Lower Murray groundwater sources

Introduction

This report is a summary of water accounts, volume pumped and groundwater levels for the Lower Murray groundwater sources for the period 1 July 2020 to 30 June 2021. It will be updated regularly.

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 Alluvial Groundwater 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 of unconsolidated sediments of the Shepparton Formation, Calivil Formation and the Renmark Group greater than 20 m down to its base (bedrock).

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 Industry and Environment Water website at: www.industry.nsw.gov.au/water/plans-programs/water-sharing-plans/status/murray-region

Basic rights

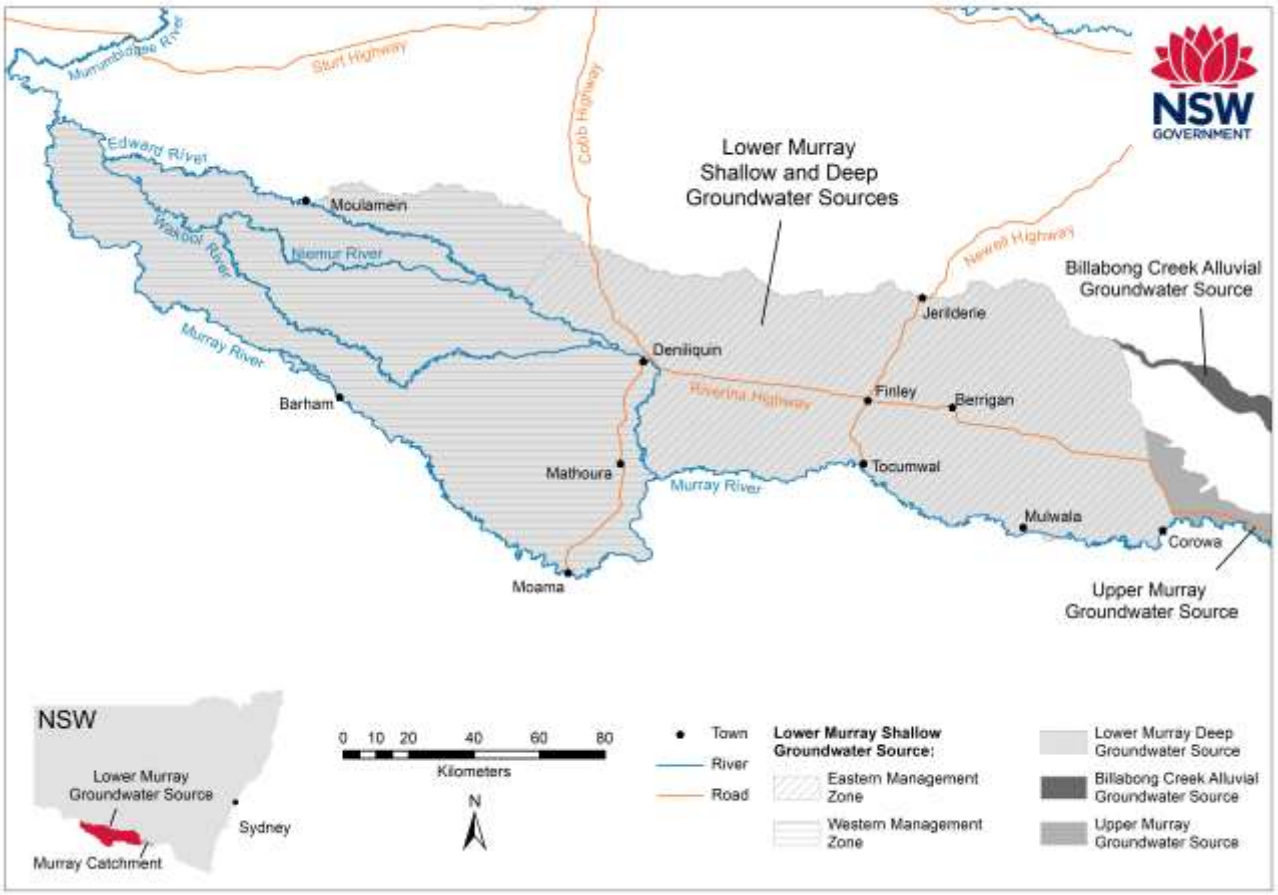
Basic landholder rights are available in this groundwater source for domestic and stock watering requirements. While landholders don't need an access licence to take water for domestic and stock purposes from groundwater below their property, the bore must be authorised by WaterNSW.

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 5,225 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.

Figure 1: Location map



Groundwater access licences

Groundwater access licence share components for 2020 - 2021 are presented in **Table 1**.

Table 1: Lower Murray groundwater sources share component at 30 June 2021

	Lower Murray (deep) Groundwater Source		Lower Murray Shallow Groundwater Source	
Access Licence Category	Number of Licences	Total Volume (ML)	Number of Licences	Total Volume (ML)
Local Water Utility[1]	2	12	0	0
Aquifer[2]	357	84,710	258	57,653
Aquifer (Town Water Supply)[1]	2	67	2	87
Salinity and Watertable Management[1]	0	0	2	20,010

[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 these water sources are defined in the water sharing plan and listed in

Table 2: Extraction limit for Lower Murray groundwater sources

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Table 2: Extraction limit for Lower Murray groundwater sources

Water Source	Extraction limit (ML/year)
Lower Murray Groundwater Source (deep)	88,900
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 (known as the assessment period) 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.

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: www.industry.nsw.gov.au/water/allocations-availability/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 credited to an access licence account in a water year is controlled by the available water determinations 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)	Aquifer	2 ML/share	1.5 ML/share	1 ML/share
	Local Water Utility	0%	100%	100%
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% of the of share component, unless water is transferred in.

Total account water is displayed in **Figure 2** (Lower Murray (deep) Groundwater Source) **and 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 **Figures 2 and 3**.

