2023 Water Security Program Annual Report

MARCH 2024

seqwater
WATER FOR LIFE

Seqwater acknowledges the Traditional Custodians of the land, catchments and waterways on which we live, work and play.

We pay our respects to Elders past, present and emerging; and acknowledge their continued connection to the land, water and culture of South East Queensland.

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Introduction

Seqwater is responsible for long-term planning, including drought response, for a reliable and sustainable water supply in South East Queensland (SEQ). This planning is outlined in the 30-year Water Security Program, "South East Queensland Water Security Program 2023" that was released in October 2023. This report can be found at: https://www.seqwater.com.au/water-security

Seqwater is required to prepare and report on water security for SEQ annually. This 2023 annual report assesses changes in water security compared to the 2023 Water Security Program.

Highlights

The highlights for 2023 include:

- continued supply of a safe, reliable and high-quality bulk water supply.
- After the region experienced a 16% decline in water grid storage levels over the year and entered the Pre-Drought (drought readiness) phase, in late December 2023 and early January 2024 widespread rainfall increased water grid storage levels to above 70%, enabling Seqwater to exit drought readiness. In accordance with the drought response plan, the Gold Coast Desalination Plant (GCDP) was operated at up to full capacity through November and December.
- the "We think of every drop" education campaign, which focused on promoting water security challenges and strategies within South East Queensland, ran through November and December.
- collaboration with the Department of Regional Development, Manufacturing and Water (DRDMW) and our SEQ Retailer Customers (City of Gold Coast, Logan Water, Redland City Council, Unitywater and Urban Utilities) on drought preparedness activities.
- continued investigative activities for the use of Western Corridor Recycled Water Scheme for non-potable industry uses.
- supply of up to 5,308 ML of purified recycled water to industrial customers, offsetting water demand from Wivenhoe Dam.
- progress on more detailed planning for regional long-term and drought contingency supply options, including the Wyaralong Water Treatment Plant (WTP) and expansion of the GCDP.
- release of the Water Security Program 2023.

Water supply security situation

Seqwater has prepared for drought this year by:

- engaging with the SEQ Retailer Customers to further develop our shared understanding of drought response needs.
- developing and releasing media campaigns to educate the community on water security challenges and the drought response plan.
- adaptively managing the Water Grid to balance water security and cost efficiency drivers.
- developing drought contingency water supply options and progressing planning.

Seqwater regularly monitors and responds to the water security situation in SEQ. When the Water Grid Storage Levels fall below 70%, Seqwater releases a monthly Water Security Status Report. The latest report outlines the water security situation as at January 2024: https://www.seqwater.com.au/sites/default/files/2024-02/Water%20Security%20Status%20Report%20January%202024.pdf

Water Grid

Seqwater has continued to progress drought preparedness throughout 2023, including further collaboration with the SEQ Retailer Customers (https://www.seqwater.com.au/waterforlife).

Widespread rainfall at the end of 2023 and the first week of 2024 saw many of the water grid storages fill. The water grid storage level is 79.5% as at 12 March 2024.

The full supply level of the SEQ Water Grid is currently approximately 88% while Seqwater undertakes its Dam Improvement Program. The program will deliver infrastructure upgrades at a number of Seqwater dams and ensure ongoing safety and security of bulk water supply well into the future.

The Lake Macdonald Dam Improvement Project will commence construction in mid-2024. Minor lowering of the Lake Macdonald water storage is required to accommodate construction. Seqwater has worked to minimise this impact, with a temporary water level that will be reduced by approximately two metres from the full supply level for around five years. This water level is higher than the previously proposed design and will provide water security reliability for the Noosa community and maintain access to the lake and local ambience during the construction period.

A detailed business case is currently being prepared for Somerset Dam. Early planning is underway for Wivenhoe Dam however as Somerset and Wivenhoe Dams operate as one system, the outcomes of the Somerset Dam Improvement Project planning will inform final considerations for Wivenhoe Dam. Planning work is also underway to confirm the preferred upgrade options for North Pine Dam.

While the program is underway, Wivenhoe, Somerset and North Pine Dams are operating at a reduced full supply level. This is an industry-accepted practice to manage dam safety.

The temporary changes mean Wivenhoe Dam storage will be maintained at 90% full supply level, Somerset Dam at 80% full supply level and North Pine at 68% full supply level, until upgrades are completed.

The temporary full supply levels mean the SEQ Water Grid at full supply is approximately 88%.

Seqwater continues to closely monitor supplies and will implement the adaptive drought response plan, as detailed in the Water Security Program, as required. Seqwater will collaborate with the SEQ Retailer Customers, Government and other key stakeholders to effectively manage drought.

