Environmental Impact Statement
For
Preliminary Minor Subdivision

Forrest View Estate

Block 116
Lots 47
239 Mountainside Road
Township of Mendham
Morris County, New Jersey

April 1, 2023

Prepared by:
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Certified Engineering, of NJ (CENJ), in accordance with the Mendham Township's Land Development Ordinances; specifically, Chapter XVII, Environmental Impact Study has prepared this Environmental Impact Statement (EIS). The scope of this EIS is limited to this regulation.

As per the Township ordinance Section 17-2.1.a. an EIS is required. The outline of the EIS is set forth in Section 17-3, and is listed as follows:

a. An Inventory of Existing Environmental Conditions
b. Plan and Description of Development
c. Assessment of the Anticipated Impact of the Project
d. Statement of Alternatives
e. Statement of Permits Required
f. Environmental Constraints Map

The following is our findings of the existing environmental features.

a. <u>An Inventory of Existing Environmental Conditions</u>

1. *<u>Description of Property:</u>* The existing site located at 239 Mountainside Road, Block 47 Lot 116 is a wooded tract of land approximately 7.496-acres. The site is located in the Township of Mendham, Morris County NJ. Current site is zoned R3 Residential single family. The entire tract is proposed to be sub-divided into two lots 3.0 acre lots.

The project is proposing a Minor Subdivision of two lots: Lot 1.01 = 3.607-acres and Lot 1.02 = 3.741-acres, with roadway ROW = 0.148-acres, for the approximate 7.496-acre site. This anticipated subdivision complies with current R3 zoning, 3-acres (min.) Single Family residential.

The site is located in the Highlands Planning Area. Based on NJDEP Geo-Web Mapping, there are no environmentally sensitive areas onsite. There are no stream corridors, wetlands, or wetlands buffer on the site. The site is located in the Skylands, but there is no T&E Species or habitats and there are no timing restrictions for the removal of trees.

The information on the site is as follows:

1.) The property is located in the Highlands Planning Area.
2.) The site does not lie in a Flood Hazard Area or associated Riparian Zone.
3.) There are no wetlands, streams and/or open bodies of water (C1 waters) on site, nor is the property located in any transition area or 300-foot buffer to an environmentally sensitive area.
4.) There are no Threatened or Endangered (T&E) species on site. Skylands indicate Wood Thrush, which is not listed as a T&E and requires no timing restrictions.
5.) The area does not contain any environmentally sensitive habitats.

In addition to the NJDEP site, we also obtained Site Soils information from the USDA NRCS soils map and report and the site is mostly composed of gravely sandy loam, Hydrologic Soil Group B.

Depth to ground water is anticipated to be over 80-inchces or about 7-feet.

We have also referred to the Highlands Council Interactive Map and confirmed project location and lack of environmentally sensitive areas on site. The map also provides a Critical Slope analysis. The project site is mostly flat and there are no critical slopes on site with the exception of the north-west corner of the site, which indicates the area is mostly moderately sloped. As summary of the proposed slope disturbance is provided on the table below.

TABLE A SLOPE ANALYSIS

LAND SLOPE		AREA (ACRES)	MAXIMUM ALLOWABLE DISTURBANCE (%)	MAXIMUM ALLOWABLE DISTURBANCE (ACRES)	PROPOSED DISTURBANCE (ACRES)	VARIANCE REQUIRED?
SYMBOL	CATEGORY (%)					
	0-10	5.2046	100%	5.2046	0.000	NO
	10-15	0.9779	25%	0.2445	0.000	NO
	15-25	1.0534	15%	0.1580	0.000	NO
	25+	0.2597	5%	0.0130	0.000	NO
TOTAL DISTURBANCE		7.4956	N/A	5.6201	0.000	NO

The natural landscape contains almost no critical slopes. This will minimize earthwork and disturbance to the natural landscape and minimizes/eliminates construction of retaining walls. The existing project site is wooded with a predominant Type B Soil. Sheet flow from the site runs in a north south direction, with portions of the site near Mountainside Road flowing to the south west. There are five points of discharge which can be clearly delineated form the existing site topography. These points have been identified on the predeveloped drainage area map and postdeveloped drainage area map as part of the stormwater management for the proposed improvements. The maps are provided in the stormwater report under separate cover. The points are described below for general overview of the existing site hydrologic flow patterns.

1. Point of analysis (DA-1) sheet flows across Mountainside Road, towards the south east, to adjacent woods and an existing paved drive (Homan Lane).
2. DA-2 sheet flows across the site to Mountainside Road.
3. DA-3 sheet flows across the site towards the adjacent property to the south east.
4. DA-4 sheet flows across the site towards the adjacent wooded property on the east side.
5. DA-5 sheet flows across the site towards the north east side.

As part of our study, we have contracted Environmental Technology, Inc. (ETI) and perform a wetlands investigation to determine any impacts from wetlands, buffers, riparian zones, and flood hazard areas. The study concluded there are no wetlands, open waters, ponds, streams or on site. Towards the North West corner of the site there is a 300-foot riparian buffer from the adjacent Lot 49, Block 116. The buffer has been taken from an LOI approved by NJDEP (copy in **Appendix F**) and

has been surveyed and shown on the site plans. The area, approx. 4,753-sf will be deed restricted, with metes and bounds included on the site survey and base maps Prepared by Shann Associates (copy in **Appendix F**). A copy of the report summary and findings from ETI is attached in **Appendix A**.

2. *Air quality:* Existing ambient air quality for Criteria Pollutants in the Morris County Region was obtained from NJDEP Bureau of Air Monitoring, 2018 NJ Air Quality Report, published November 19, 2019. A co[y of the Executive Summary is provided in **Appendix B**.

The criteria pollutants are: carbon monoxide (CO), nitrogen oxides (NO2), ozone (O3), sulfur dioxide (SOA), particulate matter (PM) and lead (Pb). Because ambient levels have dropped far below the standard throughout the state, lead is only monitored through the Bureau of Air Quality Monitoring Network at the New Brunswick station. Ambient air quality data is used as the baseline for evaluating the effect of the construction of new emission sources or of modifications to existing sources. New stationary sources of air contain information require permits from the NJDEP, Bureau of Air Quality.

Air Quality monitoring for criteria pollutants is performed by the NJDEP in five locations in Region 3 Suburban Region, which includes Morris, Somerset and Middlesex Counties.

The effects to the site can be assumed to be from the diesel emissions of construction vehicles fore proposed construction activities. Diesel exhaust is a complex mixture of compounds in gas and particle form. Particulate matter produced by diesel engines, or diesel PM, degrades air quality. Localized high levels of diesel PM may occur in Mendham Township from local sources such as trucks, construction vehicles and buses that emit a mixture of primarily gas and solid pollutants including black carbon soot.

According to NJDEP it is difficult to measure the level of diesel emission in the atmosphere because diesel emission is a complex mixture of substances. NJDEP has been seeking an effective way to develop a measurement process for determining levels of exposure to diesel within the state.

As such, the construction of the site will be a limited time frame, in which the use of heavy construction equipment will be utilized.

- Initially the site will be cleared of trees (only those marked to be removed). We anticipated four (4) weeks.
- The next activity will be the grading of the site to move the earth and set the base for the roadway and future homes, six (6) weeks.
- After which the loose earth will be compacted, and the roadway established to a base course, four (4) weeks.
- The site grading will continue to install the stormwater and utilities, say another two (2) weeks.
- Finally, the erection of the individual homes will take place.

At the time of the erection of the individual homes, the use of heavy construction machinery such

as Dozers and Front-End Loaders will no longer be required. These will be the machinery that will produce the heavier emissions limited to eight hours per day. However, the machines will have periods of inactivity during the day for which they will not be running. There will be no idling. Signs will be posted.

Construction material deliveries will be minimized by bulk deliveries and storage of the materials on site reducing the number of trips per truck. A fork-lift is anticipated to be the most widely use machinery to deliver and help bring in the materials for construction to each unit.

We anticipate the completion of the site can be done in approximately six (6) months' time, of which at the most 16-weeks will be heavy equipment use. The remaining period will be light trucks no different than those in and around the Township.

Air toxics able a large group of pollutants that are likely to be emitted into the atmosphere in large enough quantities to result in adverse health effects. Although there is no Federal air quality standard for these toxicants, Congress in 1990 directed the EPA to begin addressing 200 of these substances by developing technology control standards.

3. *Surficial & Bedrock Geology:* The site is located in the areas of gneiss and granite according to the New Jersey Geological and Water Survey. This region has the capability of recharging 20 to 23 inches of rainfall per year. Maps of the Ground Water Recharge for Morris County and Bedrock Geology are provided in **Appendix C**.

4. *USDA Soils:* The subject property comprises four soil groups as described by the USDA Web Soil Survey. These are listed below. The site is predominantly Hydrologic Soil Group Type B. A copy of the USGS SURGO Soil Report indicating the site soils and properties is provided in **Appendix D**.

We contracted with Van Cleef Engineering to perform on-site geotechnical investigations. Soil borings, test pits, laboratory and on-site tests were performed to determine the soil type, depth of seasonal high groundwater and percolation rates throughout the site at all locations for stormwater management facilities, basin, rain gardens, dry wells, and septic systems. A copy of the investigation performed by Van Cleef Engineering is provided in **Appendix E**.

1. Soil type "GKAOB" is Gladstone gravelly loam, 3 to 8 percent slopes. USDA textures ranged from gravely to sandy with a Hydrologic Soil Group of B.

2. Soil type "PAOC" is Parker Gravely Sandy Loam, 3 to 15 percent slopes. USDA texture is very gravely to very sandy with a Hydrologic Soil Group of B.

3. Soil type "PAUDC" is Parker- Gladstone complex, 15 to 25 percent slopes. USDA textures is very gravely to very sandy with a Hydrologic Soil Group of B.

4. Soil type "PAUCC" is parker- Gladstone complex, 0 to 15 percent slopes. USDA texture is very gravely sandy loam with a Hydrologic Soil Group of B.

5. *Topography:* The topography can be seen on the Topographical Survey Map prepared by Andre Schan and Associates, attached is **Appendix F**. The natural landscape contains mostly flat slopes 0% to 10%, with some critical slopes 15% and greater at the North West end of the site. Table A Slope Analysis provided above summarizes the on-site slope topography.

6. *Hydrology:* The existing project site is wooded with moderate slopes and predominant Type B Soils. Sheet flow from the site runs in a north south direction, with portions of the site near Mountainside Road flowing to the south west. There are five points of discharge which can be clearly delineated form the existing site topography. These points have been identified on the predeveloped drainage area map and postdeveloped drainage area map as part of the stormwater management for the proposed improvements. The maps are provided in the stormwater report under separate cover, for general overview of the existing site hydrologic flow patterns. The points of analysis (POA) are described above in Section a. 1.

7. Source of Water: The site is located downstream of a small drainage area. The area above the site is developed with single family home. The flow of surface runoff sheet flows across the site in a south to North West direction. Based on site investigations performed by ETI there are no flood hazard areas, wetlands, ponds, streams, or other existing sources of water on site.

8. Groundwater: Van Cleef Engineering was contracted to perform a site soils investigation to determine the depths to seasonal high groundwater in accordance with **Appendix E** of the NJDEP SWM Manual. Test pits and borings and site infiltration testing were performed for proposed stormwater management (SWM) facilities and the proposed septic systems. The testing and excavations were witnessed by the Township Board of Health. Based on research and site-specific data collected and tested, there was no soil mottling, or the groundwater encountered in depths of over eight feet.

9. Water Quality: As stated above in 6 and 7, there are no contributing surface water bodies to the site.

10. Flora & Fauna: This item is not required for a major subdivision in the R zone.

11. Flora & Fauna Survival: The site is forested. There are no rare or endangered plants since there is no surface hydrology to support these plants. There are no bodies of water on site.

12. Wetlands: AS per ETI's report there are no wetlands on site.

13. Light Levels: This item is not required for a major subdivision in the R zone.

14. Ambient Sound: A brief ambient sound level check was conducted. The site is for all purposes quite with the occasional vehicle on Mountainside Road and daily trips by local residents. The ambient sound levels appear to be between 40 dBA and 50 dBA, which can be attributed to bird calls, occasional vehicle, local area residents, and a quiet suburb (IAC Acoustics website www.industrialnoisecontrol.com).

15. Historic Districts: The closest Historic District is the Tempe Wick Road Historic District which is located approximately two and one-half mile south of the subject property. The proposed major subdivision will have no impact on the historic district.

16. Community Facilities: The community facilities most likely to service this neighborhood are:

- Mendham Township Fire Department
- Mendham Township First Aid Squad
- Mendham Township Police Department
- Mendham Township Elementary School
- Mendham Township Middle School
- West Morris Regional High School

b. Plan and Description of Development

The existing site will be developed into three single family residential units. The site will be served by local potable water, electric, telephone and gas. Septic disposal system is proposed. The site is not service by local sewerage system. The roadway Ella Lane will be a gravel drive and is proposed to be 24-fet wide. The roadway is super-elevated towards the east to allow sheet flow into the adjacent naturally vegetated areas to remain and the proposed Raingardens to collect, infiltrate and treat runoff. Gravel sidewalks are also proposed.

Roofs will be collected and directed to drywells. The roof footprint is approximately 4,200-sfper unit. The dry-wells can collect a roof area of approximately 5,000-sf. Overflows will be to existing naturally wooded areas to remain, and raingardens. Raingarden / Infiltration Ponds are also proposed to collect and treat stormwater.

During the course of construction, soil erosion and sediment control (SESC) countermeasures will be installed, both permanent and temporary. All SESC devises will be monitored and maintained during the life of the project, in compliance with the Morris County Soil Conservation District.

