

An introduction to

Managed Aquifer Recharge

Water balance. Water security.





Introduction

Hawke's Bay's freshwater resources are vital to the region's social, economic and environmental success.

They are also under increasing pressure due to recent droughts, the longer-term impacts of climate change, historic allocation of water takes and increasing demand for water.

As the gap between the region's supply and demand for freshwater grows, the Regional Council has accelerated its Water Security Programme. Supported by loan funding from the Provincial Growth Fund, one of the workstreams in this programme is the investigation of water storage options in both Central Hawke's Bay and Heretaunga. The development of water storage options - both above and below ground, can help protect and manage our freshwater to ensure secure supplies.

Work over the last decade, and confirmed this year, has highlighted the challenges of above ground water storage options in Central Hawke's Bay. There are no immediately obvious above ground storage options of a scale that are commercially and / or legally viable, though we are continuing to examine possibilities.

The Regional Council's work has therefore shifted to focus on developing Managed Aquifer Recharge (MAR) in Central Hawke's Bay. MAR can provide a way to use natural processes to replenish the Ruataniwha aquifers and thereby enhance groundwater storage.





What is Managed Aquifer Recharge?

Ninety-five per cent of the world's freshwater is stored underground.

Aquifers are recharged every day from rainfall, rivers, unlined water races and canals, and irrigation activities. These processes lead to increases in groundwater levels and act to influence the quality of water in the aquifer.

MAR is a set of physical tools that enables us to capture high-quality water from rivers and streams during high winter flows and use it to purposefully recharge aquifers, complementing the natural recharge processes. Groundwater replenishment schemes utilising MAR are designed to help manage the overall water balance for catchments, restoring groundwater that has been drawn upon during periods of peak demand.

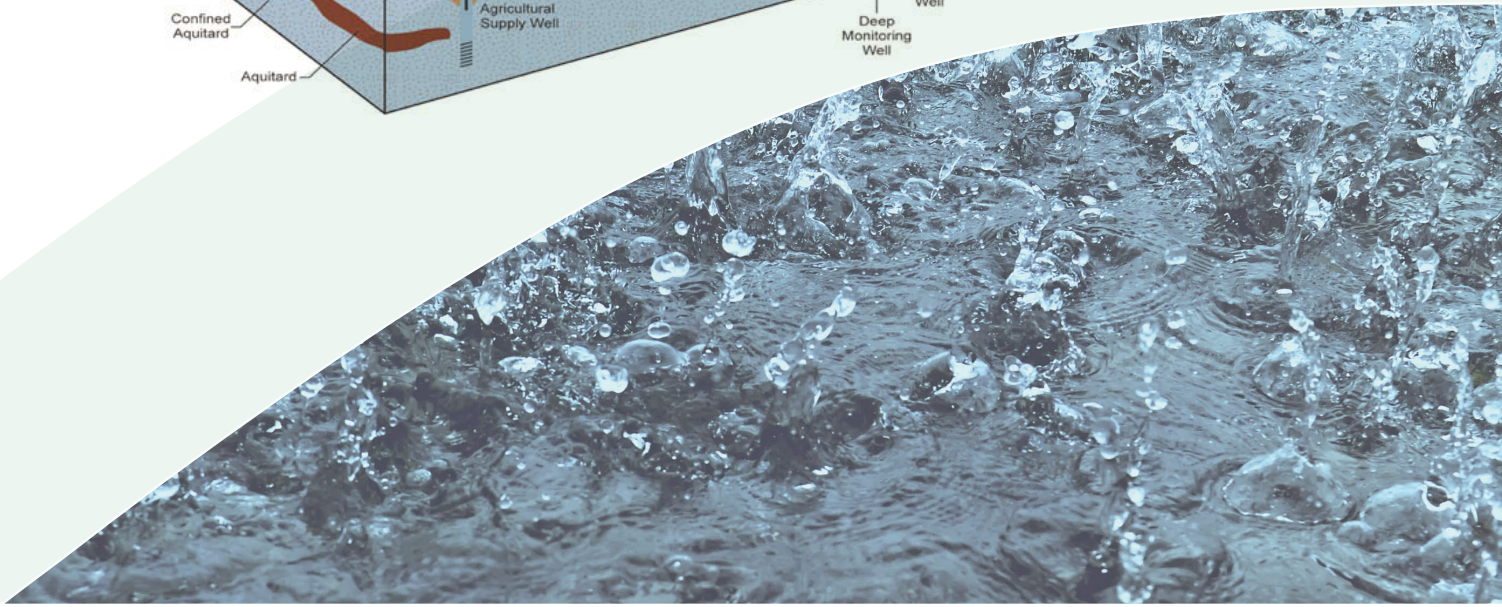
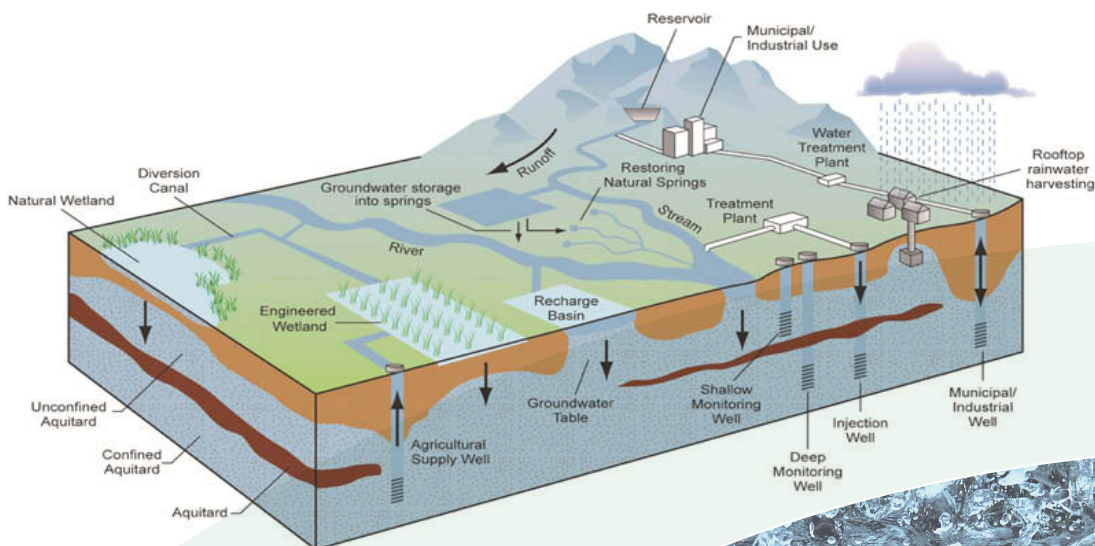
With the rising pressures of extreme droughts, and the uncertainty of climate change, ensuring that groundwater levels and the quality of freshwater stored in aquifers are appropriately managed is increasingly important.

