Karst Springs Wetland Restoration

Hydrological monitoring and investigations to inform project design

A comprehensive hydrological monitoring and assessment program has been established to inform the design of the project. Through data and information collected from the monitoring program the project will be designed to maximise ecological outcomes while preventing impacts on neighbouring properties.

No final decisions have been made regarding target inundation levels for the wetland; this will be determined through modelling and engineering design, which will be informed by the data being collected.

In addition to the extensive field monitoring program, a numerical surface water and groundwater model is being developed to simulate hydrologic interactions at the site. This model will integrate local hydrogeologic data, groundwater levels, surface water conditions, and catchment flows to predict how different wetland inundation scenarios could influence the shallow groundwater system.

Once inundated, infrastructure on site will be adaptable and adjusted if ongoing monitoring demonstrates the potential for adverse impacts to neighbouring properties, such as groundwater mounding and/or waterlogging.

Preliminary modelling shows there is more water available in Deep Creek than is required to meet the wetland's restoration needs. This means that after restoration, water will continue to flow and the wetland will experience slow, continuous movement of water. This turnover of water in the wetland is critical for maintaining water quality and ecological conditions for target wetland species.

Hydrological monitoring program

The program combines hydrogeologic data (groundwater levels and gradients), surface water, soil moisture dynamics, and streamflow data, all underpinned by near real-time telemetry and a commitment to transparent reporting.

It is specifically designed to inform project design but also detect, evaluate, and respond to any hydrologic impacts. This ensures that the restoration delivers ecological benefits while safeguarding surrounding land uses.

The hydrological monitoring program includes several key components:

<u>Groundwater monitoring network</u>

- There are two groundwater observation wells on the restoration site itself, and four additional wells installed on immediately adjacent neighbouring properties, arranged along a west and north transect to record groundwater levels before and after restoration.

- This monitoring network and spatial arrangement allows early detection of any potential groundwater mounding (rise in water table) that could extend beyond the wetland boundary.

Surface water monitoring

- Four surface water monitoring sites have been established to record water levels before and after restoration. These sites will inform the wetlands surface water relationship to groundwater and allow optimal management of the inundation levels.

Soil moisture monitoring

- Soil moisture probes are installed both on the restoration site itself and on adjacent neighbouring land. These provide direct data on potential changes to soil saturation, collecting a baseline of data pre-restoration and offering an early warning for any undesirable increases in soil moisture that could affect agricultural productivity. It is important to note that there are positive impacts to soil moisture that will also be investigated.

Telemetry and real-time data access

- All groundwater, surface water, and soil moisture monitoring instruments are linked to telemetry systems, allowing for near real-time tracking of hydrologic conditions. The surface water and groundwater data are publicly accessible via Water Data SA, ensuring transparency and enabling landholders to stay informed. Soil moisture is collected on a separate database because it does not integrate with the Water Data SA database.

Streamflow monitoring

- Flow data from Deep Creek is also being collected to understand hydrological inputs and outputs and residency time (turn-over of water within the ponds).

Baseline data collection

- A two-year baseline data collection phase is underway to establish existing (pre-restoration) conditions. This informs project design and enables before and after comparisons.