

Great Artesian Basin Groundwater Sources

Groundwater annual report 2023.

Introduction

This report is a summary of water accounts, volume pumped and groundwater levels for the Great Artesian Basin groundwater sources (GAB groundwater sources) for the period 1 July 2022 to 30 June 2023 including the start of year water account volumes for the 2023/2024 water year (1 July to 30 June).

For detailed information of the hydrogeology, management and past long-term water level behaviour of this water source refer to the Groundwater Resource Description Report for the NSW Great Artesian Basin: www.industry.nsw.gov.au/___data/assets/pdf_file/0007/291175/nsw-gab-resource-description-report.pdf

Description

The Great Artesian Basin (GAB) is Australia's largest groundwater basin, spreading across 1.7 million square kilometres of New South Wales (NSW), Queensland, South Australia and Northern Territory, which is approximately 22% of Australia.

The NSW GAB occurs across north-western NSW (Figure 1) and includes the following groundwater sources:

- Central Groundwater Source
- Eastern Recharge Groundwater Source
- Southern Recharge Groundwater Source
- Surat Groundwater Source
- Warrego Groundwater Source

The GAB groundwater sources are comprised of sedimentary rock layers that form aquifers and aquitards containing groundwater that is mostly under artesian conditions.

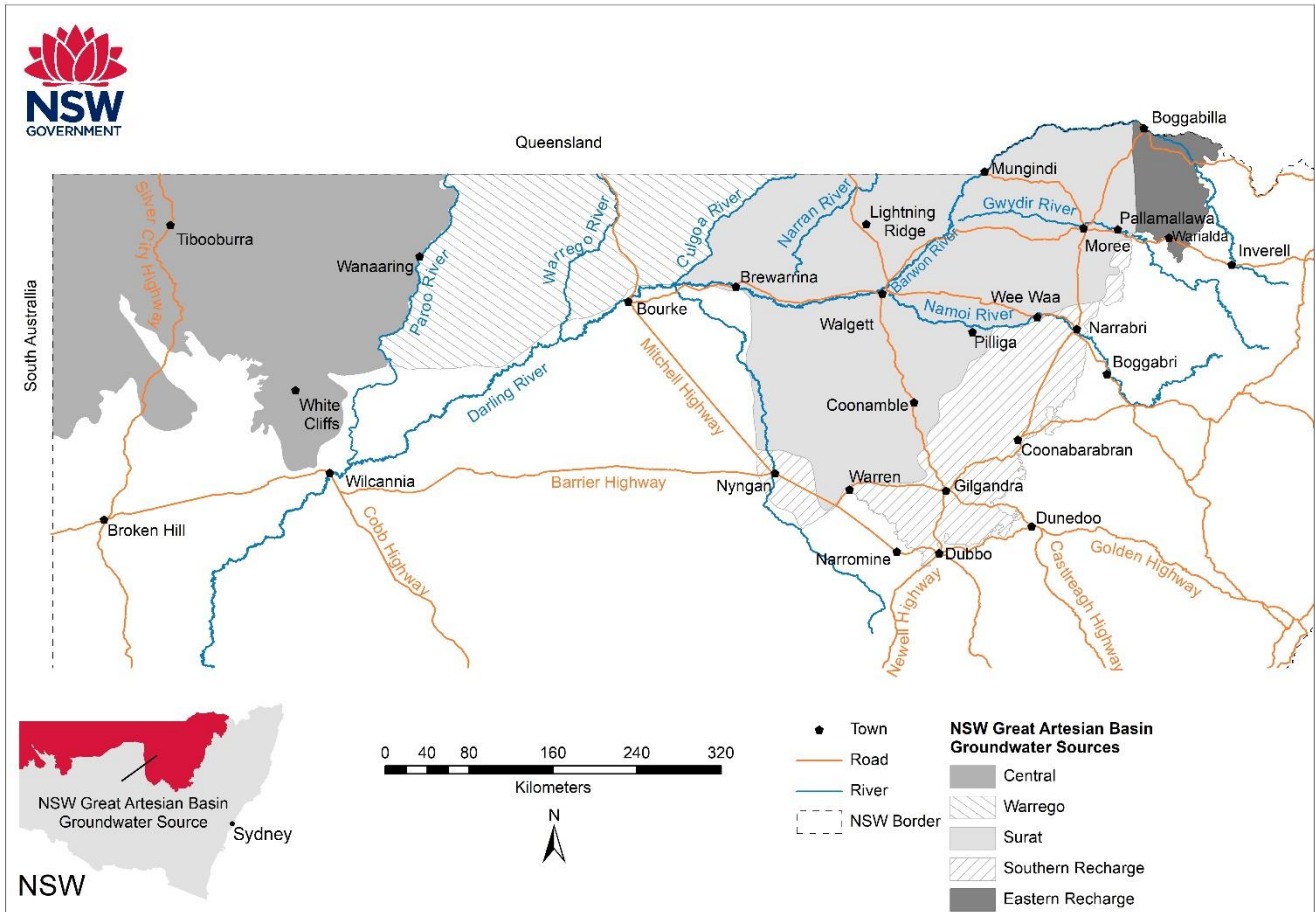
Water resource management

Water sharing plan

The GAB groundwater sources are managed by the rules defined in the Water Sharing Plan for the NSW Great Artesian Basin Groundwater Sources 2020.

These water sharing plans are available for viewing on the Department of Planning and Environment website at: water.dpie.nsw.gov.au/plans-and-programs/water-sharing-plans/status/barwon-darling-and-west-region

Figure 1: Location map



Basic rights

Basic landholder rights are available in this groundwater source for domestic and stock watering requirements. Whilst landholders don't need an access licence to take water for stock and domestic purposes from groundwater underlying their property, the bore must be authorised by WaterNSW.

The volumes of water set aside in the water sharing plan for basic landholder rights are:

- Central Groundwater Source: 3,800 megalitres (ML)
- Eastern Recharge Groundwater Source: 3,200 ML
- Southern Recharge Groundwater Source: 13,500 ML
- Surat Groundwater Source: 20,400 ML

- Warrego Groundwater Source: 3,600 ML

An approval holder is responsible for monitoring water quality from the bore to ensure it is suitable for its intended purpose for the duration of the approval. Inherent water quality and land use activities may make the water in some areas unsuitable for use. Water from the groundwater sources should not be used without first being tested and, if necessary, appropriately treated to ensure it is fit for purpose. Such testing and treatment are the responsibility of the water user.

Groundwater access licences

Groundwater access licence share components to 30 June 2023 are presented in Table 1.

Table 1: GAB groundwater sources share component at 30 June 2023

Water Source & Access Licence Category	Number of Licences	Total Volume
Central Groundwater Source		
Local water utility ¹	1	25
Aquifer ²	11	43
Eastern Recharge Groundwater Source		
Domestic and stock [town water supply] ¹	1	32
Aquifer ²	83	34,974
Southern Recharge Groundwater Source		
Local water utility [domestic and commercial] ¹	1	200
Local water utility ¹	9	3,066
Aquifer ²	162	24,687
Surat Groundwater Source		
Local water utility [domestic and commercial] ¹	1	400
Local water utility ¹	11	3,393
Aquifer [town water supply] ²	1	25

Water Source & Access Licence Category	Number of Licences	Total Volume
Aquifer ²	52	5,277
Warrego Groundwater Source		
Local water utility ¹	3	252
Aquifer ²	6	406

¹ Megalitres/year (ML)

² Megalitres per unit share

Extraction limit

All groundwater sharing plans have rules to manage extraction in a water source to the long-term average annual extraction limit.

The extraction limits for the GAB groundwater sources are listed in Table 2.

Table 2: Extraction limits for the GAB groundwater sources

Water Source	Extraction limit (ML/year)
Central Groundwater Source	5,193*
Eastern Recharge Groundwater Source	16,200
Southern Recharge Groundwater Source	38,700
Surat Groundwater Source	43,446*
Warrego Groundwater Source	8,816*

*The extraction limits for Surat, Warrego and Central groundwater sources will vary over the term of the water sharing plan depending on the water savings made under the cap and pipe projects undertaken after 1 July 2020.

Extraction in the GAB groundwater sources is not compliant if the 5 years average annual extraction (the assessment period) is more than 110% of the extraction limit (known as the compliance trigger). If average extraction exceeds the compliance trigger, then the available water determination made for aquifer access licences for the following water year may be reduced by an amount that would return total extraction to the extraction limit.

Information on tracking groundwater extraction against extraction limit for the groundwater source including the likelihood of compliance being triggered in the current water year can be found at: water.dpie.nsw.gov.au/allocations-availability/extraction-limits/tracking-groundwater

For each inland groundwater source, the tracking dashboard shows for the current water year:

- volume that if extracted will reach the compliance trigger (in ML, calculated annually)
- volume remaining to be extracted before reaching the compliance trigger (in ML, calculated throughout the year)
- likelihood that access to groundwater may be reduced in the next water year.

Note: the information on the dashboard is limited by the extraction data available at the time.

Available water

Total water availability in a water year is controlled by the available water determination (AWD) credited to an access licence account, and the carryover rules that dictate the allowable volume to be brought forward from one year to the next.

Total available water for use is controlled by the annual account usage limits, which define the maximum volume of allocated water that can be taken in that water year. The rules and limits that are applicable to the GAB groundwater sources are provided in **Table 3**.

Table 3: GAB groundwater sources access licence account rules

Access Licence Category	Carryover Limit	Annual Use Limit	Maximum AWD
Local Water Utility	0%	100%	100%
Domestic and Stock Access Licences	0%	100%	100%
Aquifer	0.6 ML/share	1.3 ML/share	1 ML/share
Aquifer (Town Water Supply)	0.6 ML/share	1.3 ML/share	1 ML/share

The maximum amount of water that can be debited from an aquifer access licence account in a water year can't exceed 1.3 ML per unit share component (annual use limit) plus any allocation transferred in (temporary trade), and minus any allocation transferred out. This means that metered extraction plus transfers out can't exceed 130 per cent of the of share component, unless water is transferred in.

