Reactivation of Public Supply Wells in Queens County, New York

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Abstract

A system of groundwater pumping wells located in southeastern Queens and southwestern Nassau Counties was owned and operated by the Jamaica Water Supply Company (JWSC) between the years of 1887 and 1996. In 1996, New York City (NYC) purchased and operated the Queens County groundwater well system, supplying drinking water to a roughly 5.5 square mile area of NYC, until 2007. Although the system has not operated since 2007, NYC is seeking to re-apply for groundwater use permits (which expire in 2017) through the New York State Department of Environmental Conservation (NYSDEC) for the 68 wells which make up the groundwater supply system in the Queens County area. According to NYC, the re-issuance of the permits are necessary in case an emergency condition in some other area of NYC's distribution system occurs, requiring NYC to pump groundwater to make up for the deficiency. Although NYC has no plans to activate any of the wells within the system in the immediate future, the re-issuance of the permits alone is cause for concern to all in Nassau County as any withdrawals from southeastern Queens County could have far reaching impacts on water quantity and water quality in Nassau County.

Introduction

NYC supplies more than 1 billion gallons of fresh water each day from large upstate reservoirs - some being more than 125 miles from City Hall - to the taps of 9 million customers. Figure 2 depicts the entire water distribution system for NYC.

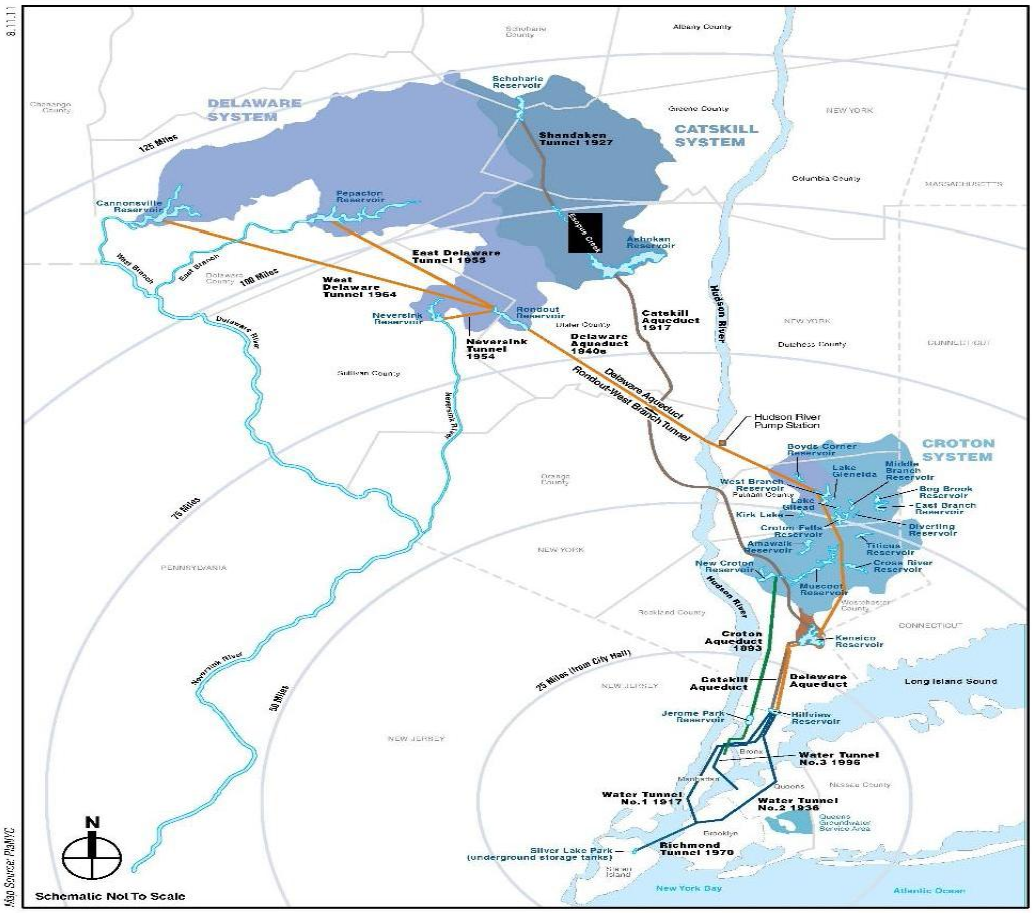
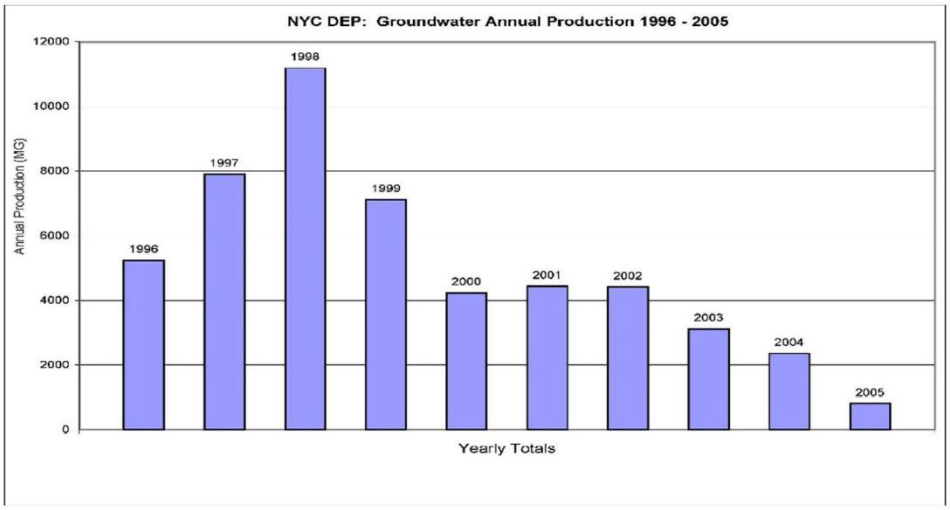


