Department of Climate Change, Energy, the Environment and Water

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General Purpose Water Accounting Report Macquarie and Cudgegong Catchments

2023-2024

Acknowledgement of Country

The Department of Climate Change, Energy, the Environment and Water acknowledges Aboriginal people as Australia's First Peoples practicing the oldest living culture on earth and as the Traditional Owners and Custodians of the lands and waters on which we rely.

We acknowledge the people of the Wiradjuri, Wailwan and Wongaibon Nations and that the land and waters of the New South Wales Macquarie River catchment area is of spiritual, cultural, customary and economic importance.

We recognise the intrinsic connection of Traditional Owners to Country and acknowledge their contribution to the management of the New South Wales Macquarie River catchment landscape and natural resources.

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Acknowledgements

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Contents

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
CARM	computer-aided river management
EWA	environmental water 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
SILO	climatic data provision system run by the Queensland government for the provision of both measured and modelled data
WASB	Water Accounting Standards Board

Abbreviation	Description
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
WSP	water sharing plan

Glossary

Term	Meaning
allocation	The assignment becomes part of the receiver's current year allocation account water.
allocation account	It determines the volume of water that is to be added to an individual's licence allocation account.
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.
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.
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.
back-calculation	It is available for anyone who has access to river frontage on their property.
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.
carryover	A catchment is a natural drainage area, bounded by sloping ground, hills or mountains, from which water flows to a low point.
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.

Term	Meaning
computer-aided river management (CARM)	the areas of land that collect rainfall and contribute to surface water (streams, rivers, wetlands) or to groundwater
dead storage	flow leaving a place or process
effective storage	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.
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.
end of system	Environmental water provisions recognise the environmental water requirements and are based on environmental, social and economic considerations, including existing user rights.
entity	a defined geographical area or zone within the accounting region Transactions and reports are produced for each entity.
environmental water	water allocated to support environmental outcomes and other public benefits Environmental water provisions recognise the environmental water requirements and are based on environmental, social and economic considerations, including existing user rights.
evaporation	the process by which water or another liquid becomes a gas Water from land areas, bodies of water, and all other moist surfaces is absorbed into the atmosphere as a vapour.
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	the pumping or diverting of water from a river or aquifer by licensed users for a specific purpose (irrigation, stock, domestic, towns, etc.) The volume is measured at the point of extraction or diversion (river pump, diversion works, etc.).

Term	Meaning
general purpose water accounting report (GPWAR)	a report prepared according to the Australian Water Accounting Standard It comprises a number of 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.
General Security licence	a category of water access licence implemented under the Water Management Act 2000 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).
groundwater	Water location beneath the ground in soil pore spaces and in the fractures of rock formations
High Security licence	a category of water access licence implemented under the Water Management Act 2000 It receives a higher priority than General Security licences but less priority than essential requirements in the available water determination process.
HYDSTRA database	a database used by NSW Department of Climate Change, Energy, the Environment and Water 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
non-physical transaction	an accounting transaction representing a process that is not a component of the water cycle (e.g. an available water determination)

Term	Meaning
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 Water Management Act 2000, 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
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 a number of 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

Term	Meaning
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 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 Water Management Act 2000

Director's foreword

This is the 14th annual release of the general-purpose water accounting report (GPWAR) for the Macquarie and Cudgegong Regulated River Water Source. It has been prepared for the accounting period 1 July 2023 to 30 June 2024 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) and licenced allocation 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
  - available water determination detailed report
  - temporary trading by licence category
  - supplementary announcements and usage by river reach
  - physical inflows and outflows to the system for the water year.

As Director Water Analytics, NSW Department of Climate Change, Energy, the Environment and Water, I declare:

- the information presented in these accounts as a faithful representation of the management and operation of the Macquarie and Cudgegong Regulated River Water Source in the reporting period
- all data presented in this report provides the best accounting information available at the time of publication
- NSW Department of Climate Change, Energy, the Environment and Waterhas 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 Climate Change, Energy, the Environment and Water

Contextual Statement

The Macquarie catchment covers an area of 74,800 square kilometres within the Murray–Darling Basin. The headwaters of the Macquarie River originate in the Great Dividing Range south of Bathurst, and the river flows in a north-westerly direction for 960 kilometres until it joins the Barwon River near Brewarrina. The major tributaries of the upper Macquarie catchment are the Cudgegong, Talbragar and Little Rivers.

Flows from the lower reaches of the Macquarie River cross into the adjacent Bogan River through a series of regulated effluent creeks that leave the Macquarie River near the town of Warren. The Bogan River rises in the Harvey Ranges near Peak Hill and flows roughly parallel to the Macquarie across the north-western plains before joining the Barwon River downstream of Brewarrina.

Elevations across the catchment range from 1,300 metres above sea level in the mountains south of Bathurst to less than 100 metres above sea level near Brewarrina in the far north of the catchment. Below Dubbo the valley is predominantly flat alluvial plains where elevations are less than 300 metres.

The Macquarie catchment is regulated by two major storages. Burrendong Dam supplies water for irrigation as well as town water and stock and domestic requirements along the Macquarie River and the lower Bogan River. It also stores water for environmental requirements in the lower valley including the Ramsar-listed wetlands in the Macquarie Marshes. Windamere Dam, on the Cudgegong River upstream of Burrendong Dam, provides water for the towns of Mudgee and Gulgong and is operated in conjunction with Burrendong to supply water requirements along the Cudgegong River and the lower Macquarie valley.

The Macquarie catchment formed part of the lands originally occupied by the Wiradjuri, Wailwan and Wongaibon Aboriginal nations. Today the catchment supports around 200,000 people with over half of this population living within the regional cities of Dubbo, Orange and Bathurst with populations of approximately 44,000, 40,000 and 46,000 respectively. Regional towns include Mudgee, Wellington, Narromine, Nyngan and Warren.

The largest agricultural use of water in the valley is for cotton production downstream of Dubbo. Other significant irrigated crops include lucerne, cereals, oilseed, wheat and vegetables. Most of the major cities and towns rely on the rivers in the catchment for their water supply including Bathurst, Orange, and Oberon upstream of Burrendong Dam, and Dubbo, Wellington, and Nyngan on the Macquarie River below Burrendong Dam. Lithgow also receives transfers of water for town water supply from the Fish River Scheme.

More detailed information on the catchment is available in the Catchment Snapshots available from DCCEEW website

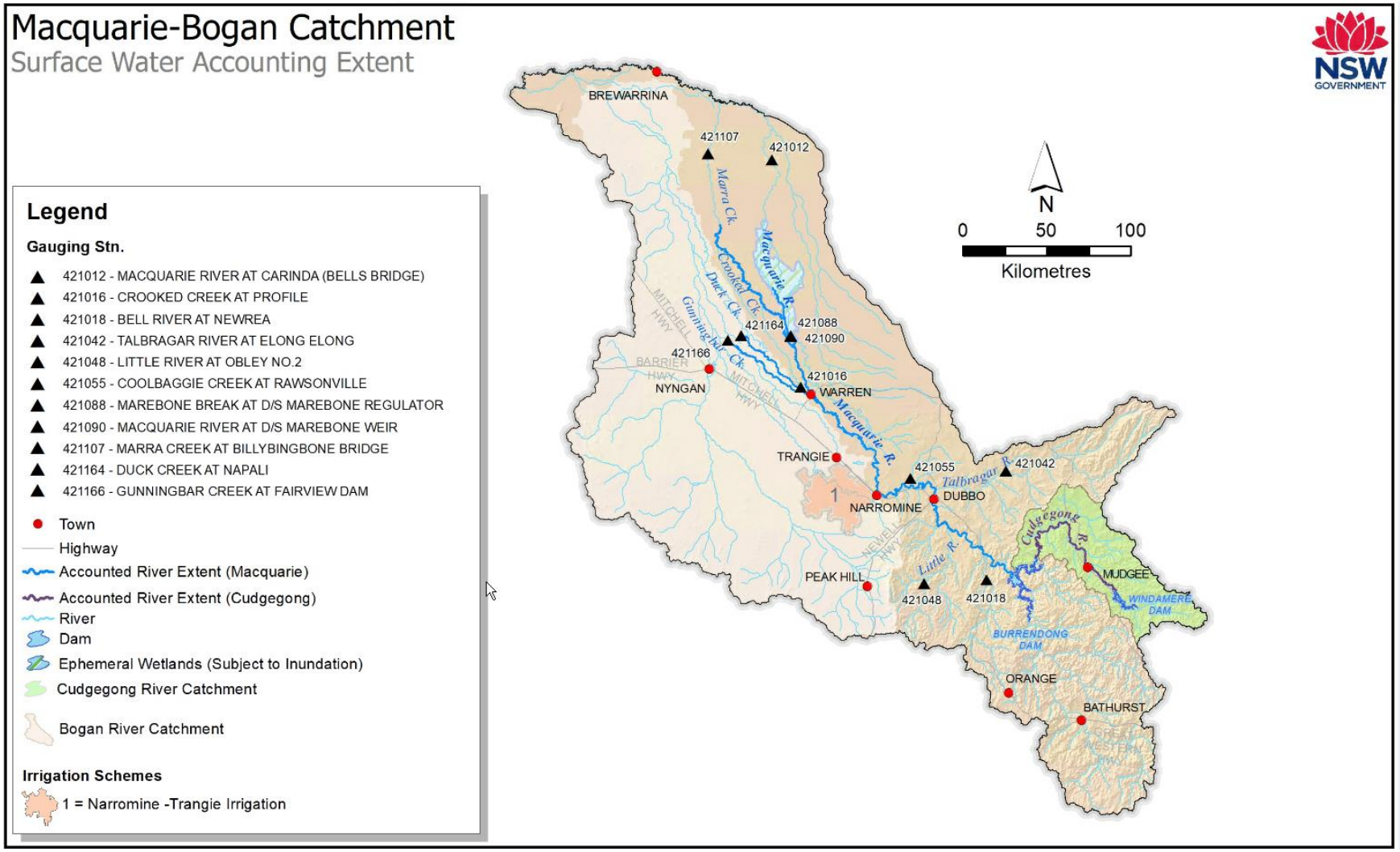
Accounting extent

The accounted river extent is illustrated in Figure 1. It includes the Cudgegong River from Windamere Dam to Burrendong Dam, the Macquarie River from downstream Burrendong Dam to the Macquarie River at Oxley Station, Crooked Creek, Duck Creek, Marra Creek and Gunningbar Creek. Water delivered to the Macquarie Marshes has been accounted as an effluent/outflow from the main river. All water licences managed by the Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source are considered.

The Bogan catchment is excluded from detailed accounting in this GPWAR aside from any water that can be identified as leaving the regulated Macquarie River for replenishment and town water purposes in the Bogan River.

Groundwater volumes for the Lower Macquarie alluvium that interact with the regulated river are quantified within the GPWAR statements. Any other groundwater interactions with the regulated river are not directly estimated and therefore form a component of the unaccounted difference. Detailed accounting and water resource information for groundwater sources are excluded and published separately on the NSW DCCEEW website.

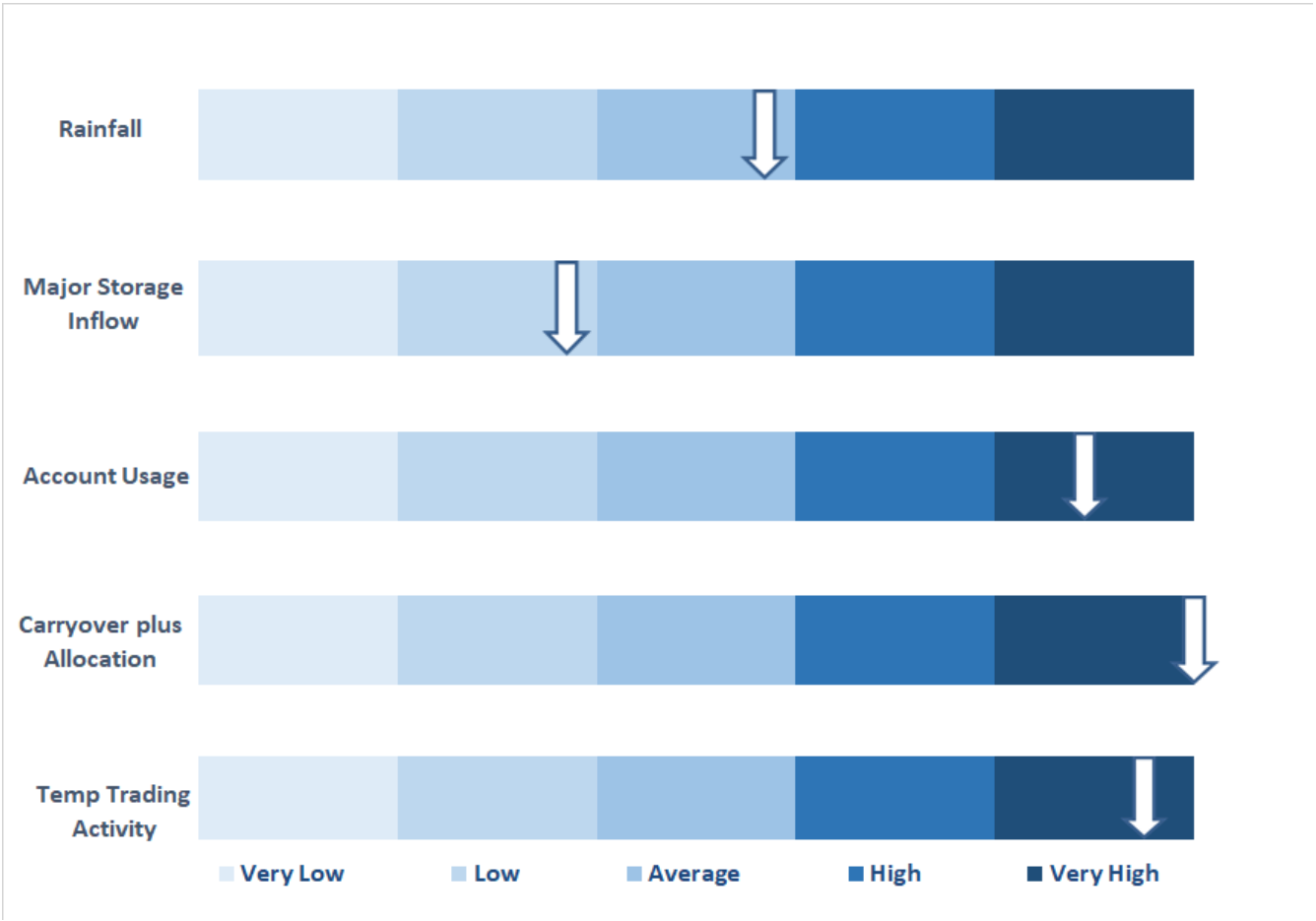
Figure 1: Surface water geographical extent of the accounts



Snapshot

The key indicators for 2023-2024 relative to other years under water sharing plan management conditions are presented in Figure 2. Relative to historical information rainfall was average and major storage inflow were in the low range, account usage, effective allocation (carryover plus allocation) and temporary trading activity were all was in the very high range. This can be attributed to average rainfall and lower inflows.

Figure 2: 2023-2024 summary indicators



Climate

At Bathurst (upper catchment), 632 millimetres of rainfall was recorded for the reporting period (Table 1). Comparatively this volume of rainfall is

- 103% of the long-term historical median for rainfall at this location.
- 57% of the highest rainfall on record at this location.
- The highest monthly rainfall occurred in April 2024 (101 millimetres) and November 2023 (98 millimetres). (Figure 3 and
- Figure 4).

At Warren (lower catchment), 509 millimetres of rainfall was recorded for the reporting period (Table 2). Comparatively this volume of rainfall is

- 108% of the long-term historical median for rainfall at this location.
- 50% of the highest rainfall on record at this location.
- The highest monthly rainfall occurred in February 2024 (100 millimetres) and November 2023 (83 millimetres). (refer to Figure 3 and
- Figure 4).

The spatial representation of rainfall was derived from interpolation between available rainfall measurements and is provided in Figure 5 (total annual rainfall for the reporting period) and Figure 6 (long-term average annual rainfall). The data indicates that rainfall was below average in western areas and increased towards the southeast with above average rainfall in areas of higher elevations.

Figure 3: Monthly rainfall data and historical median at Bathurst and Warre

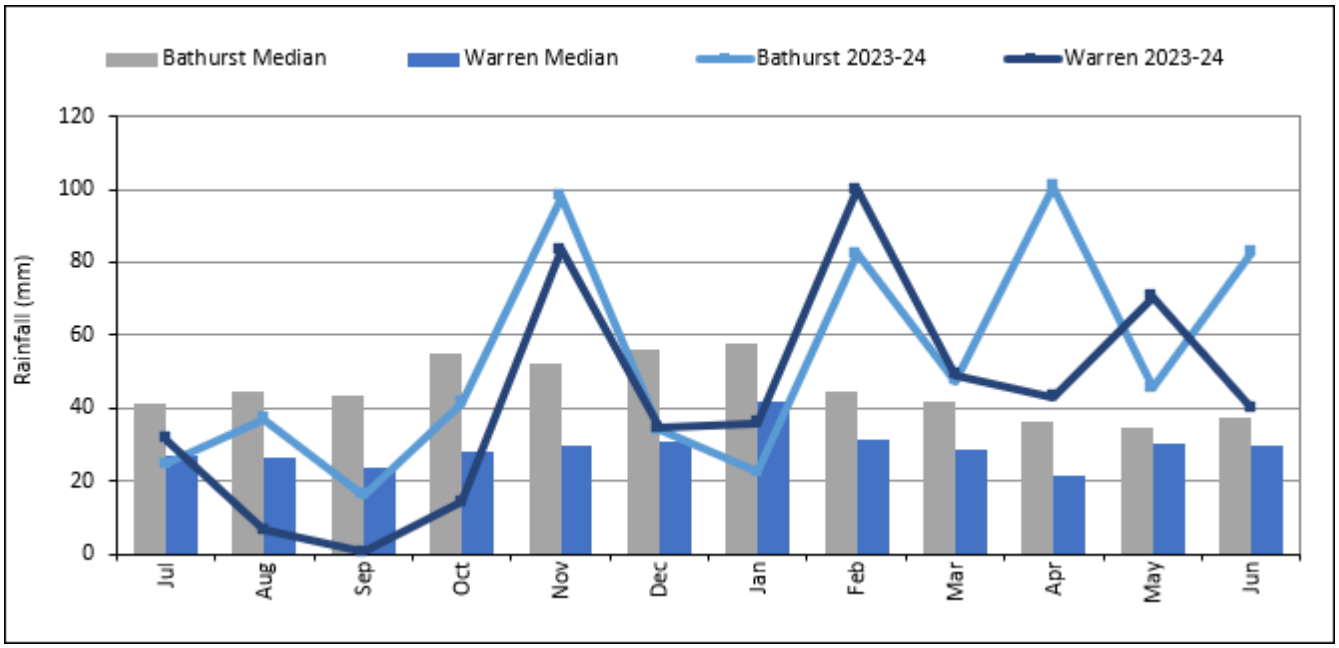


Figure 4: Monthly rainfall historical median deviations at Bathurst and Warren

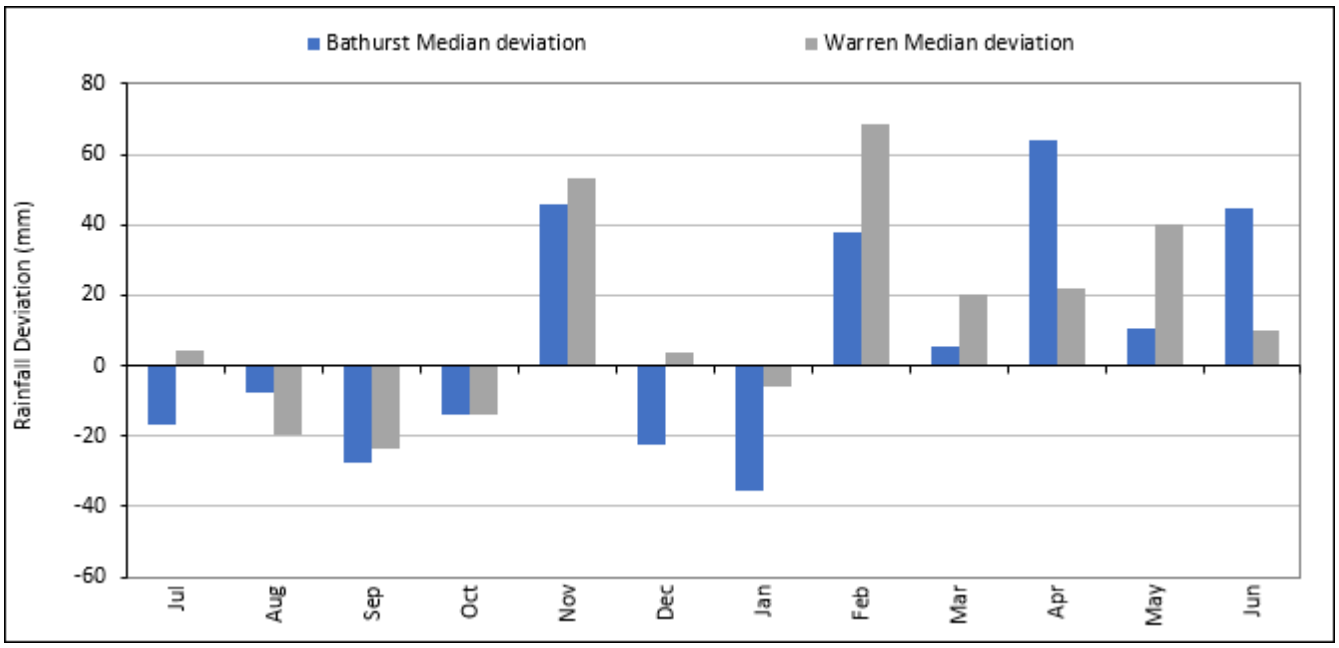


Table 1: Monthly rainfall and historic monthly rainfall statistics at Bathurst[1] for the reporting period

Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual
Bathurst 2023-24	25	37	16	41	98	34	22	82	47	101	45	83	632
Mean	48	50	47	58	62	63	67	56	55	42	41	46	633
Median	41	45	44	55	52	56	58	45	42	37	35	38	615
Lowest	4	1	4	2	1	0	1	0	0	0	1	1	375
Highest	155	163	138	216	232	219	224	236	205	166	115	193	1100
Highest Year	1922-1923	1986-1987	1892-1893	1999-2000	2021-2022	2010-2011	1978-1979	1971-1972	1926-1927	1990-1991	1995-1996	1916-1917	1949-1950

Table 2: Monthly rainfall and historic monthly rainfall statistics at Warren[1] for the reporting period

Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual
Warren 2023-24	32	7	0	14	83	35	36	100	49	43	70	40	509
Mean	34	33	31	40	39	42	56	50	46	38	37	39	484
Median	27	26	24	28	30	31	42	32	29	21	30	30	472
Lowest	0	0	0	0	0	0	0	0	0	0	0	0	179
Highest	131	145	145	174	205	237	242	363	235	303	174	174	1028
Highest Year	1897-1898	1998-1999	2016-2017	1950-1951	1950-1951	2010-2011	1995-1996	1955-1956	2021-2022	1905-1906	1983-1984	1925-1926	1955-1956

[1] Long-term statistics are from the Bureau of Meteorology—climate data online, using the climatic stations '63005—Bathurst Agricultural Station' and '51054—Warren (Frawley Street)'. Historic record statistics are 1908 to 2023 for Bathurst and 1889 to 2023 for Warren.

Figure 5: Macquarie annual rainfall for 2023-2024

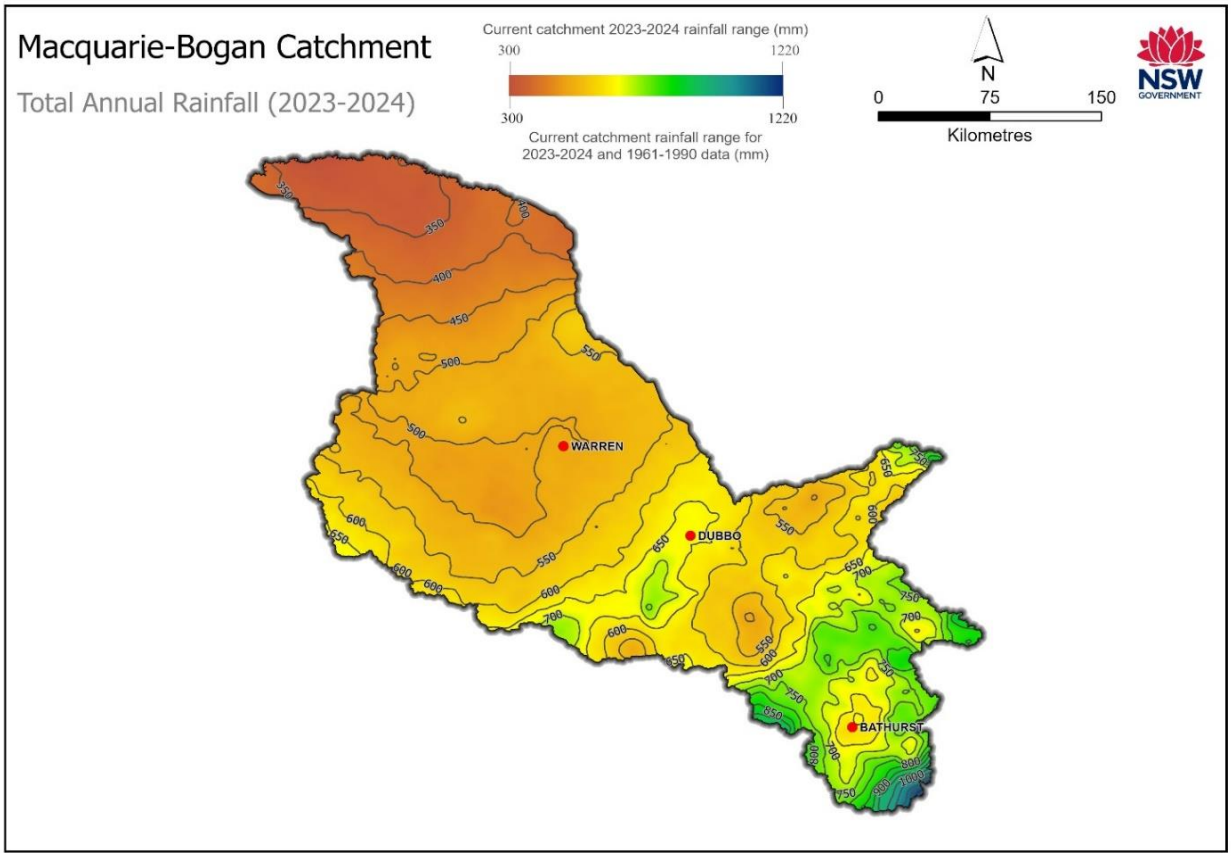
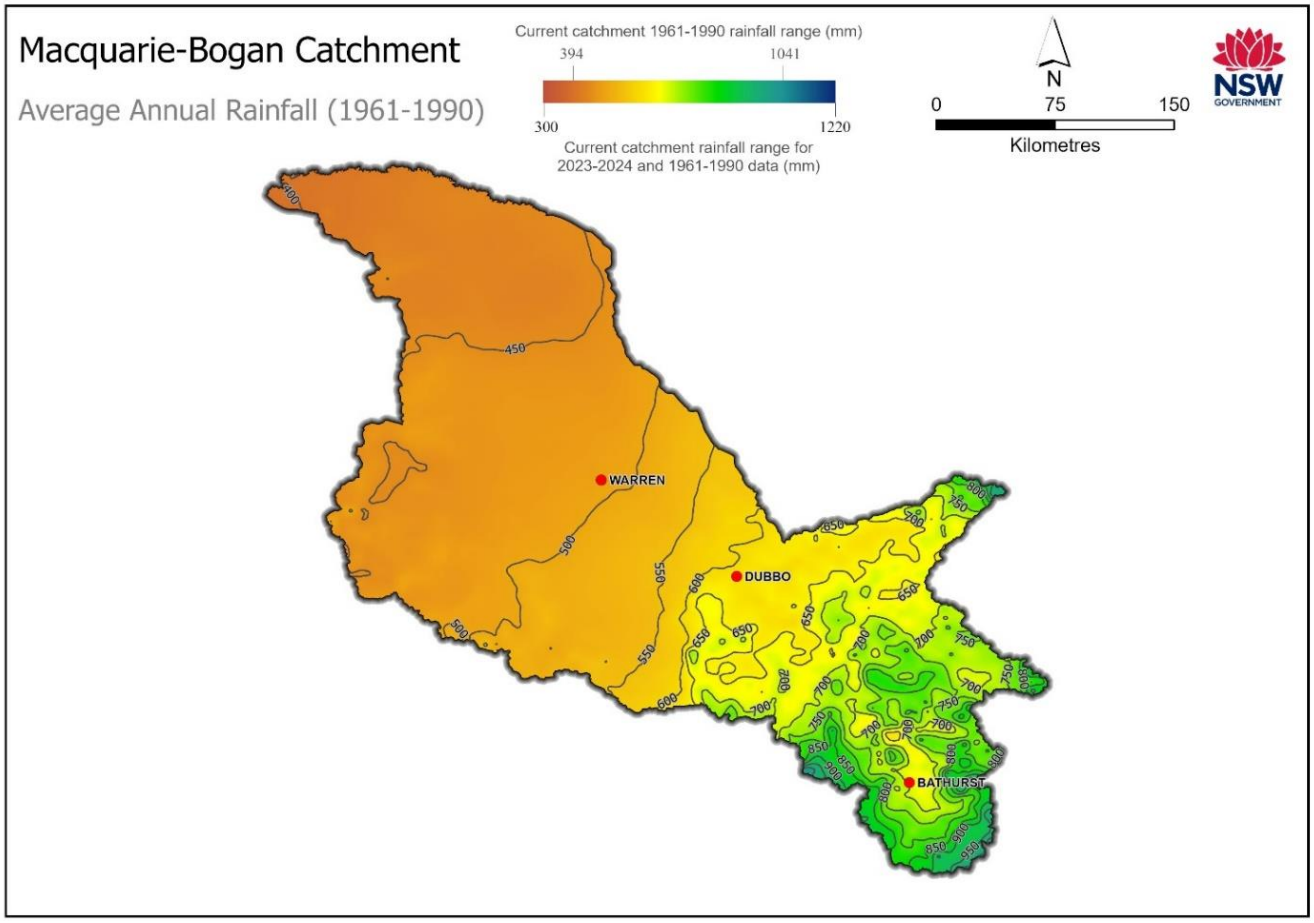


Figure 6: Average annual rainfall in the Macquarie catchment (1961–90)



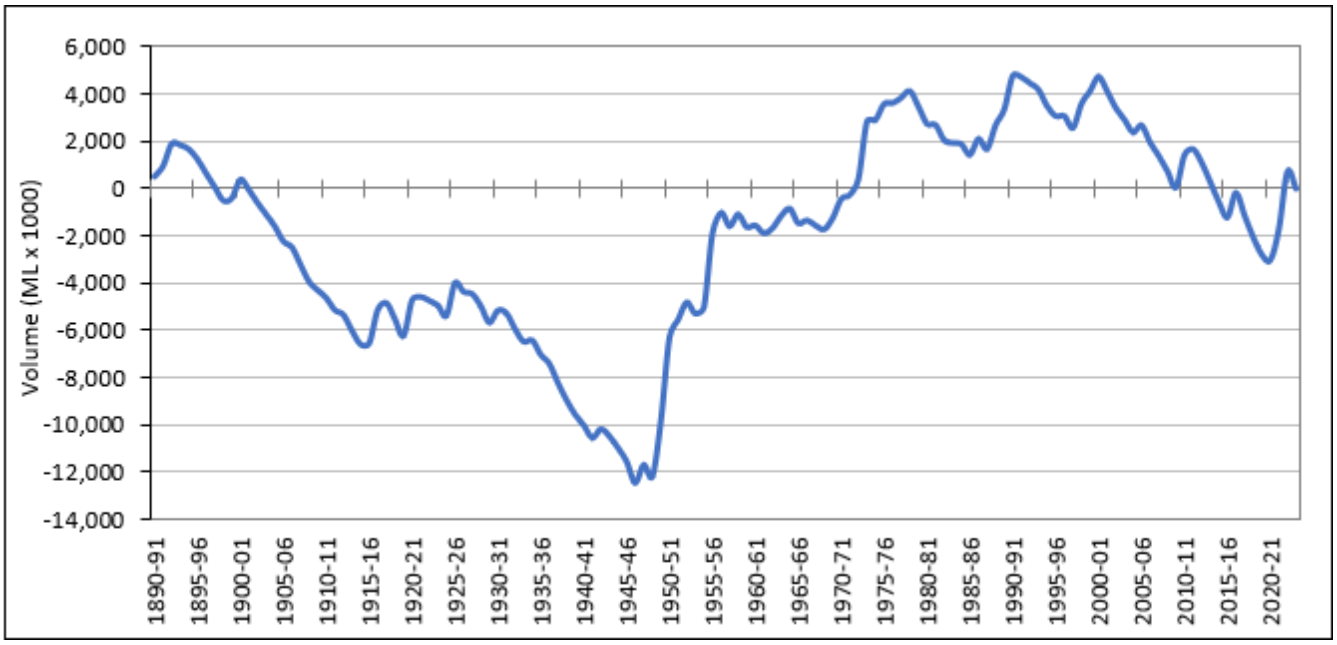
Storage inflows and volume

Long-term trends

Historically, the long-term average annual inflow[2] at the Burrendong storage site has varied significantly cycling through prolonged periods of wet and dry flow regimes. Broadly, the data (Figure 7and Figure 8) illustrates predominately:

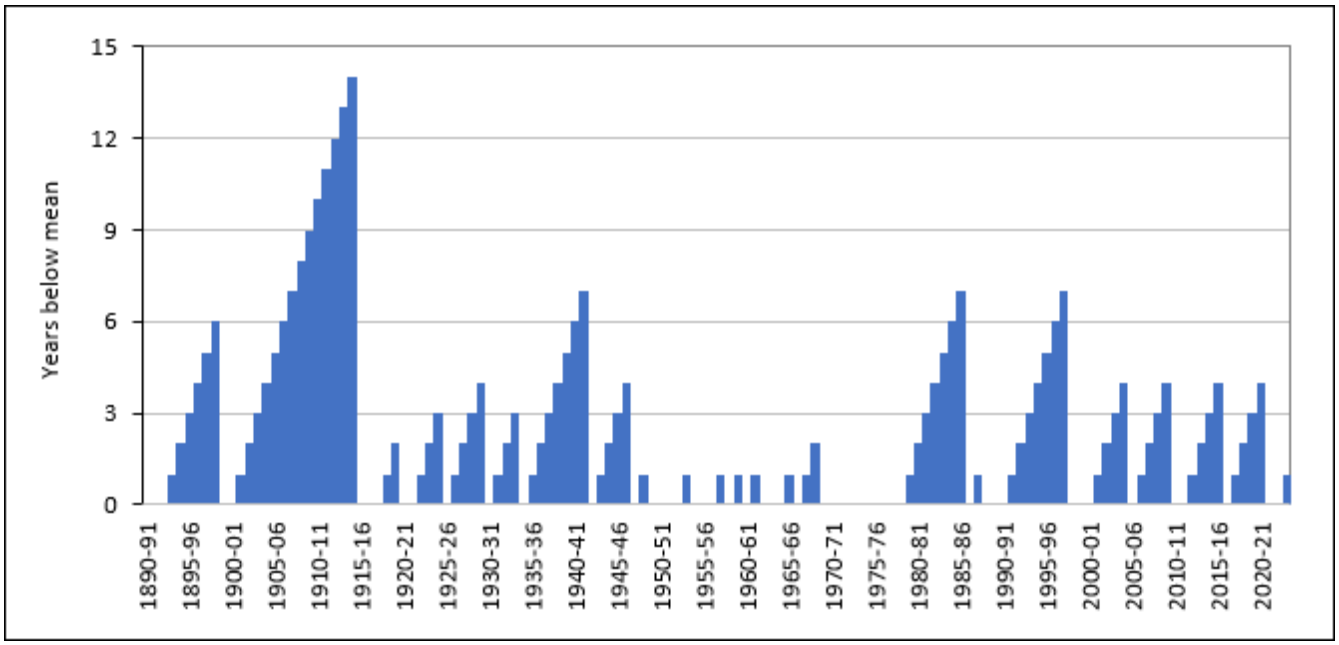
- dry conditions 1900 to 1950
- wet conditions 1950 to 1990
- dry conditions 1990 to 2020
- wet conditions 2020 to present

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



[2] Inflows are back-calculated storage inflow for the period from storage construction and gauged or rainfall runoff modelled flow for the period prior to this

Figure 8: Long-term sequence of years below mean inflow



Burrendong Dam

Inflow

For the reporting period, the total inflow to Burrendong Dam was 268,876 megalitres (Figure 9), which is:

- 36% of the long-term median annual inflow (741,675 megalitres)
- very low compared to the long-term data set exceeding 8% per cent of years in dataset (1890-91 to 2023-24)
- the 1st year of below average inflow following above average inflow in the previous reporting period

The maximum mean daily inflow rate for the reporting period was 11,244 megalitres, occurring on 7 April 2024 (Figure 10).