The construction of the infrastructure is estimated to take between six to twelve months. Construction of the dwellings may take between six months and twelve months and can begin concurrently.

c. Assessment of the Anticipated Impact of the Project Environmental Impact Summary Chart

	SHORT TERM		LONG TERM	
Resource	**Impact**	**Mitigation**	**Impact**	**Mitigation**
Air Quality	3	Y	1	N
Noise	3	Y	1	N
Geology	1	N	1	N
Topography	1	Y	1	Y
Soils	3	Y	1	Y
Water Resource				
Ground		N	1	N
Surface		Y	1	Y
Vegetation		Y	1	Y
Wildlife	3	N	2	N
Historic	1	N	1	N
Aesthetics	4	N	1	N
Municipal Revenue	1	N	2	N

1. Sewage Disposal Facilities.

All two (2) dwellings will be serviced by individual subsurface disposal systems. Soil testing has been performed by Van Cleef Engineering and witnessed by the Mendham Township Board of Health. The testing performed indicates that the soils, for both primary and reserve areas, are suitable to support such a design. An application to and approval from the Mendham Township Board of Health is required before any construction commences.

2. Solid Waste Disposal.

A Home Owners Association (HOA) will be created between the two individual single-family homeowners. The HOA will contract with private garbage haulers for disposal. During construction, the developer will be responsible for the removal of all garbage from the site. No garbage will be buried on the site.

3. Hazardous Waste Disposal.

No hazardous waste is anticipated. The developer will be responsible for complying with all local, state, and federal rules and regulations if any hazardous waste is encountered.

4. Water Supply and Water Quality.

The three (3) single-family dwellings will be served by public water. No water supply wells are required.

5. Surface Water Runoff.

The project proposes to comply with low impact development techniques and provide green infrastructures for the collection and treatment of stormwater runoff. Four Raingardens / Infiltration Ponds are proposed

and one Infiltration Basin. These BMPs will collect surface runoff and new impervious surface runoff and provide infiltration and to provide water quality, enhance groundwater recharge and reduce post developed flows. A Stormwater Management Report has been prepared and submitted in support of this application.

6. Air Quality.

The main impact to air quality will occur during construction activities. During dry periods, construction activity is capable of creating dusty conditions. The Standards for Soil Erosion and Sediment Control in New Jersey which have been addressed through the Applicant's Soil Erosion and Sediment Control Plan and will be inspected by the Morris County Soil Conservation District. Upon completion of the project, the disturbed areas will be permanently stabilized and approved by MCSCD. At that time, the proposed project will have a negligible impact on the air quality.

7. Traffic (Pedestrian and Vehicular).

Anticipated vehicular traffic will be that of typical single-family residential properties. The Residential Site Improvement Standards provide for 10.1 vehicular trips per day per dwelling. This would result in roughly 50 daily trips from the proposed development, which result in a very minimal impact to the neighborhood roads and arterial collectors.

8. Sound.

During construction there will be additional noise during working hours; however, the developer will be governed by the State of New Jersey Noise Standards. The developer anticipates utilizing typical construction equipment. No blasting is anticipated and if it were, the developer would be subject to the state regulations.

9. Artificial Light.

There will be minimal to no impact from this development during construction or long term.

10. Fire Protection.

The applicant has proposed an extension of public water main up the proposed road to the cut-de-sac, terminating with a hydrant at the cut-de-sac. This fire protection complies with the Residential Site Improvement Standards.

11. Fiscal Impact and Demography.

The dwellings that are proposed will be single-family residences, a use that is permitted in the residential R Zone. The addition of five families to the township will have a negligible impact on the community facilities.

12. Statement of Impact on Resources.

The proposed project impacts the community in that it will remove the remains of a neglected farm with buildings in disrepair and abandonment. The decrepit structures, if left unabated, would soon become homes for rodents, vermin, and undesirables. The proposed development will create an aesthetic and desirable environment. This will benefit the existing neighborhood residents and thus the municipality.

d. Statement of Alternatives.

The applicant proposes to develop the subject property as single-family residential properties which are one of the permitted uses in the R Zone. Other alternatives include the other permitted uses in the R Zone as well as allowing the property to remain vacant or possibly be added to the municipal parkland being developed on a portion of the original farm.

e. Statement of Permits Required.

Mendham Township Planning Board (current application) Mendham Township Board of Health (submitted, pending) Morris County Planning Board (submitted, pending)
Morris County Soil Conservation District (submitted, pending) NJDEP Freshwater Wetlands Absence (submitted, received)

f. Environmental Constraints Map.

As previously mentioned, there are no wetlands, open water bodies, streams or flood hazard areas on site, and as such there are no environmentally sensitive areas. An LOI (copy of map is attached in **Appendix F**) was performed for the adjacent property Block 116, Lot 49. A riparian zone buffer extends into the site at the North West corner. The area is approximately 4,700-sf and will be deed restricted. No work is proposed in this location. No other environmentally sensitive area exists on site, and there are no constraints.

APPENDIX A

Environmental Technology, INC
Wetland and Environmental Assessment

ETI ENVIRONMENTAL TECHNOLOGY INC.

Environmental Consultants

February 29, 2020

Mr. Anthony Mortezai
Optimum Development Group Corp.
6 Old Farmstead Group
Chester, NJ 07930

Re: Wetlands/Transition Area/Riparian Zone Investigation
239 Mountainside Road
Block 116, Lot 47
Township of Mendham, Morris County, N.J.

Dear Mr. Mortezai:

Per your request, Environmental Technology Inc. has visited the above referenced property and conducted a wetlands investigation to determine if a proposed subdivision is impacted by any freshwater wetlands, transition areas or riparian zones. This review is pursuant to the Freshwater Wetlands Protection Act Rules (N.J.A.C. 7:7A) and Flood Hazard Area Control Act Rules (N.J.A.C. 7:13). The project limits of disturbance are depicted on the plans prepared by Certified Engineering of NJ and consists of 12 sheets, dated February 3, 2020. We also reviewed a topographical survey prepared by Andre Schan, P.L.S., dated June 15, 2017, last revised February 8, 2020. In addition, we were provided with a NJDEP approved Flood Hazard Area Verification Plan for adjoining Lot 49 in Block 116, dated April 22, 2015, last revised May 29, 2015 and prepared by Dykstra Walker Design Group. Our methodology and findings are as follows:

STUDY METHODOLOGY

The investigations of the site were performed by Environmental Technology, Inc. on February 24, 2020.

In accordance with the New Jersey Freshwater Wetlands Protection Act, and outlined by the New Jersey Department of Environmental Protection (NJDEP), the extent of the wetlands were determined by implementing the methodology that is currently accepted by the United States Environmental Protection Agency (USEPA), namely Federal Manual for Identifying and Delineating Jurisdictional Wetlands dated January 10, 1989 and supplements. This methodology states that for an area to be considered wetland all three of the following parameters must be present:

1. Hydric Soils

2. A Predominance of Hydrophytic Vegetation

3. Hydrology

The determination of hydric soils in the field is made by the use of a manually operated soil sampler. Then a determination of hydric soils is made by using Munsell Soil Color Charts. Transects are made from the wetlands to the uplands to determine the point at which soils no longer were determined to be hydric. Hydric soils are those soils that have a chroma of less than or equal to 1 (when no mottling is present) or a matrix chroma of less than or equal to 2 when mottling is present.

When soils classified as a sand soil are encountered Munsell Soil Color Charts are not used exclusively. In these instances hydric determinations are also made by the presence of one or more of the following conditions: high organic matter content in the surface horizon, the streaking of subsurface horizons by organic matter, or the presence of organic pans.

In situations in which soils exhibit significant coloration due to the nature of the parent material (e.g. red shales) the soils often do not exhibit the characteristic chromas associated with hydric soils. In the above situations the Munsell Soil Color Charts cannot always be used to evaluate the hydric nature of the soil. In these cases their hydric nature according to the Soil Conservation Service (SCS), and the other criteria carry more weight.

Vegetation is classified according to the Eastern Mountains and Piedmont 2014 Regional Wetland Plant List prepared by the USACOE. The classifications, according to this list are as follows:

Obligate (OBL) Always found in wetlands under natural (not planted) conditions (frequency greater than 99%), but may persist in nonwetlands if planted there by man or in wetlands that have been drained, filled, or otherwise transformed into nonwetlands.

Facultative Wetland (FACW) Usually found in wetlands (67%-99% frequency), but occasionally found in nonwetlands.

Facultative (FAC) Sometimes found in wetlands (34%-66% frequency), but also occurs in nonwetlands.

Facultative Upland (FACU) Seldom found in wetlands (1%-33% frequency) and usually occurs in nonwetlands.

Nonwetland (UPL) Occurs in wetlands in another region, but not found (<1% frequency) in wetlands in the region specified. If a species does not occur in wetlands in any region, it is not on the list.

According to the Federal Manual for Identifying and Delineating Jurisdictional Wetlands dated January 10, 1989, an area has hydrophytic vegetation, when under normal circumstances

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more than 50 percent of the composition of the dominant species from all strata are obligate wetland (OBL), facultative wetland (FACW), and/or facultative (FAC) species. However, when a plant community has less than or equal to 50 percent of the dominant species from all strata represented by OBL, FACW, and/or FAC species, and hydric soils and wetland hydrology are present, the area also has hydrophytic vegetation. (NOTE: These areas are considered problem area wetlands.)

In the non-growing season hydrophytic vegetation is assumed to be present, since during this time of the year many herbaceous species are either unidentifiable or non-existent.

Hydrology is determined by the evidence of water, either visible or indicators that water was present. This is noted by visible factors such as drift lines, high water marks on trees, sediment deposits including encrusted detritus, displacement of leaf litter as the result of water flowage, and drainage patterns. During the growing season, saturated soil samples and/or the water table is noted as evidence of hydrology when they are encountered within 12 inches of the soil surface.

Seasonal high water table information is used, when available, from the Soil Conservation Service. Recent rainfall and/or other precipitation is also considered when evaluating hydrology.

In situations where the native conditions have been altered such as; cleared lands (e.g. agricultural lands), areas where the original soil has been altered (such as formerly plowed or filled lands), certain criteria are given more weight than others due to the lack of reliability of the affected parameter as an indicator.

FINDINGS

The investigations found the property to be mostly undeveloped with two frame dwellings located in the west-central section which are accessed by a gravel driveway from Mountainside Road. The remaining portions of the site consisted of a mature upland forest in the northern half and the southern half containing a mixture of old field vegetation with scattered trees. No wetlands were identified on the property or within 150 feet of the property, which is the maximum wetlands transition area required adjacent to freshwater wetlands in Mendham Township.

In addition, no watercourses were identified within the site boundaries. A regulated C-1 watercourse was identified on adjoining Lot 49 in Block 116 to the northwest of the site. The location of this watercourse is depicted on the plans prepared by Dykstra Walker, and referenced above. A small portion of the 300 foot riparian zone required adjacent to this watercourse extends onto the northwest corner of the property. The extent of this riparian zone is depicted on the topographical survey prepared by Andre Schan, revised through February 8, 2020 and referenced above.

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Common vegetation identified in the northern mature foreste, consisted of black oak (*Quercus velutina*, NL), red oak (*Quercus rubra*, FACU), white oak (*Quercus alba*, FACU), black birch (*Betula lenta*, FACU), American beech (*Fagus grandifolia*, FACU), chestnut oak (*Quercus prinus*, NL), mockernut hickory (*Carya tomentosa*, FACU), tulip-tree (*Liriodendron tulipifera*, FACU), sugar maple (*Acer saccharum*, FACU), flowering dogwood (*Cornus florida*, FACU) and Japanese barberry (*Berberis thunbergii*, FACU).

Common vegetation in the southern section consisted of sassafras (*Sassafras albidum*, FACU), white ash (*Fraxinus americana*, FACU), sugar maple, eastern red cedar (*Juniperus virginiana*, FACU), multiflora rose (*Rosa multiflora*, FACU), Japanese honeysuckle (*Lonicera japonica*, FAC), wine raspberry (*Rubus phoenicolasius*, NL), Japanese stilt grass (*Microstegium vimineum*, FAC) and various grasses (*Poa and Panicum* spp., V).

CONCLUSIONS

Based on the methodology currently accepted by the NJDEP pursuant to N.J.A.C. 7:7A; no portion of the proposed area of disturbance for the project is within an area classified as freshwater wetlands, transition areas or riparian zones.

The information provided is based on the most current information available and our best professional judgment. This letter does not consider pending or future legislation or regulations that may change the opinions provided.

Please do not hesitate to contact our office if you should have any questions regarding our findings.

SWS PCP EDUCATION EXPERIENCE PWS ETHICS DAVID C. KRUEGER 662 PROFESSIONAL WETLAND SCIENTIST

Very truly,

ENVIRONMENTAL TECHNOLOGY INC.

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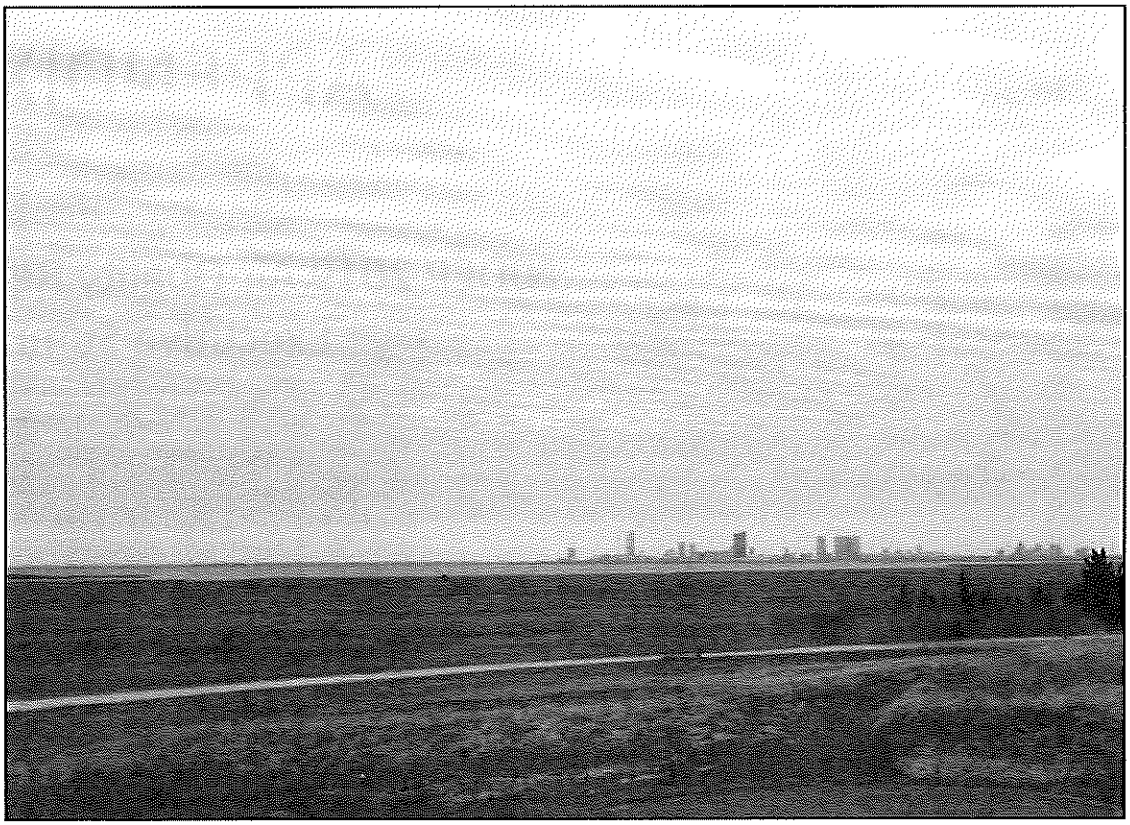
APPENDIX B

NJDEP 2019 Air Quality Report
Executive Summary

2018 New Jersey Air Quality Report

New Jersey Department of Environmental Protection



November 19, 2019

New Jersey Department of Environmental Protection
Bureau of Air Monitoring
Mail Code: 401-02E
P. O. Box 420
Trenton, New Jersey 08625-0420
Contact: bamweb@dep.nj.gov
Telephone: 609-292-0138

www.njaqinow.net

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Cover photo: Brigantine HazeCam, https://hazecam.net/archive.aspx?site=brigantine&h=8, 4/11/19.

