NEW JERSEY GEOLOGICAL AND WATER SURVEY
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STATE OF NEW JERSEY
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BEDROCK GEOLOGIC MAP of NEW JERSEY 2014

compiled by
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from maps by
Avery A. Drake and others, 1996
James P. Owens and others, 1998

cross sections by
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EXPLANATION

This map is a general overview of the bedrock geology of the state. It is an updated version of Atlas Sheet 40, Geology of New Jersey (Lewis and Kümmel, 1910-1912), and is based on New Jersey Geological Survey (2000). In order to provide a legible map product at this scale, it was necessary to combine many of the units shown on larger scale maps into new units. As a result, some units of small areal extent, small faults and igneous dikes are not shown on this map. This map is not intended to be used as a source of detailed geologic mapping for a particular area; the 1:100,000-scale statewide geologic maps or the 1:24,000-scale geologic quadrangle maps should be consulted.

This 1:250,000-scale map differs from Atlas Sheet 40 in the greater number of geologic units recognized, mainly through regional mapping that was completed from 1985 to 1995, as well as the fact that Quaternary units shown on Atlas Sheet 40 are not depicted on this map. They will be shown on a companion 1:250,000-scale surficial map. The locations of the cross sections are similar on Atlas Sheet 40 to highlight changes in geologic interpretation.

There are a few changes to descriptions of some of the units on this map relative to the 1:100,000-scale map (New Jersey Geological Survey, 2000). The latter is based on geologic mapping completed before 1998, and subsequent work has resulted in nomenclature changes. For instance, unnamed unit at Cape May (upper Pliocene) is now named Stone Harbor Formation (Sugarman and others, 2007), and lower member of the Kirkwood Formation (lower Miocene) is now named Brigantine Member (Sugarman, 2001). There also have been a few changes to the ages of some units. A refinement of the global stratigraphic column (U.S. Geological Survey, 2010) raises the Ordovician-Cambrian boundary and changes the age of the Beekmantown Group from Lower Ordovician to Lower Ordovician and Upper Cambrian and of the Allentown Formation from Lower Ordovician and Upper Cambrian to Upper Cambrian.

DESCRIPTION OF MAP UNITS

COASTAL PLAIN SEDIMENTS

Stone Harbor Formation (new name) **(upper Miocene) -** Interbedded gravel, sand, and clay

Cohansey Formation (middle Miocene) - Quartz sand, white to yellow, medium- to coarse-grained, cross-bedded. Local clay, gravel, and ironstone beds

Kirkwood Formation (middle and lower Miocene)

Belleplain Member (middle Miocene) - Sand, gray to white, fine- to medium- grained, micaceous; wood and shell fragments. Lower part - Silty clay, gray-brown, laminated; diatoms and shell fragments

Wildwood Member (middle and lower Miocene) - Clay, silty, gray to olive-gray, locally interbedded sand. Diatoms, wood and shell fragments

Shiloh Marl Member (lower Miocene) - Clay, dark-gray, locally with large shells

Brigantine Member (new name) **(lower Miocene) -** Sand, light-yellow to white, fine- to medium-grained, micaceous. Lower part - Clay and clay-silt, dark-gray, micaceous, with wood fragments

Shark River Formation (upper and middle Eocene) - Glauconite sand, silt, and clay, light-brown to gray, medium- to coarse-grained, locally indurated

Manasquan Formation (lower Eocene) - Clayey quartz sand or silt, blue-green, fine-grained. Lower part - Clayey quartz-glauconite sand, dark green

Vincentown and Hornerstown Formations, undivided (upper and lower Paleocene) - Vincentown - Quartz sand, yellow to pale-gray, medium-grained, shelly, glauconitic; clayey near base. Local calcarenite, coquina, and bryozoan reefs. Hornerstown - Glauconite sand, clayey, dark-green, fine- to medium-grained

Tinton and Red Bank Formations, undivided (Upper Cretaceous) - Tinton - Quartz and glauconite sand, dark-gray to dark-yellow, clayey. Locally indurated by siderite. Shrewsbury Member of Red Bank - Quartz sand, clayey, light-yellow to dark-brown, fine- to coarse-grained, micaceous

Red Bank and Navesink Formations, undivided (Upper Cretaceous) - Sandy Hook Member of Red Bank - Quartz sand, dark-gray, fine-grained, clayey, micaceous, fossiliferous. Navesink - Glauconitic sand, clayey and silty, gray to dark gray-green, medium-grained, locally with large shells