Figure 9: Long-term inflows to Burrendong Dam against mean and reporting year inflow

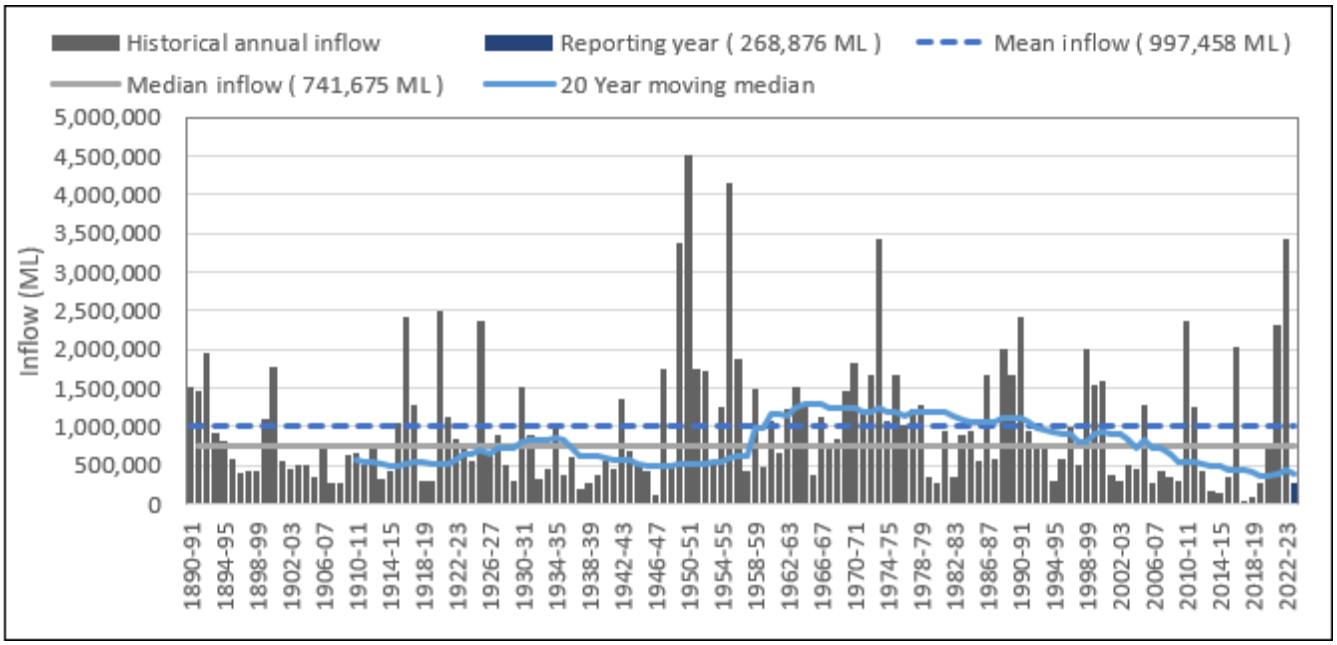
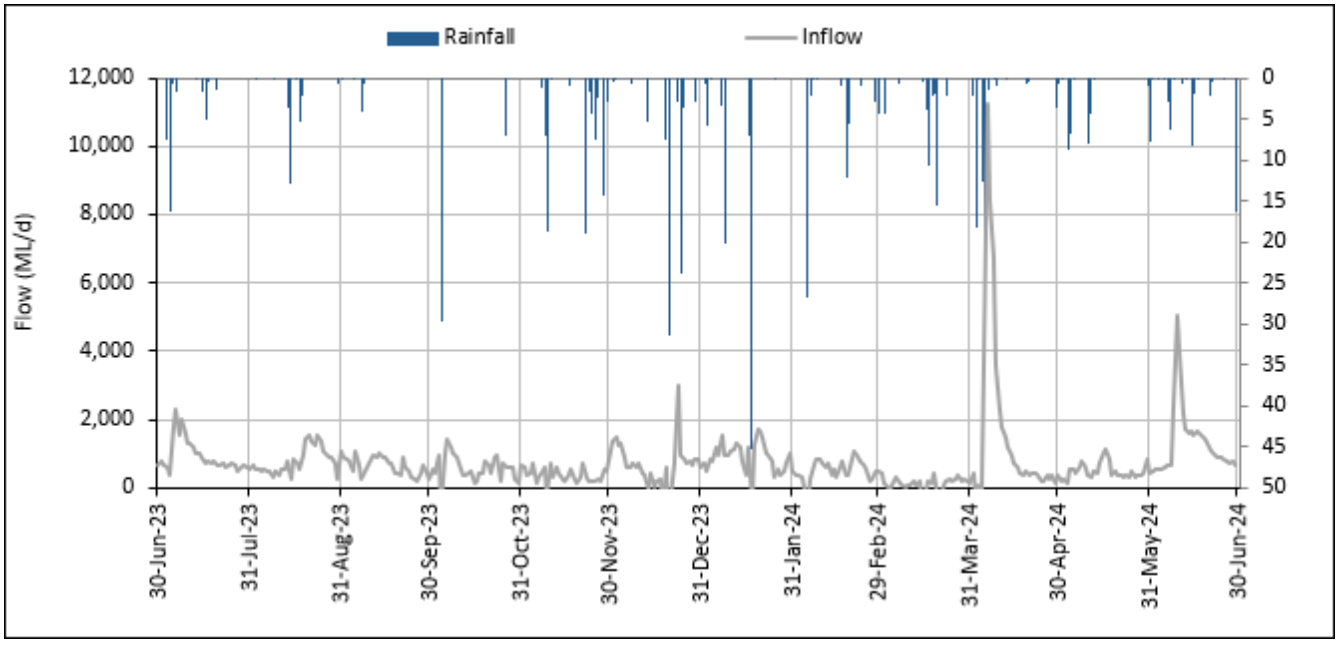


Figure 10: Daily inflows and rainfall at Burrendong



Storage volume

Burrendong storage volume:

- commenced the reporting period at 1,137,302 megalitres or 68% of full supply capacity (Figure 11)
- ended the reporting period at 748,511 megalitres or 45% of full supply, a decrease of 23% for the water year
- had a maximum volume during the reporting period of 1,142,492 megalitres or 68% of full supply capacity, occurring on 9 July 2023.

Figure 11: Burrendong Dam volume and percentage full

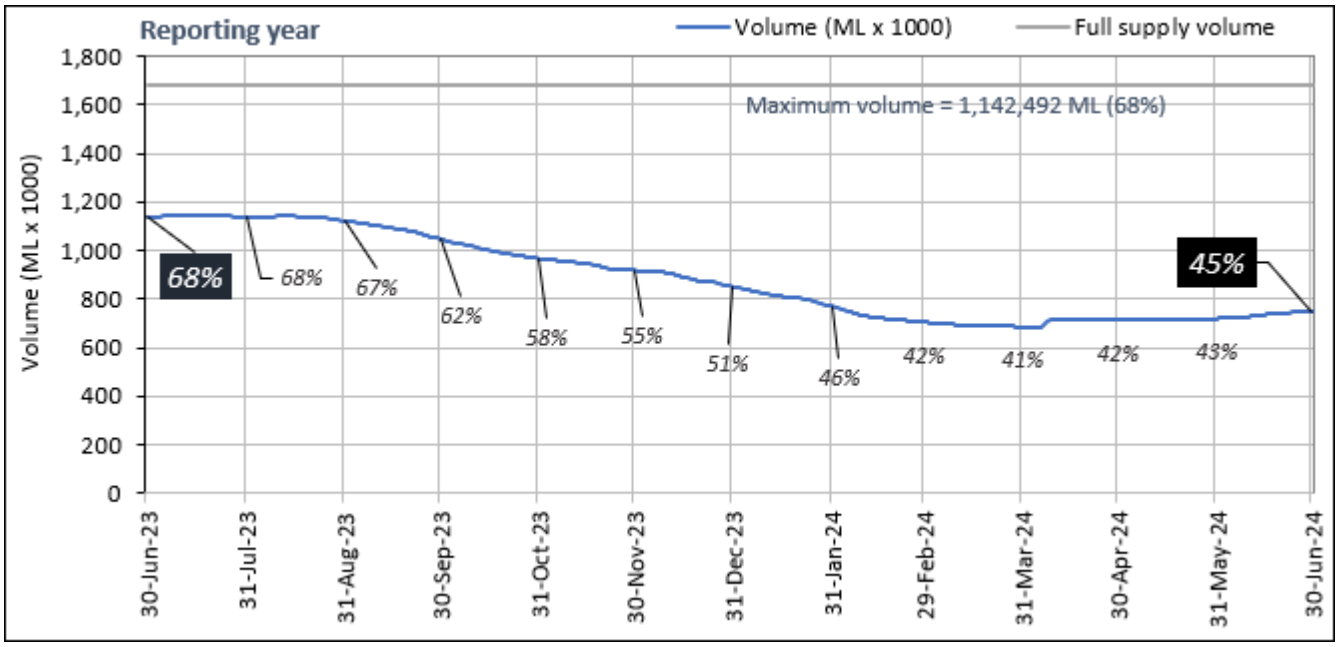
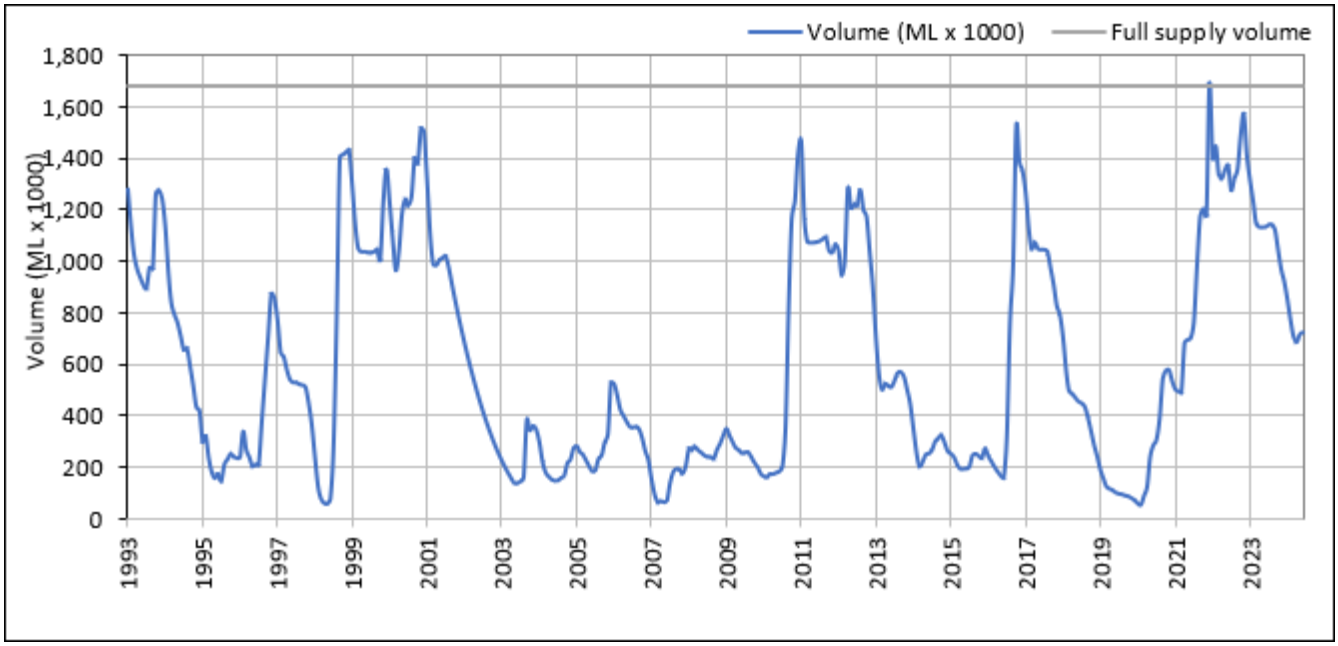


Figure 12: Burrendong Dam historical storage volumes



Windamere Dam

Inflow

- For the reporting period, the total inflow to Windamere Dam was 14,838 megalitres (Figure 13), which is:
- 38% of the long-term median annual inflow (39,241 megalitres)
- very low in comparison to the long-term data set, exceeding 18% of years in dataset (1890-91 to 2023-24)

- the 1st year of below average inflow following above average inflow in the previous reporting period.

The maximum mean daily inflow rate for the reporting period was 1,409 megalitres, occurring on 6 April 2024 (Figure 14).

Figure 13: Long-term inflows to Windamere Dam against mean and reporting year inflow

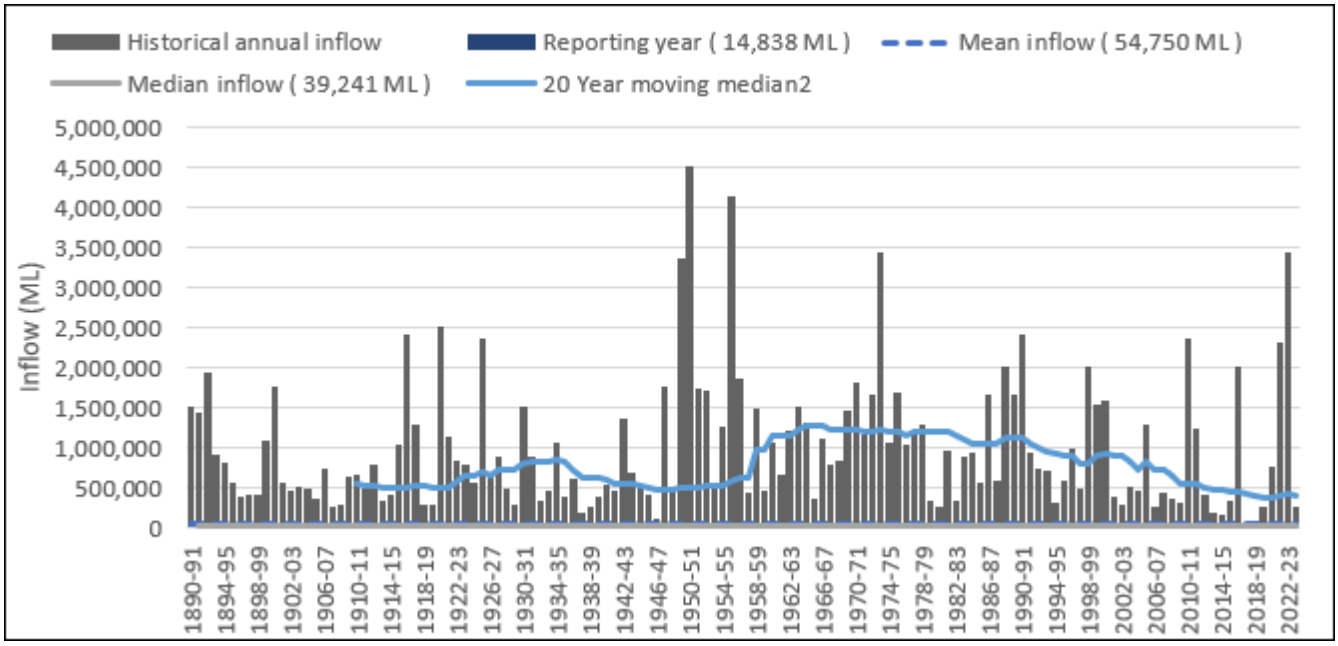
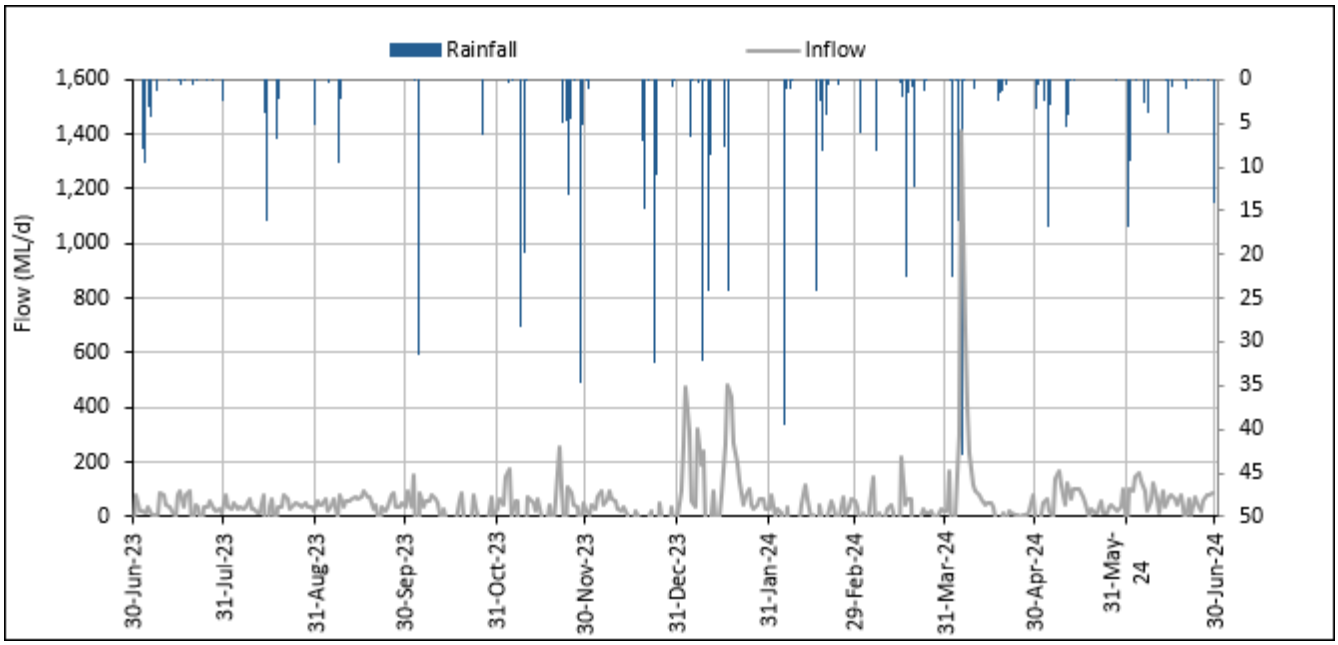


Figure 14: Daily inflows and rainfall at Windamere Dam



Storage volume

Windamere storage volume:

- commenced the reporting period at 358,499 megalitres or 97% of full supply capacity (

- Figure 15)
- ended the reporting period at 343,683 megalitres or 93% of full supply, a decrease of 4% for the water year
- had a maximum volume during the reporting period of 359,020 megalitres or 98% of full supply, occurring on 20 July 2023.

Figure 15: Windamere Dam volume and percentage full

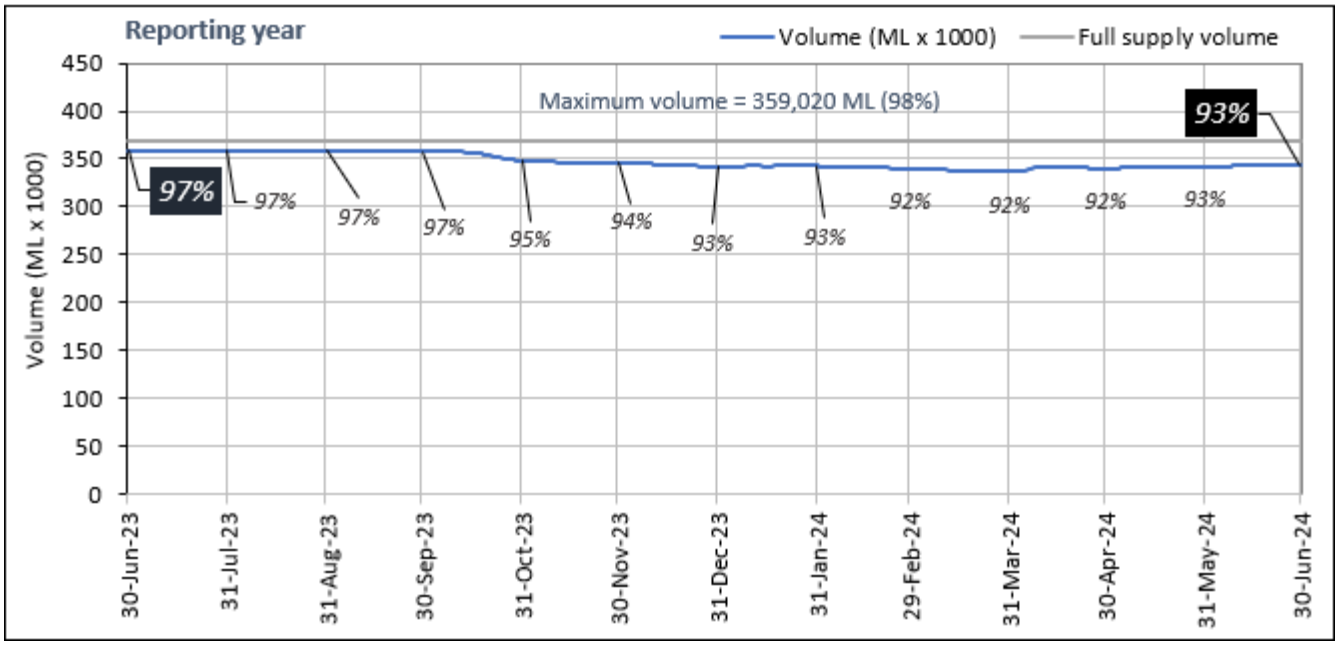
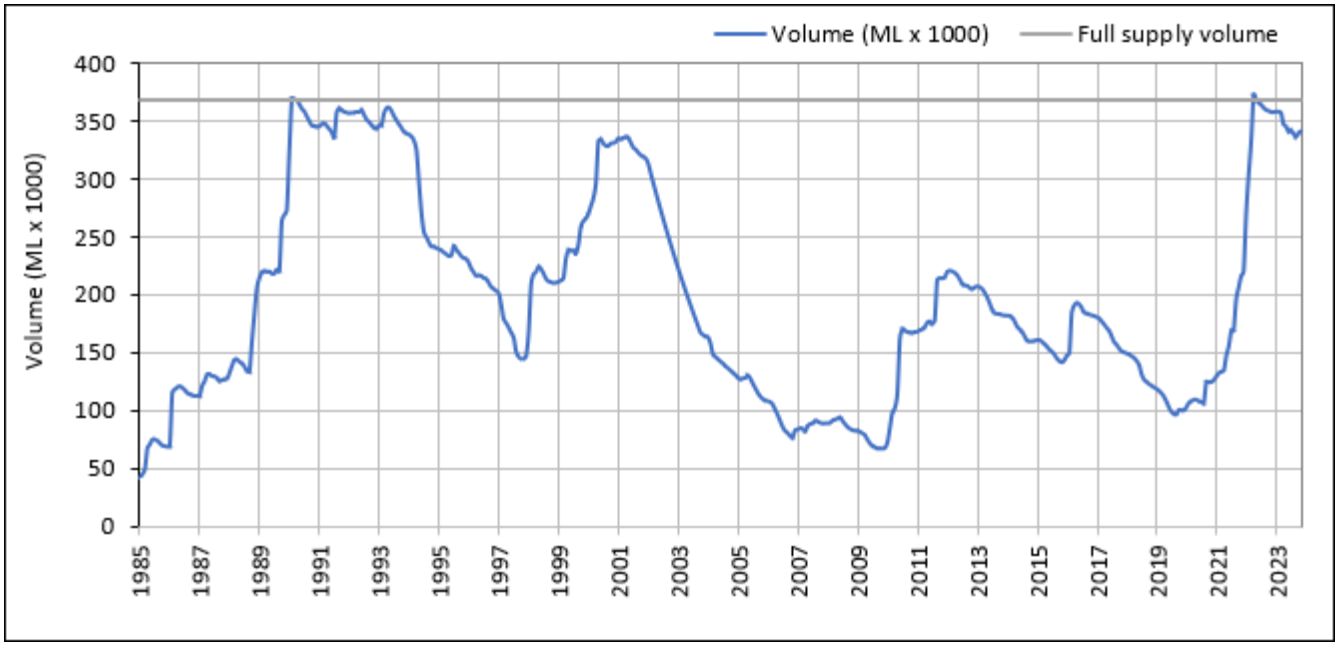


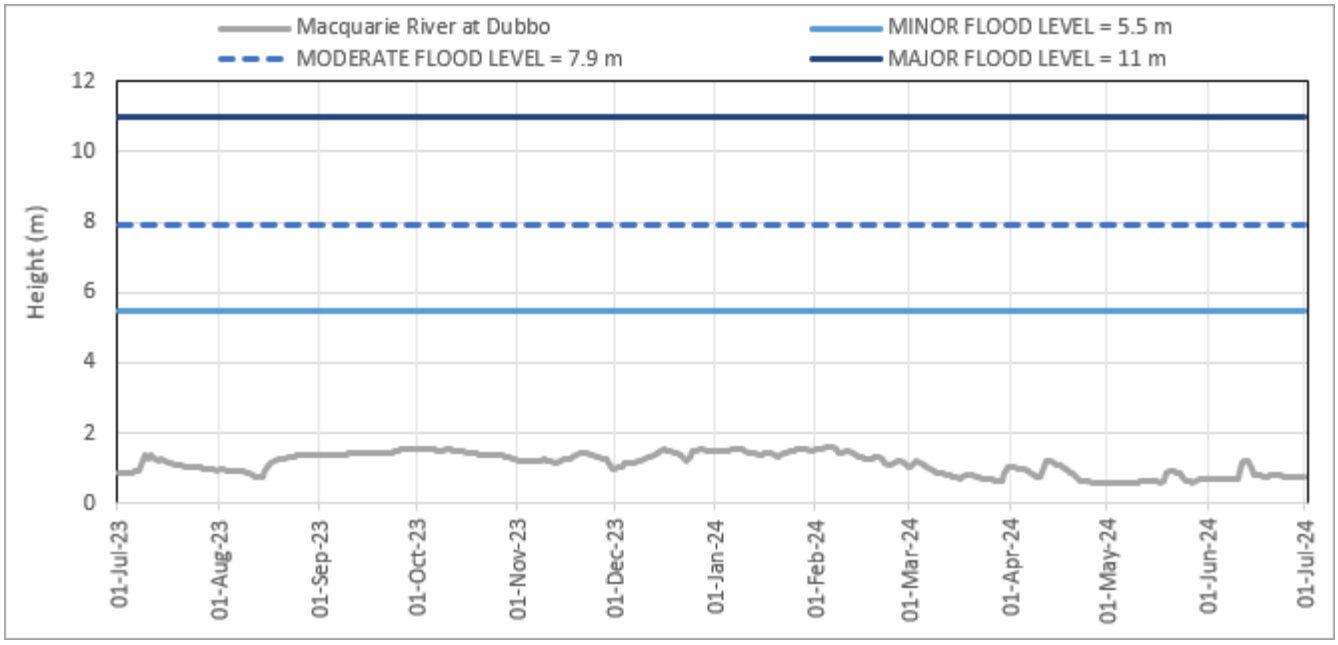
Figure 16: Windamere Dam historical storage volumes



Major high flow events

There were no major high flow events in the Macquarie River at Dubbo in 2023-24. River height at Dubbo remained below the minor flooding indicator level of 5.5 metres for the entire year. The maximum recorded river height at this location was 1.6 metres (Figure 17).

Figure 17: Macquarie River at Dubbo maximum daily flow heights



Surface water resources and management

Legislation

The Macquarie and Cudgegong Regulated Rivers water source was managed under the conditions set out in the Water Sharing Plan for the Macquarie and Cudgegong Regulated River Water Source 2016 for the entirety of the reporting period. The water sharing plan commenced on 1 July 2016 and will remain active until 30 June 2026 or alternatively until a replacement plan is gazetted. The water sharing plan was produced to meet the water management principles outlined in the NSW *Water Management Act 2000*.

Access licence account management

The licence allocation accounting rules that were in place are summarised in Table 3. While an annual accounting procedure is implemented, the rules allow for general security licence holders to carryover up to 1 megalitre per issued share. All other categories have an account limit of 100% or 1 megalitre per share and cannot carryover water between water years.

Table 3: Macquarie and Cudgegong licence allocation accounting rules

Licence category	Account limit	Carryover limit	Annual use limit	Maximum AWD
Domestic and Stock	100%	0%	N/A	100%
Domestic and Stock [Domestic]	100%	0%	N/A	100%
Domestic and Stock [Stock]	100%	0%	N/A	100%
Local Water Utility	100%	0%	N/A	100%
Regulated River (General Security)[3]	N/A	1 ML/Share	N/A	1 ML/Share
Regulated River (High Security)	1 ML/Share	0 ML/Share	N/A	1 ML/Share
Regulated River (High Security) (Research)	1 ML/Share	0 ML/Share	N/A	1 ML/Share
Regulated River (High Security) (Town Water Supply)	1 ML/Share	0 ML/Share	N/A	1 ML/Share
Supplementary	N/A	0 ML/Share	N/A	1 ML/Share

Cudgegong details

The Cudgegong is defined as that part of the water source upstream of the upper limit of Burrendong storage (Figure 1).

Extreme events stage and temporary water restrictions (Cudgegong)

The NSW Extreme Events Policy was released in October 2018 and update in August 2023 include drought measures with drought stages. The policy provides 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.

[3] Specific general security licences in the Cudgegong catchment, listed in the Water Sharing Plan schedule, are permitted to carryover volumes as listed in the schedule. These volumes exceed those resulting from the carryover rule.

Table 4 outlines the conditions that may be associated with different stages of criticality for surface water quantity. Further information is available at

https://water.dpie.nsw.gov.au/

Table 4: 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
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

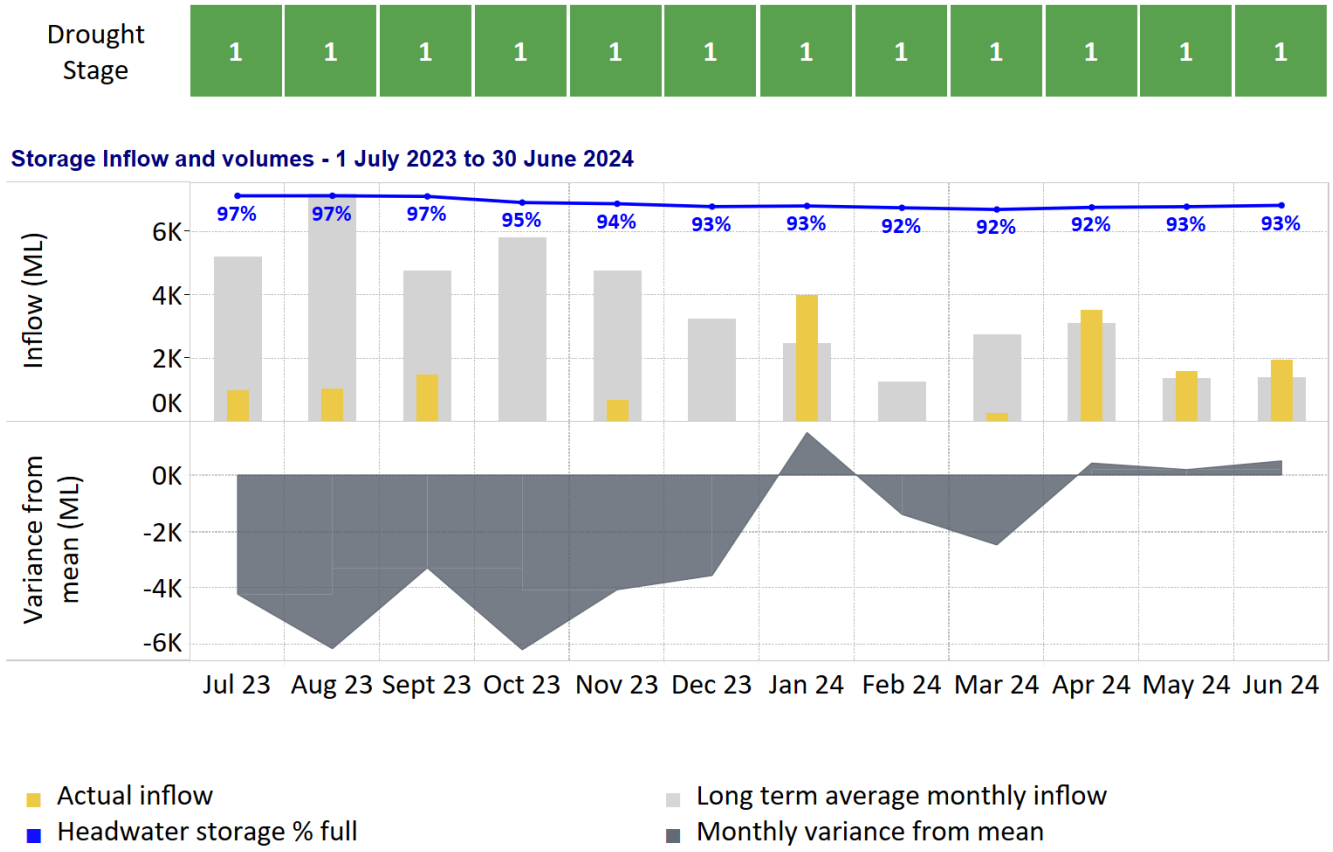
Temporary water restrictions for the reporting period

No temporary water restrictions were enforced within the Cudgegong Regulated River water source throughout the reporting period.

Extreme events stage

The Cudgegong Regulated River Water Source was in stage 1 (normal management) for the entire reporting period (Figure 18).

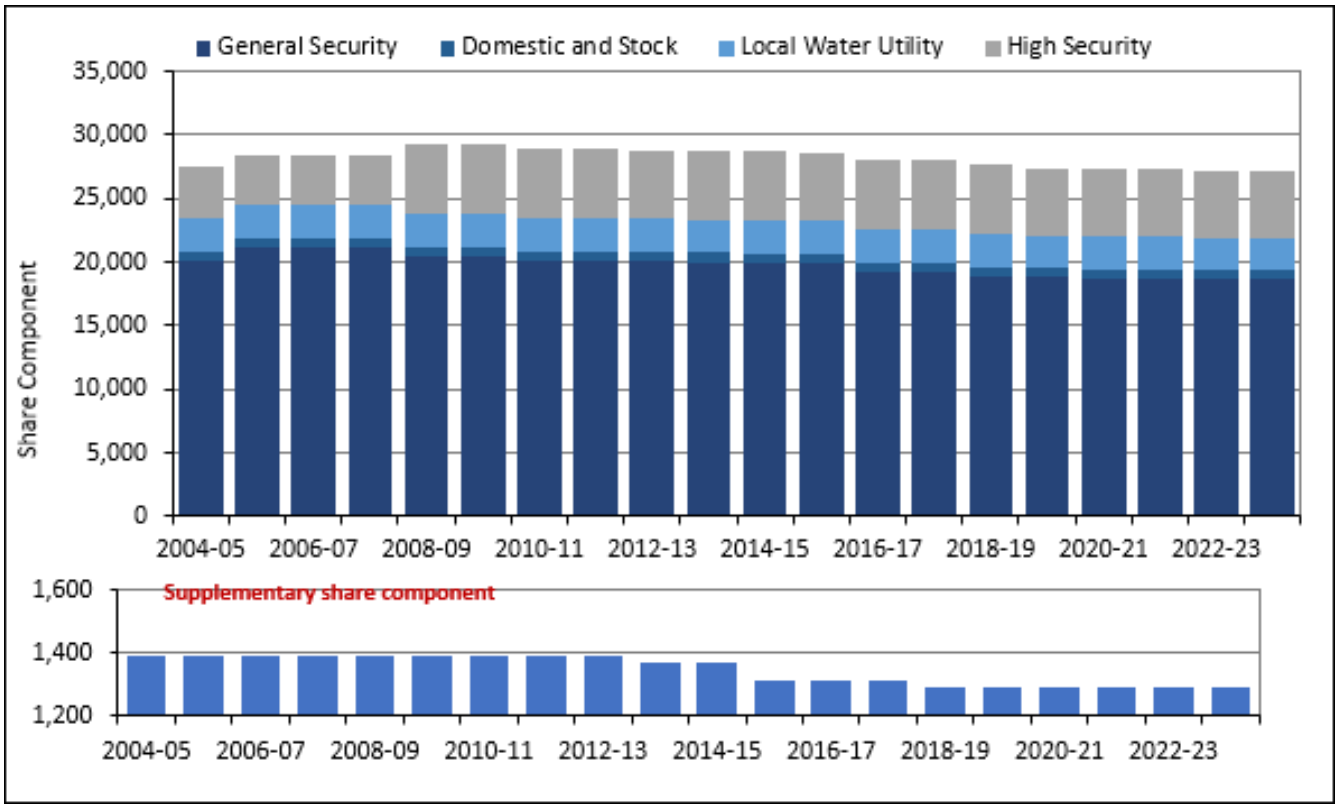
Figure 18: Drought stage for the reporting period referenced with monthly headwater storage inflow and long-term monthly inflow mean (Windamere Storage)



Access rights

- General Security shares decreased by 101 shares in the reporting period. These shares were moved to the Macquarie (Figure 19).
- Domestic and Stock shares decreased by 8 shares in the reporting period due to cancelled licences.
- The total issued shares at the end of the reporting period was 28,529 including 1,290 shares of supplementary access licences.

