www.nhwaterwell.com

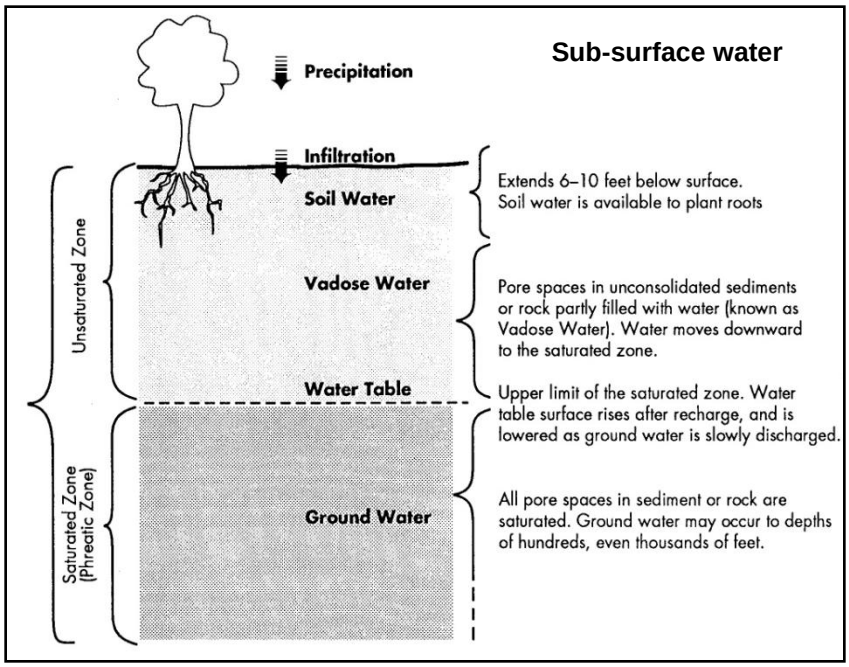
Information: New Hampshire Water Well Association

Information in this document is provided in good faith to inform the public about groundwater and water wells. Well owners should ensure that their well contractor has obtained permits (if required) and has referred to local codes, rules, regulations and laws for site selection, construction, maintenance and operation of water wells and water system equipment.

WHAT IS THE WATER TABLE?

Most people know that the "water table" has something to do with groundwater. The word *table* provides an image of a flat surface, like a tabletop, and it is commonly assumed that when a well is drilled it strikes water once it reaches below the water table. There is also a general understanding that in times of serious drought, water table levels may drop and wells may run dry. Understanding the terminology used to describe sub-surface water can help explain why water tables may rise and fall.

Some water table levels may vary by tens of feet over a short period of time and others in the same area may only change by inches. The upper surface of groundwater is the water table. Below this surface, all the pore spaces and cracks in sediments and rocks are completely filled (saturated) with water. These saturated layers, known as the **saturated zone** (or the phreatic zone), are where groundwater occurs.



In the top layers of soil, unconsolidated sediments or bedrock, pore spaces may not be completely filled with water. Some may contain water, some air, and some may only be partly filled with water. This is known as the **unsaturated zone**. Precipitation infiltrates downwards through the unsaturated zone. This infiltrating water is known as **soil water** when it is still shallow enough to be used by plants, and as **vadose water** when it is below root level. With further infiltration water will eventually reach the **water table**.

The vertical distance from the ground surface to the water table varies from place to place - it may be a few feet, or several hundred feet. Water tables usually rise with increased recharge from precipitation and decline in dry weather or if there is excessive pumping of groundwater. If the water table is hundreds of feet down, it may take years for the infiltrating recharge water to reach the saturated zone and there may be not be a seasonal change in water table levels.

The spaces between soil or sediment particles and cracks in solid rock are called voids or pores. Each sediment and rock type has differences in porosity, (the amount of water a rock formation can hold). Saturated sand may have 30% pore space to 70% solid material, while fractured granite may have 1% pore space to 99% solid rock. The sand is therefore more porous than the fractured granite.

Imagine a cubic foot of granite and a cubic foot of sand with porosity of 1% and 30%. Now add water to each. The granite will "fill up" first because there is less pore space. If it were a real aquifer, the water table level in the granite would rise faster. Similarly, because there is less storage than in the sand, the fractured granite water table would decline more rapidly in response to pumping or drought.

Water table levels in aquifers represent the combined effects of rates of recharge and rates of discharge. If pumping of aquifers takes place in excess of recharge then resource use will eventually not be sustainable. Careful monitoring of water levels in wells can show how water table levels change, and well data, with water levels and dates of the measurement are very important for groundwater management.