DOWNLOAD PDF MAPPING OF GEOLOGIC FORMATIONS AND AQUIFERS OF LONG ISLAND, NEW YORK.

Chapter 1 : Geography of Long Island - Wikipedia

Mapping of geologic formations and aquifers of Long Island, New York Bulletin GW By: Russell Suter, Wallace De Laguna, and N.M. Perlmutter.

Long Island, as part of the Outer Lands region, is formed largely of four spines of glacial moraine , with a large, sandy outwash plain towards its barrier islands and the Atlantic Ocean. These moraines consist of gravel and loose rock left behind during the two most recent pulses of Wisconsin glaciation some 21, years ago 19, BC. The northern moraine, which directly abuts the North Shore of Long Island at points, is known as the Harbor Hill moraine. The more southerly moraine, known as the Ronkonkoma moraine, forms the "backbone" of Long Island; it runs primarily through the very center of Long Island, roughly coinciding with the length of the Long Island Expressway. The land to the south of this moraine to the South Shore is the outwash plain of the last glacier. Part of this, known as the Hempstead Plains , supported one of the few natural prairies to exist east of the Appalachian Mountains. Running along the center of the island like a spine is the moraine left by the glaciers. Bald Hill, Farmingville , is the highest point along the moraine. The glaciers also formed Lake Ronkonkoma , a kettle lake. Long Island is separated from the mainland by the East River , not in fact a river, but a tidal strait. Long Island Sound forms the northern boundary of the island. Long Island contains a series of sand and gravel aquifers , geologic formations which can hold, transmit, and yield water in usable quantities. Stacked one on top of the other like layers in a cake, three major and one minor aquifer make up the Long Island aquifer system. In sequence from shallowest to the deepest, the Long Island aquifers are: Almost four million gallons each day are taken from beneath Nassau and Suffolk Counties, providing the primary source of water for the resident population. While most homes are on a municipal water system, there are still many areas where homes have their own wells to provide water. Both Nassau and Suffolk counties have long recognized their dependence on the aquifers and have stipulated that recharge basins known locally as sumps [2] be built to collect ground water. Recharge basins are required and sized based upon the scale of any new development on Long Island. In a decision, the U. Supreme Court treated the island as a peninsula for the purposes of a boundary decision. The Atlantic Ocean helps bring afternoon sea breezes that temper the heat in the warmer months and limit the frequency and severity of thunderstorms. Severe thunderstorms are not uncommon, nevertheless, especially when they approach the island from the mainland areas of the Bronx , Westchester County and Connecticut in the northwest. Temperatures[edit] Long Island temperatures vary from west to east, with the western part Nassau County of the island warmer on most occasions than the east Suffolk County. This is due to two factors: The eastern part is cooler on most occasions due to moderation of the Atlantic Ocean and Long Island Sound, and its being less developed. On dry nights with no clouds or wind, the Pine Barrens in eastern Suffolk County can be almost 20 degrees Fahrenheit 11 degrees Celsius cooler due to Radiational cooling.

Chapter 2 : Hydrogeologic-Framework Mapping - Long Island, New York

title = {Mapping of geologic formations and aquifers of Long Island, New York. copyright = {Public domain. The BHL considers that this work is no longer under copyright protection.}.

