

Lower Murray Groundwater Sources

Groundwater annual report 2023.

Introduction

This report is a summary of water accounts, volume pumped and groundwater levels for the Lower Murray groundwater sources to 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 Murray Alluvium Water Sources: www.industry.nsw.gov.au/___data/assets/pdf_file/0004/230674/appendix-a-murray-alluvium-wrp-groundwater-resource-description.pdf

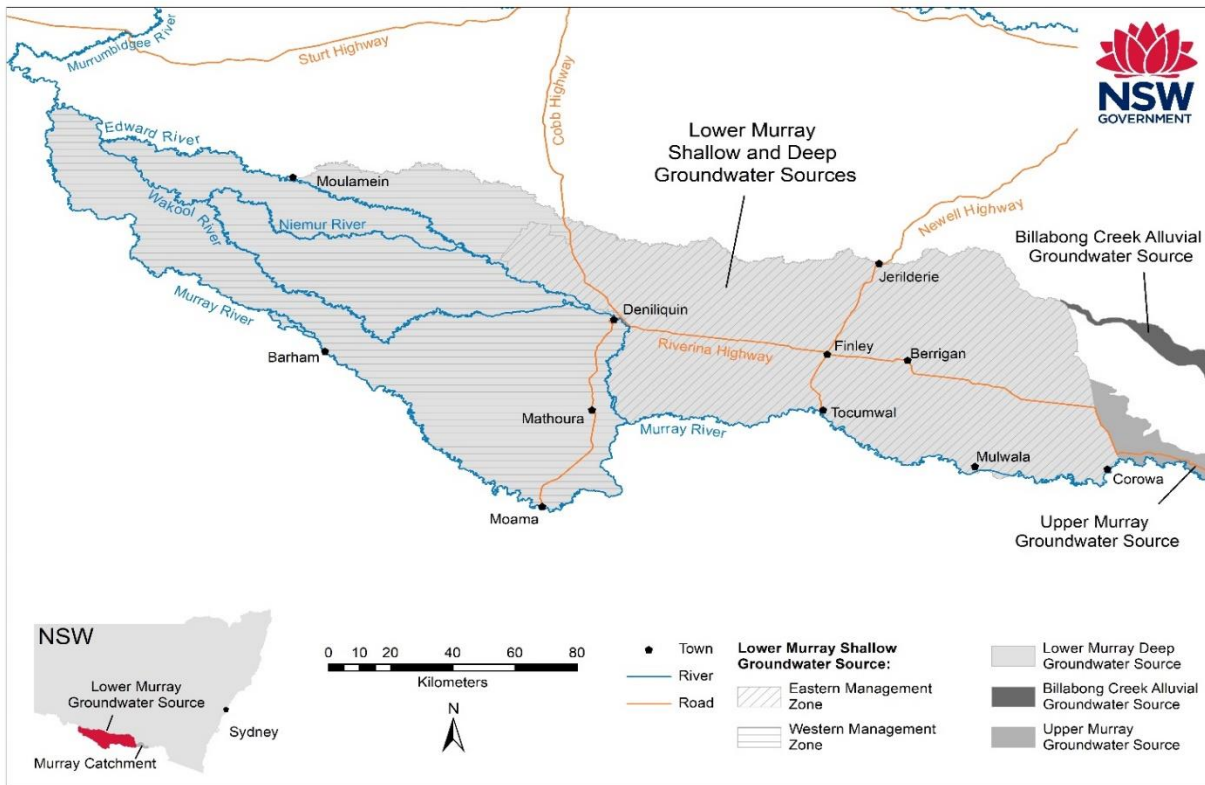
Description

The Lower Murray groundwater sources are located within Murray River catchment. The water sources are bounded by Billabong Creek to the north and the Murray River to the south and laterally extends from Murray River and Edwards River confluence from the west to Corowa in the east (Figure 1). These are made up of Cenozoic alluvial sediments (clay, silt, sand and gravel).

There are two separate groundwater sources:

- The Lower Murray Shallow Groundwater Source consists of unconsolidated alluvial sediments below the surface of the ground, to a depth of 20 metres.
- The Lower Murray (deep) Groundwater Source consists unconsolidated sediments of the Shepparton Formation, Calivil Formation and the Renmark Group greater than 20 m down to its base (bedrock).

Figure 1: Location map



Water resource management

Water sharing plan

The Lower Murray groundwater sources are managed by the rules defined in the Water Sharing Plan for the Murray Alluvial Groundwater Sources 2020.

This water sharing plan is available for viewing on the Department of Planning and Environment Water website at: water.dpie.nsw.gov.au/plans-and-programs/water-sharing-plans/status/murray-region

Basic rights

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

The volumes of water set aside in the water sharing plan for basic landholder rights for Lower Murray Shallow Groundwater Source and Lower Murray (deep) Groundwater Source are 988 and 5,228 megalitres (ML) respectively.

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: Lower Murray groundwater sources share component 30 June 2023

Access Licence Category	Lower Murray (deep) Groundwater Source		Lower Murray Shallow Groundwater Source	
	Number of Licences	Total Volume	Number of Licences	Total Volume
Local Water Utility ¹	2	12	0	0
Aquifer ²	361	84,710	258	57,653
Aquifer (Town Water Supply) ¹	2	67	2	87
Salinity and Water Table Management ¹	0	0	2	20,010

¹Megalitres/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 these water sources are defined in the water sharing plan and listed in Table 2.

Table 2: Extraction Limit for Lower Murray groundwater sources

Water Source	Extraction Limit (ML/year)
Lower Murray (deep) Groundwater Source	88,900

Water Source	Extraction Limit (ML/year)
Lower Murray Shallow Groundwater Source	81,893

Extraction in the Lower Murray (deep) Groundwater Source is not compliant if the 5 years average annual extraction is more than 105% of the extraction limit (known as the compliance trigger). Extraction in the Lower Murray Shallow Groundwater Source is not compliant if the 5 years average annual extraction 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 subsequent total water 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 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)
- the 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 determinations (AWDs) 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 Lower Murray groundwater sources are provided in **Table 3**.