Off-Grid communities

Seqwater supplies drinking water to 53,000 people living in 16 locations not connected to the SEQ Water Grid, known as off-grid communities. The water for these communities is sourced and treated locally, then distributed to households and businesses.

Drought response plans were enacted in three off-grid communities in 2023: Canungra, Dayboro and Kenilworth.

Canungra reached its pre-drought trigger in mid-July 2023, and its Drought Readiness trigger at the end of August 2023. Seqwater worked closely with Urban Utilities in preparation for restrictions and tankering however following heavy rainfall in late December 2023, Canungra exited all drought triggers on 2 January 2024.

Dayboro reached its Drought Readiness trigger twice in 2023. After triggering Drought Readiness the second time (May 2023), supply continued to decline and Drought Response (Trigger 2) was reached in October 2023. During this period of drought response, the Unitywater tanker filling station in Dayboro was closed to manage demands and preparation was undertaken to commence drought tankering activity. On 2 January 2024, following heavy rainfall in the preceding weeks, Dayboro exited all drought triggers. The Unitywater tanker filling station was re-opened on 8 January 2024.

Kenilworth triggered Drought Readiness (Trigger 1) at the end of October 2023. Following sufficient rainfall in the region in the following month, Kenilworth exited all drought response triggers on 28 November 2023.

Long term water security assessments for these communities are undertaken as part of the Water Security Program 2023.

Seqwater has considered the future demand forecast for Canungra and Dayboro with our Retailer Customers, Urban Utilities and Unitywater, and determined the level of sustainable supply, which indicates additional investment will be required.

Seqwater is currently working on the strategic water supply options and timing for that investment.

Changes to Water Security Program planning assumptions

There were no changes to the key planning assumptions that underpin the Water Security Program this year, noting the Water Security Program 2023 was released in October 2023.

Demand

Demand data in this report is for the 2022/23 financial year. Reporting based on financial year is consistent with all other demand related reporting, enabling ease of comparison.

SEQ Retailer Customers

Water demand is influenced by many factors including weather conditions, population growth, consumption behaviour and system shocks. SEQ Retailer Customer observed water demand (urban demand) for 2022/23 increased by 4.9% compared to the 2021/22 demands. This increase indicates a return to pre-COVID growth patterns.

Figure 1 shows a historical annual water consumption growth trend of around 3% per annum since 2010/11 (excluding 2020/21 to 2022/23). In 2022/23 water consumption grew by 4.9% and according to the published Queensland Government Statistician's Office (QGSO) 2023 Edition Medium Series Population, population was forecast to increase by around 2.1%. This resulted in a total per capita increase in consumption of 4.1% (Table 1).