How does it work?

The pilot involves capturing surface water from streams or rivers during winter high flow periods, settling and filtering that water and then recharging it into the aquifers below the Ruataniwha Plains.

Suitable sites for MAR tend to be in areas where thick, coarse-grained sedimentary deposits are crossed by waterways that can provide water to MAR sites during peak flows.

In 2021 the Regional Council will undertake a MAR pilot project in Central Hawke's Bay to understand and demonstrate the potential for MAR to increase freshwater security.





Why are we looking at MAR in Central Hawke's Bay?

Water storage in CHB is becoming increasingly important as the pressure on supply continues to rise.

The Ruataniwha aquifers under Central Hawke's Bay contain large volumes of groundwater that are being accessed for irrigation, industry and domestic / public supply.

Groundwater levels in the alluvial gravel deposits of the Ruataniwha basin are drawn down during summer and generally recover during the following winter. MAR offers potential to enhance this recovery of freshwater levels and increase the usable groundwater storage capacity. Investigations indicate that the Ruataniwha aquifers are likely to respond positively to MAR.

The pilot project is likely to involve two approaches to recharging the aquifers: shallow recharge using a wetland and recharge basin system and deeper aquifer recharge using an injection well system.

Does MAR work?

Yes, it can work well.

MAR is widely used in other parts of the world and is increasingly being trialled in New Zealand to support groundwater management – for example, in the Hekeao/ Hinds catchment of Canterbury and in Gisborne. MAR systems can replenish groundwater levels in aquifers, improve groundwater quality and help to restore the balance for sustainable groundwater management.

We are committed to establishing a pilot to determine the potential effectiveness of MAR in Central Hawke's Bay and plan to have a site established by winter 2021.

Is the water clean?

All water in the aquifer is naturally filtered by the ground during the recharge process.

MAR will mimic these natural filtration processes. Additionally, high quality source water is being targeted for recharge to the aquifer, as this enables the MAR processes to function optimally.





