Long Island Groundwater Resources

USGS involvement in previous efforts

Public Kickoff Meeting, February 14, 2017
Suffolk County Water Authority Education Center
Chris Schubert—U.S. Geological Survey
Outline

- Background
- Selected groundwater studies conducted on Long Island by the USGS since the early 1900’s
- Opportunities and challenges of previous USGS efforts
- Summary
Background

- The USGS collects and interprets information following nationally standardized procedures.
- This builds local knowledge about issues and trends while providing an understanding of regional and national context.
- The consistent, multi-scale approach helps to determine if issues are isolated or pervasive.
Background

- Federal funding is but one small part of the USGS program on Long Island.
- The majority of USGS work is reimbursable projects for funding partners (cooperators).
- Partnerships with cooperators enable our collective knowledge to be leveraged.
- Much of what we know today reflects past investments by many thoughtful cooperators.
Selected groundwater studies conducted on Long Island by the USGS since the early 1900’s

Historical characterization of the Long Island aquifer system

Early investigation of water-resources issues in New York City

Underground water resources of Long Island, New York (1906)

Report on the geology and hydrology of Kings and Queens Counties, Long Island (1938)
Selected groundwater studies conducted on Long Island by the USGS since the early 1900’s

Early investigation of saltwater encroachment on Long Island

Chloride content of water from wells screened in the Lloyd sand member of the Raritan formation on Long Island, New York (1950)

Foundational study of Long Island water resources

The precipitation regime of Long Island, New York (1969)
Selected groundwater studies conducted on Long Island by the USGS since the early 1900’s

Pioneering work on analog-model development

Figure 2. Arlen Harbaugh, in about 1975, making a voltage measurement on the three-dimensional electric-analog model of Long Island, New York.


Pioneering work on numerical model development

Selected groundwater studies conducted on Long Island by the USGS since the early 1900’s

Synthesis and mapping of the Long Island aquifer system


Refined modeling based on updated hydrogeology for Long Island

Particle tracking analysis of recharge areas on Long Island, New York (1991)
Opportunities and challenges of previous USGS efforts

Modeling saltwater encroachment on Long Island

- Computing resources have previously limited ability to model effects at island-wide scale

- Insights have been gained from modeling effects at local and subregional scales

Opportunities and challenges of previous USGS efforts
Field investigations of saltwater encroachment on Long Island

- Detailed information is available for water-supply aquifers in some coastal areas
- Knowledge is lacking elsewhere, especially along South Shore due to increased depth of water-supply aquifers

Opportunities and challenges of previous USGS efforts
Hydrologic data collection on Long Island

- Monitoring has focused on groundwater levels and streamflows
- Records at some sites extend back more than 75 years
- Information underpins all interpretive studies by the USGS and others
Opportunities and challenges of previous USGS efforts

Hydrologic data collection on Long Island

- Long-term records document effects of natural and manmade stresses on the aquifer system

- Fluctuations in funding have made it difficult to maintain uninterrupted, island-wide records

Water-table and potentiometric-surface altitudes of the upper glacial, Magothy, and Lloyd aquifers on Long Island, New York, in March-April 2000, with a summary of hydrogeologic conditions
Opportunities and challenges of previous USGS efforts

Other assessments to meet evolving cooperator needs

- Contaminants of emerging concern in groundwaters (and surface waters)

- Loading of freshwater and dissolved constituents (nutrients, contaminants, etc) to surface waters

Summary

- Results benefit not only our cooperators, but also the consulting and NGO communities, by providing the credible science needed to address local-scale issues.

- Ultimately, all work strives to be responsive to society’s changing needs, while supplying the long-term benchmarks against which future changes can be assessed.
For more information

U.S. Geological Survey
N.Y. Water Science Center
(631) 736-0783, -4283 fax
http://ny.water.usgs.gov

- Chris Schubert
  schubert@usgs.gov