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Report to Environment Committee
from Andrew Jones, Groundwater Scientist

Paraparaumu Shallow Groundwater Investigation

1. Purpose

To inform the Committee of the results of a preliminary investigation of the quality and quantity of shallow groundwater in the Paraparaumu area.

2. Background

In recent years a significant number of shallow bores have been drilled in the Waikanae Beach, Paraparaumu and Raumati area. These recent bores have added to the large number of existing shallow bores already thought to exist in the area. The demand for these bores has largely been driven by restrictions imposed by the Kapiti Coast District Council on the use of the public water supply system for garden irrigation. These restrictions have been necessary because of the inability of authorised takes from the Waikanae River to meet the peak summer demand for water.

The use of groundwater for garden irrigation is an attractive option for people wanting to continue irrigating despite the water restrictions because shallow bores are generally reliable and relatively cheap to install. Because the volume of water typically abstracted from one of these bores is small (less than $20m^3$/day) the impact of each individual bore is relatively minor and the abstraction is a permitted activity. However, the cumulative impact of a large number of closely spaced bores may be more significant.

Potential adverse effects from overuse of the shallow groundwater resource include interference between neighbouring bores, soil compaction and subsidence due to de-watering of organic rich sediments, seawater intrusion near the coast and draining of wetlands.

Monitoring the use of this resource is hampered by a lack of information on bore locations and depths. The drilling of a bore less than five metres deep is a permitted activity but is subject to a condition requiring the driller to supply the WRC with a

location plan of the bore. Despite this requirement very few drillers have advised the Council of the location of new bores and consequently the Council's records are poor.

The Regional Freshwater Plan advocates the use of groundwater over surface water where possible and at face value the use of groundwater for garden irrigation appears to be an attractive option. However, without adequate knowledge of the resource and the current extent of its use there is a danger that the resource may be overused. This investigation was designed to improve our knowledge of the resource.

3. Scope of the Investigation

The investigation had two broad objectives:

- to collect baseline groundwater quality and quantity information on the shallow unconfined aquifer in the Waikanae and Raumati/Paekakariki groundwater zones; and
- to improve compliance monitoring of shallow bores drilled on the Kapiti coastal plain.

The first objective sought to improve our understanding of the shallow groundwater resource by expanding the coverage of the existing regional groundwater monitoring programme.

The second objective aimed to update the Council's record of bores in the area and ensure that new bores drilled as a permitted activity are reported as required by Rule 10 of the Regional Freshwater Plan.

4. Major Findings

Groundwater Quality

Groundwater samples were taken from five bores located across the Kapiti coastal plain on two separate occasions and tested for a wide range of parameters.

In general the groundwater is only suitable for garden irrigation because of iron and manganese levels in excess of the New Zealand Drinking Water Standard and the presence of hydrogen sulphide. However, the drinking water standards for these parameters are only aesthetic guidelines. Therefore, given the excellent microbiological quality of the water it would be possible to use the shallow groundwater as an emergency drinking water supply if the consumer could tolerate the potential malodour, potential for staining and unpleasant taste. However, it would be prudent to boil the water before using it for drinking because shallow groundwater is vulnerable to contamination.

The Council has received one reported case of high boron levels having an adverse impact on the begonia plants of a bore owner in this area. However, similar high

levels were not detected in any of the five bores sampled indicating that high boron levels are only a localised phenomenon.

Groundwater Levels

Unfortunately the design of most shallow bores does not allow the insertion of a well probe to obtain the water level. To address this problem three dedicated monitoring bores are being constructed in a transect across the Paraparaumu coastal plain. These bores will be added to the existing regional groundwater level monitoring network.

The bores will be located to complement the existing sites at the Waikanae Christian Heritage Park and Queen Elizabeth Park. The Kapiti Coast District Council has shallow bores at Otaihanga and Waikanae Beach that will also be used to collect water level data.