Objectives of a MAR pilot in CHB

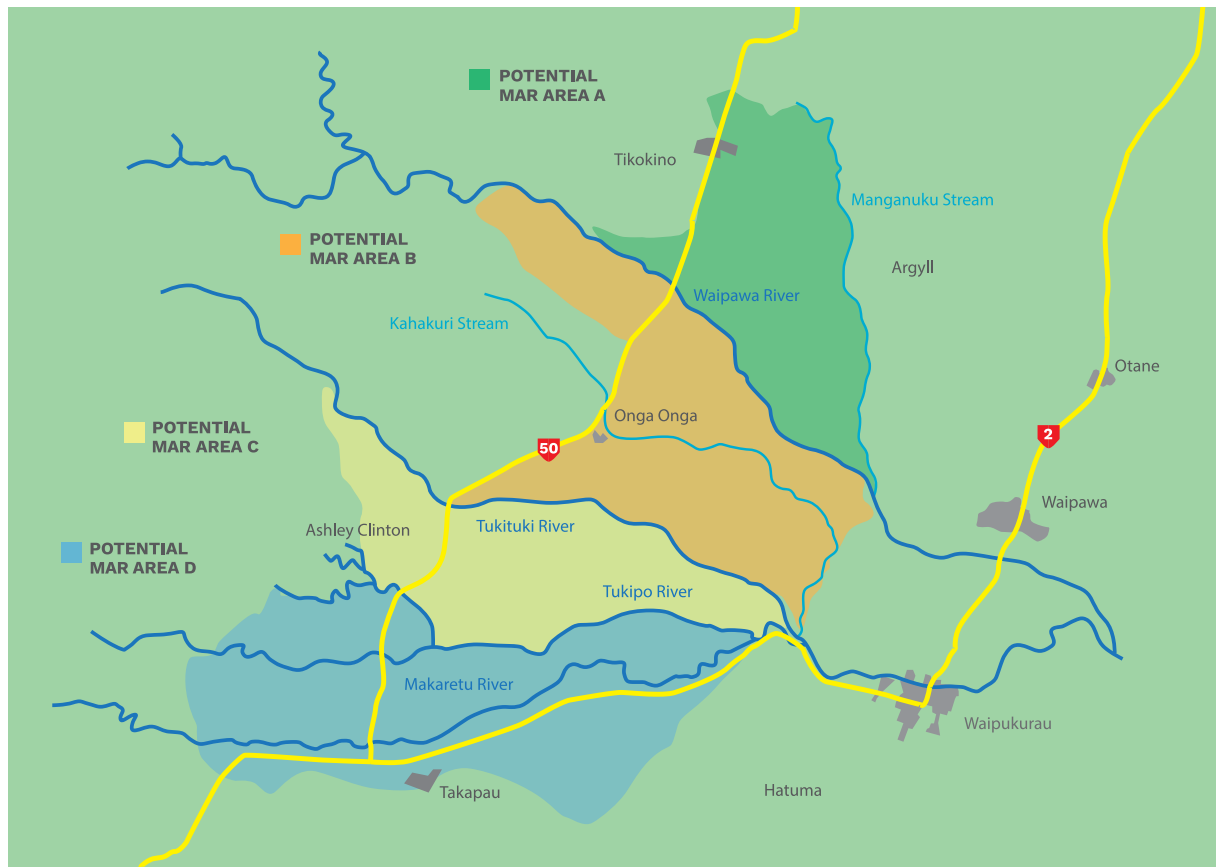
The pilot aims to demonstrate the potential for MAR as a tool to increase groundwater storage levels, leading to increased seasonal baseflows in our streams and rivers.

While the MAR pilot will be exploratory, it will provide the Regional Council and the local community with an opportunity to observe first hand how effective it may be in recharging the aquifer and delivering more water to the overall groundwater system.

It is anticipated that MAR may be part of an integrated approach to sustainably managing the overall catchment water balance and increasing the CHB's security of supply.

The project is investigating certain areas around the Ruataniwha plains and aims to select a pilot site that members of the community are able to visit and observe during operation.

Potential MAR pilot areas in CHB



What is the next step?

We intend to run a comprehensive, scientific pilot of MAR in Central Hawke's Bay.

Once we have identified a suitable MAR pilot site, we will run the pilot for a minimum of 12 months and will report the findings as we progress. There will be opportunity to discuss the concept and the pilot results with the local community before making any decisions around future use of the technology. We expect to have data from the first pilot site by the end of 2022.

What might the future hold?

If the pilot is successful, there is the potential for multiple MAR sites across areas of Central Hawke's Bay.

There is the potential for MAR to make an important contribution to increased water security across CHB and to relieve pressure on the region's aquifer and waterways.

How can I find out more?

If you would like to understand more about Managed Aquifer Recharge and the Central Hawke's Bay pilot programme, please visit our website at:

www.hbrc.govt.nz/hawkes-bay/projects/regional-water-security-programme/

If you have any further questions please contact the Hawke's Bay Regional Council's Regional Water Security Programme Director, Tom Skerman on

tom@hbrc.govt.nz

