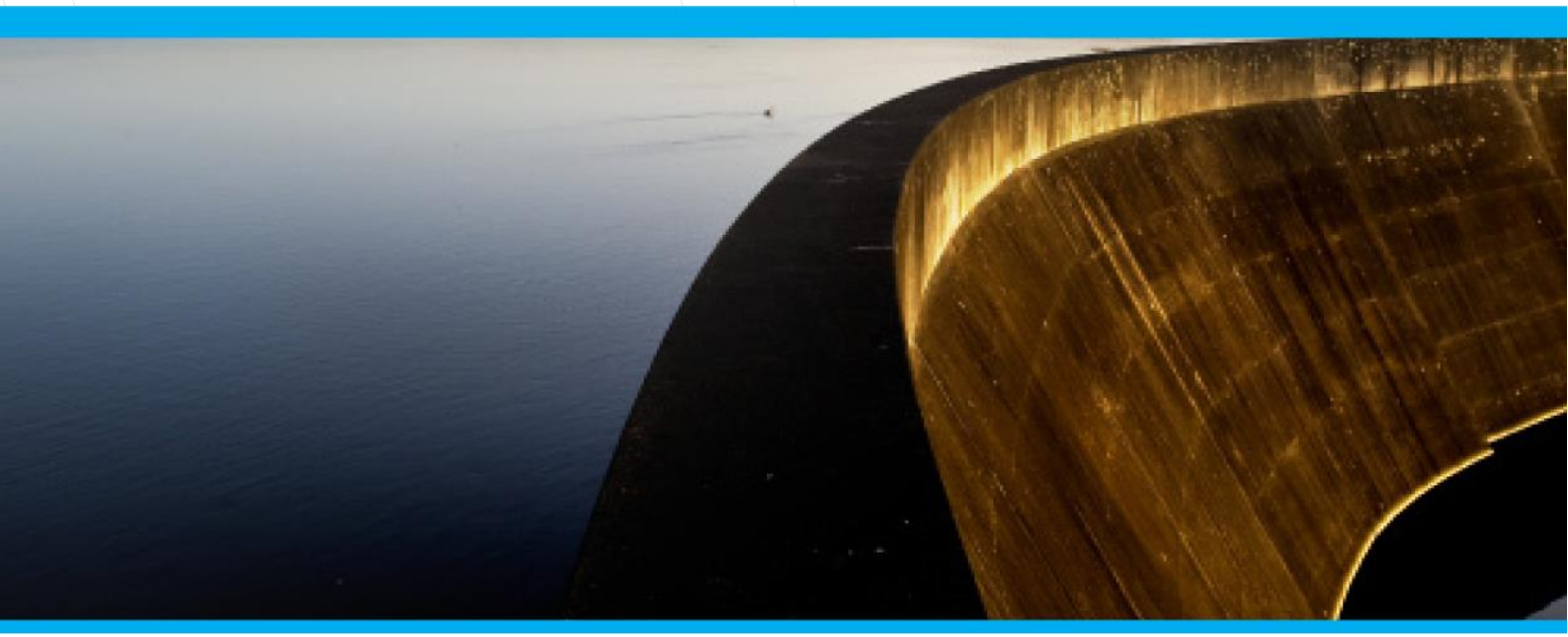
2019 Water Security Program Annual report

December 2019



seqwater
WATER FOR LIFE

SOURCE STORE SUPPLY

Contents

Executive summary

Seqwater is responsible for long-term planning for a reliable and sustainable water supply in South East Queensland (SEQ), through the 30-year Water Security Program.

Seqwater is required to prepare and report on water security for SEQ annually. This 2019 report assesses changes in water security compared to Version 2 of the Water Security Program (released March 2017).

Highlights

The highlights for 2019 include:

- drought preparedness phase (70% Water Grid Storage level) triggered on 14 March 2019 resulting in a range of drought preparatory work led by Seqwater, including the establishment of a drought response team as well as promoting awareness of waterwise behaviours
- drought response phase (60% Water Grid Storage level) triggered 18 November 2019 resulting in the Gold Coast Desalination Plant (GCDP) operating at full capacity and launch of a water savings campaign.
- preliminary preparations for restart of the WCRWS have commenced to enable a decision for full restart following the coming summer, if required.
- significant progress on more detailed planning for regional long-term and contingency supply options as input to the next Version of the Water Security Program
- further water quality testing on the WCRWS with the ongoing use of purified recycled water by Swanbank power station
- review of the regional demand forecast in collaboration with the SEQ Service Providers in preparation for the next Water Security Program. The review confirmed the demand projections from Water Security Program Version 2 are still aligned to current trends and remain current until the next Water Security Program (due in 2022)
- continuation of significant capital and operational works to further increase the Water Grid's capacity to supply water into the Northern sub-region
- continuation of the Water Future Program, a 3-year education and engagement program, with the goal of creating a waterwise SEQ. This program has included substantial community engagement through community forums, community presentations, school visits and facility tours
- engagement with peak industry bodies to ensure their members are well prepared for the impact of water restrictions
- effective engagement with the Department of Natural Resources, Mines and Energy (DNRME) on the review of the level of service objectives and the Water Security Program Development Guidelines.

Drought preparedness

Seqwater has significantly progressed drought preparedness throughout 2019, including collaboration with the SEQ Service Providers. Key dates for 2019 are:

- 14 March 2019 – Water Grid Storages reached 70% – Drought preparedness phase
- 18 November 2019 – Water Grid Storages reached 60% – Drought response phase

Water Grid Storage levels continue to decline as a result of well below average rainfall, above average temperatures and higher water demand.

Seqwater is closely monitoring the situation, implementing the drought response plan as detailed in the Water Security Program and collaborating with the SEQ Service Providers, Government and other key stakeholders to effectively manage the drought.

Since the release of Water Security Program (2017) SEQ has experienced sub-regional (northern) (refer Appendix A for map) and regional drought response, as well as significant drought impacts in many of the off-grid communities. Lessons learned will be addressed in the next Version of the Water Security Program.

Other matters

Major changes to the bulk water supply system in 2019

Throughout 2019 Seqwater continued to deliver capital works to improve the capacity of the Water Grid to transfer water into the Northern sub-region. These programs will continue to be implemented into 2020.

Changes to risks to readiness of manufactured water assets in 2019

Seqwater has undertaken risk mitigation activities to provide surety that the full WCRWS can restart in accordance with the Drought Response Plan and deliver purified recycled water to Lake Wivenhoe within a 2-year timeframe of commencement of recommissioning. This included the reinstatement of a single reverse osmosis train at the Luggage Point Advanced Water Treatment Plant (23.3 ML/day, of total Luggage Point Advanced Water Treatment Plant capacity 70 ML/day) and associated pipeline assets from a care and maintenance state. This capacity is now available for industrial use and to supply to power stations. The purified recycled water produced meets all water quality parameters within the Australian Drinking Water Guidelines.

Projected regional average urban demand

Water demand is influenced by climatic conditions, population growth and consumption behaviour. Water demand this year rose slightly and is reflective of the climatic conditions at the time. The demands are consistent with long-term historical trends, influences observed this year and the assumptions made about medium demand projections in the Water Security Program.

Assessment of the regional water balance

Commencing in 2017, Seqwater has continued to implement capital works and a change to the grid operating mode to allow for a greater volume of water to be transferred to the Northern sub-region of SEQ. Whilst the main purpose of this was to improve the water security of Sunshine Coast region it also means that there is an overall yield increase for SEQ water supply. The LOS yield modelling for the Northern Water Supply Project indicated an increase in the Level of Service (LOS) yield of 10,000 ML/annum, leading to a total of 505,000 ML/annum compared to the yield of 495,000 ML/annum specified in Version 2 of the Water Security Program. Both yields were inclusive of planned minor capacity augmentations identified at that time.

Drawdown scenarios

The region's Water Grid storage level has declined to 57.7% (16/12/2019) and continues to decline.

Whilst all storages are declining the driving factor behind this drawdown is Wivenhoe Dam which has declined to 45.7% (16/12/19), its lowest level since the Millennium Drought. 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 triggering of a drought response. Note some smaller storages along the coast remain in a good state of supply, with 7 of the Grid 12 storages above 70% capacity.

1.0 Introduction

Seqwater released the Water Security Program Version 2 in March 2017. This report can be found at:

http://www.seqwater.com.au/waterforlife

Details about the SEQ Water Grid infrastructure and the sub-regions are as detailed in the Water Security Program.

The purpose of this report is to provide an update on water security planning and implementation during the 2019 calendar year, in accordance with the *Water Regulation 2016*. This report addresses:

- major changes to the bulk water supply system over the past year
- total volumes of water supplied over the last year
- current operation and changes to risks to readiness of manufactured water assets in the past year
- projected regional average urban demand
- assessment of the regional water balance
- relevant drawdown scenarios.

2.0 Water Security status – December 2019

This section will detail the SEQ water security status for 2019, current drought actions, Water Security Program review triggers and key action status.

Drought response

The Water Security Program, through the Drought Response Plan, details an adaptive drought response approach (Figure 1). Seqwater is following this drought response approach in an adaptive manner cognisant of the climatic conditions, water demand, operation of the system and other key influential factors.

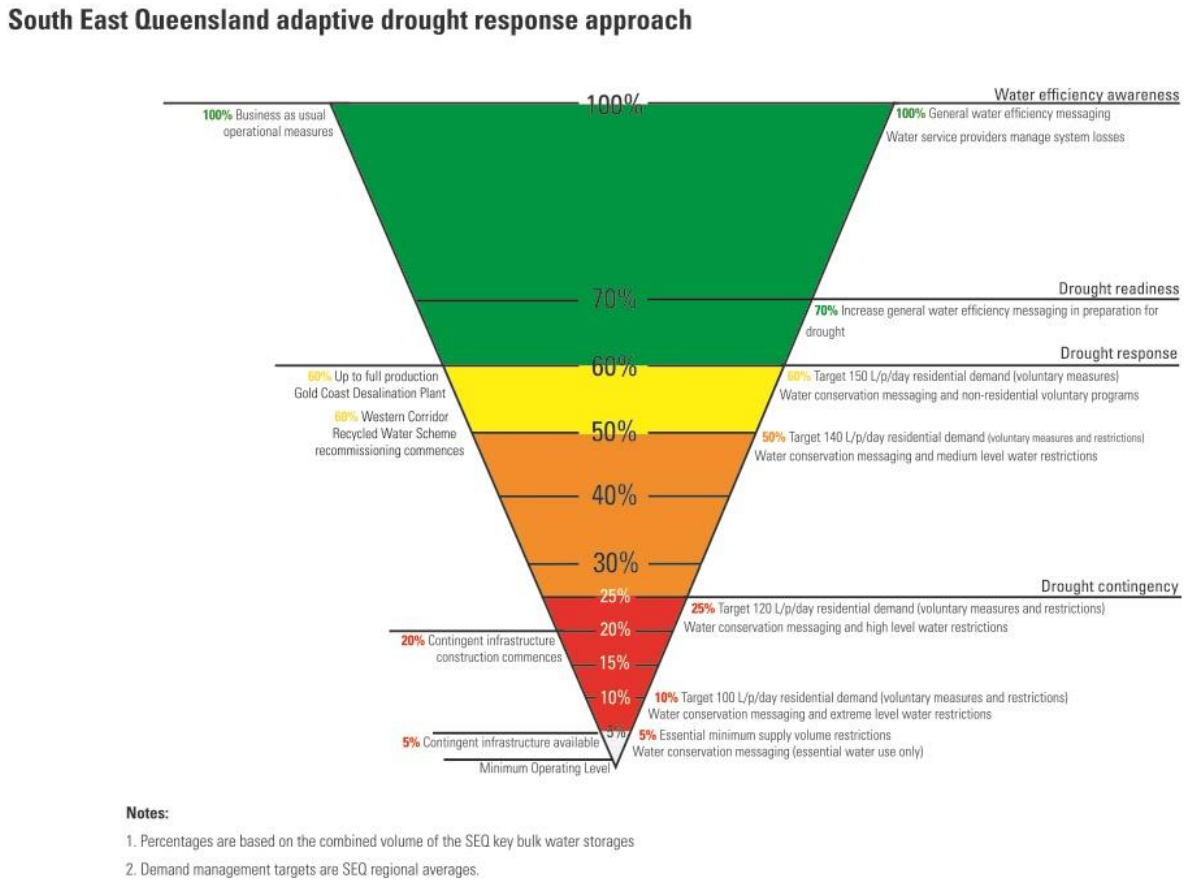


Figure 1: Drought response approach

The SEQ region reached two significant drought triggers in 2019:

- 14 March 2019 – Drought preparedness trigger (70% Water Grid Storage level)
- 18 November 2019 – Drought response trigger (60% Water Grid Storage level)

At the time of writing the Water Grid Storage level was 57.7% (16/12/2019).

