

# Lower Murray Groundwater Source: preliminary analysis of water quality (2003–2015)

The use of groundwater depends on its quality. This needs to be monitored since pumping can change groundwater quality over time.

## Monitoring in the Lower Murray Groundwater Source

The Department of Planning and Environment and WaterNSW monitored groundwater quality in the Lower Murray Groundwater Source from 2003 to 2015 (Figure 1). The focus has been on the Berriquin Irrigation District. We have information on groundwater pH (how acidic or alkaline water is), electrical conductivity (EC; a proxy for dissolved salts), and dissolved salt concentrations.

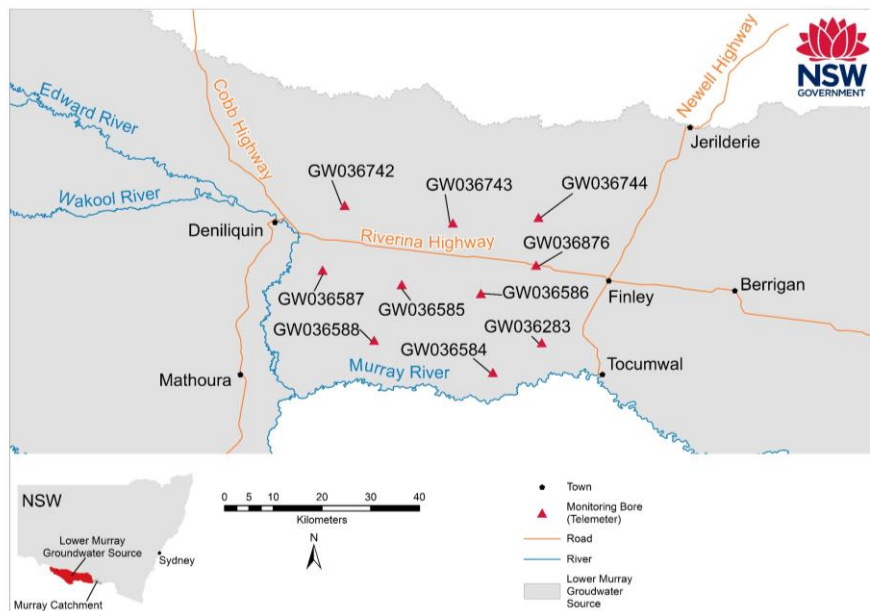


Figure 1. Monitoring sites in the Lower Murray Groundwater Source

## 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 groundwater flow direction 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 pH, 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).

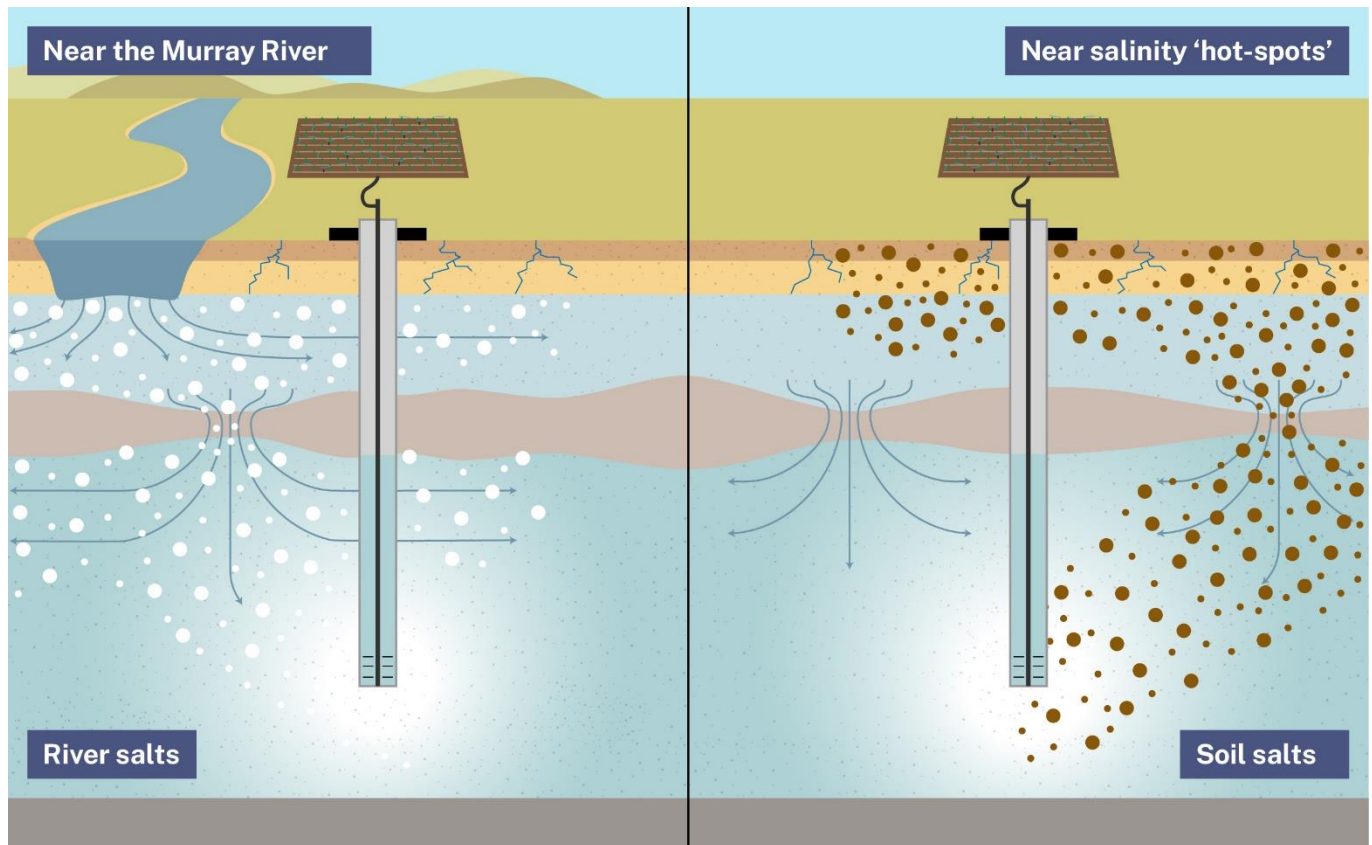


Figure 2. Conceptual model of how groundwater drawdown influences groundwater movement and water quality

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 Murray 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 in water quality over time.

## Implications for groundwater use

Groundwater salinity and quality changes 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 (SAR), and total hardness. If these changes continue it can 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.

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## Continued monitoring

Groundwater quality samples were collected from the Berriquin Irrigation District during the 2019 to 2020 'Statewide groundwater quality acquisition program'. We will use this information to continue monitoring water quality in this area of the Lower Murray Groundwater Source.

For more information on groundwater, groundwater quality monitoring, and data analysis in the Lower Murray Groundwater Source, visit the NSW Government groundwater document library at: <https://www.industry.nsw.gov.au/water/science/groundwater/document-library>.