Prepared in cooperation with the
Long Island Water Conference
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Port Washington Water District
Suffolk County Department of Health Services
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Manhasset-Lakeville Water District
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New York State Department of Environmental Conservation
Sands Point Water Department
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Water Authority of Great Neck North

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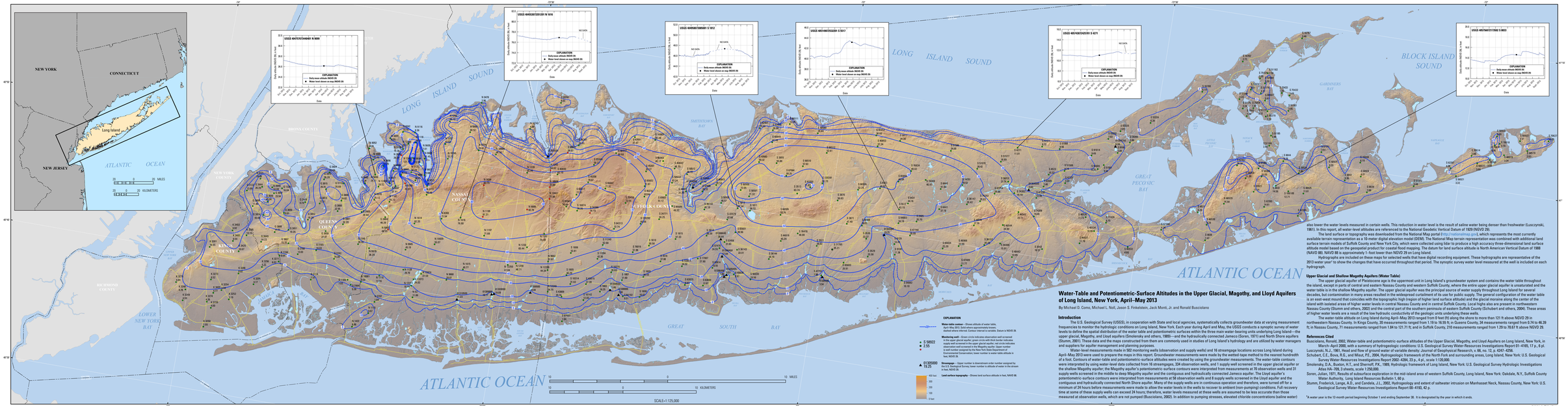
U.S. Geological Survey

Scientific Investigations Map 3326
Water table—SHEET 1 of 4
Water-Table and Potentiometric-Surface Altitudes in the Upper Glacial, Magothy, and Lloyd Aquifers of Long Island, New York, April–May 2013



Base from U.S. Geological Survey digital data 1:100,000 series
Universal Transverse Mercator projection
Zones 18 and 19, North American Datum of 1983
North American Datum of 1983

Water-Table and Potentiometric-Surface Altitudes in the Upper Glacial, Magothy, and Lloyd Aquifers of Long Island, New York, April–May 2013

By
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Introduction

The U.S. Geological Survey (USGS), 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 USGS conducts a synoptic survey of water levels to define the spatial distribution of the water table and potentiometric surfaces within the three main water-bearing units underlying Long Island—the upper glacial, Magothy, and Lloyd aquifers (Smolensky and others, 1989)—and the hydraulically connected Jamaco (Soren, 1971) and North Shore aquifers (Stumm, 2001). These data and the maps constructed from them are commonly used in studies of Long Island's hydrology and are utilized by water managers and suppliers for aquifer management and planning purposes.

Water-level measurements made in 902 monitoring wells (observation and supply wells) and 16 streamgage locations across Long Island during April–May 2013 were used to prepare the maps in this report. Groundwater measurements were made by the wetted-tape method to the nearest hundredth of a foot. Contours of water-table and potentiometric-surface altitudes were created by using the groundwater measurements. The water-table contours were interpreted by using water-level data collected from 16 streamgages, 334 observation wells, and 1 supply well screened in the upper glacial aquifer or the shallow Magothy aquifer; the Magothy aquifer's potentiometric-surface contours were interpreted from measurements at 76 observation wells and 31 supply wells screened in the middle to deep Magothy aquifer and the contiguous and hydraulically connected Jamaco aquifer. The Lloyd aquifer's potentiometric-surface contours were interpreted from measurements at 56 observation wells and 8 supply wells screened in the Lloyd aquifer and the contiguous and hydraulically connected North Shore aquifer. Many of the supply wells are in continuous operation and therefore, were turned off for a minimum of 24 hours before measurements were made to allow the water levels in the wells to recover to ambient (non-pumping) conditions. Full recovery time at some of these supply wells can exceed 24 hours; therefore, water levels measured at these wells are assumed to be less accurate than those measured at observation wells, which are not pumped (Busciolano, 2002). In addition to pumping stresses, elevated chloride concentrations (saline water) also lower the water levels measured in certain wells. This reduction in water level is the result of saline water being denser than freshwater (Lusczynski, 1961). In this report, all water-level altitudes are referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

The land surface or topography was downloaded from the National Map portal (http://nationalmap.gov), which represents the most currently available terrain representation as a 10-meter digital elevation model (DEM). The National Map terrain representation was combined with additional land surface terrain models of Suffolk County and New York City, which were collected using lidar to produce a high accuracy three-dimensional land surface altitude model based on the geospatial product for coastal flood mapping. The datum for land surface altitude is North American Vertical Datum of 1988 (NAVD 88). NAVD 88 is approximately 1 foot lower than NGVD 29 on Long Island.

Hydrographs are included on these maps for selected wells that have digital recording equipment. These hydrographs are representative of the 2013 water year[A] to show the changes that have occurred throughout that period. The synoptic survey water-level measured at the well is included on each hydrograph.

Upper Glacial and Shallow Magothy Aquifers (Water Table)

The upper glacial aquifer of Pleistocene age is the uppermost unit in Long Island's groundwater system and contains the water table throughout the island, except in parts of central and eastern Nassau County and western Suffolk County, where the entire upper glacial aquifer is unsaturated and the water table is in the shallow Magothy aquifer. The upper glacial aquifer was the principal source of water supply throughout Long Island for several decades, but contamination in many areas resulted in the widespread curtailment of its use for public supply. The general configuration of the water table is an east-west mound that coincides with the topographic high (region of higher land surface altitude) and the glacial moraine along the center of the island with isolated areas of higher water levels in central Nassau County and in central Suffolk County. Local highs also are present in northwestern Nassau County (Stumm and others, 2002) and the central part of the southern peninsula of eastern Suffolk County (Schubert and others, 2006). These areas of higher water levels are a result of the low hydraulic conductivity of the geologic units underlying these wells.

The water-table altitude on Long Island during April–May 2013 ranged from 0 feet (ft) along the shore to more than 121 ft above NGVD 29 in northwestern Nassau County. In Kings County, 20 measurements ranged from 1.19 to 18.55 ft; in Queens County, 34 measurements ranged from 0.74 to 46.39 ft; in Nassau County, 71 measurements ranged from 1.84 to 121.71 ft; and in Suffolk County, 210 measurements ranged from 1.29 to 78.67 ft above NGVD 29.

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[A]A water year is the 12-month period beginning October 1 and ending September 30. It is designated by the year in which it ends.

Hydrology by Michael Como

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