Lower Murrumbidgee Groundwater Sources

Groundwater annual report 2023.

Introduction

This report is a summary of water accounts, volume pumped and groundwater levels for the Lower Murrumbidgee Shallow and Lower Murrumbidgee Deep groundwater sources (collectively known as the Lower Murrumbidgee 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 Murrumbidgee Alluvium Water Sources: www.industry.nsw.gov.au/__data/assets/pdf_file/0017/313127/appendix-a-murrumbidgee-alluvium-wrp-groundwater-resource-description.pdf

Description

The Lower Murrumbidgee groundwater sources are located within the Murrumbidgee River catchment between the towns of Narrandera, Booligal, Balranald and Jerilderie (**Figure 1**). These are made up of Cenozoic alluvial sediments.

There are two separate groundwater sources:

- The Lower Murrumbidgee Shallow Groundwater Source consists of yellow and brown poorly sorted gravel, sand and clay deposits of the Shepparton Formation. The groundwater source extends to a depth of 40 metres, or the bottom of the Shepparton Formation, whichever is the deeper.
- The Lower Murrumbidgee Deep Groundwater Source consists of gravel, sand and clay deposits of the Calivil Formation and Renmark Group greater than 40 m down to its base.

Water resource management

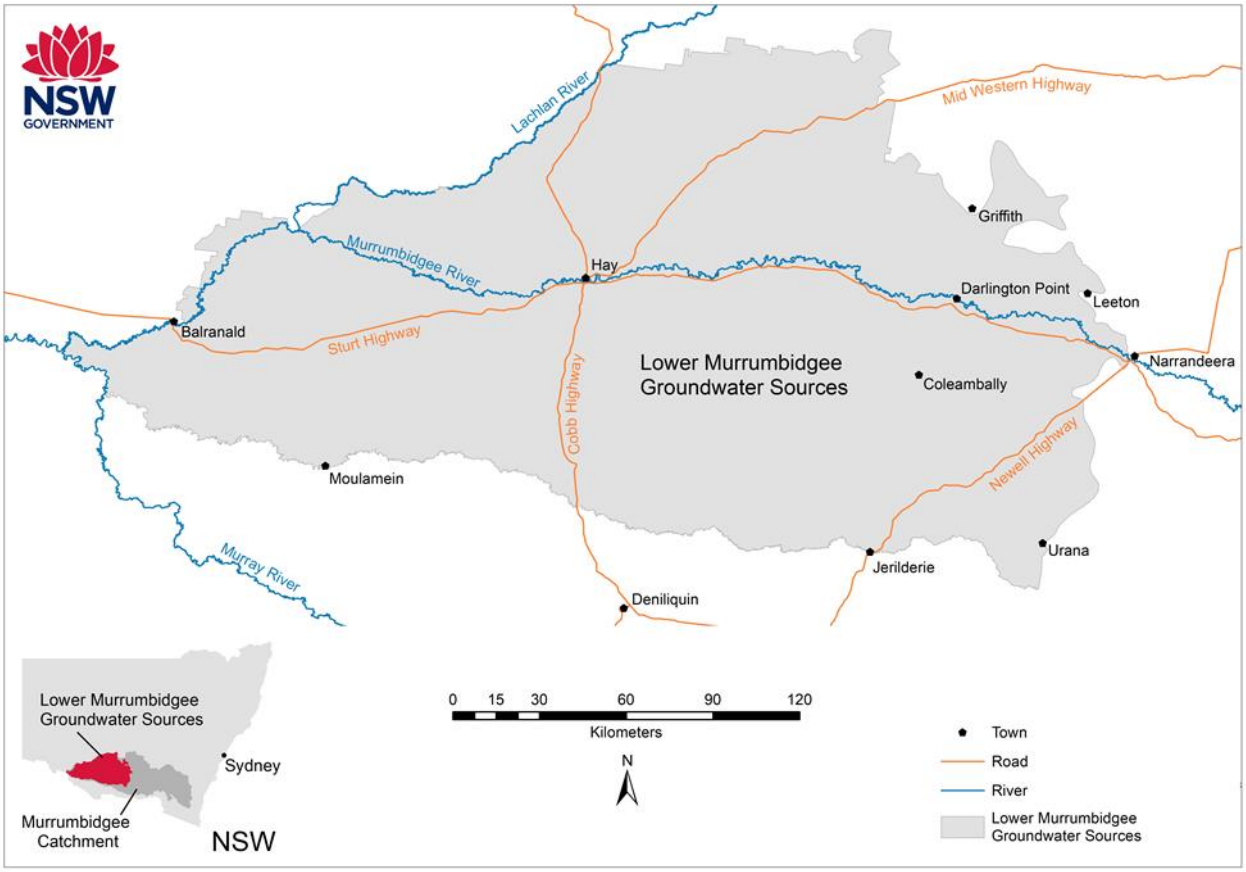
Water sharing plan

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

PUB23/1290

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

Figure 1: Location map



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 Murrumbidgee Shallow Groundwater Source and Lower Murrumbidgee Deep Groundwater Source are 10,875 and 3,625 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 Murrumbidgee groundwater sources share component 30 June 2023

Access Licence Category	Lower Murrumbidgee Deep Groundwater Source		Lower Murrumbidgee Shallow Groundwater Source	
	Number of Licences	Total Volume	Number of Licences	Total Volume
Local Water Utility[1]	3	2,210	N/A	N/A
Aquifer[2]	395	272,825	30	5,201
Aquifer (Community and Education)[1]	2	23	N/A	N/A
Aquifer (Town Water Supply)[1]	1	20	N/A	N/A
Domestic and Stock (Stock)[1]	1	324	N/A	N/A

[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 groundwater sources are defined in the water sharing plan and listed in Table 2.

Table 2: Extraction Limit for Lower Murrumbidgee groundwater sources

Water Source	Extraction Limit (ML/year)
Lower Murrumbidgee Shallow	26,875

Water Source	Extraction Limit (ML/year)
Lower Murrumbidgee Deep	273,625

Extraction in the Lower Murrumbidgee groundwater sources is not compliant if the 5 years average annual extraction is more than 105% 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 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 Murrumbidgee groundwater sources are provided in Table 3.

Table 3: Lower Murrumbidgee groundwater sources access licence account rules

Access Licence Category	Carryover Limit	Annual Use Limit	Maximum AWD
Local Water Utility	0%	100%	100%
Aquifer	2 ML/share	2 ML/share	1 ML/share

Access Licence Category	Carryover Limit	Annual Use Limit	Maximum AWD
Domestic and Stock (Stock)	0%	100%	100%
Aquifer (Community and Education)	0%	100%	100%
Aquifer (Town Water Supply)	0%	100%	100%

The maximum amount of water that can be debited from an aquifer access licence account in a water year can't exceed 2 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 200 per cent of the of share component, unless water is transferred in.

Total account water for period 2013/2014 to 2022/2023 is displayed in **Figure 2 and Figure 3** showing the proportion available for use and what is not available for use in a year for the two groundwater sources. Total yearly extraction is also displayed. Note, all access licence categories have been combined in **Figure 2 and Figure 3.**

An available water determination (AWD) of 0.65 ML/share was made for aquifer access licences in the Lower Murrumbidgee Deep Groundwater Source for 2020/21 water year. There was no reduction in AWD for licences in the Lower Murrumbidgee Shallow Groundwater Source.

