WATER-DATA REPORT NY-05-2

ABSTRACT

Water-resources data for the 2005 water year (October 2004 through September 2005) for southeastern New York State (Long Island and the five Borough of New York City) consists of records of stage, discharge, and water quality of streams; stage and water quality of lakes; stage and water quality of estuaries; and water levels and water quality of ground-water wells. This volume contains records for water discharge at 18 gaging stations; lake stage at 7 gaging stations; tide stage at 6 gaging stations; water levels at 576 wells; and water quality at 105 wells, 6 lakes, 2 streams, and 1 estuary station. Also included are data for 10 low-flow partial-record and/or miscellaneous-measurement stations. These data together with the data in volumes 1 and 3 represent that part of the National Water Data System operated by the U.S. Geological Survey in cooperation with Federal, State, and local agencies in New York State.

COOPERATION

The U.S. Geological Survey and organizations of the State of New York and other agencies have had cooperative programs for the systematic collection of water records since 1900. Organizations that assisted in collecting the data included in this volume through cooperative agreements with the U.S. Geological Survey are:

County of Nassau, Department of Public Works, Peter J. Gerbasi, Commissioner
County of Suffolk, Department of Health Services, Clare B. Bradley, M.D., MPH, Acting Commissioner
New York City Department of Environmental Protection, Christopher O. Ward, Commissioner
New York State Department of Environmental Conservation, Erin M. Crotty, Commissioner
New York State Office of Parks, Recreation, and Historic Preservation, Bernadette Castro, Commissioner
Suffolk County Water Authority, Stephen Jones, Chief Executive Officer
Town of East Hampton, Department of Natural Resources & Environmental Protection, Laurence Penny, Director
Town of North Hempstead, Jon Kaiman, Supervisor
Town of Hempstead, Department of Conservation & Waterways, Ronald W. Masters, Commissioner
Town of Shelter Island, Arthur R. Williams, Supervisor
Town of Southampton, Department of Land Management, Jefferson V. Murphree, Town Planning and Development Administrator
Village of Freeport, Richard E. Holdener, Director of Emergency Management

The following organizations aided in collecting records:

Nassau County Department of Health, Nassau County Department of Public Works, Suffolk County Department of Health Services, and Suffolk County Water Authority.

SUMMARY OF HYDROLOGIC CONDITIONS

GROUND WATER

Ground-water levels in shallow, unconfined water-table aquifers (such as the upper glacial aquifer) in southeastern New York typically show a seasonal pattern under natural (undeveloped) conditions – a sharp rise during the spring in response to aquifer recharge from precipitation and snowmelt, and a gradual decline from summer through early fall. Aquifer recharge varies locally and seasonally and is affected by many factors, including the timing and amount of precipitation, the hydraulic properties of the soil and rock, the soil-moisture content, the amount of local runoff, and the rate of evapotranspiration (including physical evaporation, transpiration by vegetation, and ground-water evapotranspiration). Much of this natural pattern is no longer evident in western parts of Long Island, where large-scale ground-water pumping, construction of impervious surfaces (such as roads and parking lots), and loss of recharge (through sanitary- and storm-sewer systems) have caused large changes in ground-water levels.

Confined aquifers (such as the Magothy and Lloyd aquifers) are less responsive to recharge events than water-table aquifers. Water levels in confined aquifers generally show a subdued and delayed water-level response to recharge events because their hydraulic connection to the overlying unconfined aquifers is indirect. Pumping from confined aquifers can cause significant water level drawdown that can propagate long distances from the pumping center. In costal areas of Long Island, where these deeper confined aquifers are the sole source of water supply, over-pumping has caused problems with saltwater intrusion. Changes in atmospheric pressure and tidal fluctuations (in near-shore area) can cause transient, but significant, water-level changes in wells that tap confined aquifers.

Typically, aquifer recharge is greatest during the late fall and from early to mid-spring, when transpiration is minimal, and the ground is not frozen. Water levels rise during the spring in response to recharge and generally exceed those reached in the preceding fall. Water levels decline during the late spring and summer, when plant growth and rising water temperatures increase the rate of evapotranspiration and, thus, decrease the rate of recharge. Storms, if of sufficient intensity and duration, can provide minor recharge to shallow aquifers during summer months. Precipitation in New York is, on average, fairly evenly distributed from month to month; thus, the annual summer decline in ground-water levels (in non-pumped areas) is due primarily to diminished recharge through increased evapotranspiration. Precipitation for the 2005 water year at Brookhaven National Laboratory was 24.12 in., 24.17 in. below normal. Winter season precipitation (October 2004 to March 2005) was 13.63 in. (11.80 in. below normal) and the summer season precipitation (April 2005 to September 2005) was 10.49 in. (12.29 in. below normal).