Mount Laurel Formation (Upper Cretaceous) - Quartz sand, coarsens upward, interbedded thin clay beds. Minor glauconite

Wenonah and Marshalltown Formations, undivided (Upper Cretaceous) - Wenonah - Quartz sand, silty to clayey, dark- to medium-gray, fine-grained; mica, lignite. Marshalltown - Quartz and glauconite sand, silty to clayey, dark-gray, fine- to medium-grained

Englishtown Formation (Upper Cretaceous) - Quartz sand, medium- to dark-gray, fine- to coarse-grained, gravelly, cross-bedded, locally with dark-gray clay beds. Abundant carbonaceous matter, especially in clay

Woodbury Formation (Upper Cretaceous) - Clay-silt, dark-gray, micaceous, locally quartz or glauconite laminae

Merchantville Formation (Upper Cretaceous) - Glauconite sand, very clayey and silty, grayish-olive-green to dark-greenish-gray; locally abundant quartz

Magothy Formation (Upper Cretaceous) - Quartz sand, white, fine- to coarse-grained, locally gravelly; thin interbedded dark-gray clay or clay-silt in upper part. Wood fragments in clay

Raritan Formation (Upper Cretaceous) - Silt and clay, dark-gray; locally interbedded sand, clayey, light-gray, fine- to very fine-grained, micaceous. Wood fragments coated with pyrite. Siderite in discontinuous beds and flattened concretions

Potomac Formation, (Upper Cretaceous) - Sand, light-colored, fine- to coarse-grained; local gravel, cross-bedded. Interbedded with white or variegated red and yellow massive clay

NEWARK BASIN Intrusive Rocks

Diabase (Early Jurassic) - Diabase, fine- to medium-grained; massive to columnar jointed

Sedimentary and Bedded Volcanic Rocks

Boonton Formation (Lower Jurassic) - Sandstone, siltstone, and silty mudstone; reddish-brown. Jbc - Local quartz-pebble conglomerate

Hook Mountain Basalt (Lower Jurassic) - Basalt, fine- to locally coarse- grained; massive to columnar jointed. Possibly three major flows

Towaco Formation (Lower Jurassic) - Sandstone, siltstone, and silty mudstone in upward-fining sequences; reddish-brown, micaceous. Jtc - Locally conglomerate and conglomeratic sandstone

Preakness Basalt (Lower Jurassic) - Basalt, fine- to locally coarse-grained; massive to columnar jointed. Jps - Reddish-brown siltstone and shale separates lower two of three major flows

Feltville Formation (Lower Jurassic) - Interbedded sandstone, siltstone, and silty mudstone in upward-fining cycles. Jfc - Locally conglomeratic

Orange Mountain Basalt (Lower Jurassic) - Basalt, fine-grained; massive to columnar jointed. Upper flow of three major flows locally pillowed

Passaic Formation (Lower Jurassic and Upper Triassic) - Sandstone, siltstone and shale; reddish-brown to purple and gray. JTrpsc - Local pebbly sandstone and conglomerate

Lockatong Formation (Upper Triassic) - Argillite, mudstone, sandstone, siltstone; gray, and minor limestone. Trlr - Grayish-red, grayish-purple and dark brownish-red sequences. Trlc - Arkosic sandstone, sandstone and conglomerate near border fault

Stockton Formation (Upper Triassic) - Arkosic sandstone and mudstone, siltstone, and shale; grayish-brown to reddish-brown. Trsc - Pebbly sandstone and conglomerate near border fault

GREEN POND MOUNTAIN REGION

Skunnemunk Conglomerate (Middle Devonian) - Conglomeratic sandstone, grayish-purple, cross-bedded, with interbedded shale

Bellvale Sandstone (Middle Devonian) - Sandstone, grayish-red, pebbly, with interbedded siltstone, sandstone and black shale at base

Kanouse Sandstone, Esopus Formation, Connelly Conglomerate and Berkshire Valley and Poxono Island Formations, undivided (Lower Devonian and Upper Silurian) - Kanouse- Sandstone and pebble conglomerate. Esopus - Gray siltstone, mudstone and sandstone. Connelly - Quartz-pebble conglomerate. Berkshire Valley - Fossiliferous limestone. Poxono Island - Dolomite, sandstone, siltstone, shale, and conglomerate

