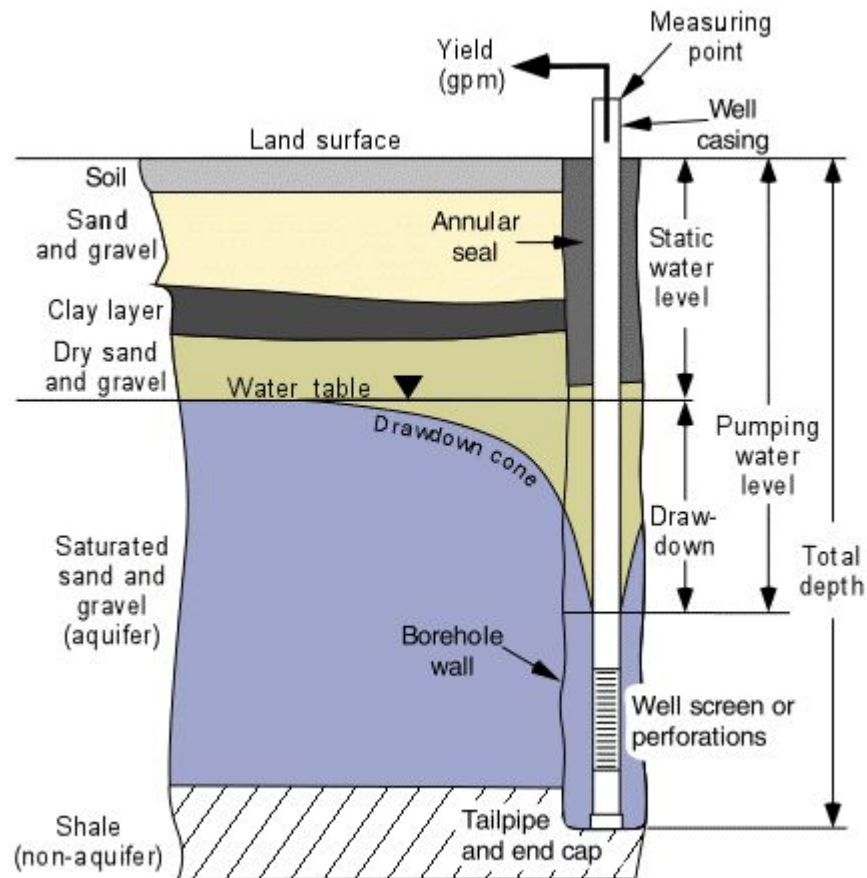


Aquifer Device Research

May 13, 2023

Canebrake Water District



Technology Types

Fixed Line - drop probe down into the well to water, electrical current senses the water and sonic senses the bottom

Pros

- Measures static well depth (top of water)

Cons

- Must be lowered into the well, could break (says meant for life)
- May contaminate (but can be cleaned before lowering)

Sonic Above Ground - transmits a sound wave into the well or pipe and measures the time for the pulse to return after contacting the water.

Pros

- Measures static well depth (top of water)
- Simpler to use (nothing to drop into the well)
- Maybe less likely to break
- Cannot contaminate the water since does not touch the water
- Quick to read

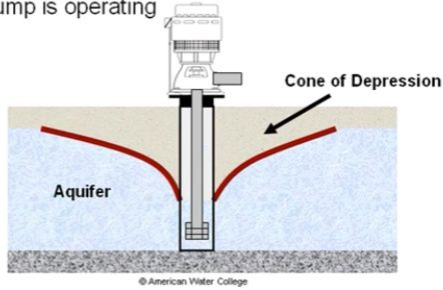
Cons

- Cannot measure well depth (bottom of well)
- Read reviews on accuracy issues but perhaps not using correctly