EXECUTIVE SUMMARY

This report presents the New Jersey Department of Environmental Protection (NJDEP) air quality monitoring data for 2018, collected from NJDEP's extensive air monitoring network. The state of New Jersey has been monitoring air quality since 1965. During that time, as a result of state, regional and national air pollution reduction efforts, pollution levels have improved significantly.

The chapter on the Air Quality Index (AQI), a national air quality rating system based on the National Ambient Air Quality Standards (NAAQS), describes the overall quality of New Jersey's air in 2018, and lists the days on which the AQI was over 100 (meaning the NAAQS were exceeded). Nineteen days were classified as "Unhealthy for Sensitive Groups" in 2018, because their numerical AQI ratings were greater than 100. Three days were classified as "Unhealthy," with AQI ratings greater than 150.

This report also includes detailed chapters for ozone, sulfur dioxide, nitrogen dioxide, particulate matter, and carbon monoxide. These are the criteria pollutants, that is, those for which NAAQS (or criteria) have been set. Other measurements made at our air monitoring stations include levels of air toxics and particulate species, and meteorology.

Figures 1-1 through 1-6 below illustrate the downward trends in concentrations of criteria pollutants in New Jersey over the past few decades by graphing the statewide design values for each pollutant. A design value is the actual statistic that is compared to a NAAQS. If this value exceeds the NAAQS at any site in the state, the state is determined to be in nonattainment. Design values for each of the criteria pollutants are described in detail in each pollutant-specific chapter of this report.

New Jersey is getting close to meeting the ozone NAAQS (Figure 1-1), and will continue to implement control strategies to reduce ambient concentrations. Because ozone is formed in the presence of sunlight and high temperatures, the highest levels occur in the summer months. Ozone has been found to have serious health effects at lower levels than previously thought. In response, the United States Environmental Protection Agency (USEPA) periodically revises and lowers the NAAQS. USEPA lowered the ozone standard to 0.070 ppm in 2015 (effective in 2016).

Particulate air pollution less than 2.5 micrometers in diameter is referred to as fine particulate or $PM_{2.5}$. These small particles can be inhaled deep into the lungs, and are known to have a greater impact on public health than larger particles, which were the focus of previous ambient air quality standards. Monitoring data in New Jersey shows a steady decline in $PM_{2.5}$ levels that are now in compliance with the NAAQS (Figure 1-2).

Nitrogen dioxide (NO_2) is a reactive gas emitted primarily from motor vehicles. It is known to cause serious health problems, especially for sensitive individuals such as children, the elderly, and people with asthma. New Jersey has long been in compliance with the NAAQS for NO_2 (Figure 1-3), although there was one exceedance of the 1-hour standard in 2018, most likely caused by a truck idling near the monitor.

The sharp increase and subsequent decrease in sulfur dioxide (SO_2) concentrations in New Jersey shown in Figure 1-4 are attributable to a coal-burning facility across the Delaware River in Pennsylvania. NJDEP established the Columbia monitoring station in 2010 to determine the facility's impact on New Jersey's air quality. Exceedances of the SO_2 NAAQS were recorded that same year. Since the plant ceased operations under a court agreement, SO_2 levels in New Jersey have again been meeting the standard.

Outdoor concentrations of carbon monoxide can affect people with cardiovascular problems. Levels in New Jersey have been below the NAAQS for over twenty years (Figure 1-5).

Air concentrations of lead have dropped dramatically since a standard was established in 1978. The last exceedances of the NAAQS were in the early 1980s (Figure 1-6).

Figure 1-1
Ozone Design Value Trend in New Jersey, 1997-2018
3-Year Average of 4th-Highest Daily Maximum 8-Hour Average Concentrations
Parts per Million (ppm)

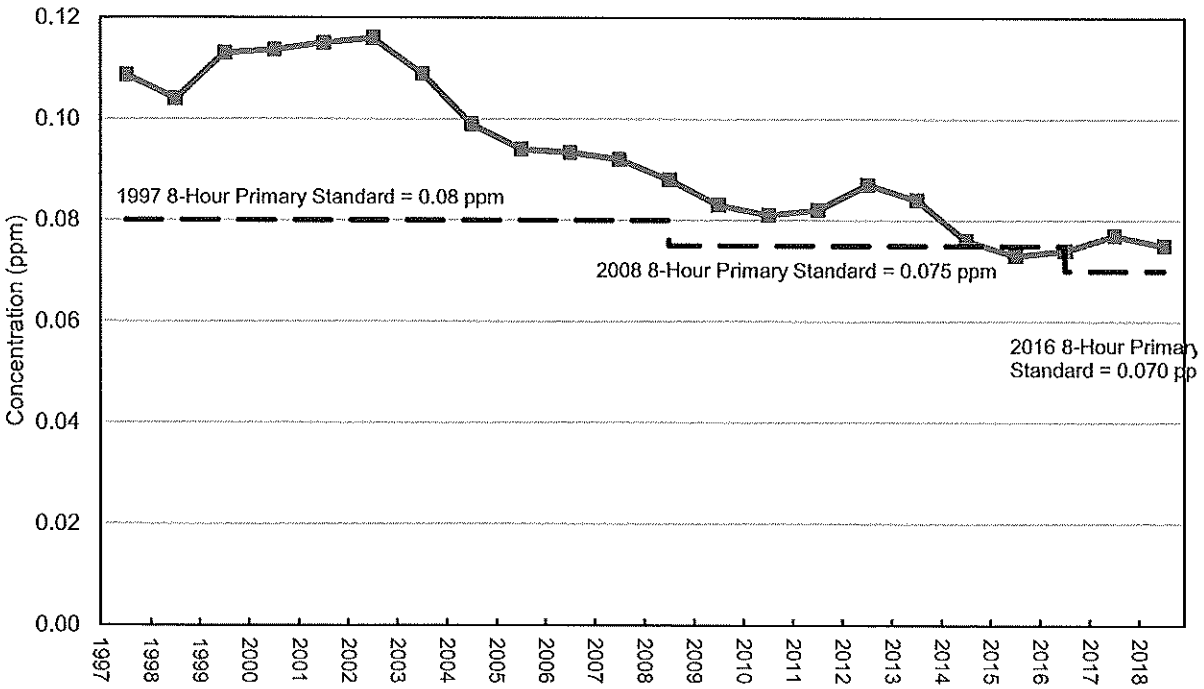


Figure 1-2

Fine Particulate ($PM_{2.5}$) 24-Hour Design Value Trend in New Jersey, 2001-2018

3-Year Average of the 98th-Percentile 24-Hour Average Concentrations

Micrograms per Cubic Meter (µg/m³)

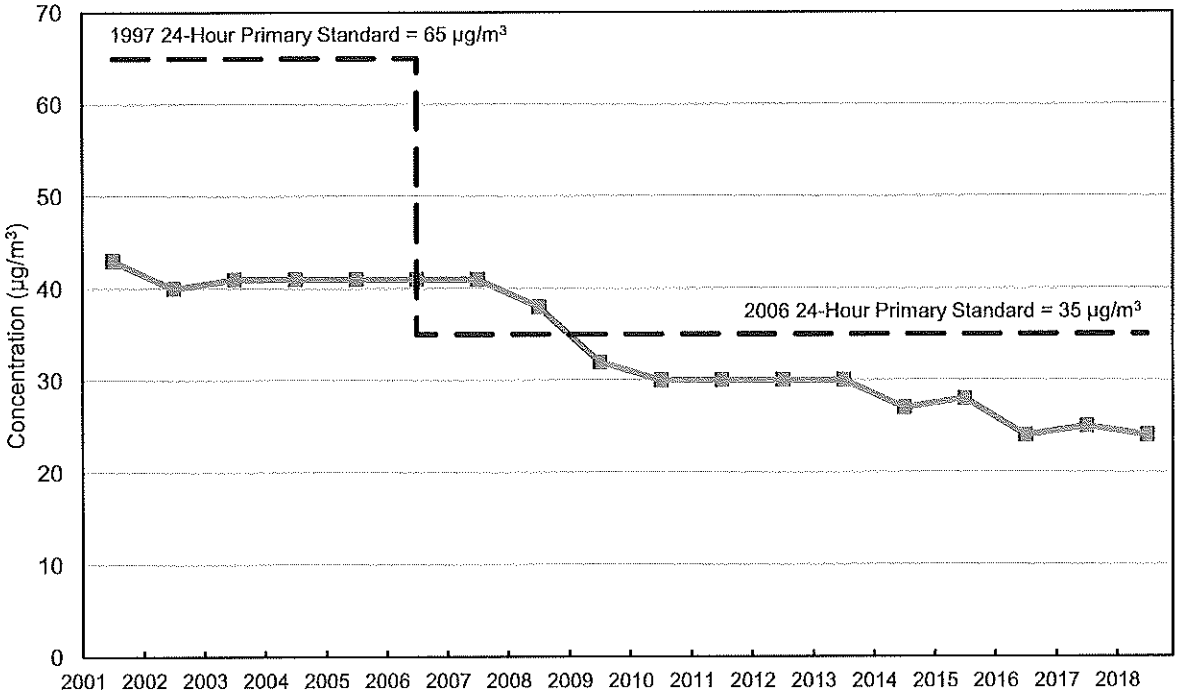


Figure 1-3

Nitrogen Dioxide (NO_2) Design Value Trend in New Jersey, 2000-2018

3-Year Average of the 98th Percentile Daily Maximum 1-Hour Average Concentration

Parts per Million (ppm)

