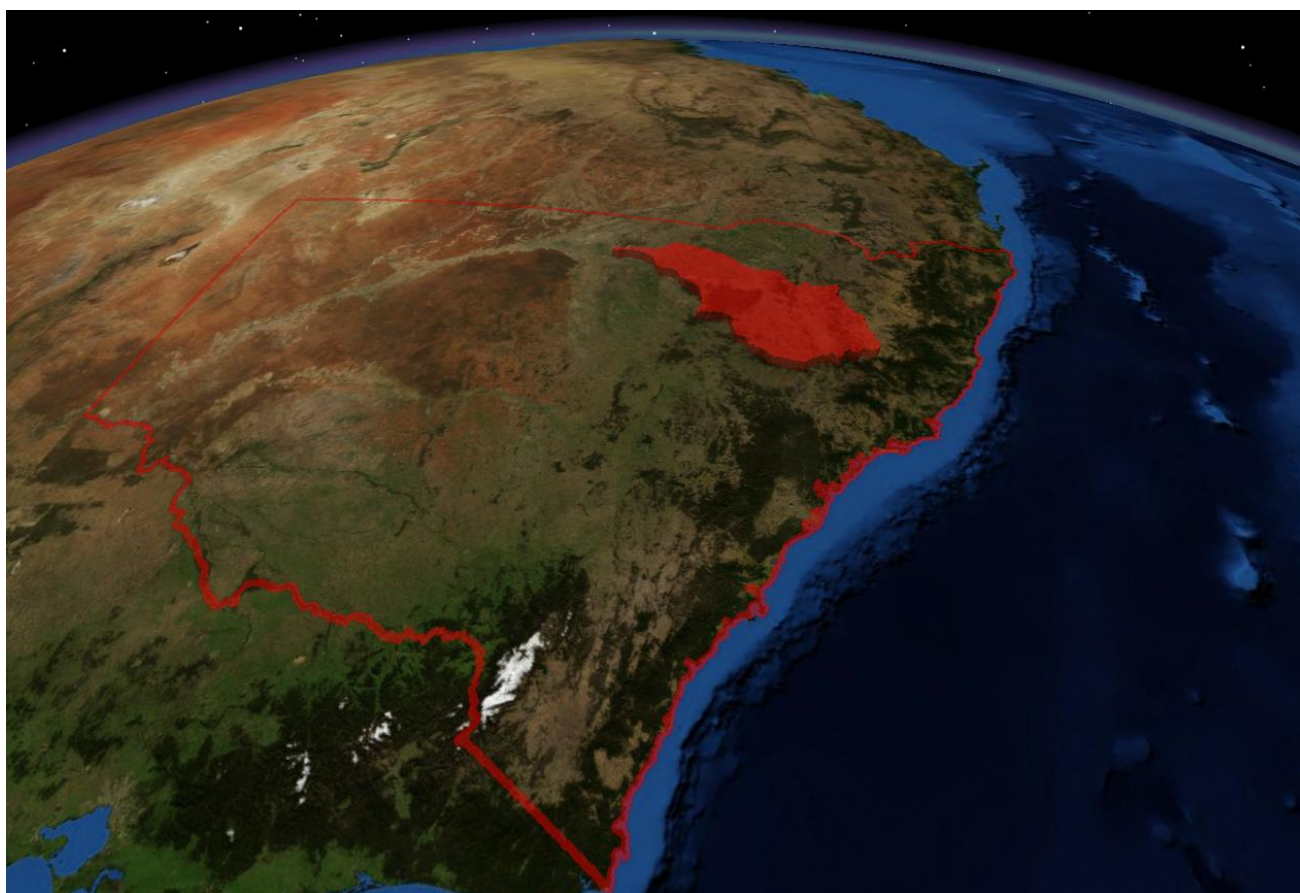




GENERAL PURPOSE WATER ACCOUNTING REPORT

Namoi Catchment

2019–20



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Abbreviations

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

Glossary

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

Term	Meaning
environmental water	water allocated to support environmental outcomes and other public benefits Environmental water provisions recognise the environmental water requirements and are based on environmental, social and economic considerations, including existing user rights.
evaporation	the process by which water or another liquid becomes a gas Water from land areas, bodies of water, and all other moist surfaces is absorbed into the atmosphere as a vapour.
evapotranspiration	the process by which water is transmitted as a vapour to the atmosphere as the result of evaporation from any surface and transpiration from plants
extraction	the pumping or diverting of water from a river or aquifer by licensed users for a specific purpose (irrigation, stock, domestic, towns, etc.) The volume is measured at the point of extraction or diversion (river pump, diversion works, etc.).
general purpose water accounting report (GPWAR)	a report prepared according to the Australian Water Accounting Standard It comprises several components including a contextual statement, a statement of water assets and water liabilities, a statement of change in water assets and water liabilities, a statement of physical water flows, notes and disclosures, and an assurance and accountability statement.
general-security licence	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).
groundwater	water location beneath the ground in soil pore spaces and in the fractures of rock formations
high-security licence	a category of water access licence implemented under the <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.
HYDSTRA database	a database used by NSW Department of Planning, Industry and Environment to store continuous, time-series data such as river flow, river height, and water quality
inflows	surface water runoff and deep drainage to groundwater (groundwater recharge) and transfers into the water system (both surface and groundwater) for a defined area
inter-valley trade	trade of licence holder allocation account water via allocation assignment from one catchment to another catchment (or state)
intra-valley trade	trade of licence holder allocation account water via allocation assignment within the same catchment
median	the middle point of a distribution, separating the highest half of a sample from the lowest half
non-physical transaction	an accounting transaction representing a process that is not a component of the water cycle (e.g. an available water determination)
physical transaction	an accounting transaction representing a process of the water cycle (e.g. an extraction)

Term	Meaning
regulated river	<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>
share component	<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>
storage	a state-owned dam, weir or other structure that is used to regulate and manage river flows in the catchment and the water bodies impounded by these structures
storage reserve	proportion of water in a storage reserved in the resource assessment process for future essential or high-security requirements (e.g. town water)
storage volume	the total volume of water held in storage at a specified time
supplementary water	unregulated river flow available for extraction under a supplementary licence
surface water	all water that occurs naturally above ground including rivers, lakes, reservoirs, creeks, wetlands and estuaries
tributary	<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>
ungauged catchment	<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>
water accounting	the systematic process of identifying, recognising, quantifying, reporting, assuring and publishing information about water, the rights or other claims to that water, and the obligations against that water
water assets	the physical water held in storage, as well as any claims to water that are expected to increase the future water resource (e.g. external water entering the system through inter-valley trading)
water liabilities	claims on the water assets of the water report entity, including water that has been allocated to licence holder accounts or environmental accounts, yet to be taken at the end of the reporting period
water sharing plan	a water management plan that defines the rules for sharing of water within a region under the <i>Water Management Act 2000</i>

Director's foreword

This is the 11th annual release of the general-purpose water accounting report (GPWAR) for the regulated component of the Namoi Regulated River Water Source. It has been prepared for the accounting period 1 July 2019 to 30 June 2020 (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
 - available water determination detailed report
 - temporary trading by licence category
 - supplementary announcements and usage by river reach
 - physical inflows and outflows to the system for the water year.

We have not included in this GPWAR detailed water accounting information on groundwater sources within the surface water accounting extent. We have covered the Peel catchment in a separate GPWAR published on the NSW Department of Planning, Industry and Environment website.

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

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



Danielle Baker

Director Water Analytics,
NSW Department of Planning, Industry and Environment

Contextual statement

The Namoi catchment is a sub-catchment of the eastern Murray–Darling Basin. It covers an area of about 42,000 square kilometres, stretching 350 kilometres from the Great Dividing Range near Tamworth to the Barwon River near Walgett. The Namoi is bounded by the Great Dividing Range in the east, the Liverpool Ranges and Warrumbungle Ranges in the south, and the Nandewar Ranges and Mount Kaputar to the north. Elevations range from over 1,500 metres above sea level in the south and east to just 100 metres on the alluvial floodplain of the lower Namoi, west of Narrabri.

Major tributaries of the Namoi River include Coxs Creek and the Mooki, Peel, Manilla, and McDonald Rivers, all of which join the Namoi River upstream of Boggabri. The Peel River, which has a catchment area of around 4,700 square kilometres, contributes an average annual volume of around 280,000 megalitres to the Namoi River. Streamflows in the Namoi catchment are regulated by three major storages: Keepit Dam on the Namoi River, Split Rock Dam on the Manilla River and Chaffey Dam on the Peel River.

Agricultural production comprises approximately half of the regional economy. Major industries include cotton, livestock production, grain and hay, poultry and horticulture. The Peel River also provides the bulk of urban water supply for Tamworth (supplemented by Dungowan storage located on Dungowan Creek). The regulated section of the Peel River is managed under a separate water allocation scheme and water sharing plan to the regulated Namoi River.

The Namoi and Peel catchments were part of the lands originally occupied by the Kamilaroi people. Today, approximately 100,000 people live within the Namoi catchment, mostly along the river and its tributaries between Tamworth and Narrabri. The largest urban centre in the valley is Tamworth, on the Peel River, which has a population of nearly 33,500. Other major centres are Gunnedah (7,500 people) and Narrabri (6,100 people)—both are located on the banks of the Namoi River. Smaller towns include Barraba, Manilla, Quirindi, Walgett, Wee Waa and Werris Creek.

Significant ecological features of the catchment include the many small floodplain wetlands associated with the river, and the large internal drainage basin of Lake Goran south of Gunnedah. Extensive areas of native woodland are conserved in the Pilliga Forest, which is the largest remaining dry sclerophyll forest west of the Great Dividing Range in NSW.

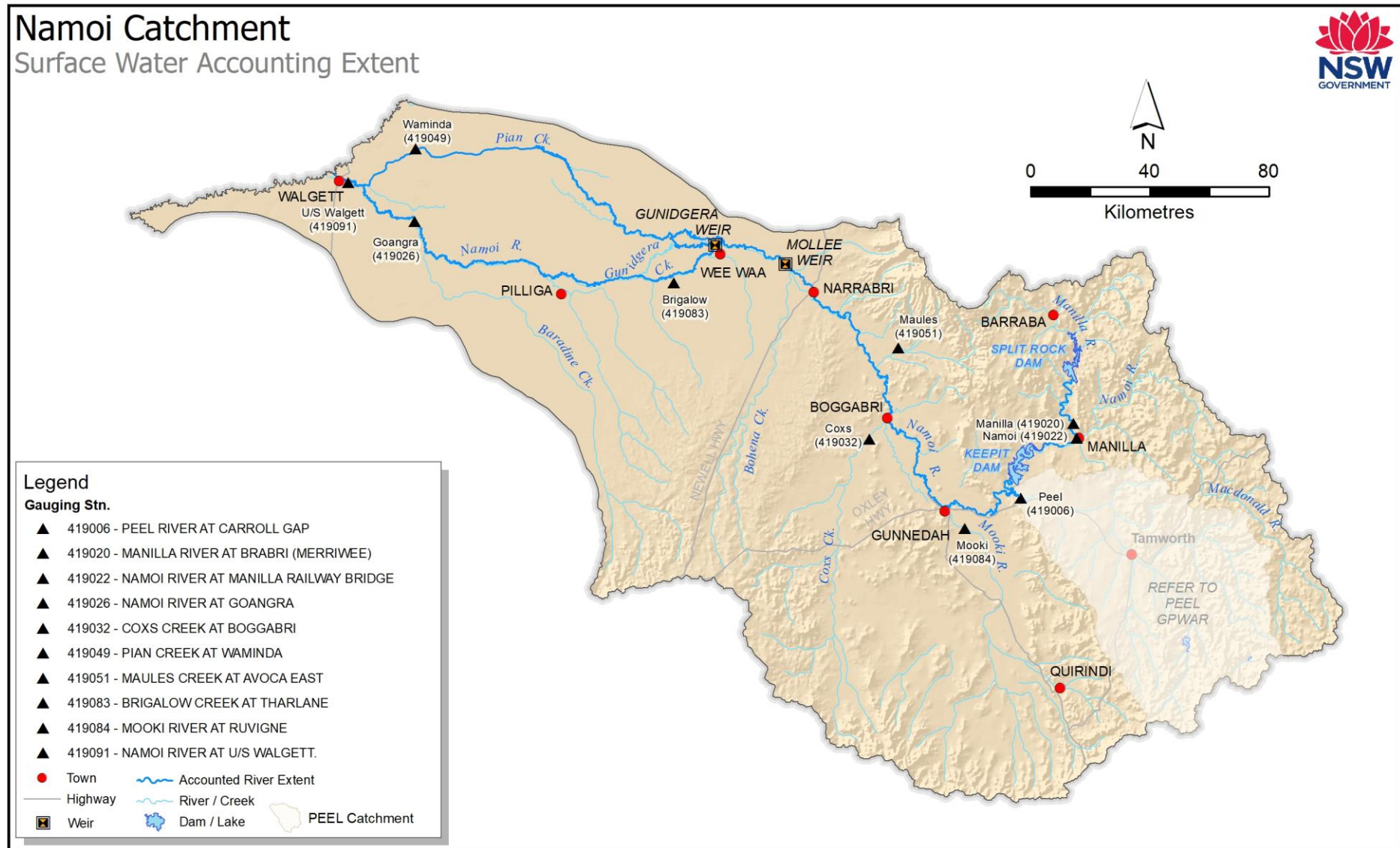
Accounting extent

The accounted river extent is illustrated in Figure 1. It includes the Upper Namoi Regulated River from Split Rock Dam to Keepit Dam, the Lower Namoi Regulated River from Keepit Dam to the Namoi-Barwon River confluence, Pian and Gunidgera Creeks.

The Peel catchment is excluded from this GPWAR¹, apart from the measured total annual flow that leaves the Peel River and flows into the Regulated Namoi River (measured by the flow gauging station at Carroll Gap). All water licences and water provisions managed by *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2016* are considered. While estimates of 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 aquifer flows and groundwater management are excluded from the GPWAR.

¹ The Peel catchment has been covered in a separate GPWAR available on the NSW Department of Planning, Industry and Environment website www.industry.nsw.gov.au .

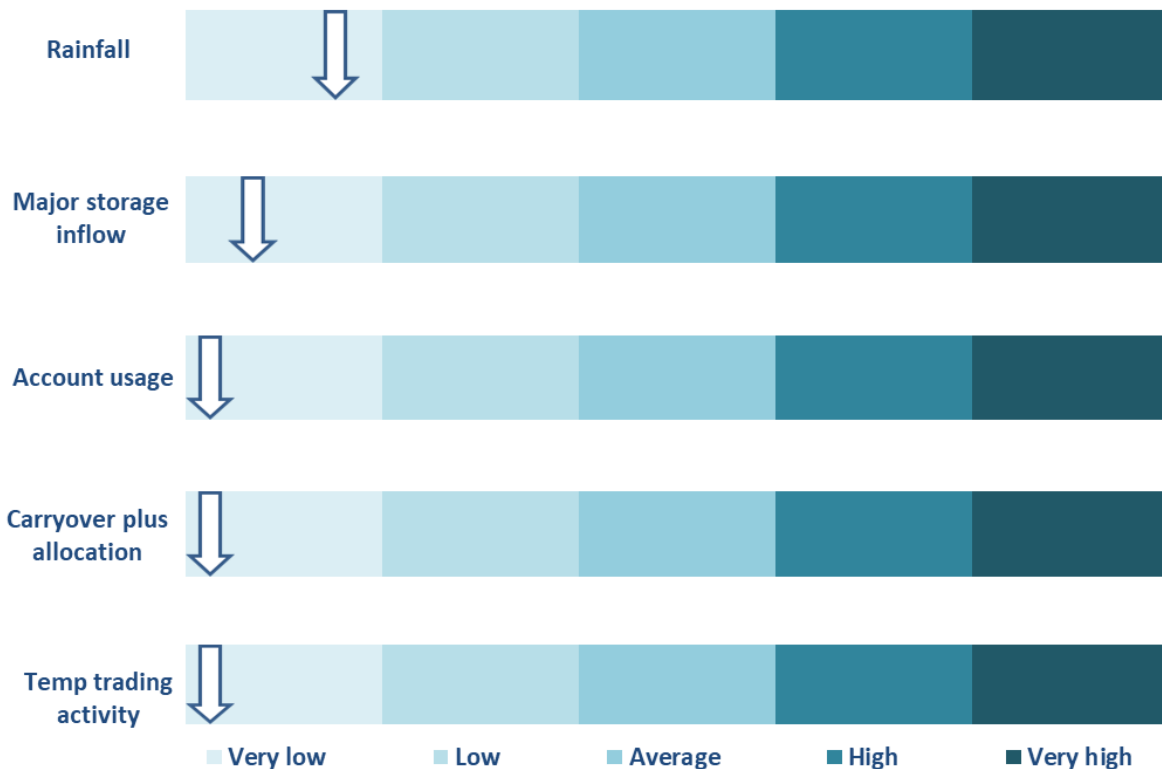
Figure 1: Surface water geographical accounting extent



Snapshot

The key indicators for 2019–20 relative to other years under water sharing plan management conditions are presented in Figure 2 (indicators are averaged across the upper and lower Namoi). For 2019-20 account usage, effective allocation (carryover plus allocations from available water determinations) and temporary trading were the lowest under water sharing plan management conditions. Rainfall and major storage inflow were also in the very low range relative to historical long term information.

Figure 2: 2019–20 Summary indicators



Climate

At Manilla (upper catchment), 470 mm of rainfall was recorded in the reporting period (Table 1). Comparatively, this volume of rainfall is:

- 75% of the long-term historical median at Manilla
- 41% of the highest rainfall on record at Manilla.

The majority of rainfall fell in February 2020 (161 mm) and Mar 2020 (68 mm) (Figure 3 and Figure 4).

At Wee Waa (lower catchment), 486 mm of rainfall was recorded in the reporting period (Table 2). Comparatively, this volume of rainfall is:

- 90% of the long-term historical median at Wee Waa
- 43% of the highest rainfall on record at Wee Waa.

The majority of rainfall fell in February 2020 (173 mm) and March 2020 (83 mm) (Figure 3 and Figure 4)

Spatially, rainfall was lower than the reference comparative average (1961–1990) across the entire extent of the catchment (Figure 5 and Figure 6).

Figure 3: Monthly rainfall for reporting period and historical medians at Manilla and Wee Waa

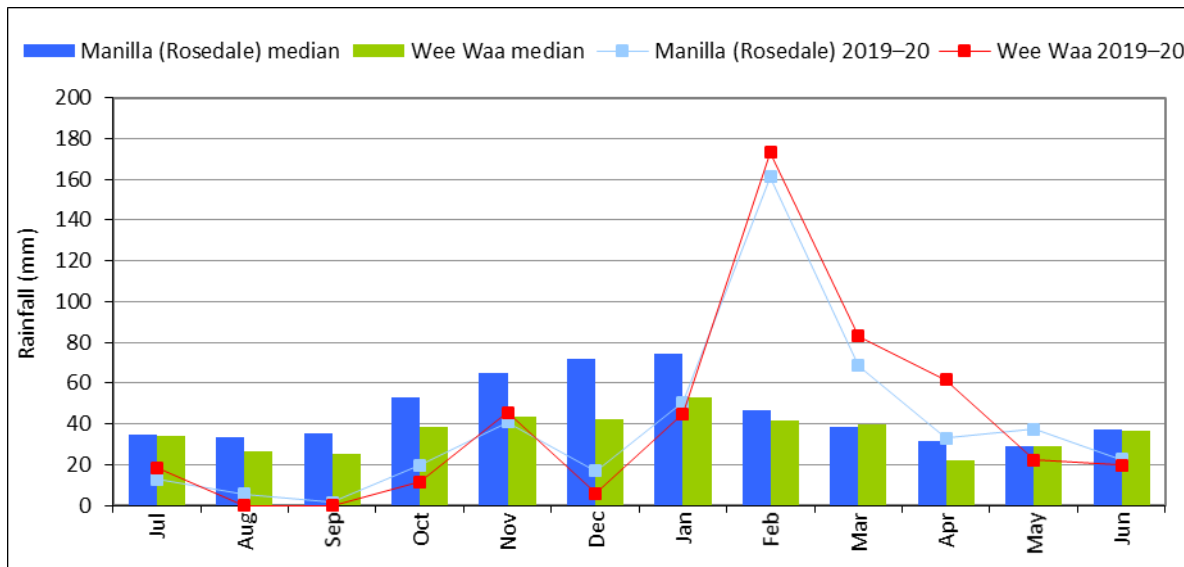


Figure 4: Rainfall deviation for reporting period compared to historical monthly medians at Manilla and Wee Waa

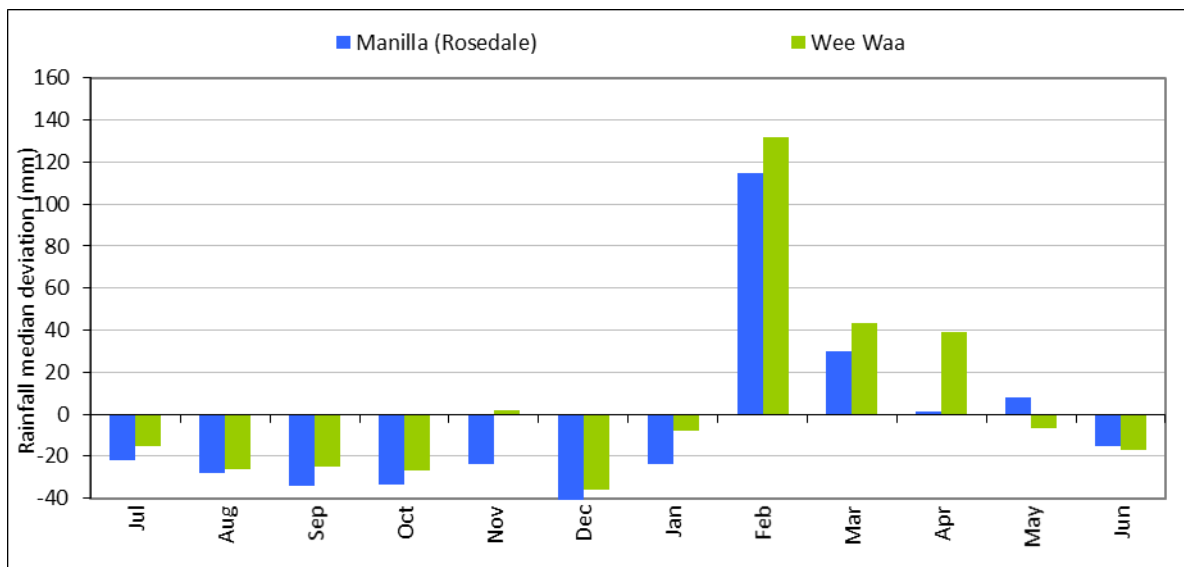


Table 1: 2019–20 monthly rainfall and historic monthly rainfall statistics at Manilla²

Manilla	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual
2019–20	12.9	5.6	1.5	19.6	40.7	16.9	50.5	161.1	68.4	32.8	37.4	22.4	469.8
Historical mean	40.8	38.5	41.3	58.5	68.1	74.5	84.5	66.6	52.9	38.6	40.0	44.4	644.2
Historical median	34.6	33.4	35.6	52.8	64.7	71.7	74.2	46.7	38.7	31.4	29.3	37.4	627.3
Historical low	0.9	0.0	0.4	1.8	2.3	2.0	1.8	1.5	0.0	0.0	0.0	0.8	221.0
Historical high	170.6	149.1	166.4	227.3	242.0	218.4	308.3	263.2	295.2	174.4	173.0	173.3	1141.7
Year of high ³	1984	1952	1998	1955	2011	1921	1978	1955	1894	1905	1983	1920	1955-1956

Table 2: 2019–20 monthly rainfall and historic monthly rainfall statistics at Wee Waa²

Wee Waa	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual
2019–20	18.5	0.0	0.0	11.4	45.6	5.8	45.0	173.3	83.0	61.6	22.2	19.7	486.1
Historical mean	41.5	34.7	35.0	47.2	56.1	55.8	77.1	62.5	51.5	36.6	43.0	44.6	583.8
Historical median	33.8	26.4	25.1	38.4	43.7	42.0	52.9	41.6	39.9	22.2	28.8	36.6	542.5
Historical low	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	238.5
Historical high	156.9	146.7	150.2	198.6	211.1	204.0	361.2	337.7	365.3	238.0	213.0	227.0	1118.7
Year of high ³	1921	1918	1998	1950	1924	1921	1974	1956	1894	1989	1991	1920	1889–90

² Long-term statistics are from the Bureau of Meteorology—climate data online, using the climatic stations '53044—Wee Waa (George St) and '55031—Manilla Post Office'. Historic record statistics are 1884 to 2020 for Wee Waa and 1883 to 2020 for Manilla.

³ Year of high is calendar year for monthly highs and water year (July to June) for annual.

Figure 5: Namoi annual rainfall for 2019–20

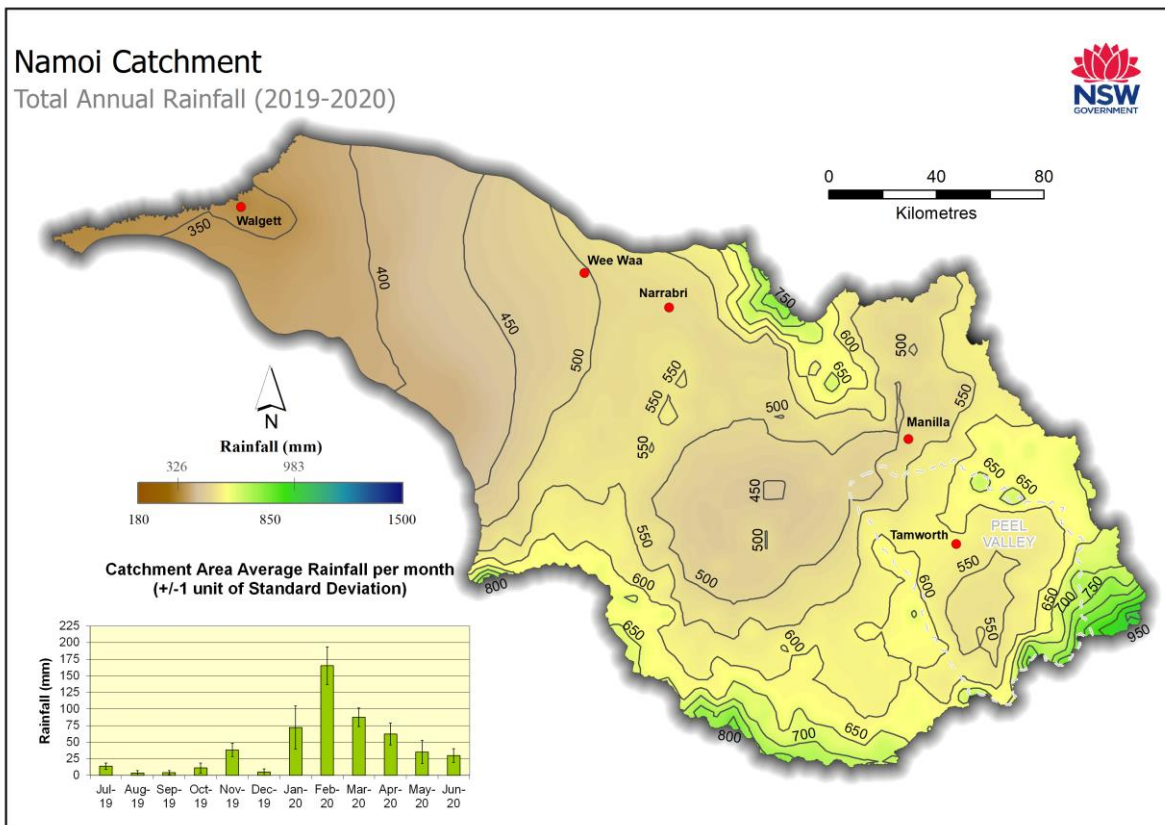
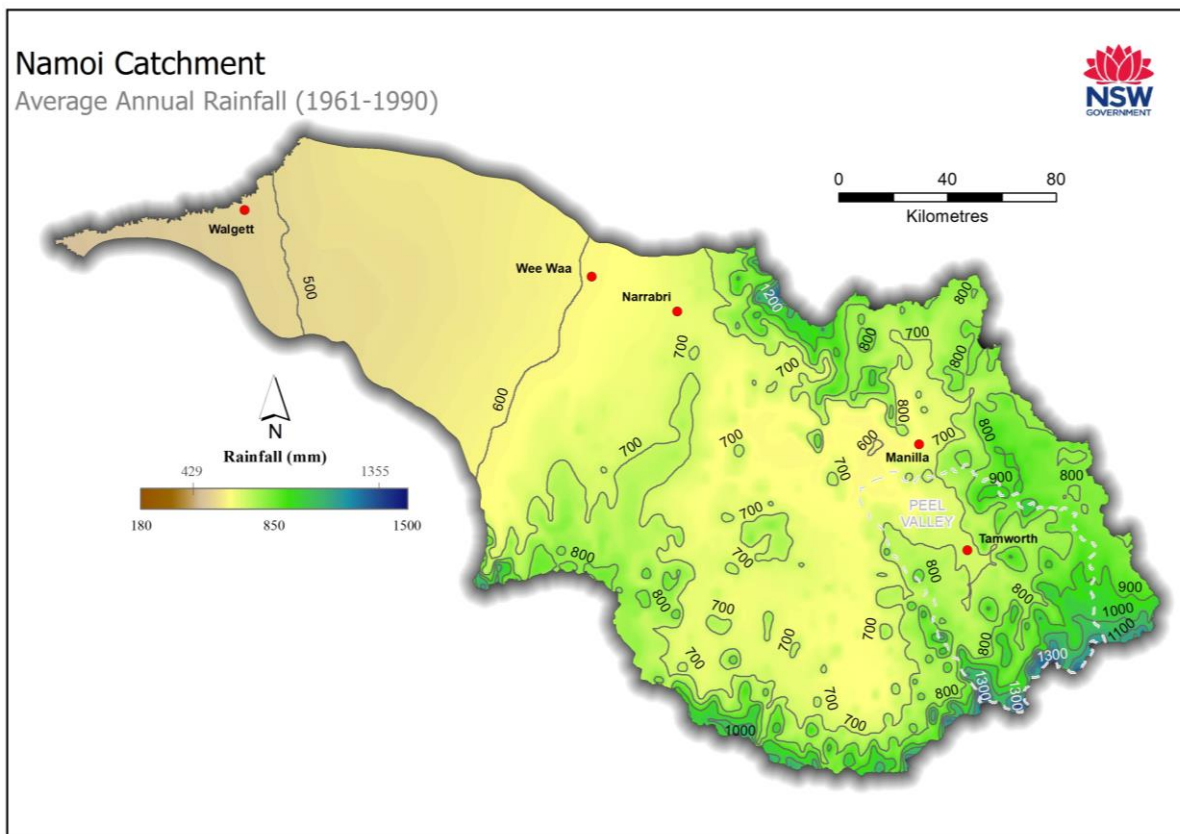


Figure 6: Average annual rainfall in the Namoi catchment (1961-1990)



Dam inflows and volume

Inflows

Historically, the long-term average annual inflow⁴ at the Split Rock storage site has varied significantly, cycling through periods of wet and dry flow regimes. Broadly, the data (Figure 7) illustrates predominantly:

- dry conditions 1895 to 1950
- wet conditions 1950 to 1980
- dry conditions 1980 to present.

