

Department of Climate Change, Energy, the Environment and Water

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# General Purpose Water Accounting Report Gwydir Catchment 2022-23



# 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 Gomeroi/Kamilaroi Nation hold the land and waters of the Gwydir 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 Gwydir River catchment landscape and natural resources.

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

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General Purpose Water Accounting Report Gwydir Catchment 2022-23

First published: January 2024

ISBN/ISSN: 2652-5038

Department reference number: PUB22/1317

More information

This report may be cited as NSW Department of Climate Change, Energy, the Environment and Water (2024) General Purpose Water Accounting Report 2022–23: Gwydir Catchment, NSW Department of Climate Change, Energy, the Environment and Water.

Acknowledgements

Produced by the Water Information team, NSW Department of Climate Change, Energy, the Environment and Water—Water group.

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# Abbreviations

Abbreviation/acronym	Description
<b>ARCGIS</b>	mapping and spatial analysis platform for designing and managing solutions through the application of geographic knowledge
<b>AWAS 1</b>	Australian Water Accounting Standard 1
<b>AWD</b>	available water determination
<b>BoM</b>	Bureau of Meteorology
<b>CAIRO</b>	computer-aided improvements to river operations
<b>ECA</b>	environmental contingency allowance
<b>GIS</b>	geographic information system
<b>GPWAR</b>	general purpose water accounting report
<b>IQQM</b>	integrated quantity and quality model
<b>MDBA</b>	Murray–Darling Basin Authority
<b>ML</b>	megalitres (1,000,000 litres)
<b>ML/d</b>	megalitres per day
<b>MODFLOW</b>	modular, 3-dimensional, finite-difference groundwater flow model
<b>SILO</b>	climatic data provision system run by the Queensland Government for the provision of both measured and modelled data
<b>WASB</b>	Water Accounting Standards Board
<b>WaterNSW</b>	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
<b>WSP</b>	water sharing plan

# Glossary

Term	Meaning
<b>allocation</b>	the specific volume of water allocated to water allocation accounts in a given season, defined according to rules established in the relevant water plan
<b>allocation assignments</b>	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.
<b>allocation account</b>	water account attached to an access licence used to track the balance of account water
<b>available water determination (AWD)</b>	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.
<b>Australian Water Accounting Standard (AWAS)</b>	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.
<b>back-calculation</b>	a calculation approach using a mass balance to determine an unknown variable (used to calculate storage inflows based on balancing the change in storage volume where inflow is the only unknown)
<b>basic rights</b>	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.
<b>computer aided improvements to river operations (CAIRO)</b>	a spreadsheet-based water balance model used for optimising river operations (orders and releases)
<b>carryover</b>	the volume or share component that may be reserved by a licence holder for use in the subsequent year
<b>catchment</b>	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.
<b>dead storage</b>	the volume in storage that is generally considered unavailable for use (e.g. water level below release valves) due to access and often poor water quality
<b>effective storage</b>	the total volume of storage minus the dead storage component—the volume generally considered as useable
<b>effluent</b>	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.
<b>entity</b>	a defined geographical area or zone within the accounting region Transactions and reports are produced for each entity.

Term	Meaning
<b>end of system</b>	the last defined point in a catchment where water information can be measured and/or reported
<b>environmental water</b>	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.
<b>evaporation</b>	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.
<b>evapotranspiration</b>	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
<b>extraction</b>	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.).
<b>general purpose water accounting report (GPWAR)</b>	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.
<b>general-security licence</b>	a category of water access licence implemented under the <i>Water Management Act 2000</i> 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).
<b>groundwater</b>	water location beneath the ground in soil pore spaces and in the fractures of rock formations
<b>high-security licence</b>	a category of water access licence implemented under the <i>Water Management Act 2000</i> It receives a higher priority than general-security licences but less priority than essential requirements in the available water determination process.
<b>HYDSTRA database</b>	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
<b>inflows</b>	surface water runoff and deep drainage to groundwater (groundwater recharge) and transfers into the water system (both surface and groundwater) for a defined area
<b>inter-valley trade</b>	trade of licence holder allocation account water via allocation assignment from one catchment to another catchment (or state)
<b>intra-valley trade</b>	trade of licence holder allocation account water via allocation assignment within the same catchment
<b>median</b>	the middle point of a distribution, separating the highest half of a sample from the lowest half
<b>non-physical transaction</b>	an accounting transaction representing a process that is not a component of the water cycle (e.g. an available water determination)
<b>physical transaction</b>	an accounting transaction representing a process of the water cycle (e.g. an extraction)

Term	Meaning
<b>regulated river</b>	<p>a river system where flow is controlled via one or more major man-made structures such as dams and weirs</p> <p>For the purposes of the <i>Water Management Act 2000</i>, a regulated river is one that is declared by the minister to be a regulated river. Within a regulated river system, licence holders can order water against a held entitlement.</p>
<b>share component</b>	<p>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</p> <p>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.</p>
<b>storage</b>	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
<b>storage reserve</b>	proportion of water in a storage reserved in the resource assessment process for future essential or high-security requirements (e.g. town water)
<b>storage volume</b>	the total volume of water held in storage at a specified time
<b>supplementary water</b>	unregulated river flow available for extraction under a supplementary licence
<b>surface water</b>	all water that occurs naturally above ground including rivers, lakes, reservoirs, creeks, wetlands and estuaries
<b>tributary</b>	<p>a smaller river or stream that flows into a larger river or stream</p> <p>Usually, several smaller tributaries merge to form a river.</p>
<b>ungauged catchment</b>	<p>a catchment without a flow gauge to accurately record stream flows</p> <p>Modelled estimates must be used to approximate the contribution of ungauged catchments to the main river.</p>
<b>water accounting</b>	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
<b>water assets</b>	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)
<b>water liabilities</b>	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
<b>water sharing plan</b>	a water management plan that defines the rules for sharing of water within a region under the <i>Water Management Act 2000</i>



# Director's foreword

This is the 13<sup>th</sup> annual release of the general-purpose water accounting report (GPWAR) for the Gwydir Regulated River Water Source. It has been prepared for the accounting period 1 July 2022 to 30 June 2023 (reporting period), under the Australian Water Accounting Standard 1 (WASB, 2012).

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

Included in the GPWAR are:

- a contextual statement, summarising the climatic conditions, water resources, environmental holdings, water trading market and water resource management in the water source for the reporting period
- a physical flow diagram, illustrating changes in storage volumes and the associated inflows and outflows
- water accounting statements presenting the opening and closing balances, and itemised changes to these balances for available water resources (water assets) 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
  - a detailed available water determination report
  - temporary trading by licence category
  - supplementary announcements and usage by river reach
  - physical inflows and outflows to the system for the water year.

Where possible, we have provided quantification of the physical groundwater interactions with the regulated river water source. However, we have not included detailed groundwater accounting information in this GPWAR.

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 Gwydir Regulated River Water Source for the reporting period
- all data presented in this report is based on the best available information at the time of publication
- NSW Department of Climate Change, Energy, the Environment and Water has, to the best of its ability, prepared this GPWAR in accordance with the Australian Water Accounting Standard 1.



**Danielle Baker**

Director Water Analytics

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

# Contextual statement

The Gwydir River is part of the Murray–Darling drainage basin in northern NSW. Covering an area of 26,600 square kilometres, the catchment extends 670 kilometres from the Great Dividing Range to the Barwon River near Collarenebri. It is separated from the Border Rivers catchment to the north by the Mastermans Range and from the Namoi catchment to the south by the Nandewar Range.

From its headwaters near Guyra and Uralla, around 1,200 metres above sea level, the Gwydir River flows north-west through steep-sided valleys. It is joined by the Horton River, the largest tributary flowing north from the Nandewar Range, before it enters the alluvial plains near Gravesend. West of Pallamallawa, the valley widens into an almost completely flat floodplain where the elevation is generally less than 200 metres. Through this flat landscape, the Gwydir flows slowly westward between low natural levee banks towards the Barwon River.

Downstream of Moree is an alluvial fan covering 200 square kilometres, where extensive floodplain wetlands known as the Lower Gwydir Wetlands have developed. These wetlands provide valuable habitat for waterbirds and are listed as a site of international significance under the Ramsar Convention on Wetlands of International Importance.

The lower half of the basin is characterised by numerous anabranches and effluents, the most significant being the Mehi River and Moomin Creek to the south, and the Carole-Gil Gil Creek system to the north.

The dominant land uses in the valley are livestock grazing and dryland agriculture, which together cover 90% of the catchment. The self-mulching black soils of the lower valley have been extensively developed for irrigated agriculture. Around 1,000 square kilometres is used to grow crops such as cotton, cereals and oilseeds.

Most of the summer crops such as cotton are irrigated, while much of the winter demand is met by rainfall. Irrigation water, town water supplies for Bingara and Gravesend and environmental releases for the Lower Gwydir wetlands are supplied from Copeton Dam, the major storage in the valley. Most irrigation diversions occur below Pallamallawa, facilitated by a network of weirs and regulators on the Gwydir River and its effluents.

The Gwydir catchment is within the traditional lands of the Gomeroi/Kamilaroi people. There are now over 26,000 people living within the catchment. The largest town is Moree (8,000 people), which is the main commercial centre for the surrounding agricultural areas. It is also a major transport and tourism hub, being located at the junction of the Gwydir and Newell highways. There are several smaller towns of 1,000 to 2,000 people—Uralla and Guyra in the New England tablelands, and Bingara and Warialda in the middle of the catchment. Smaller villages include Bundarra, Delungra, Pallamallawa and Tingha, which have populations of 300 to 700 people.

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## Accounting extent

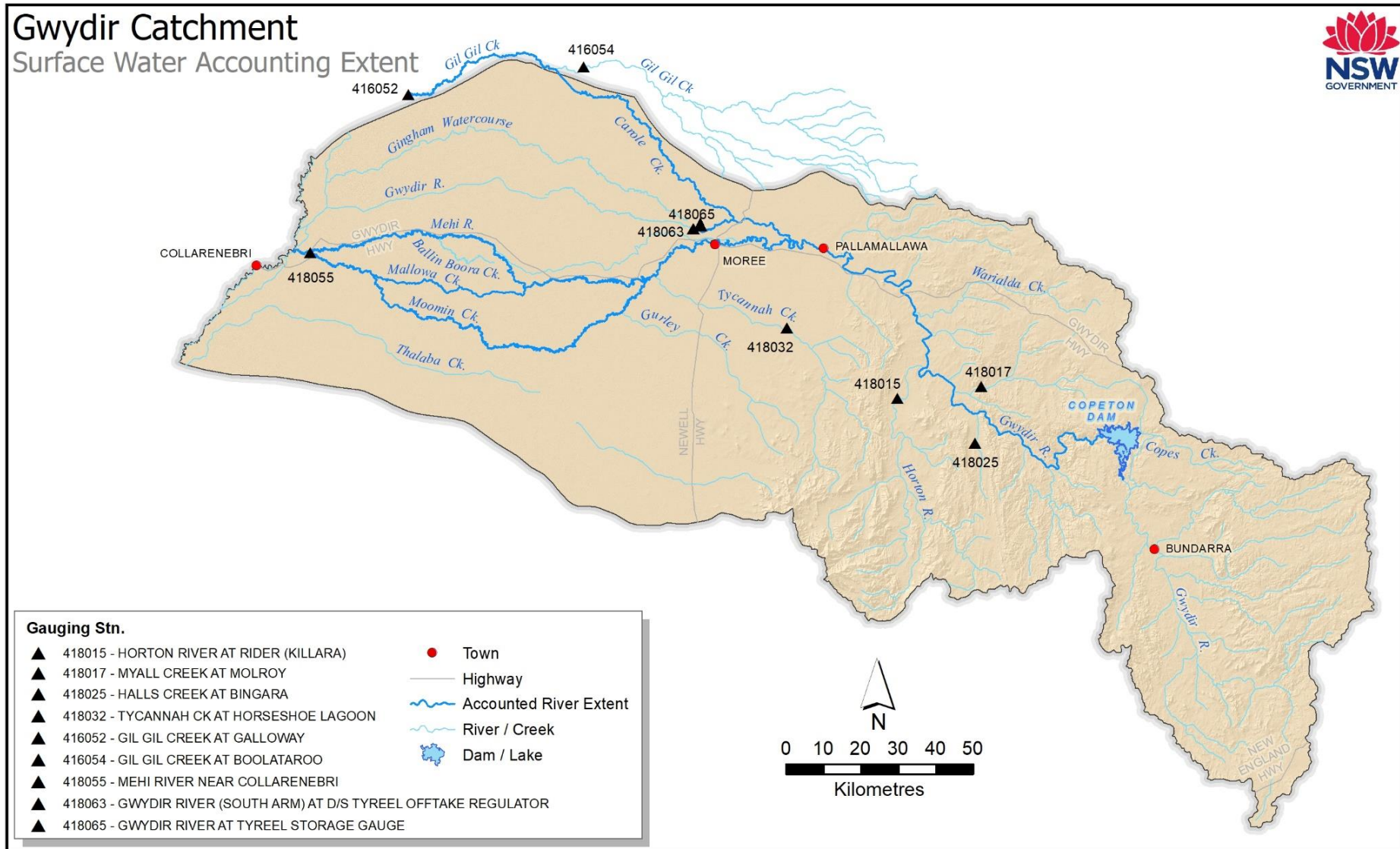
The accounting extent for surface water is illustrated in Figure 1. The accounted river extent is the Gwydir River from downstream of Copeton Dam to Millewa, the Mehi River from its initial effluent with the Gwydir River to near Collarenebri, Mallowa Creek, Moomin Creek, Carole Creek and Gil Gil Creek from its junction with Carole Creek to Gil Gil Creek at Galloway. Note that the accounted component of Gil Gil Creek extends beyond the surface water catchment boundary of the Gwydir and into the Border Rivers catchment, as orders in this section are met using resources from the Gwydir.

All licences managed under the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016* are considered. While physical groundwater volumes that interact with the regulated river are included in GPWAR statements where possible (and any interactions not directly estimated form part of the unaccounted difference) all other groundwater flows and groundwater management are excluded from the GPWAR.

The GPWAR includes estimates for end of system flows. These are the volumes at the end of the regulated water source and is not an estimate of the total volume that would enter the Barwon River.

The Gingham Channel, Mallowa Creek, Lower Gwydir River, Ballinboora Creek, and Thalaba Creek receive domestic and stock replenishment flows from the Gwydir Regulated River Water Source but do not themselves form part of this water source.

Figure 1: Surface water geographical extent of the accounts

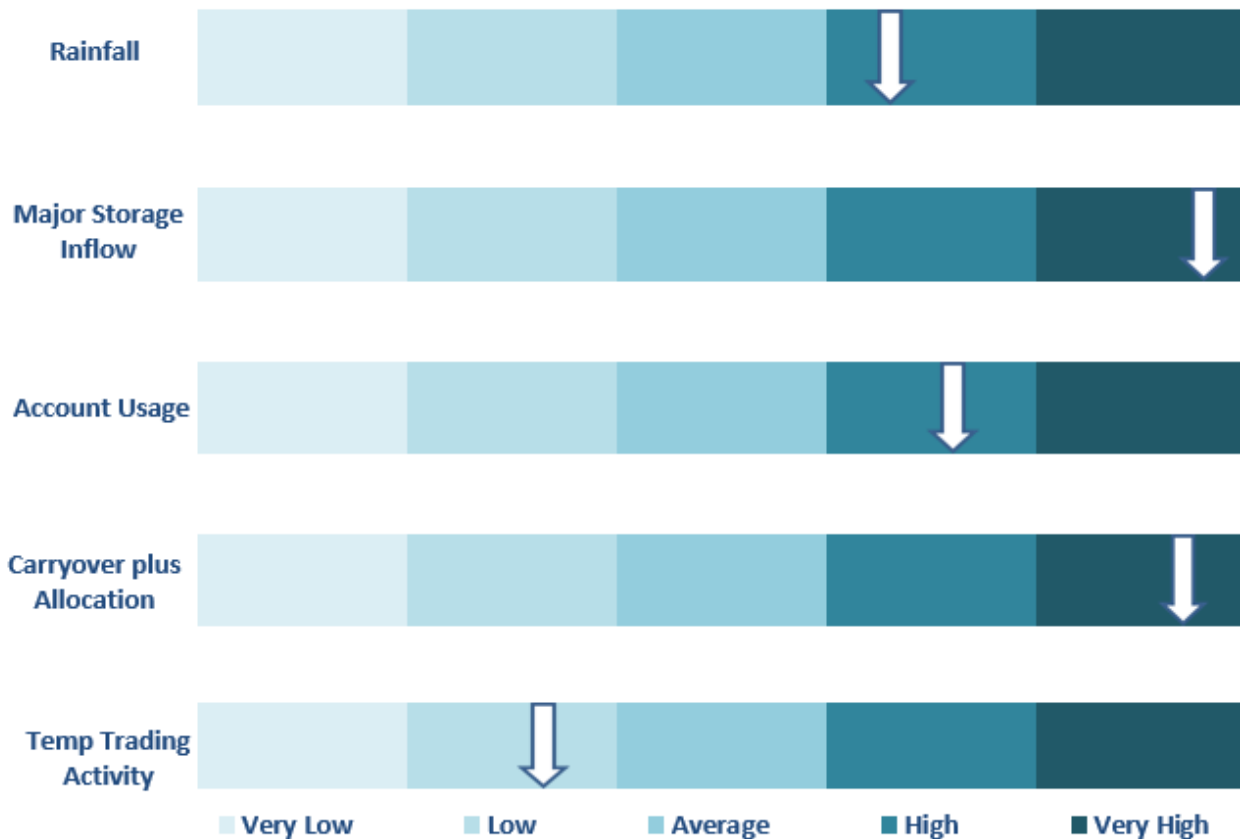


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## Snapshot

The key indicators for 2022-23 relative to historical information are presented in Figure 2. For the reporting period, major storage inflow, effective allocation (carryover plus allocation) was in the very high indicator range. Rainfall and account usage was high, while temporary trading was low.

Figure 2: 2022-23 summary indicators



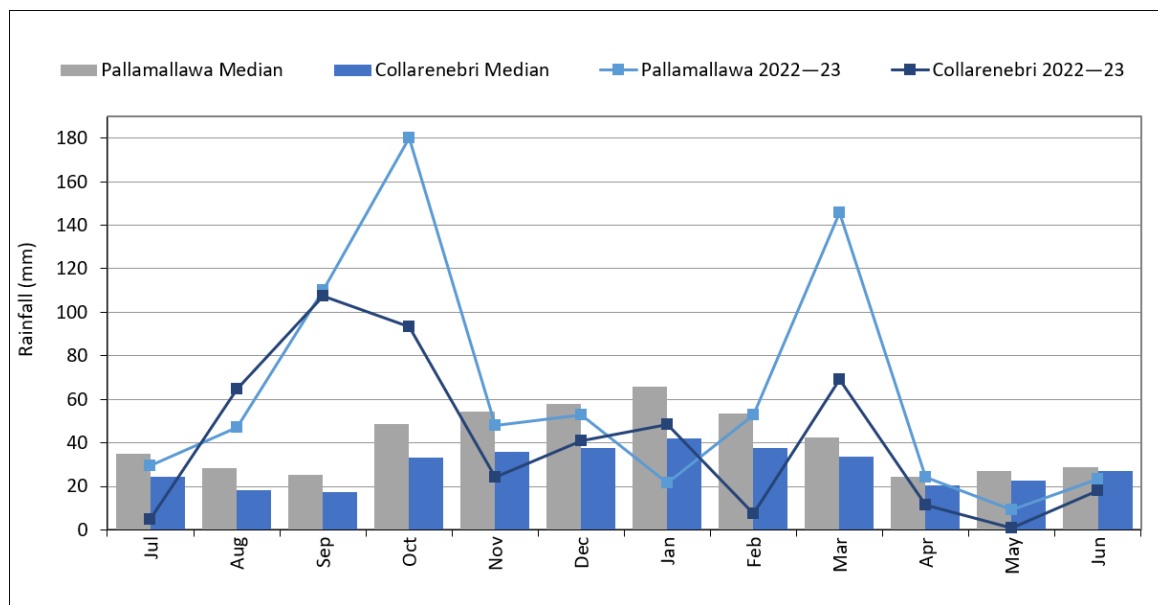
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## Climate

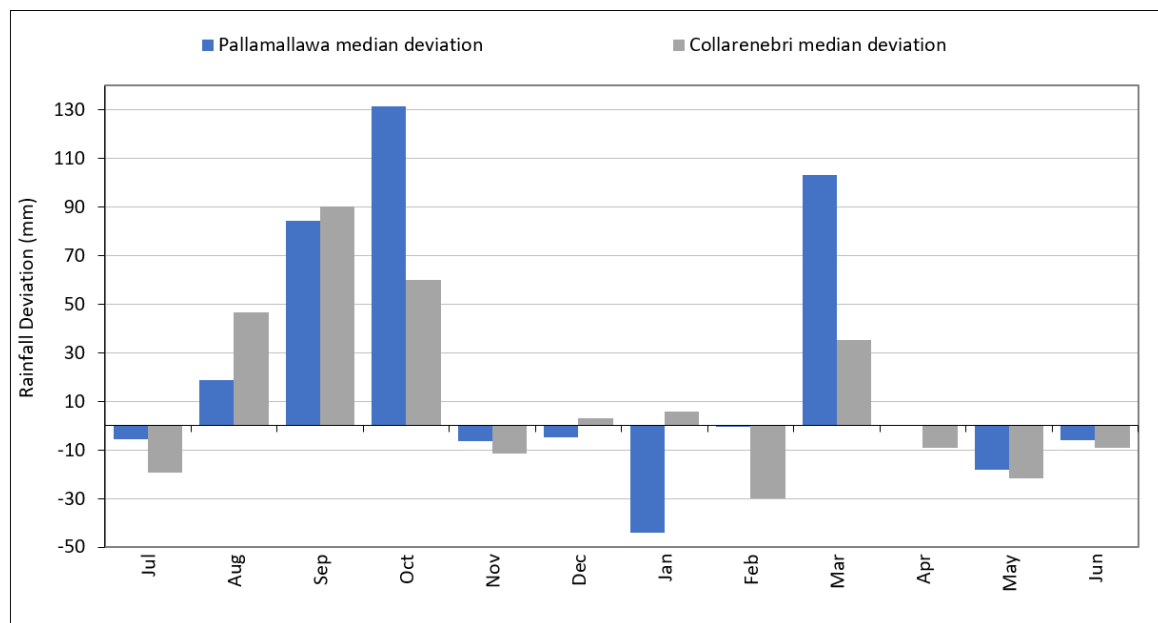
At Pallamallawa (central catchment), 745 mm of rainfall was recorded in the reporting period (Table 1). Comparatively this volume of rainfall is:

- 124% of the long-term historical median rainfall for this location
- 66% of the highest volume on record at the location.

Most rainfall fell in October 2022 (180 mm) and March 2023 (146 mm) (Figure 3: Monthly rainfall at Collarenebri and Pallamallawa for the reporting period against historical median)



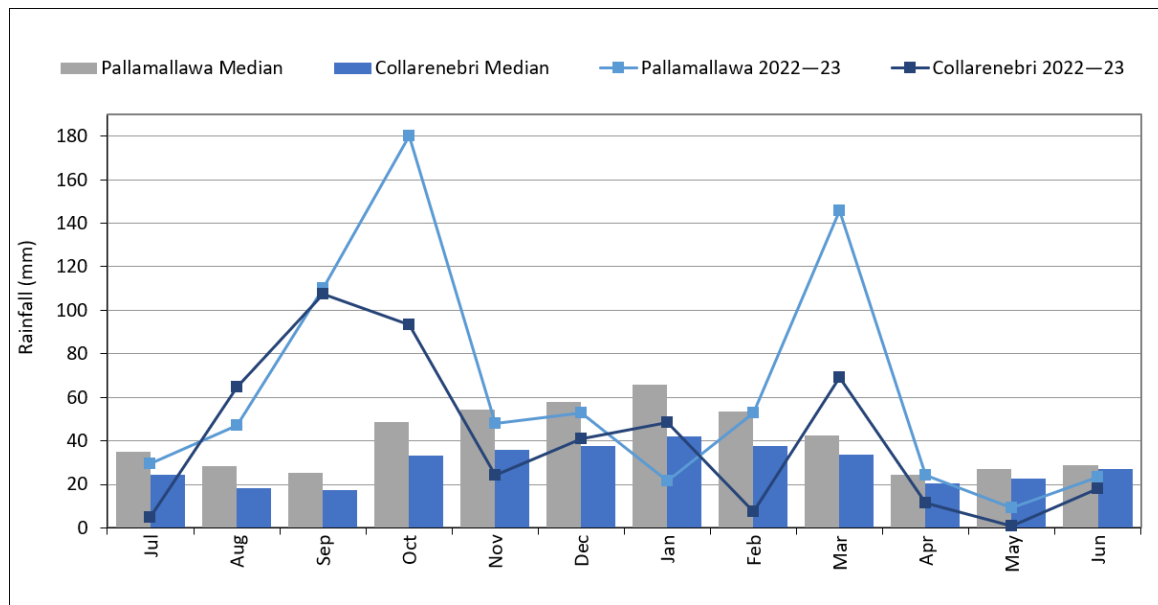
and Figure 4: Monthly rainfall deviation of the reporting period compared to historical median



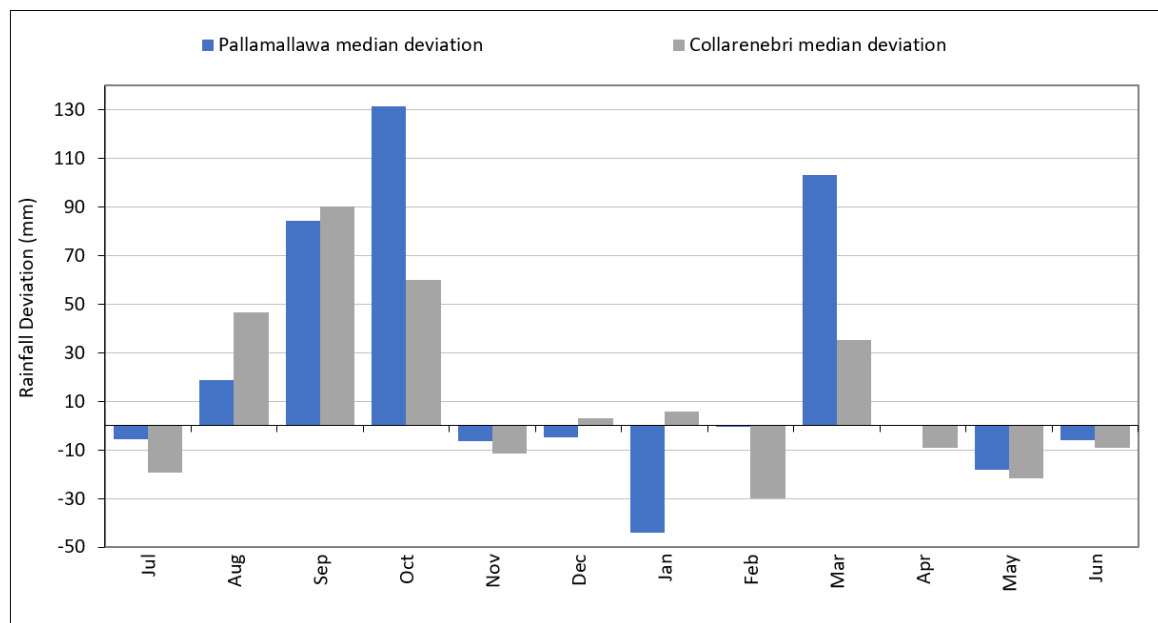
At Collarenebri (lower catchment), 490 mm of rainfall was recorded in the reporting period (Table 2). Comparatively this volume of rainfall is:

- 103% of the long-term historical median rainfall for this location
- 44% of the highest volume on record at the location.

Most rainfall fell during September 2022 (108 mm) and October 2022 (93 mm) (Figure 3: Monthly rainfall at Collarenebri and Pallamallawa for the reporting period against historical median)



and Figure 4: Monthly rainfall deviation of the reporting period compared to historical median



).

A 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 above average across the full extent of the Gwydir catchment.