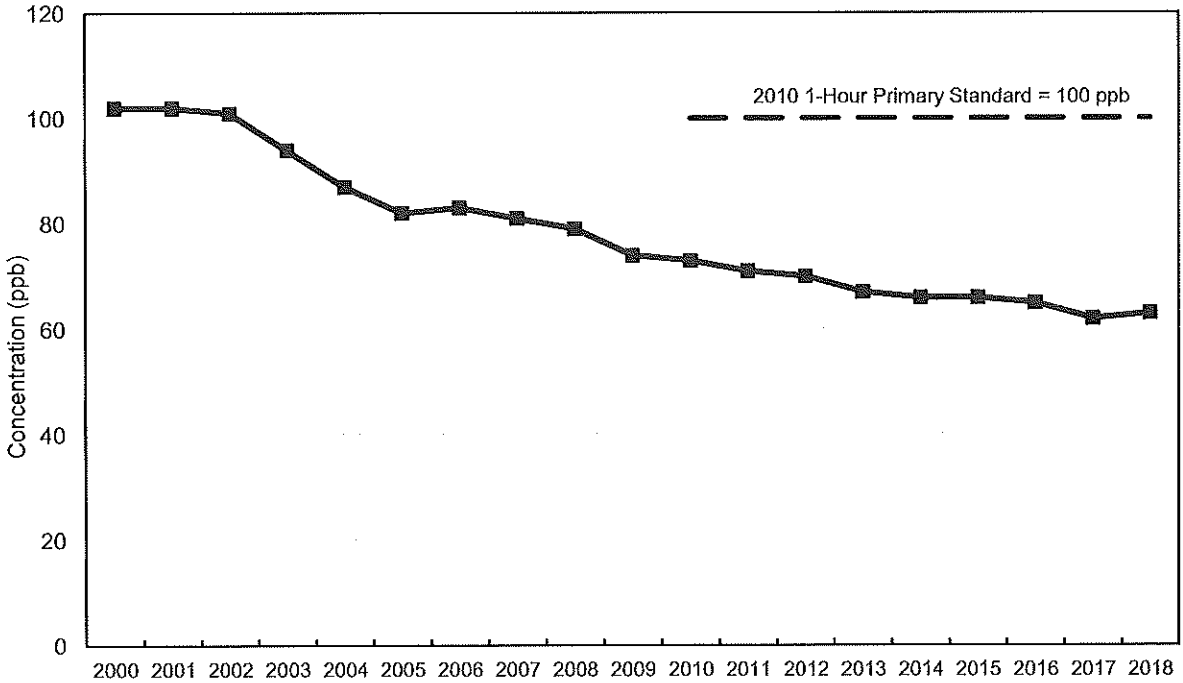


Figure 1-4

Sulfur Dioxide (SO_2) Design Value* Trend in New Jersey, 2000-2018

***3-Year Average of the 99th-Percentile of Daily Maximum 1-Hour Average Concentrations in Parts per Million (ppm)**

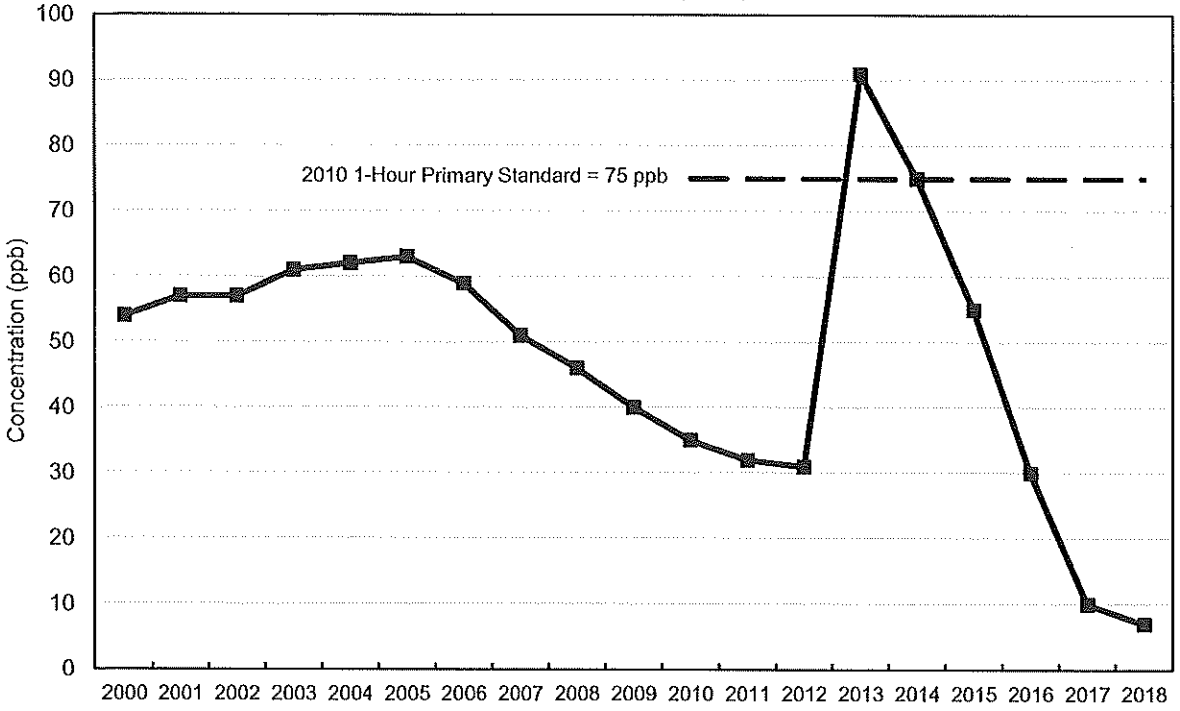


Figure 1-5

Carbon Monoxide (CO) Design Value Trend in New Jersey, 1990-2018

2nd-Highest 8-Hour Average Concentration

Parts per Million (ppm)

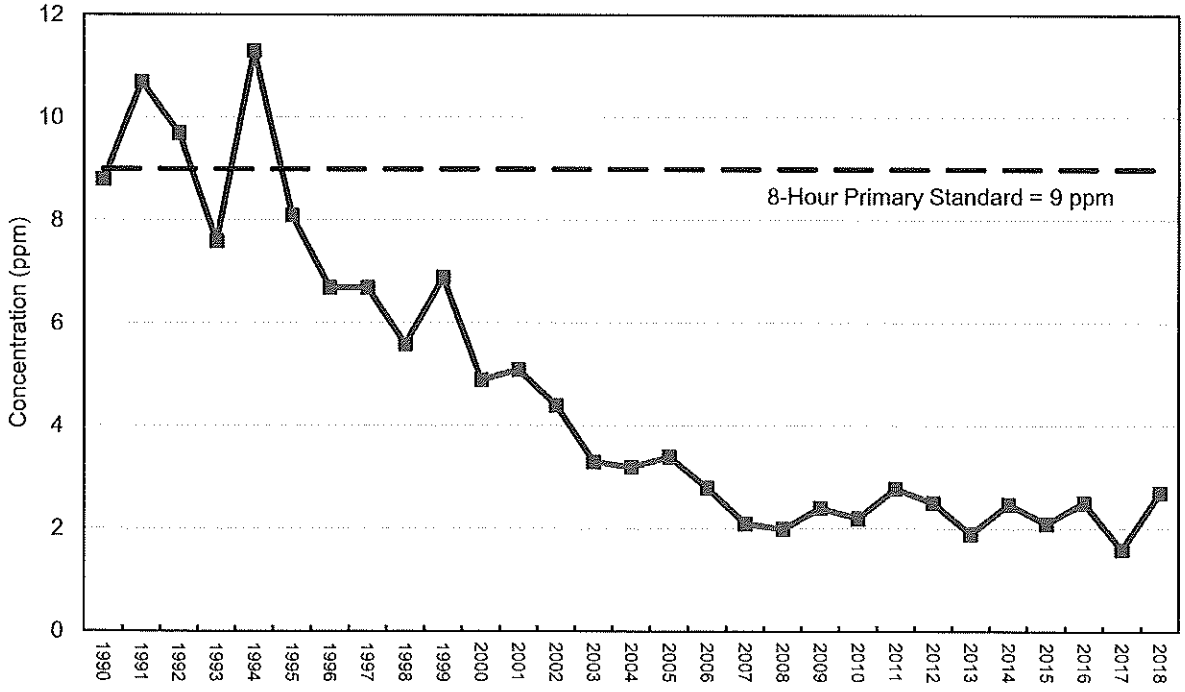
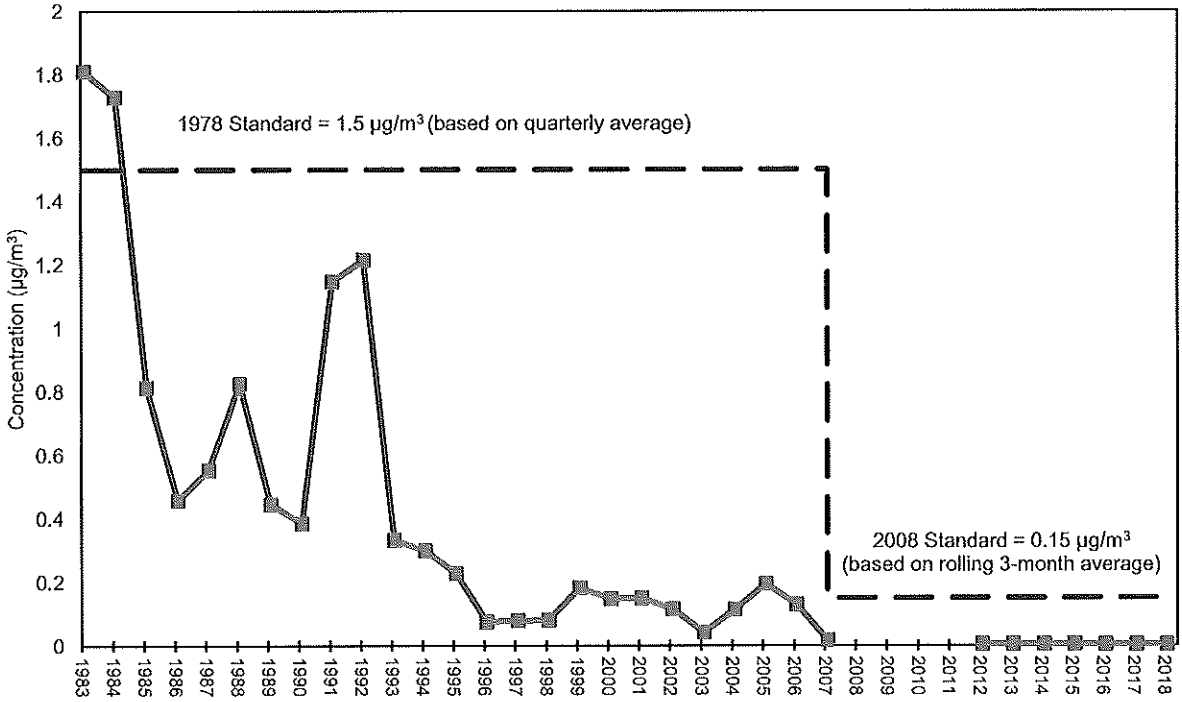


Figure 1-6
Lead Design Value Trend in New Jersey, 1983-2018
Highest 3-Month Average
Micrograms per Cubic Meter (µg/m³)



2018 Air Monitoring Network

New Jersey Department of Environmental Protection

NETWORK DESCRIPTION

In 2018, the New Jersey Department of Environmental Protection (NJDEP) Bureau of Air Monitoring (BAM) operated 32 ambient air monitoring stations. The monitoring stations vary in the number and type of monitors operating at each site. New Jersey's air monitoring program is primarily focused on the measurement of pollutants for which National Ambient Air Quality Standards (NAAQS) have been established, also known as criteria pollutants. Criteria pollutant monitoring is regulated by the United States Environmental Protection Agency (USEPA), which prescribes the design and siting of the monitoring networks, the acceptable monitoring methods, and the minimum quality assurance activities. Only data which meet USEPA requirements can be used to determine compliance with the NAAQS. There are six criteria air pollutants: ozone (O_3), particulate matter (PM), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and lead (Pb). Because particulate matter encompasses such a wide range of contaminants, there are separate NAAQS for two different size fractions of particles. There are NAAQS for fine particles, less than 2.5 microns in size, also referred to as $PM_{2.5}$ (1 micron = one millionth of a meter), and another NAAQS for inhalable particles, less than 10 microns in size, referred to as PM_{10}.

Figure 2-1
Millville Air Monitoring Station

In New Jersey, O_3, NO_2, SO_2 and CO are measured using USEPA-approved real-time monitoring methods, and data for these pollutants are continuously transmitted to a central data acquisition system. Once an hour, the Bureau of Air Monitoring posts this air quality data to its website (www.njaqinow.net) and to the USEPA's Air Now website (www.airnow.gov). Data is subsequently reviewed and certified, and is available from USEPA's Air Quality Database at https://www.epa.gov/outdoor-air-quality-data.

$PM_{2.5}$ is measured with both 24-hour filter-based samplers and real-time continuous monitors. Filters must be installed and removed manually, and brought to the BAM lab to be weighed and analyzed. A filter-based sampler is also used to determine lead and PM_{10} concentrations.

In addition to monitoring criteria pollutants, the NJDEP also measures "non-criteria pollutants," or pollutants that do not have health-based National Ambient Air Quality Standards. Certain non-criteria pollutants are grouped together by their purpose or collection method. USEPA's Photochemical Assessment Monitoring Station (PAMS) program, for example, measures non-criteria pollutants that are important in the formation of ozone. Since most ozone is not directly emitted from sources but forms in the atmosphere when volatile organic compounds and oxides of nitrogen react in the presence of sunlight, it is important to know the levels of these "precursor" pollutants.

Other non-criteria pollutants monitored by BAM include some commonly emitted by motor vehicles and other combustion sources: benzene, toluene, ethylbenzene, xylenes (measured with a "BTEX" analyzer), and black carbon (measured with an aethalometer).

Five sites in the monitoring network collect samples of $PM_{2.5}$ that are analyzed to determine the chemical makeup of the particles. These are part of USEPA's Chemical Speciation Network (CSN). This data is used in helping to identify the primary sources of particles, and in assessing potential health effects.

Volatile organic compounds (VOCs) are collected and analyzed at four monitoring sites. These non-criteria pollutants are classified as "air toxics," pollutants that have potential health effects but for which NAAQS have not been established. They can be carcinogenic or have other serious health effects, and are very diverse in their chemical composition.

Two sites, Cattus Island and Washington Crossing, are part of the National Atmospheric Deposition Network. BAM staff collect precipitation samples and ship them to a national laboratory for analysis of acids, nutrients, and base cations.

A number of sites within the air monitoring network also take measurements of meteorological parameters, such as temperature, relative humidity, barometric pressure, wind speed, wind direction, precipitation, and solar radiation.

Figure 2-1 shows the monitoring station at Millville in Cumberland County. Figure 2-2 shows a filter-based manual $PM_{2.5}$ sampler located at Union City High School in Hudson County.

The locations of all the monitoring stations that operated in 2018 are shown on the map in Figure 2-3. Table 2-1 lists the parameters that were measured at each site. More details about the monitoring stations can be found in Appendix A.

The only changes to New Jersey's monitoring network in 2018 involved replacing monitoring equipment.

