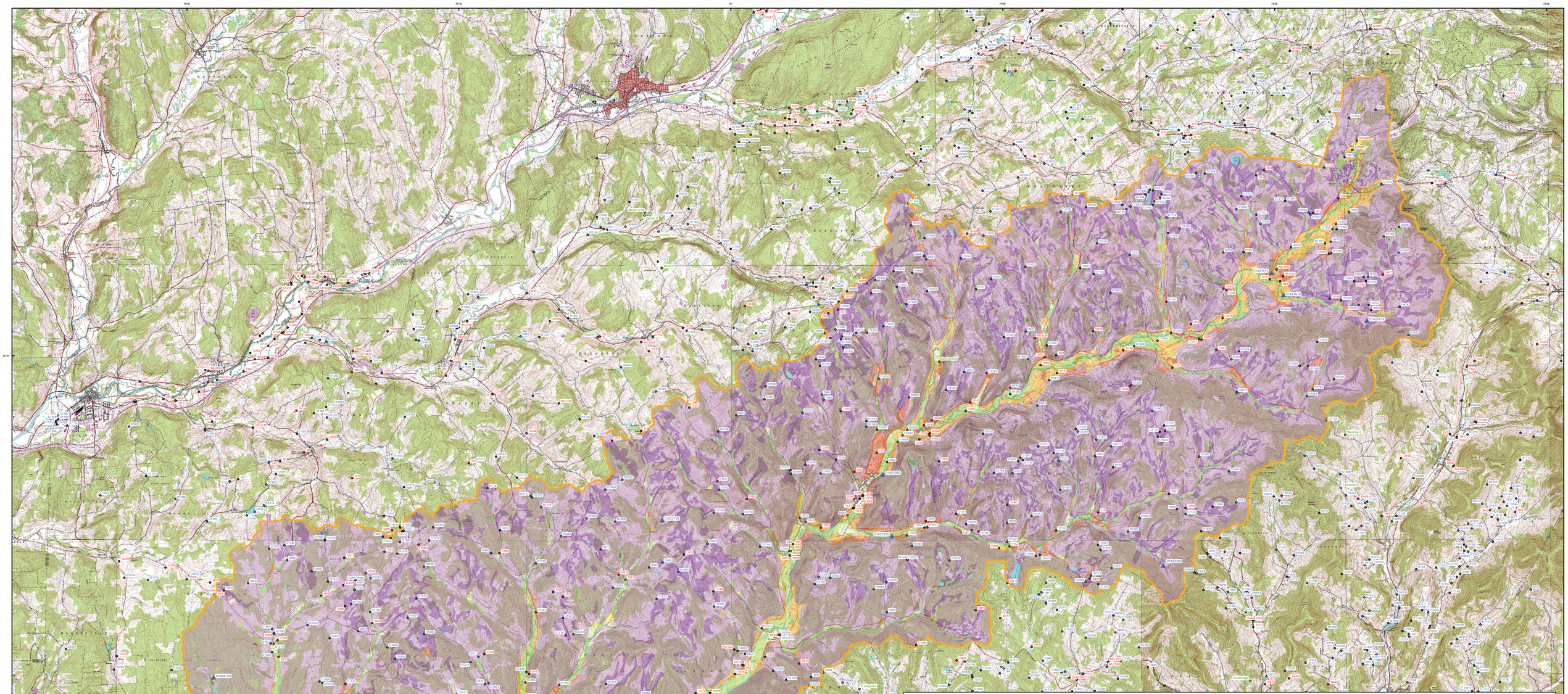
U.S. Department of the Interior
U.S. Geological Survey

Prepared in cooperation with the
New York State Department of Environmental Conservation

Scientific Investigations Report 2013–5025
Sheet 1



EXPLANATION

This map shows the distribution of surficial geologic units within the West Branch Delaware River Basin upstream from the Cannonsville Reservoir Dam, N.Y. The map includes all or part of eighteen 7.5-minute quadrangles and represents an area of 455 square miles. The map is based on the interpretation of surficial units derived from three primary sources: (1) a digital soils map of Delaware County produced by the Natural Resources Conservation Service (NRCS) in Walton, N.Y.; (2) plates and illustrations in doctoral dissertations by Kirkland (1973) and Ozvath (1985); and (3) unpublished reconnaissance-level surficial geologic maps at 1:62,500 scale, prepared as part of a previous U.S. Geological Survey (USGS) study by Soren (1963). To compile this map, an analysis of the geographic information system (GIS) coverage of NRCS soils units for the study area showed that there were 154 individual soil types within the basin. These 154 soil types were used to identify their parent materials, based on the soils descriptions given in the NRCS soils report. The individual soil types were each classified based on its assigned parent material and then aggregated by common parent material in a GIS coverage to determine the surficial geologic map units shown on this map. This map also shows the locations of wells and deep test holes from the National Water Information System (NWIS), New York State Department of Environmental Conservation (NYSDEC), and Empire State Oil and Gas Information System (ESOGIS) databases.