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

Table 4: Access licence account information

	Lower Murrumbidgee Deep Groundwater Source	Lower Murrumbidgee Shallow Groundwater Source
Carryover In (ML)	489,084	9,970
Available water determination (ML)	275,402	5,201
Total water in account (ML)	764,486	15,171

	Lower Murrumbidgee Deep Groundwater Source	Lower Murrumbidgee Shallow Groundwater Source
Water available for use (ML)	543,109	10,402

Figure 2: Account water availability and usage summary for Lower Murrumbidgee Deep Groundwater Source

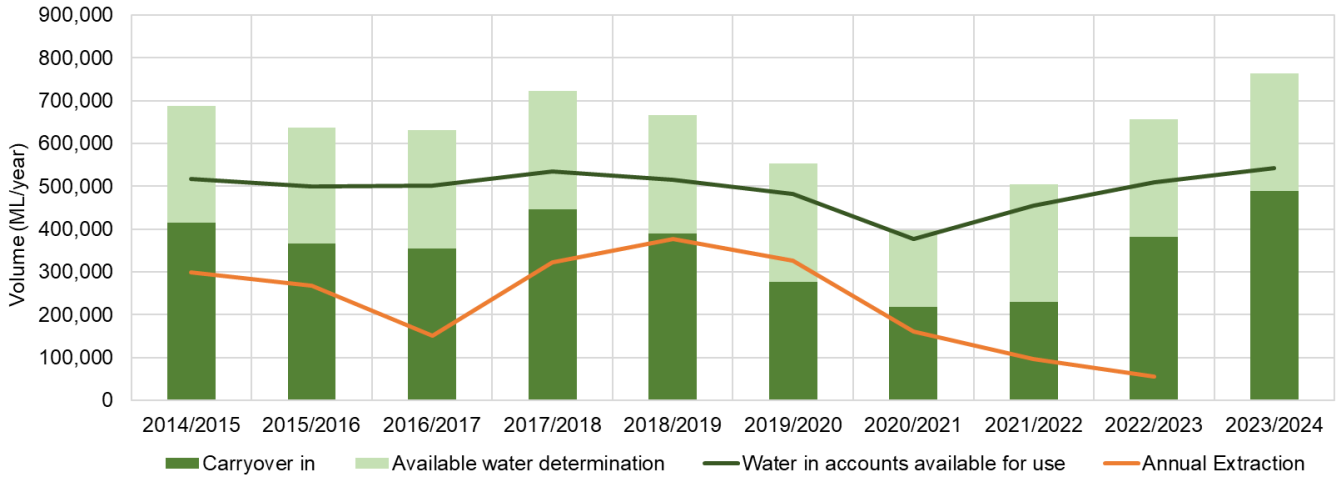
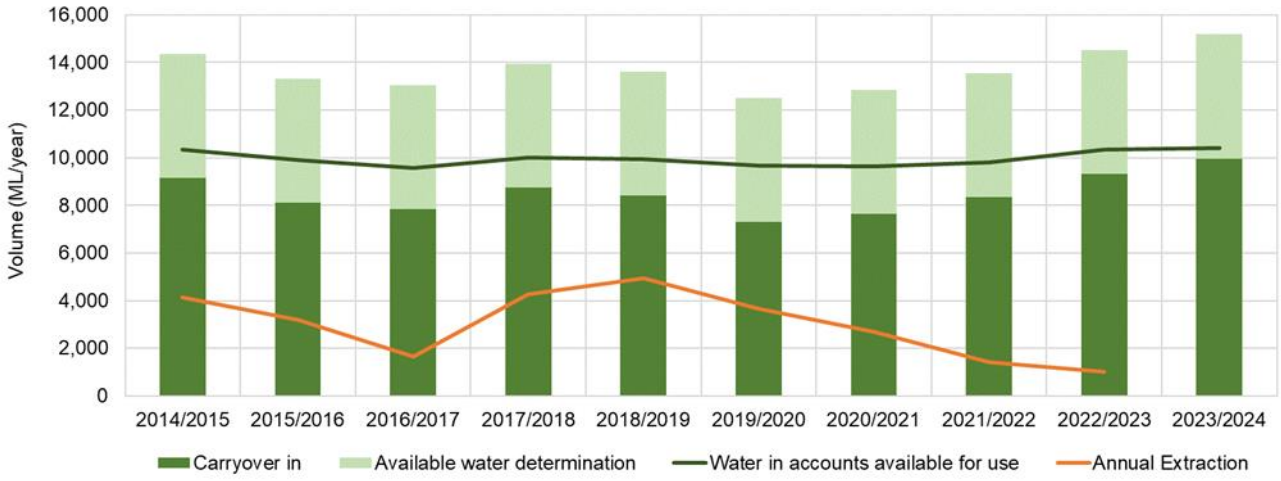


Figure 3: Account water availability and usage summary for Lower Murrumbidgee Shallow Groundwater Source



Groundwater trading

Trades are permitted within but not between Lower Murrumbidgee and any other groundwater source.

Local management areas

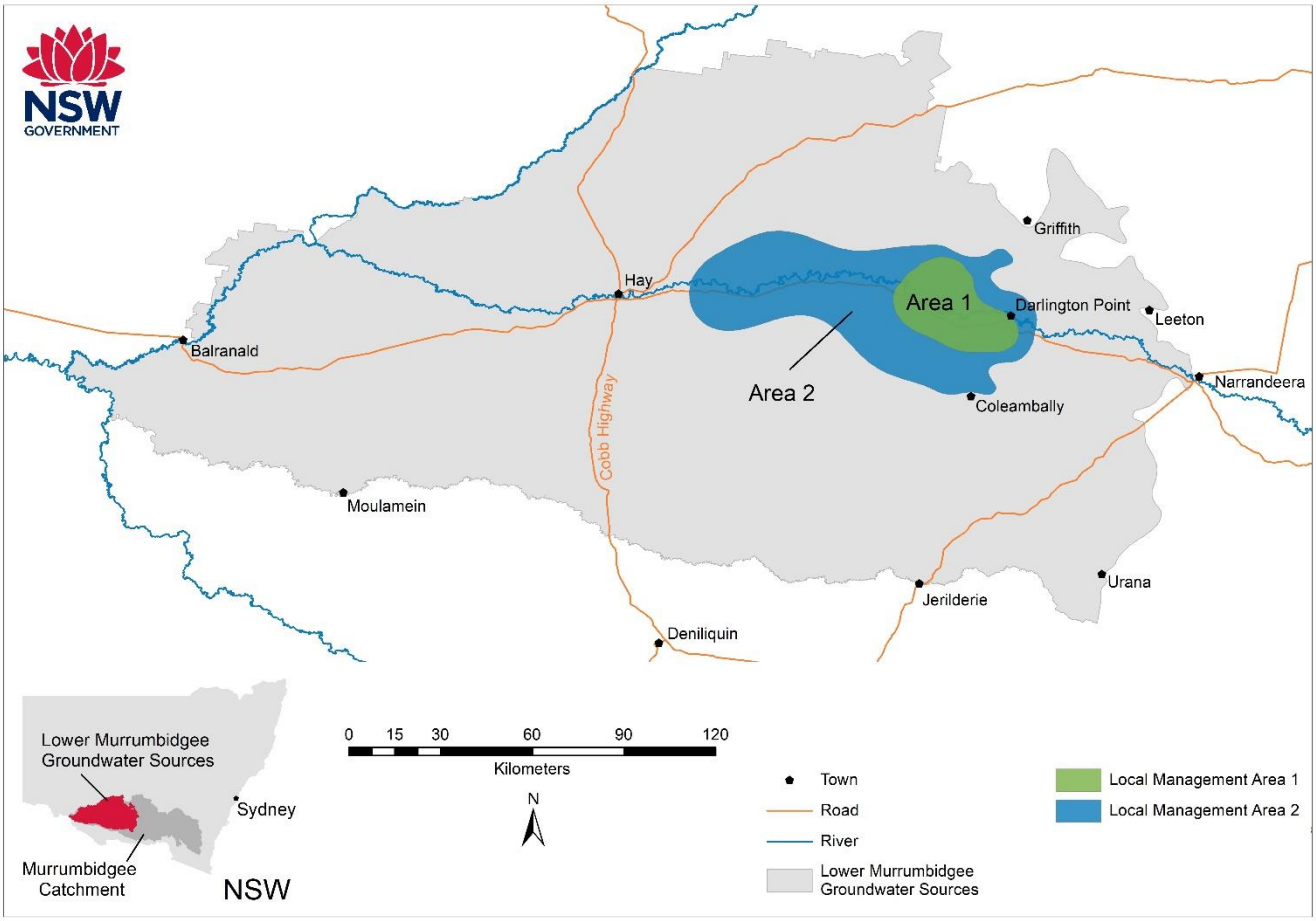
In 2007 an area between Hay, Coleambally and Griffith was identified as an area of concern due to cumulative impacts from groundwater extractions on the aquifer and other groundwater users.