Total account water for period 2014/2015 to 2022/2023 is displayed in **Figure 2 to Figure 5** showing the proportion available for use and what is not available for use in a year. Total yearly extraction is also displayed. Note: all access licence categories have been combined in these figures.

Prior to 2018/2019 there were no reduction in available water determinations for aquifer access licences in the Eastern Recharge Groundwater Source. A reduction in AWD was first made in July 2018 and the AWDs for the last six years (i.e., since 2018) is summarised below.

- 2018/2019 - 0.50 ML/share
- 2019/2020 – 0.32 ML/share
- 2020/2021 – 0.25 ML/share
- 2021/2022 – 1.0 ML/share (initially 0.38 ML/year, then 0.62 ML/share on 24 September 2021).
- 2022/2023 – 1.0 ML unit share
- 2022/2024 - 1.0 ML unit share

The access licence account information for the GAB groundwater sources on 1 July 2023 is summarised in **Table 4**.

Table 4: Licence account information for GAB groundwater sources on 1 July 2023

GAB Groundwater Source	Central	Eastern Recharge	Southern Recharge	Surat	Warrego
Carryover in	26 ML	20,537 ML	14,663 ML	3,039 ML	237 ML
Available water determination	68 ML	35,006 ML	27,953 ML	9,095 ML	658 ML
Total water in account	93 ML	55,543 ML	42,616 ML	12,134 ML	895 ML
Total water available for use:	80 ML	45,191 ML	35,284 ML	10,629 ML	773 ML

Figure 2: Account water availability and usage summary for GAB Central Groundwater Source

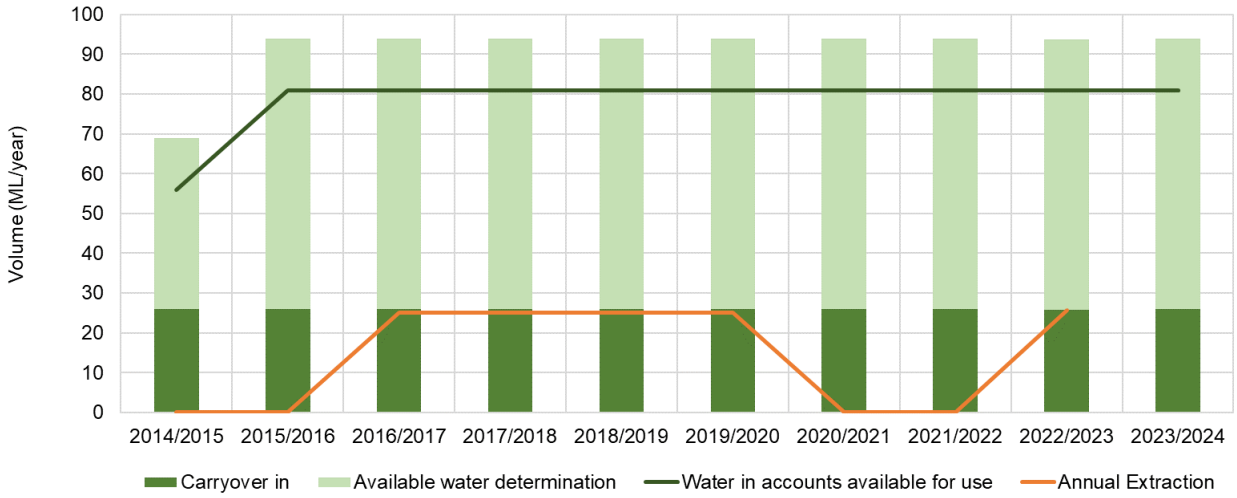


Figure 3: Account water availability and usage summary for GAB Eastern Recharge Groundwater Source

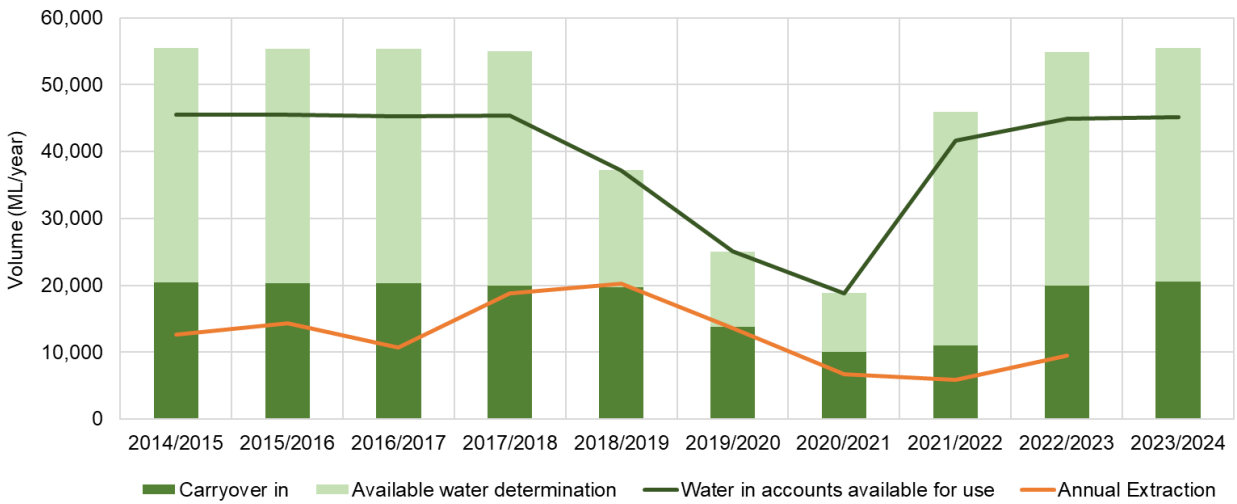


Figure 4: Account water availability and usage summary for GAB Southern Recharge Groundwater Source

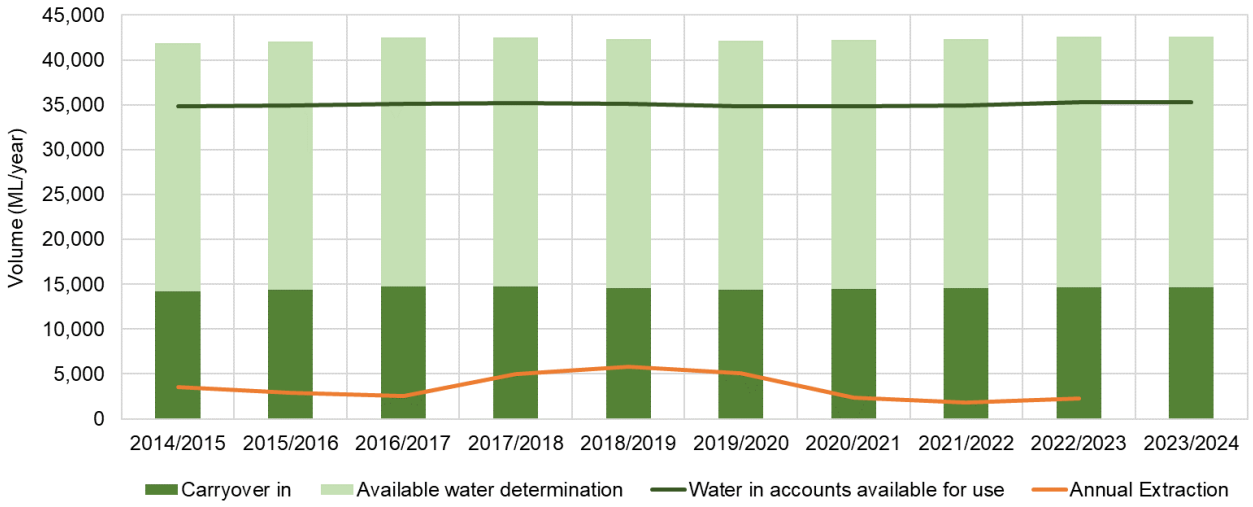


Figure 5: Account water availability and usage summary for GAB Surat Groundwater Source