Table 3: Lower Murray groundwater sources access licence account rules

Water Source	Access Licence Category	Carryover Limit	Annual Use Limit	Maximum AWD
Lower Murray (deep)	Local Water Utility	0%	100%	100%
	Aquifer	2 ML/share	1.5 ML/share	1 ML/share
Lower Murray Shallow	Aquifer	1 ML/share	1.5 ML/Share	1 ML/share
	Salinity and Water Table Management	0	1 ML	1 ML

The maximum amount of water that can be debited from an aquifer access licence account in a water year can't exceed 1.5 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 150 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 (Lower Murray (deep) Groundwater Source) and Figure 3 (Lower Murray Shallow Groundwater Source) 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 Figure 2 and Figure 3.

There has been no reduction in the available water determination for aquifer access licences in the Lower Murray (deep) Groundwater Source since the water sharing plan first started in 2006 or in the Lower Murray Shallow Groundwater Source since the water sharing plan started in 2012.

The access licence account information for the Lower Murray Groundwater Source on 1 July 2023 is summarised Table 4.

Table 4: Access license account information

	Lower Murray (deep) Groundwater Source	Lower Murray Shallow Groundwater Source
Carryover In (ML)	161,752	57,391

	Lower Murray (deep) Groundwater Source	Lower Murray Shallow Groundwater Source
Available water determination (ML)	84,789	77,750
Total water in account (ML)	246,541	135,141
Water available for use (ML)	126,706	106,393

Figure 2: Account water availability and usage summary for Lower Murray (deep) Groundwater Source

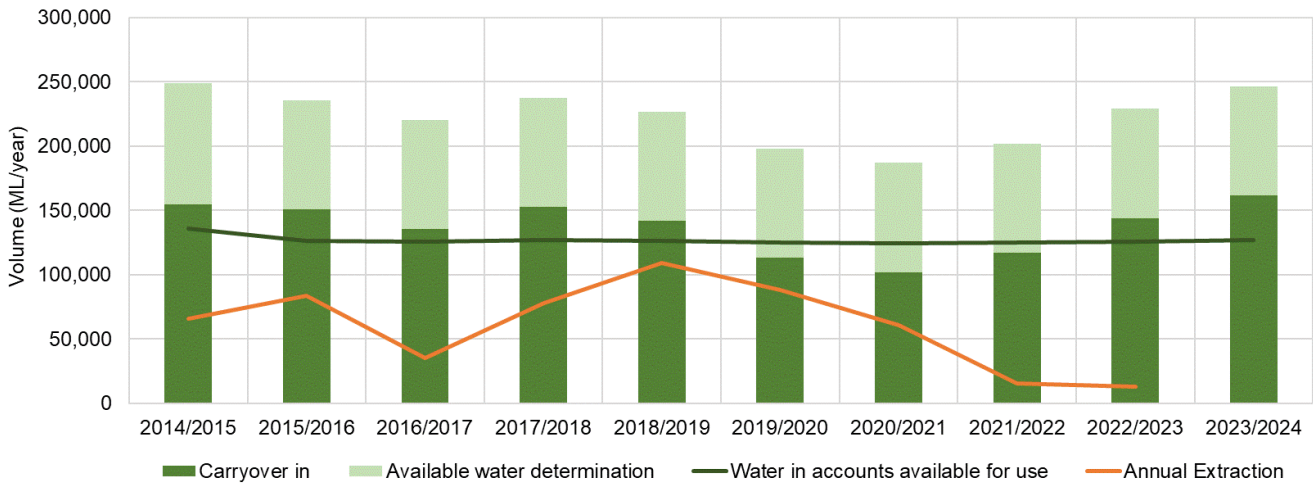
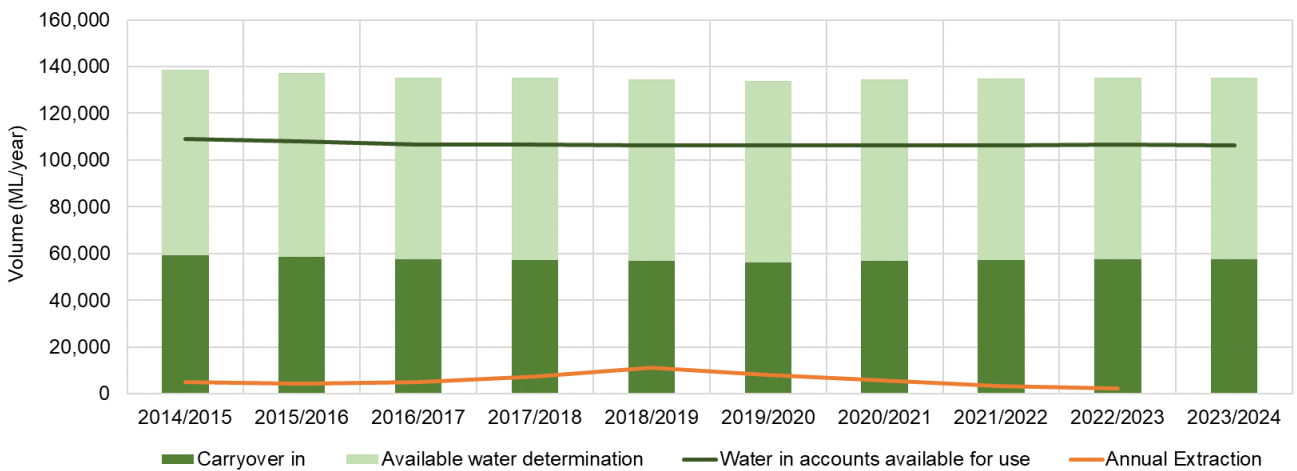


Figure 3: Account water availability and usage summary for Lower Murray Shallow Groundwater Source



Groundwater trading

For the Lower Murray groundwater sources, trading is permitted within a groundwater source, but you can't trade between the Lower Murray groundwater sources and any other groundwater source.

Local management areas

The Lower Murray Shallow Groundwater Source is divided into the following management zones (Figure 1):

- Lower Murray Shallow (Eastern) Management Zone,
- Lower Murray Shallow (Western) Management Zone.

Trades are permitted within but not between the two management zones.

Allocation assignments (temporary trade)

Trading statistics for the Lower Murray (deep) Groundwater Source are illustrated in Figure 4, excludes trades for less than \$1 per megalitre. The average value paid per megalitre in 2022-23 was \$19.80, while the maximum value was \$80 per megalitre.

There have been limited temporary trades in the Lower Murray Shallow Groundwater Source since the water sharing plan was implemented in 2012 as shown in Table 5.

