

State of New Jersey

Department of Environmental Protection

NEW JERSEY WATER SUPPLY PLAN 2017–2022

APPENDIX C

MAJOR SURFACE WATER SYSTEMS OF NEW JERSEY

The following section describes the major surface water reservoirs systems in New Jersey by drought region.

NORTHEAST DROUGHT REGION

NORTH JERSEY DISTRICT WATER SUPPLY COMMISSION

North Jersey District Water Supply Commission (NJDWSC) operates the Wanaque Reservoir, Ramapo pumping station, and Monksville/Wanaque South – Two Bridges Pump Station as one system. The Wanaque Reservoir, completed in 1929, is located in northeastern New Jersey, directly above the town of Pompton Lakes on the Wanaque River. In 1987, construction was completed on the Monksville Reservoir, also located on the Wanaque River, and just upstream of the Wanaque Reservoir, which culminated in total reservoir storage of 36.6 BG.

The NJDWSC reservoirs, Wanaque (29.6 BG) and Monksville (7.0 BG), are filled from three sources. The first source is the Wanaque River. Both Wanaque and Monksville are “on-stream” reservoirs on the Wanaque River. The Wanaque Reservoir, with a 94.4 square mile drainage area and a storage capacity of 29.6 BG, has a 10 MGD passing flow requirement downstream on the Wanaque River. The second source is the Ramapo River. The NJDWSC operates a pump station on the Ramapo River that can pump approximately 150 MGD of water into the Wanaque Reservoir, provided a 40 MGD passing flow requirement is maintained downstream of the pump station. The third source available is the Wanaque South -Two Bridges Pump Station, which consists of a single intake located on the Pompton River, upstream of the confluence of the Pompton and Passaic Rivers. From this pump station, six pumps can divert up to 250 MGD of water into the Wanaque Reservoir or into the Oradell Aqueduct, provided a minimum passing flow of 92.6 MGD is maintained in the Passaic River and required temperature and dissolved oxygen levels are met.

The NJDWSC consists of 13 member municipalities and water systems. The current approved safe yield of 190 mgd is distributed as follows:

Table C.1. North Jersey District Water Supply Commission allocations.

Municipality	Daily Allocation of Currently Approved Safe Yield (mgd)
Bayonne	10.5
Bloomfield	7.51
Cedar Grove	1.2
Clifton (PVWC)	6.345
Glen Ridge	0.705
Kearny	13
Montclair	5.7
Patterson (PVWC)	18.8
Passaic (PVWC)	10.34
Newark	49.4
Nutley	3
Wayne	9.5

Table C.1. North Jersey District Water Supply Commission allocations.

Municipality	Daily Allocation of Currently Approved Safe Yield (mgd)
Suez	48

SUEZ WATER NEW JERSEY

Suez New Jersey serves water to Alpine, Bergenfield, Bogota, Carlstadt, Cliffside Park, Closter, Cresskill, Demarest, Dumont, East Rutherford, Edgewater, Emerson, Englewood, Englewood Cliffs, Fair Lawn, Fairview, Fort Lee, Franklin Lakes, Hackensack, Hasbrouck Heights, Haworth, Hillsdale, Leonia, Little Ferry, Lodi, Maywood, Montvale, Moonachie, New Milford, Northvale, Norwood, Old Tappan, Oradell, Palisades Park, Paramus, Ridgefield, Ridgefield Park, River Edge, River Vale, Rochelle Park, Rockleigh, Rutherford, Saddle Brook, South Hackensack, Teaneck, Tenafly, Teterboro, Upper Saddle River, Wallington, Washington Township, Westwood, Woodcliff Lake, Wood-Ridge, Guttenberg, Hoboken, North Bergen, Secaucus, Union City, Weehawken, West New York and other towns through wholesale contracts. In addition to water received through its co-ownership of the Wanaque South project with NJDWSC, Suez Water (previously United Water New Jersey-UWNJ) system consists of four reservoirs in the Hackensack River Basin, four surface water diversions (the Wanaque-South project and intakes on the Saddle River, Hirschfeld Brook and Sparkill Creek), and a series of groundwater wells. The combined storage of the four reservoirs is approximately 13.9 billion gallons (BG). The total safe yield of UWNJ system is 126.5 MGD.