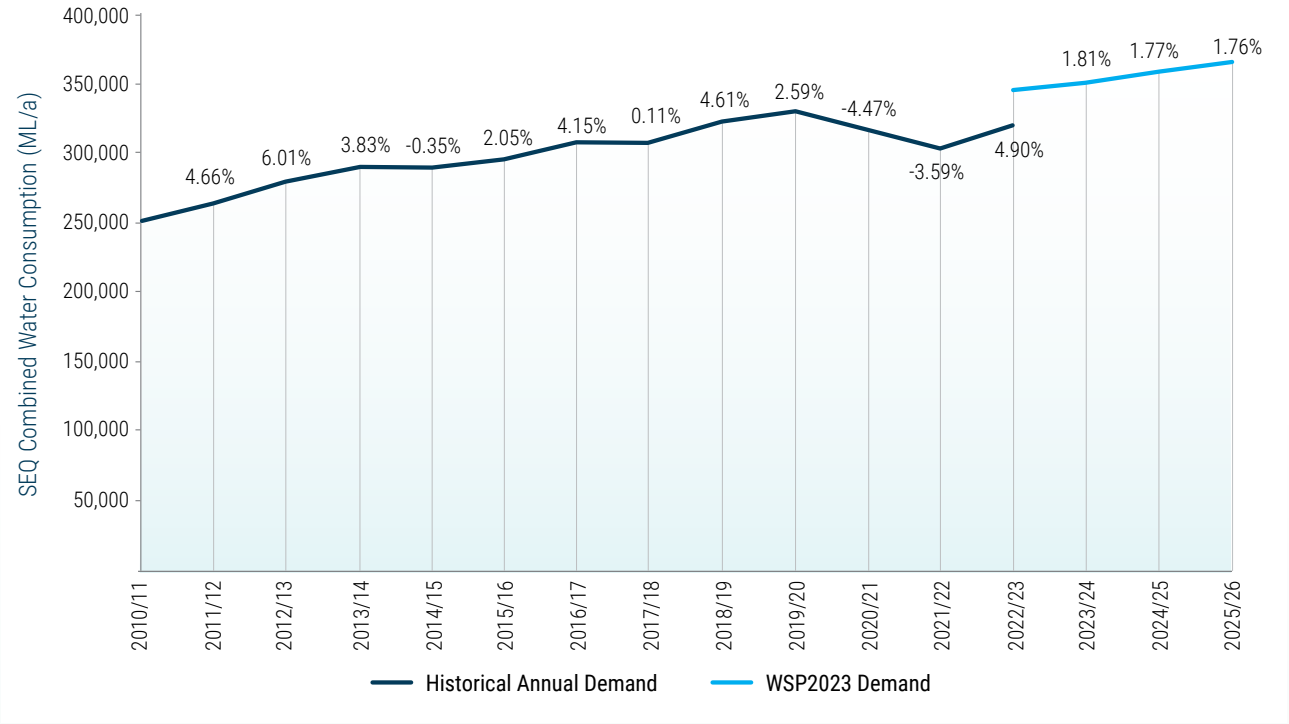

Figure 1: SEQ historical water demand and Water Security Program 2023 Planning Demand (WSP2023 Demand)

Table 1. 2021/22 and 2022/23 Water supplied to SEQ Retailer Customers (ML/a) & (L/p/d)

Region	2021/22	2022/23	% change
SEQ Water Supplied (ML/a)	304,619	319,552	4.9%
Total water consumption (residential and non-residential) (L/p/d)	233	242	4.1%

Table 2 over page illustrates consumption (megalitres per annum (ML/a)) has increased across almost all Local Government Areas (LGA), in particular Ipswich, Noosa and Scenic Rim. Table 3 illustrates the same demand data in litres per person per day (L/p/d).

The residential sector is responsible for the majority of the annual consumption increase in Ipswich (66%), in Noosa (77%) and in Scenic Rim (112%). Although residential consumption increased in these three LGAs, the non-residential sector consumption in Scenic Rim decreased in 2022/23 compared to 2021/22.

Table 2. 2021/22 and 2022/23 Water supplied to SEQ Retailer Customers by LGA (ML/a)

Region	Demand Supplied (ML/a)		% change
	2021/22	2022/23	
Brisbane	123,727	124,080	0.29%
Gold Coast	59,985	63,601	6.03%
Ipswich	15,529	19,992	28.74%
Lockyer Valley	2,263	2,453	8.42%
Logan	23,092	24,762	7.23%
Moreton Bay	31,147	33,228	6.68%
Noosa	5,595	6,065	8.39%
Redlands	13,269	14,069	6.04%
Scenic Rim	1,667	1,920	15.22%
Somerset	2,230	2,315	3.85%
Sunshine Coast	26,117	27,064	3.63%

Table 3. 2021/22 and 2022/23 Water supplied to SEQ Retailer Customers by LGA (L/p/d)

Region	Demand Supplied (L/p/d)		% change
	2021/22	2022/23	
Brisbane	265	263	-0.93%
Gold Coast	254	269	6.04%
Ipswich	168	227	35.35%
Lockyer Valley	208	233	11.82%
Logan	189	196	4.12%
Moreton Bay	181	187	2.96%
Noosa	333	353	6.30%
Redlands	229	240	4.70%
Scenic Rim	222	258	15.82%
Somerset	408	466	14.15%
Sunshine Coast	224	228	1.95%

In the current financial year (2023/24), the year-to-date demand as of end of January 2024 is 7.6% higher than over the same period in 2022/23. This suggests the 2023/24 demand growth will likely be greater than the average historical growth trend of 2.5%. This return to strong demand growth indicates the system shock experienced in 2020/21 and 2021/22 has ended and demand growth is returning to pre-covid levels.

Neighbouring Communities

Under the bulk water supply agreement with Toowoomba Regional Council up to 10,000 ML/a can be transferred from Wivenhoe Dam to Cressbrook Dam to supplement drinking water supplies in the Toowoomba region. Table 4 shows that Toowoomba Regional Council did not access this volume in 2022/23.

Table 4. 2021/22 and 2022/23 Water supplied to Toowoomba (Wivenhoe to Cressbrook transfer) (ML/a)

Customer	2021/22	2022/23	% change
Toowoomba Regional Council (ML/a)	6,868	0	-100%

Power Stations

Under bulk water supply agreements Tarong and Swanbank power stations could take up to a combined total of 29,500 ML/a in 2022/23. Table 5 below shows the volume of water supplied (combined total of raw and purified recycled water) to power stations in 2022/23 compared with 2021/22.