Figure 3: Monthly rainfall at Collarenebri and Pallamallawa for the reporting period against historical median

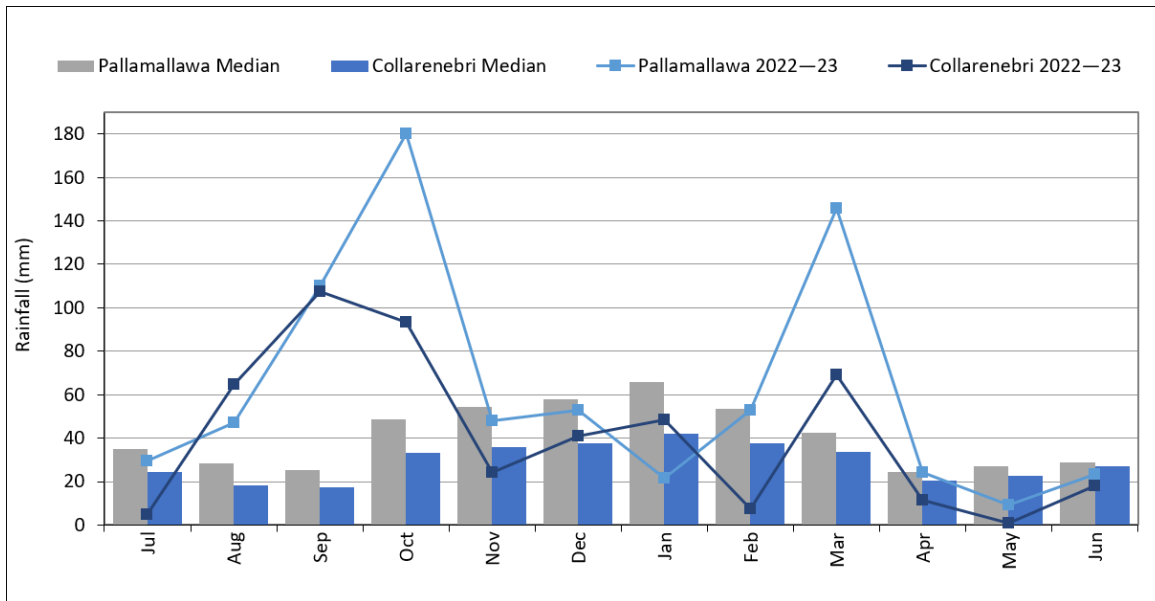


Figure 4: Monthly rainfall deviation of the reporting period compared to historical median

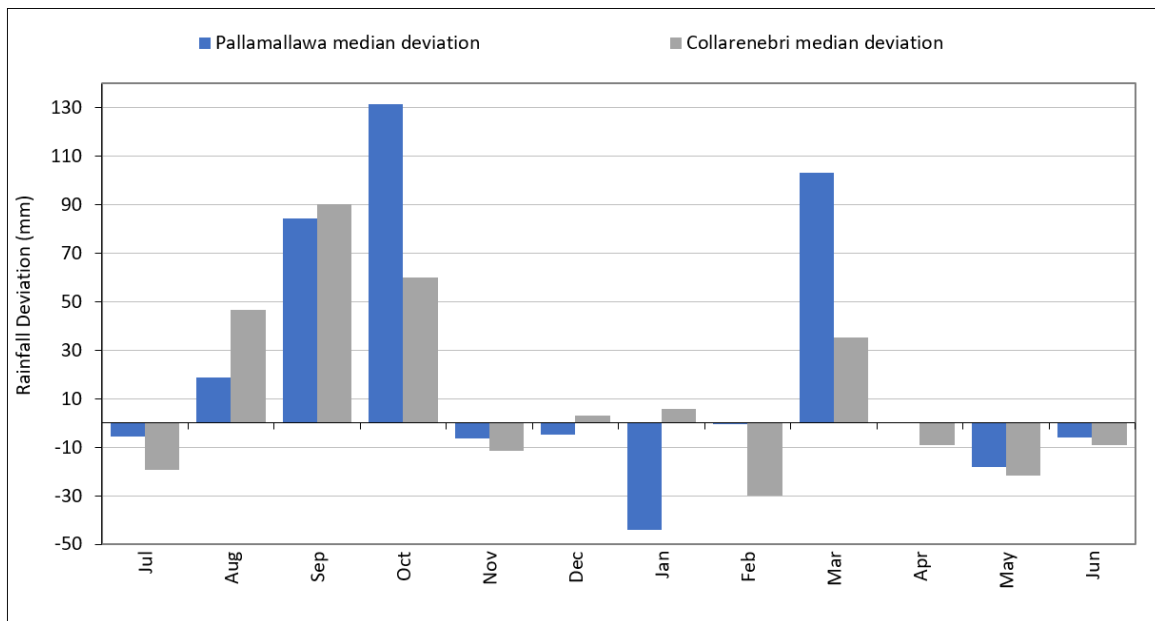




Table 1: Monthly rainfall statistics at Pallamallawa (mm)<sup>1</sup>

Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual
<b>2022-23</b>	29.4	47.2	110.0	180.2	48.0	53.0	21.6	53.0	145.6	24.4	9.0	23.1	744.5
<b>Historical Mean</b>	42.8	33.6	34.8	51.9	65.1	69.2	80.9	73.4	56.2	34.3	38.9	37.7	617.2
<b>Historical Median</b>	35.2	28.5	25.5	48.7	54.4	58.0	65.6	53.6	42.5	24.4	27.2	29.0	599.7
<b>Historical Lowest</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	303.9
<b>Highest</b>	250.8	159.7	182.2	210.3	271.0	256.9	323.9	320.9	250.4	203.6	176.8	203.8	1128.2
<b>Highest year</b>	1949-50	1965-66	1969-70	1953-54	2010-11	1969-70	1945-46	1975-76	1981-82	1987-88	1912-13	2004-05	2011-12

Table 2: Monthly rainfall statistics at Collarenebri (mm)<sup>1</sup>

Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual
<b>2022-23</b>	5.0	64.8	107.6	93.2	24.2	40.8	48.2	7.4	69.0	11.2	0.8	18.0	490.2
<b>Historical Mean</b>	33.9	26.6	26.3	37.9	47.4	52.3	67.3	57.0	49.5	33.3	34.5	34.5	496.9
<b>Historical Median</b>	24.2	18.2	17.3	33.1	35.8	37.6	42.2	37.4	33.6	20.5	22.6	27.0	475.1
<b>Historical Lowest</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	187.7
<b>Historical Highest</b>	159.7	135.0	157.3	167.1	241.2	216.4	508.4	351.4	254.2	356.0	216.2	148.1	1113.8
<b>Highest year</b>	1949-50	1917-18	1905-06	1933-34	1999-00	1990-91	1973-74	1975-76	1893-94	1989-90	1982-83	2004-05	1973-74

<sup>1</sup> Long term statistics are from the SILO—climate data online, using the climatic stations ‘48031—Collarenebri (Albert St)’ and ‘53033—Pallamallawa Post Office’. Historical record statistics commence in 1913 for Pallamallawa and 1885 Collarenebri.

Figure 5: Gwydir annual rainfall for 2022–23

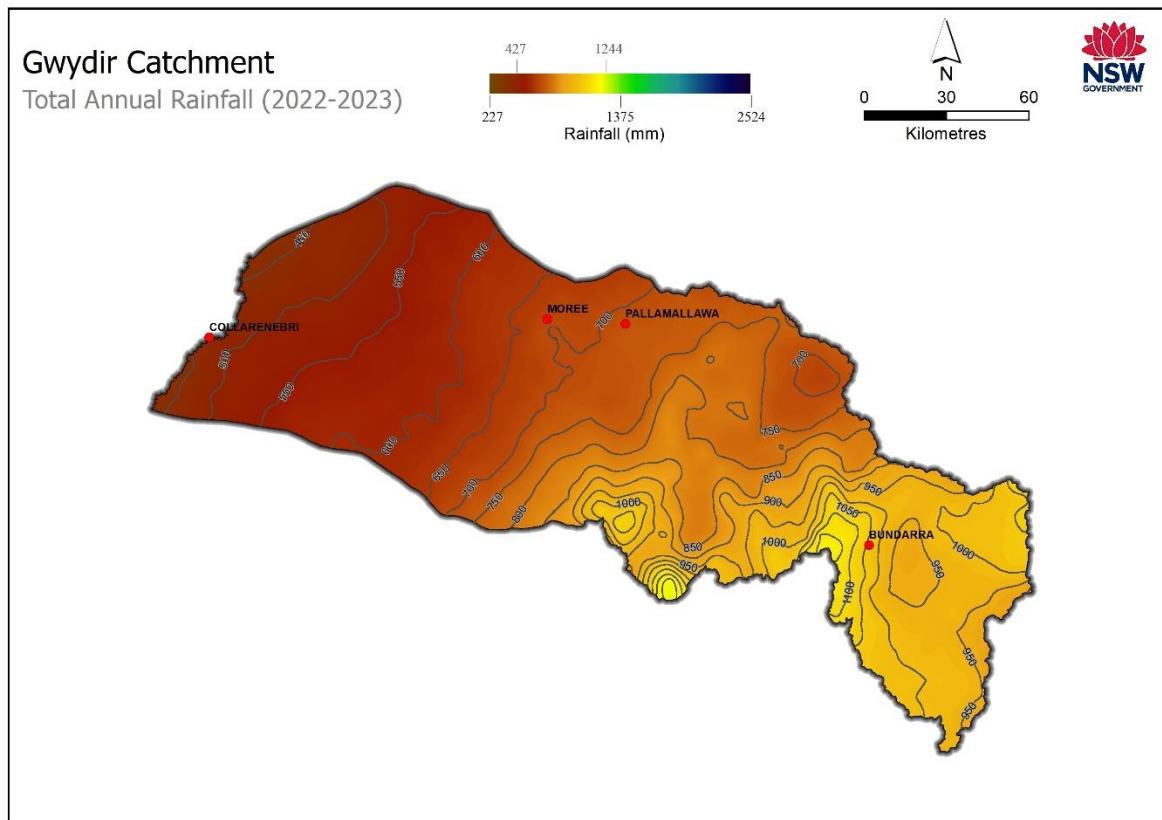
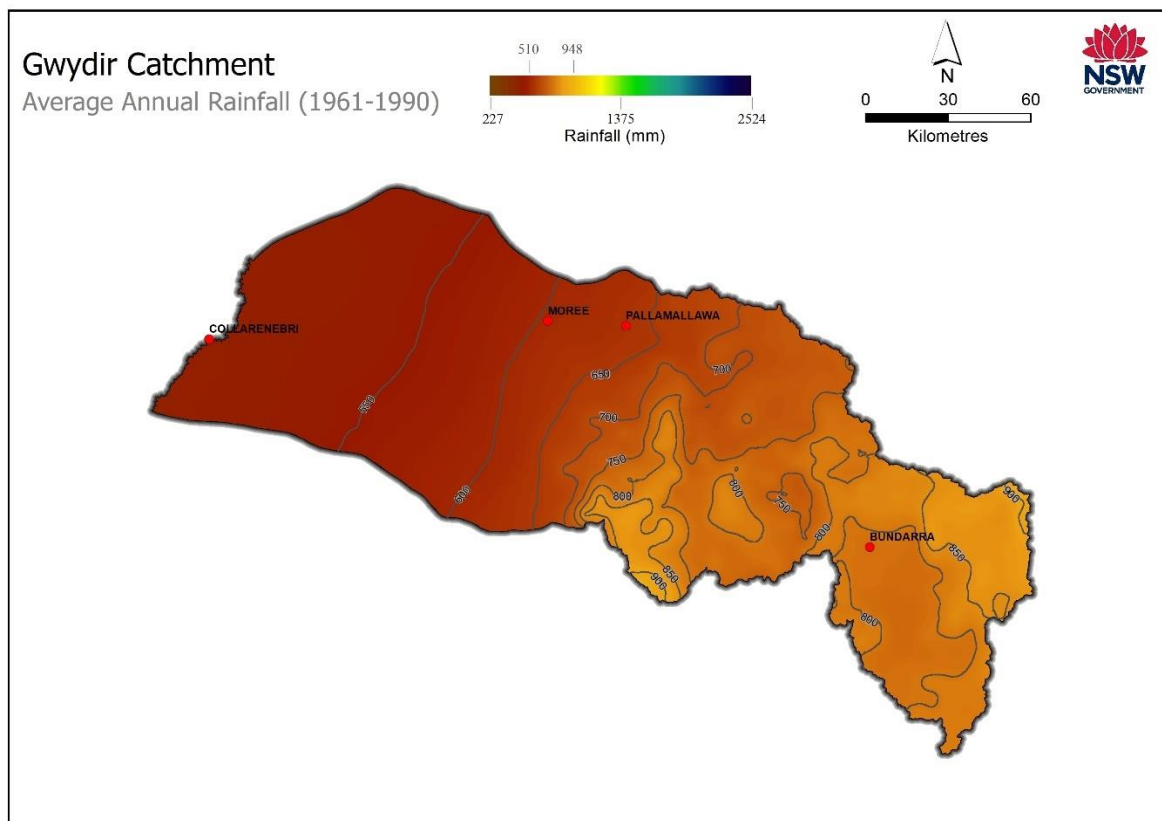


Figure 6: Average annual rainfall in the Gwydir catchment (1961–90)



# Dam inflows and volume

## Inflows

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

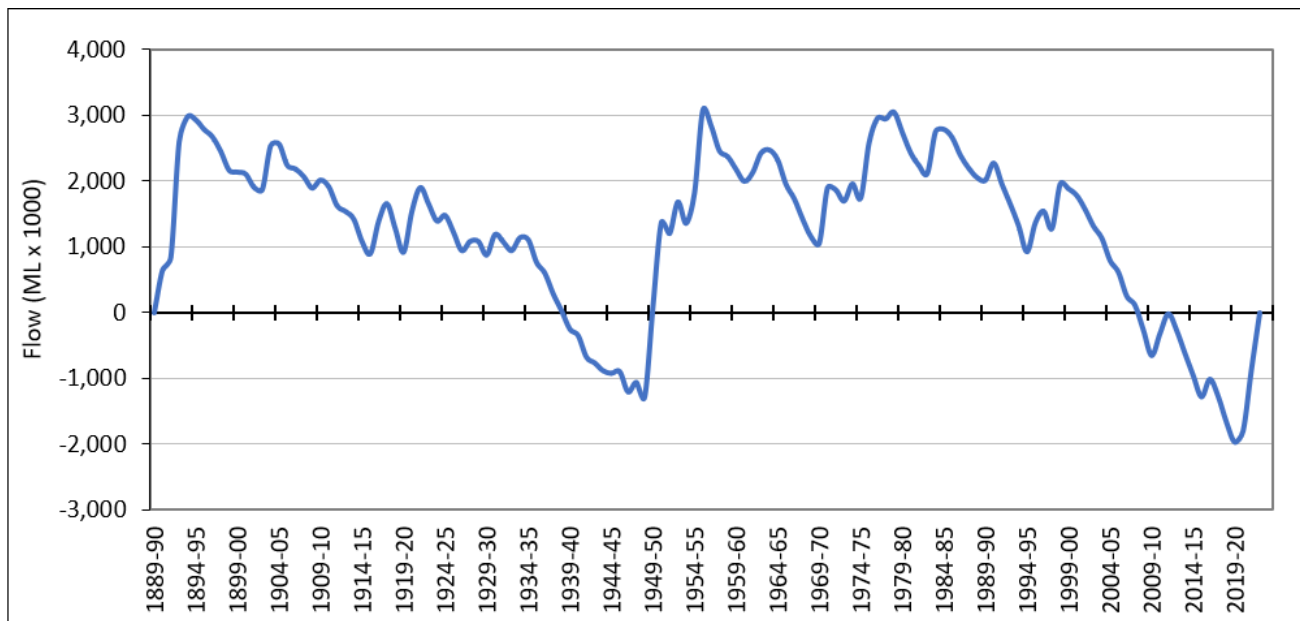
- dry conditions from 1900 to 1950
- wet conditions from 1950 to 1980
- dry conditions from 1980 to present.
- wet conditions since 2020

For the reporting period, inflow to Copeton dam (Figure 8 and Figure 9) was 1,277,525 megalitres, which is:

- 434% of the long-term median annual inflow (294,210 megalitres per year)
- very high relative to the historical record, exceeding 96% of years on record (1890-91 to 2022-23) and being the 3rd consecutive year of above average inflow.

The highest inflows in the reporting period occurred on 22 October 2022, where a maximum daily mean inflow of 172,349 megalitres per day was reached (Figure 10).

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



<sup>2</sup> Inflows are back-calculated storage inflow for period from storage construction and gauged or rainfall runoff model for the prior period

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

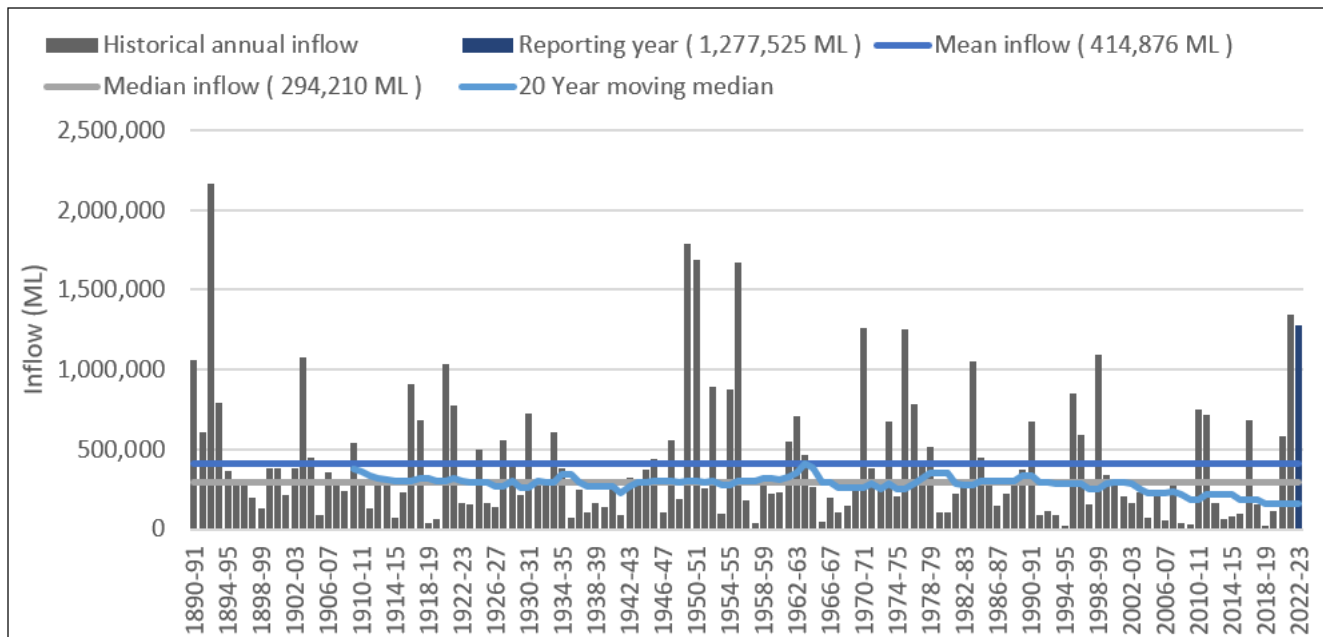


Figure 9: Long-term sequence of years below mean inflow

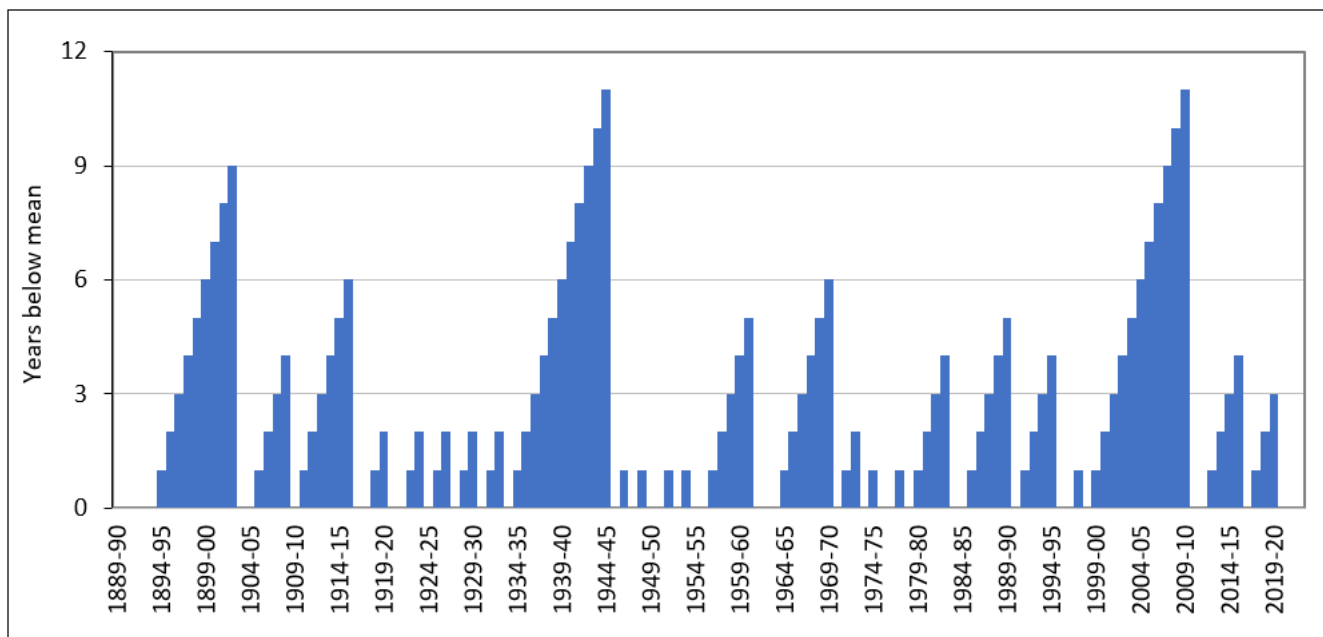
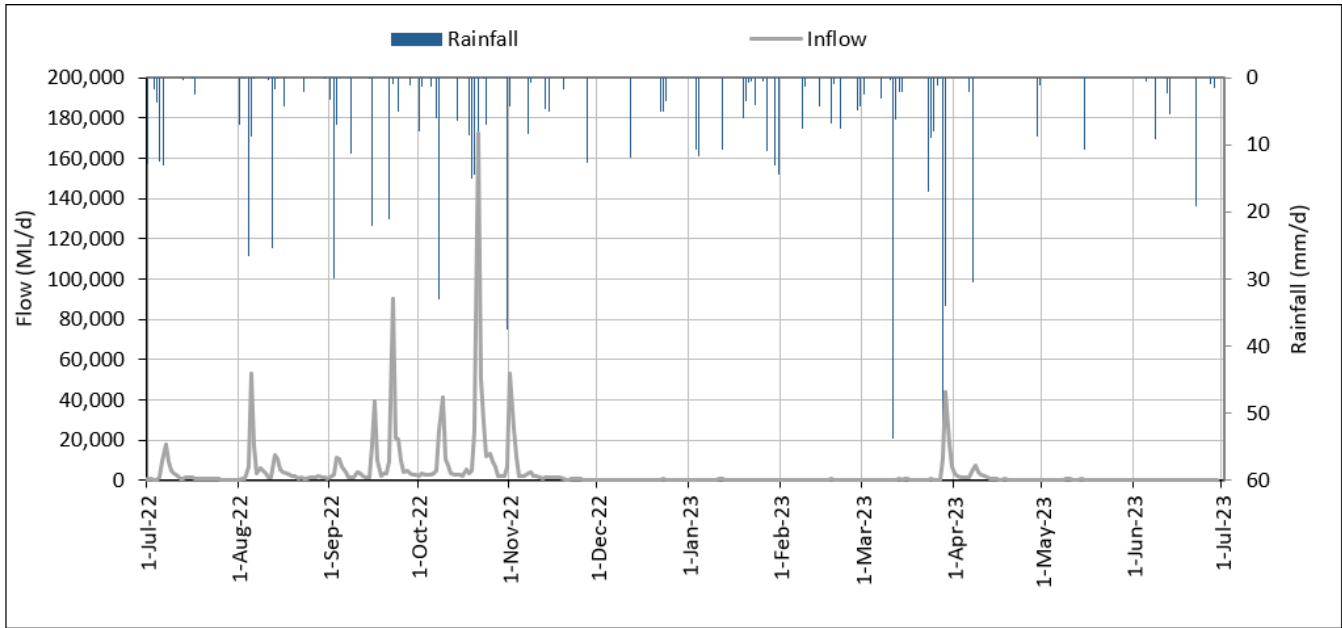


Figure 10: Daily inflows and rainfall at Copeton Dam



### Storage volume

Copeton Dam is the main supply storage in the regulated Gwydir system. The storage was completed in 1972 and has a full supply capacity of 1,361,720 megalitres. During the reporting period the:

- volume held in storage commenced at 1,355,390 megalitres or 100% of full supply capacity (Figure 11)
- volume held in storage at the end of the reporting period was 1,250,427 or 92% of full supply capacity, a decrease of 8% for the year
- maximum volume held during the reporting period was 1,374,542 megalitres or 101% of full supply capacity, occurring on 9 July 2022.

Figure 11: Copeton Dam volume and percentage of full supply volume 2022–23

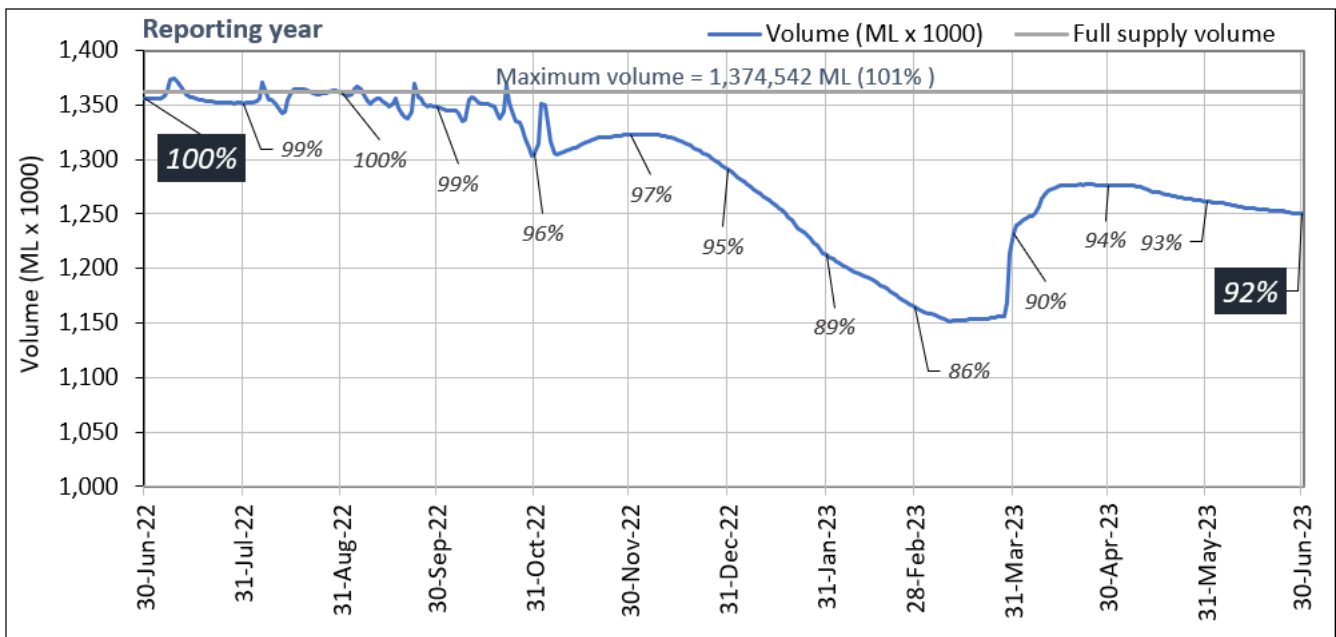
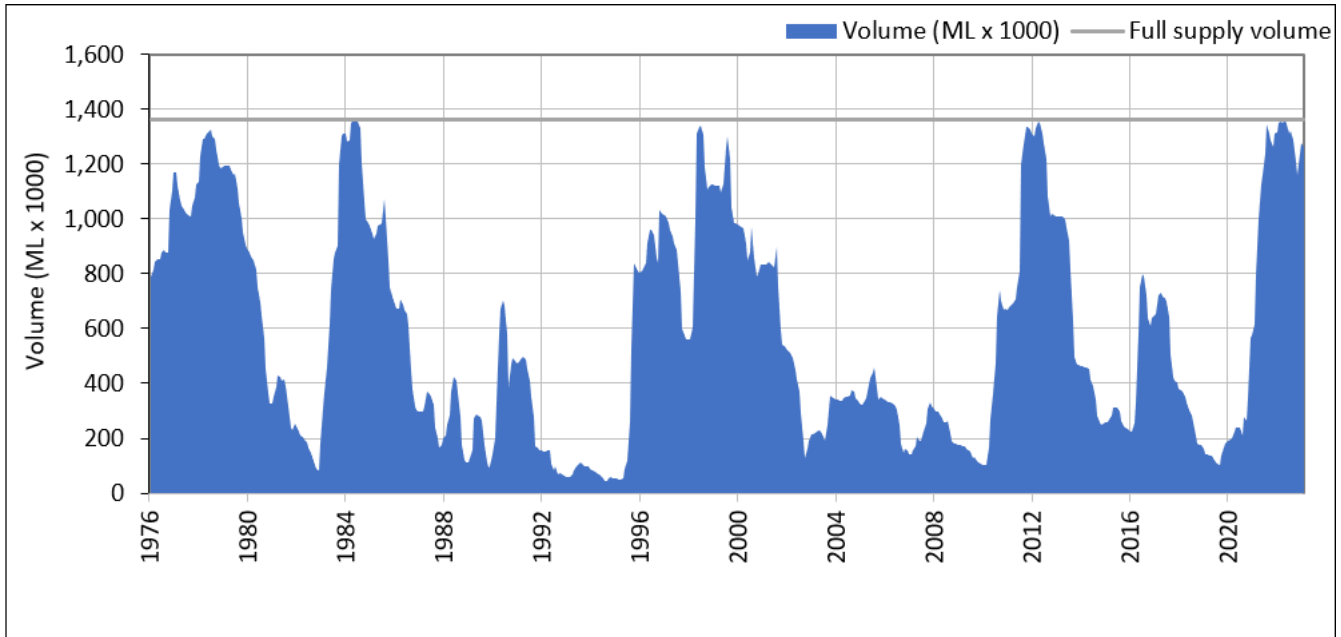


Figure 12: Historical Copeton Dam storage volumes



## Major flow events

- There were six separate events that exceeded the flood level indicators for the Gwydir River at Yarraman Bridge within the reporting period. (Figure 13). The remaining instream volumes were associated with regulated releases from Copeton storage.
- River height at Yarraman Bridge exceeded the major flooding indicator level of 7 metres.
- The Largest event occurred in October 2022 with a peak of 7.5 metres on the 23 October 2022.
- The maximum daily flow rate at Pallamallawa was 159,823 megalitres per day and occurred on 22 October 2022 (Figure 14).

