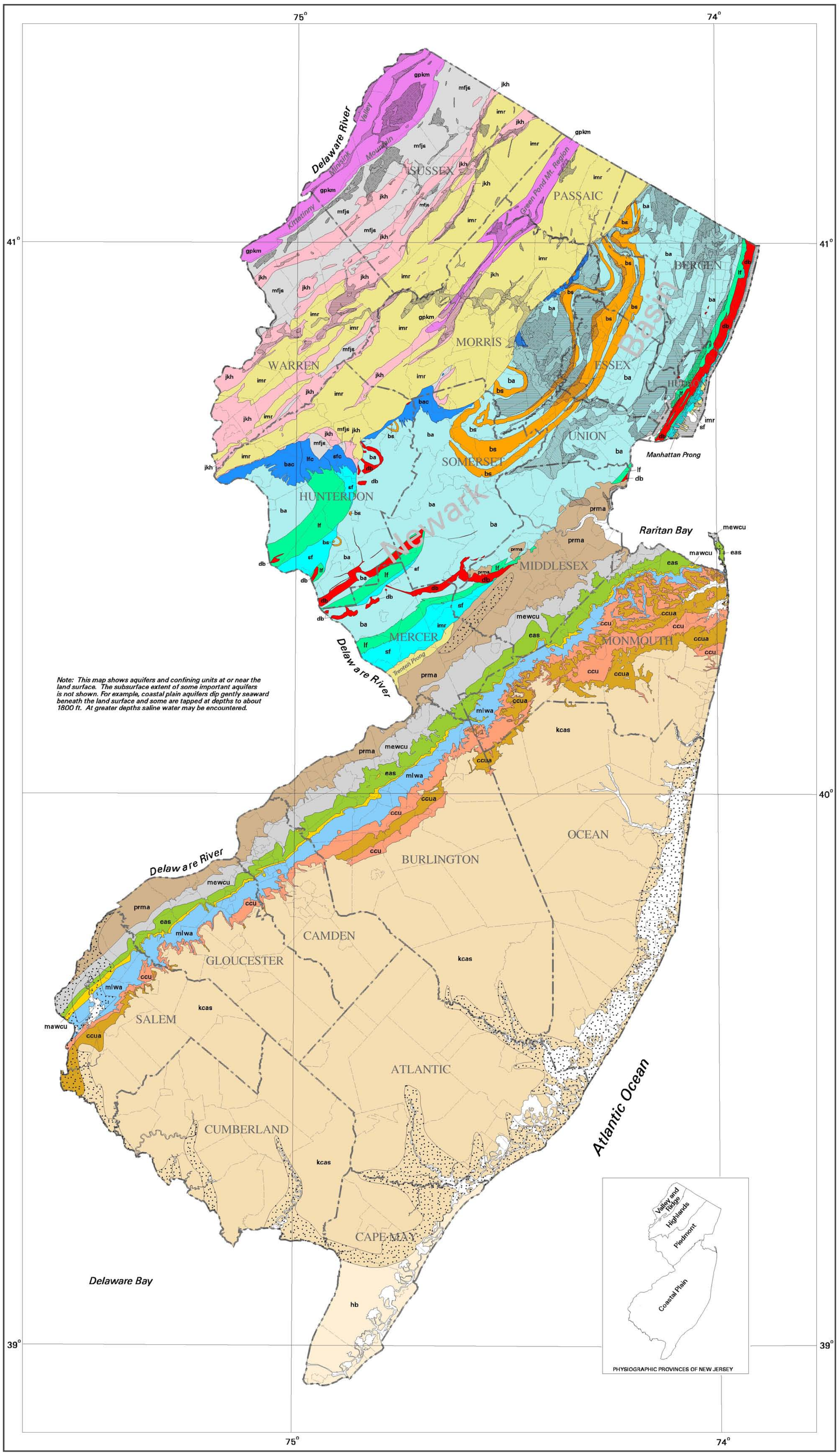
New Jersey Department of Environmental Protection (NJDEP), Division of Science and Research, 1998. Aquifers of New Jersey. G. C. Herman et al., Open File Map _OFM-24, New Jersey Geological Survey 1998. 1 Folio. Digital version at: http://www.state.nj.us/dep/njgs/pricelst/ofmap/ofm24.pdf.



SCALE 1:500,000

0 5 10 mi
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Aquifers of New Jersey

by

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NEW JERSEY DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Ranking Values for Aquifers and Confining Units in New Jersey

Aquifer Rank	Median Yields (gpm)
[A]	> 500
[B]	> 250 to 500
[C]	> 100 to 250
[D]	25 to 100
[E]	< 25

Aquifers in New Jersey can be ranked on their ability to yield ground water to high-capacity wells. These wells include water-supply, irrigation, and industrial-supply wells sited and tested for maximum yield. Many of the wells have boreholes exceeding the standard six-inch diameter for domestic wells. The five aquifer-rank values (A,B,C,D,E) are based on a statistical analysis of median yields for over 8000 high-capacity wells. Median yield is the statistical value for which there are an equal number of wells yielding greater and lesser volumes of water. Each aquifer or confining unit is assigned a rank based on its median yield or professional judgement where data are lacking. More than one ranking value indicates that well-yield data were analyzed for several lithologies within a map unit and well yields may vary considerably due to lithologic and structural influences.