Figure 2-2
Filter-Based $PM_{2.5}$ Sampler in Union City

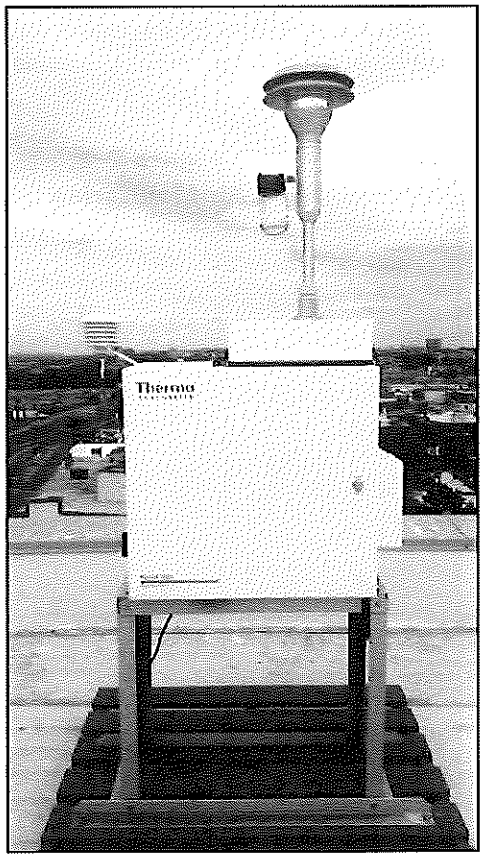


Figure 2-3
New Jersey Air Monitoring Sites in 2018

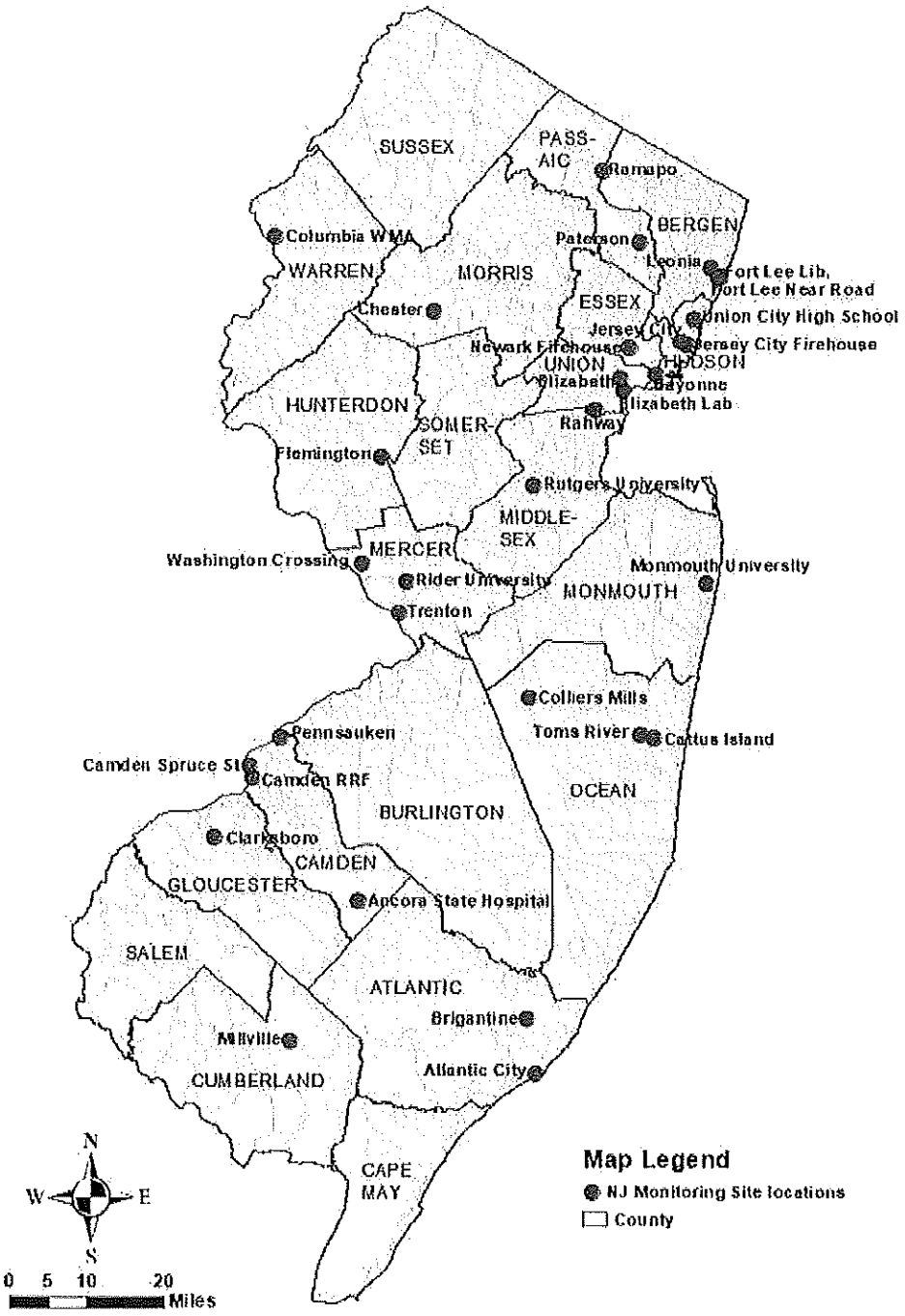


Table 2-1
2018 New Jersey Air Monitoring Network Summary

	Monitoring Parameter / Monitoring Station	CO	NO_x	NOy	O_3	SO_2	$PM_{2.5}$ (Filter-based)	Real-Time $PM_{2.5}$	Visibility	PM_{10}	Lead	$PM_{2.5}$-Speciation	O_3 Precursors (PAMS)	Toxics	BTEX & Black Carbon	Acid Deposition	Mercury	Meteorological*	Rain	Solar Radiation
1	Ancora State Hospital				X															
2	Atlantic City						X													
3	Bayonne		X		X	X									X			X	X	
4	Brigantine				X	X	X	X	X							X				
5	Camden RRF									X										
6	Camden Spruce Street	X	X		X	X	X	X				X		X	X			X	X	
7	Cattus Island															X				
8	Chester		X		X	X	X					X		X						
9	Clarksboro				X		X													
10	Colliers Mills				X															
11	Columbia		X		X	X		X										X	X	
12	Elizabeth	X				X														
13	Elizabeth Lab	X	X			X	X	X				X		X	X		X	X	X	
14	Flemington				X			X										X	X	
15	Fort Lee Library						X													
16	Fort Lee Near Road	X	X					X							X			X	X	
17	Jersey City	X	X			X														
18	Jersey City Firehouse						X	X		X										
19	Leonia				X															
20	Millville		X		X			X												
21	Monmouth University				X															
22	Newark Firehouse	X	X	X	X	X	X	X		X	X	X			X			X	X	X
23	Paterson						X													
24	Pennsauken						X													
25	Rahway						X	X												
26	Ramapo				X															
27	Rider University				X			X										X		
28	Rutgers University		X		X		X	X				X	X	X			X			
29	Toms River						X													
30	Trenton						X													
31	Union City High School						X													
32	Washington Crossing															X				
	TOTAL	6	10	1	16	9	16	12	1	3	1	5	1	4	5	3	2	8	7	1

* Meteorological parameters include temperature, relative humidity, barometric pressure, wind direction & wind speed.
X - Parameter measured in 2018

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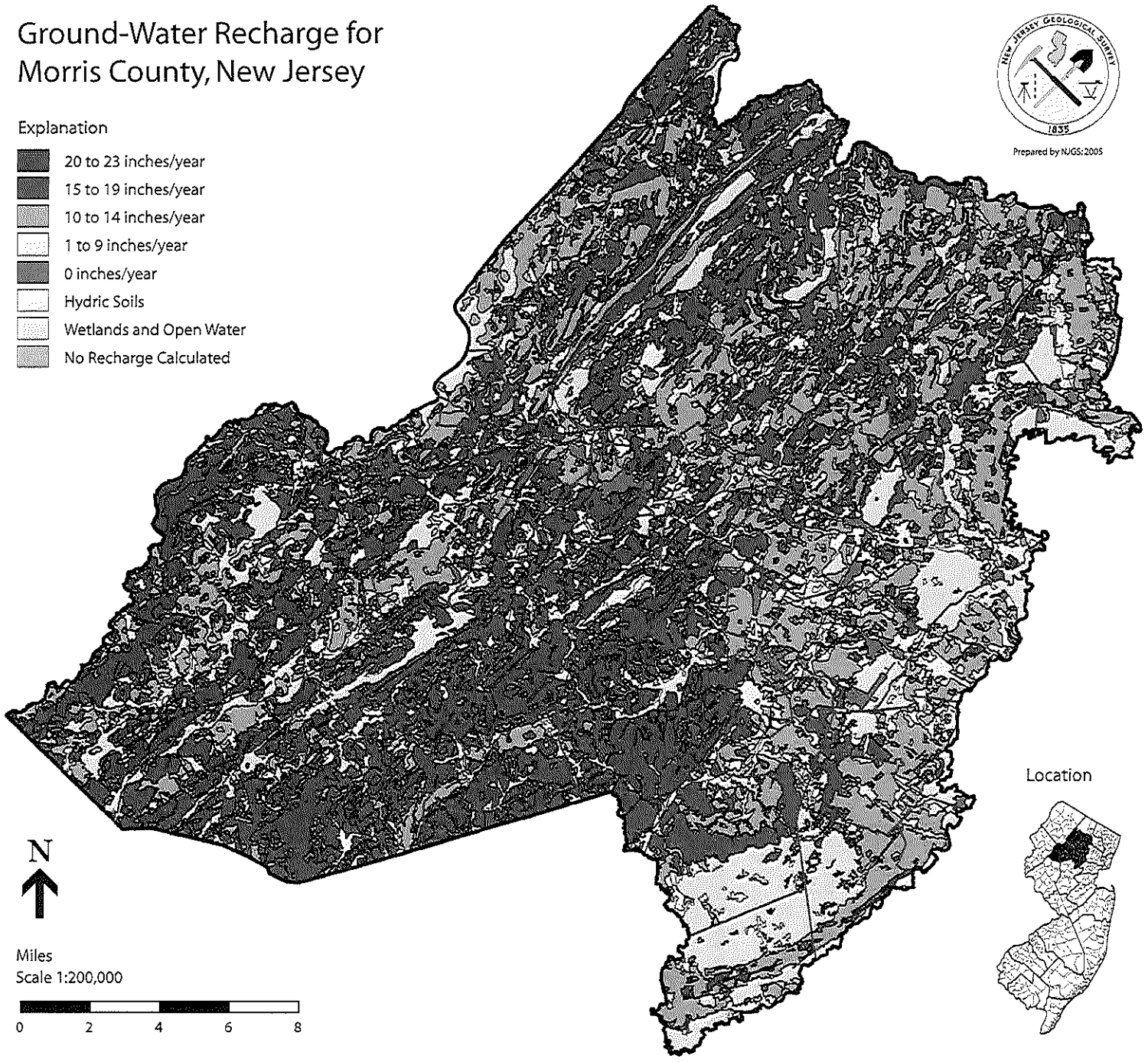
APPENDIX C

Groundwater Recharge Map for Morris County, NJ
NJ Bedrock and Geology Map

Ground-Water Recharge for Morris County, New Jersey



BEDROCK GEOLOGIC MAP OF NEW JERSEY

DESCRIPTION OF MAP UNITS

Sedimentary Rocks

CENOZOIC

Holocene: beach and estuarine deposits

Paleogene and Neogene: sand, silt, clay

MESOZOIC

Cretaceous: sand, silt, clay

Jurassic: siltstone, shale, sandstone, conglomerate

Triassic: siltstone, shale, sandstone, conglomerate

PALEOZOIC

Devonian: conglomerate, sandstone, shale, limestone

Silurian: conglomerate, sandstone, shale, limestone

Ordovician: shale, limestone

Cambrian: limestone, sandstone

Igneous and Metamorphic Rocks

MESOZOIC

Jurassic and Triassic: basalt

Jurassic: diabase

PALEOZOIC

Ordovician and Cambrian: schist, gneiss

MESOPROTEROZOIC

marble

gneiss, granite

DESCRIPTION OF MAP SYMBOLS

limit of late Wisconsinan glaciation

limit of Illinoian glaciation

limit of pre-Illinoian glaciation

SUSSEX
Franklin
Newton
Andover
Delaware Water Gap
PASSAIC
Mahwah
WARREN
Belvidere
Boonton
BERGEN
Paterson
Hackensack
MORRIS
Morristown
ESSEX
Newark
HUDSON
Jersey City
Phillipsburg
Gladstone
UNION
Elizabeth
Milford
Somerville
Carteret
HUNTERDON
Flemington
SOMERSET
New Brunswick
MIDDLESEX
MERCER
Trenton
Freehold
MONMOUTH
Asbury Park
Mount Holly
Toms River
Camden
OCEAN
BURLINGTON
Woodbury
CAMDEN
GLOUCESTER
SALEM
Salem
ATLANTIC
Bridgeton
Mays Landing
CUMBERLAND
Atlantic City
CAPE MAY
Cape May Court House

75°00′ 74°30′ 74°00′ 41°00′ 40°30′ 40°00′ 39°30′ 39°00′ 76°00′ 75°30′

0 5 10 15 20 mi
0 10 20 30 km

scale 1:1,000,000

Department of Environmental Protection

NEW JERSEY GEOLOGICAL AND WATER SURVEY

2017

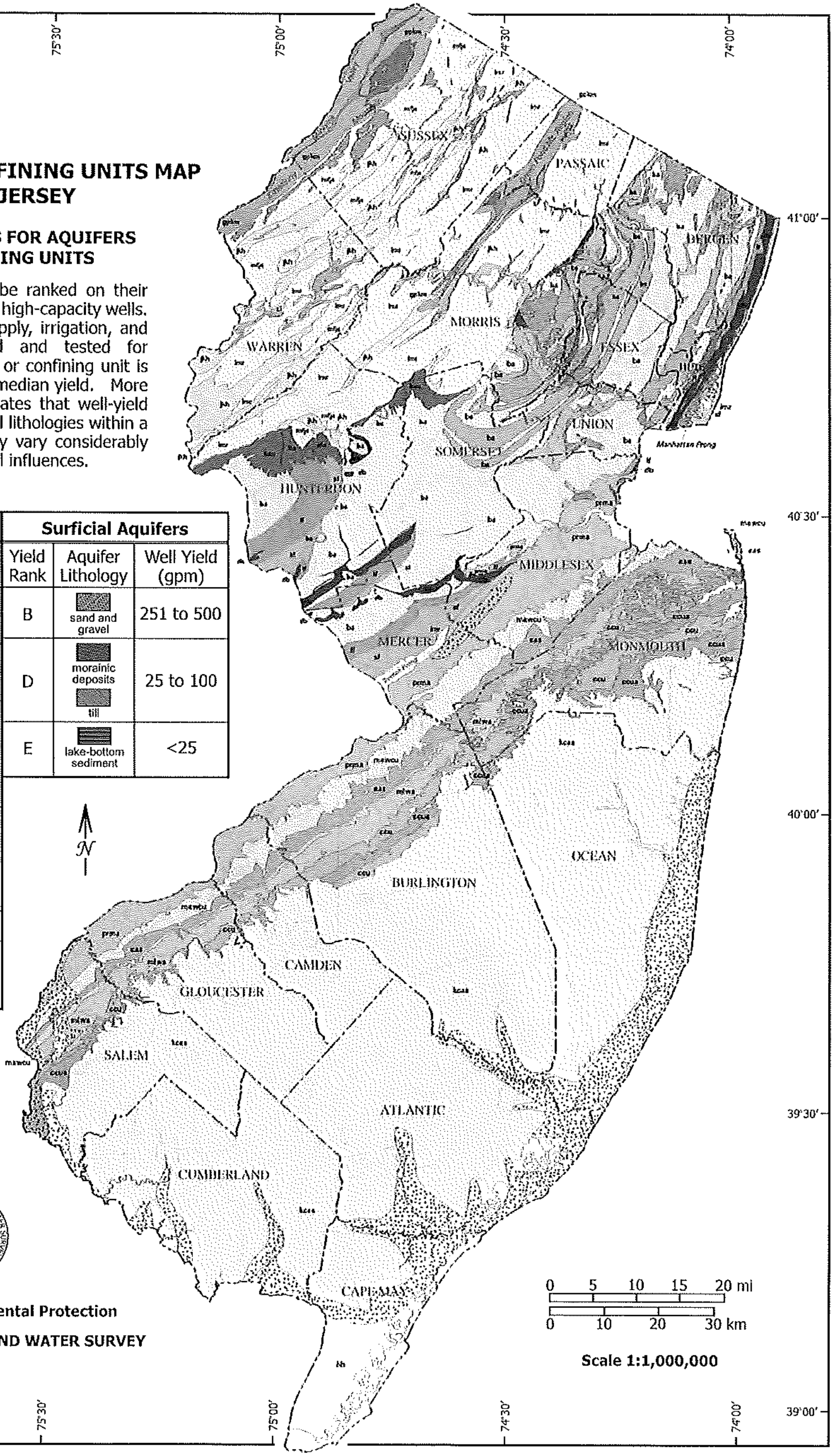
AQUIFERS AND CONFINING UNITS MAP OF NEW JERSEY

RANKING VALUES FOR AQUIFERS AND CONFINING UNITS

Aquifers in New Jersey can be ranked on their ability to yield groundwater to high-capacity wells. These wells include water-supply, irrigation, and industrial-supply wells sited and tested for maximum yield. Each aquifer or confining unit is assigned a rank based on its median yield. 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.