Table 5. 2021/22 and 2022/23 Observed Power Station Demands (ML/a)

Customer	2021/2022	2022/23	% change
Power stations (ML/a)	8,533	5,536	-35.1%

Assessment of the projected regional average demand

A review of the demand forecast was completed in early 2024. The outcomes of this review were:

- The existing demand profile used for planning functions (WSP 2023 Planning Demand) has performed within an acceptable range. Observed annual demand for 2022/23 was 8.1% below forecast, within the established 10% target threshold.
- COVID-19 pandemic system shock resulted in a reduction in observed annual water demand growth in SEQ (as shown in Figure 2 below). Prior to the pandemic, the growth was at 2.5% per annum. However, from the 2019/20 to 2021/22 financial years, demand growth decreased to -4.0% per annum, an annual reduction instead of increase.
- Figure 2 shows a return to positive demand growth (4.9%) in 2022/23. If this rate of growth continues, the demand would reach the WSP 2023 Planning Demand by the 2025/26 financial year. This annual growth rate is higher than the historical trend prior to COVID-19, though observed demand volume remains below the demand forecast. Monitoring of observed demand trends and performance against forecast will continue. Where a sustained material change in growth trends is observed, a review will be undertaken to determine impacts to water security planning and if necessary, an update to the WSP Planning Demand (and therefore the Water Security Program) will be made.
- It has been determined that no modifications are required to the projected water demand for water security planning purposes, given:
  - » the acceptable performance of the existing demand forecast,
  - » the anticipated water demand recovery commenced in 2022/23 and possible return to projected levels by 2025/26, and
  - » the uncertainty in how demand growth will recover from COVID-19 system shock.

Seqwater continues to work with the SEQ Retailer Customers to understand longer-term demands.

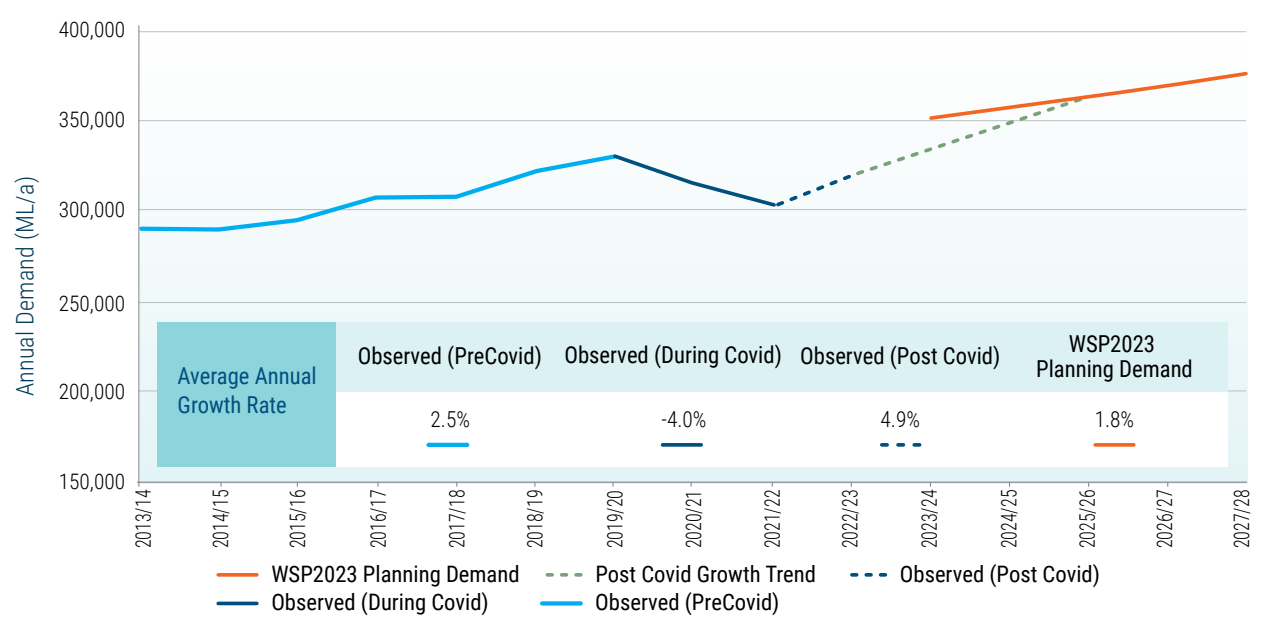

Figure 2: Observed Demand and WSP2023 Planning Demand Growth Trends

Off-grid community demand projection assessment

In most Off-Grid communities, the observed demands for the 2022/23 financial year were higher than in the 2021/22 financial year.

