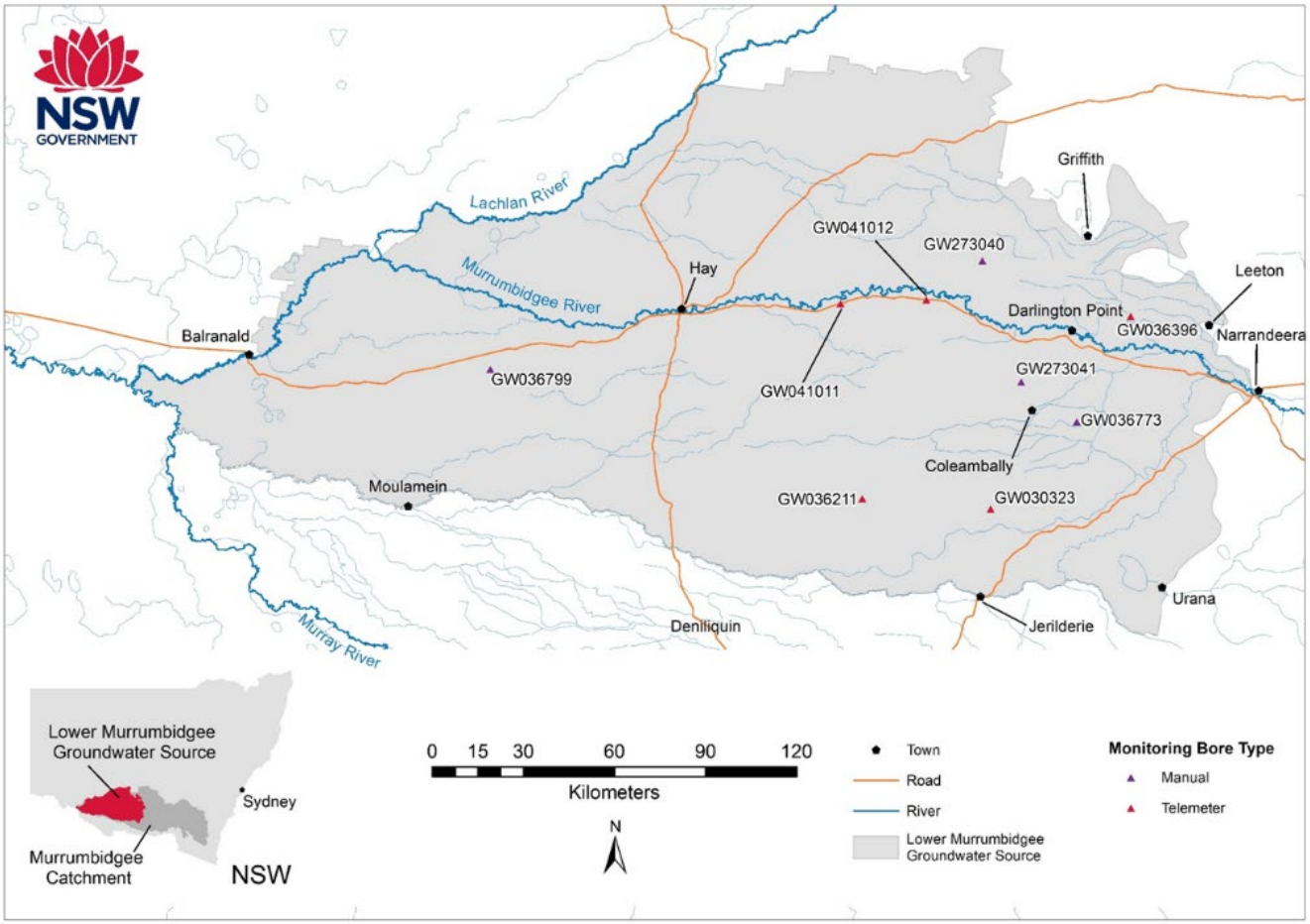
Lower Murrumbidgee Groundwater Sources: preliminary analysis of water quality (2005–2018)

Beneficial use of groundwater depends on its quality, which is monitored since pumping can change groundwater quality over time.

Monitoring: Lower Murrumbidgee Groundwater Sources

The Department of Climate Change, Energy, the Environment and Water and WaterNSW have been monitoring groundwater quality in the Lower Murrumbidgee Groundwater Sources since 2005 (Figure 1). The work has focused on the Murrumbidgee Irrigation Area and the Coleambally Irrigation Area. We have collected information on groundwater electrical conductivity (EC) and dissolved salt concentrations.

