



Section 4. State of New Jersey Profile

2014 Plan Update Changes

- The 2011 Plan presented ‘Background of the State of New Jersey’ in Appendix E. For the 2014 Plan, this section was renamed and included in the main body of the Plan.
- This entire section was revised, updated and enhanced the entire section with improved mapping and best available data.
- The overview of watersheds was moved to an appendix (Appendix P).

The State of New Jersey was a royal gift from Charles II of England to his brother James, Duke of York, in 1664. A document that records this transaction stated that “said Tract of Land is hereafter to be called by the name or names of new Cesarea or New Jersey”. This gift was how New Jersey got its name (New Jersey Department of State 2011). It was one of the 13 original states of the United States. In 1787, New Jersey became the third state to ratify the United States Constitution and the first state to sign the Bill of Rights. In 1790, the City of Trenton officially became the state capital. Mr. William Livingston was the first governor of New Jersey (State of New Jersey 2013).

4.1 Physical Setting

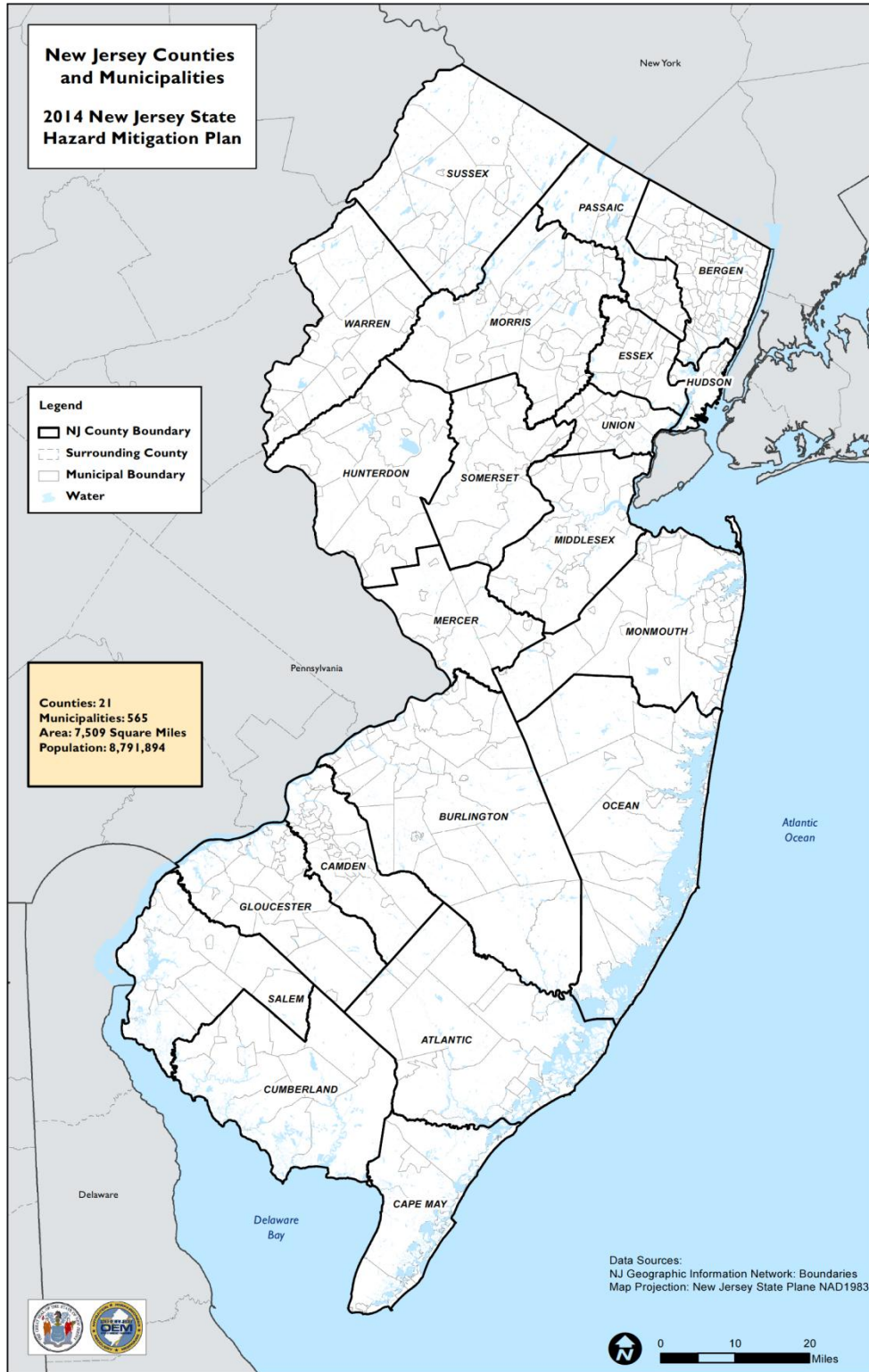
This section presents the physical setting of the State of New Jersey, including geography, government, transportation, climate, and hydrography and hydrology.

