burrinjuck and Blowering, this refers to the water that is either lost as a result of evaporation or gained as a result of rainfall. For Tombullen storage, only a net evaporation is presented which is an estimate of the combined effects of rainfall and evaporation on the storage.

Data type

Derived from measured data

Policy

Not applicable

Data accuracy

B—Estimated in the range +/- 25%

Providing agency

Department of Planning, Industry and Environment, WaterNSW

Data source

Department of Planning, Industry and Environment—SILO (Queensland government climatic information), HYDSTRA, CAIRO

Methodology

Burrinjuck and Blowering storages

Daily rainfall and Mortons shallow lake evaporation data (accessed via SILO) are applied to storage surface area time-series from HYDSTRA to achieve a volume in megalitres which is then aggregated to an annual figure. The rainfall and evaporation data utilised is equivalent to the data used in the storage inflow back-calculation (note 12).

Rainfall: Volume (ML) = Rainfall (mm) x Area (m²) x 10⁻⁶

Evaporation: Volume (ML) = Mortons shallow lake evaporation (mm) x Area (m²) x 10⁻⁶

Tombullen storage

For Tombullen a simple, annual mass balance was calculated for the storage, whereby the known components are inflow, volume, and outflow (measured data obtained from CAIRO). The volume required to achieve mass balance is therefore assumed to be the volume of net evaporation from the storage.

Net Evaporation = storage change (ML) + storage release (ML) – storage inflow (ML)

Note 14—Gauged tributary inflow

The inflow into the regulated river that occurs downstream of the headwater storages that is measured at known gauging stations.

Policy

Not applicable

Data type

Measured data

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

Department of Planning, Industry and Environment

Data sources

Department of Planning, Industry and Environment: HYDSTRA

Methodology

The flows are obtained by measuring river heights at gauging stations along the river, and then passing these heights through a rating table that converts them to a daily flow volume.

Additional information

The total gauged inflow for the reporting period is the sum of the inflows for the gauged tributaries defined in the table below.

Table 32: Summary of gauged inflow

| Station | Station name | Area (km ²) | Volume (ML) |
|---------|---|-------------------------|----------------|
| 410057 | Goobarragandra River at Lacmalac | 673 | 84,619 |
| 410025 | Jugiong Creek at Jugiong (Inverlockie) | 2,120 | 19,157 |
| 410044 | Muttama Creek at Coolac | 1,025 | 3,728 |
| 410038 | Adjungbilly Creek at Darbalara | 391 | 18,662 |
| 410061 | Adelong Creek at Batlow Road | 144 | 7,075 |
| 410047 | Tarcutta Creek at Old Borambola | 1,660 | 21,309 |
| 410103 | Houlaghans Creek at Downside | 1,130 | 1,263 |
| 410048 | Kyeamba Creek at Ladysmith | 530 | 27 |
| 410043 | Hillas Creek at Mount Adrah | 568 | 14,022 |
| 410114 | Killimcat Creek at Wyangle | 23 | 297 |
| 410012 | Billabong Creek at Cocketgedong | 4,660 | 431 |
| - | Finley Escape (Murrumbidgee Irrigation Ltd) | N/A | 41,306 |
| | Total | 12,924 | 211,895 |

Figure 37: Gauged tributary inflows for the reporting period (Plot 1)

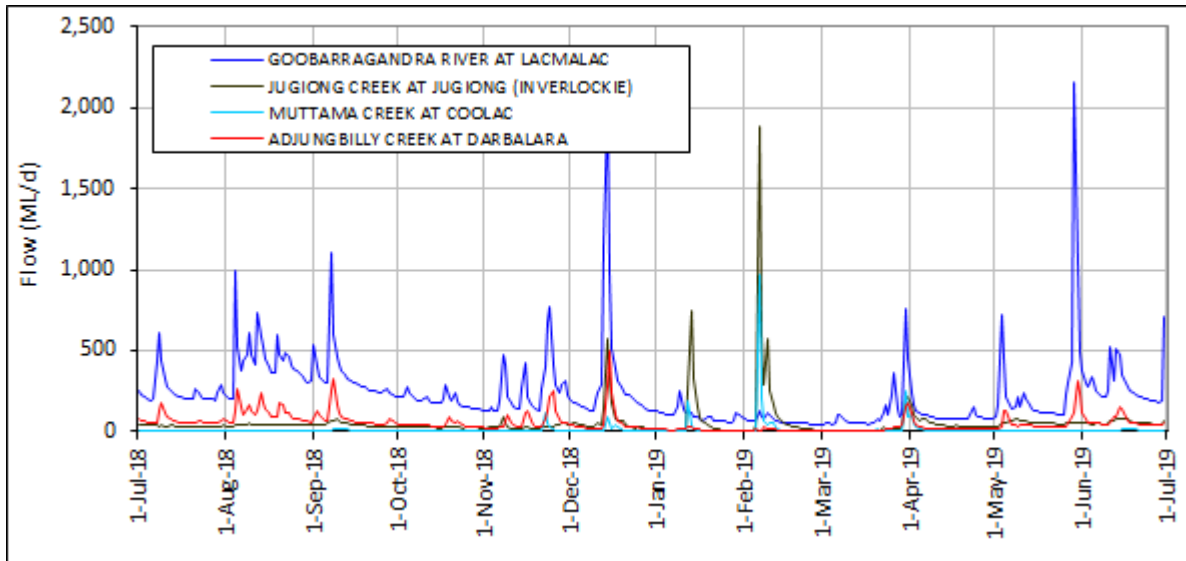


Figure 38: Gauged tributary inflows for the reporting period (Plot 2)