The four Hackensack River Basin reservoirs are as follows:

- Lake Deforest Reservoir is located 0.8 miles north of West Nyack, Rockland County, New York. The reservoir has a drainage area of 27.5 square miles and storage capacity of 5.67 BG.¹ The importance of interstate agreements and cooperation is clear considering that Suez New Jersey is reliant upon this source, which is located in New York State.
- Lake Tappan, downstream of Lake Deforest, is located 0.5 miles north of Old Tappan in Bergen County. The reservoir has a drainage area of 49 square miles and a storage capacity of 3.853 BG.
- Woodcliff Lake is a dammed impoundment along Pascack Brook, a tributary to the Hackensack River. The Lake is located 0.7 miles north of Hillsdale in Bergen County. The reservoir has a drainage area of 19.4 square miles and storage capacity of 0.871 BG.
- The Oradell Reservoir is the terminal impoundment of the Suez New Jersey system and is located on the Hackensack River at Oradell in Bergen County. The reservoir has a drainage area of 113 square miles and a storage capacity of 3.507 BG.

As an equal partner in the Wanaque-South Project with the NJDWSC, Suez New Jersey currently receives up to 48.0 MGD of water via the Oradell Aqueduct, a 17-mile pipeline that connects NJDWSC's Wanaque system and Suez's Oradell Reservoir. Intakes and pump stations on the Saddle River, Harshfeld Brook and Sparkill Creek can also be

¹ Located entirely in New York State, Lake DeForest principally is used to serve customers of Suez New York. However, under a bi-state agreement and Suez NY permitting condition, minimal releases from Lake Deforest must be made under certain conditions to maintain flow in the Hackensack River.

used to provide additional storage in the Oradell Reservoir. Finally, Suez operates raw water wells which deliver water into nearby surface sources flowing into the Oradell Reservoir.

PASSAIC VALLEY WATER COMMISSION

The Passaic Valley Water Commission (PVWC) treats and supplies water to the towns of Passaic, Paterson, Clifton, Lodi, Elmwood Park, Prospect Park, Little Falls, West Paterson, and other communities through wholesale contracts. The PVWC operates three intakes on the Pompton and Passaic Rivers (Jackson Avenue, Two Bridges, and Little Falls), and an off-stream reservoir, known as Point View. The Jackson Avenue Pump Station on the Pompton River houses five pumps with a capacity of 10 MGD each. PVWC is permitted to divert 1,550 MGM from this intake to fill the Point View Reservoir, but must maintain a 136.2 cubic feet per second (cfs) passing flow at the United States Geological Survey (USGS) gaging station, located downstream of the Jackson Avenue diversion. The Point View Reservoir has a maximum storage capacity of 2.9 BG. During times of low flow, releases are made from the reservoir to the Pompton River to ensure 75 MGD is available for diversion by PVWC at the Little Falls Pump Station and treatment plant. In addition, PVWC must maintain a minimum passing flow of 0.62 cfs for the Haycock Brook, immediately below the reservoir. The PVWC also operates intakes at the Two Bridges and Little Falls locations. They have two 50 MGD pumps in the Two Bridges Pump Station that divert water from the Pompton and Passaic Rivers. Water is transferred from Two Bridges to the Little Falls treatment plant via a 60-inch main. The Little Falls diversion is PVWC's farthest downstream diversion point, where three-60 MGD pumps divert water, via a canal off the Passaic River, to the treatment plant. The PVWC is permitted to divert up to 2,325 MGM from Two Bridges and/or Little Falls.

PVWC is also a member of the NJDWSC and receives 34.485 MGD from that source.