Weather conditions in 2022/23 were hot and dry, with ten off-grid communities recording above forecast consumption. Seven off-grid communities recorded consumption over 10% higher than forecast. The three communities which had drought response plans activated in 2023 (Canungra, Dayboro and Kenilworth) experienced consumption 20-25% higher than forecast. This was likely driven by increased off-network customer demand as well as a response to drier conditions by the connected community.

Given the impact of drought conditions to demand in 2022/23, and the observed demand increase across the SEQ region with the recovery from COVID-19 system shock, existing demand projections remain current for these communities. Ongoing monitoring will be carried out to understand the persistence of the increased demand growth, along with collaboration with Retailer Customers to incorporate these learnings into the demand forecasts.

Water Supply

Seqwater has provided water as follows in 2022/23:

Table 6. Water supplied 2022/23 (ML/a)

Sector	Total volume for 2022/23 (ML/a)
SEQ Region – total production of treated water to supply SEQ Retailer Customers	319,552
Subregions – total treated water supplied to each sub-region	
Northern (Moreton Bay, Sunshine Coast and Noosa council areas)	66,357
Central (Brisbane, Ipswich, Lockyer Valley, Scenic Rim and Somerset Council areas)	150,761
Southern (Gold Coast and Logan council areas)	88,363
Eastern (Redland City Council area)	14,069
Bulk water grid storages – Raw water extracted for water treatment (excludes environmental, flood releases and water for irrigators)	
Wivenhoe Dam and Brisbane River downstream of Wivenhoe (exclusive of pipelines)	165,701
Somerset Dam	1,497
North Pine Dam	38,784
Hinze Dam	57,901
Baroon Pocket Dam	29,375
Leslie Harrison Dam	3,403
Ewen Maddock Dam	3,631
Cooloolabin Dam and Wappa Dam	5,584

Sector	Total volume for 2022/23 (ML/a)
Sideling Creek Dam (Lake Kurwongbah)	0
Lake Macdonald	2,792
Little Nerang Dam	11,377
Climate-resilient water sources	
Gold Coast Desalination Plant Production	7,240
Western Corridor Recycled Water Scheme Production (PRW sent to power stations)	5,308
Other water sources	
North Stradbroke Island (Minjerribah) – water used for water treatment (Herring Lagoon and North Stradbroke Island Bore fields, 15 Bores)	6,711
Off-grid communities [1] - total water produced at the water treatment plant	
Amity Point	108
Beaudesert	869
Boonah-Kalbar	546
Canungra	140
Dayboro	207
Dunwich	155
Esk	229
Jimna	6
Kenilworth	55
Kilcoy	1,328
Kooralbyn	212
Linville	8
Lowood	3,175
Point Lookout	298
Rathdowney	19
Neighbouring communities – total water supplied	
Toowoomba Regional Council	0
Power Stations – total water supplied	
Total raw water intake	228
Total purified recycled water intake	5,305

Note: Whilst the data used for this reporting is from the same base data source as the Resource Operations Licence/Water Licence reporting because the focus of the reporting is different, the figures will not be consistent. For example, the Resource Operations Licence/ Water Licence reporting is reported by off-take/water allocation, whilst the water security reporting is based on the dam source.

1 Treated Water Volume

Changes to the Bulk Water Supply System

Throughout 2023 Seqwater continued to deliver capital works to improve the capability of the Water Grid. Some of the more significant works include:

- Water security projects to support the northern sub-region including the Woombye connection, which was commissioned in early 2024.
- Improvements were completed to the intake at Lake Manchester in 2023, now enabling releases up to 5,800 ML/a to supplement supply to the Mt Crosby water treatment plants.
- Construction of the South West Pipeline, which will connect Beaudesert to the SEQ Water Grid is well underway and expected to be completed in mid-2024.

Climate-resilient water assets

Seqwater has two climate-resilient water supplies – the Gold Coast Desalination Plant (GCDP) and the Western Corridor Recycled Water Scheme (WCRWS). These assets are operated based on the adaptive drought response strategy in the Water Security Program. The desalination plant is also able to support operational requirements.

