

Long Island Groundwater Sustainability Study

Project Objectives:

- Improve current understanding of the regional hydrogeologic framework including position and movement of freshwater/saltwater interface.
- Develop a new groundwater-flow model of the Long Island aquifer system.
- Conduct a comprehensive assessment of groundwater sustainability under changing hydrologic stress conditions.

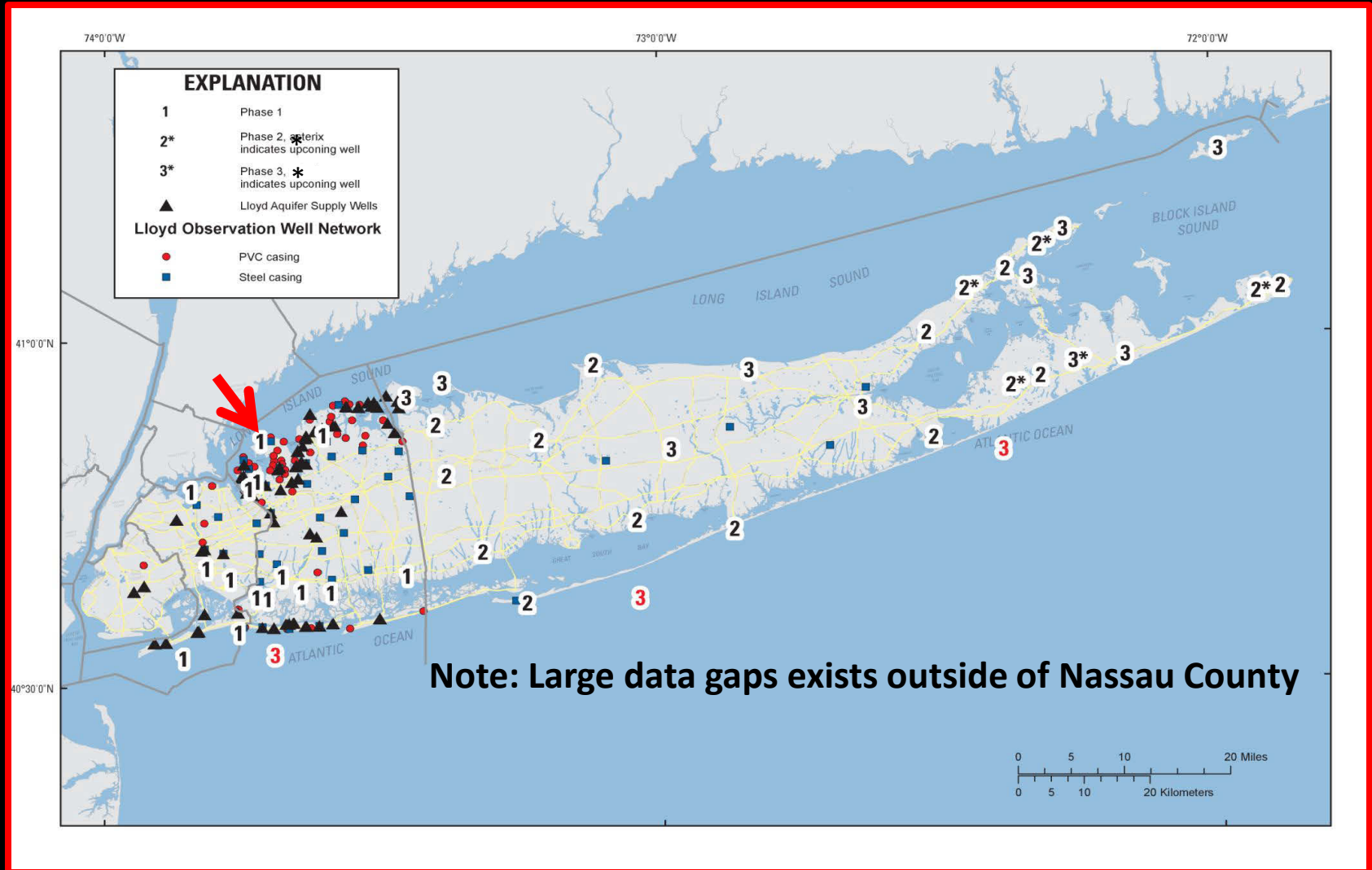
April 1, 2016 – September 30, 2021



Department of
Environmental
Conservation

