

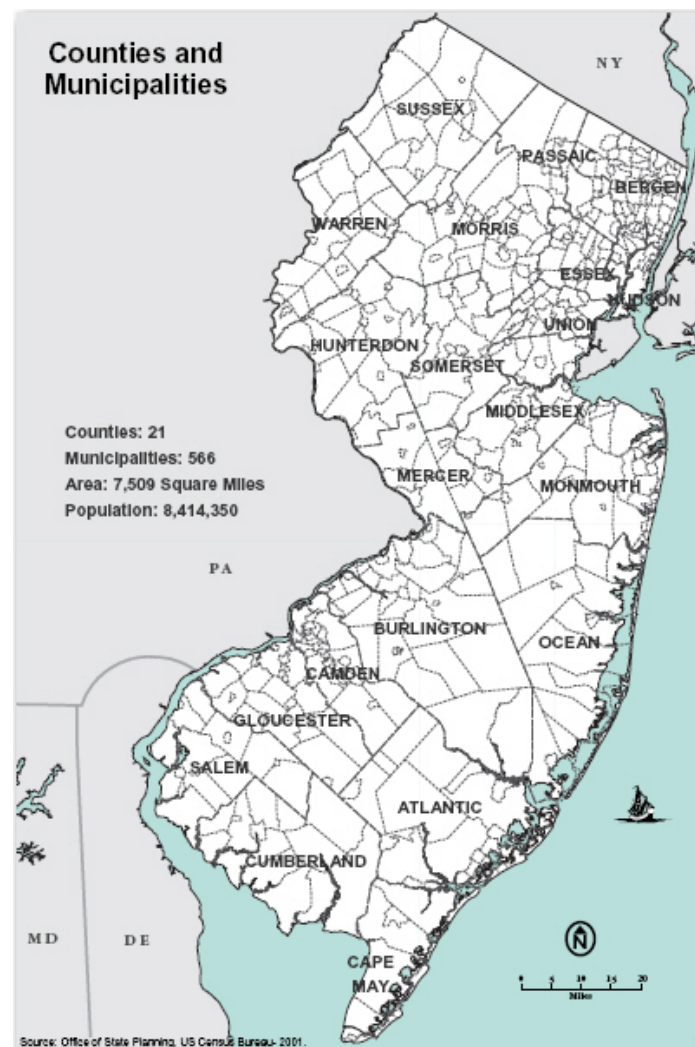


Appendix E Background of the State of New Jersey

Geography

New Jersey was named for the island of Jersey in the English Channel, but is also known as the “Garden State”. The State is located in the Mid-Atlantic region of the U.S. It is bordered by New York State to the north, the Atlantic Ocean to the east, Delaware to the south, and Pennsylvania to the west. It is about 150 miles long and 70 miles wide, comprising 8,722 square miles. The Delaware River is the largest river in the State, and defines the State’s southern and western borders. New Jersey is the most densely populated State in the nation, and one of the most ethnically diverse. It is comprised of 21 counties and 566 municipalities. The largest municipality is Newark, with a population of 273,546 (as of the 2000 Census). The capital city is Trenton, which is located in Mercer County, which is also the geographic center of the State.

Figure E-1
Map of the State of New Jersey showing Counties





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New Jersey is the 4th smallest State by land area and is occupied by four main land regions; the Atlantic Coastal Plain, the Piedmont, the New England Upland, and the Appalachian Ridge and Valley Region. The largest land area, the Atlantic Coastal Plain, covers the southern 3/5 of New Jersey. More than half of this area, characterized by gently rolling hills, is less than 100 feet above sea level. In the east the landscape consists of pine forests and salt marshes. Closer to the Atlantic coast, the salt marshes are more plentiful and shallow lagoons and meadows characterize the area. Along the coast lie New Jersey's resort areas; including Atlantic City, Ocean City, and Cape May. In the west and southwest, along the Delaware River, the fertile soil supports farming.

The Piedmont lies northeast of the Atlantic Coastal Plain. About 20 miles wide, this area covers only about 1/5 of the State. The Piedmont includes the industrial cities of Elizabeth, Patterson, Jersey City, and Newark. New Jersey's major rivers (Hudson River, Passaic River, Remapo River, Raritan River) are found in this area supporting the industrial development.

West of the Piedmont is the New England Upland. This area, sometimes called The Highlands, includes flat-topped ridges of rock and extends into Pennsylvania and New York. This area is characterized by the many beautiful lakes nestled among the ridges.

In the northwest corner of the State are the Appalachian Ridge and Valley Region. This mountainous area includes the Kittatinny Mountains that run parallel to New Jersey's northwestern border. The Delaware Water Gap is where the Delaware River has cut through the Kittatinny Mountains. The wide Appalachian Valley lies southeast of the Kittatinny Mountains. Shale and limestone formation can be found in the valley along with dairy cattle and apple orchards.

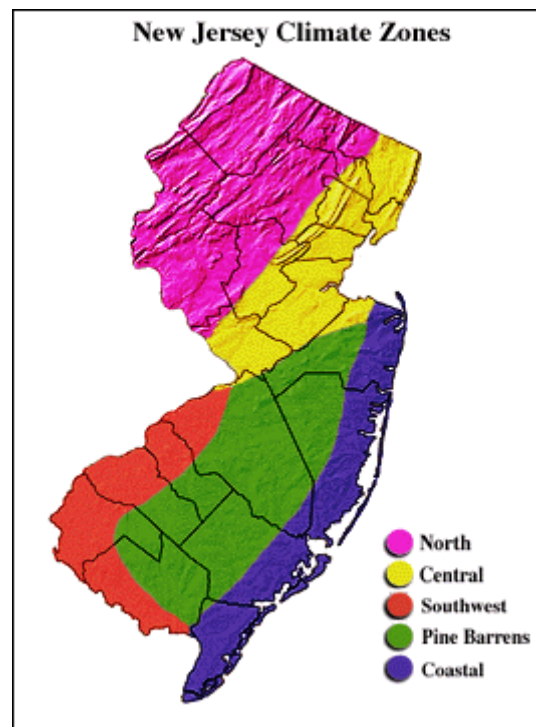
Climate

The climate in New Jersey varies greatly depending on the part of the State you are in. The southern portion tends to be more temperate than the north. The dominant feature of the atmospheric circulation over North America, including New Jersey, is the broad, undulating flow from west to east across the middle latitudes of the continent. This pattern exerts a major influence on the weather throughout the State. New Jersey has five distinct climatic regions. These are: Northern, Central, Pine Barrens, Southwest, and Coastal.

Each of the climate zones is described in detail below.

Northern Zone

The Northern climate zone covers about one-quarter of New Jersey and consists mainly of elevated highlands and valleys which are part of the Appalachian Uplands. Surrounded by land, this region can be characterized





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as having a continental type of climate with minimal influence from the Atlantic Ocean, except when the winds contain an easterly component. Prevailing winds are from the southwest in summer and from the northwest in winter.

A major source of precipitation for this area comes from storms tracking from the Mississippi Valley, over the Great Lakes, and along the St. Lawrence Valley. Coastal storms, with precipitation shields that reach well enough inland add to the precipitation totals. The highlands and mountains in this area play a role in making the climate of the Northern Zone different from the rest of the State. Clouds and precipitation are enhanced by cold frontal passage when the air, forced to rise over the mountains, produces clouds, and even precipitation, while the rest of the State observes clear skies. The latter is due in part to subsiding air flowing off the highlands.

Central Zone

The Central Zone has a northeast to southwest orientation, running from New York Harbor and the Lower Hudson River to the great bend of the Delaware River in the vicinity of Trenton. The northern edge of the Central Zone is often the boundary between freezing and non-freezing precipitation during wintertime.

Pine Barrens Zone

Scrub pine and oak forests dominate the interior southern portion of New Jersey, hence the name, Pine Barrens. Sandy soils, which are porous and not very fertile, have a major effect on the climate of this region. On clear nights, solar radiation absorbed during the day is quickly radiated back into space, resulting in surprisingly low minimum temperatures. Atlantic City Airport, which is surrounded by sandy soil, can be 15-20 degrees cooler than the Atlantic City Marina on the bay, which is only about thirteen miles away.

The porous soil permits any precipitation to rapidly infiltrate and leave surfaces quite dry. Drier conditions allow for a wider range between the daily maximum and minimum temperatures, and makes the area vulnerable to forest fires.

Southwest Zone

The Southwest Zone lies between sea level and approximately 100 feet above sea level. The close proximity to Delaware Bay adds a maritime influence to the climate of this region. The Southwest has the highest average daily temperatures in the State and without sandy soils, tends to have higher nighttime minimum temperatures than in the neighboring Pine Barrens.

This region receives less precipitation than the Northern and Central regions of the State as there are no orographic features and, it is farther away from the Great Lakes-St. Lawrence storm track. It is also far enough inland to be away from the heavier rains from some coastal storms, thus it receives less precipitation than the Coastal Zone. Prevailing winds are from the southwest, except in winter when west to northwest winds dominate. High humidity and moderate temperatures prevail when winds flow from the south or east. The moderating effect of the water also allows for a longer growing season. Autumn frosts usually occur about four weeks later here than in the North and the last spring frosts are about four weeks earlier, giving this region the longest growing season in New Jersey.



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Coastal Zone

In the Coastal Zone, continental and oceanic influences battle for dominance on daily to weekly bases. In autumn and early winter, when the ocean is warmer than the land surface, the Coastal Zone will experience warmer temperatures than interior regions of the State. In the spring months, ocean breezes keep temperatures along the coast cooler. Being adjacent to the Atlantic Ocean, with its high heat capacity (compared to land), seasonal temperature fluctuations tend to be more gradual and less prone to extremes.

Sea breezes play a major role in the coastal climate. When the land is warmed by the sun, heated air rises, allowing cooler air at the ocean surface to spread inland. Sea breezes often penetrate 5-10 miles inland, but under more favorable conditions, can affect locations 25-40 miles inland. They are most common in spring and summer. Coastal storms, often characterized as nor'easters, are most frequent between October and April. These storms track over the coastal plain or up to several hundred miles offshore, bringing strong winds and heavy rains. Rarely does a winter go by without at least one significant coastal storm and some years see upwards of five to ten. Tropical storms and hurricanes are also a special concern along the coast. In some years, they contribute a significant amount to the precipitation totals of the region. Damage during times of high tide can be severe when tropical storms or nor'easters affect the region.

This narrative borrows liberally from David Ludlum's *New Jersey Weather Book*, Rutgers University Press, New Brunswick, New Jersey, 1983, and also includes information from *Climate of New Jersey*, by the National Climatic Center, Asheville, North Carolina, June 1982. Each of these sources, plus our list of [NJ Climate Publications](#), provides a considerable amount of information on New Jersey's climate.

Demographics

New Jersey is the most densely populated State in the nation and the 11th most populated. Its 2005 estimated population is approximately 8,717,925. This is up 3.7% (310,213 persons) from the 2000 census. Of the total increase, 254,766 is attributed to a natural increase, while 79,211 is from in-migration. It is also the 2nd wealthiest State in the U.S., behind Connecticut.