CITY OF NEWARK

The City of Newark Water Department serves the City of Newark, Pequannock Township, the City of East Orange, Wayne Township, the Town of Bellville, the City of Elizabeth, and Bloomfield Township. The City of Newark's water sources lie within the Pequannock Watershed, in the Townships of Kinnelon, West Milford, Jefferson, Hardyston, and Vernon. The City of Newark also owns approximately 80% of the property surrounding its reservoirs. The five main reservoirs of the Newark system – Echo Lake, Canistear, Oak Ridge, Clinton, and Charlottesburg Reservoirs – are all located on the Pequannock River or its tributaries, and are all wholly reliant on gravity flow for storage. The combined storage of the five reservoirs is 14.80 BG, while the safe yield of the entire system is 49.1 MGD. Newark also receives 49.4 MGD from the NJDWSC system.

Newark's Pequannock System Reservoirs

- Echo Lake Reservoir is located in Passaic County, 1.6 miles north of Charlottesburg and 1.9 miles upstream from the mouth of the Macopin River. The reservoir has a drainage area of 4.35 square miles including the Matthews Brook diversion and a storage capacity of 2.004 BG at spillway elevation.
- Canistear Reservoir is located in Sussex County, 1.8 miles northeast of Stockholm. It has a drainage area of 6.08 square miles and a storage capacity of 2.407 BG at spillway elevation.
- Oak Ridge Reservoir is located in Passaic County, at the dam of the Pequannock River, 0.9 miles southwest of Oak Ridge. The reservoir has a drainage area of 27.3 square miles and a storage capacity of 3.909 BG at spillway elevation.
- Clinton Reservoir is located in Passaic County, at the dam on Clinton Brook, 2.0 miles north of Newfoundland, NJ. It has a drainage area of 10.5 square miles and a storage capacity of 3.518 BG at spillway elevation.
- Charlottesburg Reservoir is located in Passaic County, 1.1 miles upstream from the Macopin River, and 1.5 miles southeast of Newfoundland, NJ. It has a drainage area of 56.2 square miles and has a storage capacity of 2.964 BG at spillway elevation with its bascule gate closed. This reservoir is where the Newark diversion is taken, consequently being the most downstream of the five reservoirs.

CITY OF JERSEY CITY

The Jersey City system is comprised of the Boonton Reservoir system and is owned by the City of Jersey City. Currently, operations of the Jersey City system have been granted to Suez under contract. The system supplies water to Jersey City, Caldwell, and Lyndhurst. The Boonton Reservoir System consists of two reservoirs located in the Rockaway River Watershed: Boonton Reservoir and Splitrock Reservoir. The system has a combined storage of 11.3 BG. The Boonton Reservoir is the southernmost of the two, and is the point of diversion for the water system treatment plant. A 7.9 MGD minimum passing flow requirement must be satisfied in the Rockaway River, downstream of the reservoir diversion. The safe yield of the system is 56.8 MGD and consists of only natural water flow into the reservoirs.

NEW JERSEY AMERICAN WATER COMPANY - PASSAIC SYSTEM

New Jersey American Water Company's Passaic system serves the following: Bedminster, Berkeley Heights, Bernard, Bernardsville, Chatham, Chester, Far Hills, Livingston, Long Hill, Maplewood, Millburn, New Providence, Short Hills, Springfield, Summit, West Orange and portions of City of Orange, Florham Park, Harding, Hillside, Livingston, Mendham, South Orange, Union, Warren, and Watchung. The Passaic System consists of a number of groundwater wells, three surface water intakes and three off-stream reservoirs located in the upper Passaic River Basin. These reservoirs are called Number 1, 2 and 3. The combined storage of the three is 2.84 BG. The safe yield of the entire system is 10.8 MGD, which is fed mainly by water pumped from two surface water sources – Canoe Brook and Passaic River.

CENTRAL DROUGHT REGION

NEW JERSEY WATER SUPPLY AUTHORITY

The New Jersey Water Supply Authority (NJWSA) owns and operates a surface water supply complex that indirectly supplies a large quantity of water to customers in Middlesex, Hunterdon, Mercer, Somerset, and Union. This complex is composed of three facilities: Spruce Run Reservoir, Round Valley Reservoir, and the Delaware & Raritan (D&R) Canal.