USGS

Proposed Well Drilling Locations



Drilling and Geophysical Logging



USGS

Saltwater Intrusion in Great Neck

Conductivity Log

Gamma Log

Chloride mg/L

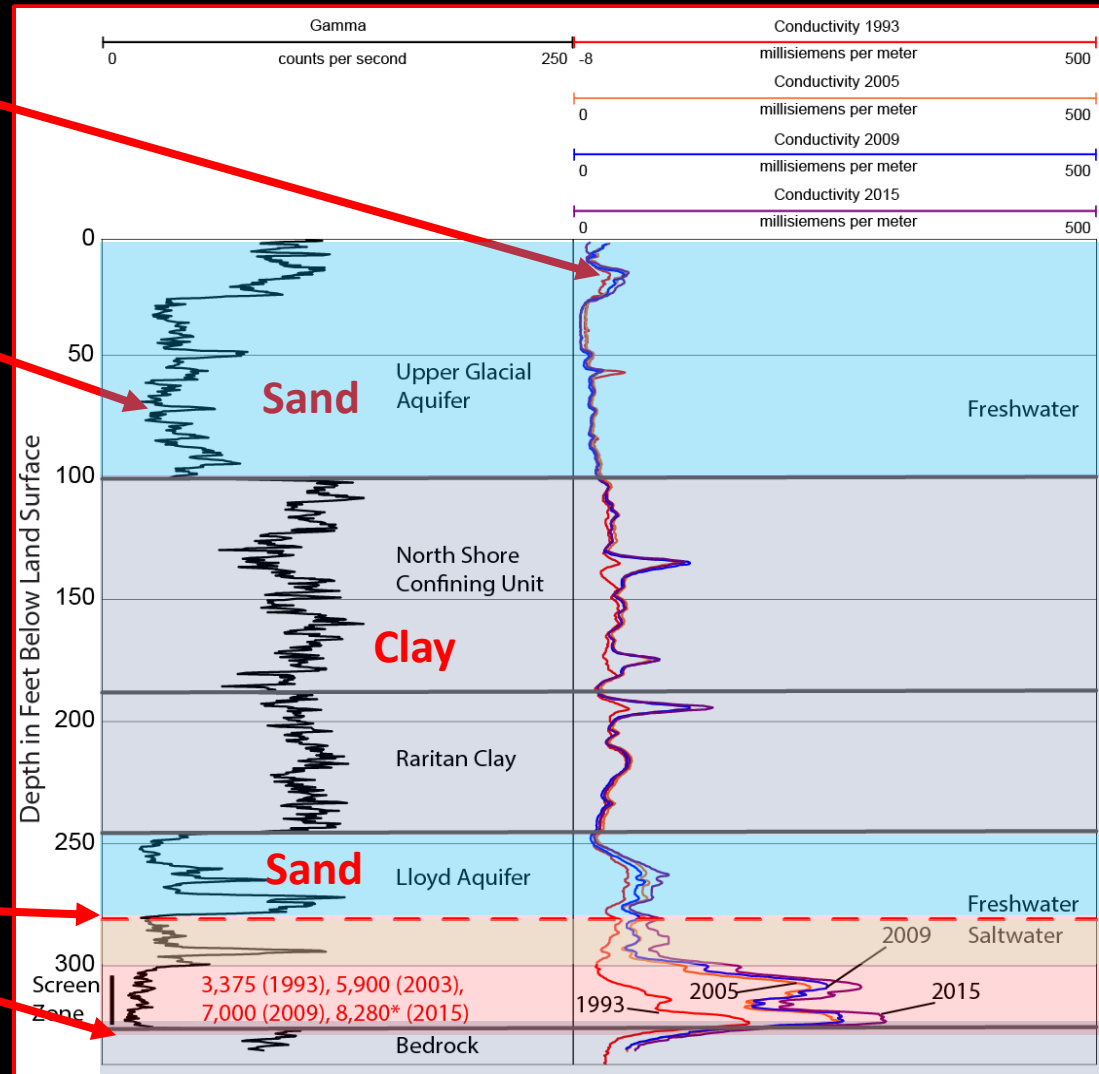
1993 3,400

2003 6,000

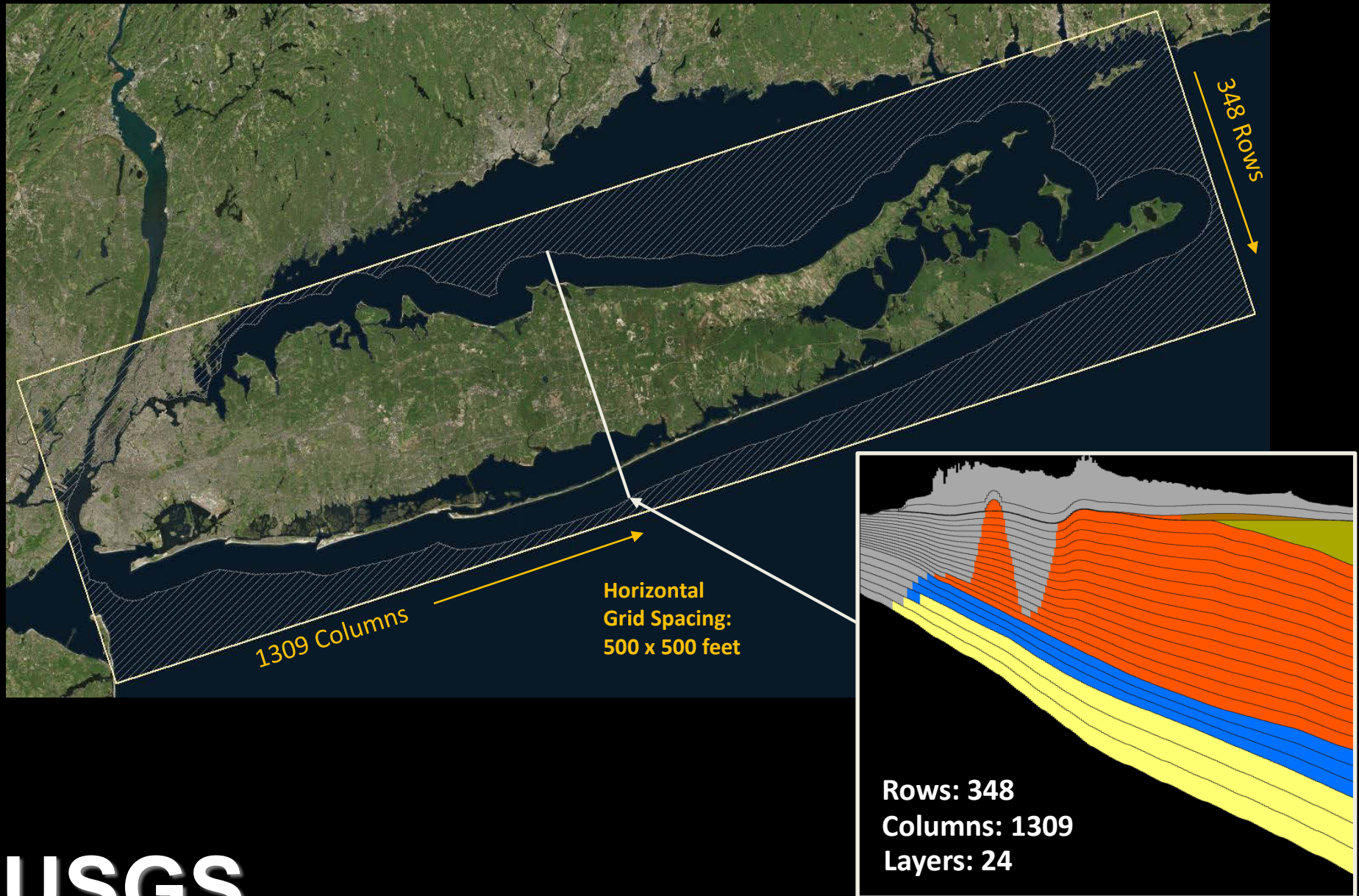