Figure 2
Delaware Aqueduct Rondout-West Branch Tunnel Repair Program **Water Supply System**

A small area of southeastern Queens and Nassau Counties was serviced by a system of 68 groundwater wells at 44 well stations and several water storage tanks between the years of 1887 and 1996 by the Jamaica Water Supply Company.

Queens Groundwater System



Since the 1990s, NYC has been monitoring leaks in the Delaware Aqueduct reservoir and tunnel system where as much as 35 million gallons per day (MGD) has been leaking from the system. A series of repairs was proposed to be conducted by NYC between the years of 2013 and 2020 which would result in the construction of a bypass tunnel combined with other system components and initiatives to account for the 500 MGD necessary to make up the difference while the portion of the Delaware Aqueduct system was shut down and repaired. One of the proposed components was the reactivation of the Queens County groundwater well system. The proposal included reactivating 23 wells at 20 well stations in order to provide 33 MGD with a total capacity of 40 MGD to include redundancy. The wells would pump from the Glacial (2 stations), Magothy (16 stations), Jameco (1 station) and Lloyd (4 stations) Aquifers. NYC has indicated that, from an economic and volumetric perspective, it would have to invest over $200 million in order to restore enough wells and well stations to provide 40 MGD.

As discussions of the plans for the reactivation of the Queens County groundwater well system and the potential for negative impacts to Nassau County's water resources became more publicized, NYC was made aware of Nassau County's opposition and significant concerns. In June 2015, NYC decided to abandon the concept of utilizing the Queens County groundwater well system to supplement the reservoir system during the Delaware Aqueduct repair and will utilize other means to make up the water shortage. Although NYC has abandoned the groundwater withdrawal proposal from the overall plan to repair the Delaware Aqueduct system, NYC is still seeking to have the NYSDEC re-issue the well permits in case future emergency conditions warrant the reactivation of the groundwater well system in any fashion.