There has been no reduction in the available water determination (AWD) 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 sources on 1 July 2021 is summarised in **Table 4**.

Table 4: Access licence account information

	Lower Murray (deep) Groundwater Source	Lower Murray Shallow Groundwater Source
Carryover In (ML)	117,002	57,087
Available water determination (ML)	84,789	77,750
Total water in account (ML)	201,791	134,837
Water available for use (ML)	124,818	106,397

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

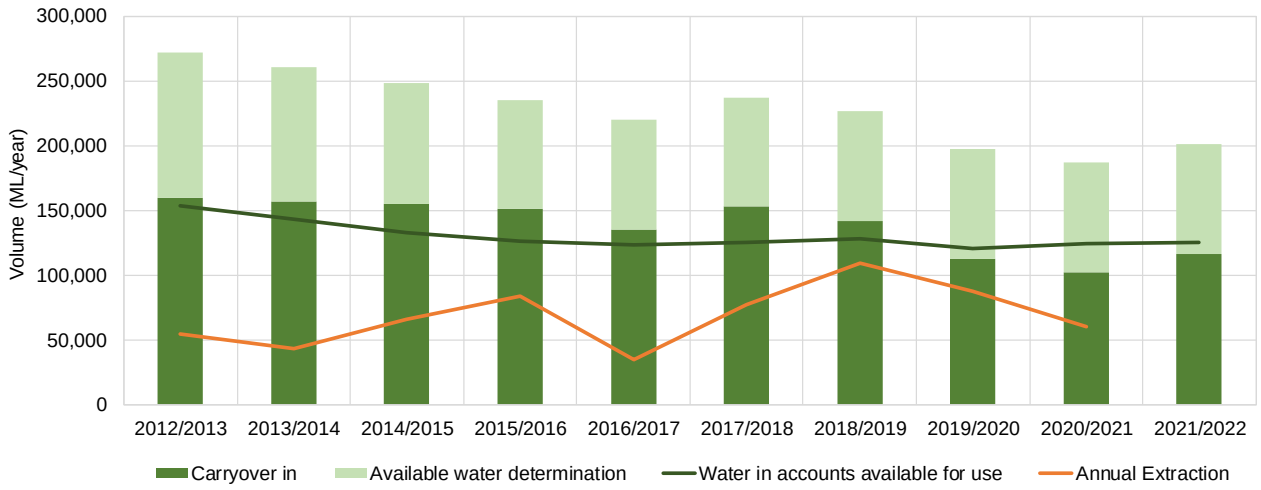
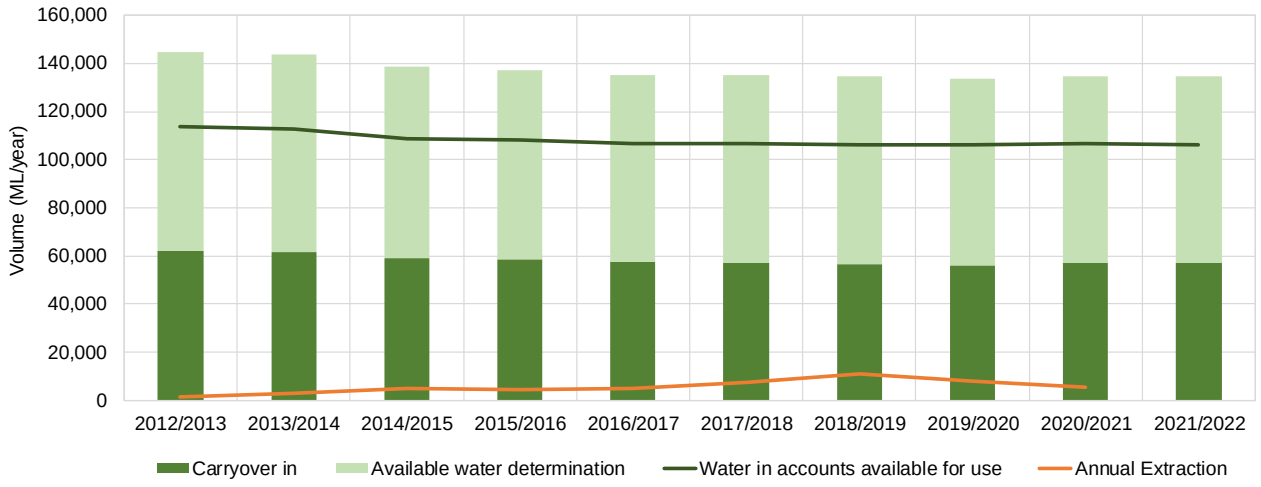


Figure 3: Account water availability and usage summary for Lower Murray Shallow Groundwater Source



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.

Water sharing plan management zones

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 2020-21 was $52.45, while the maximum value was $200 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 **Figure 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