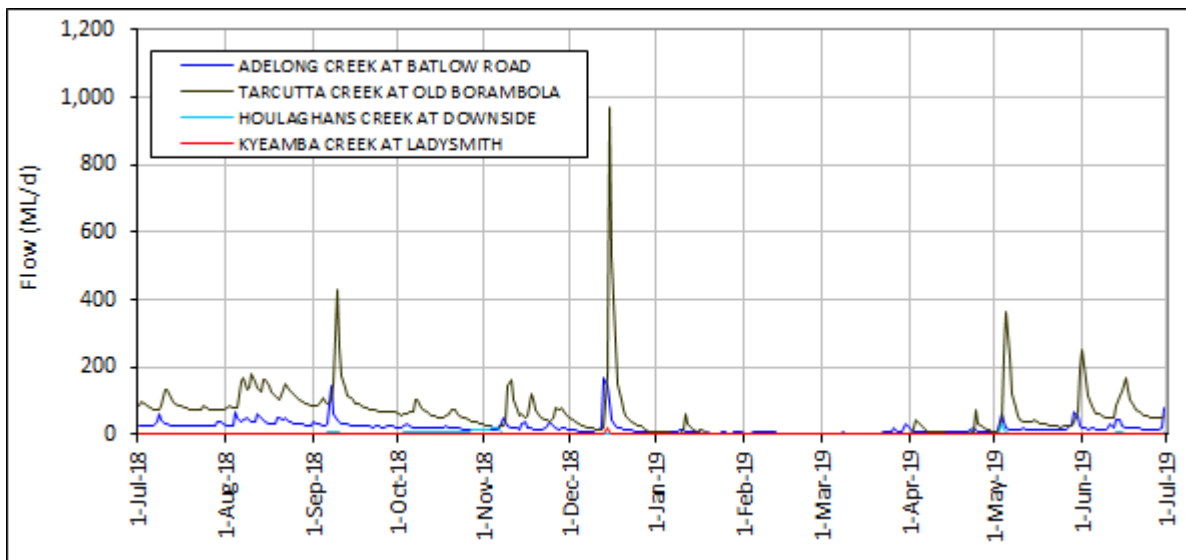
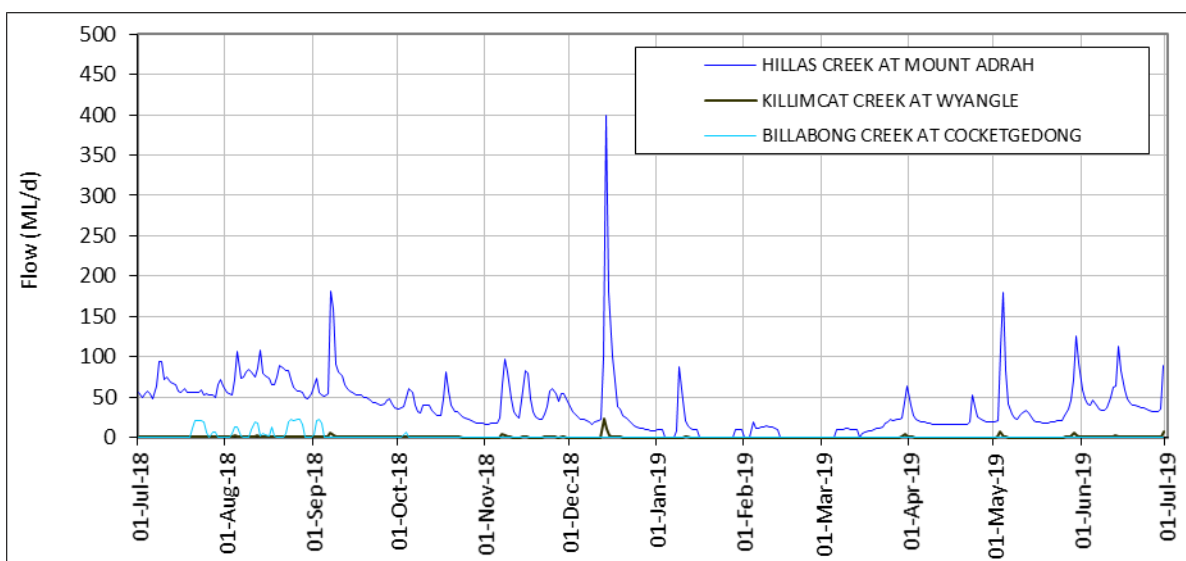


Figure 39: Gauged tributary inflows for the reporting period (Plot 3)



Note 15—Ungauged runoff estimate

The inflow into the river that occurs downstream of the headwater storages that is not measured.

Policy

Not applicable

Data type

Estimated

Data accuracy

C—Estimated in the range +/- 50%

Providing agency

Department of Planning, Industry and Environment

Data sources

Department of Planning, Industry and Environment, WaterNSW: CAIRO

Methodology

To derive an estimate a simple mass balance approach was adopted whereby known inflows and outflows were combined with an assumed loss factor. No estimate was made for the area below Narrandera or the Yanco Creek system and aquifer interaction has been excluded from the calculation.

$$U_{\text{Inflow}} = G_{\text{Narrandera}} - R_{\text{Burrinjuck}} - R_{\text{Blowering}} - G_{\text{Inflow}} + U_{\text{Narrandera}} + L_{\text{estimate}}$$

Where:

U_{Inflow} = Ungauged Inflow to Narrandera (excluding Yanco Creek system)

$G_{\text{Narrandera}}$ = Gauged flow at Murrumbidgee River at Narrandera

$R_{\text{Burrinjuck}}$ = Total release from Burrinjuck Storage

$R_{\text{Blowering}}$ = Total release from Blowering Storage

G_{Inflow} = Total gauged inflow to Narrandera (excluding Yanco system)

$U_{\text{Narrandera}}$ = Total extractions to Narrandera (excluding Yanco system extractions)

L_{estimate} = Estimate of losses in target reach. Assumed to be 15% of all water entering.

Note 16—River evaporation and river rainfall

This refers to the volume of water effective on the accounted river reach that is either lost as a result of evaporation or gained as a result of rainfall.

Data type

Derived from measured data

Policy

NA

Data accuracy

B—Estimated in the range +/- 25%

Providing agency

Department of Planning, Industry and Environment

Data source

Department of Planning, Industry and Environment: HYDSTRA, ARCGIS

QLD Department of Natural Resources: SILO

Methodology

The volume applied for evaporation and rainfall on the regulated river is achieved by first calculating a daily time-series of river area. This is achieved by breaking the river up into reaches and utilising the cross sections recorded at river gauging locations to determine the average width of the river with a given daily flow. River length is then determined between two gauging locations using ARCGIS and as such an area for each reach can be defined.

$$\text{Area (m}^2\text{)} = \text{Average W (m)} \times \text{L (m)}$$

Where W is the daily width determined from the gauging cross sections and L is the length as determined through ARCGIS analysis.

With daily area determined, various climate stations are then selected based on their proximity to each river reach. Rainfall and evaporation data are then extracted from SILO and applied to the area time-series to achieve a volume in megalitres which is then aggregated to an annual figure.

Rainfall

$$\text{Volume (ML)} = \text{Rainfall (mm)} \times \text{Area (m}^2\text{)} \times 10^{-6}$$

Evaporation

$$\text{Volume (ML)} = \text{ET}_0 \text{ (mm)} \times \text{K}_c \times \text{Area (m}^2\text{)} \times 10^{-6}$$

Where:

ET₀ = reference evapotranspiration from SILO

K_c = crop factor for open water (1.05)

Note 17—Return flows (including re-credit)

Return flow is that flow that has left the river and returns further downstream. The returning flow is less than what leaves the river. It can also include return flows from catchment drains within the irrigation corporation areas.

In certain circumstances in the Murrumbidgee water is delivered through Coleambally Irrigation catchment drains in order to meet demand in Yanco Creek system during peak flow periods. In these circumstances the return flow provided through Coleambally Irrigation will be accountable and is credited back to the appropriate allocation account. All other return from drainage is non accountable.

Re-credits are also given to Coleambally Irrigation for any flow diverted to Tombullen storage, a re-regulating storage beside the Murrumbidgee River, whereby water is diverted to the storage via the Coleambally main canal.

Data type

Measured

Policy

NA

Data accuracy

Return flow—A - Estimated in the range +/- 10%

Recredit—A1 – Nil accuracy

Providing agency

Department of Planning, Industry and Environment

Data sources

Murrumbidgee Irrigation Licence Compliance Report

Coleambally Irrigation Annual Compliance Report

Methodology

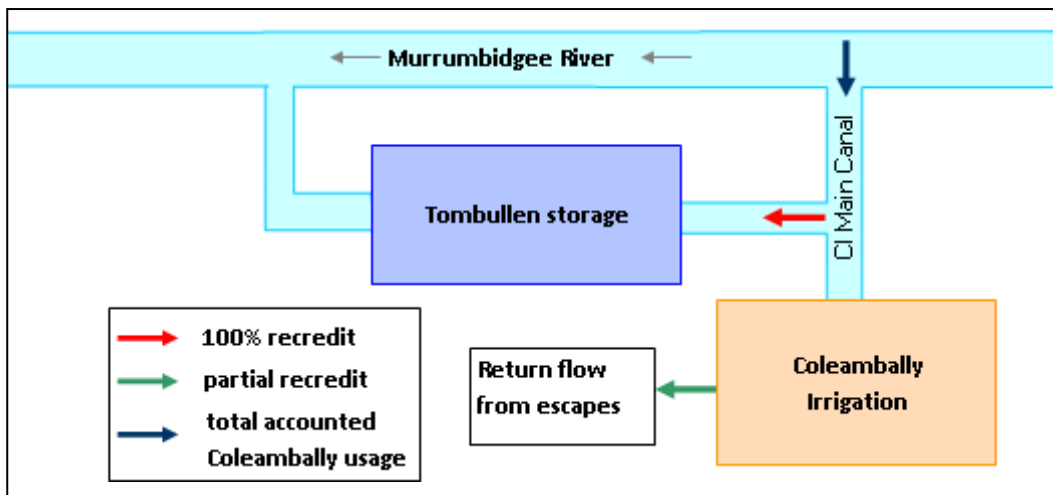
The return flows are measured in the same way as the gauged inflows, that is by measuring river heights at gauging stations along the river, passing these heights through a rating table that converts them to a flow. The gauges in question are owned by the irrigation corporations and hence flow data is derived and assessed by them. The total return flow is the sum of the flows for all the return flow gauges.

