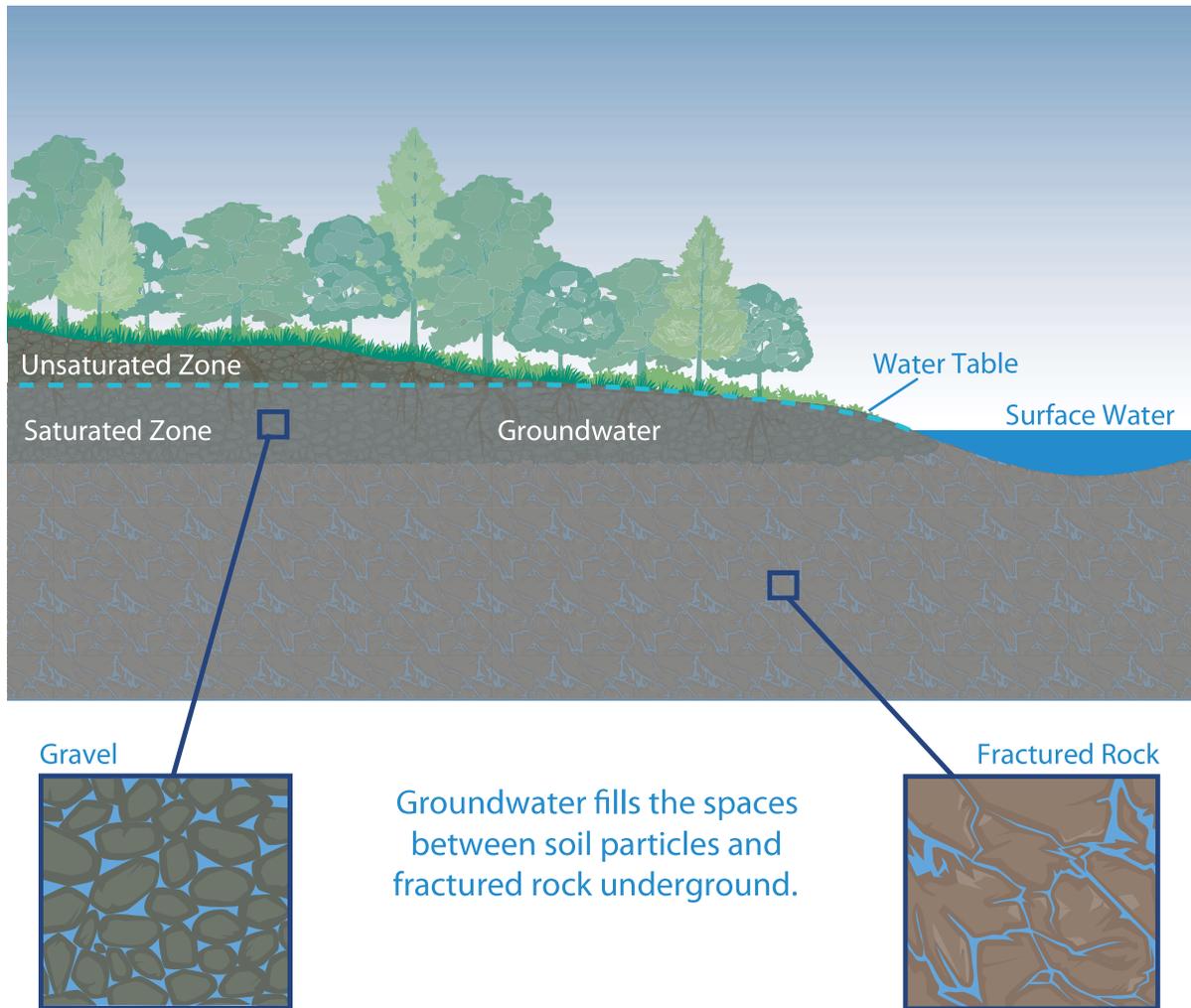


Groundwater Basics

What Is Groundwater?

Contrary to what a lot of people think, groundwater is rarely found in underground rivers or lakes in caverns. Instead, groundwater is water that fills the pores of soil, sand, gravel and cracks in rock that lie beneath the surface of the earth – much the way water saturates a sponge. Groundwater occurs in the zone of saturation in the subsurface where the materials are permeable and have connected spaces that allow water to flow through. Groundwater moves through the soil and rock under the forces of gravity, capillary action, pressure and concentration gradients, and eventually makes its way back to rivers, lakes and the oceans.