Within these broader trends there are shorter cycles of oscillation between wet and dry conditions.

Split Rock

For the reporting period, inflows to the storage were 15,916 megalitres (Figure 8), which is:

- 23% of the long-term average annual inflow (69,197 megalitres per year)
- low relative to the historical period, exceeding 24% of years (between 1892 and 2020)
- the third consecutive year of below-mean inflow.

The highest flows occurred in February 2020, with a peak inflow rate of 2,359 megalitres per day (Figure 10).

Keepit

For the reporting period, inflows to Keepit Dam storage were 61,128 megalitres (Figure 9), which is:

- 23% of the long-term average annual inflow (262,771 megalitres per year)
- very low relative to the historical period, exceeding 7% of years (between 1976 and 2020)
- the third consecutive year of below-mean inflow

The maximum inflow occurred in February 2020, with peak inflow rate of 5,764 megalitres per day, which was the result of a transfer from Split Rock storage (Figure 11).

Storage volume

Split Rock

- Volume commenced the reporting period at 12,035 megalitres or 3% of full supply capacity (Figure 12).
- Volume held at the end of the reporting period was 21,339 megalitres or 5% of full supply capacity, an increase of 2% for the year.
- The maximum volume held during the reporting period was 21,345 megalitres or 5% of full supply capacity on 21 June 2020.

Keepit

- Volume commenced the reporting period at 10,710 megalitres or 3% of full supply capacity (Figure 13).
- Volume held at the end of the reporting period was 68,443 megalitres or 16% of full supply capacity, an increase of 13% for the year.

⁴ Inflows are back-calculated storage inflow for the period since storage construction and gauged or rainfall runoff modelled for the period before

- The maximum volume held during the reporting period was 68,443 megalitres or 16% of full supply capacity on 30 June 2020.

Figure 7: Long-term annual upstream Split Rock cumulative deviation from mean

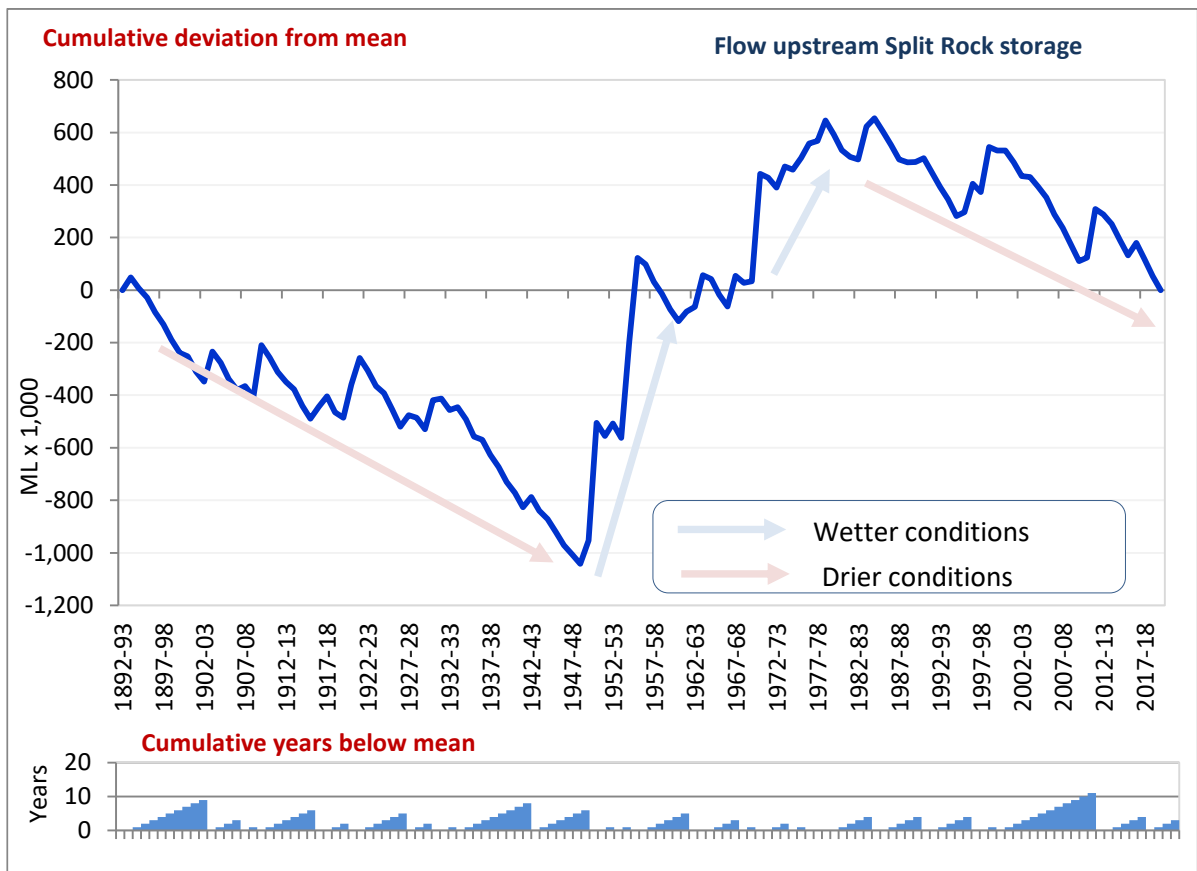


Figure 8: Long-term inflows to Split Rock against mean and reporting year inflow

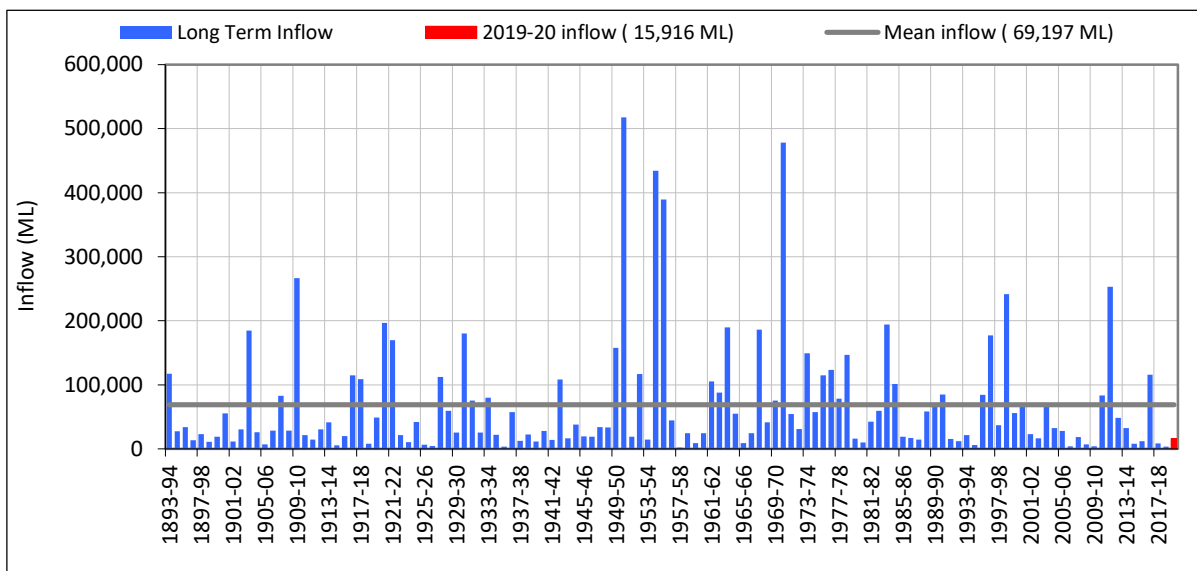


Figure 9: Long-term inflows to Keepit Dam against mean and reporting year inflow

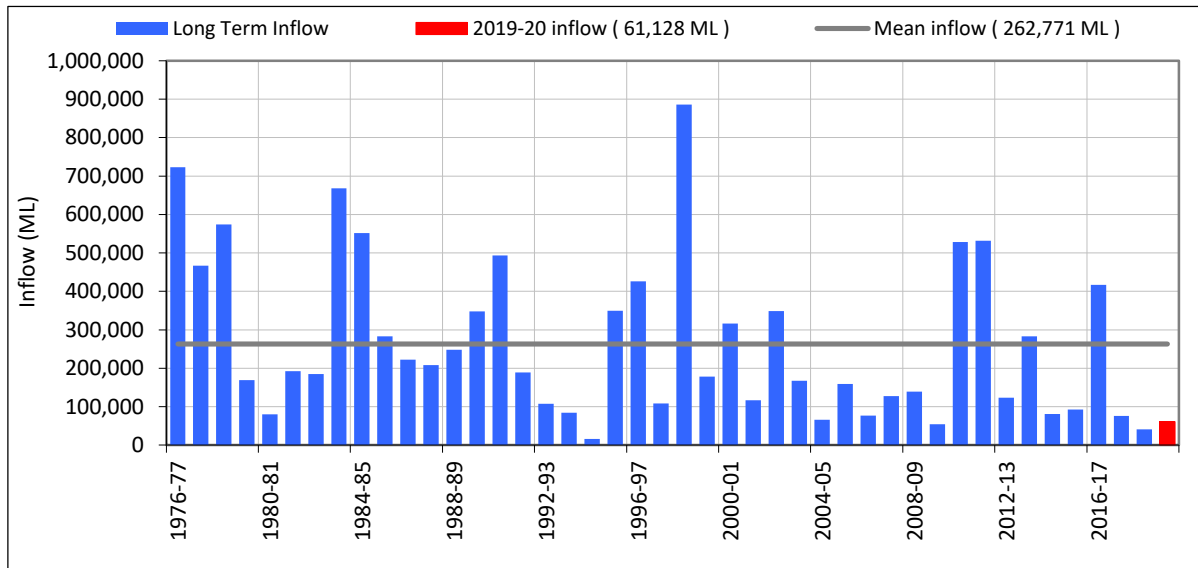


Figure 10: Daily inflows and rainfall at Split Rock 2019–20

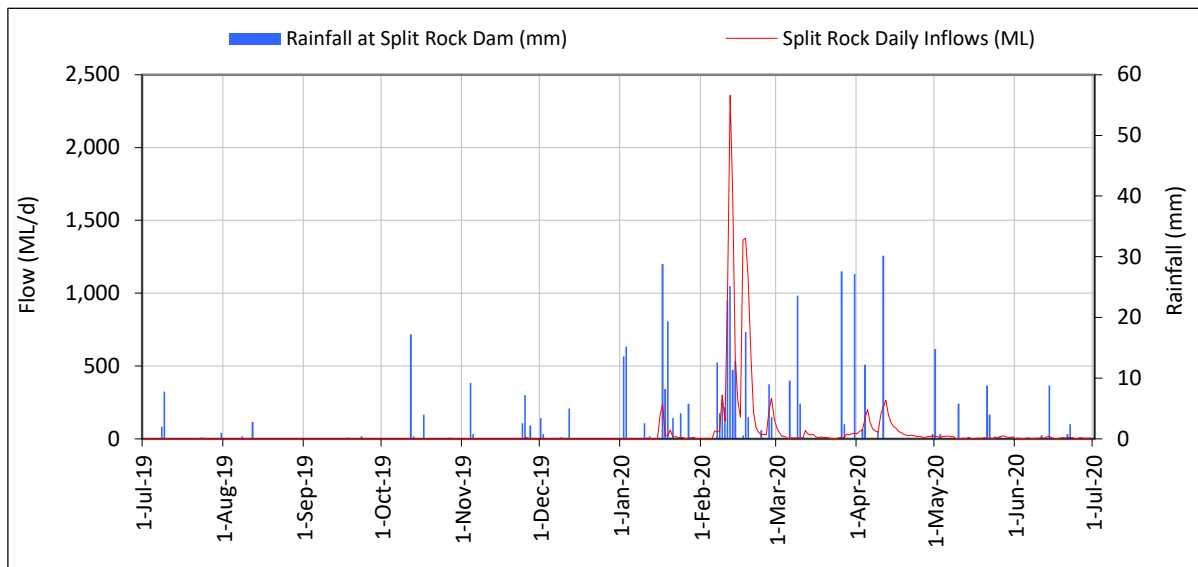


Figure 11: Daily inflows and rainfall at Keepit Dam 2019–20

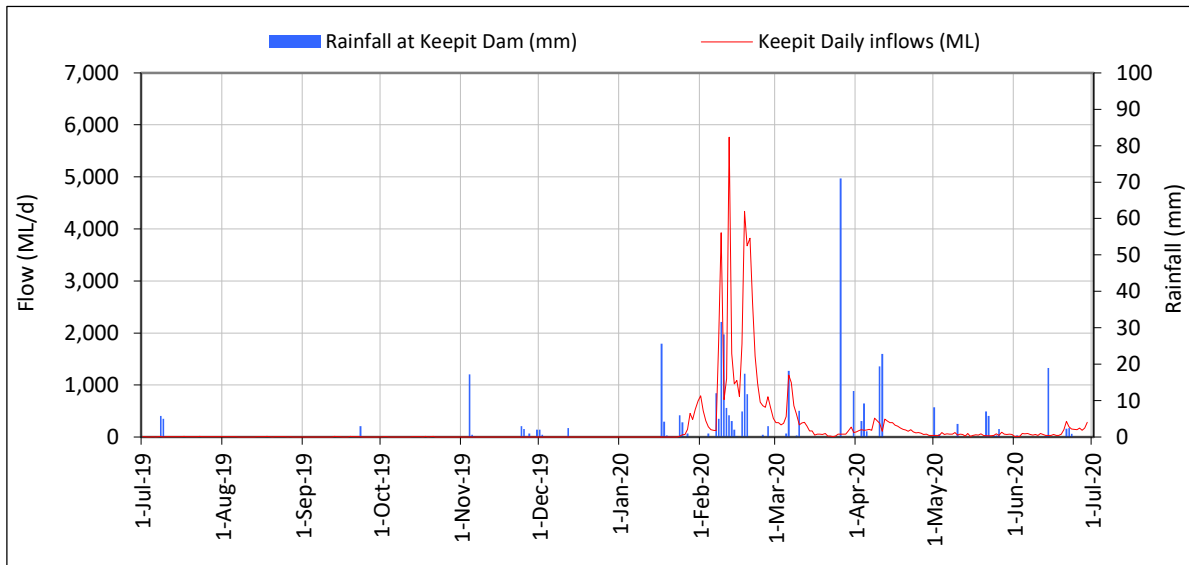


Figure 12: Split Rock Dam volume and percentage 2019–20

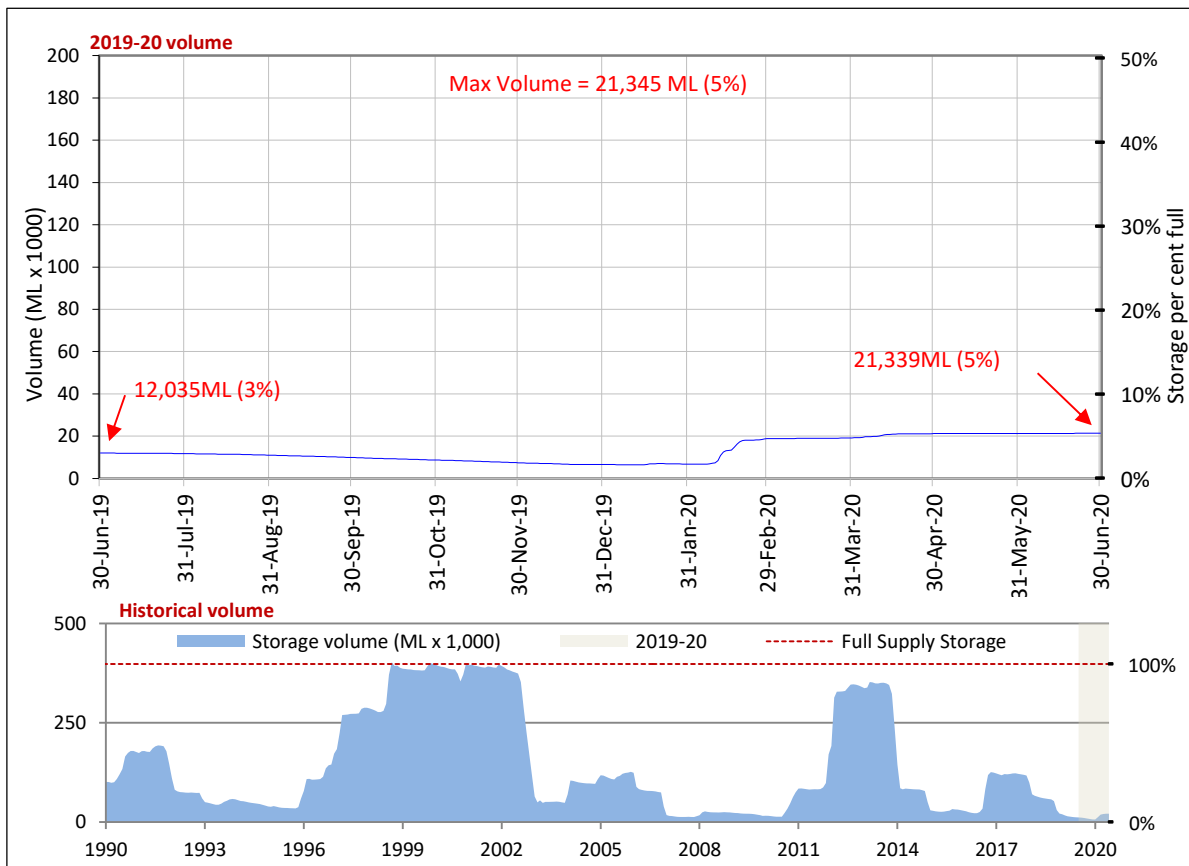
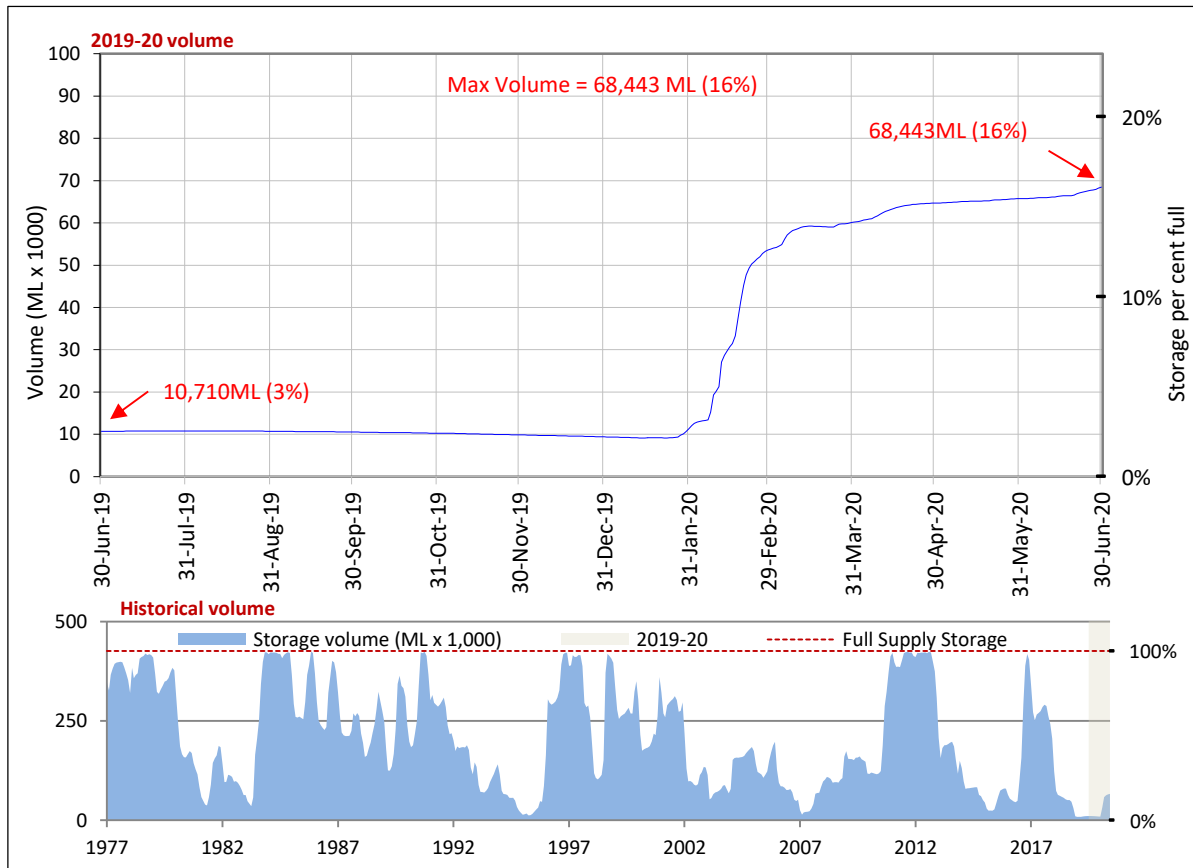


Figure 13: Keepit Dam volume and percentage 2019–20



High-flow events

There were no high-flow events through the reporting period (Figure 14). River height at Gunnedah remained below 2.5 metres for the entirety of the reporting period.

Daily flows at Gunnedah, Mollee and Goangra for the reporting period are illustrated in Figure 15. The event in February while largely contained within the river channel, was significant from a water resource management perspective, being the first runoff event of magnitude following a long and extreme sequence of drought. Further information on the management of this event is available at industry.nsw.gov.au/water/allocations-availability/northern-basin-first-flush-assessment

Figure 14: Namoi River at Gunnedah river heights ⁵

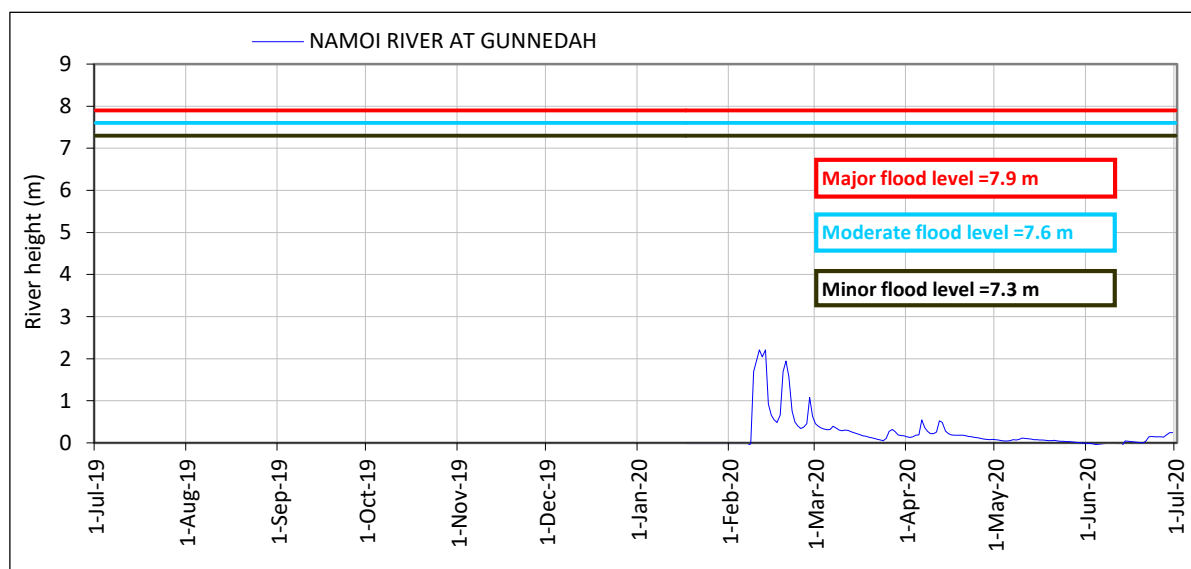
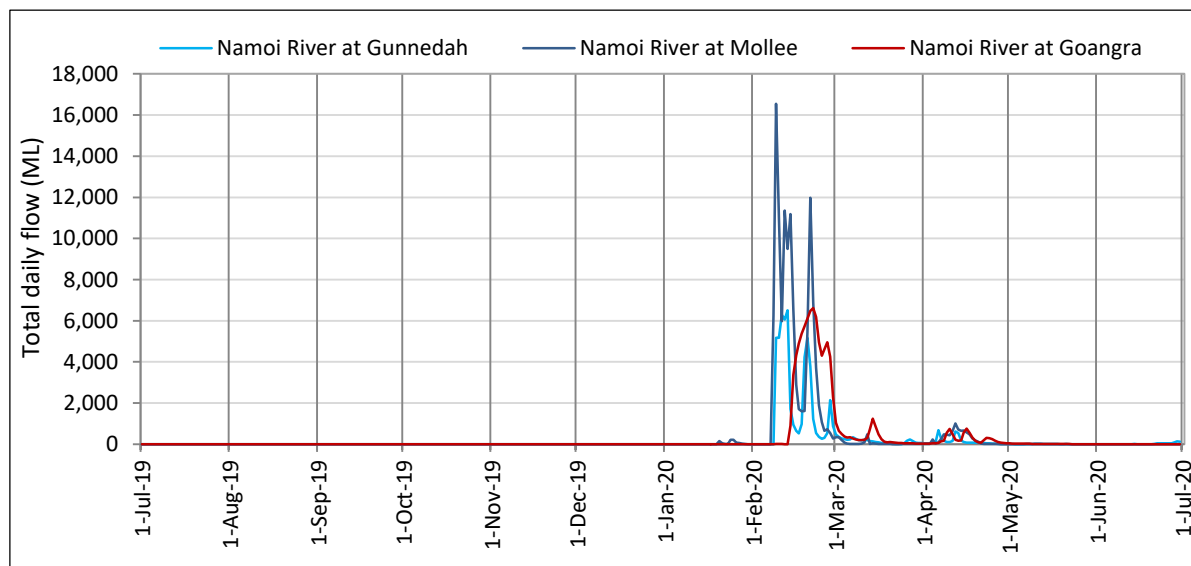


Figure 15: Total daily flow on the Namoi River at Gunnedah, Mollee and Goangra, 2019–20



⁵ Flood severity intervals obtained from the Australian Bureau of Meteorology

Surface water resources and management

Legislation

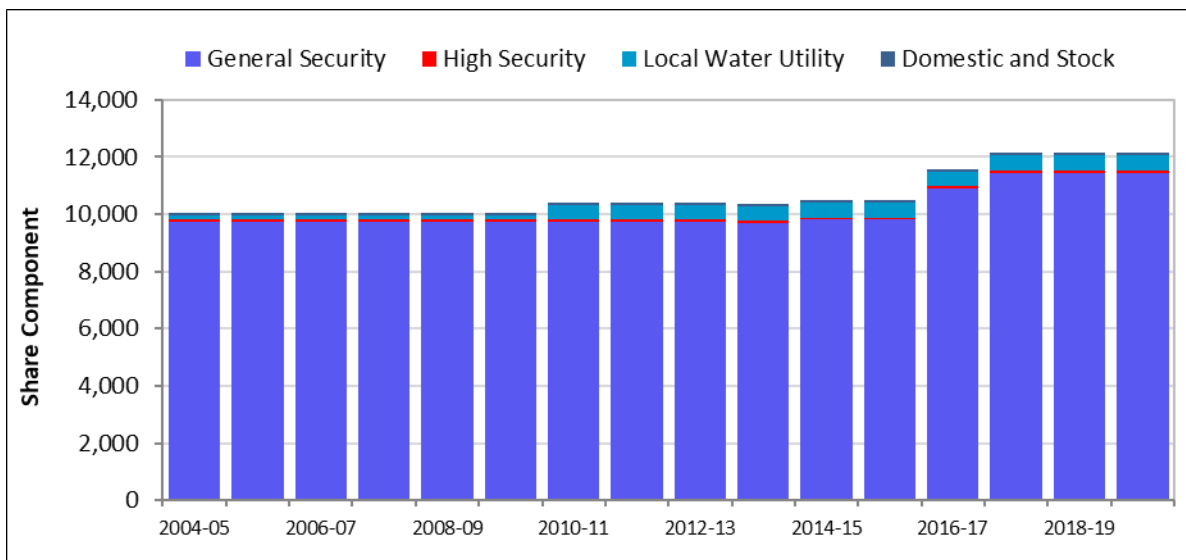
The water source was managed under the rules and requirements set out in the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2016*. This water sharing plan commenced on 1 July 2016 and will remain active until 30 June 2026. The water sharing plan was produced to meet the water management principles outlined in the *NSW Water Management Act 2000*.