Additional information

Table 33: Return flow summary table (includes flow passed to Tombullen storage)

| Year | Coleambally Irrigation | | | Murrumbidgee Irrigation |
|---------|------------------------|-----------------|---------|-------------------------|
| | Accountable | Non-accountable | Total | Non-accountable |
| 2004-05 | 1,415 | 28,385 | 29,800 | 5,663 |
| 2005-06 | 11,339 | 33,148 | 44,487 | 8,570 |
| 2006-07 | 0 | 10,487 | 10,487 | 945 |
| 2007-08 | 1,777 | 12,936 | 14,713 | 337 |
| 2008-09 | 0 | 9,277 | 9,277 | 197 |
| 2009-10 | 619 | 12,802 | 13,421 | 598 |
| 2010-11 | 400 | 41,307 | 41,707 | 5,905 |
| 2011-12 | 75,794 | 71,328 | 147,122 | 5,852 ⁴⁰ |
| 2012-13 | 73,792 | 16,253 | 90,092 | 2,563 |
| 2013-14 | 80,748 | 5,684 | 86,432 | 80 |
| 2014-15 | 89,032 | 2,014 | 91,046 | 671 |
| 2015-16 | 92,008 | 4,441 | 96,449 | 1,079 |
| 2016-17 | 87,812 | 30,007 | 117,819 | 729 |
| 2017–18 | 105,223 | 4,774 | 109,997 | 1,066 |
| 2018–19 | 72,879 | 5,309 | 78,188 | 492 |

Figure 40: Conceptual diagram for Coleambally Irrigation re-credits



⁴⁰ The return flow was incorrectly reported as 28,376 in the Murrumbidgee 2011-12 GPWAR. This figure has been corrected in the statements, which also meant an adjustment to the unaccounted difference for 2011-12 was also required.

Note 18—Dam releases, river inflow from dam releases

The volume of water released from Burrinjuck and Blowering Dams, and Tombullen (off river storage) to meet downstream requirements. Releases for Burrinjuck have been sub-classified into Translucent, Transparent or other (the remaining) releases. In the accounting process releases have been represented as both a decrease in asset (of the dams) and an equal increase in asset (the river).

Policy

Not applicable

Data type

Measured data

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

Department of Planning, Industry and Environment

Data sources

Department of Planning, Industry and Environment—HYDSTRA

WaterNSW—Daily Environmental Operational Spreadsheet

Methodology

The flows are obtained by measuring river heights at a gauging station downstream of the dam wall, and then passing these heights through a rating table that converts them to a daily flow volume. The gauges used were 410102 (Tumut River at Blowering Dam) and 410008 Murrumbidgee River at D/S Burrinjuck Dam. The total Burrinjuck release was disaggregated using daily operational spreadsheet tags of transparent and translucent releases.

Additional information

Table 34 provides a breakdown by component of the accounted storage releases for the reporting period.

Table 34: Summary of releases for the reporting period (ML)

| Storage | Type | Release (ML) | Total release (ML) |
|-------------------------------------|---------------|--------------|--------------------|
| Burrinjuck Dam | Translucent | 731 | 307,450 |
| | Transparent | 116,470 | |
| | Other | 190,249 | |
| Blowering Dam | Total release | 1,240,748 | 1,240,748 |
| Tombullen | Total release | 31,859 | 31,859 |
| Total increase to river (ML) | | | 1,580,057 |

Figure 41: Daily releases from Burrinjuck and Blowering storages 2018-19

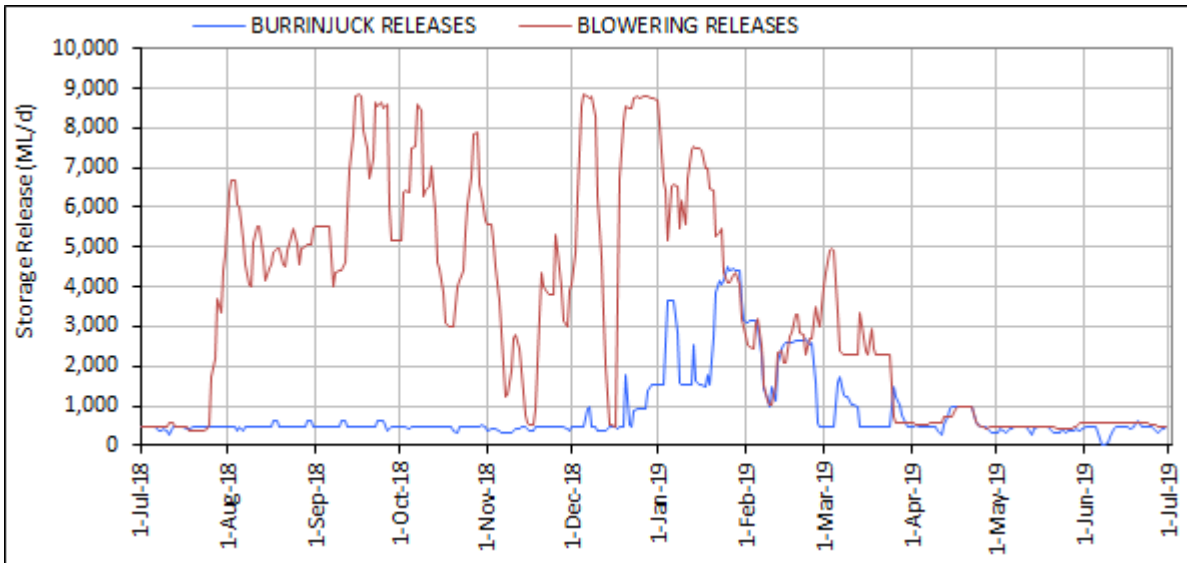
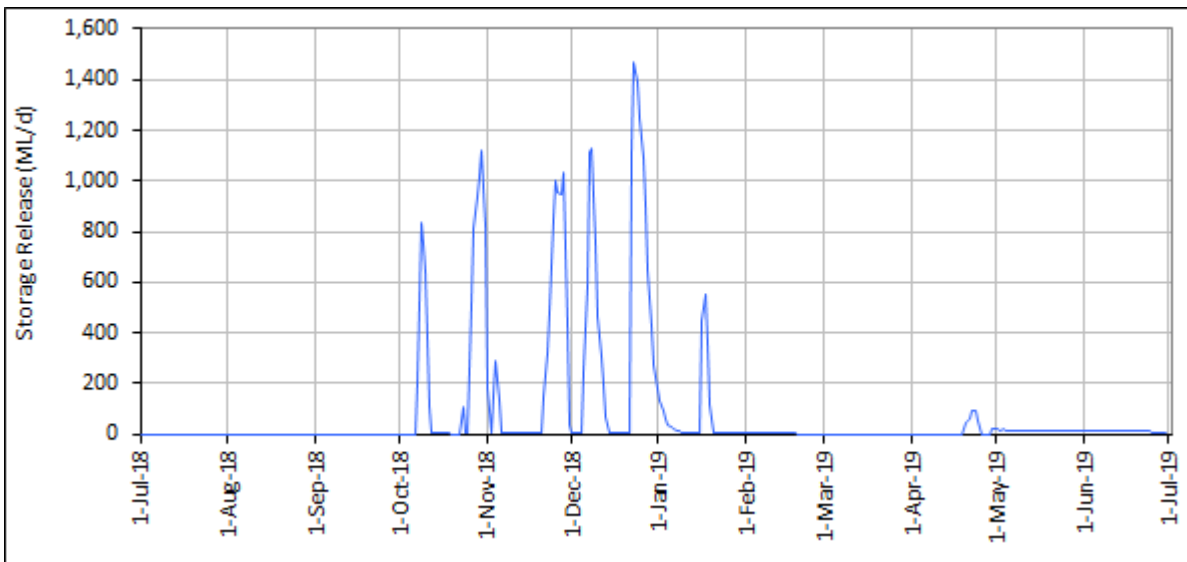