Figure 13: Gwydir River at Yarraman Bridge maximum daily river height against flood risk intervals

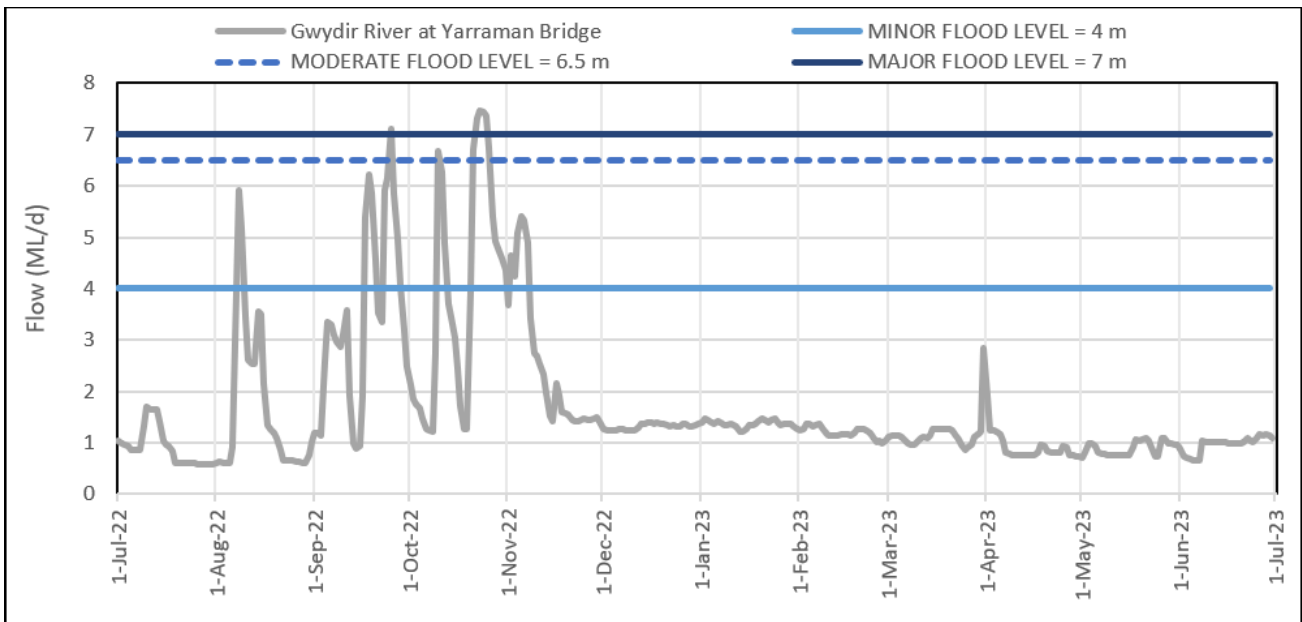
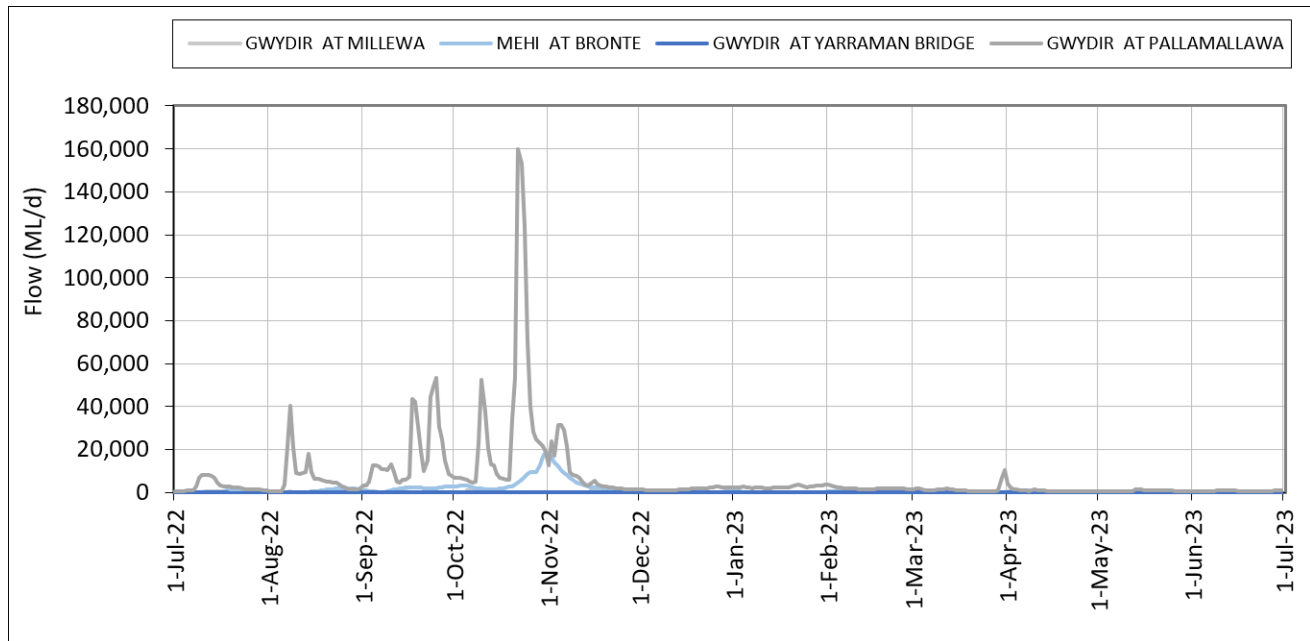


Figure 14: Gwydir flow events for reporting period



## Surface water resources and management

### Legislation

The water source was managed under rules and requirements set out in the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*. This water sharing plan started on 1 July 2016 and will remain active until 30 June 2026 or 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 rights

Excluding basic landholder rights (see Note 17), the right to a share of the water supply is controlled through the issue and management of water access licences.

- Access licence share components remained unchanged in the reporting period (Figure 15).
- Total issued share component on 30 June 2023 was 718,282 including 181,398 of supplementary shares.

Figure 15: Total issued share component, including held environmental water

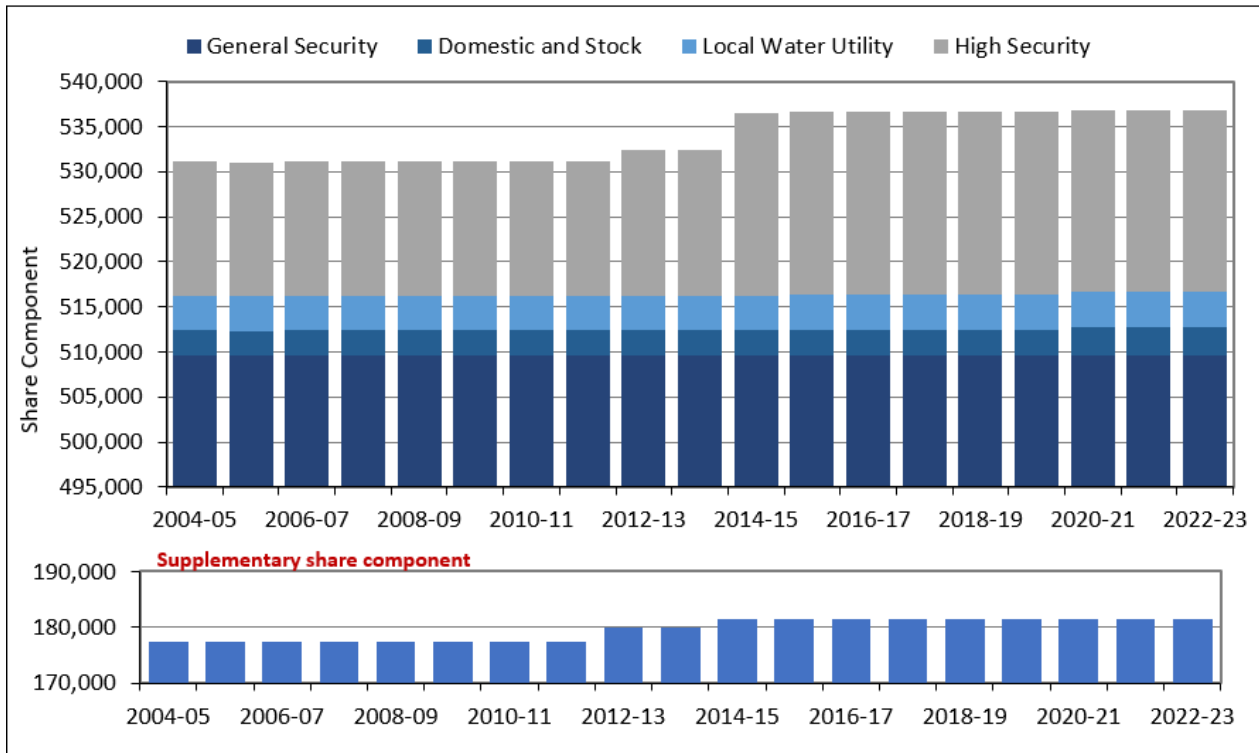


Table 3: Issued share component on 30 June 2023

Category	Issued share component
Domestic and Stock	2,506
Domestic and Stock [Domestic]	388
Domestic and Stock [Stock]	230
Local Water Utility	3,836
General Security	509,665
High Security	20,200
High Security (Research)	60
Supplementary Water	181,398
Floodplain Harvesting	104,663
<b>Total</b>	<b>822,945</b>

### Allocation account summary

A summary illustration of the accounting for High Security and General Security access licence categories in the Gwydir Regulated River is provided in Figure 16 and Figure 17 respectively. Detailed information on the water accounts for all categories of licence issued are provided in Note 1 of this report.



Figure 16: Annual water account summary Gwydir Regulated River High Security

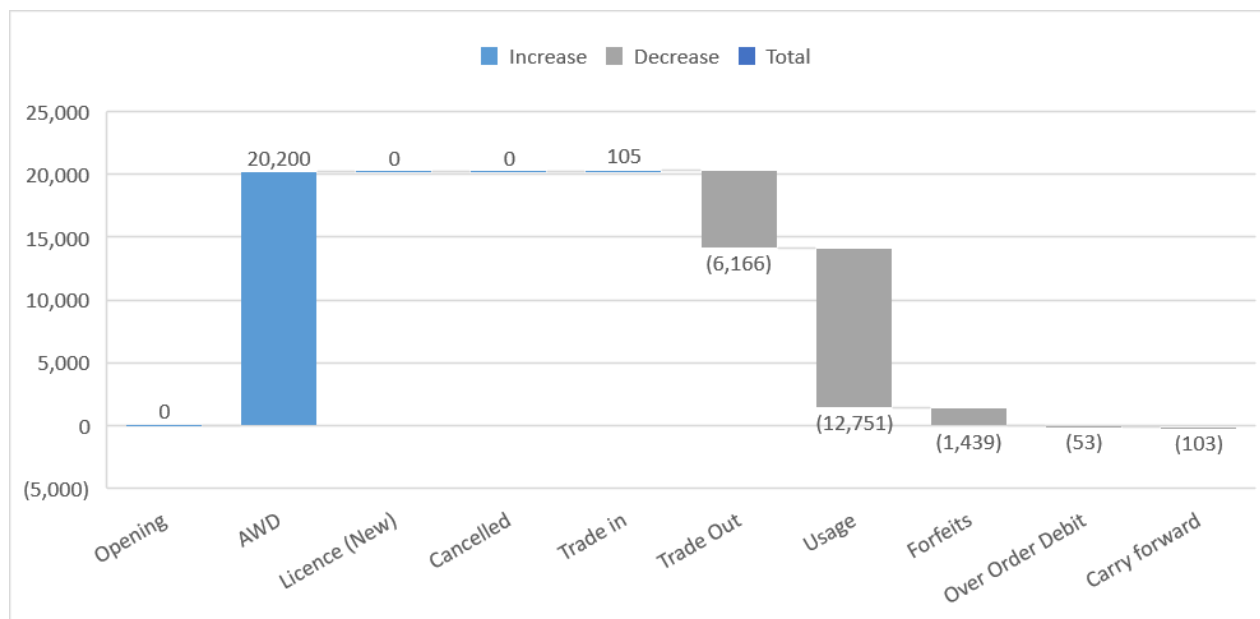
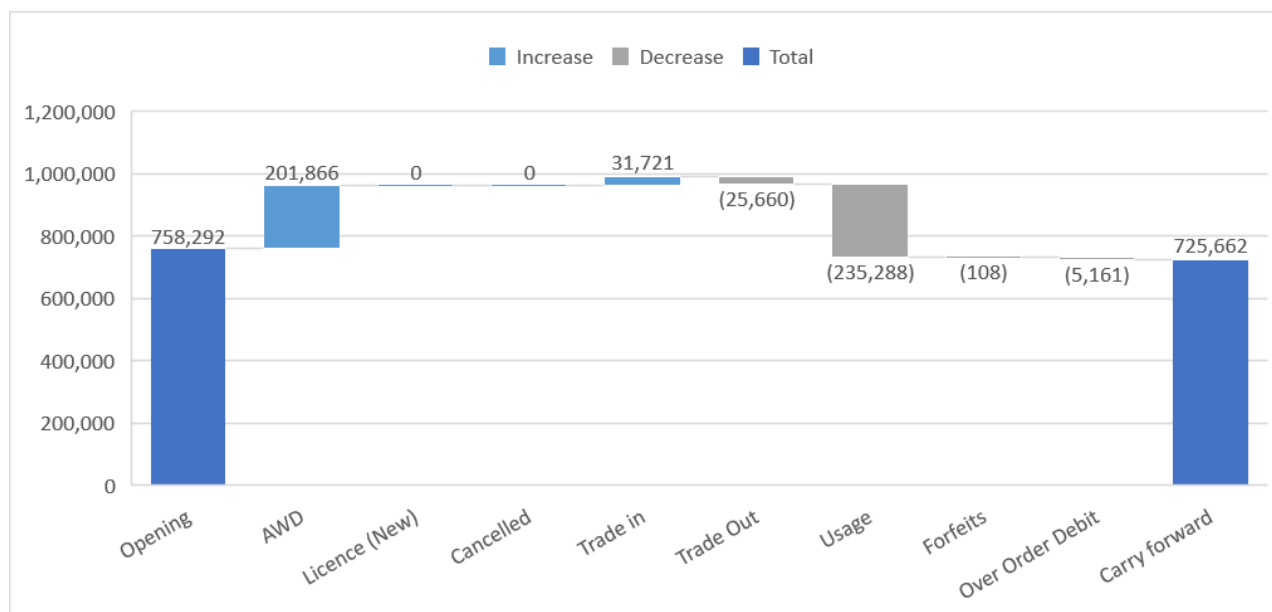


Figure 17: Annual water account summary Gwydir Regulated River General Security



### Access licence account management

A continuous accounting model is adopted for general security holders that allows these licences to hold (and carryover) over up to 1.5 megalitres per issued share. There is no maximum AWD and water will be continually shared as resource becomes available. The total annual account usage plus assignments out cannot exceed more than 3 megalitres per issued share plus assignments in. Additionally, the 3-year rolling usage plus allocations assignments out in those 3 years cannot exceed 3 megalitres per issued share plus the volume of assignments in. Floodplain Harvesting has an account limit and maximum carryover of 5 megalitre per share.

All other categories have an account limit of 100% per megalitre per share and cannot carryover water between water years. The access licence accounting rules are summarised in Table 4.

Table 4: Gwydir licensed allocation accounting rules

Licence category	Account limit	Carryover limit	Annual use limit	3-year use limit	Maximum AWD
<b>Domestic and Stock</b>	100%	0%	N/A	N/A	100%
<b>Domestic and Stock [Domestic]</b>	100%	0%	N/A	N/A	100%
<b>Domestic and Stock [Stock]</b>	100%	0%	N/A	N/A	100%
<b>Local Water Utility</b>	100%	0%	N/A	N/A	100%
<b>Regulated River (General Security)</b>	1.5 ML/Share	1.5 ML/Share	3 ML/Share <sup>3</sup>	3 ML/Share <sup>3</sup>	N/A
<b>Regulated River (High Security)</b>	1 ML/Share	0 ML/Share	N/A	N/A	1 ML/Share
<b>Regulated River (High Security) (Research)</b>	1 ML/Share	0 ML/Share	N/A	N/A	1 ML/Share
<b>Supplementary</b>	N/A	0 ML/Share	N/A	N/A	1 ML/Share
<b>Floodplain Harvesting</b>	5 ML/Share	5 ML/Share	N/A	N/A	1 ML/Share

## Extreme events stage and temporary water restrictions

The NSW Extreme Events Policy was released in October 2018 and updated in August 2023 to 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.

Table 5 outlines the conditions that may be associated with different stages of criticality for surface water quantity. Further information is available at [NSW Extreme events policy](#)

Table 5: Determination of stages of criticality for surface water quality

Stage	Stage description	Stage evidence base
<b>1</b>	Normal management	Can deliver all account water under normal river operations practices.
<b>2</b>	Emerging drought <sup>4</sup>	Unable to deliver 100% of high priority account water and maximum expected use of general security under normal river operations practices.

<sup>3</sup> The annual and 3-year use limit for general security is assessed including allocation assignments (temporary trading), whereby usage plus trade out are compared to the relative limit plus allocation assignments in

<sup>4</sup> Valleys may be declared in Stage 2 Recovering after good inflows when conditions are improving but are not yet back to normal operations.

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

### Broad-scale northern Basin restrictions

#### Gwydir temporary water restrictions

There were no temporary water restrictions during the reporting period.

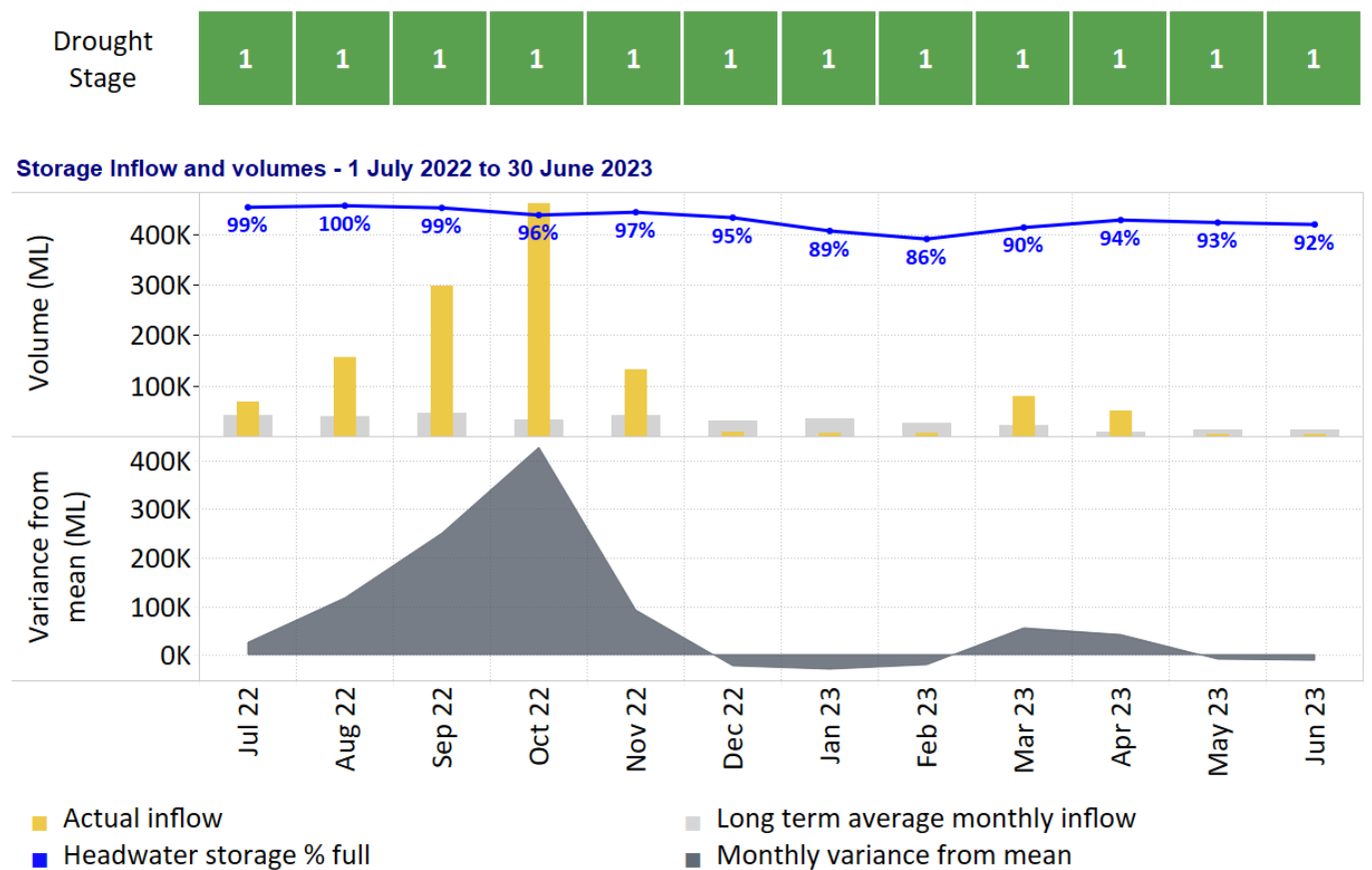
#### Extreme events stage

- The Gwydir Regulated River Water Source was in stage 1 (normal management) for the entire reporting period.
- Major storage inflow (Copeton Dam) was typically at or exceeding long term monthly averages for the majority of the water year (Figure 18).

#### Drought measures

There were no drought measures in place. Normal on-demand deliveries occurred during the reporting period.

Figure 18: Drought stage for the reporting period referenced with monthly headwater storage inflows, monthly storage inflow variance from mean and storage percent full.



## Water availability

- Domestic and Stock, Local Water Utility and High Security access licences (including sub-categories) received an opening available water determination (AWD) of 100%, the maximum allowable under the water sharing plan.
- Supplementary access licences received an opening AWD of 0.21 megalitres per share. A second announcement of 0.79 megalitres per share was issued on 15 August 2022. 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.
- At the water source level 161 days of supplementary access was available in the reporting period. Historical and reporting period supplementary access periods are illustrated in Figure 21.
- General Security access licences had a carryover of 758,292 megalitres into the reporting period, equating to 149% of total issued general security share.
- General Security access licences received an opening AWD of 0 megalitres per share.
- Additional announcements were made for General Security in July (1.03 ML/share), August (0.58 ML/share), September (0.54 ML/share), October (0.29 ML/share), December (0.16 ML/share), February (0.02 ML/share), March (0.02 ML/share), April (0.25 ML/share), and May (0.21 ML/share).
- The total General Security AWD for the reporting period was 0.396 megalitres per share, taking the total water availability (carryover plus AWD volumes) to 960,050 megalitres being 188% of issued share component. Incremental carryover and announcements for the reporting period and historical years under water sharing plan management is provided in Figure 19.
- Water availability<sup>[5][6][7]</sup> for regulated supply categories of licence (excludes supplementary) was up significantly relative to the prior reporting period (Figure 20) and was well above the average under water sharing plan management conditions (2004-05 to 2022-23).
- By volume 63% of the 3,782,608 megalitres of tributary inflows to the Gwydir River downstream of Copeton dam was contributed by the Gil Gil River (Figure 22)

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<sup>5</sup> Supplementary licences have been excluded. Each year of the plan this licence category is granted an available water determination of 100%, however access to this water is contingent on high flow events available. Actual usage information against this category of licence is available in Note 1 and Note 18 of this GPWAR.

<sup>6</sup> 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.

<sup>7</sup> Includes all access licences issued under the water sharing plan and therefore held environmental water.