Figure 1: Monitoring sites in the Lower Murrumbidgee Groundwater Sources



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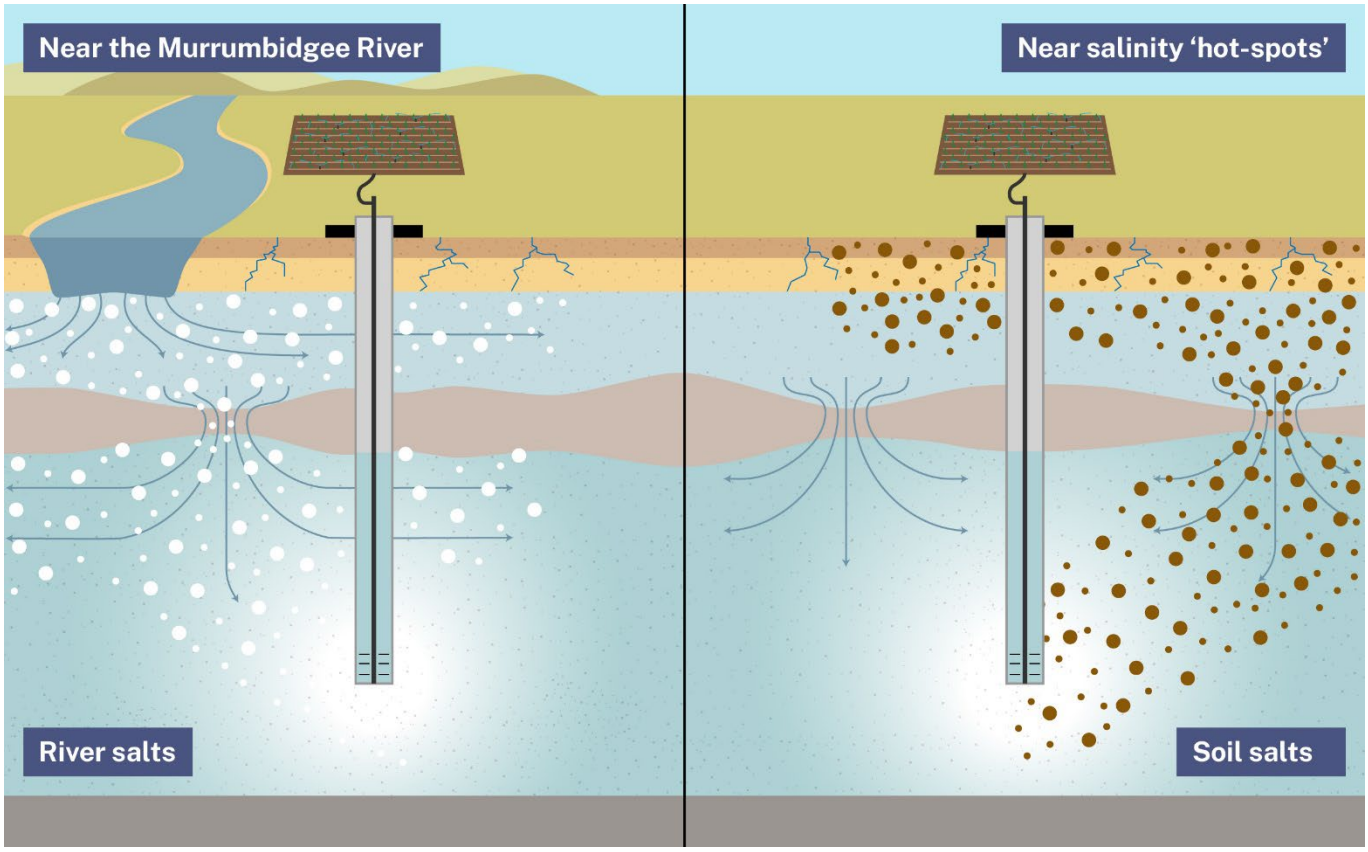
Sources of dissolved salt

Salt moves into water as the water interacts with soils and the rock it flows through. As groundwater flows within and between aquifers it moves dissolved salts with it. Pumping groundwater changes the natural flow direction of groundwater and can move poorer quality water towards areas of good quality water. This can affect what groundwater can be used for if this continues for long periods.

Identifying groundwater quality changes

We plotted trends in groundwater EC and dissolved salt concentrations over time to determine how groundwater quality has changed. This helped us develop a conceptual model that explains how groundwater pumping could affect groundwater quality (Figure 2).

Figure 2: Conceptual model of how groundwater drawdown influences groundwater movement and water quality



We found that groundwater pumping can move saline groundwater from the shallow aquifer into the fresher deep aquifer that is being pumped for groundwater supplies. It can also move fresh groundwater that occurs near the Murrumbidgee River. When pumping stops and the movement of groundwater slows, the distribution of saline and fresh groundwater mostly recovers to what it was before groundwater pumping occurred. We have seen a change in the distribution of saline groundwater and to water quality over time.

Implications for groundwater use

Changes to groundwater salinity and quality can limit what groundwater can be used for. This includes what crops can be grown or what livestock can be watered. We have seen some changes to groundwater salinity, pH, sodium absorption ratio, and total hardness. If these changes continue it may limit how groundwater is used for drinking supplies, and what livestock and crops can be watered. It can also risk damage to crops and irrigation infrastructure.

Continued monitoring

We will continue to monitor water quality in this area of the Lower Murrumbidgee Groundwater Sources.

For more information on groundwater, groundwater quality monitoring, and data analysis in the Lower Murrumbidgee Groundwater Sources, visit the groundwater document library.