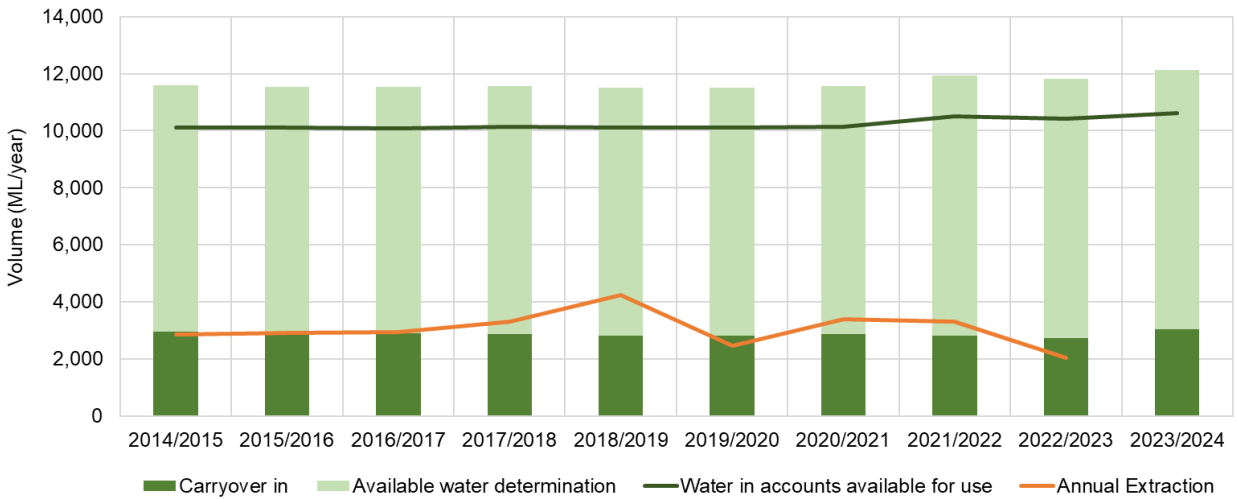
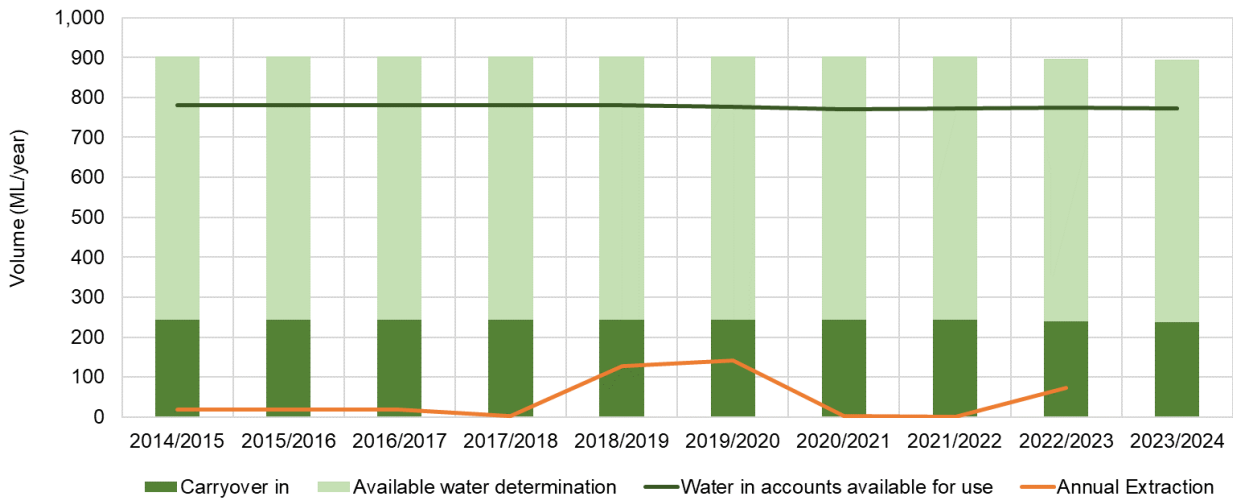


Figure 6: Account water availability and usage summary for GAB Warrego Groundwater Source



Groundwater trading

Trades are allowed within the Eastern Recharge and Southern Recharge groundwater sources. You can't trade between these groundwater sources or with any other groundwater source.

Trades are allowed between the Surat, Warrego and Central groundwater sources, but not between them and any other groundwater source.

No trading is currently allowed between states.

Allocation assignments (temporary trade)

Trading statistics for the Eastern Recharge Groundwater Source and Southern Recharge Groundwater Source and Surat Groundwater Source are illustrated in Figure 7, Figure 8 and Figure 9, respectively. These graphs exclude temporary trades for less than \$1 per megalitre. There has been no temporary trading in the Eastern Recharge, Southern Recharge, Surat, Central, and the Warrego groundwater sources during the 2022/2023 water year.

Further information on water licences, approvals, water trade, water dealings and other matters related to water entitlements in NSW, can be found on the NSW Water Register at:

waterregister.watarnsw.com.au/water-register-frame

Figure 7: Eastern Recharge Groundwater Source temporary trade statistics

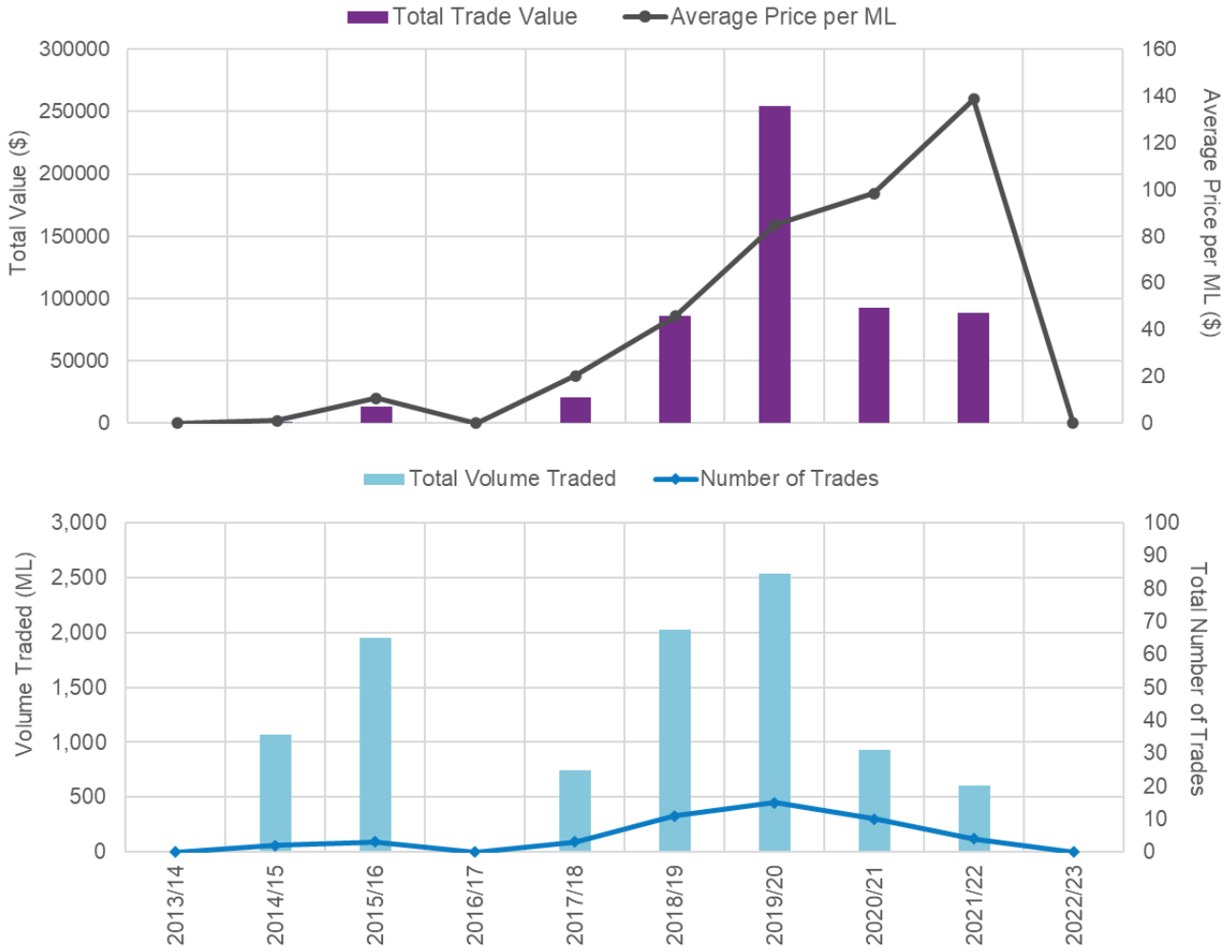


Figure 8: Southern Recharge Groundwater Source temporary trade statistics

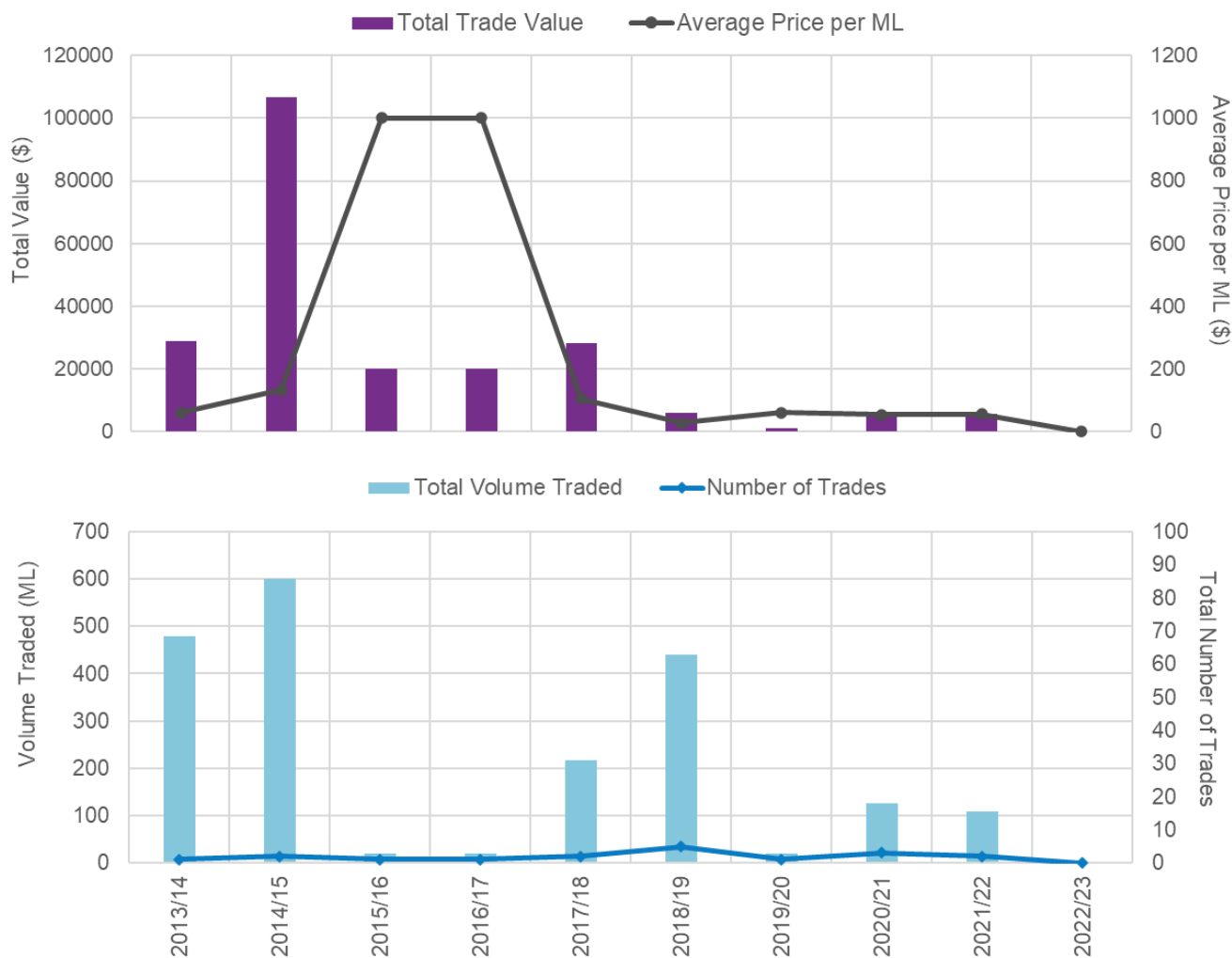
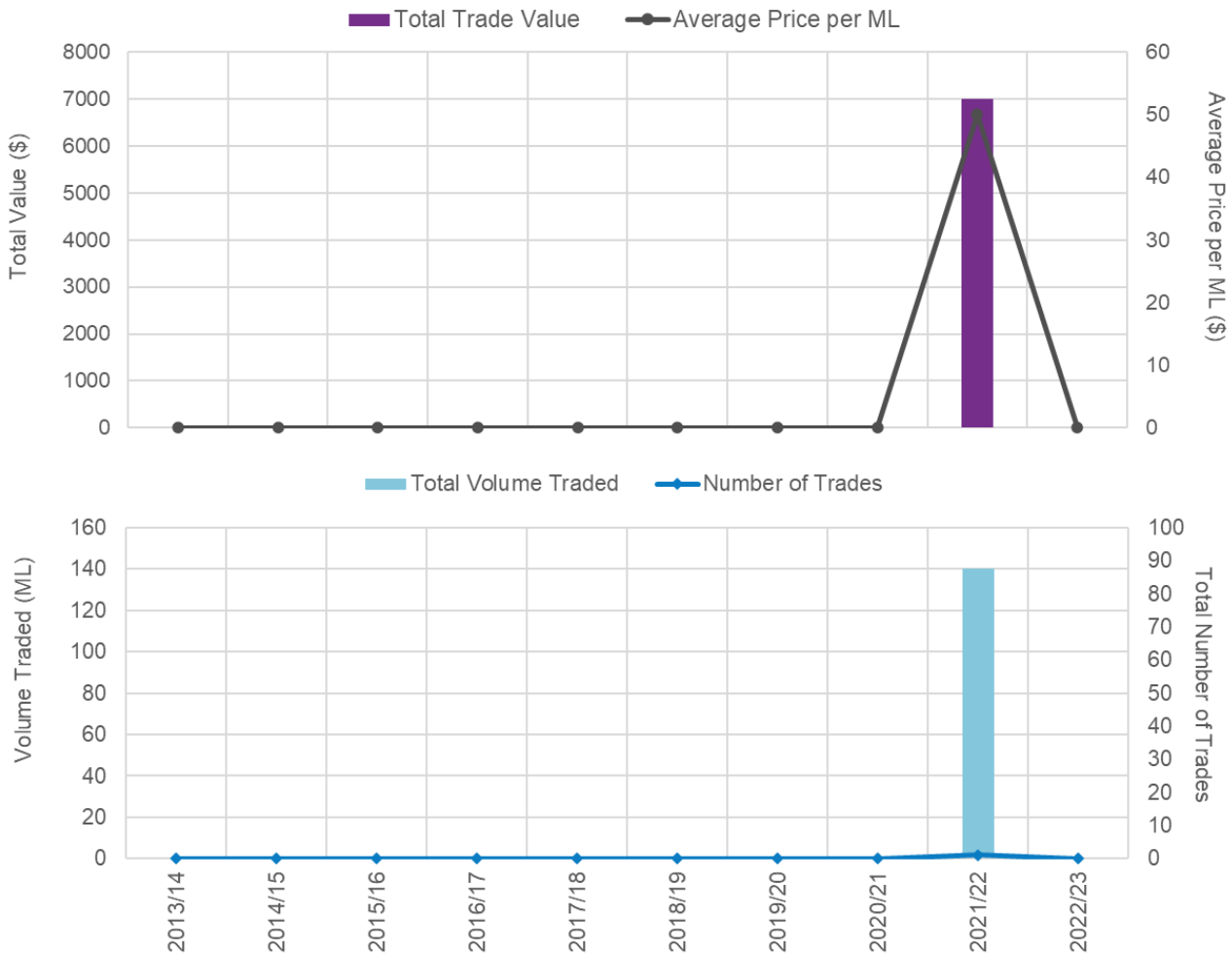


Figure 9: Surat Groundwater Source temporary trade statistics



Bores

There are approximately 8,264 registered bores across the GAB Groundwater Sources (Figure 10). The majority of these bores are used for stock and domestic purposes (Basic Landholder Rights). There is also use of groundwater for irrigation (Table 6).

Average extraction from individual production bores is around 120 ML/year (Figure 11).

Production bores in the GAB groundwater sources are concentrated in the Eastern Recharge Groundwater Source and Southern Recharge Groundwater Source, with lesser amounts in the other three groundwater sources diminishing further to the west.

Table 6: Approximate number of licensed bores in the GAB Groundwater Sources (2023)

GAB Groundwater Source	Registered Bore Purpose		
	Basic Landholder Rights	Production	Local Water Utility
Central	753	9	1
Eastern Recharge	753	118	0
Southern Recharge	4,349	200	36
Surat	1,321	55	20
Warrego	671	6	8

Water level monitoring

WaterNSW monitors groundwater levels in 90 pipes at 57 sites in the Eastern and Southern Recharge groundwater sources. Artesian pressure, flow and temperature are monitored in 66 private bores in the Central, Warrego and Surat groundwater sources (Figure 12).

At some monitoring sites there are two or more pipes monitoring different depths. The depth monitored by each pipe reflects the depth where the casing is slotted to allow groundwater entry into the pipe.

A hydrograph is a plot of groundwater level or pressure from a monitoring bore over time. A representative sample of hydrographs from monitoring bores have been selected and are presented in Figure 13 to Figure 29.

Data for the monitored bores as well as private bore information can be obtained from the WaterNSW real time data portal at: realtimedata.waternsw.com.au/

It includes data for 33 groundwater monitoring sites in real-time via telemetry. You can also request information via: Customer.Helpdesk@waternsw.com.au

Figure 10: GAB groundwater sources registered bores

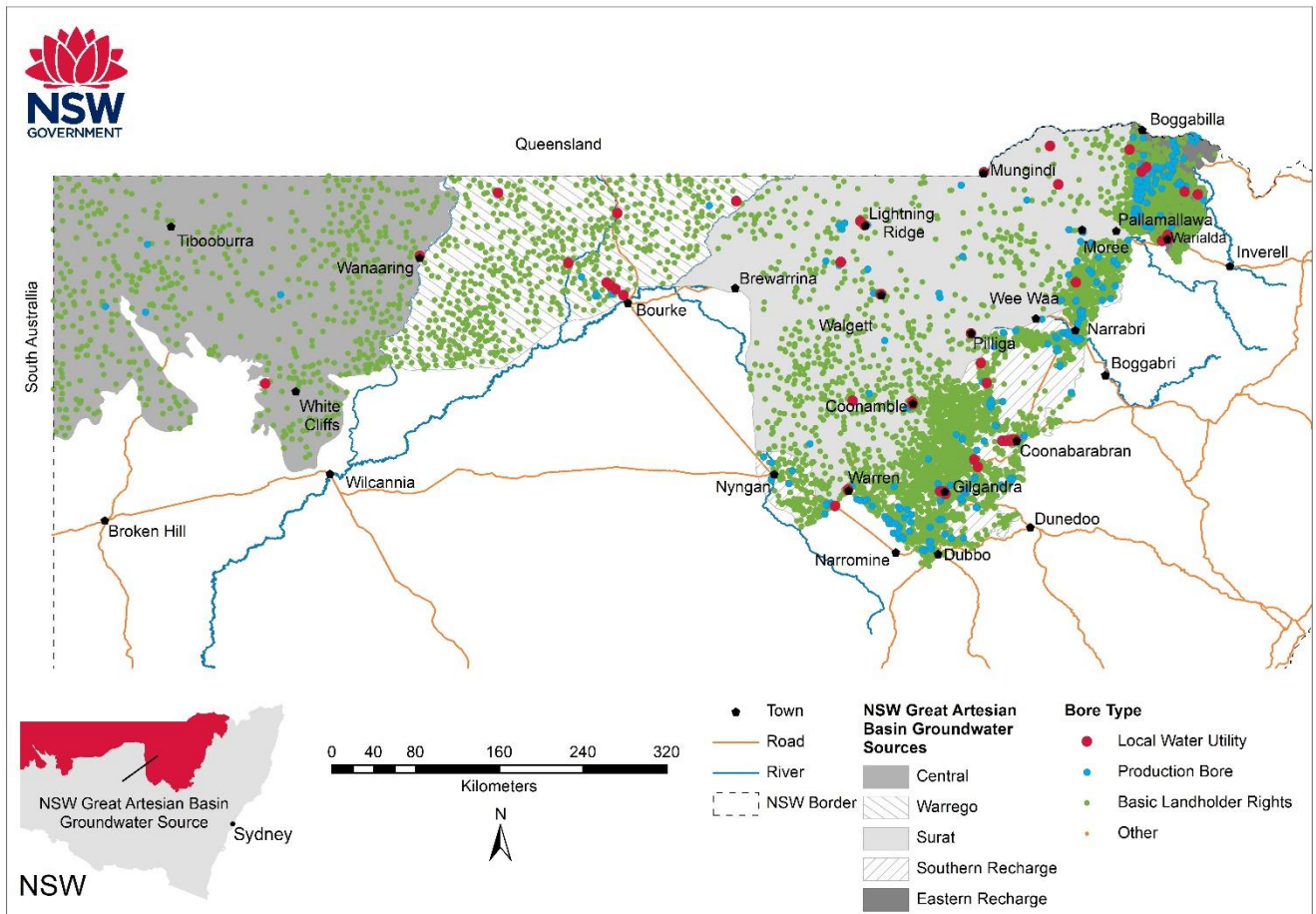


Figure 11: GAB groundwater sources water supply bores and distribution of extraction for period 2014/2015 to 2018/19