Seqwater has worked closely with the SEQ Service Providers throughout 2019 to collaborate on drought preparedness and the implementation of the drought response. This has included two drought simulation events, joint communications plans and campaigns, and demand management planning.

Seqwater also prepared its climate resilient assets (refer section 4.0), assessed a range of key network assets in readiness for use in a drought mode of operation, completed detailed drought planning, progressed governance frameworks and provided a greater detail of drought reporting to key stakeholders.

Several off-grid communities have also triggered drought response to varying degrees (refer Table 1). The drought response plans for these communities are being implemented as detailed in the Water Security Program. Since the development of these plans Seqwater and the SEQ Service Providers have drafted a water restrictions schedule. As a result, he SEQ Service Providers, responsible for demand management in the off-grid drought response plans, may choose to impose water restrictions in a staged approach (i.e. increasing severity) to enable supply to meet demand, community expectations, or other operational

reasons. These changes and other lessons learned will be reflected in the next Water Security Program.

Water Supply Scheme	Supply source	SEQ Service Provider	Drought response trigger as at 20/12/19
Canungra	Canungra Creek	Urban Utilities	Level 4
Dayboro	Groundwater	Unitywater	Level 4
Jimna	Yabba Creek	Urban Utilities	Level 1
Kalbar (Boonah, Aratula and Mount Alford)	Moogerah Dam (Warrill Valley Scheme)	Urban Utilities	Level 1
Kenilworth	Wells near the Mary River	Unitywater	Level 1

Table 1: Off-grid communities where drought has triggered in 2019

Long-term water security

Seqwater has made significant progress towards future water security in 2019. Seqwater has:

- Completed more detailed planning assessments to understand the need and options for the next water supply augmentation
- Determined how climate change will be considered in future water security planning.

In addition, Seqwater has further progressed planning to include stakeholder engagement outcomes in long-term water security planning.

Water Security Program actions and review triggers

Water Security Program Version 2 set key actions for future improvements in SEQ and also triggers for review of the Water Security Program outside of the five yearly regulated review. Since 2017 many of these key actions have been achieved and further learnings have indicated that some triggers are no longer necessary. The following two sections detail the status of these actions and triggers.

Water Security Program Action status

All Water Security Program actions are well underway. Appendix B provides detail of the status of each action item. Highlights for 2019 have been the increased collaboration with the SEQ Service Providers in the development of the next Water Security Program, particularly in discussions around decentralised schemes and liveability considerations.

Water Security Program Trigger Review status

Seqwater in consultation with the DNRME have re-considered the Water Security Program review triggers. The Water Security Program has a regulated five yearly review. In addition to this regular review, Seqwater established triggers for Program review within the five-year window, based on an annual assessment. Upon consideration of these additional triggers, it appears that most of the review triggers are more appropriate to consider as part of the five-yearly process, rather than annually. Appendix C details the review triggers and their status for 2019.

Generally, the triggers reflect slow-moving changes or changes that impact Seqwater's operation rather than immediately impact on long-term water security or the ability to meet the Region's water needs during a drought. Hence, such review triggers are no longer required. Reflective of the learnings since 2017, Seqwater will set essential triggers to protect water security. These triggers will be detailed in Water Security Program Version 3. It should be noted that the removal of the Water Security Program Version 2 triggers will not hinder Seqwater reviewing the Water Security Program if the need should arise.

The following triggers will no longer be reported against as they will be considered as part of the Water Security Program five-yearly review process:

- Demand forecast ± 10% (sustained over 6 months), due to any reason, including:
  - Demand growth distribution changes significantly
  - Demand behaviours change
- Increased prevalence of decentralised solutions and/or integrated regional planning alters distribution and degree of growth in demand
- Drinking water quality requirements change significantly, which may impact on treatment requirements and thus costs of surface water supplies to a greater degree than climate resilient supplies
- Level of Service (LOS) objectives revised
- Regulated requirements change (re: drought response)
- Policy or climate variability reduces surface water allocations available over time
- Government policy removes a water supply or system operation option from consideration
- Innovations in desalination and purified recycled water (e.g. reducing cost to operate)
- Changing availability of land and/or incompatible investment in neighbouring land
- Site-specific assessments identify issues with efficient supply options
- ±10% permanent change to grid water treatment plant production capability
- WCRWS recommissioned
- Climate change results in reduced rainfall (and thus water availability) and/or increasingly intense rainfall events which may impact on water quality, reducing the ability of the system to treat and supply surface water

Appendix C also indicates that each of the off-grid community review triggers should be removed and considered as part of the five-yearly review process only. Seqwater may still undertake internal reviews where required.

Amendment has been made to the following two review triggers:

- Change to operating full supply level (FSL) of a Grid Water Storage (GWS) – Where the need is not immediate, this change would be captured in the five-yearly review of the Water Security Program.
- Drought occurs – This criterion will be amended from 2020 to: 'Significant change to drought response approach has occurred'.

3.0 Major changes to the bulk water supply system in 2019

Change in Water Grid operations

The following Water Grid operation changes occurred during the year, in accordance with the Drought Response approach:

- GCDP was triggered to operate at up to full capacity, for continuous operation
- Southern Regional Water Pipeline operating in a northerly direction
- preliminary preparations for restart of the WCRWS have commenced to enable a decision for full restart following the coming summer, if required.
- work was completed at Luggage Point Advanced Water Treatment Plant to enable water supply for industry (see section 4.0).

Projects which continue to be implemented to improve capability to protect supply in the Northern sub-region include:

- Approximately $20 million of capital projects are underway to provide greater capability to minimise production from Landers Shute water treatment plant. These projects primarily improve connectivity from the Northern Pipeline Interconnector (NPI) to the Landers Shute supply zones and transfer capacity from the central sub-region to the northern sub-region.
- Planning work has continued to investigate appropriate drought contingency and long-term water supply solutions for the Northern sub-region. This work will also further consider whether the Baroon Pocket supply protection trigger can be optimised further.

4.0 Readiness of climate-resilient supply assets

Seqwater has two climate-resilient water supplies – Gold Coast Desalination Plant (GCDP) and Western Corridor Recycled Water Scheme (WCRWS). These assets are operated differently based on the drought response approach and other operational activities.

The readiness of each supply asset to respond to drought triggers continued to improve during 2019.

The GCDP commenced operation in drought response mode on 18 November 2019. Preliminary preparations for restart of the WCRWS have commenced to enable a decision for full restart following the coming summer, if required.

Gold Coast Desalination Plant (GCDP)

The GCDP is a key component of the drought response and is triggered to operate at up to full capacity and for continuous operation when 60% Water Grid storage capacity is reached.

The GCDP operates in 'Hot Standby' and must be able to respond as a contingent supply and provide 33% production capacity within 24 hours and full capacity within 72 hours. To maintain its hot standby state of readiness, the plant operates under a reduced frequency and run time mode. This means the plant typically runs three times per fortnight with water production ranging from 4 ML to 6 ML per run depending upon the raw water quality and other conditions. The flexibility of hot standby mode for GCDP was evidenced when GCDP played a significant role providing drinking water supply during the January 2011 flood event and the Australia Day 2013 extreme weather event, and during the March 2017 ex-Tropical Cyclone Debbie event.

In addition to emergency event response, the GCDP is used to supplement the Gold Coast water supply during planned temporary closures of the Mudgeeraba, Molendinar and Mt Crosby water treatment plants for planned upgrade works. This was again evidenced in 2019 when the GCDP plant operated continuously over a three-month period, from late April to July, producing 6,535 ML to supplement supply while the Molendinar water treatment plant was offline for major upgrade works.

Asset capability testing is undertaken on a regular basis at various production capacities as part of GCDP preparedness. This is considered prudent, to demonstrate readiness of continuous run during a drought event or for responding to an emergency event requiring operation of GCDP at short notice. This ongoing testing includes a plant performance and reliability trial. This testing results in operational improvements which provide greater readiness for drought response.

GCDP commenced operation in drought response mode on 18 November 2019.

Western Corridor Recycled Water Scheme (WCRWS)

The WCRWS is also a key component of the drought response, being triggered to commence recommissioning (which may take up to two years) from 60% Water Grid Storage level.

Seqwater has completed a program plan for restart and remobilisation of the scheme following extensive collaboration with SEQ service providers and internal and external stakeholders (including government agencies). Seqwater is now better informed about critical path activities, resource costs and timeframes required for restart of the WCRWS, all of which significantly improve our state of readiness when required.

Seqwater has undertaken risk mitigation activities to improve surety that the WCRWS can restart in the two-year timeframe from commencement of recommissioning and augment to Lake Wivenhoe. This has been successfully demonstrated at Luggage Point Advanced Water Treatment Plant by the restart, in 2018, of a single reverse osmosis train and

associated pipeline network that was in a decommissioned state. This single train provides approximately one third of the Luggage Point plant's capacity which is now available for industrial use (23.3 ML/day, of a total plant capacity 70 ML/day). The purified recycled water produced meets all water quality parameters within the Australian Drinking Water Guidelines.

Having completed the restart plan, Seqwater has undertaken further work in 2019 on critical pre-requisite activities including: updating the Recycled Water Management Plan and implementation of validation and verification in conjunction with Urban Utilities; and work with DNRME on requirements for the transmission licence and a framework to account for water released into Wivenhoe Dam.

Seqwater has also continued working with interested parties to consider other uses for the WCRWS water in times outside of drought.

As part of the Water Future Program, Seqwater is also educating key stakeholders and the community about the importance of purified recycled water as a climate-resilient water source for SEQ.

Preliminary preparations for restart of the WCRWS have commenced to enable a decision for full restart following the coming summer, if required.

5.0 Projected regional average urban demand

Demand is significantly impacted by climatic conditions, population growth and consumption behaviour changes. Consequently, the projected regional average urban demand must be assessed annually to understand changes to the forecast demand.

This section outlines:

- Key elements of the demand assessment and the outcomes
- Annual demand forecast assessment - 2019
- Off-grid community demand projections review.

In accordance with legislative requirements, Seqwater must complete a review of its water security program at least every 5 years or if there is a significant change to any matter affecting, or likely to affect, the achievement of the desired level of service objectives. Seqwater must also annually assess whether the projected regional average urban demand is still current. This section comprises the annual assessment.

The most recent complete dataset available for this annual review is the 2017/18 actual water consumption. The 2017/18 actual water consumption was 1.25% above the Water Security Program Version 2 forecasted medium (planning) demand which shows that over the longer term these fluctuations are still close to the projected regional average demand used in Water Security Program Version 2.

Demand assessment

To understand the emerging water consumption trend, the annual demand assessment includes the comparison of changes across the three core demand drivers: climatic conditions, population, and consumption behaviour across various residential cohorts and non-residential sectors. The following sub-sections provide a summary of 2018/19 financial year actual consumption.

Climatic Conditions

The impact of climatic conditions on demand is highlighted when demands spike during hot dry spells. Climatic conditions predominantly impact short term demand behaviour. This sub-section provides a detailed overview of the climatic conditions over the 2019 year and their impact on short-term demand.

The Bureau of Meteorology (BOM) annual climate information indicated that 2019 will rank amongst Australia's warmest and driest years on record. Australia's mean temperature over January to November has been the highest on record for large areas, including SEQ. Overall, 2019 to-date has been a very dry year for Australia. January–November rainfall has been the second lowest on record for Australia as a whole (spanning 120 years). For the year to date, rainfall has been 'below' to 'very much below average' to 'lowest on record' across SEQ.

The impact of these climatic conditions has been reflected in water consumption data. Analysis of 2019 production data compared to the previous 6 years shows that consumption in much of January to March, September and November in 2019 was significantly higher than typical historical observations. The hotter and drier conditions in 2019 have contributed to an increase of 6% in combined per capita water consumption compared to the previous year.