VALLEY AND RIDGE PROVINCE
(including age-equivalent units of the Newark Basin and the Green Pond Mountain Region)

Marcellus Shale (Valley and Ridge) **and Cornwall Shale** (Green Pond Mountain Region) **(Middle Devonian) -** Shale, dark-gray to grayish-black, fossiliferous, interbedded with siltstone

Buttermilk Falls and Onondaga Limestones, undivided (Middle Devonian) - Limestone, medium- to dark-gray, fossiliferous, and nodular black chert

Schoharie and Esopus Formations and Oriskany Group (Ridgely Sandstone, Shriver Chert and Glenerie Formation), undivided (Lower Devonian) - Schoharie - Calcareous siltstone and silty limestone, black chert. Esopus - Silty shale, siltstone and calcareous siltstone. Oriskany - Fossiliferous quartz-pebble conglomerate and sandstone, grading into siltstone, shale and limestone to northeast

Helderberg Group (Port Ewen Shale, Minisink Limestone, New Scotland Formation, Kalkberg Limestone, Coeymans Formation and Manlius Limestone), Rondout and Decker Formations and Bossardville Limestone, undivided (Lower Devonian and upper Silurian) - Shale grading into fossiliferous limestone that grades into pebbly calcareous sandstone. Bioherms present

Poxono Island Formation (upper Silurian) - Dolomite and quartz sandstone interbeds

Bloomsburg Red Beds (Valley and Ridge) **and Longwood Shale** (Green Pond Mountain Region) **(upper Silurian) -** Interbedded shale, siltstone, sandstone; red. Local quartz-pebble conglomerate

Shawangunk Formation (Valley and Ridge) **and Green Pond Conglomerate** (Green Pond Mountain Region) **(middle and lower Silurian) -** Sandstone, quartzite and quartz- pebble conglomerate, whitish in west and reddish in east

Nepheline syenite (Silurian and Ordovician) - Alkalic to alkalic-calcic nepheline syenite

Ouachitite breccia (Silurian and Ordovician) - Olivine-free biotite lamprophyre. Xenoliths of older rocks

Martinsburg Formation, undivided (Upper Ordovician) - Interbedded graywacke, siltstone and slate with laminated to thick-bedded shale, slate, and siltsone

High Point Member (Upper Ordovician) - Thin-bedded shale, siltstone, and medium- to thick-bedded sandstone

Ramseyburg Member (Upper Ordovician) - Interbedded graywacke and siltstone with shale and slate

Bushkill Member (Upper Ordovician) - Interbedded thinly laminated to thick-bedded shale and slate, and laminated to thin-bedded siltstone

Jacksonburg Limestone and sequence at Wantage (Upper Ordovician) - Jacksonburg - Argillaceous limestone overlying fossiliferous limestone. Wantage - Discontinuous; interbedded siltstone, shale, conglomerate, limestone, and dolomite

Kittatinny Supergroup (Lower Ordovician and Cambrian)

Beekmantown Group (Lower Ordovician and Upper Cambrian) - Dolomite, dark-gray, locally fetid, with nodular and rugose chert overlying laminated dolomite and local limestone. Lower part - Medium-bedded dolomite with chert

Allentown Dolomite (Upper Cambrian) - Dolomite, minor orthoquartzite, and shale. Ripple marks, cross-beds, edgewise conglomerate, mud cracks, oolites, and stromatolites

Leithsville Formation and Hardyston Quartzite, undivided (Middle to Lower Cambrian) - Leithsville - Dolomite and siliciclastic rocks. Hardyston - Quartzite, arkosic sandstone, and dolomitic sandstone

JUTLAND KILPPE SEQUENCE

Rocks of the Jutland klippe sequence, undifferentiated (Middle Ordovician to Upper Cambrian?) - Interbedded shale, dolomite, limestone, siltstone, and sandstone

MANHATTAN PRONG

Manhattan Schist (Lower Cambrian and/or Neoproterozoic?) - Mica schist and gneiss, medium dark-gray, medium- to coarse-grained

Serpentinite (Lower Cambrian and/or Neoproterozoic?) - Serpentinite, light yellowish-green to dark-green, fine-grained, massive

