Overview of Lloyd Aquifer Representation in Nassau and Suffolk County Groundwater Models

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The importance of Long Island's groundwater resource has long been recognized, and many studies of the aquifer system have been conducted since the beginning of the 20th century. In recent years, both Nassau County Department of Public Works (NCDPW) and Suffolk County have developed computerized, regional groundwater flow models to develop in-house modeling capabilities to help manage the sole source aquifer that provides the island's water supply. Nassau County's original groundwater flow model was completed as part of a cooperative effort in the late 1980's; Suffolk County's Main Body flow model was developed and implemented as part of a cooperative effort in the 1990s. The Countys used the models to:

- Help to understand the factors affecting groundwater flow and the impacts of human-imposed stresses on the system;
- Investigate the groundwater system's ability to adequately supply water for public consumption both for the present and in the future;
- Study the relationship between water groundwater levels and stream baseflows and assess and respond to declining water levels and stream baseflows;
- Investigate and address the possible threat of salt water intrusion in localized areas;
- Evaluate the impacts that changing water supply pumping rates and locations may have on the system; and
- Understand the movement of regional and localized contaminants through the aquifers.

The extent of the modeled aquifers is depicted in figures 1 and 2.

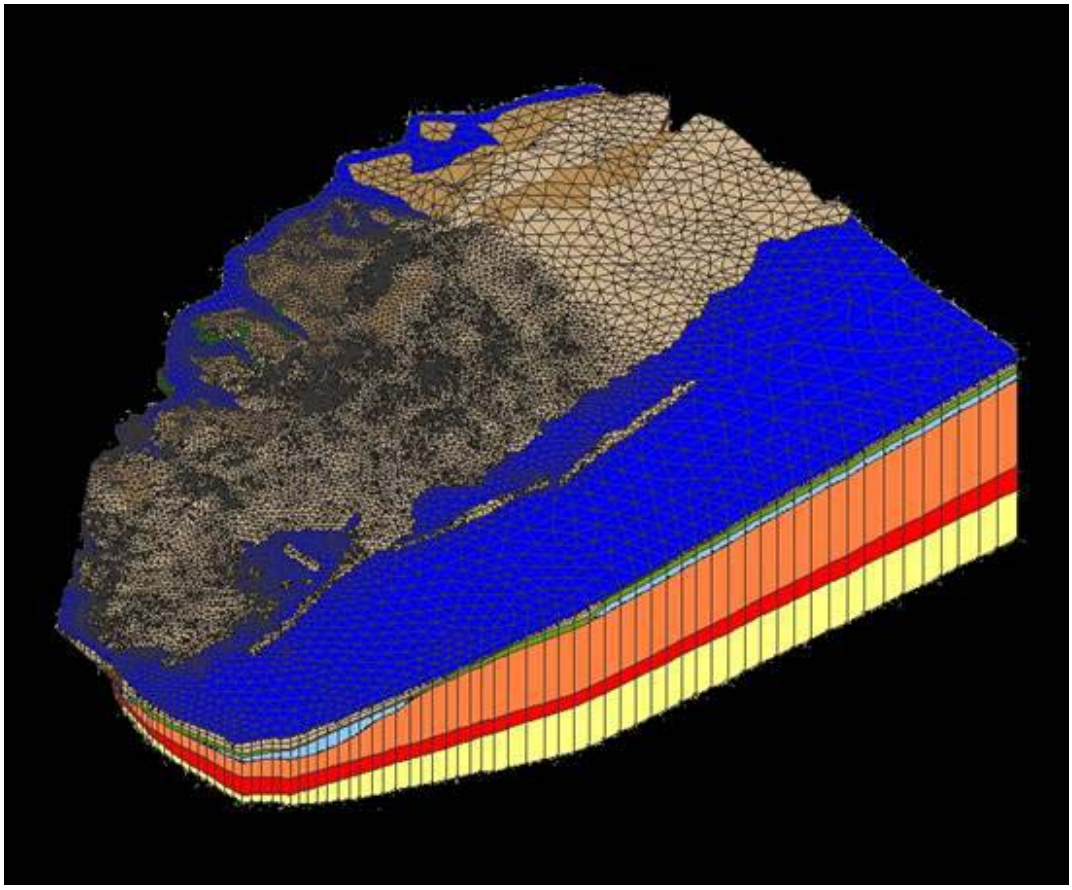

Figure 1 – Three-dimensional depiction of Nassau County Model Area

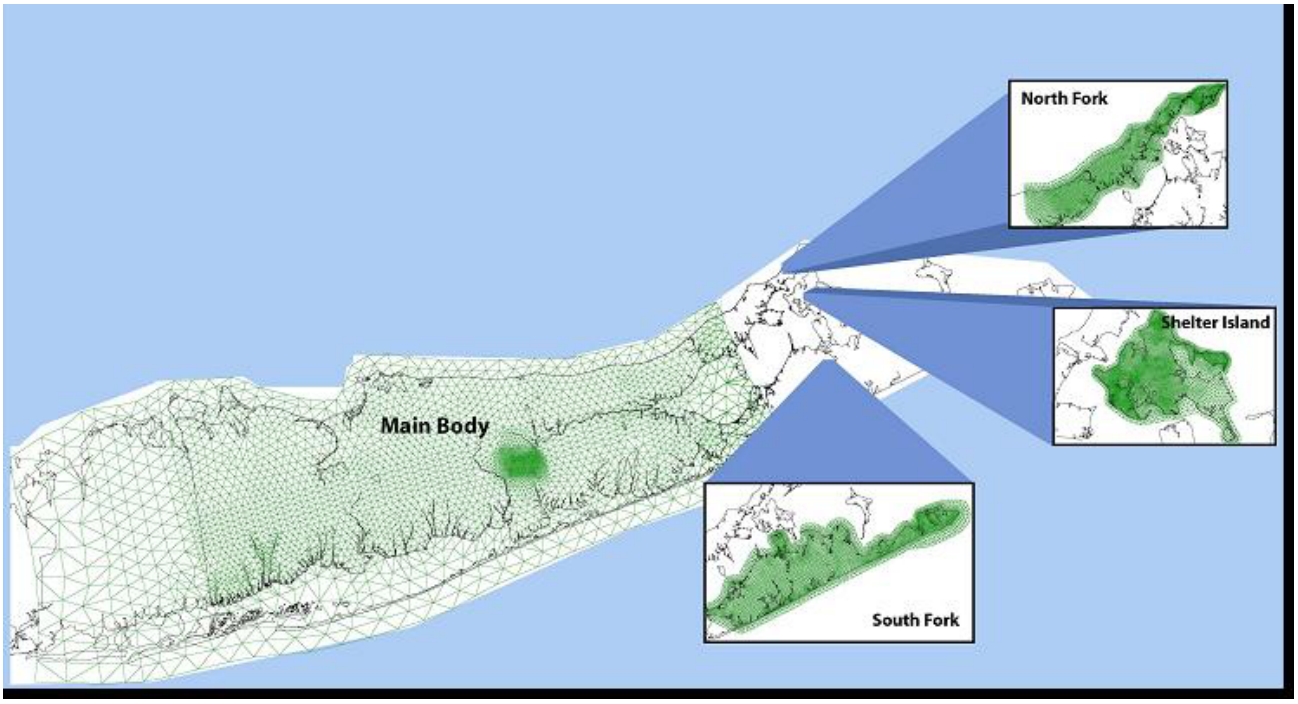

Figure 2 – Suffolk County's Main Body Flow Model and North Fork, South Fork and Shelter Island Freshwater/Salt Water Interface Models