Figure 42: Daily releases from Tombullen storage 2018-19



Note 19—End of system flow

This refers to flow that leaves the entity and does not return.

Data type

Derived from measured data

Policy

Not applicable

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

Department of Planning, Industry and Environment

Data source

Department of Planning, Industry and Environment—HYDSTRA

Methodology

Summation of flows at gauging station/s measuring the volume of water that leaves the entity. For the Murrumbidgee reporting entity this is represented by the following gauges:

- 410134 Billabong Creek at Darlot
- 410003 Murrumbidgee River at Balranald

These gauges record the time series of heights which are converted to a volume of water based on a derived 'height to flow' relationship (rating table).

Under the water sharing plan minimum flow targets also exist at these end of system gauges.

Additional Information

Figure 43 and Figure 44 provide details of the daily flows in comparisons to both the minimum flow targets and the required flow targets. The required flow targets are made up of the minimum targets plus any other downstream requirements such as demand, environmental water requirements or inter-valley trade delivery requirements. A truncated plot is provided for each site to provide a clearer view the minimum flow target.

Figure 43: Murrumbidgee River at Balranald flow and target

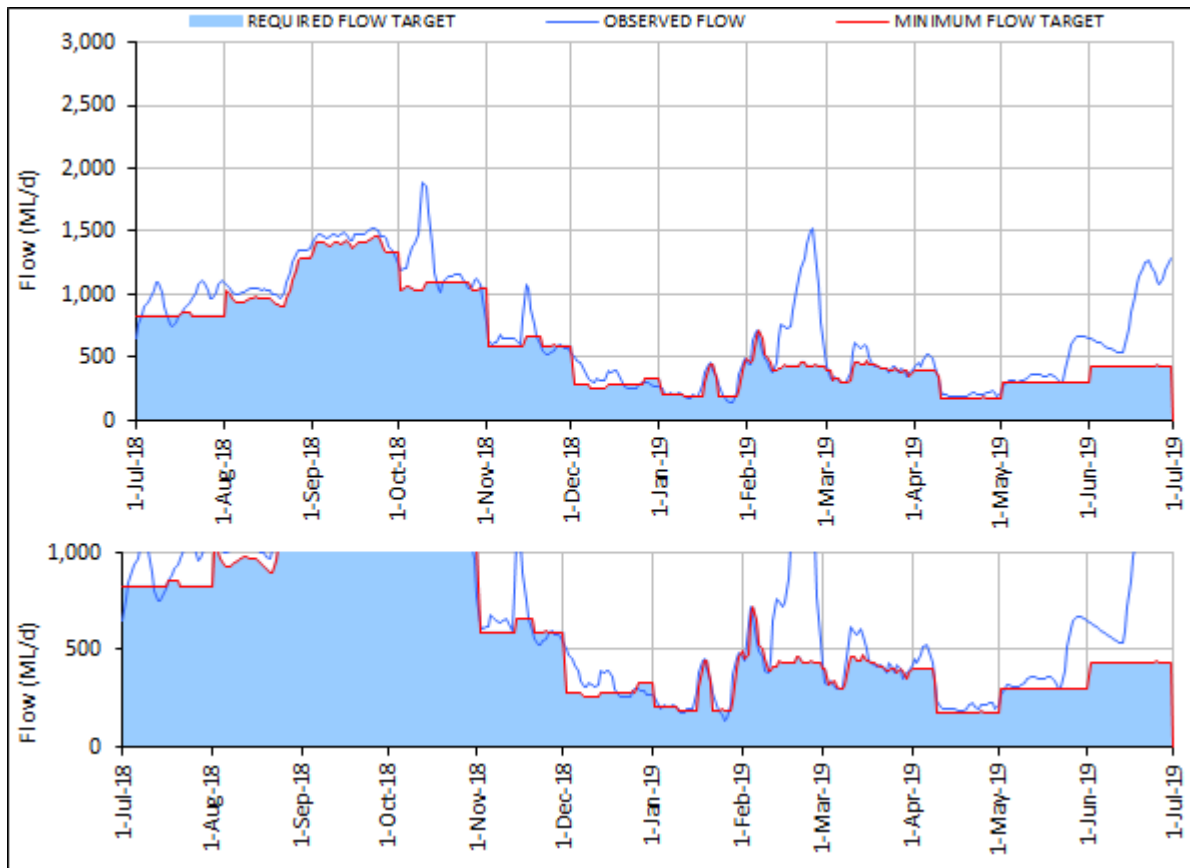
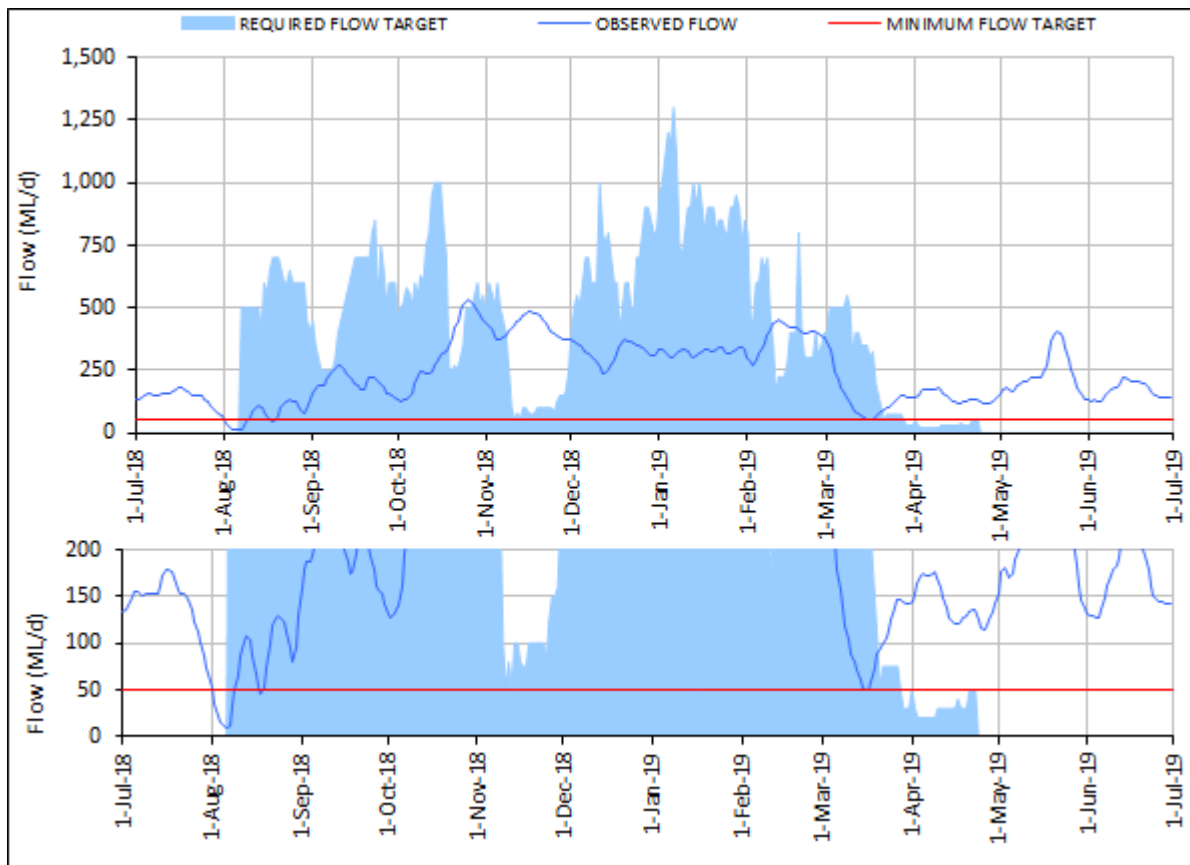


