July 2024

Factsheet

ROUS COUNTY COUNCIL

Groundwater Exploration and Testing

Rous delivers high-quality drinking water to the Northern Rivers

How we test potential groundwater sources to ensure they can be used sustainably and responsibly to supply the Northern Rivers with high-quality drinking water.

One third of all the water used in Australia is groundwater. In the Northern Rivers we have aquifers that are extensively investigated and well understood, like the Richmond Coastal Sands source at Woodburn and the shallow Alstonville Basalt Plateau source. It can take several years of exploration and testing to reach a sound understanding of an aquifer.

Preliminary research

This involves collecting information on an area including historical records, maps and scientific reports. Factors including topography, geology, rainfall, ecology, and land use are considered. It may involve gathering data from nearby bores, their depth to the water, how much water is pumped and the material the aquifer is made of.

Test drilling and test pumping

Hydrogeologists drill exploratory bore holes (also known as wells) into the ground and pump water to the surface. Results from a sampling program provide information about the material the aquifer is made of and variations within it, the water's quality and its flow. Nearby bores may also be tested to measure the potential effect of the test pumping on them. A licence is required from the State government for test drilling. Testing periods vary but are typically around a week.

Reconnaissance and field mapping

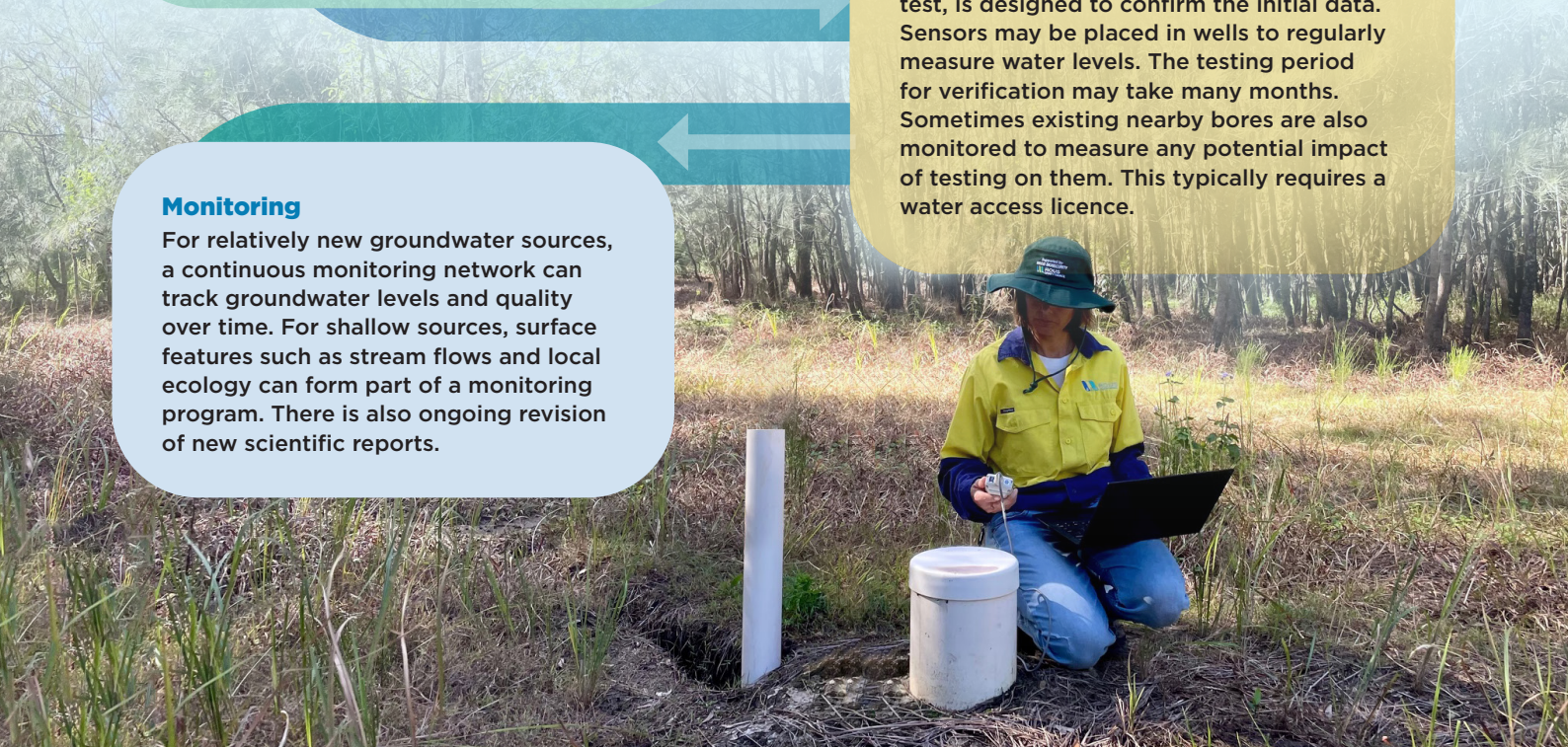
Site visits review surface features and geological formations such as springs or natural vegetation patterns. Geological studies provide clues about the layers of soil, sand or rock underground. Research and site visits also identify areas that could be culturally or environmentally sensitive.