The identification of this area of concern lead to two trade management areas being established to assist in the management extractions at a local level. The following rules apply:

- Trade permitted within and out of Local Management Area 1
- Trade permitted within and out of Local Management Area 2
- Cannot trade from Local Management Area 2 to Local Management Area 1
- Cannot trade into the Local Management Areas

The local management areas in the Lower Murrumbidgee Deep Groundwater Source are shown in Figure 4.

Figure 4: Lower Murrumbidgee Groundwater Sources management areas



Allocation assignments (temporary trade)

Trading statistics for the Lower Murrumbidgee Deep Groundwater Source are illustrated in **Figure 5**, excludes trades for less than $1 per megalitre. The average value paid per megalitre in 2022-23 was $36.70, while the maximum value was $210 per megalitre.

Trade in the Lower Murrumbidgee Shallow Groundwater Source has been minimal since the commencement of the plan **(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 5: Lower Murrumbidgee Deep Groundwater Source temporary trade statistics

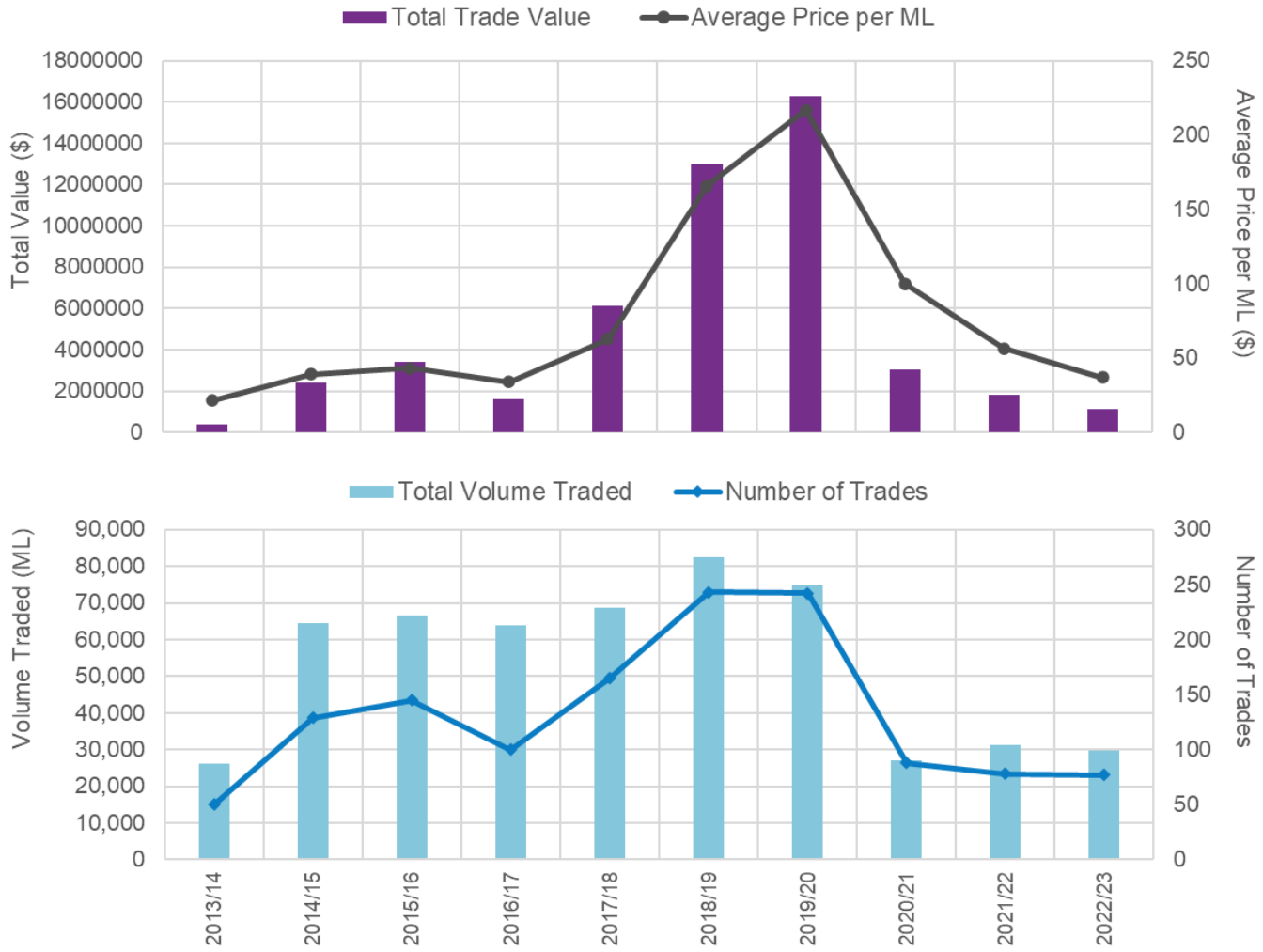


Table 5: Lower Murrumbidgee Shallow Groundwater Source temporary trade statistics

Year	Number of Trades	Total Volume Traded (ML)	Total Trade Value ($)	Average Price per ML ($)
2017-2018	2	590	22,200	38
2018-2019	1	2	100	50
2019-2020	1	5	750	150
2020-2021	1	5	250	50
2021-2022	0	0	-	-
2022-2023	0	0	-	-

Bores

The number of registered bores across the Lower Murrumbidgee Deep and Lower Murrumbidgee Shallow groundwater sources are 1,376 and 1,252 respectively (**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 more productive aquifers (Lower Murrumbidgee Deep) can yield up to 6,600 ML/year, while most production bores produce supply in the range of 1,000 ML/year (**Figure 8**). Average extraction from individual production bores in the Lower Murrumbidgee Shallow Groundwater Source is around 150 ML/year (**Figure 9**). This is based on average extraction from 2017/2018 to 2021/2022 and unlikely to have changed significantly.

Table 6: Approximate number of licensed bores in Lower Murrumbidgee groundwater sources (2022)

Groundwater Source	Registered Bore Purpose		
	Basic Landholder Rights	Production	Local Water Utility
Lower Murrumbidgee Deep	869	498	9
Lower Murrumbidgee Shallow	1,212	40	0

Water level monitoring

WaterNSW monitors groundwater levels at 264 monitoring bores at 152 sites in the Lower Murrumbidgee groundwater sources (**Figure 7**). 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 21**.

