State of the Environment **Report Card 2016**

Measuring our groundwater levels

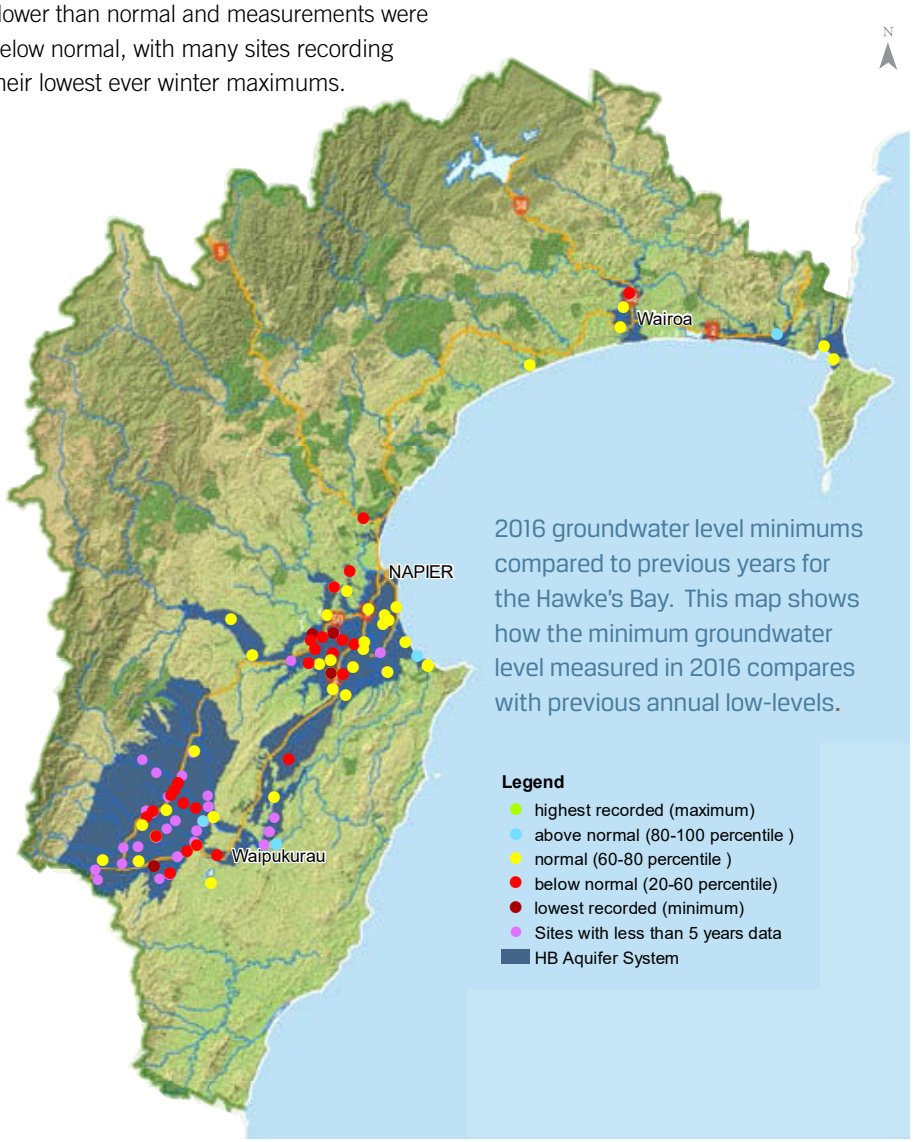
Hawke's Bay Regional Council has been measuring groundwater levels since 1968.

We do this to help evaluate changes in the groundwater resource over time, develop groundwater models and forecast trends, and to design, implement, and monitor the effectiveness of Resource Management Plans. About 70% of consented water takes in Hawke's Bay are for groundwater and more than 90% of the region's consented groundwater abstraction is allocated from the Heretaunga and Ruataniwha Plains.

What happened in 2016 on the Heretaunga and Ruataniwha Plains?

Groundwater levels during summer and late autumn declined to normal and below normal conditions. Rainfall events in spring and summer during late 2015 helped to relieve demand for groundwater during the early irrigation period and allowed groundwater levels to maintain their normal rate of decline. Between February and May, the Heretaunga and Ruataniwha Plains received only 37% of the normal cumulative rainfall, which was the driest since 2007.

This dry period increased demand for groundwater over late summer and reduced the amount of recharge usually received over autumn. As such, groundwater levels recovered slower than normal and measurements were below normal, with many sites recording their lowest ever winter maximums.



2016 groundwater level minimums compared to previous years for the Hawke's Bay. This map shows how the minimum groundwater level measured in 2016 compares with previous annual low-levels.