Bedrock Aquifers		
Yield Rank	Aquifer Lithology	Well Yield (gpm)
A	prma	>500
B-A	kcas	>250
B	eas	251 to 500
C-B	jkh	101 to 500
C	ba, sf, kh, mwa	101 to 251
D	bs, tl, gplm, mfjs, kmr	25 to 100
E-B	ccu, ccua	<250
E	mawcu, mawcu	<25

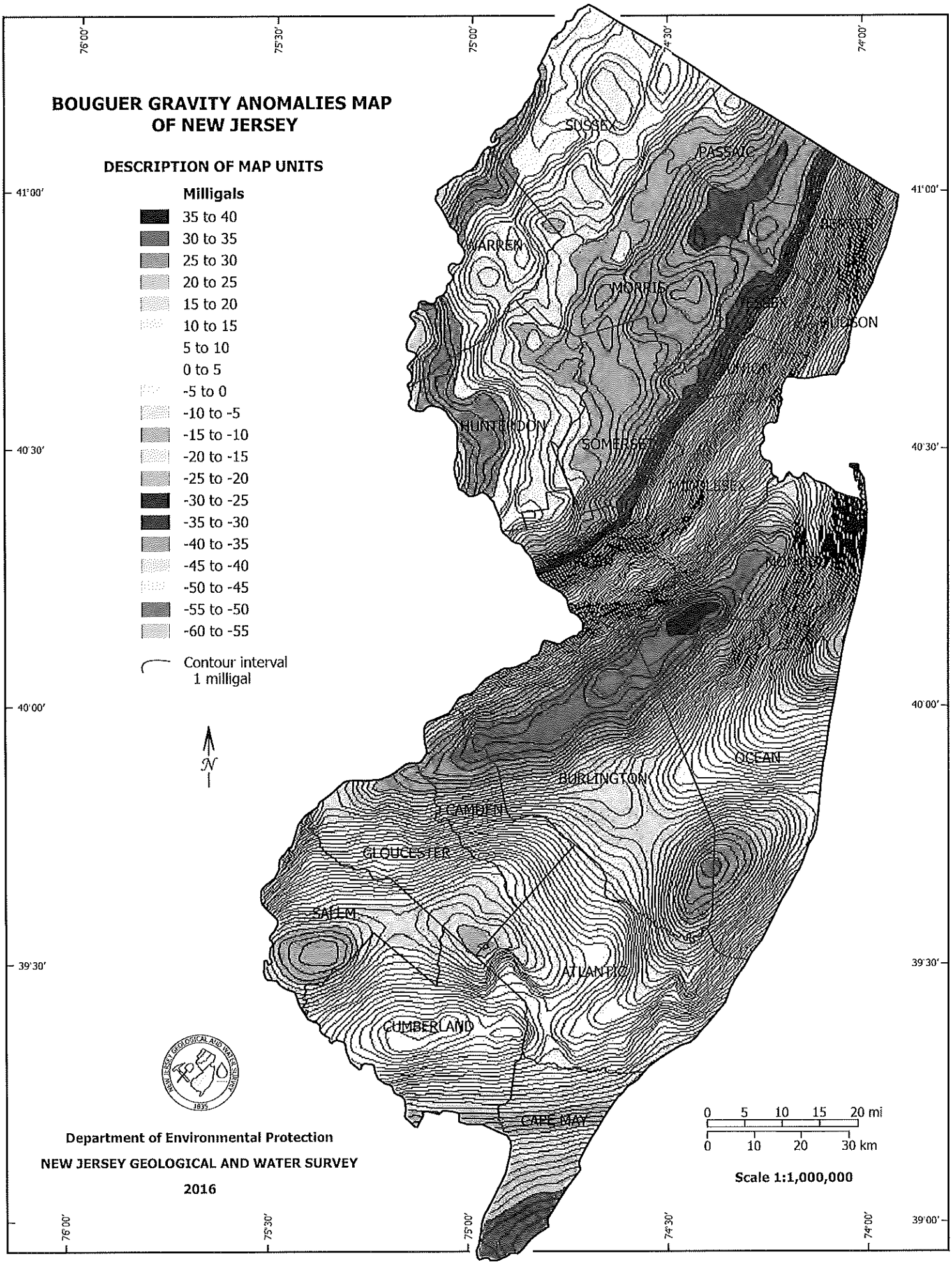
Surficial Aquifers		
Yield Rank	Aquifer Lithology	Well Yield (gpm)
B	sand and gravel	251 to 500
D	morainic deposits; till	25 to 100
E	lake-bottom sediment	<25