Figure 19: Cudgegong share component since the commencement of the water sharing plan



Allocation account summary

A summary illustration of the accounting for General Security, High Security and Local Water Utility access licence categories in the Cudgegong is provide in Figure 20, Figure 21 and Figure 22 respectively. Detailed information on the water accounts for all categories of licence issued are provided in Note 1 of this report.

Figure 20: Annual water account summary Cudgegong General Security

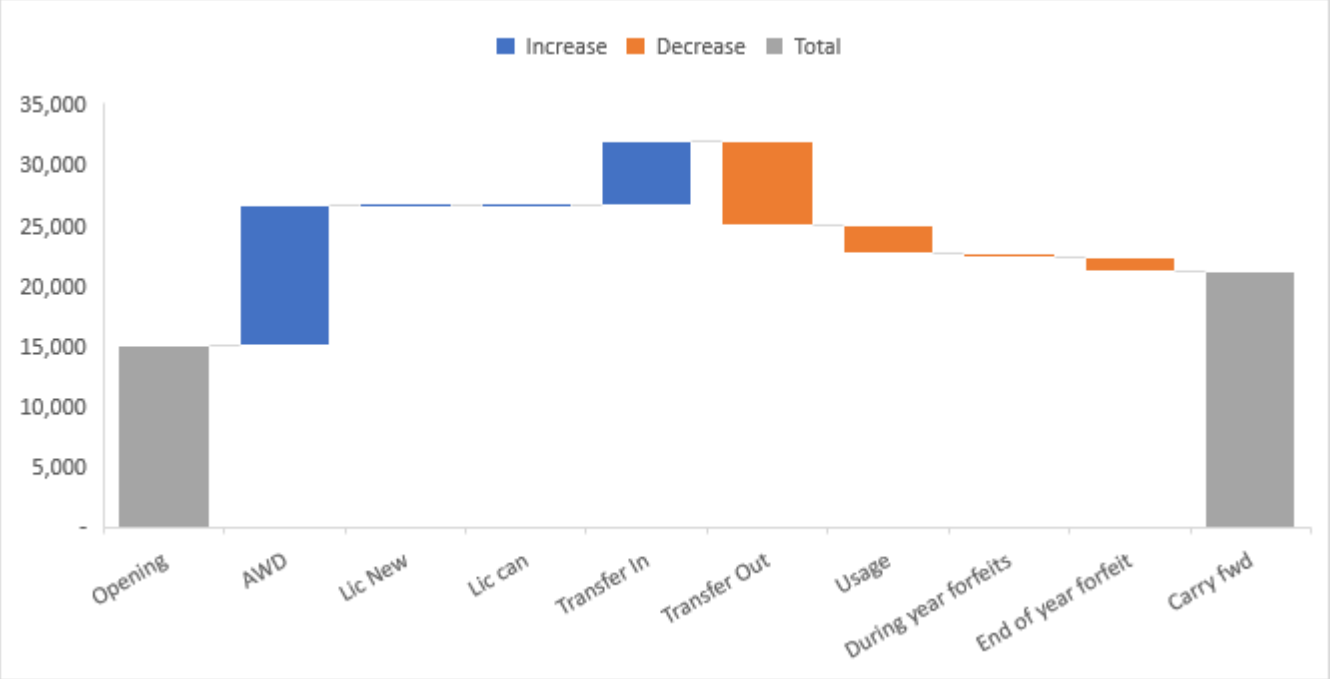


Figure 21: Annual water account summary Cudgegong High Security (includes sub-categories)

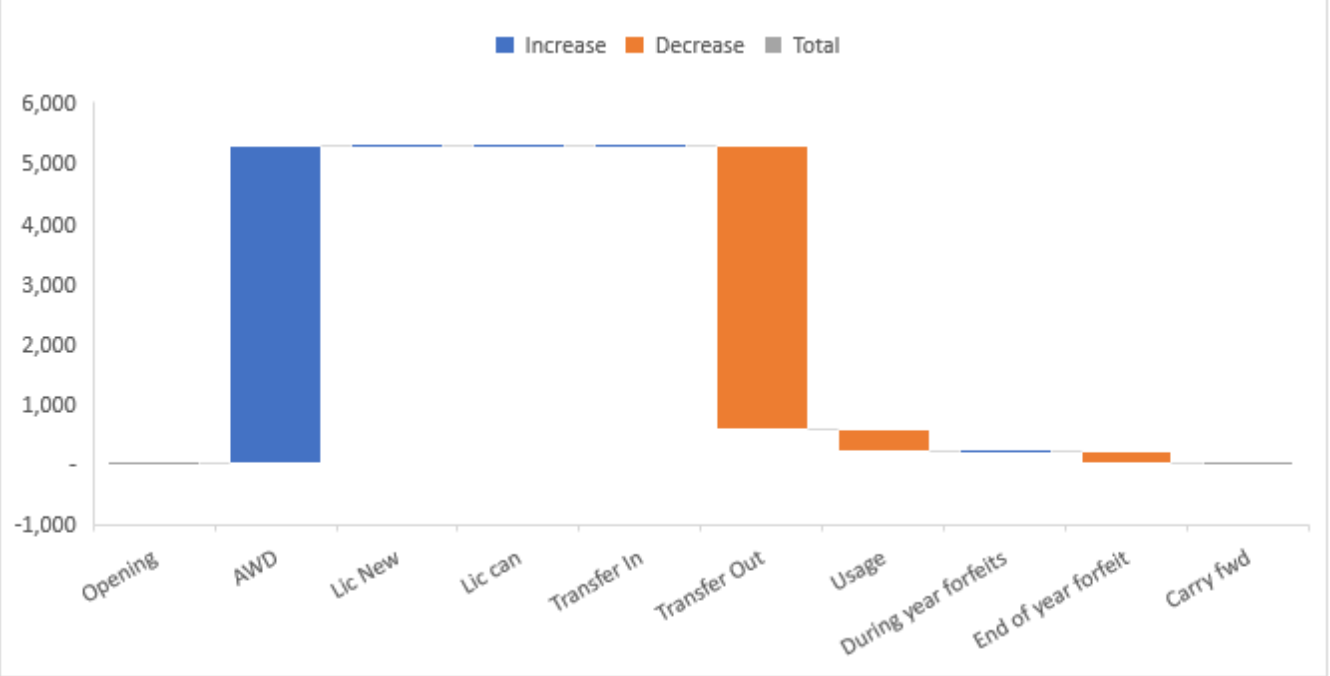
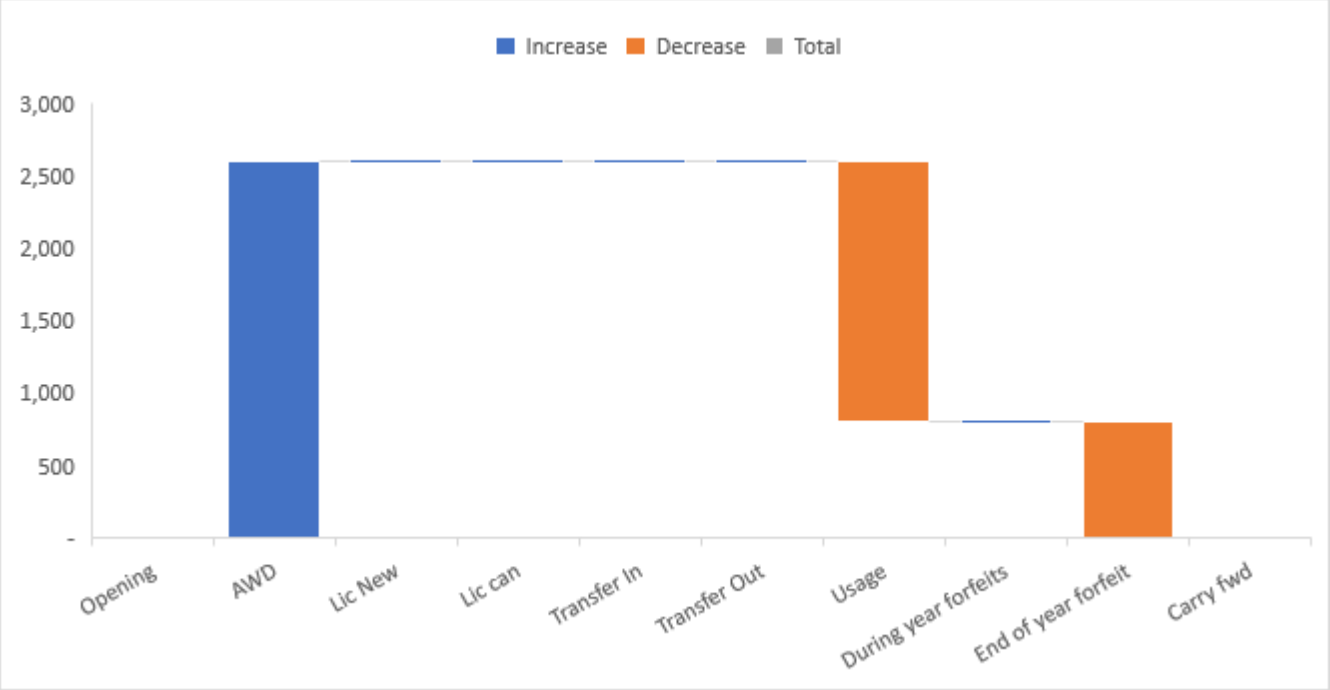


Figure 22: Annual water account summary Cudgegong Local Water Utility



Water availability

- The opening available water determination (AWD) for domestic and stock (including subcategories and local water utility was the maximum permitted allocation of 100%.
- The opening AWD for the specific purpose high security licence sub-categories of 'research' was the maximum permitted allocation of 100%.
- The opening AWD for high security was 1 megalitres per share being the maximum permitted allocations.
- General security access licences had a carryover of 14,940 megalitres into the reporting period, equating to 80% of issued share component for this category (in the Cudgegong).

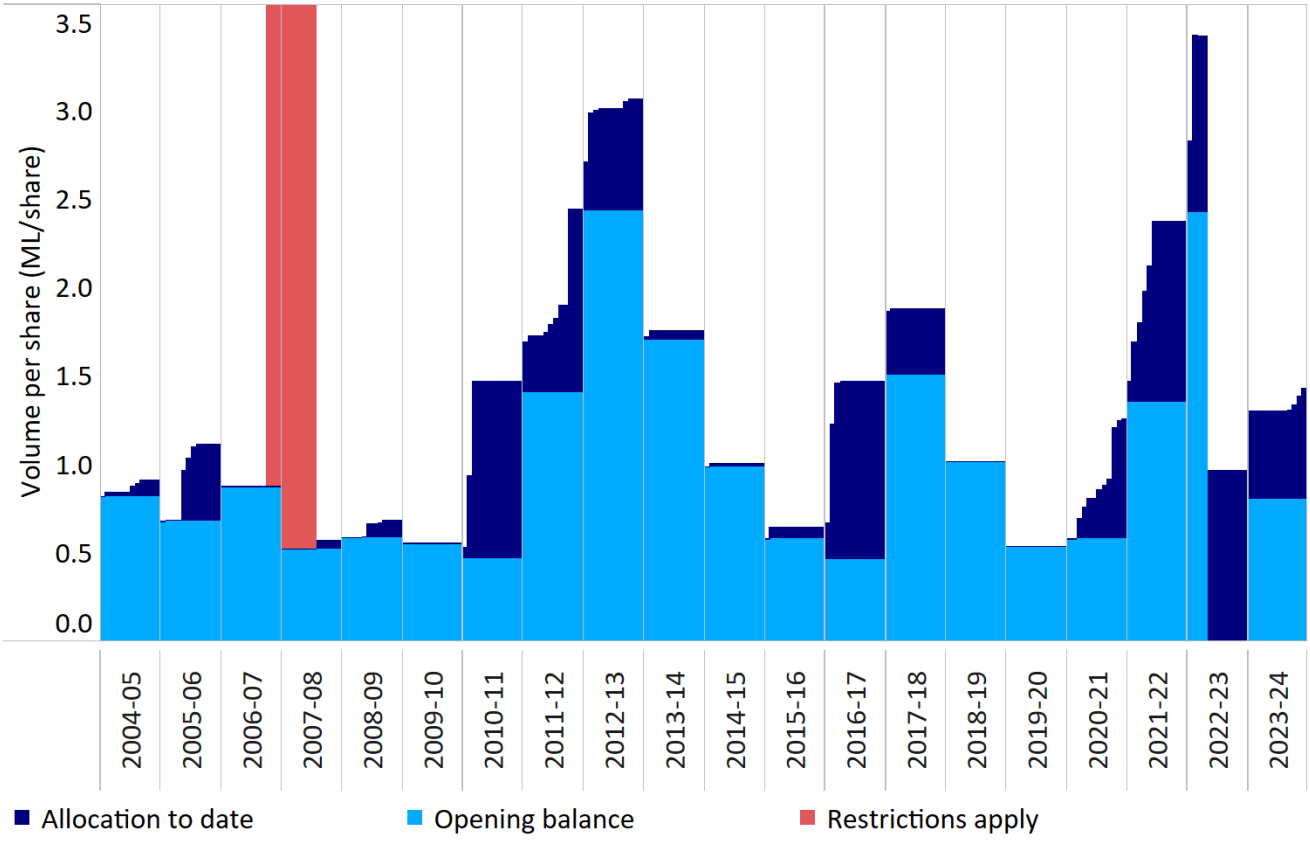
General security access licence received an opening available water determination of 0.37 megalitres per share, further announcements were made on, 15 August 2023 of 0.02 megalitres per share , 15 September 2023 of 0.05 megalitres per share , 03 October 2023 of 0.02 megalitres per share , 15 December 2023 of 0.08 megalitres per share , 02 January 2024 of 0.06 megalitres per share , 15 January 2024 of 0.06 megalitres per share, 01 February 2024 of 0.34 megalitres per share , bringing the cumulative total to 1 megalitres per share. Carryover and AWD allocation as a proportion of share for the reporting period and historical water sharing plan management are illustrated in Figure 23.

- Supplementary licence holder received an AWD of 1 megalitre per share. Each year of the plan this licence category has been granted an available water determination

of 1 megalitre per share, however access to this water is contingent on high flow events available. Actual usage information against this category of licence is available in Note 20 of this GPWAR.

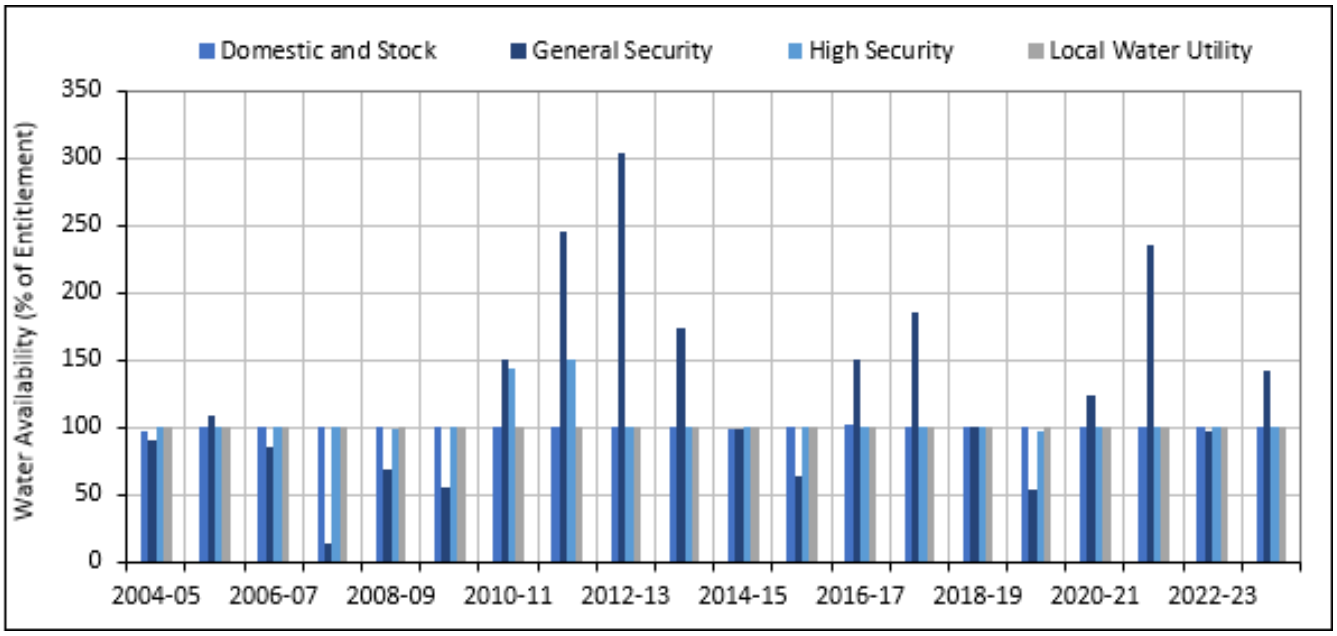
- Total water availability[4] was the highest since 2021–22 (Figure 24)
- There were no Spill allocation adjustments in the reporting period. Storage spill allocations adjustments occurred in 2010–11, 2011–12, 2016–17, 2021-22 and 2022-23 (full reset of allocation accounts to 1 megalitre per share). Refer to Note 5 (detailed item notes) for more information on this accounting process.

Figure 23: Incremental available water determination and carryover volumes for Cudgegong General Security as a proportion of share component



[4] Supplementary licences have been excluded. Includes all access licences issues under the water sharing plan and therefore held environmental water. Includes credits and debits resulting from account spill reset (see disclosure note 5 for details). At the commencement of the water sharing plan (2004-05) water held in general security accounts was allowed to be brought forward as an opening balance.

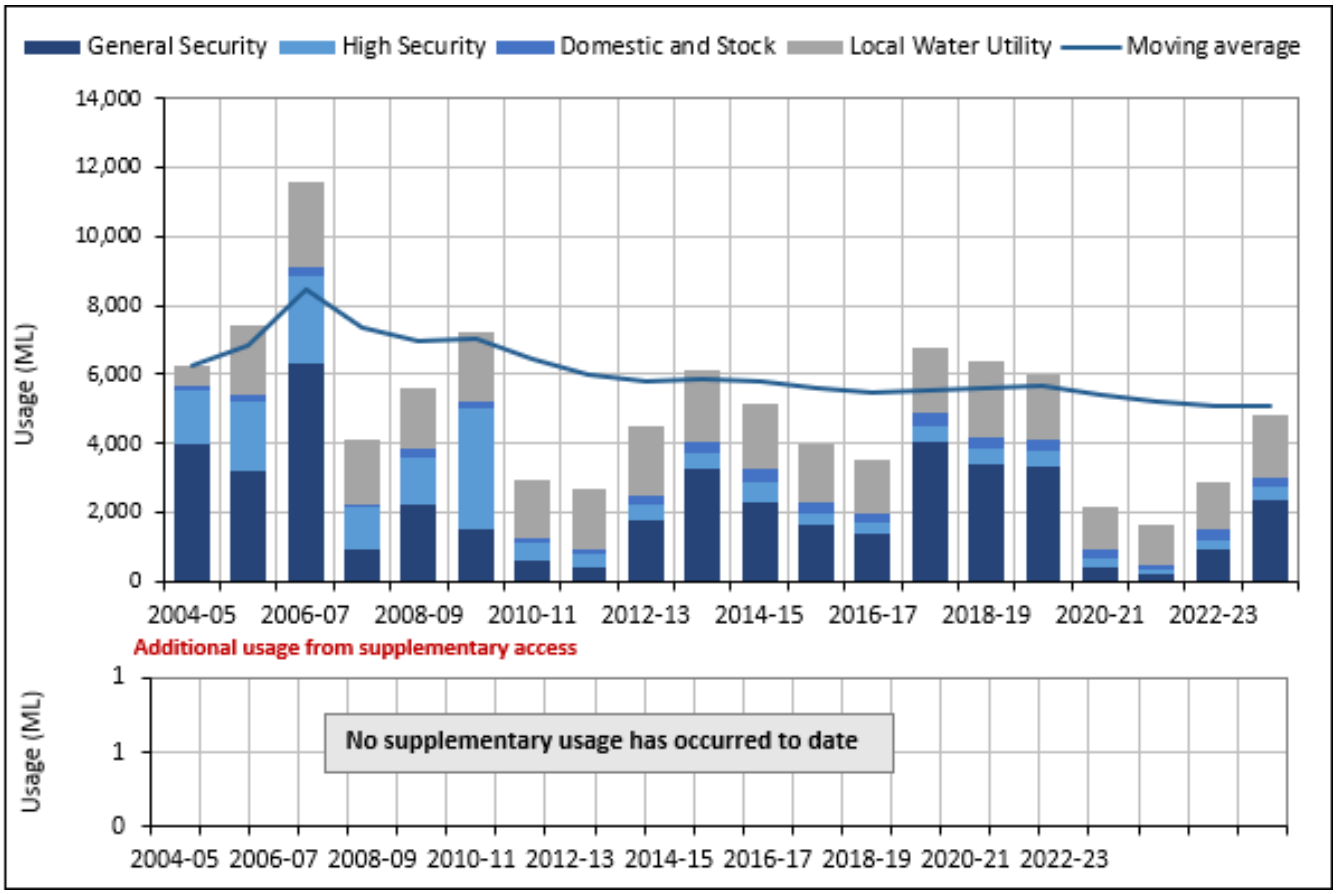
Figure 24: Cudgegong account water availability (carryover + available water determinations)



Account usage

- Water usage in the Cudgegong was 66% greater than previous water year with 4,826 megalitres debited against licence accounts (Figure 25).
- No supplementary usage has occurred in the Cudgegong under water sharing plan management conditions (commencing 2004-05).
- The average usage (since 2004-05) decreased moderately to 5,092 megalitres.

Figure 25: Cudgegong annual usage against moving average usage



Utilisation and inactive share

The percentage of inactive licences during the reporting period decreased from the previous reporting period as requirement to order water increased due to the drier conditions in the catchment.

- 12% of General Security share component was inactive for the reporting period, a decrease of 30% from the prior reporting period (Table 5).
- 3% of High Security share component was inactive for the reporting period, an increase of 1% from the prior reporting period.
- Considering all categories of access licence, 10% of All regulated share component was inactive for the reporting period, compared to 30% in the prior reporting period (decrease activity).
- 100% of Supplementary water share component was inactive for the reporting period, an increase of 54% from the prior reporting period.

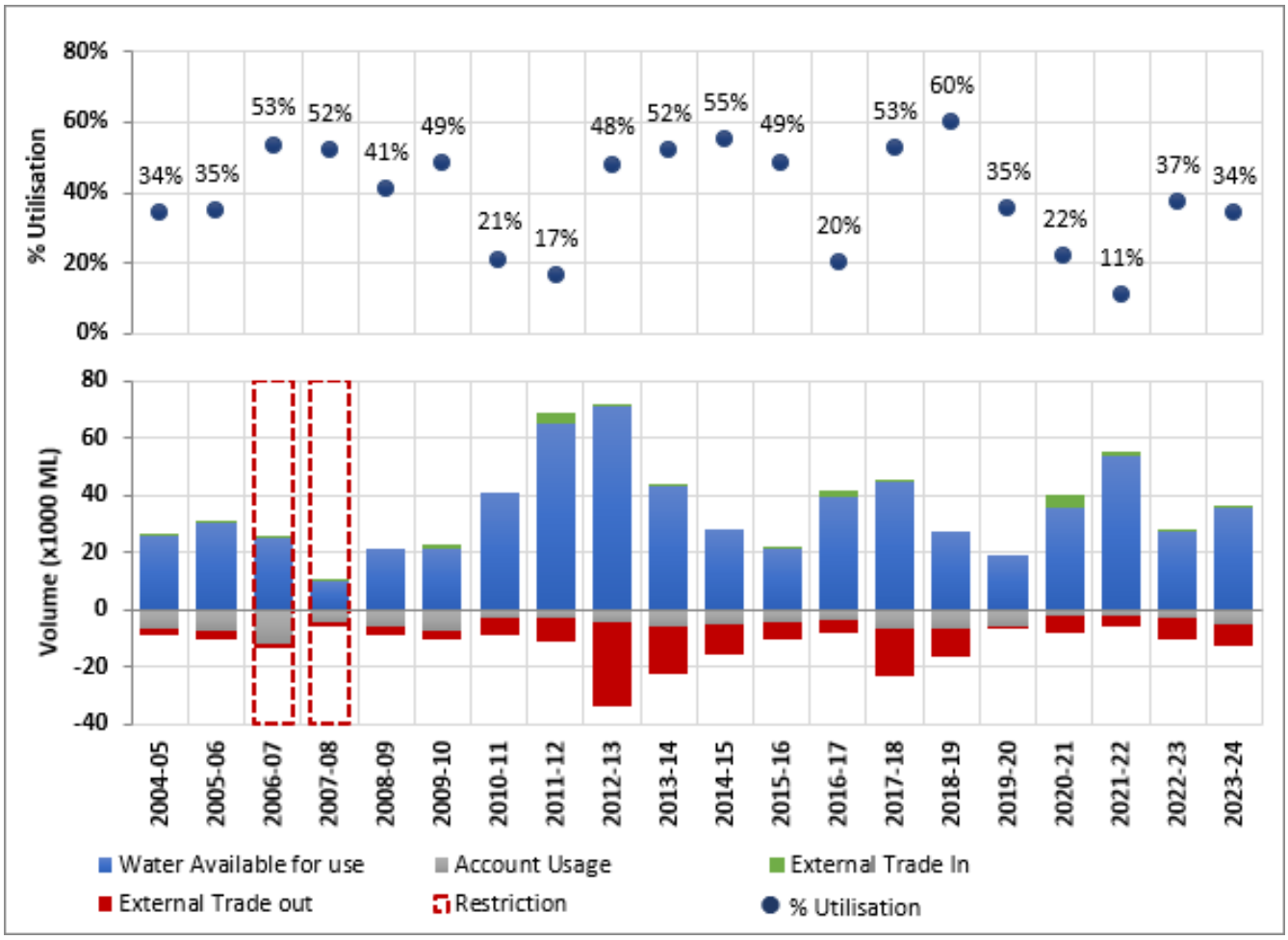
- Utilisation[5] of available water from regulated supplies (excluding supplementary) decreased from 37% to 34% (Figure 26).

Table 5: Inactive licence summary Cudgegong

Licence Category	Inactive licences (number)	Inactive share component	Sum of % of Total	Sum of % of total share (prior year)
Domestic and stock	26	248	38%	51%
Domestic and stock [domestic]	9	23	100%	100%
Domestic and stock [stock]	3	15	100%	100%
High Security	6	162	3%	2%
High security [research]	1	1	100%	100%
Local water utility	0	0	0%	0%
General Security	60	2,244	12%	42%
Regulated Supply Total	105	2,693	10%	30%
Supplementary water	88	1,290	100%	46%

[5] An access licence is considered inactive if the holding does not use water or engage in the temporary trading market for the reporting period. Utilisation reflects the amount of water used, relative to the maximum available for use.

Figure 26: Cudgegong percentage utilisation (water availability plus trade in from external water source against account usage and trade out to external water source)

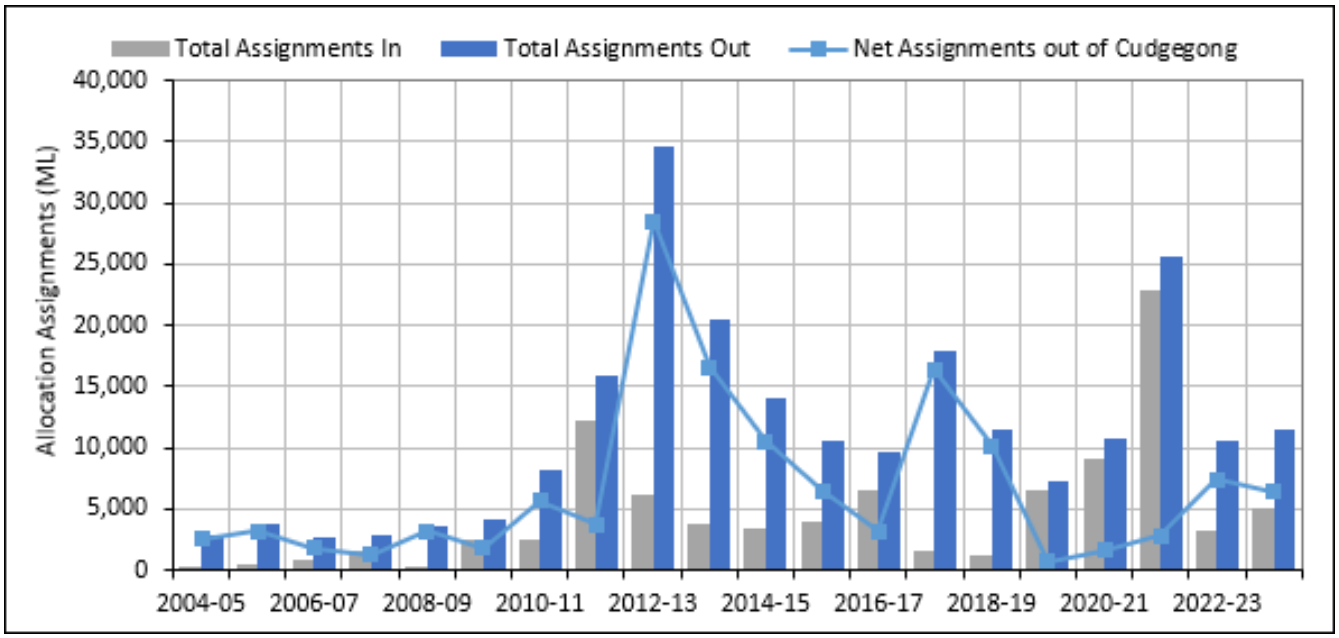


Temporary trading (allocation assignments)

Temporary trading is implemented in this water source under the clause 71T (assignment of water allocations between access licences) of the NSW *Water Management Act 2000*.

- Trade activity by volume was 9% higher than the previous year
- 5,158 megalitres was traded into Cudgegong access licences and 11,566 megalitres was traded out of access licences, a net assignment out of 6,408 megalitres (to the Macquarie). (Figure 27).

Figure 27: Cudgegong allocation assignment (temporary trading) summary



Commercial temporary trading statistics (assignment of allocation)

- A total of 57 transactions were processed for commercial consideration.
- The average price was $256 per megalitre, a 118% increase on the prior year ($117 per megalitre).
- The maximum price paid for water was $350 per megalitre. (Figure 28).
- The total market value of temporary commercial trade was $1,248,282, which represents a 163% increase from the previous year's market value. (Figure 29)

Figure 28: Cudgegong allocation assignments — trade price statistics

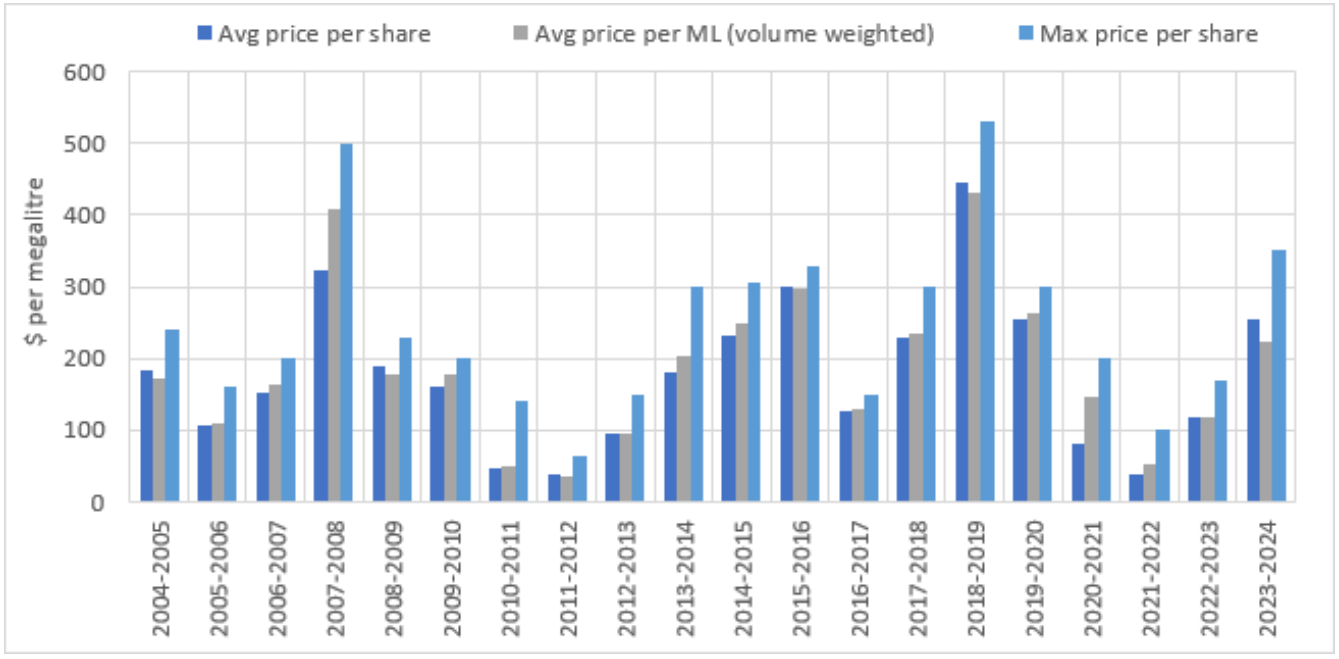
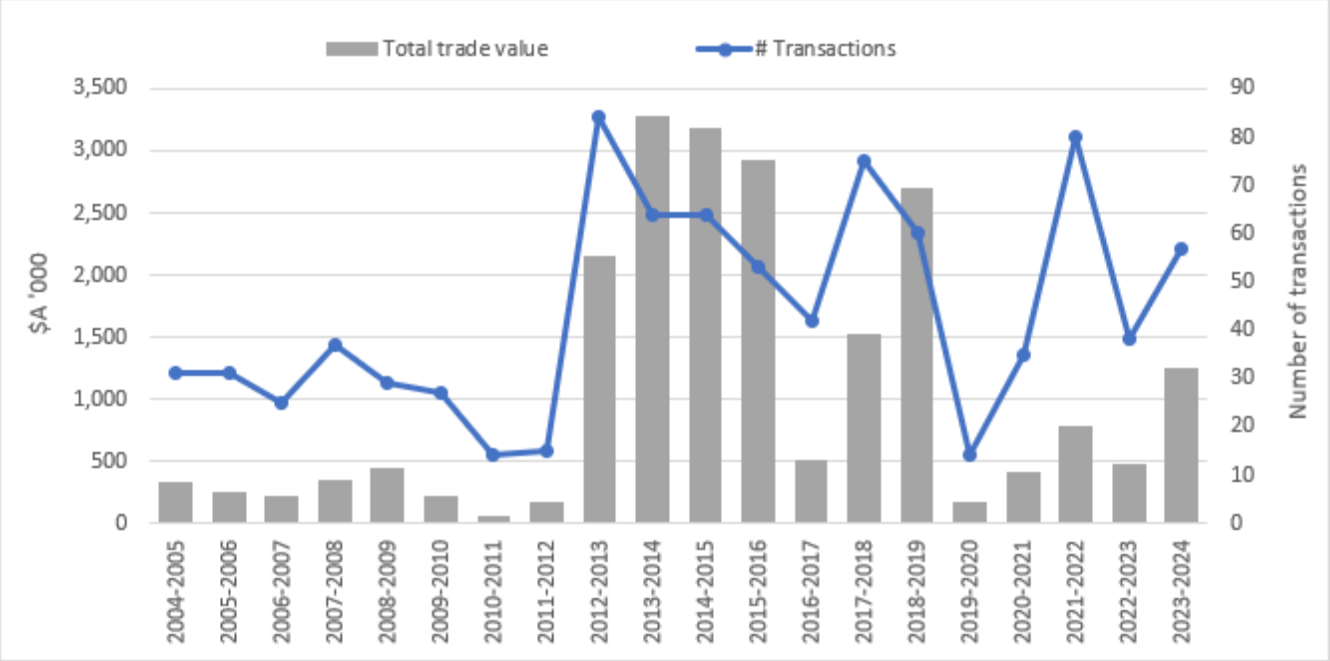


Figure 29: Cudgegong allocation assignments — trade value statistics



Commercial statistics, permanent trading (share assignments and transfer of licence)

Division 4 (dealings with access licences) of the water management act 2000 allows for a range of dealing options that permanently effect the title of the water access licence. Two of the more common dealing practises under this division are assignments of rights under access licences (clause 71Q) and transfer of access licences (clause 71M). With consideration to these dealing types from a commercial perspective[6]:

- In general the market is relatively inactive in the Cudgegong, with 71Q dealings never exceeding 5 transactions in any water year
- Average Price and maximum price per share for the General security and High security access licence categories are shown in Figure 30 and
- Figure 32 respectively
- There were no General Security permanent assignments processed during the reporting period.(Figure 31)
- There were no High Security permanent assignments processed during the reporting period.
- For the reporting period there were 5 transfer of licence holder that occurred for commercial purposes totalling 157 shares. (
- Figure 33).