Upper Namoi Regulated River Water Source

Access rights

- Access licence share components increased by one share (domestic and stock) through the reporting period (Figure 16).
- Total issued share component on 30 June 2020 was 12,140.
- Share increase over time is generally associated with share moving to the upper Namoi from the lower Namoi.

Figure 16: Upper Namoi Issued share component since the commencement of the water sharing plan (excluding supplementary licences)



Access licence account management

The licence allocation accounting rules that were in place are summarised in Table 3. An annual accounting approach is implemented, and the rules allow for General Security licence holders to carry over unused water up to 0.5 megalitres per issued share. Accounts cannot exceed 100% of issued share component (one megalitre per share).

Table 3: Upper Namoi licence allocation accounting rules

Licence category	Account limit	Carryover limit	Annual use limit	Maximum AWD	3-year use limit
Domestic and Stock	100%	0%	N/A	100%	N/A
Domestic and Stock [Domestic]	100%	0%	N/A	100%	N/A
Domestic and Stock [Stock]	100%	0%	N/A	100%	N/A
Local Water Utility	100%	0%	N/A	100%	N/A
Regulated River (General Security)	1 ML/Share	0.5 ML/Share	N/A	1 ML/Share	N/A
Regulated River (High Security)	1 ML/Share	0 ML/Share	N/A	1 ML/Share	N/A

Extreme events stage and temporary water restrictions (Upper Namoi)

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

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

Table 4 outlines the conditions that may be associated with different stages of criticality for surface water quality. Further information is available at www.industry.nsw.gov.au/water/what-we-do/legislation-policies/eep

Table 4: Determination of stages of criticality for surface water quantity

Stage	Stage description	Stage evidence base
1	Normal management	Can deliver all account water under normal river operations practices
2	Emerging drought (or recovering)	Unable to deliver 100% of high priority account water and maximum expected use of General Security under normal river operations practices
3	Severe drought	Only able to deliver restricted high priority demands and restricted remaining General Security account water
4	Critical drought	Only able to deliver restricted town water supply, stock and domestic and other restricted high priority demands

Temporary water restrictions for the reporting period

- At the commencement of the 2019-20 water year, a temporary restriction of 25% was placed on carryover in general security accounts in the Upper Namoi. On 6 December 2019 this order was extended prohibiting the take of all carryover water to conserve supplies for town water. With improvement in conditions in early 2020, this was repealed on 25 February 2020 allowing full access to remaining account water.
- Under the Northern Basin restrictions, from 17 January to 13 February high security access in the Upper Namoi was not permitted

Extreme events stage

- The Upper Namoi started 2019–20 in stage 3 severe and was escalated to stage 4 (critical drought) on 7 November 2019. As conditions improved in February 2020, the Upper Namoi eased to stage 3 in March and then stage 2 (recovering) in May 2020. Storage inflows to Split Rock were below average for all months excepting February 2020 (Figure 17).

- Only block releases were made for most of 2019–20 to conserve supplies.
- Normal releases from Split Rock Dam re-commenced from April 2020, once two years reserve for town water supply was available in the storage (Figure 17).
- Looking at 2 year natural storage inflow sequences between 1891 and current, as an indicator of drought severity illustrates that the current period (1 July 2018 to 30 June 2020, 19,579 megalitres), was dry, however, above the lowest sequence in the record of 10,966 megalitres which occurred between 1 July 2008 to 30 June 2010 (Figure 24). The total 2-year inflow for the current period was 78% lower than the median 2-year median inflow sequence (71,034 megalitres, 1 July 1994 to 30 Jun 1996).

Figure 17: Drought stage for the reporting period referenced with monthly headwater storage inflows, monthly storage inflow variance from mean and 2-year cumulative inflow sequence

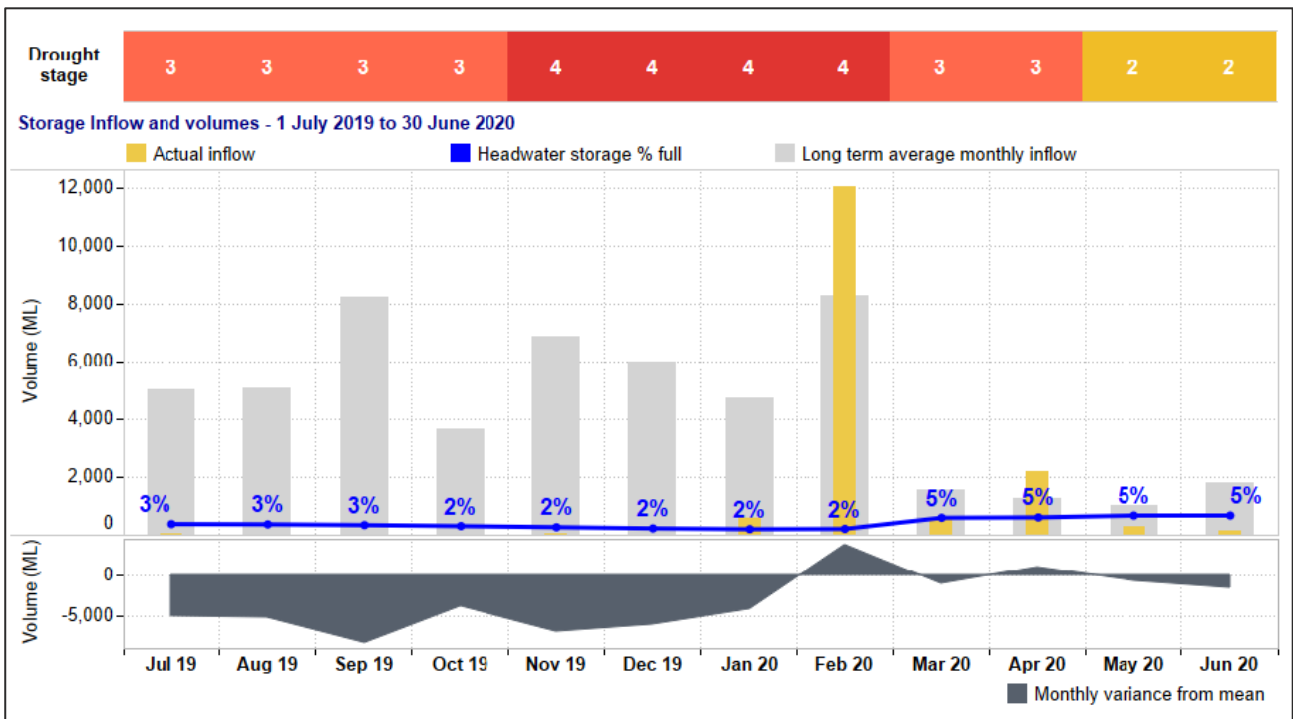
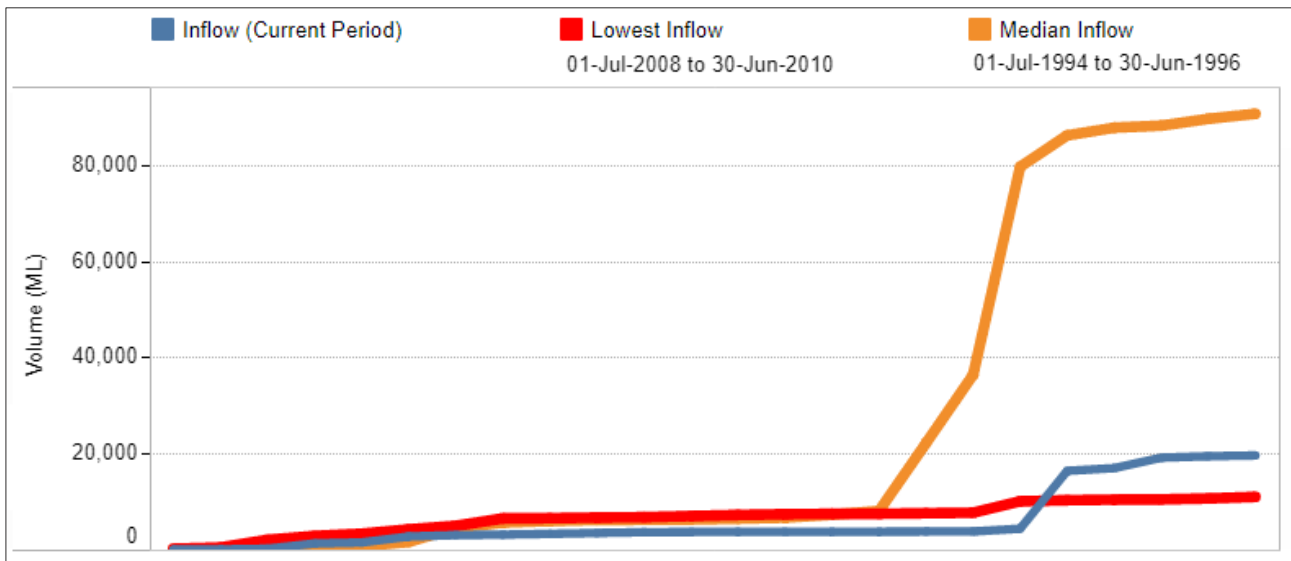


Figure 18: 2 year sequence analysis, Split Rock Dam



Water availability

- Local Water Utility and Domestic and Stock access licences (including sub-categories of these) received an equivalent opening available water determination (AWD) of 100%, the maximum allowable under the water sharing plan rules.
- High security access licences received an opening AWD (1 July 2019) of 0.75 megalitres per share (75% equivalent), with a further increase of 0.25 (25% equivalent) on 21 April 2020.
- General security access licences carried over 2,670 megalitres into the 2019–20 water year (23% of issued share)
- General security access licences received an opening AWD (1 July 2019) of 0 megalitres per share (0% equivalent), and an additional announcement of 0.5 (50% equivalent) on 21 April 2020 (Figure 19).
- Water availability for General Security failed to reach 100% for the fifth time under water sharing plan management conditions (Figure 20)⁶.
- Total water availability considering all categories of licence was the lowest since 2015–16 (Figure 20).

⁶ At the start of the water sharing plan (2004–05), we allowed water held in General-Security accounts to be brought forward as an opening balance. This includes all access licences issues under the water sharing plan and therefore held environmental water. Water availability refers to the sum of water that was in holder accounts. It does not consider annual use limits and therefore was not necessarily all available for use in this water year. Accounts with a negative carryover (overuse) can restrict the maximum availability. The calculation is based on the end-of-year share component.

Figure 19: Incremental available water determination for Upper Namoi General Security licences as a proportion of share component

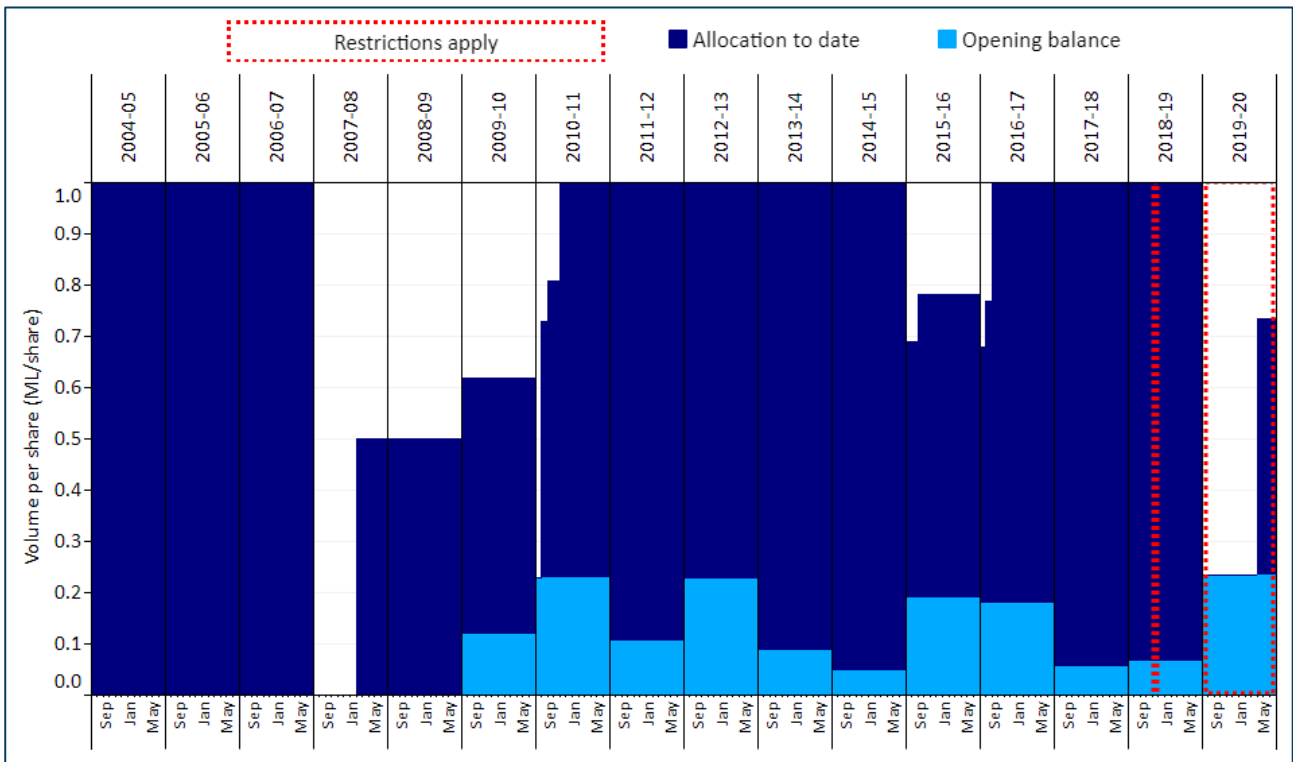
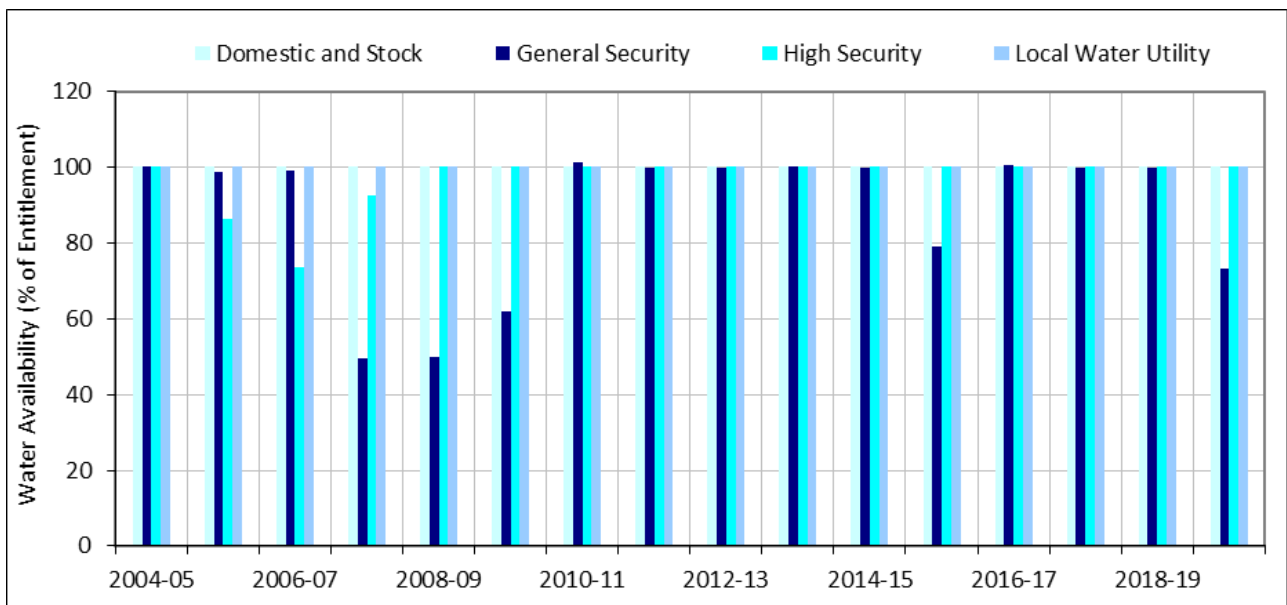


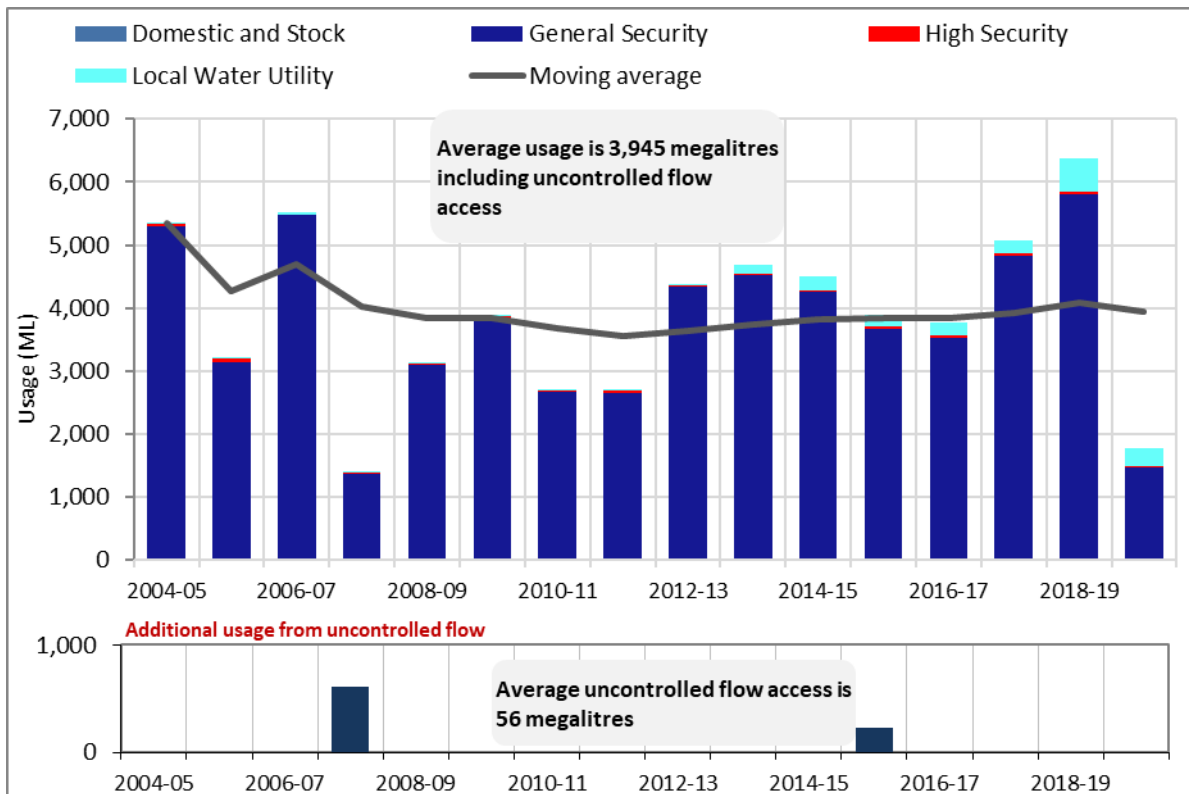
Figure 20: Upper Namoi account water availability (carryover + AWD)



Account usage

- Usage from regulated supply totalled 1,794 megalitres for the reporting period (1,781 megalitres controlled and 13 megalitres uncontrolled flow access) (Figure 21).
- This was the second lowest usage under water sharing plan management conditions
- The average usage since 2004–05 is 3,945 megalitres.

Figure 21: Upper Namoi usage by category



Utilisation and inactive share

- 41% of General Security share component was inactive⁷ for the reporting period, increasing from 8% in the prior year (Table 5).
- Considering all categories of access licence, 39% of share component was inactive for the reporting period, increasing from 9% on the prior year.
- Utilisation⁸ of available water from regulated supply (excludes uncontrolled flow usages) was down 29% on the prior accounting period to 41%, the lowest under water sharing plan management conditions (Figure 22).

⁷ An access licence is considered to be inactive if the holding does not use water or access the temporary trade market for the reporting period.

⁸ Utilisation reflects the amount of water used, relative to the maximum amount available for use.

Figure 22: Upper Namoi percentage utilisation⁹

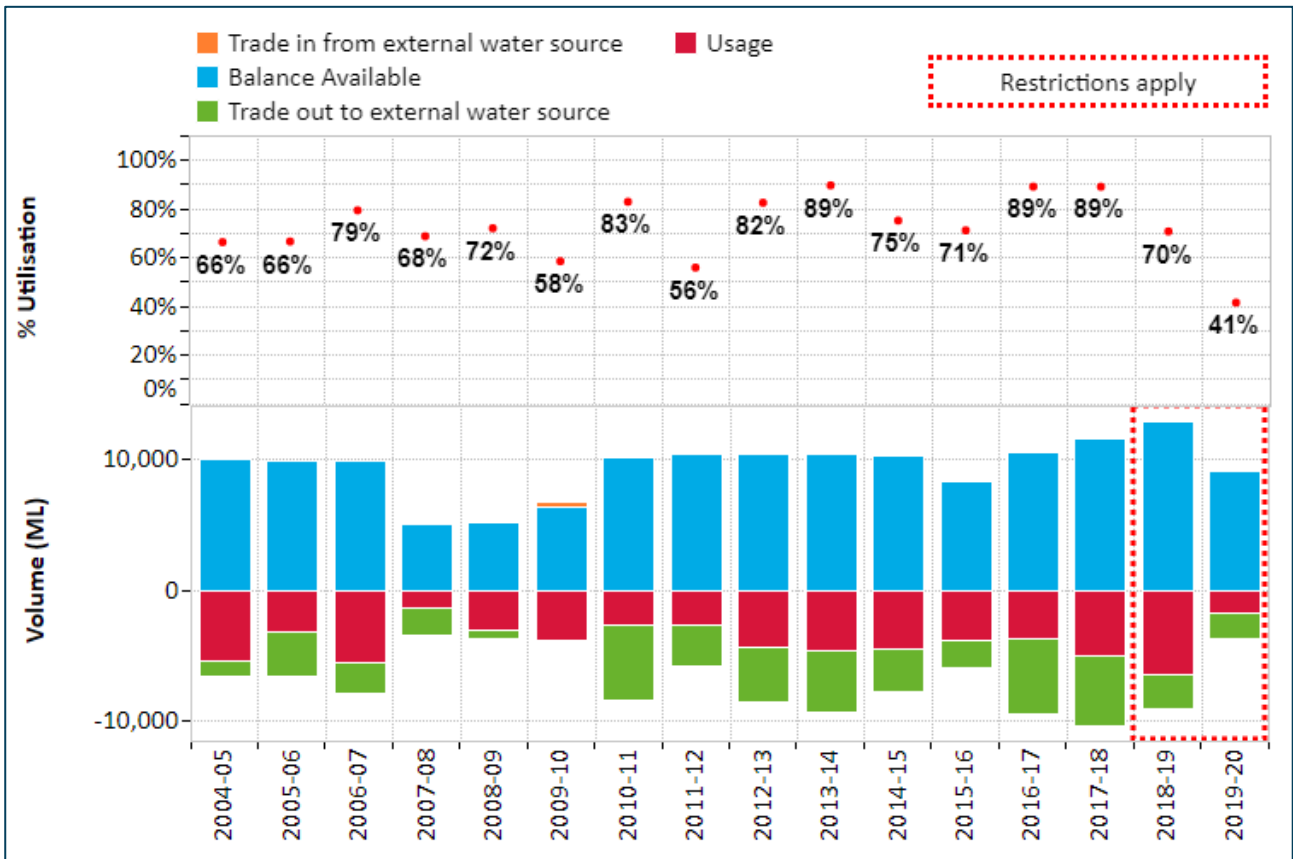


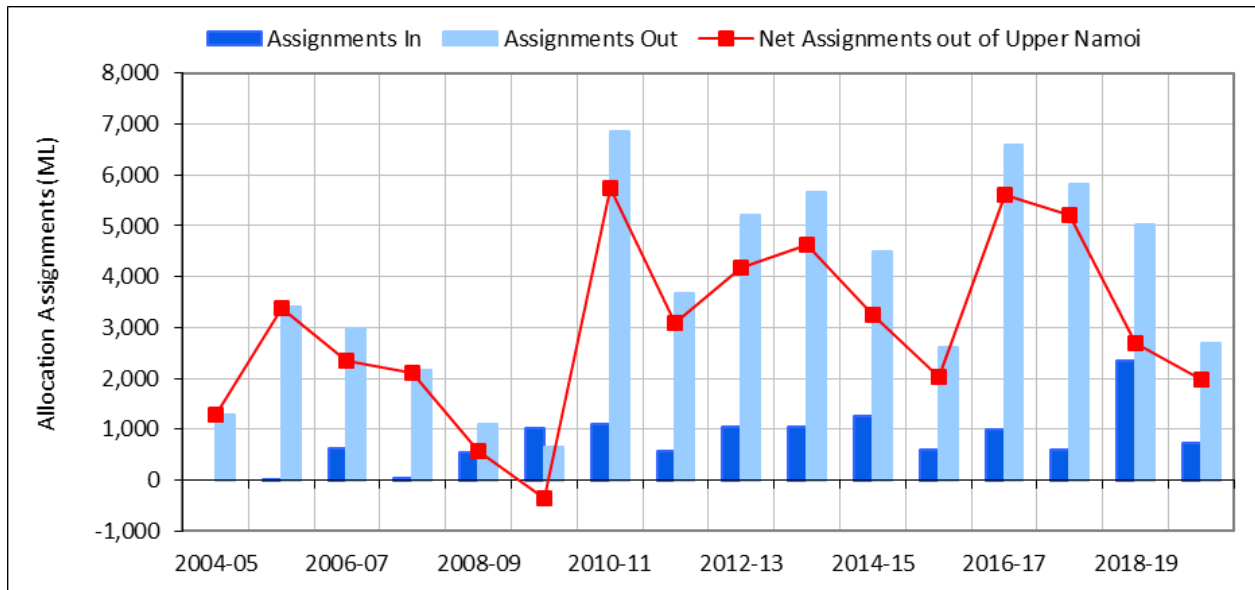
Table 5: Upper Namoi inactive licence summary for the reporting period

Licence category	Inactive licences 2019–20 (number)	Inactive share component 2019–20	Inactive share component % of total 2019–20	Inactive share component % of total prior year 2018–19
Domestic and Stock	13	74	100%	100%
Domestic and Stock [Domestic]	5	11	100%	100%
Domestic and Stock [Stock]	0	0	0%	0%
Local Water Utility	0	0	0%	0%
General Security	66	4,654	41%	8%
High Security	4	29	36%	0%
Total	88	4,768	39%	9%

⁹ Includes water availability plus trade in from external water sources against account usage and trade out to external water sources. Excludes supplementary and uncontrolled flow access.

Temporary trading (allocation assignments)

Figure 23: Upper Namoi trading summary



- A net of 1,963 megalitres was moved to the Lower Namoi water source through temporary trading, which was down on the prior reporting period and the lowest since 2009–10 (Figure 23).