New Jersey is a very ethnically diverse State. As of 2005, Caucasians made up 76.6% of the population, below the national percentage of 80.2%. New Jersey's minority percentage is higher than the national trend. This also holds true for foreign-born population those who use English as a second language in the home. The percentage of foreign-born residents is 17.5%, while the national average is only 11.1%. More than 25% of households in New Jersey reported in speaking a language other than English in the home. ([QuickFacts: New Jersey, U.S. Census Bureau](#); 11.09.2007)

New Jerseyans are a highly educated population. More than 82% of the population has received a high school diploma and over 29% of the population has a Bachelor's degree or higher. These education rates translate into jobs and income. New Jersey is the second wealthiest State in the nation. The median income is \$57,338 while the national average is \$44,334 as of 2004. (<http://quickfacts.census.gov/qfd/States/34000.html>, 11-9-2007)



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Economy

The US Bureau of Economic Analysis estimates that the total State product for New Jersey in 2004 was \$416 billion. It is ranked second in the nation by the number of places with per capita incomes above national average with 76.4%. Nine of New Jersey's counties are in the top 100 of the wealthiest in the nation. (<http://www.bea.gov/bea/newsrelarchive/2005/gsp1005.pdf>)

The State is noted for its output of chemicals and pharmaceuticals, machinery, and a host of other products, including electronic equipment, printed materials, and processed foods. The long history of heavy industry in New Jersey has left the State with the largest inventory of U.S. Superfund sites, and industrial cleanup is an important issue in its cities.

New Jersey has been a leader in industrial research and development since the establishment in 1876 of Thomas Edison's research facility in Menlo Park. Color television, the videotape recorder, and the liquid crystal display were invented in New Jersey corporate research labs. Today telecommunications and biotechnology are major industries in the State, and the area near Princeton has developed into a notable high-tech center. Finance, warehousing, and "big box" retailing have also become important to the State's economy, attracting corporations and shoppers and to a large extent reversing New Jersey's onetime role as a suburb for commuters to New York City and Philadelphia. New Jersey's tourism also strongly drives the economy.

Transportation

A tremendous transportation system, concentrated in the industrial lowlands, moves products and a huge volume of interstate traffic through the State. Busy highways like the Garden State Parkway and the New Jersey Turnpike are part of a network of toll roads and freeways. New Jersey is linked to Delaware and Pennsylvania by many bridges across the Delaware River. Traffic to and from New York is served by railway and subway tunnels and by the facilities of the Port Authority of New York and New Jersey—the George Washington Bridge, the Lincoln and Holland vehicular tunnels, and three bridges to Staten Island. Airports are operated by many cities, and Newark airport (controlled by the Port Authority) ranks among the nation's busiest. Shipping in New Jersey centers on the ports of the Newark Bay and New York Bay areas—notably Port Newark and Port Elizabeth—with relatively minor seagoing traffic on the Delaware as far north as Trenton.

Agriculture

New Jersey is a leading State in agricultural income per acre. The scrub pine area of the southern inland region is used for cranberry and blueberry culture. North of the pine belt the soil is extremely fertile and supports a variety of crops, most notably potatoes, corn, hay, peaches, and vegetables (especially tomatoes and asparagus). Dairy products, eggs, and poultry are also important. Commercial and residential expansion, however, has taken over much of the State's farmland, and New Jersey is now almost one third developed. (<http://www.infoplease.com/ce6/us/A0859952.html>, 11-09-2007)



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Government

The New Jersey legislature consists of a senate of 40 members and an assembly of 80 members. The Governor and Lt. Governor serve a four-year term and may be reelected once.

New Jersey sends 13 Representatives and two Senators to the U.S. Congress and has 15 electoral votes. The State is made up of 21 counties and 566 municipalities. All 566 New Jersey municipalities, regardless of their form of government, can be classified as belonging to one of five types of municipal government::

- Borough
- Township
- City
- Town, and
- Village.

For more information on local government types the New Jersey League of Municipalities publication, available on line, entitled "Forms of Government – Everything You've Always Wanted To Know but Were Afraid To Ask" is available.

New Jersey State government legislative body consists of an upper house Senate consisting of 40 members and a lower house General Assembly or 80 members. Assembly members are elected for a two-year term and State Senators are elected and serve four year terms.

Regional Planning Authorities Include:

- Meadowlands Development Commission
- Highlands Council
- Pinelands Commission
- Delaware and Raritan Canal Commission

Now participating in Hazard Mitigation Planning are five (5) Special Purpose Districts

- Meadowlands Commission (Bergen and Hudson Counties)
- Bayonne MUA (Hudson County)
- Jersey City MUA (Hudson County)
- North Bergen MUA (Hudson County)
- North Hudson SA (Hudson County)

Municipal Utility Authorities

A **Municipal Utility Authority** (usually just **MUA**) is an organization that maintains the infrastructure for a public service (often also providing a service using that infrastructure). MUAs are subject to forms of public control and regulation ranging from a single jurisdictional-based group to one with a regional scope. In New Jersey the generally include water and sewage and are provided by 100 MUAs. A full listing is available on line.



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Summary of Municipal Authorities by County

County	Number of Utility Authorities
Atlantic	5
Bergen	4
Burlington	9
Camden	2
Cape May	1
Cumberland	3
Essex	2
Gloucester	5
Hudson	7
Hunterdon	4
Mercer	5
Middlesex	4
Monmouth	13
Morris	13
Ocean	7
Passaic	3
Salem	1
Somerset	3
Sussex	1
Union	6
Warren	2
Total	100

Higher Education

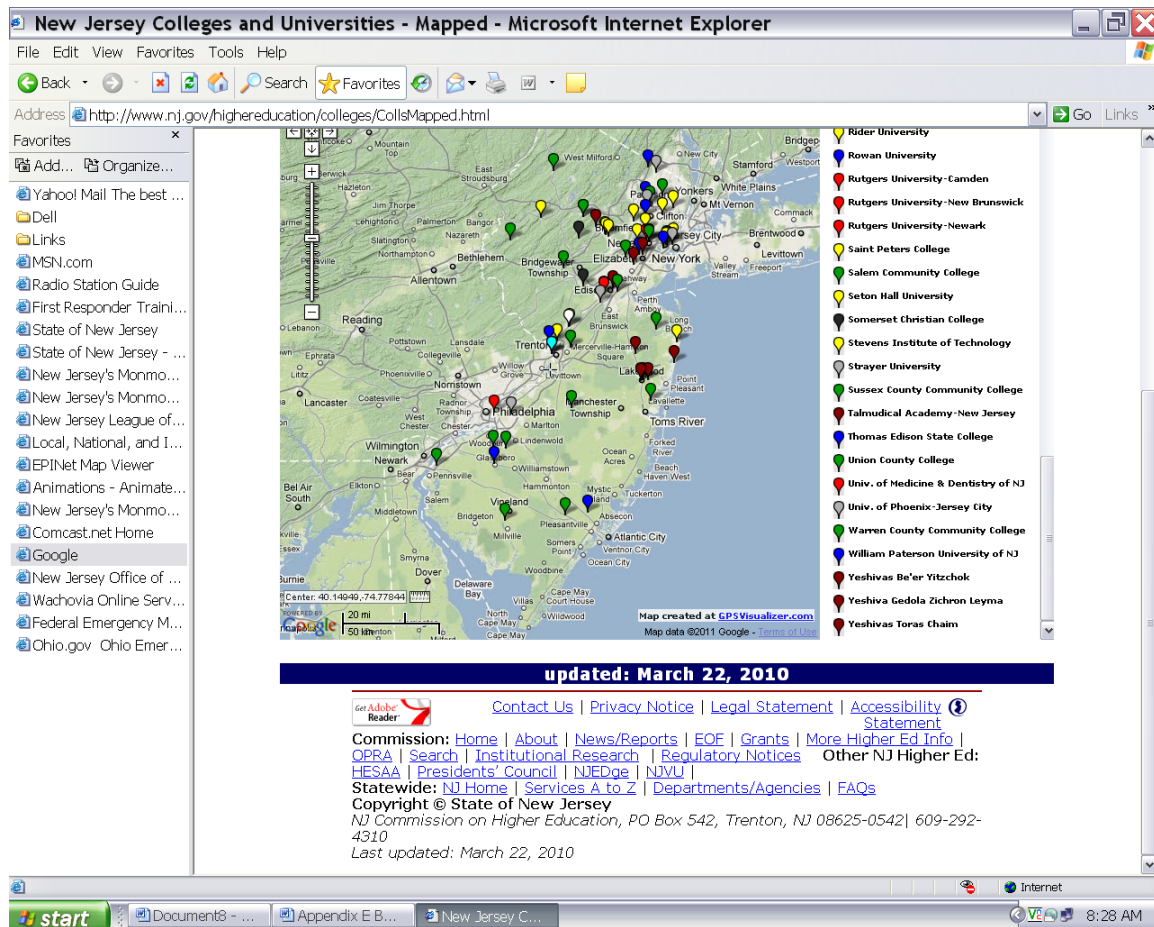
New Jersey is home to two of the most prestigious centers of higher learning, including Princeton University and Rutgers, the State University of New Jersey.

- Rutgers has 50,000 students and is one of the nation's major public institutions for higher education. Chartered in 1766, the university has a unique history as a colonial college, a land-grant institution, and a State university. The University offers 27 degree programs in more than 100 fields. (<http://ruweb.rutgers.edu/about-the-university.shtml>)
- Princeton University is the fourth oldest college in the US. Princeton's Nassau Hall was the temporary capitol of the United States in 1783. Today, there are more than 850 full-time faculty members and 4,760 undergraduate and 2,295 graduate students. (<http://www.princeton.edu/main/about/facts/>)

Other colleges and universities can be found on line at:



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ZXC Table
Summary Table Colleges and Universities in New Jersey

Colleges and Universities in New Jersey Summary Table	
Group 1 – Listed with detailed information	
Public Research Universities	3
State Colleges and Universities	9
Community Colleges	19
Independent Four Year Colleges	14
Group 2 – Listed without detailed information	
Proprietary Institutions with Degree Granting Authority	6
Rabbinical Schools and Theological Seminaries	11
Independent Two-Year Religious Colleges	2
Total	64



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Population

2010 Population Summary
Source: US Census

County	Square Miles	NJ Census Population		% Change Population	Density per square mile	
		2000	2010*		2000	2010
Atlantic	561.07	252,552	274,549	8.7%	450.2	489.3
Bergen	234.17	884,118	905,116	2.4%	3,778.3	3,865.2
Burlington	804.57	423,394	448,734	6.0%	526.0	557.7
Camden	222.3	508,932	513,657	0.90%	2,292.5	2,310.6
Cape May	255.19	102,326	97,265	-4.9%	401.3	381.1
Cumberland	489.3	146,438	156,898	7.1%	299.5	320.7
Essex	126.27	793,633	783,969	-1.2%	6,298.7	6,208.7
Gloucester	324.72	254,673	288,288	13.2%	783.6	887.8
Hudson	46.69	608,975	634,266	4.2%	13,042.9	13,584.6
Hunterdon	429.94	121,989	128,349	5.2%	283.7	298.5
Mercer	225.93	350,761	366,513	4.5%	1,552.0	1,622.2
Middlesex	309.72	750,162	809,858	8.0%	2,419.9	2,614.8
Monmouth	471.94	615,301	630,380	2.5%	1,303.6	1,335.7
Morris	468.99	470,212	492,276	4.7%	1,002.6	1,049.7
Ocean	636.28	510,916	576,567	12.8%	803.3	906.2
Passaic	185.29	489,049	501,226	2.5%	2,643.5	2,705.1
Salem	337.88	64,285	66,083	2.8%	190.2	195.6
Somerset	304.69	297,490	323,444	8.7%	975.4	1,061.6
Sussex	521.26	144,166	149,265	3.5%	176.7	268.4
Union	103.29	522,541	536,499	2.7%	5,073.2	5,194.1
Warren	357.87	102,437	108,692	6.1%	286.1	303.7
Total	7,417.34	8,414,350	8,724,560	4.5%	1,134.5	1,185.3