2009 7,000

2015 8,300

Saltwater



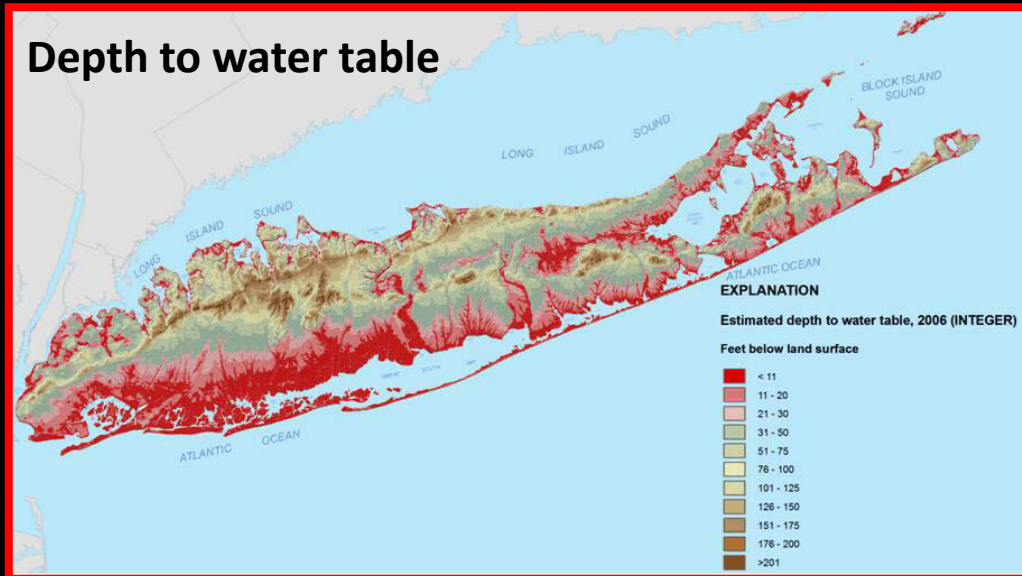
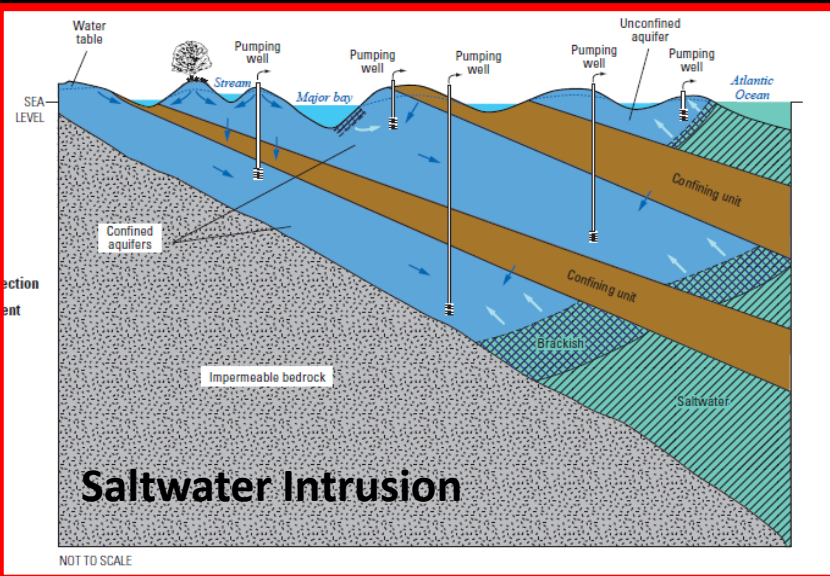
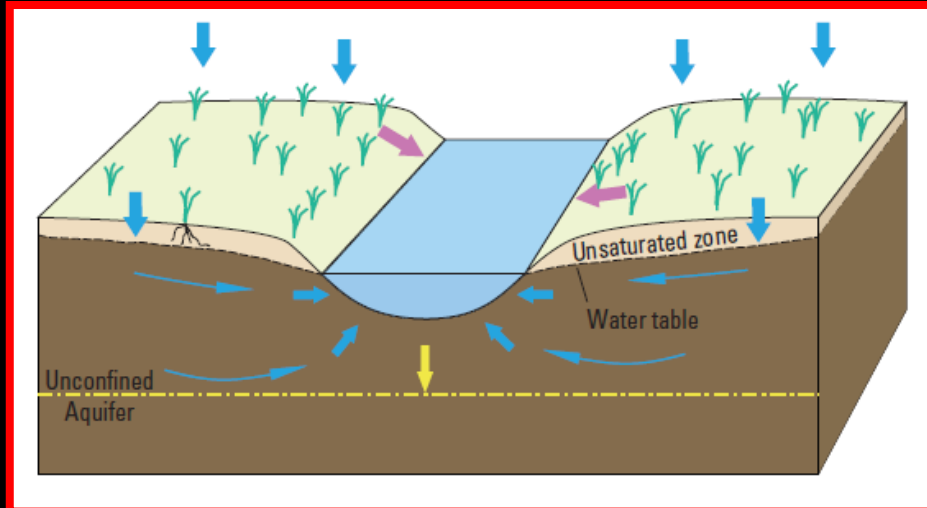
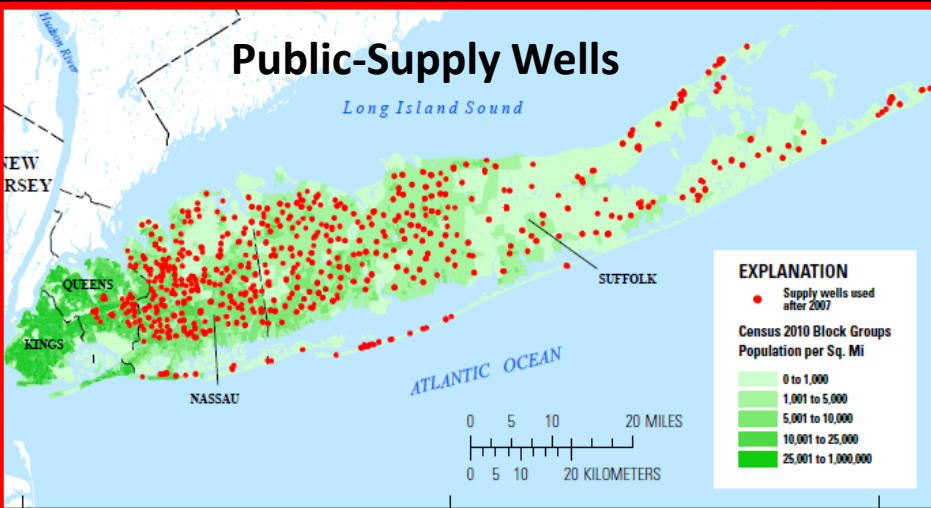
Long Island Regional Model Grid