Desalination

The GCDP is a key asset for the provision of water security in SEQ. The plant is used to provide supply resilience and to enable planned maintenance to other assets within the water grid. The plant is a critical drought water supply asset. It can also play an important role supplementing the SEQ Water Grid during flood events, as it did in 2022 when raw water quality issues reduced production at water treatment plants.

When not in production, the GCDP is maintained in a 'hot standby' mode to maintain the condition of its membranes and can be operational at a rate of 33% capacity within 24 hours and up to the maximum production capacity of 133 ML/d within 72 hours (45,625 ML/a based on 125 ML/d operation capacity that includes maintenance and down time).

Desalination plants are not dependent on rainfall into catchments for source water but can be impacted by source water limitations such as exceptionally high tides or seaweed blooms that can produce high turbidity source water.

Purified Recycled Water

The WCRWS is a scheme consisting of three advanced water treatment plants (AWTP) and over 220 km of connecting pipelines between the AWTPs, industrial customers (including the power stations) and Wivenhoe Dam. This scheme has an annual production capacity of 59,130 ML/a once recommissioned to full capacity.

The WCRWS network three AWTPs are:

- Bundamba AWTP, average production capacity of 19,710 ML/a
- Gibson Island AWTP, average production capacity of 16,425 ML/a
- Luggage Point, average production capacity of 22,995 ML/a.

Three treatment units (or trains) at Luggage Point AWTP are currently operational to produce purified recycled water. The peak capacity of the three treatment units is 70 ML/d, however this is limited by the current balance of plant capacity of 46 ML/d. This water is currently used to flush the pipeline and supply industrial customers.

Operation of Climate-Resilient Water Assets

The WCRWS operated throughout 2023 (both outside of drought and when below the 70% Pre-Drought trigger) supplying 5,308 ML to industrial customers.

The GCDP operated as required throughout 2023 to support system resilience and maintenance at other areas of the water grid. Production was increased throughout November and December 2023 in response to reaching the 70% Pre-Drought trigger. Over the November to December period, production averaged 83 ML/d.

Table 7. Operation of climate-resilient water sources due to drought response and to support grid operations during 2023

Date/s	Climate-resilient water operation
1 January 2023 – 31 October 2023 (Outside of drought)	Luggage Point AWTP continued supply of purified recycled water in 2023, with approximately 4,893 ML supplied to industrial customers while outside of drought.
1 January 2023 – 31 October 2023 (Supporting grid operations outside of drought)	GCDP operated throughout 2023 to support grid operations. Production volume between 1 January 2023 – 31 October 2023 was 2,195 ML.
1 November 2023 - 3 January 2024 (Drought operation)	Luggage Point AWTP supplied 615 ML of purified recycled water to industry customers between 1 November 2023 – 3 January 2024, offsetting potable water demand from the Grid during the drought response period.
1 November 2023 - 3 January 2024 (Drought operation)	GCDP was operating for drought response due to low water levels in the Grid-connected dams, up until 3 January 2024, supplementing water grid levels with 5,325 ML of manufactured water.

Assessment of the regional water balance

Level of Service (LOS) yield modelling undertaken in the development of the Water Security Program 2023 determined the existing SEQ system has a LOS yield of 430,000 ML/a under historical climate conditions dropping to 325,000 ML/a by 2051 (under future climate conditions). This modelling indicates an augmentation is required by about 2030/31, depending on what projected demands are considered and the assumed impact of future climate change. The existing system case assumes all storages can be operated using their designed Full Supply Level.

As there have been no changes to the key planning assumptions (including WSP2023 Planning Demand and available climate change data for the region), the LOS yield modelling outcomes remain current.

Drawdown scenarios

The region's Water Grid storage level was at 66.3% at 31 December 2023, a material reduction to its level of 81.7% at the beginning of 2023. Storages dropped 16.6% in 2023, a decline only slightly less severe than the 19% reduction observed in 2019. Figure 3 illustrates that storages were drawing down at a similar rate in 2023 as was observed in 2019. Note, short term drought response planning undertaken through 2023 used the 2019 drawdown rate to provide trigger date forecasting.