Figure 19: Incremental available water determination and carryover volumes for 'General Security' as a proportion of share component

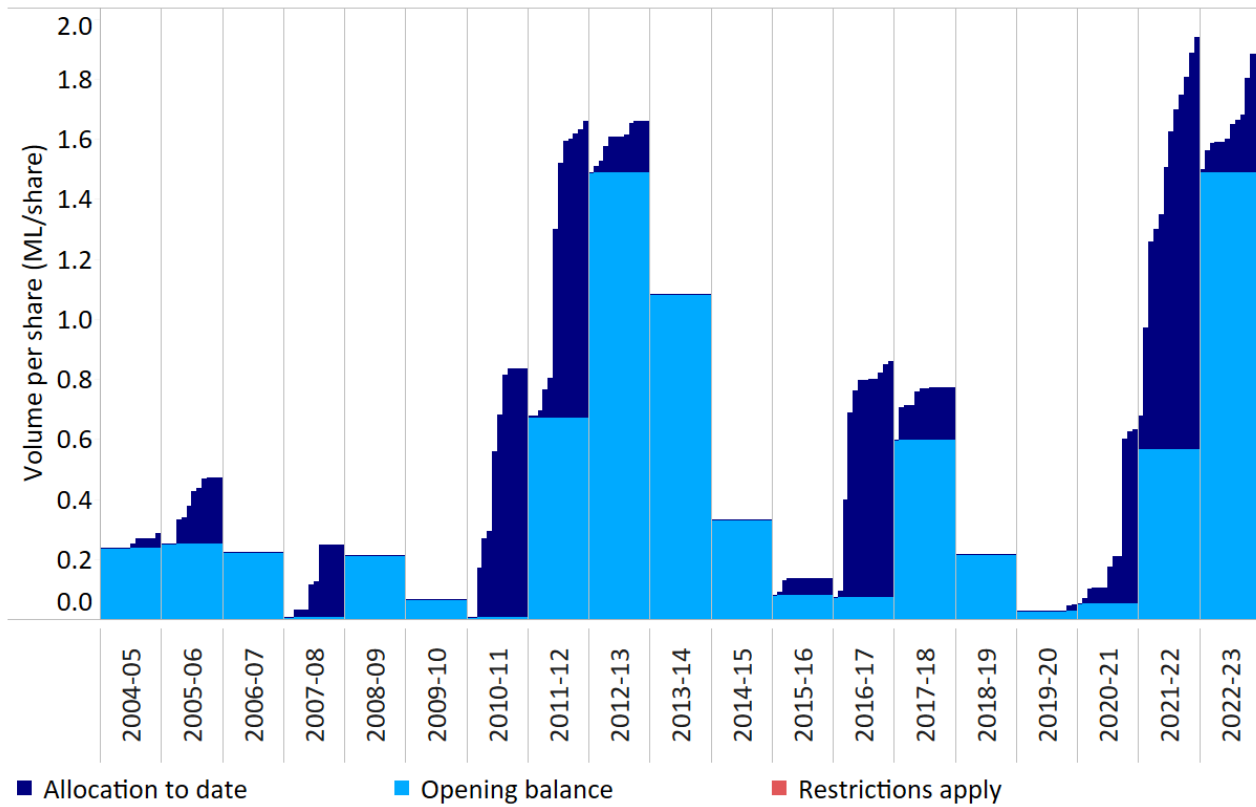


Figure 20: Gwydir account water availability (carryover plus AWDs)

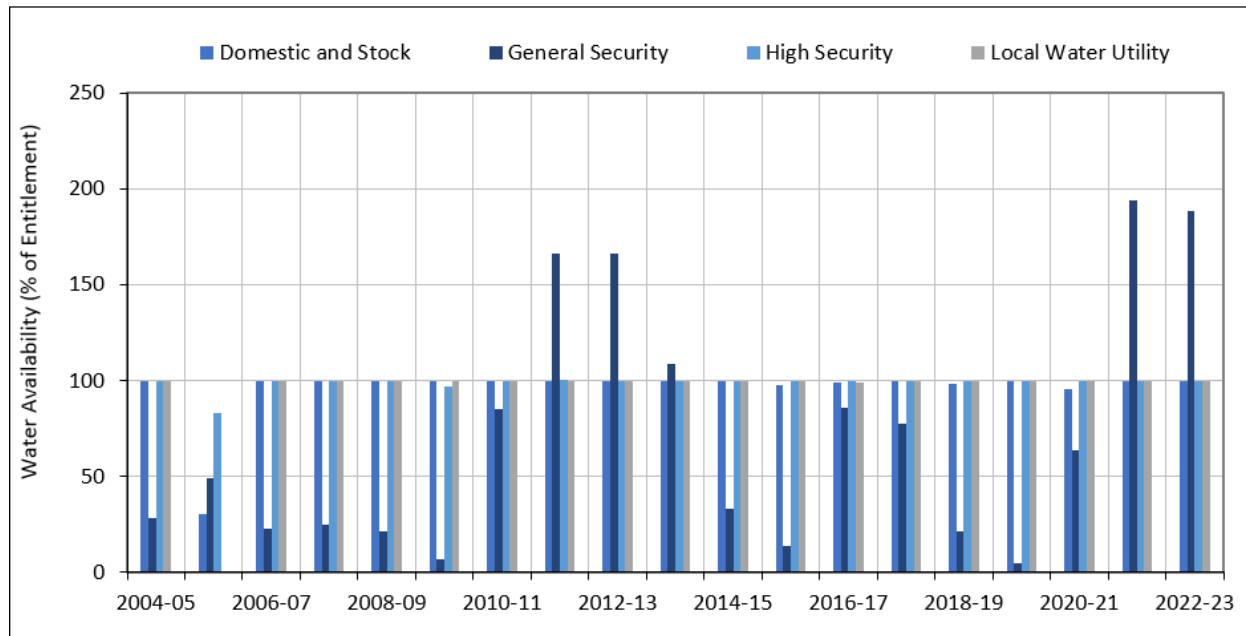


Figure 21: Supplementary Event Access

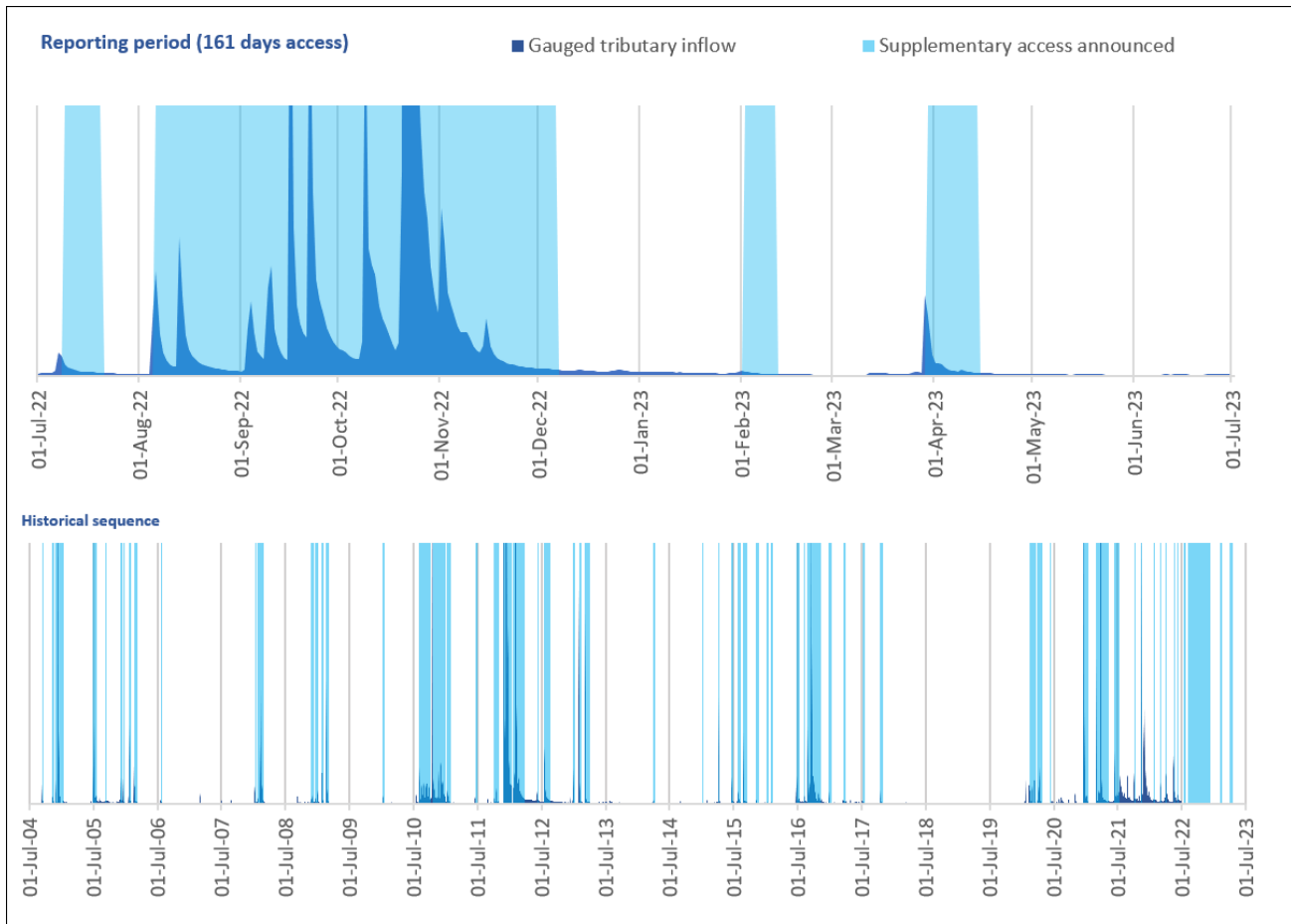
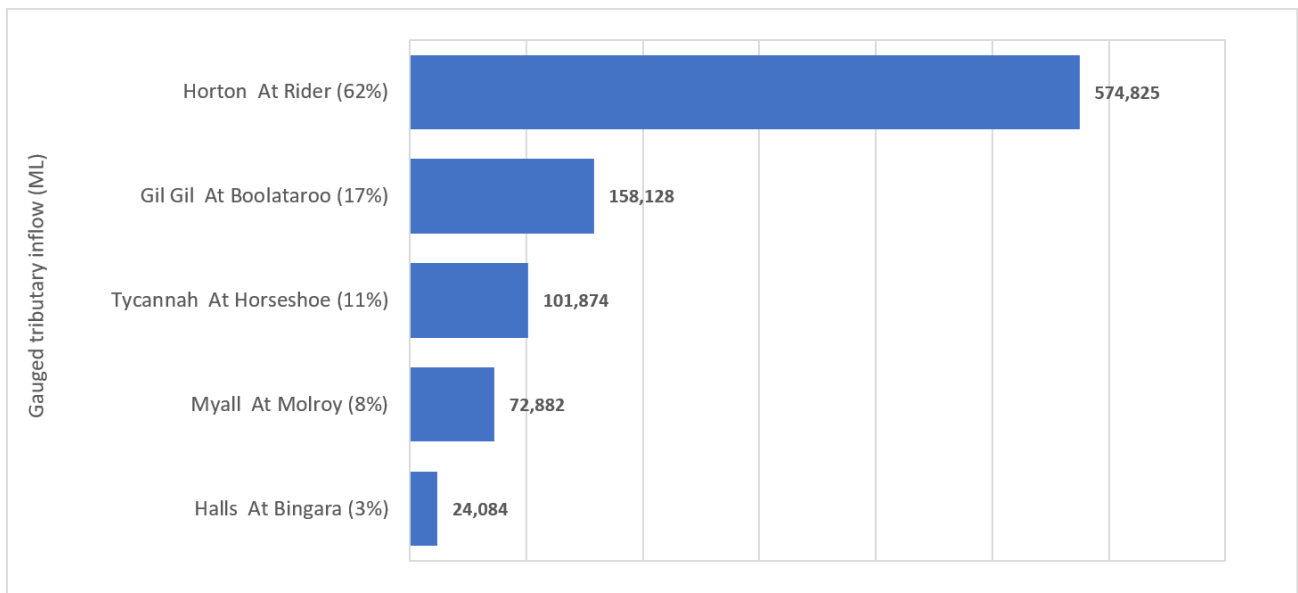


Figure 22: Measured tributary inflow contributions

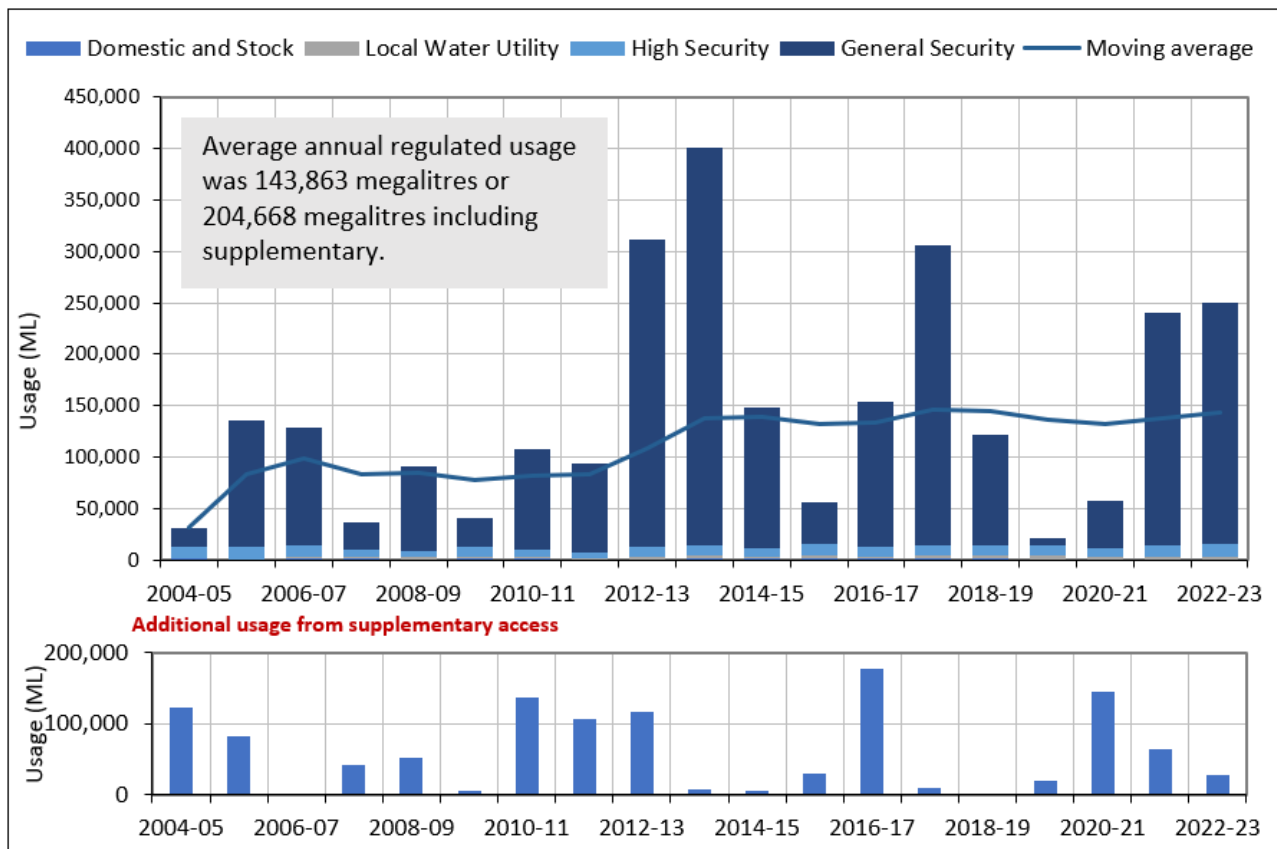


## Account usage

Account usage refers to the total volume of water debited against an access licence.

- Account usage from the regulated supply totalled 250,543 megalitres for the reporting period which was a significant increase from the previous reporting period and well above average usage under water sharing plan management conditions (Figure 23).
- Additionally, 28,572 megalitres was accessed from high-flow supplementary events.
- Average usage excluding supplementary access increased to 143,863 megalitres (2004-05 to 2022-23)
- Average Usage including supplementary access increased to 204,668.
- Refer to disclosure Note 3 for further usage details.

Figure 23: Access licence account usage



## Utilisation and inactive share

We consider an access licence entitlement inactive if the holding does not use water or access the temporary trade market for the reporting period. Utilisation reflects the amount of water used from regulated supplies (excludes supplementary water), relative to the maximum amount available for use in the water year.

For the reporting period:

- 7% of general security share component was inactive for the reporting period, a decrease of 1% from the prior reporting period (Table 6)

- 6% of high security share component was inactive for the reporting, a decrease of 23% from the prior reporting period (Table 6)
- a total of 1,673 shares of domestic and stock (and subcategories) were inactive (67% of issued share)
- 13% of supplementary share component was inactive for the reporting period, up from 8% in the prior reporting period.
- utilisation of available water from regulated supplies (excludes 'Supplementary') increased to 25% from 24% in the previous year (Figure 24).

Figure 24: Gwydir account utilisation

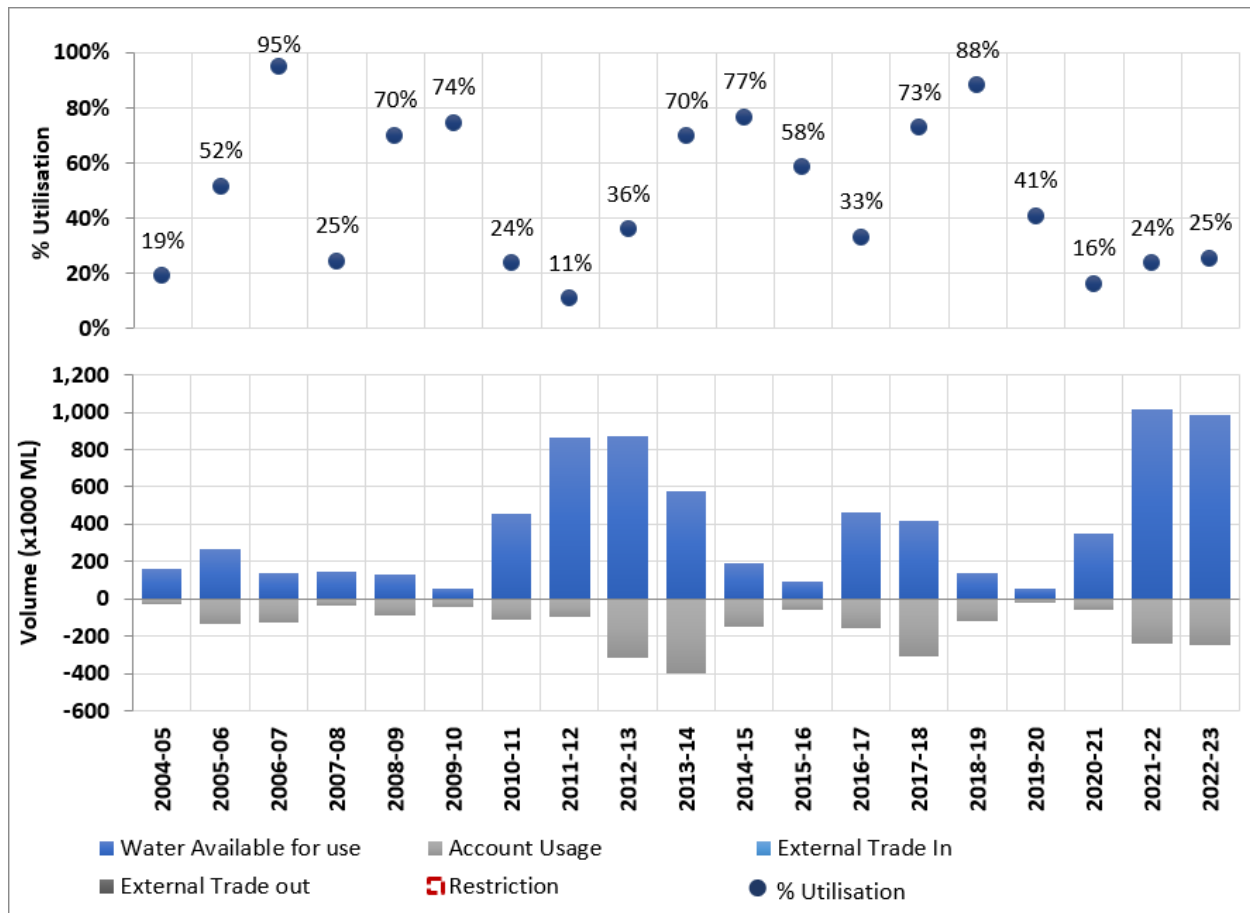


Table 6: Gwydir inactive licence summary for the reporting period

Licence category	Inactive licences (number)	Inactive share component	Inactive share % of total	Inactive share % of total prior year (2021-22)
<b>Domestic and Stock</b>	42	1,673	67%	77%
<b>Domestic and Stock [Domestic]</b>	4	385	99%	100%
<b>Domestic and Stock [Stock]</b>	19	150	65%	93%
<b>Local Water Utility</b>	0	0	0%	0%



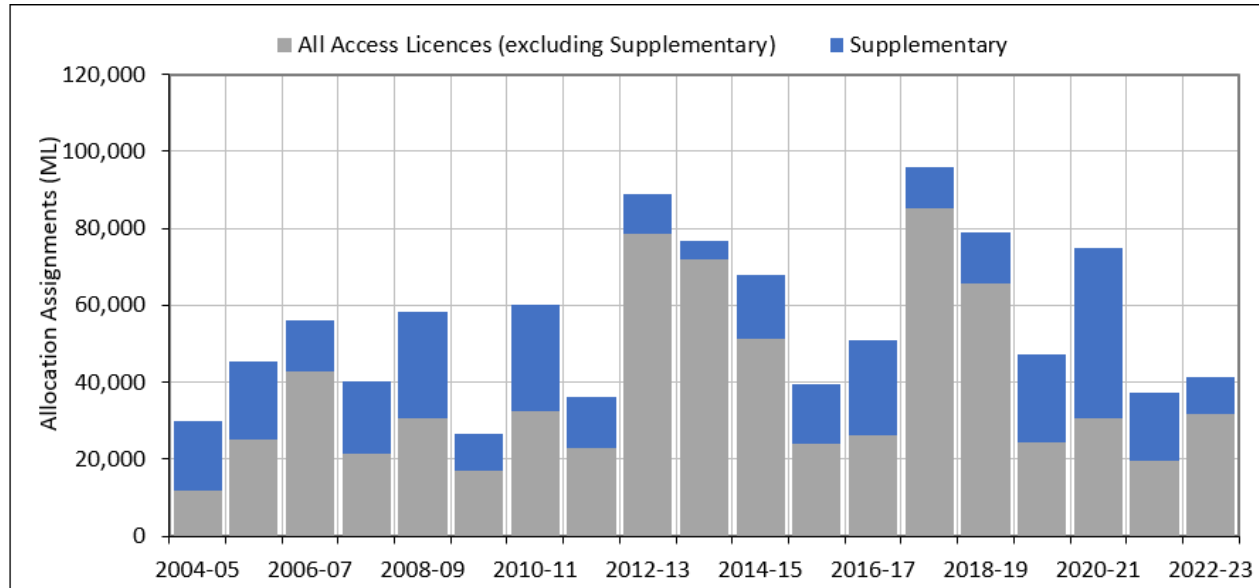
Licence category	Inactive licences (number)	Inactive share component	Inactive share % of total	Inactive share % of total prior year (2021–22)
Regulated River (General Security)	70	34,596	7%	8%
Regulated River (High Security)	8	1,286	6%	29%
Regulated River (High Security) [Research]	1	60	100%	100%
<b>Total regulated supply</b>	<b>144</b>	<b>38,150</b>	<b>7%</b>	<b>10%</b>
Supplementary Water	60	22,975	13%	8%
Floodplain Harvesting	86	104,663	100% <sup>8</sup>	N/A

## Temporary trading (allocation assignments)

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

The total volume transferred under allocation assignments (41,320 megalitres) in the reporting period was 10% higher than the prior reporting period and was the fourth lowest under water sharing plan management conditions (2004-05 to 2022-23) (Figure 25).

Figure 25: Allocation assignment total volumes



## Commercial temporary trading statistics

- A total of 21 assignment were processed for commercial consideration, transferring 9,201 megalitres of water between holder accounts.<sup>9</sup>

<sup>8</sup> Floodplain Harvesting had a reported take of 0ML for the reporting period

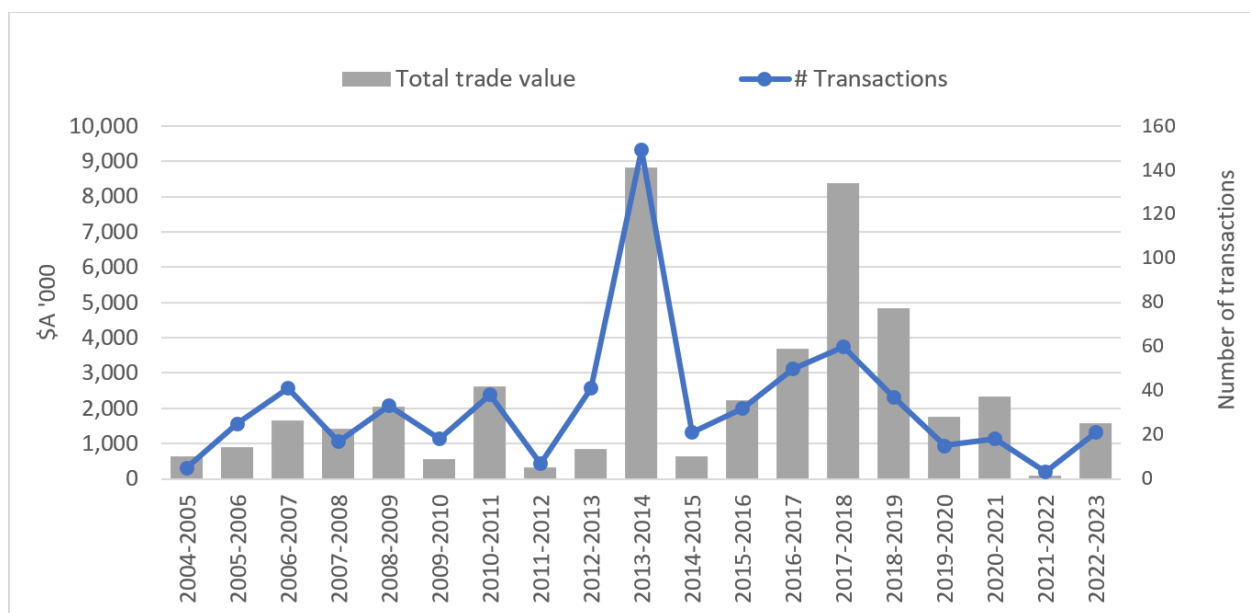
<sup>9</sup> Trades were tagged as commercial if the consideration per megalitre exceeded \$1. A maximum limit was also applied to eliminate outliers from the dataset.

- The average price in the reporting period was \$ 181 per megalitre (Figure 26).
- Total trade value for the reporting period (\$ 1,564,625 ) a 1526% increase on the prior reporting period.
- Further details on allocation assignments for the reporting period are available in Note 4 of this GPWAR.

Figure 26: Allocation assignments commercial price statistics



Figure 27: Allocation assignments commercial value statistics



### Permanent trading (assignment of share and transfer of licence)

Permanent trading is implemented in this water source under the sections 71 M (Transfer of access licences) and 71Q (Assignment of rights under access licence) of the *Water Management Act 2000*.

During the reporting period:

- zero general security share assignments (71Q) were processed (Figure 29)
- zero commercial share assignments occurred for other categories of access licence.
- no commercial exchange of high security share occurred via share assignment transactions.
- no environmental share assignments have occurred since 2010–11 (Figure 30).
- an additional 2,990 shares were exchanged for monetary consideration (greater than \$1 per share) through change of holder licence dealings (Figure 31).