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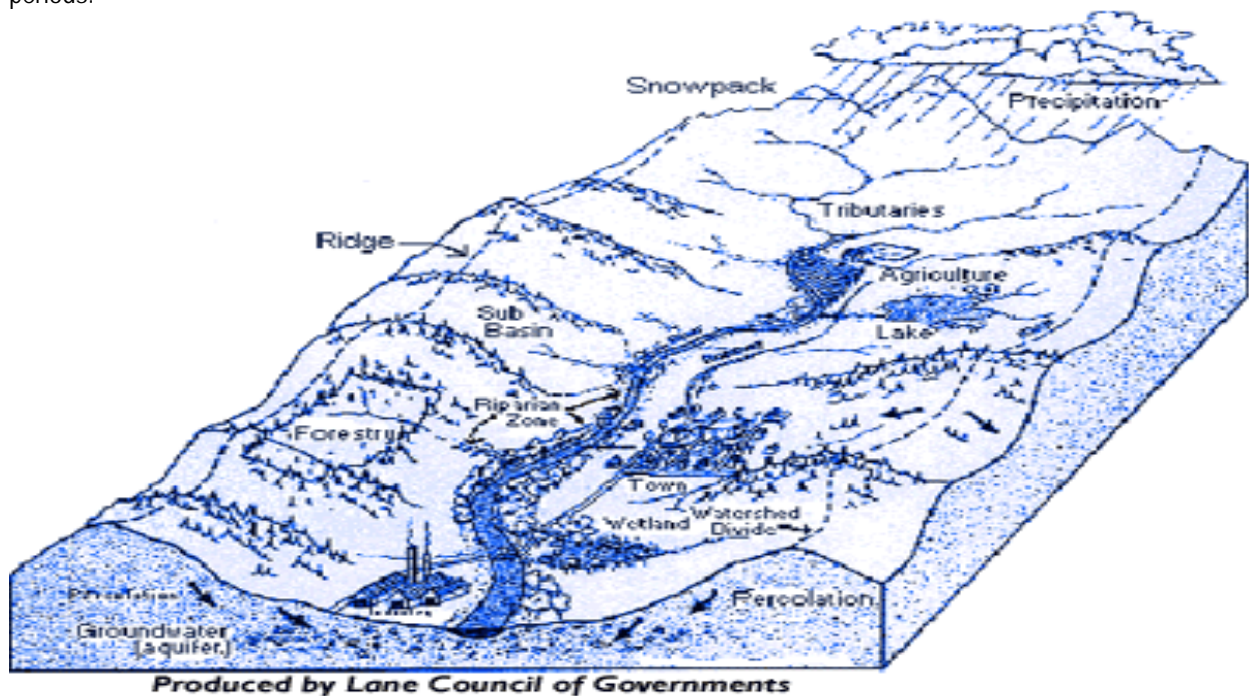
New Jersey Watersheds

A watershed is the area of land that drains into a body of water such as a river, lake, stream or bay. It is separated from other systems by high points in the area such as hills or slopes. It includes not only the waterway itself but also the entire land area that drains to it. For example, the watershed of a lake would include not only the streams entering the lake but also the land area that drains into those streams and eventually the lake. Drainage basins generally refer to large watersheds that encompass the watersheds of many smaller rivers and streams.

For millions of years, water has been used. It is constantly being recycled and reused. It is important to understand how water moves through the Earth's water cycle -- the movement of water from the Earth's surface into the atmosphere and back to the Earth's surface again. This process repeats itself continuously.

Urbanization (or development) has a great effect on local water resources. It changes how water flows in the watershed and what flows in the water. Both surface and ground water are changed.

As a watershed becomes developed, the rate of stormwater runoff is increased. Less stormwater is able to soak into the ground because sidewalks, roads, parking lots and rooftops block this infiltration. This means a greater volume of water reaches the waterway faster and less of that water is able to infiltrate to ground water. This, in turn, leads to more flooding after storms but reduced flow in streams and rivers during dry periods.

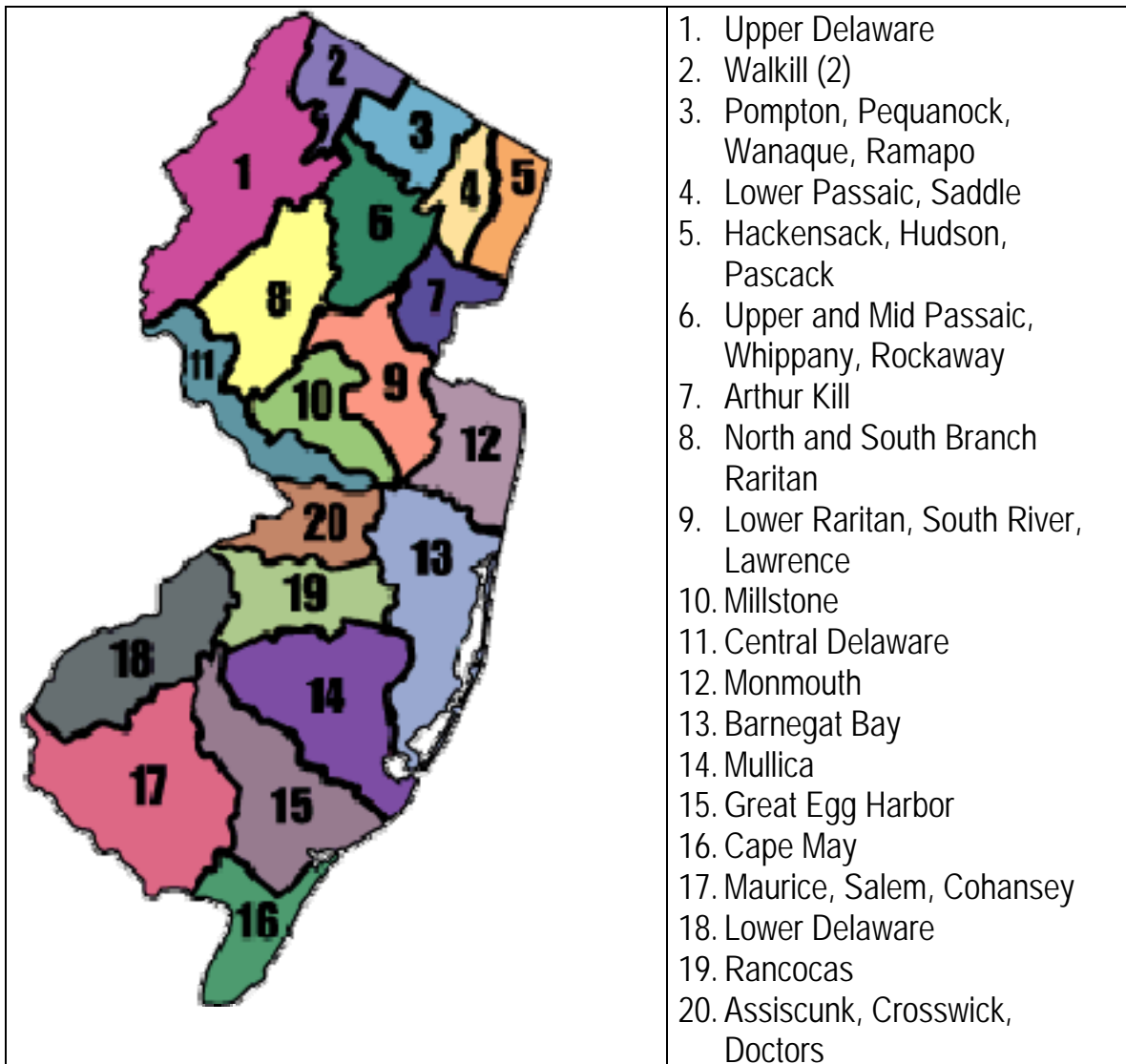


Watersheds come in all shapes and sizes. They cross municipal and county boundaries. In the New Jersey there are 20 watersheds. When flooding occurs it impacts the entire watershed. Graphic and factual information on each watershed management area follows.



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New Jersey Watershed Management Areas (NJDEP)

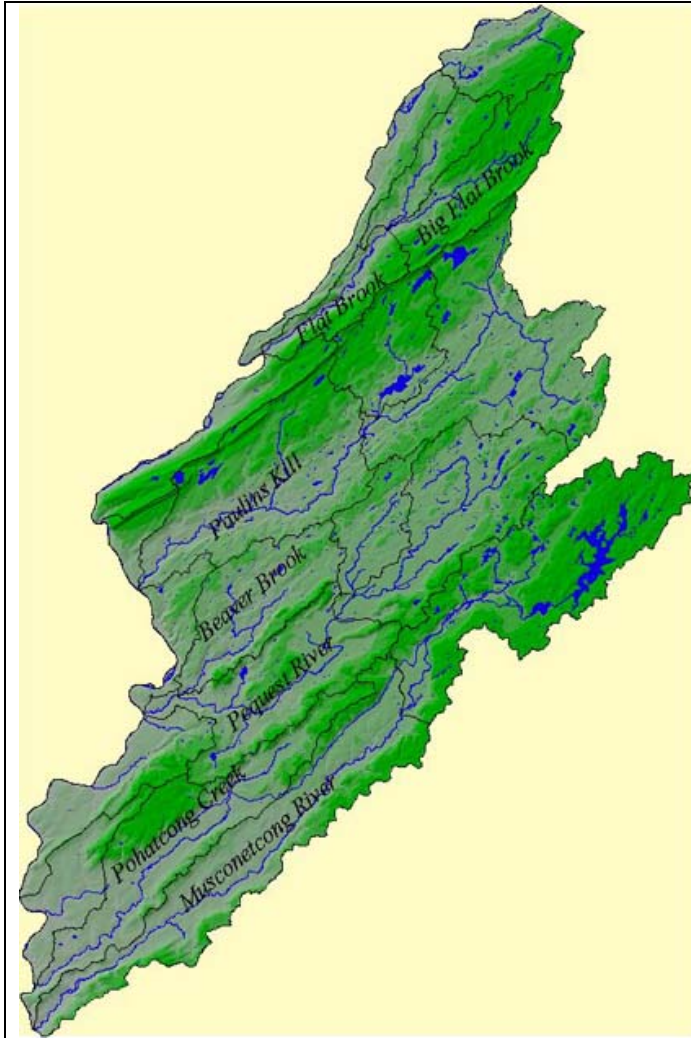


Descriptions of Individual Watershed follow:



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Watershed Management Area 1 - Upper Delaware



Watershed Management Area 1 (WMA 1) includes portions of Sussex, Morris, Hunterdon, and all of Warren Counties. It contains 54 Municipalities. This area, also known as the Upper Delaware River Watershed, encompasses 746 square miles in the mountainous northwestern corner of the state, within the Valley and Ridge and Highlands physiographic provinces.

Within Area 1, there are six major drainage basins:

- Delaware River,
- Flat Brook,
- Paulins Kill,
- Pequest River,
- Lopatcong River and Pohatcong River Drainage, and the
- Musconetcong River.