SPRUCE RUN AND ROUND VALLEY RESERVOIRS

Spruce Run Reservoir is located on the Spruce Run just north of Clinton, New Jersey. It has a drainage area of 41 square miles and a storage capacity of 11 BG. It is filled through natural flow from its two largest tributaries – Spruce Run and Mulhockaway Creek – and discharges into the South Branch of the Raritan River near Clinton. Statutory passing flows of 40 MGD at the USGS gaging station at Stanton and 70 MGD at the USGS stream gage at Manville are required.

Round Valley Reservoir is located just east of Spruce Run Reservoir. It has a storage capacity of 55 BG and is almost entirely reliant on water pumped from the South Branch of the Raritan River at the Hamden Pumping Station since its drainage area is a mere 5.7 square miles. Water can be released as needed to either the Hamden Pumping Station or the South Branch of Rockaway Creek (a tributary of the Lamington River) by gravity lines.

Water released from either reservoir travels downstream to maintain flow at the intake of New Jersey American Water/Elizabethtown Water Company and at the intakes of other users. There is also a required statutory passing flow of 90 MGD at the USGS stream gage at Bound Brook.

The Spruce Run and Round Valley systems have a safe yield of 176 MGD at Bound Brook. This, in combination with the D&R Canal safe yield of 65 MGD provides the NJWSA with a total yield of 241 MGD.

DELAWARE & RARITAN CANAL

Originally constructed in 1834 as a barge canal, the Delaware & Raritan Canal (D&R Canal) underwent extensive rehabilitation by the New Jersey Water Supply Authority in the 1980's. The D&R Canal is now operated to transfer water from the Delaware River into the Raritan River Basin for consumption. The feeder canal extends 22 miles along the Delaware River from Bull's Island, near Frenchtown, south to Trenton. The main canal runs 36 miles from Trenton to New Brunswick with a break at the Route 1 crossing.

The NJWSA is allocated up to 100 MGD of Delaware River water via the D&R Canal, although under the “1983 Good Faith Agreement” of the Delaware River Basin Commissioners, only 65 million gallons per day may be diverted during a Drought Warning or Emergency designated by the Delaware River Basin Commission. This potential reduction in allocation is currently reflected in the safe yield of the NJWSA System. Under the Flexible Flow Management Plan (FFMP), the Parties to the 1954 Supreme Court decree agreed to temporarily re-establish a portion of the allotment to 85 MGD under drought conditions.

Water in the D&R Canal is transported by gravity flow through Hunterdon, Mercer, and Somerset Counties along the path of the Millstone River to the Raritan River. Most of the safe yield of the system is diverted by purveyors at Bound Brook. At Bound Brook, the Raritan River, containing water released upstream from the Spruce Run and Round Valley Reservoirs, is directly adjacent to the D&R Canal, containing the Delaware River water. A pump station located at this point is able to transfer water between the Raritan River and D&R Canal.

COASTAL NORTH DROUGHT REGION

NEW JERSEY WATER SUPPLY AUTHORITY - MANASQUAN RESERVOIR

The New Jersey Water Supply Authority’s Manasquan Reservoir supplies water directly or indirectly to the following: Avon-by-the-Sea, Belmar, Brielle, Keyport, Lake Como, Matawan, Red Bank, Sea Girt, Spring Lake, Spring Lake Heights, Wall Township and New Jersey American Water. The Manasquan Reservoir is located entirely within the Manasquan River drainage basin in southeastern Monmouth County and northeastern Ocean County. It is located on Timber Swamp Brook, which is a tributary of the Manasquan River. The reservoir has a usable capacity of 4.67 BG and a 740-acre surface water body area, while having a safe yield of 30 MGD. The drainage area above the reservoir on Timber Swamp Brook is approximately 3.3 square miles, while the drainage area above the reservoir intake on the Manasquan River is approximately 65 square miles. The intake for the reservoir is located on the Manasquan River at Hospital Road, less than a half-mile west of the Garden State Parkway in Wall Township. The minimum passing flow on Timber Swamp Brook is 0.969 MGD, while the minimum passing flow below the intake on the Manasquan River is 8 MGD.

