

Explaining NGT's role in the "Regional Recharge Farm" concept

Mark Bachmann, Nature Glenelg Trust (NGT)

September 2021



Introduction

The Limestone Coast Landscape Board has recently produced a short fact sheet on the **Regional Recharge Farm** concept (attached to this paper for your information), and Nature Glenelg Trust (NGT) is a proud partner in this new initiative. This short paper explains NGT's role in the concept from our perspective and our organisation's hopes for how the Regional Recharge Farm idea might be applied more broadly in the future to benefit our region's water resources and the environmental values that are most sensitive to impacts on shallow groundwater.

Background

Prior to the 2018 State Election in South Australia, Nature Glenelg Trust (as a member of the [South Australian Nature Alliance](#)) contributed to a policy document authored by environmental groups, entitled "**South Australia, Our Future, actions to protect people, places and wildlife**", which was provided to all political parties and went on to inform commitments adopted ahead of the election.

A new concept that Nature Glenelg Trust put forward under the water theme which appeared in this document (p. 13) sought the following new commitment:

- *Create 1000 hectares of new 'Aquifer Recharge Farms' in agricultural regions of the state.*

While no political commitments were made in relation to this theme at that time, the idea of working with farmers and other land managers to proactively manage groundwater resources by retaining water in natural wetlands in the landscape has since begun to resonate with a wider audience. This issue is especially pertinent in parts of the state where the over-allocation of groundwater resources for various forms of direct or indirect extractive use are causing an ongoing decline, or even total loss, of environmental values dependent on those same water resources.

Environmental features reliant on the surface expression or discharge of shallow groundwater are some of the most vulnerable to changes in the water balance. This has led to a significant policy challenge because in many locations on-ground outcomes occurring under current policy settings, like a falling water table or declining spring discharges compromising groundwater dependent ecosystems, are actually contravening the objects of the *Landscape South Australia Act 2019*.

New pilot projects

In 2021, the Limestone Coast Landscape Board has attracted new investment into the region from two funding sources¹ and will soon co-invest with NGT in the further development of the Regional Recharge Farm concept at two sites owned by NGT. These two properties, Mt Burr Swamp and the Hutt Bay Wetlands, were privately secured by NGT as community demonstration areas for environmental restoration but require further investment to realise their full potential. Both sites occur in areas with important environmental features that interact with shallow groundwater but have inherited a legacy of detrimental impacts from prior land-use, including artificial drainage.

¹ Funding sources are:

- The South Australian Government *Landscape Priorities Fund*
- The Australian Government *National Water Grid Fund – Connections Pathway* program



Artificial drain at Mt Burr Swamp, intercepting the perched groundwater aquifer

The logic is to now use these sites as case studies to test the co-benefits that can be achieved for environmental values and the groundwater resource by partially or fully reversing the impacts of artificial drainage on these properties. These case study sites however are not the first.

The first demonstration site

The first site where this concept was successfully illustrated at a large scale in the Limestone Coast, on previously drained farmland, was at Pick Swamp; where artificial drains were progressively decommissioned from 2007. The image below along the boundary of the restored wetland, is essentially a before (left) and after (right) restoration photo. Prior to artificial drainage to facilitate agriculture, the whole area shown in the image below was a natural wetland.



Looking north along the levee bank at Pick Swamp, the western boundary of Piccaninnie Ponds Conservation Park. To the left (west) is artificially drained wetland and to the right (east) is a restored Pick Swamp.

Of note, this is a groundwater spring-fed and dependant wetland adjacent to the coast. The drain which can be seen to the left of the levee bank above runs continuously (24 hours a day, every day of the year) straight to the sea. To facilitate agricultural land use, this drain draws down directly on groundwater, from an already over-allocated unconfined aquifer. By drawing water out of a spring-fed wetland like this, the drain not only compromises local environmental values, but it also lowers the surrounding groundwater level (reducing its storage capacity in the surrounding peat and porous limestone substrate), with knock-on sustainability effects for all other water users.

This is an image of unconfined aquifer groundwater expression at the surface - in two states - side by side, showing the role of artificial drainage and drain management. To the left, the water level is depleted by about 2 metres via drainage, the peat substrate is exposed and oxidising carbon to the atmosphere, and groundwater dependent environmental values are stressed. To the right, the previously drained peat is now re-saturated (permanently locking up that carbon), the water level has risen and environmental values have rapidly recovered – providing a wide range of benefits that also extend beyond the wetland, including buffering and protecting the ground water resource.