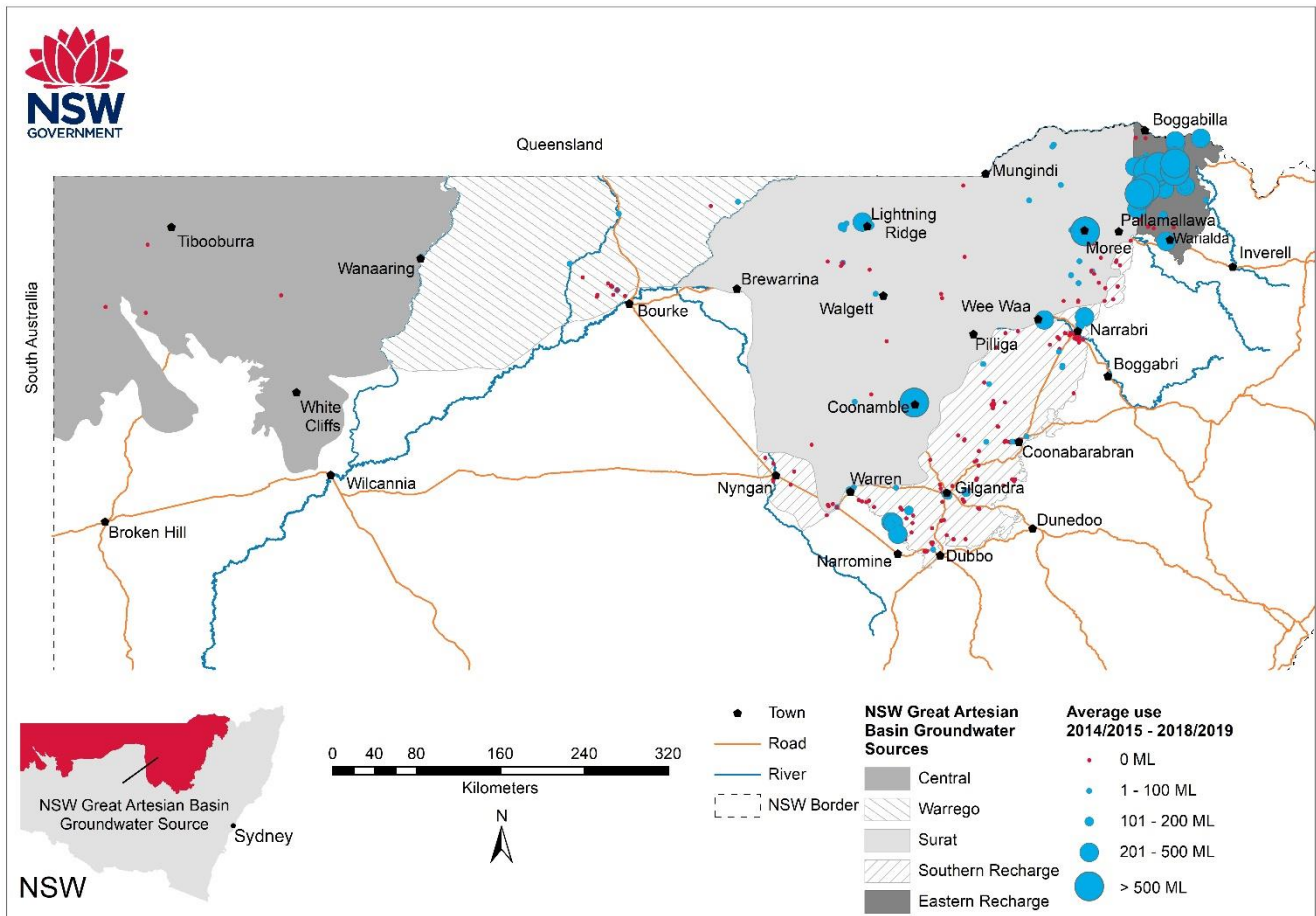


Figure 12: GAB groundwater sources monitoring bore sites

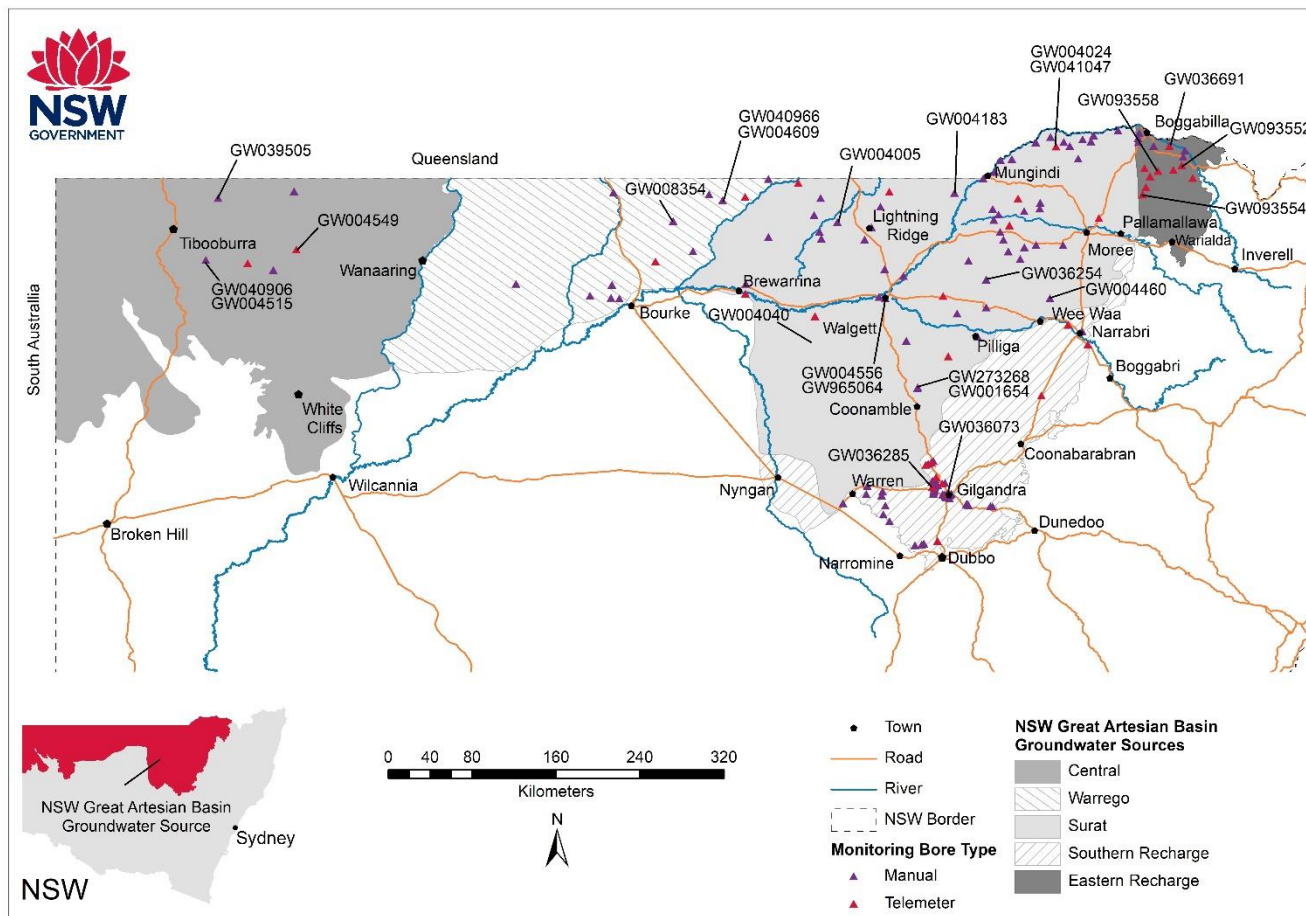


Figure 13: Hydrograph for monitoring bore GW036691 – Eastern Recharge Groundwater Source

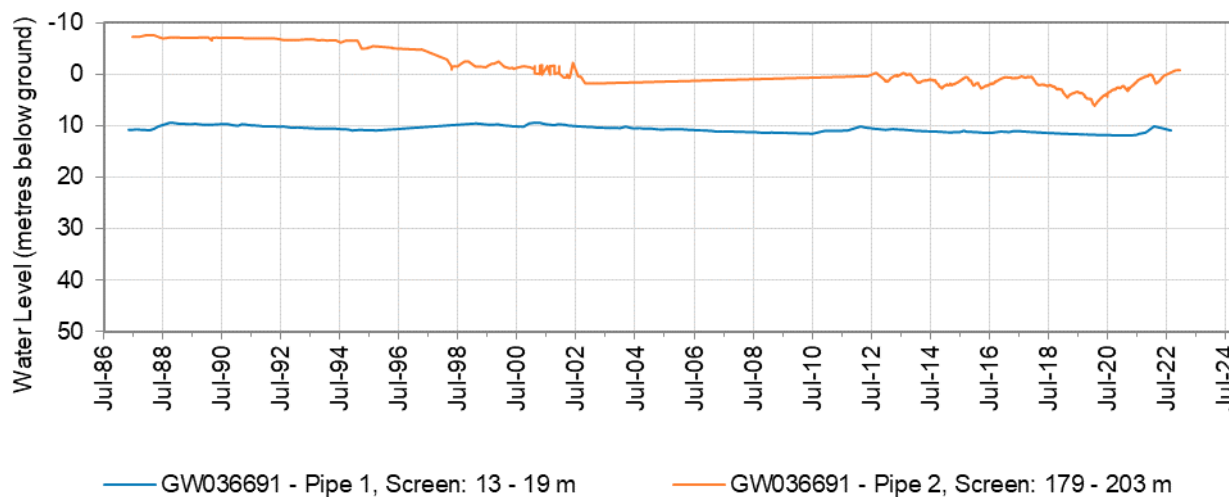


Figure 14: Hydrograph for monitoring bore GW093552 – Eastern Recharge Groundwater Source

