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Report to Environment Committee
from Andrew Jones, Groundwater Scientist

Kapiti Coast Shallow Groundwater Investigation Progress Report

1. Purpose

To inform the Committee of investigation work undertaken on the shallow groundwater under the Paraparaumu area over the last 14 months.

2. Background

In March 2001, I reported to the Committee on progress made on our Kapiti Coast shallow groundwater investigation and monitoring programme. This programme was initiated in 1999 in response to increasing use of shallow groundwater for garden irrigation and concerns about its long-term sustainability.

Over the last 14 months we have continued the programme by:

- Notifying proposed changes to the Regional Freshwater Plan that require resource consent for all new bores regardless of their depth;
- Continuing to monitor groundwater levels at our dedicated monitoring sites;
- Monitoring a number of privately owned bores to determine rates of groundwater usage; and
- Undertaking a survey of groundwater levels from Raumati to Waikanae.

3. Changes to the Regional Freshwater Plan

In January 2002 changes to the Regional Freshwater Plan were notified. These changes make the construction of all new bores a discretionary activity. Previously, bores shallower than five metres could be constructed as a permitted activity subject to several conditions, including one that required the driller to supply the Council with a location plan of the bore. Compliance with this requirement was poor and our lack of knowledge about the location of new bores was hampering our ability to manage the

resource. The proposed changes mean that all new bores will require a resource consent so we will be able to track the number and location of new bores, and assess where water is being taken from the ground.

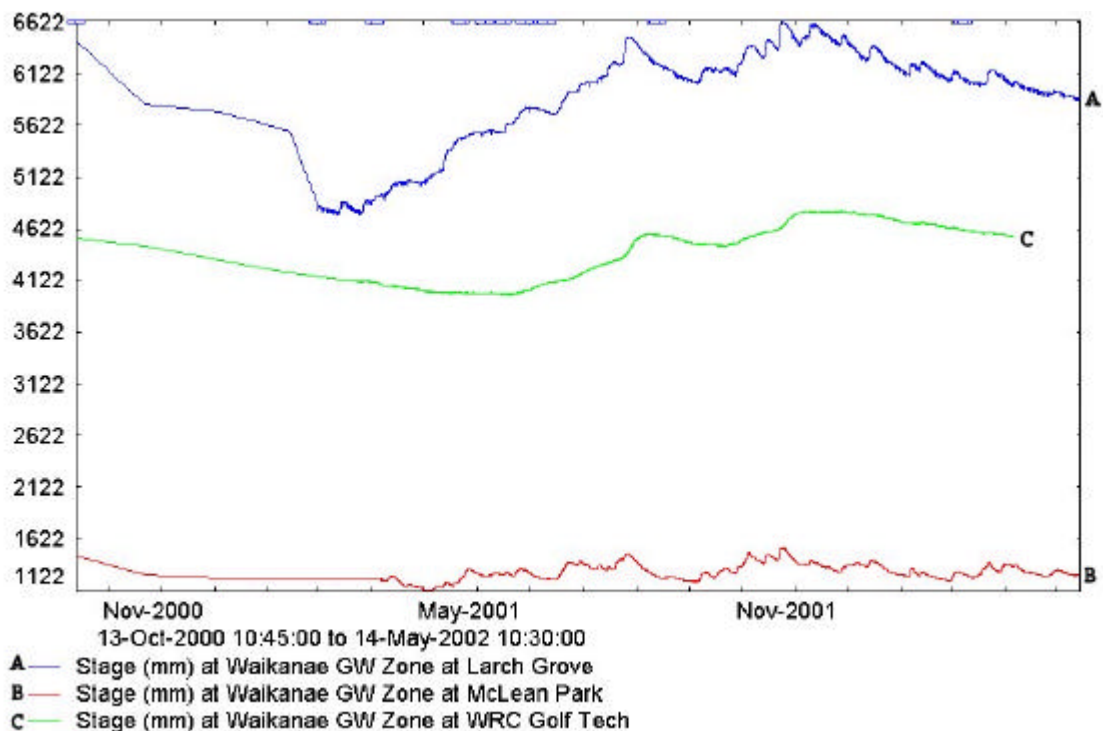
4. Groundwater Use

Rule 7 of the Regional Freshwater Plan allows up to 20 000 litres per day to be taken as a permitted activity subject to a number of conditions. However, an accurate estimate of the amount of water actually used is required to assess the demand on the resource. To obtain that estimate we installed meters on the bores of seven volunteers. The largest user used a total of 310 cubic metres from August 2001 to April 2002, which corresponds to a mean daily volume of 1150 litres. The mean daily volume of the other users was much less than this value.

All volunteers have commented that because of the relatively wet summer they have used much less groundwater than they would have otherwise. Accordingly, I propose to continue and expand the metering programme into this summer to obtain more representative results. Nevertheless, the results so far indicate that actual groundwater usage is much less than that allowed by the permitted activity.

5. Water Level Monitoring

In July 2000 we drilled three dedicated monitoring bores along Kapiti Road. Automatic water level recorders were installed in March 2001 and the following graph shows the information recorded so far.