Holocene

Alluvium—Consists primarily of silt, fine to coarse sand, and fine gravel in overbank deposits generally less than 10 feet in thickness. Derived from reworked and fluvially sorted outwash, kame, and till deposits. Generally confined to flood plains within a valley. Generally permeable

Alluvial fan—Postglacial alluvial fans developed where upland tributaries enter major stream valleys. Sediments are generally poorly sorted, consisting mostly of gravel, sand, and silt derived from erosion of upland till and kame deposits. Moderately permeable

Artificial fill (constructed land)—Constructed earth fill as part of urban or suburban areas or as part of the Cannonsville Reservoir Dam

Peat and muck—Postglacial swamp deposits in topographic depressions consisting of organic materials, silt, and clay

Water—Open bodies of water, such as reservoirs, lakes, ponds, and rivers

Pleistocene

Till (thin) over rock—Consists generally of a veneer of lodgment till (ground moraine) up to 5 feet thick overlying upland bedrock hills. Greater thicknesses may exist in small upland hollows and on south-facing slopes in areas not specifically mapped as thick till. Bedrock is usually exposed on hilltops, cols, and notches. Generally impermeable

Till, thick—Consists of thick deposits of ablation till in valley bottoms and lodgment till in higher elevation upland tributaries. Till thicknesses of up to several hundred feet may occur in main valleys where ablation till and poorly sorted ice-contact sediments combine to form lateral embankments. May include thin, discontinuous beds of lacustrine silt and clay, and (or) poorly-sorted, ice-contact sand and gravel. Generally impermeable, except sand and gravel beds, which are moderately permeable

Till and colluvium (undifferentiated)—Consists of remobilized and redeposited till, talus slopes of boulder-sized slabs of local bedrock, and local landslides of till. Thickness variable, generally poorly permeable. Includes areas of in-place till and remobilized till (colluvium), which cannot be differentiated on the basis of associated soil types. Generally impermeable

Outwash—Sand and gravel outwash deposited by high-energy braided streams carrying meltwater from the retreating glacial ice front. Outwash partly fills the West Branch Delaware River valley forming a valley train. Outwash ranges from 20 to 65 feet in thickness and usually overlies previously deposited ice-contact sand and gravel. The outwash unit and the underlying ice-contact (kame) sand and gravel together form the stratified-drift aquifer within the West Branch Delaware River valley. Outwash generally underlies postglacial alluvium in the main valley. High permeability

Alluvium and outwash (undifferentiated)—Postglacial alluvium overlying Pleistocene outwash deposits that cannot be differentiated on the basis of associated soil types. High permeability

Kame sand and gravel (undifferentiated)—Consists of ice-contact, stratified deposits of sand, gravel, silt, and clay deposited by glacial meltwater streams between a retreating ice tongue and the valley wall in the West Branch Delaware River valley and some tributaries. Larger units may be either kame terraces, kame moraines, or kame deltas. Consists primarily of stratified sand and gravel. Kame terraces may occur in pairs, along both valley walls, and collapsed segments may be overlain by outwash. Permeability high but variable. Kame terraces are large, permeable constructional features that rest directly on till or bedrock and are hydraulically connected to adjacent outwash. As such, they represent preferential pathways for recharge to both confined and unconfined areas of the stratified-drift aquifer in the valley. Kame moraines consist of ice-contact, poorly stratified sand and gravel deposited by retreating (ablating) glacial ice. Kame moraines may originate as supraglacial or englacial debris that are fluvially deposited against stagnant ice blocks. They are usually deposited during a temporary halt in the ice-retreat process and are commonly associated with a deposit of downvalley outwash. Permeability is usually poor because of poor sorting. Kame deltas consist of ice-contact, stratified sand and gravel deposited as a prograding delta into a temporary proglacial lake by glacial meltwater streams. Kame deltas characteristically display topset, foreset, and bottomset bed features in large excavations (gravel pits). Kames are usually isolated, small, mounded structures that may be partly overlain by outwash and (or) alluvium and underlain by till or bedrock. Generally high, but variable, permeability

Outwash and (or) kame sand and gravel (undifferentiated)—Areas of outwash and kame sand and gravel that cannot be differentiated on the basis of associated soil types

Devonian

Rock—Upland, scarp, or hilltop areas of exposed bedrock. Bedrock may be overlain by a veneer of ground moraine. Bedrock underlying hills and hilltops consists of Devonian age sandstones and conglomerates of the West Falls Group

Well—Well data from USGS NWIS database. Number is county well number

Well—Well data from NYSDEC Water Well Program well database. Number is county well number

Deep exploratory test hole—Exploratory test hole drilled for assessment of potential natural gas reserves. Well data from the New York State Museum ESOGIS database

Streamgage and identification number—Maintained by the USGS

Geologic contact—Contact between adjacent surficial geologic units

Basin boundary—Approximate location of drainage divide that delineates the West Branch Delaware River drainage area upstream of the Cannonsville Reservoir Dam

References Cited

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Base from U.S. Geological Survey Digital Raster Graphics, 1:24,000 scale
Universal Transverse Mercator projection, zone 18
North American Datum of 1983

0 4 8 MILES
0 4 8 KILOMETERS

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Hydrogeology of the West Branch Delaware River Basin, Delaware County, New York

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2013

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Suggested Citation: Reynolds, R.J., 2013, Hydrogeology of the West Branch Delaware River Basin, Delaware County, New York: U.S. Geological Survey Scientific Investigations Report 2013–5025, 26 p., http://pubs.usgs.gov/sir/2013/5025/