



## Key Points

- The volume of groundwater stored in Marlborough aquifers ranges between normal and high for spring 2013
- No abstraction issues are anticipated for the upcoming 2013/14 summer irrigation season until the New Year at the earliest
- Weather conditions and the Wairau River flows will determine the state of groundwater resources later in season
- Initial water level information from the recharge well is now available
- It's too early to be definitive but these results suggest a small variation in recharge rate in relation to Wairau River flow
- Results from several other projects will combine to provide a picture of the recharge rate and the means for real time allocation of groundwater

## What is state of Marlborough's groundwater resources heading into summer?

Marlborough District Council operates a network of monitoring wells which provide a real time picture of the status of each of the main aquifers across the district.

Summer is the period when groundwater demand is highest. Each Spring MDC look backwards to review the effects of abstraction during the previous summer, and forwards to plan for use during the upcoming summer season.

The plots in Figure 1 represent how groundwater levels vary relative to historic conditions and their current state prior to the 2013/14 irrigation season for five wells representing the main Marlborough aquifer systems.

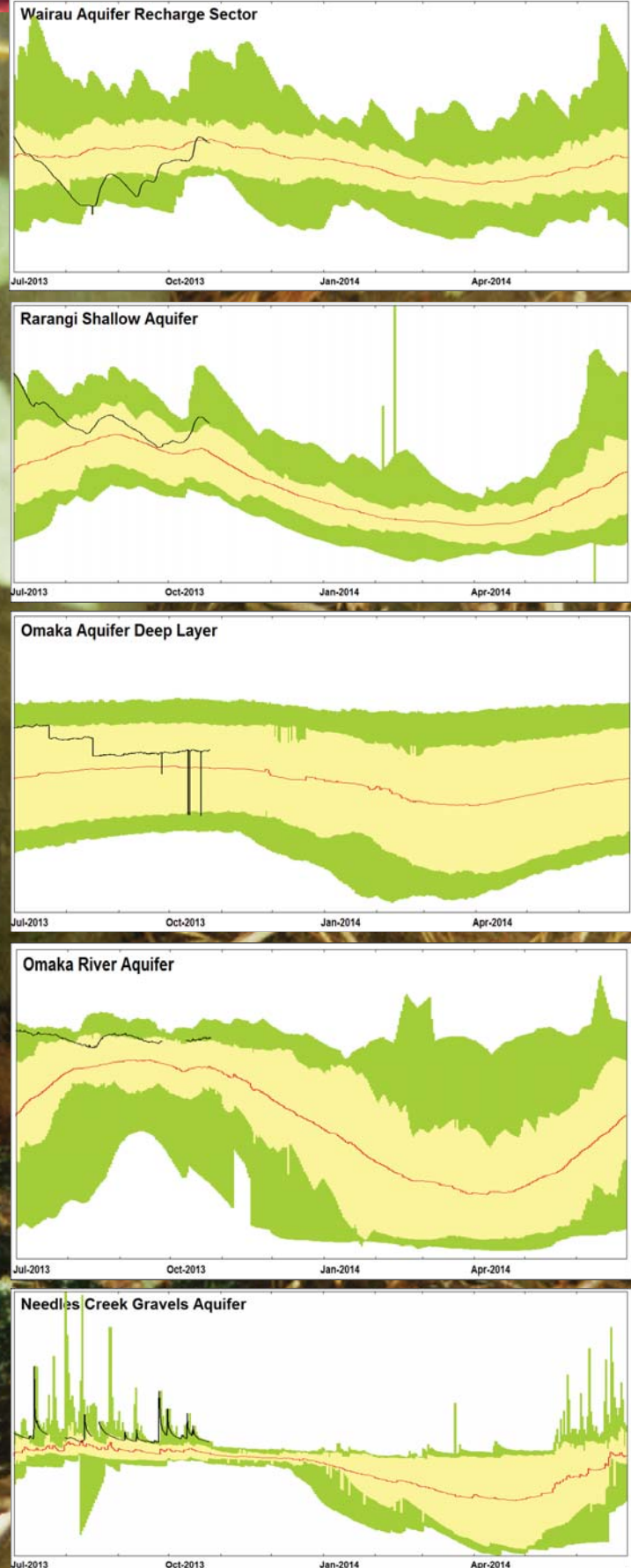
The black line shows the current groundwater level and the red line is the long term mean. In the yellow central band groundwater levels are referred to as normal (contain 60% of values). The upper and lower green bands show when groundwater levels are relatively high or low.

Water levels across most Marlborough aquifers are currently normal to high with sufficient storage to meet irrigation demand at this stage.

However, this can change rapidly depending on summer weather conditions, especially for small aquifers with less storage to match natural drainage or greater abstraction.

Benmorven Aquifer levels remain subdued whereas all other deeper Southern Valleys Aquifer levels are the highest on record. This reflects the use of SVIS water instead of local groundwater resources and an absence of drought since 2001.