Figure 28: Share assignment price statistics for General Security

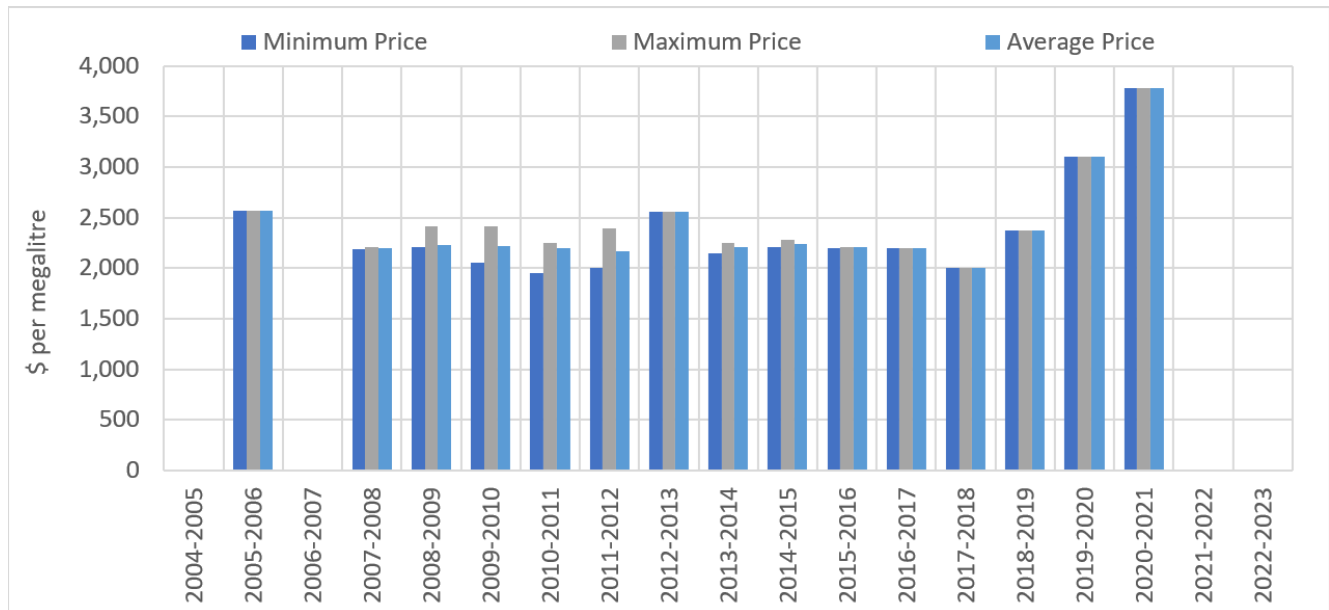


Figure 29: Share assignment value statistics for General Security

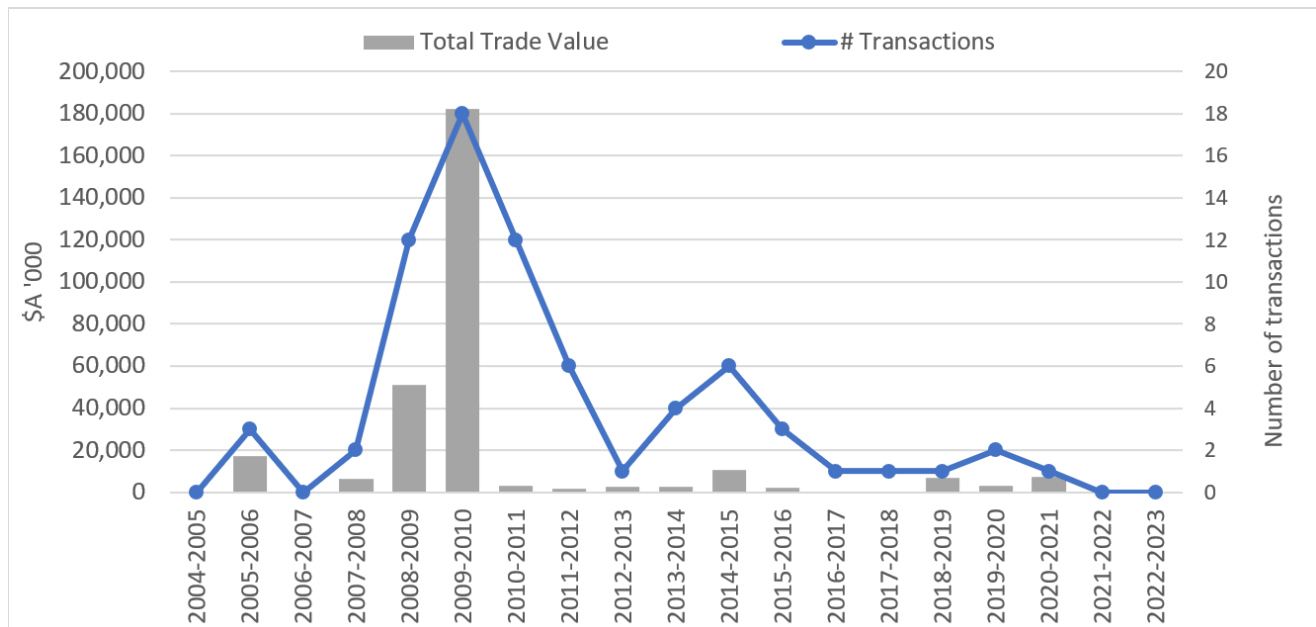


Figure 30: Share assignment trades for environmental and consumptive licence holders across all licence categories

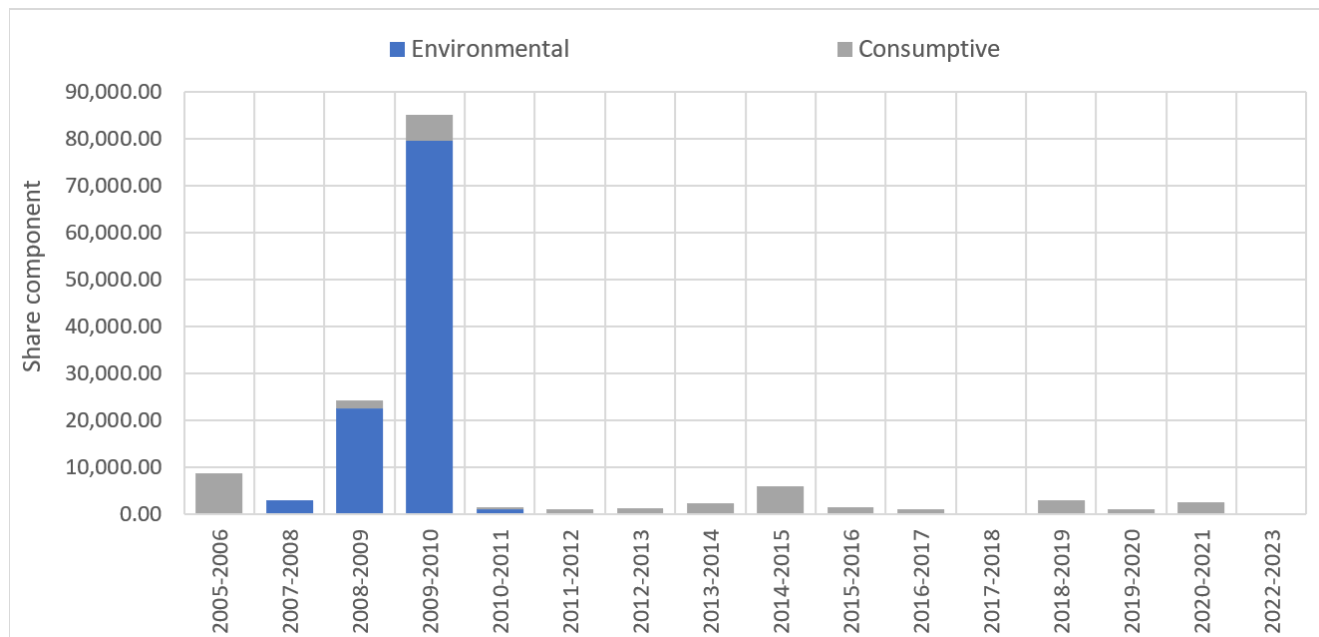
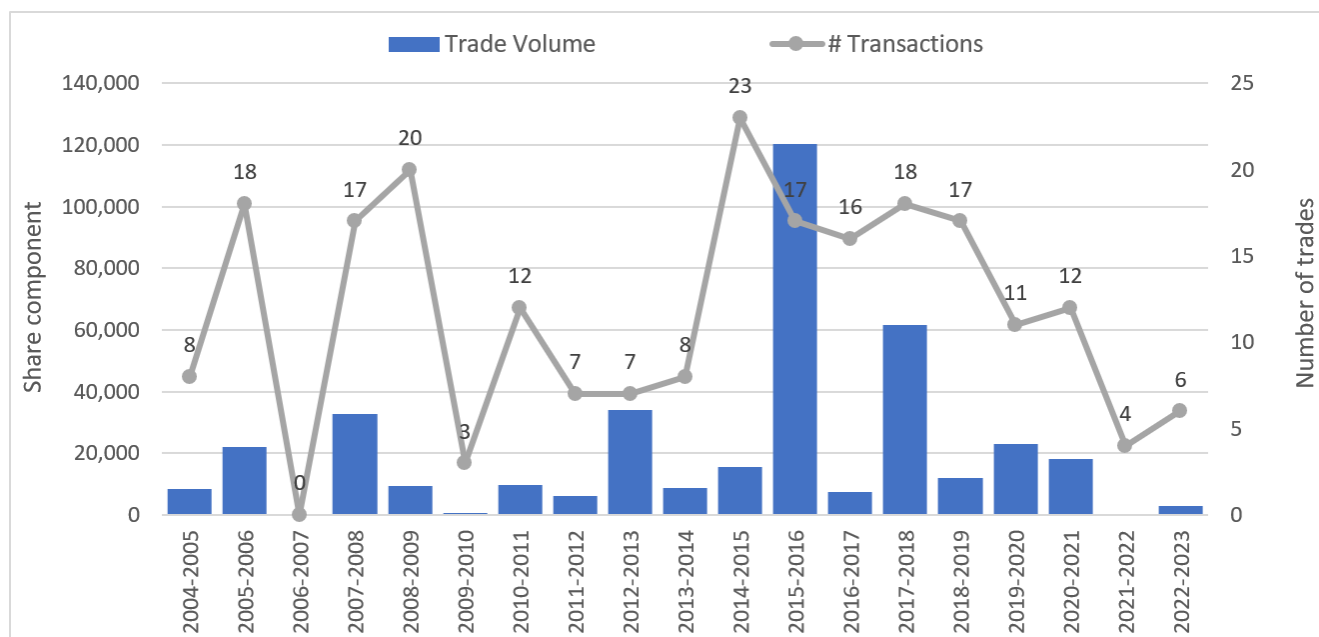


Figure 31: Access licence holder transfer summary



## Replenishment flows

Replenishment flow requirements of the water sharing plan are detailed in Note 15 of this GPWAR. There were no replenishment flows delivered from storage within the reporting period. Good tributary inflows meant this was not required.

## Floodplain harvesting

NSW is at an early stage of implementing floodplain harvesting measurement requirements and compliant measurement equipment (which includes telemetry) was not required to be installed during the reporting period. While alternative methods for determining the volume of take under floodplain harvesting access licences for are being looked at there are now results available at the time of writing.

The reported volume of take under floodplain harvesting access licences for the 2022-23 reporting period is 0 ML.

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## Held environmental water

Held environmental water refers to access licences that are managed for the purpose of sustaining and improving environmental outcomes within the system.

- There was no change to held environmental water holdings for the reporting period (Figure 32).
- 135,965 shares were held by environmental managers as of 30 June 2023.
- Held environmental usage totalled 10,789 megalitres from the regulated supply, (6,281 megalitres General security access and 4,508 megalitres High security access, excluding supplementary access (Figure 32).
- Additionally, there was 2,045 megalitres of environmental usage associated with supplementary licence holdings.
- Utilisation of available water from regulated supplies (excludes 'Supplementary') decreased from 15% to 6% for the reporting period (Figure 33). Allocated water is able to be carried forward for future use under the continuous accounting protocols.
- Details on held environmental accounting for the reporting period are available in Note 5 of this GPWAR.

Figure 32: Held environmental account usage

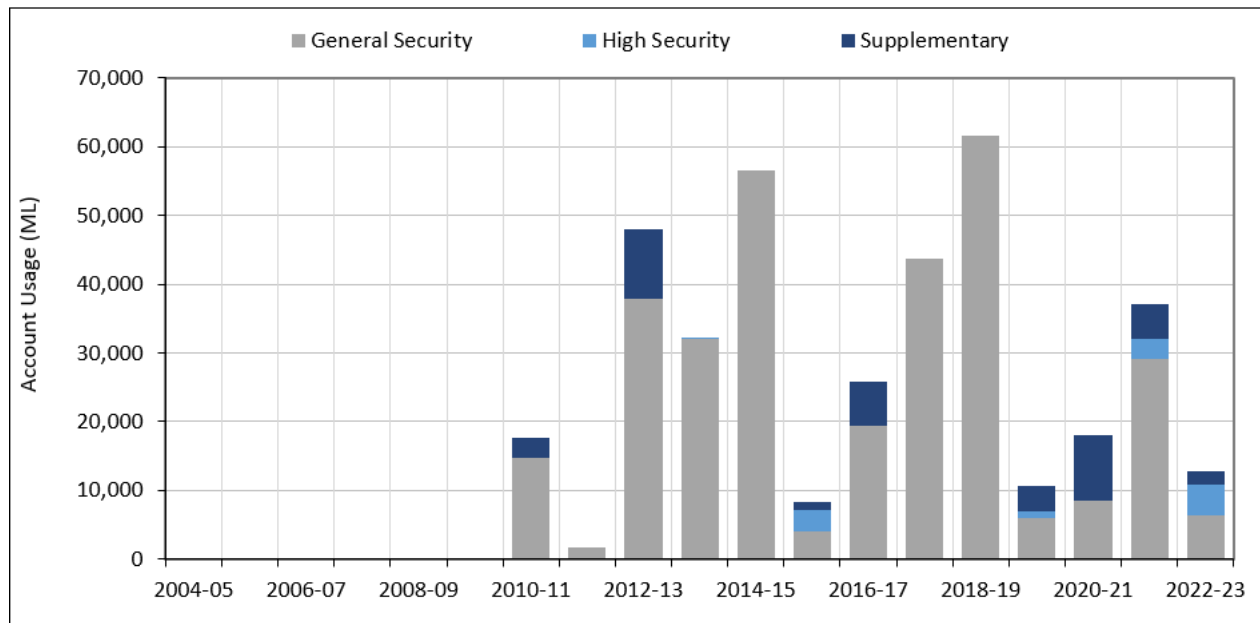
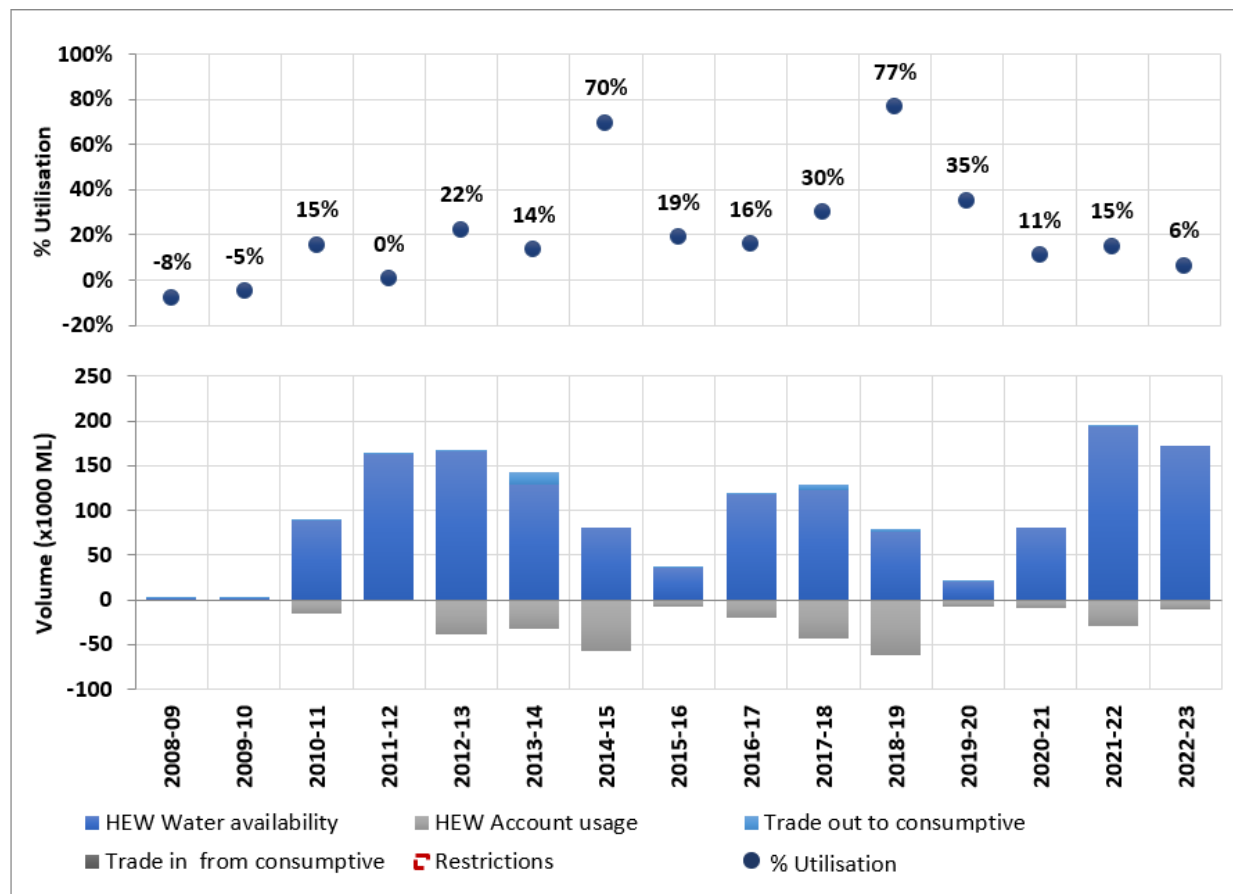


Figure 33: Held environmental account utilisation



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## Planned environmental water—environmental contingency allowance

Planned environmental water refers to a range of environmental allowances and provisions implemented under the water sharing plan to improve environmental outcomes.

- The environmental contingency allowance (ECA) had an opening balance of 90,000 megalitres.
- 5,620 megalitres was credited to the ECA for the reporting period
- The resulting ECA Availability being 95,620 megalitres.
- 5,620 megalitres of ECA was delivered (Figure 35).
- The ECA had a closing balance of 90,000 megalitres.
- Further details are available in Note 6 of this GPWAR.

## Planned environmental water—other

- All minimum flow targets were met for the reporting period.
- Further details are available in Note 6 of this GPWAR.

Figure 34: Held environmental water share component in the Gwydir

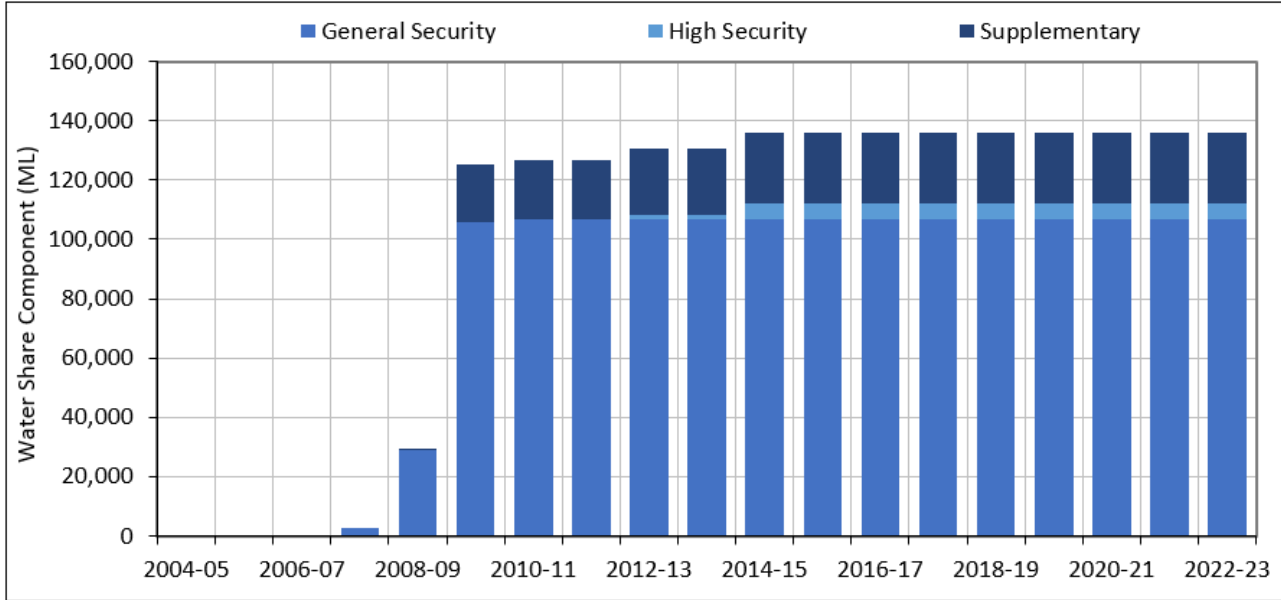
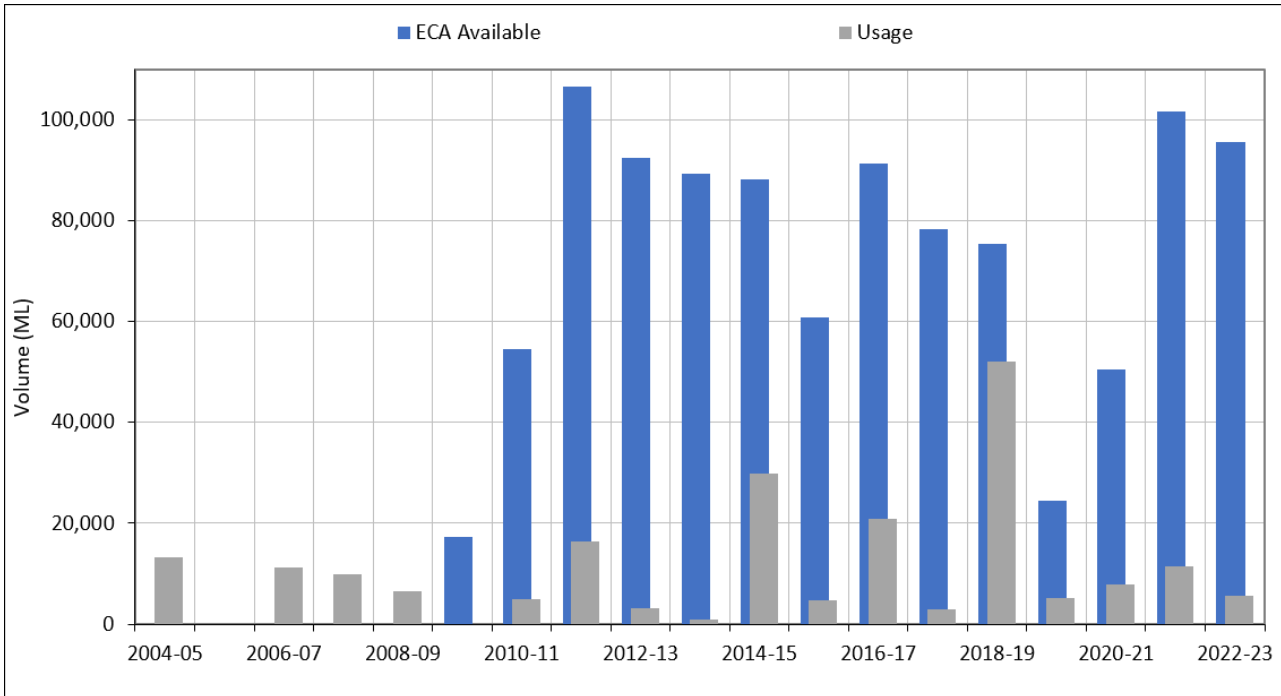


Figure 35: Environmental contingency allowance summary





# Water accounting statements

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## Significant water accounting policies

We have used an accrual basis of accounting to prepare the water accounting statements in this GPWAR. All figures are in megalitres (ML).

We have excluded the 'Statement of Physical Flows' from this GPWAR as all transactions have been presented in the statements 'Water Assets and Liabilities' and 'Changes in Water Assets and Water Liabilities'. We have included a physical flow diagram that represents the physical movements of water to more clearly depict 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 Lands and Water website ([www.industry.nsw.gov.au/water](http://www.industry.nsw.gov.au/water)).

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## Quantification of data

### Data accuracy

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 we anticipate high accuracy through to modelled results and estimates where accuracy can be highly variable, depending on a range of factors. To improve accuracy and prevent misuse of the data in the accounts, we have added an accuracy assessment to all figures in the water accounting statements (Table 7).

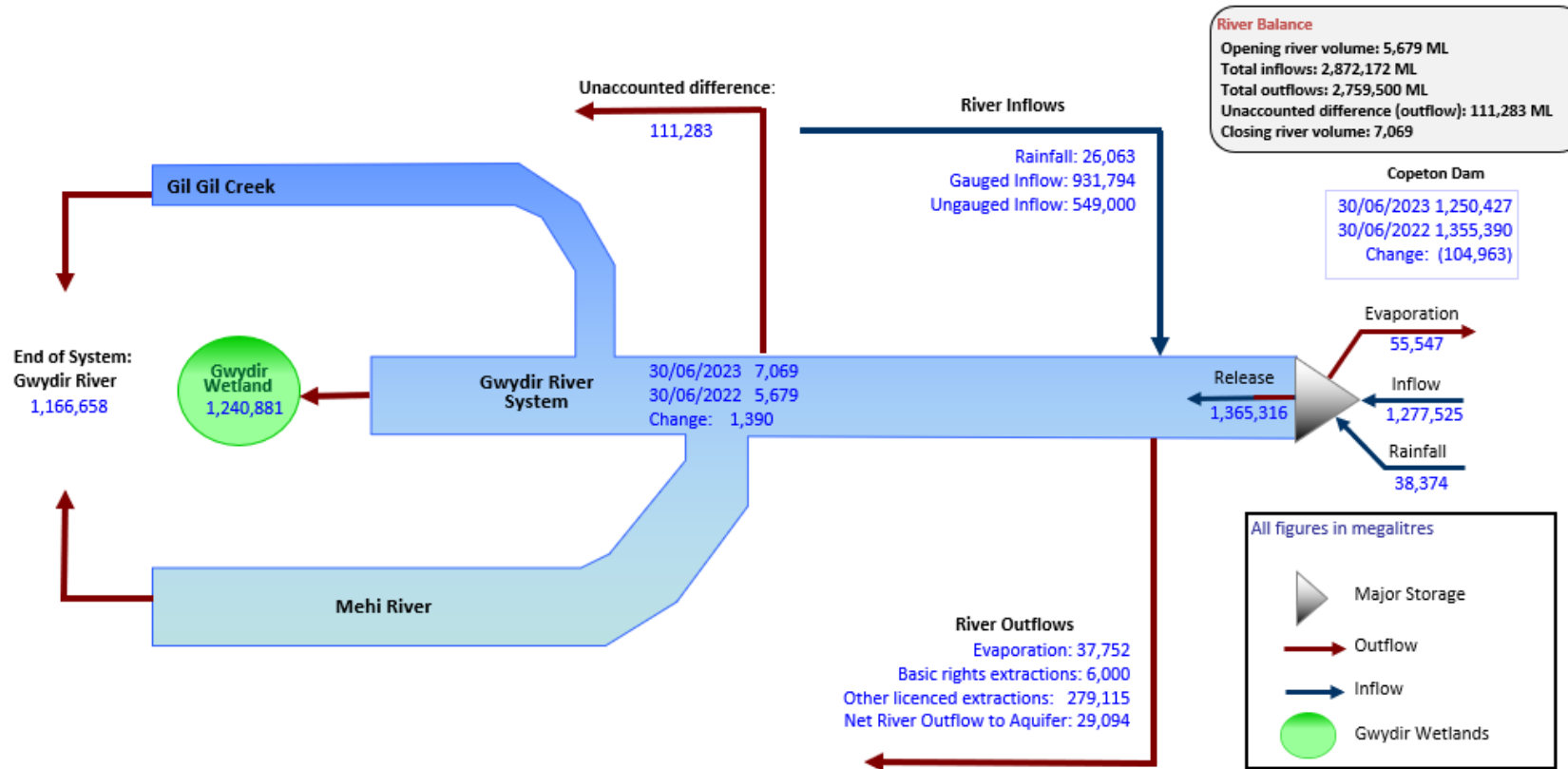
Table 7: Water account data accuracy estimates key

Accuracy	Description
<b>A1<sup>10</sup></b>	± 0% Data is determined rather than estimated or measured. Therefore, the number contains no inaccuracies.
<b>A</b>	± 10%
<b>B</b>	± 25%
<b>C</b>	± 50%
<b>D</b>	± 100%

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<sup>10</sup> 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 Department of Climate Change, Energy, the Environment and Water corporate database.

# 2022-23 Gwydir physical flows mass balance diagram



River inflows and outflows are totalled for the regulated accounting extent

River extractions considers gross diversions (recredits), in stream e-water use and ordered water leaving the system that accounted in other outflow items (detailed in note 21)

# Statement of water assets and water liabilities

## For the year ended 30 June 2023

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

Some figures may differ from previous general purpose water accounting statements where updated information has been provided after the reports was published.

