

Water supply management of the New York Metropolitan area and future challenges from population growth and global climate change

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Abstract The New York Metropolitan Area (NYMA), with a population of more than 8 000 000 people consumes more than 4.5 million cubic metres of water daily from a watershed area of more than 4970 km². Developed in the late 1800s and expanded in the early 1900s, this system was designed according to climatic and demographic conditions existing at that time. Today, the management of one of the largest surface water supply systems in the US experiences new challenges associated with climate change, maintenance and enhancement of current conservation measures, coastal salt water intrusion, and continuing demands for economical development in upstate watershed communities. However, as described here, the large spatial distribution of the system allows effective management of water supply and treatment; and to a large extent, prevents the effects of droughts and floods. Recent changes in climatic conditions and population growth present challenges that require applications of new hydrological tools to develop better economic and political strategies. The main challenges are: (1) the management of the changing hydrological conditions in the watershed area due to climate change; (2) the ability to improve current water supply management and conservation measures or find water alternatives to accommodate the still growing population; and (3) to preserve the currently pure natural water supply for the future generations. Climate change on the Northeastern Coast of the USA is becoming well pronounced, with increasing average winter temperatures, ocean surface temperatures, and general instability in annual weather patterns. This affects the amount of available precipitation, and as a result, the amount of water storage in reservoirs. However, the uncertainty of future climatic changes makes it difficult to make effective forecasts. In this paper we argue that current considerations of presently uncertain climate change effects on the New York City watershed system might be less challenging to the future management than the current trends in population growth and maintenance and enhancement of existing conservation measures.

Key words New York City water supply; climate change; water quality; hydrology; management