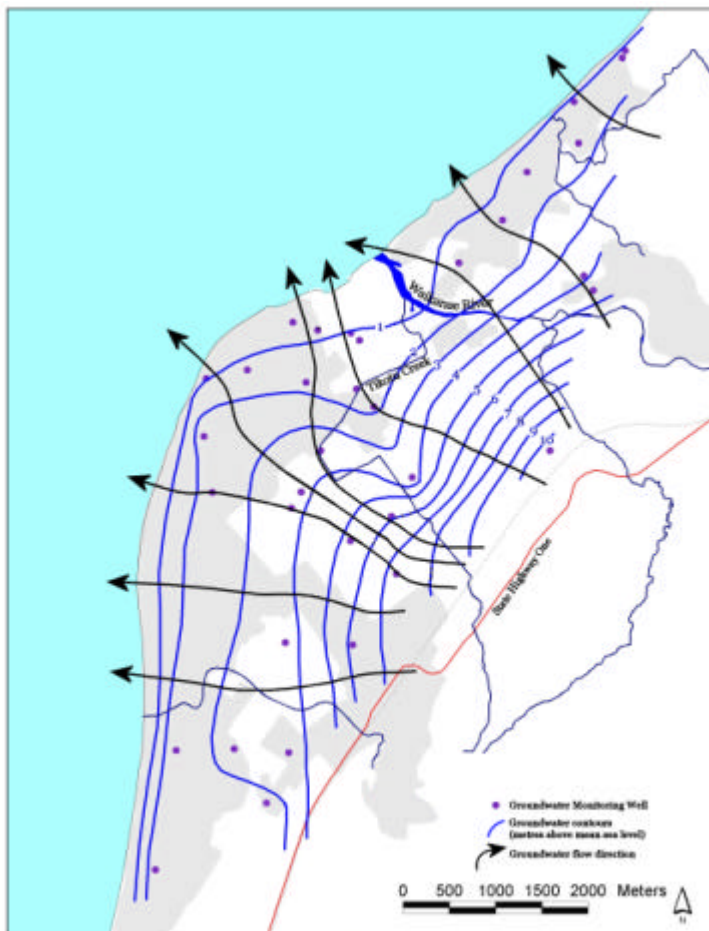
The effect of the relatively wet summer can be clearly seen with current groundwater levels significantly higher than levels recorded during the drought period in early 2001.

Ongoing monitoring at these three sites will enable us to quantify the seasonal variation in shallow groundwater levels. Knowledge of the seasonal variation will provide a context in which to assess possible declines in water level caused by pumping.

Additional automatic water level sites are planned for Queen Elizabeth Park and Waikanae Beach and will be installed in time for the the 2002-2003 summer period.

5.1 Piezometric Survey

An important achievement this year is the establishment of a network of 40 privately owned bores that can be used for water level monitoring. The elevation of each bore in the network has been measured to allow us to compare water levels from Raumati to Waikanae Beach. Concurrent measurements of groundwater level in each bore allows the groundwater surface to be contoured and displayed on a map. Below I have shown the first contour map we have produced.



Groundwater flow directions can be inferred from the contour map as groundwater flows perpendicular to the contours and toward the coast.

The contour pattern is as expected in the Waikanae area but in Paraparaumu the contours show that groundwater is flowing faster in the Mazengarb Road area than surrounding areas. Drainage into Titoku Stream may be the reason for this pattern. Concurrent measurements of water level throughout the network will be repeated at least four times over the next 12 months. A comparison of the resulting contour plots will show us whether there is any seasonal variation in groundwater flow directions.

The contour pattern supports our assumption that rainfall is the dominant recharge source for the shallow aquifer. Additional monitoring sites adjacent to the Waikanae River and Wharemauku Stream will be needed to confirm whether these surface water bodies are recharging the groundwater.

6. Interaction With Other Groundwater Programmes

The ongoing shallow groundwater programme is helping us to reassess our conceptual model of Kapiti groundwater. The development of the conceptual model has been restricted to the Otaki – Te Horo area this year and will be extended southward in the next 12 months. Repeat piezometric surveys of the shallow groundwater will be important to help understand the interaction between shallow groundwater and the deeper gravel aquifers.

The shallow groundwater programme has also assisted our monitoring programme for the Te Harakeke and Queen Elizabeth Park wetlands. In particular the piezometric survey has provided a regional context for the water level measurements made at each wetland. A detailed hydrological study of each wetland undertaken this year has given us a much improved understanding of how the shallow groundwater system interacts with the remaining wetland habitats on the Kapiti Coast.

7. Future Directions

To improve our understanding of the shallow groundwater resource the following steps are proposed in the coming year:

- Continuation and expansion of our programme that monitors actual groundwater usage.
- Ongoing water level monitoring at the Kapiti Road sites to quantify seasonal variation in the shallow groundwater levels.
- Repeat surveys of groundwater levels across the Kapiti Coast to assess potential seasonal variation in groundwater flow directions.
- Completion of the Kapiti conceptual model and subsequent reassessment of aquifer safe yields along the coast.

8. **Communication**

The results of the investigation are being provided to all residents who have assisted the programme by allowing access to their bores. The Kapiti Coast District Council are also being advised of the results of the investigation because of their interest in the promotion of shallow groundwater for garden irrigation to alleviate the demand on their public water supply system.

9. **Recommendation**

That the report be received and its contents noted.

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