Commercial transactions (allocation assignments from Upper Namoi access licences)

- 23 commercial trades¹⁰ were processed in the reporting period, 17 less than in the year before (Figure 24).
- Average consideration per megalitre for the reporting period was \$225.
- The maximum consideration paid for temporary water was \$350 per megalitre.

Permanent trading (commercial share assignments and transfer of licence)

- There has been minimal market activity since water management act implementation (2004–05 to current) (Figure 25).
- Two General Security share assignments (71Q) occurred in reporting period.
- Additionally, 30 shares were exchanged (1 transaction) for commercial consideration through transfer of licence dealings (71M) (Figure 26).

¹⁰ Trades have been considered commercial if consideration per megalitre/share exceeds \$1

Figure 24: Upper Namoi allocation assignments—trade consideration statistics

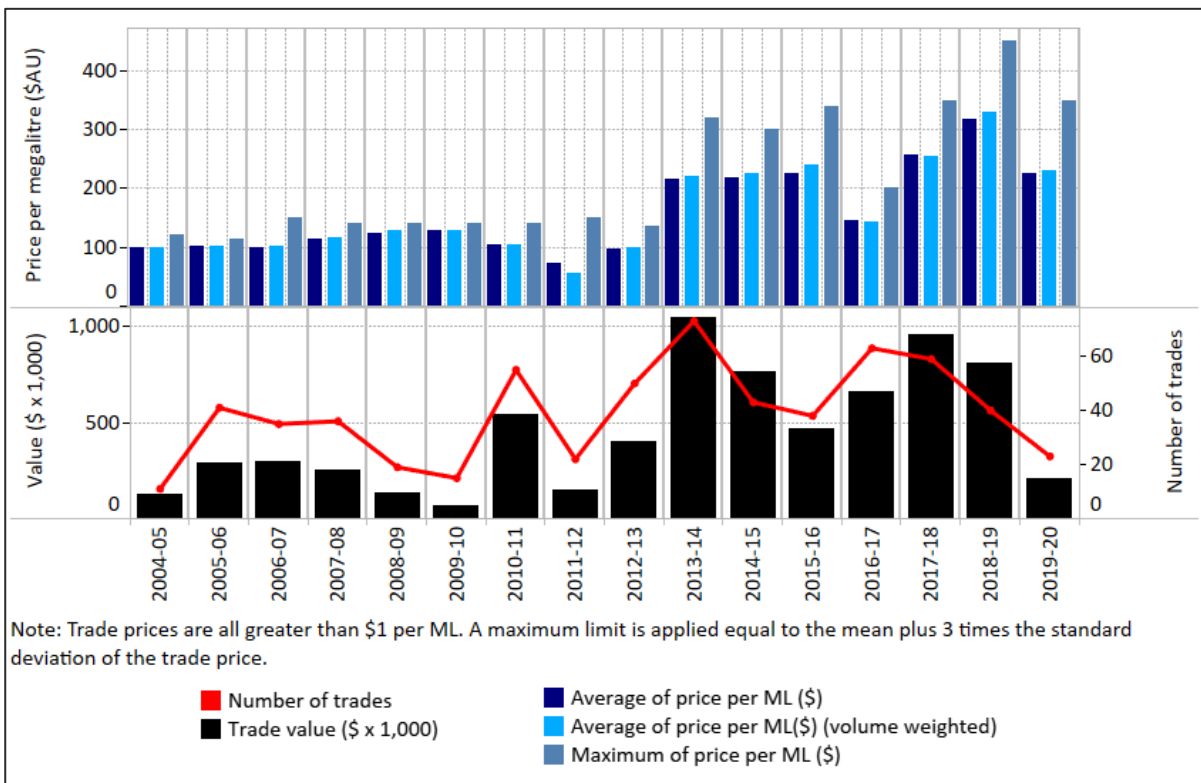


Figure 25: Upper Namoi share assignments trade market statistics (General Security)

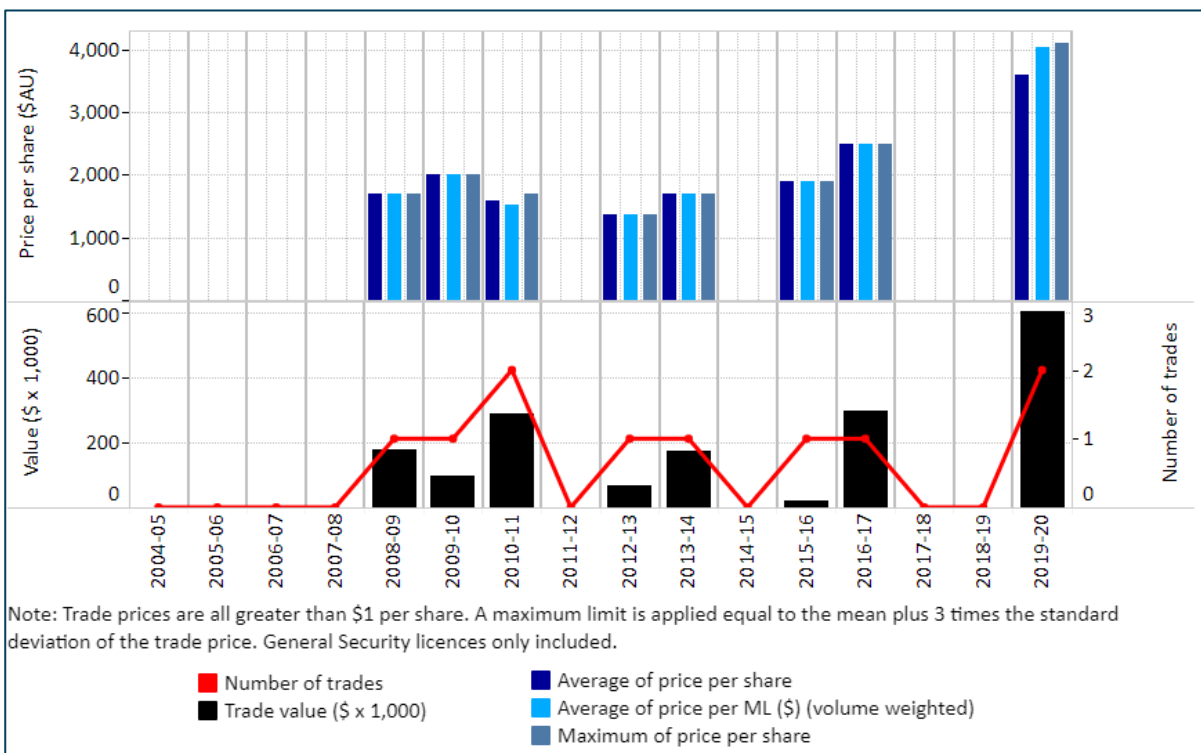
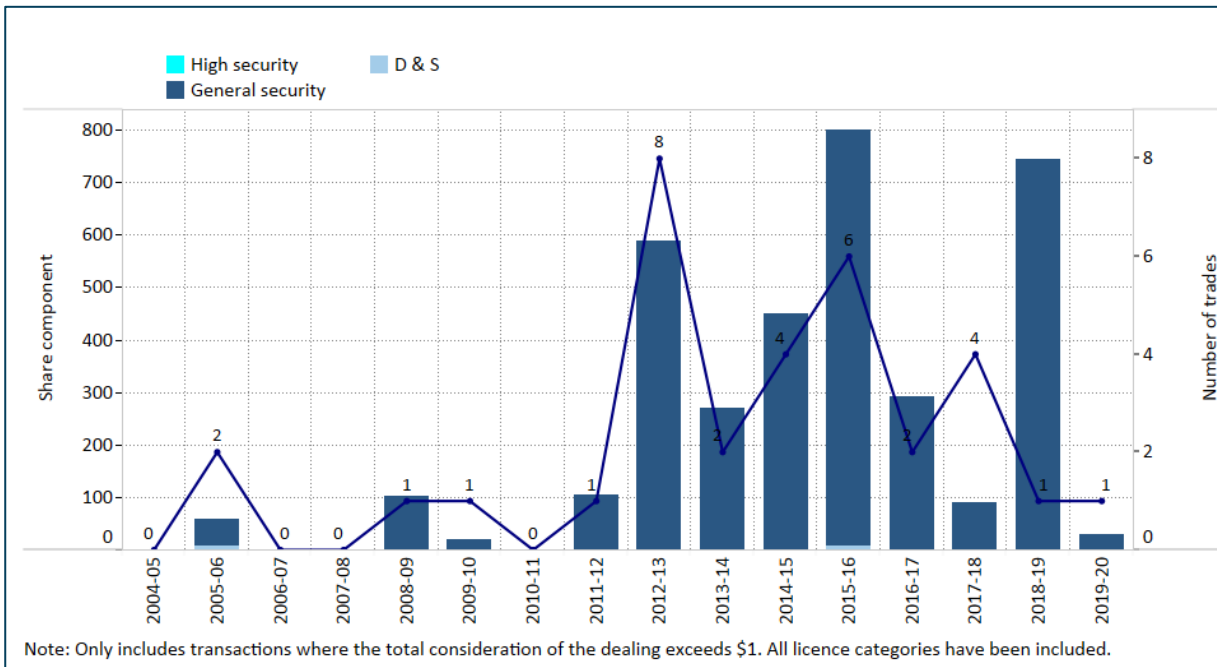


Figure 26: Upper Namoi transfers of licence (share)

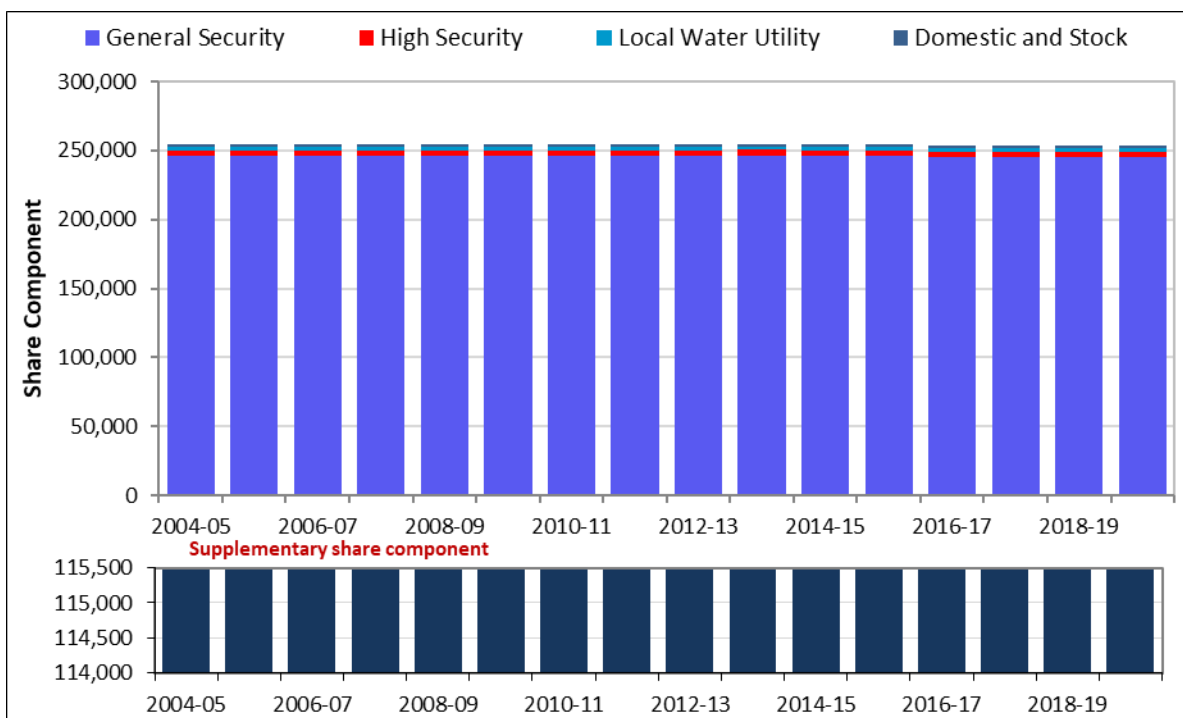


Lower Namoi Regulated River Water Source

Access rights

- Share component remained constant throughout the reporting period (
- Figure 27).
- Total share component remained constant with 368,735 shares issued including 115,479 shares of supplementary water.

Figure 27: Lower Namoi issued share component since the commencement of the water sharing plan



Access licence account management

The licence allocation accounting rules that were in place are summarised in Table 6. We apply a continuous accounting procedure and the rules allow for General- Security licence holders to hold and carry over up to 2 megalitres per issued share. Annual account usage cannot exceed more than 1.25 megalitres per issued share and cannot exceed 3 megalitres per issued share in 3 years. All other categories have an account limit of 100% or 1 megalitre per share and cannot carry over water between water years.

Table 6: Lower Namoi licence allocation accounting rules

Licence category	Account limit	Carryover limit	Annual use limit	Maximum AWD	3-year use limit
Domestic and Stock	100%	0%	N/A	100%	N/A
Domestic and Stock [Domestic]	100%	0%	N/A	100%	N/A
Domestic and Stock [Stock]	100%	0%	N/A	100%	N/A
Local Water Utility	100%	0%	N/A	100%	N/A
Regulated river (General Security)	2 ML/share	2 ML/share	1.25 ML/share	N/A	3 ML/share
Regulated river (High Security)	1 ML/share	0 ML/share	N/A	1 ML/share	N/A
Regulated river (High Security) (Research)	1 ML/share	0 ML/share	N/A	1 ML/share	N/A
Supplementary	N/A	0 ML/share	N/A	1 ML/share	N/A

Extreme events stage and temporary water restrictions (Lower Namoi)

Generic policy background on the NSW extreme events policy and temporary water restrictions is provided under 'Extreme events stage and temporary water restrictions (Upper Namoi)' of this document

Temporary water restrictions for the reporting period

- A temporary restriction was placed on groundwater access licences in the Maules Creek Groundwater Source to protect supply for basic landholder rights and aquatic systems as the groundwater is highly connected to surface water in this area. This restriction was in effect from 18 October 2019 until 30 June 2020.
- A temporary water restriction was placed on all water held in general security carryover accounts in the Lower Namoi. This restriction was in place from 1 July 2019 until 25 February 2020, when it was repealed when conditions improved.
- Under the Northern Basin restrictions, from 17 January to 13 February high security access in the Lower Namoi was not permitted and unregulated river access until 21 February (with some limited exemptions). Floodplain harvesting access was restricted from 7 February to 21 February for the Upper Namoi floodplain and 23 February for the mid Namoi and Lower Namoi floodplains.

Extreme events stage

- The Lower Namoi started the water year in stage 4 critical. The valley was eased to stage 3 severe in March 2020 and remained in that stage for the remainder of 2019–20. Storage inflows to Keepit were below average for all months excepting February 2020 (Figure 28).

- No releases were able to be made from Keepit Dam for most of the water year due to extremely limited storage resources. Dam levels began to rise in February and a small release was made in March 2020 to supply users close to the dam with stock and domestic water. For all other users, access was only available from tributary inflows downstream of Keepit dam.
- Looking at 2 year natural storage inflow (removing impact of Split Rock transfers), as an indicator of drought severity sequences to Keepit Dam between 1961 and current, illustrates that the period between 1 July 2018 to 30 June 2020 totalled 71,221 megalitres, and was the lowest 2 year period in this timeframe. This inflow total was 84% lower than the median two year median inflow sequence (435,504 megalitres between 1 July 1972 and 30 June 1974).

Figure 28: Drought stage for the reporting period referenced with monthly headwater storage inflows, monthly storage inflow variance from mean

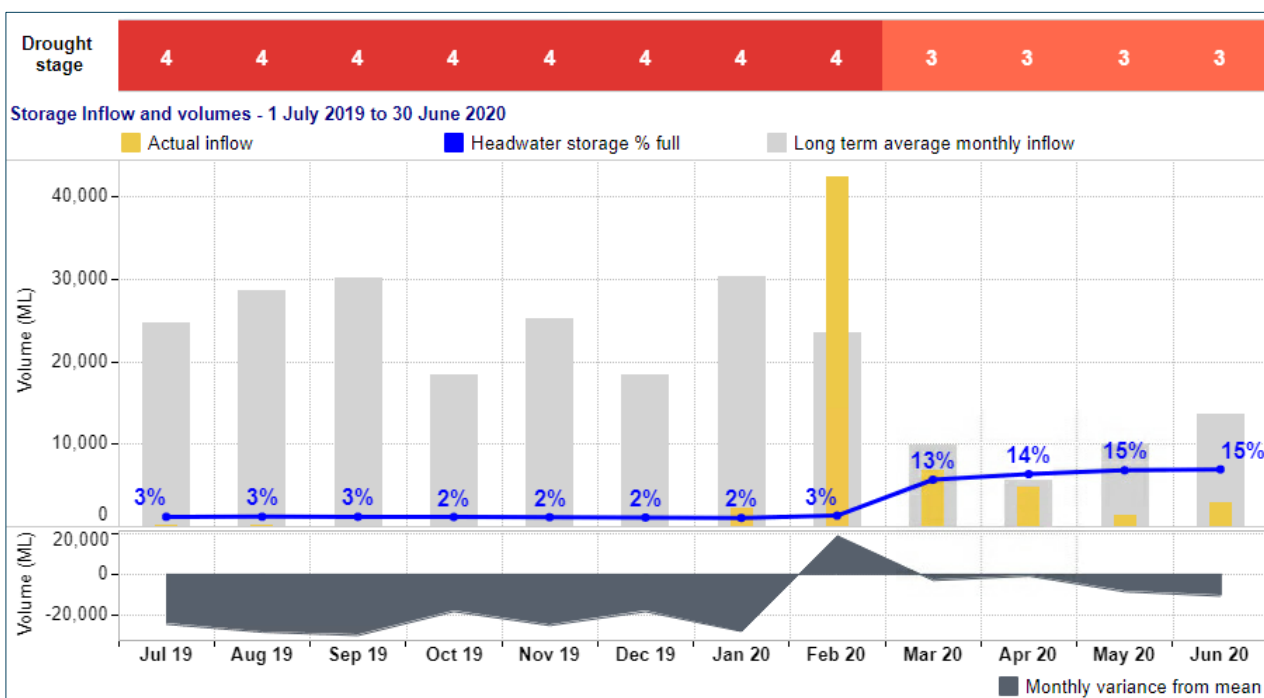
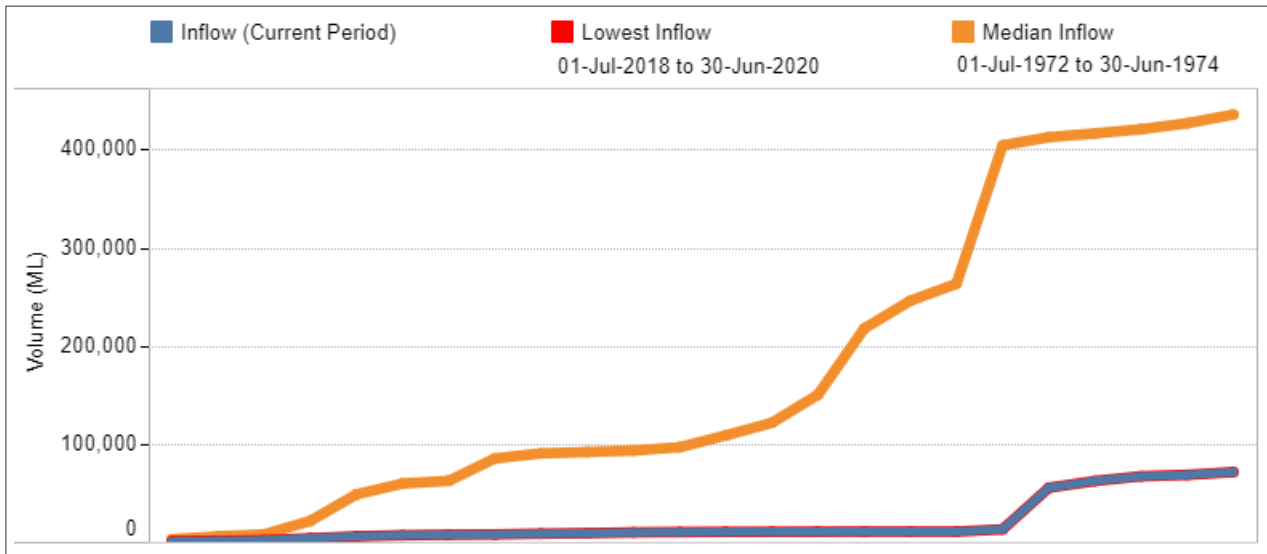


Figure 29: Drought stage for the reporting period referenced with monthly headwater storage inflows, monthly storage inflow variance from mean



Water availability

- Domestic and Stock, and Local Water Utility access licences (including sub-categories of these) received an equivalent opening AWD of 100%, the maximum allowable under the water sharing plan rules.
- Supplementary access licences received an opening AWD of 1 megalitre per share, the maximum allowable under the water sharing plan.
- General Security access licences carried 12,474 megalitres into 2019–20 (5% of issued share). This account water was restricted from 1 July 2019 to 25 February 2020.
- With severe drought continuing into 2019–20 General Security access licences received an opening AWD of 0.0 megalitres per share and no further announcements occurred throughout the year.
- This is the second consecutive year of General Security receiving 0% AWD for the water year, and the sixth since management under water sharing plan conditions (2004–05).
- High Security (including the sub-category of research) received an opening AWD of 0.75 megalitres per share, and additionally an AWD of 0.25 megalitres per share on 21 April 2020, reaching the maximum allowable for this category (100% of issued share).
- Considering all categories with regulated supply (excludes supplementary), total water availability was the lowest since operation under water sharing plan management commenced (Figure 31)⁶.

Figure 30: Incremental available water determination for Lower Namoi general security as a proportion of share component

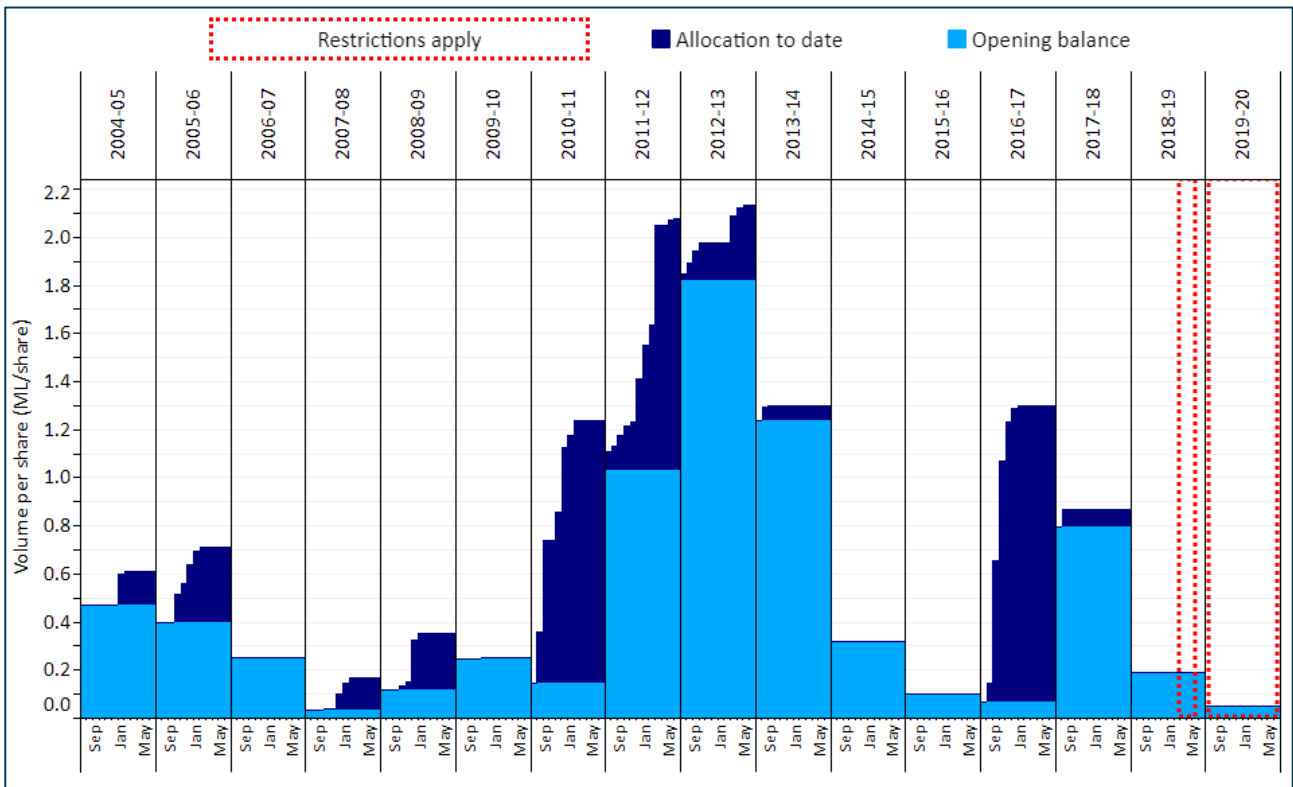
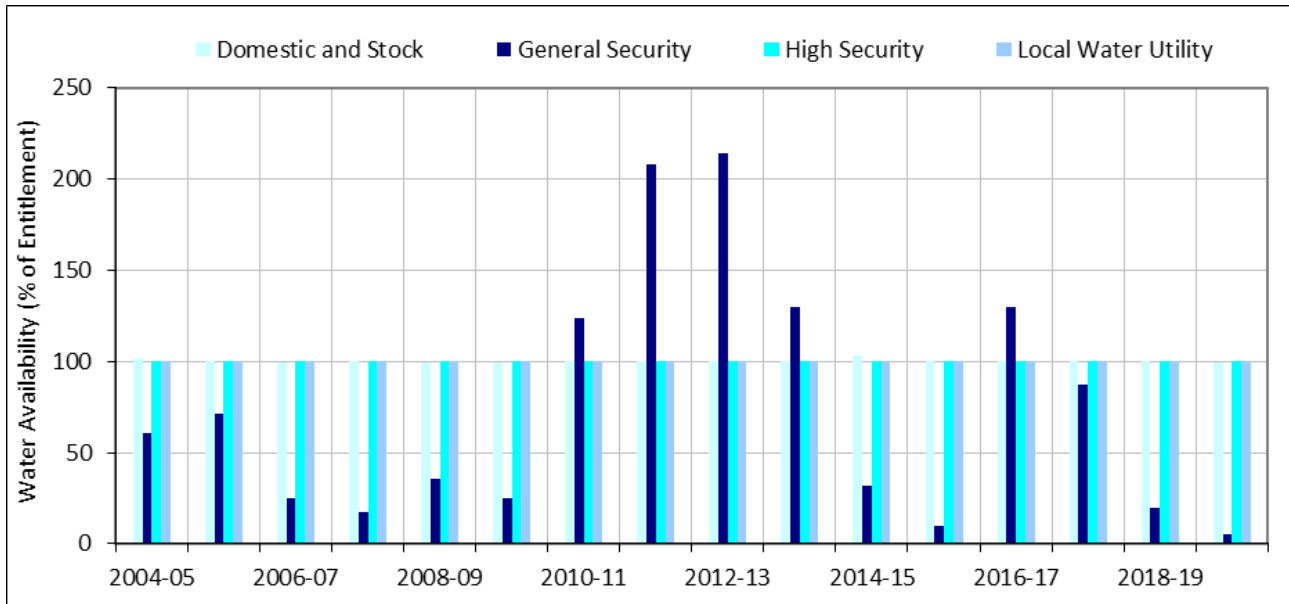


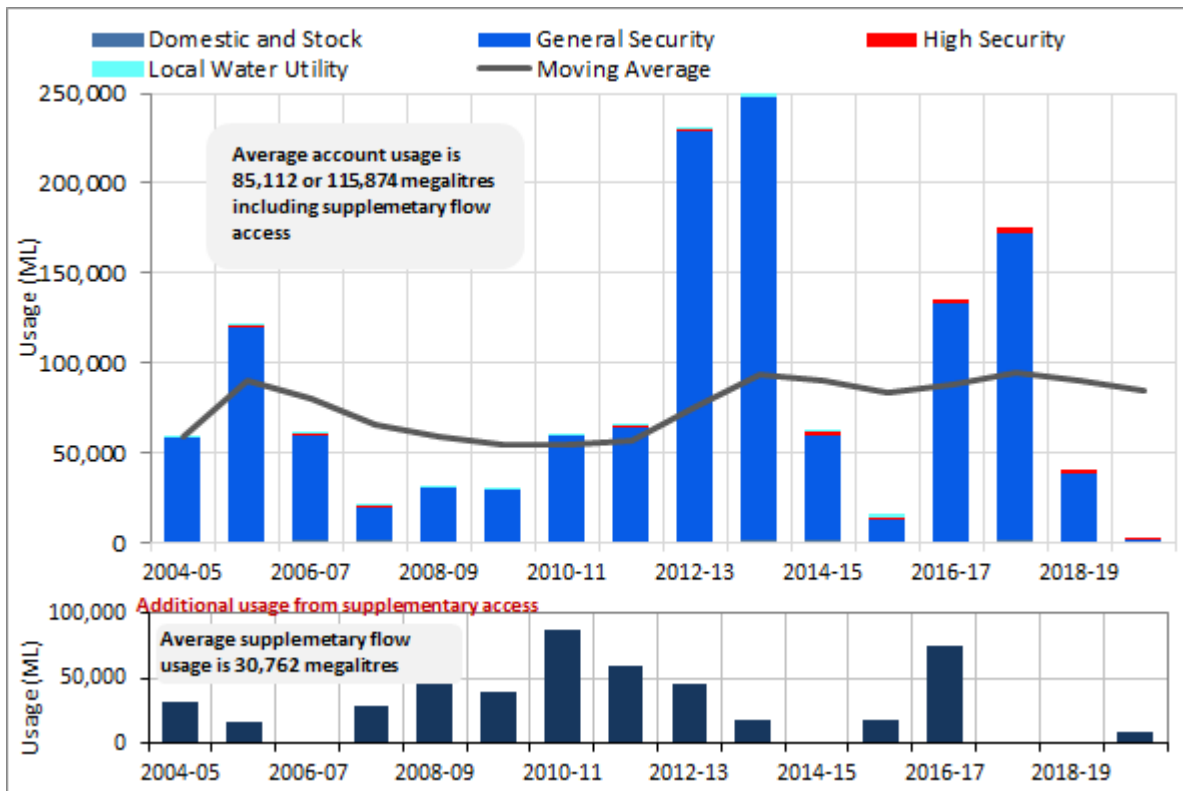
Figure 31: Lower Namoi account water availability (carryover + AWD)



Account usage

- Usage from regulated supply totalled 11,007 megalitres for the reporting period (Figure 32)
- This includes 8,271 megalitres accessed through supplementary water events. Detailed information on supplementary access is available in note 20 of this GPWAR.
- This was the lowest usage since reporting commenced in 2004–05
- Average usage under water sharing plan management conditions is 115,874 megalitres (all categories of access licence).