Population Growth

Seqwater uses the Queensland Government Statistician's Office (QGSO) population profiles as an input to determining annual demand for SEQ. The population forecast profiles are ground-truthed against the most recently available information sourced from the SEQ Service Providers. The QGSO population forecast profiles are used as a key base input for demand forecasting as they represent a whole of Government view on future SEQ population growth. This approach ensures alignment with planning for infrastructure and services at the Local Government Area (LGA) levels.

The current demand forecast review has used the latest published population forecast (2018 edition) by QGSO and was also validated against findings from the connection/account growth analysis to obtain an updated medium (planning) population growth for SEQ. The serviced population is calculated by applying the "percentage of connection" based on the people who are connected or will be connected to the Water Grid in future. Seqwater reviews the percentage of connection on a regular basis using end-customer billing information, census published data and SEQ Service Providers' information.

When compared to the Water Security Program Version 2 medium population projection. the QGSO 2018 Edition Medium Series population is approximately 0.56% above at the start

(January 2018) and 4.84% above at the end of the 30-year projection period (January 2047). Differences in population projections vary more on a sub-regional scale as shown in Figure 2. The aggregated population of Central includes the population of Brisbane, Ipswich, Scenic Rim, Somerset and Lockyer Valley; North includes the population of Moreton Bay, Sunshine Coast and Noosa; and South includes the population of Logan, Redland and Gold Coast LGAs. See Appendix A for a map of the sub-regions.

Overall, the differences in population projections over the next 5 years vary less than 0.2% regionally and at most less than 2.6% sub-regionally. Over the 30-year timeframe the percentage variance trends between 4.8 to 8.7% higher than the Water Security Program Version 2 population projections.

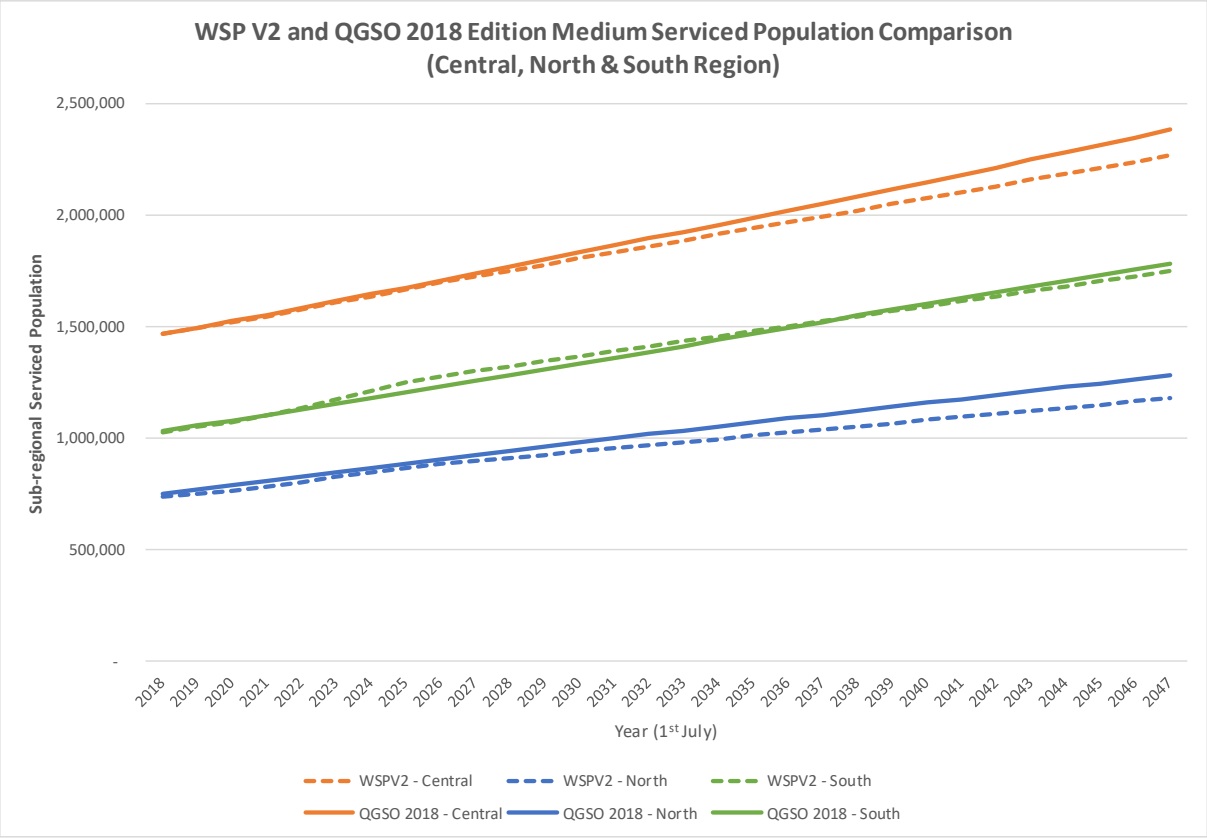


Figure 2: Water Security Program Version 2 medium population projection compared to QGSO 2018 edition medium population projection – (a) SEQ Serviced Population (b) Sub regional Population, i.e. Central, North & South

Consumption Behaviour

Analysis of 2018/19 trends in water consumption by sector was completed using 2017/18 financial billing information provided by the Service Providers. The 2017/18 financial billing data was used for the purpose of the 2019 annual demand review as this was the most recently completed billing data set received from Service Providers at the time of the review.

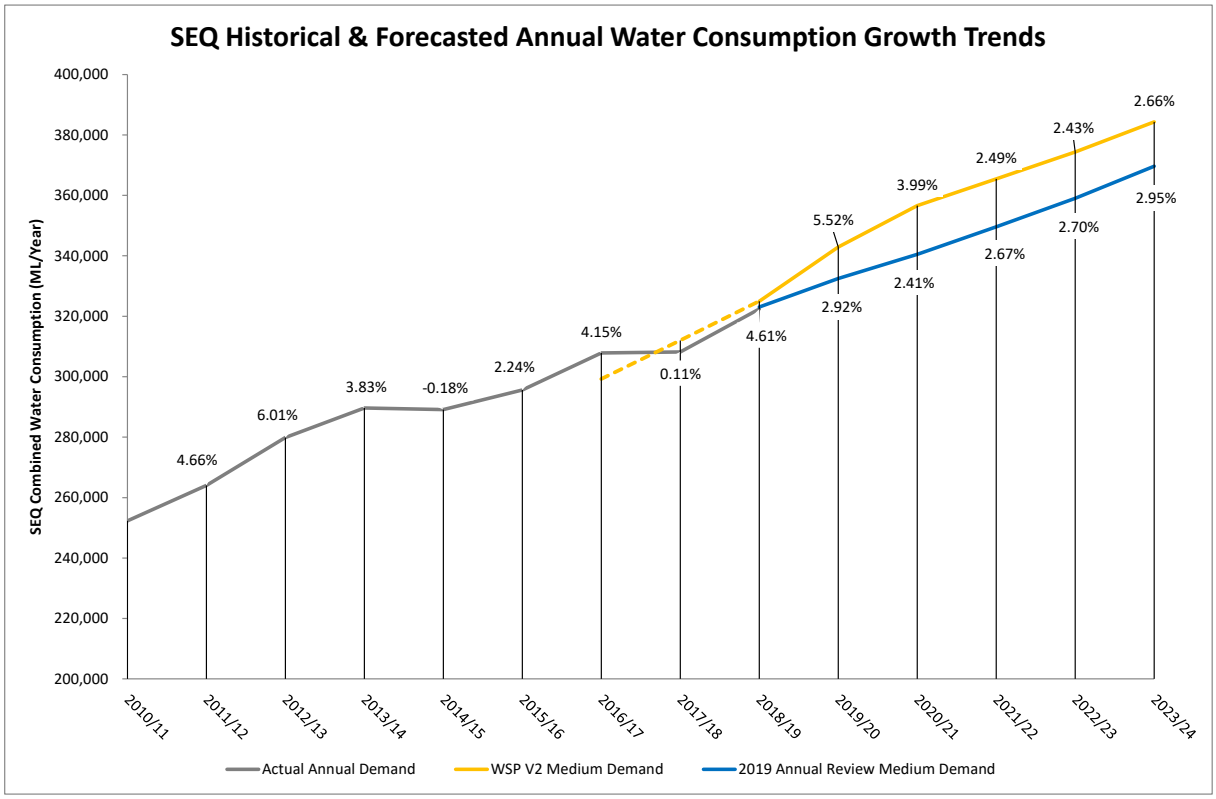


Figure 3: SEQ historical and Water Security Program Version 2 and 2019 Annual Review water demand trend.

Longer term historical water usage

Figure 3 shows a historical annual water consumption growth trend of around 5% per annum for most years reviewed. 2018/19 also showed a water consumption annual growth rate of about 5%. This level of growth is likely influenced by prolonged hot-dry conditions.

Year-to-date annual demand growth as of November 2019 is on trend with the average annual 5% historical growth if hot-dry conditions persist. The 5% growth target also aligns to the Water Security Program Version 2 forecast water demand for 2019/20, as shown in Figure 3.

With the BOM January to March 2020 outlook of small areas of southeast Queensland likely to be drier than average, including a very high chance of warmer than average daytime temperatures, it is likely that the rest of the 2019/20 financial year water consumption growth will achieve average to above average growth in comparison with historical consumption.

Recent water usage

Based on 2018/19 water production data, total combined (residential and non-residential) water usage has increased by 4.61% from 2017/18 financial year to 2018/19, comprising a total increase in usage of 14,203 ML for the 12-month period.

The 2018/19 production volume was analysed to examine water consumption behaviour by sector, using 2017/18 billing information. Analysis showed that about three quarters of all

water demand in SEQ comes from residential demand, and the remainder from non-residential demand. These sectors have been further broken down into groups as shown in Table 2 and Figure 4.

	Sector Name	Annual Consumption Volume (ML)			
		2017/18	% Split	2017/18	% Split
RES	Single Family Residential	152,123,852	71.37%	213,154,561	74.56%
	Multi Family Residential	59,412,175	27.87%		
	Rural Residential	1,618,535	0.76%		
NON-RES	Commercial	17,030,193	23.42%	72,730,916	25.44%
	Large Manufacturing Industrial	9,902,939	13.62%		
	Industrial	19,497,912	26.81%		
	Irrigation	2,359,296	3.24%		
	Public	15,384,187	21.15%		
	Rural	3,199,693	4.40%		
	Tourism	5,356,695	7.37%		

Table 2: SEQ residential and non-residential total water consumption breakdown for 2017/18 financial year.