DESCRIPTION OF AQUIFERS AND CONFINING UNITS

Glacial Aquifers and Confining Units

Till [D]

Morainic Deposits [D]

Lake-bottom Sediment [E]

Sand and Gravel [B]

Glacial deposits of boulders, gravel, sand, silt, and clay where thicker than 50 ft. Aquifers composed of stratified sand and gravel are confined in the subsurface by lake-bottom silt and clay, till, and morainic deposits. Sand and gravel includes glacial fans or deltas, fluvial outwash, and ice-contact deposits. Till and morainic deposits locally form aquifers where thick and sandy. Aquifers have primary intergranular porosity and permeability. Ground-water quality varies with the sedimentary texture and mineral content. Water is fresh, slightly alkaline, moderately-hard to hard, and of the calcium-bicarbonate type.

Aquifers and Confining Units of the Coastal Plain

Surficial sediments thicker than 50 ft. overlying Coastal Plain aquifers and confining units [C]. Includes beach, dune, deltaic, and marine sands, and recent alluvium. Sediments are considered part of the underlying aquifer or a minor aquifer atop a confining unit.

hb — Holly Beach water-bearing zone [C] - Water-table aquifer composed of sand, gravel, silt, and clay where thicker than 50 ft. Includes beach, dune, deltaic, and marine sands, and recent alluvium. Underlain by Estuarine Clay confining unit and Estuarine Sand aquifer. Primary intergranular porosity and permeability. Water is fresh, acidic, corrosive, and has low dissolved solids. Corrosivity decreases in confined parts. High iron and manganese locally. Salinity elevated in confined parts near coastal areas. Sodium chloride type water is common.

kcas — Kirkwood-Cohansey aquifer system [B-A] - Water-table aquifer composed of sand and gravel with lenses of silt and clay. Cohansey aquifer confined in Cape May County. Underlain by confined Kirkwood aquifers (Atlantic City 800-foot sand and Rio Grande water-bearing zone). Primary intergranular porosity and permeability. Leakage to confined parts provides water. Water is fresh, acidic, highly corrosive, and is low in dissolved solids. Less corrosive water is common in confined aquifers. Iron and manganese levels are locally elevated. Salinity may be elevated in confined parts near coastal areas. Sodium chloride type water is common.

ccu / ccua — Composite confining unit [E-B] - Silt and clay with localized sand lenses. Confining units include the Shark River, Manasquan, Hornerstown, and Tinton Formations, and the lower part (Sandy Hook Member) of the Red Bank Formation. Localized water-table aquifers (ccua) composed of massive quartz sand outcrop as the Vincentown Formation and the upper part (Shrewsbury Member) of the Red Bank Formation. These aquifers grade into confining units southeastward in the subsurface where the quartz sands become more glauconitic and silty. The Piney Point aquifer occurs near the top of the composite unit in the subsurface only. Water in the aquifers is generally good, but iron and manganese levels may be locally elevated and require chemical treatment. Calcium-bicarbonate type waters dominate.

mlwa — Mount Laurel-Wenonah aquifer [C] - Glauconitic sand overlying micaceous sand. Primary intergranular porosity and permeability. Water is fresh, moderately hard and alkaline. Calcium and magnesium levels decrease with depth. Locally elevated iron and manganese levels. Calcium-bicarbonate type waters dominate.

mawcu — Marshalltown-Wenonah confining unit [E] - Silt, clay, and thin layers of sand. Water is generally good but locally requires chemical treatment. Map unit only depicts Marshalltown Formation.

eas — Englishtown aquifer system [B] - Upper and lower sand with localized clay beds. Primary intergranular porosity and permeability in sands. Water is fresh, moderately hard and is alkaline. Salinity, sodium, and potassium levels increase with depth. Calcium and magnesium levels generally decrease to the southeast. Locally elevated iron and manganese levels. Calcium-bicarbonate type waters dominate.

mewcu — Merchantville-Woodbury confining unit [E] - Silt, clay, and thin layers of sand. Water is generally good but locally requires chemical treatment.

prma — Potomac-Raritan-Magothy aquifer system [A] - Interbedded sand, gravel, silt, and clay separated into lower, middle and upper aquifers. Includes the Raritan confining unit composed of interbedded sand, silt, and clay. Primary intergranular porosity and permeability. Water is fresh, moderately hard with a near-neutral pH. Salinity increases towards the coastline near Delaware and Raritan Bays. Elevated iron and manganese are common. Calcium and magnesium levels decrease and sodium and potassium levels generally increase to the southeast. Calcium-bicarbonate type waters dominate.

