

# Managed Aquifer Recharge (MAR) – Proposed Modelling Scenario

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8 November 2016

## 1. Objectives and scope

(following discussion at October meeting between representatives of the Ruamāhanga Whaitua Committee (RWC) and GWRC)

The RWC are interested in exploring the concept of managed aquifer recharge on the Wairarapa Plains with the objective of enhancing environmental flows in spring fed streams, wetlands and rivers during critical stress (dry) periods.

The focus at this stage is not to store water in deeper aquifers for abstraction but in recharging targetted areas of the shallow groundwater environment (connected to surface water ecosystems) through managed infiltration of water sourced from major rivers.

An example model scenario will provide information to the RWC around the general concepts and principles of MAR, and how it could be modelled.

The 'Middle Valley' area (between the Waingawa and Waiohine rivers) will be the target area for modelling MAR using the distributed existing water race channels (off-channel ponds).

Proving the feasibility of managed aquifer recharge is not a primary objective at this stage, although the scenario result may provide some preliminary guidance. Ultimately the scenario will be used by the RWC to determine whether they wish to further develop concepts and explore the feasibility of MAR.

## 2. How this scenario will be modelled

- Use injection wells to add water to the shallow groundwater system (upper model layers) along the water race network (Taratahi and Carrington. Moroa? Fig 1). It doesn't really matter at this stage how the water is infiltrated (e.g. through soakage basins or modified channels) – the location is most important for the scenario.
- Quantity injected: currently (in the calibrated model) 20% of the water in the races is assumed to return to the aquifer using an array of injection wells (see Fig 2). So there is already some recharge.
- When is water infiltrated? Commence in Nov? Six months?

- The scenario will entail running the model with increased water recharge returns using the existing injection wells. We can run several versions of the scenario at the same time.
- Suggest we begin with 2 and 5 and 10 times the current rate of return to look at sensitivity and whether we can get the water into the aquifer.
- Run the model at weekly time steps for the entire calibration simulation period.

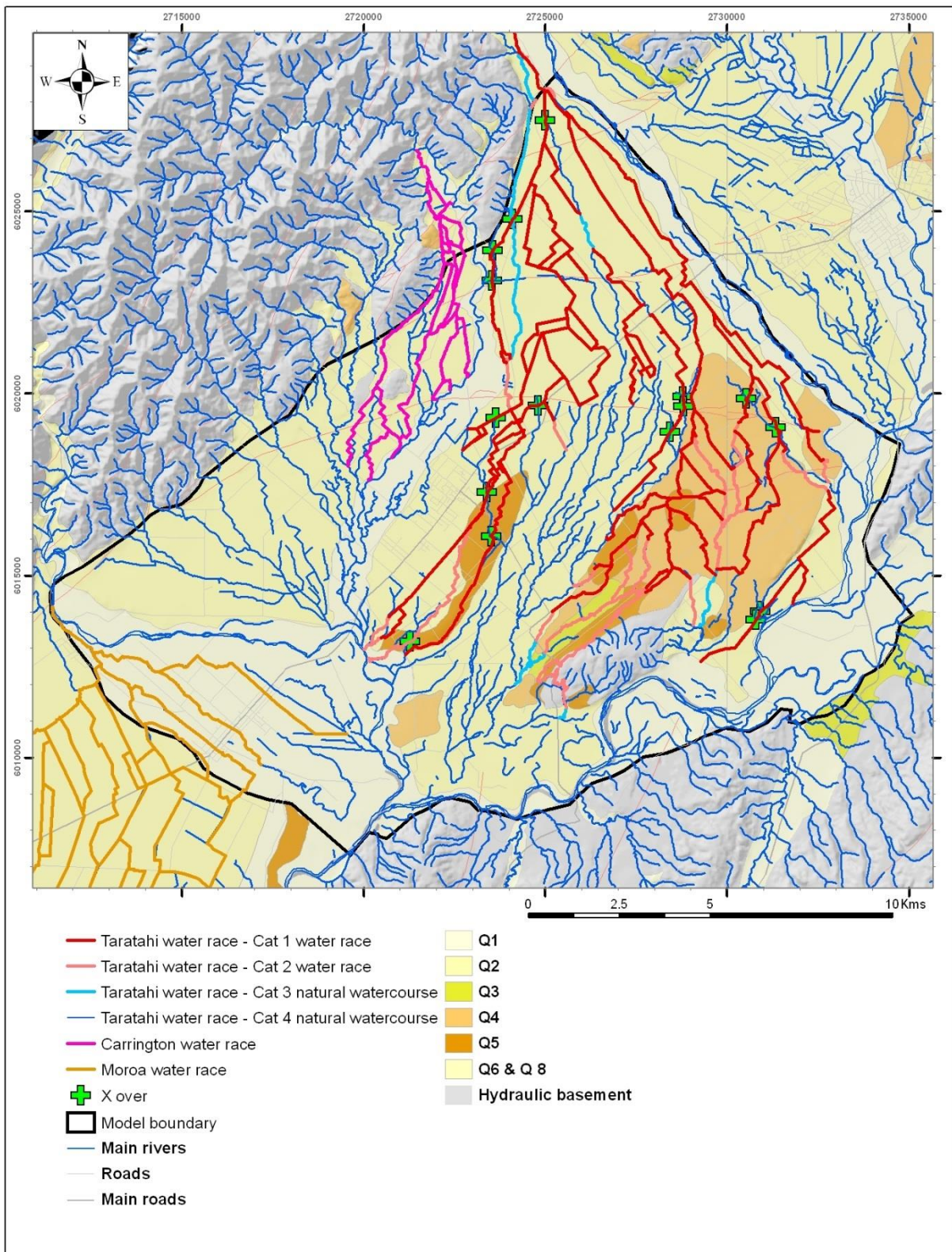
### 3. Scenario outputs

Outputs to assess the effect of MAR will be the modelled summer flows at selected points in the stream channels and rivers (Parkvale Stream, Booths Creeks, Beef Creek System, Mangatarere Stream, Papawai Springs).

Estimates of viable quantities of water required for MAR from which can be used to assess potential river sources.

An indication of how receptive the shallow groundwater system is to recharge.

**Fig 1: Water races**



**Fig 2:** North model surface water and water race simulation