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

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

Figure 4: Lower Murray (deep) Groundwater Source temporary trade statistics

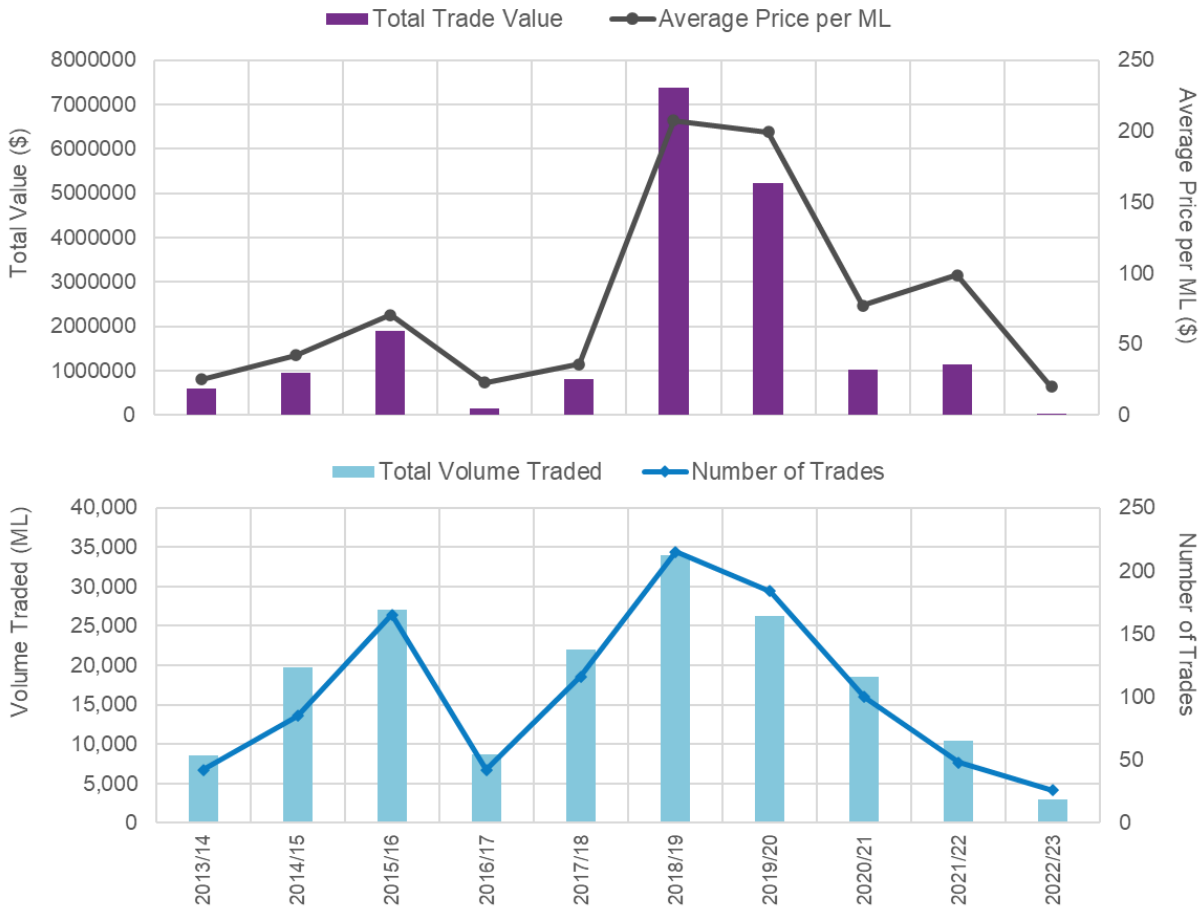


Table 5: Lower Murray Shallow Groundwater Source temporary trade statistics

Year	Number of Trades		Total Volume Traded (ML)		Total Trade Value (\$)	Average Price per ML (\$)
	Western Zone	Eastern Zone	Western Zone	Eastern Zone		
2018/19	1	4	360	650	1,250	5
2019/20	1	4	360	655	750	5

Bores

There are approximately 2,697 and 643 registered bores across the Lower Murray (deep) Groundwater Source and Lower Murray Shallow Groundwater Source respectively (Figure 5 and Figure 6). The majority of these bores are used for stock and domestic purposes (Basic Landholder Rights). There is also significant use of groundwater for irrigation (Table 6).

Bores constructed in the deeper productive aquifer system can yield up to 4,150 ML/year, while most production bores produce supply in the range of up to 500 ML/year (Figure 7). Average extraction from individual production bores in the Lower Murray Shallow Groundwater Source is around 85 ML/year.

Table 6: Approximate number of licensed bores in Lower Murray groundwater sources (2023)

Groundwater Source	Registered Bore Purpose			
	Basic Landholder Rights	Production	Local Water Utility	Salinity and Water Table Management
Lower Murray (deep)	2,315	379	3	0
Lower Murray Shallow	289	302	0	52

Water level monitoring

WaterNSW monitors groundwater levels at 183 monitoring bores at 79 sites in the Lower Murray groundwater sources (Figure 9). At most 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 10 to Figure 18.

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/

Data is also available for 12 of the groundwater monitoring sites in real-time via telemetry. You can also request information via: Customer.Helpdesk@waternsw.com.au