### Surface water assets

1. Surface Water Storage	Accuracy	Notes	30-06-2023	30-06-2022
Copeton Dam	A	7	1,250,427	1,355,390
Regulated River	A	8	7,069	5,679
<b>Total surface water storage (Asws)</b>	-	-	<b>1,257,497</b>	<b>1,361,069</b>
<b>Change in surface water storage</b>	-	-	<b>(103,572)</b>	<b>678,083</b>

### Surface water liabilities

2. Allocation account balances	Accuracy	Notes	30-06-2023	30-06-2022
Domestic And Stock	A	1	0	0
Domestic And Stock (Domestic)	A	1	0	0
Domestic And Stock (Stock)	A	1	0	0
General Security	A	1	725,662	758,291
High Security	A	1	(103)	(0)
High Security (Research)	A	1	0	0
Local Water Utility	A	1	(20)	(7)
<b>Total allocation account balances (Lalloc)</b>	-	-	<b>725,539</b>	<b>758,284</b>
<b>Change in allocation accounts</b>	-	-	<b>(32,745)</b>	<b>469,331</b>

3. Planned environmental water provisions	Accuracy	Notes	30-06-2023	30-06-2022
Environmental Contingency Allowance (ECA)	A1	6	90,194	90,194
<b>Total ECA balances (LPEW)</b>	-	-	<b>90,194</b>	<b>90,194</b>
<b>Change in planned environmental water balances</b>	-	-	<b>0</b>	<b>47,770</b>

### Surface water net changes

4. Surface water net assets	30-06-2023	30-06-2022
<b>Net surface water assets (Asws-Lalloc-LPEW)</b>	<b>441,764</b>	<b>512,591</b>
<b>Change in net surface water assets</b>	<b>(70,827)</b>	<b>160,982</b>

# Changes in water assets and water liabilities

For the year ended 30 June 2023

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

Surface Water Storage Inflows	Accuracy	Notes	30-06-2023	30-06-2022
Copeton Dam	-	-	-	-
<b>Inflow</b>	A	9	1,277,525	1,255,525
Rainfall	B	10	38,374	49,186
River	-	-	-	-
Rainfall	B	11	26,063	1,493
Gauged inflow	A	12	931,794	450,169
Ungauged inflow	C	13	549,000	497,000
Inflow from storage releases	A	14	1,365,316	563,245
<b>Total Surface Water Storage Increases (Isws)</b>			4,188,072	2,818,996

Surface Water Storage Outflows	Accuracy	Notes	30-06-2023	30-06-2022
Copeton Dam	-	-	-	-
<b>Evaporation</b>	B	10	55,547	51,371
Release (valve/spillway)	A	14	1,365,316	563,245
River	-	-	-	-
Evaporation	B	11	37,752	1,149
<b>Flow leaving</b>	A	15	1,166,658	467,371
Flow to Gwydir Wetlands	B	15	1,240,881	692,198
Extractions - access licences	A	16	279,115	268,379
Extractions - basic landholder rights	A1	17	6,000	6,000
<b>Net loss to groundwater</b>	C	20	29,094	16,593
Unaccounted difference	A1	19	111,283	74,608
<b>Total Surface Water Storage Decreases (Dsws)</b>	-	-	4,291,645	2,140,913
<b>Net Surface Water Storage Inflow (Isws-Dsws-Usws)</b>	-	-	(103,572)	678,083

## 2. Changes in allocation accounts

Allocation Account Increases	Accuracy	Notes	30-06-2023	30-06-2022
Available water determination	-	-	-	-
Domestic And Stock	A1	2	2,506	2,506
Domestic And Stock (Domestic)	A1	2	388	388
Domestic And Stock (Stock)	A1	2	230	230
General Security	A1	2	201,866	700,024
High Security	A1	2	20,200	20,200
High Security (Research)	A1	2	60	60
Local Water Utility	A1	2	3,836	3,836
Unregulated flow demand	-	-	-	-
Supplementary water	A	18	28,572	64,925
Assignments in	A1	4	31,826	19,614
<b>Total Allocation Account Increases (Iaa)</b>	-	-	<b>289,484</b>	<b>811,784</b>

Allocation Account Decreases	Accuracy	Notes	30-06-2023	30-06-2022
Account usage	-	-	-	-
Domestic And Stock	A	3	670	494
Domestic And Stock (Stock)	A	3	3	0
General Security	A	3	47	15
High Security	A	3	235,288	225,778
Local Water Utility	A	3	12,751	11,974
Account forfeits	-	-	-	-
Domestic And Stock	A1	1	1,828	2,008
Domestic And Stock (Domestic)	A1	1	385	388
Domestic And Stock (Stock)	A1	1	174	205
High Security	A1	1	108	0
High Security (Research)	A1	1	1,439	6,751
Local Water Utility	A1	1	60	60
Over Order Debits	-	-	-	-
Domestic And Stock	A	21	8	4
Domestic And Stock (Stock)	A	21	10	10
General Security	A	21	5,161	6,316
High Security	A	21	53	73
Unregulated flow supply	-	-	-	-
Supplementary Water	A	18	28,572	64,925
Assignments out	A1	4	31,826	19,614
<b>Total Allocation Account Decreases (Daa)</b>	-	-	<b>322,229</b>	<b>342,453</b>
<b>Net Allocation Account Balance Increases (Iaa-Daa)</b>	-	-	<b>(32,745)</b>	<b>469,331</b>

### 3. Change in environmental contingency allowance (ECA)

Increases	Accuracy	Notes	30-06-2023	30-06-2022
Account increases	A1	6	5,620	59,293
<b>Total PEW account increases (Ipew)</b>	-	-	5,620	59,293

Decreases	Accuracy	Notes	30-06-2023	30-06-2022
Account usage	A1	6	5,620	11,523
<b>Total PEW account decreases (Dpew)</b>	-	-	5,620	11,523
<b>Net Environmental Contingency Allowance increase (Ipew - Dpew)</b>	-	-	0	47,770

### 4. Overall changes

Change in surface water net assets	30-06-2023	30-06-2022
<b>Change in Net Surface Water Assets (Isws-Dsws-Usws-laa+Daa-Ipew+Dpew)</b>	<b>(70,827)</b>	160,982

# Note disclosures

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## Reconciliation and future prospect descriptions

Reconciliation of change in net water asset to net change in physical water storage <sup>11</sup>	2022–23 ML	2021–22 ML
Change in net surface water assets	(70,827)	160,982
Non-physical adjustments	-	-
Net change in allocation accounts	(32,745)	469,331
Net change in claims to water: ECA	0	47,770
Net change in physical surface water storage	(103,572)	678,083

Reconciliation of closing water storage to total surface water assets	30 June 2023	30 June 2022
Closing water storage	-	-
Surface water storage	1,257,497	1,361,069
Additional surface water assets	N/A	N/A
Total surface water assets	1,257,497	1,361,069

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

Datasets to produce an informative 12-month forecast for report users are generally not available at the time of writing.

In lieu of this, the web links to below provide the latest water availability information, allocations and usages for the Gwydir Regulated River Water Source.

Carryovers and available water determinations for the 2022–23 are provided as at the time of writing (Table 8) along with information about the Gwydir system's reliability produced from the NSW industry long term planning models (Figure 36 and Figure 37).

<sup>11</sup> All figures can be derived from or found directly in the Water Accounting Statements of the General Purpose Water Accounting Report. All figures are in megalitres.

## Latest water availability

You can find the latest information on water availability, including water allocation statements, water allocations summaries and 2022-23 available water determinations, on the NSW Department of Climate Change, Energy, the Environment and Water webpage at [industry.nsw.gov.au/water/allocations-availability/allocations](https://industry.nsw.gov.au/water/allocations-availability/allocations)

You can also subscribe to receive the latest updates.

## Latest storage volumes

See real-time information on current storage volumes at [realtimedata.waternsw.com.au](https://realtimedata.waternsw.com.au)

## Latest usage data

Usage for the open water year (updated weekly), and historical usage is available to view and download via the Department Climate Change, Energy, the Environment and Water at [Usage dashboard | Water \(nsw.gov.au\)](https://usage.dashboard.water.nsw.gov.au)

## Significant events since reporting period

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

## System reliability<sup>12</sup>

The latest long-term planning model (IQQM) reflecting a water sharing plan management scenario in the Gwydir provides indicative system reliability information for the start and end of a watering season<sup>13</sup>.

In any given year, the simulation indicates High Security entitlements are likely to have full allocation 100% of the time.

At the start of the water year, the simulation indicates that General Security licence holders receive an equivalent allocation of 100% or greater 28% of the time (Figure 36). Availabilities significantly increase throughout the water year when usages have started, and the storage is supplemented from new inflow. By the end of the water year, the simulation results indicate a water availability of 100% or greater, 46% of the time (Figure 37).

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<sup>12</sup> Models used by state water agencies are subject to continuous improvements and updates. The reliability described in this report represents the information available when the report was compiled and may vary from reliability computed in the latest version of the models.

<sup>13</sup> Modelled data simulated as July to June water year. Simulation period 1 June 1892 to 30 June 2016.

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

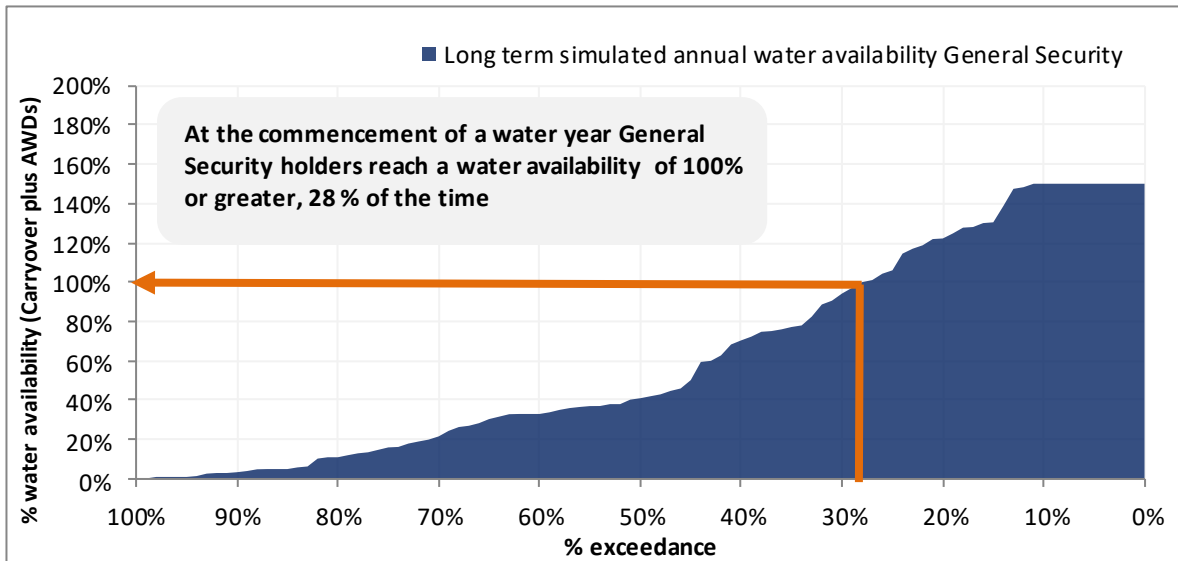
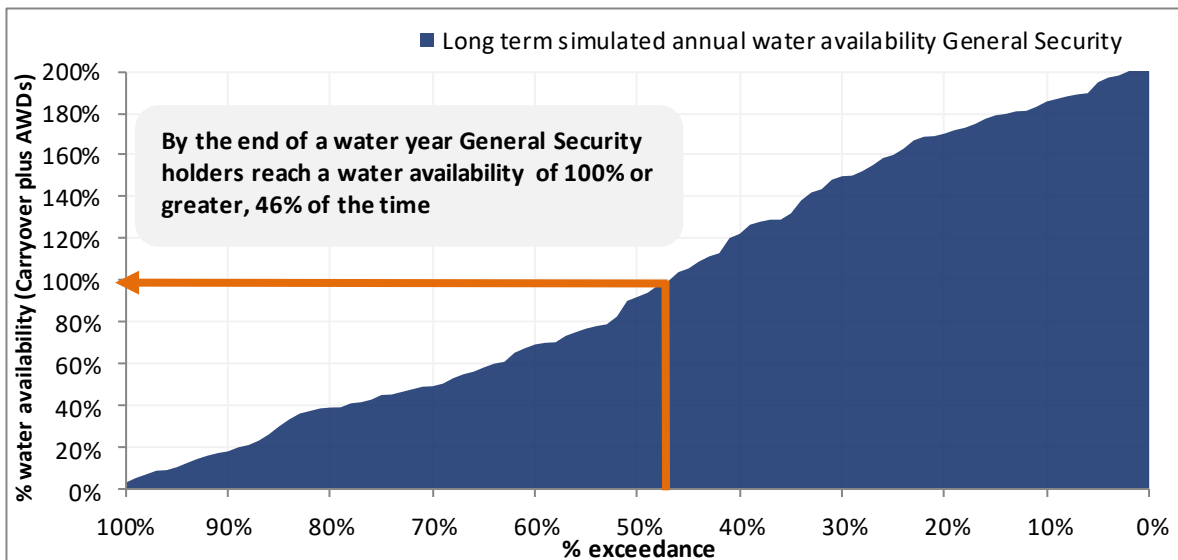


Figure 37: End of water year simulated availability for General Security access licences



## Carryovers and available water determinations 2023–24

Table 8: Gwydir carryovers and available water determinations since reporting period close (as of December 2023)

Date	Individual announcement	Share component	Allocation volume (ML)	Cumulative volume (ML)	Allocation volume (%)	Cumulative volume (%)	Balance available (ML)	Balance not available (ML)	Balance total (ML)	Balance available (%)	Balance total (%)
<b>Domestic and Stock</b>											
1-Jul-23	Opening	2,506			0.00%	0.00%	0	0	0	0.00%	0.00%
1-Jul-23	AWD 100.0 %	2,506	2,506	2,506	100.00%	100.00%	2,506	0	2,506	100.00%	100.00%
<b>Domestic and Stock [Domestic]</b>											
1-Jul-23	Opening	388			0.00%	0.00%	0	0	0	0.00%	0.00%
1-Jul-23	AWD 100.0 %	388	388	388	100.00%	100.00%	388	0	388	100.00%	100.00%
<b>Domestic and Stock [Stock]</b>											
1-Jul-23	Opening	230			0.00%	0.00%	0	0	0	0.00%	0.00%
1-Jul-23	AWD 100.0 %	230	230	230	100.00%	100.00%	230	0	230	100.00%	100.00%
<b>Floodplain Harvesting</b>											
1-Jul-23	Opening	104,663			0.00%	0.00%	104,663	0	104,663	100.00%	100.00%
1-Jul-23	AWD 1.0 ML per Share	104,663	104,663	104,663	100.00%	100.00%	209,326	0	209,326	200.00%	200.00%
<b>Local Water Utility</b>											
1-Jul-23	Opening	3,836			0.00%	0.00%	(20)	0	(20)	(0.50%)	(0.50%)
1-Jul-23	AWD 100.0 %	3,836	3,836	3,836	100.00%	100.00%	3,816	0	3,816	99.50%	99.50%
<b>Regulated River (General Security)</b>											
1-Jul-23	Opening	509,665			0.00%	0.00%	710,319	15,343	725,662	139.40%	142.40%
1-Jul-23	AWD 0.0 ML per Share	509,665	0	0	0.00%	0.00%	710,319	15,343	725,662	139.40%	142.40%
7-Aug-23	AWD 0.03 ML per Share	509,665	9,347	9,347	1.80%	1.80%	718,848	16,161	735,009	141.00%	144.20%
<b>Regulated River (High Security)</b>											
1-Jul-23	Opening	20,200			0.00%	0.00%	(103)	0	(103)	(0.50%)	(0.50%)
1-Jul-23	AWD 1.0 ML per Share	20,200	20,200	20,200	100.00%	100.00%	20,097	0	20,097	99.50%	99.50%

Date	Individual announcement	Share component	Allocation volume (ML)	Cumulative volume (ML)	Allocation volume (%)	Cumulative volume (%)	Balance available (ML)	Balance not available (ML)	Balance total (ML)	Balance available (%)	Balance total (%)
<b>Regulated River (High Security) [Research]</b>											
1-Jul-23	Opening	60			0.00%	0.00%	0	0	0	0.00%	0.00%
1-Jul-23	AWD 100.0 %	60	60	60	100.00%	100.00%	60	0	60	100.00%	100.00%
<b>Supplementary Water</b>											
1-Jul-23	Opening	181,398			0.00%	0.00%	0	0	0	0.00%	0.00%
1-Jul-23	AWD 1.0 ML per Share	181,398	181,398	181,398	100.00%	100.00%	181,398	0	181,398	100.00%	100.00%

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## Note 1—Allocation accounts

This note is a reference for the volume held in the allocation accounts at the time of reporting and is also relevant for the various processes that 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. It represents that volume of 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 5).

### Data type

Derived from measured data

### Policy

*Water Sharing Plan for the Gwydir Regulated River Water Source 2016*

Available on the NSW Department of Climate Change, Energy, the Environment and Water website at [www.industry.nsw.gov.au/water](http://www.industry.nsw.gov.au/water)

### Data accuracy

A1—Nil inaccuracy  $\pm 0\%$

### 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)
- over-order debits
- forfeiture due to:
  - no carryover being permitted (end-of-year forfeit)

- allocation account limits
- licence conversion
- trade of allocation water between accounts (detailed in Note 4)
- carryover rules.

## Additional information

Table 10 summarises the water allocation accounts for each category of access licence. Table 9 describes each of the table components. All figures are in megalitres.

Table 9: Explanatory information for allocation account summary (Table 10 and Table 17)

Heading	Description
<b>Share</b>	This is the total volume of entitlement in the specific licence category.
<b>Opening balance</b>	The volume of water that has been carried forward from the previous year's allocation account
<b>AWD</b>	Available water determination: Total annual volume of water added to the allocation account because of allocation assessments. This includes additional AWD made due to a storage spill reset as defined in the water sharing plan.
<b>Lic New</b>	Licences – New: Increase in-account water as a result of issuing a new licence
<b>Lic Can</b>	Licences – Cancelled: Decrease in account water as a result of a licence cancellation where account balance has not been traded to another licence
<b>Drought sus In</b>	Drought suspension – In: Temporary water restriction applied, reducing account water available for use in reported water year
<b>Drought sus Out</b>	Drought suspension – Out: Temporary water restriction re-credit increasing account water available for use in reported water year
<b>Asn In</b>	Assignment – In: Increase in account water as a result of temporary trade in
<b>Asn Out</b>	Assignment – Out: Decrease in account water as a result of temporary trade out
<b>Usage</b>	Volume of water that is extracted or diverted from the river and is accountable against the access licence allocation
<b>Over-order debit</b>	Volume of water ordered that exceeded the recorded usage for the corresponding periods. In licence categories where water order debiting applies, any orders in excess of usage are accountable against the licence.
<b>During year forfeit</b>	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.
<b>EoY forfeit</b>	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
<b>EoY Avail</b>	End of year balance – Available: Account balance that is available to be taken at the conclusion of the water year
<b>EoY NA</b>	End of year balance – Not available: That part of the remaining account balance that is not available to be taken at the conclusion of the water year. This is water in accounts that is in excess of the annual take limit.
<b>Carry fwd</b>	Carry forward: This represents the account water that is permitted to be carried forward into the next water year, as determined by the carryover rules.

Table 10: Allocation account balance summary (reporting period). See Table 9 for an explanation of headings.

Category	Share	Opening balance	AWD	Lic New	Lic Can	Drought sus In	Drought sus Out	Asn In	Asn Out	Usage	Over order debit	During year forfeit	EoY Avail	EoY NA	EoY forfeit	Carry fwd
<b>Domestic and Stock</b>	2,506	0	2,506	0	0	0	0	0	0	670	8	0	1,828	0	1,828	0
<b>Domestic and Stock [Domestic]</b>	388	0	388	0	0	0	0	0	0	3	0	0	385	0	385	0
<b>Domestic and Stock [Stock]</b>	230	0	230	0	0	0	0	0	0	47	10	0	174	0	174	0
<b>Local Water Utility</b>	3,836	(7)	3,836	0	0	0	0	0	0	1,785	0	0	2,044	0	2,064	(20)
<b>General Security</b>	509,665	758,292	201,866	0	0	0	0	31,721	25,660	235,288	5,161	108	705,543	20,119	0	725,662
<b>High Security</b>	20,200	0	20,200	0	0	0	0	105	6,166	12,751	53	0	1,335	0	1,439	(103)
<b>High Security (Research)</b>	60	0	60	0	0	0	0	0	0	0	0	0	60	0	60	0
<b>Supplementary Water</b>	181,398	0	181,398	0	0	0	0	9,494	9,494	0	0	0	152,826	0	152,826	0
<b>Floodplain Harvesting</b>	104,663	0	104,663	0	0	0	0	0	0	0	0	0	104,663	0	0	104,663



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## 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 we add to an individual's licence allocation account. Announcements of allocations are made on a seasonal basis—usually corresponding with the financial year—and are updated on a regular basis or following significant inflow events. Under the *Water Management Act 2000* the announcements are termed available water determinations.

### 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 Gwydir Regulated River Water Source 2016

- Part 8—Limits to the availability of water
  - Division 1—Long-term extraction limit
  - Division 2—Available water determinations.

Available on the NSW Department of Climate Change, Energy, the Environment and Water website at [www.industry.nsw.gov.au/water](http://www.industry.nsw.gov.au/water)

### Data accuracy

A1—Nil inaccuracy +/- 0%

### Providing agency

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

### Methodology

In the Gwydir Regulated Water Source, available water determinations (AWDs) are calculated based on a concept of continuous accounting that assesses the water contained in the headwater storages, periodically updating projections and distributing the stored resource available. All projections are for 2 years from the date of the assessment. Under continuous accounting, the AWDs are based on the actual volume of water in storage at the time of the resource assessment. This does not account for sequences of future inflows.

The process firstly involves assessing effective storage, which is the available storage volume after storage losses are accounted for. Storage losses cannot be controlled by a management rule, so they must be provided for first. After this, existing commitments are taken into account. Next, any uncommitted water is first committed to essential supplies. Then it is added to the delivery loss account to target a volume equivalent to a maximum of 30% of the deliverable General Security volume and then to the ECA account. Any remaining uncommitted water is then shared in proportion to the amount of entitlement in the remaining resource categories.

The essential supplies mentioned above consist of items such as:

- Stock and Domestic requirements
- Local Water Utilities (for example, town water supplies, industrial use)
- High Security (permanent plantings such as orchards and vineyards)
- end-of-system flow requirement resulting from the system operation
- minimum storage releases.

The volume of water distributed to licence categories is expressed as either a volume per share or as a percentage of share component, depending on the category of licence. The following table details each licence category and how it is announced.

Table 11: Access licence category announcement type

Licence category	AWD priority
General Security	Volume per share
High Security	Volume per share
Domestic and Stock <sup>14</sup>	Per cent of share component
Local Water Utility	Percent of share component

The AWD for Supplementary licence accounts is a separate process and is not dependent on the water asset available. It is made once at the start of the year and unless there is a management change because of the growth in use strategy, it is maintained at the maximum value prescribed in the plan, which is generally 1 megalitre per share (equivalent to 100% of entitlement). Therefore, it is not considered to create a liability on the system and is only considered in terms of an extraction that reduces the water asset.

<sup>14</sup> Domestic and Stock is further broken down into 3 sub-categories: 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.

## Additional information

Table 13 summarises allocations for the reporting period. Table 12 describes each component presented in the summary.

Table 12: Allocation summary report notes

Heading	Description
<b>Date</b>	Date that available water determination was announced, and water was credited to accounts
<b>Opening (ML)</b>	Remaining allocation account balances at the conclusion of the previous season that is allowed to be carried forward to this season
<b>Individual announcement</b>	Actual available water determination announcement made to each licence category
<b>Share component (entitlement)</b>	Sum of the licensed volume of water within the licence category on the announcement date
<b>Allocation volume (ML)</b>	Volume of water credited to accounts within a licence category as a result of the announcement made
<b>Cumulative volume (ML)</b>	Cumulative total of the announced volumes for the water year and licence category
<b>Allocation volume (%)</b>	This is the announced volume expressed as a percentage of the share applicable on the particular date
<b>Cumulative volume (%)</b>	This is the cumulative volume expressed as a percentage of the entitlement applicable on the particular date
<b>Balance available (ML)</b>	Sum of water in allocation accounts that has been made available to be taken during the season
<b>Balance not available (ML)</b>	Water allocated that is not accessible at this point in time
<b>Balance total (ML)</b>	Sum of the total volume of account water in accounts
<b>Balance available (%)</b>	Balance available expressed as a percentage of the share component
<b>Balance total (%)</b>	Total account balance expressed as a percentage of the share component.

Table 13: Allocation announcements during the reporting period for Gwydir regulated river water source. See Table 12 for an explanation of headings

Date	Individual announcement	Share component	Allocation volume (ML)	Cumulative volume (ML)	Allocation volume (%)	Cumulative volume (%)	Balance available (ML)	Balance not available (ML)	Balance total (ML)	Balance available (%)	Balance total (%)
<b>Domestic and Stock</b>											
1-Jul-22	Opening		2,506		0.00%	0.00%	0	0	0	0.00%	0.00%
1-Jul-22	AWD 100.0 %		2,506	2,506	100.00%	100.00%	2,506	0	2,506	100.00%	100.00%
<b>Domestic and Stock [Domestic]</b>											
1-Jul-22	Opening		388		0.00%	0.00%	0	0	0	0.00%	0.00%
1-Jul-22	AWD 100.0 %		388	388	100.00%	100.00%	388	0	388	100.00%	100.00%
<b>Domestic and Stock [Stock]</b>											
1-Jul-22	Opening		230		0.00%	0.00%	0	0	0	0.00%	0.00%
1-Jul-22	AWD 100.0 %		230	230	100.00%	100.00%	230	0	230	100.00%	100.00%
<b>Floodplain Harvesting</b>											
1-Jul-22	Opening				0.00%	0.00%	0	0	0	0.00%	0.00%
15-Aug-22	AWD 1.0 ML per Share		104,663	104,663	100.00%	100.00%	104,663	0	104,663	100.00%	100.00%
<b>Local Water Utility</b>											
1-Jul-22	Opening		3,836		0.00%	0.00%	(7)	0	(7)	(0.20%)	(0.20%)
1-Jul-22	AWD 100.0 %		3,836	3,836	100.00%	100.00%	3,829	0	3,829	99.80%	99.80%
<b>Regulated River (General Security)</b>											
1-Jul-22	Opening		509,665		0.00%	0.00%	757,944	347	758,292	148.70%	148.80%
1-Jul-22	AWD 0.0 ML per Share		0	0	0.00%	0.00%	757,944	347	758,292	148.70%	148.80%
6-Jul-22	AWD 1.03 ML per Share		6,206	6,206	1.20%	1.20%	764,150	347	764,498	149.90%	150.00%
5-Aug-22	AWD 0.58 ML per Share		31,740	37,946	6.20%	7.40%	794,176	2,061	796,237	155.80%	156.20%
7-Sep-22	AWD 0.54 ML per Share		12,496	50,442	2.50%	9.90%	804,900	3,834	808,733	157.90%	158.70%
10-Oct-22	AWD 0.29 ML per Share		1,194	51,636	0.20%	10.10%	806,078	3,850	809,928	158.20%	158.90%
7-Dec-22	AWD 0.16 ML per Share		5,863	57,499	1.20%	11.30%	811,896	3,895	815,791	159.30%	160.10%
12-Jan-23	AWD 0.11 ML per Share		25,164	82,663	4.90%	16.20%	835,455	5,500	840,955	163.90%	165.00%
7-Feb-23	AWD 0.02 ML per Share		7,069	89,732	1.40%	17.60%	842,037	5,986	848,023	165.20%	166.40%
7-Mar-23	AWD 0.02 ML per Share		8,107	97,839	1.60%	19.20%	849,724	6,407	856,131	166.70%	168.00%
6-Apr-23	AWD 0.25 ML per Share		63,285	161,124	12.40%	31.60%	906,395	13,021	919,416	177.80%	180.40%
5-May-23	AWD 0.21 ML per Share		40,740	201,864	8.00%	39.60%	940,037	20,119	960,156	184.40%	188.40%

Date	Individual announcement	Share component	Allocation volume (ML)	Cumulative volume (ML)	Allocation volume (%)	Cumulative volume (%)	Balance available (ML)	Balance not available (ML)	Balance total (ML)	Balance available (%)	Balance total (%)
<b>Regulated River (High Security)</b>											
1-Jul-22	Opening	20,200			0.00%	0.00%	0	0	0	0.00%	0.00%
1-Jul-22	AWD 1.0 ML per Share	20,200	20,200	20,200	100.00%	100.00%	20,200	0	20,200	100.00%	100.00%
<b>Regulated River (High Security)[Research]</b>											
1-Jul-22	Opening	60			0.00%	0.00%	0	0	0	0.00%	0.00%
1-Jul-22	AWD 100.0 %	60	60	60	100.00%	100.00%	60	0	60	100.00%	100.00%
<b>Supplementary Water</b>											
1-Jul-22	Opening	181,398			0.00%	0.00%	0	0	0	0.00%	0.00%
1-Jul-22	AWD 0.21 ML per Share	181,398	38,094	38,094	21.00%	21.00%	38,094	0	38,094	21.00%	21.00%
15-Aug-22	AWD 0.79 ML per Share	181,398	143,304	181,398	79.00%	100.00%	181,398	0	181,398	100.00%	100.00%

---

## 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. This figure excludes that water accounted as over- order debit, which is accounted for separately (see Note 21).

### Data type

Measured/administration 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 (Joint ownership).