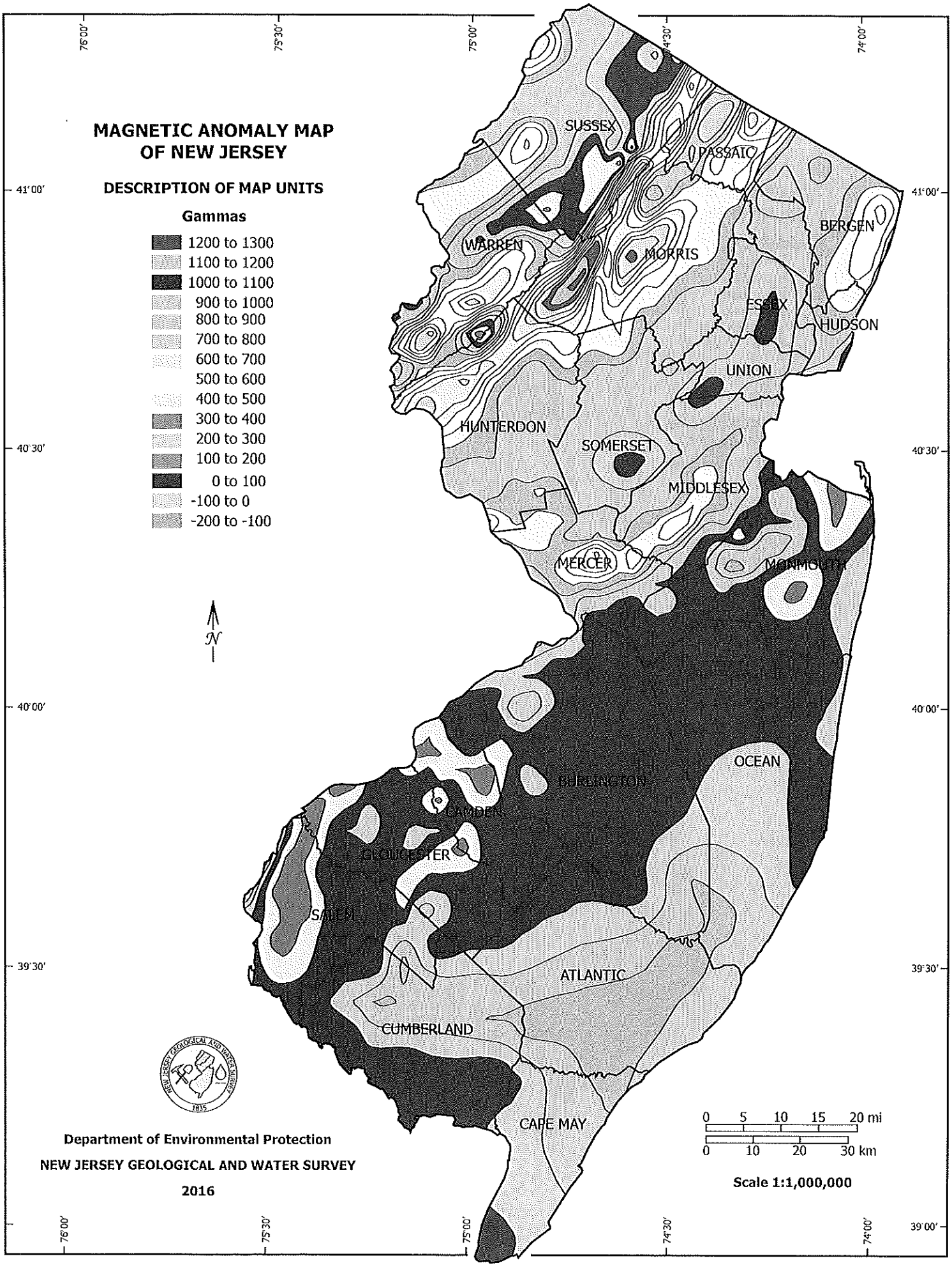


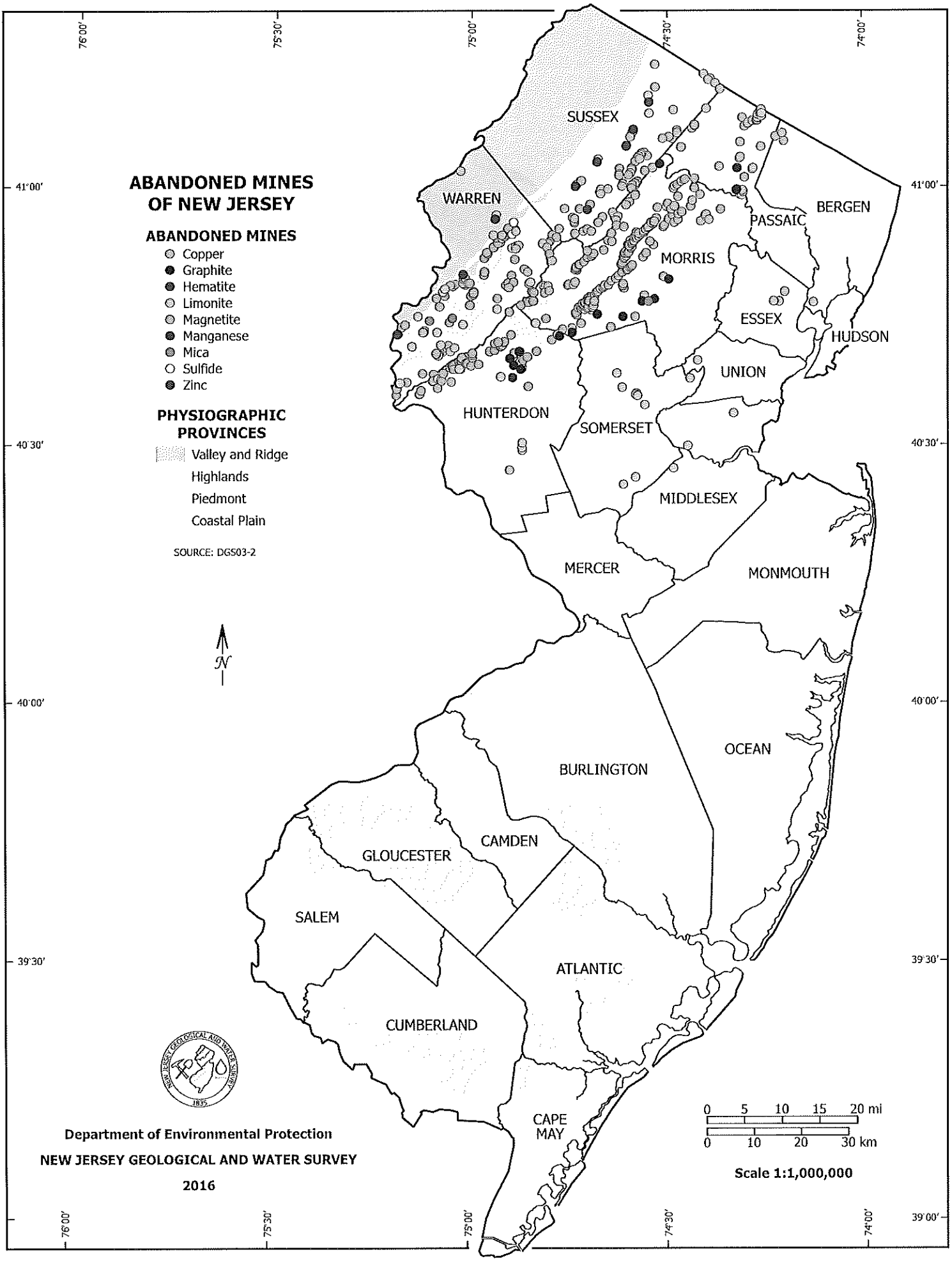
Department of Environmental Protection

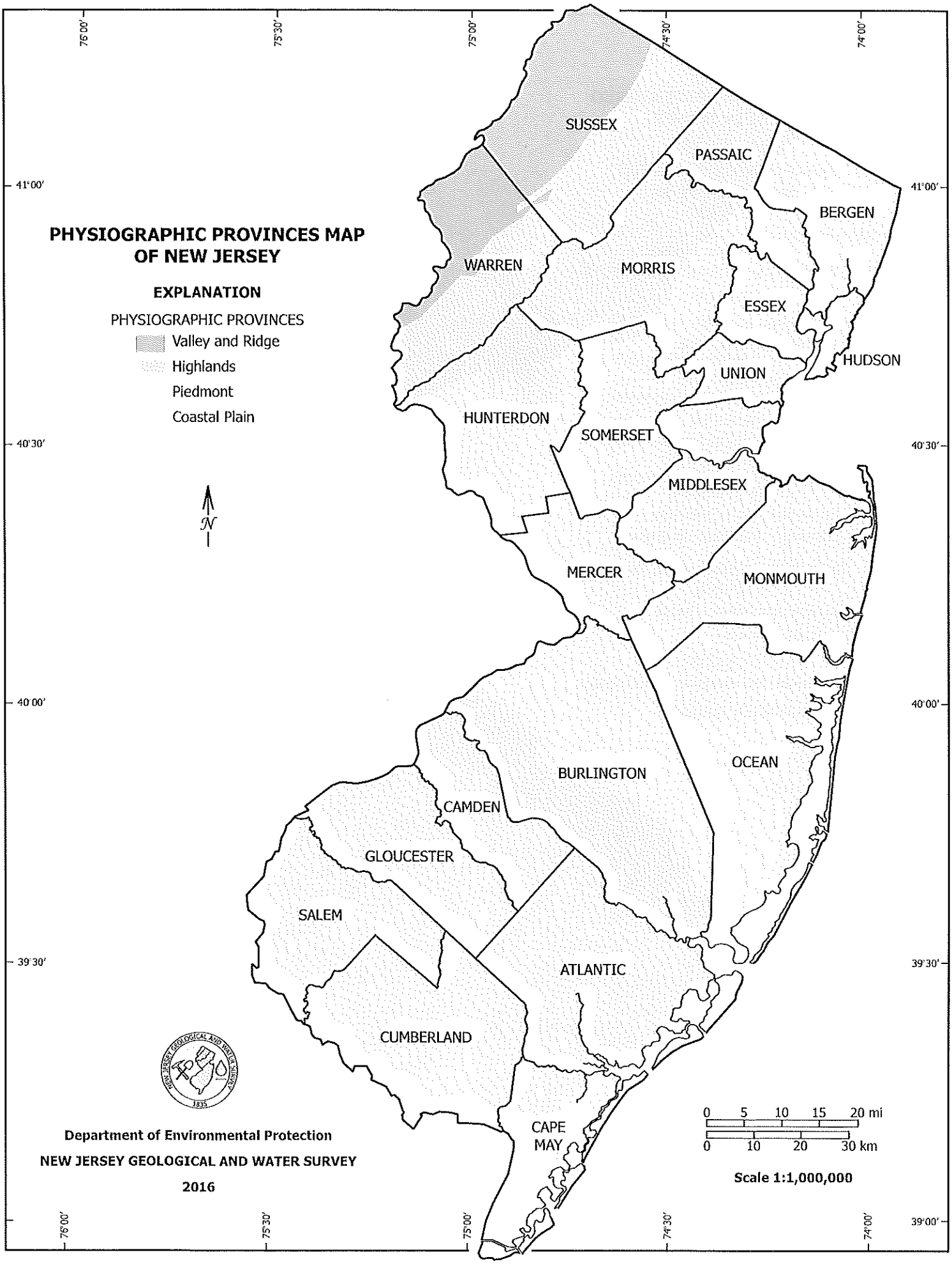
NEW JERSEY GEOLOGICAL AND WATER SURVEY

2016


BOUGUER GRAVITY ANOMALIES MAP
OF NEW JERSEY
DESCRIPTION OF MAP UNITS
Milligals
35 to 40
30 to 35
25 to 30
20 to 25
15 to 20
10 to 15
5 to 10
0 to 5
-5 to 0
-10 to -5
-15 to -10
-20 to -15
-25 to -20
-30 to -25
-35 to -30
-40 to -35
-45 to -40
-50 to -45
-55 to -50
-60 to -55
Contour interval
1 milligal
N
SUSSEX
PASSAIC
WARREN
MORRIS
ESSEX
HUNTERDON
SOMERSET
MIDDLESEX
OCEAN
BURLINGTON
CAMDEN
GLOUCESTER
SALEM
ATLANTIC
CUMBERLAND
CAPE MAY
76°00'
75°30'
75°00'
74°30'
74°00'
41°00'
40°30'
40°00'
39°30'
39°00'
0 5 10 15 20 mi
0 10 20 30 km
Scale 1:1,000,000
Department of Environmental Protection
NEW JERSEY GEOLOGICAL AND WATER SURVEY
2016


MAGNETIC ANOMALY MAP
OF NEW JERSEY
DESCRIPTION OF MAP UNITS
Gammas
1200 to 1300
1100 to 1200
1000 to 1100
900 to 1000
800 to 900
700 to 800
600 to 700
500 to 600
400 to 500
300 to 400
200 to 300
100 to 200
0 to 100
-100 to 0
-200 to -100
SUSSEX
PASSAIC
BERGEN
WARREN
MORRIS
ESSEX
HUDSON
UNION
HUNTERDON
SOMERSET
MIDDLESEX
MERCER
MONMOUTH
OCEAN
BURLINGTON
CAMDEN
GLOUCESTER
SALEM
ATLANTIC
CUMBERLAND
CAPE MAY
N
76°00'
75°30'
75°00'
74°30'
74°00'
41°00'
40°30'
40°00'
39°30'
39°00'
0 5 10 15 20 mi
0 10 20 30 km
Scale 1:1,000,000
Department of Environmental Protection
NEW JERSEY GEOLOGICAL AND WATER SURVEY
2016


ABANDONED MINES OF NEW JERSEY
ABANDONED MINES
Copper
Graphite
Hematite
Limonite
Magnetite
Manganese
Mica
Sulfide
Zinc
PHYSIOGRAPHIC PROVINCES
Valley and Ridge
Highlands
Piedmont
Coastal Plain
SOURCE: DGS03-2
SUSSEX
WARREN
MORRIS
PASSAIC
BERGEN
ESSEX
HUDSON
UNION
HUNTERDON
SOMERSET
MIDDLESEX
MERCER
MONMOUTH
OCEAN
BURLINGTON
CAMDEN
GLOUCESTER
SALEM
ATLANTIC
CUMBERLAND
CAPE MAY
76°00'
75°30'
75°00'
74°30'
74°00'
41°00'
40°30'
40°00'
39°30'
39°00'
0 5 10 15 20 mi
0 10 20 30 km
Scale 1:1,000,000
Department of Environmental Protection
NEW JERSEY GEOLOGICAL AND WATER SURVEY
2016


PHYSIOGRAPHIC PROVINCES MAP OF NEW JERSEY
EXPLANATION
PHYSIOGRAPHIC PROVINCES
Valley and Ridge
Highlands
Piedmont
Coastal Plain
SUSSEX
PASSAIC
BERGEN
WARREN
MORRIS
ESSEX
HUDSON
UNION
HUNTERDON
SOMERSET
MIDDLESEX
MERCER
MONMOUTH
OCEAN
BURLINGTON
CAMDEN
GLOUCESTER
SALEM
ATLANTIC
CUMBERLAND
CAPE MAY
76°00'
75°30'
75°00'
74°30'
74°00'
41°00'
40°30'
40°00'
39°30'
39°00'
0 5 10 15 20 mi
0 10 20 30 km
Scale 1:1,000,000
Department of Environmental Protection
NEW JERSEY GEOLOGICAL AND WATER SURVEY
2016

MAP OF EARTHQUAKES EPICENTERED IN NEW JERSEY

EXPLANATION

DESCRIPTION OF MAP UNITS

Sedimentary Rocks

CENOZOIC

- Holocene: beach and estuarine deposits
- Paleogene and Neogene: sand, silt, clay

MESOZOIC

- Cretaceous: sand, silt, clay
- Jurassic: siltstone, shale, sandstone, conglomerate
- Triassic: siltstone, shale, sandstone, conglomerate

PALEOZOIC

- Devonian: conglomerate, sandstone, shale, limestone
- Silurian: conglomerate, sandstone, shale, limestone
- Ordovician: shale, limestone
- Cambrian: limestone, sandstone