These drainage basins flow in a southeasterly direction to the Delaware River, providing an outstanding recreational resource for trout production and maintenance, as well as habitat for an abundance of wildlife including threatened and endangered species.

Each part of Area 1 has its own characteristics. The 65 square-mile Flat Brook watershed lies within state parks and forest boundaries as well as the Delaware Water Gap Recreation Area. The Flat Brook and its tributaries continue to be among the highest quality surface waters in the state.

The Paulins Kill watershed has the most developed centers of this rural area but it is well recognized for its agriculture and forested area. The water quality ranges from fair to good.

There are many recreational areas in the the Pequest River watershed with land use heavily forested and agricultural. As with other watersheds in the northwestern part of the state, there is increasing residential and commercial development.

Pohatcong Creek runs 28 miles in Warren County. Both the Pohatcong River and Lopatcong Creek are known for their agricultural features. Water quality is impacted by both agriculture and suburban development.



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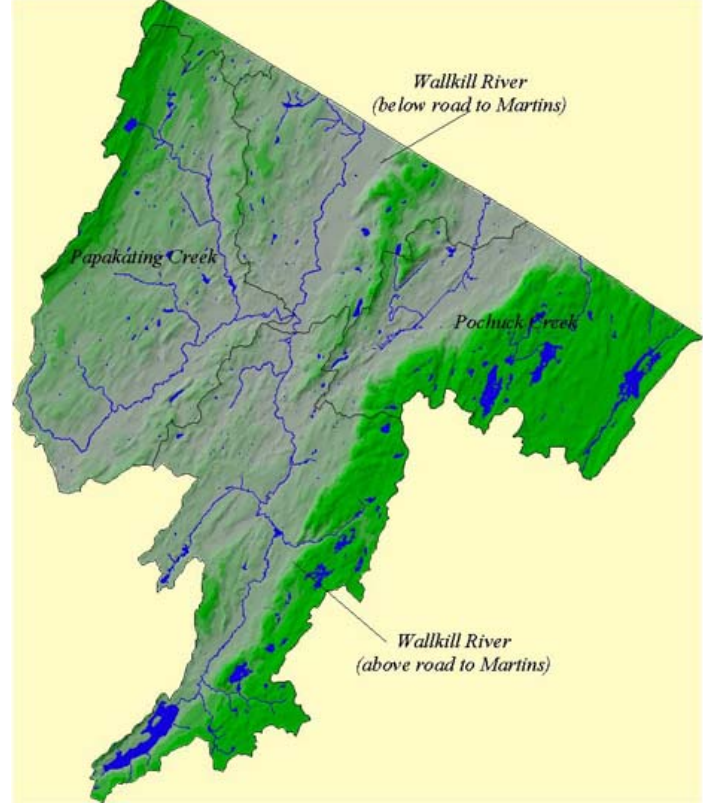
The Musconetcong River runs from Lake Hopatcong to the main stem of the Delaware River. The watershed contains some developed areas but also many forests and farms. Popular with fishermen, the river is an important recreational fishing resource.

Area 1 has been impacted by suburban development over the past decades. As pollution from farming activities such as runoff from crop lands and animal holdings decline, these problems are being replaced with increasing effects of suburban/urban runoff. The result is increased stream temperatures and elevated levels of sediment, bacteria and phosphorus.



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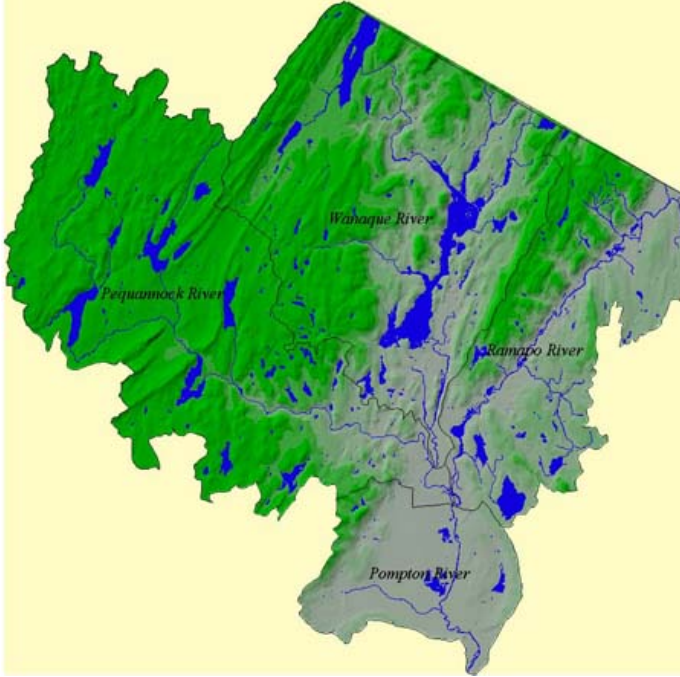
Watershed Management Area 2 - Walkill

	<p>This area is predominantly rural. The largest towns are Vernon, Sparta, Franklin and Sussex. Key tributaries flowing into the Walkill include the Papakating (15 miles long) and Pochuck (8 miles long). Creeks, lakes and impoundments in this watershed include Lake Mohawk at the headwaters, Newton Reservoir, Lake Grinnell, Wawayanda Lake and many more.</p> <p>The four watersheds for Area 2 are the</p> <ul style="list-style-type: none">• Upper Walkill,• Lower Walkill,• Papakating Creek and• Black Creek. <p>Watershed Management Area 2 (WMA 2), also known as the Walkill River Watershed, includes 11 townships in Sussex County. It is recognized as unique because its headwaters begin at Lake Mohawk in Sparta Township and then the river flows north into New York, eventually emptying into the Hudson River.</p>
<p>The Walkill Watershed is about 208 square miles in area. It is comprised of a variety of land uses, including rural and centralized residential development, agriculture, commercial, recreational and industrial usage. The Walkill River National Wildlife Refuge provides migratory and nesting habitats for numerous birds and waterfowl and is home to several endangered species.</p> <p>This area is predominantly rural. The largest towns are Vernon, Sparta, Franklin and Sussex. Key tributaries flowing into the Walkill include the Papakating (15 miles long) and Pochuck (8 miles long). Creeks, lakes and impoundments in this watershed include Lake Mohawk at the headwaters, Newton Reservoir, Lake Grinnell, Wawayanda Lake and many more.</p> <p>Data collected from monitoring near Sussex and Unionville show mildly elevated phosphorus and bacteria levels in the Walkill River. Several restoration and protection plans for subwatersheds of the Walkill River are under development to study the causes of these elevated levels and determine methods to reduce them.</p>	



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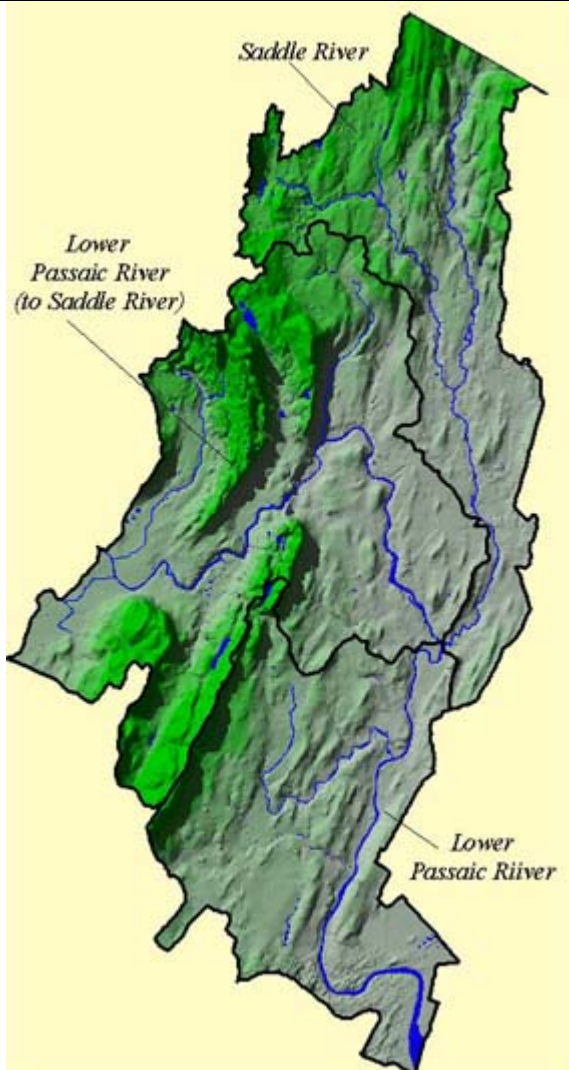
Watershed Management Area 3 - Pompton, Pequannock, Wanaque, Ramapo

	<p>Watershed Management Area 3 (WMA 3) is situated within the water-rich Highlands Province of New Jersey. It lies primarily in Passaic County but also includes parts of Bergen, Morris and Sussex Counties. With its headwaters in New York State, the Pequannock, Wanaque and Ramapo Rivers all flow into the Pompton River, a key tributary to the Upper Passaic River.</p> <p>This area boasts some of New Jersey's major water supply reservoir systems, including the Wanaque Reservoir, the largest surface water reservoir in our state.</p> <p>There are four watersheds in Area 3:</p> <ul style="list-style-type: none">• Pompton River• Ramapo River,• Pequannock River and• Wanaque River Watersheds.
<p>Most of the land in the Pequannock River Watershed is forested and protected for water supply purposes and parklands. The remaining lands are under residential and industrial/commercial use. The Pequannock River experiences excessive summertime water temperatures that could be deleterious to aquatic life.</p> <p>The majority of land in the Wanaque River Watershed is undeveloped, consisting of reservoirs, parks and farms. The remaining land is residential with some land being used for industry and commerce. For Area 3, a key source of nonpoint source pollution is urban/suburban development. Runoff from housing and road construction sites and runoff from urban surfaces and storm sewers have contributed significantly to pollution in the waterways. There is an apparent decline in water quality from siltation and elevated stream temperatures. These sources have degraded the fishery habitat by contributing to excessive situations and elevated stream temperatures</p>	



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Watershed Management Area 4 - -Lower Passaic, Saddle



Watershed Management Area 4 (WMA 4) includes the Lower Passaic River (from the Pompton River confluence downstream to the Newark Bay) and its tributaries, including the Saddle River. The drainage area is about 180 square miles and lies within the portions of Passaic, Essex, Hudson, Morris and Bergen Counties.

The 129 square miles of land in the Lower Passaic River Watershed is primarily urban/suburban. As a result, water quality conditions along this 33-mile section of the Passaic River are poor, reflective of numerous point sources, significant nonpoint source contributions and high sediment oxygen demands.

Reflecting the area's industrialized history, the conditions are affected by the number of hazardous waste sites and contamination problems found in these areas.