Figure 1: Aquifer Status

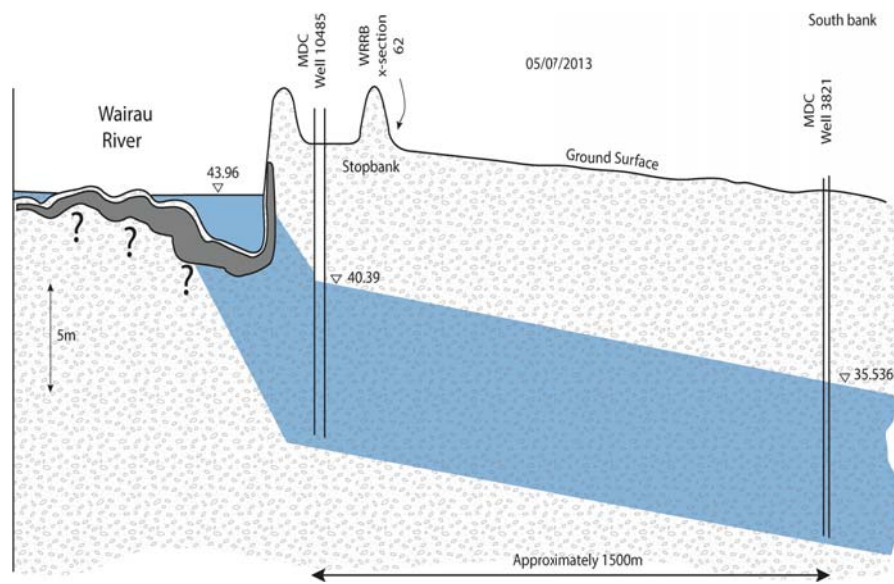


## What results are available for recharge project and what have we learnt?

MDC established three new Wairau River flow sites in late 2013. Differences in channel flow will indicate losses to groundwater in a particular reach of the river. No results are available quite yet as MDC are still in the process of calibrating the instruments.

The other key project involves the installation of a well on the stop-bank near the Wairau River within the recharge reach (Figure 2). Initial results are now available but many months of record are needed before we know if the recharge rate varies with Wairau River flood flows and the mechanics are confidently understood.

Figure 2 : Conders Groundwater Recharge Well



## What is planned for 2014?

MDC and ESR will measure levels of argon gas in groundwater in wells in the recharge area in early 2014. This will be repeated under wetter conditions to compare any difference in the “recharge plume” in relation to large Wairau River floods.

Changes in the conductivity and temperature of groundwater compared to Wairau River water will also provide clues about surfacewater-aquifer interaction in the recharge sector of our most important groundwater system. These instruments have been installed but require time to calibrate.

Figure 4 : Calculated Recharge Rate

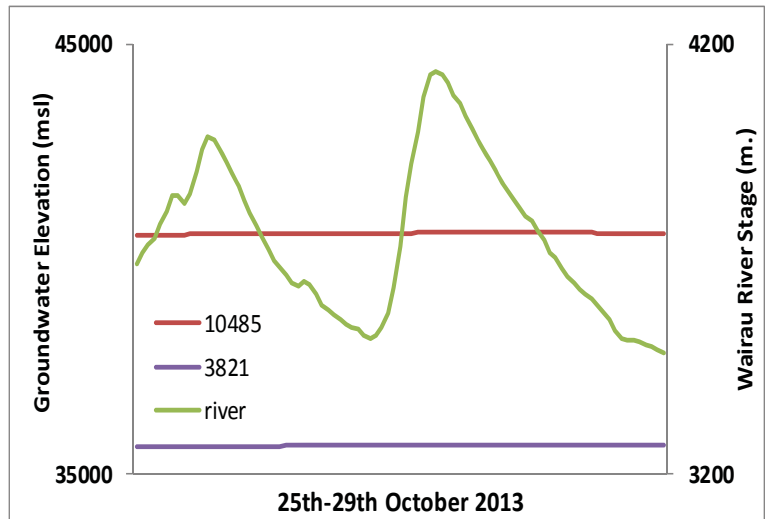
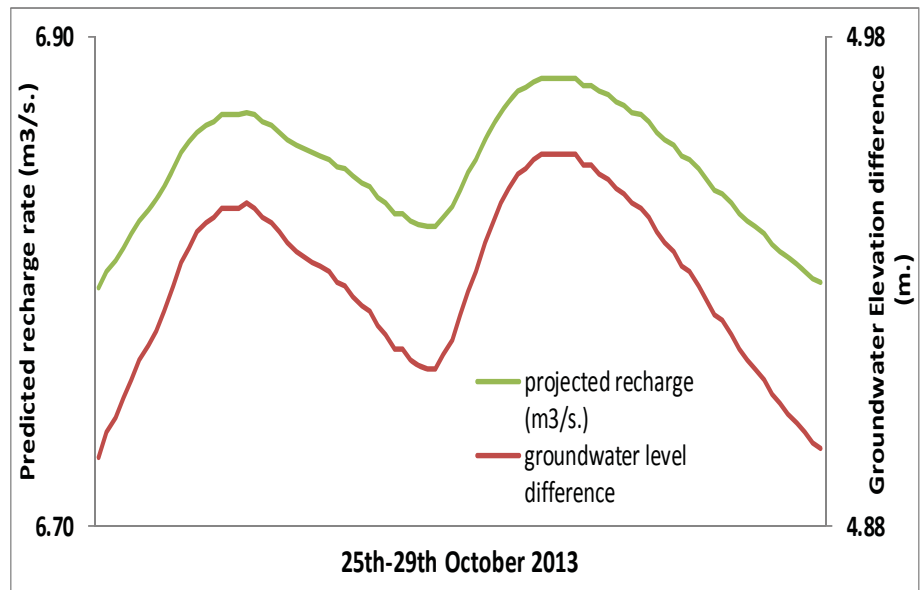


Figure 3 : Groundwater Variation to Small Flood

The first indications are that groundwater level doesn't vary much with river level despite their close proximity (Figure 3). The purple line is the inland well elevation, red line is stopbank well elevation with river stage in green.

Consequently the difference in water level between riparian groundwater and wells further inland is relatively static. It follows that the recharge rate under these conditions won't increase significantly either (Figure 4).

However these preliminary results are for a small flood only and may not hold for much larger flows.