Well Depth Knowledge

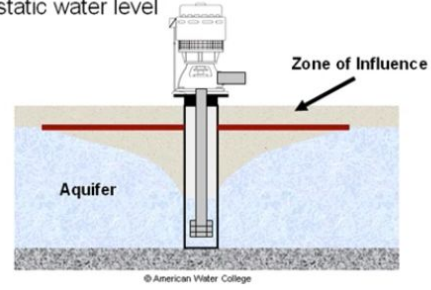
Cone of Depression

The depressed water surface surrounding the well when the well pump is operating



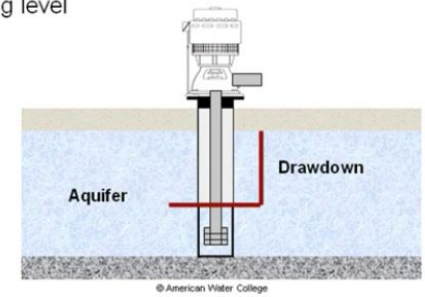
Zone of Influence

The distance that the cone of depression affects the normal static water level



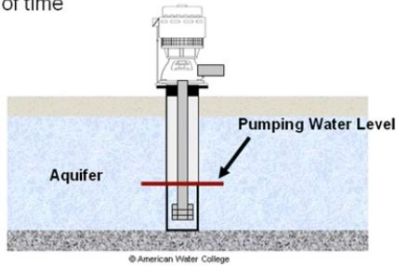
Drawdown

The drop in water level from the static level to the pumping level



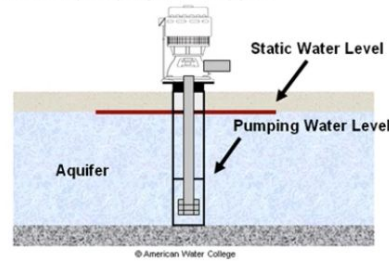
Pumping Water Level

The water level in the well after it has been pumping for a period of time



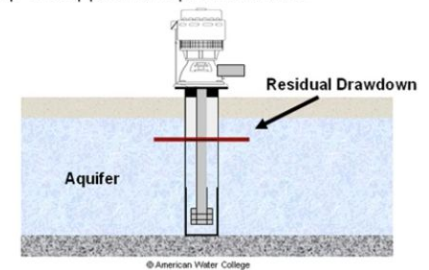
Recovery Time

The time required for the well water level to return to the static level after pumping has stopped



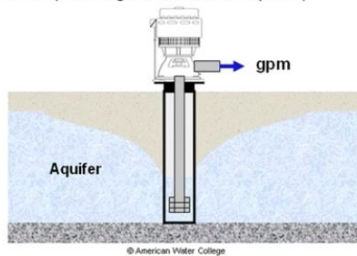
Residual Drawdown

A water level below the static level that remains after the pump is stopped for a period of time



Well Yield

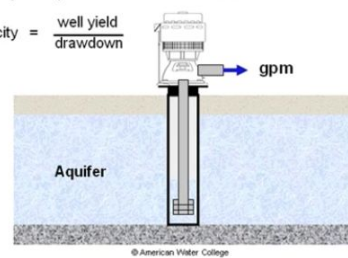
The rate at which a well can be pumped over a long period of time (recharge rate of the aquifer)



Specific Capacity

The well yield per unit of drawdown

$$\text{specific capacity} = \frac{\text{well yield}}{\text{drawdown}}$$



Water Aquifer Volume Indicators

- Fast recovery time
- Small drawdown after much pumping
- Large Specific Capacity

Mooney well depth ~500 feet
 Peterson well depth 480 feet
 Is this static or bottom depths?
 What are our well diameters ?

Vendor Choices

Brand	Type	Depth	Cost	Warranty
ENO - 2010 Pro	Sonic	4000 ft	\$1445	1 year
<ul style="list-style-type: none"> • Automatic Logging Rates - 1 sec to 60 min per sample (useful to measure the well changes) • Can buy from Amazon • \$119 extended warranty Specs & Reviews				

Brand	Type	Depth	Cost	Warranty
Solinst Model 104	Sonic	2000 ft	\$ 1569	3 year
<ul style="list-style-type: none"> • Runs from batteries • Works in any closed pipe, straight or angled • Works better in wells < 8" (see video) • Set min/max detection range for more accurate readings • Cover the well opening so the sound reflection can be caught properly Manual & Video & Specs				

Brand	Type	Depth	Cost	Warranty
Solinst - P2M2-1000	Line	1000 ft	\$1523	1 year
Specs ???				

Brand	Type	Depth	Cost	Warranty
Heron 300 meter	Line	984 ft	\$1998	?
Specs ???				

Computing Total Water Volume in a Aquifer



Both water aquifers have same Well depth
But the right aquifer has 10X more water volume
A single Well depth does not measure Total aquifer volume available.