[6] Considers only those transactions associated with a consideration greater than $1 per share

Figure 30: Commercial share assignment price statistics, General Security, Cudgegong

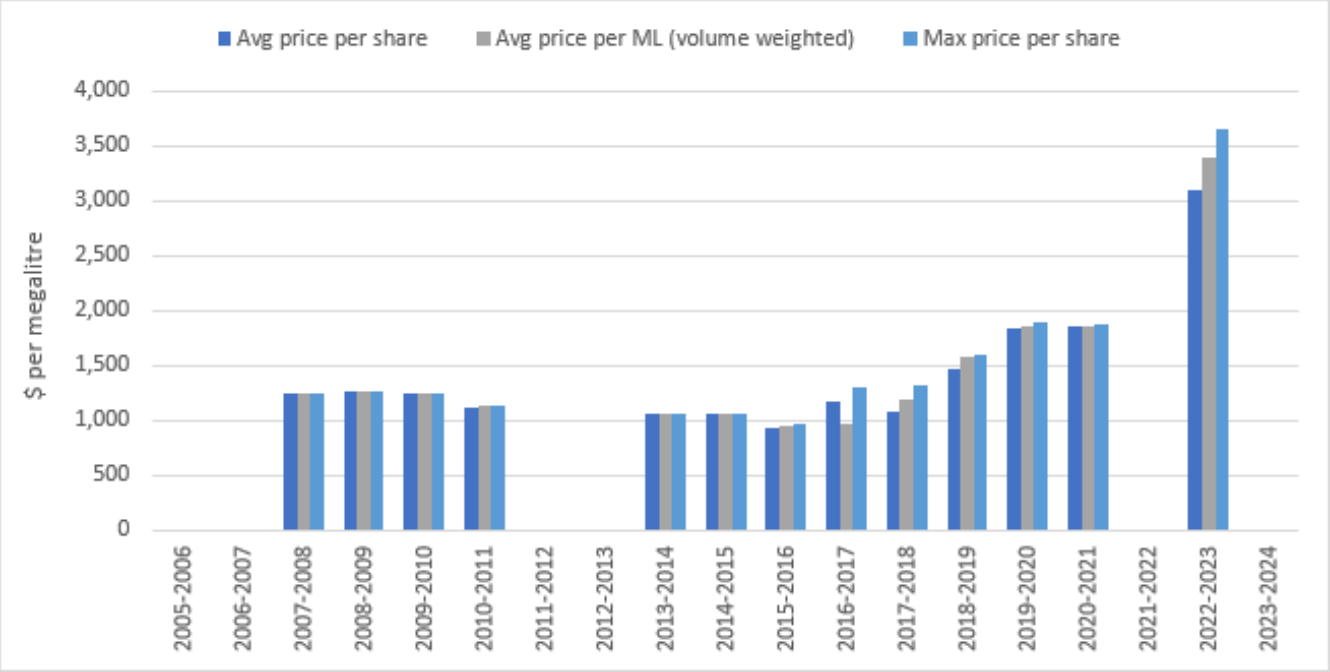


Figure 31: Commercial share assignment value statistics, General Security, Cudgegong

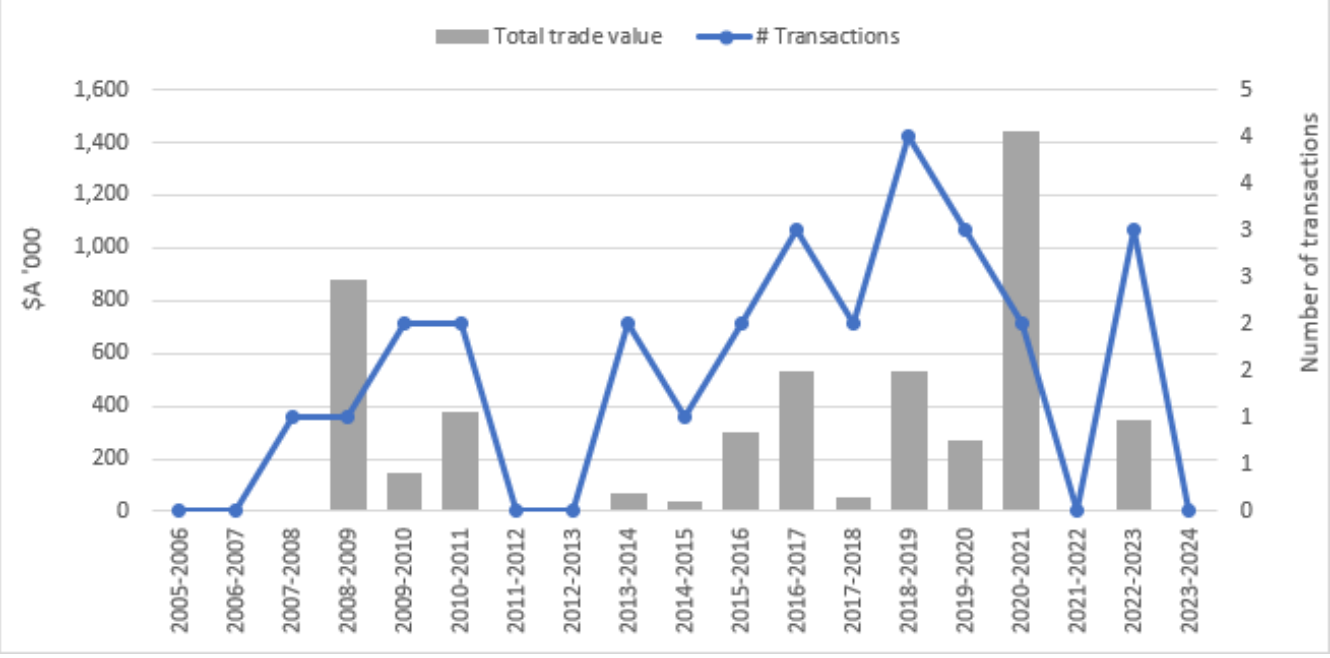


Figure 32: Commercial share assignment price statistics, High Security, Cudgegong

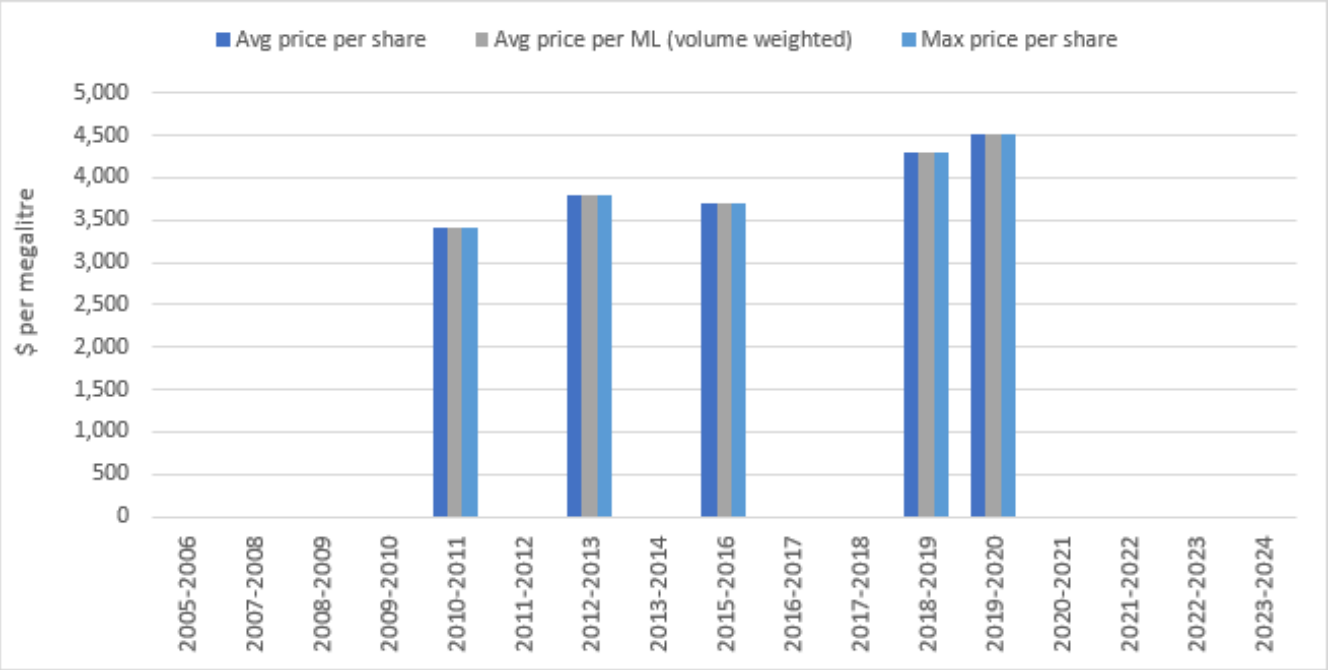
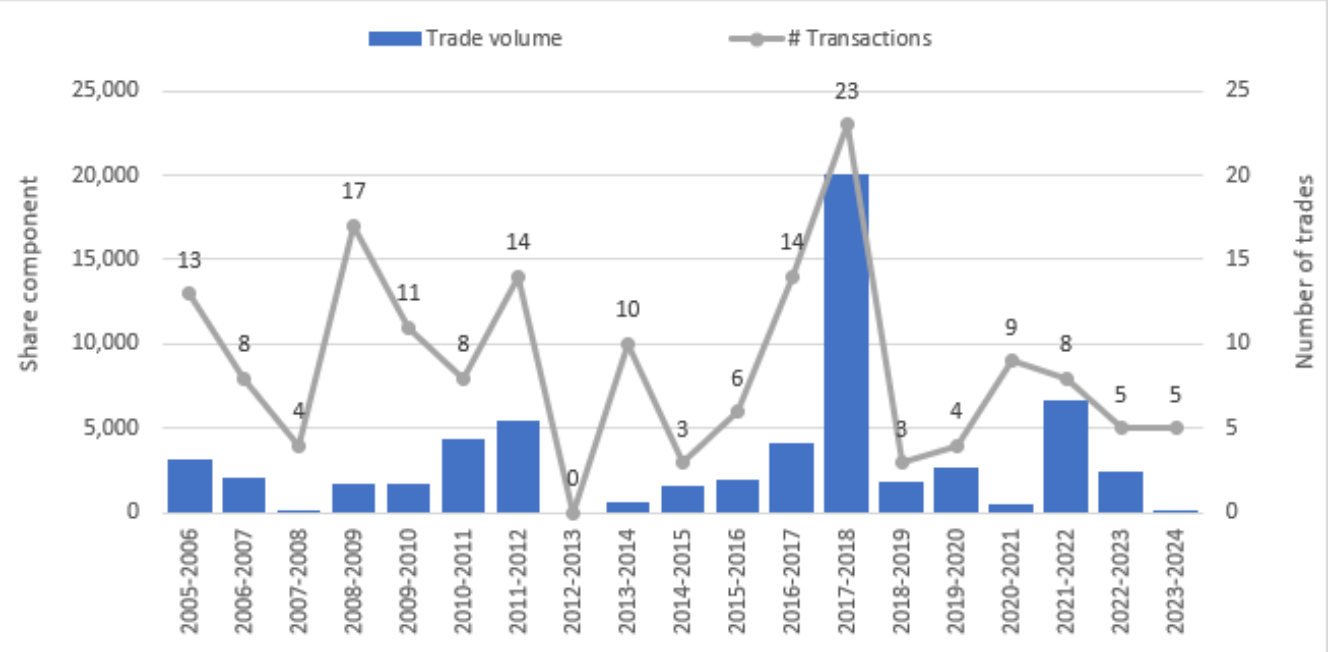


Figure 33: Commercial change of holder transactions—Cudgegong



Macquarie details

The Macquarie is defined as that part of the water source downstream of the upper limit of Burrendong storage (Figure 1).

Extreme events stage and temporary water restrictions (Macquarie)

Background on the NSW extreme events policy and temporary water restrictions is provided under “Extreme events stage and temporary water restrictions (Cudgegong)” of this document.

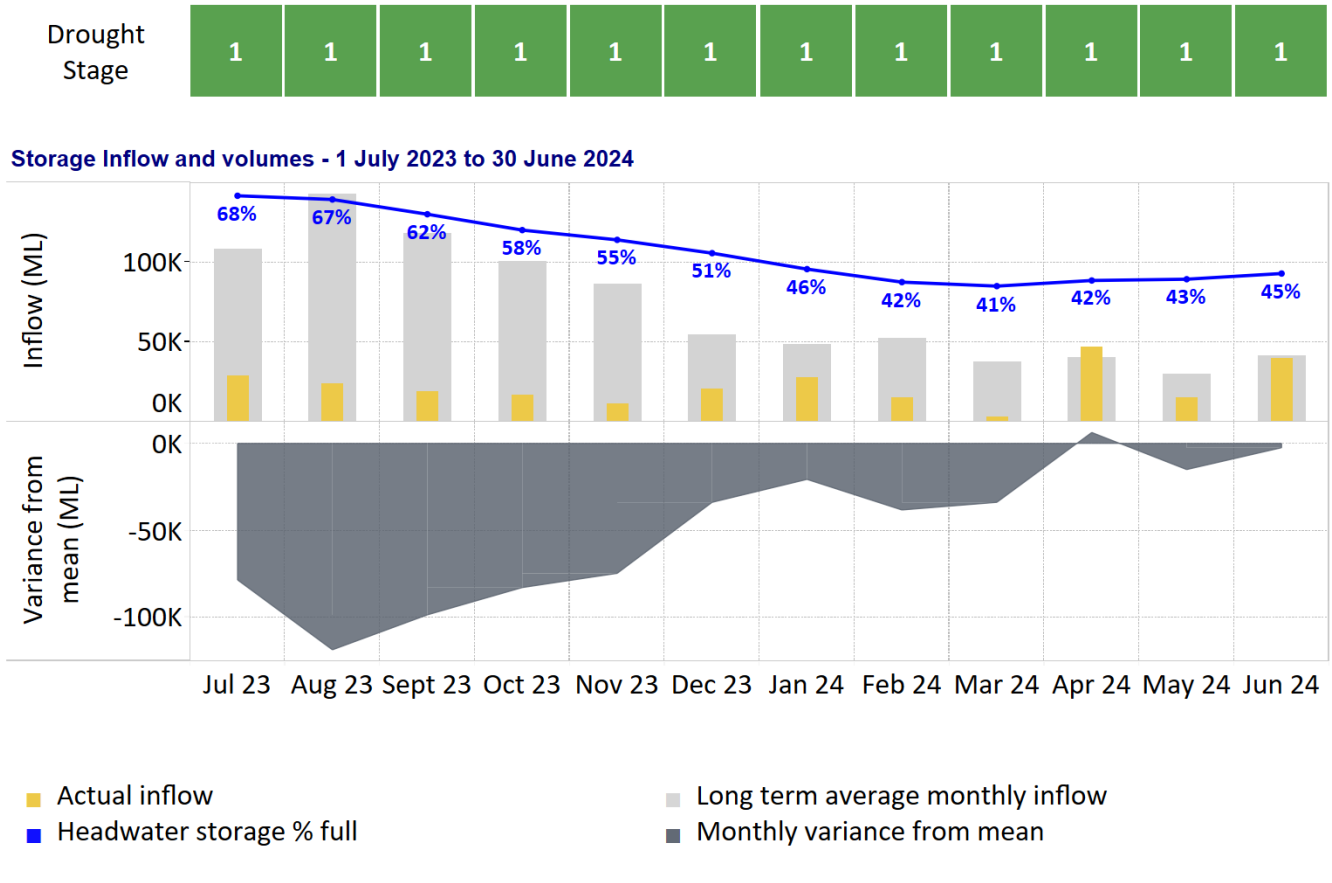
Temporary water restrictions for the reporting period

No temporary water restrictions were enforced within the Macquarie Regulated River water source throughout the reporting period.

Extreme events stage

- The Macquarie Regulated River Water Source was in stage 1 (normal management) for the entire reporting period (Figure 34).

Figure 34: Drought stage for the reporting period referenced with monthly storage inflow for the reporting period and long-term monthly inflow mean

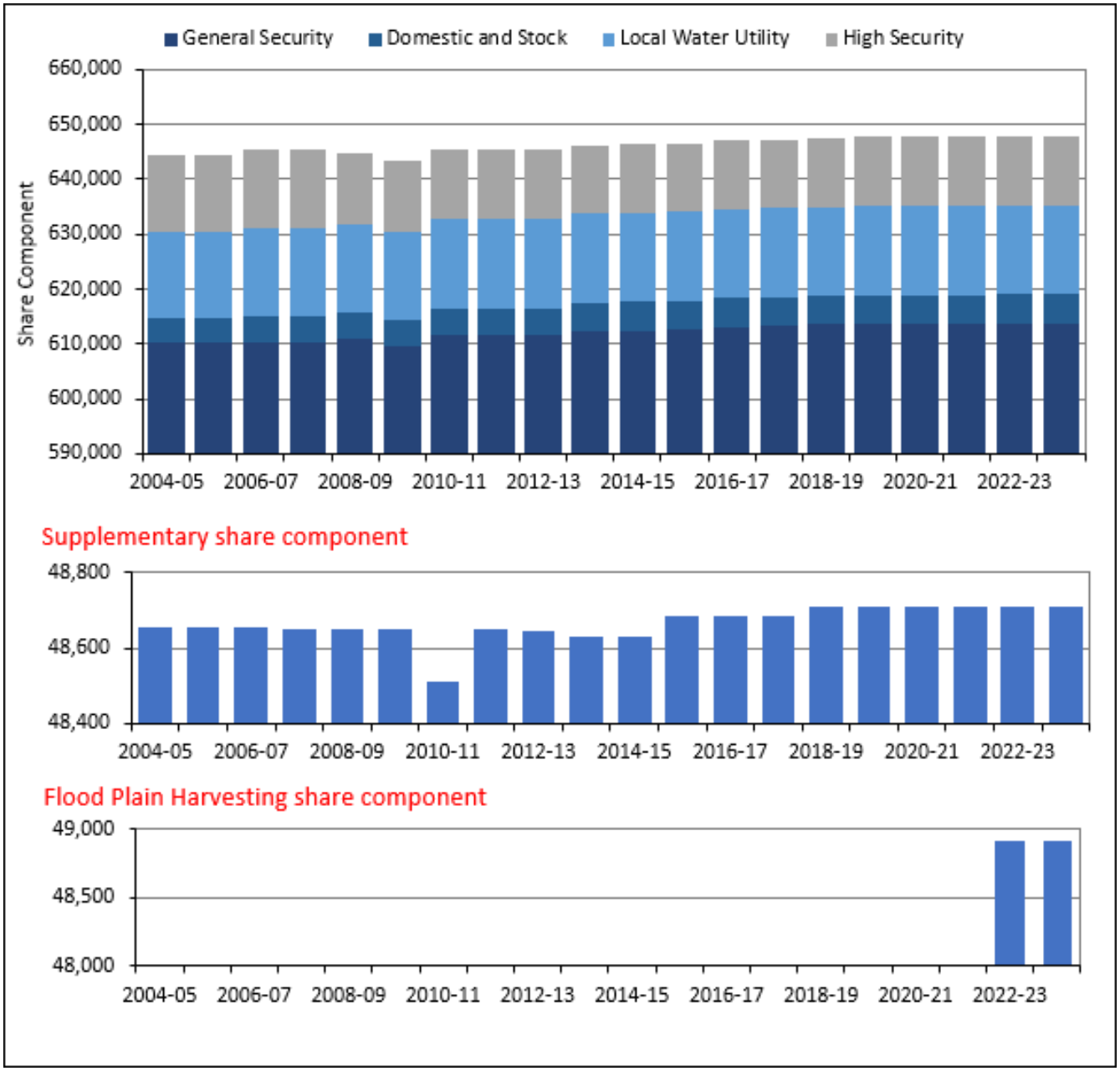


Access rights

- Share component of general security in the Macquarie increased by 101 shares in the reporting period traded in from the Cudgegong (Figure 35)).
- Domestic and Stock shares decreased by 8 shares due to the cancellation of a licence.

- The total issued share at the end of the reporting period was 696,582 including 48,708 shares of supplementary access and 48,911 shares of Floodplain harvesting

Figure 35: Macquarie share components end of reporting period



Allocation account summary

A summary illustration of the accounting for Macquarie General Security, High Security and Local Water Utility access licence categories is provide in Figure 36, Figure 37 and Figure 38 respectively. Detailed information on the water accounts for all categories of licence issued are provided in Note 1 of this report.

Figure 36: Annual water account summary Macquarie General Security

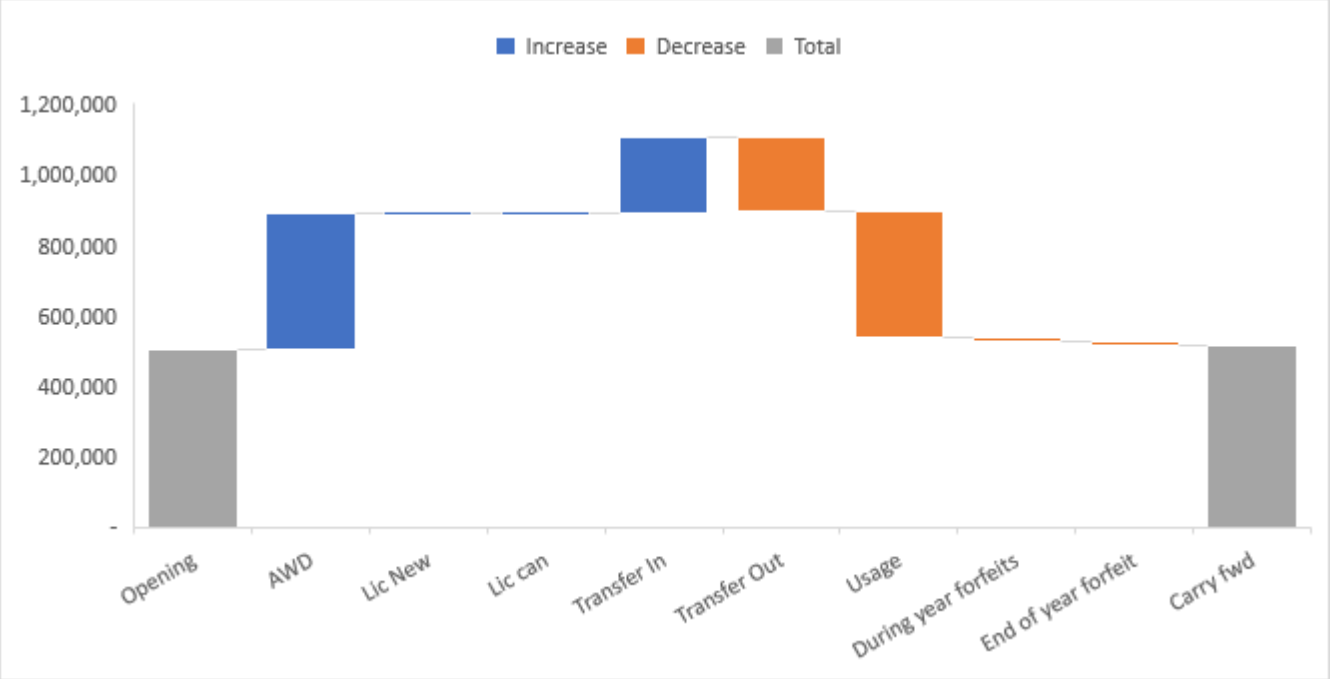


Figure 37: Annual water account summary Macquarie High Security

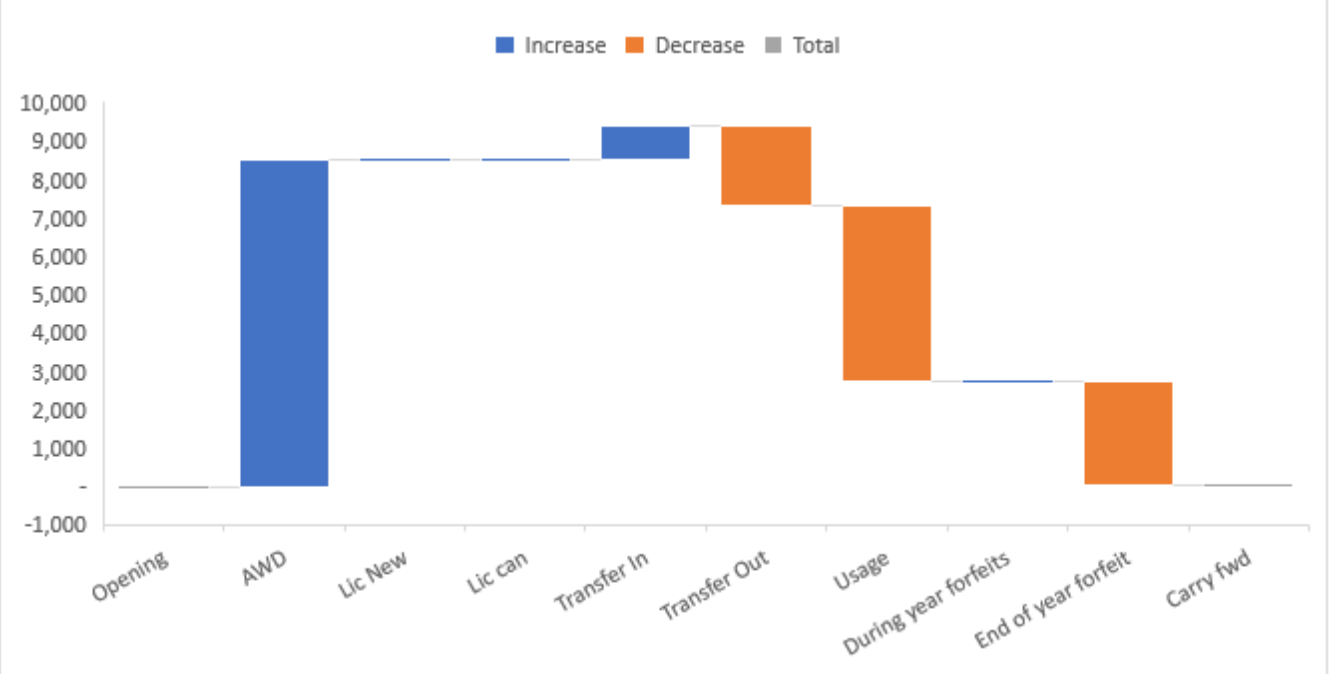
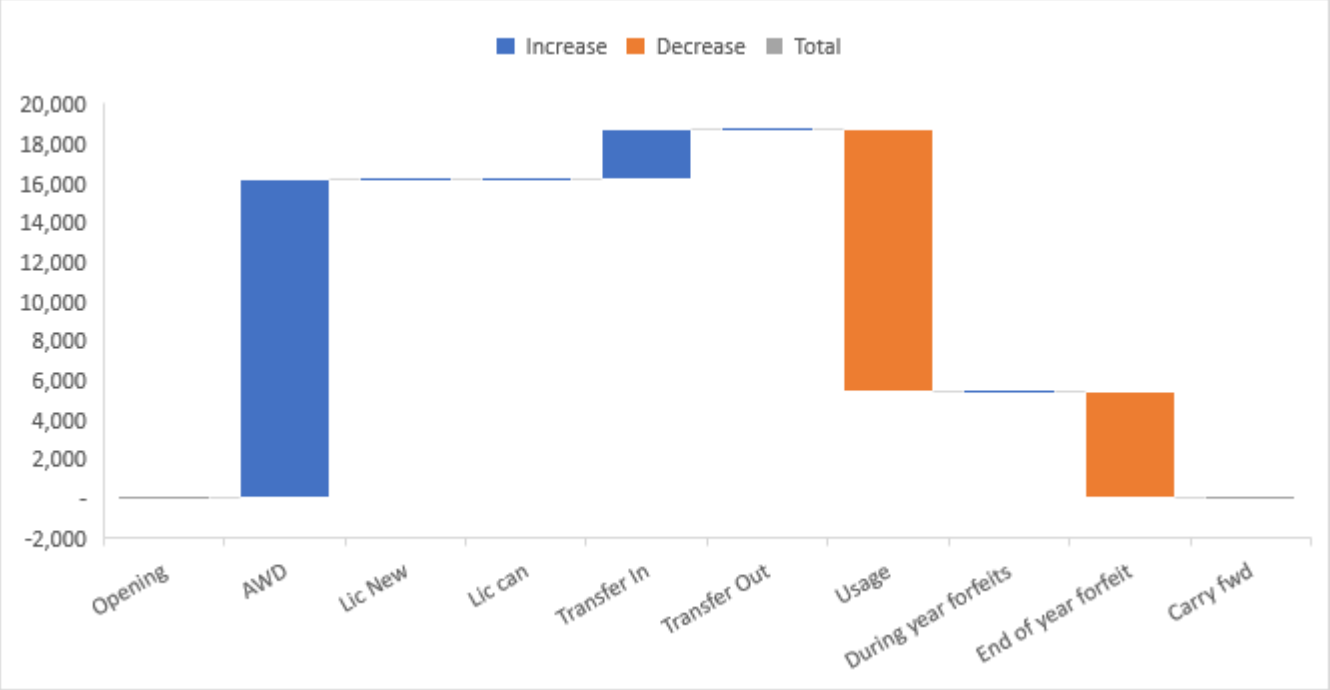


Figure 38: Annual water account summary Macquarie Local Water Utility



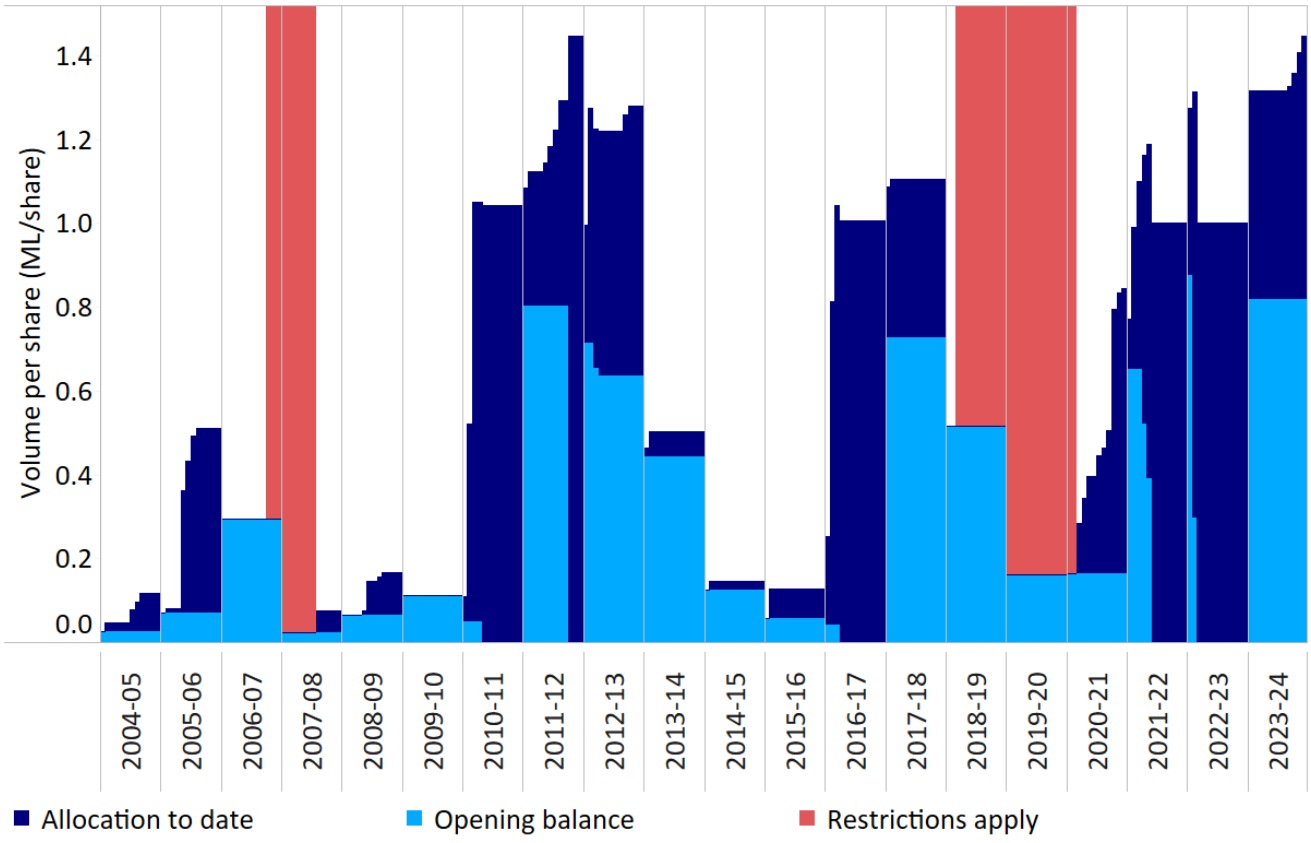
Water availability

- The opening available water determination (AWD) for domestic and stock (including subcategories and local water utility was 100% being the maximum permitted allocation.
- The opening AWD for the specific purpose High Security licence categories of 'town water supply' and 'research' was 100% being the maximum permitted allocation.
- The opening AWD for high security was 1 megalitres per share being the maximum permitted allocation.
- General security access licences had a carryover of 502,063 megalitres into the reporting period equating to 82% of issued share component for this category (in the Macquarie).
- General security access licence received an opening available water determination of 0.0 megalitres per share with further announcements on 12 July 2023 of 0.5 megalitres per share, 12 March 2024 of 0.01 megalitres per share, 11 April 2024 of 0.3 megalitres per share, on 10 May 2024 0.05 megalitres per share and on 13 June 2024 0.4 megalitres per share being made reaching a cumulative total of .630 megalitres per share. Carryover and AWD allocation as a proportion of share for the reporting period and historical water sharing plan management are illustrated in Figure 39.
- Supplementary licence holder received an AWD of 1 megalitre per share. Each year of the plan this licence category has been granted an available water determination

of 1 megalitre per share, however, access to this water is contingent on high-flow events being available. Actual usage information against this category of licence is available in note 20 of this GPWAR.

- Floodplain harvesting access licences received an opening AWD of 1 megalitres per share.
- Total water availability[7] was the highest since 2021–22 (Figure 40)
- No Spill allocation reset was applicable in the reporting period. Storage spill allocations resets occurred in 2010–11, 2011–12, 2016–17, 2021-22, 2022-23 (full reset of allocation accounts to 1 megalitre per share). Refer to Note 5 (detailed item notes) for more information on this accounting process.
- By volume 84 % of the 37,924 megalitres of tributary inflows to the Macquarie River downstream of Burrendong dam was contributed by the Bell River (72 %) and Coolbaggie Creek (12 %) (Figure 41).

Figure 39: Incremental available water determination and carryover volumes for Macquarie General Security as a proportion of share component



[7] Supplementary licences have been excluded. Includes all access licences issues under the water sharing plan and therefore held environmental water. Includes credits and debits resulting from account spill reset (see disclosure note 5 for details). At the commencement of the water sharing plan (2004-05) water held in general security accounts was allowed to be brought forward as an opening balance.