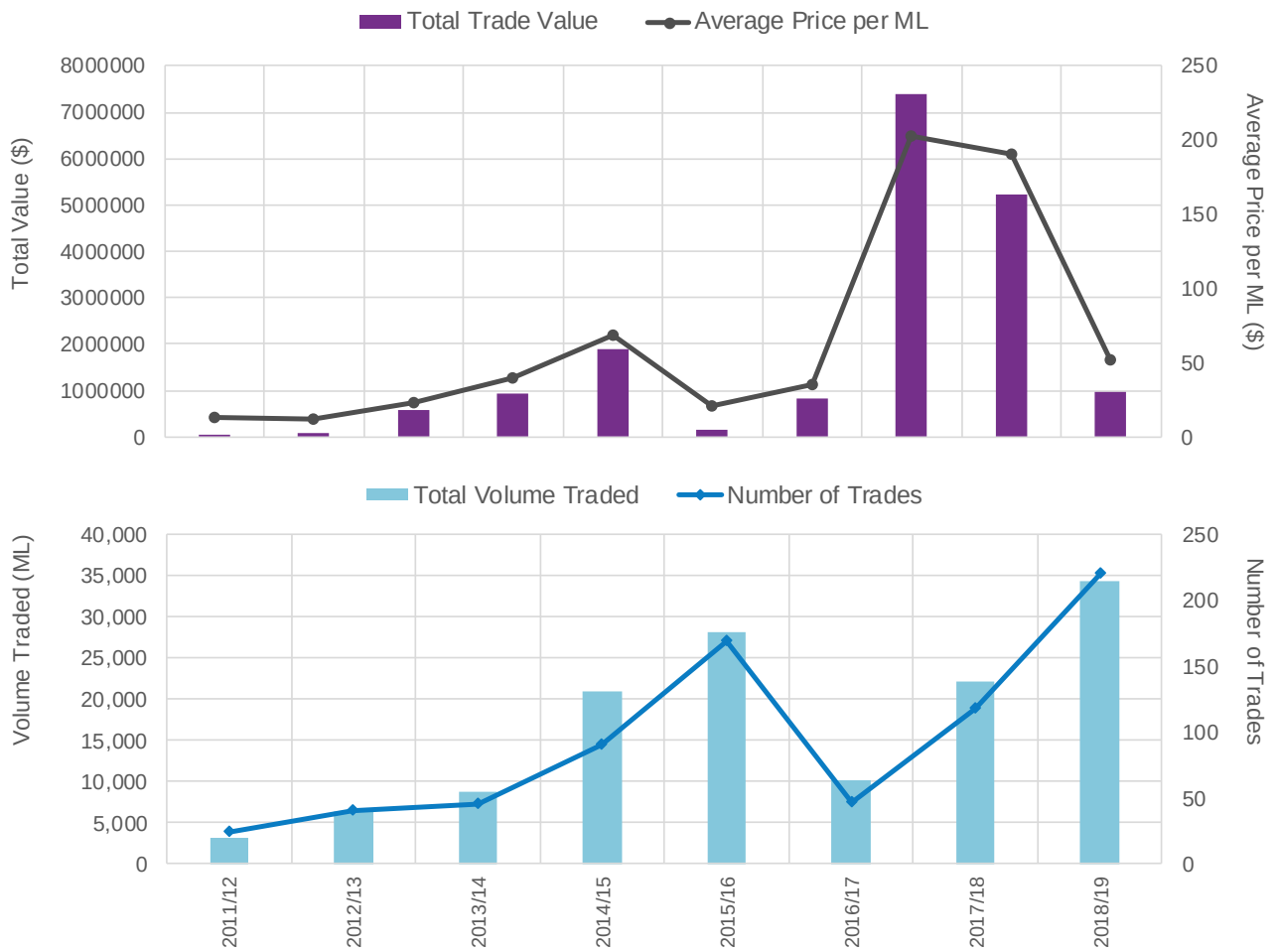


Table 5: Lower Murray Shallow Groundwater Source temporary trade statistics

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 2,630 and 640 registered bores across the Lower Murray (deep) Groundwater Source and Lower Murray Shallow Groundwater Source respectively (Error! Reference source not found. **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: Number of licensed water supply bores in the Lower Murray groundwater sources (at June 2021)

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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 (Error! Reference source not found. **7**).

Table 6: Number of licensed water supply bores in the Lower Murray groundwater sources (at June 2021)

Water Source	Registered Bore Purpose			
	Basic Landholder Rights	Production	Local Water Utility	Salinity and Water Table management
Lower Murray (deep) Groundwater Source	2,268	355	3	0
Lower Murray Shallow Groundwater Source	273	314	0	52

Water level monitoring

WaterNSW monitors groundwater levels at 183 monitoring bores at 79 sites in the Lower Murray Groundwater Source (deep) (**Figure 8**). 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.

Water levels within the irrigation areas of the Lower Murray Shallow Groundwater Source are also monitored by Murray Irrigation Limited for rising watertable and soil salinisation issues.

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 **Figures 9 to 18**.

Data for the monitored bores, as well as private bore information, can be obtained from the WaterNSW real time data portal (realtimedata.waternsw.com.au/). It includes data for 12 groundwater monitoring sites in real-time via telemetry. You can also request information via: Customer.Helpdesk@waternsw.com.au