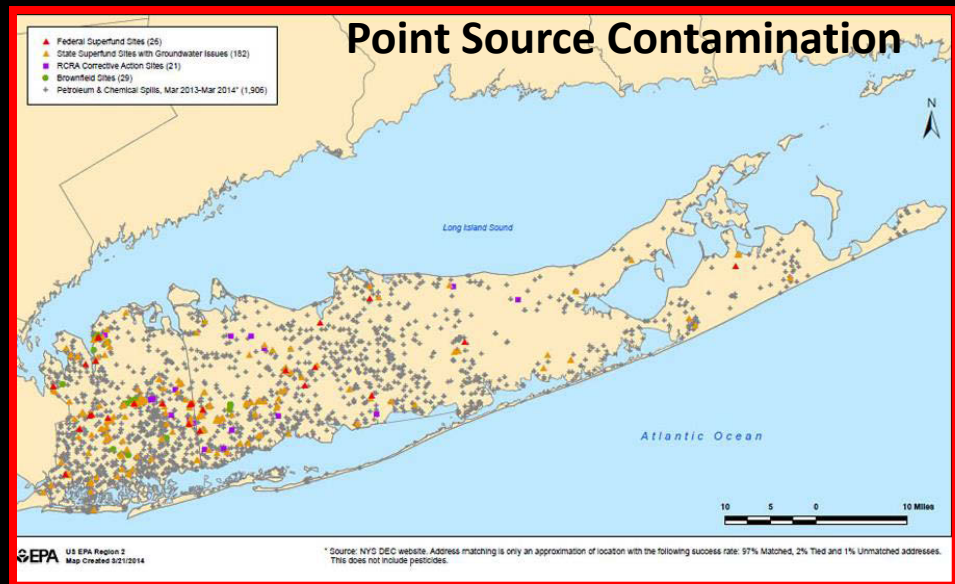
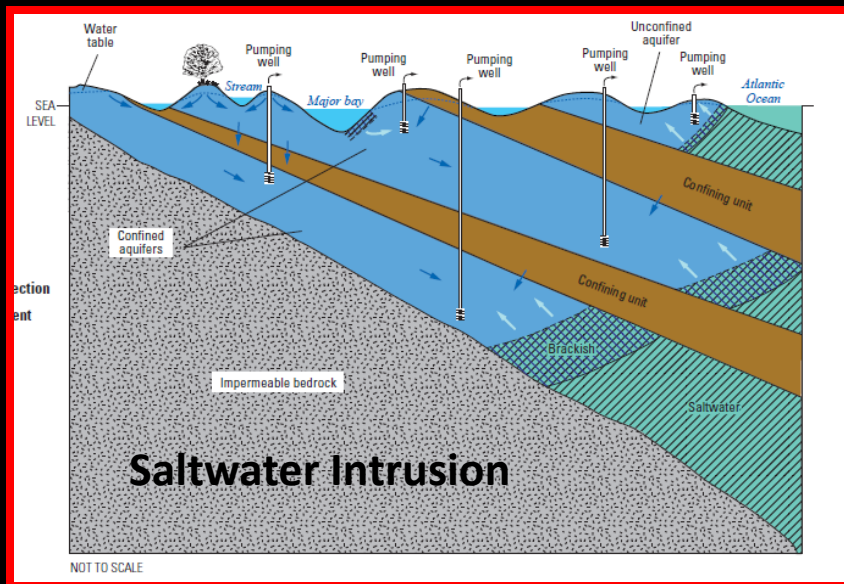