Figure 5: Lower Murray (deep) Groundwater Source registered bores

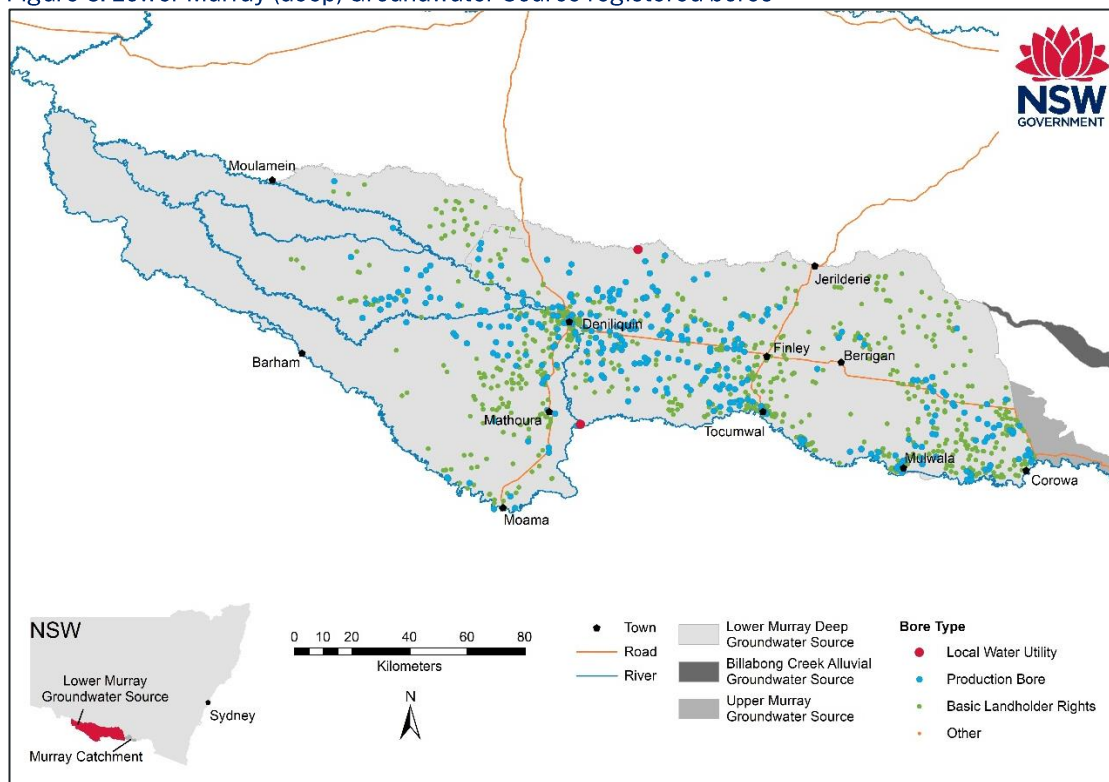


Figure 6: Lower Murray Shallow Groundwater Source registered bores

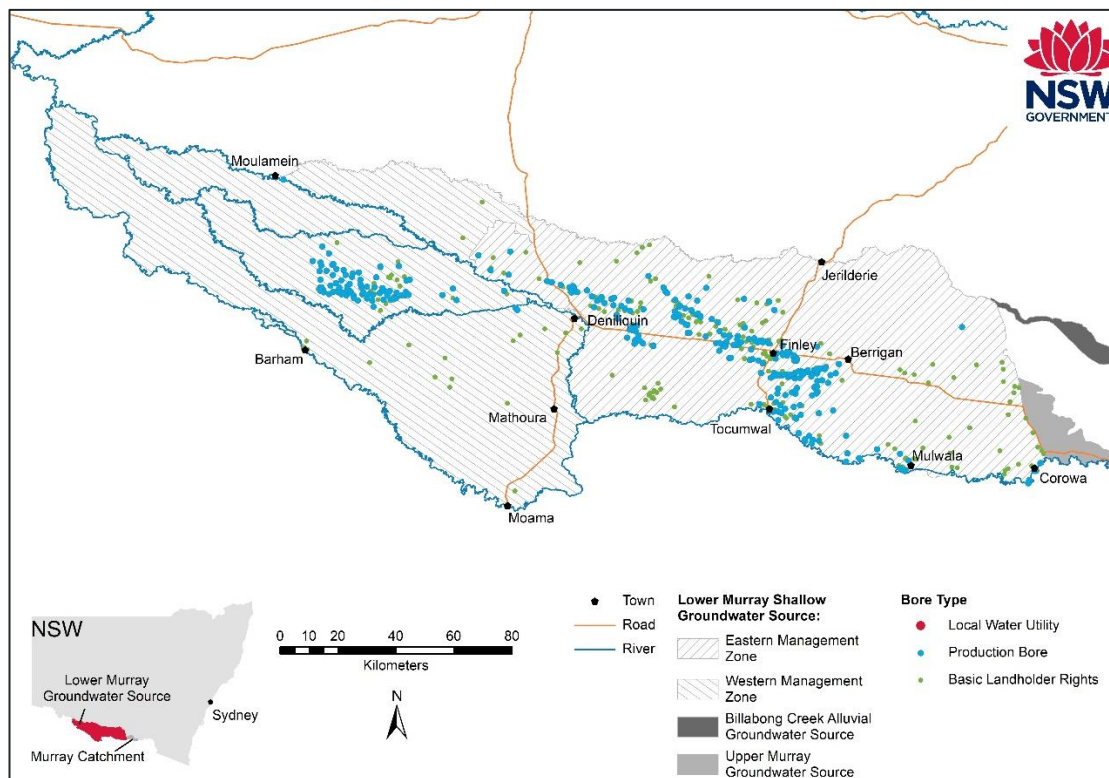


Figure 7: Lower Murray (deep) Groundwater Sources water supply bores and distribution of extraction (for period 2017/2018 to 2021/2022)