Figure 5: Lower Murray Groundwater Source registered bores

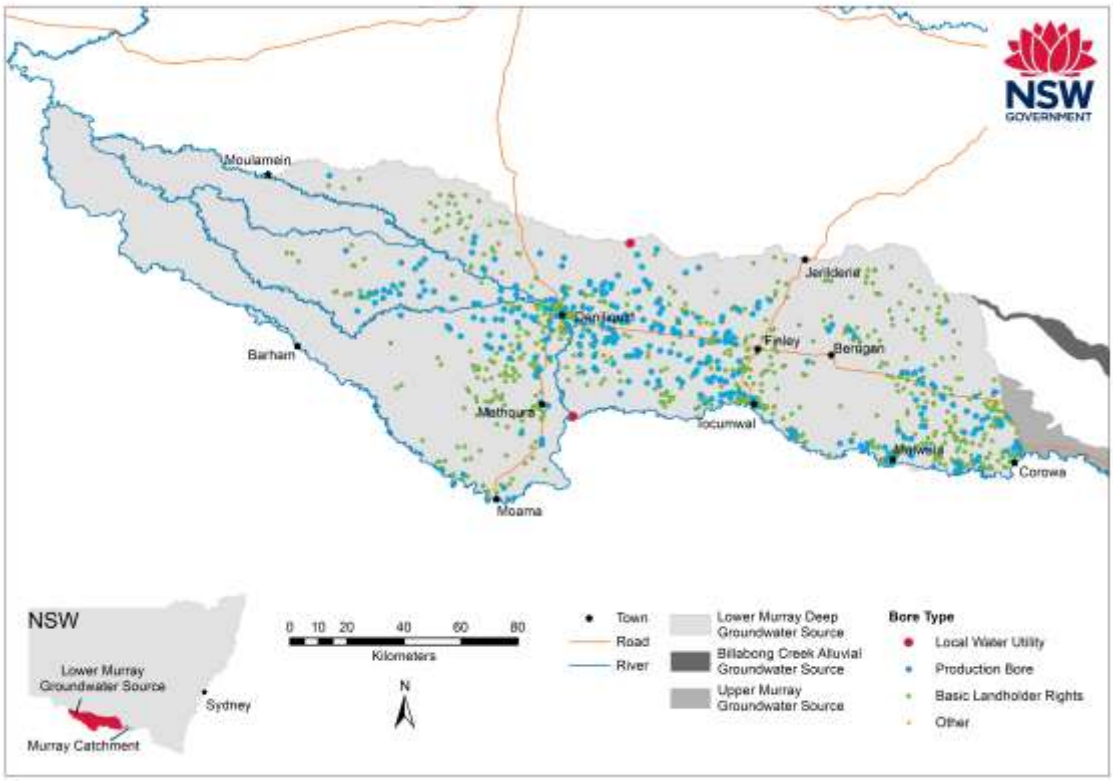

Figure 6: Lower Murray Shallow Groundwater Source registered bores

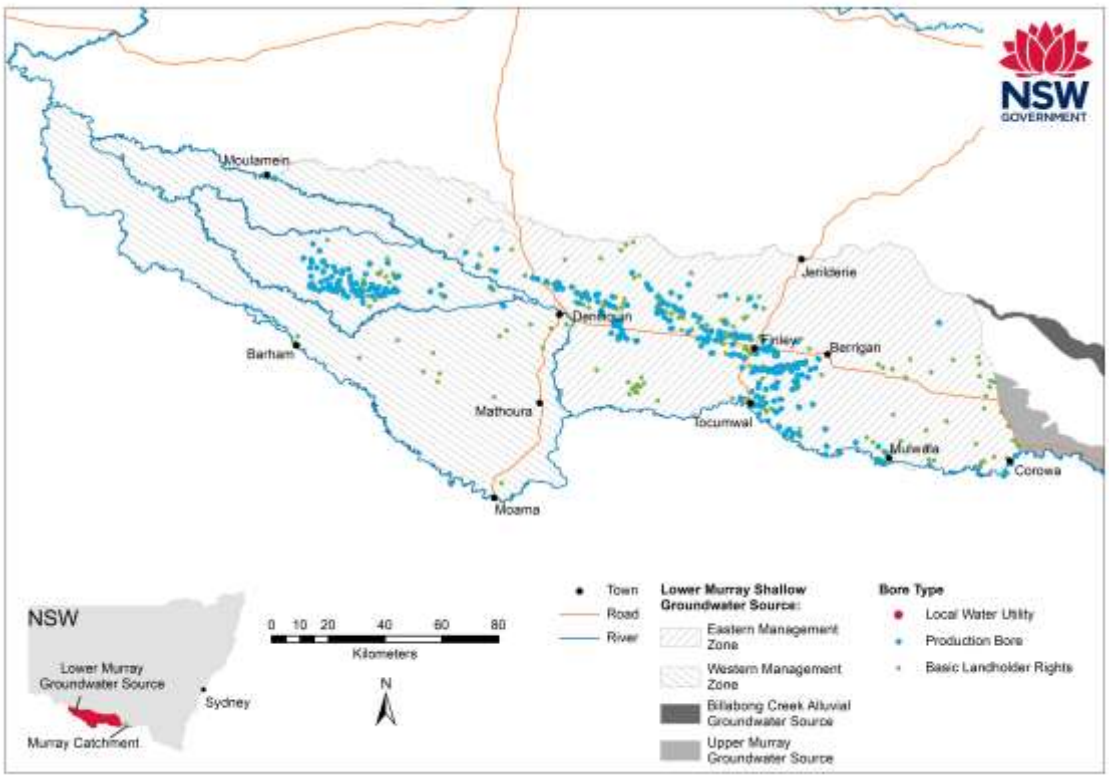

Figure 7: Lower Murray Groundwater Source water supply bores and distribution of extraction