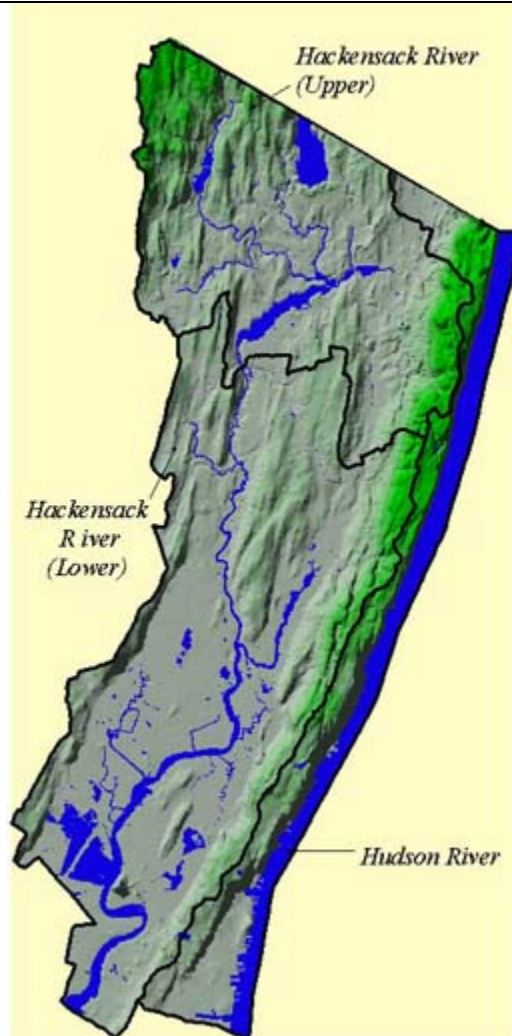
The Lower Passaic includes a number of waterfalls, culminating in the Great Falls at Paterson.

The Saddle River Watershed has a drainage area of 51 square miles. This watershed is extensively developed and contains many older cities and industrial centers including Newark, Paterson, Clifton and East Orange. Like the Lower Passaic, the Saddle River's water quality is affected by its industrial past, current point sources of pollution and urban runoff.



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Watershed Management Area 5 - Hackensack, Hudson, Pascack



Watershed Management Area 5 (WMA 5) has a drainage area of over 165 square miles. This area includes parts of Hudson and Bergen Counties. There are three watersheds in this area:

- Hackensack River,
- Hudson River and
- Pascack Brook.

This area is the most populated of all the watershed management areas. About 50% of the land is still undeveloped and more than 30% is residential development. The remaining developed land is commercial/industrial use.

Much of the lower Hackensack River Watershed is tidal marsh known as the Hackensack Meadowlands, home to over 700 plants and animal species including several rare and endangered species. There are many hazardous waste or Superfund sites, which are identified as contaminating local surface waters found in this watershed. As a result, the sale and consumption of striped bass and blue crabs is prohibited.

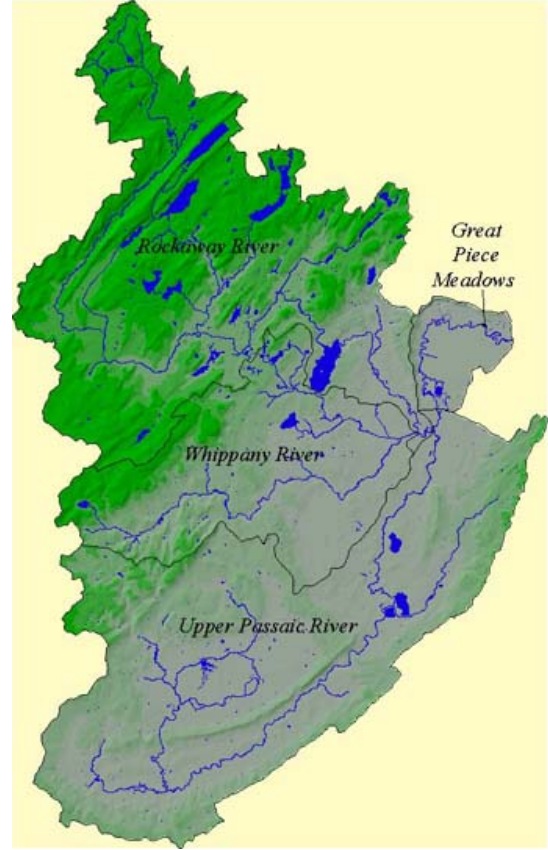
Water quality is primarily affected by nonpoint sources. They include extensive urban/suburban development and the land disposal of waste materials. The river is also impacted by runoff from construction activities, urban surfaces, storm and combined sewer, roads and landfill leachate.

These sources have resulted in flooding, habitat destruction and fish community degradation. They have also affected reduction of dissolved oxygen levels, excessive nutrients and accelerated eutrophication.



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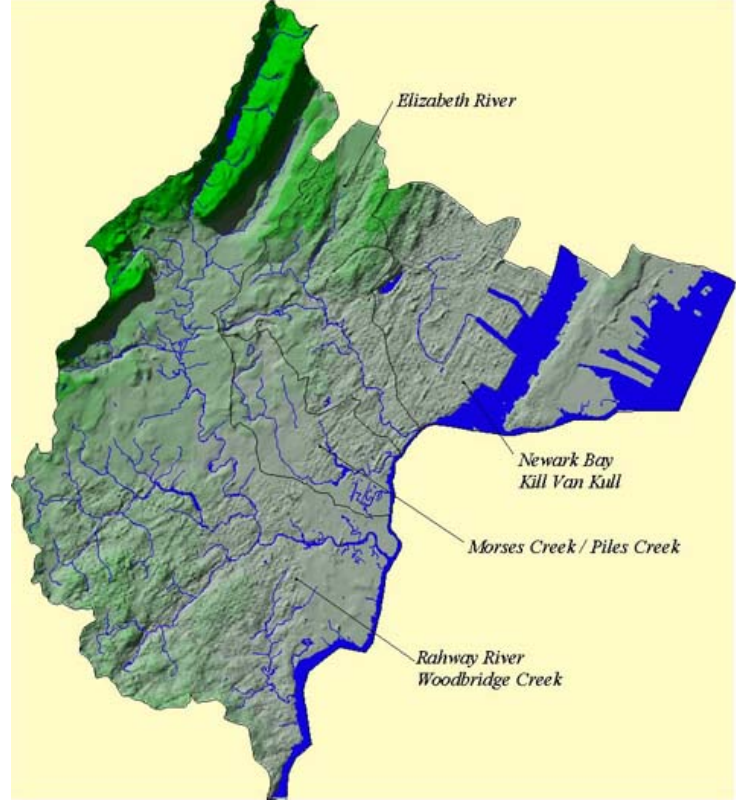
Watershed Management Area 6 - Upper and Mid Passaic, Whippany, Rockaway

	<p>Watershed Management Area 6 (WMA 6) represents the area drained by waters from the upper reaches of the Passaic River Basin. This includes the Passaic River from its headwaters in Morris County to the confluence of the Pompton River.</p> <p>This area is situated in Morris, Somerset, Sussex and Essex Counties and includes the Upper and Middle Passaic River, Whippany River and Rockaway River Watersheds. Extensive suburban development and reliance upon ground water sources for water supply characterize this watershed.</p> <p>The Upper Passaic River represents a significant source of drinking water for a large portion of northeastern New Jersey. About one half of the land in this watershed is undeveloped or vacant with the rest primarily residential and commercial. This watershed has experienced key development in the more rural undeveloped areas.</p>
<p>The land use patterns in the Rockaway River area are complex and include wooded/vacant areas, parklands and residential development. There are also some areas having industrial and commercial uses. Suburban development is on the rise.</p> <p>Urban/suburban development is causing the water quality of the Whippany River to be degraded. Runoff from construction activity, stormwater discharges, urban surfaces and the loss of riparian vegetation are suspected of contributing to siltation in the river. This has resulted in reduction in the trout holding capacity of the waterway.</p> <p>This area has been severely impacted by urban/suburban development. The quality of water is affected by these conditions. Sources such as construction activities and urban runoff from storm sewers and urban surfaces have resulted in siltation, high stream temperatures and losses of riparian vegetation.</p>	



Appendix E Background of the State of New Jersey

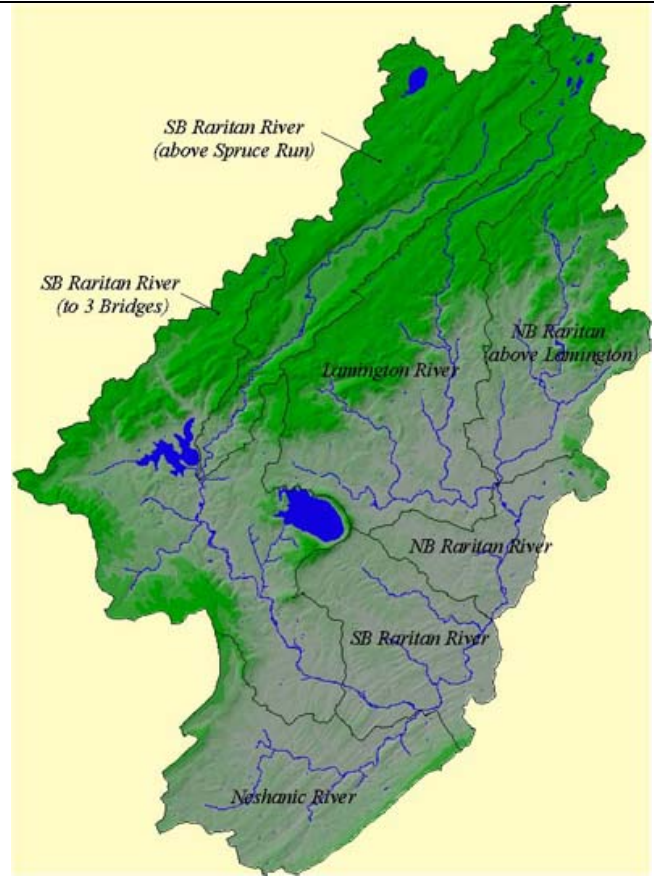
Watershed Management Area 7 - Arthur Kill

	<p>Watershed Management Area 7 (WMA 7) is represented by large portions of Essex, Union and Middlesex Counties.</p> <p>The mainstem of the Rahway River is 24 miles long, flowing from Union into the Arthur Kill near Linden. It is tidal from the Pennsylvania Railroad Bridge at Rahway down to the mouth. Key tributaries include the East Branch Rahway River, Woodbridge River and Robinson's Branch. Major impoundments are the Middlesex Reservoir, Orange Reservoir, Lower and Upper Echo Lakes and Diamond Mill Pond.</p> <p>The Elizabeth River is 11 miles long, much of it channelized for flood control purposes. Land uses in the Rahway and Elizabeth Watersheds are mainly residential, commercial and industrial.</p>
<p>The water quality of the Rahway and Elizabeth Rivers are reflective of urbanized streams and past industrial uses. Hazardous waste sites are present in these watersheds. Another potential problem could be landfill leachate, which may contribute to the degradation of the tidal Rahway River as well as to the adjacent Arthur Kill, Marshes Creek and Kings Creek.</p> <p>Key problems in this watershed include point source pollution, habitat destruction and flood control. The sources of nonpoint pollution that have been identified include construction activities, storm sewers, urban surfaces, roads and combined sewer overflows. All of these conditions have contributed to high stream temperatures, sediment and nutrient loadings, periodic low dissolved oxygen levels and fishkills.</p>	