Because the existence of fresh groundwater has not been documented beneath the North and South Forks, and Shelter Island, the Lloyd aquifer is not represented in the fresh water/salt water interface models developed for those areas.

At the time of model development, both Counties recognized that while extensive data existed to describe the shallow aquifer, more limited information was available to characterize the Lloyd aquifer. The thickness of the aquifer reportedly varies from 0 feet, in those areas along the north shore of Nassau County where it is absent, to upwards of 600 feet along the south shore. The aquifer is believed to extend beyond the island's coastlines to the north beneath Long Island Sound in eastern Nassau County and in Suffolk County, and offshore beyond the barrier beaches to the south. While water level measurements used as calibration targets were available to represent hundreds of shallow wells, much less information was used to evaluate whether or not the models adequately characterized conditions in the Lloyd aquifer.

Over the years, both Counties have initiated opportunities to integrate updated Lloyd information into the modeling framework, to improve the models' ability to represent conditions in the deep aquifer. The results of a drilling program conducted jointly by NCDPW and the USGS to help to characterize the deep aquifer were incorporated into the updated Nassau County groundwater model utilized for the Long Island Source Water Assessment Program evaluations. As part of the Comprehensive Water Resources Management Plan currently being developed for Suffolk County, additional water level information obtained from Lloyd wells was used to verify previous calibrations, and Lloyd pump test information was made available by the Suffolk County Water Authority, to verify the representation of Lloyd aquifer properties.

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