Figure 40: Macquarie account water availability (Carryover + available water determinations)

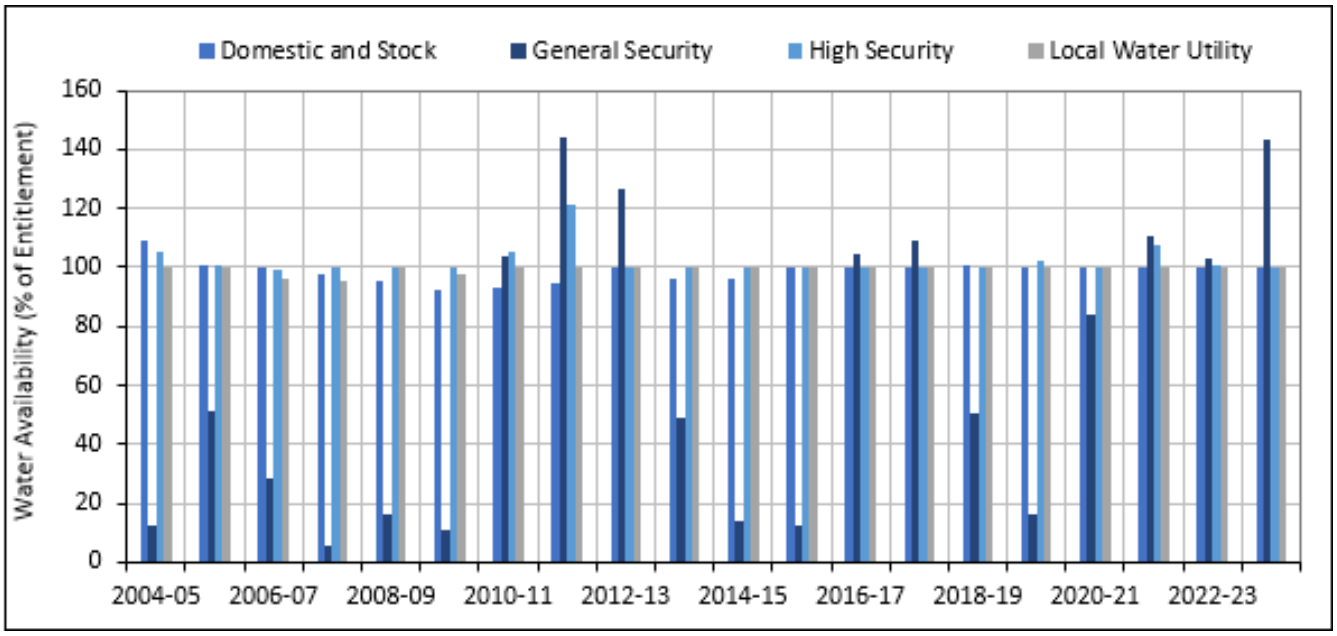
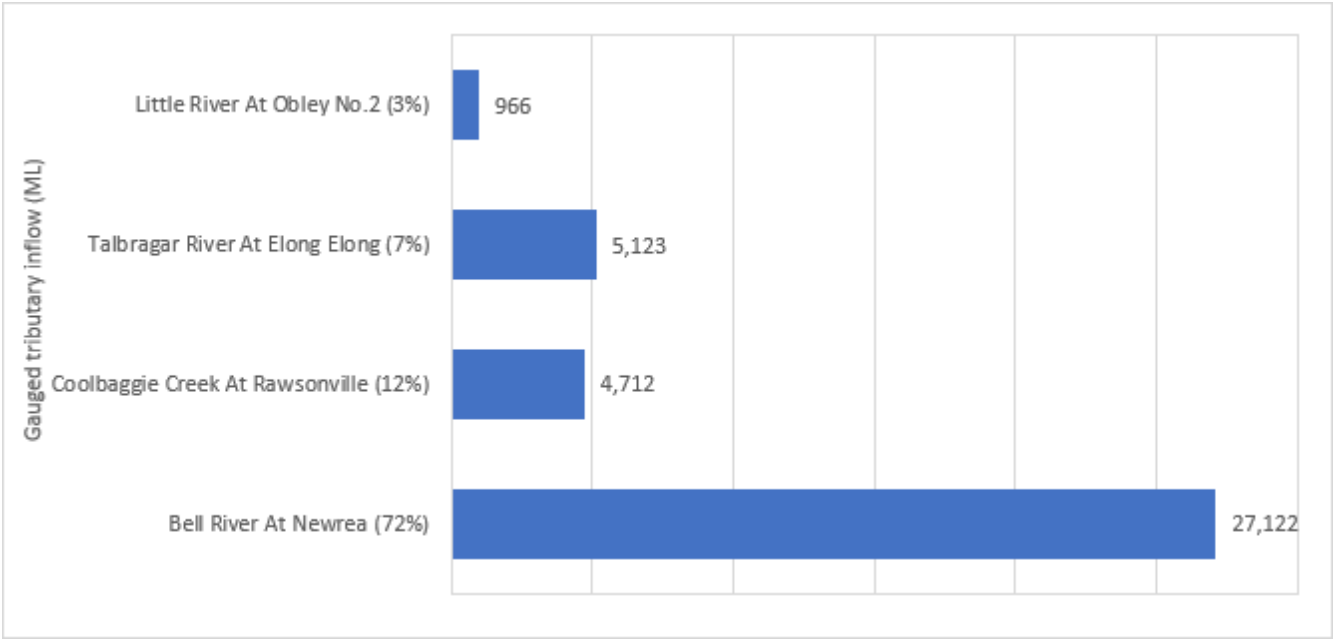


Figure 41: Measured tributary inflow contributions



Account usage

- Water usage from regulated supply in the Macquarie remained steady relative to the previous reporting period, with 381,850 megalitres debited against accounts (Figure 42).
- Water usage from general security was 359,220 megalitres while supplementary usage totalled 0 megalitres being significantly less than the previous water year.

- Average annual usage (since 2004-05) decreased moderately to 183,026 megalitres (regulated supply) per year, or 193,997 megalitres per year including access to supplementary water.
- There was 0 megalitres of floodplain harvesting usage reported during the reporting period.
- At the water source level 0 days of supplementary access was available in the reporting period. Historical and reporting period supplementary access periods are illustrated in (Figure 43)

Figure 42: Macquarie annual usage against moving average usage

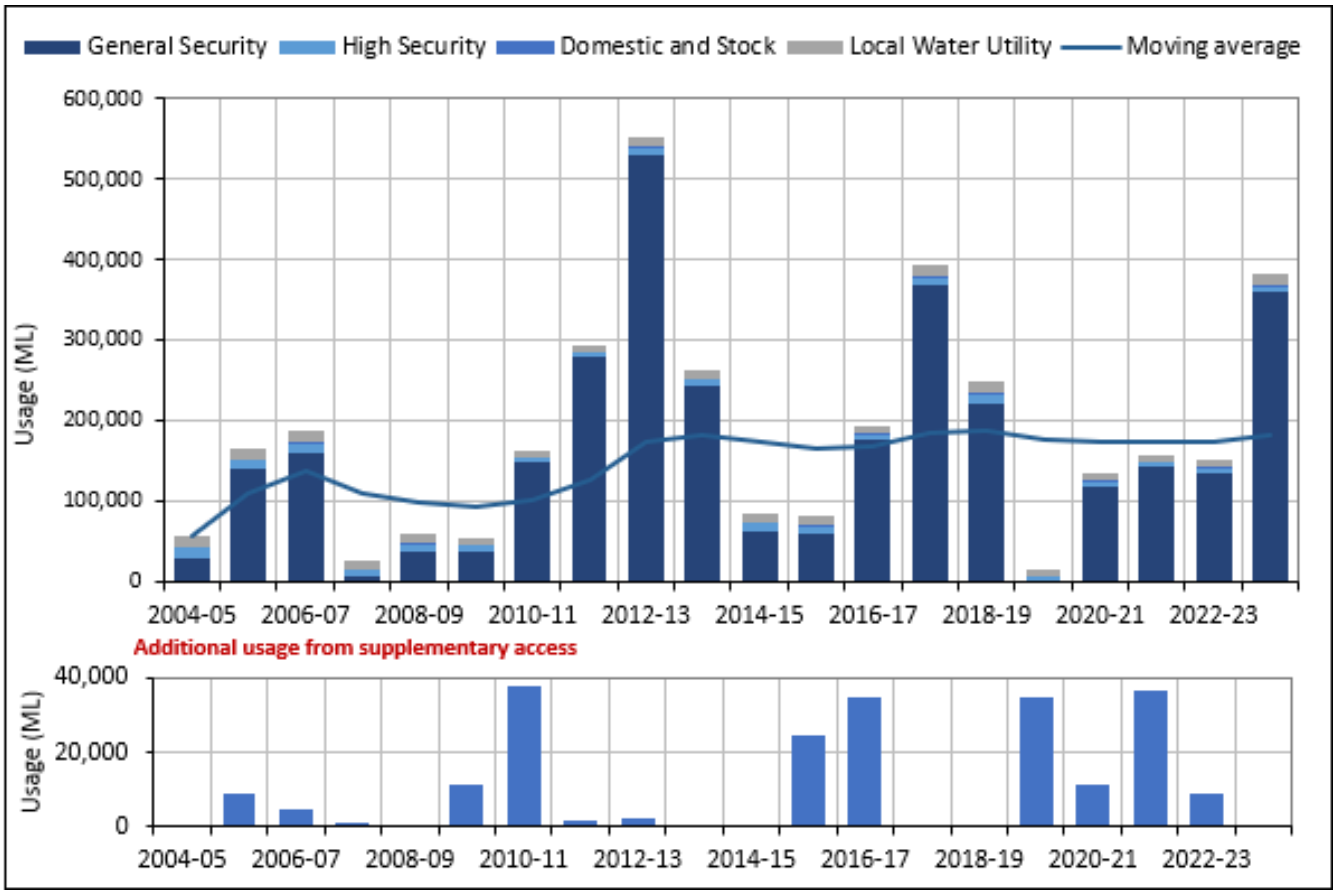
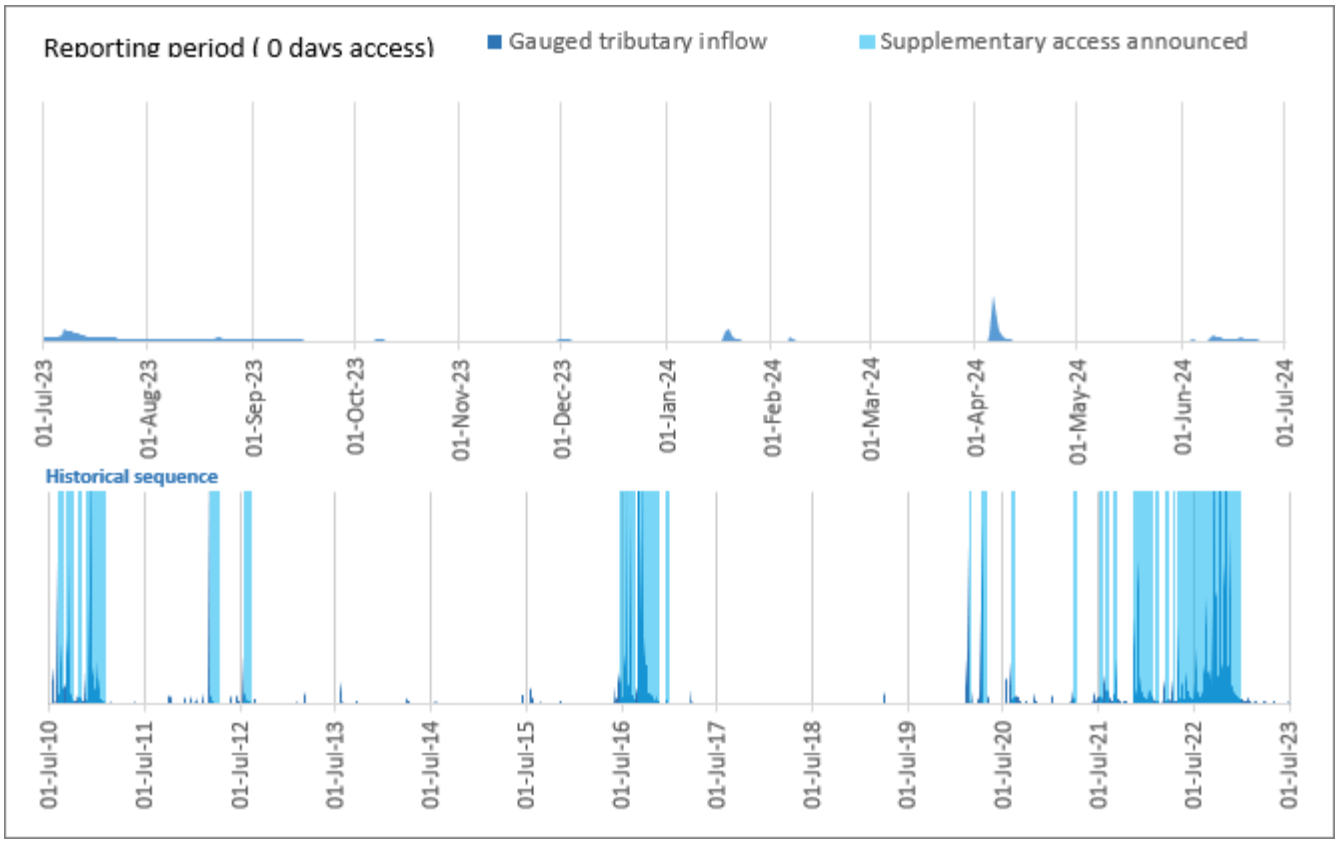


Figure 43: Supplementary event access



Utilisation and inactive share

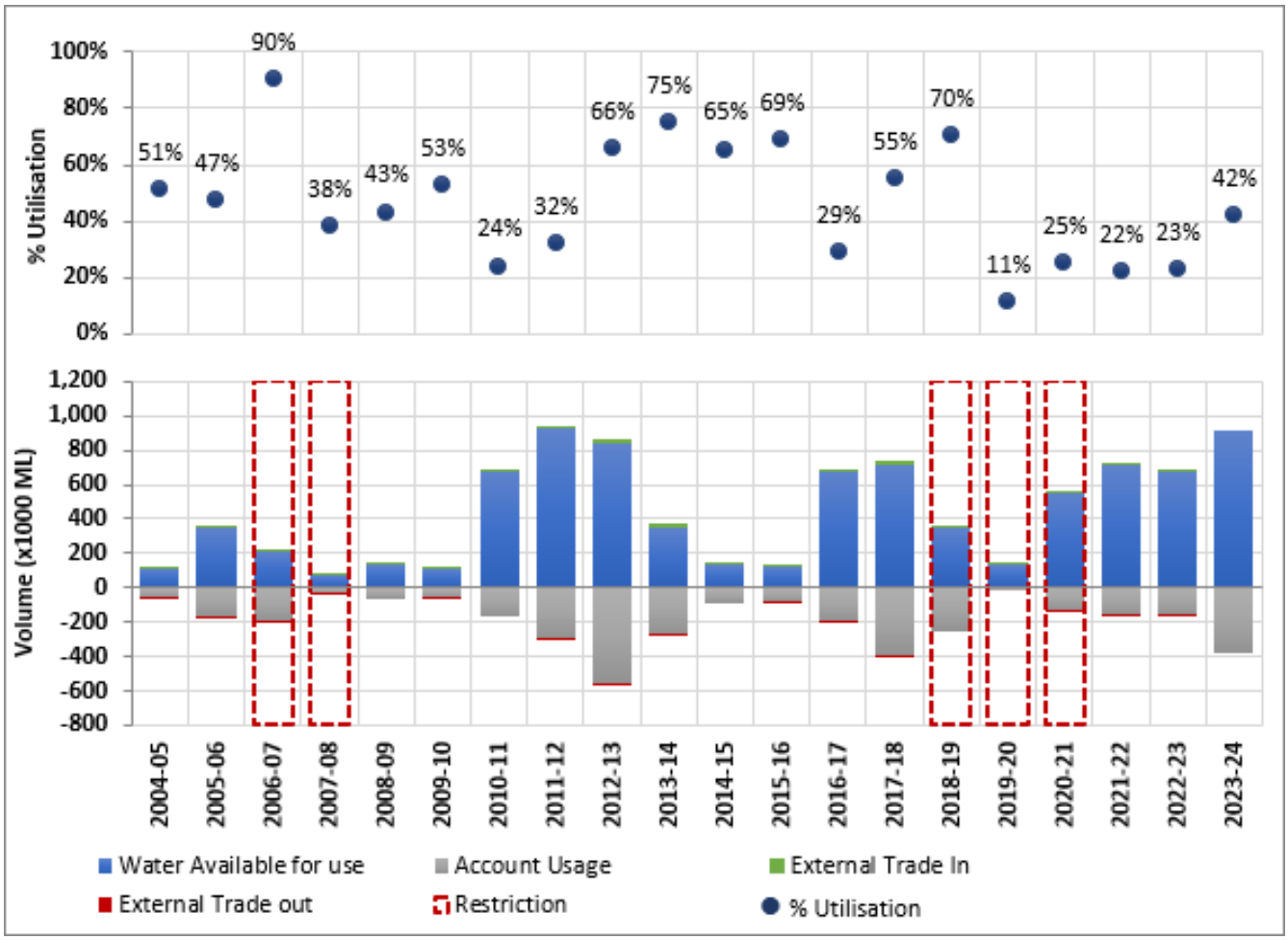
- The percentage of inactive licences during the reporting period decreased from the previous reporting period as requirement to order water increased due to the drier conditions in the catchment.
- 2% of General Security share component was inactive for the reporting period, a decrease of 19% from the prior reporting period (Table 6).
- 73% of Supplementary water share component was inactive for the reporting period, an increase of 29% from the prior reporting period. While there was no usage of Supplementary water during the reporting period there was trade of allocation.
- Considering all categories of access licence, 2% of all regulated share component was inactive for the reporting period, compared to 21% in the prior reporting period.
- Utilisation[8] of available water from regulated supplies (excluding supplementary) increased to 42% from 23% (Figure 44).

[8] An access licence is considered inactive if the holding does not use water or engage in the temporary trading market for the reporting period. Utilisation reflects the amount of water used, relative to the maximum available for use.

Table 6: Inactive licence summary Macquarie

Supply Type	Licence Category	Inactive licences (number)	Inactive share component	Sum of % of Total	Sum of % of total share (prior year)
Regulated Supply	Domestic and stock	123	2,006	47%	49%
	Domestic and stock [domestic]	61	381	47%	48%
	Domestic and stock [stock]	23	125	76%	76%
	High Security	13	219	3%	3%
	High security [research]	2	344	9%	9%
	High security [town water supply]	1	40	100%	100%
	Local water utility	0	0	0%	0%
	Local water utility [domestic and commercial]	0	0	0%	100%
	General Security	212	10,819	2%	21%
Regulated Supply Total		435	13,934	2%	21%
Other Supply	Supplementary water	387	35,525	73%	44%
	Floodplain harvesting	67	48,911	100%	100%
Other Supply Total		454	84,436	86%	72%

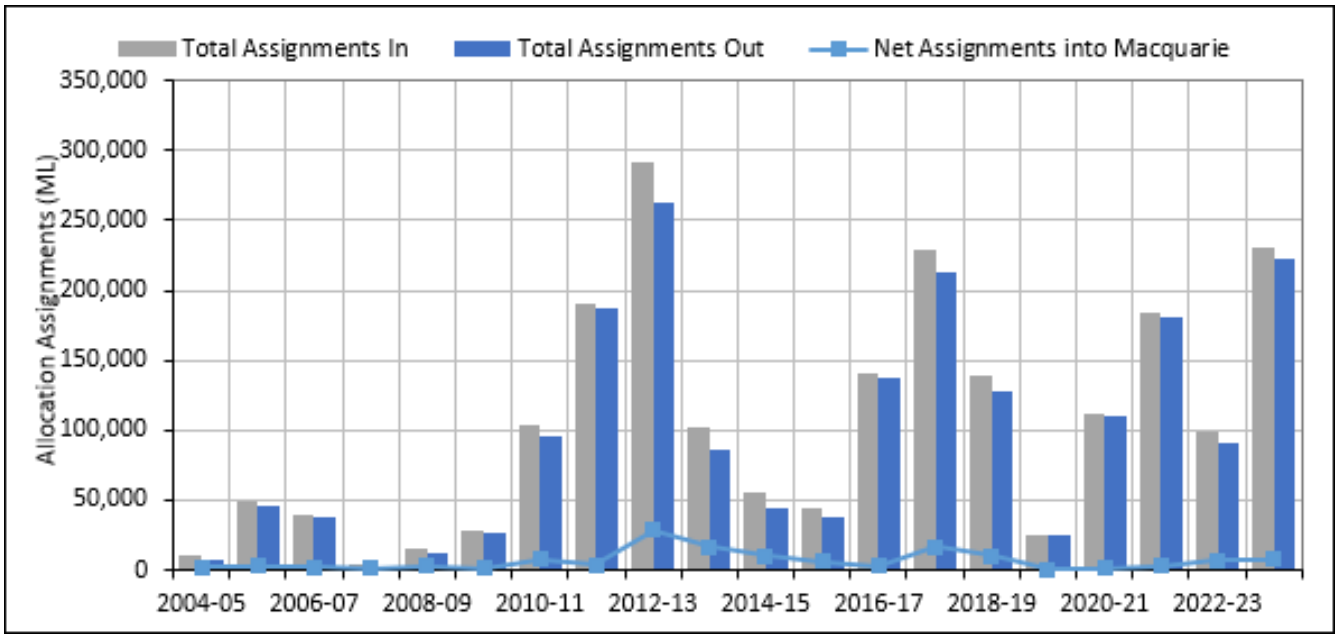
Figure 44: Macquarie percentage utilisation (water availability plus trade in from external water source against account usage and trade out to external water source)



Temporary trading (allocation assignments)

- By volume allocation assignments were 126% higher than the previous water year with 230,405 megalitres traded into Macquarie access licences, including supplementary trading (Figure 45).
- A total of 222,797 megalitres was traded out of Macquarie access licences resulting in a net assignment into the Macquarie (from the Cudgegong) of 7,608 megalitres (including supplementary).
- Regulated trade (excluding supplementary) totalled 9,747 megalitres into Macquarie from Cudgegong with 3,880 megalitres out from Macquarie to Cudgegong.
- Trade into the Macquarie exceeds trade out in all years under water sharing plan operation.

Figure 45: Macquarie allocation assignment (temporary trading) summary



Commercial temporary trading statistics (assignment of allocation)

- A total of 223 transactions were processed for commercial consideration
- The average price was $250 per megalitre, a 102% increase on the prior year ($124 per megalitre)
- The maximum price paid for water was $400 per megalitre.
- The total market value of temporary commercial trade was $12,947,705, which represents an 877% increase from the previous year's market value
- A total of 51,786 megalitres was transferred under these commercial sales. (Figure 46).

Figure 46: Macquarie allocation assignments—trade price statistics[9]

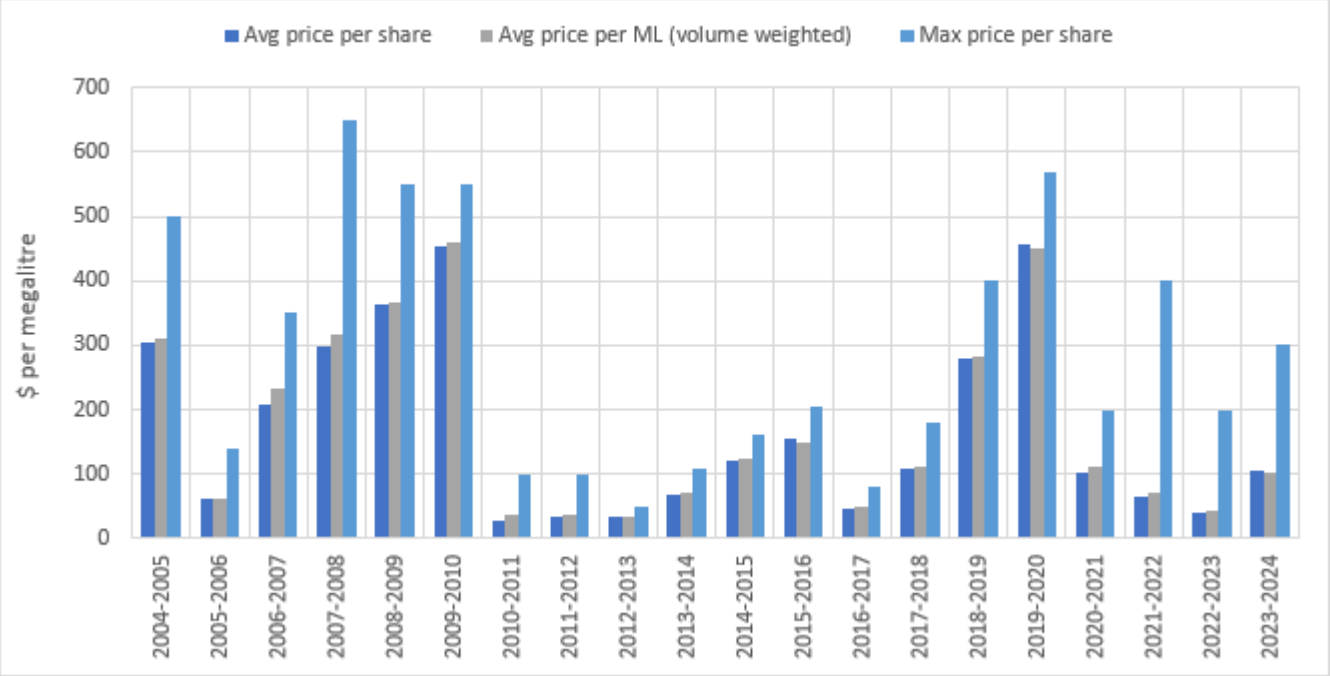
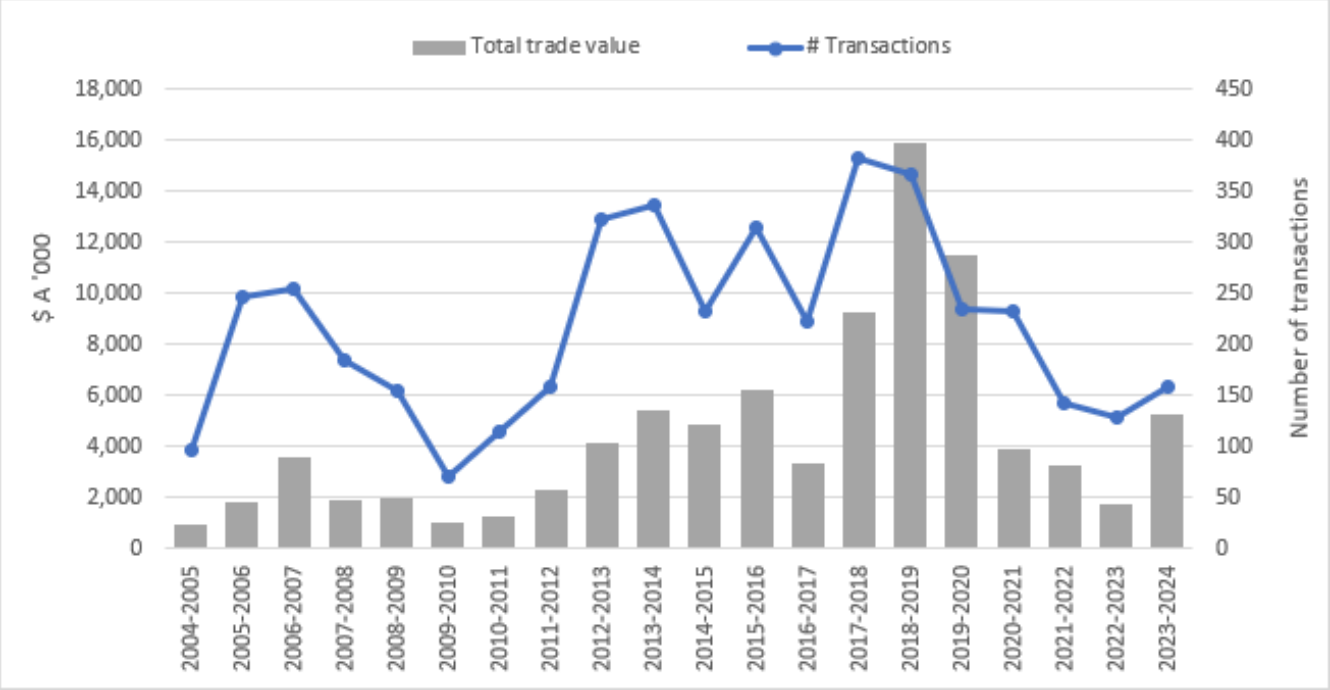


Figure 47: Macquarie allocation assignments—trade value statistics



[9] Trade prices are all greater than $1 per megalitre. A maximum limit is applied equal to the mean plus 3 times the standard deviation of the trade price. Supplementary licence allocation assignments are excluded.

Commercial statistics, permanent trading (share assignments and transfer of licence)

- A total of A total of 9 permanent assignment (71Q) of General Security shares occurred within the reporting period. (Figure 49).
- The average price was $3,491 per megalitre, a 18% increase on the prior year ($2,967 per megalitre).
- The maximum price paid for water was $4,000 per megalitre.
- The total market value of permanent commercial trade for General Security was $4,721,095, which represents a 52% decrease from the previous year's market value
- The general security sale price within the Macquarie relative to other NSW regulated river water sources selling share in the reporting period is provided in Figure 50.
- There were no High Security permanent assignments processed during the reporting period.
- No commercial share assignments of high security have occurred since 2013–14.
- In addition to share assignment dealings, a total of For the reporting period there were 28 transfer of licence holder (71M) that occurred for commercial purposes totalling 51,332 shares(Figure 51).

Figure 48: Commercial share assignment price statistics, General Security, Macquarie

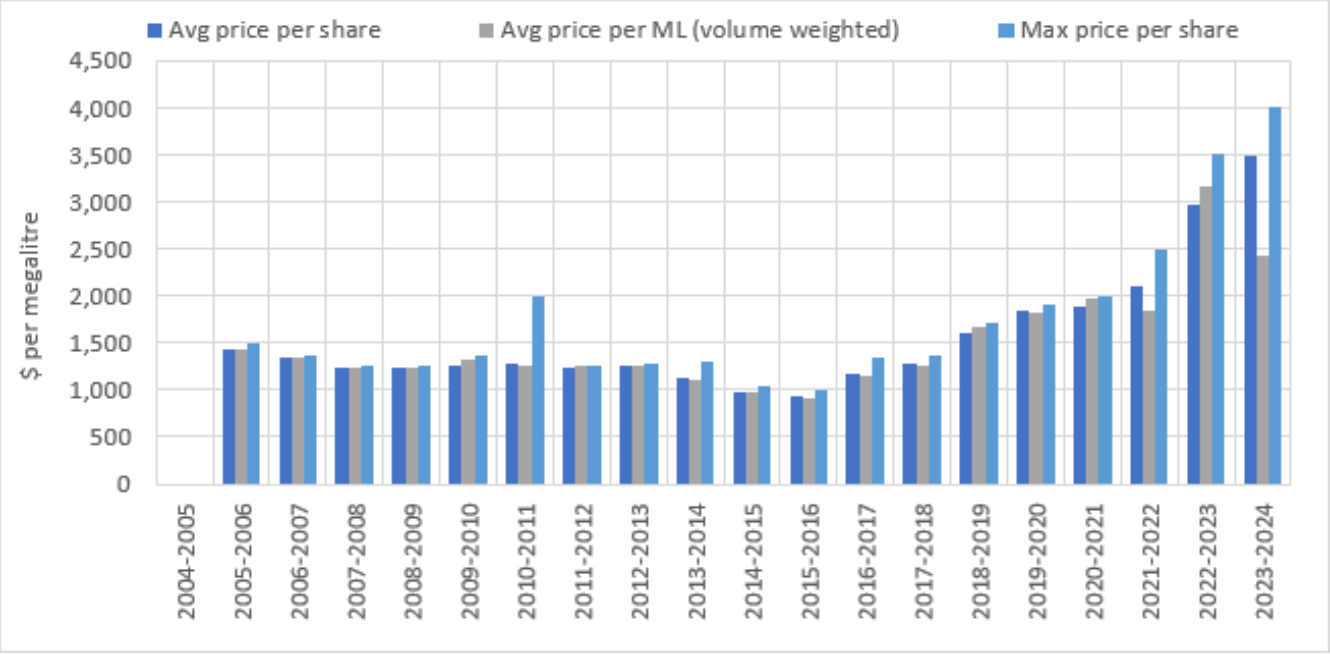


Figure 49: Commercial share assignment value statistics, General Security, Macquarie

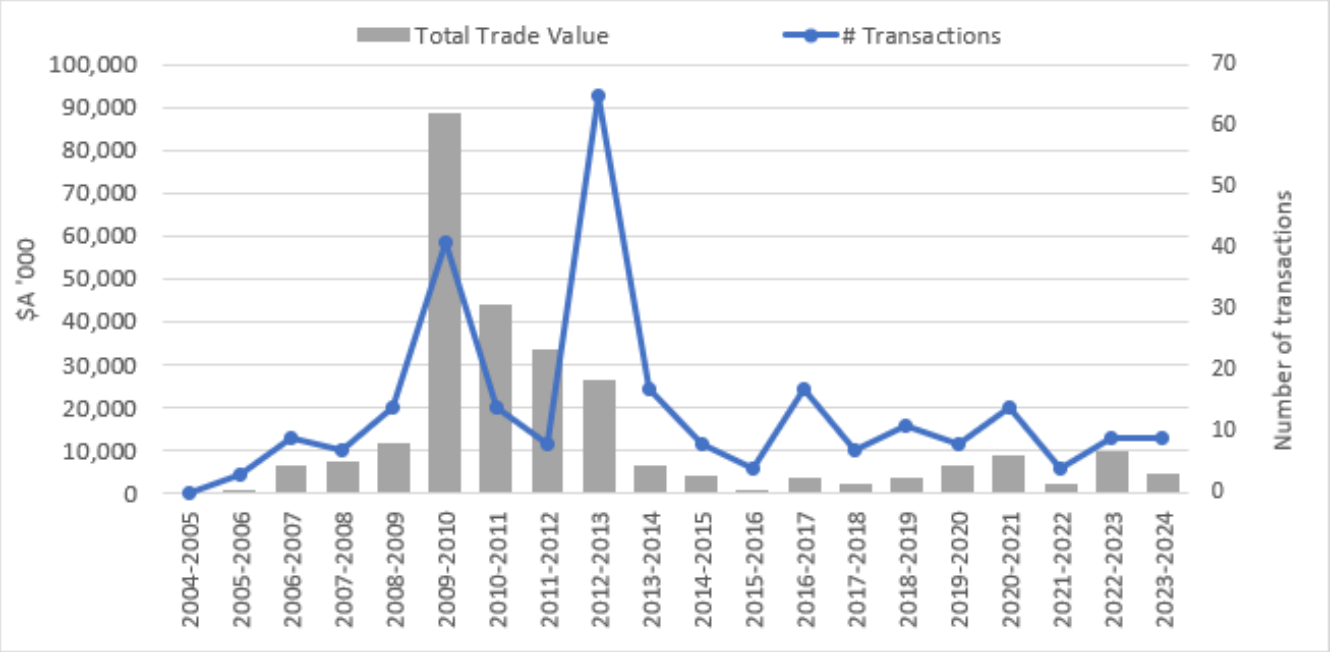


Figure 50: General Security average share price relative comparison for reporting period

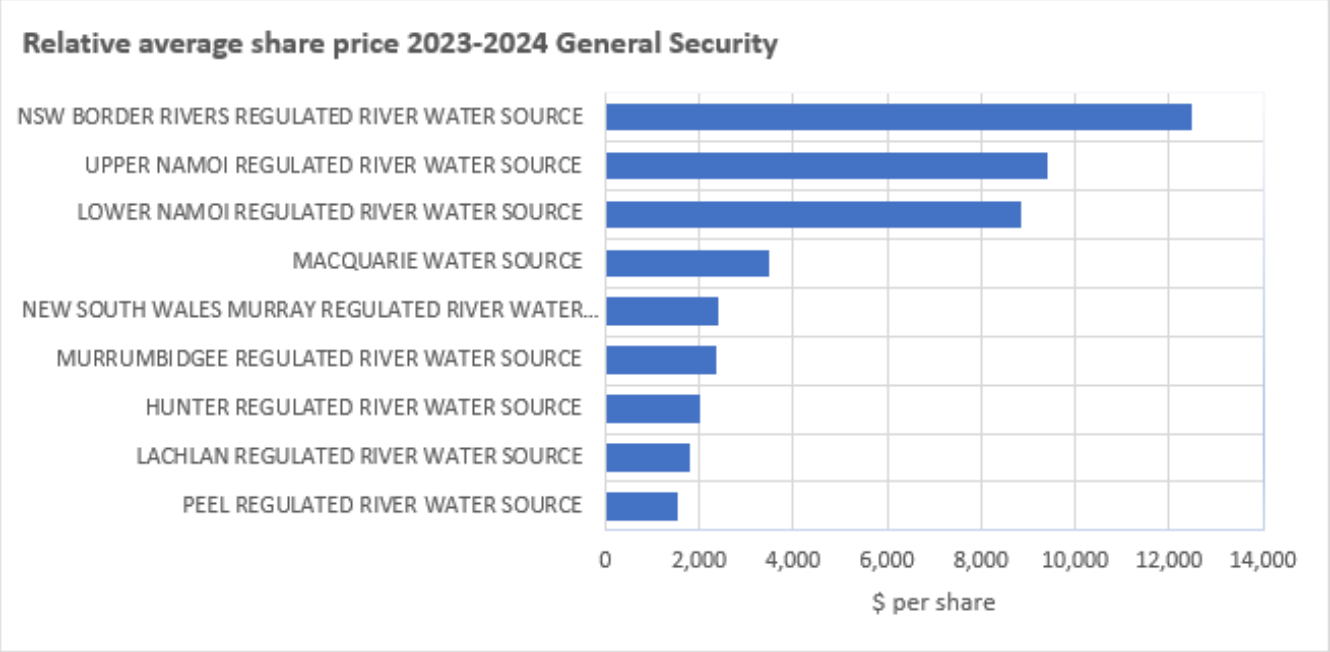
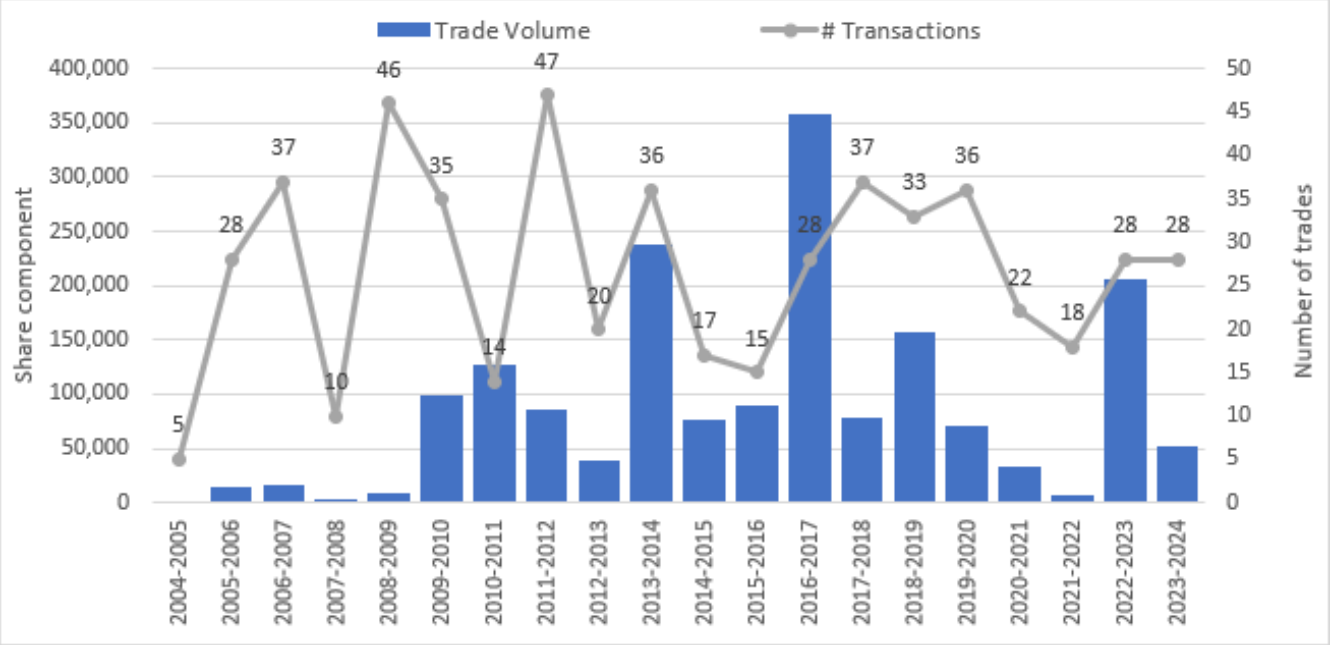


Figure 51: Commercial change of holder transactions—Macquarie



Replenishment flows

The replenishment flow requirements of the water sharing plan were delivered by rainfall runoff events (not sourced from storage) in the lower catchment at varying times throughout the reporting period. The replenishments flow volumes delivered are estimated as:

- Gum Cowal – Terrigal Creek system: 20,343 megalitres
- Crooked Creek below Mumblebone: 26,836 megalitres
- Bogan River between Nyngan and Gunningbar Creek Confluence: >1,000 megalitres
- Belaringar Creek downstream of Albert Priest channel: Not Required
- Belaringar Creek upstream Albert Priest channel: Not Required
- Ewanmar Creek (Reddenville Break): Not Required
- Marra Creek: 8,638 megalitres
- Lower Bogan River: 21,658 megalitres
- Macquarie River downstream of Macquarie Marshes 67,578 megalitres[10]

All the above systems were fully replenished following the deliveries. All deliveries were sourced from local runoff and tributary inflows downstream of storage. For details on replenishment flow events refer to Note 21.