Well 5335 in Central Hawke's Bay equipped with a float encoder and cell phone telemetry.

How we monitor groundwater levels

Groundwater levels are generally measured monthly by manually dipping monitor wells across the region. However, HBRC has a small network of wells with equipment capable of automatically measuring groundwater. These instruments record groundwater levels every 15 minutes but can be set to measure at higher or lower frequencies.

Groundwater levels measured at high frequency allow HBRC to monitor short-term responses in the aquifer system, such as tidal effects, drawdown from neighbouring pumping and flood propagation waves during high river flows.

This information not only informs us about the specific pressures acting on the aquifer but can also be used to estimate aquifer properties, which are needed for modelling.

When telemetry is coupled with recorders, groundwater levels can be monitored in real time so any changes can be instantly observed at the HBRC office. Telemetry also helps us identify when instruments fail - allowing us to remedy any problems immediately.

Groundwater

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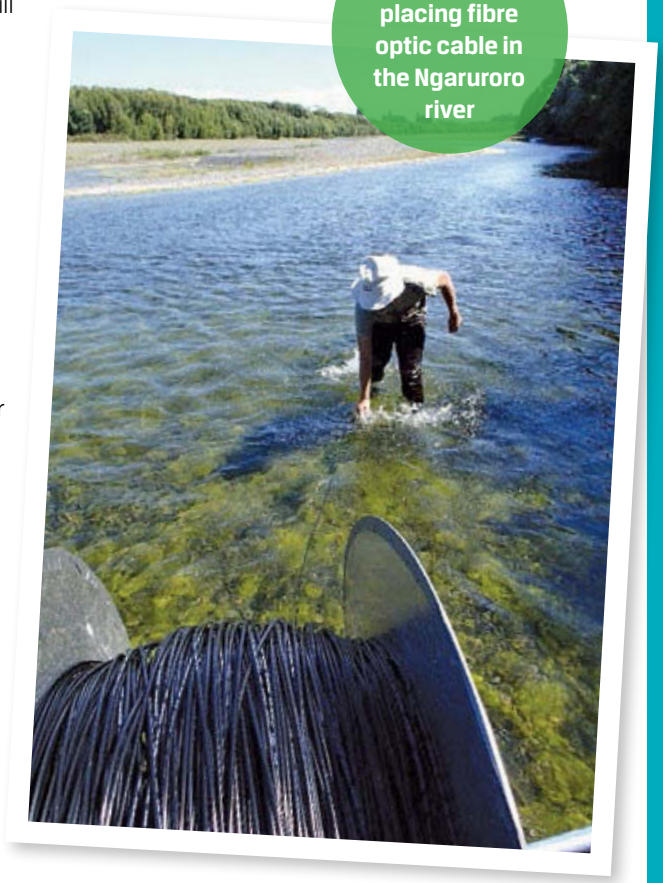
Taking the Ngaruroro's temperature

Fibre-optic cable was used in the Ngaruroro River in 2016 to find out more about the connections between groundwater and surface water.

Scientists from GNS Science worked with Hawke's Bay Regional Council on a project in the lower Ngaruroro to investigate these connections, using water temperature and river flow measurements.

GNS scientists placed five kilometres of fibre-optic cable along the bed of the Ngaruroro River between Hill Road (about 1km downstream of Fernhill) and Carrick Road to measure water temperature.



GNS Scientist placing fibre optic cable in the Ngaruroro river

Meanwhile, HBRC staff gauged flows at Fernhill and at Hill, Twyford and Carrick Roads. Preliminary flow measurements from the survey suggest that approximately 300 litres/second is progressively lost to groundwater between the upper and lower gauging sites.

The information will be used to assist with the management of water resources in Hawke's Bay and GNS research into characterising New Zealand's groundwater systems.

QUICK FACTS

Hawke's Bay contains New Zealand's second largest groundwater resource, which accounts for 16% of the total number of groundwater resource consents in New Zealand and 7% of the total weekly-allocated volume

Approximately **70%** of all water consented for abstraction in Hawke's Bay is for groundwater

The main groundwater use is for irrigation, which accounts for approximately **85%** of the number of water resource consents issued, and approximately **75%** of the weekly allocated volume

Find out more

The purpose of HBRC's State of the Environment report is to:

- Report on issues that affect our shared environment
- Help councils and communities set priorities for environment management
- Monitor the effectiveness of how we manage the environment
- Provide information people can use in their decision-making

This report card is part of a series prepared by Hawke's Bay Regional Council. It outlines the high-level results from HBRC's monitoring programme.

For more details, including full technical reports and up to the minute monitoring results **visit www.lawa.org.nz**

HAWKE'S BAY REGIONAL COUNCIL

www.hbrc.govt.nz