4.1.1 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 United States. It is about 150 miles long and 70 miles wide, comprising 8,722 square miles (7,419 square miles of land and 1,303 square miles of water) with a population of 8,791,894 (United States Census 2010). The State is bordered to the north by the State of New York, to the south by the Delaware Bay and Atlantic Ocean, to the east by the Atlantic Ocean, and to the west by the Delaware River and the State of Pennsylvania. 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 United States, and one of the most ethnically diverse. It is composed of 21 counties and 565 municipalities, as illustrated in Figure 4-1. Geographically, Hudson County is the smallest county (46.19 square miles) and Burlington County is the largest (798.58 square miles). In terms of population, the largest municipality is the City of Newark, with a population of 277,140 (United States Census 2010). The capital of New Jersey is the City of Trenton, located in Mercer County, which is also the approximate geographic center of the State.



Figure 4-1. State of New Jersey



Source: New Jersey Geographic Information Network (NJGIN) 2013



The New Jersey Geological Survey (NJGS) states that New Jersey is the fourth smallest state in the United States. It is occupied by four physiographic provinces: Valley and Ridge, Highlands, Piedmont, and Coastal Plain. Each province defines a region in which relief, landforms, and geology are significantly different from that of the other regions. The boundary between each province is determined by a major change in topography and geology.

The Valley and Ridge Province is approximately 536 square miles and occupies a major portion of Sussex and Warren counties. It is characterized by steep-sided, linear ridges and broad valleys. The Kittatinny Valley forms the eastern segment of the Province. Kittatinny Mountain is a broad, even-crested ridge that ranges from 1,600 to 1,800 feet above sea level and separates the upper Delaware River above the Delaware Water Gap from the Kittatinny Valley. High Point, near the northern end of Kittatinny Mountain, is the highest point in New Jersey at 1,803 feet above sea level (Dalton 2003).