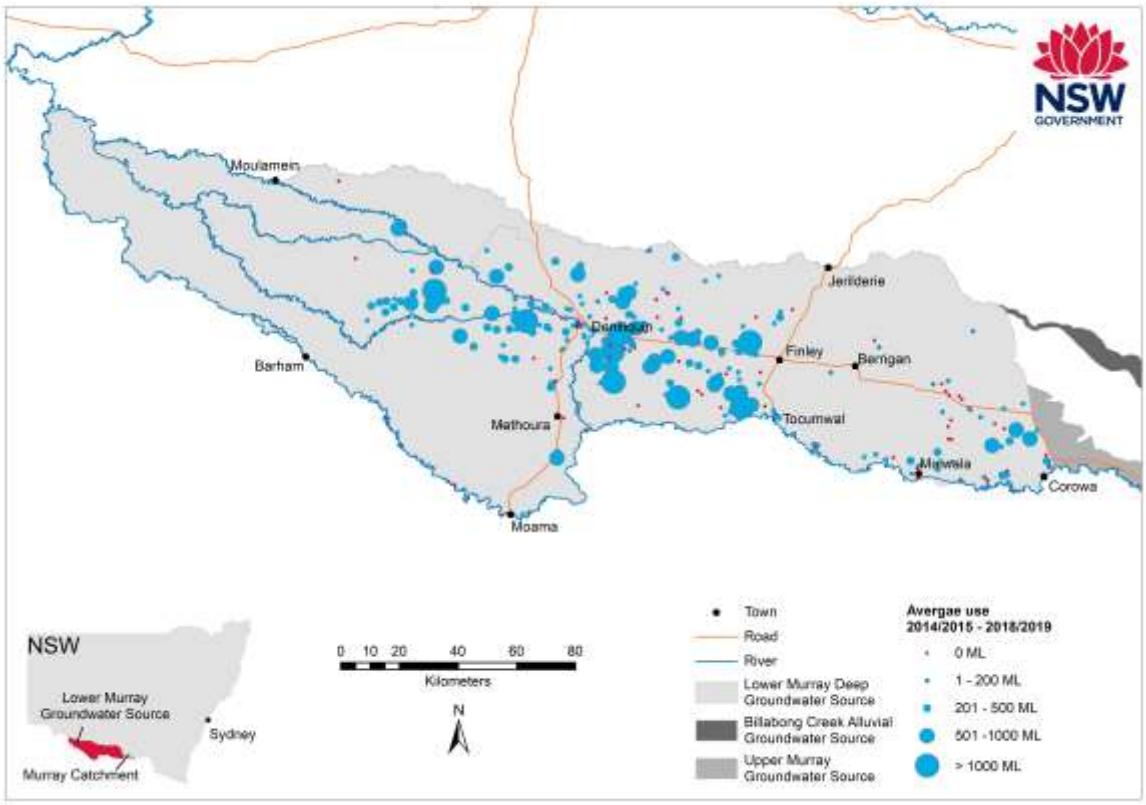

Figure 8: Lower Murray Groundwater Source monitoring bore sites

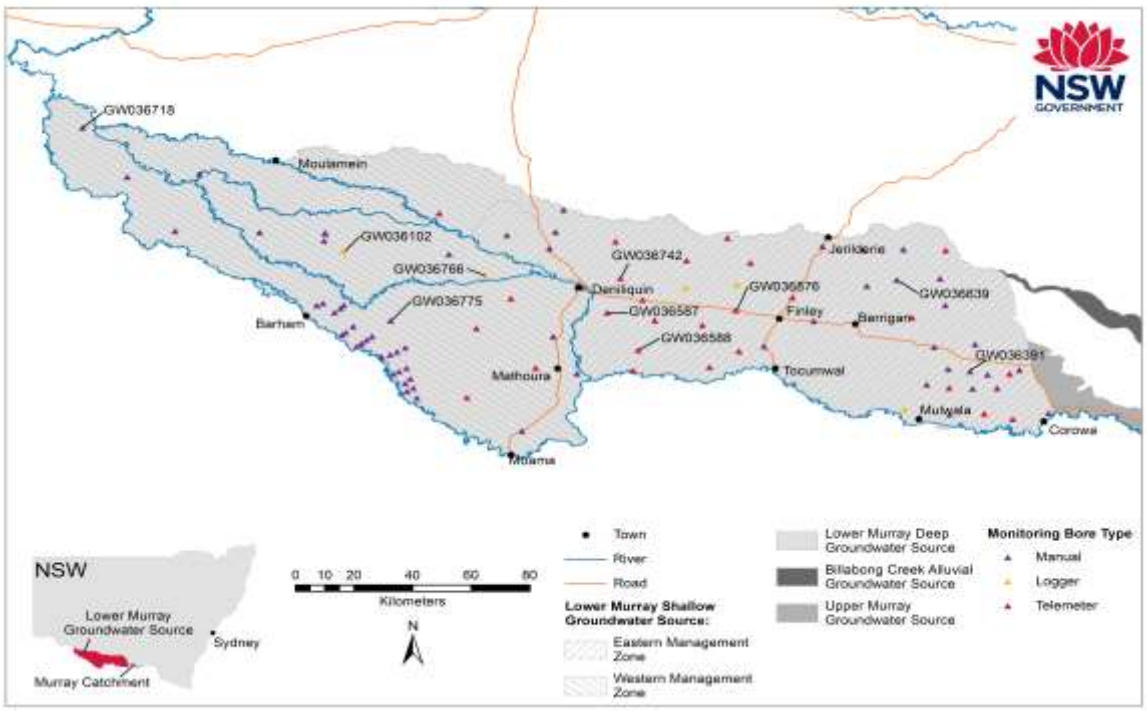

Figure 9: Hydrograph for monitoring bore GW036102

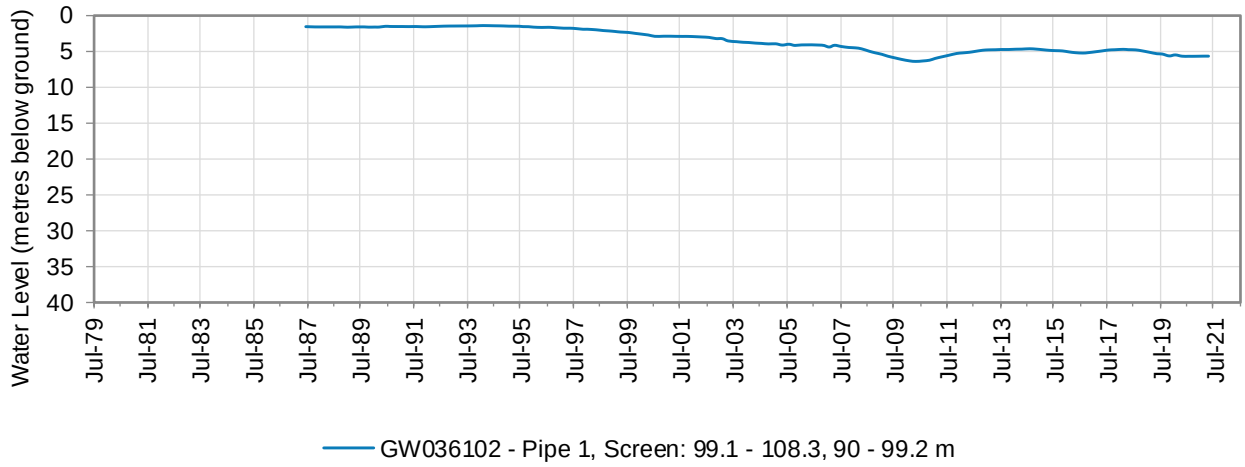