[10] The replenishment flow requirement below the Macquarie Marshes requires that (at least) two deliveries of up to 50 megalitres per day from Miltara to achieve a visible flow at Glenacre for 5 or more days. Operationally the flow is managed through monitoring flows at the Pillicawarrina gauging station (421127), which reflects the volume stated here. There is high interception within the Marshes between Pillicawarrina and Miltara.

Environmental water

Planned environmental water

Cudgegong Environmental water allowance

Translucent releases from Windemere Dam ceased on the 1 July 2023 and was replaced by Cudgegong Environmental Water Allowance.

- The environmental water allowance had an opening balance of 18,622 megalitres.
- A total of 6,938 megalitres was allocated to the account during the reporting period.
- Usage for the reporting period was 9,219 megalitres.
- A total of 0 megalitres of water was forfeited as a result of evaporation and storage spills.
- Historical use of the environmental water allowance is presented in Figure 52.
- The end of year balance (carry forward) totalled 16,341 megalitres.

Macquarie Environmental water allowance

- The environmental water allowance (active plus translucent sub-accounts) had an opening balance of 117,410 megalitres for the reporting period.
- A total of 100,800 megalitres was allocated to the account during the reporting period.
- Usage for the reporting period was 115,483 megalitres (74,985 active sub-account and 40,498 translucent sub-account).
- A total of 872 megalitres of water was forfeited as a result of evaporation and storage spill.
- Historical use of the environmental water allowance is presented in Figure 52
- The end of year balance (carry forward) totalled 101,855 megalitres (40,689 active sub-account and 61,166 translucent sub-account).

Further details on planned environmental water are available in Note 7 of this GPWAR.

Figure 52: Cudgegong Environmental water allowance summary since commencement of plan[11]

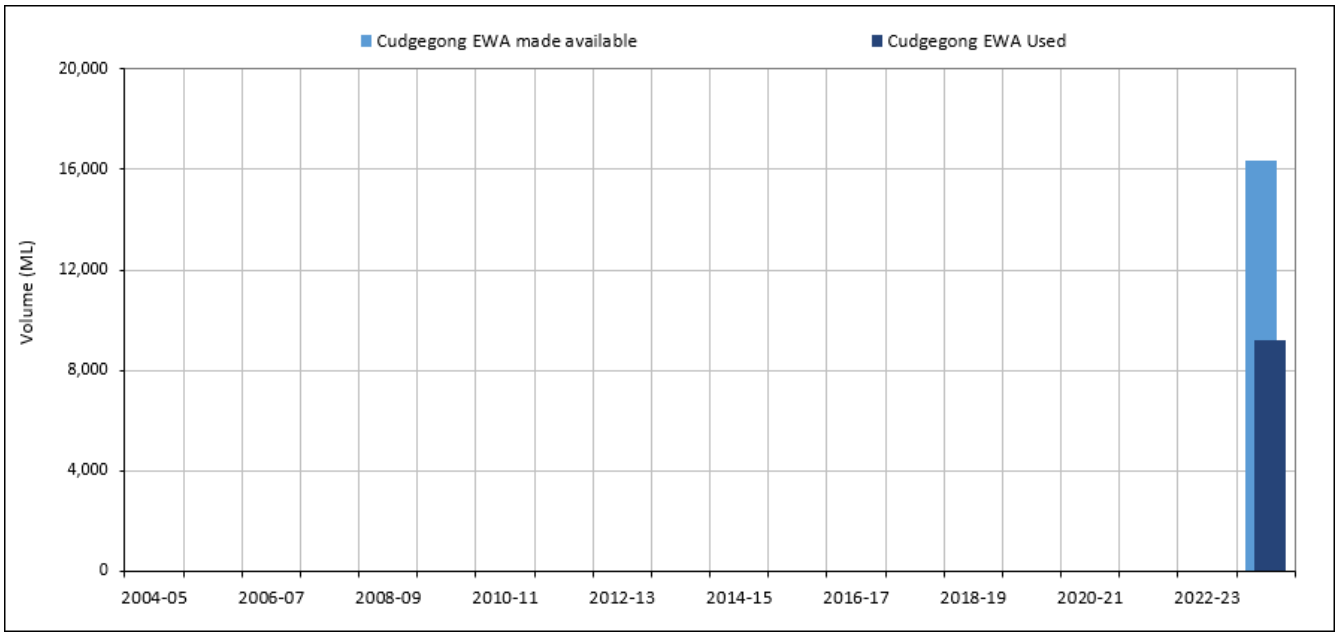
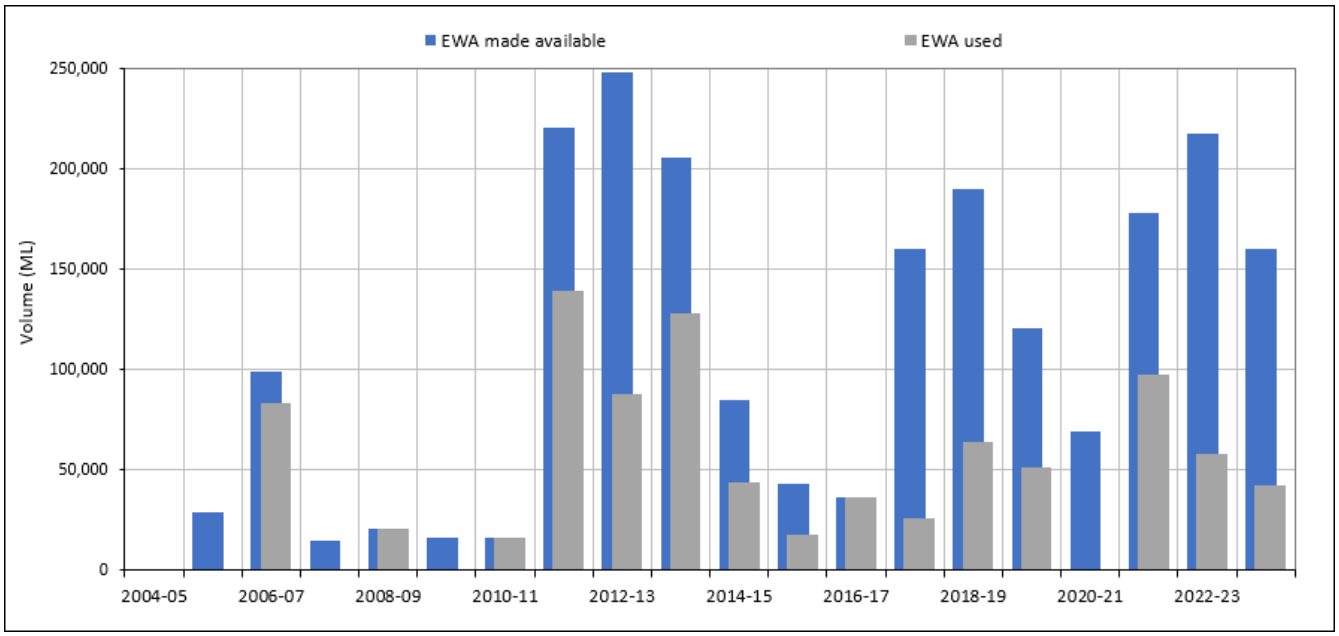


Figure 53: Macquarie Environmental water allowance summary since commencement of plan



[11] Cudgegong Environmental Water allowance commenced on the 1 July 2023

Held environmental water

Cudgegong

- There was no increase to the held environmental water portfolio share in the reporting period.
- A total of 901 general security shares were managed for environmental purposes as of 30 June 2024 (Figure 54).
- No usage has occurred against held environmental licences in the Cudgegong to date (however the allocations may be traded to Macquarie licences to be used).

Macquarie

- There was no increase to held environmental water portfolio share in the reporting period.
- A total of 183,486 shares were managed for environmental purposes as of 30 June 2024, consisting of 173,742 general security and 9,744 supplementary (Figure 55).
- A total of 81,377 megalitres of general security and 0 megalitres of supplementary water was used in the reporting period (Figure 56).
- Held environmental water account utilisation from regulated supply (excluding supplementary) increased to 46% from 10%. Historical utilisation figures are provided in Figure 57.
- Details on environmental watering targets and outcomes are available from the NSW Department of Climate Change, Energy, the Environment and Water—Environment Energy and Science website.
- For additional details on held environmental water refer to Note 6.

Figure 54: Held environmental water share component in the Cudgegong catchment

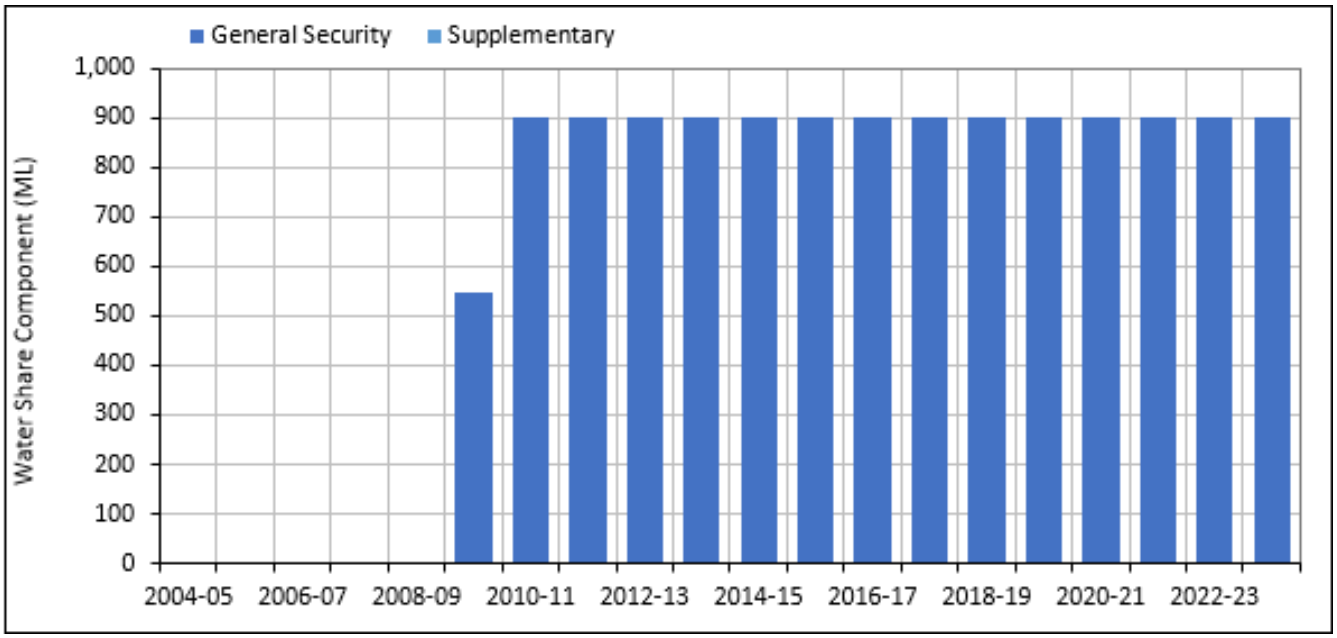


Figure 55: Held environmental water share component in the Macquarie catchment

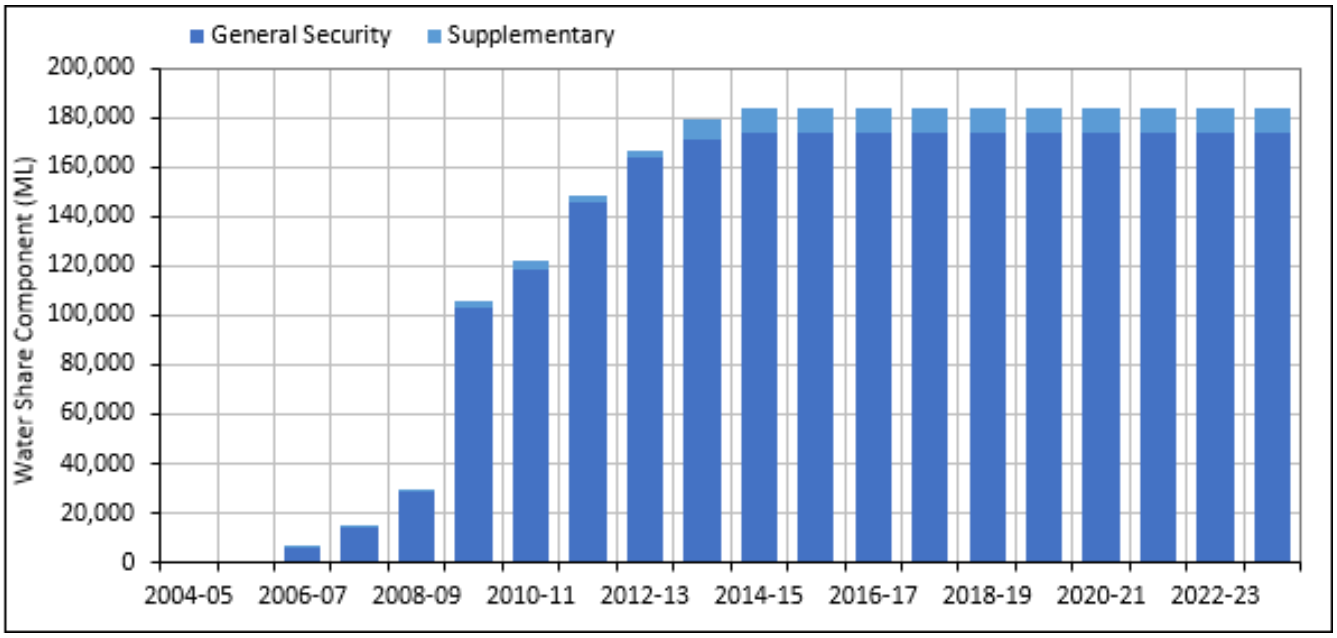


Figure 56: Held environmental usage in the Macquarie catchment

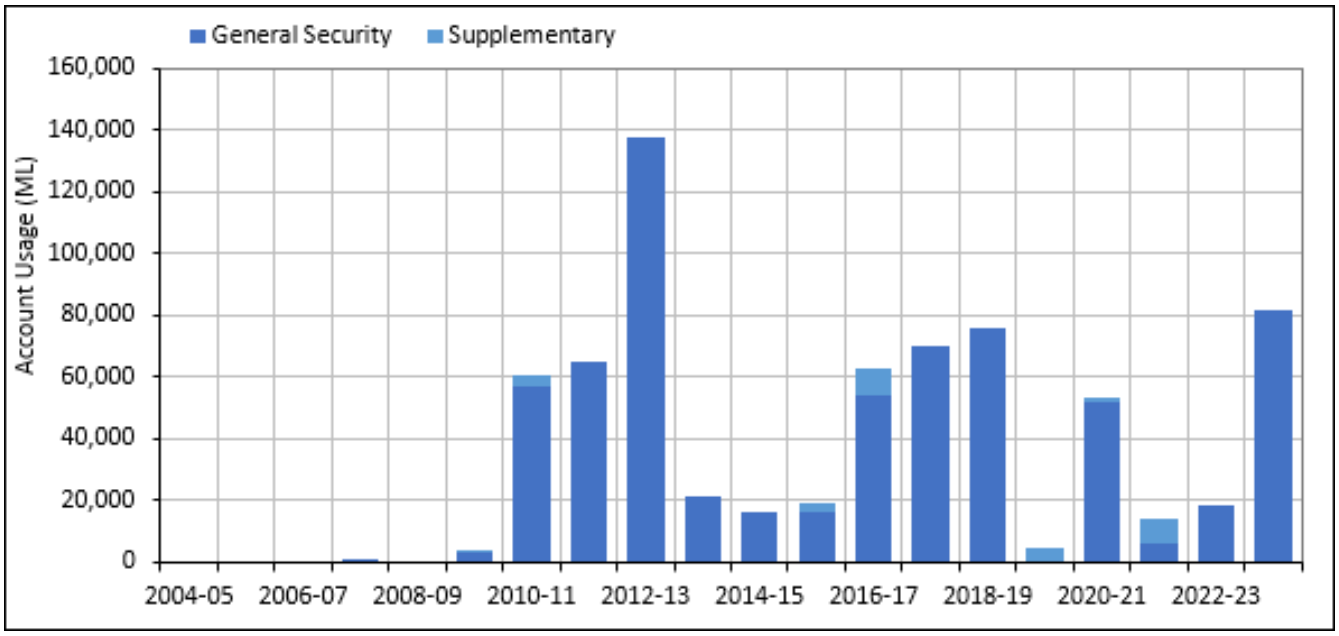
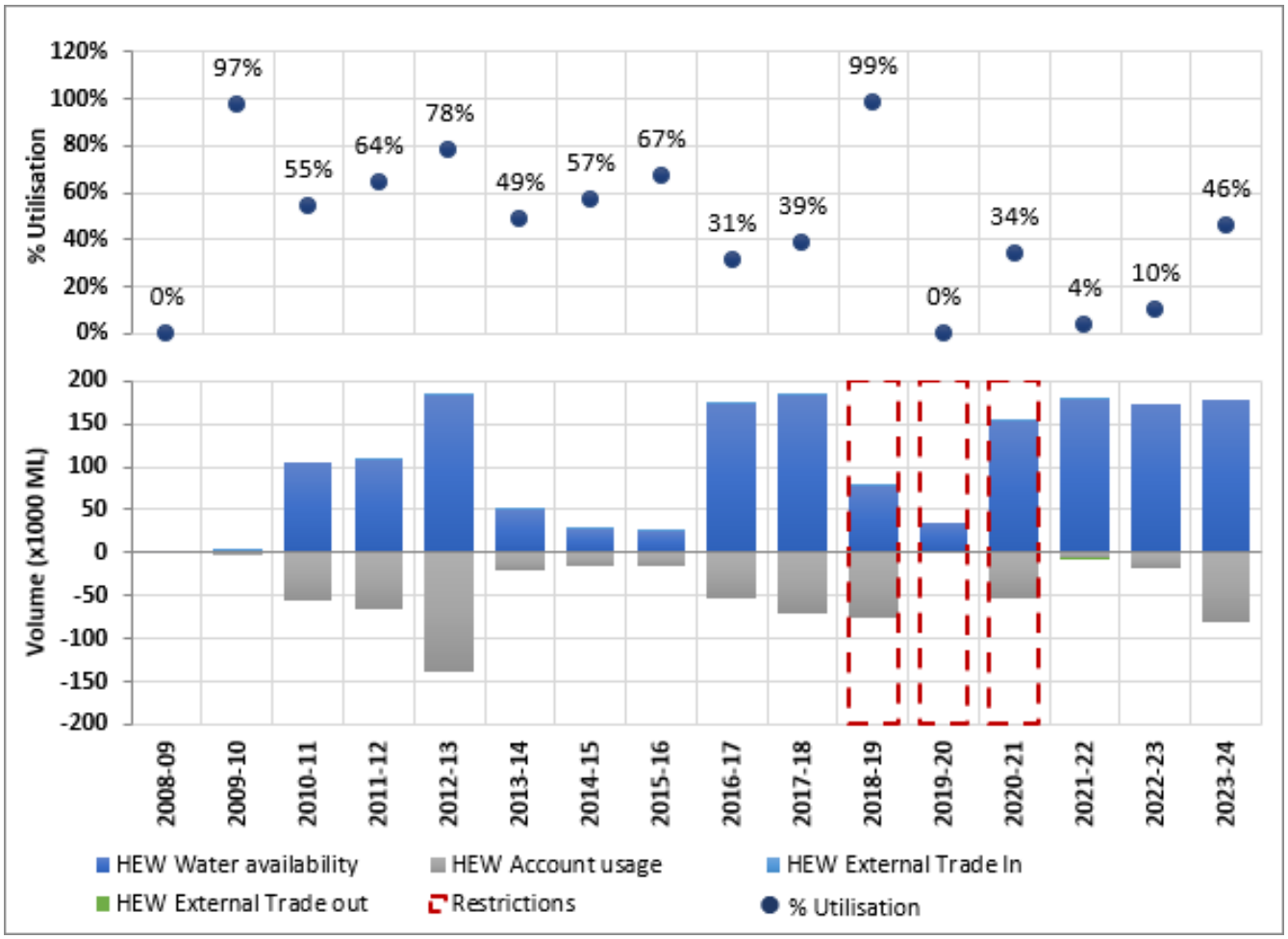


Figure 57: Held environmental utilisation Macquarie catchment (excludes supplementary holdings)



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 depiction of those accounting processes associated with physical flow movement.

For general information on how to interpret the NSW Department of Climate Change, Energy, the Environment and Water water accounting statements refer to the Guide to General Purpose Water Accounting Reports available for download from the NSW Department of Climate Change, Energy, the Environment and Water website at https://water.dpie.nsw.gov.au/

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 7).

Table 7: Water account data accuracy estimates key

Accuracy	Description
A1[12]	+/- 0% Data is determined rather than estimated or measured. Therefore, the number contains no inaccuracies.
A	+/- 10%
B	+/- 25%
C	+/- 50%
D	+/- 100%

[12] 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 NSW Climate Change, Energy, the Environment and Water corporate database

2023–24 physical flows mass balance diagram

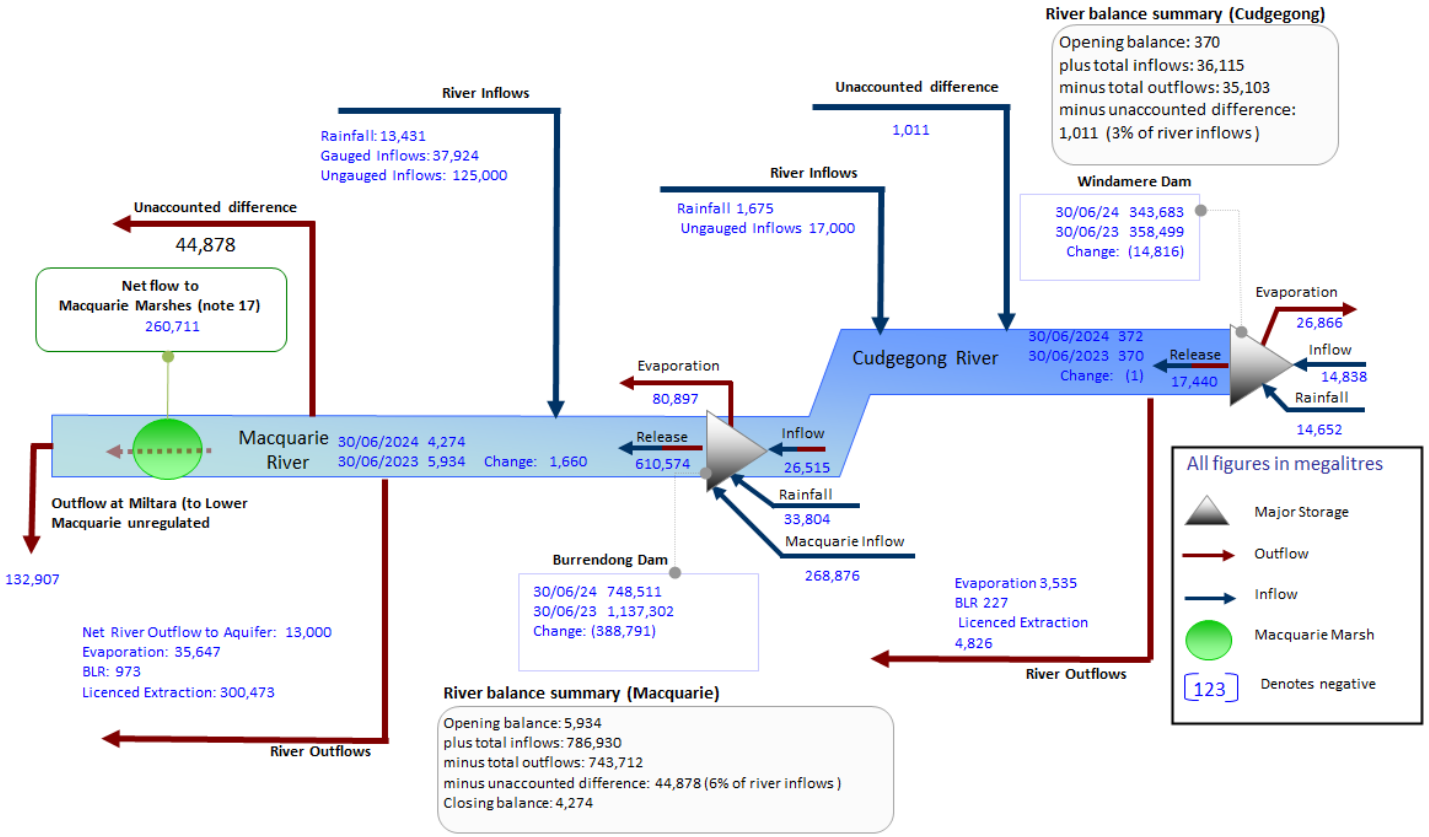


Diagram showing the Macquarie Physical flows mass balance. For more refer to the Statement of Water Assets and Liabilities and the Statement of Changes in Water Assets and Liabilities following this diagram.

Statement of water assets and water liabilities

For the year ended 30 June 20243

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

Surface water assets

1.Surface water storage	Accuracy	Notes	30-06-2024	30-06-2023
Windamere Dam	A		343,683	358,498
Burrendong Dam	A		748,511	1,137,302
Cudgegong River	B	11	372	370
Macquarie River	B	11	4,274	5,935
Total surface water storage(Asws)			1,096,840	1,502,106
Change in surface water storage			(405,266)	(47,309)

Surface water liabilities

2.Allocation account balances	Accuracy	Notes	30-06-2024	30-06-2023
Cudgegong				
Domestic and Stock	A		0	(0)
Domestic and Stock [Domestic]	A		0	0
Domestic and Stock [Stock]	A		0	0
General Security	A		21,153	14,940
High Security	A		0	(0)
High Security {Research]	A		0	0
Local Water Utility	A		0	0
Macquarie				
Domestic and Stock			A	0
Domestic and Stock [Domestic]			A	0
Domestic and Stock [Stock]			A	0
General Security			A	514,179
High Security			A	(2)
High Security {Research]			A	0
High Security (Town Water Supply)			A	0
Local Water Utility			A	(0)

2.Allocation account balances	Accuracy	Notes	30-06-2024	30-06-2023
Total allocation account balances(Lalloc)			535,330	516,822
Change in allocation account balance			18,508	(66,233)

3.Planned environmental water provisions	Accuracy	Notes	30-06-2024	30-06-2023
Environmental water allowance	A1		101,855	117,410
Total ECA balances(LPEW)			101,855	117,410
Change in planned environmental water balances			(15,555)	(42,590)

Surface water net changes

4. Net change	30 June 2024	30 June 2023
Net surface water assets (ASWS-LALLOC-LPEW)	459,655	867,874
Change in net water assets	(408,219)	61,514

Changes in water assets and water liabilities

For the year ended 30 June 2023 (1 of 3)

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

Surface Water Storage Increases	Accuracy	Notes	30-06-2024	30-06-2023
Burredong Dam				
Inflow	A	9	268,876	3,431,990
Rainfall	B		33,804	67,610
Windamere Dam				
Inflow	A	9	14,838	257,825
Rainfall	B		14,652	15,948
Cudgegong River				
Rainfall	B		1,675	5,192
Gauged inflow	A	12	n/a	n/a
Ungauged (estimated) inflow	C		17,000	603,000
Inflow from storage releases (Windamere)	A	14	17,440	111,402
Macquarie River				
Rainfall	B		13,431	26,802
Gauged inflow	A	12	37,924	1,095,674
Ungauged (estimated) inflow	C		125,000	254,000
Inflow from storage releases (Burrendong)	A	14	610,574	3,547,102
Adjusting increases to water assets	A			
Total surface water storage increases (Isws)			1,155,215	9,416,545

Surface Water Storage Decreases	Accuracy	Notes	30-06-2024	30-06-2023
Burredong Dam				
Evaporation	B		80,897	90,379
Release	A		610,574	3,547,102
Windamere Dam				
Evaporation	B		26,866	23,461
Release	A		17,440	111,402
Cudgegong River				

Surface Water Storage Decreases	Accuracy	Notes	30-06-2024	30-06-2023
Evaporation	B		3,535	3,698
Flow leaving	A	15	26,515	700,589
Extractions - basic landholder rights	A		227	227
Extractions - access licences	A		4,826	2,900
Unaccounted difference	A		1,011	12,817
Macquarie River				
Evaporation	B		35,647	43,834
Extractions - basic landholder rights	A		973	973
Extractions - access licences	A		300,473	141,804
Flow leaving	A	15	132,907	2,584,753
Flow to Macqaurie Marsh	B	17	260,711	365,000
Net river outflow to groundwater	C		13,000	37,500
Other outflows (Ewanmar Ck estimated outflow)	B		0	1,067,257
Unaccounted difference	A		44,878	730,158
Adjusting decreases to water assets	A			
Total surface water storage decreases (Dsws)			1,560,481	9,463,854
Net Surface Water Storage Inflow (Isws-Dsws-Usws)			(405,266)	(47,309)

Net surface water storage inflow (Isws – Dsws)	(47,309)	646,118

2. Changes in allocation accounts

Allocation Account Increases	Accuracy	Notes	30-06-2024	30-06-2023
Cudgegong				
Available water determination				
Domestic and Stock	A1		648	656
Domestic and Stock [Domestic]	A1		23	23
Domestic and Stock [Stock]	A1		15	15
General Security	A1		11,757	18,762
High Security	A1		5,291	5,291
High Security [Research]	A1		1	1
Local Water Utility	A1		2,600	2,600
Unregulated flow demand				
Supplementary water (demand)	A1	20	0	0
Allocation assignments -buyers			5,158	3,221
Macquarie				
Available water determination				
Domestic and Stock	A1		4,275	4,283
Domestic and Stock [Domestic]	A1		804	804
Domestic and Stock [Stock]	A1		165	165
General Security	A1		386,698	1,227,423
High Security	A1		8,537	17,074
High Security [Research]	A1		4,044	4,044
High Security (Town Water Supply)	A1		40	40
Local Water Utility	A1		16,205	16,205
Unregulated flow demand				
Supplementary water (demand)	A1	20	0	8,864
Allocation assignments -buyers			221,714	88,879
Adjusting increases to water liabilities	A			
Total Allocation Account Increases (Iaa)			667,974	1,398,349

Allocation Account Decreases	Accuracy	Notes	30-06-2024	30-06-2023
Cudgegong				
Account usage				
Domestic and Stock	A1		292	279
General Security	A1		2,364	947
High Security	A1		372	262
Local Water Utility	A1		1,798	1,413
Account forfeits				
Domestic and Stock	A1		356	370
Domestic and Stock [Domestic]	A1		23	23
Domestic and Stock [Stock]	A1		15	15
General Security	A1		1,486	46,626
High Security	A1		206	148
High Security [Research]	A1		1	1
Local Water Utility	A1		802	1,188
Licence cancelled				
Domestic and Stock	A1		0	8
Allocation assignments -sellers			11,566	9,924
Macquarie				
Account usage				
Domestic and Stock	A1		1,423	1,162
Domestic and Stock [Domestic]	A1		338	190
Domestic and Stock [Stock]	A1		37	39
General Security	A1		359,220	135,380
High Security	A1		4,559	5,041
High Security [Research]	A1		2,938	800
High Security (Town Water Supply)	A1		0	0
Local Water Utility	A1		13,335	8,447
Supplementary water	A1	3	0	8,864
Account forfeits				
Domestic and Stock	A1		2,852	3,113
Domestic and Stock [Domestic]	A1		466	614
Domestic and Stock [Stock]	A1		128	126
General Security	A1		21,510	1,135,410
High Security	A1		2,751	10,970
High Security [Research]	A1		1,106	3,244
High Security (Town Water Supply)	A1		40	40
Local Water Utility	A1		5,378	7,758
Licence cancelled				

Allocation Account Decreases	Accuracy	Notes	30-06-2024	30-06-2023
Domestic and Stock	A1		0	8
Allocation assignments -sellers			214,106	82,176
Adjusting decreases to water liabilities	A			
Total allocation account decreases (Daa)			649,466	1,464,582

Net Allocation Account Balance Increases (Iaa-Daa)		18,508		(66,233)

3. Changes in planned environmental water provisions (PEW)

Increases	Accuracy	Notes	30-06-2024	30-06-2023
Account increases	A1	7	100,800	160,000
Adjusting increases to water liabilties (PEW)	A1			
Total PEW account increases (Ipew)			100,800	160,000

Decreases	Accuracy	Notes	30-06-2024	30-06-2023
Account usage	A1	7	115,483	42,590
Other account decreases	A1	7	872	160,000
Adjusting decreases to water liabilties (PEW)	A1	24		
Total PEW account decreases (Dpew)			116,355	202,590
Net Environmental Contingency Allowance increase (Ipew - Dpew)			(15,555)	(42,590)

Change in net surface water assets (Isws-Dsws-Usws-Iaa+Daa-Ipew+Dpew)			(408,219)	61,514

Note disclosures

Reconciliation and future prospect descriptions

Reconciliation of change in net water asset to net change in physical water storage[13]	2023–24 ML	2022–23 ML
Change in net surface water assets	(408,219)	61,514
Non-physical adjustments		
Net change in allocation accounts	18,508	(66,233)
Net change in claims to water: EWA	(15,555)	(42,590)
Total non-physical adjustments	2,953	(108,823)
Net change in physical surface water storage	(405,266)	(47,309)

Reconciliation of closing water storage to total surface water assets	30 June 2024 ML	30 June 2023 ML
Closing water storage		
Surface water storage	1,096,840	1,502,106
Total surface water assets	1,096,840	1,502,106

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

Availability of final datasets for reporting in the GPWAR which include field staff finalising meter readings inhibit the ability to publish the account in a timeframe to render a 12-month forecast from the reporting date useful to users of this report.

In lieu of this information, web links to information sources for the latest water availability information for the Cudgegong and Macquarie Water Sources are provided below. Carryovers and available water determinations at the time of reporting are also presented along with probability information pertaining to the reliability of the Cudgegong and Macquarie systems.

[13] All figures in the reconciliation tables can be derived from or found directly in the Water Accounting Statements of the General Purpose Water Accounting Report

Latest Water Availability

You can find the latest information on water availability, including water allocation statements, water allocations summaries and 2023-2024 available water determinations, on the NSW Department of Climate Change, Energy, the Environment and Water webpage at Allocations | Water (nsw.gov.au)

You can also subscribe to receive the latest updates.