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

Figure 6: Lower Murrumbidgee Deep Groundwater Source registered bores

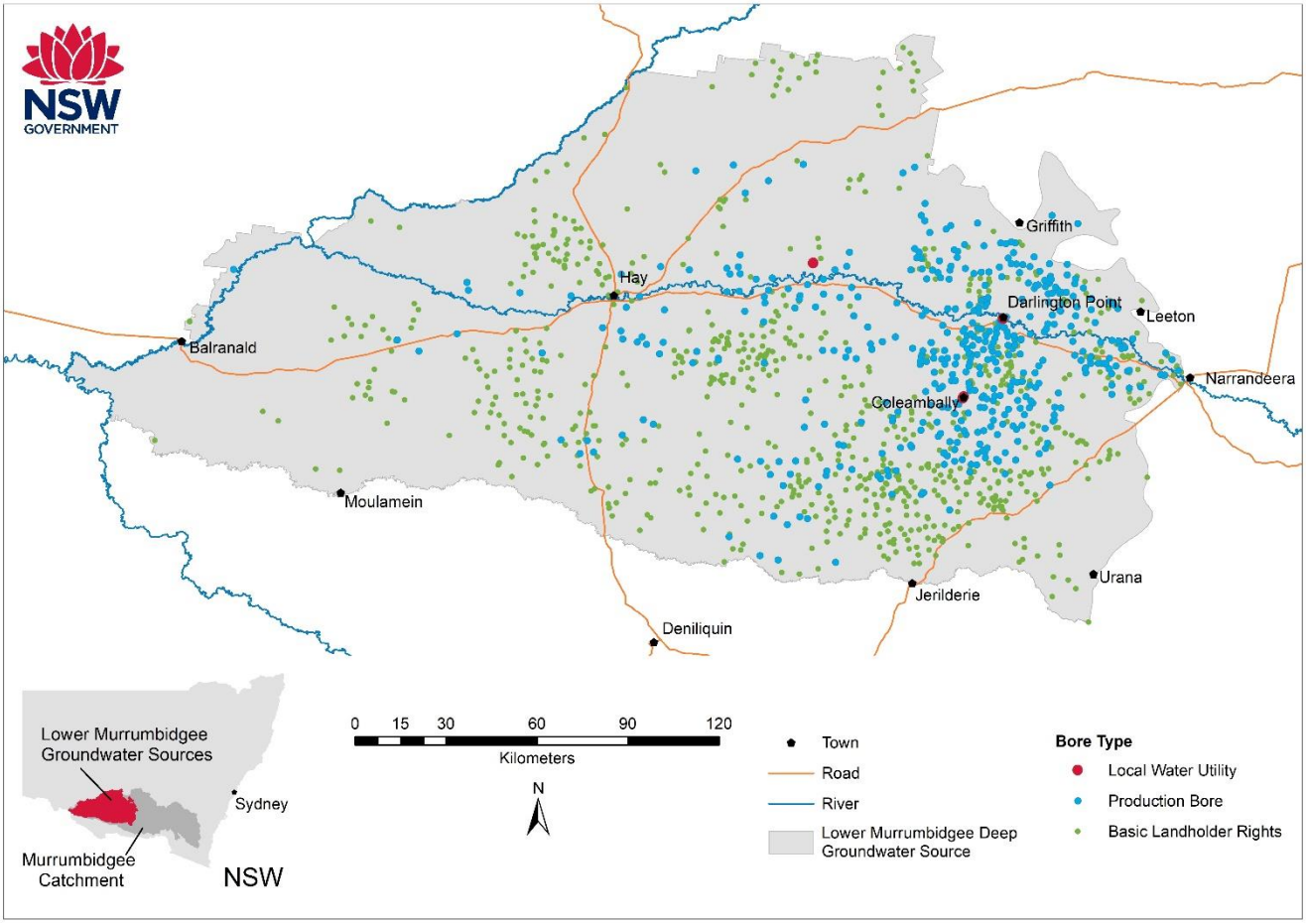


Figure 7: Lower Murrumbidgee Shallow Groundwater Source registered bores

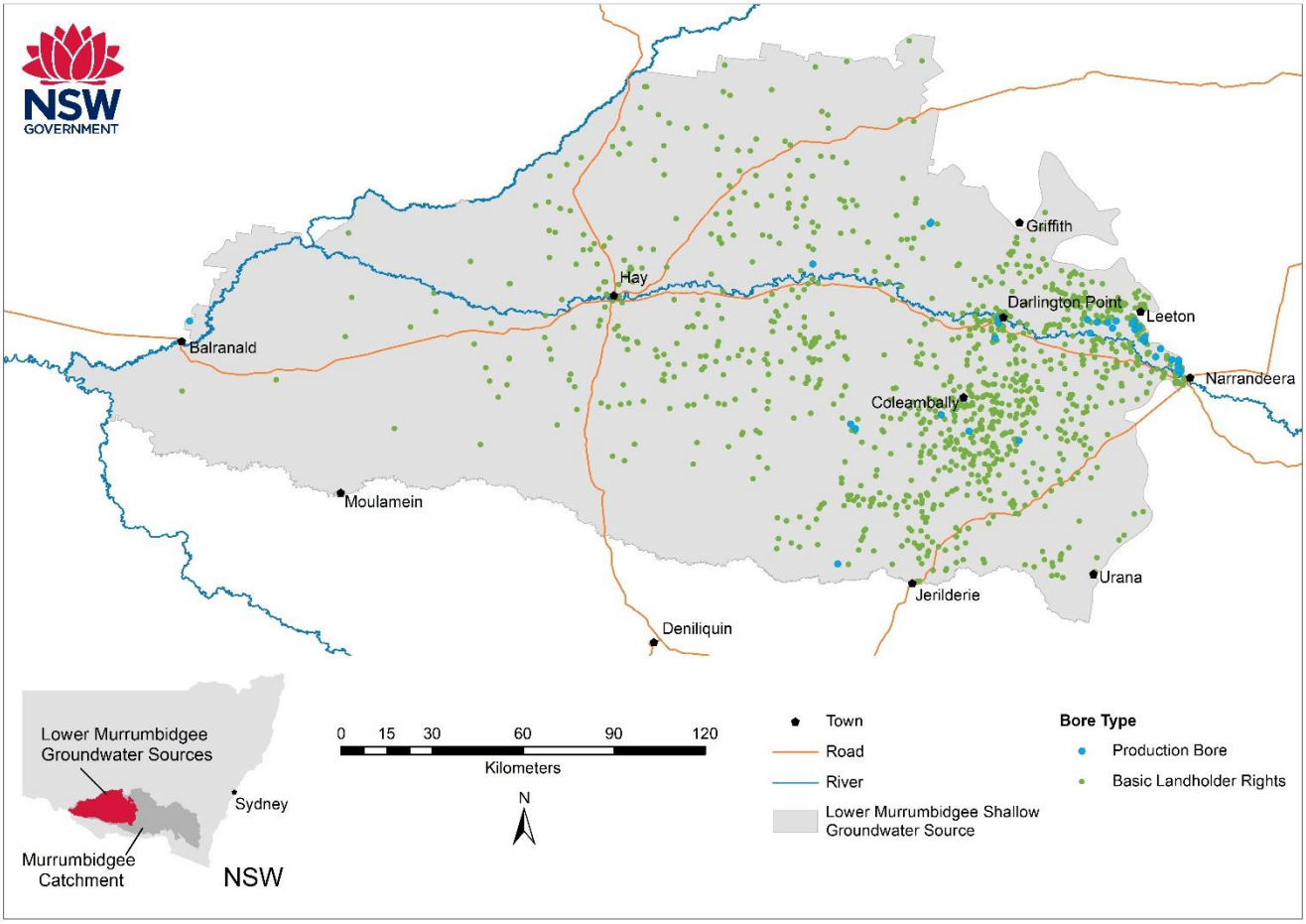


Figure 8: Lower Murrumbidgee Deep Groundwater Source water supply bores and distribution of extraction (for period 2017/2018 to 2021/2022).