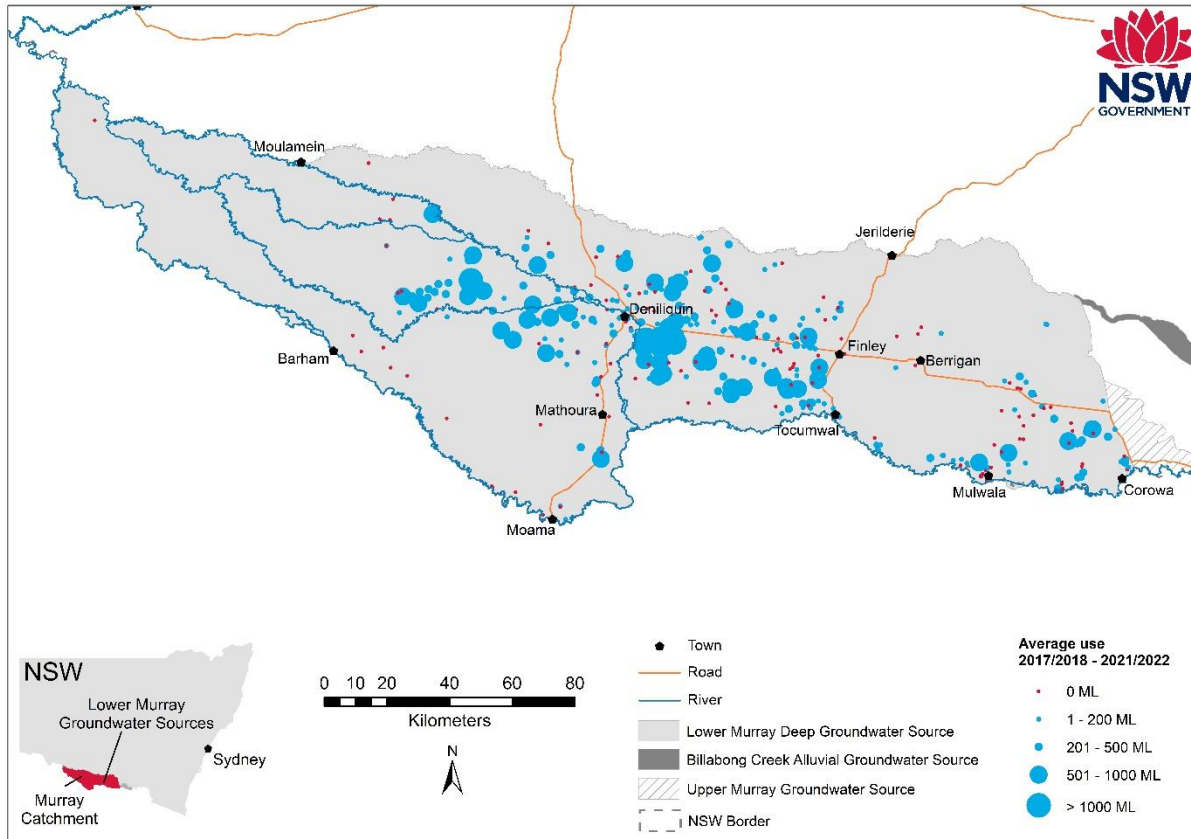


Figure 8: Lower Murray Shallow Groundwater Source water supply bores and distribution of extraction (for period 2017/2018 to 2021/2022)

