One of the major Missions of the Target Range Sewer & Water District is to Protect the Aquifer that we are blessed to have.

What is an Aquifer and why do we want or need to protect it?

Definition of an Aquifer:

An aquifer is a body of saturated rock through which water can easily move. Aquifers must be both permeable and porous and include such rock types as sandstone, conglomerate, fractured limestone and unconsolidated sand and gravel. Fractured volcanic rocks such as columnar basalts also make good aquifers. The rubble zones between volcanic flows are generally both porous and permeable and make excellent aquifers. In order for a well to be productive, it must be drilled into an aquifer. Rocks such as granite and schist are generally poor aquifers because they have a very low porosity. However, if these rocks are highly fractured, they make good aquifers. A well is a hole drilled into the ground to penetrate an aquifer. Normally such water must be pumped to the surface. If water is pumped from a well faster than it is replenished, the water table is lowered and the well may go dry. When water is pumped from a well, the water table is generally lowered into a cone of depression at the well. Groundwater normally flows down the slope of the water table towards the well.

Is an Aquifer an Underground River?

No not as we vision rivers. Almost all aquifers are not rivers and are more like a underground lake in saturated rock, however there are those they do have flow. The flow of water moves slowly through pore spaces in an aquifer's rock or sediment. True underground rivers are found only in cavernous rock formations where the rock surrounding cracks or fractures has been dissolved away to leave open channels through which water can move very rapidly, like a river.

Ground water has to squeeze through pore spaces of rock and sediment to move through an aquifer. Because it takes effort to force water through tiny pores, ground water loses energy as it flows, leading to a decrease in hydraulic head in the direction of flow. Larger pore spaces usually have higher permeability, produce less energy loss, and therefore allow water to move more rapidly. For this reason, ground water can move rapidly over large distances in aquifers whose pore spaces are large (like the lower Portneuf River aquifer) or where porosity arises from interconnected fractures. Ground water moves very rapidly in fractured rock aquifers like the basalts of the eastern Snake River Plain. In such cases, the spread of contaminants can be difficult or impossible to prevent.

What does an aquifer look like?

Every aquifer is unique, although some are more generic than others. The boundaries of an aquifer are usually gradational into other aquifers, so that an aquifer can be part of an aquifer system. The top of an unconfined aquifer is the water table. A confined aquifer has at least one aquitard at its top and, if it is stacked with others, an aquitard at its base.

Missoula Aquifer Creation:

Approximately 12,000 years ago a glacial lake formed in the valleys of western Montana behind an ice dam holding a 2,400 foot deep lake called Glacial Lake Missoula. The size of Glacial Lake Missoula has been estimated to have been the size of Lake Erie and Ontario of the Great Lakes combined. The damn of ice was located near present Lake Pend Oreille in Northern Idaho. When the ice dam burst the flood waters created a wall of water moving between 35 and 55 miles an hour with a force 60 times the flow of the Amazon River. This flood rushed overland thru Idaho, Washington and Oregon creating the Columbia Gorge emptying into the Pacific Ocean. The flood tore away soils and mountainsides depositing millions of tons of cobble and gravel, which over time, filled the Missoula valley and created the Missoula valley aquifer. It has been recorded that numerous floods occurred at least 40 times over the next two thousand years in the Glacial Lake Missoula area however these floods where not in the magnitude of the original flood but added sediment to the creation of the Missoula Aquifer.

The Missoula aquifer comprises 100 to 150 feet of sand, gravel and cobbles approximately twenty five feet below the valley surface level. Below this is a surficial aquifer that is over 2,000 feet of grained sediments overlying bedrock.

The following is a map that depicts the impact of the Missoula Glacial Flood.

There are several publications on the web especially under NOVA – Mystery of the Mega Flood – that gives a great portrayal of the Glacial Lake Missoula Flood.