Is bottled water really a good idea? Maybe not if you examine the facts. Here are 10 very surprising statistics. Our Long Island Aquifers: The Basics Residents of Nassau and Suffolk counties typically enjoy superior quality water and a plentiful supply. Meticulously managed and highly regulated, both counties draw drinking water from a sole source, a system of aquifers beneath the surface of the island. The protection, maintenance and long-term sustainability of the aquifers are vital concerns of the NSWCA. The following are some basic facts and answers to frequently asked questions that the NSWCA receives. This is a branch of the earth sciences in the area of geology that deals with the distribution and movement of groundwater. What is an aquifer? Aquifers contain, transmit and yield water in usable quantities. Also related are Aquitards and Aquicludes. Acquitards are clay units that have very low permeability, minimizing water exchange between the layers of an aquifer. Aquicludes or aquifuges are solid impermeable areas that overlay an aquifer. Layers of clay between certain aquifer layers retard some water movement beneath Long Island. The aquifers slope toward the southern part of the island. This causes the deepest parts of the aquifers and the groundwater system to reside along the southern shore of Long Island, and to extend out into the subsurface material beneath the Atlantic ocean floor. Nassau and Suffolk counties obtain their drinking water from three major aquifers underlying Long Island which constitute a sole source aquifer. The aquifers are, from the shallowest to the deepest, the Upper Glacial, the Magothy and the Lloyd aquifers. One minor aquifer, the Jameco is also in use. The Upper Glacial Aquifer: Formed during the last ice age, the Upper Glacial is the aquifer closest to the surface. The youngest aquifer formation, the Upper Glacial, was laid down during the last Ice Age, million years ago. It contains sands, pebbles, rocks and occasionally boulders, carried to Long Island and left behind by the glaciers. The water table, meaning the top of the groundwater system, is found in the Upper Glacial aquifer. Consisting of sand deposits alternating with clay, it attains a maximum thickness of approximately 1, feet and is the source of water for most of Nassau County and about half of Suffolk County. The formation can be seen in the coastal bluffs of the north shore and plunges under the land surface to the south. The sand and gravel of the Magothy aquifer was deposited in the upper Cretaceous Period, about million years ago. The Lloyd aquifer is 1, feet below the surface at its deepest point and the water it contains is about six thousand years old. The Lloyd aquifer is found at depths averaging feet along the north shore. Along the south shoreline the Lloyd aquifer is approximately 1, feet below the land surface. In addition to the aquifers, the Raritan Formation, a clay deposit averaging foot thickness, separates and confines the Magothy and Lloyd aquifers. It has two primary units: An upper clay member and a lower sand member called the Lloyd Sand. The clay member reaches a maximum thickness of feet. Nassau and Suffolk counties utilize a sole source aquifer. Long Island is not alone in having groundwater as a source of drinking water. Across the USA, some million Americans utilize groundwater for their drinking water. All Long Island aquifers receive their fresh water from precipitation, averaging some 44 inches of precipitation per annum. Surface water progresses through hundreds of feet of closely packed sand, gravel, pebbles and soil, and is filtered of most impurities before reaching the aquifers. Precipitation and snowmelt replenish more water than is pumped out annually, but without meticulous day-to-day oversight and management, that could change.

Chapter 3 : Full text of "Mapping of geologic formations and aquifers of Long Island, New York"

Search the history of over billion web pages on the Internet.

Geological Survey, in cooperation with State and local agencies, systematically collects groundwater data at varying measurement frequencies to monitor the hydrologic conditions on Long Island, New York. Each year during April and May, the U. Geological Survey completes a synoptic survey of water levels to define the spatial Geological Survey Scientific Investigations Map , 4 sheets, scale 1: Historical â€" chloride concentration data of glacial aquifer wells in the study area indicate the presence of four wedges of saltwater intrusion that may have been caused by industrial pumpage. Stumm, Frederick; Como, Michael D. Water , 9, Geological Survey began a multiyear regional assessment of groundwater availability in the Northern Atlantic Coastal Plain NACP aquifer system in as part of its ongoing regional assessments of groundwater availability of the principal aquifers of the Nation. The goals of this national assessment are to document Geological Survey Professional Paper , 76 p. Vertically integrated variable-density groundwater flow is based on Future demands for the limited freshwater supply during a prolonged drought could cause drawdowns that induce saltwater intrusion and render the supply unusable. The freshwater system on the North Fork contains several localized, hydraulically isolated aquifers bounded Nineteen boreholes were drilled during Stumm, Frederick; Lange, Andrew D. The resultant lowering of water levels during periods of heavy pumping caused saltwater intrusion in nearshore areas and the migration of contaminants from land surface Ground water at several public-supply wells has been affected by the intrusion of saltwater from the surrounding embayments Manhasset Bay, Long Island Sound, Hempstead Harbor. Seven public-supply wells have been affected by the intrusion of saltwater from the surrounding embayments Little Neck Bay, Long Island Sound, Manhasset Bay. This report presents results of a ground-water flow This report describes the structure and operation of the western part of the Long Island ground-water system, and the hydrologic effects associated with human development from to the These deposits are thinnest in northern Queens County northwestern Long Island , where bedrock crops out, and increase to a maximum thickness of 2, ft in southeastern Long Island

Chapter 4 : NYS GIS Clearinghouse

Note: Citations are based on reference standards. However, formatting rules can vary widely between applications and fields of interest or study. The specific requirements or preferences of your reviewing publisher, classroom teacher, institution or organization should be applied.