Significant events since 2023-2024

No significant events have occurred up until the time of publication of this report.

System reliability

The latest long-term planning model (IQQM) reflecting a water sharing plan management scenario in the Macquarie–Cudgegong system provide indicative system reliability information for the commencement and closure of a watering season[14].

In any given year, the simulation indicates high security entitlements are likely to a have full allocation 100% of the time for Macquarie–Cudgegong system.

At the commencement of the water year, the simulation shows that, over the long-term, the allocation of General Security licence holders equal or exceed 100% of their entitlement 24% of the time (Figure 58).

Availabilities significantly increase throughout the water year as storages are supplemented from new inflow. By the end of the water year, the simulation results indicate a water availability of 100% of entitlement or greater 46% of the time in the Macquarie–Cudgegong (Figure 59).

[14] Modelled data simulated as July to June water year. Simulation period 1 June 1892 to 30 June 2018. As model's are conditionally revised to reflect changes in water management rules, and improved understanding of system behaviour (data), information is guiding only and may not reflect the latest modelling information available.

Figure 58: Macquarie–Cudgegong start of water year simulated availability for General Security access licences

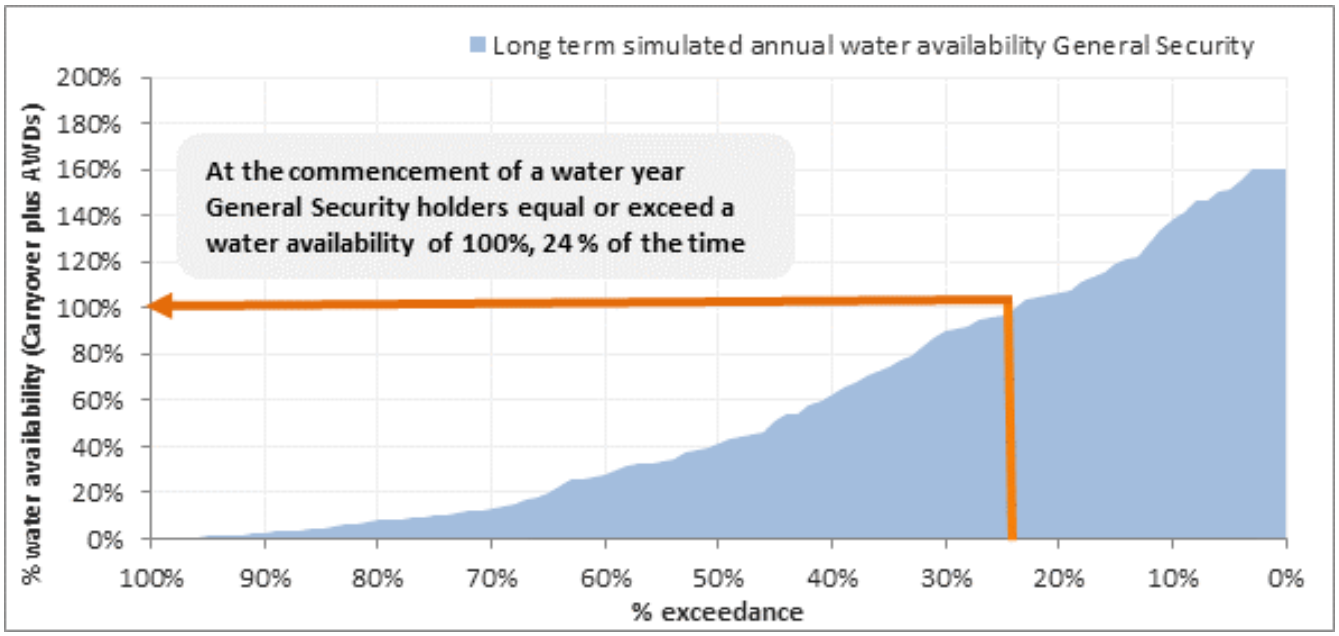
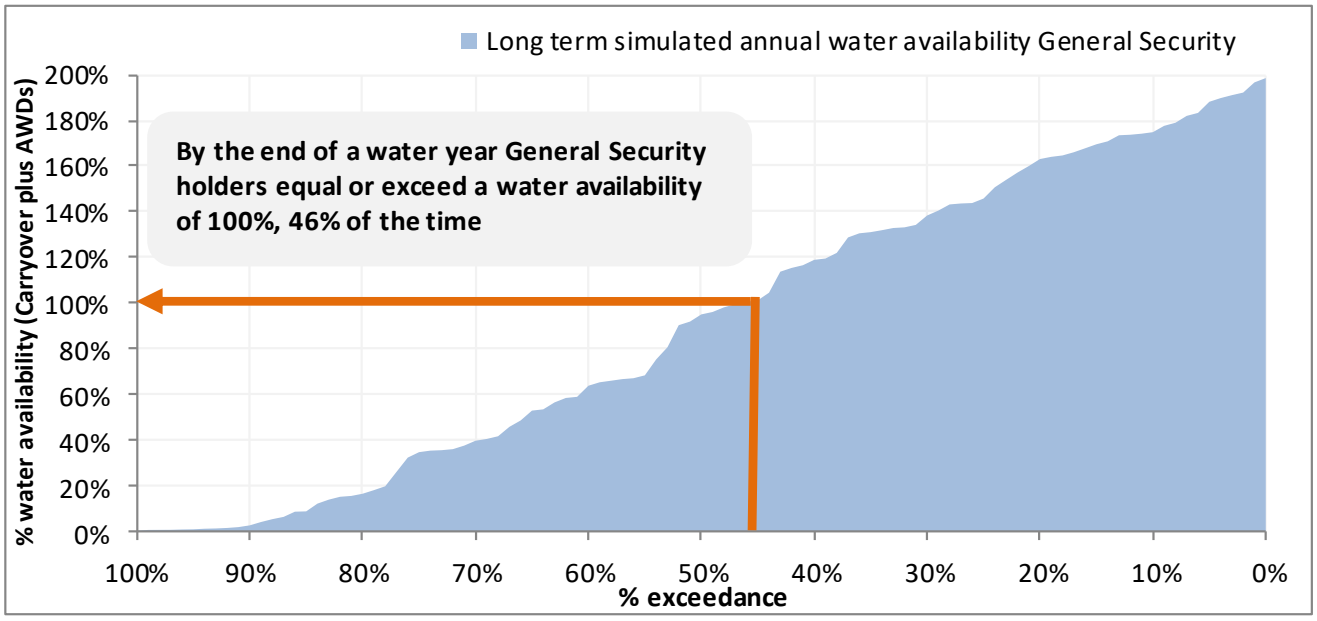


Figure 59: Macquarie–Cudgegong end of water year simulated availability for General Security access licences



Detailed item notes

Note 1 — Allocation accounts

This note is reference for the volume held in the allocation accounts at the time of reporting and is 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 the 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 is therefore inclusive of licences held by environmental holders (these are also detailed separately in Note 6).

Data type

Derived from measured data

Policy

Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016

Available on the NSW Department of Climate Change, Energy, the Environment and Water website at https://water.dpie.nsw.gov.au/

Data accuracy

A1 — Nil inaccuracy +/- 0%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data source

WaterNSW/NSW Department of Climate Change, Energy, the Environment and Water — 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 (AWD) (detailed in Note 2)
- allocation account usage (detailed in Note 3)
- forfeiture due to:
  - no or limited carryover being permitted (end of year forfeit)
  - account limit breaches
  - storage spills (detailed in Note 5)
  - evaporation reductions on carryover
  - cancellation of licence
- trade of allocation water between accounts (detailed in Note 4)
- determined carryover volume.

Additional information

Table 9 and Table 10 on the following page provide a balanced summary of the water allocation accounts for each category of access licence. Table 8 gives a description of each of the table components.

Table 8: Explanatory information for account summary tables (Table 9 and Table 19)

Heading	Description
Share	This is the total volume of entitlement in the specific licence category.
Opening balance	The volume of water that has been carried forward from previous years allocation account.
AWD	**Available water determination**: The total annual volume of water added to the allocation account as a result of allocation assessments. This figure includes additional AWD made as a result of a storage spill reset as defined in the water sharing plan.
Lic New	**Licences – New**: Increase in account water as a result of the issuing of a new licence.
Lic Can	**Licences – Cancelled**: Decrease in account water as a result of a licence cancellation where account balance has not been traded to another licence.
Asn In	**Assignment – In**: Increase in account water as a result of temporary trade in.

Heading	Description
Asn – Out	Assignment – Out: Decrease in account water as a result of temporary trade out.
Usage	Volume of water that is extracted or diverted from the river and is accountable against the access licence allocation
Drought sus In	**Drought suspension – In:** Temporary water restriction applied, reducing account water available for use in reported water year
Drought sus Out	**Drought suspension – Out:** Temporary water restriction re-credit increasing account water available for use in reported water year
During Year forfeit	Account water forfeited throughout the year as a result of the accounting rules specified in the water sharing plan. Forfeited water may occur due to account limits being reached, conversions between licence categories and various types of other licence dealings. It also includes any reductions on carryover volumes due to storage evaporation as required by the water sharing plan. Included in this figure are net forfeitures resulting from storage spills resets which brings accounts back to 100% capacity. This includes the forfeiture of carryover water being the volume in the flood mitigation zone until all the carryover water has been forfeited.
EoY forfeit	**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.
EoY Avail	**End of year balance – Available:** Account balance that is available to be taken at the conclusion of the water year.
EoY NA	**End of year balance – Not available:** Account balance that is not available to be taken at the conclusion of the water year (due to restrictions or water sharing plan account limit rules
Carry fwd	**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.
( )	Negative figures are shown in red brackets

Table 9: Cudgegong account balance summary for the reporting period. See Table 8 for explanation of headings.

	Share	Opening	AWD	Lic New	Lic can	Trade in	Trade out	Usage	UCF	Over order	During year forfeit	EoY Avlb	EoY NA	End of year forfeit	Carry fwd
Domestic And Stock	648	0	648	0	0	0	0	292	0	0	0	356	0	356	0
Domestic And Stock (Domestic)	23	0	23	0	0	0	0	0	0	0	0	23	0	23	0
Domestic And Stock (Stock)	15	0	15	0	0	0	0	0	0	0	0	15	0	15	0
Local Water Utility	2,600	0	2,600	0	0	0	0	1,798	0	0	0	802	0	802	0
High Security	5,291	(0)	5,291	0	0	0	4,713	372	0	0	0	206	0	206	0
High Security (Research)	1	0	1	0	0	0	0	0	0	0	0	1	0	1	0
General Security	18,661	14,940	11,757	0	0	5,158	6,853	2,364	0	0	279	22,360	0	1,207	21,153
Supplementary Water	1,290	0	1,290	0	0	0	0	0	0	0	0	1,290	0	1,290	0

Table 10: Macquarie account balance summary for the reporting period

	Share	Opening	AWD	Lic New	Lic can	Trade in	Trade out	Usage	UCF	Over order	During year forfeit	EoY Avlb	EoY NA	End of year forfeit	Carry fwd
Domestic And Stock	4,275	0	4,275	0	0	0	0	1,423	0	0	0	2,852	0	2,852	0
Domestic And Stock (Domestic)	803	0	804	0	0	0	0	338	0	0	0	466	0	466	0
Domestic And Stock (Stock)	165	0	165	0	0	0	0	37	0	0	0	128	0	128	0
Local Water Utility	16,205	0	16,205	0	0	2,508	0	13,335	0	0	0	5,378	0	5,378	0
High Security	8,537	(23)	8,537	0	0	893	2,098	4,559	0	0	0	2,749	0	2,751	(2)
High Security (Town Water Supply)	40	0	40	0	0	0	0	0	0	0	0	40	0	40	0
High Security (Research)	4,044	0	4,044	0	0	0	0	2,938	0	0	0	1,106	0	1,106	0
General Security	613,805	501,905	386,698	0	0	218,313	212,008	359,220	0	0	11,263	524,426	0	10,247	514,179
Supplementary Water	48,708	0	48,708	0	0	8,691	8,691	0	0	0	0	48,708	0	48,708	0
Floodplain Harvesting	48,911	16,141	48,911	0	0	0	0	0	0	0	0	65,053	0	0	65,053
Local Water Utility (Domestic/Commercial)	1,200	0	1,200	0	0	0	1,200	0	0	0	0	0	0	0	0

Note 2 — Available water determination (AWD) (allocation announcement)

This is the process by which the regulated surface water asset available for use within the regulated system is determined and shared. The process calculates 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 NSW *Water Management Act 2000* the announcements are termed available water determinations.

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 Macquarie and Cudgegong Regulated Rivers Water Source 2016

- Part 8 — Limits to the availability of water
  - Division 2 — Available Water Determinations.

Available on the NSW Department of Climate Change, Energy, the Environment and Water website at https://water.dpie.nsw.gov.au/

Data accuracy

A1 — Nil inaccuracy +/- 0%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water.

Methodology

The AWD procedure itself is generally divided into two sections: the available water asset, and system commitments. Once the required system commitments have been allowed for, the remaining water asset is then available for distribution to the access licence categories in order of priority (see following table). Announcements are expressed as either a percentage of the share component for all access licences where share components are specified as megalitres per year, or megalitres per unit share for all regulated river (high security) access

licences, regulated river (general security) access licences and supplementary water access licences.

Table 11: Priority of access licence categories

Licence category	AWD priority
General Security	Low
High Security	High
Conveyance	Low
Domestic and Stock[15]	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 have to 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 has already been allocated to accounts but 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
- Available water determinations are limited to an equivalent volume of 100% of share component (entitlement) for all categories other than general security. The sum of available water determinations for general security holders cannot exceed

[15] 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 were all treated as Domestic and Stock.

1 megalitre per share, unless the AWD is a result of a storage spill reset (see Note 5 for more details).

Additional information

The following pages contain the allocation summary reports for the reporting period. Table 12 provides a description of the relevant elements in these reports.

Table 12: Allocation summary report notes

Report heading	Description
Opening	Remaining allocation account balances at the conclusion of the previous season that is allowed to 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.
Allocation announced volume	Volume of water credited to accounts within a licence category as a result of the announcement made.
Allocation cumulative announced volume	Cumulative total of the announced volumes for the water year and licence category.
Allocation announced volume % of share	This is the announced volume expressed as a percentage of the entitlement applicable on the particular date.
Allocation cumulative announced volume % of share	This is the cumulative total percent (of total entitlement) that has been issued on the announcement date (inclusive)
Account balance available	Sum of water available in allocation accounts that has been made available to be taken during the season.
Account balance not available	Water allocated that is not accessible at this point in time.
Account balance total	Total balance of accounts (available plus not available)
Account balance available % of share	Account balance available expressed as a percentage of share component.
Account balance total % of share	Account balance expressed as a percentage of share component.
Supplementary water	Water that is not a stored source of water and is only made available if an uncontrolled flow event occurs.

Report heading	Description
Floodplain Harvesting	Floodplain harvesting licences define the volume of water that users can legally harvest from floodplains.

Table 13: Allocation announcements for the reporting period — Cudgegong

Category	Date	Individual announcement	Share component	Allocation volume (ML)	Balance available (ML)	Balance not available (ML)	Balance total (ML)
DOMESTIC AND STOCK	1/Jul/23	Open	648	0	0	0	0
		AWD 100.0 %	648	648	648	0	648
DOMESTIC AND STOCK[DOMESTIC]	1/Jul/23	Open	23	0	0	0	0
		AWD 100.0 %	23	23	23	0	23
DOMESTIC AND STOCK[STOCK]	1/Jul/23	Open	15	0	0	0	0
		AWD 100.0 %	15	15	15	0	15
REGULATED RIVER (HIGH SECURITY)	1/Jul/23	Open	5,291	0	0	0	0
		AWD 1.0 ML per Share	5,291	5,291	5,291	0	5,291

Category	Date	Individual announcement	Share component	Allocation volume (ML)	Balance available (ML)	Balance not available (ML)	Balance total (ML)
SUPPLEMENTARY WATER	1/Jul/23	Open	1,290	0	0	0	0
		AWD 1.0 ML per Share	1,290	1,290	1,290	0	1,290
LOCAL WATER UTILITY	1/Jul/23	Open	2,600	0	0	0	0
		AWD 100.0 %	2,600	2,600	2,600	0	2,600
REGULATED RIVER (GENERAL SECURITY)	1/Jul/23	Open	18,661	0	14,940	0	14,940
		AWD 0.0 ML per Share	18,661	0	14,940	0	14,940
	12/Jul/23	AWD 0.5 ML per Share	18,661	9,331	24,271	0	24,271
	12/Mar/24	AWD 0.01 ML per Share	18,661	187	24,457	0	24,457

Category	Date	Individual announcement	Share component	Allocation volume (ML)	Balance available (ML)	Balance not available (ML)	Balance total (ML)
	11/Apr/24	AWD 0.03 ML per Share	18,661	560	25,017	0	25,017
	10/May/24	AWD 0.05 ML per Share	18,661	935	25,952	0	25,952
	13/Jun/24	AWD 0.04 ML per Share	18,661	746	26,697	0	26,697
REGULATED RIVER (HIGH SECURITY)[RESEARCH]	1/Jul/23	Open	1	0	0	0	0
		AWD 100.0 %	1	1	1	0	1

Table 14: Allocation announcements for the reporting period — Macquarie

Category	Date	Individual announcement	Share component	Allocation volume (ML)	Balance available (ML)	Balance not available (ML)	Balance total (ML)
DOMESTIC AND STOCK	1/Jul/23	Open	4,275	0	0	0	0
		AWD 100.0 %	4,275	4,275	4,275	0	4,275
DOMESTIC AND STOCK[DOMESTIC]	1/Jul/23	Open	803	0	0	0	0
		AWD 100.0 %	803	804	804	0	804
DOMESTIC AND STOCK[STOCK]	1/Jul/23	Open	165	0	0	0	0
		AWD 100.0 %	165	165	165	0	165
REGULATED RIVER (HIGH SECURITY)	1/Jul/23	Open	8,537	0	-23	0	-23
		AWD 1.0 ML per Share	8,537	8,537	8,514	0	8,514
SUPPLEMENTARY WATER	1/Jul/23	Open	48,708	0	95	0	95

Category	Date	Individual announcement	Share component	Allocation volume (ML)	Balance available (ML)	Balance not available (ML)	Balance total (ML)
		AWD 1.0 ML per Share	48,708	48,708	48,803	0	48,803
LOCAL WATER UTILITY	1/Jul/23	Open	16,205	0	0	0	0
		AWD 100.0 %	16,205	16,205	16,205	0	16,205
REGULATED RIVER (GENERAL SECURITY)	1/Jul/23	Open	613,805	0	502,063	0	502,063
		AWD 0.0 ML per Share	613,805	0	502,063	0	502,063
	12/Jul/23	AWD 0.5 ML per Share	613,805	306,903	808,966	0	808,966
	12/Mar/24	AWD 0.01 ML per Share	613,805	6,138	815,104	0	815,104
	11/Apr/24	AWD 0.03 ML per Share	613,805	18,415	833,519	0	833,519

Category	Date	Individual announcement	Share component	Allocation volume (ML)	Balance available (ML)	Balance not available (ML)	Balance total (ML)
	10/May/24	AWD 0.05 ML per Share	613,805	30,692	864,211	0	864,211
	13/Jun/24	AWD 0.04 ML per Share	613,805	24,551	888,762	0	888,762
REGULATED RIVER (HIGH SECURITY)[RESEARCH]	1/Jul/23	Open	4,044	0	0	0	0
		AWD 100.0 %	4,044	4,044	4,044	0	4,044
REGULATED RIVER (HIGH SECURITY)[TOWN WATER SUPPLY]	1/Jul/23	Open	40	0	0	0	0
		AWD 100.0 %	40	40	40	0	40
LOCAL WATER UTILITY[DOMESTIC AND COMMERCIAL]	1/Jul/23	Open	1,200	0	0	0	0
		AWD 100.0 %	1,200	1,200	1,200	0	1,200

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.

Data type

Measured/administration data

Policy

Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016

Data accuracy

A — Estimated in the range +/- 10%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data source

WaterNSW/NSW Department of Climate Change, Energy, the Environment and Water– 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. These are:

- 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.

The following table 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 subcategories 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 for the reporting period

Licence category	Macquarie account usage (ML)	Cudgegong account usage (ML)
Domestic and Stock	1,423	292
Domestic and Stock [Domestic]	338	0
Domestic and Stock [Stock]	37	0
Local Water Utility	13,335	1,798
General Security	359,220	2,364
High Security	4,559	372
High Security (Research)	2,938	0
High Security (Town Water Supply)	0	N/A

Licence category	Macquarie account usage (ML)	Cudgegong account usage (ML)
Supplementary Water	0	0
Total usage	381,850	4,826

Note 4 — Internal trading (allocation assignments)

This represents the temporary trading (allocation assignments) of water between allocation accounts within the regulated Macquarie and Cudgegong water sources.

Data type

Administration

Policy

Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016

- Part 10 Access licence dealing rules
  - Clause 49 rules relating to constraints within this water source
  - Available on the NSW Department of Climate Change, Energy, the Environment and Water website at https://water.dpie.nsw.gov.au/

Data accuracy

A1 — Nil inaccuracy +/- 0%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data source

WaterNSW/NSW Department of Planning and Environment — Water Accounting System (joint ownership of system).

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 internal trade for each licence category is zero for a water year. As such, trades occur as both a water liability decrease (sellers of water) and a water liability increase (buyers of water).

Additional information

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

Table 17: Macquarie catchment allocation assignments summary for reporting period

From	To Macquarie General security	To Macquarie High security	To Macquarie Supplementary water	To Cudgegong General security	To Cudgegong High security	Total
Macquarie General security	41,574	0	0	3,197	0	44,771
Macquarie High security	1,208	26	0	125	0	1,359
Macquarie Supplementary water	0	0	8,691	0	0	8,691
Cudgegong General security	1,759	0	0	355	0	2,114
Cudgegong High security	4,435	34	0	244	0	4,713
Cudgegong Supplementary water	0	0	0	0	0	0
Total	48,976	60	8,691	60	8,691	61,648

Note 5 — Storage spill account reset

Windamere Dam

As set out in the water sharing plan allocation is progressively withdrawn from Cudgegong general security and high security carryover sub accounts whenever, Windamere Dam is spilling while the volume held in Burrendong Dam is in exceedance of full supply capacity (i.e. in the flood mitigation zone). Water will be withdrawn monthly at a volume equivalent to the volume spilled from Windamere Dam, while these conditions prevail, until the sub accounts are empty.

All remaining water in the AWD sub accounts will be forfeited and reset to 1 megalitre per share once all allocation has been withdrawn from the carryover sub accounts in the Macquarie. Following the reset each month that Burrendong Dam remains above its full supply level (i.e. in the flood mitigation zone) the AWD sub accounts will be topped up to the equivalent of 1 megalitre per share. Detailed rules about the implementation of this process are available in the water sharing plan.

Burrendong Dam

Similarly, water sharing plan allocation is progressively withdrawn from general security and high security carryover sub accounts and the Environmental Water Allowance (EWA) whenever the volume held in Burrendong storage is in exceedance of full supply capacity (i.e. in the flood mitigation zone). Once all allocation has been withdrawn from the carryover sub accounts all remaining water in the AWD sub accounts will be forfeited and they will be reset to 1 megalitre per share or 160,000 megalitres for the EWA. Following the reset each month that Burrendong Dam remains above its full supply level (i.e. in the flood mitigation zone) the AWD sub accounts will be topped up to the equivalent of 1 megalitre per share while EWA account will be topped up to 160,000 megalitres. Detailed rules about the implementation of this process are available in the water sharing plan.

Water traded out of accounts during the year prior to a spill reset is accounted for under the rules of its source location and licence category during the spill reset process.

Data type

Administration

Policy

Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016

- Part 9 Rules for Managing Access Licences
  - Division 2 Water Allocation Account Management
    - Clause 44 Carrying over of water allocation credits, water allocation sub-account limits and withdrawal of water allocations that have been carried over

- Part 8 Limits to the availability of water

– Division 2 Available water determinations

  - Clause 36 Available water determinations for regulated river (high security) access licences
  - Clause 37 Available water determinations for regulated river (general security) access licences

- Part 3 Environmental water provisions

– Clause 14 Planned environmental water

Available from the NSW Department of Climate Change, Energy, the Environment and Water website at https://water.dpie.nsw.gov.au/

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data source

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

Methodology

Data is extracted directly from the corporate databases which results in a reduction and\or increase in the associated general security account.

Additional information

Table 18: Storage Spill forfeitures and resets for the reporting period

Catchment	Licence type	Spill forfeiture	Spill AWD reset
Cudgegong	General Security	0	0
Cudgegong	High Security	0	0
Macquarie	General Security	0	0
Macquarie	High Security	0	0
Macquarie	EWA	0	0

Note 6 — Held environmental water

This represents that environmental water that is held as part of a licensed volumetric entitlement. These licences are either purchased on the market by environmental agencies or issued as a result of water savings achieved through investment by those relevant agencies.

These licences are held within the same licence categories as all other water access licences and are subject to the same operating rules. 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 — 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 providing water to or supplementing water requirements of specific environmental events or incidents.

Data type

Measured

Policy

Water Management Act 2000

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

Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016

Available on the NSW Department of Climate Change, Energy, the Environment and Water website at https://water.dpie.nsw.gov.au/

Data accuracy

A1 — Estimated in the range +/- 10%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data source

WaterNSW/NSW Department of Climate Change, Energy, the Environment and Water– Water Accounting System (Joint ownership of System).

Available Water Determination Register—NSW Department of Climate Change, Energy, the Environment and Water website at https://water.dpie.nsw.gov.au/

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:

- available water determination (AWD) (detailed in Note 2)
- allocation account usage (detailed in Note 3)
- forfeiture due to:
  - no or limited carryover being permitted (end of year forfeit)
  - account limit breaches
  - storage spills (detailed in Note 5)
  - evaporation reductions on carryover
  - cancellation of licence
- trade of allocation water between accounts (detailed in Note 4)
- determined carryover volume.

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

Explanatory information for Environmental Account Summaries is provided at Table 8. Details of held environmental water accounting are provided in the summaries provided at Table 19, Table 20, Table 21 and Table 22. Details about the Macquarie and Cudgegong held environmental water temporary trading is provided in Table 23.

Table 19: Environmental account balance summary for reporting period—Macquarie. See Table 8 for explanation of headings.

Category	Share	Opening	AWD	Lic New	Lic can	Trade in	Trade out	Usage (Controlled)	Uncontrolled usage	Over order forfeit	During year forfeits	End of year balance (available)	End of year balance (unavailable)	End of year forfeit	Carry forward
General Security	173,742	155,096	109,457	0	0	92,524	94,976	81,377	0	0	3,590	177,135	0	4,176	172,959
Supplementary Water	9,744	0	9,744	0	0	8,440	8,440	0	0	0	0	9,744	0	9,744	0

Table 20: Environmental account balance summary for reporting period—Cudgegong. See Table 8 for explanation of headings

Category	Share	Opening	AWD	Lic New	Lic can	Trade in	Trade out	Usage (Controlled)	Uncontrolled usage	Over order forfeit	During year forfeits	End of year balance (available)	End of year balance (unavailable)	End of year forfeit	Carry forward
General Security	901	901	568	0	0	33	581	0	0	0	22	899	0	0	899
Supplementary Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 21: Annual change in held environmental water shares—Macquarie.

Category	Volume 30 June 2023	Volume 30 June 2024	Volume difference	No. licences 30 June 2023	No. licences 30 June 2024	No. licence difference
General Security	173,742	173,742	0	10	10	0
Supplementary Water	9,744	9,744	0	4	4	0

Table 22: Annual change in held environmental water shares—Cudgegong

Category	Volume 30 June 2023	Volume 30 June 2024	Volume difference	No. licences 30 June 2023	No. licences 30 June 2024	No. licence difference
General Security	901	901	0	4	4	0
Supplementary Water	0	0	0	1	1	0

Table 23: Macquarie and Cudgegong environmental temporary trading summary. See Table 8 for explanation of headings

FROM	TO Environmental Cudgegong General security	TO Environmental Macquarie General security	Total
Environmental Cudgegong General security		581	581
Environmental Macquarie General security	33		33
Total	33	581	614

Component summaries

- Environment to environment trade: 614
- Environment to consumptive trade: 0
- Consumptive to environment trade: 0

Note 7 — Environmental provisions

There a number of planned environmental provisions allowed for within the regulated Macquarie and Cudgegong water sources, implemented under the water sharing plan, with the aim of enhancing environmental benefits.

A long-term extraction limit

Macquarie-Cudgegong Regulated River Water River extractions must be limited to the lesser of the following;

a) long-term average annual extraction calculated under Clause 28 (2) of the Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016
b) long-term average annual extraction calculated under Cap baseline conditions as agreed under the Murray-Darling Basin Agreement that was in place at the commencement of the Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2003.

All flows above the plan extraction limit, are reserved for environmental health.

Environmental Water Allowance for the Cudgegong River

The plan allows for up to 11,400 megalitres to be credited to an environmental water allowance in any water year. This allowance is to be used to make releases for environmental purposes in the Cudgegong River downstream to Burrendong Dam. The allowance replaced translucent

releases operating rules for Windamere Dam.

Establish an environmental water allowance for the Macquarie River

The plan allows for up to 160,000 megalitres to be credited to an environmental water allowance in any water year. Part of this allowance (sub account 1) is used to provide more natural flows downstream of Burrendong Dam. Releases are made during the periods 1 July to 30 November, and 5th March to 30th June each water year to attain, in combination with downstream tributary inflows, a flow of between 500 and 4,000 megalitres per day at Marebone Weir. The other part of the environmental water allowance (sub account 2) is released when needed for special environmental purposes such as enhancing native fish recruitment, ensuring completion of water bird breeding events, and alleviating severe, unnaturally prolonged drought conditions in the Macquarie Marshes. An Environmental Flow Reference Group provides advice on when the water should be released for environmental purposes.

Data type

Measured

Policy

Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016

- Part 3 Environmental Water Provisions
  - Clause 14 Planned Environmental Water

Available on the NSW Department of Climate Change, Energy, the Environment and Water website at https://water.dpie.nsw.gov.au/

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data source

WaterNSW/NSW Department of Climate Change, Energy, the Environment and Water—Water Accounting System (Joint ownership of System).

WaterNSW annual compliance report (internal document)

Additional information

Table 24: Summary balance of Cudgegong environmental water allowance

Water year	**Carryover account as at 1 July**	**AWD**	**AWD Spill Reset**	**Forfeiture – spill**	**Forfeiture – evaporation**	**Annual usage**	**End of year balance as at 30 June**
2023-24	18,622	6,938	0	0	0	9,219	16,341

Table 25: Summary balance of Macquarie environmental water allowance

Water year	Carryover account as at 1 July	AWD	AWD Spill Reset	Forfeiture – spill	Forfeiture – evaporation	Annual usage	End of year balance as at 30 June
2004-05	14,803	14,400	0	0	731	0	28,472
2005-06	28,472	70,400	0	0	0	83,784	15,088
2006-07	15,088	0	0	0	2,136	0	12,952
2007-08	12,952	8,000	0	0	0	20,952	0
2008-09	0	16,000	0	0	0	0	16,000
2009-10	16,000	0	0	0	0	16,000	0
2010-11	0	160,000	160,000	99,624	0	139,098	81,278

Water year	Carryover account as at 1 July	AWD	AWD Spill Reset	Forfeiture – spill	Forfeiture – evaporation	Annual usage	End of year balance as at 30 June
2011-12	81,278	78,400	160,000	71,446	0	88,232	160,000
2012-13	160,000	102,400	0	57,071	0	128,119	77,210
2013-14	77,210	9,600	0	0	1,886	43,671	41,254
2014-15	41,254	3,200	0	0	1,516	17,746	25,192
2015-16	25,192	11,200	0	0	0	36,392	0
2016-17	0	160,000	160,000	160,000	0	26,375	133,625
2017-18	133,625	60,800	0	0	4,155	64,232	126,038
2018-19	126,038	0	0	0	5,593	51,072	69,372
2019-20	69,372	0	0	0	0	0	69,372
2020-21	69,372	108,800	0	0	334	97,542	80,296
2021-22	80,296	124,784	36,800	23,803	283	57,795	160,000
2022-23	160,000	64,000	96,000	160,000	0	42,590	117,410
2023-24	117,410	100,800	0	872	0	115,483	101,855

Table 26: Macquarie environmental water allowance usage and balances by sub account

Water year	Active sub-account usages	Active sub-account balance as at 30 June	Translucent sub-account usages	Translucent sub-account as at 30 June
2011-12	68,064	96,000	20,168	64,000
2012-13	117,436	5,761	10,683	71,449
2013-14	27,861	23,091	15,810	18,163
2014-15	17,746	17,176	0	8,016
2015-16	36,392	0	0	0
2016-17	23,189	72,812	3,186	60,813
2017-18	64,232	75,623	0	50,415
2018-19	51,072	41,623	0	27,749
2019-20	0	41,623	0	27,749
2020-21	44,794	61,902	52,748	18,394
2021-22	17,802	96,000	39,993	64,000
2022-23	25,865	38,135	16,725	79,275
2023-24	74,985	40,689	40,498	61,166

Note 8 — 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

NSW Department of Climate Change, Energy, the Environment and Water

Data source

NSW Department of Climate Change, Energy, the Environment and Water– HYDSTRA

Methodology

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

Additional information

Table 27: Storage summary table

Name	Capacity (ML)	Dead storage (ML)
Windamere Dam	368,120	1,130
Burrendong Dam	1,190,060[16]	33,730

For plots of storage behaviour for the reporting period, including volumes and percentages, see Figure 15 and Figure 11 in this report.

[16] Burrendong also has a flood mitigation storage zone of 489,940 megalitres. Combined capacity is 1,680,000 megalitres.

Note 9 — 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

NSW Department of Climate Change, Energy, the Environment and Water

Data sources

NSW Department of Climate Change, Energy, the Environment and Water: 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 28: Summary of river channel storage 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 are assumed to be linear.

Note 10 — Storage inflow

Storage inflow refers to the volume of water flowing into the major headwater storages — Windamere Dam and Burrendong Dam.

Policy

Not applicable

Data type

Derived from measured data

Data accuracy

A — Estimated in the range +/- 10%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data sources

NSW Department of Climate Change, Energy, the Environment and Water: HYDSTRA, Integrated Quantity and Quality Model (IQQM)

Methodology

In most of the major storages in NSW 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 (assuming seepage as negligible). This is referred to a backcalculation of inflows.

The backcalculation 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.

$$\sum_{i=1}^{n} I_i = \Delta S_i + O_i + Se_i + \frac{(E_i - R_i) * A_i}{100}$$

Table 29: 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

Symbol	Variable	Unit
A	Surface area — derived from height to surface areas lookup curve	ha

Additional information

For plots of daily storage inflows refer to Figure 14 and Figure 10 earlier in this report.

Note 11 — Storage evaporation and storage rainfall

This refers to the volume of water effective on Windamere and Burrendong Dam that is either lost as a result of evaporation or gained as a result of rainfall.

Data type

Derived from measured data

Policy

Not applicable

Data accuracy

B — Estimated in the range +/- 25%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data source

NSW Department of Climate Change, Energy, the Environment and Water– IQQM backcalculation, HYDSTRA

Methodology

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 backcalculation (note 10)

Rainfall:

$$\sum_{i=1}^{n} V_i = \frac{R_i \times \mathrm{A}_i}{100}$$

Evaporation:

$$\sum_{i=1}^{n} V_i = \frac{E_i \times \mathrm{A}_i}{100}$$

Table 30: Components for storage evaporation and rainfall

Symbol	Variable	Unit
V	Volume	ML/year
R	Rainfall	mm/day
A	Surface area — derived from height to surface areas lookup curve	Ha
E	Evaporation (Mortons shallow lake estimation, SILO)	mm/day

Note 12 — 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

Not applicable

Data accuracy

C — Estimated in the range +/- 50%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data source

NSW Department of Climate Change, Energy, the Environment and Water: 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.

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

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 is 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:

$$\sum_{i=1}^{n} V_i = \frac{R_i \times A_i}{10^6}$$

Evaporation:

$$\sum_{i=1}^{n} V_i = \frac{ETO_i \times K_c \times A_i}{10^6}$$

Table 31: Components for storage evaporation and rainfall

Symbol	Variable	Unit
V	Volume	ML/year
R	Rainfall	mm/day
A	Surface area — derived from height to surface areas lookup curve	m2
ETO	reference evapotranspiration from SILO	mm/day
Kc	Crop coefficient for open water (1.05)	-

Note 13 — 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

NSW Department of Climate Change, Energy, the Environment and Water

Data sources

NSW Department of Climate Change, Energy, the Environment and Water: 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.