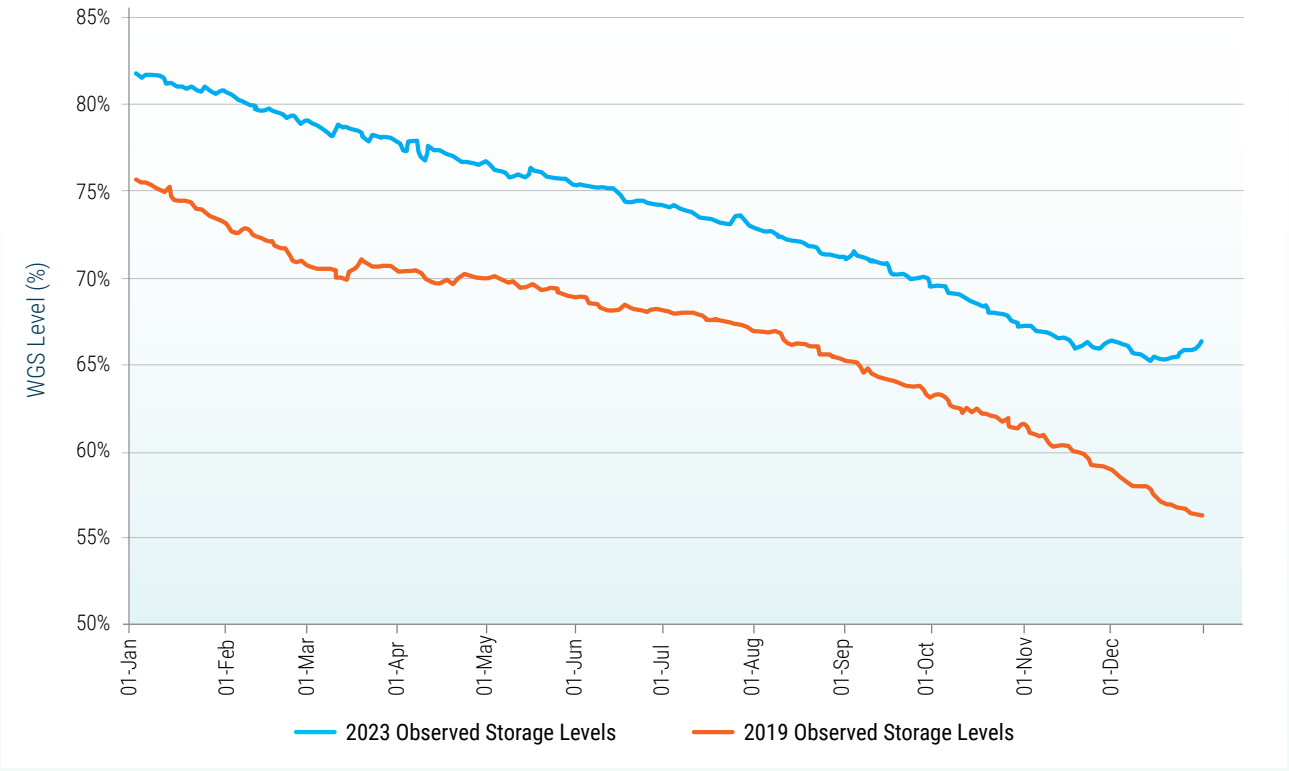

Figure 3: 2023 observed storage levels compared with 2019 observed storage levels

Wivenhoe Dam declined 17.5% over 2023, to a low of 61.9% on 22 December 2023, however following strong rainfall at the end of 2023 and throughout January 2024, Wivenhoe had returned to above 70% by end of January 2024. With Wivenhoe Dam representing more than half of the total water storage for the Water Grid, this makes a significant impact on the Water Grid storage level and the likelihood of triggering drought response measures. Seqwater provides access to the Water Grid storage levels and individual dam levels drawdown data at: https://www.seqwater.com.au/historic-dam-levels

Figure 4 shows recorded storage levels depleting at a similar rate to those observed at the beginning of the Millennium Drought drawdown. The design drought drawdown, which assumes the worst inflows in the stochastic dataset over a 10-year period, is also presented in Figure 4 for comparative purposes. Note, both the Millennium and design drought drawdowns were assumed to commence when storages were last at their temporary full supply level of 88% (September 2022). It should also be noted that the observed storage level dropped 5.8% in the second half of October 2022 when strategic releases were made from Wivenhoe Dam ahead of the 2022/23 La Nina wet season to increase the temporary flood storage space in Wivenhoe Dam, allowing additional flood waters to be stored if required.

