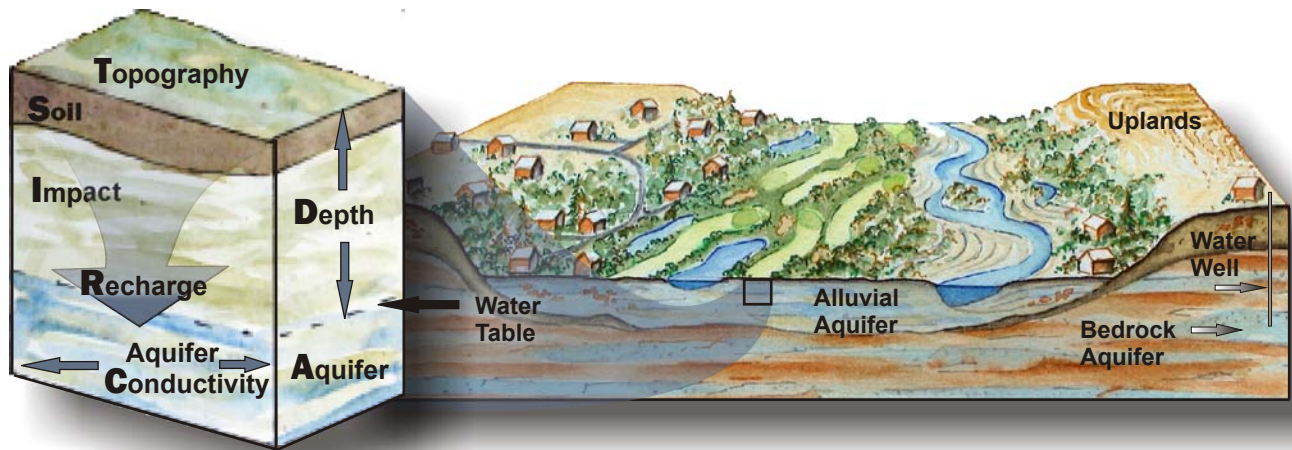


The Alluvial Aquifer

How Vulnerable is the Alluvial Aquifer to Contamination?

Considering several critical groundwater features using DRASTIC, a commonly applied tool to assess aquifer vulnerability, it is clear that the alluvial aquifer is highly vulnerable compared to other aquifers in the watershed.



D = Depth

The deeper the barrier zone above the aquifer, the greater the natural retention and filtration of contaminants. Depth of the barrier zone will vary with the time of year as the water table is highest in the spring. The soil above the alluvial aquifer is thin relative to the thick blanket of soil and till overlying bedrock aquifers in upland areas.

R = Recharge

The greater the recharge (water moving into the aquifer), the more contaminants will reach the aquifer. In addition to natural precipitation, recharge of the aquifer occurs under septic fields, leaky pipes, stormwater retention ponds, irrigated lawns, crops, and golf greens. The alluvial aquifer is additionally recharged in the spring by the Elbow River.

A = Aquifer

The porosity (spaces) and permeability (connection of the spaces) within an aquifer determines the path length and travel time for contaminants. The loose material of the alluvial aquifer (i.e., sand, gravel, and cobbles) is very coarse grained relative to the small cracks and pores in upland bedrock aquifers. As a result, contaminants can move rapidly over long distances.

S = Soil

The soil and roots reduce contaminant levels through biodegradation by soil organisms and adsorption onto clay particles. The glacial till overlaying bedrock aquifers in the watershed is rich in clay, resulting in effective removal of contaminants. Till is absent over the alluvial aquifer and clay content within the aquifer is low.

T = Topography

The slope of the land influences how much rainfall infiltrates into the soil. The steeper the slope, the greater the likelihood that water will flow over the land surface. On flat ground, like that on the alluvial aquifer, the likelihood that contaminants will infiltrate into the ground is high.

I = Impact

The vadose zone is the unsaturated zone above the alluvial aquifer. This is the sand, gravel and cobbles that are not surrounded by water. The coarse texture of this zone means that contaminants will move rapidly to the water table.

C = Conductivity

The conductivity (rate of groundwater flow) through the alluvial aquifer is high.