Figure 44: Billabong Creek at Darlot flow and target



Note 20—Diversions to Lowbidgee

The Lowbidgee is the largest area of floodplain wetland remaining in the Murrumbidgee catchment. It is located between Maude and Balranald and covers an area over 2,000 square kilometres. The Lowbidgee includes the second largest red gum forest in Australia and significant black box, lignum and reed-bed communities. The lower Murrumbidgee floodplain wetlands have a strategic role in the health of the Murray-Darling river system and are significant at a national and international level.

Data type

Measured

Policy

Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016

Part 9 Rules for managing access licences

Division 2 Access to supplementary water and taking water without debit rules

- Clause 69 Taking of water under supplementary water access licences and supplementary (Lowbidgee) access licences
- Clause 70 Distribution rules for the Lowbidgee area

Available from Department of Planning, Industry and Environment website at www.industry.nsw.gov.au/water

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

Department of Planning, Industry and Environment

Data source

Department of Planning, Industry and Environment—HYDSTRA

WaterNSW—annual compliance report

Methodology

The total diversion to Lowbidgee is calculated by summing the flows diverted down three canals off Maude Weir and four Regulators off Redbank Weir.

Note 21—Extractions from river

For surface water this refers to the actual volume of water directly pumped or diverted from the regulated river by licence holders. Occasionally (generally in the case of environmental water) volumes are ordered against a licence account for in-stream benefits or for end of system flow events. As such the volume reported to be physically extracted from the river will not always be equal to the amount of water debited to accounts for usage, which has been reported in detail in Note 3. The figure also excludes basic rights extractions, which is reported as a separate line item and detailed in Note 22.

Data type

Measured data

Policy

Not applicable

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

Department of Planning, Industry and Environment

Data source

WaterNSW/ Department of Planning, Industry and Environment—Water Accounting System (Joint ownership of system).

Department of Planning, Industry and Environment—Water Ordering and Usage database

Methodology

For the purposes of this GPWAR extraction from the river is considered to be the total volume metered and debited to the allocation accounts minus any water that can be identified as being used within the system or ordered to be passed through the system. These volumes are generally associated with environmental water orders and have already been accounted for in other line items. Extractions from river included that diverted to an irrigation corporation for distribution.

Additional information

Table 35 provides a reconciliation of the accounted usage against access licences compared to the extraction from river volume presented in the water accounting statements.

Table 35: Reconciliation of physical extraction⁴¹ to account usage

| Item | Volume (ML) |
|---|------------------|
| Extractions from river ⁴² | 896,413 |
| Plus licenced flow leaving accounting extent ⁴³ | 141,094 |
| Plus In stream licenced usage ⁴⁴ | 27,600 |
| Minus uncontrolled flow extractions ⁴⁵ | 0 |
| Total account usage debited to access licences ⁴⁶ | 1,065,107 |

⁴¹ Excludes basic rights extractions (estimated in a separate item)

⁴² Estimate of direct licenced extractions from the river including uncontrolled flow extractions but excluding basic rights usage.

⁴³ Licenced water ordered to leave the accounted Murrumbidgee extent (licenced water to Lowbidgee).

⁴⁴ Water ordered and used within the system (not extracted from the river).

⁴⁵ Water extracted that is not accountable against a licenced allocation.

⁴⁶ The total amount of water debited against the allocation accounts.

Note 22—Basic rights extractions

This is the non-licensed right to extract water to meet basic requirements for household purposes (non-commercial uses in and around the house and garden) and for watering of stock. It is available for anyone who has access to river frontage on their property.

This water cannot be used for irrigating crops or garden produce that will be sold or bartered, for washing down machinery sheds or for intensive livestock operations.

In times of limited supply, there may be restrictions on taking water for domestic and stock use.

Data Type

Estimated

Policy

Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016

Part 5 Requirements for water

- Clause 18 Domestic and stock rights

Available on the Department of Planning, Industry and Environment website at www.industry.nsw.gov.au/water

Data accuracy

C—Estimated in the range +/- 50%

Providing agency

Department of Planning, Industry and Environment

Data source

Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2003

Methodology

The estimation of domestic and stock rights uses a series of estimates for water usage, stocking rates, population and property shape based on local knowledge to calculate riparian (stock and domestic) requirements in megalitres per year. The annual extraction for Domestic and Stock rights in the water accounts is assumed to be the estimated figure stated in the Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2003 (4,560 megalitres).

Note 23—Supplementary/Uncontrolled Flow extractions

This is the volume of water extracted, diverted or delivered under supplementary access licences and uncontrolled flow rules during announced periods of supplementary water. Supplementary flow events are announced periodically during the season when high flow events occur with the period of extraction and volume of water to be extracted determined based on the rules as set out in the water sharing plans. It is important to note that supplementary access licences differ from other categories of access licence in that the volume of water announced in the available water determination account refers to an annual upper limit for extractions and its provision is totally reliant on the occurrence of high flow events. In addition to supplementary water access being available during the supplementary flow events uncontrolled flow (if available) is also accessible against general security licences (see Note 23 for more detail on uncontrolled flows).

In 2012-13 a new category of licence, Supplementary (Lowbidgee), was introduced under WMA2000 to convert land (area) based rights to a volumetric entitlement.

For this GPWAR the actual amount of Supplementary water taken during the year has been displayed as both an increase in water liability (demand to take from an announced event) and an equal decrease in water liability (reduction in supplementary holders account for physical extractions), the net effect is zero system on the system liability and a decrease in the systems total water assets. No other processes for supplementary water (available water determinations, trading etc) were considered in the accounting process.

Uncontrolled Flow refers to a specific volume of non-debit water, as defined in the water sharing plan, pumped or diverted from the river for consumptive use by general security licence holders during periods when the extraction of supplementary water is permitted. It differs from supplementary water, which is a defined licence category that limits the volume pumped during high flow events, in that based on rules defined in the water sharing plan it can debit the licence holders general security account.