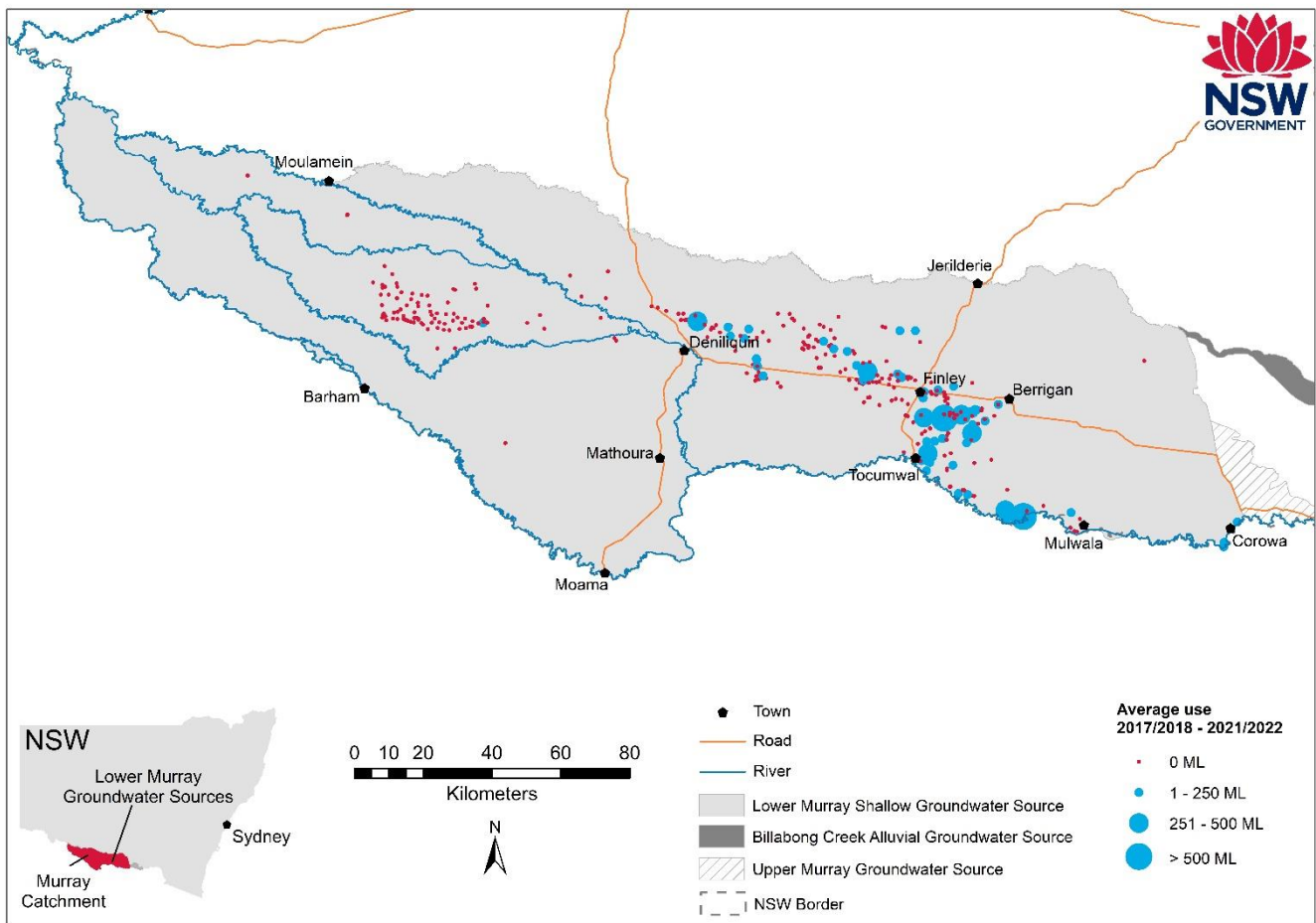


Figure 9: Lower Murray Groundwater Sources monitoring bore sites

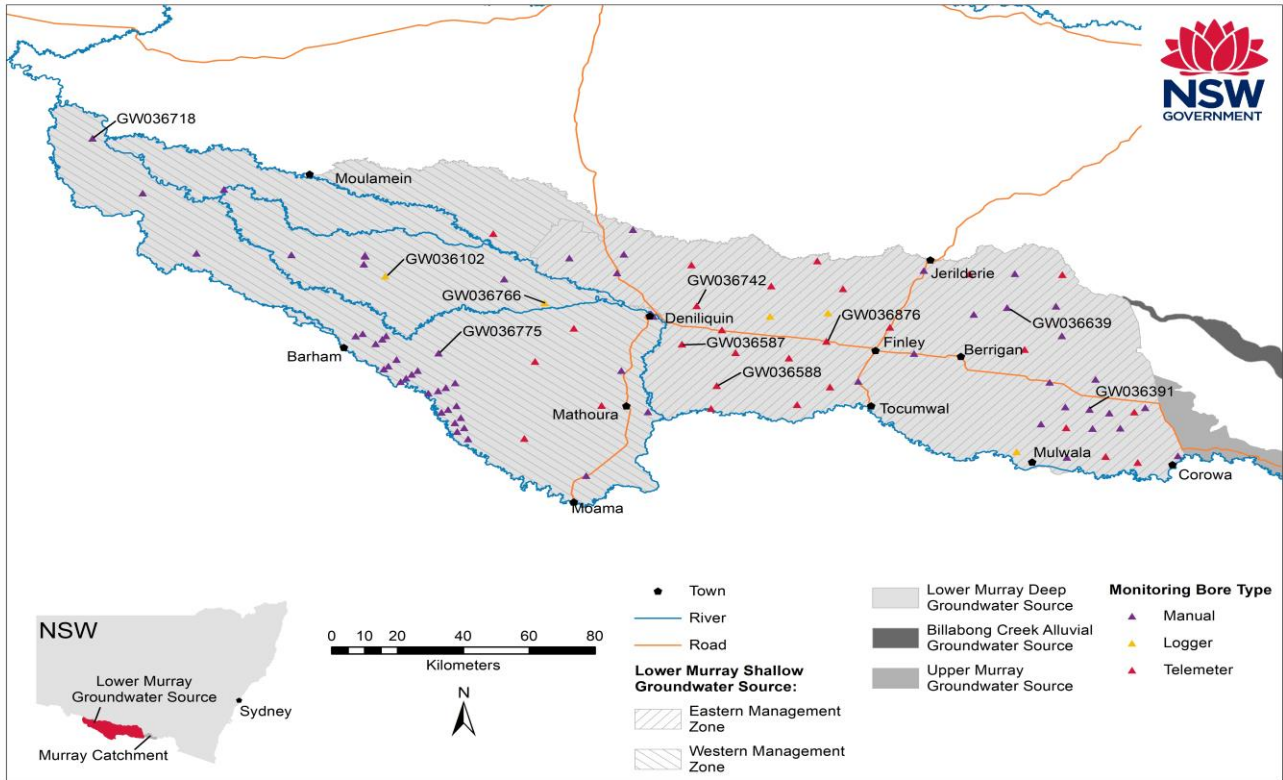


Figure 10: Hydrograph for monitoring bore GW036102

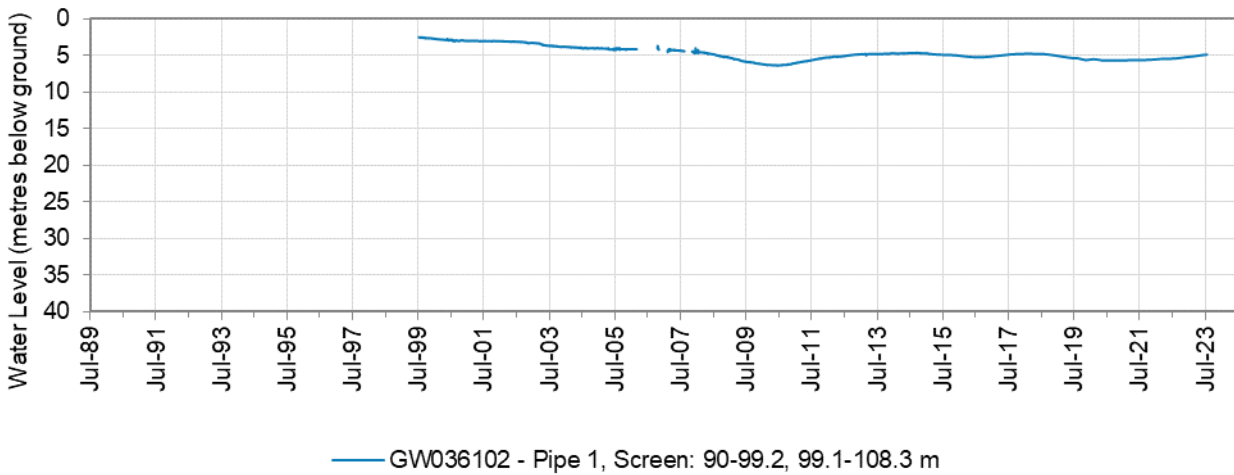


Figure 11: Hydrograph of monitoring bore GW036391