Figure 32: Lower Namoi usage by category (excludes supplementary diversions)



Utilisation and inactive share

- 73% of General Security share component was inactive¹¹ for the reporting period, increasing from 38% in the prior year (Table 7).
- Considering all categories of access licence, 72% of share component was inactive for the reporting period, increasing from 38% in the prior year.
- Utilisation¹² of water available to extract from regulated supply (excludes supplementary flow access) decreased from 73% in the prior reporting period to 13% for 2019–20.
- This was the lowest utilisation under water sharing plan management conditions on record (Figure 33). Restrictions were in place at times impacting the ability to utilise available account water (refer to section ‘Temporary water restrictions for the reporting period’)

¹¹ An access licence is considered to be inactive if the holding does not use water or access the temporary trade market for the reporting period.

¹² Utilisation reflects the amount of water used, relative to the maximum amount available for use.

Figure 33: Lower Namoi percentage utilisation¹³

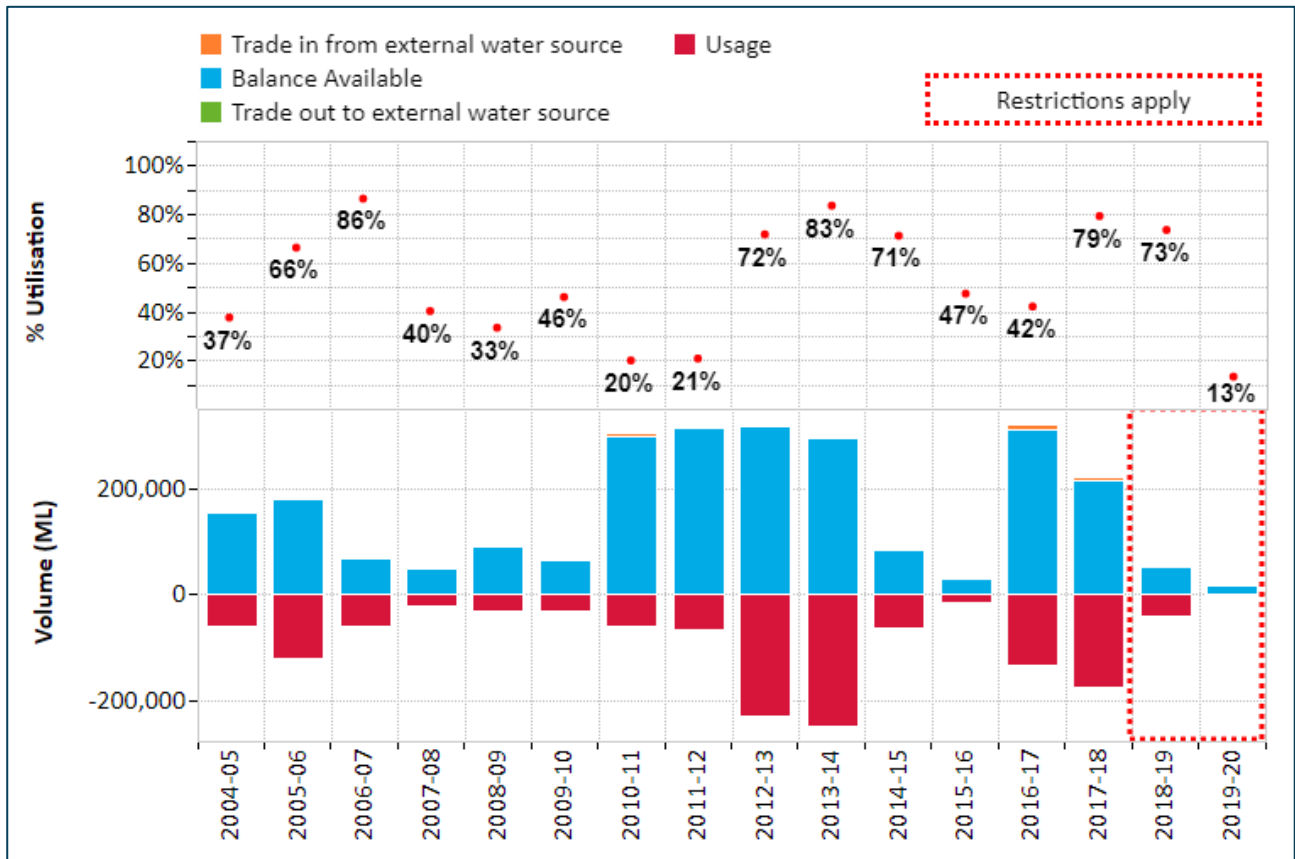


Table 7: Lower Namoi inactive licence summary¹⁴

Licence category	Inactive licences 2019–20 (number)	Inactive share component 2019–20	Inactive share component % of total 2019–20	Inactive share component % of total prior year 2018–19
Domestic and Stock	78	1094	66%	45%
Domestic and Stock [Domestic]	4	17	85%	70%
Domestic and Stock [Stock]	21	237	92%	60%
Local Water Utility	1	2,271	100%	100%
General Security	240	177,847	73%	38%
High Security	4	150	4%	3%
High Security [Research]	0	0	0%	0%
Total	348	181,616	72%	38%

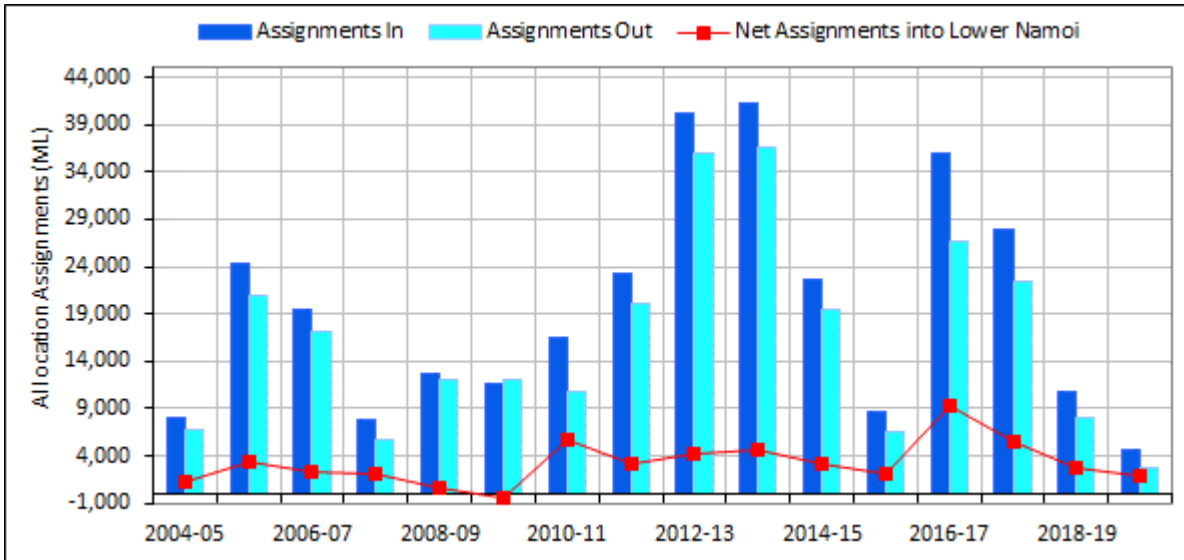
¹³ Water availability plus trade in from external water sources against account usage and trade out to external water sources. Excludes supplementary and uncontrolled flow access

¹⁴ Inactive licences are those licences that have no usage or allocation trade for the water year.

Temporary trading (allocation assignments)

- A total 1,963 megalitres was traded from the Upper Namoi to the Lower Namoi (Figure 34)¹⁵. No temporary trading occurred between the Peel and Lower Namoi in the reporting period.
- Considering all categories of licences 4,590 was traded into Lower Namoi access licences and 1,963 was traded out, the lowest trade activity by volume, since 2015–16.

Figure 34: Lower Namoi temporary trading summary



Commercial transactions (allocation assignments from Lower Namoi access licences)

- One commercial trade¹⁶ was processed in the reporting period (Figure 35).
- The average consideration per megalitre for the reporting period was \$200.
- The maximum consideration for temporary water was \$200 per megalitre.

Permanent trading (commercial share assignments and transfer of licence)

- No General Security commercial share assignments was processed in the reporting period (Figure 36).
- Additionally, 19,342 shares (19 transactions) were exchanged for commercial consideration through transfer of licence dealings (Figure 37).

¹⁵ Supplementary licence trade has been excluded from this plot.

¹⁶ Trades have been considered commercial if consideration per megalitre/share exceeds \$1

Figure 35: Lower Namoi allocation assignments—trade consideration statistics

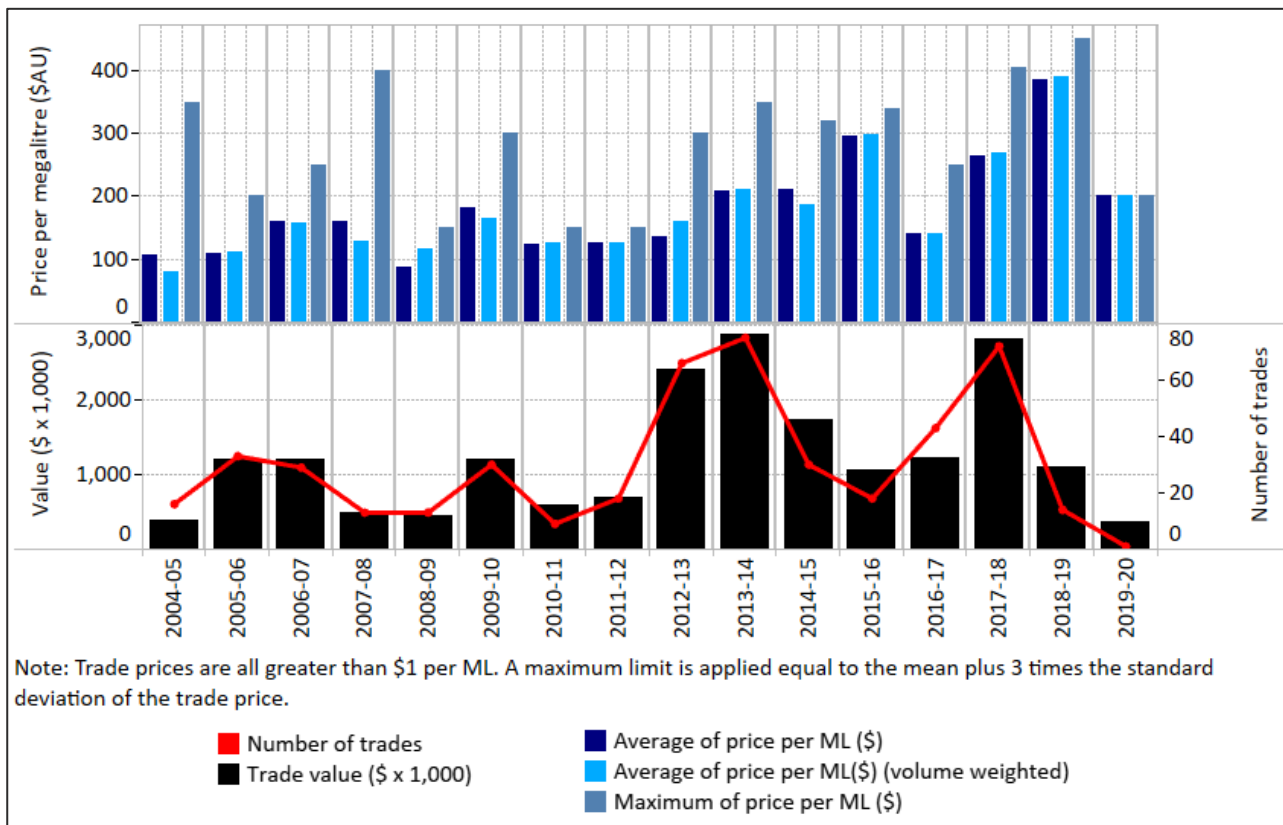


Figure 36: Lower Namoi share assignments trade market statistics (General Security)

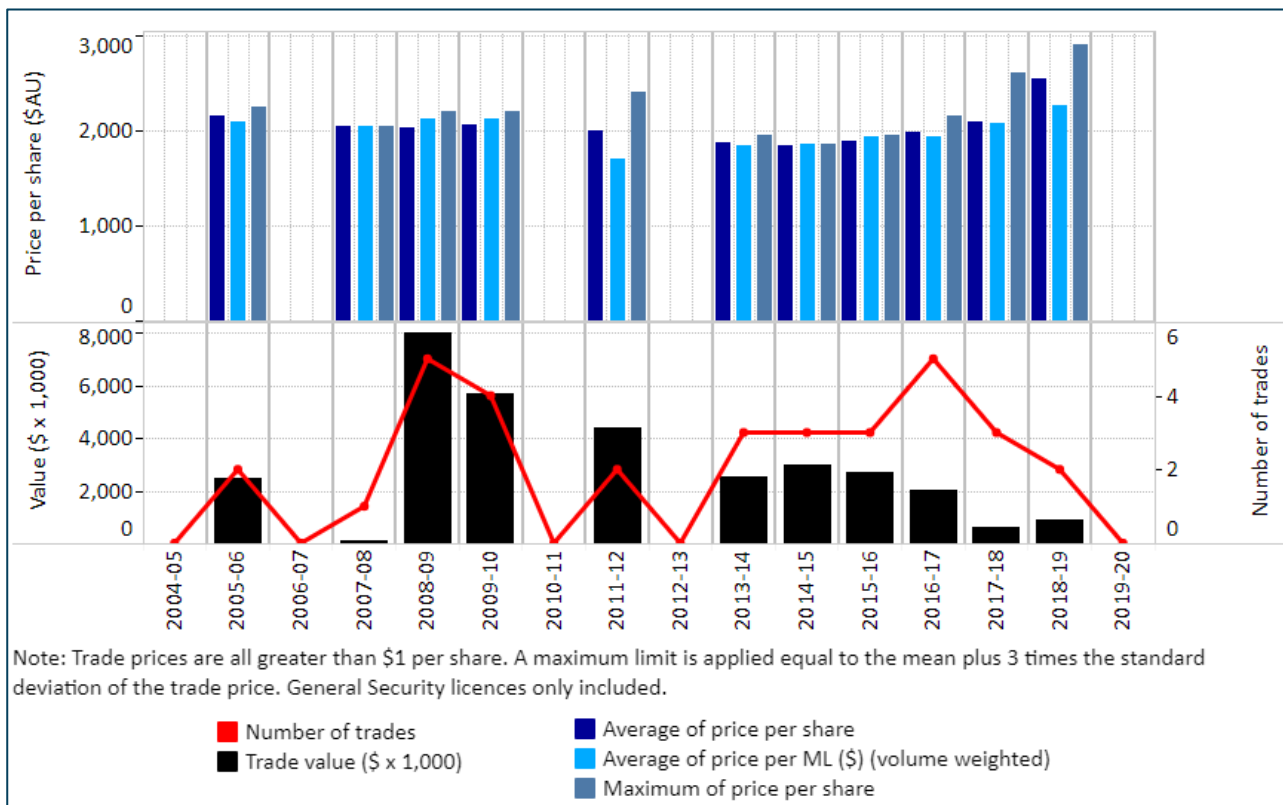
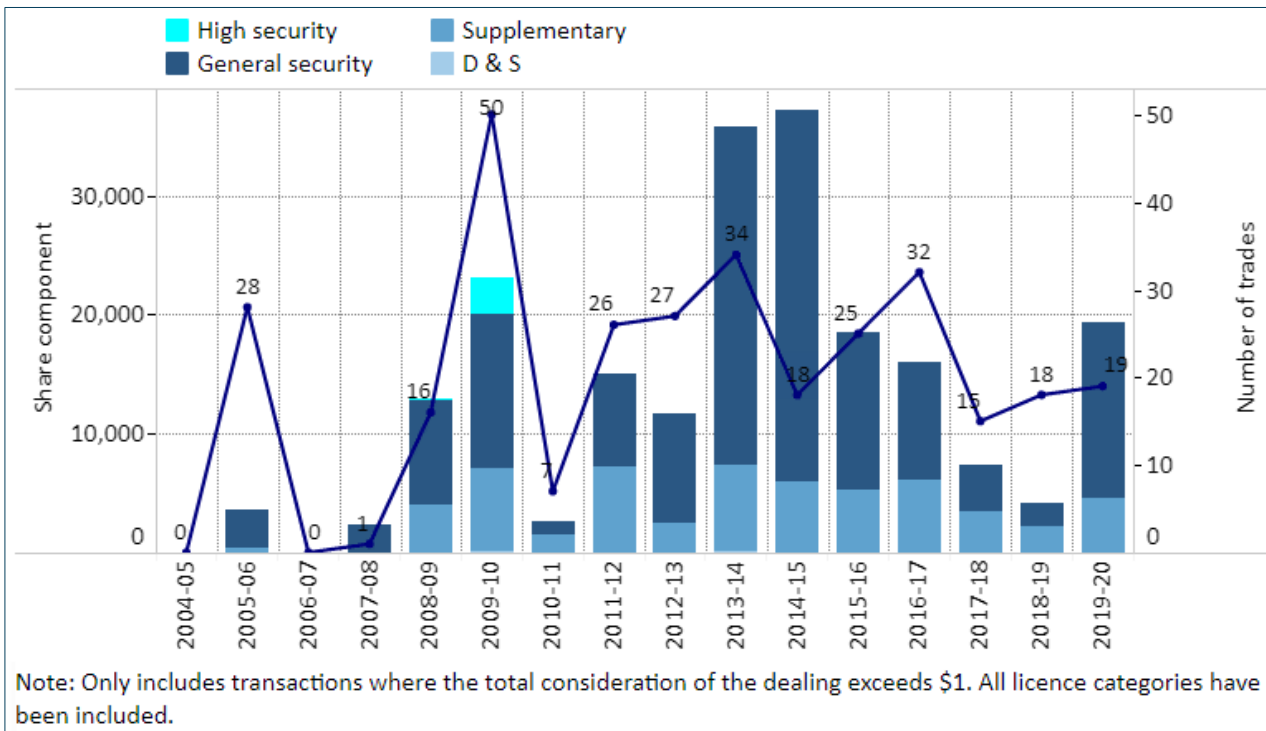


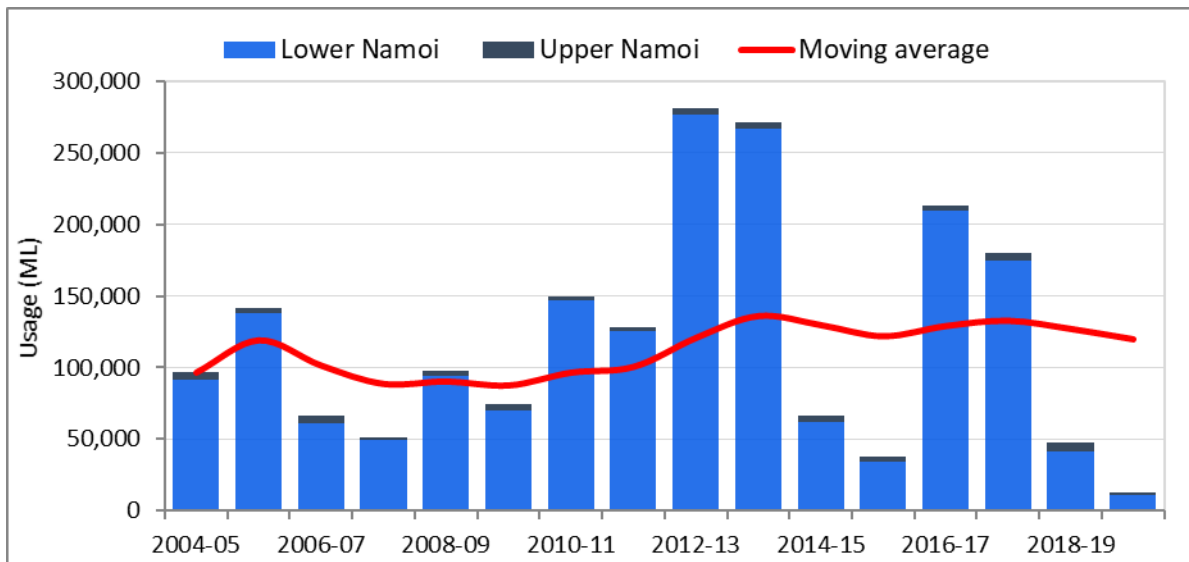
Figure 37: Lower Namoi transfers of licence (share)



Total usage (combined upper and lower Namoi)

- The total account usage in Namoi¹⁷ was 12,790 megalitres.
- The water sharing plan moving-average usage decreased to 119,819 megalitres per year (Figure 38).

Figure 38: Namoi combined-average annual account usage and moving-average usage



¹⁷ Total annual account usage in the Namoi includes all account usage in both the upper and lower Namoi, which includes the supplementary use in the Lower Namoi.

Environmental water

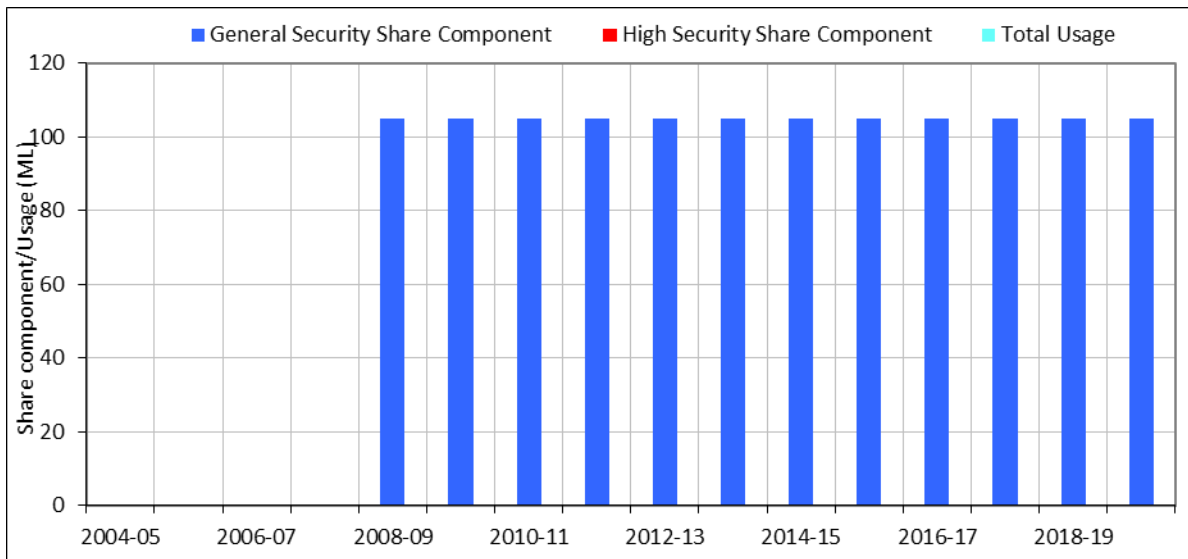
Held environmental water

Held environmental water refers to access licences that are managed to sustain and improve environmental outcomes within the system.

Upper Namoi

- There was no increase to held environmental water in the Upper Namoi for the reporting period (Figure 39).
- Held environmental water totalled 105 General Security shares at the closure of reporting period.
- A High Security licence of zero share component has been held since 2008–09.
- No usage has occurred against the holdings (however, trading to the Lower Namoi for environmental releases is common).

Figure 39: Held environmental water share component and usage in the Upper Namoi

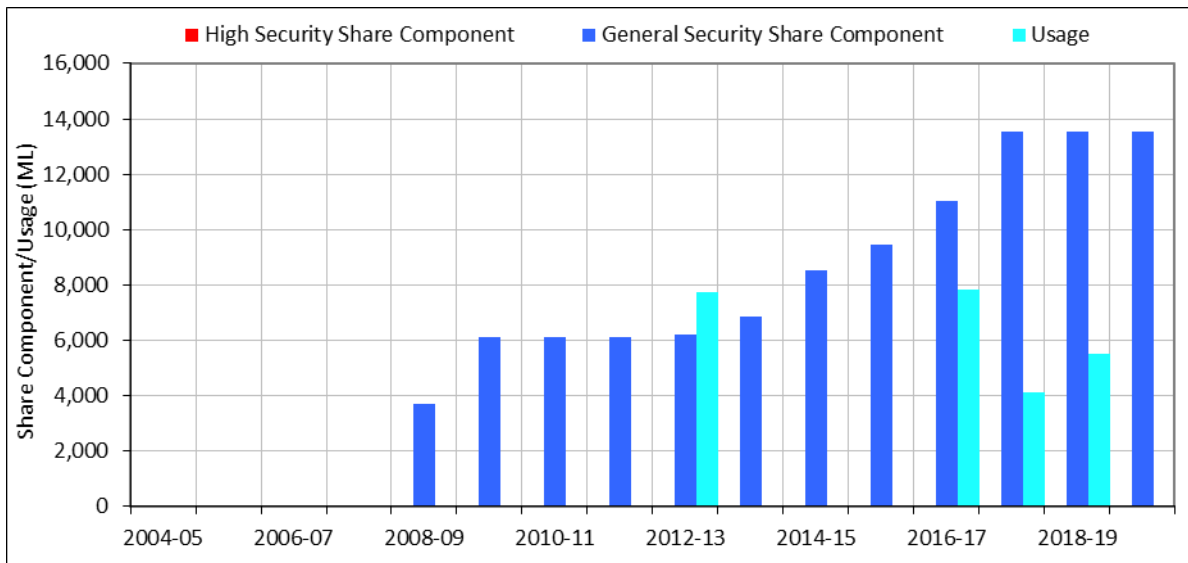


Lower Namoi

- Held environmental water General Security share component totalled 13,548 shares¹⁸ at the closure of reporting period (Figure 40).
- Nil usage for environmental licences was recorded during the reporting period.
- Carry forward at the end of the reporting period was 552 megalitres.

¹⁸ A High Security licence of zero share component has been held since 2008-09.

Figure 40: Held environmental water share component and usage in the Lower Namoi



Planned environmental water

Planned environmental water refers to environmental provisions allowed for under Part 3 of the water sharing plan.