Data type

Measured data

Policy

Water Sharing Plan for the Murrumbidgee Regulated River Water Source 2016

Part 7 Limits to the availability of water

Division 2—Available water determinations

- Clause 65 Available water determinations for supplementary water access licences
- Clause 66 Available water determinations for supplementary water (Lowbidgee) access licences

Part 9 Rules for managing access licences

Division 2 Access to supplementary water and taking water without debit rules

- Clause 69 Taking of water under supplementary water access licences and supplementary (Lowbidgee) access licences
- Clause 70 Distribution rules for the Lowbidgee area
- Clause 71 Taking of water without debit under regulated river (general security) access licence

Refer to applicable Water Sharing Plan on Department of Planning, Industry and Environment Website.

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

Department of Planning, Industry and Environment

Data source

WaterNSW/ Department of Planning, Industry and Environment—Water Accounting System (Joint ownership of System).

Methodology (Supplementary water)

Supplementary and uncontrolled flow water extraction and diversion data is collected by either on farm meters that measure extraction or gauges on diversion works. Meter readings are collected for individual licence holders at intervals during the year and converted via a calibration factor to a volume of water extracted. Water diverted from the river is measured by recording the height at either the gauge or weir with the volume diverted being derived by passing these heights through a rating table. However, with supplementary and uncontrolled flow water being extracted through the same pumps as those extracting water under other categories of access licences additional information is required to separate out supplementary and uncontrolled flow extraction. Basically, licence holders provide notification of their intention to pump prior to pumping or diverting water during the declared supplementary event and provide meter readings both at the commencement and conclusion of pumping. This enables the supplementary flow extraction to be assessed independent of other categories of access licences.

The total volume of supplementary extractions is then calculated by summing the individual extractions and diversions that occurred during declared periods of supplementary flow for the water year.

Methodology (Uncontrolled flow usage)

Uncontrolled flow usage is measured in the same way as general security extractions but is tagged as uncontrolled flow in the accounting system. Under specific rules as outlined in the water sharing plan the uncontrolled usage will be debited against the general security account in a water year. The summary of these rules is given below:

- Uncontrolled flow can be extracted, up to a limit of 0.85 megalitres per share of entitlement, without debit when the annual allocation plus carryover (effective allocation) is below 0.7 megalitres per share of entitlement.
- When uncontrolled extractions plus effective allocation exceed a volume equivalent to 0.85 megalitres per share of entitlement then the volume of exceedance less any previously debited exceedance water will be debited against the general security allocation account.
- When effective allocation exceeds 0.85 megalitres per share of entitlement then the uncontrolled usage less any previously debited exceedance will be debited against the general security allocation account

As uncontrolled flow is extracted through the same pumps as those extracting water under other categories of access licences additional information is required to identify periods and hence volumes of uncontrolled flow extractions. This is achieved by holders providing notification of intent to pump prior to pumping or diverting water during a declared supplementary event and provide meter readings both at the commencement and conclusion of pumping. This enables the uncontrolled flow extraction to be assessed independent of the other categories of access licences.

Additional information

No access to supplementary or uncontrolled flow was available in the reporting period.

Figure 45: Supplementary water usage⁴⁷

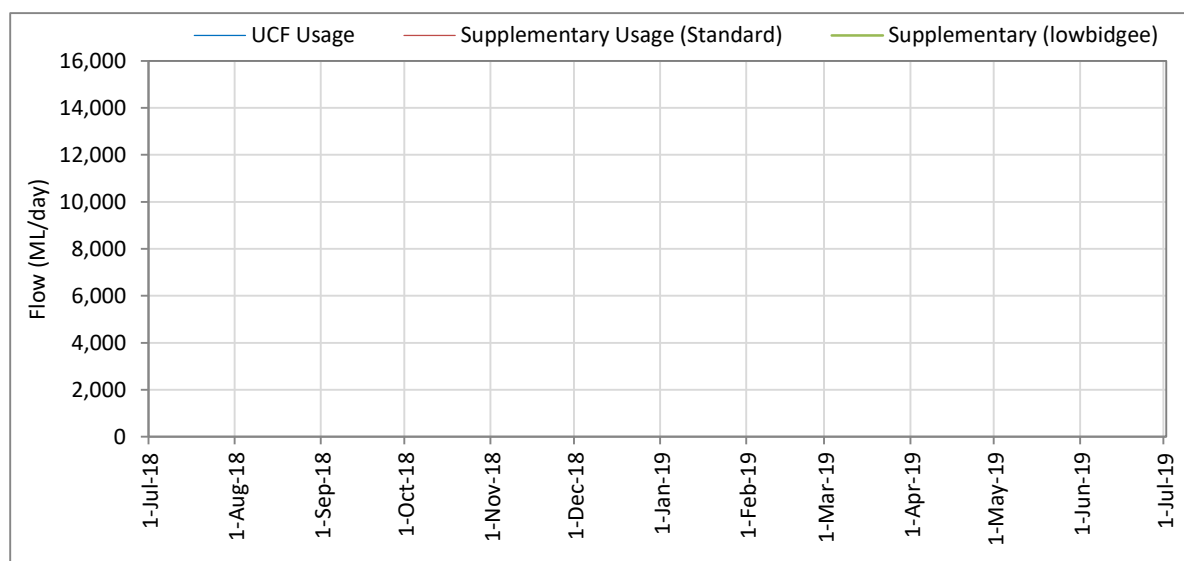


Table 36: Uncontrolled flow allocation accounted usage⁴⁸

| Water year | Uncontrolled flow extractions |
|------------|-------------------------------|
| 2004–05 | 145,197 |
| 2005–06 | 187,302 |
| 2006–07 | 0 |
| 2007–08 | 0 |
| 2008–09 | 0 |
| 2009–10 | 21,977 |
| 2010–11 | 0 |
| 2011–12 | 0 |
| 2012–13 | 0 |
| 2013–14 | 40,547 |
| 2014–15 | 28,014 |
| 2015–16 | 78,931 |
| 2016–17 | 839 |
| 2017–18 | 20,605 |
| 2018–19 | 0 |

⁴⁷ This refers to the total uncontrolled flow usage at the time of extraction i.e. not adjusted for conversion back to general security as per the plan rules.

⁴⁸ This refers to the uncontrolled flow after adjustments for conversions back to general security usage as per the water sharing plan rules.

Note 24—Unaccounted volume

In theory, if all the processes of a water balance were accurately accounted for the unaccounted difference would be zero. In reality due to the large accuracy uncertainties in many of the volumes presented in the accounts, the various sources and methods from which the data has been obtained and the fact that not all processes of the water cycle have been accounted for in detail, the statements are not balanced at the end of the accounting process. In order to balance the accounts a final balancing entry is required, and this is termed the unaccounted difference. As technology progresses and accuracy improves in the account estimates, it is anticipated that relatively, this figure should reduce in future accounts.

Data type

Not applicable

Policy

Not applicable

Data accuracy

D—Estimated in the range +/- 100% (this refers to the fact the unaccounted volume is a result of a range of processes estimated using different methodologies and accuracies. The accuracy around the number itself, that is required to achieve mass balances is A1—Nil accuracy).

Providing agency

Not applicable

Data source

Not applicable

Methodology

The unaccounted difference is equal to the amount required to obtain the correct physical volume in river at the end of the reporting period, after all the known physical inflows and outflows have been accounted. The accounting process of this GPWAR attempted to represent the physical movement of water by creating a river asset. The opening and closing balance of the river volume was estimated according to Note 11.