### 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. However, with multiple categories of access licences being extracted through the same pumps, more information and methodologies are needed to separate use under the various licence categories:

- based on periods of announcement—during periods of supplementary water announcements, extractions can be debited against the Supplementary water licences
- 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 next table. The ranking is based on the nature of and rules of each of the licence categories.

Table 14 shows the order in which extractions are apportioned to access licence categories, starting at priority 1. This is a generic list where not all categories will necessarily appear in this GPWAR. There are also various sub-categories of licence associated with some of these.

Table 14: 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

## Additional information

Table 15 summarises account usage by licence category for the reporting period.

Table 15: Account usage summary

Licence category	Account usage (ML)
Domestic and Stock	670
Domestic and Stock [Domestic]	3
Domestic and Stock [Stock]	47
Local Water Utility	1,785
General Security	235,288
High Security	12,751
High Security (Research)	0
Supplementary	28,572
Floodplain Harvesting	0
<b>Total account Usage</b>	<b>279,115</b>





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## Note 4—Internal trading (allocation assignments)

This represents the temporary trading (allocation assignments) of water between allocation accounts within the Gwydir Regulated River water source.

### Data type

Administration

### Policy

*Water Management Act 2000*

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

Water Sharing Plan for the Gwydir Regulated River Water Source 2016

- Part 10 Access licence dealing rules
  - Available on the NSW Department of Climate Change, Energy, the Environment and Water website at [www.industry.nsw.gov.au/water](http://www.industry.nsw.gov.au/water)

### 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

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 16 presents the internal trading figures between licence categories. All figures represent a volume in megalitres.

Table 16: Gwydir allocation assignments summary

<b>From</b>	<b>To General Security</b>	<b>To High Security</b>	<b>To Supplementary Water</b>	<b>Total</b>
<b>General Security</b>	23,074	-	-	23,074
<b>High Security</b>	6,061	105	-	6,166
<b>Supplementary Water</b>	-	-	9,494	9,494
<b>Total</b>	<b>29,135</b>	<b>105</b>	<b>9,494</b>	<b>38,734</b>

---

## Note 5—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:

- 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 either providing water to, or supplementing the water requirements of, specific environmental events or incidents.

### Data type

Measured

### Policy

- Water Sharing Plan for the Gwydir Regulated River Water Source 2016

Available on the NSW Department of Climate Change, Energy, the Environment and Water website at [www.industry.nsw.gov.au/water](http://www.industry.nsw.gov.au/water)

### 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)

Available Water Determination Register—NSW Department of Climate Change, Energy, the Environment and Water website at [www.industry.nsw.gov.au/water](http://www.industry.nsw.gov.au/water)

### Methodology

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

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

- licensed extractions
- forfeiture due to:
- carryover rules
- account spillage as a result of AWD
- licence conversions
- excess orders (where water order debiting is in place)
- licence conversion
- trade of allocation water between accounts.

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

## Additional information

Table 17 summarises held environmental water for the reporting period. Table 9 explains the components. Table 18 summarises changes to the environmental portfolio since the previous reporting period. Table 19 provides environmental allocation movement through temporary allocation assignments.

Table 17: Gwydir held environmental water account summary. See Table 9 for an explanation of headings.

Category	Share 30 June 2022	Opening balance	AWD	Drought sus In	Drought sus Out	Asn In	Asn Out	Account usage	EoY Avail	EoY NA	EoY forfeit	Carry fwd
General Security	106,617	159,926	6,281	0	0	2,586	2,586	6,281	159,926	0	0	159,926
High Security	5,757	0	5,757	0	0	0	0	4,508	1,357	0	1,249	0
Supplementary water	23,591	0	23,591	0	0	0	0	0	6,683	0	21,546	0

Table 18: Annual change summary for Gwydir regulated river environmental licences

Category	Volume 30 June 2022	Volume 30 June 2023	Volume difference	No. Licences 30 June 2022	No. Licences 30 June 2023	No. Licence difference
General Security	106,617	106,617	0	8	8	0
High Security	5,757	5,757	0	4	4	0
Supplementary water	23,591	23,591	0	4	4	0

Table 19: Environmental allocation assignment summary. Movement of water via allocation assignments between consumptive and environmental licences.

From	To Consumptive General security	To Environmental General security	To Supplementary	Total
Environmental – General security	-	2,586	-	2,586
Environmental – High Security	-	-	-	0
Environmental – Supplementary	-	-	-	0
<b>Total</b>	-	2,586	-	2,586

---

## Note 6—Environmental provisions

There are several planned environmental provisions within the regulated Gwydir water source that are implemented under the water sharing plan. These provisions aim to enhance environmental benefits.

**A minimum flow requirement through to the Gwydir Wetlands:** The flow aims to maintain wetland health by maintaining a minimum flow into the Gwydir Wetlands of up to 500 megalitres per day.

**An environmental contingency allowance (ECA):** Water is put aside in Copeton storage that can be called upon to achieve environmental benefits such as supporting bird breeding events, supporting native fish colonies and maintaining general river ecosystem health. The amount of water that may be credited to the ECA account is determined based on the available water determinations for General Security licence holders, up to a maximum of 90,000 megalitres. Utilisation of the ECA is managed by the Department of Climate Change, Energy, the Environment and Water – Environment, Energy and Science (former New South Wales Office of Environment and Heritage).

**Long-term extraction limit:** By limiting long-term average extractions to an estimated 392,000 megalitres per year, this plan ensures that approximately 66% of the long-term average annual flow in the water source (estimated to be 1,141,000 megalitres per year) will be preserved and will contribute to the maintenance of basic ecosystem health.

**Supplementary access restrictions:** During periods of supplementary flow, water made available for consumptive use is restricted to a maximum volume of 50% of the water in excess of requirements, with the remaining 50% being reserved for environmental benefit. For more detail on supplementary water announcements and extractions, refer to Note 18.

### Data type

Measured

### Policy

*Water Sharing Plan for the Gwydir Regulated River Water Source 2016*

- Part 3 Environmental Water Provisions
  - Clause 13 and 14 Planned Environmental Water

Available on the NSW Department of Climate Change, Energy, the Environment and Water website at [www.industry.nsw.gov.au/water](http://www.industry.nsw.gov.au/water)

### 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)

WaterNSW annual compliance report (internal document)

## Methodology

The minimum flow required to pass to the Gwydir Wetlands is calculated by assessing the total volume of water entering the Gwydir River from the Horton River, Myall Creek and Hall's Creek and any water spilling or being pre-released from Copeton Dam against the Yarraman gauge on the Gwydir. The volume assessed up to a maximum of 500 megalitres per day is required to be passed through to Gwydir wetlands being split 50/50 between Gingham and Lower Gwydir. It is however acknowledged that at times when other system requirements are minimal, natural attenuation of flows may mean that the required minimum flows are not achieved. The system operational requirements are indicated in

Figure 38 by the total orders at Copeton Dam.

## Additional information

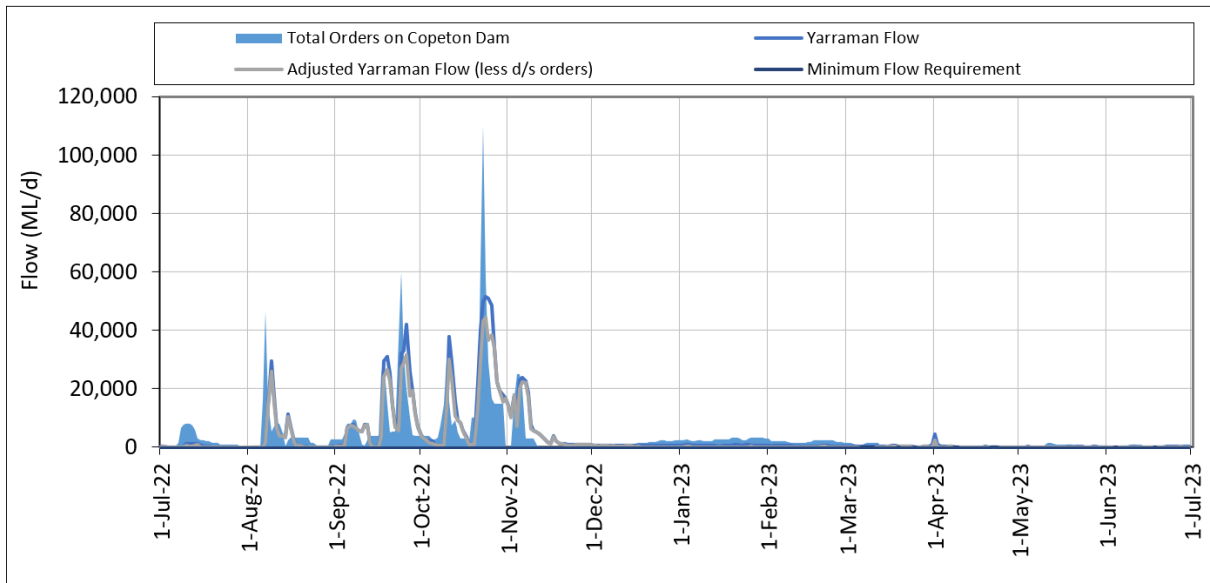
Annual accounting information for the ECA is presented in Table 20. Performance of the minimum flow requirement is provided in Figure 38.

Table 20: Summary of ECA account balance<sup>15</sup>

Water Year	Water Credited	Usage	Balance
2009-10	0	0	17,300
2010-11	37,310	5,000	49,610
2011-12	56,890	16,500	90,000
2012-13	2,330	3,074	89,260
2013-14	0	1,000	88,260
2014-15	0	29,895	58,370
2015-16	2,400	4,750	56,020
2016-17	35,380	21,000	70,400
2017-18	7,930	3,000	75,330
2018-19	0	52,000	23,330
2019-20	1,170	5,228	19,270
2020-21	31,130	7,978	42,420
2021-22	59,293	11,523	90,000
2022-23	5,620	5,620	90,000

<sup>15</sup> The ECA balance is held to 4 significant figures only

Figure 38: Plot of minimum flow targets at Yarraman





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## Note 7—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 that cannot be accessed under normal operating conditions (for example, volume below low-level outlet). It is assumed that the dead storage can be accessed if required via alternative access methods (for example syphons).

### Data type

Derived from measured data

### Policy

Not applicable

### Data accuracy

A—Estimated in the range +/- 10%

### Providing agency

Lands 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 21: Capacity and dead storage summary table

Name	Capacity (ML)	Dead storage (ML)
Copeton Dam	1,361,720	18,490

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## Note 8—River channel storage

This is 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 any river section  $i$ , the volume of water in the section is:

$$V_i = Q_i \times T_i$$

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

$$\text{Total river volume} = \sum_{i=1}^n V_i$$

The components of the above formula are explained in Table 22.

Table 22: Summary of river channel storage calculation components

Symbol	Variable	Data source	Unit
<b>Q<sub>i</sub></b>	Average flow in the river section. Calculated by averaging the daily flows at the upstream and downstream river gauges.	HYDSTRA	ML/d
<b>V<sub>i</sub></b>	Volume in each river section	Calculated	ML
<b>T<sub>i</sub></b>	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.
- We assume that daily flow change between gauging sites is linear.

---

## Note 9—Storage inflow—Copeton

Storage inflow refers to the volume of water flowing into the major headwater storage, Copeton 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, SILO (Queensland Government climatic information)

### 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. This is referred to as a back-calculation of inflows.

The back-calculation figures were derived using a one-day time-step, with the inflow calculated according to the equation below. The daily inflows are then summed to provide an annual inflow figure.

$$I = \sum_{i=1}^{365} \left( \Delta S_i + O_i + Se_i + \frac{(E_i - R_i) * A_i}{100} \right)$$

The components of the above formula are explained in Table 23.

Table 23: Components for back-calculation of inflow

Symbol	Variable	Unit
I	Inflow	ML/day
$\Delta S_i$	Change in storage volume at the time i	ML
$O_i$	Outflow at the time i	ML/day
$Se_i$	Seepage at the time i	ML/day
$R_i$	Rainfall at the time i	mm/day

Symbol	Variable	Unit
<b>E<sub>i</sub></b>	Evaporation (Mortons shallow lake estimation, SILO) at the time i	mm/day
<b>A<sub>i</sub></b>	Surface area at time i —derived from height to surface areas lookup curve	ha

Assumptions and approximations:

- Constant storage specific pan evaporation factors are applied (one annual factor).
- Seepage was assumed to be zero.

## Note 10—Storage evaporation and storage rainfall

This refers to the volume of water effective on Copeton 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—HYDSTRA, SILO (Queensland Government climatic information)

### 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 that is then aggregated to an annual figure. The rainfall and evaporation data used is equivalent to the data used in the storage inflow back-calculation (Note 9)

#### Rainfall:

$$V = \sum_{i=0}^{365} \left( \frac{R_i \times A_i}{100} \right)$$

#### Evaporation:

$$V = \sum_{i=0}^{365} \left( \frac{E_i \times A_i}{100} \right)$$

The components of the above formulas are explained in

Table 24.

Table 24: Components for storage evaporation and rainfall

Symbol	Variable	Unit
<b>V</b>	Volume	ML/year
<b>R<sub>i</sub></b>	Rainfall at the time i	mm/day
<b>A<sub>i</sub></b>	Surface area at the time i—derived from height to surface areas lookup curve	Ha

Symbol	Variable	Unit
<b>E<sub>i</sub></b>	Evaporation (Mortons shallow lake estimation, SILO) at the time i	mm/day

---

## Note 11—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 2 gauging locations using ARCGIS and as such an area for each reach can be defined.

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

In the formula, 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 that is then aggregated to an annual figure.

#### **Rainfall:**

$$V = \sum_{i=1}^{365} \frac{R_i \times A_i}{10^6}$$

#### **Evaporation:**

$$V = \sum_{i=1}^{365} \frac{ETO_i \times K_c \times A_i}{10^6}$$

The components of the above formulas are explained in Table 25.

Table 25: Components for storage evaporation and rainfall

Symbol	Variable	Unit
<b>V</b>	Volume	ML/year
<b>R</b>	Rainfall	mm/day
<b>A<sub>i</sub></b>	Surface area at the time i—derived from height to surface areas lookup curve	m <sup>2</sup>
<b>ETO<sub>i</sub></b>	Reference evapotranspiration from SILO at the time i	mm/day
<b>K<sub>c</sub></b>	Crop coefficient for open water (1.05)	-



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## Note 12—Gauged tributary inflow

This is the inflow into the regulated river that occurs downstream of the headwater storages and 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

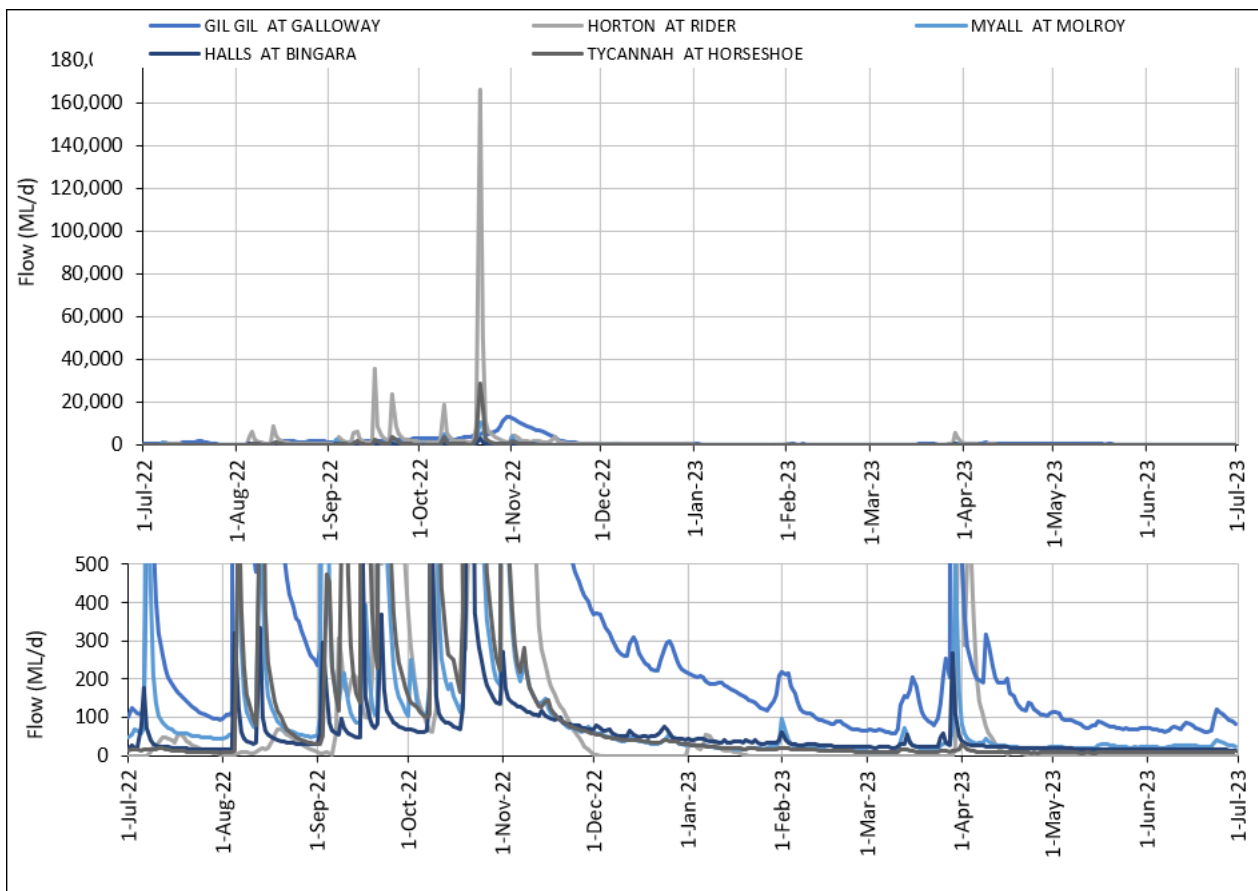
Table 26. A plot of the daily gauged tributary inflows is provided in Figure 39.

Table 26: Summary of gauged tributary inflow (annual volume in megalitres)

Station	Station name	Catchment area (km <sup>2</sup> )	Inflow (ML)
418025	Halls Creek at Bingara	156	24,084

Station	Station name	Catchment area (km <sup>2</sup> )	Inflow (ML)
418015	Horton River at Rider	1,970	574,825
418017	Myall Creek at Molroy	842	72,882
418032	Tycannah Creek at Horseshoe Lagoon	866	101,874
416054	Gil Gil Creek at Boolataroo	7,985	158,128
<b>Total Gauged Inflow</b>	-	-	<b>931,794</b>

Figure 39: Gauged tributary Inflow



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## Note 13—Ungauged runoff estimate

This is the inflow into the river that occurs downstream of the headwater storages and 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, HYDSTRA

### Methodology

To derive an estimate, a simple mass balance approach was adopted between Copeton Dam and Pallamallawa, whereby known inflows and outflows were combined with an assumed loss factor.

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

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 (Pallamallawa).
- **SR<sub>k</sub>** = Copeton storage release
- **GI** = Gauged inflows (Copeton to Pallamallawa)
- **E** = Extractions (Copeton to Pallamallawa)
- **LE** = Estimated losses. This was assumed to be 10% of the measured (gauged flow plus storage releases) entering the system.

## Additional information

For 2019–20, an additional estimate of 8,000 megalitres was included to estimate additional ungauged inflows in the Moomin Creek system (downstream of Pallamallawa).

Table 27 summarises ungauged inflow estimates for the reporting period and prior years.

Table 27: Summary of Gwydir ungauged inflow estimates

Catchment	Total volume estimated (ML)
2013-14	49,000
2014-15	52,000
2015-16	65,000
2016-17	196,000
2017-18	120,000
2018-19	2,000
2019-20	67,000
2020-21	233,000
2021-22	497,000
2022-23	549,000

---

## Note 14—Dam releases, river inflow from dam releases

This the volume of water released from Copeton Dam. 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

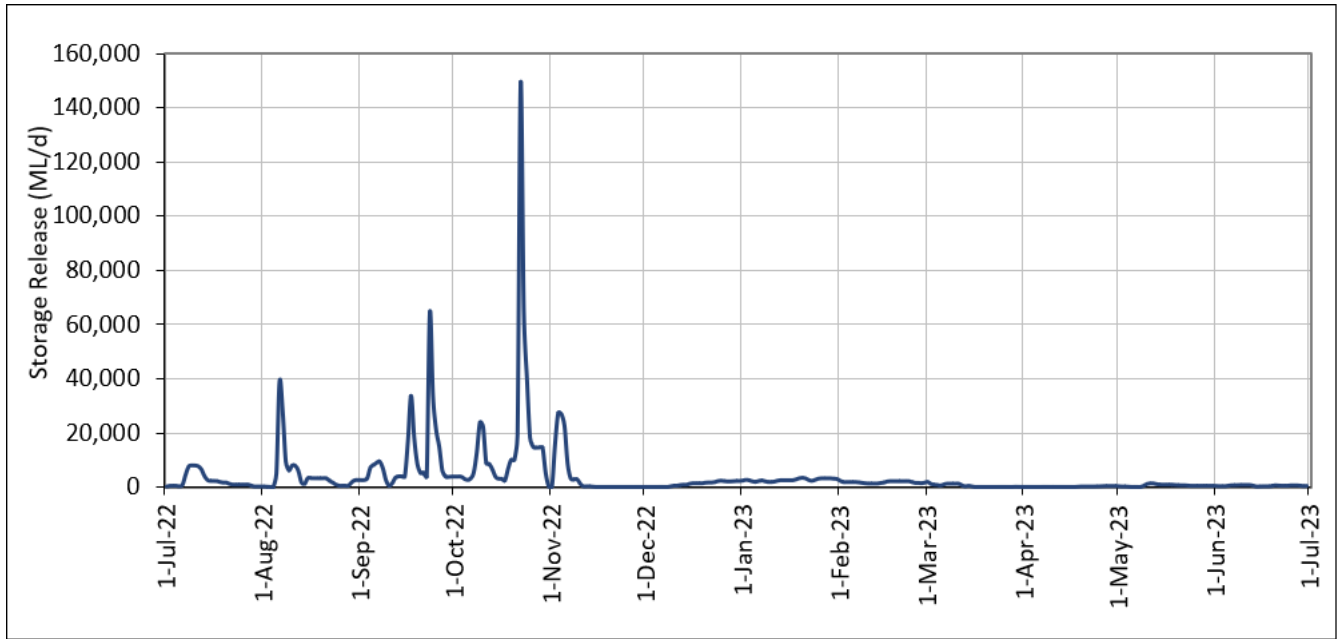
### Methodology

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).

### Additional information

Figure 40 provides daily releases from Copeton storage for the reporting period.

Figure 40: Copeton Dam releases



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## Note 15—End-of-system flow/flow to wetlands/replenishments

The Gwydir Wetlands are the western flowing semi-permanent wetlands, located on the Gwydir River floodplain, 60 kilometres west of Moree NSW, in the northern Murray Darling Basin. The climate is semi-arid with average annual rainfall of 585 mm. The wetlands consist of two main subsystems: the Gingham Watercourse (northern), the Big Leather - Lower Gwydir (southern). These systems are generally terminal wetlands, meaning that their water flows finish on the floodplain. Although in large floods the two will merge, flooding the vast plain and moving west to reach the Barwon-Darling River system.

End-of-system flow/flow to wetlands/replenishments refers to flow that leaves the entity and does not return to the entity. The flow has been separated into delivered replenishment flows that are delivered as a requirement of the water sharing plan and other end-of-system flows. The *flow to wetlands* line item (effectively an end-of-system flow for accounting purposes) is an estimate of the total amount of water that entered the Gwydir wetlands.

Under the conditions of the water sharing plan, water must be put aside in Copeton dam to deliver, as required, replenishment flows of up to 4,000 megalitres per water year to Thalaba Creek.

### Data type

Derived from measured data

### Policy

*Water Sharing Plan for the Gwydir Regulated River Water Source 2016*

- Part 10 System operation rules
  - Clause 66 Replenishment flows to Thalaba Creek
  - Clause 67 Replenishment flows to Mongyer Lagoon

Available on the NSW Department of Climate Change, Energy, the Environment and Water website at [www.industry.nsw.gov.au/water](http://www.industry.nsw.gov.au/water)

### 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, WaterNSW annual compliance report (internal document)

## Methodology

End-of-system flows are derived by the summation of flows at gauging site/s measuring the volume of water that leaves the accounting extent (Figure 1). Replenishments flows are obtained from the annual WaterNSW compliance reports.

Flows to the Gwydir wetlands are estimated by summing flows leaving Tyreel weir (which is passed to both to the lower Gwydir River and Gingham watercourse), and then subtracting any non-environmental usage from these reaches below Tyreel weir. The remaining volume is assumed to be the amount that was supplied to the Gwydir wetlands.

## Additional information

A summary of the calculation to determine the inflow to wetlands line item is presented in Table 28. Total end-of-system flows for the reporting period are summarised in Table 29. End-of-system outflows, excluding the flow to wetlands, are illustrated in

Figure 41. Water movements into, around and out of the Wetlands is visualised Gwydir wetlands flow diagram below.