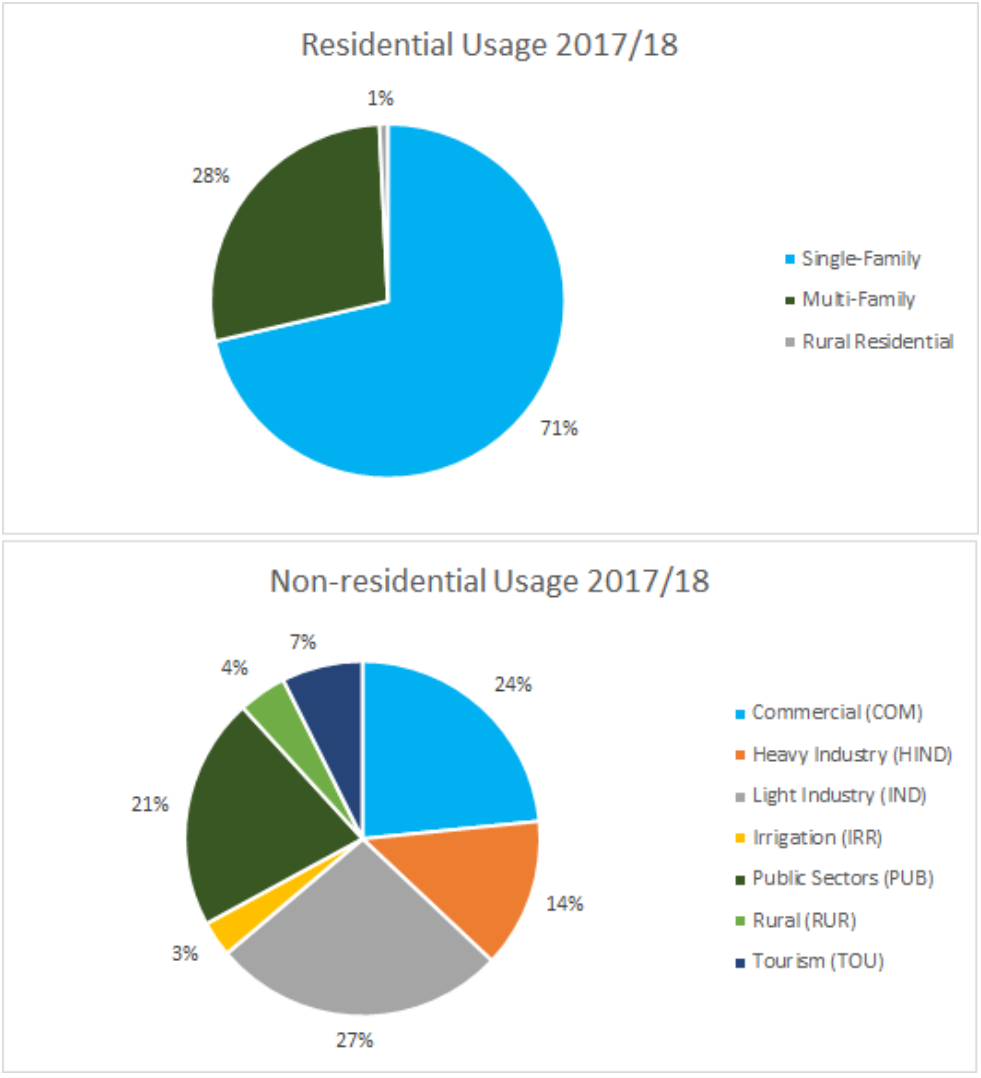


Figure 4: 2017/18 residential and non-residential sectors breakdown pie-chart

Local Government Area water consumption

Combining the consumption breakdown information in Table 2, actual 2018/19 total sub-regional production information and serviced population estimates, current per capita residential and non-residential average daily consumption figures (starting consumption for demand forecasting) were determined as shown in Table 3.

	2017/18		
Council	**Res LPD**	**Non-Res LPD**	**Serviced Population**
Brisbane	163	104	1,214,822
Gold Coast	191	99	589,293
Ipswich	148	124	210,472
Lockyer Valley	136	109	26,410
Logan	156	46	303,648
Moreton Bay	154	50	433,566
Noosa	270	109	44,186
Redland	179	59	151,242
Scenic Rim	163	115	17,386
Somerset	168	250	13,133
Sunshine Coast	179	80	282,489
SEQ	169	88	3,286,647

Table 3: 2017/18 per capita residential consumption at the local government area (LGA) basis

Further analysis has been undertaken this year into non-residential growth assumptions by groups (Figure 5). Previously, non-residential demand projections have used the residential increase in demand as a proportional proxy for non-residential demand, but sufficient data now exists to project demand increases by non-residential group (e.g. commercial, industrial, etc). This will result in more accurate projections which can better account for the differences across groups in non-residential demands.

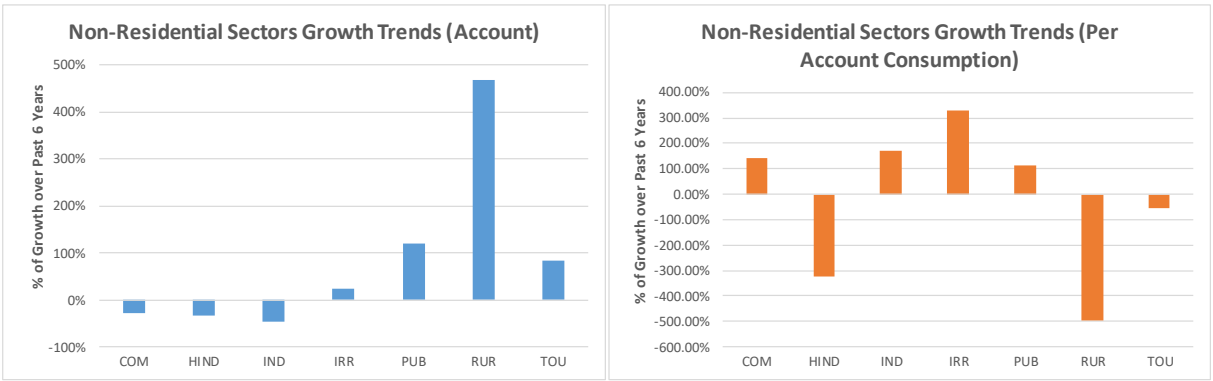


Figure 5: Non-residential sectors growth trends.

Annual demand forecast assessment - 2019

The 2019 annual demand forecast assessment included a review of key parameters including population projections, residential and non-residential water consumption, total system losses and seasonal variation.

The residential per capita daily consumption (LPD) assessment outcomes summarised in Table 3 were used as the starting residential consumption in the 2019 annual demand review. This assessment is the same as for the Water Security Program Version 2 and aligns with the Water Security Program Version 2 at the SEQ regional level, and varies by up to 9% at the sub-regional level.

Actual demand vs 2019 annual demand review

Actual 2018/19 annual demand

- Actual 2018/19 annual demand appears to align with the 2019 Annual Review medium demand projection (reference Figure 6).
- Compared to consumption in the previous financial year, the actual 2018/19 annual demand is 4.61% higher. This is higher than the average long-term historical growth of 3% per annum since 2010/11. The prolonged hot and dry extreme weather conditions experienced in recent years are likely to have driven this increasing consumption. As part of sensitivity analysis, the 2019 Annual Review low and high demand projections have been generated to show the impact of changes in assumptions used in forecast.

Low demand – 2019 Annual Review demand assessment

- The 2019 Annual Review for low demand (solid green line in Figure 7) shows an upward divergence of 13.4% from the Water Security Program Version 2 low demand profile towards the end of 2055/56. This higher future demand volume can mostly be attributed to higher future estimates for the low series population in the QGSO 2018 edition population projections.

Medium demand – 2019 Annual Review demand assessment

- The 2019 Annual Review for medium demand (solid blue line in Figure 7) is 3.04% lower than the Water Security Program Version 2 medium demand profile at the beginning of 2019/20 but starts to converge towards 2016/27, and by 2055/56 there is a forecast upward divergence of approximately 6.4%.

High demand – 2019 Annual Review demand assessment

- The 2019 Annual Review for high demand (solid red line in Figure 7) shows a downward divergence of 8.3% from Water Security Program Version 2 high demand towards the end of 20155/56. The lower estimated future volume can mostly be attributed to the revised lower future medium series population estimate in the QGSO 2018 edition population projections, as well as revised non-residential future growth.

Long-term demand deviation

- Long-term demand deviations between Water Security Program Version 2 and the 2019 Annual Review of low, medium and high demands are shown in Figure 7.
- Long-term deviation for low, medium and high demand profiles are attributed to the revised population adjustment in the QGSO 2018 edition population estimate in

comparison to the earlier QGSO 2011 edition population estimate, in addition to the updated modelling methodology.

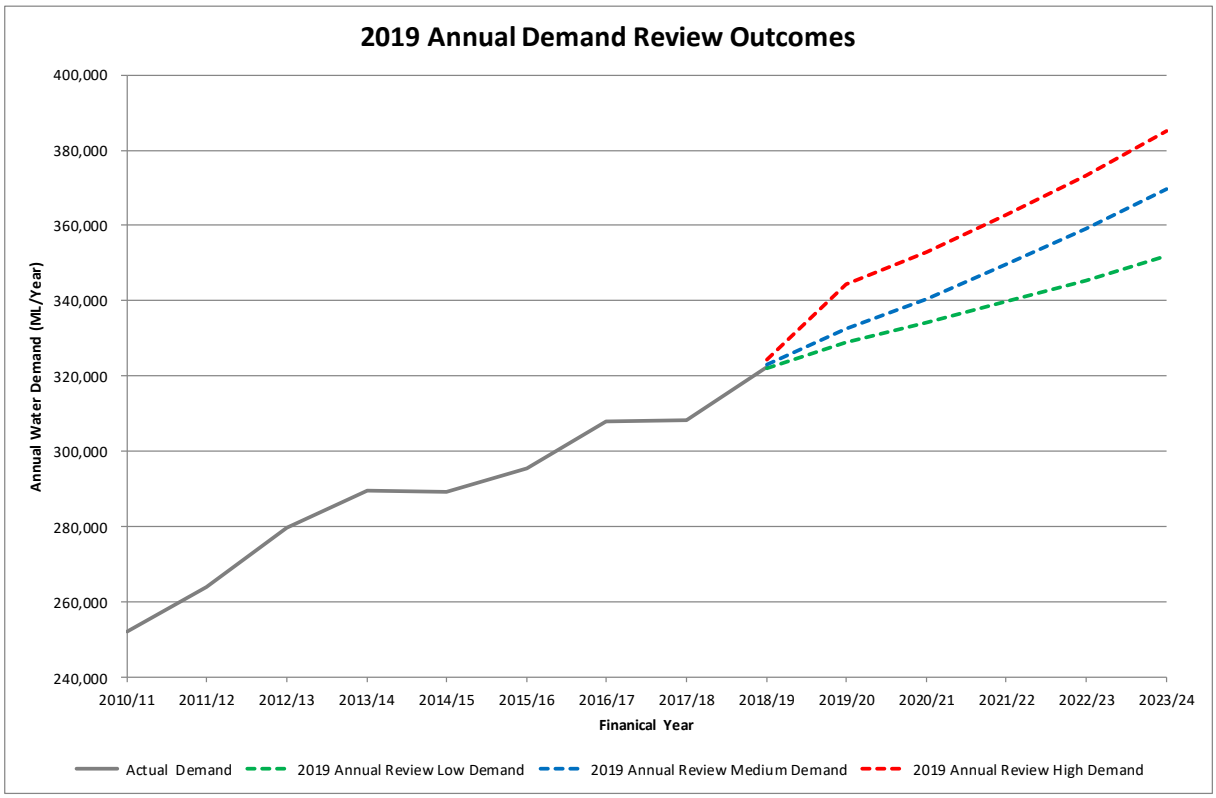


Figure 6: Overview of 2019 annual demand forecast review

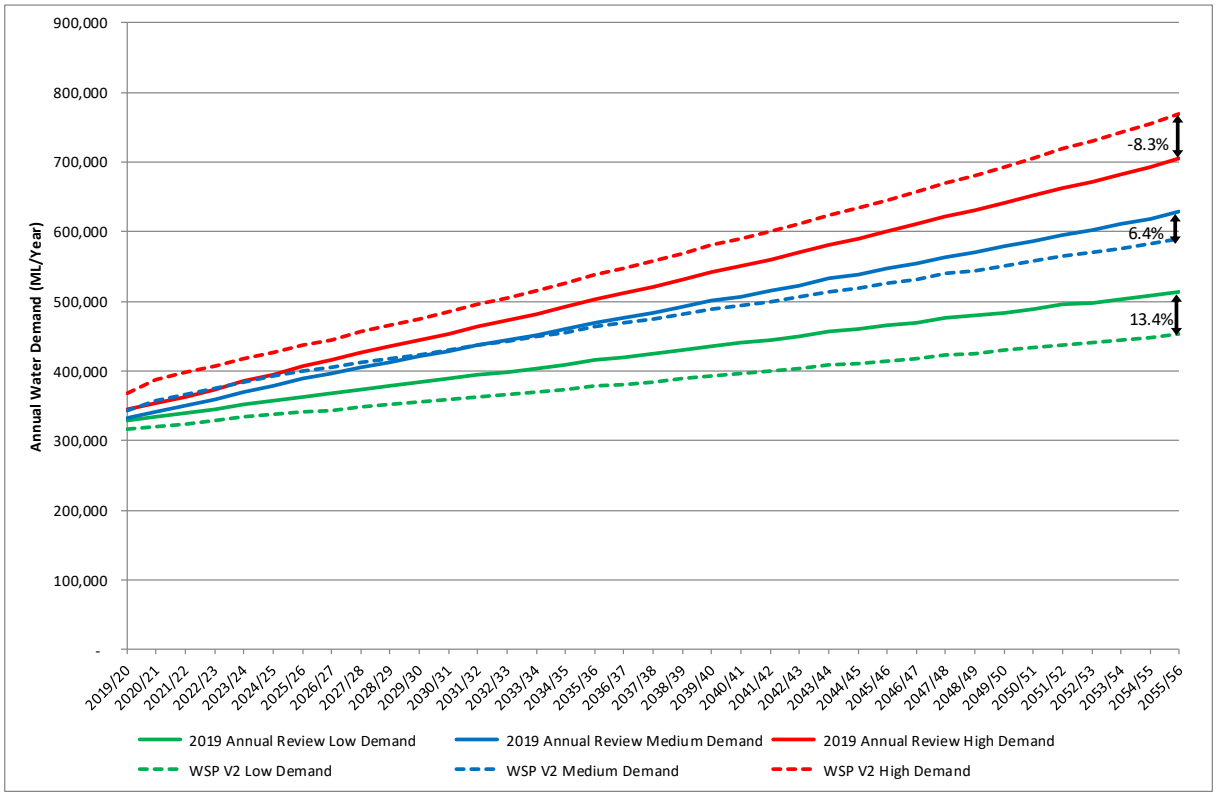


Figure 7: Water Security Program V2 demands compared to 2019 annual assessment demands

Table 4 details the 2019 Annual Demand Review low, medium and high demands for SEQ from 2019/20-2024/25, including power station consumption and Toowoomba demand.