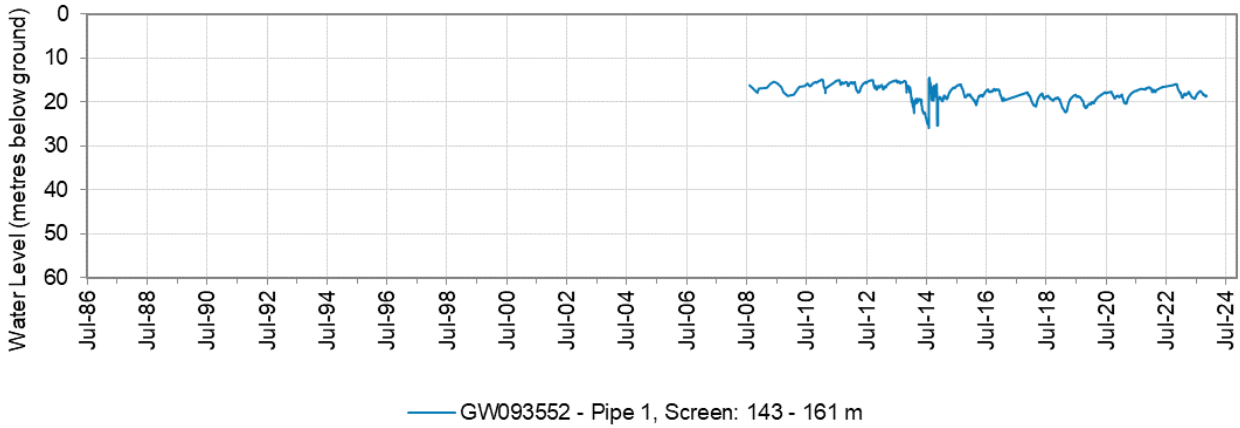


Figure 15: Hydrograph for monitoring bore GW093554 – Eastern Recharge Groundwater Source

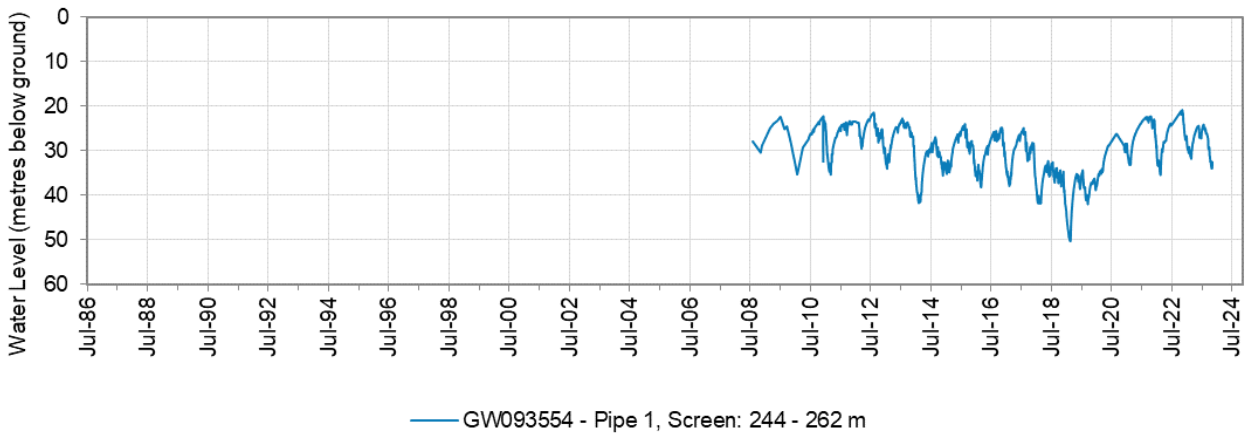


Figure 16: Hydrograph for monitoring bore GW093558 – Eastern Recharge Groundwater Source

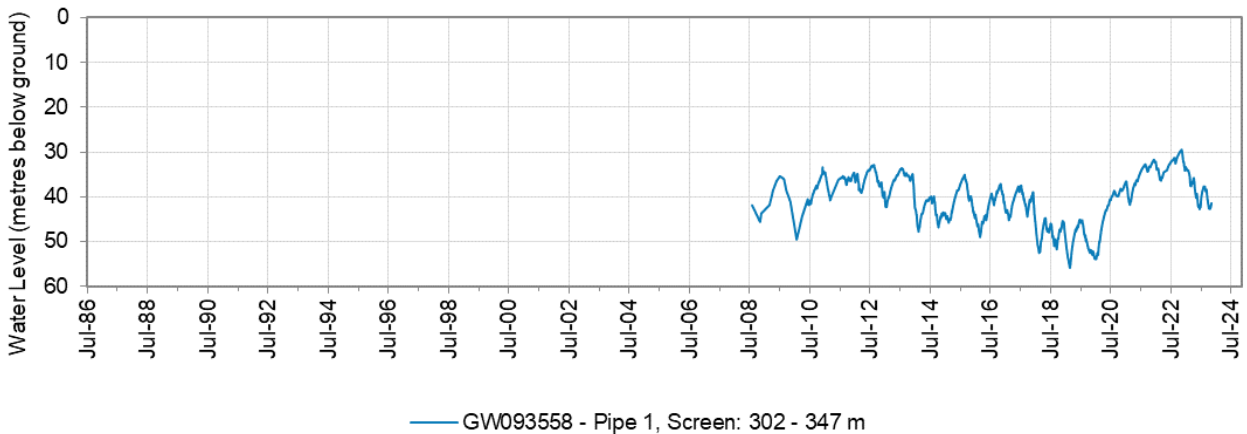


Figure 17: Hydrograph for monitoring bore GW036073 – Southern Recharge Groundwater Source

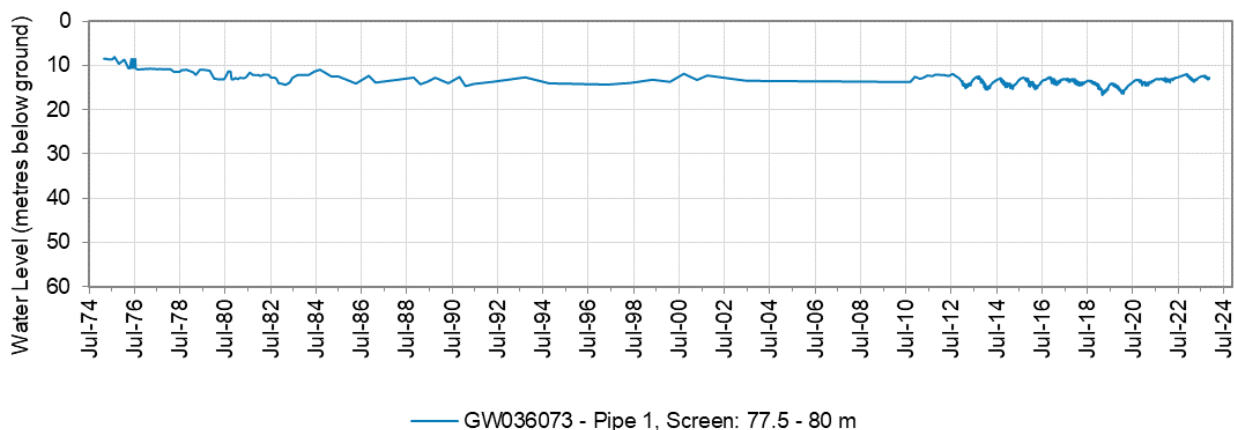


Figure 18: Hydrograph for monitoring bore GW036245 – Southern Recharge Groundwater Source

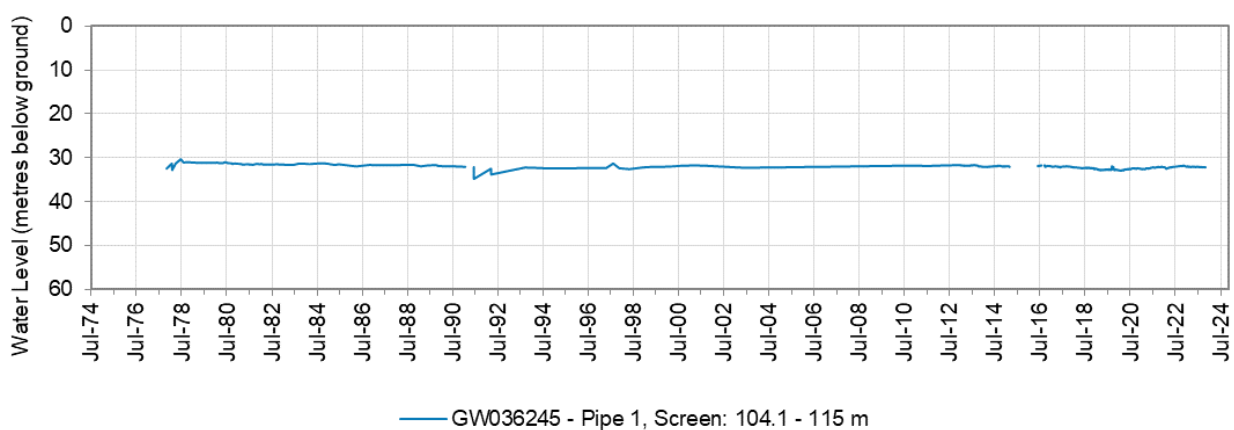


Figure 19: Hydrograph for monitoring bore GW036285 – Southern Recharge Groundwater Source