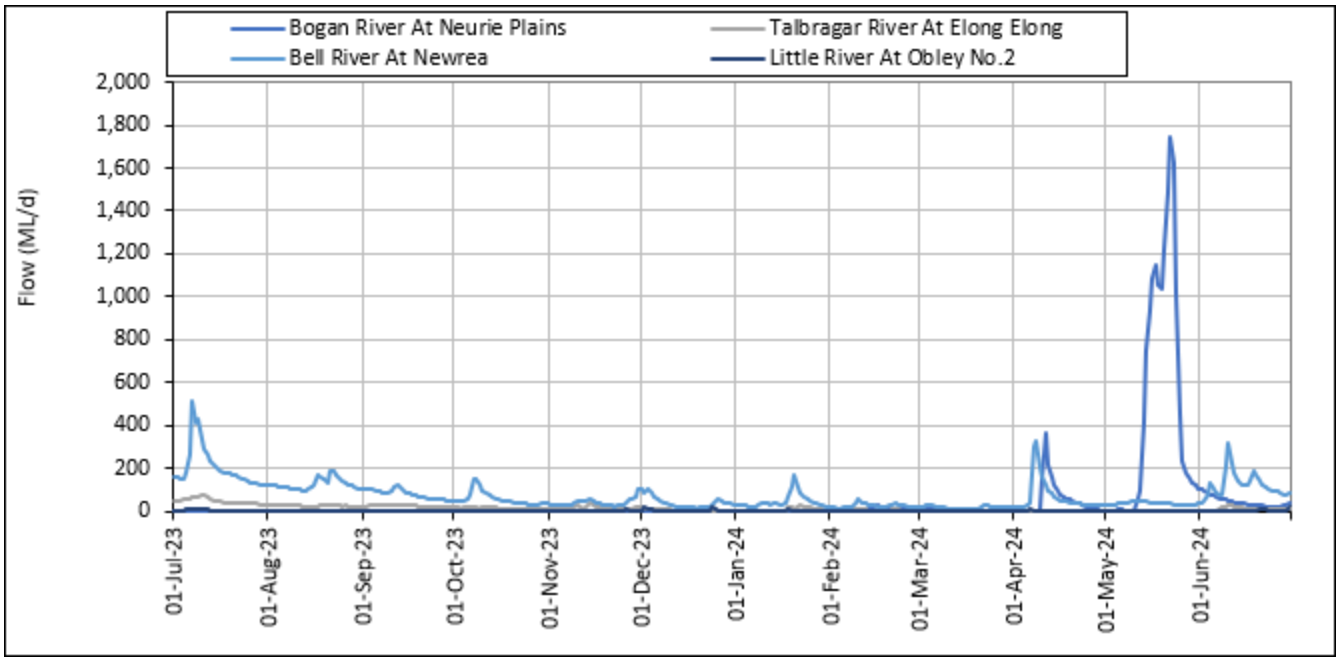
The daily flows for the reporting period for each of the gauged tributaries is shown in Figure 60 below.

Table 32: Summary of gauged tributary inflow for the reporting period

Station	Station Name	Area (km2)	Flow (ML)
421018	Bell River At Newrea	1,620	27,122
421055	Coolbaggie Creek At Rawsonville	626	4,712
421042	Talbragar River At Elong Elong	3,050	5,123

Station	Station Name	Area (km2)	Flow (ML)
421048	Little River At Obley No.2	612	966
		Total Gauged Inflow	37,924

Figure 60: Macquarie gauged daily tributary inflow for the reporting period



Note 14 — 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

NSW Department of Climate Change, Energy, the Environment and Water

Data sources

NSW Department of Climate Change, Energy, the Environment and Water

Methodology

Ungauged inflow is a very difficult component to estimate. 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 areas below the Yamble Bridge gauge in the Cudgegong, and the Warren Weir gauge in the Macquarie (runoff to river considered negligible).

$$UI = EoS - SR - GI + E + LE$$

Where:

- UI = Ungauged Inflow Estimate
- EoS = Gauged Flow at the point in the system where no further inflow is estimated downstream for the purposes of this ungauged calculation (Yamble Bridge in the Cudgegong and Warren Weir in the Macquarie)
- SR_k = Storage release
- GI = Gauged inflows
- E = Extractions (excluding any that are below the nominated 'EoS')
- LE = Estimated losses – assumed to be 10% of the measured (gauged flow plus storage releases) entering the system for the Cudgegong and 50% for the Macquarie. The very high loss estimate for the Macquarie (50%) was assumed based on high overbank flows,

effluent flows and flood runners resulting in large quantities of water being lost to the Macquarie system during flood events.

Table 33: Summary of ungauged inflow estimates for Cudgegong and Macquarie systems

Catchment	Cudgegong Total volume estimated (ML)	Macquarie Total volume estimated (ML)
2013-14		
2014-15		
2015-16		
2016-17		
2017-18	6,500	11,900
2018-19	3,700	9,000
2019-20	72,500	94,100
2020-21	55,400	60,500
2021-22	252,500	122,800
2022-23	603,000	254,000
2023-24	16,000	158,000

Note 15 — Dam releases, river inflow from dam releases

The volume of water released from Windamere and Burrendong storages. In the accounting process this release is represented as both a decrease in asset (of the dam) and an equal increase in asset (of the river).

Policy

Not applicable

Data type

Measured data

Data accuracy

A — Estimated in the range +/- 10%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data sources

NSW Department of Climate Change, Energy, the Environment and Water: HYDSTRA

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 releases have been represented in the Statement of Changes in Water Assets and Water Liabilities as both a decrease in water asset (water leaving the dam) and an equal volume of increase in water asset (water released increasing the volume of the river). It would have been also possible to account this as a transfer in asset whereby the volumes would not appear in the statements.

Additional information

Figure 61: Burrendong Dam releases during reporting period

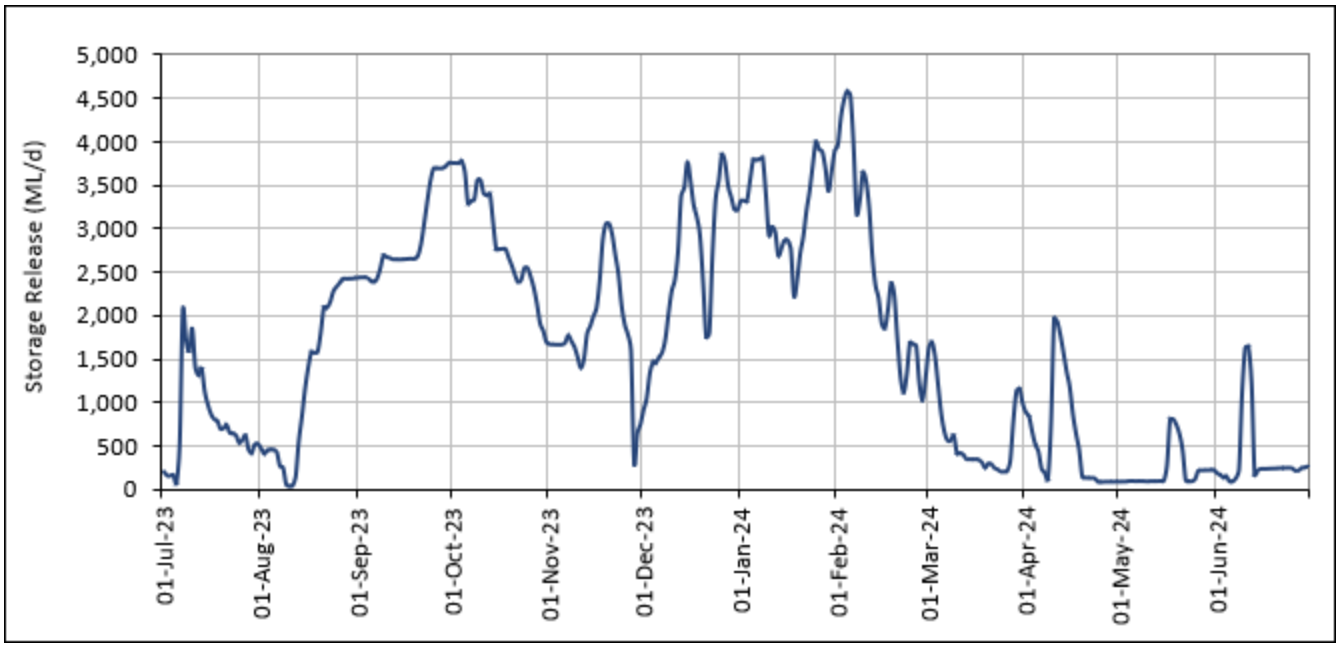
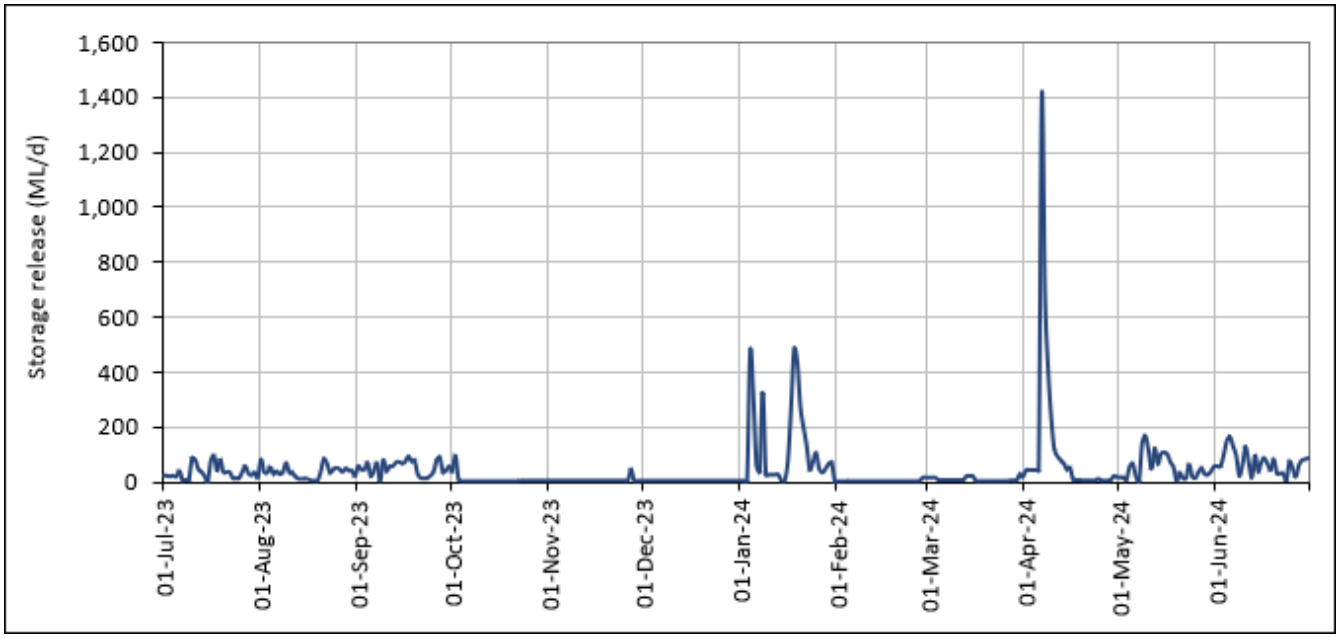


Figure 62: Windamere Dam releases during reporting period



Note 16 — End of system/Regulated Effluents

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

Data type

Derived from measured data

Policy

Not applicable

Data accuracy

A — Estimated in the range +/- 10%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

WaterNSW

Data source

NSW Department of Climate Change, Energy, the Environment and Water– HYDSTRA

Methodology

Summation of flows at gauging site/s measuring the volume of water that leaves the entity at end of system locations or via regulated effluents.

For the Macquarie reporting entity of this GPWAR the end of system is considered to be the Macquarie River at Miltara (421135)[17]. The Miltara site is downstream of the last regulated river licences and also downstream of environmental assets within the Macquarie Marshes that source water from the regulated system. The regulated system defined by the water sharing plan ceases at the confluence of the Macquarie River and Monkeygar Creek offtake.

Regulated effluents leaving are quantified for the regulated Duck Creek and Gunningbar Creek (last downstream gauge) as well as regulated flows to Marra Creek and Crooked Creek and Gum Cowal Creek which receive replenishment supplies from the regulated system (closest offtake measurement is used). In addition effluent flows flow leaving the system via Ewenmar Creek are estimated as no viable gauge is available.

Gauges at these locations record a time series of heights that are converted to a volume of water based on a derived 'height to flow' relationship (rating table). Effluent outflows from the Macquarie

[17] Revised accounting extent commencing in the 2019-20 GPWAR

other than those defined in this note, such as flow leaving via Albert Priest channel, have not been included in this line item and form part of the unaccounted difference presented in the statements.

Additional Information

Table 34: Accounted system outflows during reporting period

Station	Station name	Volume (ML)
421166	Gunningbar Creek At Fairview Dam	19,291
421016	Crooked Creek At Profile	9,342
421164	Duck Creek At Napali	9,436
421097	Marra Creek At Carinda Road	8,282
421135	Macquarie River At Miltara	65,229
421146	Gum Cowal At Bitification	21,327
	Ewenmar Creek	0
Total	-	132,907

Figure 63: Macquarie end of system flow

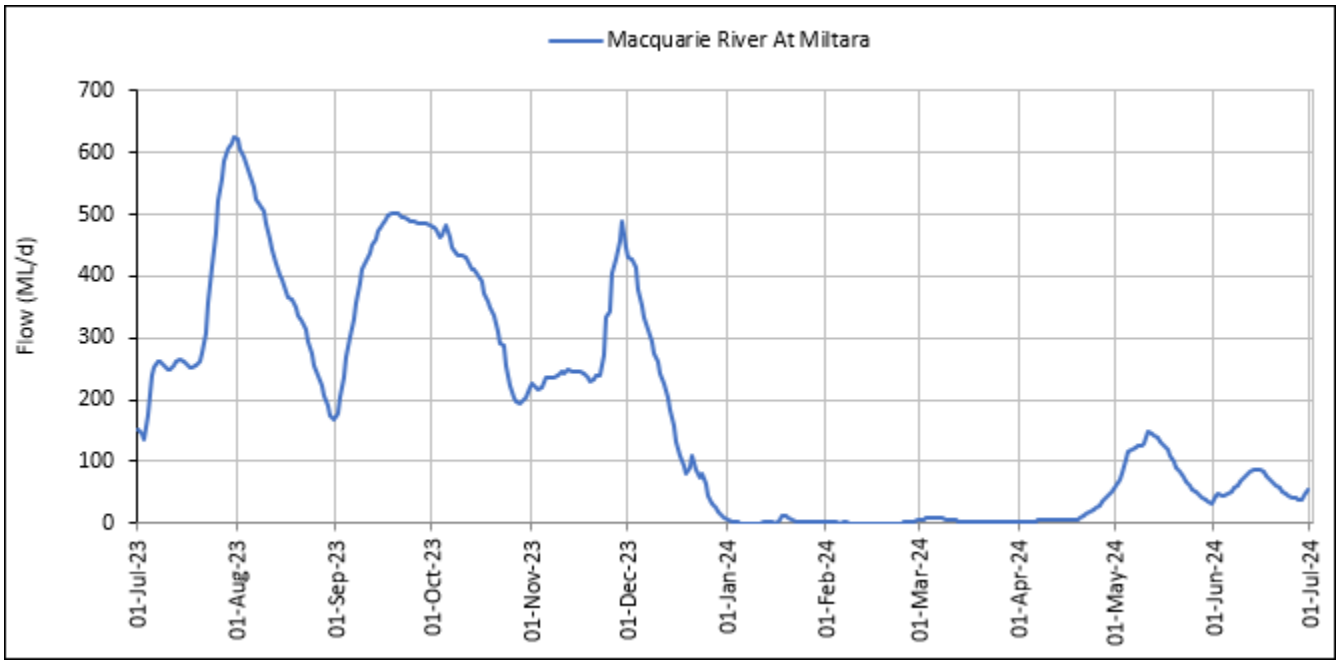
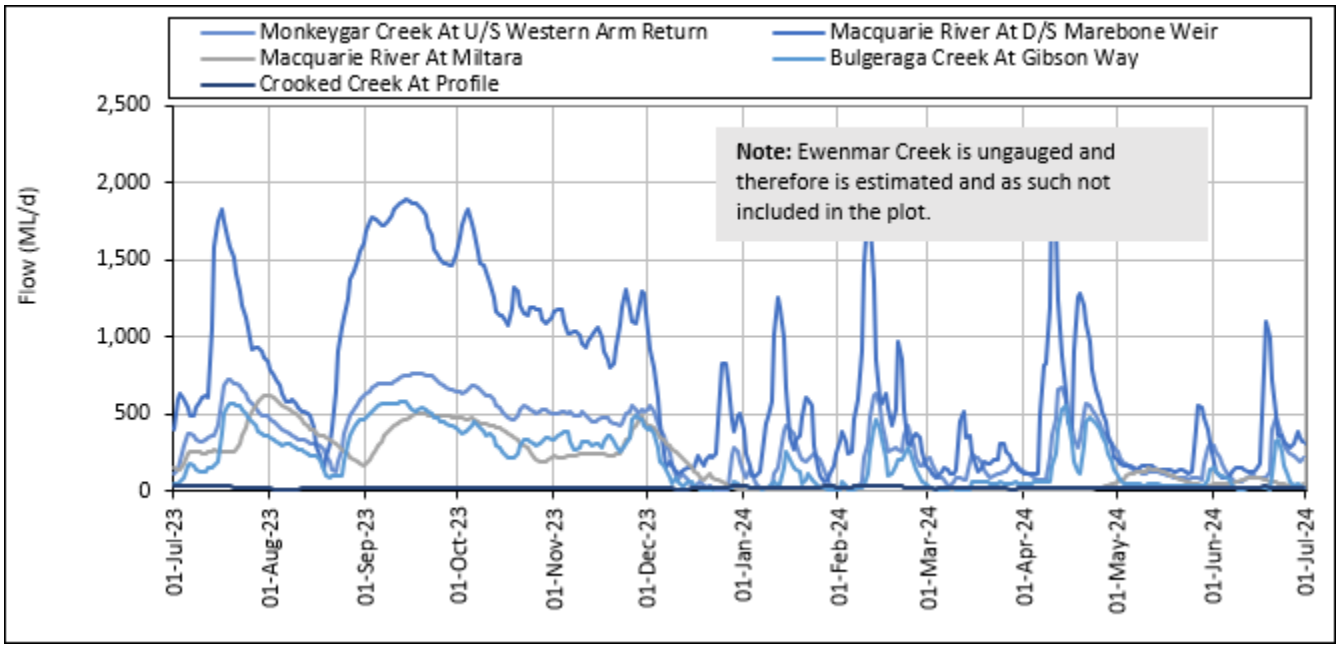


Figure 64: Macquarie regulated effluents



Note 17 — Flow to Macquarie Marshes

The flow to Macquarie Marshes is an estimate of the volume of water that enters the Macquarie Marshes from the accounted regulated river extent. It excludes water to deliver consumptive users, replenishment flow deliveries that does not pass through, and regulated outflow downstream of the Marshes (where it is possible to quantify).

The total water entering the Macquarie Marshes in a year is made up of water provided from a variety of sources including:

- Environmental Water Allowance (EWA) and translucent flow delivery
- Held Environmental Water (licensed)
- Operational loss
- Other surplus flow during high flow events

Policy

Not applicable

Data type

Measured data

Data accuracy

B — Estimated in the range +/- 25%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data sources

NSW Department of Climate Change, Energy, the Environment and Water: HYDSTRA, WaterNSW: annual compliance report (internal document) and Water Accounting System

Methodology

Generally for estimating a net flow volume to the Macquarie Marshes system we use flow measurements at Marebone Weir, flow returning downstream of the Marshes, measured regulated consumptive use downstream of Marebone Weir, estimated replenishment deliveries, and a baseflow delivery estimate. However, in times of flood when water is on the flood plain and flows entering the marshes are unreliable we use Warren Weir flows as an alternative to the combined D/S Marebone Weir and Marebone Break flows.

The calculation is summarised below:

$$Q_{Net} = Q_{mw} + Q_{mb} - Q_{out1} - Q_{out2} - Q_{Rep} - E_{Con} \text{ (non flood)}$$

$$Q_{Net} = Q_{ww} - Q_{out1} - Q_{out2} - Q_{Rep} - E_{ConW} \text{ (flood)}$$

Where:

- Q_{Net} = Net flow estimate to Macquarie Marshes
- Q_{mw} = Total flow passing Marebone Weir via the Macquarie River (421090)
- Q_{mb} = Total flow passing via Marebone Break (421088)
- Q_{ww} = Total flow passing via Warren Weir (421004)
- E_{Con} = Measured licence extractions below Marebone Weir (regulated consumptive use only)
- E_{ConW} = Measured licence extractions below Warren Weir (regulated consumptive use only)
- Q_{out1} = Total flow passing at Miltara (421135) (inclusive of replenishment deliveries to the Lower Macquarie unregulated)
- Q_{out2} = Baseflow delivery
- Q_{Rep} = Estimated replenishment deliveries in the Gum Cowal and Terrigal Creek system

Calculation assumptions

The resulting net flow to Marshes (Q_{Net}) is an approximation for the purpose of this annual account and due to data limitations does not quantify the full suite of processes occurring in the Macquarie Marsh area. The net volume calculated in this account is inclusive of:

- any ungauged outflows to Ginghet Creek and Milmiland Creek
- any outflow to Marthaguy Creek via Terrigal Creek (while the volume leaving Terrigal Creek is measured the flow maybe a combination of both regulated outflow, and local rainfall runoff. The volume was therefore excluded for the purpose of this calculation).
- the supply of basic landholder rights between Marebone and Miltara and replenishment delivery losses occurring in the Northern Marshes bypass channel.

Additionally, the calculation does not allow for:

- floodplain harvest take from any overbank flows
- any unregulated licence extractions downstream of Marebone Weir
- other loss processes in the system.

Additional Information

Table 35 below shows the components and calculation process that determines the flow going to Macquarie Marshes. Due to flooding during the reporting period flows entering the marshes were estimated based on the flood flow methodology described earlier.

Figure 65 provides a diagram show the distribution of flows into, around and out of the Macquarie Marshes.

Table 35: Flow to Macquarie Marshes for the reporting period

Item	Volume (ML)
Macquarie River Downstream Marebone Weir	86,121
Marebone Break Downstream Marebone Weir	264,807
Total Flow Downstream Marebone Weir	350,928
Flow leaving Marshes via Gum Cowal Creek	21,327
Flow leaving the Marshes via the Macquarie River	65229
Total Flow Leaving	86,556
Non Environmental Usage Downstream Marebone Weir	0
Baseflow (10 ML/Day)	3,660
Total Flow to Macquarie Marshes	260,711

Figure 65: Diagram of flow distribution in Macquarie Marshes

Note 18 — Extractions from river

This is 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 to pass through end of system target points. As such the volume reported to be physically extracted from the accounted river extent will not always be equal to the amount of water debited against accounts for usage, which has been described in Note 3. The volume stated for extractions from river excludes basic rights extractions, which is reported as a separate line item and detailed in Note 19.

Data type

Measured data

Policy

Not applicable

Data accuracy

A — Estimated in the range +/- 10%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data source

WaterNSW/NSW Department of Climate Change, Energy, the Environment and Water– Water Accounting System

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 licenced account 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.

Additional information

Table 36: Reconciliation of physical extraction to account usage (ML)

Formula	Macquarie	Cudgegong
Licenced extractions from River [18]	300,473	4,826
Plus		
Licenced flow leaving System[19]	81,377	0
Plus		
In stream licenced usage [20]	0	0
Equals		
Total account usage [21]	381,850	4,826

[18] Direct licenced extractions from the river excluding basic rights usage estimate

[19] Licenced environmental water ordered delivered to the Macquarie Marshes for environmental purposes. This volume is already accounted in the flow to Macquarie Marsh line item (note 17), and is removed here to avoid double accounting

[20] Water ordered and used within the accounted system for environmental benefit (not extracted from the river)

[21] The total amount of water accounted for usage against the allocation accounts

Note 19 — 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 Macquarie and Cudgegong Regulated Rivers Water Source 2016

- Part 4 Basic Landholder Rights
  - Clause 17 Domestic and stock rights

Available on the NSW Department of Climate Change, Energy, the Environment and Water website at https://water.dpie.nsw.gov.au/

Data accuracy

C — Estimated in the range +/- 50%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data source

Water Sharing Plan for the Macquarie Regulated River Water Source 2016

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 Macquarie and Cudgegong Regulated Rivers Water Source 2016 being 973 megalitres per year for Macquarie and 227 megalitres per year for Cudgegong.

Note 20 — Supplementary extractions

This is the volume of water extracted or diverted under supplementary access licences 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 in the account refers to an annual upper limit for extractions and its provision is totally reliant on the occurrence of high flow events.

Data type

Measured data

Policy

Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016

- Part 8 Limits to the availability of water
  - Division 2 — Available water determinations
    - Clause 38 Available water determinations for supplementary water access licences
- Part 9 Rules for managing access licences
  - Division 3 — Extraction conditions
    - Clause 47 Extraction of water under supplementary water access licences

Refer to applicable Water Sharing Plan on NSW Department of Climate Change, Energy, the Environment and Water website at https://water.dpie.nsw.gov.au/

Data accuracy

A — Estimated in the range +/- 10%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data source

WaterNSW/NSW Department of Climate Change, Energy, the Environment and Water — Water Accounting System (Joint ownership of system).

Methodology

Supplementary 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 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 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.

Additional information

There were no supplementary access events during the reporting period.

Note 21 — Replenishments flows

This refers to water that is set aside as part of either essential requirements or to be provided from uncontrolled flows for the provision of flows to Marra Creek, Bogan River, downstream of Macquarie Marshes, Gum Cowal/Terrigal System, Crooked Creek, Belaringar Creek and Ewenmar Creek. The water is to supply water for households, town use and stock and for accounting purposes and in some cases treated as water leaving the system/entity. Additional details including the annual limits to be delivered are detailed in the water sharing plan.

Data type

Calculated from measured data

Policy

Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016

- Part 12 System operation rules
  - Clause 58 Replenishment flows

Available on the NSW Department of Climate Change, Energy, the Environment and Water website at https://water.dpie.nsw.gov.au/

Data accuracy

A — Estimated in the range +/- 10%

B — Estimated in the range +/- 25%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data source

WaterNSW

Methodology

Replenishment flows are delivered at certain times of the year and the volume can be assessed by the flow recorded at the gauging station for that period.

The following tables summarise the assessed replenishment flows for the reporting period.

Additional Information[22]

Values for Replenishment flows are from WaterNSW Annual Compliance report

Table 38: Replenishment flow summary for uncontrolled flow requirements

Location	Annual requirement	Estimated replenishment delivery[26]	Event period	Source of supply	Performance
a) Gum Cowal / Terrigal system	Up to 10,000 ML/yr.	20,343 ML	20/08/2023-29/10/2023	Replenishment provided by releases from Burrendong Dam and inclusive of passing translucent, active and HEW environment flows from 18 August. D/s trib flows contributed to delivery of replenishment flows.	System completely replenished
b) Crooked Ck. below Mumblebone	Up to 4000 ML/yr.	26,836 ML	01/07/2023-30/06/2024	Replenishment provided by rain and downstream tributary flows, combined with local rainfall runoff	The creek was partially replenished
c) Bogan R. Nyngan – Gunningbar confluence	Up to 1000 ML/yr.	Unable to estimate the exact volume. However as per the visual inspections our best estimate is more than 1000ML/d	12/05/2024-04/06/2024	Replenishment provided by local rainfall runoff and flows from upper Bogan River	System completely replenished

[22]Values for Replenishment flows are from WaterNSW Annual Compliance report

Table 38, Table 39 and Table 40 extracted from Water NSW, Annual Compliance Report

Location	Annual requirement	Estimated replenishment delivery[26]	Event period	Source of supply	Performance
d) Belaringar Ck. D/S of Albert Priest Channel	Up to 1000 ML/yr.	As last year was very wet, no requirement for replenishment flows in 2023-24.	01/07/2022 to 31/12/2022	System replenished with flow coming down from Belaringar creek	A lot of flows provided last year therefore, no requirement to deliver in 2023-24
e) Ewenmar Ck. (Reddenville Break)	Up to 1,500 ML/yr.	As last year was very wet, no requirement for replenishment flows in 2023-24.			No replenishment flows were diverted into Reddenville Break due to no major rainfall events during 2023-24 water year.
f) Belaringar Ck. U/S	Up to 5000 ML/yr.	As last year was very wet, no requirement for replenishment flows in 2023-24		No replenishment flows were diverted into Reddenville Break due to no major rainfall events during 2023-24 water year..	

Table 39: Replenishment flow summary for water made available from storage (or supplemented from uncontrolled flows)

Location	Annual requirement	Estimated replenishment delivery	Event period	Source of supply	Performance
a) Marra Ck.	Up to 15000 ML/yr.	Estimated Volumes * - measured at Carinda Rd (421097) - 8,638ML	20/10/2023- to 06/12/2024	Replenishment provided by Burrendong Dam release followed by local rainfall runoff.	System completely replenished

Location	Annual requirement	Estimated replenishment delivery	Event period	Source of supply	Performance
b) Lower Bogan River	Up to 15000 ML/yr.	Est. volumes measured at d/s. Fairview (421166) Est. 17,412ML. measured at Gongolgon	01/07/2023-30/06/2024	Replenishment provided by rain and trib flows. Approx. 17,412 ML measured at Fairview (provided from uncontrolled flows from tribs joining Macq River	System completely replenished.

Table 40: Replenishment flows downstream of Macquarie Marshes

Location	Annual requirement	Volume diverted	Event period	Source of supply	Performance
Macquarie River D/S Macquarie Marshes.	Twice Yearly	Measured at Miltara (421147) Total measured 67,578 ML	01/07/23 to 30/06/2024	Flows provided by tribs, active and translucent flows, environmental licenced flow releases and flow contributions from Marthaguy Creek.	System completely replenished.

Note 22 — River and groundwater interaction

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

While a detailed water budget for the groundwater aquifer had previously been reported within the water accounting statements (Macquarie–Bogan catchment General Purpose Water Accounting Report 2010-11), this is now being presented in the groundwater appendix of this document.

Data type

Modelled

Policy

Not applicable

Data accuracy

D — Estimated in the range +/- 100%

Providing agency

NSW Department of Climate Change, Energy, the Environment and Water

Data source

NSW Department of Climate Change, Energy, the Environment and WaterMODFLOW (Data inputs from HYDSTRA, GDS)

Methodology

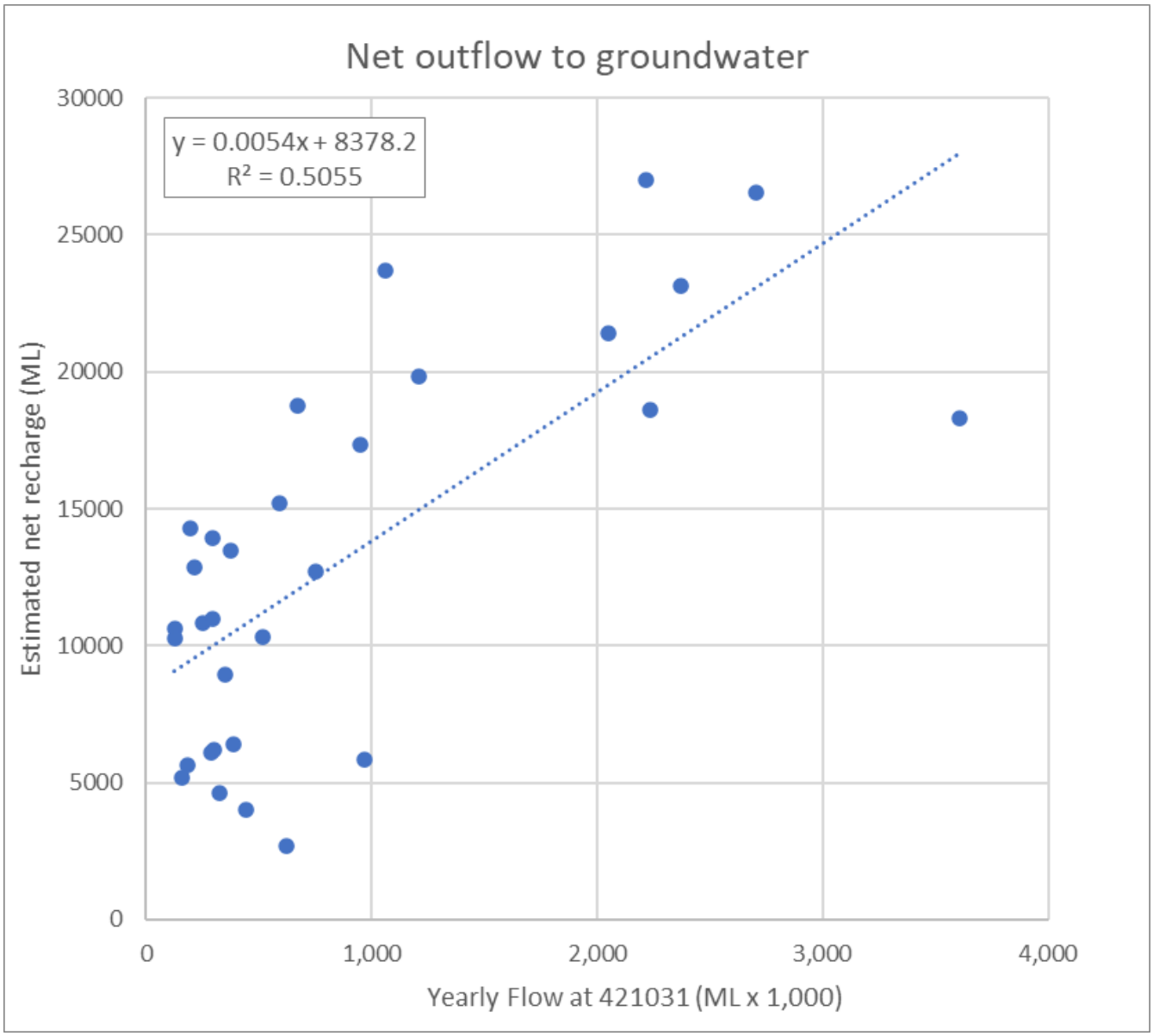
For the lower Macquarie groundwater source the method used to calculate either flow from the connected alluvium to the accounted river extent and the accounted river extent to the alluvium aquifer can be either of the following:

- If available use the estimated annual budget from the NSW Department of Climate Change, Energy, the Environment and WaterMODFLOW model for the Lower Macquarie Groundwater Management Area (for a more detailed explanation of the Method, see 'Method A' in the document NSW General Purpose Water Accounting Reports — Groundwater Methodologies, available for download from the NSW Department of Climate Change, Energy, the Environment and Water website at https://water.dpie.nsw.gov.au/
- Alternatively an estimation based on the relationships developed between the flow at river gauging site '421031 Macquarie River at Gin Gin' and historical MODFLOW model

results (Figure 68). The resulting equations used for estimating the accounting input are as follows:

– Net Outflow to Aquifer = 0.0054 x Annual Flow (gauging site 421031) + 8,378

Figure 68: Net outflow to groundwater relationship chart



No estimates were made for interactions with the river outside the area covered by the lower Macquarie groundwater source.

Additional information

No annual groundwater budget from Method A is available for the reporting period.

Note 23 — Unaccounted difference

In theory, if all the processes of a water balance could be accurately accounted for the unaccounted difference would be zero. Due to the large uncertainties in many of the volumes presented in the accounts, the various sources from which the data has been obtained and the fact that not all processes of the water cycle have been accounted, the statements are not balanced at the end of the accounting process. 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. Unaccounted differences for Cudgegong and Macquarie Water sources are shown in Table 41 and Table 42 respectively.

Data type

Not applicable

Policy

Not applicable

Data accuracy

D — Estimated in the range +/- 100%

Providing agency

Not applicable

Data source

Not applicable

Methodology

The unaccounted difference is equal to the amount required to obtain the correct volume in river at the end of the reporting period, after all the known physical inflows and outflows have been accounted. The double-entry accounting process 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 9.

Surface Water Unaccounted difference:

$$UVSW = Rs - Rc + RI - Ro$$

Where:

- UVSW = 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)

Additional information

Table 41: Historic Unaccounted Difference Cudgegong

Water Year	UAD	Total In	%
2017-18	536	27,872	2%
2018-19	3,853	33,503	12%
2019-20	(2,197)	92,245	2%
2020-21	(8,643)	69,111	13%
2021-22	2,483	277,463	1%
2022-23	12,817	720,231	2%
2023-24	1,011	36,114	3%

Table 42: Historic Unaccounted Difference for Macquarie

Water Year	UAD	Total In	%
2017-18	115,860	616,563	19%
2018-19	117,546	448,401	26%
2019-20	47,195	328,577	14%
2020-21	(25,819)	549,485	5%
2021-22	382,646	2,492,559	15%
2022-23	730,158	4,971,280	15%
2023-24	44,878	788,590	6%

Note 24 — Adjusting entry

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, a balance in the previous year has been since adjusted 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

NSW Department of Climate Change, Energy, the Environment and Water.

Data source

Not applicable

Methodology

A journal entry is placed in the comparative (prior) year to ensure correct opening balances are achieved in the reporting year.

Additional information

The adjusting entries applicable for the reporting period are provided below (Table 43)

Table 43: Account adjustments

Adjustment	Value (ML)
Increase to allocation account balance	0
Decrease to allocation account balance	0

References

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