These sediments consist of gravel, sand, silt, and clay underlain by crystalline bedrock of early Paleozoic age fig. The bedrock is relatively impermeable, and forms the base of the groundwater-flow system on Long Island. The geologic and hydrologic units underlying Long Island have been studied and characterized by the USGS since the early s. Much of this earlier work has been synthesized by Smolensky and others ; however, in this previous work, there continues to be uncertainty in areas of complex hydrogeology especially along the northern parts of Long Island where extensive glacial erosion and deposition has not been adequately mapped. Approach A synthesis of all existing lithologic data collected since the last framework compilation Smolensky and others, will be augmented with a network of new observation wells that will be drilled in areas of complex hydrogeology to better define and reduce uncertainties in the hydrogeologic framework and to provide additional information for the numerical groundwater-flow model being developed as part of this study. Up to 25 new wells will be drilled over the next three years to collect core samples, borehole-geophysical logs, water-quality samples, and groundwater levels. In addition, surface-geophysical methods will be utilized to fill in data gaps where no wells exist. These methods include passive-seismic and time-domain electromagnetic induction. In , the USGS installed outpost wells in the northernmost part of this hydrogeologic section and produced a much more detailed framework that indicates a more complex groundwater-flow system. Drilling The drilling program will consist of mud-rotary drilling and split-spoon core sampling. Most boreholes will be drilled through the unconsolidated sediments into bedrock, and core samples will be obtained at regular intervals for geologic analysis. Each drilled borehole will be cased with polyvinyl chloride PVC to allow for future groundwater sampling, groundwater-level measurements, and borehole-geophysical logging needed to assess long-term changes in aquifer conditions and saltwater-intrusion concerns. Core Analysis Core samples obtained during drilling will be analyzed for minerology, grain size, and color fig. The core samples will be used to correlate borehole-geophysical logs and to determine contacts between hydrogeologic units. Color descriptions of the core samples will be based on the standard Munsell color chart Natural Resources Conservation Service. The image above shows a sediment-core sample collected during the drilling of monitoring well S in Jamesport, NY in September, This sample was collected from a depth of feet below land surface using the split-spoon coring method. The geophysical-logging systems that will be used in this study provide continuous-digital records that are dependent upon the physical properties of the sediment, the rock matrix, and the interstitial fluids. At each of the drilled boreholes, natural-gamma radiation gamma , spontaneous potential SP , single-point-resistance SPR , and short-and long-normal resistivity R logs will be collected in mud-filled open boreholes before the casing is installed, then focused electromagnetic-induction EM logs will be obtained after installation of the polyvinyl chloride PVC casing. Key existing observation wells will also be logged for EM to determine if saltwater intrusion has changed over time at that location. The types of geophysical logs being used for this study, and their descriptions and uses are shown below: Clays and fine-grained sediments tend to be more radioactive than the quartz sand that forms the bulk of the deposits on Long Island. Gamma logs commonly are used for lithologic and stratigraphic correlation. SP logs are used to determine lithology, bed thickness, and salinity of formation water Keys, SPR logs are used to obtain high-resolution lithologic information. Normal-resistivity R logs â€”measure apparent resistivity in ohm-meters using two electrodes typically spaced 16 to 64 in. R logs are used to interpret lithology and water salinity Keys, The intensity of the secondary field received by the receiver coil is proportional to the formation conductivity Keys, ; Serra, ; Keys and MacCary, EM logs are used in conjunction with gamma logs to distinguish between conductive fluids and conductive clays, and have been used on Long Island to delineate

the freshwater-saltwater interface Chu and Stumm, ; Stumm, , , ; Stumm and Lange, ; Stumm and others, , All borehole geophysical logs collected by the USGS are now available online. The measured data are the vertical and two horizontal north-south and east-west components of the seismic noise. This field is switched on and off, which induces eddy currents in the subsurface producing a secondary electromagnetic field. The decay of this secondary electromagnetic field is then measured by the receiver coil. The amplitude of the current starts to decay immediately, which induces more current to flow, but now at a greater depth from the transmitter loop. The deeper current flow also decays, which then induces even deeper currents to flow.

Chapter 5 : NYS GIS Clearinghouse - US Geological Survey (USGS) New York Water Science Center Dat

The Lloyd Aquifer is the deepest and oldest of Long Island's aquifers. It is a sand and gravel formation ranging in thickness from zero to five hundred feet. At its deepest, it is 1, feet below the surface.

Chapter 6 : Long Island Groundwater Geology

state of new york department of conservation water power and control commission mapping of geologic formations and aquifers of long island, new york.

Chapter 7 : Our Long Island Aquifers: The Basics | Nassau Suffolk Water Commissioners Assocation (NSW

Based on the geologic and other data now available to show graphically the various aquifers and other formations making up Long Island, this to be done in such manner as to facilitate the work of the Commission in the regulation of use of Long Island ground waters.

Chapter 8 : Groundwater Sustainability of the Long Island Aquifer System

Geology, Soils and Topography Geology The Geology of Long Island, New York, U.S. Geological Survey Professional Paper 82, p. N.M., , Mapping of.