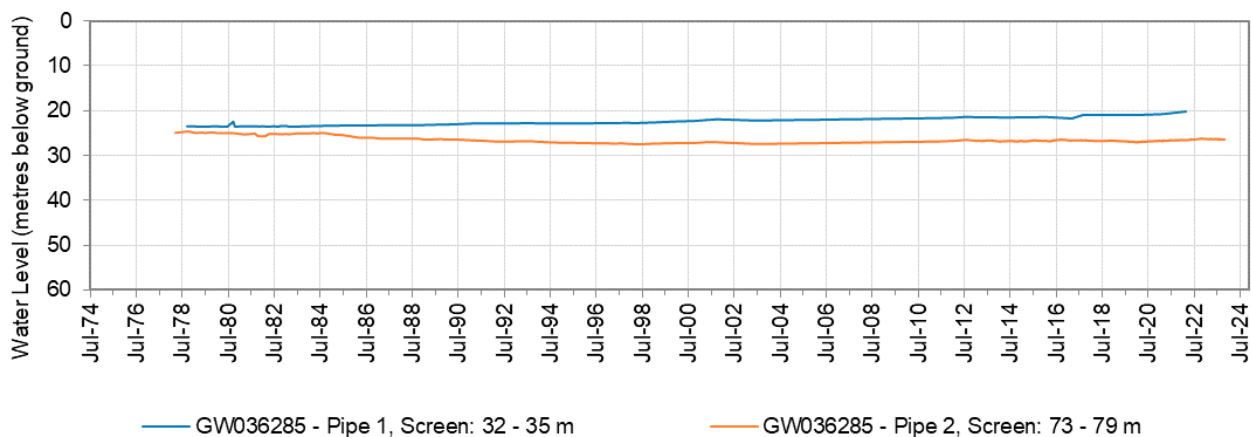


Figure 20: Hydrograph for monitoring bore GW001654 (Whittonbri – Plugged) and GW273268 (Whittonbri No 2) – Surat Groundwater Source

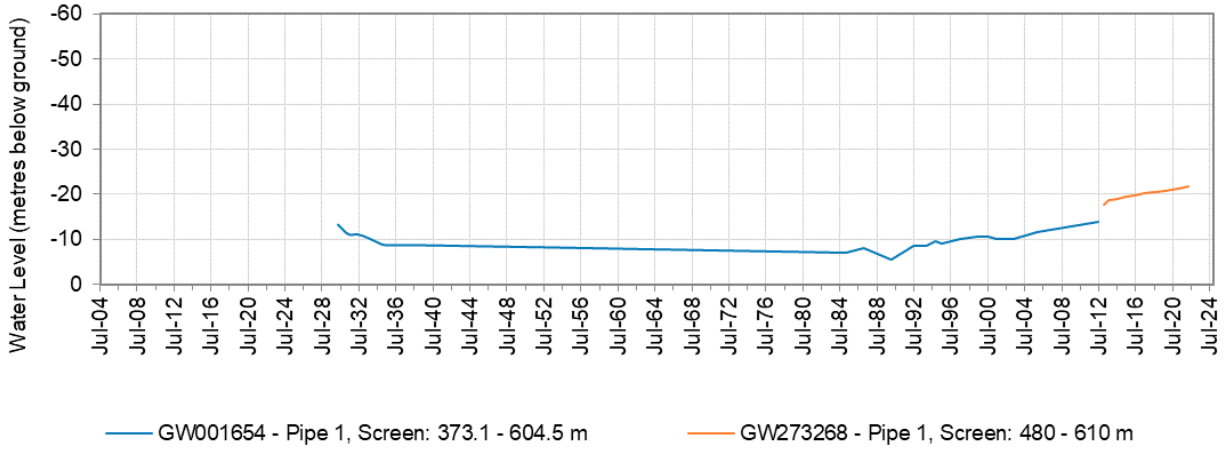


Figure 21: Hydrograph for monitoring bore GW004005 (Bangate No 2) – Surat Groundwater Source

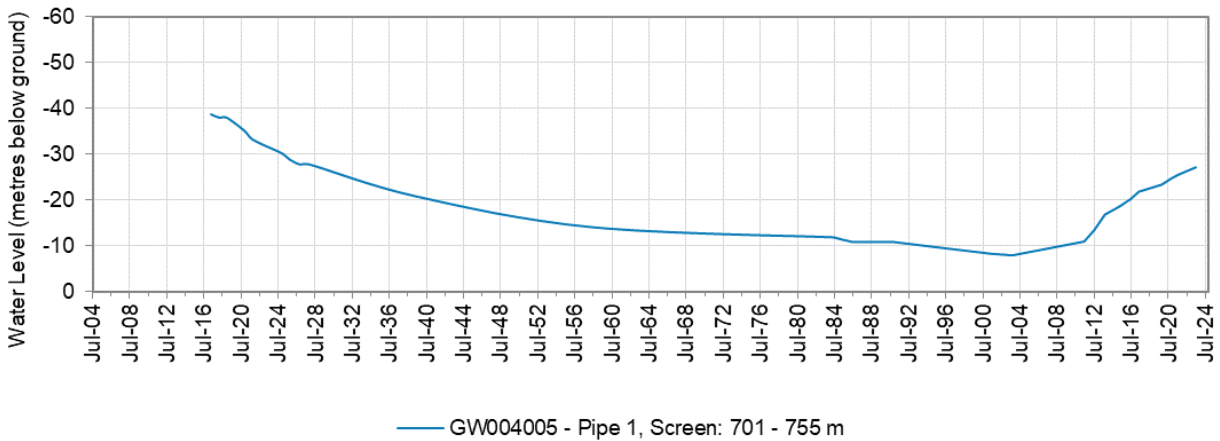


Figure 22: Hydrograph for monitoring bore GW004024 (Boomi – Plugged) and GW041047 (Boomi East No 2) – Surat Groundwater Source

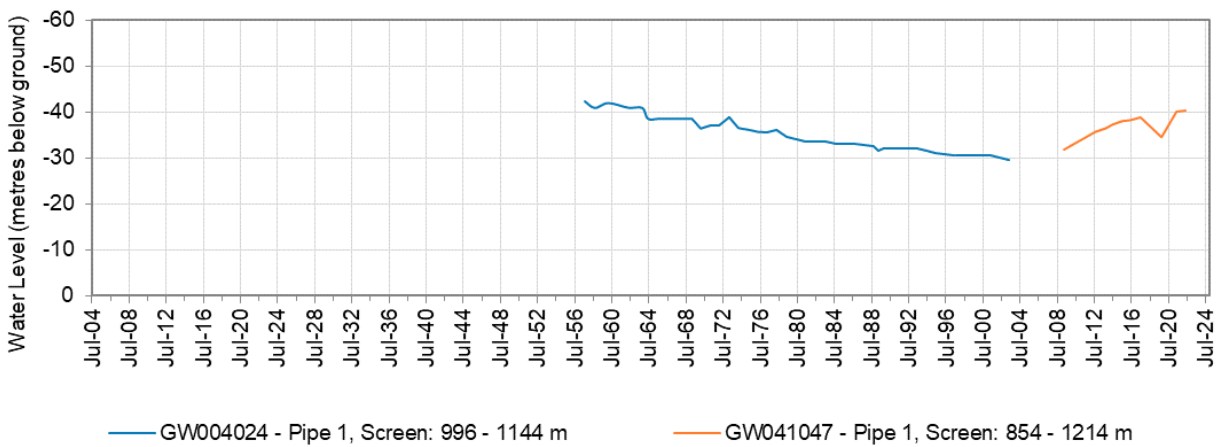


Figure 23: Hydrograph for monitoring bore GW004183 (Eulalie) – Surat Groundwater Source

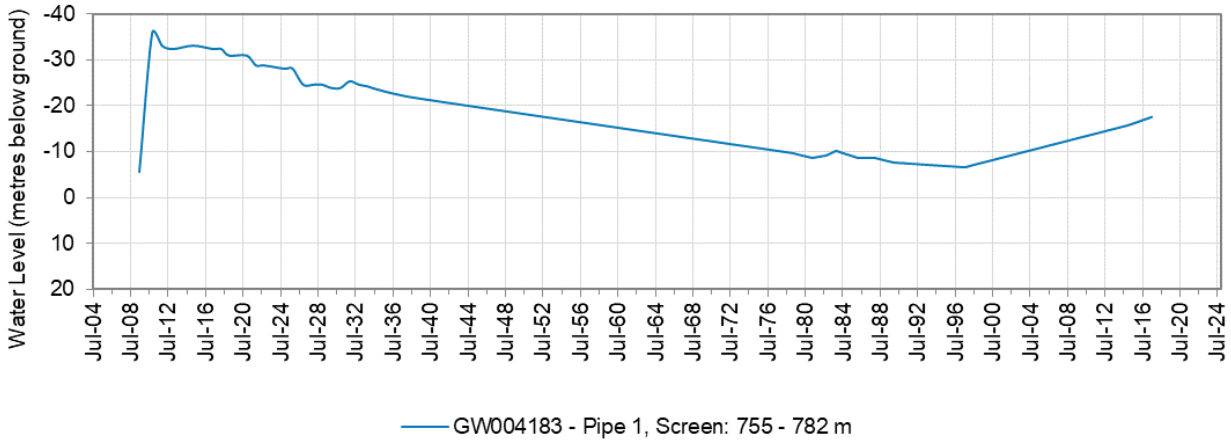


Figure 24: Hydrograph for monitoring bore GW004460 (Roma) – Surat Groundwater Source

