

Groundwater 2007/08

Key points:

- 2007/08 was an extremely dry year resulting in minimal recharge of the region's shallow aquifers and all-time low groundwater levels in many aquifers.
- High nitrate-nitrogen concentrations were recorded in some of the region's aquifers. Contamination levels are highest in shallow aquifers, correlating with more intensive landuse.
- A wet May and June in 2008 led to a recovery in groundwater levels in many aquifers across the region. However, groundwater levels in some deep confined aquifers continue to be at or below long-term minimum levels.
- A model of the middle section of the Wairarapa valley groundwater system has been developed. This model allows us to test various climatic and water abstraction scenarios that will help us determine water allocation limits.

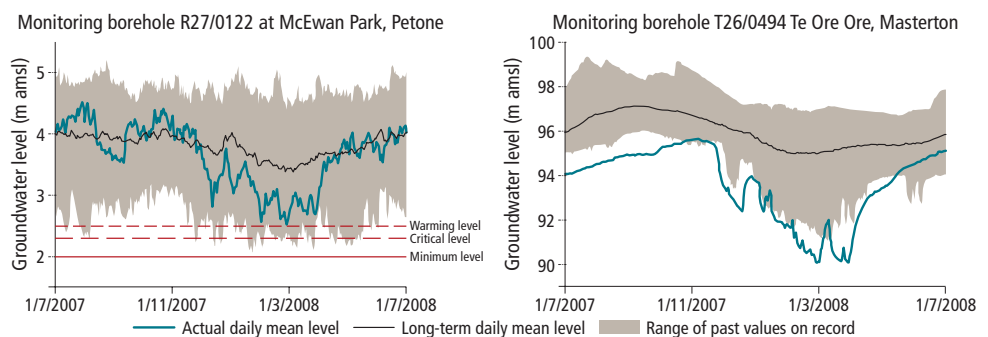
What happened in 2007/08?

Groundwater quantity

A relatively dry winter in 2007 followed an extremely dry autumn, significantly reducing the volume of water entering aquifers. This lack of winter recharge led to below average groundwater levels in spring 2007 in the region's main aquifers, particularly in the Wairarapa and Kapiti Coast.

The long dry summer of 2007/08 led to greater demand for groundwater for irrigation and municipal water supply and this was reflected in all-time low groundwater levels in many areas. There were a number of reports of shallow boreholes that do not fully penetrate aquifers 'drying up'. The low groundwater levels contributed to reduced flows in many rivers and spring-fed streams, and reduced water levels in wetlands.

Wetter conditions in May and June led to a recovery in groundwater levels in many shallow unconfined aquifers. However, many deeper confined aquifers – which respond to change more slowly – still recorded all time lows or below average levels during this period.



Groundwater levels at the Petone foreshore from the confined Waiwhetu aquifer (left) show the effects of above average groundwater pumping for public water supply throughout the summer months. Groundwater levels were maintained above the warning level set in the aquifer to safeguard against the effects of saline intrusion. The relatively dry year and long-term low groundwater levels are evident in the Te Ore Ore monitoring borehole near Masterton (right). Long term minimum levels were recorded throughout much of the year due to reduced recharge and groundwater abstraction in the aquifer. Groundwater levels can be seen to recover back towards average levels in May and June 2008 when it was very wet.

Wairarapa groundwater investigation

Significant progress has been made over the last year with the Wairarapa groundwater investigation, with one of three computer models (middle Wairarapa valley) completed. Extensive field operations were also carried out throughout the year, including the drilling of 11 monitoring boreholes, a seismic geophysics survey, isotope chemistry sampling to determine groundwater age, a springs survey and reading of meters on water takes. Work will continue next year on modelling the lower and upper parts of the Wairarapa valley.

Our groundwater model provides a tool which will allow us to test a range of climatic and water abstraction scenarios. The results will contribute to the sustainable management of the groundwater system in the Wairarapa by providing a basis for groundwater allocation provisions in the review of our regional plans, scheduled to begin next year.



Construction of a new shallow monitoring borehole in Te Ore Ore as part of the Wairarapa groundwater investigation. This borehole, and ten others constructed across the valley, will support existing monitoring sites to help us understand the complex hydrogeological systems in the Wairarapa. At this particular monitoring site, we hope to further explore the link between the Te Ore Ore aquifer and the Poterau Spring seen in the foreground.