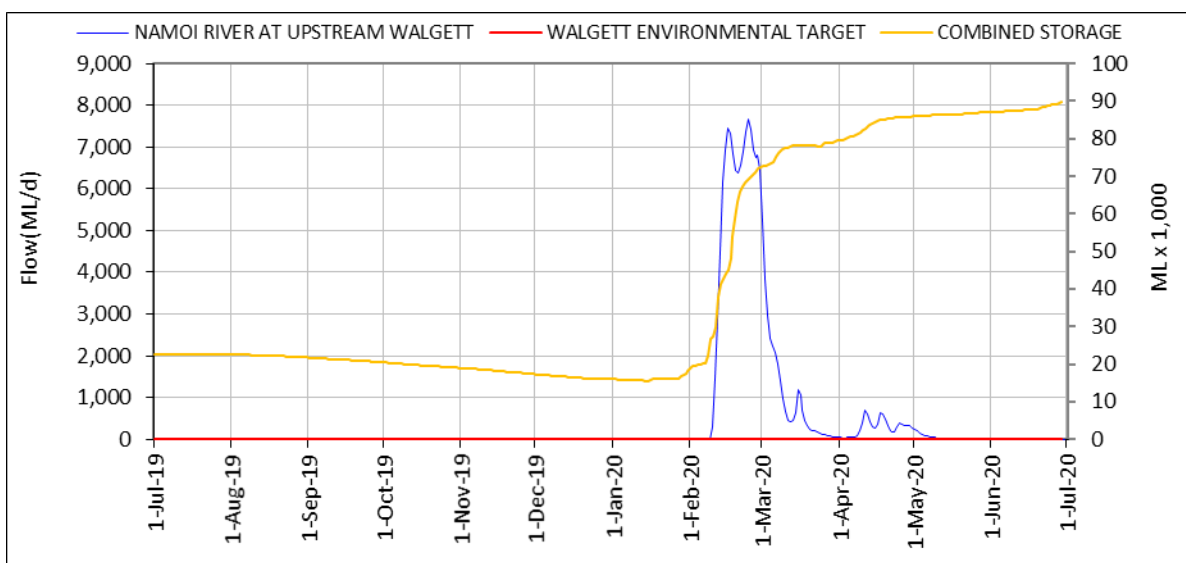
Upper Namoi

- There are no specific planned environmental rules relevant for the Upper Namoi (the long-term average annual extraction limit applies to both the upper and lower Namoi collectively).

Lower Namoi

- The combined storage volume (Split Rock and Keepit) stayed below 120,000 megalitres throughout the water year (Figure 41) and therefore there was no minimum flow required at Walgett during the water year.

Figure 41: Minimum flow requirement performance



Water accounting statements

Significant water accounting policies

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

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

We have included a diagram representing the physical movements of water to provide a clearer depiction of the accounting processes associated with physical flow movement.

For a detailed explanation of how to interpret the NSW Department of Planning, Industry and Environment water accounting statements refer to *Interpreting New South Wales Office of Water General Purpose Water Accounting Reports*, which is available for download on from the NSW Department of Planning, Industry and Environment website (www.industry.nsw.gov.au/water).

Quantification of data

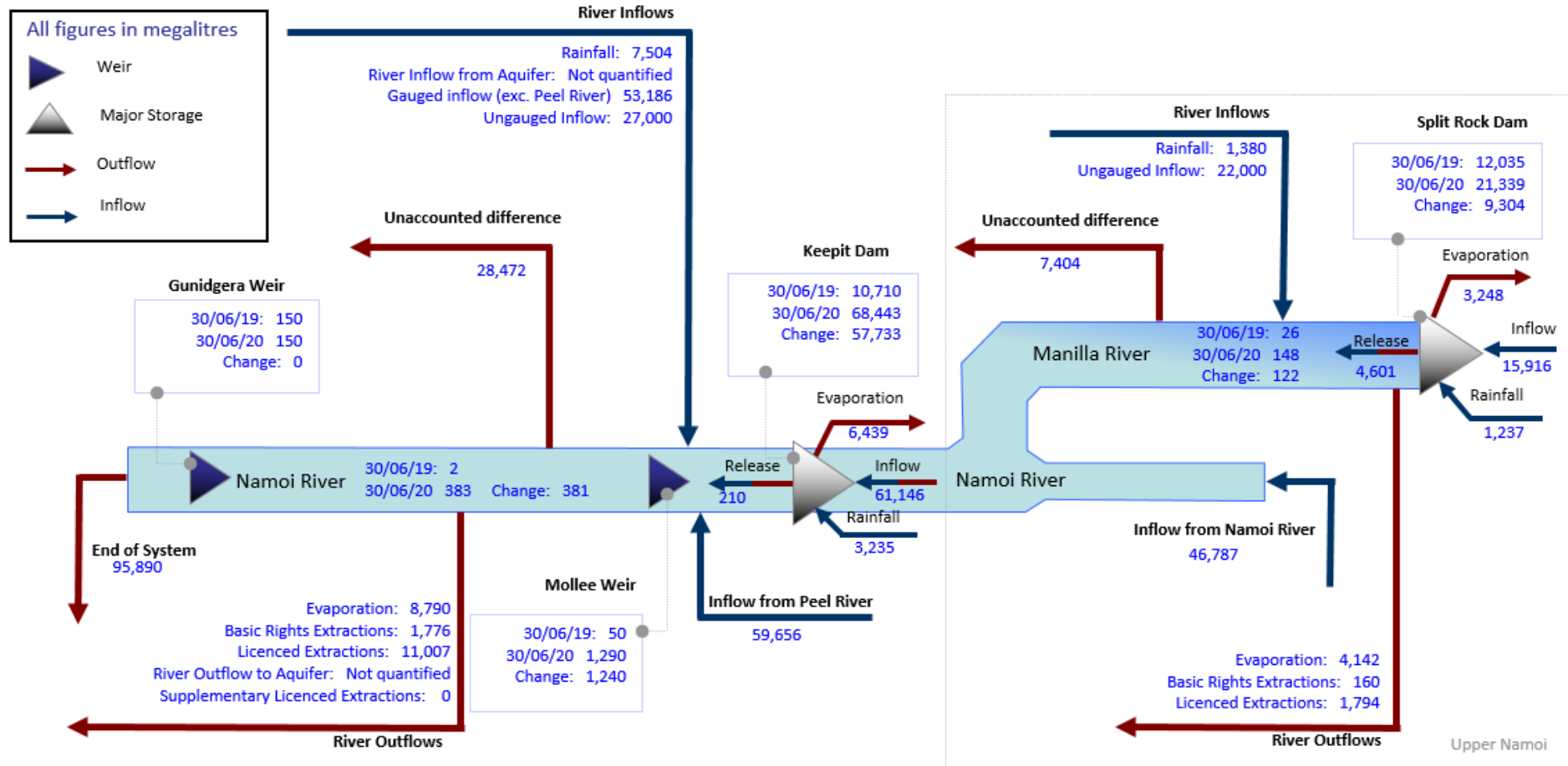
Data accuracy

We have gathered the data used to account for water movement and management from a variety of sources and systems. The data ranges from observed values, where a high accuracy would be anticipated, through to modelled results and estimates, where accuracy can be highly variable, depending on a range of factors. To address the inconsistencies in accuracy and prevent misuse of the data in the accounts, we have added an assessment of accuracy to all figures in the water accounting statements (Table 8).

Table 8: Water account data accuracy estimates key

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

2019–20 Namoi physical flows mass balance diagram



Statement of water assets and water liabilities

For the year ended 30 June 2020

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

Surface water assets

1. Surface water storage	Accuracy	Notes	30 June 2020	30 June 2019
Split Rock Dam	A	8	21,339	12,035
Keepit Dam	A	8	68,443	10,710
Gunidgera Weir	B	8	150	150
Mollee Weir	B	8	1,290	50
River		9		
Upper	B		148	26
Lower	B		383	2
Total surface water storage (Asws)			91,753	22,973
<i>Change in surface water storage</i>			68,780	(92,766)

Surface water liabilities

2. Allocation account balance	Accuracy	Notes	30 June 2020	30 June 2019
Upper Namoi				
General Security	A1	1	4,575	2,670
Lower Namoi				
D&S (Stock)	A1	1	0	(15)
Domestic and Stock (D&S)	A1	1	0	0
General Security	A1	1	14,905	12,332
Total allocation account balance (Lsws)			19,480	14,987
<i>Change in allocation account balance</i>			4,493	(33,123)

Surface water net changes

Net change	30 June 2020	30 June 2019
Net surface water assets (Asws – Lsws)	72,273	7,987
<i>Change in net surface water assets</i>	64,286	(59,643)

Changes in water assets and water liabilities

For the year ended 30 June 2020 (1 of 3)

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

Surface water storage inflows	Accuracy	Notes	2019–20	2018–19
Split Rock Dam				
Inflow	A	10	15,916	3,671
Rainfall	B	11	1,237	2,273
Keepit Dam				
Inflow	A	10	61,146	41,261
Rainfall	B	11	3,235	2,271
River				
Upper Namoi				
River Inflow from Split Rock Releases	A	15	4,601	47,770
Gauged Inflow	A	13	46,787	4,269
Ungauged Inflow	C	14	22,000	6,000
Rainfall	C	12	1,380	1,290
Lower Namoi				
River Inflow from Keepit Releases	A	15	210	79,550
Gauged Inflow (excluding Peel River)	A	13	53,186	5,857
Ungauged Inflow	C	14	27,000	3,000
Rainfall	C	12	7,504	5,120
Inflow from Peel (Carroll Gap)	A	13	59,656	8,810
River Inflow from Aquifer	D	21	Not quantified	17,464
Total surface water storage increases (Isws)			383,959	228,606
Surface water storage outflows	Accuracy	Notes	2019–20	2018–19
Split Rock Dam				
Evaporation	B	11	3,248	6,049
Release	A	15	4,601	47,770
Keepit Dam				
Evaporation	B	11	6,439	6,369
Release	A	15	210	79,550
River				
Upper Namoi				
Evaporation	C	12	4,142	4,755
End Of System (inflow to Keepit)	A	10	61,146	41,261
Basic Rights Extractions	C	18	160	160
Licenced extractions	A	17	1,794	6,386
Lower Namoi				
Evaporation	C	12	8,790	24,632
End of System Flow	A	16	95,890	3,192
River Outflow to Aquifer	D	21	Not quantified	26,918
Basic Rights Extractions	C	18	1,776	1,776
Licenced extractions	A	17	11,007	41,105
Total surface water storage decreases (Dsws)			232,302	289,923
Unaccounted difference (Upper and Lower) (Usws)				
Upper Namoi	D	22	7,404	6,814
Lower Namoi	D	22	28,472	24,636
Net surface water storage changes			2019–20	2018–19
Net surface water storage inflow (Isws – Dsws – Usws)			68,779	(92,767)

Changes in water assets and water liabilities

For the year ended 30 June 2020 (2 of 3)

2. Changes in allocation accounts

Allocation account increases	Accuracy	Notes	2019–20	2018–19
Available water determinations (Upper Namoi)	A1	2		
Domestic and Stock			90	90
General Security			5,727	10,688
High Security			80	80
Local Water Utility			515	515
Available water determinations (Lower Namoi)	A1	2		
Domestic and Stock			2,006	2,006
General Security			0	0
High Security			3,418	3,418
High Security (Research)			486	486
Local Water Utility			2,271	2,271
New licence	A1	1		
Lower Namoi			0	0
Internal trading—buyers	A1	5		
Upper			736	2,343
Lower			4,211	7,477
External trading				
Trade from Peel to Lower Namoi	A1	5	0	0
Supplementary water demand—Lower Namoi	A	20	8,271	0
Uncontrolled flow demand—Upper Namoi	A	24	13	0
Account adjustments			271	0
Total allocation account increases (Iaa)			28,094	29,375

Changes in water assets and water liabilities

For the year ended 30 June 2020 (3 of 3)

Allocation account decreases	Accuracy	Notes	2019–20	2018–19
Account usage	A	3		
Upper Namoi				
Domestic and Stock			5	2
General Security			1,469	5,800
High Security			19	40
Local Water Utility			289	543
Lower Namoi				
Domestic and Stock			501	956
General Security			1,561	37,468
High Security			310	2,245
High Security (Research)			365	436
Local Water Utility			0	0
Supplementary			8,271	0
Uncontrolled flow extractions				
Upper Namoi	A	24	13	0
Account forfeiture	A	1		
Upper Namoi				
Domestic and Stock			85	88
General Security			390	173
High Security			61	40
Local Water Utility			227	72
Lower Namoi				
Domestic and Stock			1,471	1,040
General Security			0	297
High Security			1,097	882
High Security (Research)			122	0
Local Water Utility			2,271	2,271
Internal trading—sellers	A1	5		
Upper Namoi			2,699	2,343
Lower Namoi			2,248	7,477
Water order debiting (Orders > Usage)	A	4		
Domestic and Stock			12	24
General Security			90	300
High Security (HS)			21	1
High Security (Research)			0	0
Licence cancelled				
Upper			0	0
Lower			8	0
Total allocation account decreases (Daa)			23,601	62,498
Net environmental provisions change			2019–20	2018–19
Net allocation account balance increase (Iaa – Daa)			4,493	(33,124)
3. Overall changes				
Surface water assets			2019–20	2018–19
Change in net surface water assets (Isws – Dsws – Usws – Iaa + Daa)			64,286	(59,643)

Note disclosures

Reconciliation and future prospect descriptions

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

Reconciliation of change in net water asset to net change in physical water storage ¹⁹	2019–20	2018–19
Change in net surface water assets	64,286	(59,643)
Non-physical adjustments		
Net change in allocation accounts	4,493	(33,124)
Net change in physical surface water storage	68,779	(92,767)

Reconciliation of closing water storage to total surface water assets	30 June 2020	30 June 2019
Closing water storage		
Surface water storage	91,753	22,973
less River volume (Lower)	(383)	(2)
less Gunidgera weir volume	(150)	(150)
Less Mollee weir volume	(1,290)	(50)
Total surface water assets ²⁰	89,930	22,771

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

The links below give the latest water availability information for the Upper Namoi and Lower Namoi Regulated River Water Sources. This includes carryovers and available water determinations at the time of reporting, along with probability information about the reliability of the Namoi system.

¹⁹ All figures can be derived from or found directly in the Water Accounting Statements of the General Purpose Water Accounting Report. All figures are reported in megalitres.


²⁰ While the volume of the river, Gunidgera weir and Mollee weir at the end of the reporting period may be used to subsidise future deliveries, they are not assessed as primary assets for meeting commitments in the upper and lower regulated river water sources and are therefore removed from this reconciliation. This reduction has not been applied in previous GPWARs.

Latest water availability

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


You can also subscribe to receive the latest updates.

Allocations




How water is allocated

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




Summary of current water allocations

A listing of current water allocation for major regulated rivers.




Water allocation statements

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



Available water determinations

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



Outlook & forecasts

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

Significant events since the reporting period

Not applicable.

System reliability

The latest long-term planning model (IQQM) reflecting a water sharing plan management scenario in the Namoi provides indicative system reliability information for the commencement and closure of a watering season²¹. Model results relate to the Lower Namoi General Security holders only.

²¹ Modelled data simulated as July to June water year. Simulation period 1 June 1892 to 30 June 2016

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 long-term simulation indicates that the General Security water availability (carryover plus available water determination) is 200% for 9% of the time and 100% for 44% of the time (Figure 42).

There is a significant increase in availability throughout the water year when usages have commenced and the storage is replenished with new inflow, allowing further announcements. By the end of the water year, the simulation results indicate a water availability equal to or exceeding 100% for 73% of the time (Figure 43).

Figure 42: Start of water year simulated availability for General Security access licences (Lower Namoi)

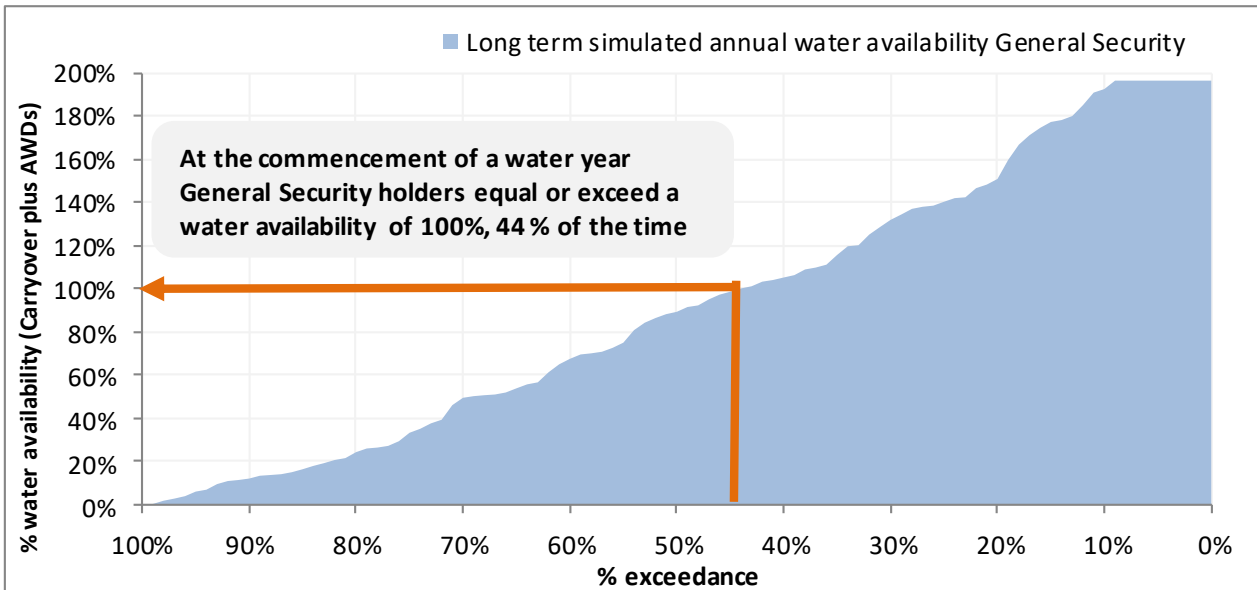
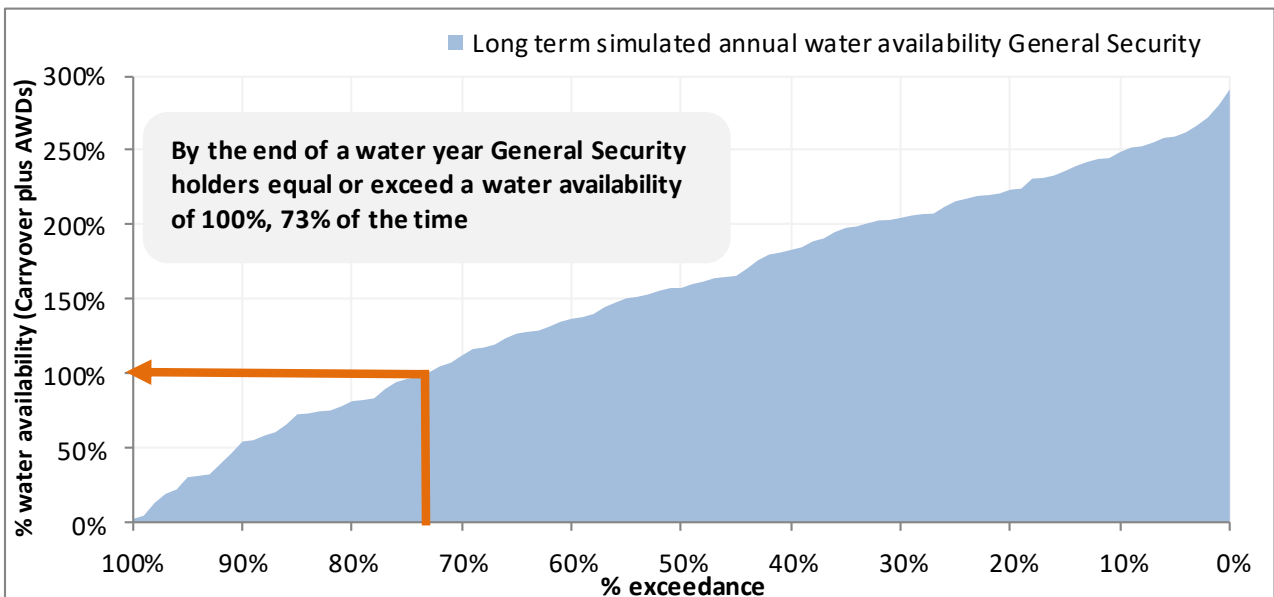


Figure 43: End of water year simulated availability for General Security access licences (Lower Namoi)



Carryovers and available water determinations 2020–21

Table 9. Upper Namoi Carryovers and available water determinations since reporting period ended (2020-21, as of April 2021)

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 (%)
Domestic and Stock											
1-Jul-20	Opening	74			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-20	AWD 100.0 %	74	74	74	100.0%	100.0%	74	0	74	100.0%	100.0%
Domestic and Stock [Domestic]											
1-Jul-20	Opening	12			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-20	AWD 100.0 %	12	12	12	100.0%	100.0%	12	0	12	100.0%	100.0%
Domestic and Stock [Stock]											
1-Jul-20	Opening	5			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-20	AWD 100.0 %	5	5	5	100.0%	100.0%	5	0	5	100.0%	100.0%
Local Water Utility											
1-Jul-20	Opening	515			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-20	AWD 100.0 %	515	515	515	100.0%	100.0%	515	0	515	100.0%	100.0%
Regulated River (General Security)											
1-Jul-20	Opening	11,454			0.0%	0.0%	4,575	0	4,575	39.9%	39.9%
1-Jul-20	AWD 0.0 ML per Share	11,454	0	0	0.0%	0.0%	4,575	0	4,575	39.9%	39.9%
8-Sep-20	AWD 0.5 ML per Share	11,454	5,727	5,727	50.0%	50.0%	10,302	0	10,302	89.9%	89.9%
13-Jan-21	AWD 0.5 ML per Share	11,454	2,519	8,246	22.0%	72.0%	12,821	0	12,821	111.9%	111.9%
Regulated River (High Security)											
1-Jul-20	Opening	80			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-20	AWD 0.9 ML per Share	80	72	72	90.0%	90.0%	72	0	72	90.0%	90.0%

Table 10: Lower Namoi Carryovers and available water determinations since reporting period ended (2020-21, as of April 2021)

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 (%)
Domestic and Stock											
1-Jul-20	Opening	1,721			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-20	AWD 100.0 %	1,721	1,721	1,721	100.0%	100.0%	1,721	0	1,721	100.0%	100.0%
Domestic and Stock [Domestic]											
1-Jul-20	Opening	20			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-20	AWD 100.0 %	20	20	20	100.0%	100.0%	20	0	20	100.0%	100.0%
Domestic and Stock [Stock]											
1-Jul-20	Opening	257			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-20	AWD 100.0 %	257	257	257	100.0%	100.0%	257	0	257	100.0%	100.0%
Local Water Utility											
1-Jul-20	Opening	2,271			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-20	AWD 100.0 %	2,271	2,271	2,271	100.0%	100.0%	2,271	0	2,271	100.0%	100.0%
Regulated River (General Security)											
1-Jul-20	Opening	245,075			0.0%	0.0%	12,962	1,943	14,905	5.3%	6.1%
1-Jul-20	AWD 0.0 ML per Share	245,075	0	0	0.0%	0.0%	12,962	1,943	14,905	5.3%	6.1%
8-Sep-20	AWD 0.042 ML per Share	245,075	10,210	10,210	4.2%	4.2%	23,158	1,957	25,115	9.4%	10.2%
7-Oct-20	AWD 0.014 ML per Share	245,075	3,403	13,613	1.4%	5.6%	26,707	1,810	28,518	10.9%	11.6%
6-Nov-20	AWD 0.014 ML per Share	245,075	3,404	17,016	1.4%	6.9%	30,099	1,822	31,921	12.3%	13.0%
7-Dec-20	AWD 0.01 ML per Share	245,075	2,443	19,459	1.0%	7.9%	32,575	1,789	34,364	13.3%	14.0%
13-Jan-21	AWD 0.237 ML per Share	245,075	57,794	77,253	23.6%	31.5%	89,912	2,246	92,158	36.7%	37.6%
5-Feb-21	AWD 0.076 ML per Share	244,920	18,601	95,805	7.6%	39.1%	108,308	2,451	110,759	44.2%	45.2%
9-Apr-21	AWD 0.433 ML per Share	244,920	105,802	201,607	43.2%	82.3%	212,421	4,140	216,561	86.7%	88.4%
Regulated River (High Security)											
1-Jul-20	Opening	3,418			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-20	AWD 0.9 ML per Share	3,418	3,076	3,076	90.0%	90.0%	3,076	0	3,076	90.0%	90.0%
8-Sep-20	AWD 0.1 ML per Share	3,418	342	3,418	10.0%	100.0%	3,418	0	3,418	100.0%	100.0%
Regulated River (High Security) [Research]											
1-Jul-20	Opening	486			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-20	AWD 90.0 %	486	437	437	90.0%	90.0%	437	0	437	90.0%	90.0%
8-Sep-20	AWD 10.0 %	486	49	486	10.0%	100.0%	486	0	486	100.0%	100.0%
Supplementary Water											
1-Jul-20	Opening	115,479			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-20	AWD 1.0 ML per Share	115,479	115,480	115,480	100.0%	100.0%	115,480	0	115,480	100.0%	100.0%

Detailed item notes

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 occur to either increase or decrease an allocation account throughout the water year.

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

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

Water that is in the accounts at the end of a water year but is not permitted to be carried over is forfeited and has been represented as a decrease in water liability.

The accounting presented is relevant to licence category and is therefore inclusive of licences held by environmental holders (these are also detailed separately in Note 6).

Data type

Derived from measured data

Policy

Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated Rivers Water Sources 2016

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

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

Water Accounting System jointly owned by NSW Department of Planning, Industry and Environment and WaterNSW

Methodology

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

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

Additional information

Table 12 (Upper Namoi) and Table 13 (Lower Namoi) summarise the water allocation accounts for each category of access licence. Table 11 describes each of the components within the water allocation account balances.

Table 11: Explanatory information for allocation account summary

Heading		Description
Share		This is the total volume of entitlement in the specific licence category.
Opening balance		The volume of water that has been carried forward from previous years allocation account.
AWD—Available water determination		The total annual volume of water added to the allocation account as a result of allocation assessments. This figure includes additional AWD made as a result of a storage spill reset as defined in the water sharing plan.
Licences	New	Increase in account water as a result of the issuing of a new licence.
	Cancel	Decrease in account water as a result of a licence cancellation where account balance has not been traded to another licence.
Drought suspension	In	Temporary water restriction applied, reducing account water available for use in reported water year
	Out	Temporary water restriction re-credit increasing account water available for use in reported water year
Assignments	In	Increase in account water as a result of temporary trade in.
	Out	Decrease in account water as a result of temporary trade out.
Account usage		Volume of water that is extracted or diverted from the river and is accountable against the access licence allocation
Uncontrolled flow usage		Volume of non-debit water extracted against general security as per water sharing plan provision in years of reduced allocations
Over-order debit		As a result of water order debiting being applied in a water source water ordered in excess of usage can be debited against an access licence.
Forfeits	During year	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.
	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.
End-of-year balance	Available	Account balance that is available to be taken at the conclusion of the water year.
	Not available	Water in accounts that is not available to be taken as a result of annual use limits that are applied to accounts.
Carry forward		This represents the account water that is permitted to be carried forward into the next water year as determined by the carryover rules.
()		Negative figures are shown in red brackets

Table 12: Allocation account balance summary for the Upper Namoi

Category	Share	Opening balance	AWD	Licences		Drought suspension		Assignments		Account usage	Uncontrolled flow usage	During year forfeit	End of year balance		End of year forfeit	Carry forward
				New	Cancel	In	Out	In	Out				Available	Not available		
Domestic and Stock	74	0	74	0	0	0	0	0	0	0	0	0	74	0	74	0
Domestic and Stock [Domestic]	12	0	11	0	0	0	0	0	0	0	0	0	11	0	11	0
Domestic and Stock [Stock]	5	0	5	0	0	0	0	0	0	5	0	0	0	0	0	0
Local Water Utility	515	0	515	0	0	0	0	0	0	289	0	0	227	0	227	0
General Security	11,454	2,670	5,727	0	0	1,580	1,580	736	2,699	1,469	13	0	4,965	0	390	4,575
High Security	80	0	80	0	0	47	47	0	0	19	0	0	61	0	61	0

Table 13: Allocation account balance summary for the Lower Namoi

Category	Share	Opening balance	AWD	Licences		Drought suspension		Assignments		Account usage	Over order debit	During year forfeit	End of year balance		End of year forfeit	Carry forward
				New	Cancel	In	Out	In	Out				Available	Non available		
Domestic and Stock	1,721	(15)	1,729	0	8	0	0	8	8	479	10	0	1,216	0	1,217	(0)
Domestic and Stock [Domestic]	20	0	20	0	0	0	0	0	0	2	1	0	17	0	17	0
Domestic and Stock [Stock]	257	0	257	0	0	0	0	0	0	20	0	0	237	0	237	0
Local Water Utility	2,271	0	2,271	0	0	0	0	0	0	0	0	0	2,271	0	2,271	0
General Security	245,075	12,603	0	0	0	11,853	12,124	4,203	250	1,561	90	0	12,963	1,943	0	14,905
High Security	3,418	0	3,418	0	0	2,549	2,549	0	1,990	310	21	0	1,097	0	1,097	0
High Security [Research]	486	0	486	0	0	0	0	0	0	365	0	0	122	0	122	0
Supplementary	115,479	0	115,480	0	0	0	0	379	379	8,271	0	0	107,209	0	107,209	0

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

This is the process by which the regulated surface water asset available for use within the regulated system is determined and shared. The process calculates the volume of water 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 Upper Namoi and Lower Namoi Regulated Rivers Water Sources 2016

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

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

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

NSW Department of Planning, Industry and Environment.