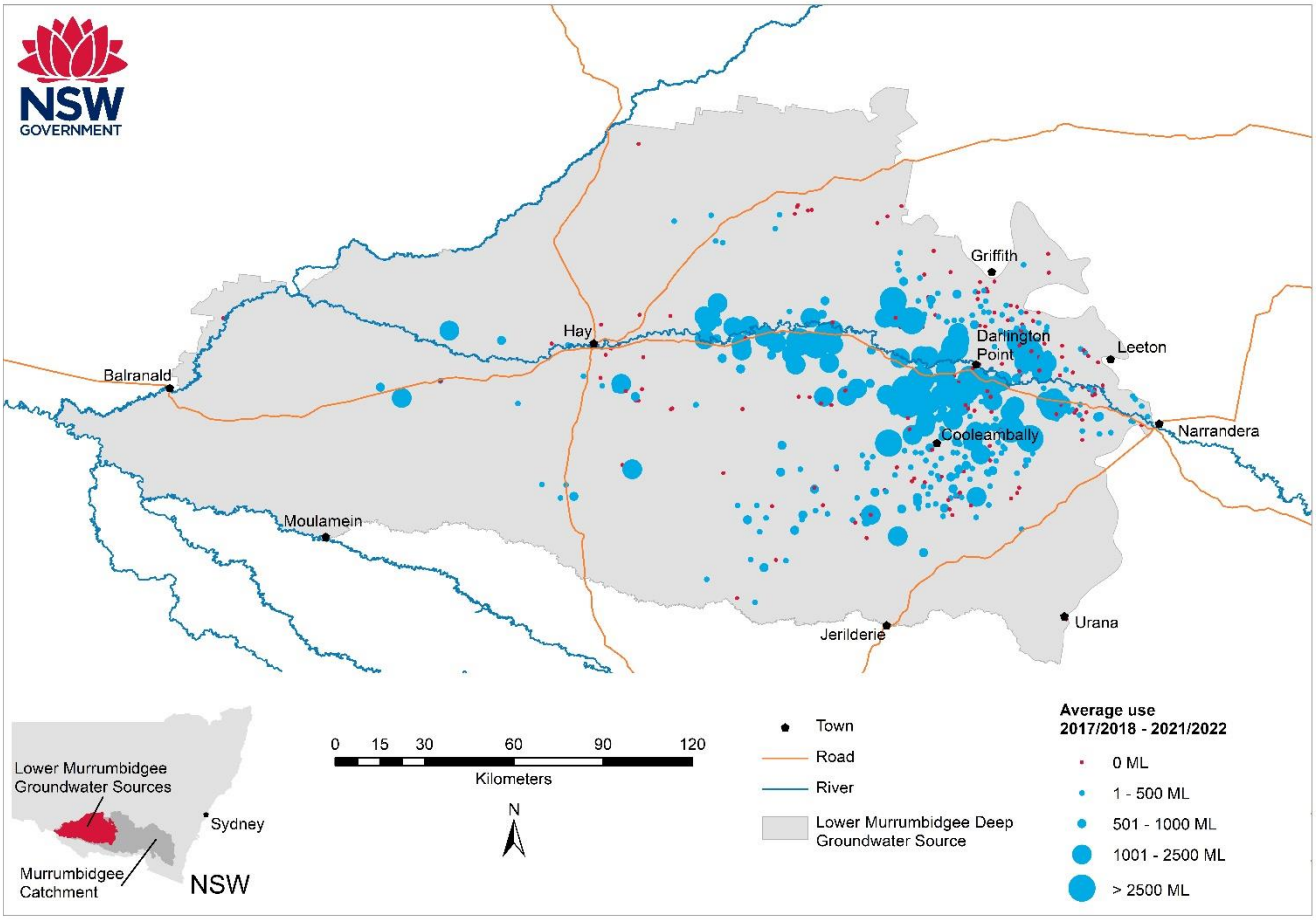


Figure 9: Lower Murrumbidgee Shallow Groundwater Source water supply bores and distribution of extraction (for 2017/2018 to 2021/2022).

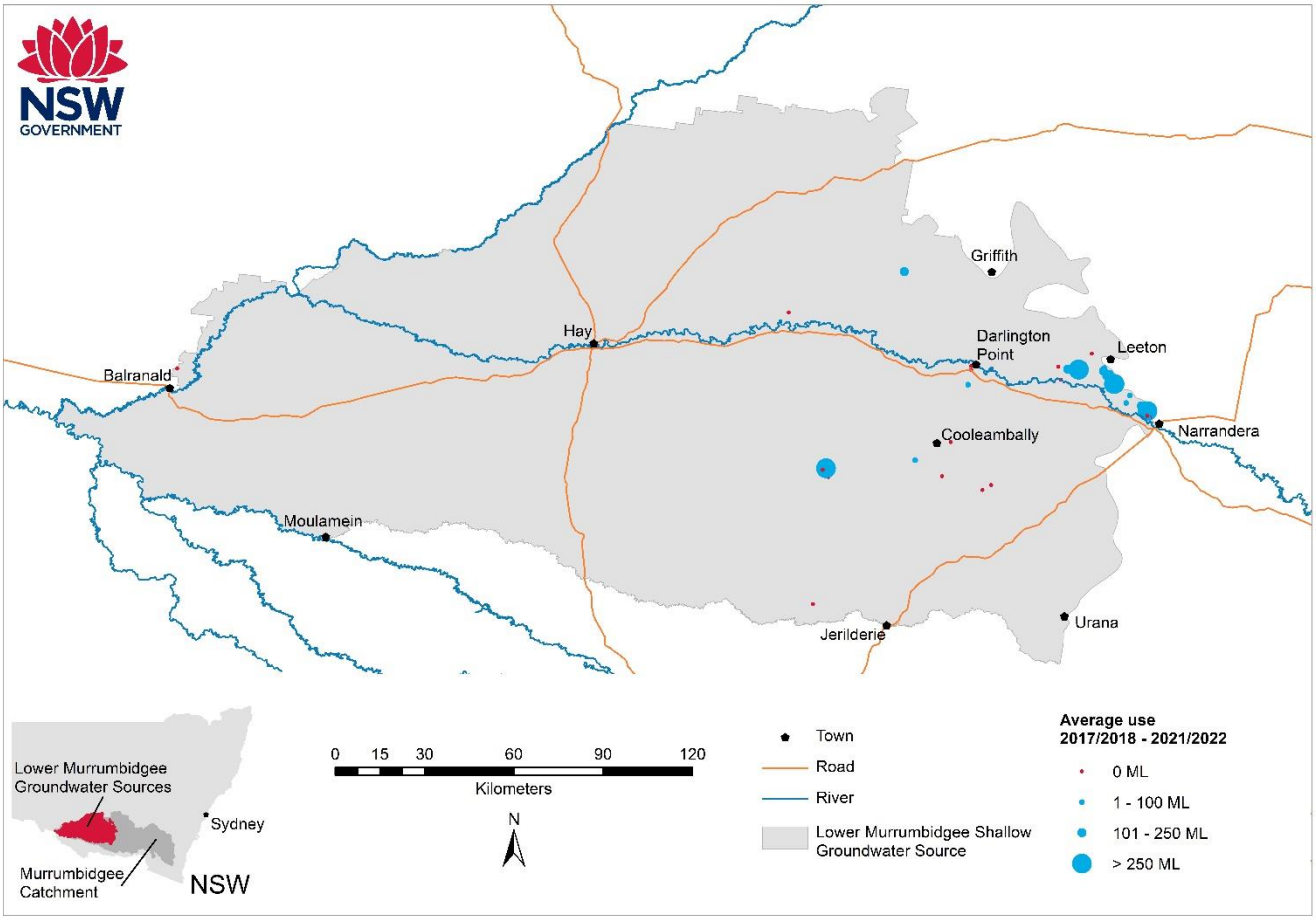


Figure 10: Lower Murrumbidgee groundwater sources monitoring bore sites.