Verification

If preliminary tests indicate a prospective groundwater source, then a verification program, also known as a sustained pumping test, is designed to confirm the initial data. Sensors may be placed in wells to regularly measure water levels. The testing period for verification may take many months. Sometimes existing nearby bores are also monitored to measure any potential impact of testing on them. This typically requires a water access licence.

Monitoring

For relatively new groundwater sources, a continuous monitoring network can track groundwater levels and quality over time. For shallow sources, surface features such as stream flows and local ecology can form part of a monitoring program. There is also ongoing revision of new scientific reports.



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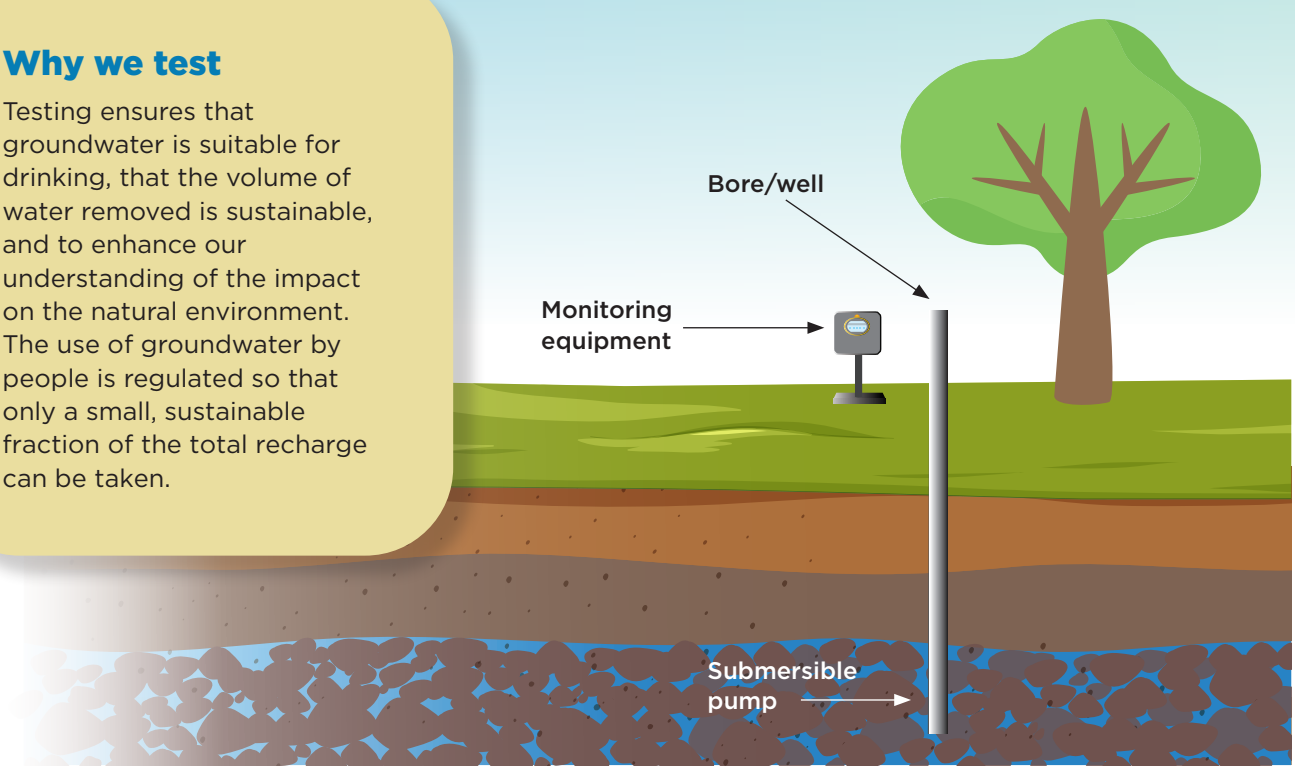
Why we test

Testing ensures that groundwater is suitable for drinking, that the volume of water removed is sustainable, and to enhance our understanding of the impact on the natural environment. The use of groundwater by people is regulated so that only a small, sustainable fraction of the total recharge can be taken.



Glossary

Aquifer
An underground body of rock, sediment, soil or sand containing a usable supply of water. Some people imagine water collects in underground lakes or rivers; in fact, groundwater lies within pores and crevices of rocks, sediment, soil or sand.

Hydrogeology
The study of groundwater that can involve chemistry, physics, geology and engineering.

Groundwater sampling program
Testing water's chemical composition, temperature, pH and other properties. This determines if the water is suitable for drinking. Analysing isotopes (variants of chemical elements) provides clues about the water's origin and age.

Flow
The speed at which water moves in an aquifer. Flow is variable depending on what an aquifer is made of and its permeability, how quickly it recharges, underground gradients and pressure.

Aquifer recharge
The replenishment of groundwater by precipitation. Recharge is the volume of water that infiltrates into an aquifer and is typically expressed as a volume, e.g. megalitres per year (ML/year). Recharge rates vary from months to millennia, depending on rainfall, climate changes, land use, the aquifer's composition and depth. Managed aquifer recharge is the intentional recharge of aquifers by people.