Table 28: Calculation of Gwydir flow to wetlands

Component	Volume (ML)
<b>Gingham watercourse diversion from Tyreel Weir</b>	1,027,528
<i>less</i> Consumptive usage from Gingham watercourse below Tyreel Weir	7,520
<i>plus</i> Gwydir River release from Tyreel Weir	238,287
<i>less</i> Consumptive usage from Gwydir River below Tyreel Weir	17,414
<b>Total volume estimate flow delivered to the Gwydir wetlands</b>	1,240,881
<b>Replenishment component of flow to wetlands</b>	0 <sup>16</sup>

Table 29: End-of-system flow summary

Station	Volume (ML)	Accounting component
<b>Mehi River near Collarenebri</b>	581,719	End of system: other
<b>Gil Gil Creek at Galloway</b>	420,794	End of system: other
<b>Replenishment outflows</b>	0	End of system: replenishment
<b>Total end of system flow</b>	1,166,658	-

<sup>16</sup> Replenishment supplies to the Lower Gwydir and Gingham are no longer supplied from open channel deliveries due to completion of the domestic and stock supply pipeline scheme



Figure 41: Gwydir end of system (includes flow to wetlands)

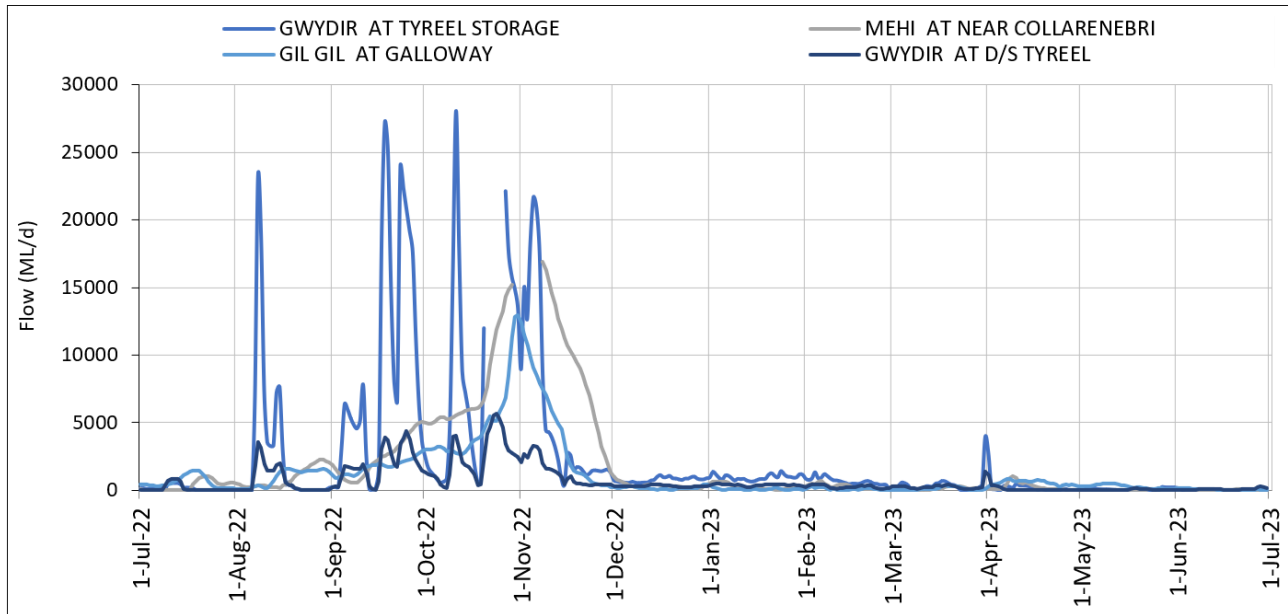
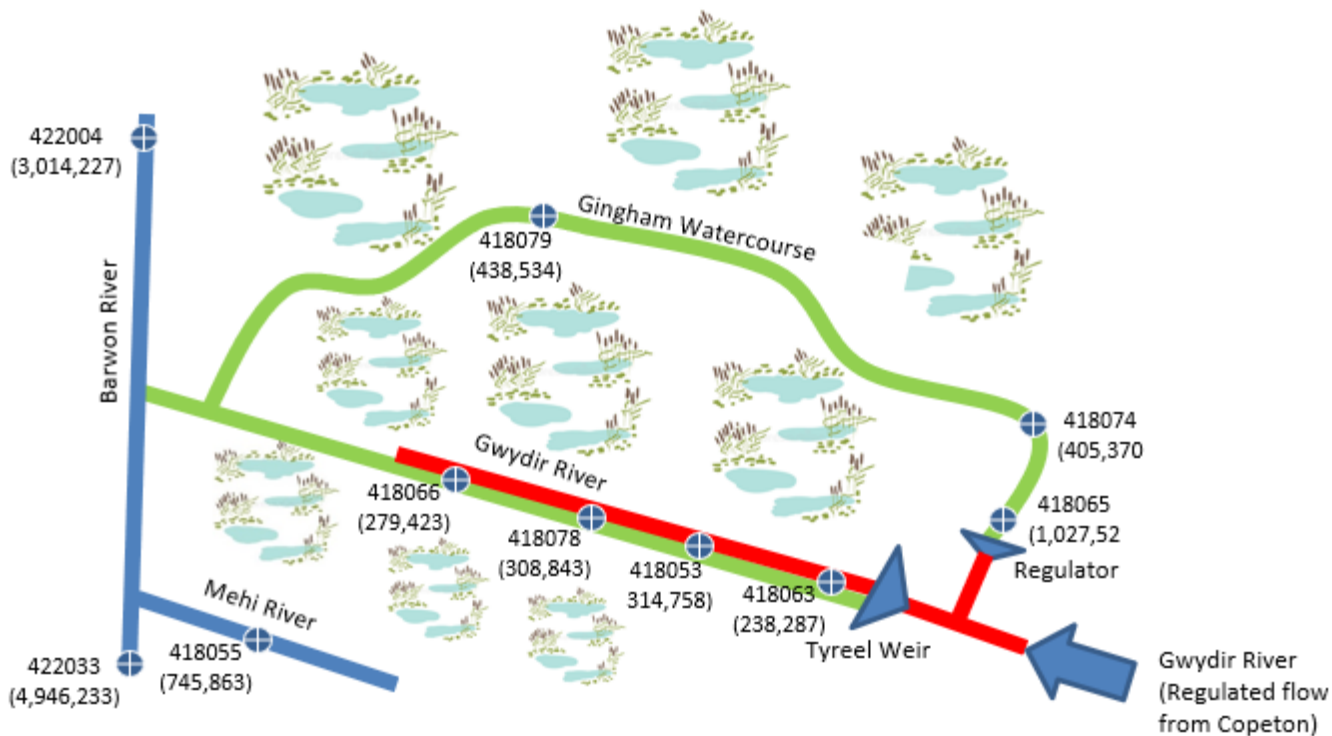


Figure 42: 2022-23 Gwydir Wetlands flows diagram



Gauging Stations	
418053	- Gwydir River at Brageen Crossing
418063	- Gwydir River at D/S Tyreel Offtake Regulator
418065	- Gwydir River at Tyreel Storage Gauge
418066	- Gwydir River at Millewa
418074	- Gingham Channel at Teralba
418078	- Gwydir River at Allambie Bridge
418079	- Gingham Channel at Gingham Bridge
422004	- Barwon River at Mogil Mogil
422033	- Barwon River at Collarenebri

Legend	
	Gauging Station (e.g. 418063)
(###,##0)	Annual Gauged Flows
	E-water
	Regulated
	Gwydir Wetlands

---

## Note 16—Extractions from river

This is the 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 figure stated for extractions from river excludes basic rights extractions, which is reported as a separate line item and detailed in Note 17.

### 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.

NSW Department of Climate Change, Energy, the Environment and Water—Water Ordering and Usage database

### Methodology

For the purposes of this GPWAR, extraction from the river is considered to be the total volume metered and debited to the allocation accounts, minus any 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 separately in other line items.

## Additional information

Table 30 reconciles estimated extractions from the river compared to total account usage.

Table 30: Reconciliation of physical extraction to account usage

<b>Component</b>	<b>Volume (ML)</b>
<b>Licenced extractions from river <sup>17</sup></b>	279,115
<b><i>plus</i> Licensed flow leaving system<sup>18</sup></b>	0
<b><i>plus</i> In-stream licenced usage <sup>19</sup></b>	0
<b>Total allocation account usage <sup>20</sup></b>	<b>279,115</b>

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<sup>17</sup> Direct licenced extractions from the river excluding basic rights usage estimate

<sup>18</sup> Licenced water ordered to leave the accounted Gwydir extent for environmental benefits

<sup>19</sup> Water ordered and used within the accounted system for environmental benefit (not extracted from river)

<sup>20</sup> The total amount of water accounted for usage against the allocation accounts

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## Note 17—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 Gwydir Regulated River 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 [www.industry.nsw.gov.au/water](http://www.industry.nsw.gov.au/water)

### 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 Gwydir 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 Gwydir Regulated River Water Source 2016* (6,000 megalitres)

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## Note 18—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. Supplementary access licences differ from other categories 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 Gwydir Regulated River 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 Taking of water under supplementary water access licences

Refer to applicable Water Sharing Plan on the NSW Department of Climate Change, Energy, the Environment and Water website at [www.industry.nsw.gov.au/water](http://www.industry.nsw.gov.au/water)

### Data accuracy

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)

### 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, more information is needed to separate out supplementary extraction. Basically, licence holders notify us of their intention to pump before pumping or diverting water during the declared supplementary event. They also provide meter readings both at the start and end of pumping. This enables the supplementary flow extraction to be assessed independently of other categories of access licences.

The total volume of water that may be made available for extraction under supplementary water access licences in the Gwydir Regulated River Water Source should not exceed 50% of the total supplementary volume available to share (remaining 50% reserved for environmental benefits).

### Additional information

Daily supplementary extractions, totals extraction by river section and operational supplementary announcements are presented in Figure 43, Figure 44 and Table 31 respectively.

Figure 43: Supplementary daily extractions

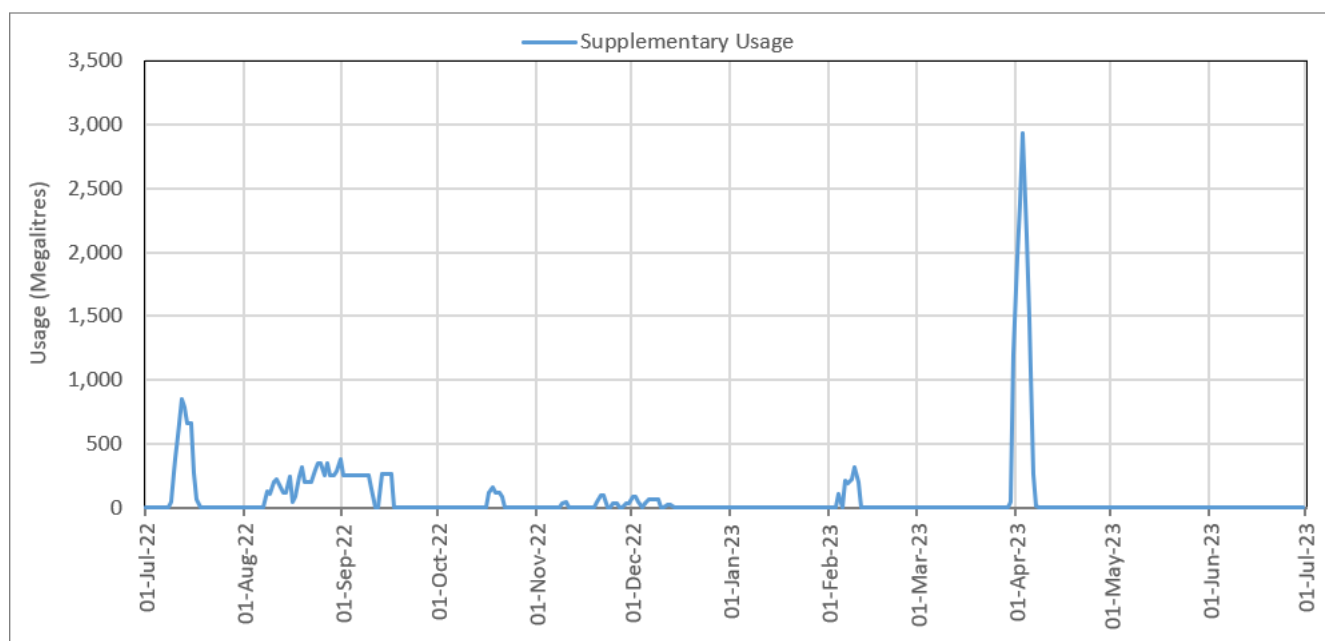


Figure 44: Total supplementary usage by river section

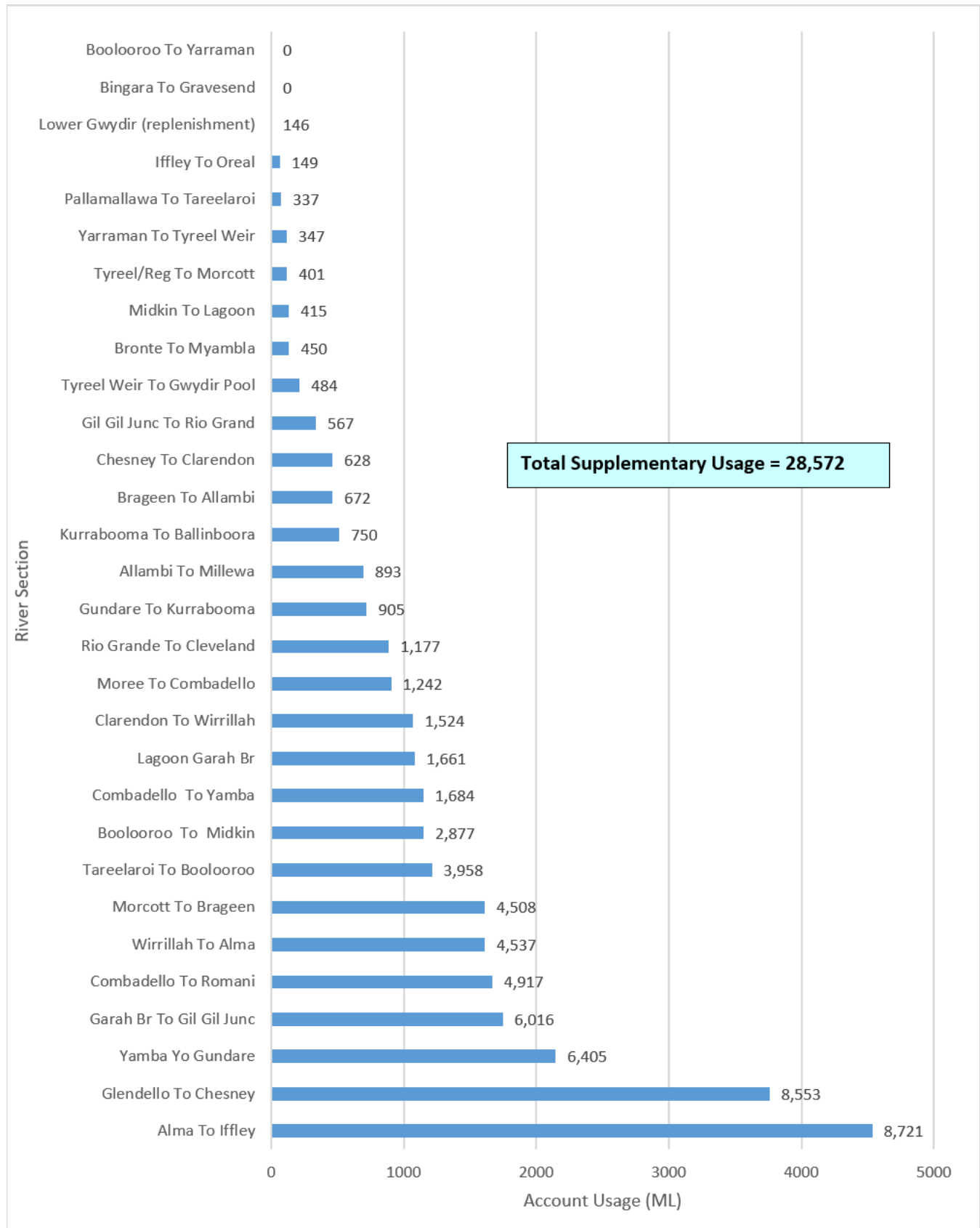




Table 31: Gwydir supplementary announcements

Announcement Date	% use limit	Section	Section start date	Section end date	Supp. usage
8-Jul-22	21	Pallamallawa To Tareelaro	9-Jul-22	14-Jul-22	74.4
8-Jul-22	21	Tareelaro To Boolooroo	10-Jul-22	14-Jul-22	231.9
8-Jul-22	21	Tyreel/Reg To Morcott	10-Jul-22	15-Jul-22	50
8-Jul-22	21	Morcott To Brageen	10-Jul-22	15-Jul-22	248.6
8-Jul-22	21	Allambi To Millewa	10-Jul-22	15-Jul-22	618.9
8-Jul-22	21	Garah Br To Gil Gil Junc	10-Jul-22	16-Jul-22	608.8
8-Jul-22	21	Tyreel Weir To Gwydir Pool	10-Jul-22	15-Jul-22	100
8-Jul-22	21	Moree To Combadello	11-Jul-22	16-Jul-22	402
8-Jul-22	21	Gundare To Kurrabooma	13-Jul-22	19-Jul-22	332
8-Jul-22	21	Combadello To Romani	12-Jul-22	18-Jul-22	850
8-Jul-22	21	Clarendon To Wirrillah	14-Jul-22	20-Jul-22	562.7
8-Jul-22	21	Wirrillah To Alma	14-Jul-22	20-Jul-22	211
6-Aug-22	100	Morcott To Brageen	7-Aug-22	22-Nov-22	579.4
6-Aug-22	100	Allambi To Millewa	8-Aug-22	18-Oct-22	0.8
6-Aug-22	100	Boolooroo To Midkin	7-Aug-22	18-Oct-22	202
6-Aug-22	100	Gundare To Kurrabooma	6-Aug-22	13-Dec-22	279.6
6-Aug-22	100	Kurrabooma To Ballinboora	6-Aug-22	13-Dec-22	379.7
6-Aug-22	100	Glendello To Chesney	9-Aug-22	22-Oct-22	3320
6-Aug-22	100	Chesney To Clarendon	9-Aug-22	25-Oct-22	362
6-Aug-22	100	Clarendon To Wirrillah	10-Aug-22	3-Dec-22	390
6-Aug-22	100	Wirrillah To Alma	10-Aug-22	3-Dec-22	1367.1
6-Aug-22	100	Alma To Iffley	10-Aug-22	18-Oct-22	3708.8
2-Feb-23	20	Gundare To Kurrabooma	4-Feb-23	7-Feb-23	108
2-Feb-23	20	Kurrabooma To Ballinboora	5-Feb-23	9-Feb-23	134.6
2-Feb-23	20	Bronte To Myambla	6-Feb-23	10-Feb-23	134.5
2-Feb-23	20	Iffley To Oreal	6-Feb-23	10-Feb-23	66
2-Feb-23	5	Alma To Iffley	6-Feb-23	10-Feb-23	824.4
30-Mar-23	10	Tareelaro To Boolooroo	31-Mar-23	3-Apr-23	979
30-Mar-23	10	Yarraman To Tyreel Weir	31-Mar-23	3-Apr-23	115.8
30-Mar-23	10	Tyreel/Reg To Morcott	1-Apr-23	4-Apr-23	69.4
30-Mar-23	10	Morcott To Brageen	2-Apr-23	4-Apr-23	782.5
30-Mar-23	10	Brageen To Allambi	3-Apr-23	5-Apr-23	463.4
30-Mar-23	10	Allambi To Millewa	3-Apr-23	7-Apr-23	74
30-Mar-23	10	Boolooroo To Midkin	31-Mar-23	4-Apr-23	947.2
30-Mar-23	10	Midkin To Lagoon	1-Apr-23	4-Apr-23	134.3
30-Mar-23	10	Lagoon Garah Br	2-Apr-23	5-Apr-23	1082.4
30-Mar-23	10	Garah Br To Gil Gil Junc	30-Mar-23	6-Apr-23	1137.6
30-Mar-23	10	Gil Gil Junc To Rio Grand	30-Mar-23	14-Apr-23	337
30-Mar-23	10	Rio Grande To Cleveland	30-Mar-23	14-Apr-23	886.6
30-Mar-23	10	Tyreel Weir To Gwydir Pool	1-Apr-23	4-Apr-23	113
30-Mar-23	10	Moree To Combadello	31-Mar-23	4-Apr-23	501.9
30-Mar-23	10	Combadello To Yamba	1-Apr-23	4-Apr-23	1146.5

Announcement Date	% use limit	Section	Section start date	Section end date	Supp. usage
30-Mar-23	10	Yamba Yo Gundare	2-Apr-23	5-Apr-23	2146.1
30-Mar-23	10	Combadello To Romani	1-Apr-23	4-Apr-23	816.9
30-Mar-23	10	Glendello To Chesney	3-Apr-23	6-Apr-23	438.5
30-Mar-23	10	Chesney To Clarendon	4-Apr-23	7-Apr-23	100.4
30-Mar-23	10	Clarendon To Wirrillah	5-Apr-23	8-Apr-23	118.4
30-Mar-23	10	Wirrillah To Alma	5-Apr-23	8-Apr-23	34

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## Note 19—Unaccounted difference

In theory, if all the processes of a water balance could be accurately accounted for, the unaccounted difference would be zero. In reality, because of uncertainty about many of the volumes presented in the accounts, the variety of data sources, and not all processes of the water cycle being accounted for, 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 improves the accuracy of the account estimates, we anticipate that, relatively, this figure should be lower in future accounts.

### 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 needed to get the correct volume in river at the end of the reporting period, after all the known physical inflows and outflows have been accounted for. The double-entry accounting process attempts 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 8.

Surface Water Unaccounted difference

$$UVSW = R_s - R_c + RI - R_o$$

Where:

- **UVSW** = Unaccounted difference for Surface Water
- **Rs** = Opening river volume estimate
- **Rc** = Closing river volume estimate
- **Ro** = Physical outflows from the river (for example, extractions)
- **RI** = Physical inflows to the river (for example, runoff, return flows, dam releases)

## Additional information

The unaccounted difference as a percentage of total river inflow for the reporting period and prior years is presented in Table 32.

Table 32: Summary of unaccounted difference

Water year	Unaccounted difference (ML)	Total river inflow (ML) <sup>21</sup>	% of inflow
2013–14	67,972	670,354	10%
2014–15	5,701	405,337	1%
2015–16	4,958	273,707	2%
2016–17	51,699	774,000	7%
2017–18	142,421	585,358	24%
2018–19	69,664	261,611	27%
2019–20	7,287	165,958	4%
2020–21	117,256	949,191	12%
2021–22	74,608	1,514,285	5%
2022–23	111,283	2,872,172	4%

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<sup>21</sup> Total river inflows as presented in the water accounting statements

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## Note 20—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).

### 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 Water—MODFLOW (Data inputs from HYDSTRA, GDS)

### Methodology

For the lower Gwydir 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 Water MODFLOW model for the lower Gwydir groundwater source (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 [www.industry.nsw.gov.au/water](http://www.industry.nsw.gov.au/water)).
- Alternatively, an estimation based on the relationships developed between the river stage and historical MODFLOW model results is used. The river gauging site 418087 (MEHI River at Chinook) was used to develop the relationship for the Lower Gwydir Groundwater Management Area.

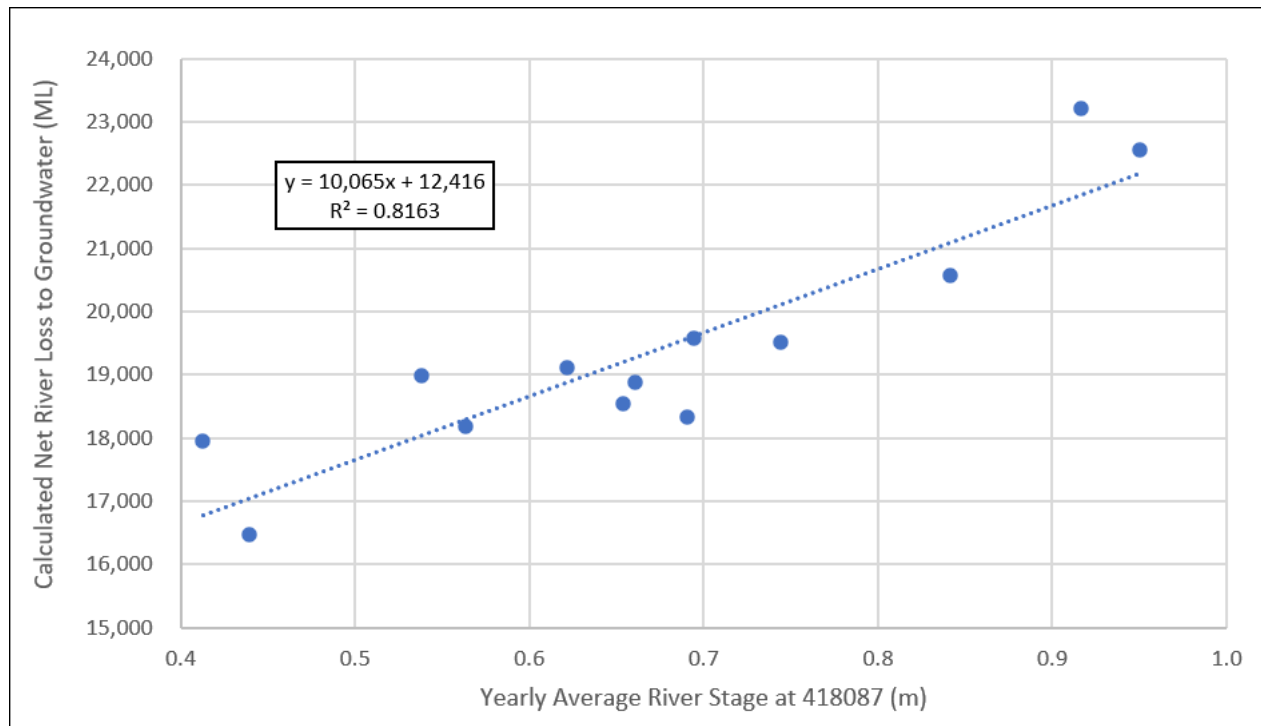
The chart used to analyse the historical river flows to the Lower Gwydir Groundwater source is provided in Figure 45. The resulting equation was used for estimating the accounting inputs are as follows:

Lower Gwydir Groundwater management Area:

$$\text{Net River Flow to Aquifer} = 10,065 \times \bar{H} + 12,416$$

Where  $\bar{H}$  is the average annual river stage.

Figure 45: Net River flow to Lower Gwydir Groundwater analysis chart

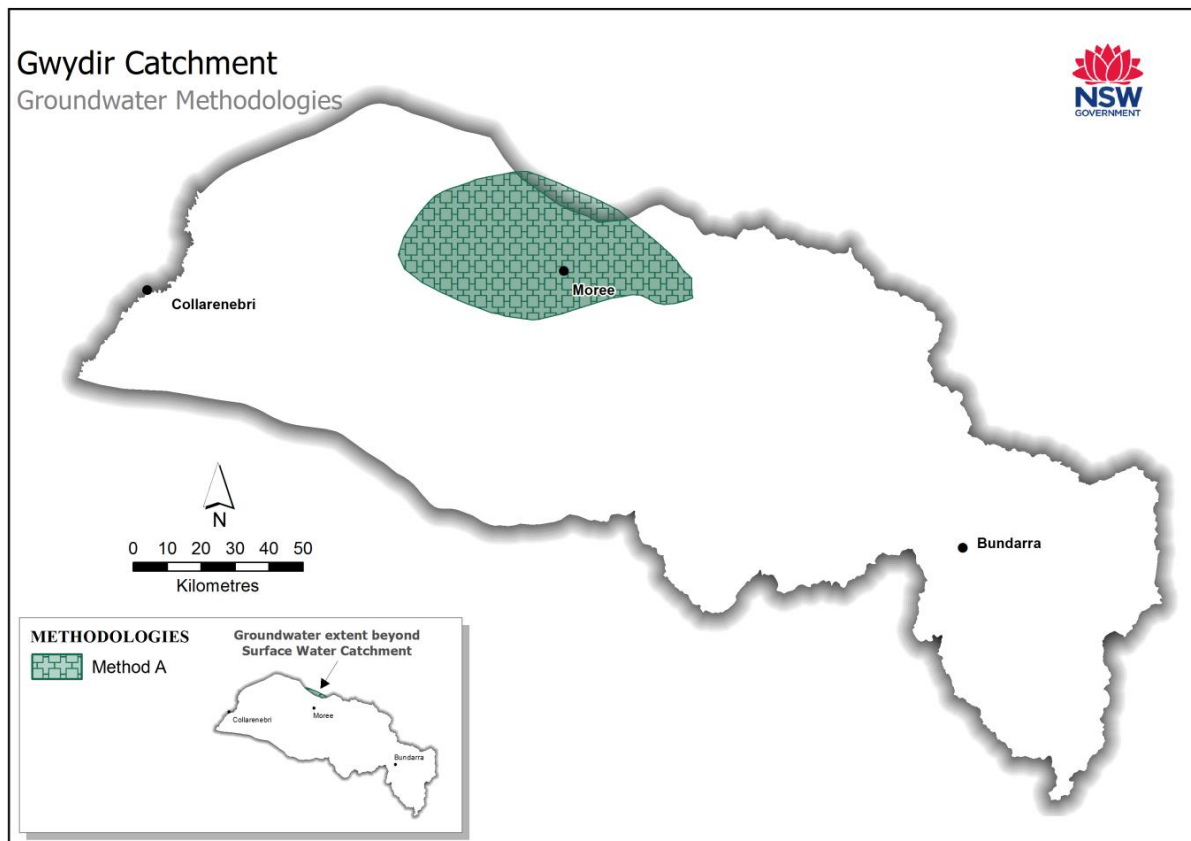


No estimates were made for interactions with the river outside the area covered by the lower Gwydir groundwater source.

### Additional information

Spatial coverage of the modelling data relative to the Gwydir catchment is presented in Figure 46. Groundwater interaction with the river outside of this area would form part of the unaccounted difference volume reported in the statements. The modelled annual groundwater budget for the reporting period was not available at the time of writing and any volumes associated with ground water interactions are included in the unaccounted difference shown in Table 32.

Figure 46: Groundwater methods



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## Note 21—Water order debiting

In the Gwydir regulated water source the allocation accounts are currently managed using a water order debiting approach. Accounting under this system defines that the accounts are reduced by the greater of the volume of water:

- extracted
- ordered for extraction against an access licence.

Therefore, the volume appearing in statements against the line item ‘water order debiting’ reflects the amount of water ordered against a category of licence that is in excess of the physical extraction that occurred.

### Data type

Measured/calculated

### Policy

Water Sharing Plan for the Gwydir Regulated River Water Source 2016

- Part 9—Rules for managing access licences.
  - Division 2—Water allocation account management.
    - Clause 42—Volume taken under access licences.

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

### Data accuracy

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)

### Methodology

Over-order debiting is a required component of balancing the allocation accounts detailed in Note 1. The over-order debit component is calculated by analysing the recorded extractions against orders for the corresponding measurement period. That is, if metered usage is collected monthly, then the corresponding monthly orders are compared and any orders that are in excess the usage are recorded as over-order debit.



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## Note 22—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, we need to correct accounts for a variety of reasons including when we have identified an error in the previous year's reporting, a balance in the previous year has since been adjusted, or when a process that had previously been reported cannot 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 year to ensure correct opening balances are achieved in the reporting year. No adjusting entries were needed for the reporting period.

# References

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