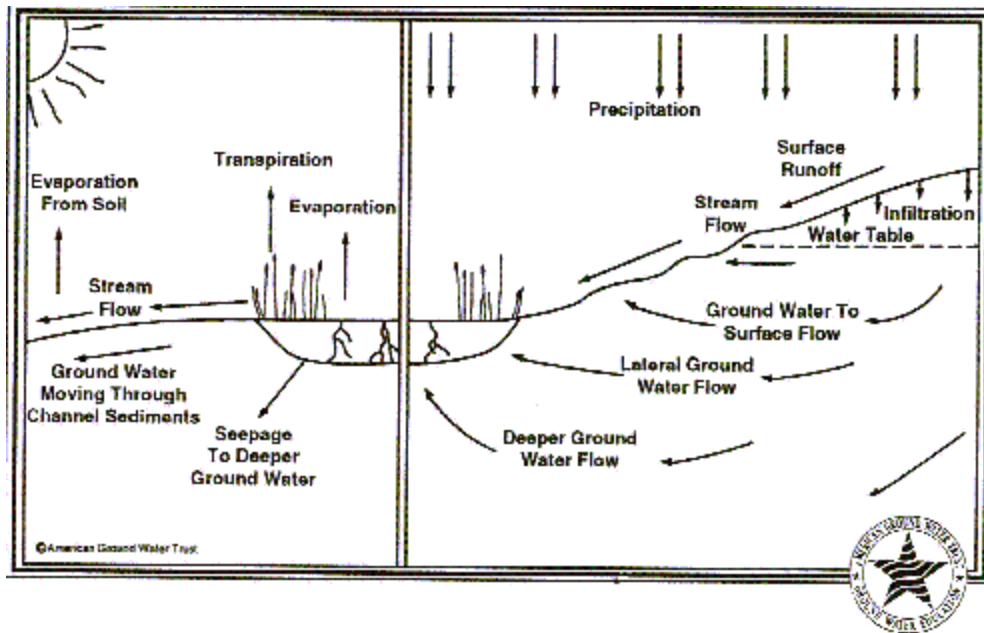


HOW RIVERS, LAKES, AND GROUND WATER ARE CONNECTED

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We all know that ground water occurs underground. We all know that surface water, (ponds, lakes, rivers and wetlands) occurs at the surface. Surface water you can see, ground water you can't see. What many people don't realize is that much of the surface water was once ground water. In some instances, what you see today as surface water may end up tomorrow as ground water.

All water is part of the hydrologic system. Energy from the sun causes evaporation of water from the land, lakes and oceans, which eventually falls as rain or snow. Once it reaches the land surface, some water may move below ground, but eventually, virtually all of it will end up back at the surface. The figure below shows how water may move beneath the surface at different depths and travel at different speeds. Once water infiltrates below a depth where evaporation or plant roots can't reach, it may remain as ground water beneath the surface for months, years, decades or even longer.



Have you ever wondered how rivers continue to flow even if there has been no rain for weeks? The answer is that ground water, stored in rock formations, continues to supply water through the banks and beds of rivers and streams. Once in the river, ground water becomes surface water! In some cases, particularly in dry areas, rivers may lose water that soaks through the riverbed to reach ground water. In these cases, surface water becomes ground water! In recent years we have become increasingly aware of the ecological importance of wetlands. Following the lead of federal agencies, most states now have strict rules to protect wetlands. Nearly all America's freshwater wetlands are maintained because of inflow from ground water. The close hydrologic connection between wetlands and ground water is good reason for wetland biologists to understand ground water and for ground water specialists to appreciate the ecological significance of wetlands. Ground water has great environmental, as well as economic significance. Protecting aquifers makes good ecological and economic sense.

A great way to help people understand how the hydrologic system works is to think about how one water drop may have moved through the hydrologic system. For example, from cloud to rain drop, then infiltration through the soil to ground water, then slow travel through rock formations into a valley bottom wetland, then from the wetland into a river and back to the ocean. The process could take many years. The drop may have traveled just a few miles, or hundreds of miles. During its travel it could perhaps have been intercepted by a water well and swirled up through the impellers of an irrigation pump and moved from ground water to the surface in the space of a few seconds.

The many ways that water can move through the hydrologic system provides great opportunities for teaching. Your imagination is the only limitation to the way you can tell the story of the water drop; and in

the process, help people understand the importance of protecting resources, and managing water use to be sustainable.

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