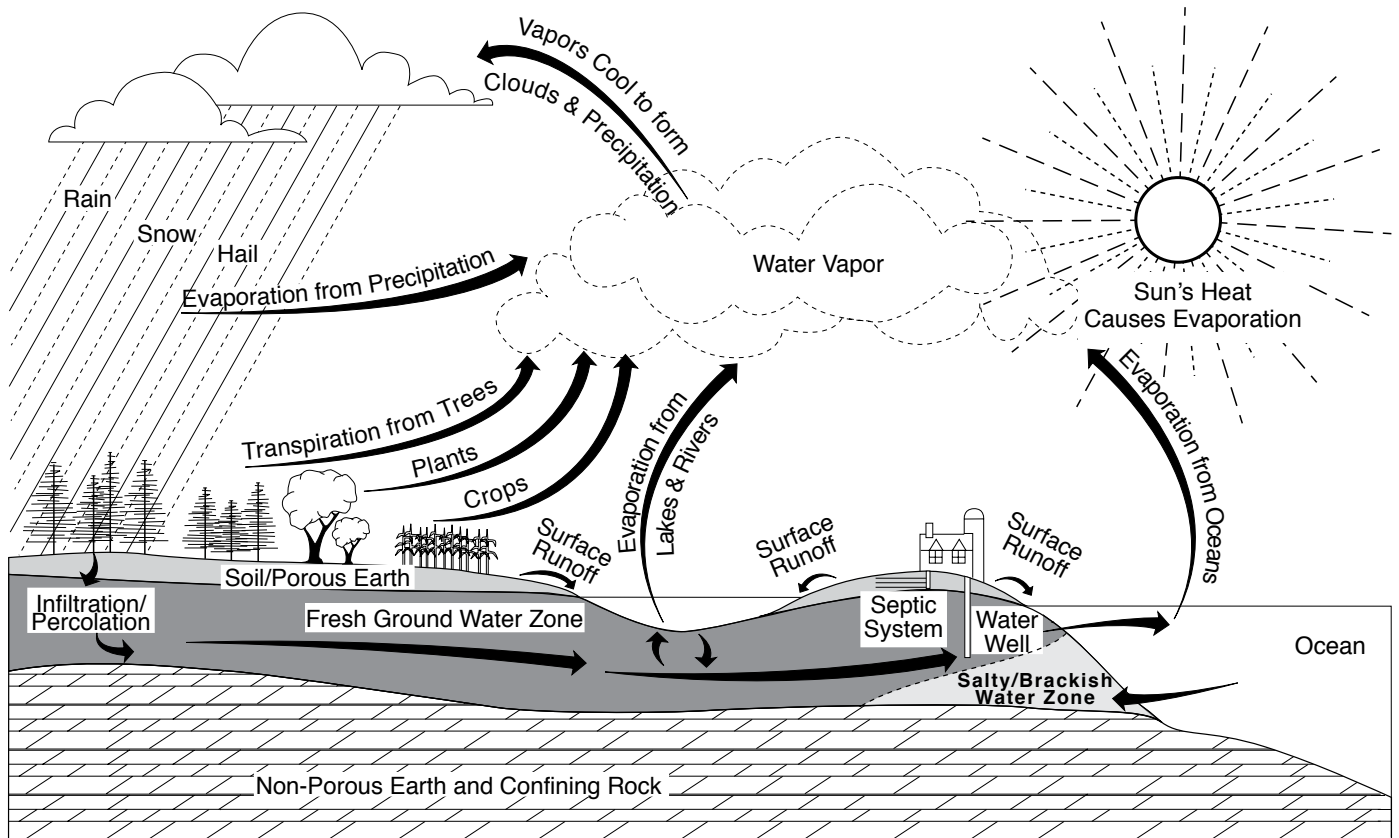




Ohio Department of Natural Resources Division of Water Fact Sheet

Fact Sheet 93-18

The Hydrologic Cycle



Water, our most precious resource. Over the millennia, great civilizations have both flourished and perished due to the availability of water. Today, industrialized societies are still, and possibly more so, dependent on reliable water supplies. In Ohio, each person uses about 75 gallons of water per day for household and other domestic uses. When the water that is used by industry and manufacturing, agriculture and households is added together, an average of over 11.7 billion gallons of water are used daily in Ohio, nearly 1,100 gallons per person. Even with more efficient use and other conservation efforts, as the population increases, so does the need for water.