Table 4: 2019 Annual Demand Review

Financial Year	Low demand SEQ (ML/Year)	Medium demand SEQ (ML/Year)	High demand SEQ (ML/Year)
2019/20	328,886	332,484	344,561
2020/21	334,161	340,502	352,890
2021/22	339,953	349,606	362,699
2022/23	345,479	359,061	373,233
2023/24	351,860	369,671	385,012
2024/25	356,565	378,790	395,240

Seqwater continues to work with the SEQ Service Providers to understand longer-term demands and potential demand management options.

Off-grid community demand projection assessment

Discussions with SEQ Service Providers continue regarding the long-term demand forecasts for off-grid communities, in relation to population and demand. Any changes will be reflected in the Water Security Program Version 3.

The short-term demands for most off-grid communities have been significantly higher due to current drought conditions, including increased outdoor water use by consumers, but also

increased reliance on the potable water supply by non-connected consumers (i.e. consumers living outside of the water supply scheme using rainwater tanks or other suitable supplies). As these rainwater tank supplies and other supplies are depleted, the consumers rely on the potable water supply (via carting) to top up their rainwater tanks. In some cases, this is adding additional demand of approximately 30% - 50% to the existing demand for the connected community, placing significant stress on the water treatment plants in these off-grid communities. Seqwater continues to monitor these demands closely.

6.0 Drawdown scenarios

On a regional basis, storages have consistently declined over the course of 2019. The Water Grid Storages include the 12 major urban water supply dams in SEQ that are connected to the Water Grid. Figure 8 indicates how the Water Grid Storage levels have drawn down since June 2015 given real inflows, in comparison to the Millennium Drought and Design Drought inflows with the current drought response approach (including the water grid, GCDP and WCRWS). The impact on the sub-regional storages is shown in Appendix D.

The Design Drought is a modelling-generated drought based on the worst droughts in the stochastic dataset. The Design Drought was developed for the Water Security Program Version 2 based on data from our stochastic record to define a potential drought worse than the Millennium Drought. All droughts start with declining inflows; it is the severity and duration of the drought that differs.

The drawdowns vary for sub-regional storages with 2019 demonstrating the significant impact that the level of Lake Wivenhoe has on the combined Water Grid Storage capacity. While Baroon Pocket and Hinze Dams both remained above 80% capacity, the central storages have been drawn down considerably. Wivenhoe Dam dropped over 20% during 2019 to reach 47% (November 2019).

Seqwater will continue to closely monitor the situation and respond accordingly based on the adaptive drought response approach.

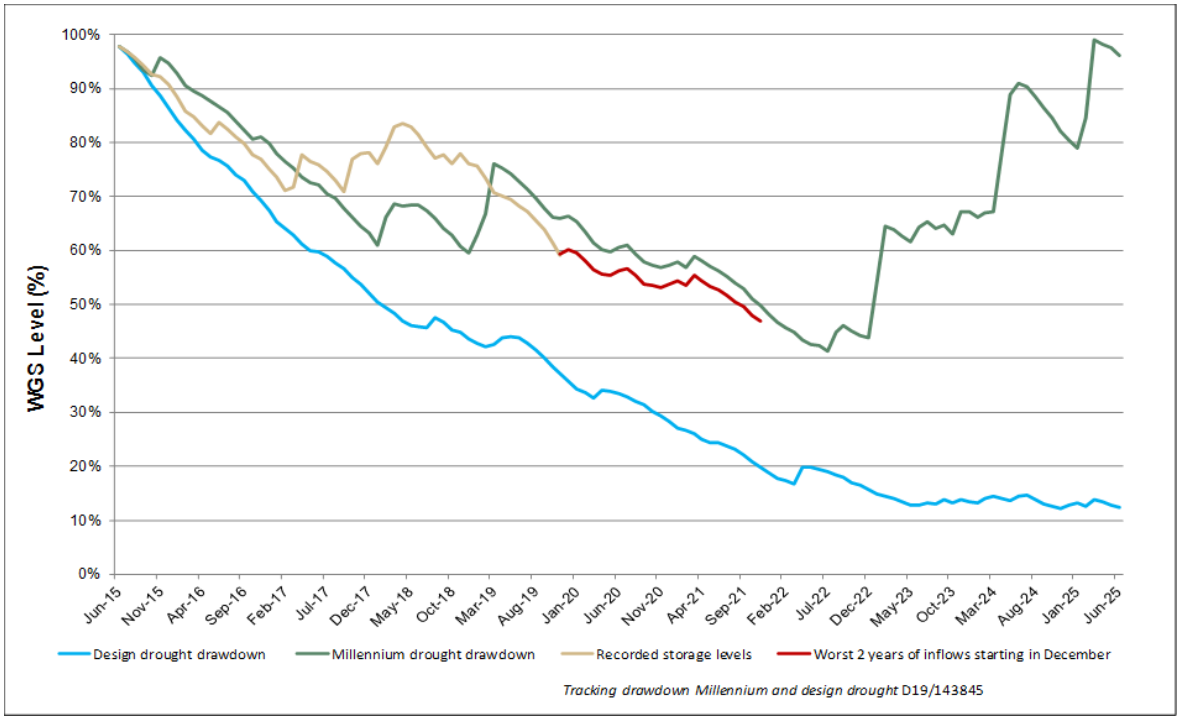


Figure 10: WGS drawdowns commencing June 2015

The combined Water Grid Storage levels have been steadily declining over 2019 (Figure 10) from around 75% to 56% as a result of very little inflow, high evaporation and increased water demand.

Figure 10 details the drawdown of the Water Grid Storages since June 2015. Appendix D indicates the drawdown of the key individual water supply sources across the region from June 2015. As noted earlier, the local storages are critical to the water supply for each sub-region. It is important to monitor each storage and operate the system in a way to supplement these storages to meet the demands of the sub-regions.

Appendix A – SEQ bulk water supply sub-regions

- Northern sub-region
  Bulk water supply assets from Noosa to North Pine WTP; interface with the central sub-region.

- Central sub-region
  Areas supplied by Wivenhoe and Somerset dams via the Mt Crosby WTPs (i.e. Brisbane, Ipswich, Beaudesert and Logan).

- Eastern sub-region
  Assets from the transfer interface between the central sub-region through to Capalaba and North Stradbroke Island WTP.

- Southern sub-region
  Encompasses the Gold Coast supply area and interfaces with the central sub-region.

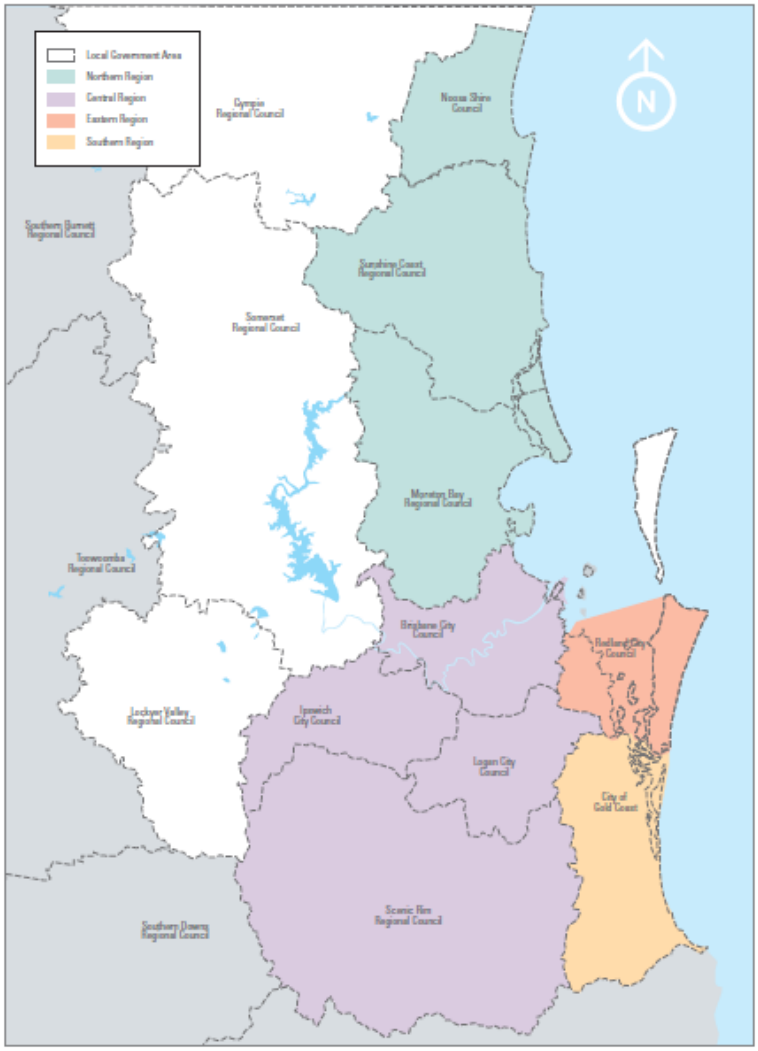


Figure A-1: Sub-regions of the South East Queensland Water Grid

Appendix B – Status of Water Security Program key actions

Note, only actions which remain outstanding or in progress will be reported in the next annual report. Ongoing projects are considered part of Seqwater's normal operations and will not be reported beyond this 2019 annual report. This action list will not be included in Water Security Program Version 3 unless there are outstanding actions to complete, and only those outstanding actions will be included.

Action	Status	Comment
Develop an overarching Water Security Program community engagement strategy which is staged, includes targeted objectives, aligns with the options assessment framework, and incorporates both community involvement in the development of the Water Security Program as well as to community education.	✓ Completed	Water Future Program in place
Develop a detailed plan of community engagement on drought, including both education and understanding preferences for: • drought demand management options, • system operation options (including the use of the WCRWS, contingent supply options for responding to drought, trade-offs and how they vary between options, and how they are used to respond to drought), and • the role of the community in drought.	✓ Completed	Water Future Program in place Drought communications and education programs in place and developing further as drought severity increases.
Develop a community education plan to maintain and expand on the community's water literacy, understanding of the water cycle and the concept of catchment to tap/bay, and understanding of different water security options and trade-offs.	✓ Completed	Water Future Program developed and being implemented.
Develop Seqwater's liveability objectives and the role of Seqwater in contributing to the liveability of the SEQ region, by: • Defining Seqwater's role in contributing to the liveability of the region, • In accordance with the defined role above, working with SEQ service providers, local councils and relevant government departments to define liveability objectives for the region, • Define water security related liveability objectives for incorporation into Version 3 of the Water Security Program.	In progress	Definition and roles and responsibilities developed with the SEQ Service Providers.

