



Groundwater Quality

Information Sheet

SoE Monitoring Network Reviews

As a result of some of the findings of the report, Environment Southland is currently reviewing its SoE groundwater quality monitoring programme. Over the past 10 years, several reviews of parts of the monitoring programme have been undertaken, however some of the field procedures, site selection criteria and regional coverage has been identified as needing further review. This work is due for completion in 2011.

Background

Groundwater is a valuable resource for the Southland Region. It forms an integral part of the hydrological cycle and has significant influence on aquatic ecosystems in river and wetland habitats.

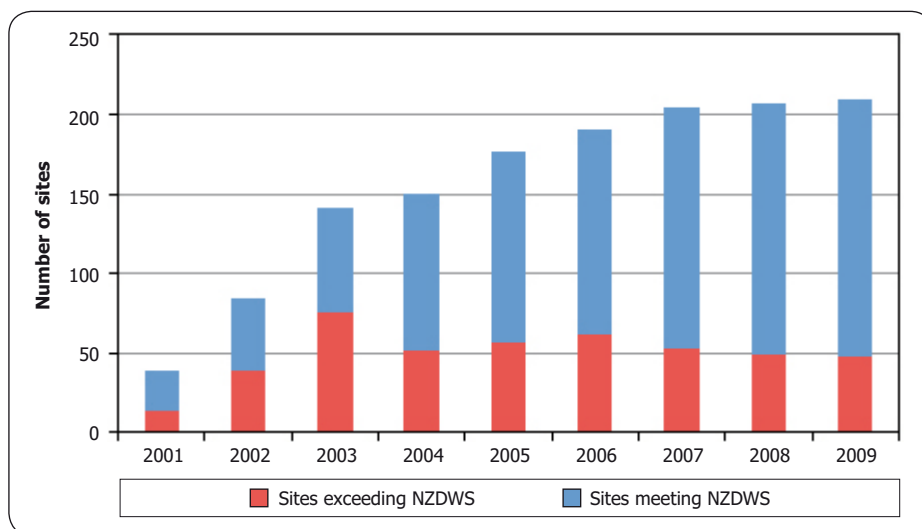
Groundwater quality in Southland is influenced by a range of factors including rock-water interaction, the nature of aquifer recharge, groundwater flow characteristics and human activities. In order to monitor state and trends in groundwater quality for the Southland region, Environment Southland began a State of the Environment (SoE) monitoring programme in 2000. This monitoring programme is supplemented by an investigation programme, designed to improve understanding of the cause, extent and behavior of contaminants in groundwater.

Summary of results

Environment Southland recently completed a comprehensive analysis of ten years of groundwater quality monitoring data. The key findings from the resulting report titled State of the Environment: Groundwater Quality Technical Report, (Liquid Earth, 2010) are:

- Overall, untreated groundwater is suitable for human consumption from a majority of Southland aquifers. However, some aquifers are unsuitable for drinking without treatment due to naturally high concentrations of iron, manganese and hardness. These are mainly deeper aquifers or in some areas where lignite measures are close to the surface. Water from these aquifers may also be difficult to use due to staining of laundry, baths and toilets and in some cases the growth of iron bacteria within the reticulation system.
- Due to aquifer recharge processes, shallow groundwater found throughout Southland commonly exhibits pH values which are outside the aesthetic guideline range recommended in the New Zealand drinking water standards (NZDWS). Low pH water can corrode galvanized or metal piping, especially if sitting around for a period of time, which can dissolve small amounts of metal into the water.
- Bacterial contamination has significantly decreased over the past six years dropping from an incident rate of 53% in 2003 to 22% in 2009. This is largely attributed to the ongoing efforts by Environment Southland in increasing awareness of well and bore head protection and improved drilling standards.

