

Preliminary analysis of water quality 2003–2019

The use of groundwater depends on its quality. As pumping can change groundwater quality over time, it needs to be monitored so that it does not affect the way water can be used.

Monitoring in the Lower Namoi Groundwater Source

The Department of Planning, Industry and Environment and WaterNSW have been monitoring groundwater quality regularly in the Lower Namoi Groundwater Source since 2003 (Figure 1). The focus has been on an area north-east of Cryon. We have analysed groundwater samples for information on groundwater pH (how acidic/alkaline water is), electrical conductivity (EC; a proxy for dissolved salts), and the different dissolved salt concentrations.

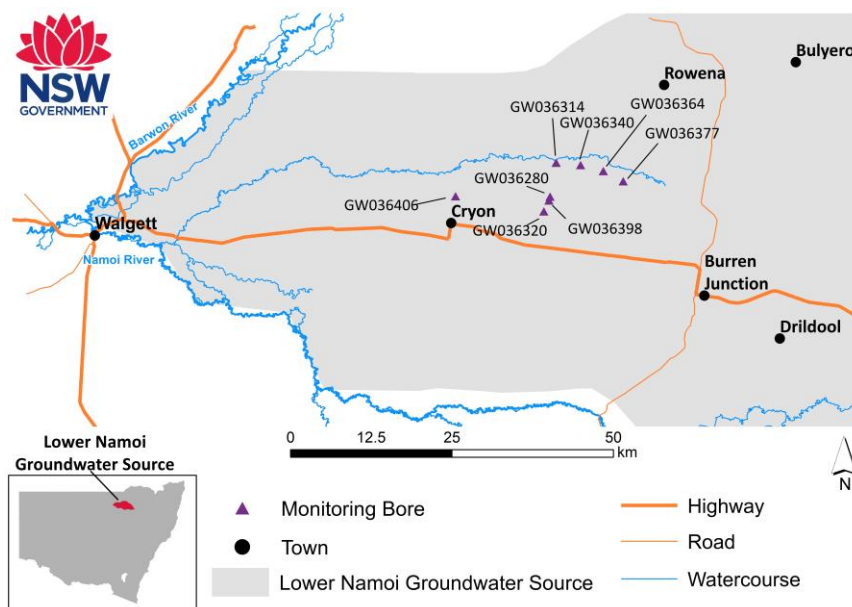


Figure 1. Monitoring sites in the Lower Namoi Groundwater Source

Sources of dissolved salt

Salt moves into groundwater as it interacts with soils and the rock it moves 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 landholder bores. If this continues for long periods, this movement of dissolved salt may affect groundwater salinity and pH and change the suitability of the groundwater for what it can be used for.

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 be influencing groundwater quality (Figure 2).

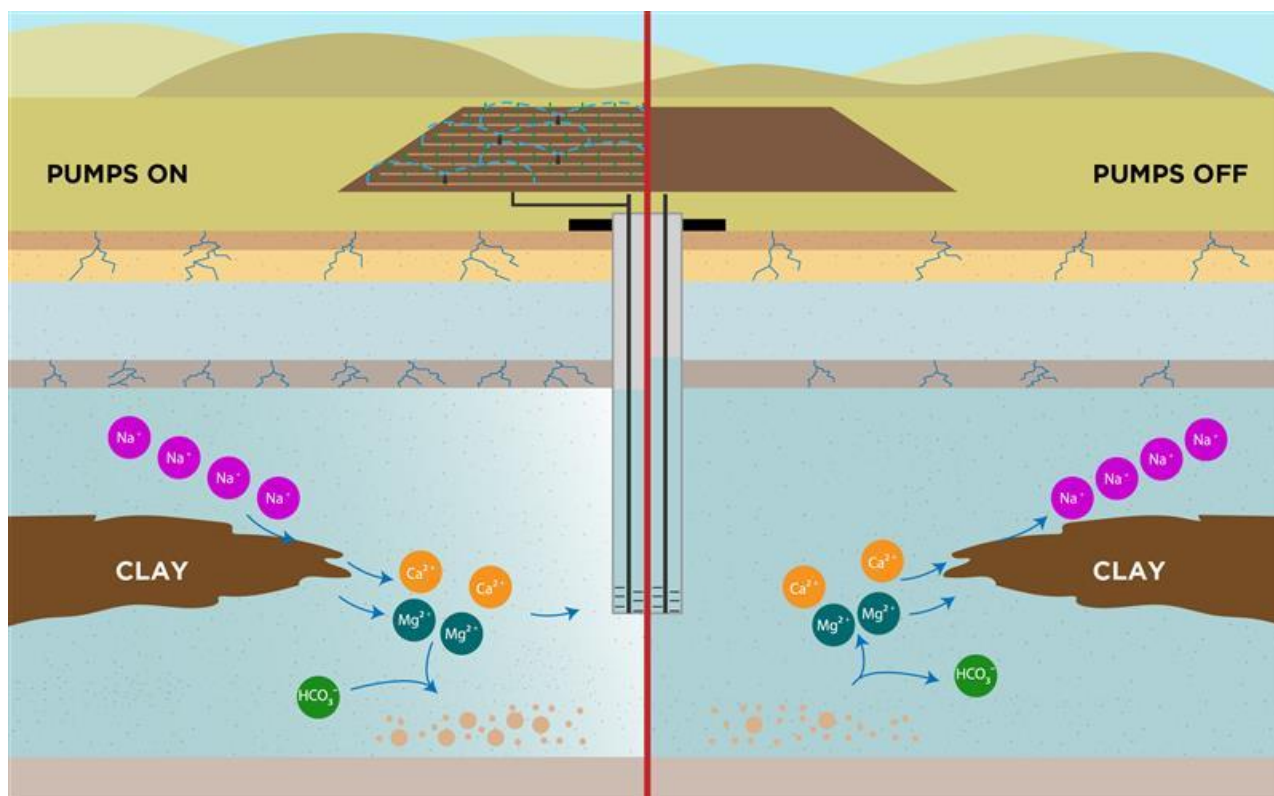


Figure 2. Conceptual model of how groundwater drawdown and recovery influences water quality

In the Cryon area, 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 change how groundwater interacts with the rocks and minerals, changing groundwater pH and dissolved salt composition. When pumping stops and the movement of saline groundwater slows, the change in the groundwater quality **mostly** recovers to what it was before groundwater pumping. Over time, we have seen a gradual change in the groundwater quality.

Implications for groundwater use

Groundwater salinity and quality changes in the Lower Namoi Groundwater Source can limit what the groundwater can be used for, including what crops can be grown or what livestock can be watered. We have seen some changes to groundwater pH, Sodium Absorption Ratio (SAR), and Total Hardness and if these changes continue to increase this can risk damage to crops, soil structure, and irrigation infrastructure.

Continued monitoring

We will continue to sample groundwater in this area of the Lower Namoi Groundwater Source to monitor changes to water quality.

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

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