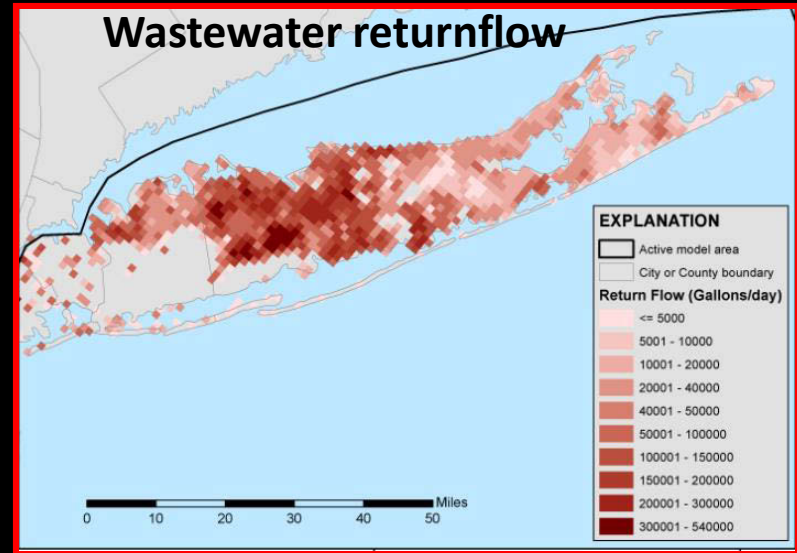
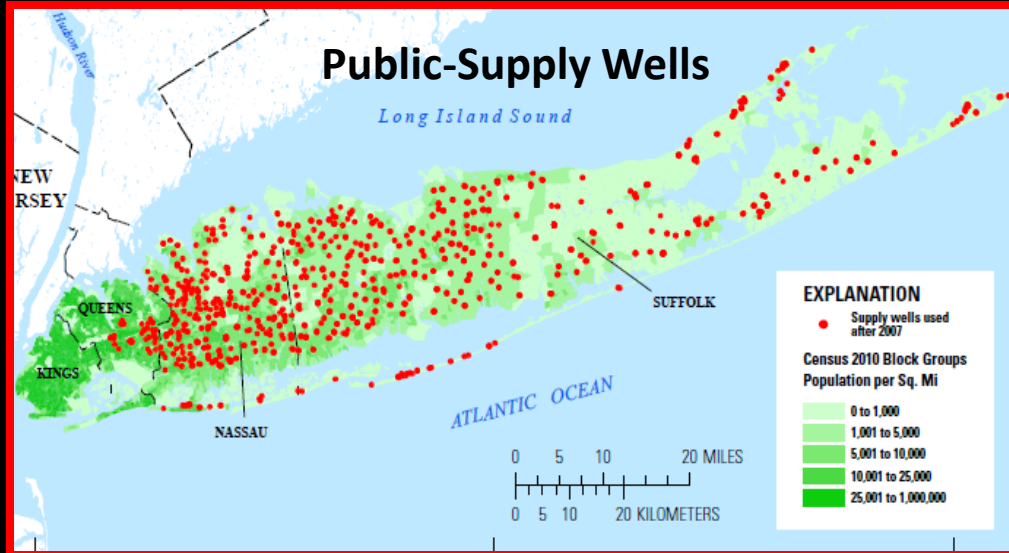
GW Sustainability: Limiting Factors