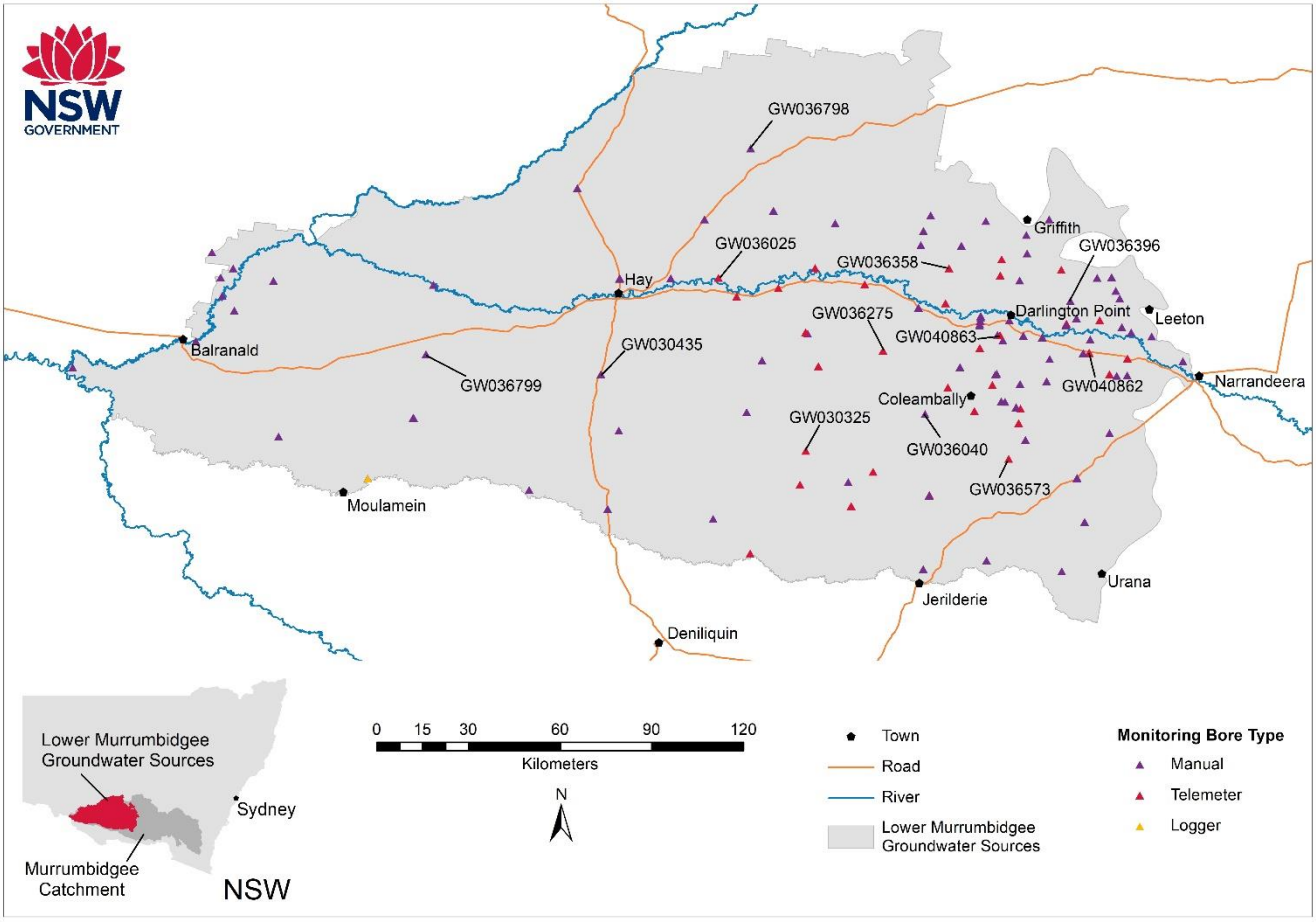


Figure 11: Hydrograph for monitoring bore GW040862

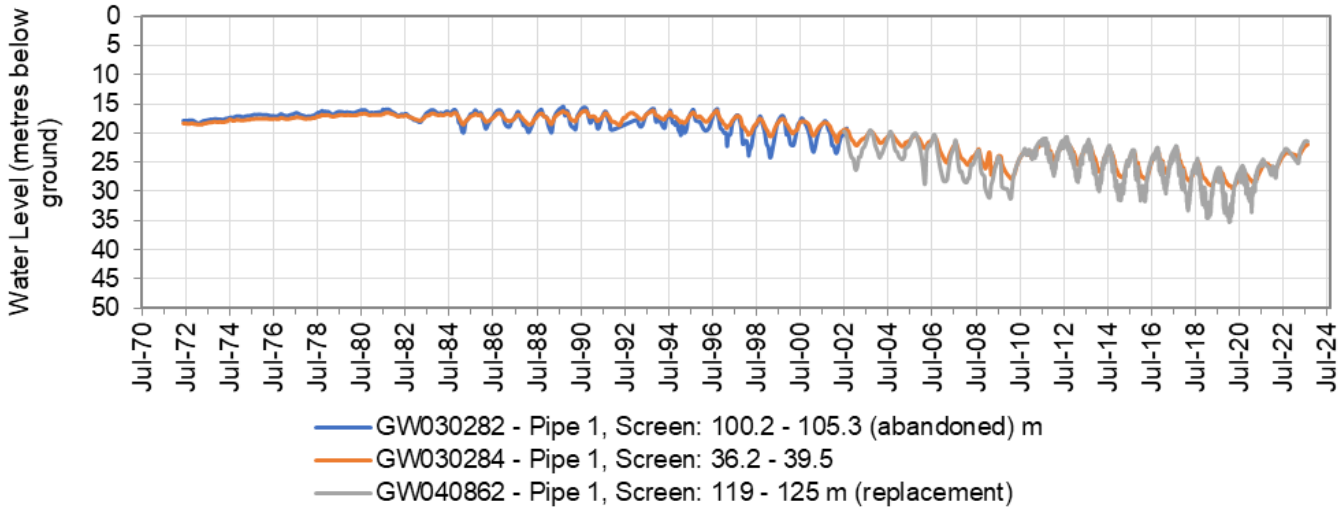


Figure 12: Hydrograph of monitoring bore GW036396

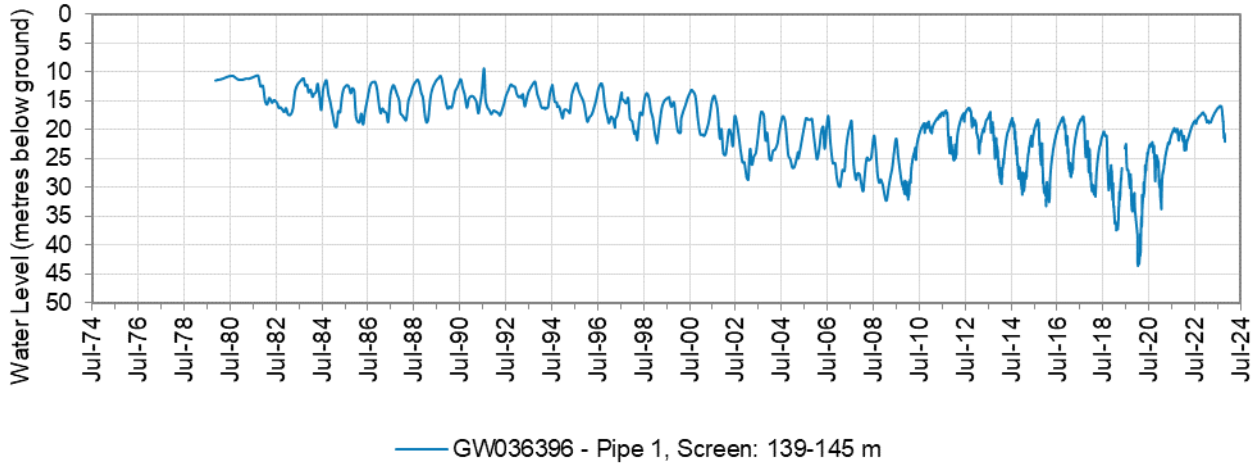


Figure 13: Hydrograph of monitoring bore GW040863

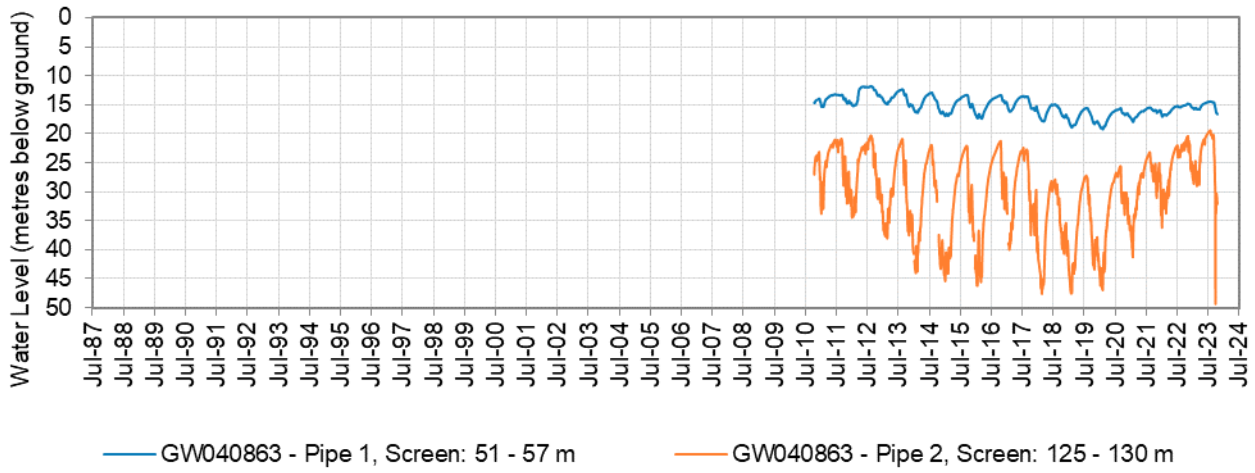


Figure 14: Hydrograph of monitoring bore GW036573