Fractured-rock Aquifers of the Newark Basin Part of the Piedmont

bs — Basalt [D] - Hard, dense, and highly-fractured igneous rocks. Ground water stored and transmitted in fractures. Water is normally fresh, slightly to highly alkaline, moderately hard, and of the calcium-bicarbonate type.

db — Diabase [E] - Hard and dense igneous rocks. Ground water stored and transmitted in fractures. Few high-capacity wells. Water is normally fresh, slightly to highly alkaline, moderately hard, and of the calcium-bicarbonate type.

ba / bac — Brunswick aquifer [C] - Sandstone, siltstone, and shale of the Passaic, Towaco, Feltville, and Boonton Formations. Ground water stored and transmitted in fractures. Water is normally fresh, slightly alkaline, non-corrosive and hard. Calcium-bicarbonate type waters dominate. Subordinate calcium-sulfate waters are associated with high total dissolved solids. Includes conglomerate facies (bac) along the northwest margin of the basin.

lf / lfc — Lockatong Formation [D] - Silty argillite, mudstone and fine-grained sandstone and siltstone with minor limestone. Ground water stored and transmitted in fractures. Wells completed in the conglomerate facies (lfc) generally show increased capacities. Water is normally fresh, slightly alkaline, noncorrosive and hard. Calcium-bicarbonate type waters dominate.

sf / sfc — Stockton Formation [C] - Arkosic sandstone. Ground water stored and transmitted in fractures. Water is fresh, slightly acidic, corrosive and moderately hard. Calcium-bicarbonate type waters dominate. Includes conglomerate facies (sfc) along the northwest margin of the basin.

Fractured-rock Aquifers of the Valley and Ridge, Highlands and Trenton and Manhattan Prongs of the Piedmont

gpkm — Rocks of the Green Pond Mountain Region, Kittatinny Mountain, and Minisink Valley [D] - Quartzite and sandstone underlie mountainous ridges. Sandstone, siltstone, shale, and limestone underlie mountain flanks and adjacent valleys. Unit includes the stratigraphic interval from the Skunnemunk through Green Pond Conglomerates in the Green Pond Mountain Region, and the Marcellus Shale through Shawangunk Conglomerate in the Minisink Valley and Kittatinny Mountain areas. Limestone provides best yields. Ground water stored and transmitted in fractures. Fractures in limestone are locally enlarged by chemical weathering. Water is generally good but chemical treatment may be locally required for hardness, iron and manganese.

mfjs — Martinsburg Formation and Jutland Sequence [D] - Claystone slate, siltstone, sandstone, with minor limestone and dolomite. Ground water stored and transmitted in fractures. Water is fresh, slightly alkaline, noncorrosive, and moderately hard. Calcium-bicarbonate waters dominate.

jkh — Jacksonburg Limestone, Kittatinny Supergroup, and Hardyston Quartzite [C-B] - Dolomite and limestone with minor shale, sandstone, and quartzite. Ground water stored and transmitted in fractures. Fractures in dolomite and limestone are locally enlarged by chemical weathering. Water is fresh, slightly alkaline, noncorrosive and hard. Calcium-magnesium-bicarbonate type waters dominate.

imr — Igneous and metamorphic rocks [D] - Gneiss, granite, schist, and marble. Ground water stored and transmitted in fractures. Fractures in marble are locally enlarged by chemical weathering. Average water from non-marble units is fresh, slightly acidic, corrosive and moderately hard. Water from marble has higher TDS, alkalinity, pH, hardness, and is less corrosive. Calcium-bicarbonate type waters dominate. Chemical treatment may be locally required for hardness, iron, and manganese.

DATA SOURCES

State, county, and municipal boundaries from GIS reference files of the N.J. Dept. Environmental Protection. All data generated in 1927 North American Datum (NAD27) state-plane-coordinate (SPC) feet and projected into NAD83 SPC feet except where noted below.

Bedrock geologic data from 1:100,000 scale ARC/INFO GIS coverages compiled by the N.J. Geological Survey. Data generalized to the 1:250,000 scale by removing polygons with areas less than 1,000,000 sq. ft. (about 23 acres).

Glacial geologic data generalized from N.J. Geological Survey Digital Geodata Series DGS 96-1. Coverage generated by clipping the statewide coverage with 50 ft. isopach contours from the sediment-thickness coverage, and generalized by removing polygons with areas less than 1,000,000 sq. ft.

Map extent for surficial sediments thicker than 50 ft. overlying Coastal Plain aquifers and for Holly Beach water-bearing zone compiled at the 1:500,000 scale in 1983 NAD83 SPC feet by the authors for this map.

Well-yield data from unpublished databases on file at the offices of the N.J. Geological Survey, PO Box 427, Trenton, NJ 08625.

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