Surface Water Unaccounted difference

$$UV_{SW} = Rs - Rc + Ri - Ro$$

Where:

UV_{SW} = Unaccounted difference for Surface Water

Rs = Opening river volume estimate

Rc = Closing river volume estimate

Ro = Physical outflows from the river (e.g. extractions)

Ri = Physical inflows to the river (e.g. runoff, return flows, dam releases)

Note 25—River and groundwater interaction

This note refers to the net effect of water that has been identified as either flowing from the connected alluvium to the accounted river extent (increase in water asset), and from the accounted river extent to the alluvium aquifer (decrease in water asset).

Data type

Modelled

Policy

Not applicable

Data accuracy

D—Estimated in the range +/- 100%

Providing agency

Department of Planning, Industry and Environment

Data source

Department of Planning, Industry and Environment MODFLOW (Mid Murrumbidgee), Water Table Fluctuation Model (Lower Murrumbidgee). Data inputs to the models are obtained from HYDSTRA, GDS

Methodology

The river interaction methods used to produce estimates in this GPWAR are documented in the report, *General Purpose Water Accounting Reports: Groundwater methodologies*. This document is available for download from the Department of Planning, Industry and Environment webpage.

Method A (Modflow) was used to assess the annual physical groundwater budget in both the Mid Murrumbidgee Groundwater Management Area and the Lower Murrumbidgee groundwater management area. The 2018–19 GPWAR includes results from the newly calibrated Lower Murrumbidgee model which have allows separate quantification of both river inflows and river outflows in the accounting statements (a limitation of the method B approach utilised in prior publications resulting where only a net interaction is quantified).

No estimate is included in the statements for any river interactions outside the areas covered by these methods.

Additional information

Groundwater model results illustrating water flows and storage change in reporting period for the Lower Murrumbidgee. Mid Murrumbidgee (zone 2) and Mid Murrumbidgee (zone 3) are presented in Figure 46, Figure 47 and Figure 48 respectively.