Figure 1. Number of monitoring bores showing the presence of indicator bacteria *Escherichia coli* (*e.coli*)

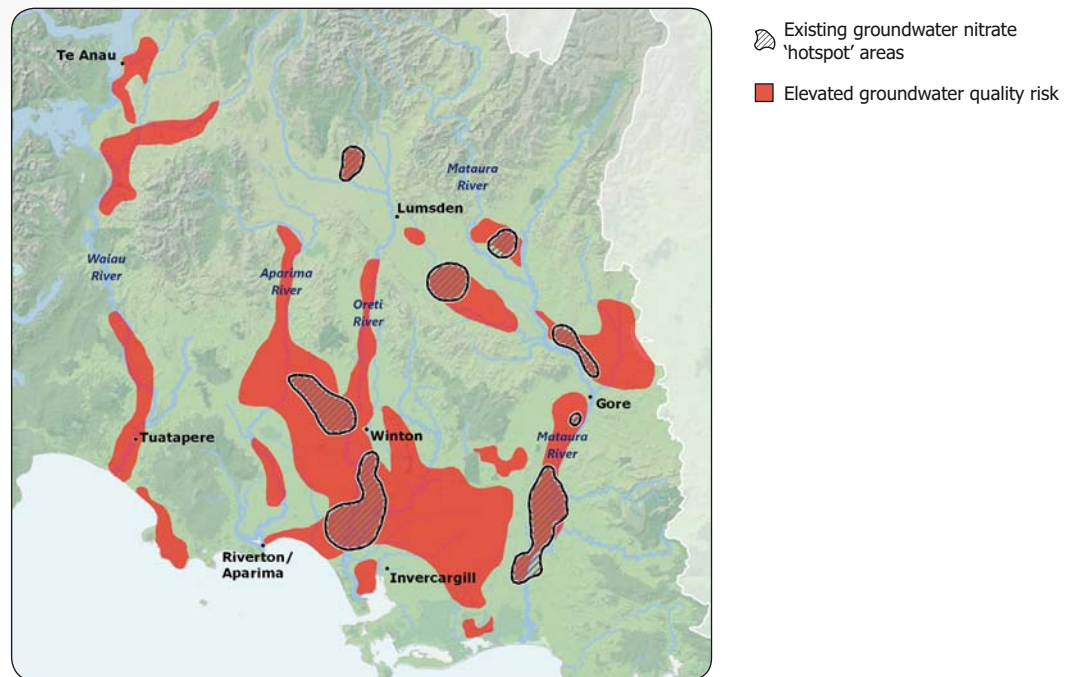


Groundwater Quality Investigation

Many groundwater quality investigation studies are carried out periodically to provide information to better understand and help manage the groundwater quality of the region. Many of the reports produced as a result of the investigation are available on the Environment Southland website and include a denitrification experiment near Edendale (in partnership with ESR), a multi-depth groundwater study near Heddon Bush, pesticides in groundwater near Edendale and a Balfour groundwater quality study (with the Primary Sector Water Partnership).

- Nitrogen which is not used by plants or held in the soil can be lost to waterways. Soluble forms of nitrogen can build up in groundwater (in the form of nitrate) and can lead to detrimental effects for drinking water supply or aquatic ecology.
- Nitrate concentrations in groundwater breached the health standards in 12% of bores sampled in 2009 while 59% of sites had nitrate concentrations that indicated land use activities are influencing groundwater quality.
- Nitrate concentrations are increasing in 36% of monitoring bores while only 14 % of bores have decreasing nitrate concentrations.
- Southland's groundwater nitrate concentrations are higher than all other regions except for Waikato and Canterbury. Part of the reason for this is due to the type of aquifers Southland has.
- In the past few years Environment Southland has been mapping areas where nitrate concentrations exceed drinking water standards and areas which are inherently vulnerable.

Figure 2. Areas of elevated groundwater nitrate risk



If you are concerned about the quality of your water supply, contact either Public Health South or Environment Southland for more information.

References

- Daughney, C.J. and Randall, M. 2009. National Groundwater Quality Indicators Update: State and Trends 1995-2008
- GNS Science consultancy Report 2009/145 prepared for the Ministry for the Environment.
- Hughes, B. N., 2010. Environment Southland State of the Environment: Groundwater Quality Technical Report. Prepared by Liquid Earth Limited for Environment Southland, May 2010. 58p.
- Ministry of Health, 2008. The New Zealand Drinking Water Standards. Published by the Ministry of Health. 171p.

Further information

More detail on the groundwater quality monitoring programme is available on our website at www.es.govt.nz.



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