Water Cycle and Watershed Theory

Water Basics

Water (H2O) has two parts hydrogen (H+) and one part oxygen (O-2) forming the most important molecule on earth. Water has many useful properties and characteristics. It comes in three forms: liquid, gas, and solid. It's high heat capacity (takes a long time to heat or boil) allows it to absorb a great amount of heat without much rise in temperature. It has surface tension, adhesion, and cohesion properties that allows it to attach to solid substances, creates a surface film on which things can float, and makes it stick together as it moves through things (hose, soil) or upward against gravity in a plant. Water could be considered the universal solvent because it dissolves many substances or changes the forms of other substances. It is a necessity of life – our most important natural resource. We have a fixed amount of water on the earth to use and it is always on the move, changing forms in a continuous cycle.

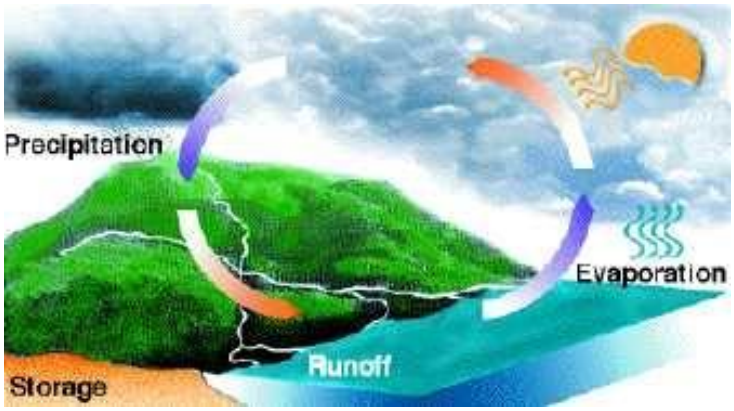
Water Cycle

The global water cycle is the continuous cycle of water between the atmosphere and the Earth's surface. The amount of water circulating through the cycle never changes. However the form in which the water exists – either gas, liquid, or solid – does change. Solar energy powers the water cycle, transferring water into the atmosphere, and then precipitating the water to the Earth's surface. A series of storage phases and transfer processes exist between the land and the sea.

Surface water may not stay there for long. Evaporation (process by which a liquid becomes a gas) occurs from a range of hosts, including oceans, lakes, plant tissue, and rivers. Transpiration is the term often given to the specific process of water vapor being given off by plants. This gaseous form of water will rise into the atmosphere. Once there, condensation of the evaporated water converts the vapor into a liquid (or solid) in the atmosphere, helping to form our clouds. Condensation relieves the atmosphere of the water vapor that it had been stockpiling, sending the water back to the earth asprecipitation (rain, snow, hail, and sleet).

Where does the fallen precipitation go once it reaches the Earth's surface? 85% of precipitation falls directly into the oceans. The rest of the precipitation will be absorbed by vegetation, another portion runoffs into neighboring lakes and streams, some will be locked up as solid ice on glaciers, and the remaining precipitation is absorbed into soil and rock, percolating downward to become ground water. Infiltration is the term for water that seeps down into the ground through the pores or spaces in soil and rock. This water will reach a ground water saturation zone (area underground where all pore space is filled with water).

This process of constantly replenishing the Earth's water supply below the Earth's surface is called recharge.

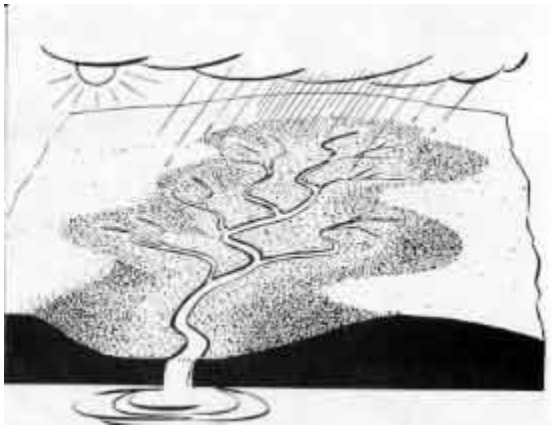


What is a Watershed?

The water that does not evaporate or soak into the soil usually drains into streams, rivers, marshes, lakes, and eventually the ocean. The land area from which the water drains to a given point is a watershed. Drainage basin is another term for watershed. You can think of a watershed as the drainboard that carries rinse water into your kitchen sink. The excess water of the drainboard makes its way down into the drain of the sink. The drainboard here can be thought of as the total land area that contributes its excess water into a waterway, (the drain).

Think of a small stream in your community. Water from a few acres drained into that little stream. Those few acres were its watershed. Small streams will drain into larger streams. The land areas drained by the small streams make up the watershed of the larger stream into which they flowed…small watersheds make up the larger watersheds.

A good example of small creeks or rivers flowing into larger waterways is the Mississippi River. The Mississippi River drains a watershed of about 1,243,000 square miles. Thousands of smaller watersheds compose this massive watershed.



Anywhere you stand on the earth's land, you are standing in a watershed. All water on land drains to somewhere, and any type of land can compose a watershed. From mountainous land to land that is nearly flat, to marshy land suited only for wildlife to rocky, rough land. The land may be urbanized, covered with towns, suburban developments, and industrial plants.

The inhabitants of the watershed are also part of the watershed, for we influence what happens within the watershed-good or bad. We have a tremendous responsibility to ensure that we do not disrupt the watershed in any way. It is important to realize that if we contaminate the water running into the waterway, we also contaminate the waterway itself. Furthermore, by contaminating the waterway, we also affect our neighbors downstream from us who will suffer from the water we are polluting.