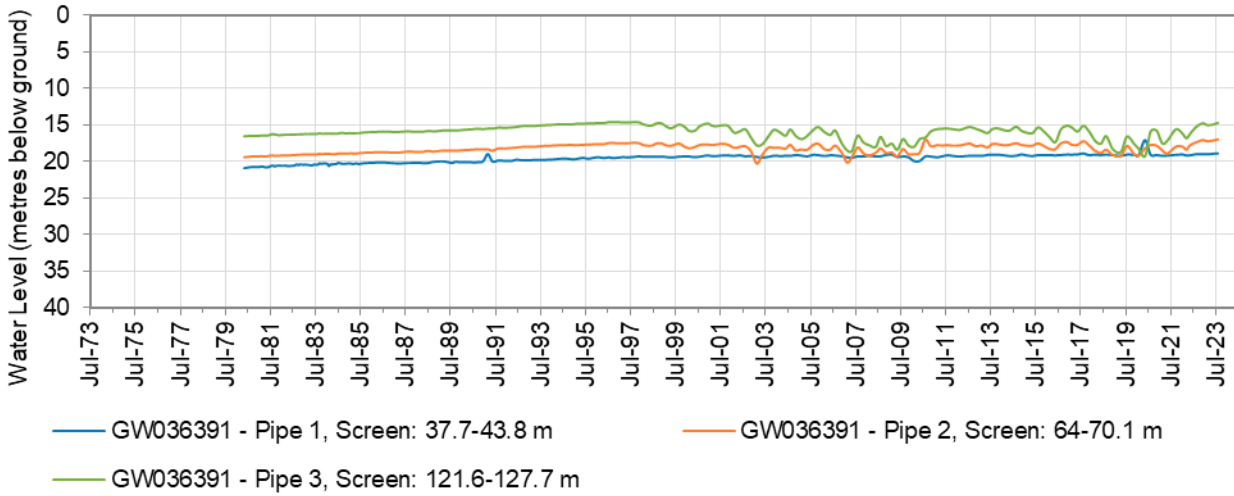


Figure 12: Hydrograph of monitoring bore GW036587

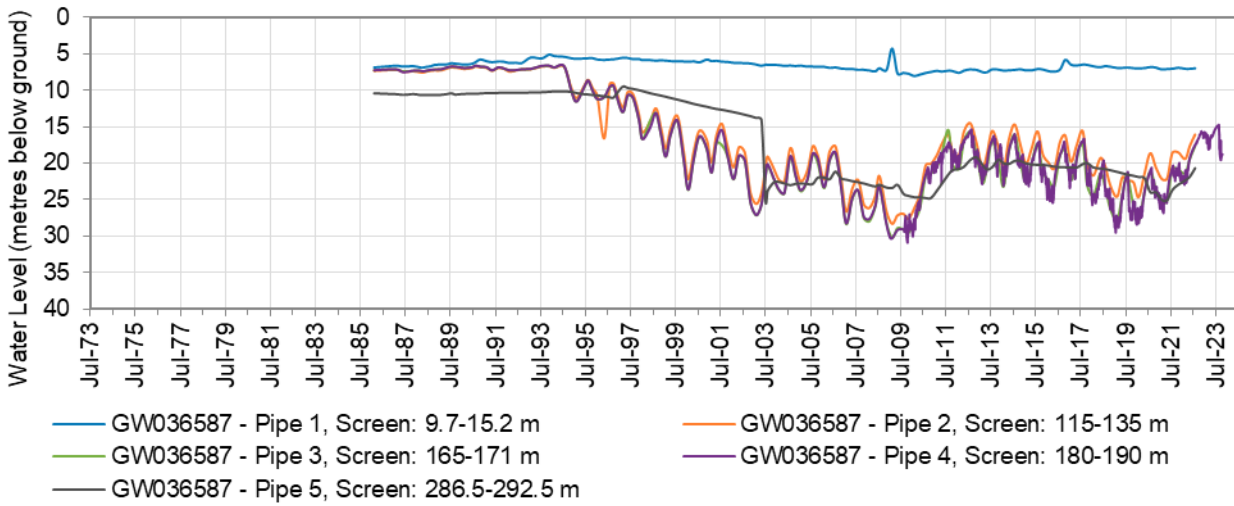


Figure 13: Hydrograph of monitoring bore GW036588

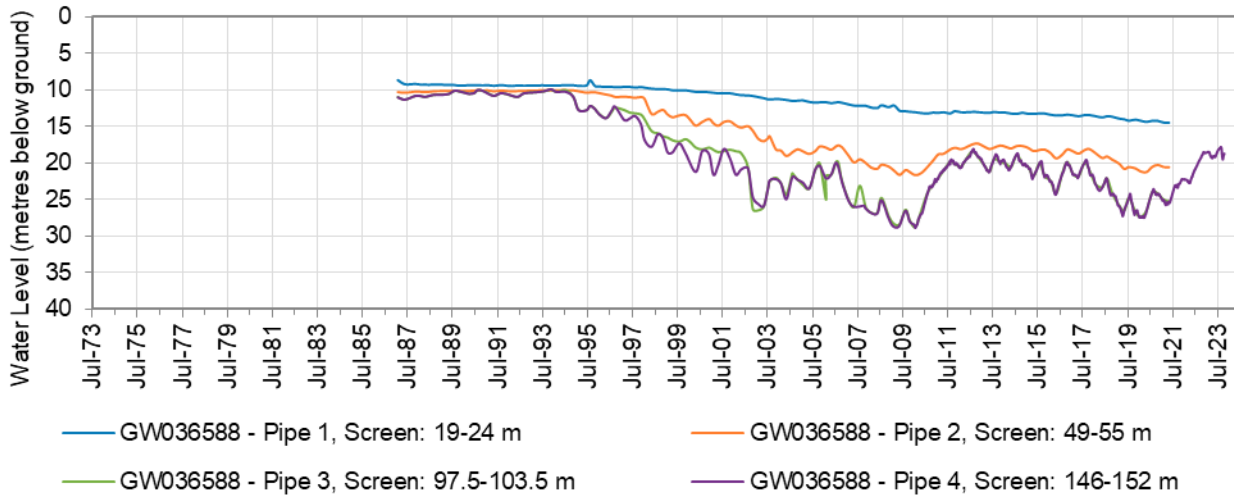


Figure 14: Hydrograph of monitoring bore GW036639

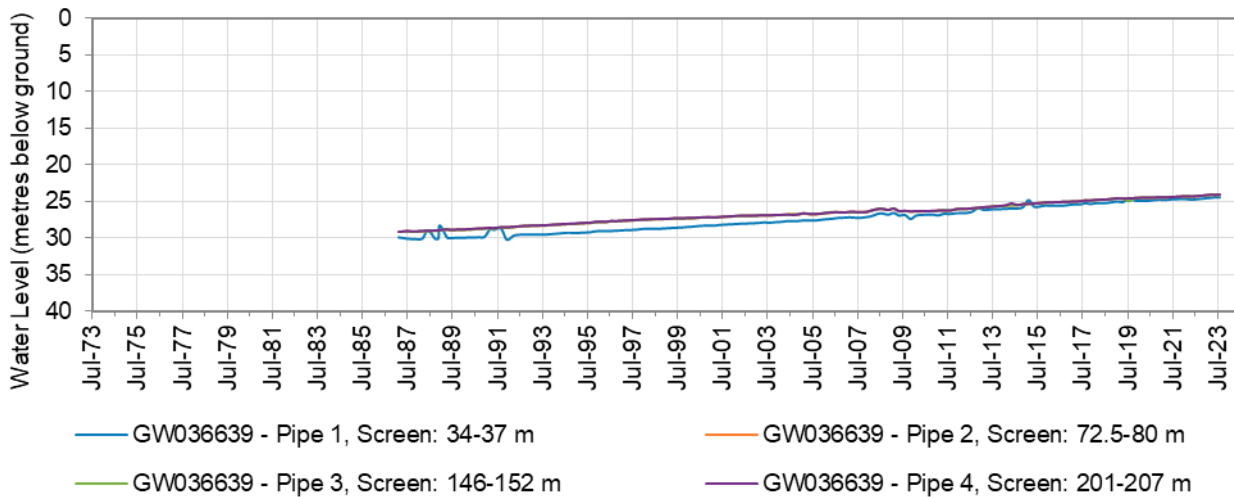