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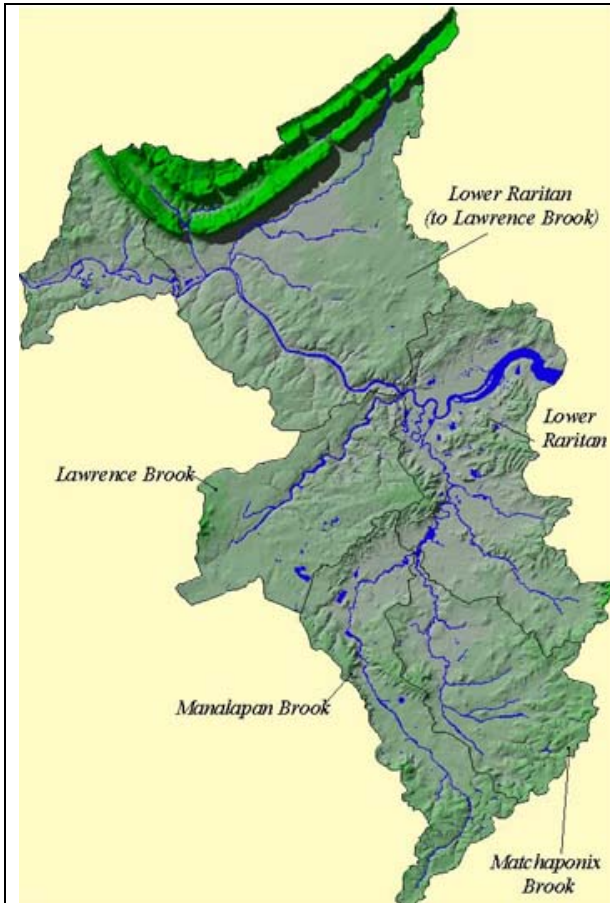
Watershed Management Area 8 - North and South Branch Raritan

	<p>Watershed Management Area 8 (WMA 8) includes the North and South Branches of the Raritan River and their tributaries. Large parts of Somerset, Hunterdon and Morris Counties are included in this area.</p> <p>The South Branch is 51 miles long and flows from western Morris County through central Hunterdon County and into western Somerset where it joins the North Branch. Major tributaries include the Neshanic River, Spruce Run Creek, Mulhockaway Creek and Cakepoulin Creek. Major impoundments are the Spruce Run and Round Valley Reservoirs.</p> <p>The land use in the South Branch Raritan River is mostly agricultural, but suburban and industrial development is increasing at a quick rate. The overall water quality is regarded as good. Warm summertime temperatures threaten the aquatic life, especially in the trout maintenance portions of the river. Elevated lead levels may be threatening the aquatic life support use in the river.</p>
<p>The tributaries of the South Branch Raritan River indicate there is good water quality with slight nutrient enrichment. The North Branch of the Raritan River is 23 miles long and flows from northwestern Morris County through Somerset County to the confluence with the South Branch between the towns of Branchburg and Raritan. Major tributaries include the Peapack Brook, Rockaway Creek, and Lamington River and the only major impoundment is Ravine Lake. Land use in the North Branch</p> <p>Raritan River Watershed is primarily rural, woodland and agriculture with scattered areas of commercial and residential but there is intense development along the major road corridors of Routes 24 and 206 and interstate highways 22, 287 and 78.</p> <p>This watershed is experiencing a trend common around the state. There is a decline in farm activity and a rapid increase in suburban nonpoint sources, contributing to the excessive loading of nutrients and sediments to the waterway.</p>	



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Watershed Management Area 9 - Lower Raritan, South River, Lawrence



Watershed Management Area 9 (WMA 9) includes the mainstem of the Raritan River, the South River and Lawrence Brook. Middlesex, Somerset and Monmouth Counties comprise most of the area's political geography.

The Raritan River Basin is the largest river basin situated entirely within our state. The land use in this watershed is mainly urban/suburban, with industrial and commercial centers throughout.

The mainstem of the Raritan River spans from the confluence of the North and South Branches to the Raritan Bay. For the most part, this drainage area is densely populated. There are two low dams in this river, Fieldsville Dam and Calco Dam. Among the many small recreational lakes and ponds in this area are Watchung Lake, Surprise Lake, Spring Lake and Green Brook Pond (all manmade).

The South River begins at Duhernal Lake in Spotswood and flows to the Raritan River at Sayreville. It is formed by the confluence of the Manalapan and Matchaponix Brooks. Other tributaries include Deep River and Tennants Brook and major impoundments are Matchaponix Brook and South River.

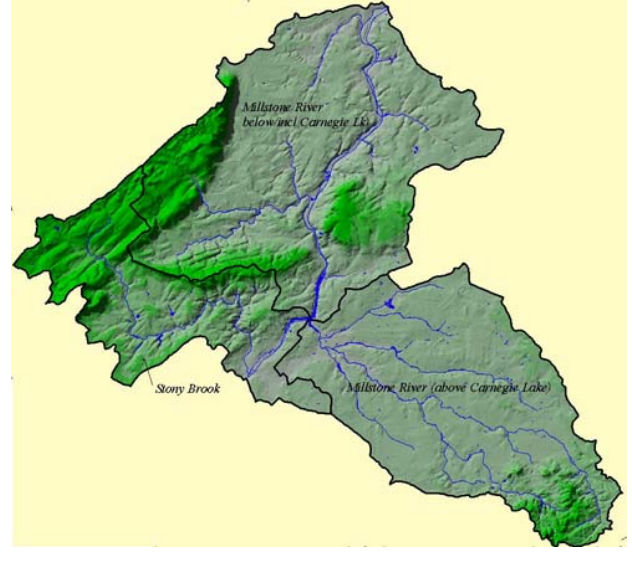
Land use in the upper part of this area, the Manalapan and Matchaponix Brooks watersheds, is predominantly agriculture and forests. New industrial and residential development is becoming incorporated into these areas and there is existing, older development in the South River subwatershed.

Construction activities and severe stream bank modification have contributed to silt loads and local flooding. There is increasing amounts of runoff from urban surfaces, roads and storm sewers. These conditions have had an impact on the reduction and quality of fish habitat.



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Watershed Management Area 10 - Millstone

	<p>Watershed Management Area 10 (WMA 10) includes the Millstone River and its tributaries. The Millstone River itself is a tributary to the Raritan River. This watershed is located in portions of Hunterdon, Somerset, Middlesex, Mercer and Monmouth Counties.</p> <p>The Millstone River is 38 miles long and flows from Millstone Township in Monmouth County to the Raritan River near Manville and Bound Brook. Major tributaries include Stony Brook, Cranbury Brook, Bear Brook, Ten Mile River, Six Mile River and Bedens Brook and the largest impoundment is Carnegie Lake.</p>
<p>Land use in the Millstone Watershed is mainly suburban development with scattered agricultural areas although there is extensive, recent development present in the upper portion.</p> <p>There are many problems in this area, which are associated with suburban development. Some of them include runoff from construction sites, suburban surfaces, storm sewers and roads. Septic systems are felt to be a potential pollution problem throughout the watershed. And in some areas, this can be a threat to the ground water.</p> <p>It is a combination of agricultural and urban runoff that is suspected of degrading the fish communities in some areas.</p>	



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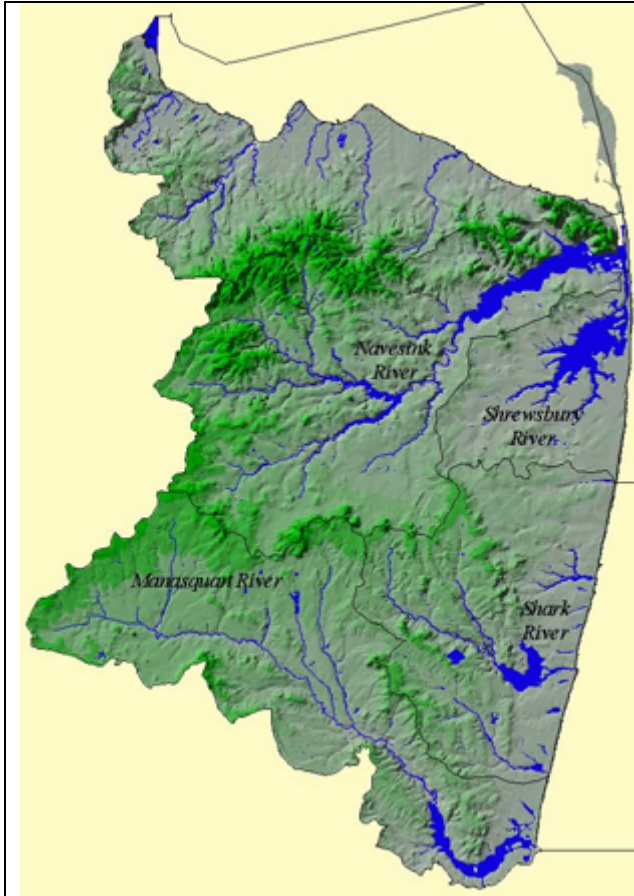
Watershed Management Area 11 - Central Delaware

	<p>Watershed Management Area 11 (WMA 11), known as the Central Delaware Tributaries, affects the drainage in 24 municipalities within the Hunterdon, Mercer and Monmouth Counties. Area 11 covers approximately 272 square miles and is dominated by the Assunpink Creek and its tributaries to the south and much smaller creeks in the northern portions.</p> <p>The four watersheds in Area 11 are the</p> <ul style="list-style-type: none">• Lockatong Creek/Wickecheoke Creek,• Hakiwokake/Hariwokake/Nishisakawick Creek,• Alexauken Creek/Moore Creek/Jacobs Creek and• Assunpink Creek
<p>The area's land uses range from agricultural to urban, most notably in the state's capital city - Trenton. The area has been heavily impacted by suburban development as the population for Area 11 has greatly increased during the past decade. This development has stressed the water resources and affected the water quality.</p> <p>The land uses for Lockatong Creek/Wickecheoke Creek Watershed is chiefly agriculture and forests. There is residential and commercial development scattered throughout. This area is impacted by runoff from cropland and pastureland. The agricultural sources are believed to be on the decline. They are being replaced by increasing quantities of runoff from road construction and maintenance.</p> <p>The Assunpink Creek's upper watershed has both agricultural/rural and suburban land uses. Portions of the Assunpink are highly channelized for flood control. As the river flows through Trenton, its watershed becomes highly urbanized and water quality declines.</p>	



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Watershed Management Area 12 - -Monmouth



Watershed Management Area 12 (WMA 12) extends from Perth Amboy to Point Pleasant Beach. WMA 12 is comprised of an assemblage of coastal subwatersheds, all or a portion of which fall into 56 municipalities in the Raritan Bay and Atlantic Coastal drainage basins. The majority of impacted municipalities are in Monmouth County but several lie within the boundaries of Middlesex and Ocean Counties.

WMA 12 is part of the Atlantic Coastal Plain. The soils tend to be sandy closer to the ocean and to have more clay and silt further inland. In general, topography is fairly flat with some hills primarily along the border between the Inner and Outer Coastal Plains. In northern Monmouth County, Mount Mitchell (elevation 260 feet) is part of the Atlantic Highlands and is one of the highest points on the Atlantic Coast in North America.

Land use ranges from agriculture and forested areas to suburban/urban residential and commercial uses. The northern part of WMA 12 is more densely populated than the southern portion. Over the past decade, land use has shifted to more suburban/urban residential uses.



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Watershed Management Area 13 - Barnegat Bay



County, as well as parts of Monmouth County. The area lies mostly in Ocean County and includes the Barnegat Bay as well as the following subwatersheds:

- Metedeconk River,
- Toms River,
- Forked River and
- Cedar Creek.