- **Water Quantity**
 - Groundwater depletion
 - Groundwater-fed ponds, streams, wetlands
 - Coastal discharge
- **Water Quality:**
 - Saltwater intrusion
 - Anthropogenic contamination

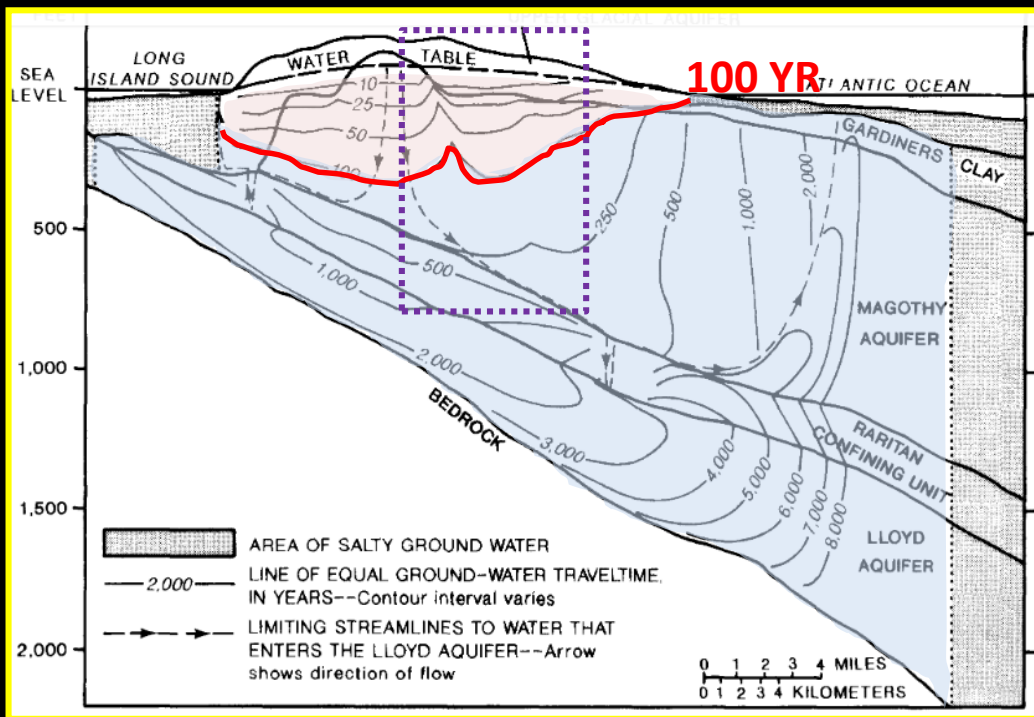
Water Quantity Concerns



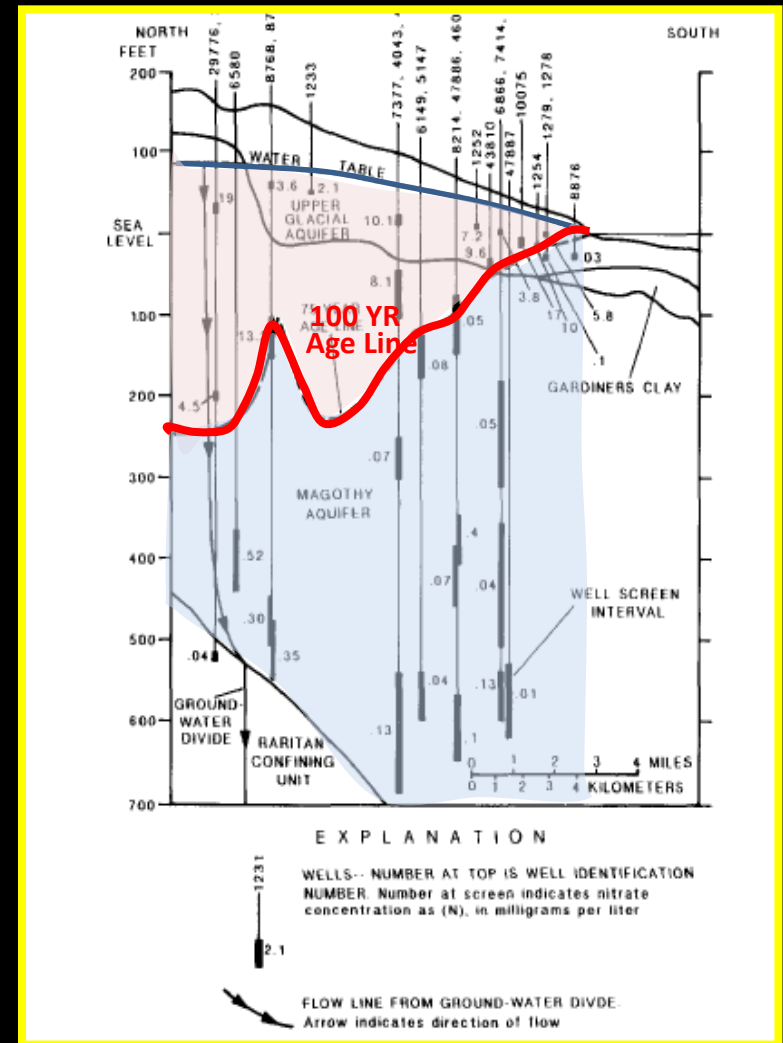
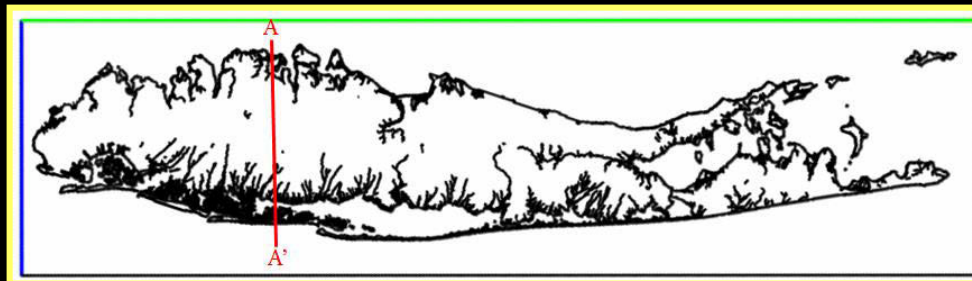
Water Quality Concerns