Figure 10: Hydrograph for monitoring bore GW036391

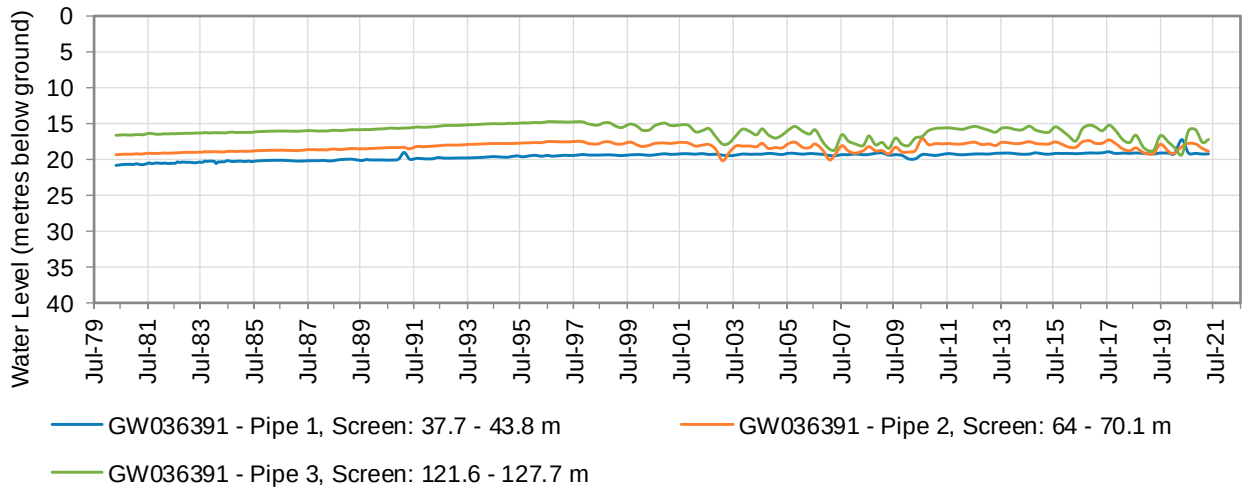

Figure 11: Hydrograph for monitoring bore GW036587

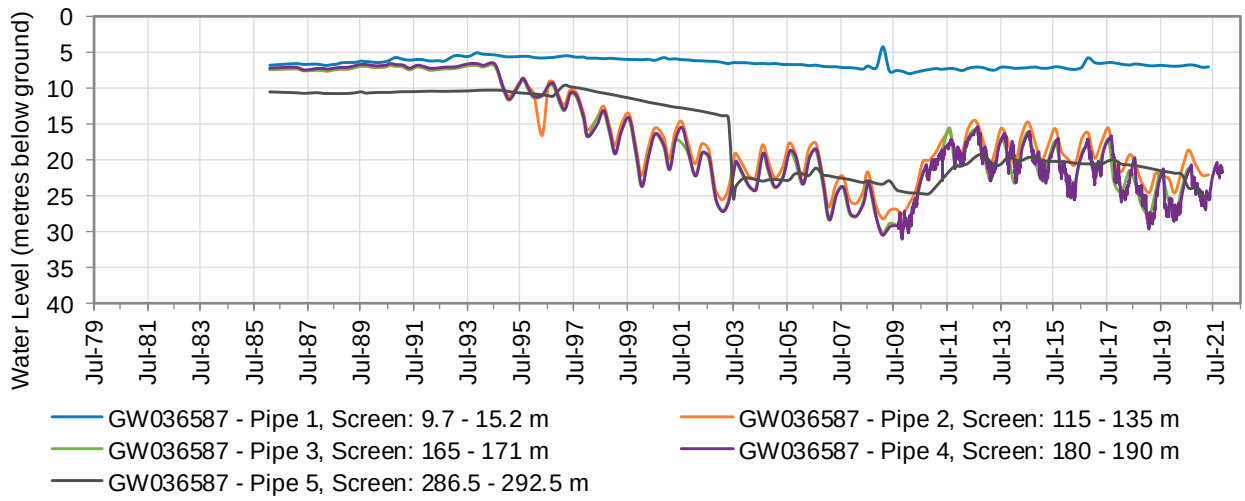

Figure 12: Hydrograph for monitoring bore GW036588

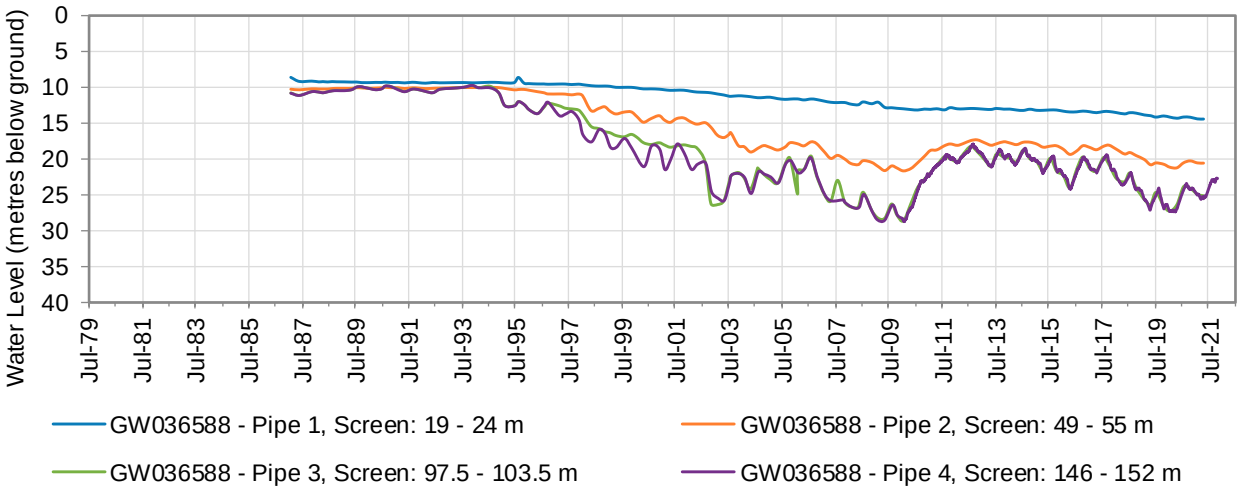