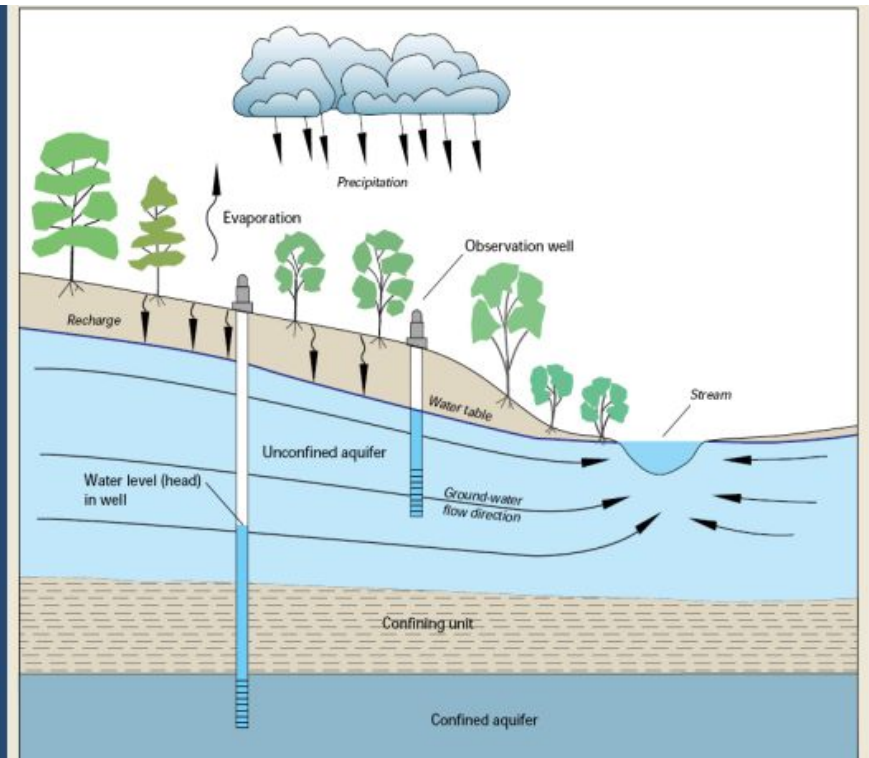
Does a Well Static Level Change

- The well's static level will usually be at its lowest during the dry season of the year
- The well water static level will usually be at its highest during the wettest season of the year, or after a period of heavy rainfall or heavy snow melt
- A well's static level may drop precipitously in response to events that disturb the soil or water bearing rock nearby, such as road or foundation blasting
- A well's static level may drop precipitously or even disappear entirely - leaving the well "dry" in response to changes in the underlying rock strata or on occasion if someone drills another water well nearby, tapping the same aquifer.

[reference](#)

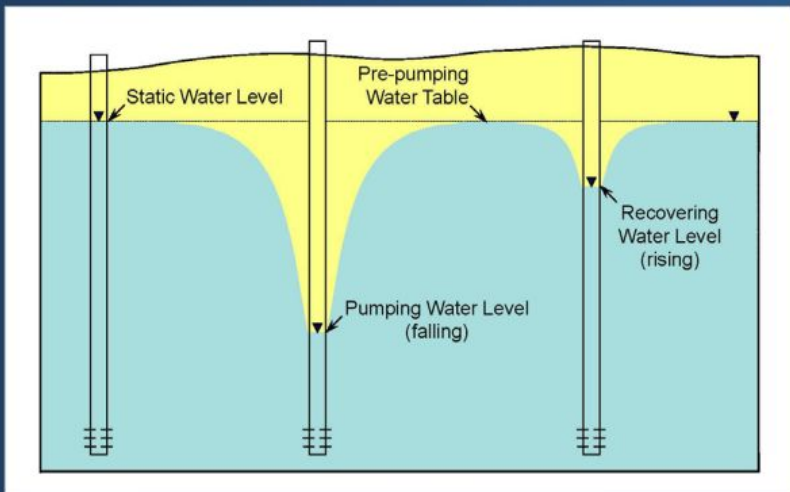
[Chlorine Meter](#)...(another gadget)

- A measurement of the water level in a well.
- Static (non-pumping) ground water level measurements represents conditions in the surrounding aquifer.
- Measurements over time give a better representation of aquifer conditions.

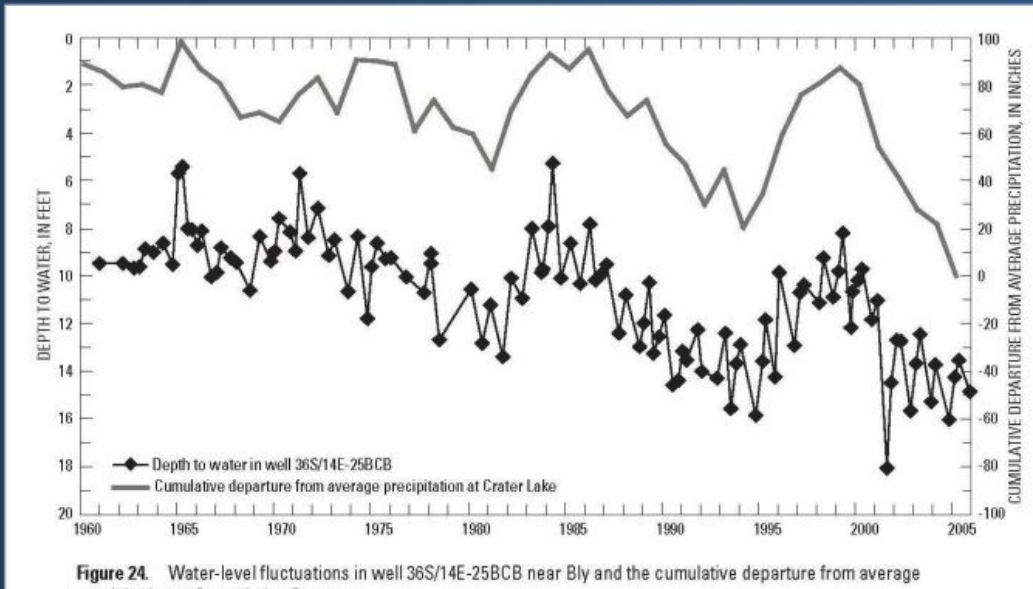


Turn off pump before measurement (prefer off 2 or more hours):
Goal = static (fully recovered) groundwater level

Measuring Ground Water Level



Groundwater Level Trends (climate influence)



Source: USGS Scientific Investigations Report 2007-5050

Measuring Ground Water Level