Data source

Water Accounting System jointly owned by NSW Department of Planning, Industry and Environment and WaterNSW

You can access the Available Water Determination Register at the NSW Department of Planning, Industry and Environment website, www.industry.nsw.gov.au/water

Methodology

The available water determination (AWD) applies different concepts and rules depending on the water source.

In the Lower Namoi Regulated Water Source, we calculate AWDs based on a concept of continuous accounting that assesses the resource (water) contained in the headwaters storage. We periodically update projections and distribute the regulated (stored) resource available. All projected requirements are for two 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 and do not account for sequences of future inflows.

We calculate the Upper Namoi Regulated Water Source AWDs using annual accounting concepts, with the exception that we do not consider headwater inflows. Calculations are based on the resource held at the point of assessment. This is because Split Rock storage is a shared resource

for both the upper and lower regulated water sources. Under the annual accounting, once allocation for essential requirements and high security is secured at 100%, general security is allocated water according to the volume held in Split Rock dam, as defined in Table 14.

Table 14: General security AWD announcement rules for the Upper Namoi Regulated River Water Source

Per unit share (ML)	Volume of water held in Split Rock Dam during the water year (per cent of full supply)
0.0	<5%
0.5	5% - 8%
0.6	8% - 10%
1.0	>10%

Assessments in all water sources involve the calculating the effective storage, which is the available storage volume after storage losses are accounted for. Storage losses cannot be controlled by a management rule and, therefore, must be provided for first. Once this has been considered, we allocate water for essential supplies as the highest priority, and then allocate any remaining, uncommitted water 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, and 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. Table 15 details each licence category and how it is announced.

Table 15: Access licence category announcement type

Licence category	Announcement type
General Security	Volume per share
High Security	Volume per share
Domestic and Stock ²²	Percent 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 due to the growth in use strategy, it is maintained at the maximum value prescribed in the plan, which is generally one 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.

²² Domestic and Stock consists of three sub categories: Domestic and Stock, Domestic and Stock (Domestic) and Domestic and Stock (Stock). High Security consists of two sub categories: High Security and High Security (Research).

Additional information

Table 17 (Upper Namoi) and Table 18 (Lower Namoi) contain the allocation summary reports for the reporting period. Table 16 describes components to help interpret the allocation summary tables.

Table 16: Allocation summary report notes

Component	Description
date	date of applicable transaction (opening balance of available water determinations)
opening	remaining allocation account balances at the conclusion of the last season that has been carried forward to this season
individual announcement	actual announcement made to each licence category
share component (entitlement)	sum of the licensed volume of water within the licence category on the announcement date
allocation volume (ML)	volume of water credited to accounts within a licence category as a result of the announcement made
allocation cumulative volume (ML)	cumulative total of the announced volumes for the water year and licence category
allocation (%)	the announced volume on the specific date expressed as a percentage of the share component
allocation cumulative (%)	cumulative total of the announced volumes, as at the announcement date, for the water year and licence category, expressed as a percentage of share component
balance available (ML)	sum of water available in allocation accounts, as at the specified date, that has been made available to be taken during the season
balance not available (ML)	water allocated that is not accessible at this point in time
balance total (ML)	sum of all the water credited to allocation accounts as at the specified date
balance available (%)	sum of water available in allocation accounts, as at the specified date, that has been made available to be taken during the season, expressed as a percentage of share component
balance total (%)	sum of all the water credited to allocation accounts as at the specified date, expressed as a percentage of share component

Table 17: Allocation announcements for the Upper Namoi regulated river water source

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 (%)
DOMESTIC AND STOCK											
1-Jul-19	Opening	74			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-19	AWD 100.0 %	74	74	74	100.0%	100.0%	74	0	74	100.0%	100.0%
DOMESTIC AND STOCK[DOMESTIC]											
1-Jul-19	Opening	11			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-19	AWD 100.0 %	11	11	11	100.0%	100.0%	11	0	11	100.0%	100.0%
DOMESTIC AND STOCK[STOCK]											
1-Jul-19	Opening	5			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-19	AWD 100.0 %	5	5	5	100.0%	100.0%	5	0	5	100.0%	100.0%
LOCAL WATER UTILITY											
1-Jul-19	Opening	515			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-19	AWD 100.0 %	515	515	515	100.0%	100.0%	515	0	515	100.0%	100.0%
REGULATED RIVER (GENERAL SECURITY)											
1-Jul-19	Opening	11,454			0.0%	0.0%	2,670	0	2,670	23.3%	23.3%
1-Jul-19	AWD 0.0 ML per Share	11,454	0	0	0.0%	0.0%	2,670	0	2,670	23.3%	23.3%
1-Jul-19	Drought Suspension 25.0 %	11,454			0.0%	0.0%	2,001	668	2,670	17.5%	23.3%
6-Dec-19	Drought Suspension 100.0 %	11,454			0.0%	0.0%	1,090	1,580	2,670	9.5%	23.3%
25-Feb-20	Drought Suspension Re-credit 100.0 %	11,454			0.0%	0.0%	2,670	0	2,670	23.3%	23.3%
21-Apr-20	AWD 0.5 ML per Share	11,454	5,727	5,727	50.0%	50.0%	8,397	0	8,397	73.3%	73.3%
REGULATED RIVER (HIGH SECURITY)											
1-Jul-19	Opening	80			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-19	AWD 0.75 ML per Share	80	60	60	75.1%	75.1%	60	0	60	75.1%	75.1%
1-Feb-20	Drought Suspension 100.0 %	80			0.0%	0.0%	13	47	60	16.2%	75.1%
17-Feb-20	Drought Suspension Re-credit 100.0 %	80			0.0%	0.0%	60	0	60	75.1%	75.1%
21-Apr-20	AWD 0.25 ML per Share	80	20	80	24.9%	100.0%	80	0	80	100.0%	100.0%

Table 18: Allocation announcements for the Lower Namoi regulated river water source

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 (%)
DOMESTIC AND STOCK											
1-Jul-19	Opening	1,729			0.0%	0.0%	(15)	0	(15)	(0.9)%	(0.9)%
1-Jul-19	AWD 100.0 %	1,729	1,729	1,729	100.0%	100.0%	1,714	0	1,714	99.1%	99.1%
DOMESTIC AND STOCK[DOMESTIC]											
1-Jul-19	Opening	20			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-19	AWD 100.0 %	20	20	20	100.0%	100.0%	20	0	20	100.0%	100.0%
DOMESTIC AND STOCK[STOCK]											
1-Jul-19	Opening	257			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-19	AWD 100.0 %	257	257	257	100.0%	100.0%	257	0	257	100.0%	100.0%
LOCAL WATER UTILITY											
1-Jul-19	Opening	2,271			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-19	AWD 100.0 %	2,271	2,271	2,271	100.0%	100.0%	2,271	0	2,271	100.0%	100.0%
REGULATED RIVER (GENERAL SECURITY)											
1-Jul-19	Opening	245,075			0.0%	0.0%	10,217	2,256	12,474	4.2%	5.1%
1-Jul-19	AWD 0.0 ML per Share	245,075	0	0	0.0%	0.0%	10,217	2,256	12,474	4.2%	5.1%
1-Jul-19	Drought Suspension 100.0 %	245,075		0	0.0%	0.0%	350	12,124	12,474	0.1%	5.1%
25-Feb-20	Drought Suspension Re-credit 100.0 %	245,075		0	0.0%	0.0%	12,472	2	12,474	5.1%	5.1%
REGULATED RIVER (HIGH SECURITY)											
1-Jul-19	Opening	3,418			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-19	AWD 0.75 ML per Share	3,418	2,564	2,564	75.0%	75.0%	2,564	0	2,564	75.0%	75.0%
1-Feb-20	Drought Suspension 100.0 %	3,418			0.0%	0.0%	15	2,549	2,564	0.4%	75.0%
9-Feb-20	Drought Suspension Re-credit 100.0 %	3,418			0.0%	0.0%	2,564	0	2,564	75.0%	75.0%
25-Feb-20	Drought Suspension Re-credit 100.0 %	3,418			0.0%	0.0%	2,564	0	2,564	75.0%	75.0%
21-Apr-20	AWD 0.25 ML per Share	3,418	854	3,418	25.0%	100.0%	3,418	0	3,418	100.0%	100.0%

Date	Individual announcement	Share component	Allocation volume (ML)	Cumulative volume (ML)	Allocation volume (%)	Cumulative volume (%)	Balance available (ML)	Balance not available (ML)	Balance total (ML)	Balance available (%)	Balance total (%)
REGULATED RIVER (HIGH SECURITY)[RESEARCH]											
1-Jul-19	Opening	486			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-19	AWD 75.0 %	486	365	365	75.0%	75.0%	365	0	365	75.0%	75.0%
1-Feb-20	Drought Suspension Re-credit 100.0 %	486			0.0%	0.0%	365	0	365	75.0%	75.0%
9-Feb-20	Drought Suspension Re-credit 100.0 %	486			0.0%	0.0%	365	0	365	75.0%	75.0%
25-Feb-20	Drought Suspension Re-credit 100.0 %	486			0.0%	0.0%	365	0	365	75.0%	75.0%
21-Apr-20	AWD 25.0 %	486	122	486	25.0%	100.0%	486	0	486	100.0%	100.0%
SUPPLEMENTARY WATER											
1-Jul-19	Opening	115,479			0.0%	0.0%	0	0	0	0.0%	0.0%
1-Jul-19	AWD 1.0 ML per Share	115,479	115,480	115,480	100.0%	100.0%	115,480	0	115,480	100.0%	100.0%

Note 3—Allocation account usage

This is the volume of water that is extracted, diverted or measured as usage and is accountable against an access licence issued under the water sharing plan. This figure excludes that water accounted as over-order debit, which is accounted for separately (see Note 4).

Data type

Measured/administration data

Policy

Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated Rivers Water Sources 2016

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

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

Water Accounting System jointly owned by NSW Department of Planning, Industry and Environment and WaterNSW

Methodology

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

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

- based on periods of announcement—during periods of supplementary water announcements, extractions can be debited against the supplementary water licences
- usage based on water orders—users place orders for water against an access licence and usages are debited against accounts in proportion to the orders placed
- licence category apportionment—if no water orders are available, water extracted is apportioned against categories of access licence in order of priority, as set out in the table below. The prioritising is based on the nature of and rules around each of the licence categories.

Table 19 provides the order in which extractions are apportioned to access licence categories in the water accounting system. This is a generic list where not all categories will necessarily appear in this GPWAR. There are also various sub-categories of licence associated with some of the categories.

Table 19: Licence category metered usage apportionment

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

Account usage for the reporting period is illustrated in Table 20.

Table 20: Account usage summary

Category	Account usage Lower Namoi (ML)	Account usage Upper Namoi (ML)
Domestic and Stock	479	0
Domestic and Stock [Domestic]	2	0
Domestic and Stock [Stock]	20	5
Local Water Utility	0	289
General Security	1,561	1,482
High Security	310	19
High Security (Research)	365	N/A
Supplementary Water	8,271	N/A
Total	11,008	1,795

Note 4—Water order debiting

In the Lower Namoi regulated water source, the allocation accounts are 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 and
- water 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 exceeds the physical extraction that occurred.

Data type

Measured/calculated

Policy

Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 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 Planning, Industry and Environment website at:

www.industry.nsw.gov.au/water

Data accuracy

Estimated in the range +/- 10%.

Providing agency

NSW Department of Planning, Industry and Environment

Data source

Water Accounting System jointly owned by NSW Department of Planning, Industry and Environment and WaterNSW

Methodology

Over-order debiting is a required component of balancing the allocation accounts detailed in Note 1. We calculate the over-order debit component 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 exceed the usage are recorded as over-order debit.

Note 5—Internal trading (allocation assignments)

This represents the temporary trading (allocation assignments) of water between allocation accounts within the regulated Upper and Lower Namoi water sources.

Data type

Administration

Policy

Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated Rivers Water Sources 2016

- Part 10 Access licence dealing rules
 - Clause 50 rules relating to constraints within these water sources

Water Management Act 2000

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

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

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

Water Accounting System jointly owned by NSW Department of Planning, Industry and Environment and WaterNSW

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

Account usage for the reporting period is illustrated in Table 20

Table 21 and Table 22 provide allocation assignment summary figures (total volumes) between licence categories. All figures represent a volume in megalitres.

Table 21: Upper Namoi allocation assignments summary

Allocation assignments (ML)		To water source, licence category		
		Lower Namoi	Upper Namoi	Total
From water source, licence category		General Security	General Security	
Upper Namoi	General Security	1,963.2	735.7	2,698.9
Total		1,963.2	735.7	2,698.9

Table 22: Lower Namoi allocation assignments summary

Allocation assignments (ML)		To water source, licence category			Total
		Lower Namoi			
From water source, licence category		General Security	Supplementary	Domestic and Stock	
Lower Namoi	General Security	249.9			249.9
	High Security	1,990			1990
	Supplementary		379		379
	Domestic and Stock			8	8
Upper Namoi	General Security	1,963.2			1,963.2
Total		4,203.1	379	8	4,590.1

Note 6—Held environmental water

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

These licences are held within the same licence categories as all other water access licences and so are subject to the same operating rules. Therefore, they are subject to the following key rules:

- available water determinations (AWD) for their share of the entitlement to be added to accounts
- carryover rules—the forfeiting of unused water that cannot be carried over
- provide water orders before use.

These licences are used to provide environmental benefit and outcomes to the catchment by either providing water to, or supplementing water requirements of, specific environmental events or incidents.

Measured

Policy

Water Management Act 2000

Data accuracy

A1—Estimated in the range +/- 10%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

Water Accounting System jointly owned by NSW Department of Planning, Industry and Environment and WaterNSW

You can access the Available Water Determination Register at the NSW Department of Planning, Industry and Environment website, 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 end of the water year once all transactions and forfeit rules have been applied to the accounts. These environmental balances are at the licence category level and represent the water that can be carried forward for use in the next year. Below is list of typical transactions that can apply to an environmental allocation account:

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

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

Additional information

Table 24 and Table 26 present the annual account summary balances for held environmental licences. The processes presented in the balance are described in Table 23. Table 25 and Table 27 provide changes to environmental holdings for the reporting period. Table 28 presents temporary trade volumes associated with held environmental licences for the reporting period.

Table 23: Explanatory information for the environmental account summary

Heading		Description
share		the total volume of entitlement in the specific licence category
opening balance		the volume of water that has been carried forward from the previous year's allocation account
AWD—Available water determination		The total annual volume of water added to the allocation account as a result of allocation assessments. This figure includes additional AWD made as a result of a storage spill reset, as defined in the water sharing plan.
Licences	New	increase in account water as a result of the issuing of a new licence
	Cancel	decrease in account water as a result of a licence cancellation where account balance has not been traded to another licence
Drought suspension	In	Temporary water restriction applied, reducing account water available for use in reported water year
	Out	Temporary water restriction re-credit increasing account water available for use in reported water year
Assignments	In	increase in account water as a result of temporary trade in
	Out	decrease in account water as a result of temporary trade out
Account usage		volume of water that is extracted or diverted from the river and is accountable against the access licence allocation
Uncontrolled flow usage		volume of non-debit water extracted against general security as per water sharing plan provision in years of reduced allocations
Over-order debit		As a result of water order debiting being applied in a water source, water ordered in excess of usage can be debited against an access licence.
Forfeits	During year	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.
	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
End-of-year balance	Available	account balance that is available to be taken at the conclusion of the water year
	Not Available	Water in accounts that is not available to be taken as a result of annual use limits that are applied to accounts
Carry forward		the account water that is permitted to be carried forward into the next water year, as determined by the carryover rules
()		Negative figures are shown in red brackets.

Table 24: Lower Namoi regulated water source environmental account balance summary

Category	Share 30 June 2020	Opening balance	AWD	Licences		Drought suspension		Assignments		Account usage	Water order debit	During- year forfeit	End-of-year balance		End- of- year forfeit	Carry forward
				New	Cancel	In	Out	In	Out				Available	Not available		
General Security	13,548	552	0	0	0	552	552	0	0	0	0	0	552	0	0	552
High Security	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Supplementary water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 25: Lower Namoi regulated water source environmental holding summary

Category	Volume 30 June 2019	Volume 30 June 2020	Volume Difference	No. Licences 30 June 2019	No. Licences 30 June 2020	No. Licence Difference
General Security	13,548	13,548	0	3	3	0
High Security	0	0	0	1	1	0
Supplementary water	0	0	0	1	1	0

Table 26: Upper Namoi regulated water source environmental account balance summary

Category	Share 30 June 2020	Opening balance	AWD	Licences		Drought suspension		Assignments		Account usage	Water order debit	During year forfeit	End-of-year balance		End- of- year forfeit	Carry forward
				New	Cancel	In	Out	In	Out				Available	Not available		
General Security	105	0	53	0	0	0	0	0	0	0	0	0	53	0	0	53
High Security	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 27: Upper Namoi regulated water source environmental holding summary

Category	Volume 30 June 2019	Volume 30 June 2020	Volume Difference	No. Licences 30 June 2019	No. Licences 30 June 2020	No. Licence Difference
General security	105	105	0	2	2	0
High security	0	0	0	1	1	0

Table 28: Namoi environmental trade

Licence category	Lower Namoi General Security
Upper Namoi General Security	0

Note 7—Environmental provisions

Minimum end-of-system flow target

This refers to the maintenance of a flow rate that leaves the Namoi River in line with the end-of-system environmental flow provision, as specified in the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2016*. The rule states that in the months of June, July and August, a minimum daily flow that is equivalent to 75% of the natural 95th percentile daily flow for each month, shall be maintained in the Namoi River at Walgett (gauging station number 419091). As a volumetric target, this is equivalent to 21, 24 and 17 megalitres per day respectively. The rule is not applicable when the sum of the water stored in Keepit Dam and Split Rock Dam is less than 120,000 megalitres.

Long-term average extraction limit (LTAEL)

By limiting long-term average extractions to an estimated 238,000 megalitres per year, this plan ensures that approximately 73% of the long-term average annual flow in the water source (estimated to be 870,000 megalitres per year) will be preserved and will contribute to the maintenance of basic ecosystem health.

Data type

Derived from measured data

Policy

Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2016

- Part 3—Environmental Water Provisions.
 - Clauses 13, 14—Planned Environmental Water.

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

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

NSW Department of Planning, Industry and Environment—HYDSTRA

Methodology

For the minimum end-of-system flow target: Walgett daily flows are calculated by processing a gauged stream level through a rating table that converts it to a flow rate. These Walgett flows are then compared to the target flows to check for compliance against the water sharing plan rules.

Long-term average extraction limit: The assessment against the LTAEL shall include the sum of all licensed usage (including held environmental), basic rights extractions, net trade out of the water source and water taken under flood plain harvesting rights.

Note 8—Surface water storage

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

Data type

Derived from measured data

Policy

Not applicable

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

NSW Department of Planning, Industry and Environment—HYDSTRA

Methodology

Storage volumes are calculated by processing a gauged storage elevation through a rating table that converts it to a volume. For plots of the daily storage volumes refer to Figure 12 and Figure 13.

Additional information

Table 29: Storage summary

Name	Capacity (ML)	Dead storage (ML)
Split Rock Dam	397,370	3,160
Keepit Dam	425,510	6,550
Gunidgera Weir	1,900	375
Mollee Weir	3,250	50

Note 9—River channel storage

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

Policy

Not applicable

Data type

Derived from measured data

Data accuracy

B—Estimated in the range +/- 25%

Providing agency

NSW Department of Planning, Industry and Environment

Data sources

NSW Department of Planning, Industry and Environment: 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.

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

Table 30: Summary of river channel storage calculation components

Symbol	Variable	Data source	Unit
Q	average flow in the river section, calculated by averaging the daily flows at the upstream and downstream river gauges	HYDSTRA	ML/day
V	volume in each river section	Calculated	ML
T	average travel time for a parcel of water to travel through the river section	CAIRO	days

Assumptions and approximations:

- Travel times are estimated to the nearest day.
- We assume that daily flow change between gauging sites is linear.

Note 10—Storage inflow

Storage inflow refers to the volume of water flowing into the major headwater storages—Split Rock Dam and Keepit Dam.

Policy

Not applicable

Data type

Derived from measured data

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

NSW Department of Planning, Industry and Environment

Data sources

NSW Department of Planning, Industry and Environment: HYDSTRA

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.

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

Table 31: Components for back-calculation of inflow

Symbol	Variable	Unit
I	Inflow	ML/day
ΔS	Change in storage volume	ML
O	Outflow	ML/day
Se	Seepage	ML/day
R	Rainfall	mm/day
E	Evaporation (Mortons shallow lake estimation, SILO)	mm/day
n	Number of days in the year (e.g. 365)	
A	Surface area— derived from height to surface areas lookup curve	ha

For Keepit Dam, inflow is provided by both the Manilla River and inflow from the upper Namoi (unregulated) river. This split was estimated in the GPWAR by subtracting the inflow from the Namoi River upstream of the Manilla River (419005) and the flow from Halls Creek (419029) from the total back-calculated inflow. For daily storage inflows, refer to Figure 10 and Figure 11.

Assumptions and approximations:

- Seepage was assumed to be zero.

Note 11—Storage evaporation and storage rainfall

This refers to the volume of water effective on Spilt Rock and Keepit Dams 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 Planning, Industry and Environment

Data source

NSW Department of Planning, Industry and Environment, HYDSTRA

QLD government, SILO (<https://www.longpaddock.qld.gov.au/silo/>)

Methodology

The volume applied for evaporation and rainfall on these storages is achieved by first calculating a daily time-series of storage surface area using a height-to-area lookup curve as defined in HYDSTRA.

Daily rainfall and evaporation data is then applied to the area time-series to achieve a volume in megalitres which is then aggregated to an annual figure. The rainfall and evaporation data utilised is equivalent to the data used to derive storage inflow (detailed in Note 10) with the same pan factor applied to the evaporation data

Rainfall volume (ML) =

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

Evaporation volume (ML) =

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

Table 32: Components for storage evaporation and rainfall

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

Note 12—River evaporation and river rainfall

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

Data type

Derived from measured data

Policy

Not applicable

Data accuracy

C—Estimated in the range +/- 50%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

NSW Department of Planning, Industry and Environment: HYDSTRA, ARCGIS

Queensland government: SILO (www.longpaddock.qld.gov.au/silo)

Methodology

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

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

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 which is then aggregated to an annual figure.

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

Evaporation: Volume (ML) = ETo (mm) x Kc x Area (m²) x 10⁻⁶

Where ETo = reference evapotranspiration from SILO and Kc = crop factor for open water (1.05)

Note 13—Gauged tributary inflow

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

Policy

Not applicable

Data type

Measured data

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

NSW Department of Planning, Industry and Environment

Data sources

NSW Department of Planning, Industry and Environment: HYDSTRA

Methodology

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

Additional information

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

Table 33: Summary of gauged tributary inflow (Upper Namoi)

Station	Station name	Catchment area (Km2)	Inflow (ML)	Total inflow (ML)
419022	Namoi River at Manilla Railway Bridge	3,160	57,406	N/A
419020	Manilla River at Brabri (Merriwee)		10,618	N/A
Net tributary flow (419022 - 419020)				46,788

Table 34: Summary of gauged tributary inflow (Lower Namoi)

Station	Station name	Catchment area (Km2)	Inflow (ML)	Total inflow (ML)
419006	Peel River at Carroll Gap	4,670	59,656	N/A
419084	Mooki River at Ruvigne	0	11,120	N/A
419032	Coxs Creek at Boggabri	4,040	27,580	N/A
419083	Brigalow Creek at Tharlane	333	4,473	N/A
419051	Maules Creek at Avoca East	739	10,013	N/A
Net tributary flow				112,842

Figure 44: Upper Namoi gauged tributary inflows

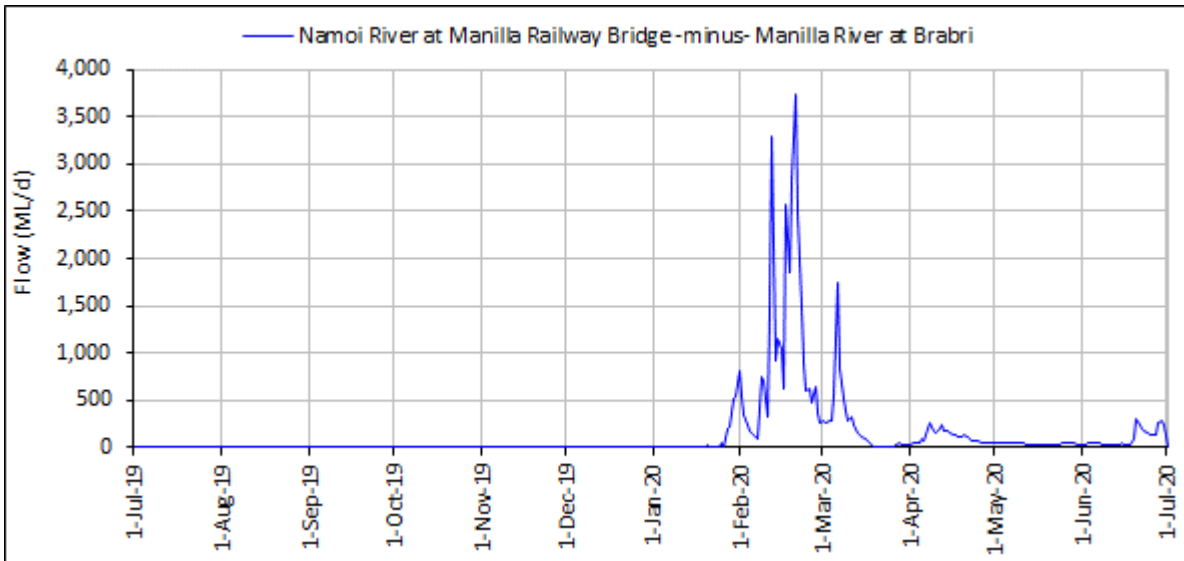
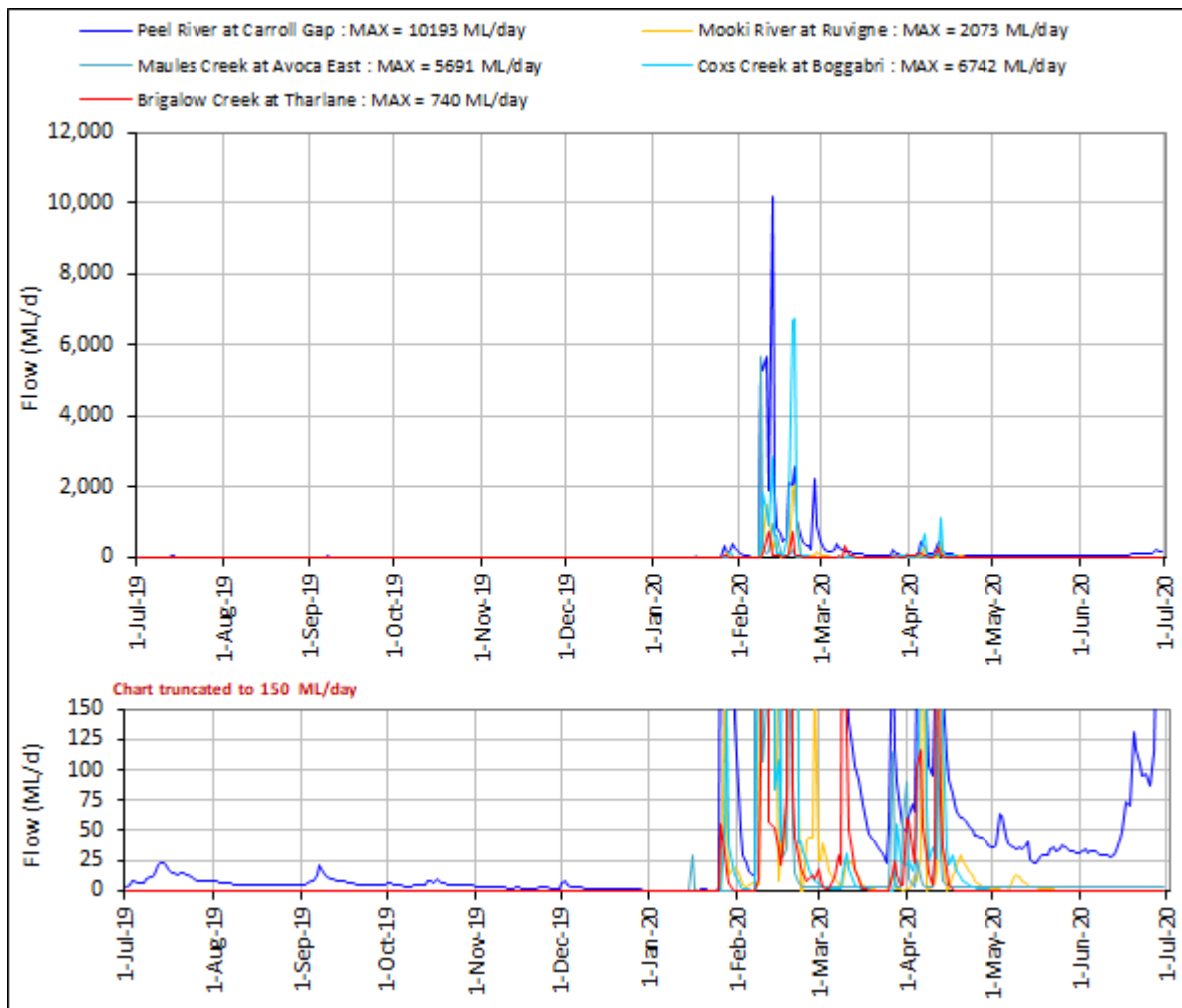


Figure 45: Lower Namoi gauged tributary inflows



Note 14—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 Planning, Industry and Environment

Data sources

CAIRO, jointly owned by the NSW Department of Planning, Industry and Environment and WaterNSW

Methodology

To derive an estimate, a simple mass balance approach was adopted whereby known inflows and outflows were combined with an assumed loss factor. No estimate was made for the areas below the Goangra gauge in the Namoi River and Waminda gauge in Pian Creek. Upper Namoi estimates were based on inflows between Split Rock Dam and Keepit Dam.