Figure 2. Groundwater

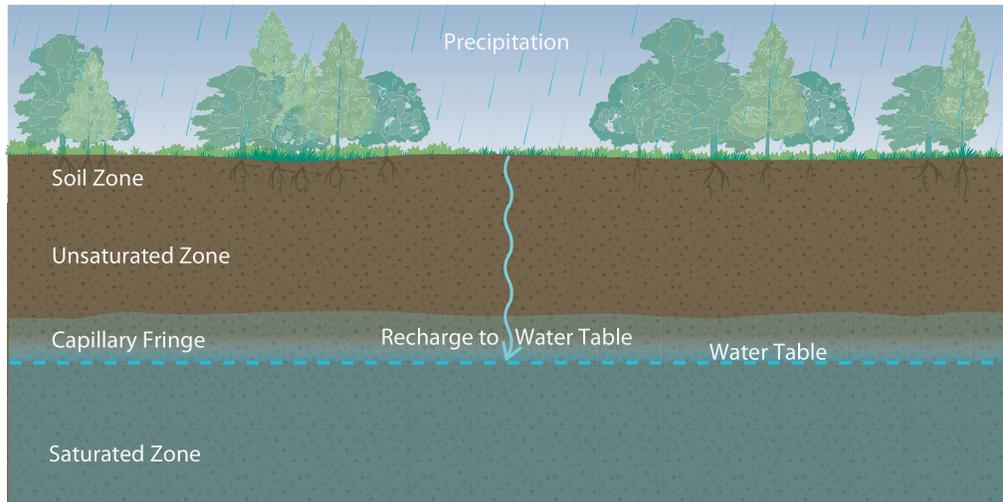


Groundwater Basics

Where Does Groundwater Come From?

Groundwater begins as precipitation that falls onto the ground. Some of it runs off the land, evaporates into the atmosphere, or is taken up immediately by plant roots and transpired. The precipitation that soaks into the ground and makes it beyond the root zone is pulled down by gravity until it reaches the water table. Below the water table, all the pore spaces in the soil are filled with water. This is the saturated zone.

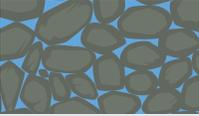
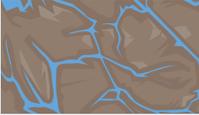
Figure 3. Recharge to the Water Table



How Is Groundwater Stored?

Groundwater is stored in **aquifers**. An aquifer is any soil or rock formation that is capable of yielding usable amounts of water to a water supply well. Connecticut has two main types of aquifers that are capable of supplying water to a drinking water well. These are stratified drift aquifers and bedrock aquifers. Figure 4 summarizes some of the characteristics of these aquifer types.

Figure 4. Connecticut's Aquifers

Stratified Drift Aquifer 	Consists of stratified layers of sand and gravel Most productive aquifers High permeability/moderate porosity Susceptible to pollution
Bedrock Aquifer 	Water is contained within fractures in the bedrock Generally, least productive aquifers Low permeability/low porosity Can yield sufficient volume of water for a private well

Groundwater Basics

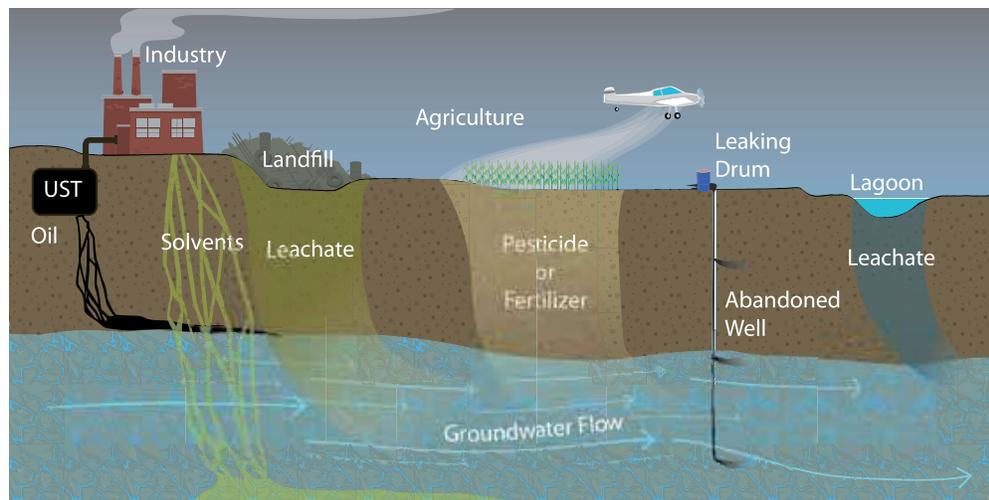
How Can Groundwater Be Contaminated?

As groundwater infiltrates down to the water table, it can pick up contaminants from the ground surface or underlying soil and move the contaminants through the groundwater system. Even though groundwater travels very slowly, contaminants can be transported great distances from their source. The contaminants can form a concentrated plume that follows the groundwater flow path.

What Are the Potential Sources of Contamination?

There are many different potential sources of contamination. Any site that has or uses hazardous materials can be considered a potential source. Some of the commonly known sources are landfills, industries, dry cleaners, underground storage tanks (USTs), chemical leaks and spills, improper waste disposal practices, improper pesticide and fertilizer use, and improper storage of road deicing materials.

Figure 5. Groundwater Contamination



What Are The Effects of Groundwater Contamination?

Groundwater contaminated with chemicals, pesticides, gasoline or oil can cause serious human and animal health problems. Those who drink it or come in contact with it can suffer diseases, nervous system disorders, liver or kidney failure, or cancer. Detection and treatment of contaminated water can be very expensive, much more expensive than taking steps to prevent the contamination from occurring in the first place.

How Is Groundwater Contamination Prevented?

Best management practices can be used to minimize the risk of groundwater contamination. For example, providing secondary containment, using leak detection systems, having an emergency spill response plan and employing waste minimization techniques can lower the risk of contamination. However, siting controls and prohibition of high risk land uses in sensitive areas can be the most effective tool available to reduce the contamination risk.