Water levels in most wells screened in the upper glacial, Magothy, and Lloyd aquifers on Long Island were near to slightly above normal at the beginning of the 2005 water year. Levels increased during April, May, and June to above normal levels, then began a sharp decline during July that continued for remainder of the water year. Water levels ended the water year at near normal levels. Record-high water levels were measured in 95 wells on Long Island, primarily in central and eastern Queens County and western and northern Nassau County, a result of

reductions in local ground-water pumpage. Record-low water levels were measured in 13 well throughout Queens, Nassau, and Suffolk Counties.

SURFACE WATER

Most streams on Long Island are broad and shallow with highly permeable streambeds consisting mainly of sand and gravel; thus, Long Island's streams are in direct hydraulic contact with the water table. Under natural conditions, most of the stream discharge originates as ground-water seepage; so accordingly, the flows of most Long Island streams closely reflect changes in the water-table altitude.

Streamflow on Long Island was above normal at the beginning of the 2005 water year, then gradually decreased to near or slightly below normal by July or August, and remained below normal to the end of the water year. Average runoff for the water year was generally above normal. Maximum peak discharges for the water year occurred on several days in response to localized storms. Most of the maximum peaks in Queens County, southwestern Nassau County, and north-central Suffolk County occurred on March 28, in southeastern Suffolk County on April 2, in south-central Suffolk County on May 1, and in southwestern Suffolk County and northeastern Nassau County on July 8, 13, 18, and 25. The maximum monthly mean discharge for the 2005 water year at most stations occurred in March, April or May, and most minimum monthly mean discharges occurred in September.

The maximum water levels for the 2005 water year at the lake-stage gage on Long Pond near Sag Harbor were recorded on May 29, 30, and the maximum water level at the station on Georgica Pond at Apaquogue was recorded on April 4. Minimum water levels at the station on Long Pond were recorded on September 26, 30, and the minimum water level at Georgica Pond was recorded on October 21. The maximum monthly mean water level at Long Pond occurred in June, and the maximum monthly mean water level at Georgica Pond occurred in July. The minimum monthly mean water level at Long Pond occurred in September, and the minimum monthly mean water level at Georgica Pond occurred in November.

The maximum water level for the 2005 water year at the tide-stage gage on Jamaica Bay at Inwood was recorded on December 10. Maximum water levels at most other tide-stage gages were recorded on May 24-25, although at the station on Great South Bay at Lindenhurst they were also recorded on April 3. Minimum water levels at all tide-stage gages were recorded on March 9, during which every station except the one at Great South Bay reached a new record low. Maximum monthly mean water levels for the 2005 water year at all stations occurred in October, and minimum monthly mean water levels occurred in December.

WATER QUALITY

Five synoptic samplings of ground-water and surface-water quality were conducted during the 2005 water year. The first sampling was done as part of an ongoing reconnaissance of the water resources of Kings and Queens Counties. Samples were collected at 48 wells and 2 streams in the Counties and analyzed for 315 organic and inorganic constituents. The most frequently detected contaminant was Trichloromethane, found in 54 percent of the samples.

The second sampling was done as part of a reconnaissance of the water resources of Richmond County. Samples were collected at 20 wells in the County and analyzed for 315 organic and inorganic constituents. No outstanding trends were found, with most compounds detected below their reporting limit.

The third sampling entailed an analysis of water quality from eight wells and six ponds in the Towns of East Hampton and Southampton. Wells were sampled for 133 compounds, including pesticides, inorganics, and wastewater; ponds were sampled for 17 compounds, including nutrients and inorganics. No outstanding trends were found, however, elevated pH and dissolved oxygen levels were present in some ponds.

The fourth sampling entailed an analysis of water quality from six wells on Shelter Island for 62 pesticides and their degradates. Only one compound was detected, Aldicarb Sulfone, at well S51177.1.

The fifth sampling was done as part of a reconnaissance of wastewater compounds in the ground water of Nassau County. Samples were collected at 23 wells and analyzed for 62 wastewater compounds. Forty-one compounds were reported below their reporting limit.