Action	Status	Comment
Develop an options assessment framework which will underpin progress toward meeting the United Nations definition of water security, which will balance multiple considerations and take into account broader societal impacts beyond the strict provision of bulk water service. The options assessment framework should: • Incorporate liveability into objectives of the framework • Broaden the consideration of the Total Economic Value of options, and • Expand the boundary of assessment (catchment-to-tap as opposed to a focus on the bulk water supply system in isolation).	In progress	Options assessment framework to include consideration of the UN Sustainable Development Goals. It is considered more appropriate to use the UNSDGs than the water security definition as it is more encompassing of sustainability and can be relatable to the SEQ situation. Liveability – developed definition and roles and responsibilities with SEQ Service Providers.
Work with water service providers and regulatory agencies to further develop the options assessment approach for future versions of the Water Security Program.	In progress	Working with the SEQ Service Providers to understand future need, impacts of possible options and agreement on the assessment process.
Improve decision support systems (i.e. enhance and refine modelling tools and build integration between tools) to reflect the options assessment framework, such that it can readily quantify and assess options and strategies for achieving Water Security for the region.	Ongoing	A review is underway.
Continuous improvements of demand forecasting, through: • Review of demand forecasting capability • Identifying opportunities for improvement (including market segmentation and the use of smart meters)	✓ Completed	Ongoing regular review occurs with SEQ Service Providers.
Integration of flood mitigation, dam safety and water security planning so that trade-offs can be concurrently assessed and planning is integrated.	In progress	Scoping considerations for Water Security Program Version 3
Expansion of scenario planning, to allow comprehensive scenario analysis to be undertaken such that the Water Security Program can adapt to a broader range of shocks and trends (scenarios to be developed as part of the options assessment framework).	✓ Completed	Scenario planning across the SEQ water industry completed. Six scenarios developed
Develop and implement a site security strategy for future water supply options, to ensure that suitable sites remain available and options are not inadvertently lost due to lack of a suitable site.	In progress	Significant progress made. Investigative work underway
Determine feasibility of interstate water transfers between QLD and NSW (hydrologic, economic and regulatory feasibility).	✓ Completed	Investigations occur when requests are received.

Action	Status	Comment
Continue investigations into the potential for implementing decentralised schemes on a sub-regional basis, to understand the role and feasibility of decentralised water schemes in SEQ (including consideration of scheme types, cost-benefit analysis, role in drought, contribution to resilience and contribution to liveability).	In progress	Seqwater is working with SEQ Service Providers and Councils to understand the costs and benefits of decentralised schemes in relation to water security. This work will be considered in Water Security Program Version 3.
Improve understanding of SEQ groundwater systems, their reliability and performance for improvement management and understanding of contribution to water security (i.e. refine groundwater model).	In progress	Study completed on Bribie Island aquifers. Work commencing to better understand the Brisbane aquifer system.
Identify shocks and trends that can impact on water security, the water supply system and/or specific options to adapt Water Security Program to changing influences.	✓ Completed	Completed as part of the scenario planning, United Nations Sustainable Development Goal, and climate change and greenhouse gas emissions projects.
Understand and adapt to potential impacts from climate change, including: • development and implementation of a climate adaptation strategy, • progression of paleoclimatic research, • monitoring and identifying potential changes, and • researching potential climate change and associated impacts for SEQ.	Ongoing	Adaptation strategy developed. Paleoclimate research underway. Work is ongoing exploring future climate impacts.
Influence and adapt to changes in policy and regulation which may impact on water security, including identification of policy or regulatory changes that may occur or that would improve water security, and development of actions plans to either influence or respond to changes.	✓ Completed	This is recognised and managed through the application of the Service Policy and Strategy Framework
Ensure the Water Security Program is reflective of societal needs and values, through ongoing community engagement and monitoring of demographics and regional growth through the demand forecasting network.	Ongoing	This work is being considered as part of the options assessment review.

Action	Status	Comment
Balance competing needs for resources to maintain water security for the SEQ region, through: • identification of competing needs, and • monitoring growth in industrial, tourism and commercial demand, changes in regional energy and food production, and demand for water-based recreation.	✓ Completed	Future scenario planning work has identified possible future competing needs. In addition, discussions with neighbouring communities have progressed to understand their possible future needs from SEQ. Through the Water Plan for SEQ and the connection with the Regional Plan greater clarity on growth will occur. Ongoing consideration of future impacts will occur through regular environmental scans, participation in water industry working groups, and other appropriate forums and research.
Maintain and improve where appropriate the impact on the environment in relation to water security (including assessment of impact on aquatic and terrestrial ecosystems, impacts on GHG emissions, and LCA / ecological footprint).	Ongoing	Source Protection Strategy developed setting out the principles by which Seqwater invests in catchment health to improve water quality. Rules are also being established to set expectations for environmental and sustainable performance of assets. Work is also underway to establish Seqawater's complete carbon footprint and explore opportunities for reduce this impact.
Achieve best for community outcomes in achieving water security for the region, monitoring changes to the economy and how this may change the cost-benefit of options and/or community views in relation to values of options. Includes: • understanding patterns of industrial and agricultural production, • monitoring changes in the Australian economy, water pricing and affordability • cost-benefit analysis of water security options	Ongoing	Cost benefit analysis to be considered further in the Options Assessment Framework review.

Action	Status	Comment
Adapt the program as technology changes to maintain best value for the community in achieving water security through both improved monitoring, modelling and analysis, and new and/or improved options. Includes monitoring of: • Advances in catchment monitoring • River and catchment restoration techniques • Quantification of dam storage using new technology • Advances in water treatment technology • Advances in water quality monitoring • Smart monitoring and use of big data • Analysis of emerging decentralised schemes	✓ Completed	This is addressed through the application of the Strategic Research Management Plan and membership to technical partnerships and advisory groups.
Develop a detailed drought response plan with SEQ service providers.	In progress	Seqwater has significantly progressed drought readiness documentation. This will be ongoing as drought progresses and additional plans are required. Drought simulation events held with the SEQ Service Providers. SEQ Service Providers developing drought readiness plans for their businesses in alignment with Seqwater's response.
Broaden involvement with SEQ's water service providers, and partner with them in the ongoing development and review of the Water Security Program so that future versions can provide more integrated outcomes. Includes: • Development of options assessment framework with SEQ service providers • Analysis of impacts from catchment to bay, incorporating impact on SEQ service provider systems	In progress	This action is well advanced. SEQ Service Providers participate in the Water Security Program Partner Panel which is a key contributor to the development of Water Security Program Version 3, including options assessment, decentralised schemes and liveability to name a few.
Work with DEWS (now DNRME) and other Queensland government departments to better align planning and review cycles (e.g. LOS objectives review, Water Security Program and price path).	✓ Completed	LOS review has been undertaken effectively with Seqwater with great understanding of the impact of timing on Water Security Program Version 3. Future legislative change should consider improved timing alignment of review with development of the Water Security Program.
Work with SEQ service providers, local councils and other relevant planning agencies to undertake integrated planning to achieve positive liveability outcomes for the region.	Ongoing	Commenced with the decentralised scheme discussions. Will progress to greater liveability discussions as part of Water Security Program Version 3 and the development of the Water Plan for SEQ.

Action	Status	Comment
Actively pursue partnerships with SEQ service providers, local government, non-government organisations and the Queensland government, to improve regional investments, reduce risk and resilience across the water cycle, and identify and deliver collaborative investment opportunities that will deliver multiple benefits to different stakeholders.	Ongoing	This action will progress as part of the Water Plan for SEQ development.
Complete a Water Security Program annual report. Report to include: - an annual water security assessment - an annual bulk water supply system status assessment, to determine the availability of supplies and operational status of the system - annual water usage monitoring and comparison with previous years, to determine if demand forecast assumptions remain valid or require further investigation or review - annual assessment of the SEQ regional water demand forecast, to determine if demand forecast is materially divergent from the forecast included in Version 2 such that it triggers a review of the forecast and of the Water Security Program. - annual regional water balance and confirm whether water security objectives can be achieved - annual assessment of GWS levels and climate outlook to assess probability and potential earliest timing of reaching drought triggers.	Ongoing	Ongoing each December. Report produced for 2017, 2018 and 2019.
Maintain and implement readiness plans for climate-resilient water assets, so that climate-resilient water assets are able to be used as required and needed.	✓ Completed	Completed and regularly updated.
Review and develop the next Version of the Water Security Program on a five-yearly basis.	Ongoing	Significant progress made towards the development of the next Water Security Program.
Develop and implement, revise and refine Water Security Program community engagement strategy on a five-yearly basis.	Ongoing	Well underway for Water Security Program Version 3
Finalise a risk assessment and quantify high priority extreme weather and climate change risks	In progress	Initial risk assessment completed
Determine an Seqwater resilience target and adaptation pathway and assess implications	Ongoing	Audits and assessments in progress
Quantify interdependent risks and collaborative adaptation pathways with external agencies	Ongoing	Collaborating with external agencies

Action	Status	Comment
Provide guidance to government in relation to developing regional resilience in the water supply industry	Ongoing	Progress on climate change considerations for Water Security Program Version 3
Develop and implement an adaptation strategy to ensure long term planning and investment takes into account the risk of climate change and appropriately factor the risk in forecast expenditure and demand	Ongoing	Progress on climate change considerations for Water Security Program Version 3
Maintain strategic engagement with Queensland Government on review of planning policy, state development master planning and with local government on local plans, so that development in our catchments considers water supply impacts	Ongoing	Ongoing discussions with government
Review and update the Seqwater development guidelines to provide guidance to government on the assessment of development applications	Ongoing	Ongoing engagement to inform guidance material
Provide informed input to the State Government processes that review economic regulation of water prices to ensure the impact of regulatory regimes on long term asset and supply sustainability is appropriately considered	Ongoing	Ongoing discussions with Government.
Provide information and contribute to national guidelines on water and recycled water quality and state based legislative frameworks so water quality continues to be protected within an efficient regulatory regime	Ongoing	Participate in national and state level discussions
Participate in research at a national level (WSAA and Water Research Australia) about alternative water sources	Ongoing	Contribute to WSAA and other projects which may inform research at this level
Continue to engage the community to inform and shape water security for the region	Ongoing	Water Future Program in place.
Conduct research and collaborate on research projects to better understand how the public value drinking water and perceive water quality risks	Ongoing	Projects underway
Participate in case studies of water sensitive developments (e.g. Aura development at Caloundra South) to determine the impact of water sensitive and climate adaptive development principles on demand and liveability	Ongoing	Participation in case studies completed. Further work being completed to understand the impact of decentralised schemes on water security for Water Security Program Version 3.
Work with Queensland Government departments to identify a process for securing sites to maintain flexibility to adapt to changing water security needs of the region	Ongoing	Discussions occurring as needed.
Complete the current quantitative assessments of impacts of water-based recreation and grazing on water quality and use this information to apply policy decisions	Ongoing	Assessments underway to inform policy decisions.
Engage with the electricity sector to understand the future electricity sources and how this may impact on demand	Ongoing	Engagement completed for 2019

Action	Status	Comment
Continue research to model future changes in catchment land use under various scenarios to better understand impacts on catchment-based water supplies	Ongoing	Research ongoing
Develop the quantitative risk assessment tools used for impact assessment over the past two years to aid the ongoing identification, quantification and management of risks to drinking water quality from all potential sources	Ongoing	Several research projects underway, some completed.
Continue research to investigate and quantify how investment in catchments can improve drinking water quality outcomes	Ongoing	Catchment decision support system operationalised
To better understand potential risks to water security continue modelling how water quality in our storages may be affected by catchment degradation and a changing climate over the long term and use the outcomes to inform long-term catchment planning	Ongoing	Long term planning reports for catchments prepared.
Examine the paleoclimate record to determine whether our current projections of rainfall and catchment yield are based on data that is representative of the climate extremes that could occur in the future	Ongoing	Research underway
Review information gaps and legislative opportunities to collaborate with local government and water service providers to develop common objectives in investing in a future based on total economic value for the region	Ongoing	The Water Security Program Partner Panel considers such topics and is working towards the Water for SEQ Plan which will be the first step towards common objectives, which will eventually consider total economic value for the region.
Further investigate the economic impacts of supply, demand and system options	Ongoing	Demand management assessment economic framework completed. Options assessment under review.
Monitor trends in the local and global economy that may influence water security in the region	Ongoing	Ongoing monitoring
Developing better water quality monitoring and analytical methodologies to inform risk assessment and reduce costs associated with different water supply options	Ongoing	Ongoing improvement in water quality monitoring and analytical methodologies
Developing models and decision support tools that utilise the latest technology to guide investment planning	Ongoing	Ongoing development of models and tools

Action	Status	Comment
Seqwater will continue to participate in quarterly technology reviews with its peers in the water industry through WSAA and to participate in technology trials with water service provider partners. The following areas of technology implementation have been highlighted for the next two years: - utilising the latest technological innovations to accurately quantify reservoir storage capacity and understand the factors that reduce capacity - investigate and trial advances in water treatment technology for all types of water sources	Ongoing	Undertaking research to quantify rate of sedimentation. Advances in water treatment- moving bed bioreactor treatment process. Considering energy efficiency with the pumping strategy.
Using advanced measuring and modelling techniques to accurately measure and predict asset condition	Ongoing	Ongoing planning and assessment regarding asset condition
Continue to work with water service providers to understand the role and benefits of smart metering, monitor consumption trends, incorporate results in future planning and consider how best to use the technology to increase the community's water efficiency awareness	Ongoing	Demand Forecasting, Demand Management and Communications networks with the SEQ Service Providers consider these issues.