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

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

SR_k = Storage release

GI = Gauged inflows

E = Extractions (excluding any that are below the nominated 'EoS')

LE = Estimated losses. For 2019-20 this was assumed to be 20% of the measured water (gauged flow plus storage releases) entering the system for the Upper Namoi, 5% from Keepit Dam to Mollee Weir and 20% downstream of Mollee Weir.

Table 35: Summary of ungauged inflow estimate

Catchment	Total volume estimated (ML)
Upper Namoi	22,000
Lower Namoi	27,000

Note 15—Dam releases, river inflow from dam releases

This is the volume of water released from Split Rock and Keepit storages. In the accounting process, this release is represented as both a decrease in asset (of the dam) and an equal increase in asset (of the river).

Policy

Not applicable

Data type

Measured data

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

NSW Department of Planning, Industry and Environment

Data sources

NSW Department of Planning, Industry and Environment: HYDSTRA

Methodology

The flows are obtained by measuring river heights at a gauging station downstream of the dam wall, and then passing these heights through a rating table that converts them to a daily flow volume. The releases have been represented in the Statement of Changes in Water Assets and Water Liabilities as both a decrease in water asset (water leaving the dam) and an equal volume of increase in water asset (water released increasing the volume of the river). It would also have been possible to account this as a transfer in asset whereby the volumes would not appear in the statements.

Additional information

Dam releases from Split Rock and Keepit dams are shown in Figure 46 and Figure 47, respectively.

Figure 46: Split Rock Dam storages releases 2019–20

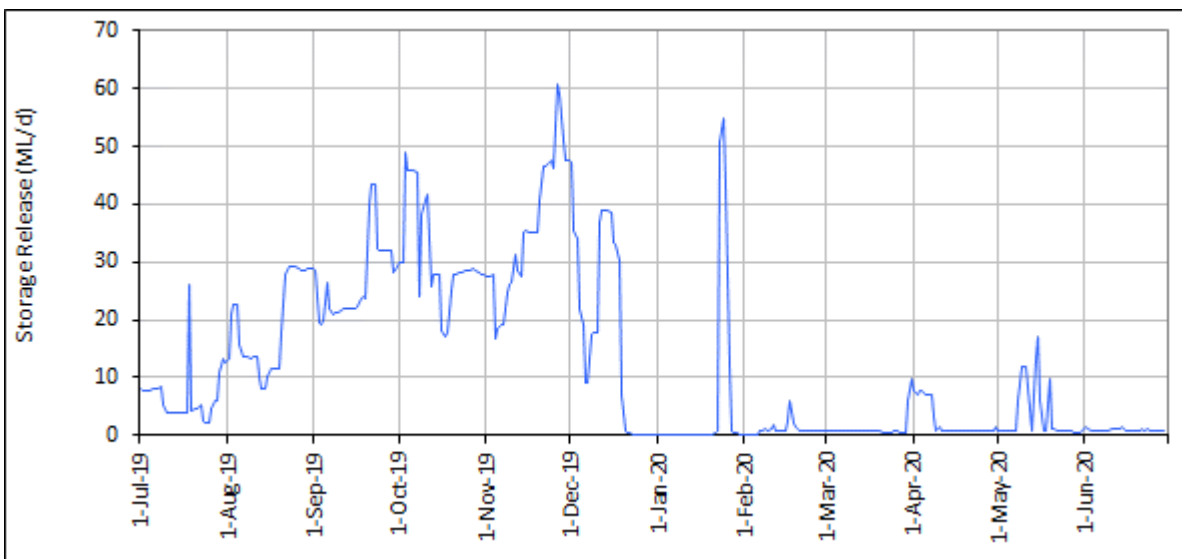
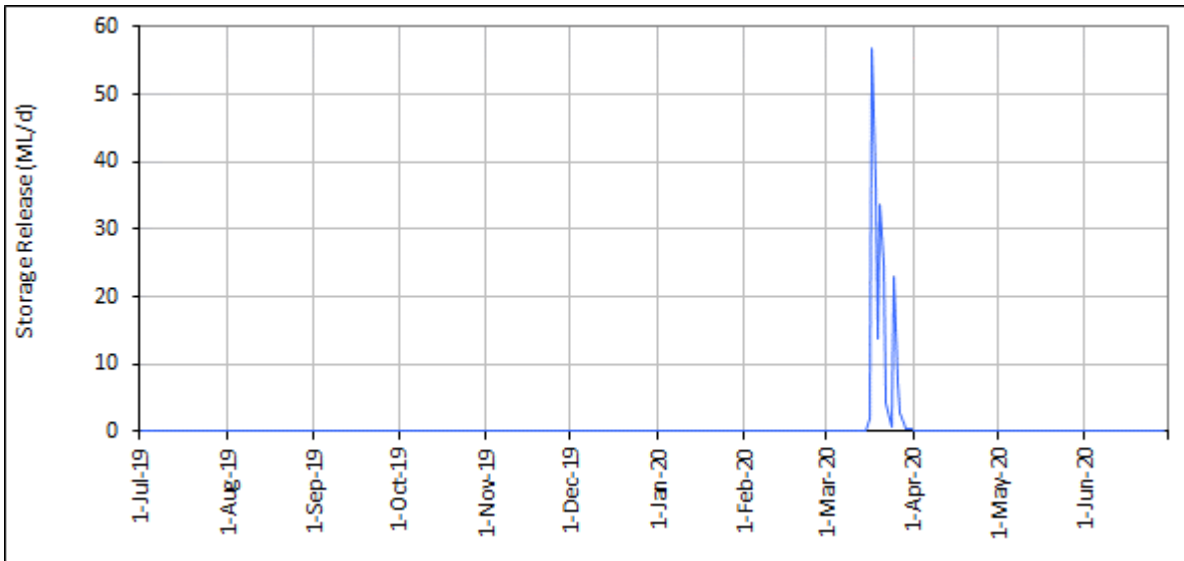


Figure 47: Keepit Dam storage releases 2019–20



Note 16—End of system flows

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

An end-of-system environmental flow provision for the Namoi is specified in the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2016*. Details on this provision are specified in Note 7 of this GPWAR.

Data type

Derived from measured data

Policy

Not applicable

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

NSW Department of Planning, Industry and Environment—HYDSTRA

Methodology

This is the summation of flows at gauging site/s measuring the volume of water that leaves the entity at end of system locations.

While it appears that the most logical site to record the end-of-system flow for the Namoi is at Walgett (419091), it is not appropriate as it is a backwater affected in times of flooding in the Barwon River.

Therefore, for the Namoi reporting entity, the end of system has been considered to be the summation of the flow passing the Namoi River at Goangra (419026) and Pian Creek at Waminda (419079).

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

Additional information

The flow leaving the Namoi system through Waminda and Goangra gauging stations are presented in Table 36, Figure 48 and Figure 49.

Table 36: End-of-system gauging site flows

Station	Location	Total flow (ML)
419026	Namoi River at Goangra	91,834
419049	Pian Creek at Waminda	4,056
Total		95,890

Figure 48: Pian Creek at Waminda flow

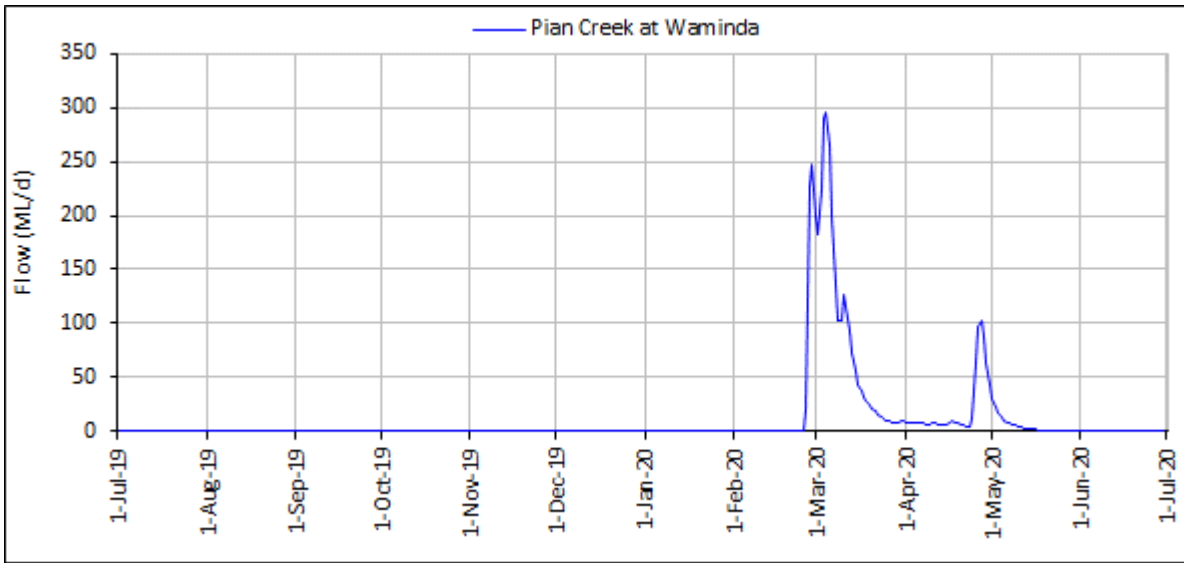
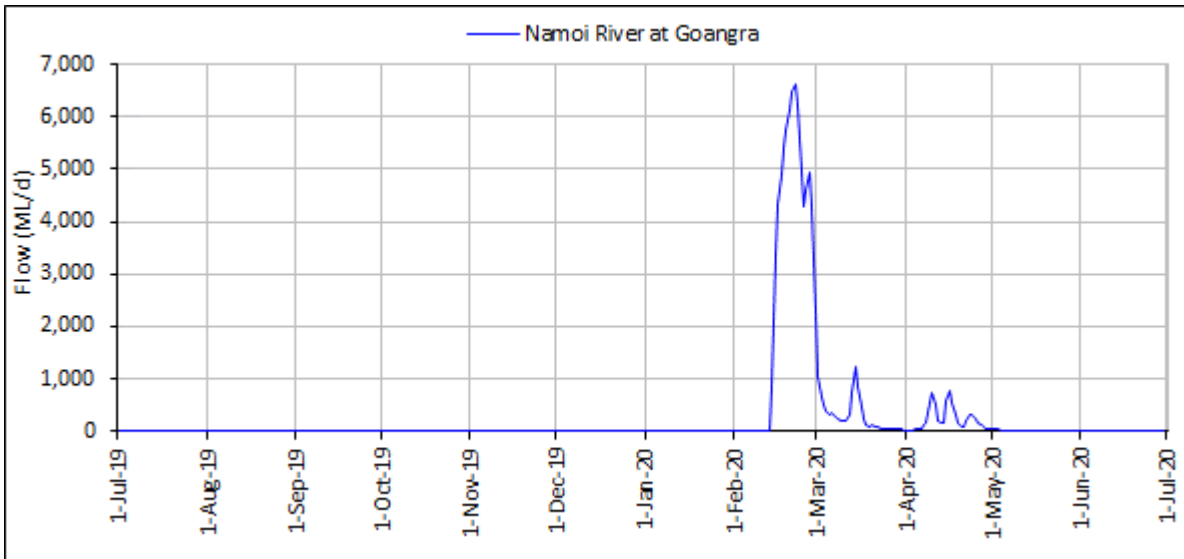


Figure 49: Namoi River at Goangra flow



Note 17—Extractions from river

This is the actual volume of water directly pumped or diverted from the regulated river by licence holders. Occasionally, (generally in the case of environmental water) volumes are ordered against a licence account for in-stream benefits or to pass through end-of-system target points. As such, the volume reported to be physically extracted from the accounted river extent will not always be equal to the amount of water debited against accounts for usage, which has been described in Note 3. The volume stated for extractions from river excludes basic rights extractions, which is reported as a separate line item and detailed in Note 18.

Data type

Measured data

Policy

Not applicable

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

Water Accounting System jointly owned by NSW Department of Planning, Industry and Environment and WaterNSW

Methodology

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

Additional information

For the reporting period, no licenced account water was identified as being used within the system or ordered to be passed through the system (that is, we assume that all account usage was extracted/diverted from the accounted extent of the regulated river).

Table 37: Reconciliation of physical extraction to account usage (ML)

Item	Lower Namoi	Upper Namoi
Licensed extractions from River ²³	11,007	1,781
plus Licensed flow leaving System ²⁴	0	0
plus In stream licenced usage ²⁵	0	0
equals Total account usage ²⁶	11,007	1,781

²³ Direct licenced extractions from the river excluding basic rights usage estimate

²⁴ Licenced water ordered to leave the accounted Namoi extent for environmental benefits

²⁵ Water ordered and used within the accounted system for environmental benefit (not extracted from the river)

Note 18—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 Upper Namoi and Lower Namoi Regulated Rivers Water Sources 2016

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

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

Data accuracy

C—Estimated in the range +/- 50%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

Water Sharing Plan for the Upper and Lower Namoi Regulated River Water Sources 2016

Methodology

The estimation of domestic and stock rights uses a series of approximations 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 Upper and Lower Namoi Regulated River Water Source 2016*, which is 160 megalitres per year for the Upper Namoi and 1,776 megalitres per year for the Lower Namoi.

²⁶ The total amount of water accounted for usage against the allocation accounts

Note 19—Replenishment flows

This refers to the water that must be set aside in Split Rock and/or Keepit Dam as part of the essential requirements for the provision of flows to Pian Creek. The water is to supply water for households, town use and stock. For accounting purposes, it is wholly within the system, so it does not appear as a separate entry in water accounting statements.

The requirement is that up to two replenishment flows, producing a visible flow for five or more consecutive days at Waminda gauge, are to be provided annually with total flows that must not exceed 14,000 megalitres in a single water year at Pian Creek downstream of Dundee. The two replenishments are generally delivered from unregulated flows in the system but can be supplemented from Keepit Dam releases if necessary.

Data type

Calculated from measured data

Policy

Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2016

- Part 12 System operation rules
 - Clause 59 Replenishment flows

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

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

NSW Department of Planning, Industry and Environment—Water NSW Compliance Report (Internal document)

Methodology

Up to two replenishment flow events are to be provided annually from a combination of unregulated flows and Keepit Dam releases and diverted down Gunidgera/Pian Creek system, with Pian Creek at Waminda gauging station used for compliance.

Additional Information

With extreme dry conditions in the first part of 2019-20, the first Pian Creek replenishment flows could not be delivered. The second replenishment flow was conducted with the February 2020 tributary inflows. Flows arrived at Waminda gauge on 26 February 2020 and persisted at low levels until late May 2020.

Note 20—Supplementary extractions

This is the volume of water extracted or diverted under supplementary access licences during announced periods of supplementary water. Supplementary flow events are announced periodically during the season when high flow events occur. The period of extraction and the volume of water to be extracted is determined based on the rules as set out in the water sharing plans.

Supplementary access licences differ from other categories of access licence in that the volume of water in the account refers to an annual upper limit for extractions and its provision is totally reliant on the occurrence of high flow events.

Data type

Measured data

Policy

Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated Rivers Water Sources 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 48 Taking of water under supplementary water access licences in the Lower Namoi Regulated River Water Source

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

Data accuracy

A—Estimated in the range +/- 10%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

Water Accounting System jointly owned by NSW Department of Planning, Industry and Environment and WaterNSW

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, we need more information to separate out supplementary extraction. Licence holders notify us of their intention before pumping or diverting water during the declared supplementary event and provide meter readings both at the start and end of pumping.

This allows the supplementary flow extraction to be assessed independently of other categories of access licences.

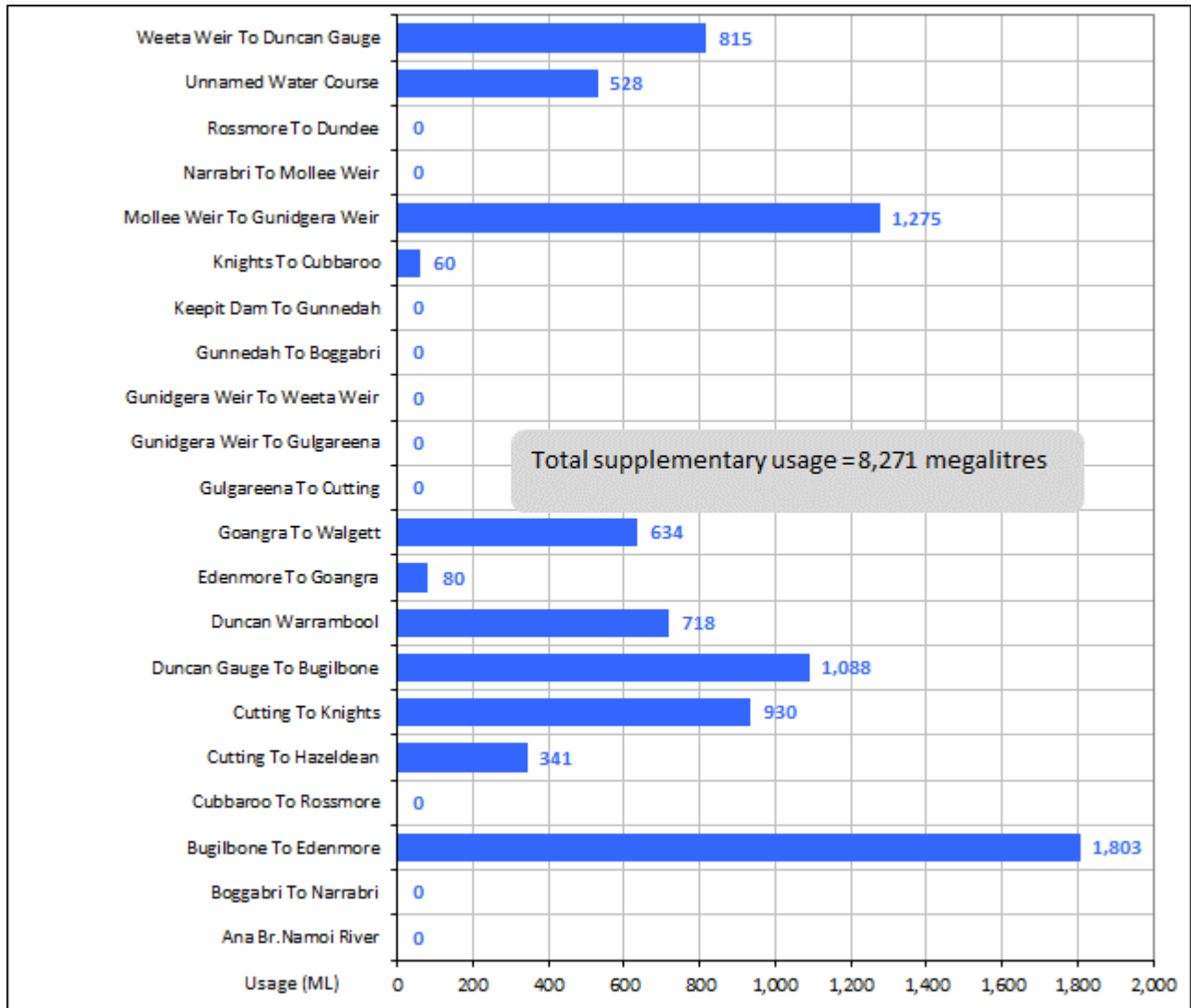
Additional information

Four supplementary access events were announced with a total volume of 8,271 megalitres extracted. The first was subject to a section 324 order limiting the volume of water able to be accessed. Supplementary operational announcements are presented in Table 38. The supplementary usage by section is shown in Figure 50.

Table 38: Supplementary event announcements

Announce date	% use limit	Section	Star date	End date	Supp. usage	UCF usage
25-Feb-20	100	Ana Br.Namoi River	25-Feb-20	27-Feb-20	0	0
25-Feb-20	100	Duncan Warrambool	25-Feb-20	27-Feb-20	0	0
25-Feb-20	100	Gunidgera Weir to Gulgareena	25-Feb-20	27-Feb-20	0	0
25-Feb-20	100	Gulgareena to Cutting	25-Feb-20	27-Feb-20	0	0
25-Feb-20	100	Cutting to Hazeldean	25-Feb-20	27-Feb-20	60	0
25-Feb-20	100	Cutting to Knights	25-Feb-20	27-Feb-20	120	0
25-Feb-20	100	Knights to Cubbaroo	25-Feb-20	27-Feb-20	60	0
25-Feb-20	100	Cubbaroo to Rossmore	25-Feb-20	27-Feb-20	0	0
25-Feb-20	100	Rossmore to Dundee	25-Feb-20	27-Feb-20	0	0
25-Feb-20	100	Unnamed Water Course	25-Feb-20	27-Feb-20	527.5	0
25-Feb-20	100	Narrabri to Mollee Weir	25-Feb-20	27-Feb-20	0	0
25-Feb-20	100	Keepit Dam to Gunnedah	25-Feb-20	27-Feb-20	0	0
25-Feb-20	100	Gunnedah to Boggabri	25-Feb-20	27-Feb-20	0	0
25-Feb-20	100	Boggabri to Narrabri	25-Feb-20	27-Feb-20	0	0
25-Feb-20	100	Mollee Weir to Gunidgera Weir	25-Feb-20	27-Feb-20	59.6	0
25-Feb-20	100	Gunidgera Weir to Weeta Weir	25-Feb-20	27-Feb-20	0	0
25-Feb-20	100	Weeta Weir to Duncan Gauge	25-Feb-20	27-Feb-20	240	0
25-Feb-20	100	Duncan Gauge to Bugilbone	25-Feb-20	27-Feb-20	513	0
25-Feb-20	100	Bugilbone to Edenmore	25-Feb-20	27-Feb-20	600	0
25-Feb-20	100	Edenmore to Goangra	25-Feb-20	27-Feb-20	80	0
25-Feb-20	100	Goangra to Walgett	25-Feb-20	27-Feb-20	192	0
11-Mar-20	100	Duncan Warrambool	11-Mar-20	16-Mar-20	309.1	0
11-Mar-20	100	Weeta Weir to Duncan Gauge	11-Mar-20	16-Mar-20	280	0
11-Mar-20	100	Duncan Gauge to Bugilbone	11-Mar-20	16-Mar-20	167.7	0
11-Mar-20	100	Bugilbone to Edenmore	11-Mar-20	16-Mar-20	500.7	0
11-Mar-20	100	Edenmore to Goangra	11-Mar-20	16-Mar-20	0	0
11-Mar-20	100	Goangra to Walgett	11-Mar-20	16-Mar-20	130	0
6-Apr-20	100	Ana Br.Namoi River	7-Apr-20	20-Apr-20	0	0
6-Apr-20	100	Duncan Warrambool	7-Apr-20	20-Apr-20	408.4	0
6-Apr-20	100	Gunidgera Weir to Gulgareena	7-Apr-20	20-Apr-20	0	0
6-Apr-20	100	Gulgareena to Cutting	7-Apr-20	20-Apr-20	0	0
6-Apr-20	100	Cutting to Hazeldean	7-Apr-20	20-Apr-20	281	0
6-Apr-20	100	Cutting to Knights	7-Apr-20	20-Apr-20	810.3	0
6-Apr-20	100	Knights to Cubbaroo	7-Apr-20	20-Apr-20	0	0
6-Apr-20	100	Cubbaroo to Rossmore	7-Apr-20	20-Apr-20	0	0
6-Apr-20	100	Rossmore to Dundee	7-Apr-20	20-Apr-20	0	0
6-Apr-20	100	Unnamed Water Course	7-Apr-20	20-Apr-20	0	0
6-Apr-20	100	Narrabri To Mollee Weir	7-Apr-20	20-Apr-20	0	0
6-Apr-20	100	Mollee Weir to Gunidgera Weir	7-Apr-20	20-Apr-20	1214.9	0
6-Apr-20	100	Weeta Weir to Duncan Gauge	7-Apr-20	20-Apr-20	295	0
6-Apr-20	100	Duncan Gauge to Bugilbone	7-Apr-20	20-Apr-20	406.8	0
6-Apr-20	100	Bugilbone to Edenmore	7-Apr-20	20-Apr-20	702.6	0
6-Apr-20	100	Edenmore to Goangra	7-Apr-20	20-Apr-20	0	0
6-Apr-20	100	Goangra to Walgett	7-Apr-20	20-Apr-20	312	0

Figure 50: Lower Namoi supplementary usage by river section



Note 21—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).

A detailed water budget for the groundwater aquifers associated with these estimates is in the groundwater appendix of this document.

Data type

Modelled

Policy

Not applicable

Data accuracy

D—Estimated in the range +/- 100%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

NSW Department of Planning, Industry and Environment MODFLOW (Data inputs from HYDSTRA, GDS)

Methodology

For the Upper and Lower Namoi groundwater sources, the annual budget has been estimated using the NSW Department of Planning, Industry and Environment MODFLOW models for the upper and lower Namoi Groundwater Management Area. (For a more detailed explanation of the Method, see 'Method A' in the document NSW General Purpose Water Accounting Reports - Groundwater Methodologies, available for download from the NSW Department of Planning, Industry and Environment website.)

Additional information

River and aquifer interactions were not quantified in this flow balance for the 2019–20 GPWAR.

Note 22—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 improves 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 required to obtain the correct volume in river at the end of the reporting period, after all the known physical inflows and outflows have been accounted 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 9.

Surface Water Unaccounted difference

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

Where:

UVSW = Unaccounted difference for Surface Water

R_s = Opening river volume estimate

R_c = Closing river volume estimate

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

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

Note 23—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 been since 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 Planning, Industry and Environment

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.

Additional information

An adjusting entry of 271 was required for General Security at the start of the reporting year.

Note 24—Uncontrolled flow usage (Upper Namoi)

This refers to a specific volume of non-debit water. This is uncontrolled flow, as defined in the water sharing plan. It is water pumped or diverted from the river for consumptive use by general security licence holders during announced periods of unregulated inflows to the water source. However, the volume pumped during these unregulated inflow events is limited. This is based on the rules defined in the water sharing plan where volumes pumped that exceed the limit are debited against the licence holder's general security account.

Data type

Measured data

Policy

Water Sharing Plan for the Upper and Lower Namoi Regulated River Water Sources 2016

- Part 8 Limits to the availability of water
 - Division 2—Available water determinations
 - Clause 37 Available water determinations for regulated river (general security licences)

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

Data accuracy

A1—Nil inaccuracy +/- 0%

Providing agency

NSW Department of Planning, Industry and Environment

Data source

Water Accounting System jointly owned by NSW Department of Planning, Industry and Environment and WaterNSW

Methodology

- When available water determinations for general security access licences in the Upper Namoi are less than or equal to 0.60 megalitres per unit share, access to uncontrolled flow may occur during periods of announced uncontrolled flow events
- The maximum volume of uncontrolled flow licence holders are allowed to take is the lesser of:
 - 1 megalitre per share, minus the total allocation announcements within a water year (as an equivalent percentage per share)
 - 0.5 megalitres per share.
- If the above limits are exceeded with uncontrolled take volumes throughout the water year, the exceedances will then be debited against the general security access licence account.
- Uncontrolled flow usage is measured in the same way as general security extractions but is tagged as uncontrolled flow in the accounting system. As uncontrolled flow is extracted through the same pumps as those extracting water under other categories of access licences, we need more information to identify periods and, therefore, volumes of uncontrolled flow extractions. This is achieved by holders notifying us of their intent before pumping or diverting water during a declared uncontrolled flow event and providing meter readings both at the start and end of pumping. This allows us to assess the uncontrolled flow extraction independently of the other categories of access licences.

References

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