Data collection will commence at all sites upon completion of the new bores in August 2000. Data will be collected three-weekly during the summer months and six-weekly for the remainder of the year.

5. Estimated Groundwater Usage

A 1976 Wellington Regional Water Board report estimated that there were 3000–4000 shallow bores in the Paraparaumu area. The current number of bores is unknown. The report states that because of poor water quality the majority of these bores were only used for irrigation. The report estimated that the typical daily abstraction from all bores was 260 000 gallons per day, or 1182 m^3/day. The estimate was qualified by the observation that abstraction is likely to be considerably greater during dry periods as the demand for irrigation water increases.

A local drilling contractor has estimated that 3500 litres/day is required to irrigate the average lawn on a single property during the summer months. This estimate is significantly greater than the Water Board's estimate and highlights the large potential cumulative abstraction rate from shallow bores.

Policy 6.2.3 of the Regional Freshwater Plan specifies the following safe yields:

Groundwater Zone	Aquifer Depth	Safe Yield (m3/day)
Waikanae	0-45	14 450
Raumati/Paekakariki	0-6	5980

Current water permits authorise 6703 m^3/day to be taken from the Waikanae Groundwater Zone. Of this total, 4670 m^3/day is allocated for emergency public supply. The remaining allocation is sufficient to cope with about 2200 bores pumping at 3.5 m^3/day. Therefore, on a regional scale the safe yield of the groundwater system is not likely to be compromised. However, the safe yield is only a regional estimate for an aquifer defined to be 45m thick. Large numbers of shallow bores in a small area may be having a more significant effect on local groundwater levels. Monitoring

of the shallow groundwater level across the coastal plain will be necessary to assess potential overuse.

The lack of development of the Raumati/Paekakariki groundwater zone means that safe yield is not likely to be compromised.

6. Liaison with the Kapiti Coast District Council and Drilling Contractors

As part of their water conservation campaign the Kapiti District Council maintains a register of properties with bores and rainwater tanks. The register allows KCDC field staff to identify households with private water supplies who otherwise may be considered to be breaching water restrictions if irrigating their garden while a restriction is in place. The current register lists 770 bores and 108 tanks. These bores are being incorporated into the Council's bore log database.

Contact with local drilling contractors was made to make them aware of the requirements of the Freshwater Plan and the rationale behind those requirements. The contact with contractors was aimed at developing a working relationship to ensure ongoing improvement of drilling practices and regulation.

To assist with the explanation of the regional rules, a drillers' information kit was produced and distributed to local drilling contractors. The information kit was generally well received, however there was some apprehension from one contractor who was concerned that any regulation would adversely impact his business.

Since the kit was issued in December 1998, the amount of information received about bore locations has not improved. Therefore, it will be necessary to revisit the drilling contractors to reinforce the importance of this information to the sustainable management of the resource.

7. Where To From Here?

This report has identified that ongoing monitoring is required to adequately monitor the usage of this resource. Further work proposed includes:

- measuring actual water usage at selected sites along the coast, particularly during the summer;
- ongoing collection of water level data;
- ongoing collection of water quality data from two of the five sites used in this investigation;
- undertaking several short duration pump tests to assess the hydraulic characteristics of the aquifer; and
- follow up work with local drilling contractors to ensure the requirements of the Regional Freshwater Plan are met.

8. Communications

The results of this investigation will be distributed to all bore owners who allowed their bore to be used to collect water samples. All bore owners expressed a keen interest in the outcome of the investigation, particularly the water quality analyses.

The Kapiti District Council will also be informed of the outcome of the investigation to ensure we continue to receive their support to improve the management of the resource.

Drilling contractors will receive the results of the investigation as we seek to improve the quantity and quality of information that we receive from them.

The iwi will also be provided with the results of the investigation as they have expressed concern about the extensive use of this resource and absence of comprehensive monitoring data.

9. Recommendation

That the report be received and its contents noted.

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