The Toms River drains an area of 124 square miles. It flows from western Ocean and Monmouth Counties southeast to Barnegat Bay at the town of Toms River, 11 miles north of Barnegat Inlet. This is an area of low relief, containing many small tributaries which feed into the Toms River. The larger tributaries include Davensports Branch, Union Branch and Wrangle Brook. The watershed also drains a large area of the Pinelands. Major impoundments include Success Lake and Horicon Lake. Population centers include Toms River, Lakehurst, Dover and Manchester.

This watershed lies in the Coastal Plain and is about one-half forested, with the remainder residential developments, a military installation and agricultural. There has been a substantial amount of new residential and commercial development throughout the watershed in the past five years.

Watershed Management Area 13 (WMA 13) drains the central Atlantic section of New Jersey. The Barnegat Bay Watershed is a 660 square mile area encompassing all of the land and water in Ocean

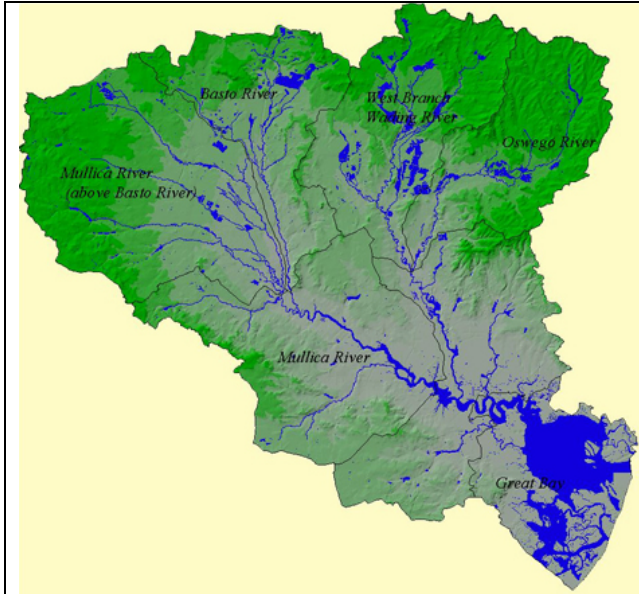
The Barnegat Bay - Little Egg Harbor Estuary is located along the central New Jersey coastline within the Atlantic Coastal Plain physiographic province. Its watershed encompasses most of the 33 municipalities in Ocean County, as well as four municipalities in Monmouth County. Although long recognized for its great aesthetic, economic and recreational value, this backbay system is now affected by an array of human impacts that potentially threaten its ecological integrity.

The Barnegat Bay Estuary is a 75 square mile environmentally sensitive estuarine system, consisting of aquatic vegetation, shellfish beds, finfish habitats, waterfowl nesting grounds and spectacular vistas. Its 660 square mile watershed is now home for approximately 500,000 people, a population which more than doubles during the summer season.



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Watershed Management Area 14 - Mullica



Watershed Management Area 14 (WMA 14) includes watersheds draining portions of the Pinelands of New Jersey. Major rivers include:

- the Mullica,
- the Wading River,
- Nochescatauxin Brook,
- Atsion Creek,
- the Bass River,
- Batsto River,
- Nescochaque Creek,
- Landing Creek,
- Hammonton Creek and
- the Oswego River.

The area lies in Burlington, Atlantic and Ocean Counties. The Mullica River and tributaries are considered the primary drainage system for the Pinelands. The total area of the drainage basin (Mullica River and tributaries) is some 561 square miles. The area includes the following watersheds: Mullica River, Mechesactauxin Creek, Wading River, Atsion Creek, Batsto River and Doughty Creek.

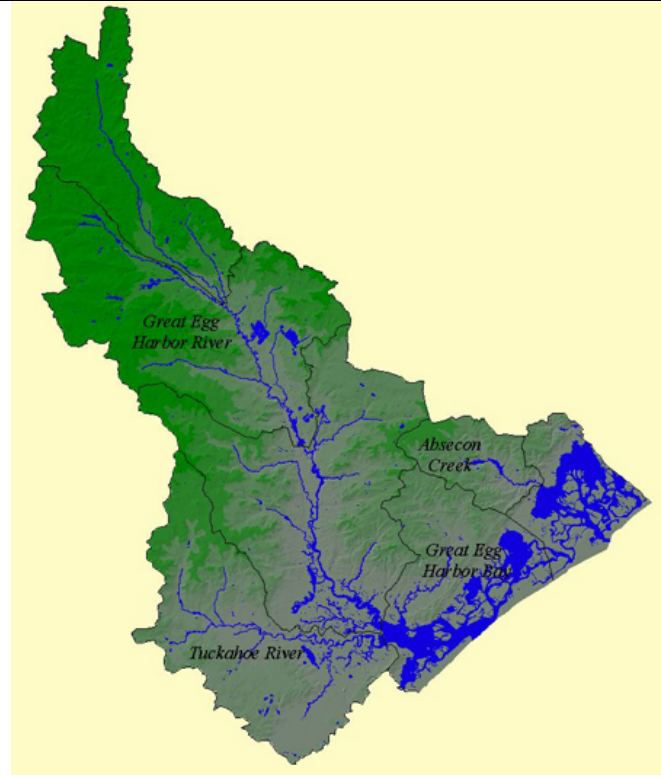
The Mullica River empties into Great Bay, a large estuarine system. The population centers are Winslow, Galloway and Hammonton. About 80 percent of this watershed consists of state parks and forests, with the remainder being agricultural and developed areas. Much of these waterways are incorporated in the New Jersey Wild and Scenic River System.

Overall, water quality is good and reflective of natural Pinelands conditions. However, the Mullica River is very sensitive to the effects of human activities due to the acidic and low nutrient nature of the pinelands stream environment. Agricultural and suburban runoff can significantly alter natural conditions by adding nutrients and making streams less acidic. These influences are felt in the more developed southern coastal section of the watershed.



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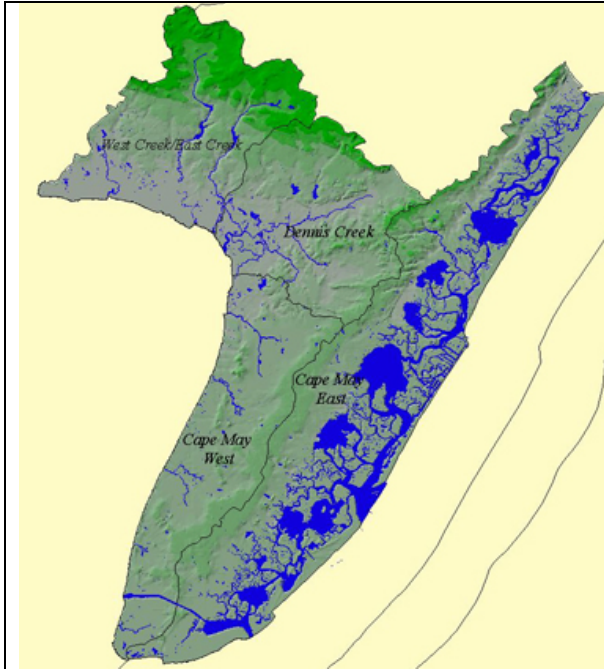
Watershed Management Area 15 - Great Egg Harbor

	<p>Watershed Management Area 15 (WMA15) includes watersheds draining to Great Egg Harbor in Atlantic County. The management area encompasses waters draining eastern Gloucester and Camden Counties. The area includes the following watersheds:</p> <ul style="list-style-type: none">• Great Egg Harbor River,• Tuckahoe River,• Absecon Creek and• Patcong Creek. <p>The Great Egg Harbor River is 49 miles long and drains an area of 304 square miles. It originates in eastern Gloucester and Camden Counties, an agricultural and suburban area, before flowing through the Pinelands region. The river drains into Great Egg Harbor Bay before emptying into the Atlantic Ocean. The river is tidal downstream of the dam at Mays Landing.</p>
<p>The watershed's dominant land use is forests, with the remainder agricultural and developed. Population centers include Berlin, Winslow, Monroe, Mays Landing and Egg Harbor City. The major tributaries are Hospitality Branch, Watering Race, Babcock Creek, Deep Run, South River and Stephens Creek.</p> <p>There are many lakes and ponds in this area, but the largest is Lake Lenape, near Mays Landing. Of the approximately 12 NJPDES permitted discharges here, about half are municipal and half are industrial/commercial.</p> <p>Nonpoint source pollution issues related to cropland agriculture dominate the upper reaches of the watershed. In the lower more developed section of the watershed, suburban/urban runoff are the primary contributors.</p>	



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Watershed Management Area 16 - -Cape May



Watershed Management Area 16 (WMA 16) includes watersheds draining the Cape May portion of New Jersey. The region includes Cape May County south and east of the Tuckahoe River watershed. The region contains minimal surface water flow. Ground water and shellfish harvesting water quality are the principal water issues. No fixed physical/chemical fresh (surface) water monitoring locations are currently located within this management area. The area includes the following watersheds:

- Dennis Creek,
- Delaware Bay Coastal Drainage,
- Cape May Atlantic Coastal Drainage.

Cape May County is located at the southern-most portion of New Jersey and represents a continuation of the Atlantic Coastal Plain. The county is 267 square miles in area and is bounded on the north by Atlantic and Cumberland Counties, on the east by the Atlantic Ocean and on the west and south by the Delaware Bay.

The region represents a low lying, gently rolling plain whose highest point is 54 feet above sea level and whose surface is largely covered by wet soils and wetlands. Large swamps (Great Cedar, Timber and Beaver Swamps) occupy the north-central part of the county. Most, if not all, streams are tidal in their lower reaches and terminate by flowing into fresh water swamps that, in turn, discharge into saltwater marshes near the shore.


The county's permanent year-round population is about 77,000 with approximately 42 percent of the population residing on the barrier islands that comprise the eastern perimeter of the peninsula. The summertime population rises to 564,000 with 69 percent residing on the barrier islands.

As stated previously, one of the principal water resource issues within this management area is drinking water supply. The resource is largely dependent upon ground water that is in turn highly vulnerable to saltwater intrusion from the west, south and east, especially in the southern portion of the peninsula. The expected increase in population (an expected 68 percent increase by 2040) is predicted to put further stress on the already overextended water supply.