Discussion

There have been a number of studies conducted over the last 50 plus years examining the use, impacts, and potential re-use of the groundwater aquifer system beneath Queens County. The theme of these studies have concluded that, without stringent management, the resource could become useless due to salt water encroachment or other type of contamination. There is particular sensitivity towards the use of the Lloyd Aquifer, the deepest confined aquifer and only source of fresh water for the barrier beach communities around Long Beach in southwest Nassau County. Similarly, concerns raised from the northwestern Nassau County water suppliers on Manhasset Neck and the Port Washington peninsulas have publicized the importance of further study and evaluation of the impacts of re-energizing the Queens County groundwater well system. Historically, measured groundwater elevations have shown that significant cones of depression develop during periods of groundwater pumping from eastern Queens County wells. These cones of depression, as much as 40 feet below sea level, can cause changes in groundwater flow direction, rate of movement, and salt-water intrusion potential, as well as changing known groundwater contamination plume migration. Although the wells have not pumped since 2007, and the consideration to reactivate the wells during a perceived emergency has been removed for now, NYC is moving forward with a plan to have all the well permits re-issued. NYC is currently developing a scope for a Draft Environmental Impact Statement (DEIS) for the re-issuance of the well permits. There is serious concern that, without updated hydrogeological framework information, the same assumptions will be made when utilizing and running a groundwater flow model to determine impacts of groundwater withdrawals. Without even a basic acknowledgment of where the current position of the freshwater-saltwater interface is in the various aquifers, it would be highly unlikely that a ground water flow model can accurately predict how and where it will move.

The United States Geological Survey (USGS) has proposed a project to evaluate the hydrogeologic framework, groundwater availability, and water-supply sustainability in western Long Island. The need for further study, including the installation of additional monitoring wells drilled to bedrock, before allowing the well permits in Queens County to be re-issued, is paramount and needs to be conducted as soon as possible. Recent developments regarding funding this study to be conducted by the USGS have been made public through a February 21, 2016 announcement by the New York State Governor's Office. The announcement detailed the allocation of $6 million towards the study of Long Island's aquifer system. Specific details on how the funds will be distributed between several projects have not been made available yet, but funding the additional study of water availability and impact of ground water withdrawals from the Queens County groundwater wells is of the utmost importance.

Summary and Conclusions

A plan by NYC to reactivate the Queens County groundwater well system in order to supply drinking water to residents within about a 5.5 square mile service area during repairs to its Delaware Aqueduct system has been met with significant concerns and opposition over the possible adverse impacts of the associated

groundwater withdrawals. Although the plan to reactivate the well system has been withdrawn, NYC is still seeking to have the well permits, which expire in 2017, re-issued by the NYSDEC. The re-issuance of these permits requires the preparation of a DEIS which is currently in the scoping phase. Given the uncertainty of a number of key parameters needed in order to make the proper decisions regarding the operation and use of the Queens County groundwater well system, further study of the hydrogeologic framework and position of the freshwater-saltwater interface including the development of a groundwater model that will predict its movements in response to groundwater withdrawals, must be conducted immediately. Regardless of the outcome of the study, the protection of the Lloyd aquifer must be further enhanced by eliminating the potential for any additional withdrawals of water from the Queens County groundwater well system going forward.

Recommendations

The Long Island Commission for Aquifer Protection (LICAP) should recommend that the abandonment of any and all NYC plans to utilize the Queens County groundwater well system to provide water to NYC in case of an emergency should be made permanent. Since such a plan was abandoned already in favor of other sources of water being already available in the existing, vast system of reservoirs, aqueducts and tunnels, LICAP should strongly recommend that NYC's plan to have its well permits for the Queens County groundwater well system be rejected or disallowed permanently, or at least until an exhaustive scientific evaluation of the potential impacts of pumping in southeastern Queens County is assessed and finalized.

LICAP should recommend also, regardless of the outcome of any study, that no well permits for the Lloyd Aquifer ever be re-issued to NYC in the Queens County groundwater area.

References

www.ny.water.usgs.gov/projects/LIsustainability

www.nyc.gov/html/dep/html/environmental_reviews/rwb_tunnel_repair_project.shtml