

**PEACE OF MIND**

The groundwater aquifer system on Long Island, N.Y.

Long Island, N.Y. is entirely dependent on the underlying groundwater aquifer system for its freshwater supply. The groundwater aquifer system is the only source of water for over 2.8 million people in Nassau and Suffolk Counties who use over 400 million gallons of water per day from more than 1,500 public-supply wells. The groundwater aquifer system also supports various ecosystems, such as streams, ponds, wetlands, and estuaries that rely on groundwater discharge.

The groundwater aquifer system on Long Island consists of several freshwater zones or aquifers that are generally arranged in increasing depth from the upper glacial, North Shore, Jameco, Magothy, and Lloyd aquifers. The upper glacial aquifer is the shallowest and most widely used aquifer on Long Island. It is composed of sand and gravel deposits left by the last glacial advance about 20,000 years ago. The North Shore aquifer is a local aquifer that occurs along the north shore of Long Island where glacial deposits are thicker and more permeable than elsewhere. The Jameco aquifer is a thin and discontinuous aquifer that lies between the upper glacial and Magothy aquifers in western Long Island. It is composed of sand and gravel deposits interbedded with clay layers. The Magothy aquifer is the thickest and most extensive aquifer on Long Island. It is composed of sand and gravel deposits of Cretaceous age that were deposited by ancient rivers and deltas. The Lloyd aquifer is the deepest and oldest aquifer on Long Island. It is composed of sand and gravel deposits of Cretaceous age that overlie the bedrock surface.

The groundwater aquifer system on Long Island is bounded by the water table, the fresh-salt water interfaces, the bedrock surface, and the streams. The water table is the upper surface of the saturated zone where the water pressure is equal to atmospheric pressure. The water table generally follows the topography of the land surface but may be locally affected by pumping or recharge. The fresh-salt water interfaces are the zones where freshwater and saltwater mix in the aquifer system. Freshwater and saltwater have different densities and tend to form a wedge-shaped interface along coastal areas or beneath estuaries. The bedrock surface is the lower boundary of the groundwater aquifer system where nearly impermeable consolidated rocks occur. The bedrock surface varies in depth from about 500 feet below sea level in western Long Island to about 2,000 feet below sea level in eastern Long Island. The streams are the surface-water features that drain the groundwater aquifer system and receive groundwater discharge. The streams also provide recharge to the groundwater aquifer system through infiltration of surface runoff or precipitation.

The groundwater aquifer system on Long Island is replenished by precipitation that percolates through the soil and reaches the water table. The average annual precipitation on Long Island is about 44 inches, of which about 25 inches becomes recharge to the groundwater aquifer system. The recharge rate varies spatially and temporally depending on factors such as land use, soil type, vegetation cover, evaporation, transpiration, runoff, and climate. The recharge rate also affects the water level and flow direction of the groundwater aquifer system.

The groundwater aquifer system on Long Island flows from areas of high water level to areas of low water level under the influence of gravity and hydraulic gradients. The natural flow direction of the groundwater aquifer system is generally from north to south across Long Island toward the Atlantic Ocean or Long Island Sound. However, local flow directions may be altered by pumping wells, artificial recharge basins, or surface-water features that create cones of depression or mounds of elevation in the water table. The natural flow rate of the groundwater aquifer system depends on factors such as hydraulic conductivity, porosity, storage coefficient, hydraulic gradient, and effective stress.