Igneous and Metamorphic Rocks

MESOZOIC

- Jurassic and Triassic: basalt
- Jurassic: diabase

PALEOZOIC

- Ordovician and Cambrian: schist, gneiss

MESOPROTEROZOIC

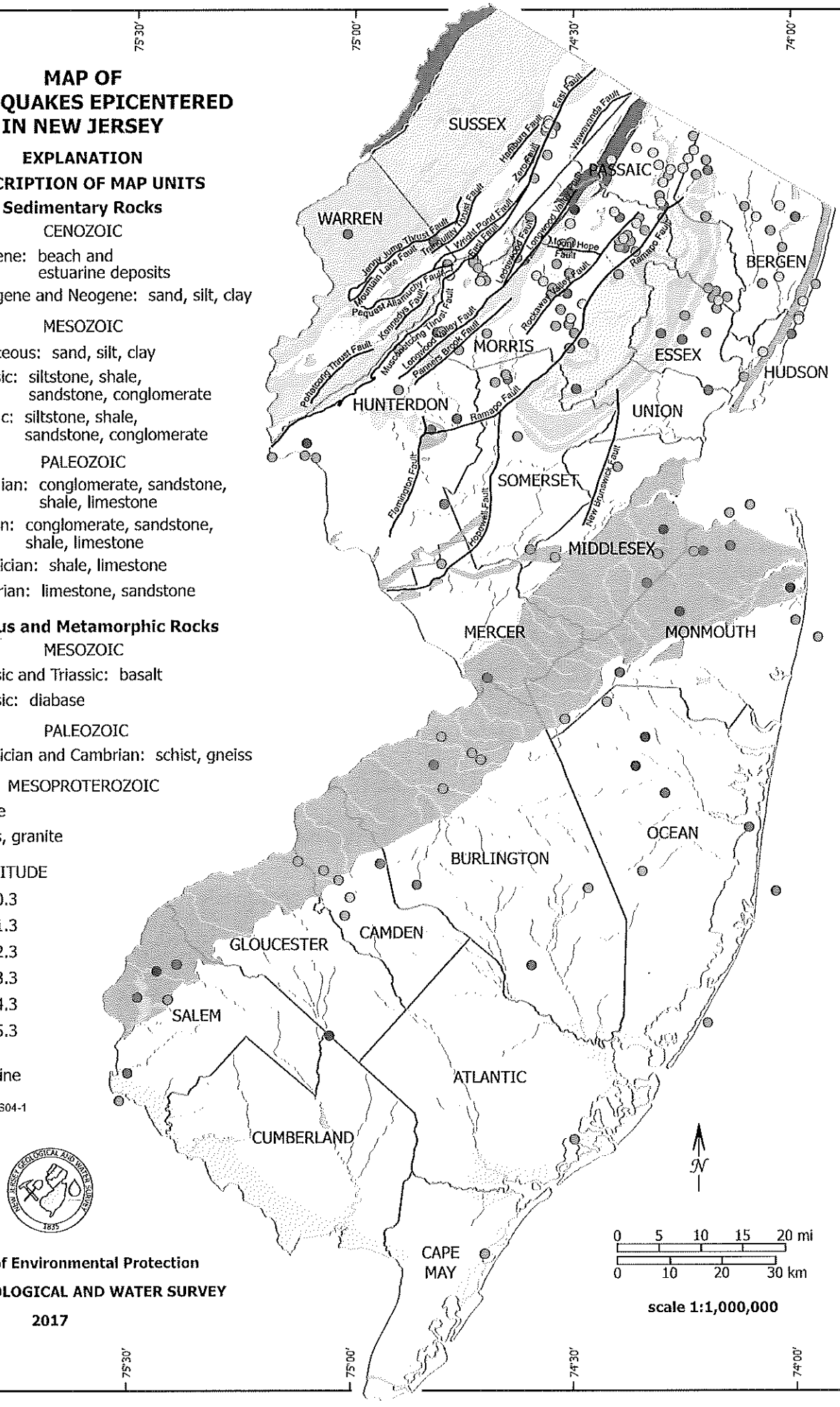
- marble
- gneiss, granite

MAGNITUDE

- 0.0 - 0.3
- 0.4 - 1.3
- 1.4 - 2.3
- 2.4 - 3.3
- 3.4 - 4.3
- 4.4 - 5.3

Fault line

SOURCE: DGS04-1



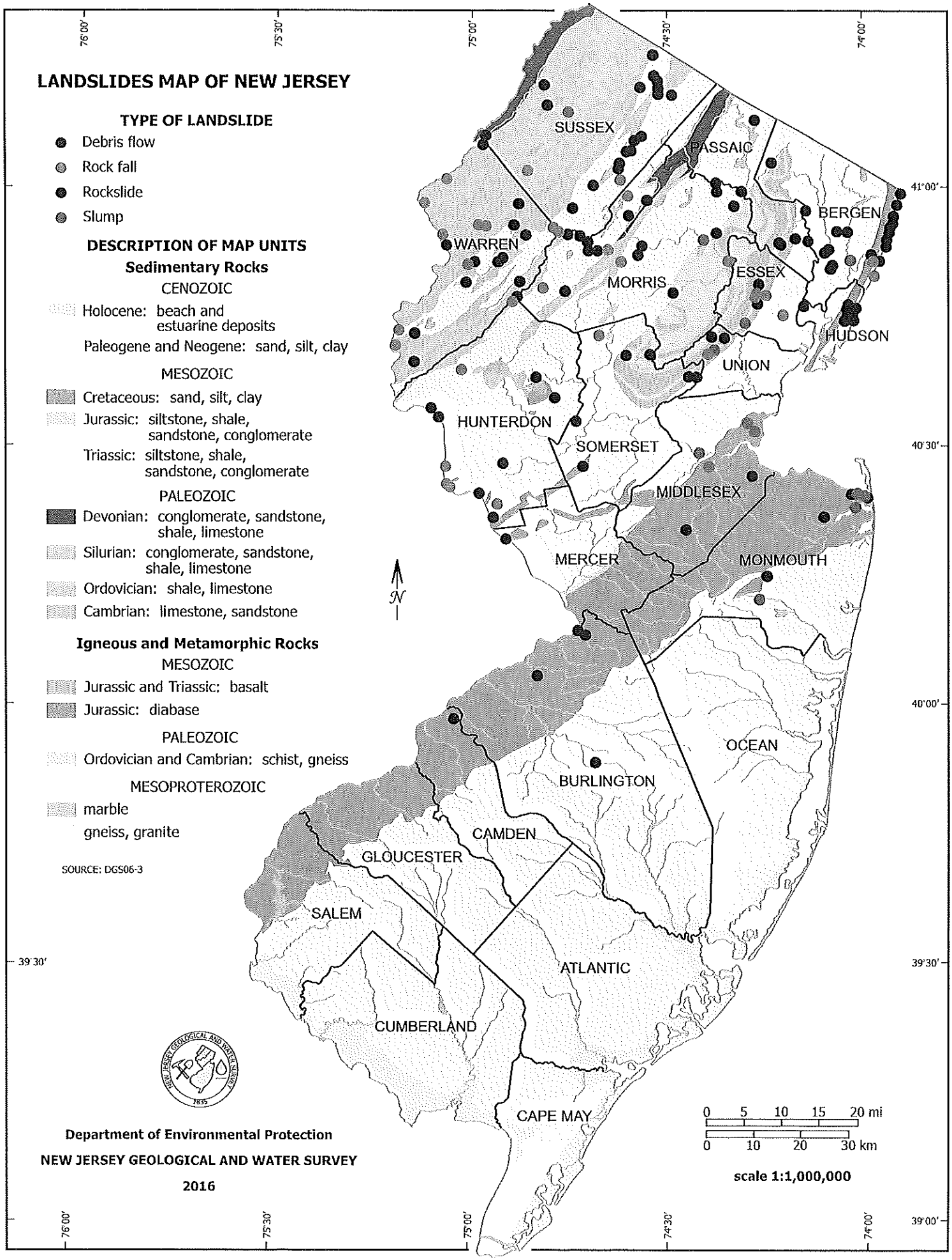
scale 1:1,000,000

Department of Environmental Protection

NEW JERSEY GEOLOGICAL AND WATER SURVEY

2017

LANDSLIDES MAP OF NEW JERSEY



TYPE OF LANDSLIDE

- Debris flow
- Rock fall
- Rockslide
- Slump

DESCRIPTION OF MAP UNITS

Sedimentary Rocks

CENOZOIC

Holocene: beach and estuarine deposits

Paleogene and Neogene: sand, silt, clay

MESOZOIC

Cretaceous: sand, silt, clay

Jurassic: siltstone, shale, sandstone, conglomerate

Triassic: siltstone, shale, sandstone, conglomerate

PALEOZOIC

Devonian: conglomerate, sandstone, shale, limestone

Silurian: conglomerate, sandstone, shale, limestone

Ordovician: shale, limestone

Cambrian: limestone, sandstone

Igneous and Metamorphic Rocks

MESOZOIC

Jurassic and Triassic: basalt

Jurassic: diabase

PALEOZOIC

Ordovician and Cambrian: schist, gneiss

MESOPROTEROZOIC

marble

gneiss, granite

SOURCE: DGS06-3

Department of Environmental Protection

NEW JERSEY GEOLOGICAL AND WATER SURVEY

2016

scale 1:1,000,000

SURFICIAL GEOLOGIC MAP OF NEW JERSEY

DESCRIPTION OF MAP UNITS

HOLOCENE

- floodplain alluvium
- beach sand
- freshwater wetland deposit
- estuary and salt marsh deposit
- postglacial stream terrace

PLEISTOCENE GLACIAL

- Kittatinny Mountain Till
- Netcong Till
- Rahway Till
- Flanders Till
- Port Murray Till
- moraine
- sand and gravel
- lake clay

PLEISTOCENE NONGLACIAL

- windblown sand and silt
- colluvium
- Lower Stream Terrace
- Upper Stream Terrace
- Cape May 3 Marine Terrace
- Cape May 2 Marine Terrace
- Cape May 1 Marine Terrace

PLIOCENE

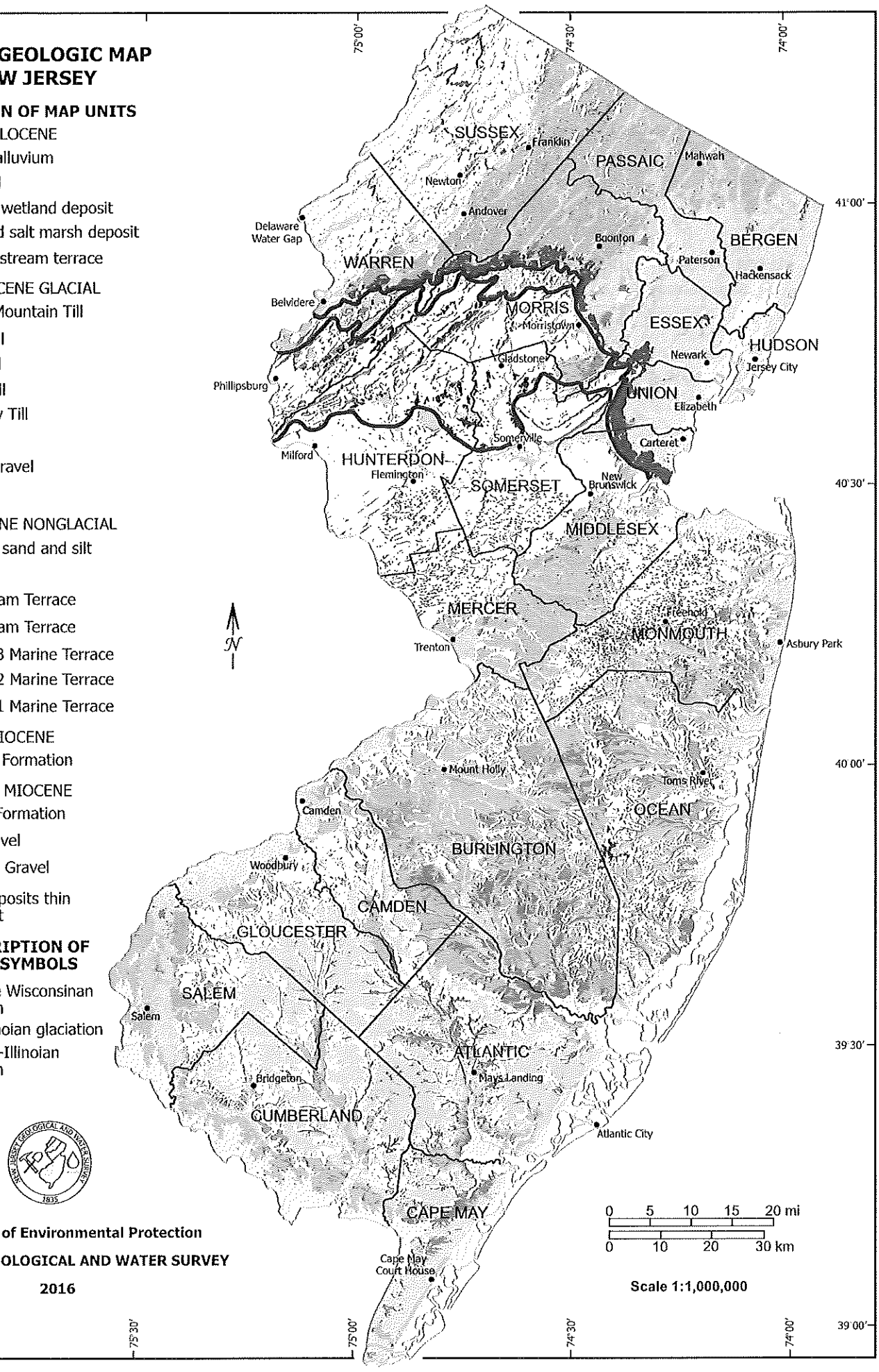
- Pensauken Formation

LATE MIOCENE

- Bridgeton Formation
- Upland Gravel
- Beacon Hill Gravel
- surficial deposits thin or absent

DESCRIPTION OF MAP SYMBOLS

- limit of late Wisconsinan glaciation
- limit of Illinoian glaciation
- limit of pre-Illinoian glaciation



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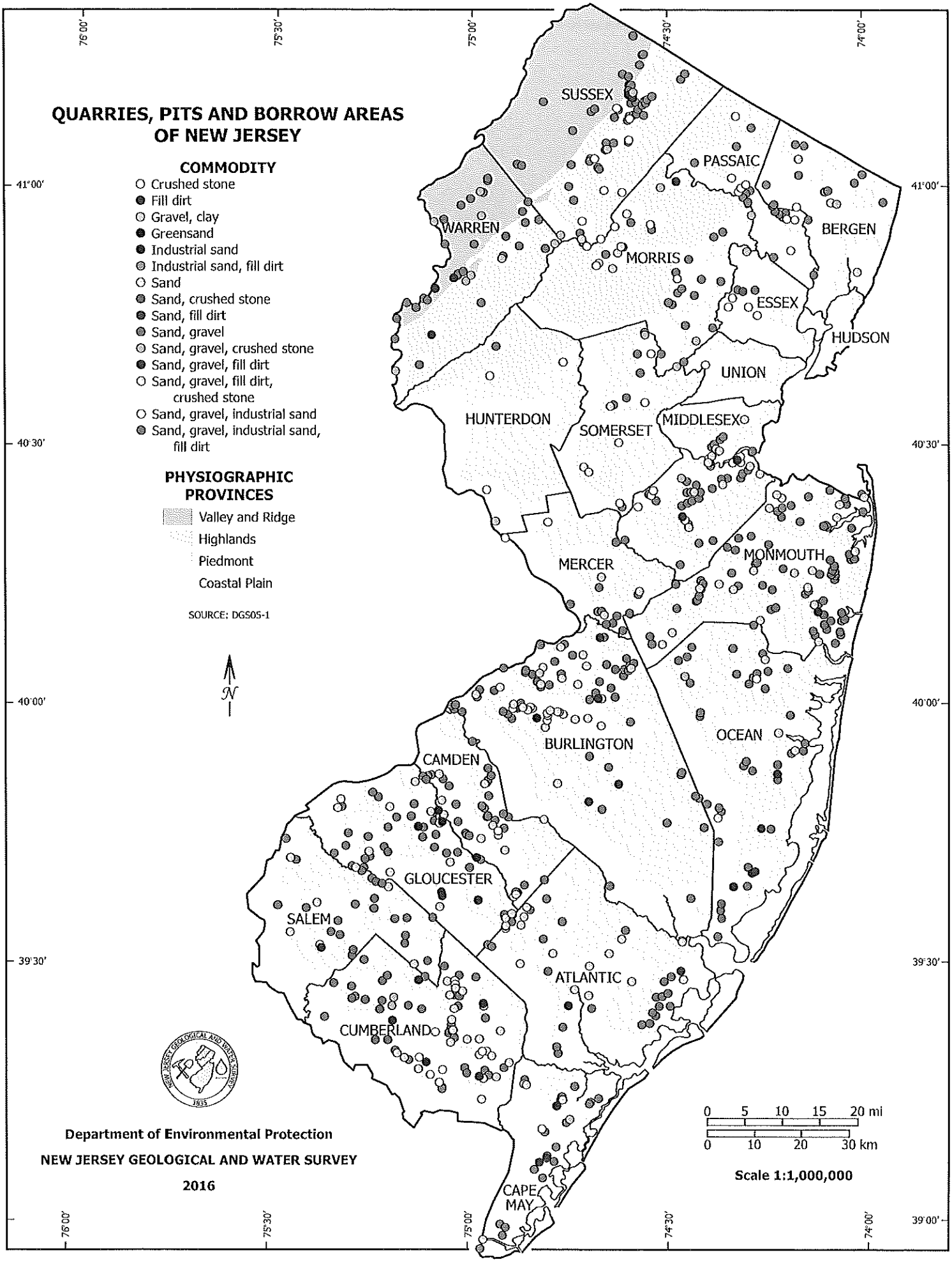
NEW JERSEY GEOLOGICAL AND WATER SURVEY

2016


QUARRIES, PITS AND BORROW AREAS OF NEW JERSEY
COMMODITY
Crushed stone
Fill dirt
Gravel, clay
Greensand
Industrial sand
Industrial sand, fill dirt
Sand
Sand, crushed stone
Sand, fill dirt
Sand, gravel
Sand, gravel, crushed stone
Sand, gravel, fill dirt
Sand, gravel, fill dirt, crushed stone
Sand, gravel, industrial sand
Sand, gravel, industrial sand, fill dirt
PHYSIOGRAPHIC PROVINCES
Valley and Ridge
Highlands
Piedmont
Coastal Plain
SOURCE: DGS05-1
SUSSEX
PASSAIC
BERGEN
WARREN
MORRIS
ESSEX
HUDSON
UNION
HUNTERDON
SOMERSET
MIDDLESEX
MERCER
MONMOUTH
OCEAN
BURLINGTON
CAMDEN
GLOUCESTER
SALEM
ATLANTIC
CUMBERLAND
CAPE MAY
41°00'
40°30'
40°00'
39°30'
39°00'
76°00'
75°30'
75°00'
74°30'
74°00'
0 5 10 15 20 mi
0 10 20 30 km
Scale 1:1,000,000
Department of Environmental Protection
NEW JERSEY GEOLOGICAL AND WATER SURVEY
2016

APPENDIX D

NRCS Morris County Soil Resource Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Morris County, New Jersey

239 Mountainside Road, Mendham

April 12, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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