BRICK TOWNSHIP MUNICIPAL UTILITIES AUTHORITY

The Brick Township Municipal Utilities Authority (BTMUA) serves Brick, portions of Howell, and provides bulk sales to Point Pleasant Beach, Point Pleasant Borough, and Lakewood Township. The BTMUA has a number of groundwater wells (including those formerly owned by Parkway Water Company (PWC) due to BTMUA’s acquisition of PWC), two surface water intakes on the Metedeconk River, and a reservoir. The reservoir is located on a 120-acre tract that borders Brick and Wall Townships, has a water surface area of approximately 90 acres, and holds approximately one billion gallons of water. The reservoir is operated as a pump/storage facility which is fed by a 42” ductile iron pipe which pumps water from the Metedeconk River to the reservoir and releases through the same pipe via gravity. The Metedeconk River is fed by a 70-square mile watershed that traverses seven municipalities in northern Ocean and southern Monmouth counties. The BTMUA draws water from two sources: the river, which supplies 74 percent of the water, and BTMUA’s 2,000-foot-deep wells which draw water from the Raritan Magothy Aquifer. The existing allocation of the surface water system is 650 MGM, and 3.7 BG per year. The safe yield of the surface water system is calculated to be 17 MGD, based on the 1981 and 2002 droughts. In addition, the creation of the BTMUA reservoir (860 million gallons) increased the storage of the Coastal North Drought Region from 7.9 BG to 8.8 BG (an 11.39% increase). This system must maintain a passing flow at the North Branch of the Metedeconk River of 14 CFS.

NEW JERSEY AMERICAN WATER COMPANY - COASTAL NORTH SYSTEM - SWIMMING RIVER AND GLENDOLA RESERVOIRS

New Jersey American Water Company's (NJAWC) Coastal North System serves over 350,000 people within Monmouth and Ocean Counties. In addition to many groundwater wells, they divert water from intakes on the Jumping Brook and the Shark River, and operate the Swimming River and Glendola reservoirs. The Swimming River Reservoir has storage capacity of 2.3 BG, but a usable capacity of 1.82 BG. Its drainage area is 48.5 square miles. The Swimming River Reservoir is fed by the Ramanessin Brook, Fourth Creek, Bordens Brook, Willow Brook, Hopp Brook, Big Brook, Fulling Mill Brook, Barren Neck Brook, Trout Brook, Yellow Brook, Miry Bog Brook, Mine Brook, Slope Brook, Hockhockson Brook, and Pine Brook. These tributaries allow the Swimming River to meet its passing flow of 9.4 CFS (or 6 MGD) below the reservoir.

The Glendola Reservoir is operated as an "off-river" storage facility to provide storage for flows pumped from the Shark River and Jumping Brook. The property is located in the Glendola section of Wall Township. The reservoir has a drainage area of 16.0 square miles and a storage capacity of 1 billion gallons. It maintains passing flows of 1.25 MGD in the Shark River and 0.75 MGD in the Jumping Brook. The reservoir has a safe yield of 11.1 MGD, inclusive of the 5.4 MGD purchased from the New Jersey Water Supply Authority Manasquan System and pumped to the Glendola Reservoir.

COASTAL SOUTH DROUGHT REGION

ATLANTIC CITY MUNICIPAL UTILITIES AUTHORITY

The Atlantic City Municipal Utility Authority (ACMUA) was established on September 14, 1978 by action of the Board of Commissioners of the City of Atlantic City, who created it under the provisions of the New Jersey Municipal and County Utilities Law. On Jan 22, 1980, the ACMUA acquired the Atlantic City Water Utility and assumed operation and maintenance of the system. ACMUA now serves approximately 150,000 people in Atlantic County. The Authority's main facilities include two surface water reservoirs, Kuehnle and Doughty Ponds with a combined capacity of approximately 500 million gallons. The ACMUA also possesses twelve wells and three water towers with a combined capacity of more than 9 million gallons.