Appendix C – Status of Water Security Program review triggers

Water Security Program Version 2 is the first time that a full five-year review period has occurred. Based on this experience, learnings have indicated that many of the review triggers established by Seqwater for Water Security Program Version 2 are not required. Generally, as they are slow moving changes or changes that impact Seqwater's operation rather than immediately impact on long-term water security or ability to meet the Region's water needs during a drought. Hence, such review triggers are no longer required. Where removal of the trigger is indicated below the trigger will no longer be reported against. New triggers, reflective of the learnings since 2017, will be detailed in Water Security Program Version 3.

Seqwater is committed to water security and an adaptive response. The removal of review triggers will not hinder Seqwater in making any necessary reviews between Water Security Program cycles, but will remove the need to undertake reviews on matters that may no longer be of relevance from a long-term planning perspective given the five yearly review process of the Water Security Program.

Regional review triggers

Trigger Category	Trigger	Status 2019	Comments / next steps
Demand	Demand forecast ± 10%, due to any reason, including: - Demand growth distribution changes significantly - Demand behaviours change	Demand on a fortnightly basis fluctuated due to long-dry conditions. However did not vary on average across the year by 10%	Demand will fluctuate for a range of reasons. A 10% variation may not result in any issue for water security in the short term, especially where the Water Grid can meet demand. Any changes in water demand will be reviewed at the five yearly Water Security review basis and reported annually in the Water Security Annual Report. **This criteria will no longer be assessed as a review trigger for the Water Security Program.**
Demand	Increased prevalence of decentralised solutions and/or integrated regional planning alters distribution and degree of growth in demand	No significant change	Changes such as decentralised schemes to the point of making a marked difference in demand are slow moving. Such a review will occur every five years when the Water Security Program is reviewed. **This criteria will no longer be assessed as a review trigger for the Water Security Program.**
Regulation	Drinking water quality requirements change significantly, which may impact	No significant change	There are generally long lead times to make changes to treatment plants and operations in relation to such regulatory changes. Such changes will be assessed

Trigger Category	Trigger	Status 2019	Comments / next steps
	on treatment requirements and thus costs of surface water supplies to a greater degree than climate resilient supplies		every five years when the Water Security Program is reviewed. **This criteria will no longer be assessed as a review trigger for the Water Security Program.**
Regulation	LOS objectives revised	LOS revised. No significant change to trigger a revised Water Security Program	The LOS is reviewed every five years, post the release of the Water Security Program. The timing of the review is to allow time to complete the review and provide the outcomes to Seqwater, still enabling sufficient time for Seqwater to complete the review of the Water Security Program using the revised LOS. **This criteria will no longer be assessed as a review trigger for the Water Security Program**. Where a change to the Water Security Program is required earlier, this will be directed by the Regulator.
Regulation	Regulated requirements change (re: drought response)	No regulated change	Regulated changes generally have long lead times. Such changes will be assessed every five years when the Water Security Program is reviewed. **This criteria will no longer be assessed as a review trigger for the Water Security Program**. Where a change occurs and the Regulator advises that there is a significant impact on the drought response approach in the Water Security Program, an addendum for the drought response approach will be prepared.
Regulation	Policy or climate variability reduces surface water allocations available over time	No change	These changes generally have long lead times. Such changes will be assessed every five years when the Water Security Program is reviewed. **This criteria will no longer be assessed as a review trigger for the Water Security Program.**
Regulation	Government policy removes an option from consideration	No change	Such changes generally require significant planning and investigation to determine the option. Consequently, this would be considered as part of the five yearly Water Security Program review. Where required by the Regulator, an addendum to the Water Security Program removing the option will be prepared. **This criteria will no longer be assessed as a review trigger for the Water Security Program**.
Supply - planning	Innovations in desalination and purified recycled water treatment significantly reduce the cost of these options while maintaining or increasing their reliability improving their performance compared to other sources of water	No significant change	Such changes would take time to implement and would therefore be considered as part of the five yearly review of the Water Security Program. **This criteria will no longer be assessed as a review trigger for the Water Security Program**.

Trigger Category	Trigger	Status 2019	Comments / next steps
Supply - planning	Changing availability of land and/or incompatible investment in neighbouring land	No significant change	Investigations into alternative sites has a long lead time. Consideration of alternative sites will occur as part of the five yearly Water Security Program review. **This criteria will no longer be assessed as a review trigger for the Water Security Program.**
Supply - planning	Site-specific assessments identify issues with efficient supply options	No significant change	Investigations into alternative sites has a long lead time. Consideration of alternative sites will occur as part of the five yearly Water Security Program review. **This criteria will no longer be assessed as a review trigger for the Water Security Program.**
Supply - treatment	±10% permanent change to grid WTP production capability	No significant change	Changes to the WTP production capacity occur as a result of water quality guidelines and other actions. These matters are reviewed at each five yearly Water Security Program review and necessary amendments made to base case and operational changes reflected in the Program. **This criteria will no longer be assessed as a review trigger for the Water Security Program.**
Supply - operation	WCRWS recommissioned	Not recommissioned in 2019	The Water Security Program details when the WCRWS will be recommissioned. Hence the recommissioning of WCRWS in alignment with the Water Security Program should not result in a review of the Water Security Program. **This criteria will no longer be assessed as a review trigger for the Water Security Program.**
Supply - operation	Change to operating FSL of a GWS	Changes to the FSL have occurred on a number of Water Grid storages since 2019. These changes have been required for dam safety reasons. None of the lowerings have resulted in a significant risk to regional water security.	A water security assessment occurs each time the FSL are changed. Generally, due to the operation the Water Grid, the water security risk can be managed. Where the change impacts on long-term water security and an immediate change is required (e.g. new infrastructure) an addendum to the Water Security Program would be required. **Where the need is not immediate, this change would be captured in the five yearly review of the Water Security Program.**
Climate	Drought occurs	A sub-regional drought occurred in the	The Water Security Program contains the drought response, hence the triggering of drought should not trigger a review of the Water Security Program. Where there is a

Trigger Category	Trigger	Status 2019	Comments / next steps
		northern sub-region in 2017 and recovered in 2018. The current drought situation	significant change to the drought response an addendum to the Water Security Program will be made to detail the revised drought response. Consideration of the need for the revised drought response addendum will be given at the time with the Regulator in relation to the due date of the next Water Security Program. Hence, **this criteria will be amended from 2020 to: 'Significant change to drought response approach has occurred'.**
Climate	Climate change results in reduced rainfall (and thus water availability) and/or increasingly intense rainfall events which may impact on water quality, reducing the ability of the system to treat and supply surface water	Weather conditions have been variable. Recent climate research shows clear indications of climate change. The indicator for rainfall however is still variable between the models.	This is a slow changing event and will be captured as part of the five yearly Water Security Program review process. **This criteria will no longer be assessed as a review trigger for the Water Security Program.**

Off-grid review triggers

The off-grid communities had specific review triggers identified in Water Security Program Version 2 as shown below. An assessment has been completed which indicates that all triggers are reviewed as part of the Water Security Program five yearly review and therefore that the criteria will no longer be assessed as a review trigger for the Water Security Program.

Community	Storage triggers	Demand Triggers		
		LOS yield	Treatment capability	
		AD demand (ML/a)	*AD demand (ML/d)*	*Equivalent MDMM (ML/d)*
Beaudesert	Maroon Dam ≤ 10,000 ML or 25% FSL	NA	> 2.3 ML/d	> 3.5 ML/d
Boonah-Kalbar	Moogerah Dam ≤ 25% FSL	≥ 800 ML/a	≥ 1.5 ML/d	≥ 2.2 ML/d
	Warrill Valley water supply scheme MP) entitlement usage > 50% of announced MP entitlements			
Canungra	NA	≥ 130 ML/a	≥ 0.86 ML/d	≥ 1.2 ML/d
			NA	*AFTER WTP UPGRADE:* Demand likely ≥ 20hr capacity of the upgraded WTP within a 2-year period
Amity Point	Significant changes to groundwater behaviour	≥ 160 ML/a	≥ 0.71	≥ 1.2 ML/d
			If likely ≥ 1.5 ML/d within a 2-year period	NA
Point Lookout	Significant changes to groundwater behaviour	≥ 600 ML/a	≥ 0.88 ML/d	≥ 1.6 ML/d
			If likely ≥ 1.3 ML/d within a 2-year period	NA
Dunwich	Significant changes to groundwater behaviour	≥ 400 ML/a	≥ 0.61 ML/d	≥ 0.92 ML/d
			If likely ≥ 1.2 ML/d within a 2-year period	NA
Dayboro	NA	≥ 220 ML/a	≥ 0.48 ML/d	≥ 0.72 ML/d
			NA	*AFTER WTP UPGRADE:* equivalent of 80% of the available capacity
Esk	NA	≥ 300 ML/a	≥ 0.56 ML/d	≥ 0.84 ML/d
Jimna	NA	≥ 16 ML/a	≥ 0.017 ML/d	≥ 0.053 ML/d
Kenilworth	NA	≥ 150 ML/a	≥ 0.23 ML/d	≥ 0.35 ML/d
Kilcoy	NA	≥ 1200 ML/a	≥ 2.3 ML/d	≥ 3.2 ML/d
Kooralbyn	NA	≥ 360 ML/a	≥ 0.60 ML/d	≥ 0.91 ML/d
Linville	NA	≥ 28 ML/a	≥ 0.040 ML/d	≥ 0.080 ML/d
Lowood	NA	NA	≥ 10 ML/d	≥ 15 ML/d
Rathdowney	NA	≥ 64 ML/a	≥ 0.13 ML/d	≥ 0.20 ML/d
Somerset	NA	≥ 32 ML/a	≥ 0.1 ML/d	≥ 0.15 ML/d

Appendix D – Sub-regional storage drawdowns

The information and graphs below show for each key storage:

- The January and December 2019 recorded storage levels (actual observed)
- How the system would have responded to Millennium Drought inflows with the current drought response approach (including the Water Grid, GCDP and WCRWS) for that storage/s, based on the drawdown since June 2015
- The Design Drought drawdown. The Design Drought was developed based on data from our stochastic record to define a potential drought worse than the Millennium Drought for that storage/s, based on the drawdown since June 2015.

Wivenhoe and Somerset Dams

Over 2019 Wivenhoe Dam dropped from 67.25% to 46%, and Somerset Dam from 77.42% to 65.8%.

