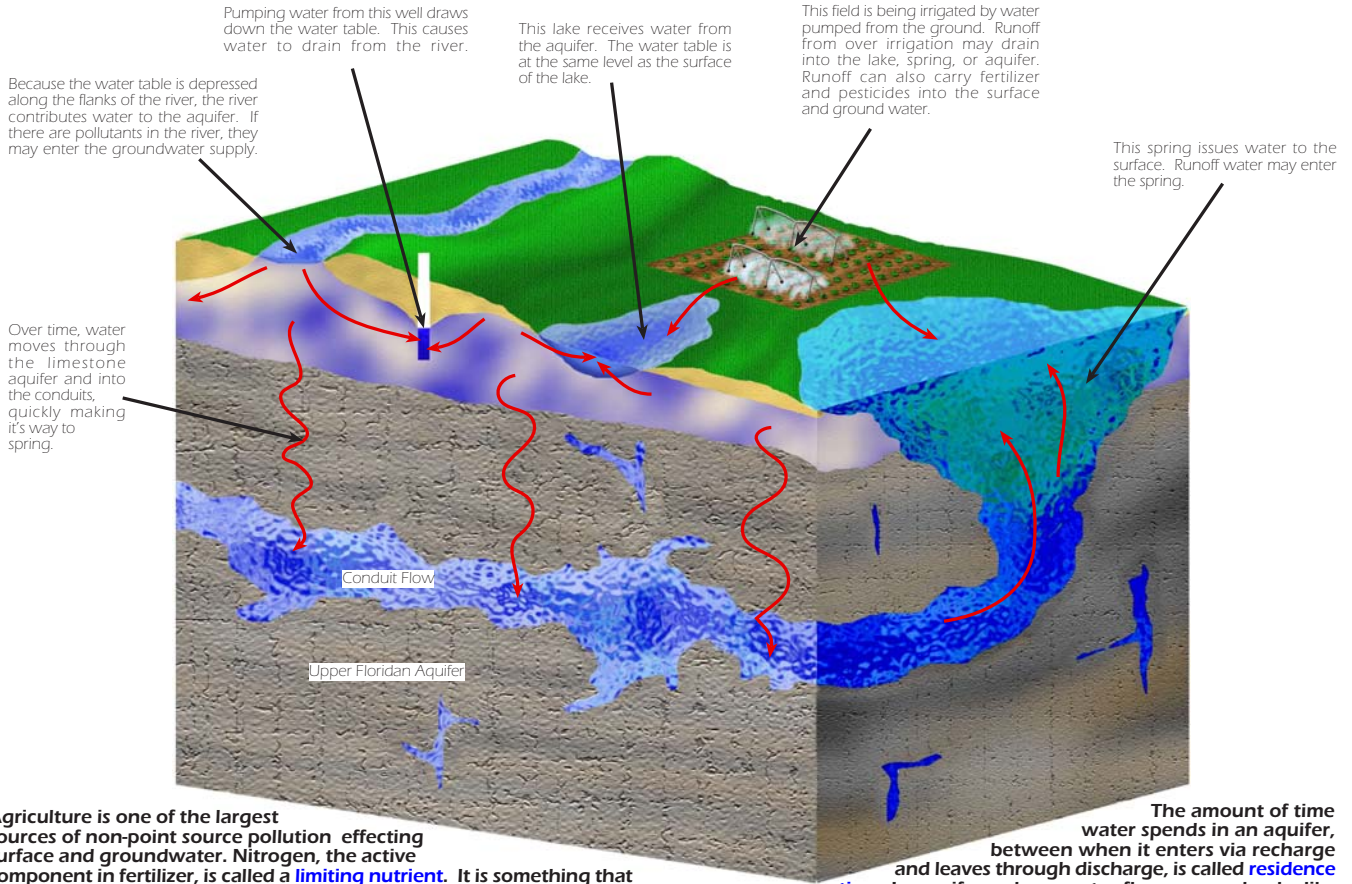


Groundwater/ Surface water Interaction

Because of Florida's unique geologic conditions, interaction of the surface water and groundwater systems is of particular concern. As you have seen, surface water often enters the groundwater supply through sinkholes. Rivers, wetlands, and lakes both contribute water to and take water from aquifers. If the water table is high, depressions in the land surface may fill with water creating lakes or wetlands. If the water table is low, water from lakes may slowly seep through the soil into the aquifer.

