Case Study: Using Sentek's EnviroSCAN to Measure Groundwater Recharge

Background

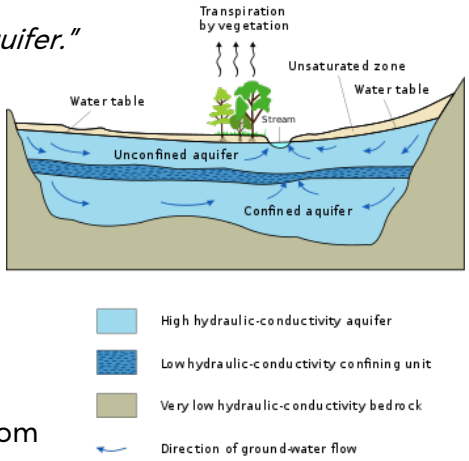
In Western Australia, the most widespread useable water resources are found in groundwater systems. In most cases to use this groundwater, one must be licensed under the Rights in Water and Irrigation Act 1914 by the state's Department of Water and Environmental Regulation. Information to support an application for this licence can include hydrogeological reports. This includes details of the groundwater system, description of the aquifer and estimates of groundwater storage and recharge potential.

Richard Nixon by his EnviroSCAN in the gates of his property

Sentek spoke with Principal Hydrogeologist Richard Nixon of Global Groundwater (Perth, Western Australia), to hear how he used Sentek's EnviroSCAN to more accurately estimate water recharge in his groundwater system.

"If you can measure the change in saturation below the root zone then you can estimate the water moving through to the aquifer."

- Richard Nixon



Visual representation of an aquifer

Methods & Materials

MODFLOW is a groundwater model designed to handle multi-layered systems with irregular boundaries and natural features and is often used to support groundwater licence applications. Richard describes that although MODFLOW does not have an unsaturated component to it, using it in conjunction with data from the EnviroSCAN gives them the ability to give an input of recharge based on the understanding of the amount of water that had bypassed the root zone.

Global Groundwater uses Sentek's EnviroSCAN to confidently quantify the parameters in their groundwater cycle. The EnviroSCAN probe provides a deep understanding of soil, offering flexibility and precision monitoring at multiple depths up to 40 meters (120 feet). In Richard's case, a 1.2m (4') EnviroSCAN is used for his relatively shallow system, where saturation is achieved at 1m (3').

Results

Sentek's EnviroSCAN probe provided the point source quantitative data that was previously not readily obtained. Where some aquifer parameters were merely estimated in the past, the EnviroSCAN ultimately lead to accurate quantifiable numbers were used to confidently calculate quotes based on actual local measurements rather than regional norms.

"What we've been able to do with the soil moisture probes is get the other end of the equation, also a point source which helps us gain confidence that we're using a number that we can measure and that is sensible."

"The better we understand, the lower the risk, the greater the security of the resource."

- Richard Nixon

Sentek's EnviroSCAN probe

In the United States, California has concerns beyond the depletion of water reserves with respect to groundwater. Extraction of groundwater has the potential to cause the ground to subside, causing massive infrastructure damage to roads, bridges and other structures.

In this video in the UK, Soil Moisture Sense demonstrate the ingenuity of Sentek dealers.

Gill Costa poses with the drill team after successfully installing a deep probe as part of CSU's research into Groundwater recharge