Figure 46: Lower Murrumbidgee alluvium physical flow budget for reporting period

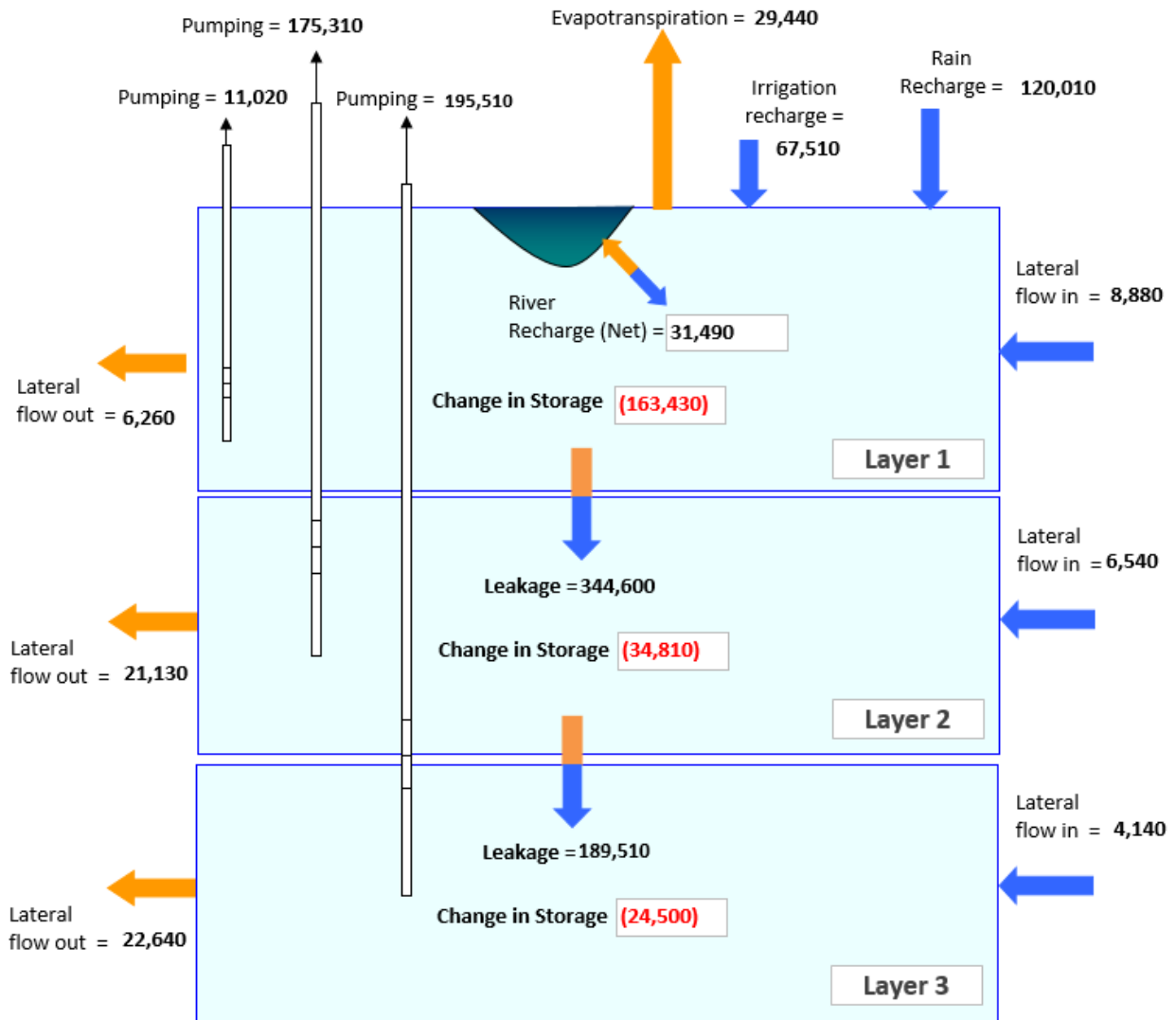


Figure 47: Mid Murrumbidgee Zone 2 alluvium physical flow budget

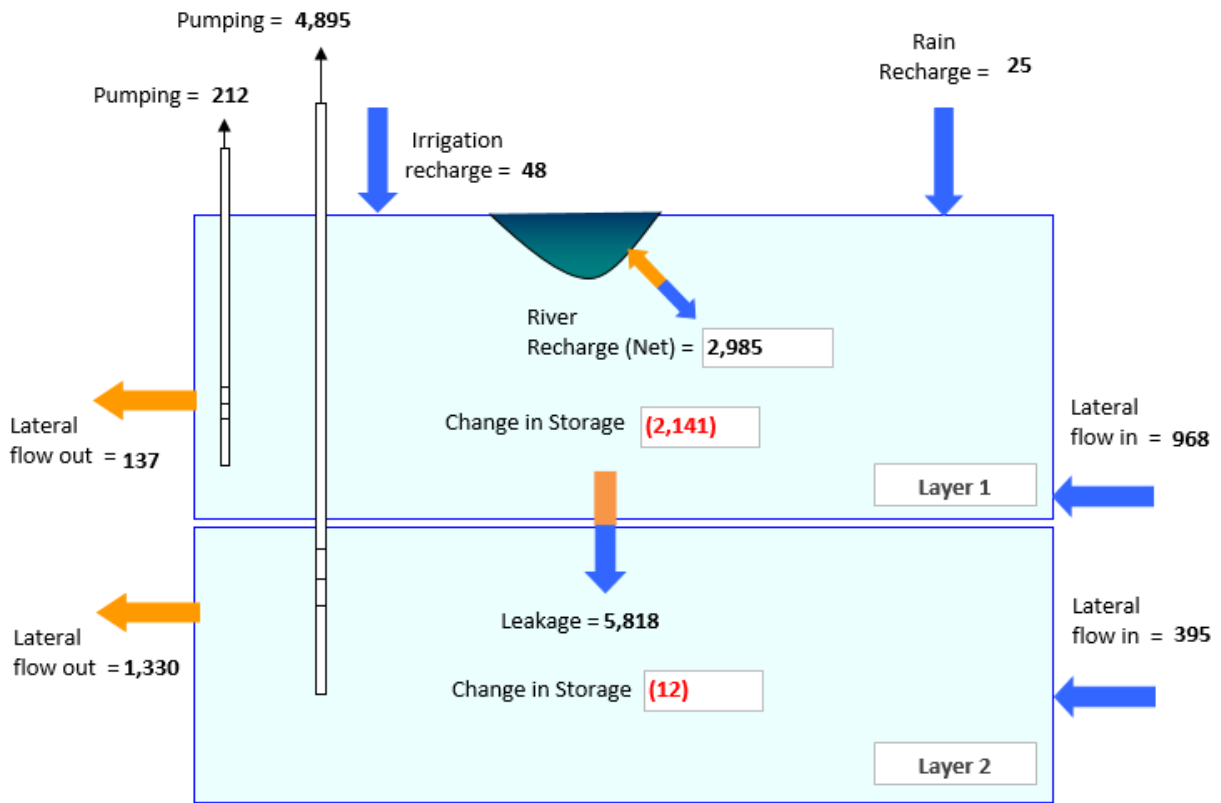
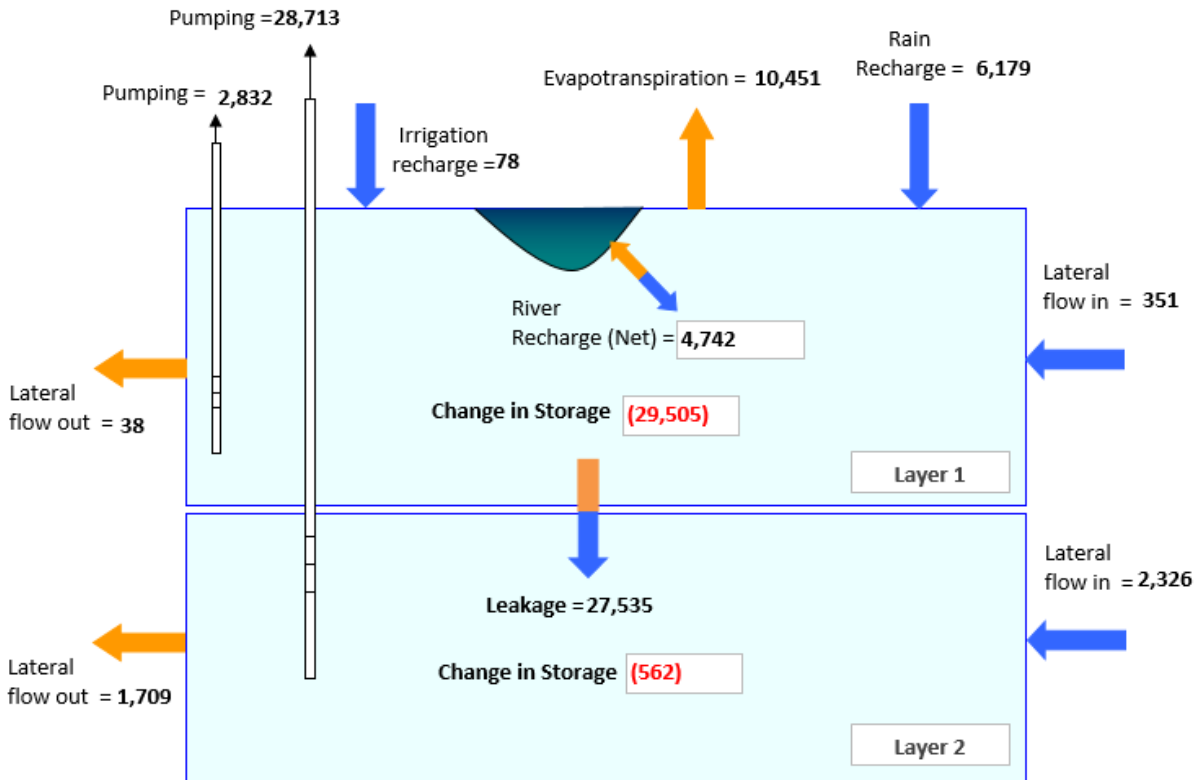


Figure 48: Mid Murrumbidgee Zone 3 alluvium physical flow budget



Note 26—Snowy River allocation transfer

Through government funded intervention water entitlement is accumulated from the Murrumbidgee (and Murray) valleys, via water saving implementation, or entitlement purchases in order to return water to the Snowy River. The Snowy River has suffered increasing environment degradation, following implementation of the Snowy Mountains Scheme for electricity and irrigation. A significant portion of the rivers historical natural flows were harvested for use west of the Great Dividing Range, and the system no longer received critical high flow events for the ecosystem.

The Snowy Water Inquiry Outcomes Implementation Deed (2002) is a legally binding agreement between the New South Wales, Victoria and Commonwealth governments. The deed includes the water recovery targets for the Snowy, Murray and Snowy Montane Rivers increased flows programs.

Targets for the increased flow programs include returning the following average volumes annually:

Snowy River—212,000 megalitres or 21% of the average natural flow

Murray River—70,000 megalitres

Snowy Montane Rivers—up to 117,800 megalitres

Data type

Derived from allocation data

Policy

Snowy Water Inquiry Outcomes Implementation Deed (2002)

Available on the Department of Planning, Industry and Environment website at

www.industry.nsw.gov.au/water

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

Department of Planning, Industry and Environment

Data source

WaterNSW/ Department of Planning, Industry and Environment—Water Accounting System (joint ownership)

Methodology

Each year, allocated water in licences dedicated to Snowy River releases is determined on January 31 each year (the amount Snowy Hydro is instructed to withhold from upcoming release requirements). A transaction of this amount removes the allocation the licenced accounts and decreases the liability on the Murrumbidgee water assets. Any available water determinations that occur after this date and prior to the closing of the water year, are added to the accounts, with the standard carryover rules of the relative licence category applied.

Additional information

Table 37: Summary of Murrumbidgee Snowy River environmental holdings and transfers

| Category | Share | Allocation transferred |
|--|--------|------------------------|
| Coleambally Irrigation (Conveyance) | 3,500 | 3,140 |
| Murrumbidgee Irrigation (Conveyance) | 20,000 | 14,312 |
| Regulated River (Conveyance) | 1,000 | 190 |
| Regulated River (General Security) | 75,489 | 14,343 |
| Regulated River (High Security) | 1,885 | 1,791 |
| Non-licenced water recovery ⁴⁹ | N/A | 49,678 |
| Total allocation for release in Snowy River | | 83,454 |

⁴⁹ Savings for Forrest Creek replenishment configuration and Computer Aided River Management (CARM) projects are yet to be converted to a registered access licence but are being allowed for in operation.

References

WASB 2012, Australian Water Accounting Standard 1 Preparation and Presentation of General Purpose Water Accounting Reports (AWAS 1), Bureau of Meteorology