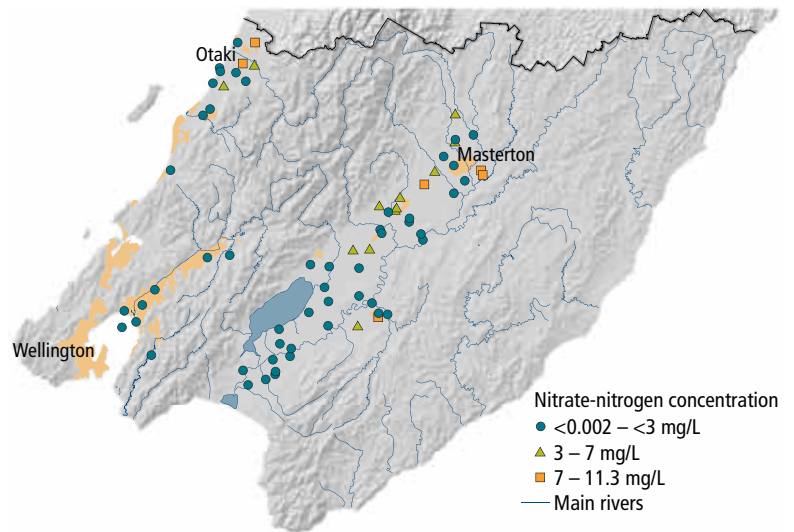
Groundwater quality

Greater Wellington monitored groundwater quality every three months at 70 sites across the region. Water samples were tested for a range of physical, chemical and microbiological variables including nutrients, metals and faecal bacteria.

The 2007/08 results showed that faecal bacteria (*E. coli*) counts were above the Ministry of Health drinking water standard for bacteria (<1 cfu/100 mL) in 11 boreholes located in Kapiti, Wairarapa and Wainuiomata. The highest bacteria count recorded was 600 cfu/100 mL at Te Horo beach. Nitrate-nitrogen concentrations were high (between 7-11.3 mg/L) in six boreholes but no concentrations exceeded the drinking water standard (11.3 mg/L).

Groundwater quality investigations

Targeted groundwater quality investigations continued in several areas in the Wairarapa, including an area of increasing rural-residential development with on-site wastewater disposal (Norfolk Road, Carterton) and an agricultural area in Te Ore Ore near Masterton. The results of these investigations, together with the results from other targeted investigations in the Wairarapa over the last four years highlight that nitrate-nitrogen contamination exists to various degrees. The greatest contamination is present in shallow groundwater in the intensively farmed Mangatarere (Carterton) and Te Ore Ore areas, with some boreholes exceeding the national drinking water standards for nitrogen and *E. coli* bacteria. Contamination is generally higher in the winter months when rainfall is greater, soils are more saturated and groundwater levels higher.



Nitrate-nitrogen concentrations recorded in Groundwater state of the environment monitoring boreholes. Boreholes were sampled quarterly over 2007/08 with the highest concentrations recorded in this period shown in the figure above. No results exceeded the Ministry of Health drinking water standard of 11.3 mg/L in the lower Wairarapa but concentrations in six boreholes were relatively high (7–11.3 mg/L).

What is Greater Wellington doing?

- Routinely monitoring groundwater levels at 129 sites across the region, with 11 new sites to come on-line in 2008/09.
- Monitoring groundwater quality at quarterly intervals at 70 sites across the region to check long-term changes in water quality.
- Targeted monitoring of nitrate concentrations in the areas of the region most vulnerable to contamination.
- Developing a groundwater model of the Wairarapa valley to improve our understanding and management of this large groundwater resource.
- Commencing investigations on the Kapiti Coast (where urban development and demand on groundwater in the shallow aquifer has grown) that will include monitoring of saline intrusion and nitrate-nitrogen concentrations.

What can you do?

- If you have your own bore for a domestic water supply, it's essential to have good well head protection, and to get the water tested regularly – we suggest annually. Greater Wellington staff can advise on how to get the water tested.
- Apply for resource consents before drilling any bore, and if you propose to take more than 20,000 litres of water per day.
- If you have a consented groundwater take, read your meter regularly – this will aid any future consent renewal and assist with modelling and management of the groundwater resource.
- Manage animal effluent disposal systems and fertiliser use to ensure that application rates are appropriate for the soil type and soil moisture conditions.

More information

Some of the information on this card is a summary of the 2007/08 annual groundwater monitoring report which is available on our website at www.gw.govt.nz/envreports. If you would like to know more about groundwater, visit our website or contact:

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