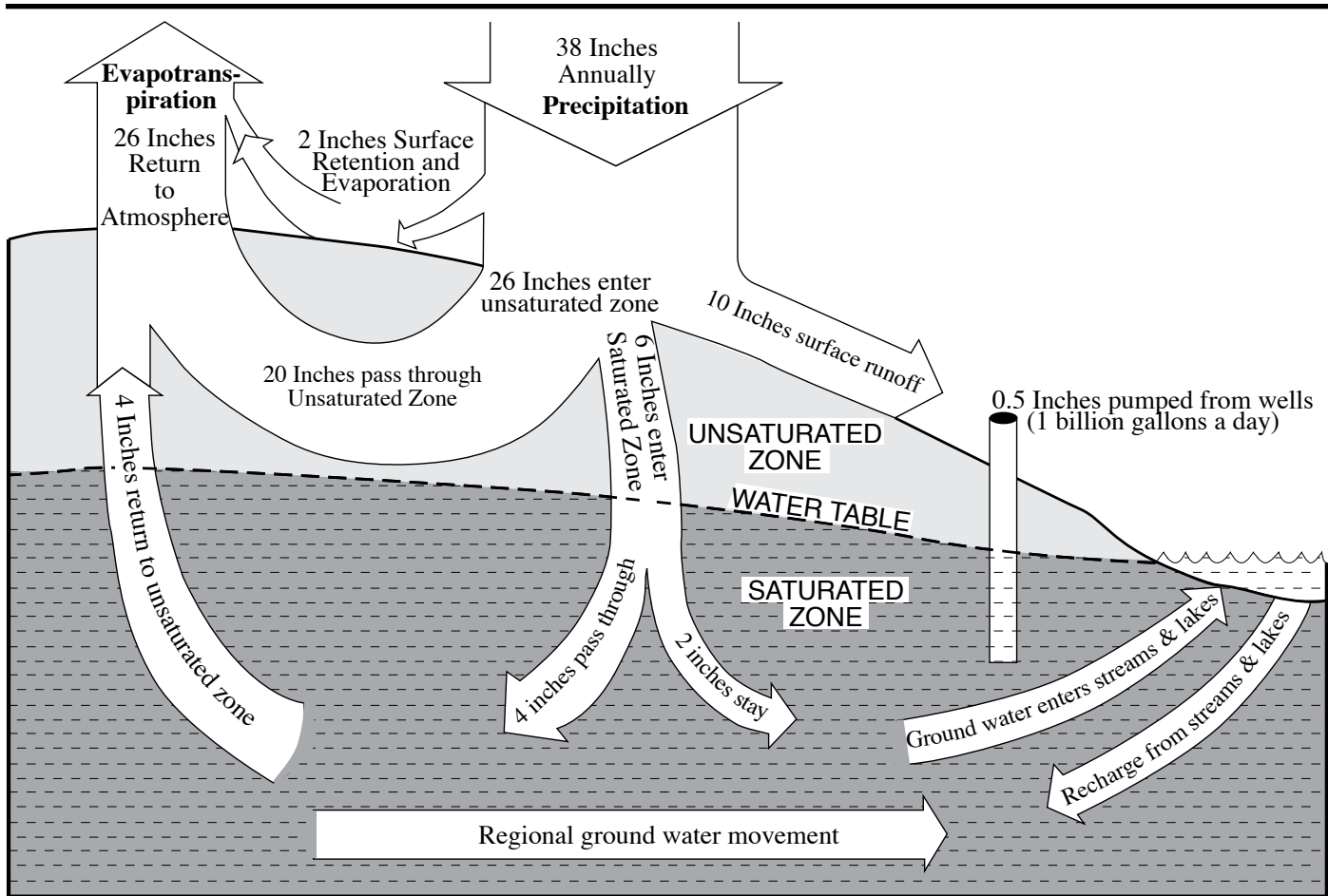
A Renewable Resource

The amount of water on Earth has essentially never changed. It is continuously being recycled, moving from one storage place to another, including lakes, streams and oceans, underground, in glaciers and ice caps, and in the atmosphere. This recycling movement is called the water or hydrologic cycle. The hydrologic cycle (above) explains

the exchange of water between the atmosphere, ground and surface of the Earth. The hydrologic cycle is perhaps the most important natural phenomenon on Earth; it is the driving force behind most other natural processes. The movement of water through the cycle annually replenishes our water supplies, thus making water a renewable resource. This replenishment takes place throughout the year, but is more pronounced during the winter and spring months.

The hydrologic cycle is an ever fluctuating, dynamic system. Small changes often occur in the quantities of water located in the various segments of the cycle. Many of these fluctuations relate to seasonal changes. For example, the amount of rainfall, the effect of temperature on evaporation, and the uptake of water by plants during the growing season all affect how much water will be available in any segment of the water cycle. Thus, the movement of water in the cycle is always changing. Even small changes in the cycle at a regional or local scale may look like large changes to us as in the form of droughts or floods.

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What Happens in Ohio?

The water cycle is not unique to Ohio, rather the process occurs worldwide. A water budget is used to understand its effect on local water resources and to predict or estimate quantities of available water from surface or ground water sources.

The water budget for Ohio is illustrated above. Ohio averages about 38 inches of precipitation a year. Of this, 10 inches run off the land surface directly to streams and rivers, two inches are temporarily retained on the surface in puddles, etc. and then evaporate, and 26 inches enter or infiltrate into the ground. Of this latter 26 inches, 20 inches pass directly through the unsaturated zone (soil) and are returned to the atmosphere by evaporation from the soil and by plants through transpiration. The other six inches infiltrate into the saturated zone (aquifer). Of these six inches, four inches pass through the saturated zone and are returned to the atmosphere through evaporation and transpiration. The remaining two inches become part of the ground water system, eventually discharging to streams, lakes and springs

or are pumped to the surface by wells. Evaporation from lakes and streams (and oceans) returns the surface runoff and ground water discharge to the atmosphere, thus completing and balancing the cycle.

A Reliable Water Supply

The hydrologic cycle assures a reliable, although fluctuating, water supply by annually replenishing, or recharging, both surface and ground water sources. When water removal (evaporation, transpiration, water supply, etc.) exceeds replenishment (precipitation), water levels fall as usually observed during the summer and fall months; conversely, water levels rise when replenishment exceeds removal, usually during the winter and spring months. Properly designed wells and reservoirs with adequate storage for dry periods can provide a reliable water source for drinking, industry

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