TRENTON PRONG

Wissahickon Formation (Lower Cambrian and/or Neoproterozoic?) - Mica schist and gneiss, medium- to coarse-grained, foliated, gray to pinkish-gray

Metabasalt (Neoproterozoic?) - Intercalated dark greenish-gray, fine-grained greenstone, and grayish-green, fine- to medium-grained green schist

Metagabbro and rocks of intermediate composition (Mesoproterozoic?) - Metamorphosed gabbro and/or diorite and andesite, medium-grained, medium-gray to very dark greenish-gray

Gneiss, granofels and migmatite (Mesoproterozoic?) - Includes various gneiss and schist. Buff, tan, light-gray, greenish-gray, or pinkish-white, medium- to coarse-grained

NEW JERSEY HIGHLANDS

Mount Eve Granite (Mesoproterozoic) - Granite, light-gray to pinkish-gray, medium- to coarse-grained, massive

Byram Intrusive Suite, undivided (Mesoproterozoic) - Granite, alaskite, quartz monzonite, and monzonite. Pinkish-white or light pinkish-gray, medium- to coarse-grained, massive

Lake Hopatcong Intrusive Suite, undivided (Mesoproterozoic) - Granite, alaskite, quartz monzonite, and monzonite. Greenish-gray, medium- to coarse-grained, massive

Marble (Mesoproterozoic) - Marble, white or grayish-white, fine- to coarsely crystalline, calcitic to locally dolomitic. Host rock of Franklin and Sterling Hill zinc-iron-manganese deposits

Metasedimentary and metavolcanic rocks, undifferentiated (Mesoproterozoic) - Gneiss, locally rusty, pinkish-white, light-gray, or greenish-gray, medium-grained, moderately foliated to well layered

Losee Metamorphic Suite, undivided (Mesoproterozoic) - Gneiss, granite and metadiorite, light-greenish-gray or greenish-gray, medium- to coarse-grained, massive to layered

Amphibolite, mafic gneiss and microantiperthite alaskite, undifferentiated (Mesoproterozoic) - Amphibolite and mafic gneiss - Grayish-black, fine- to medium-grained, foliated. Microantiperthite alaskite - Light greenish-gray, medium- to coarse-grained, massive

DESCRIPTION OF MAP SYMBOLS

Contact (white)
Fault
Municipal boundary
County boundary
State boundary
Road

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Base map (shoreline, water and roads) digitized from 1:24,000-scale aerial photographs. Boundaries from NJDEP database. North American Datum 1983 (NAD83).

Valley & Ridge
Highlands
Piedmont
Coastal Plain

Physiographic Provinces of New Jersey

GIS/Cartography by
Zehdreh Allen-Lafayette, Michael W. Girard,
William P. Graff, Ronald S. Pristas

0 5 10 miles
0 5 10 kilometers
scale 1:250,000

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NEW JERSEY GEOLOGICAL AND WATER SURVEY 1835

Cross Section A - A'

Delaware River | Peters Valley | Branchville | Walkill River | Green Pond | Ramapo Fault Throws | Second Watchung Mountain | First Watchung Mountain | Nutley | Hackensack River | The Palisades

2500 feet SEA LEVEL — No vertical exaggeration

Cross Section B - B'

Delaware River | Kittatinny Mountain | NJ 94 | Interstate 80 | Musconetcong River | Chester | Bernardsville | Ramapo Fault | Interstate 78 | NJ Turnpike

2500 feet SEA LEVEL — No vertical exaggeration

Cross Section C - C'

Delaware River | Musconetcong River | Frenchtown | US 202 | Interstate 95 | Trenton

2500 feet SEA LEVEL — No vertical exaggeration

Cross Section D - D'

Bordentown | North Branch Rancocas River | NJ 70 | NJ 72 | Garden State Parkway | Little Egg Harbor

200 feet SEA LEVEL — Vertical exaggeration X20

Cross Section E - E'

Delaware River | Interstate 676 | US 130 | Interstate 295 | NJ Turnpike | Otter Brook | Pines Run | Estell

200 feet SEA LEVEL — Horizontal scale: 1:62,500; Vertical scale: 1:6,250; Vertical exaggeration X10

ATLANTIC OCEAN
Delaware Bay
DELAWARE
PENNSYLVANIA
NEW YORK
Hudson River
Raritan Bay
Newark Bay
Barnegat Bay
Little Egg Harbor
Great Bay
Great Egg Harbor