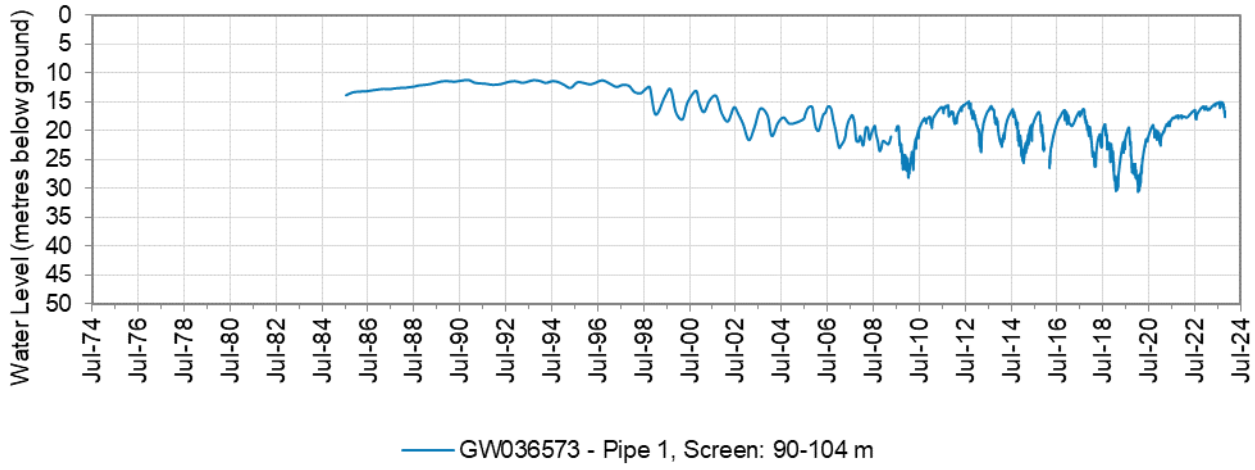


Figure 15: Hydrograph of monitoring bore GW036358

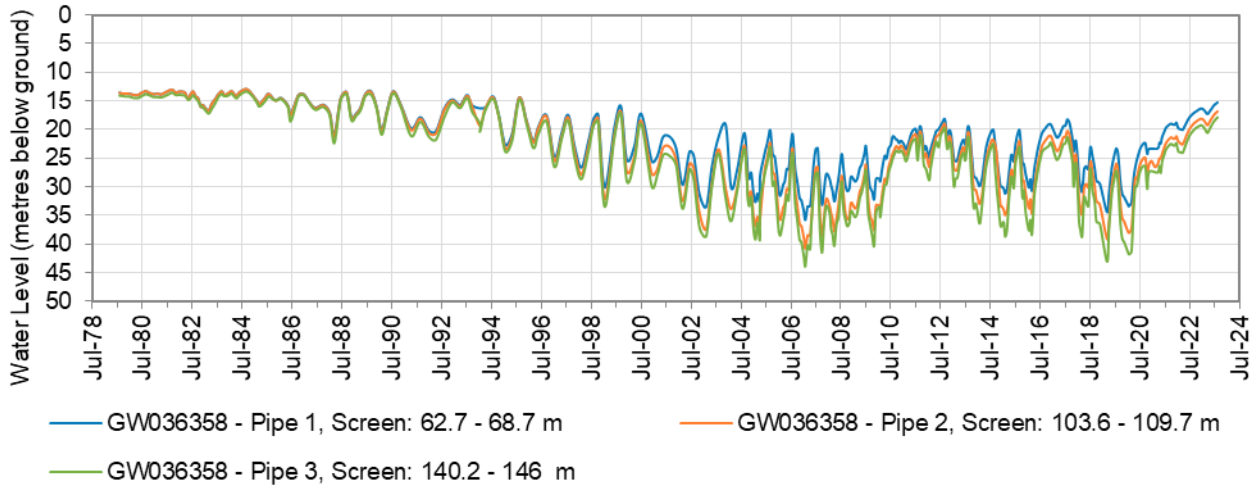


Figure 16: Hydrograph of monitoring bore GW036275

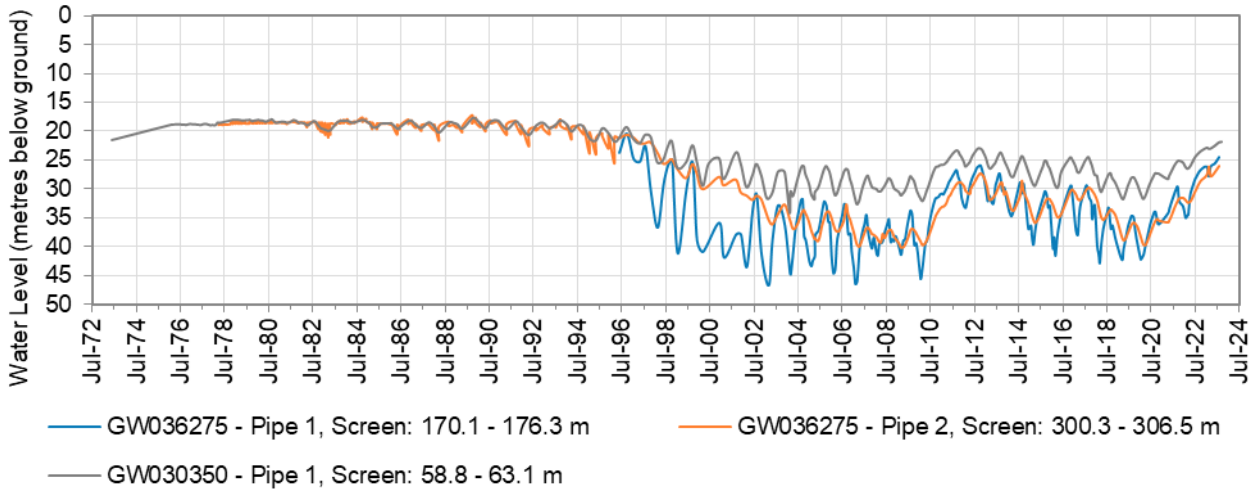


Figure 17: Hydrograph of monitoring bore GW036040

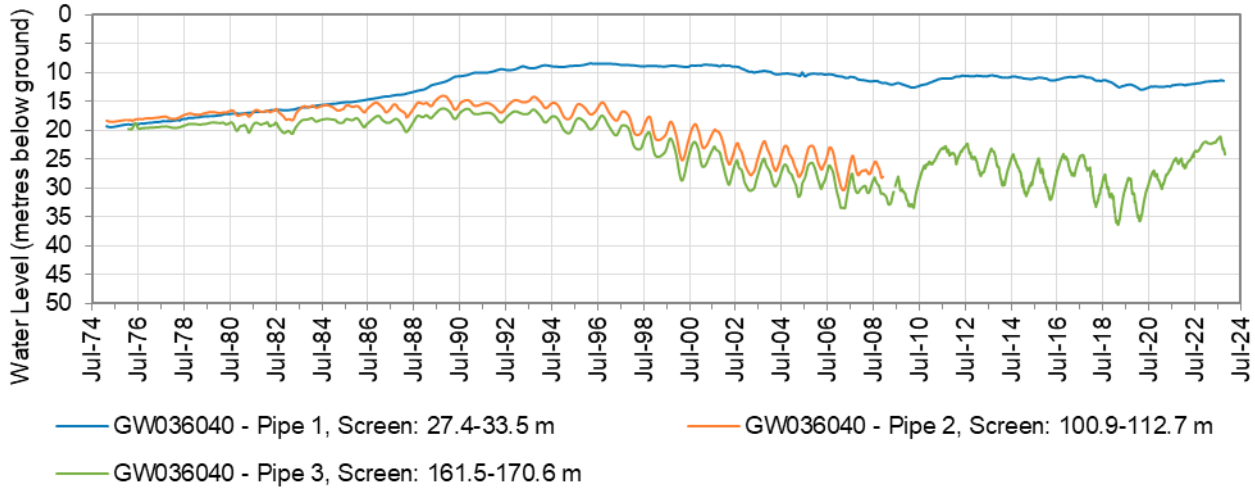


Figure 18: Hydrograph of monitoring bore GW030325