GW Age: Surrogate for Water Quality



Groundwater Age Distribution

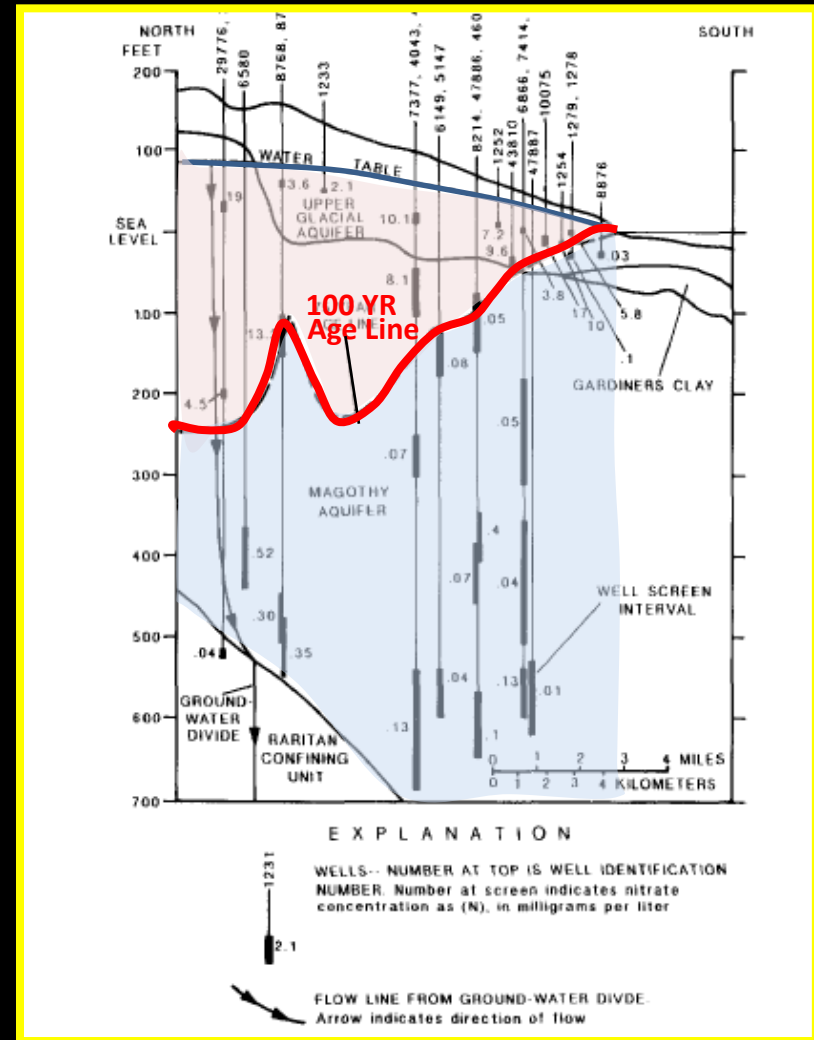


Modified from Buxton and Modica (1992)

GW Age: Surrogate for Water Quality

Quantify Susceptibility:

- Volume of aquifer
- Number of wells affected
- Amount of water pumped
- Population served
- Future vulnerability



Regional Sustainability Assessment:

Water Quantity:

- Calculate changes in water levels, streamflow, and coastal discharge to be used for ecohydrological response assessment.

Water Quality:

- Determine potential areas susceptible saltwater intrusion and use groundwater age distribution for regional vulnerability/sustainability assessment.

GW Sustainability Scenarios

➤ Change in withdrawals:

- Existing wells
- New wells
- Short-term, emergency reactivation of existing NYC wells

➤ Changes in returnflow:

- Wastewater
- Recharge basins
- Water reuse

➤ Climate change:

- Sea-Level Rise
- Recharge (changes to precip. and temp. regime)

Project Website



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Groundwater Sustainability of the Long Island Aquifer System

Home Background Concerns Approach Deliverables Staff Collaboration Selected Publications

Map of Long Island



The communities of Nassau and Suffolk Counties get their water solely from groundwater that is pumped from aquifers (subsurface sands and gravels that store and transmit water). The quantity and quality of groundwater can be affected by natural processes such as drought, or human activities such as groundwater pumping and urbanization. Decreases in ground-water levels, saltwater intrusion, and groundwater contamination have led to concerns about the future availability of groundwater on Long Island. **Groundwater sustainability can be defined as the development and use of groundwater in a manner that can be maintained for indefinite time without causing unacceptable environmental or socioeconomic consequences.** Informed management of the Long Island aquifer system can help ensure a regionally sustainable groundwater resource. This study will evaluate the sustainability of Long Island's groundwater resource, now and for the future, by mapping, monitoring, and modeling this critical aquifer system.

Sole-Source Aquifer



Saltwater Intrusion



Geologic Mapping



Water Levels



<https://ny.water.usgs.gov/projects/LIsustainability/underconstruction.html>

News

Drilling on Long Island Started today!
Exploratory well drilling on Long Island has begun, and is planned to continue through the summer. The drilling will better define the aquifer system, track saltwater encroachment, and inform a new groundwater-flow model for the Island. Knowledge of the effects of land use and water use on groundwater resources is critical for understanding the sustainability of Long Island's sole source aquifer system. The 5-1/2 year, \$6.5 million cooperative project with New York State leverages regional NAWQA studies to inform management and protection of the Island's sole source of drinking water.
26 January 2017 [usgs.gov](#)

News article
NYWSC text...
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