Figure 15: Hydrograph of monitoring bore GW036718

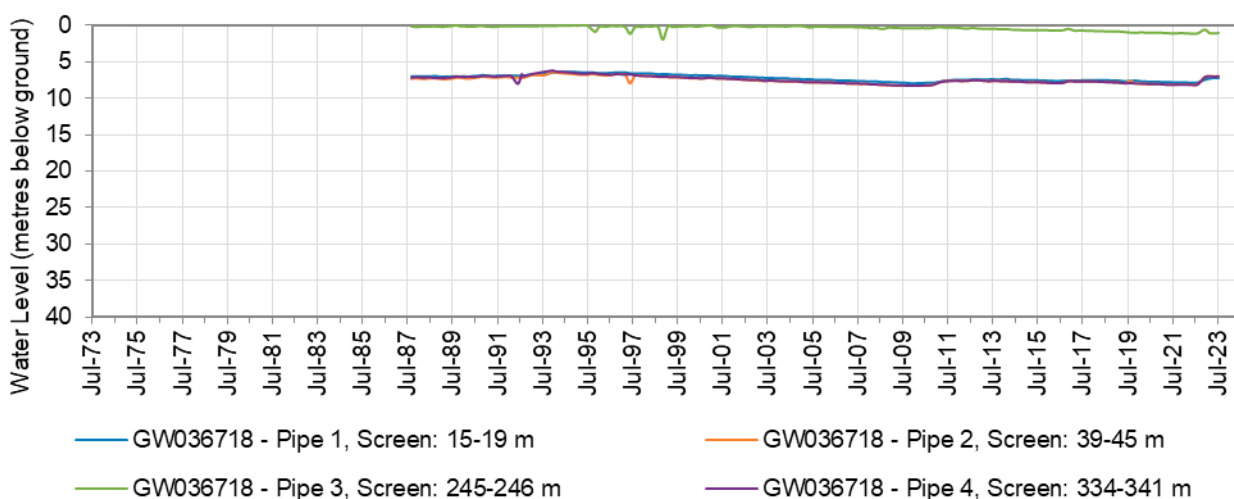


Figure 16: Hydrograph of monitoring bore GW036742

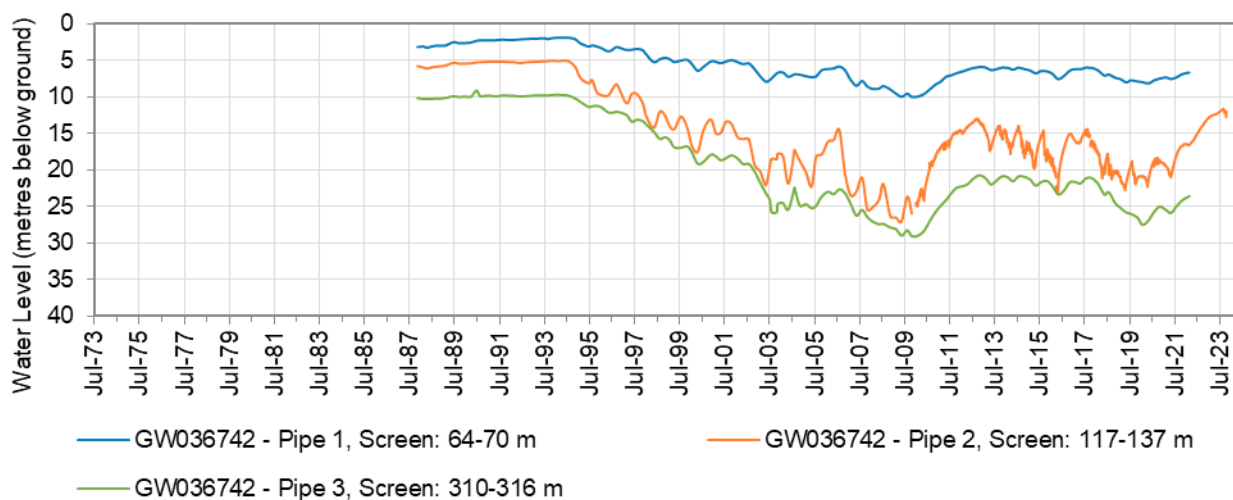


Figure 17: Hydrograph of monitoring bore GW036766

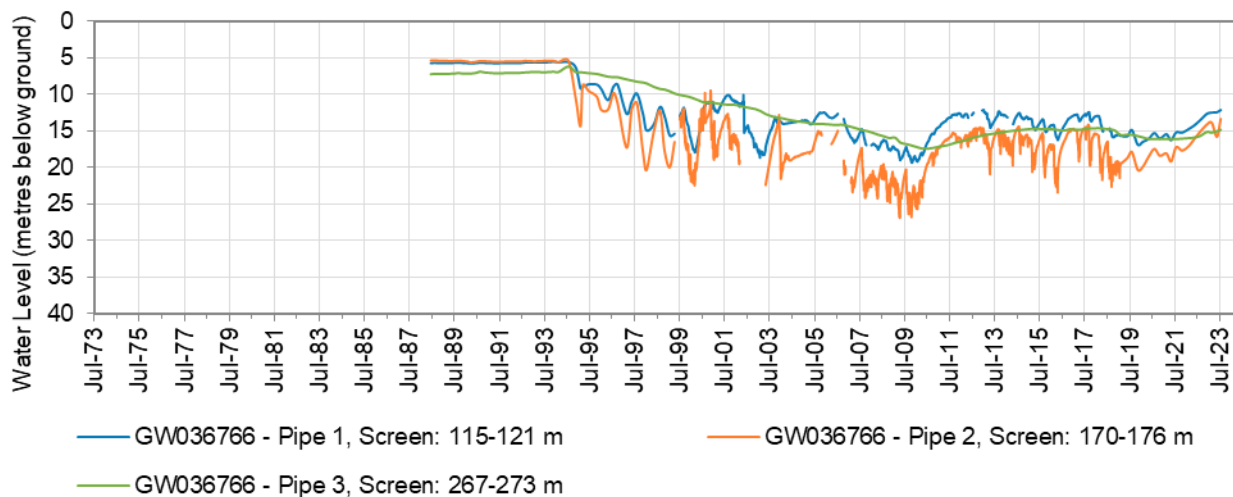


Figure 18: Hydrograph of monitoring bore GW036775