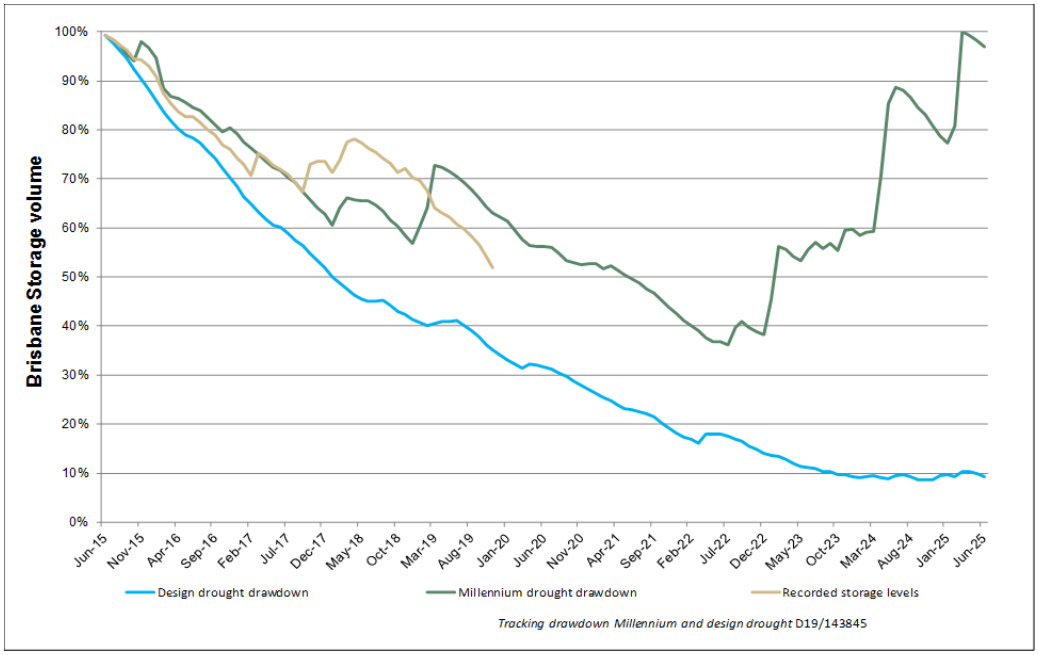


Figure D-1: Drawdown of combined Wivenhoe and Somerset storages commencing June 2015

Figure D-1 shows the combined storage level of Wivenhoe and Somerset dams since end of June 2015, representing 70.3% of the WGS capacity at full supply, tracked against the millennium and design drought inflow drawdowns over the same period. Based on this set of simulations the actual storages have tracked along the millennium drought but have since diverged and are now, as at December 2019 are between the millennium and design drought simulated storage levels.

Hinze Dam

Hinze Dam dropped from 95% to 85% to over 2019.

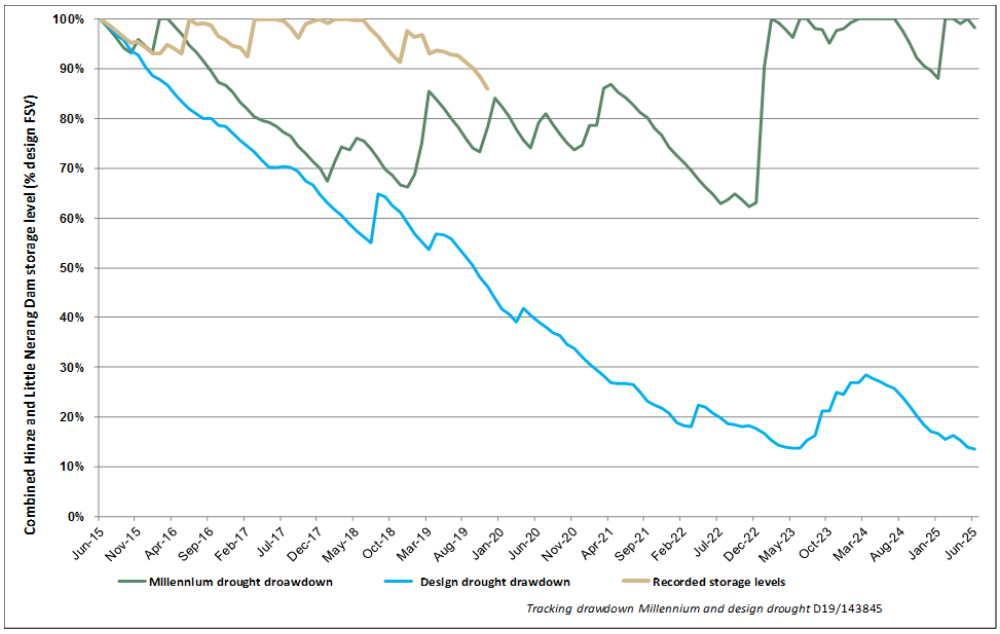


Figure D-2: Gold Coast System drawdown commencing June 2015

Figure D-2 shows that the Gold Coast storages (Hinze and Little Nerang dams) have tracked above the simulated millennium and design drought inflow drawdowns.

Baroon Pocket Dam

Baroon Pocket Dam dropped from 99.8% to 81.7% over 2019.

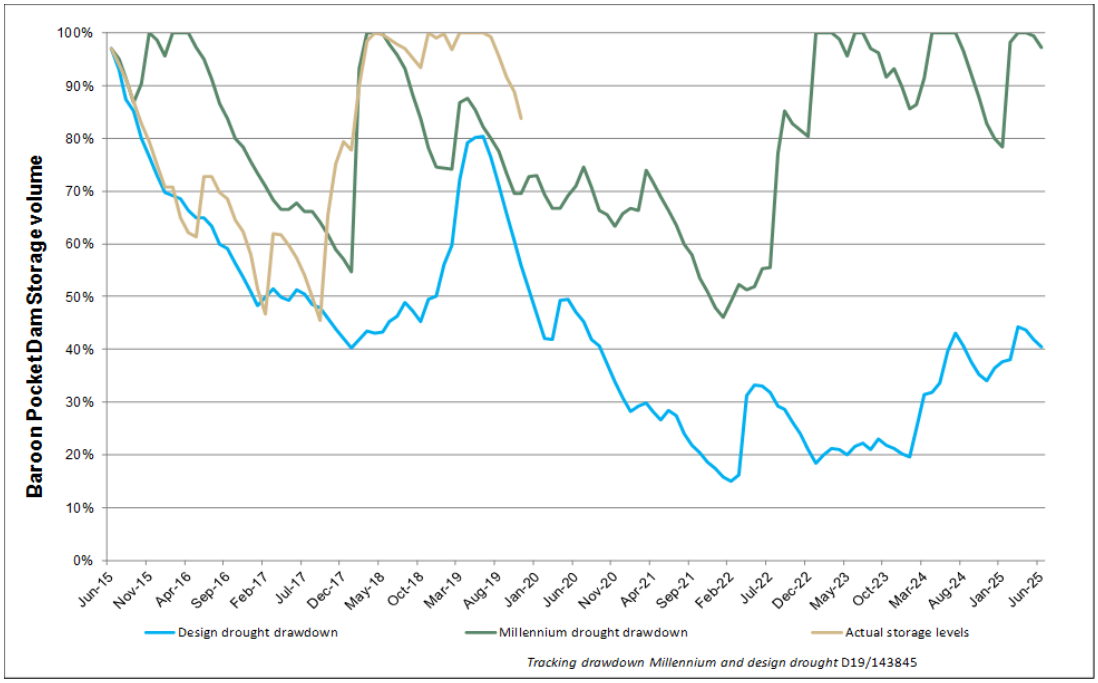


Figure D-3 Baroon Pocket drawdowns commencing June 2015

Figure D-3 shows that while the storage did track along the design drought inflow drawdown from June 2015, inflows in late 2017 saw the storage jump up to millennium drought or higher since. Baroon is now well above the millennium drought drawdown.

North Pine Dam

North Pine Dam dropped from 76.5% to 59% over 2019.

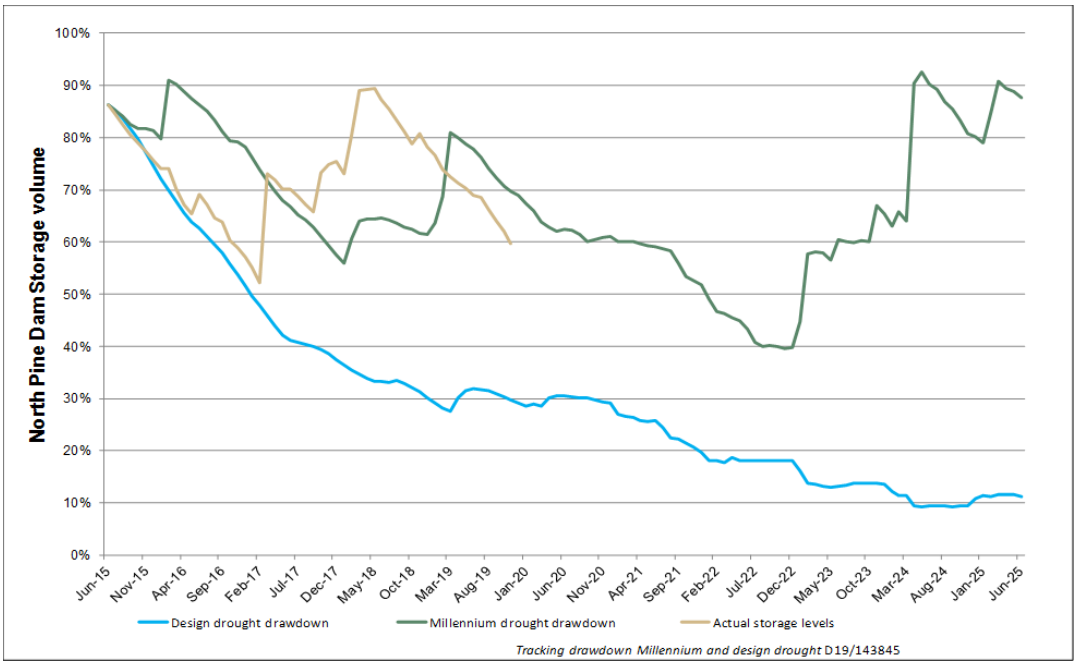


Figure D-4: Drawdown of North Pine Dam commencing June 2015

Figure D-4 shows that although North Pine Dam received some good inflows in late 2017 the drawdown rate on this storage since then has been similar to the design drought drawdown rate. North Pine Dam is a critical asset for supply to the Northern sub-region and Seqwater will continue to monitor and manage this storage for long term water security.

Leslie Harrison Dam

Leslie Harrison Dam dropped from 43.3% to 30.2% over 2019.

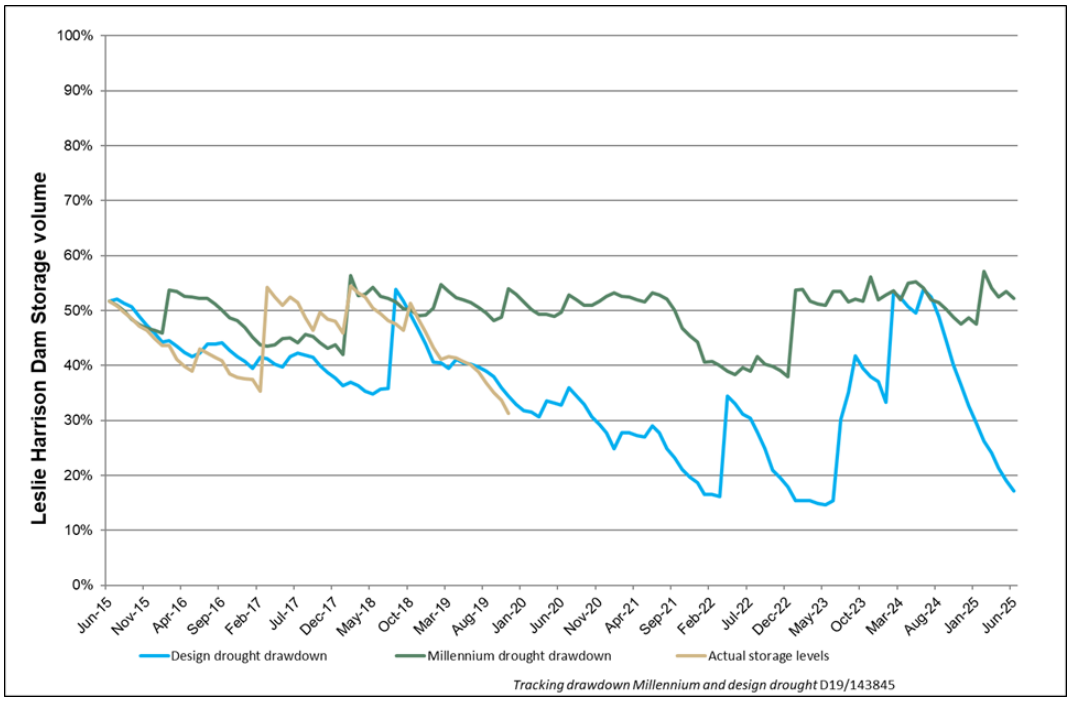


Figure D-5: Eastern sub-region drawdown commencing June 2015

Figure D-5 shows that the Leslie Harrison Dam has been tracking along the design drought drawdown for most of 2019. As the key water supply for the eastern sub-region this dam will be monitored closely.