The future

The newly announced projects that will occur on NGT properties are philosophically similar to Pick Swamp. Although private rather than government land, in being owned by a charitable not-for-profit organisation, NGT's Reserves will be perpetually protected as environmental restoration sites for community benefit. While the NGT case study sites are a positive start, if we are serious about addressing threats to groundwater to a degree that is genuinely capable of reversing current trends for environmental values impacted by regional groundwater policy challenges, we really need to think beyond land secured for conservation or environmental restoration purposes alone.

All rural landholders are custodians of natural resources on behalf of the community and although many in the Limestone Coast still own drained wetland areas that interact directly with shallow groundwater, this number is reducing due to regional trends in the water table. This includes both groundwater expression sites (e.g. Pick Swamp), and those where recharge to the unconfined aquifer (e.g. via soil infiltration or runaway holes) from natural wetlands is known to occur.

Yet at the present time there are no existing mechanisms available that would enable either:

- **farmers** to consider alternative economic uses for land that is suitable for potential re-inundation, making it available to help recover a depleted water table and deliver wider community (environmental, social, economic) benefits; or
- **other rural industries** to offset their groundwater impacts in one location by directly or indirectly contributing to the re-inundation of land elsewhere in the region where it is practical and technically feasible to do so.

For example, in the future, subject to the development of the necessary policy and economic mechanisms, imagine a scenario where a farmer with a "recharge paddock" might be paid for reversing artificial drainage and allowing a natural wetland to re-inundate for wider community benefit, and in doing so also diversifying their on-farm income.

From NGT's perspective, land use, drainage and aquifer management cannot be separated in this region, where a porous limestone substrate exists. Genuine progress requires a few things: (1) an honest discussion about land use planning / compatibility in specific locations, (2) accepting that the status quo for water resource management is not working, and (3) innovative thinking / open minds.

Unfortunately, there are vast swathes of the region where groundwater dependent ecosystems have been lost and, based on current trends and land use, are unlikely to ever be recovered. However, there are still many locations where future net-gains in environmental values are achievable – as the examples in this paper illustrate. NGT is committed to working with landowners, government and industry to develop the **Regional Recharge Farm** concept and help turn this vision into a reality.



A restored wetland at Mt Burr Swamp – many additional shallow groundwater dependent wetlands at this NGT Reserve, which is home to more than 50 drained wetlands, will benefit from the Recharge Farm project.

Regional Recharge Farm

Groundwater resources in the Limestone Coast are critical and underpin the region's environmental, social, cultural and economic values.

The unconfined aquifer is a renewable resource that is predominantly recharged from rainfall. To manage these water resources, extraction of water and recharge must be balanced. Water is extracted from the unconfined aquifer through irrigation and directly by vegetation. Recharge has been reduced over time through the efficient removal of water from the landscape by artificial drainage networks. Under changing climate conditions the Limestone Coast is predicted to be hotter and drier, further reducing recharge of the aquifer. Exploring new ways to achieve localised recharge of the unconfined aquifer is critical to achieving water security and sustainability in the Limestone Coast region. A new concept being trialled to increase aquifer recharge is a **Regional Recharge Farm**.

What is a **Regional Recharge Farm**?

- A regional recharge farm is a location in the landscape where water is actively held in natural wetland features for the purposes of passively increasing recharge to, or reducing the depletion of, the shallow unconfined aquifer.
- Water may be held in the landscape through on ground works to modify or reverse artificial drainage impacts.
- Holding of water in the landscape may be permanent or seasonal and where appropriate, the location may have alternate functions when not flooded for recharge (e.g. grazing).
- Holding water in the landscape may achieve other benefits such as enhancing or restoring groundwater dependent ecosystems or increasing soil moisture for productivity.

While current policy settings facilitate recharge farms on land managed primarily for ecological values, this concept could evolve in the future to develop mechanisms to support a wider application of this idea, and deliver similar outcomes across the broader commercial/agricultural landscape.

Where can a **Regional Recharge Farm** be located?

- Suitable locations for regional recharge farms will depend on the soil and substrate type, groundwater hydrology, topography and infrastructure needs of the location.
- A regional recharge farm could occur on private or public land and the concept is intended to be inclusive of all land managers.