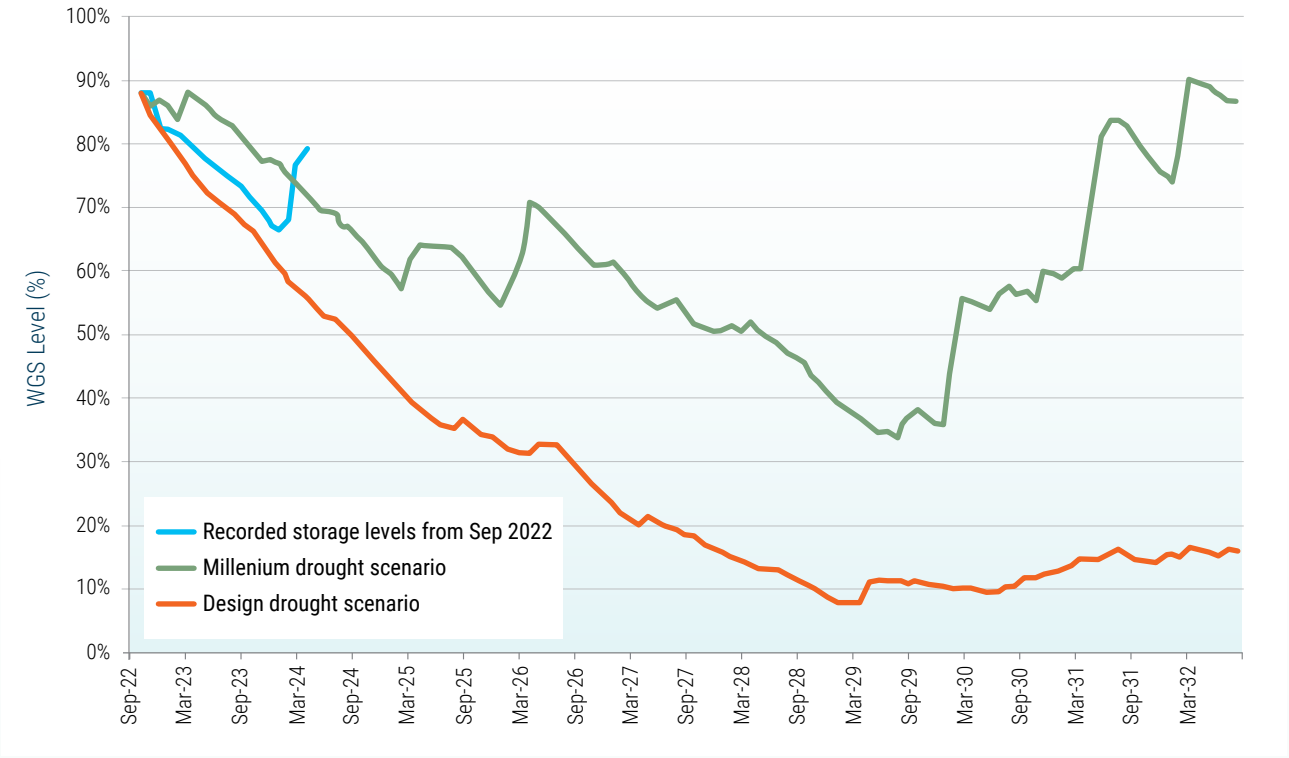

Figure 4: Design and Millennium Drought inflow draw downs and recorded water grid storage levels from September 2022

Water Security outcome statement status

All Water Security Program 2023 actions are underway. Updates on the planned actions for 2023-2024 are provided in Table 8 below. Planned Actions for 2024-2035 remain as per the WSP 2023 Action Plan.

Table 8. Water Security Program 2023 Action Plan Update

	Action	Progress
2023-2024	Review the depth and storage volumes of Seqwater's largest dams using the latest techniques to ensure dam capacity assumptions remain accurate as these are critical to LOS yield assessments	Work is ongoing with updated storage information anticipated to be ready for review by Seqwater in mid-2024.
	Review ongoing developments in climate change science and data and update water supply modelling with new information about climate change impacts	Review of climate change science and data is ongoing. It is anticipated that new information will become available by late 2024.
	Proceed with business cases for the proposed Gold Coast Desalination Plant expansion and Wyaralong Water Treatment Plant (WTP) to determine if these are the best short-term options to meet growth	Business cases through Gateway Review process in early 2024.
	Complete a new detailed business case by the end of 2024 for the next major enhancement – a new desalination plant	Development of detailed business case is underway and targeting completion in late 2024.

Water Security Program review

Based on the assessment below the Water Security Program does not need to be reviewed prior to the next regulatory review in 2028.

Table 9. Water Security Program Review Triggers

Trigger for review	2023 Status
Change to operating full supply level (OFSL) of a water grid storage	Changes to the full supply level have not impacted water security at this time, as storages are currently lower than the revised level. Seqwater will continue to monitor storage and demand patterns and react accordingly.
Significant change to drought response approach has occurred	No significant change to drought response approach has been considered in 2023. The drought response plan was implemented in alignment with the adaptive SEQ Drought Response Plan.


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