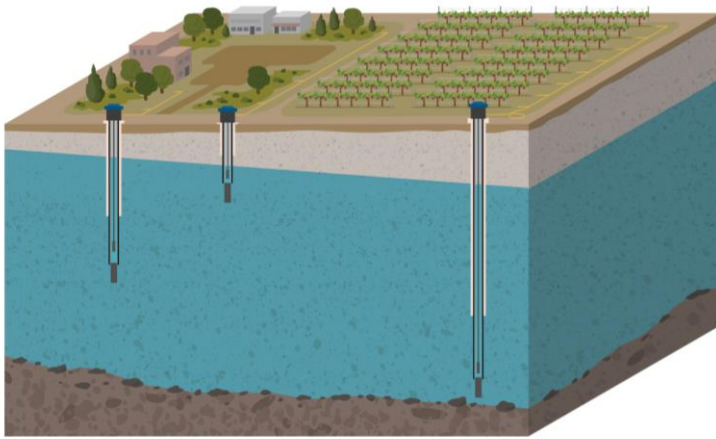


# Wells and Groundwater

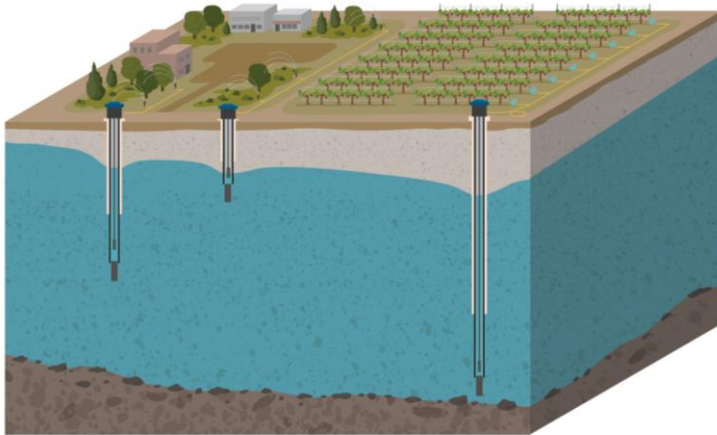
In most wells, the groundwater level rises and falls during the year due to changes in seasonal recharge and people pumping well water. When pumping water from one well lowers the water level in a nearby well, it's called **hydraulic interference**. In some cases, hydraulic interference from a neighboring well can affect a well's ability to produce an adequate supply of water for an intended use. The layering and types of rocks or sediment a well is drilled through and well construction contributes to whether different wells have hydraulic relationships. Differences in groundwater-level elevations and the influence of pumping in one well on the groundwater level in nearby wells are important pieces of information used to understand the movement and connectivity of the groundwater system.

## How does Pumping Impact Groundwater?



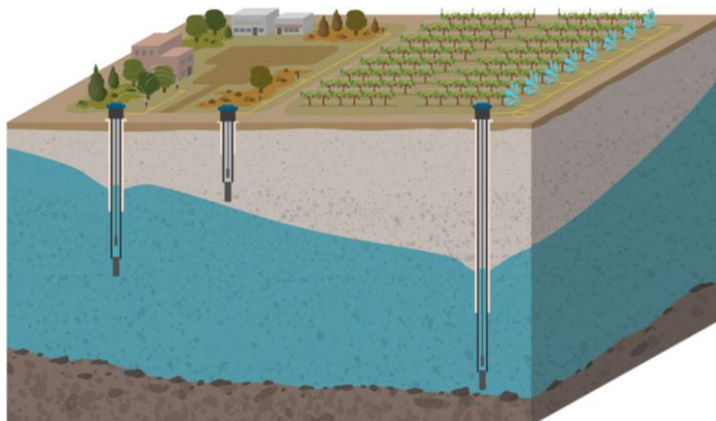
### Static Water Level (SWL):

Groundwater in an alluvial aquifer, where wells of different depths are showing a no pumping scenario and water levels are static.



### Cone of Depression:

Groundwater use in an alluvial aquifer, where wells of different depths are showing a small use pumping scenario and small cones of depression.



### Hydraulic Interference:

Groundwater use in an alluvial aquifer, where wells of different depths are showing a pumping scenario and large cones of depression. The shallow well has dried due to pumping by the deeper wells. Hydraulic interference happens when pumping water from one well lowers the water level in the aquifer enough to affect how much water nearby wells can pump.

## How is Groundwater Measured?

To measure well water levels, a thin cable called an e-tape is lowered down the well until it contacts the top of the water in the well. The distance, measured in feet below the land surface, is called a depth to water measurement.

These measurements help identify the direction of groundwater flow, track seasonal and long-term trends, and indicate how shallow groundwater interacts with rivers, springs, and canals.

*Photo: Measuring depth to water with e-tape*



For a single well, the data can be displayed as feet below land surface over time. When examining data from multiple wells, it is more useful to standardize the measurements to feet above sea level, allowing comparisons across the group of wells. When a well is measured at the same time of year every year, a hydrograph shows a decrease when water leaving the aquifer is more than water entering the aquifer. If more water enters the aquifer than leaves it, the hydrograph will show an increasing water level.

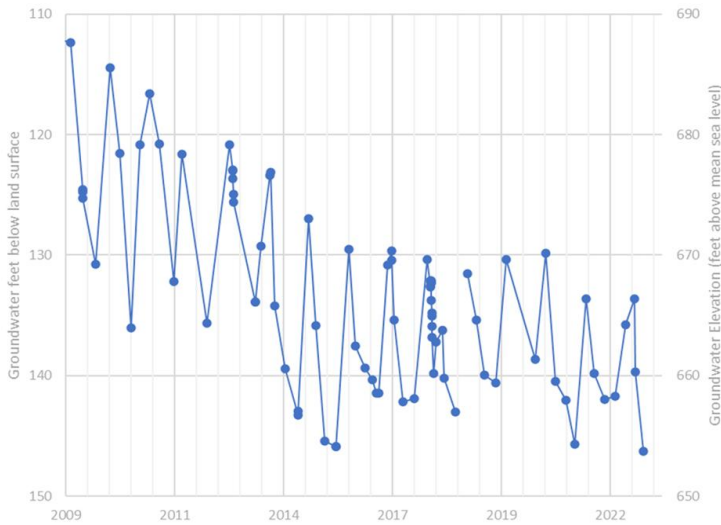
**A hydrograph is used to show changes in groundwater levels over time.**

Feet Below  
Land Surface

110



150



2009



2023

Increasing Time

Feet Above  
Sea Level

690



650

### Rising Groundwater Levels

occur when recharge (water entering the aquifer) exceeds discharge (water leaving it through pumping or natural outflow).

### Stable Groundwater Levels

occur when recharge (water entering the aquifer) equals discharge (water leaving it through pumping or natural outflow).

### Declining Groundwater Levels

occur when discharge (water leaving the aquifer through pumping or natural outflow) is greater than recharge (water entering the aquifer).

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