Figure 13: Hydrograph for monitoring bore GW036639

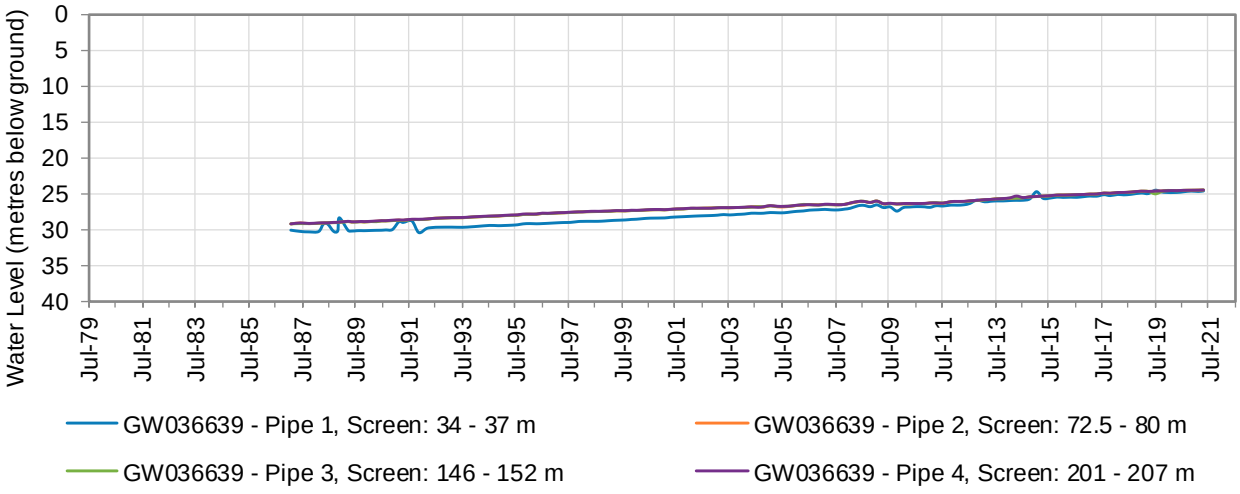

Figure 14: Hydrograph for monitoring bore GW036718

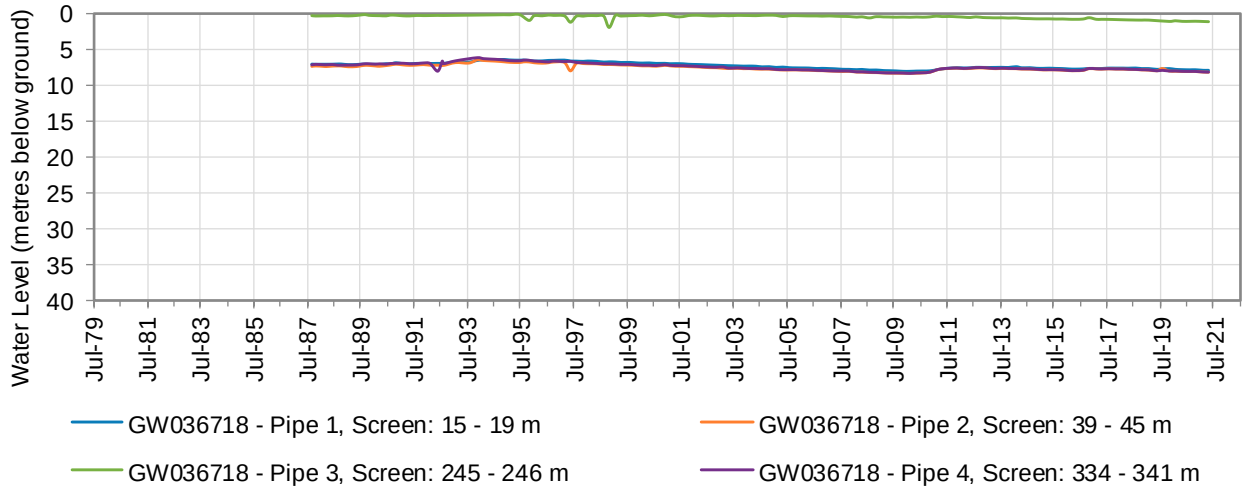

Figure 15: Hydrograph for monitoring bore GW036742