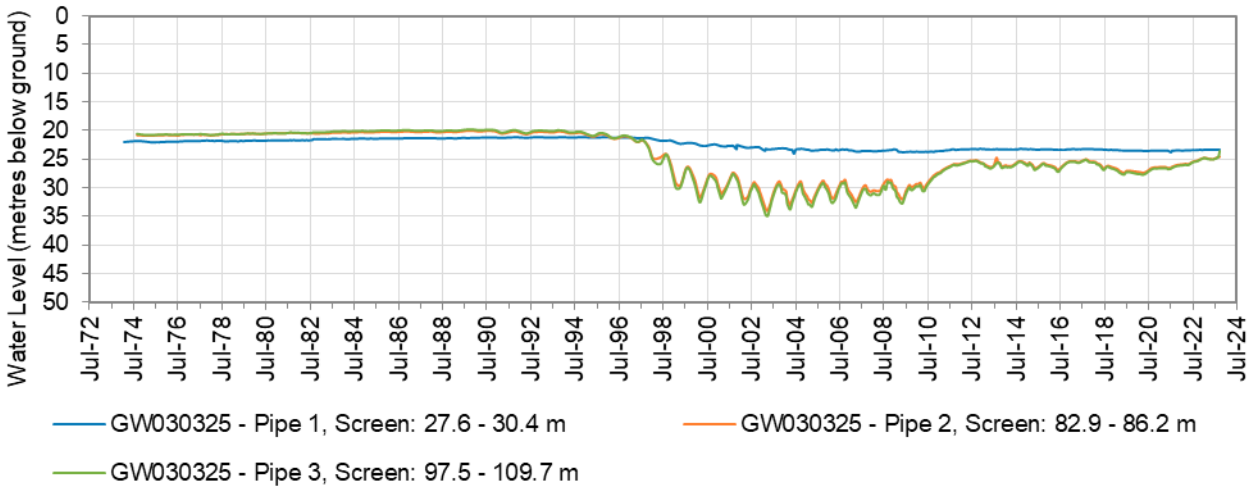


Figure 19: Hydrograph of monitoring bore GW036025

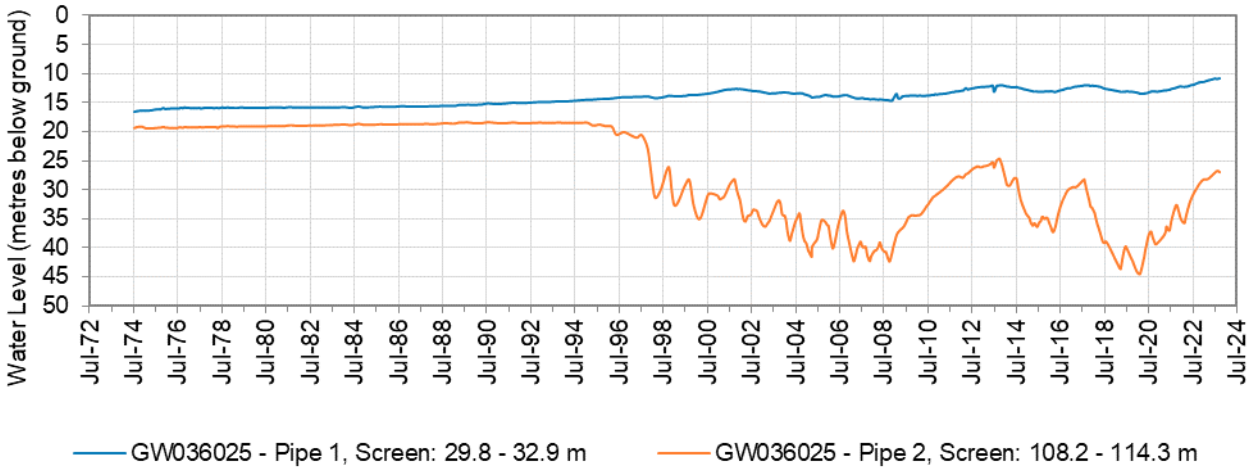


Figure 20: Hydrograph of monitoring bore GW036798

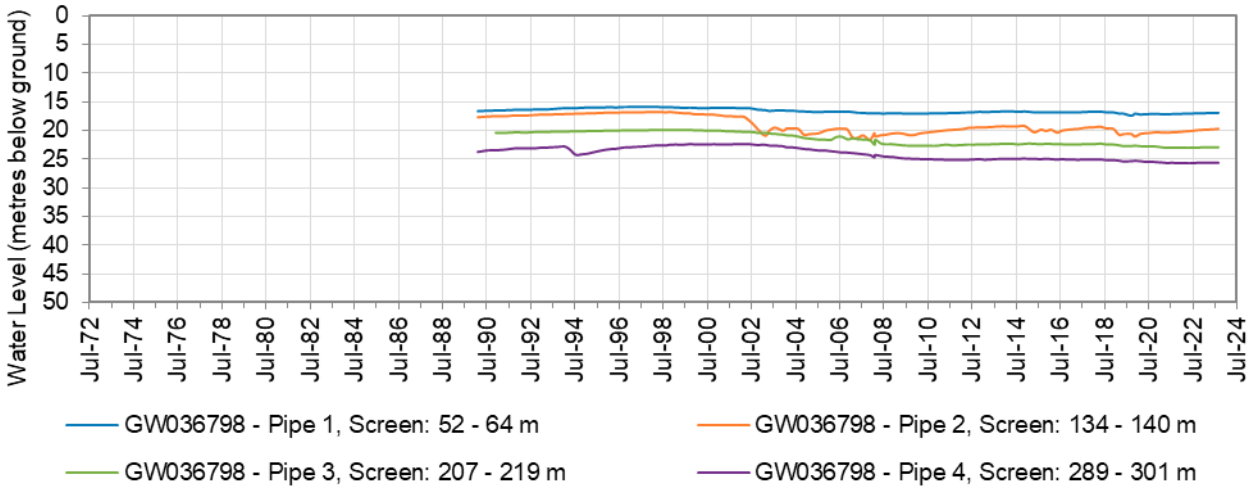


Figure 21: Hydrograph of monitoring bore GW030435

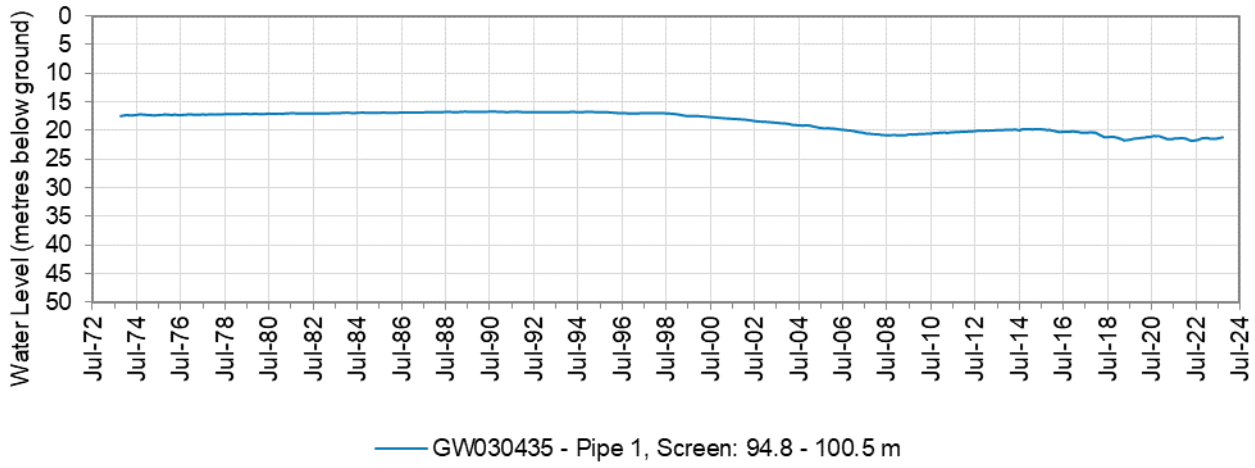


Figure 22: Hydrograph of monitoring bore GW036799