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Watershed Management Area 17 - Maurice, Salem, Cohansey

 <p>The map shows the watershed area with various rivers and creeks labeled: Salem River (N), Salem River (S), Still Run, Scotland Run, Muddy Run, Maurice River, Manantico Creek, Alloway Creek, Stow Creek, Cohansey River, Cedar Creek, Dividing Creek, and Manumuskine River. The area is shaded in green and blue, indicating different land uses and water bodies.</p>	<p>Watershed Management Area 17 (WMA 17) includes:</p> <ul style="list-style-type: none">• The Cohansey River,• Maurice River,• Salem River and• Alloway, Dividing, Manantico, Manusmuskin, Miles, Mill, Stow and Whooping Creeks. <p>This area includes portions of Atlantic, Cumberland, Gloucester and Salem Counties, over 39 municipalities and encompasses 885 square miles.</p> <p>The Cohansey River is nearly 30 miles long, draining 105 square miles of eastern Salem County to the Delaware Bay. This is an area of very low relief, which results in numerous small tributaries. Sunset Lake and Mary Elmer Lake are among 20 major impoundments in this drainage basin. The main land use of this watershed is agriculture, but much of this land is forested.</p>
<p>The Maurice River has a drainage area of 386 square miles and meanders south for 50 miles through Cumberland County to the Delaware Bay. The major tributaries of this river are Scotland Run, Manantico Creek, Muskee Creek, Muddy Run and the Manumuskine River. There are about 20 major lakes in this area, with Union Lake being the largest. The principal land use in this watershed is agriculture.</p> <p>The Salem River drains an area of 114 square miles and flows 32 miles from Upper Pittsgrove Township west to Deepwater, then south to the Delaware River. The area lies within Salem County, the major population center being Salem City. Much of the lower portions of the river are tidal. Major tributaries of the Salem River include Mannington Creek, Game Creek, Majors Run and Fenwick Creek. Land use in this watershed is about 40% cropland, with the rest being woodland, tidal/freshwater marsh, urban and pasture.</p> <p>Nonpoint sources of water pollution range from agricultural activities such as tree harvesting, crop production and animal pastures to urban runoff from construction, septic systems and urban surfaces.</p>	



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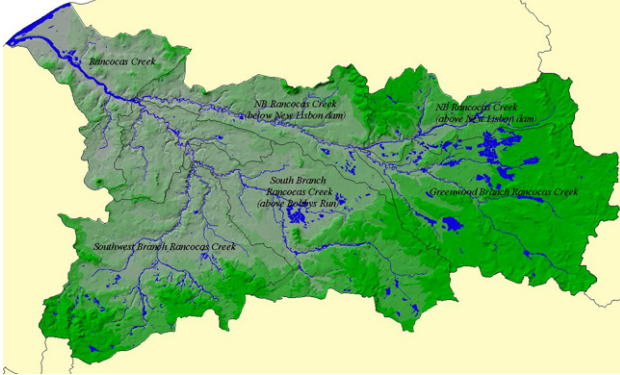
Watershed Management Area 18 - Lower Delaware

	<p>Watershed Management Area 18 (WMA 18) includes:</p> <ul style="list-style-type: none">• the Cooper River,• Big Timber,• Manuta,• Newton,• Oldmans,• Pennsauken,• Pompeston,• Raccoon, Repaupo and• Woodbury Creeks, as well as Baldwin Run, Swede Run and Maple Swamp.
<p>This management area covers all of parts of Burlington, Camden and Gloucester Counties, including 68 municipalities encompassing 391 square miles. The Cooper River is 16 miles long and its watershed encompasses an area of 40 square miles. The River flows through Camden County to the Delaware River at Camden City.</p> <p>Big Timber Creek drains an area of 63 miles. The mainstem and most of the south branch divide Gloucester and Camden Counties before flowing into the Delaware River near Brooklawn, south of Camden. Mantua Creek drains an area of 50.9 square miles of land. From its headwaters in Glassboro, Mantua Creek flows 18.6 miles northwest to the Delaware River at Paulsboro.</p> <p>Oldmans Creek drains an area of 44 square miles and flows on the Coastal Plain to the Delaware River. This Creek, 20 miles long, marks the boundary between Gloucester and Salem Counties. The Pennsauken Creek drains 33 square miles of southwestern Burlington County and northern Camden County. This creek flows into the Delaware River near Palmyra, New Jersey. The North Branch of the Pennsauken is in Burlington County, while the south branch is the boundary between Burlington and Camden Counties.</p> <p>The Raccoon Creek Watershed contains approximately 40 square miles and drains central Gloucester County. The Creek itself is 19 miles long and flows from Elk Township to the Delaware River, across from Marcus Hook, Pennsylvania.</p> <p>Woodbury Creek is five miles long and drains 18 square miles. It is the smallest watershed in Gloucester County.</p> <p>In general, industrial and urban development is concentrated downstream closer to the Delaware River and the upstream headwaters have more forested and agricultural land uses. The upstream sections are more influenced by suburban and agricultural runoff problems whereas the downstream portions are influenced by both past and present industrial and urban uses. Pennsauken and Cooper River flow through heavily urbanized and industrial areas and have water quality problems related</p>	



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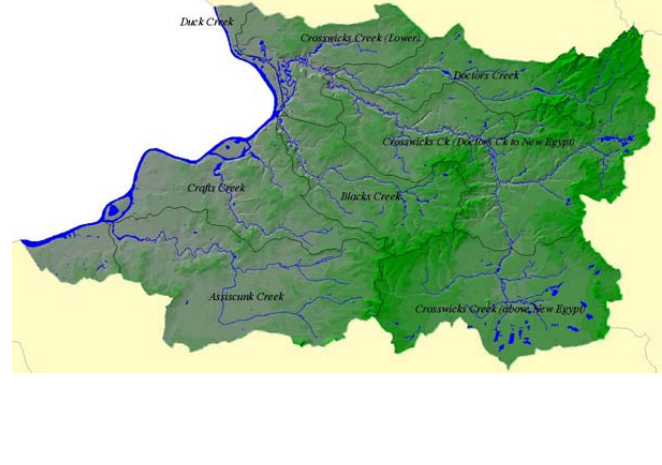
Watershed Management Area 19 - Rancocas

	<p>Watershed Management Area 19 (WMA 19) is the largest watershed in south central New Jersey. It is comprised of:</p> <ul style="list-style-type: none">• the North Branch,• South Branch and• Main Stem of the Rancocas Creek, including Mill Creek. <p>Portions of Burlington,</p> <ul style="list-style-type: none">• Camden and Ocean Counties are included as well as 33 municipalities.
<p>Of the 360 square miles in this area, the North Branch drains 167 square miles and the South Branch drains 144 square miles. Starting in Browns Mills, the North Branch is 31 miles long and is fed by the Greenwood Branch, McDonalds Branch and Mount Misery Brook. The major tributaries to the South Branch include the Southwest Branch Rancocas Creek, Stop the Jade Run, Haynes Creek and Friendship Creek. The watershed extends from the shores of the Delaware River to the interior of the Pinelands.</p> <p>After the confluence of the north and south branches, the main stem flows about 8 miles and drains an area of approximately 49 square miles before emptying into the Delaware River at Delanco and Riverside.</p> <p>As part of the Delaware Estuary, tidal influence occurs for about 15 stream miles extending the entire length of the mainstream to the dam at Mount Holly on the North Branch, Vincenttown on the South Branch, and Kirby Mills on the Southwest Branch.</p> <p>Land use is a mix of agriculture, forest and suburban development. Agricultural land is quickly becoming suburban development in this watershed. Runoff from agricultural and suburban development have resulted in elevated Ph, bacteria and nutrient levels in many areas.</p>	



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Watershed Management Area 20 - Assiscunk, Crosswicks, Doctors

	<p>Watershed Management Area 20 (WMA 20) includes:</p> <ul style="list-style-type: none">• the Assiscunk,• Blacks, Crafts,• Crosswicks,• Doctors, Duck and• Mill Creeks. <p>This 253 square mile area includes 26 municipalities spanning four counties: Burlington, Mercer, Monmouth and Ocean.</p>
<p>The largest watershed, Crosswicks Creek, is 25 miles long and drains an area of 146 square miles to the Delaware River at Bordentown. Major tributaries include Jumping Brook, Lahaway Creek, North Run and Doctors Creek. Tides affect this stream up to the Crosswicks Mill Dam. Allentown Lake, Oakford Lake, Prospertown Lake and Imlaystown Lake are major impoundments in the Crosswicks Creek Watershed. It also includes the Hamilton/Trenton Marsh.</p> <p>This area is at the upper reaches of the Delaware Estuary. The streams are tidally influenced although they are considered freshwater.</p> <p>Nonpoint source issues in the area arise from both agricultural runoff and suburban construction. Elevated levels of phosphorus and fecal coliform bacteria have been noted for some segments of the area.</p>	



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County	Watershed (River) Management Areas (#)
	Watershed arranged alphabetically
Atlantic	<ul style="list-style-type: none"> • Great Egg Harbor (15) • Maurice, Salem, Cohansey (17) • Mullica (14)
Bergen	<ul style="list-style-type: none"> • Hackensack, Hudson, Pascack (5) • Lower Passaic, Saddle (4) • Pompton, Pequannock, Wanaque, Ramapo (3)
Burlington	<ul style="list-style-type: none"> • Assiscunk, Crosswick, Doctors (20) • Barnegat Bay (13) • Lower Delaware (18) • Mullica (14) • Rancocas (19)
Camden	<ul style="list-style-type: none"> • Great Egg Harbor (15) • Lower Delaware (18) • Mullica (14) • Rancocas (19)
Cape May	<ul style="list-style-type: none"> • Cape May (16) • Great Egg Harbor (15)
Cumberland	<ul style="list-style-type: none"> • Cape May (16) • Great Egg Harbor (15) • Maurice, Salem, Cohansey (17)
Essex	<ul style="list-style-type: none"> • Arthur Kill (7) • Lower Passaic, Saddle (4) • Upper and Mid Passaic, Whippany, Rockaway (6)
Gloucester	<ul style="list-style-type: none"> • Great Egg Harbor (15) • Lower Delaware (18) • Maurice, Salem, Cohansey (17)
Hudson	<ul style="list-style-type: none"> • Hackensack, Hudson, Pascack (5) • Lower Passaic, Saddle (4)
Hunterdon	<ul style="list-style-type: none"> • Central Delaware (11) • Millstone (11) • North and South Branch Raritan (8) • Upper Delaware (1)
Mercer	<ul style="list-style-type: none"> • Assiscunk, Crosswick, Doctors (20) • Central Delaware (11) • Millstone (10)



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Middlesex	<ul style="list-style-type: none">• Arthur Kill (7)• Lower Raritan, South River, Lawrence (9)• Monmouth (12)• Millstone (10)
Monmouth	<ul style="list-style-type: none">• Assiscunk, Crosswick, Doctors (20)• Barnegat Bay (13)• Lower Raritan, South River, Lawrence (9)• Millstone (10)• Monmouth (12)
Morris	<ul style="list-style-type: none">• North and South Branch Raritan (8)• Pompton, Pequannock, Wanaque, Ramapo (3)• Upper and Mid Passaic, Whippany, Rockaway (6)• Upper Delaware (1)
Ocean	<ul style="list-style-type: none">• Assiscunk, Crosswick, Doctors (20)• Barnegat Bay (13)• Rancocas 19)• Mullica (14)• Monmouth (12)
Passaic	<ul style="list-style-type: none">• Lower Passaic, Saddle (4)• Pompton, Pequannock, Wanaque, Ramapo (3)• Walkill (2)
Salem	<ul style="list-style-type: none">• Lower Delaware (18)• Maurice, Salem, Cohansey (17)
Somerset	<ul style="list-style-type: none">• Lower Raritan, South River, Lawrence (9)• Millstone (10)• North and South Branch Raritan (8)• Upper and Mid Passaic, Whippany, Rockaway (6)
Sussex	<ul style="list-style-type: none">• Pompton, Pequannock, Wanaque, Ramapo (3)• Upper Delaware (1)• Upper and Mid Passaic, Whippany, Rockaway (6)• Walkill (2)
Union	<ul style="list-style-type: none">• Arthur Kill (7)• Lower Raritan, South River, Lawrence (9)• Upper and Mid Passaic, Whippany, Rockaway (6)•
Warren	<ul style="list-style-type: none">• Upper Delaware (1)