

USING GIS TOOLS IN EVALUATING GROUNDWATER FLOODING ON LONG
ISLAND, NEW YORK

by Jack Monti, Jr and Ronald Busciolano

U.S. Geological Survey, New York Water Science Center

2045 Rt. 112 Coram, N.Y. 11727

High water-table conditions throughout parts of Long Island since 2005 have caused widespread groundwater flooding of subterranean structures and failures of septic systems. To supply local agencies and the public with data needed to define and manage areas of groundwater flooding, the U.S. Geological Survey (USGS) created a series of maps documenting these conditions.

Water-level measurements made by the USGS at 502 wells across Long Island during March-April 2006 were used to contour water-surface altitudes for the island's three main aquifers. Water-table aquifer contours (available at <http://pubs.usgs.gov/sim/3066/>) were estimated using measurements at 341 wells. This information along with a comparison to a digital elevation model of Long Island was used to map the depth to the water table in a Geographic Information System (GIS), and collectively conveys the hydrologic conditions of aquifers beneath Long Island. Additionally, an Arc Internet Map Server (ArcIMS) (available at http://ny.ims.er.usgs.gov/LI_maps06/) was developed to disseminate information collected during the 2006 survey and is a derived product of the GIS.

In April 2010, water-level measurements showed that water-table levels on Long Island increased about 2.5 feet on average and a maximum of 9 feet from April 2009. The largest increases occurred in areas where low-permeability soils are present. Smaller, but more problematic changes occurred in low-lying areas where underground structures are close to the water table. Based on the 2006 depth-to-water map, water-table increases experienced in low-lying areas in 2010, potentially impacted about a half million homes and businesses where the water table is less than 11 feet below land surface.

Increasing temperatures, rising sea levels, changes in precipitation patterns, and more intense and frequent extreme weather events are predicted for the region. Based on the recent events of 2010, in addition to storm-surge damage in low-lying areas, a rise in sea level or more frequent and intense storms will increase the potential impact of groundwater flooding on property and the environment.