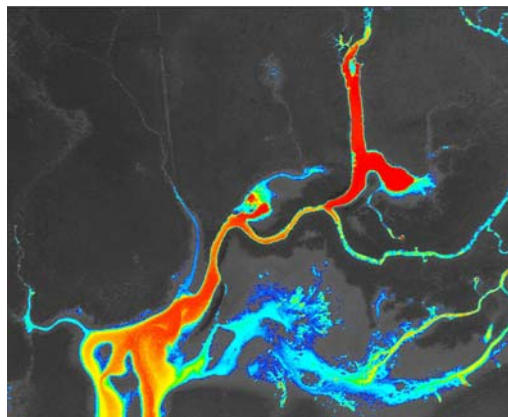
Sometimes, people pump more water out of an aquifer than they should. When this happens, the water table can become lower and water may drain out of lakes and into the aquifer to replace water that is being pumped out. In extreme cases, over pumping of an aquifer can cause lakes and wetlands to dry up and enhance the formation of sinkholes.

Not only does water easily enter the groundwater system from the surface, but so does contamination. There are two types of pollution sources: point source and non-point source. **Point source pollution** refers to pollution that originates from a definable source such as a leaking underground storage tank or a factory. Most **non-point source pollution** comes from fertilizers and pesticides spread on fields, lawns, and parks.



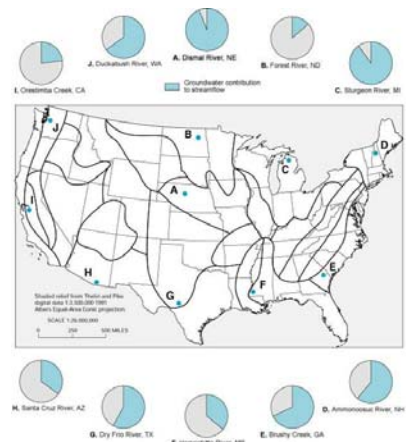
Agriculture is one of the largest sources of non-point source pollution effecting surface and groundwater. Nitrogen, the active component in fertilizer, is called a **limiting nutrient**. It is something that plants need to grow, but is found in limited quantities in nature. If farmers over-apply fertilizers, the excess nitrates may get into surface and groundwater systems, enhancing growth of algae in pore spaces, springs, and streams, and damaging ecosystems. Excess nitrates and pesticides run off of crops and end up in drinking water, sometimes resulting in health problems in humans and animals. Nitrates can also originate from animal manure, sewage treatment sprayfields, and some types of rocks.

The amount of time water spends in an aquifer, between when it enters via recharge and leaves through discharge, is called **residence time**. In aquifers where water flows more slowly, like sandstone aquifers, bacteria has time to digest contaminants. The residence time of water in some limestone aquifers is so short that there is not enough time for natural processes to remove the contamination.



This thermographic aerial photograph shows the interaction of surface and groundwater. Cold colors (blues) represent places where cooler groundwater is coming to the surface. Existing surface water is shown by hot colors (red and orange). Warm colors (bright greens, yellows) show areas of mixing.

The portion of water in a stream that comes from the groundwater supply is referred to as **base flow**. If no water enters the stream from runoff or rain, the level of a stream at base flow stage (level of water in a stream) marks the surface of the water table. The amount of water that an aquifer contributes to a stream varies between locations.



This image shows the locations of ten streams and the percent of groundwater that contributes to streamflow. The blue area of the circle is the percent of the total flow that comes from groundwater sources.