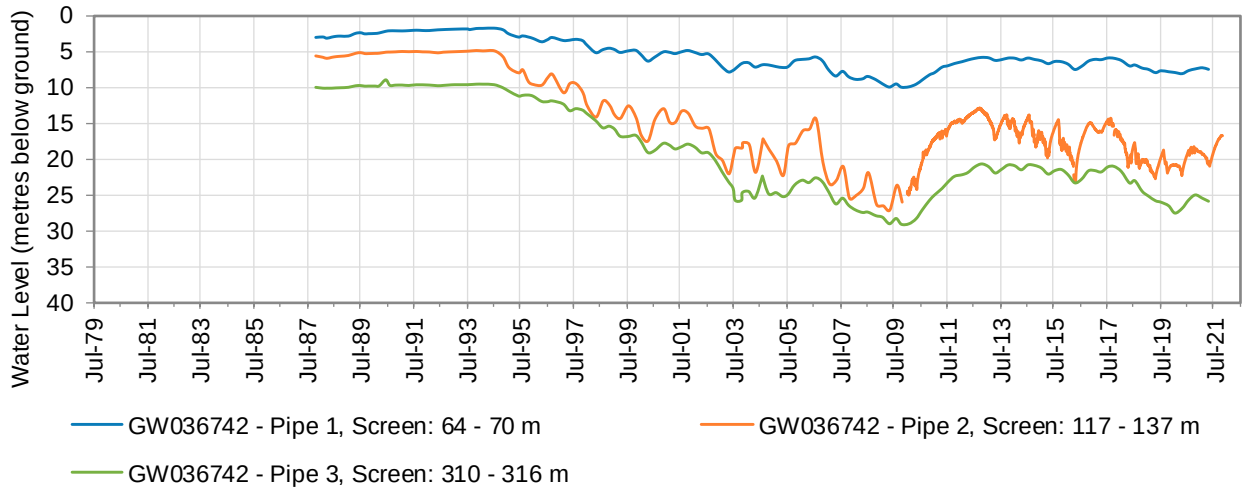

Figure 16: Hydrograph for monitoring bore GW036766

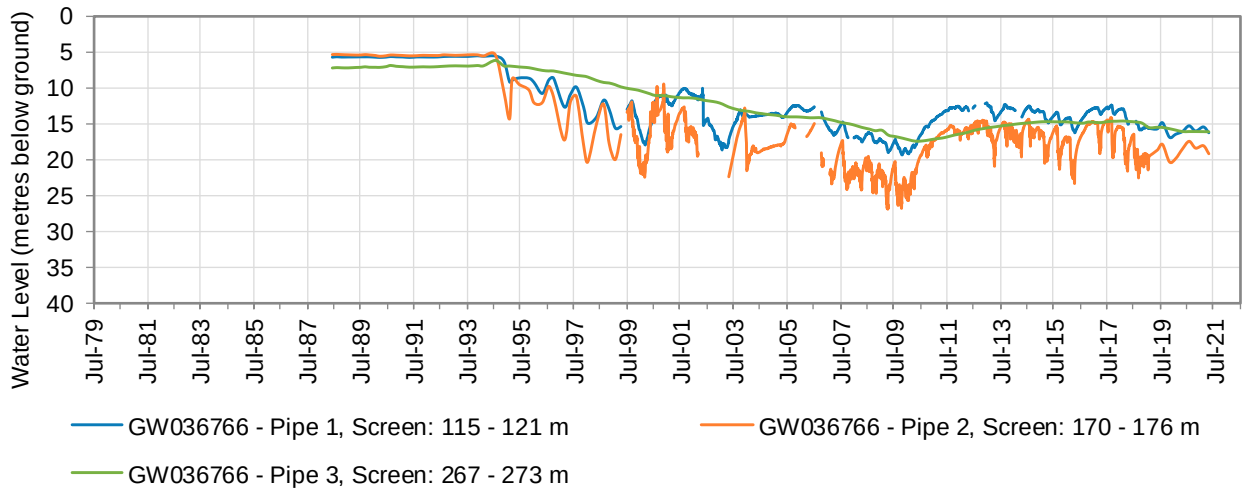

Figure 17: Hydrograph for monitoring bore GW036775

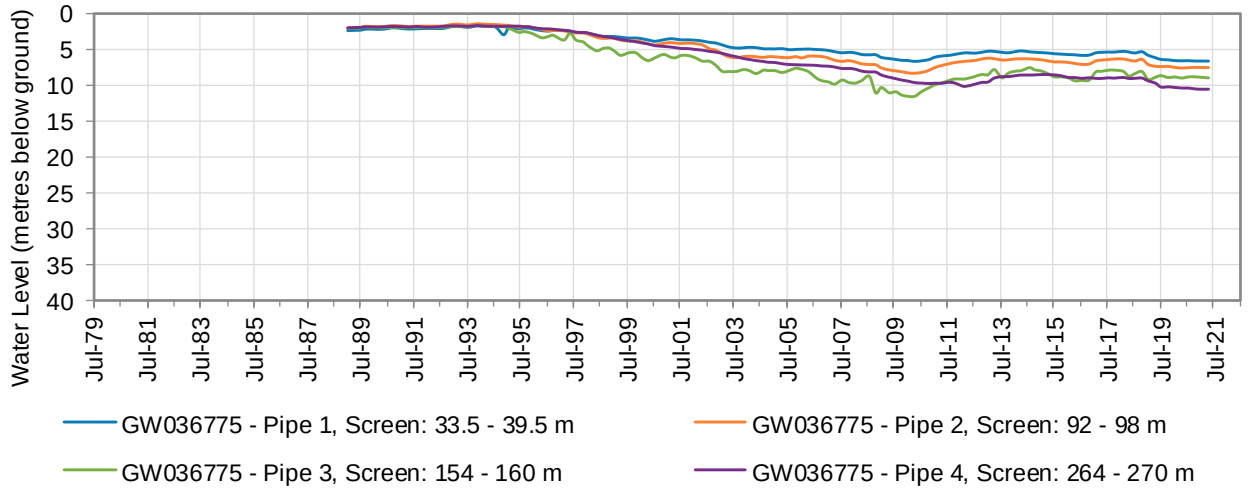

Figure 18: Hydrograph for monitoring bore GW36876