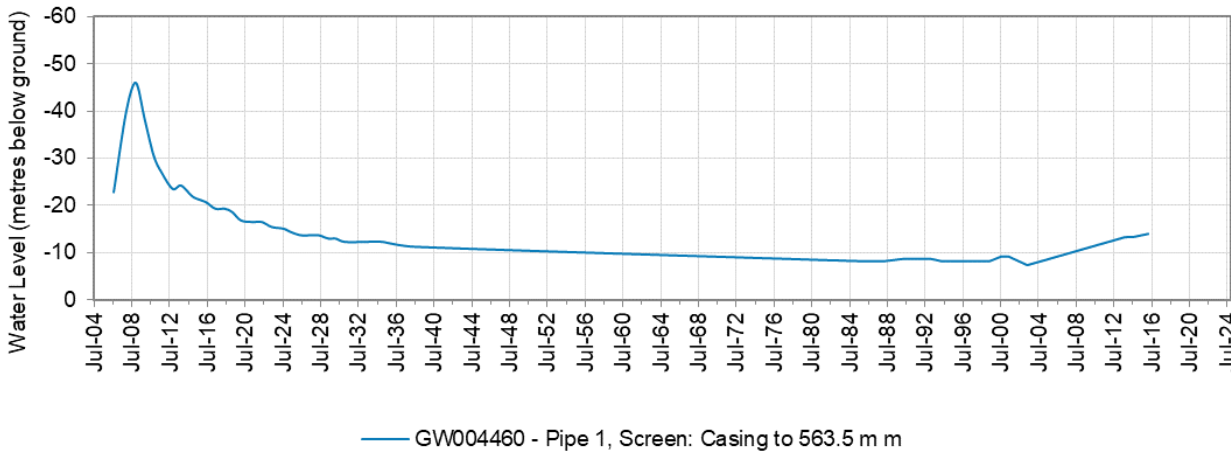


Figure 25: Hydrograph for monitoring bore GW004556 (Walgett TWS – Plugged) and GW965064 (Ulumbie No 2) – Surat Groundwater Source

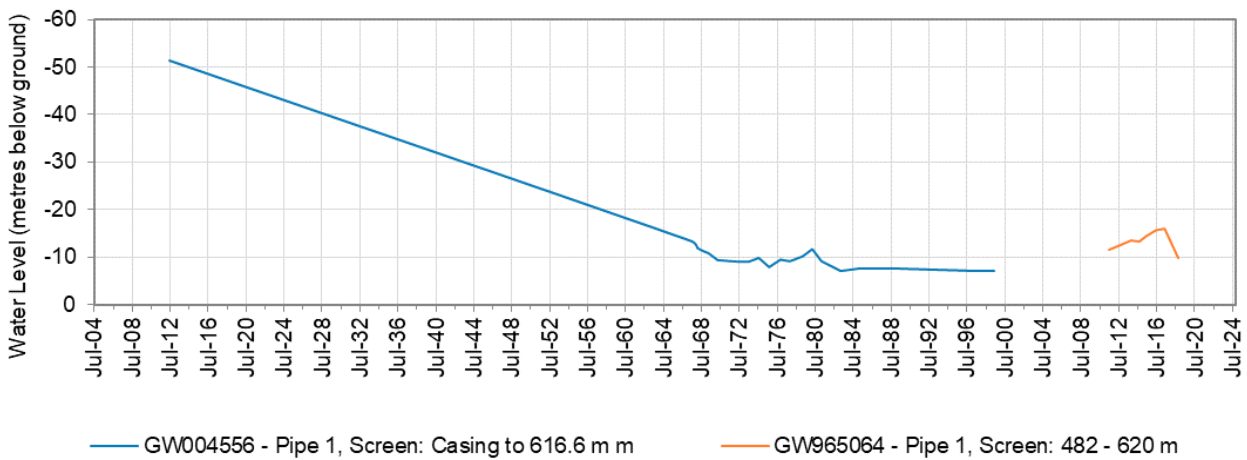


Figure 26: Hydrograph for monitoring bore GW004609 (Weilmoringle No 2 – Plugged) and GW0040966 (Orana) – Warrego Groundwater Source

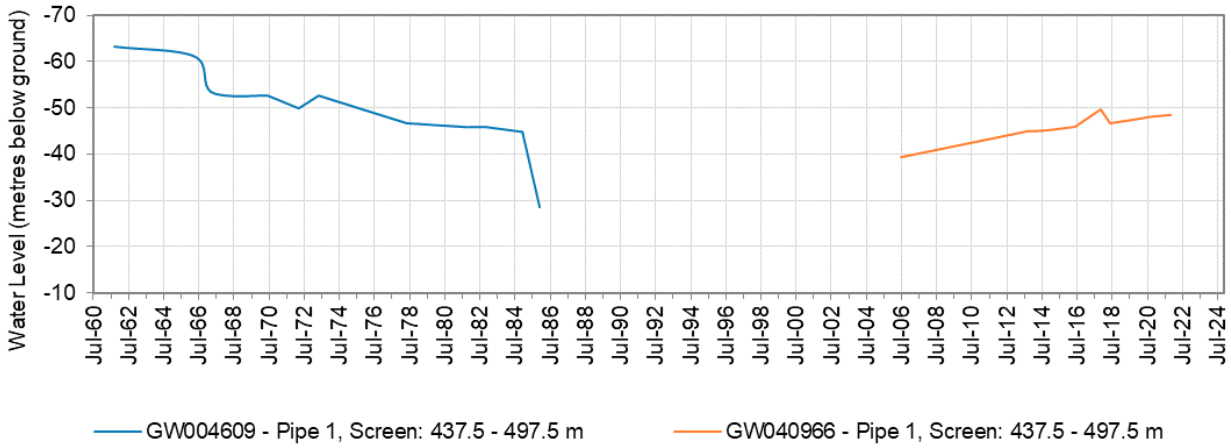


Figure 27: Hydrograph for monitoring bore GW008354 (Oswald) – Warrego Groundwater Source

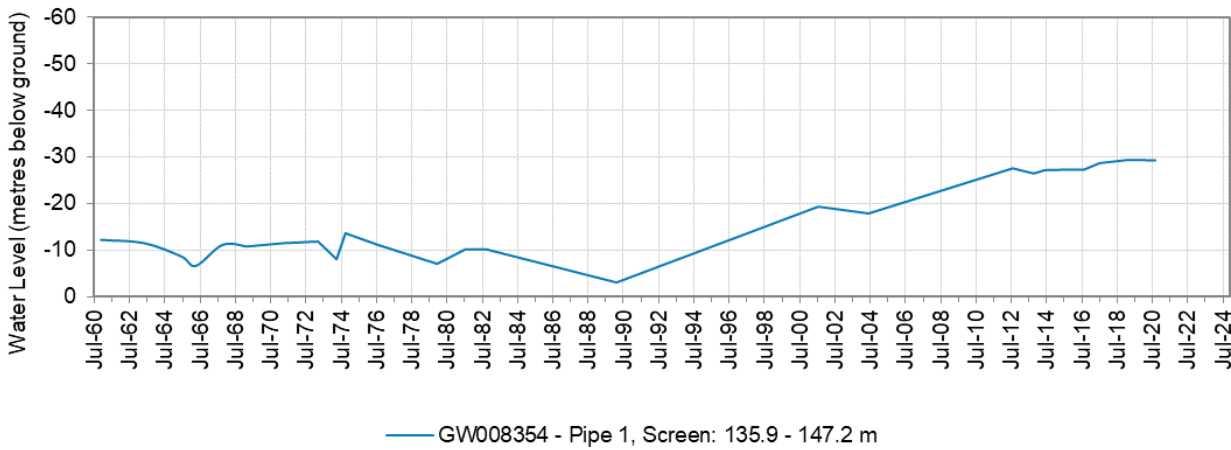


Figure 28: Hydrograph for monitoring bore GW040906 (Tineroo No 2) and GW004515 (Tineroo – Plugged) – Central Groundwater Source

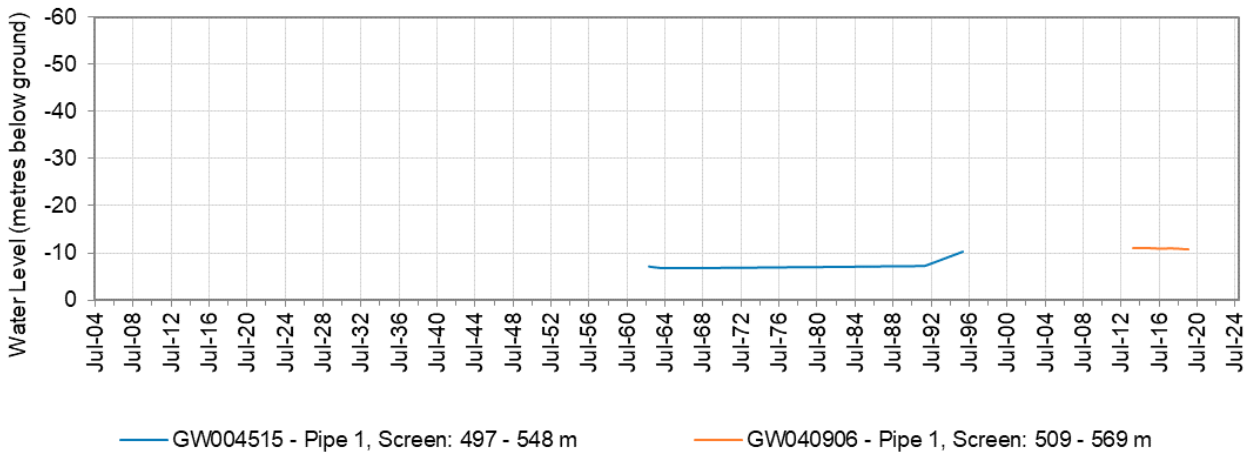


Figure 29: Hydrograph for monitoring bore GW004549 (Urisino No 4) - Central Groundwater Source