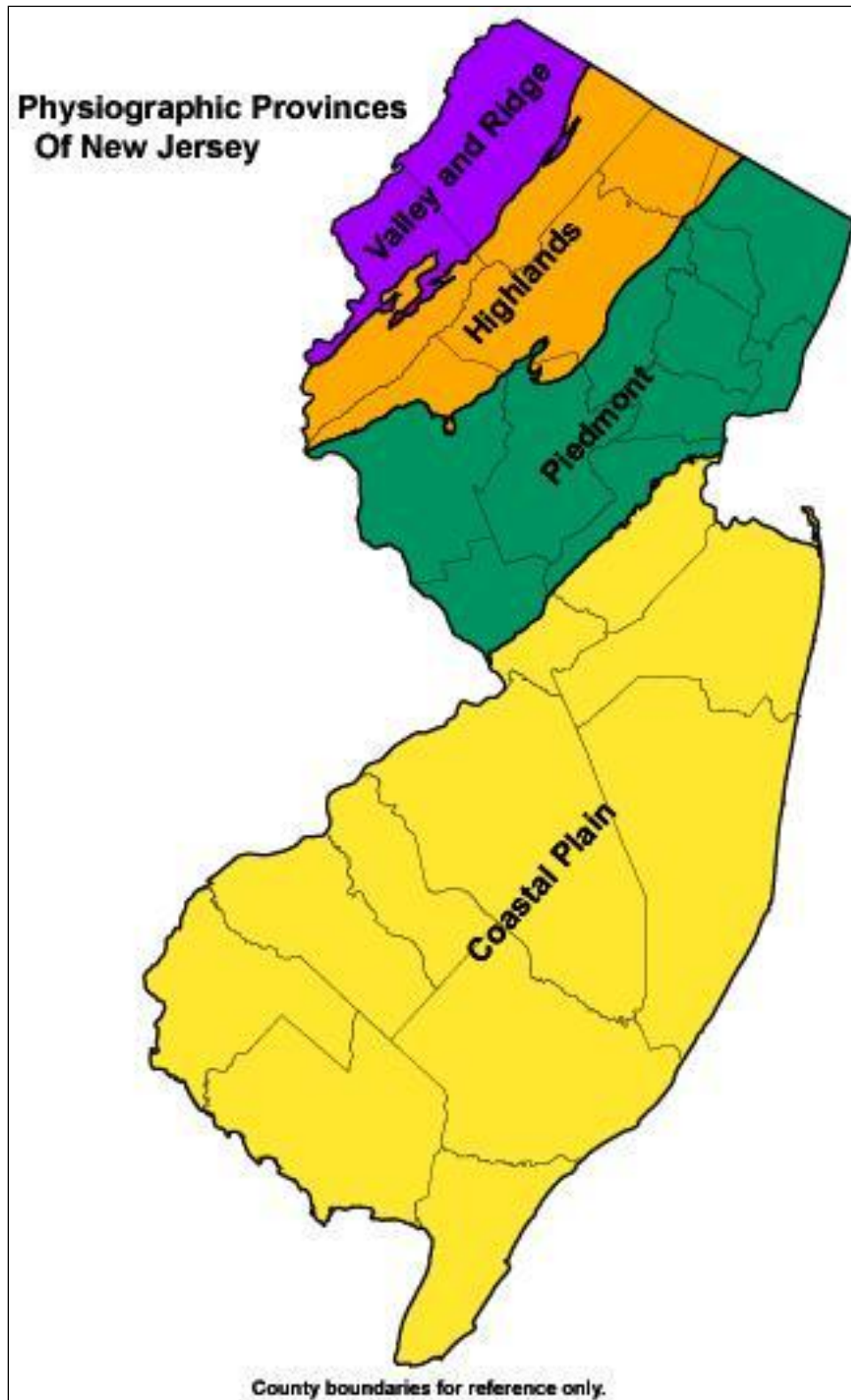
The Highlands Province is approximately 980 square miles located in the southeastern portion of the Sussex and Warren Counties, major portions of Hunterdon, Morris, and Passaic counties, and small portions of Bergen and Somerset Counties. This province is approximately 10 miles wide at the Delaware River and 25 miles wide near the New York State border. It has a rugged topography that consists of a series of discontinuous rounded ridges separated by deep, narrow valleys. Wawayanda Mountain is the highest point in the Highlands at 1,496 feet above sea level. The maximum elevation of the peaks decreases toward the southeastern border and southwest to the Delaware River (Dalton 2003).

The Piedmont Province is approximately 1,600 square miles and makes up approximately one-fifth of the State of New Jersey. It occupies all of Essex, Hudson, and Union counties, most of Bergen, Hunterdon, and Somerset counties, and parts of Mercer, Middlesex, Morris, and Passaic counties. The Piedmont Province is mainly a low rolling plain divided by a series of higher ridges. Its width varies from approximately 16 miles at the New York State border to over 30 miles at the Delaware River. Along the foot of the Highlands, the elevation of the Piedmont Province ranges from 300 to 400 feet above sea level. The highest point in the Piedmont Province is 914 feet at Barren Ridge on the northern side of the Hunterdon Plateau. The most prominent feature in the eastern part of the Piedmont Province is the Palisades (Dalton 2003).

The largest province in New Jersey is the Coastal Plain Province. It is approximately 4,667 square miles and occupies three-fifths of the State. This province includes all of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Monmouth, Ocean, and Salem counties, and part of Mercer and Middlesex counties. A broad trough follows the Piedmont boundary from Raritan Bay to the City of Trenton. Near Monmouth Junction, where the trough floor forms a saddle, it reaches an elevation of about 80 feet above sea level. East of this depression is the drainage divide between the Delaware River and the Atlantic Ocean. The maximum elevation of the Coastal Plain is 391 feet at Crawford Hill. The Highlands of Navesink, at 266 feet above sea level, is the highest point along the coast of New Jersey (Dalton 2003). Figure 4-2 illustrates the physiographic provinces of New Jersey.



Figure 4-2. Physiographic Provinces of New Jersey



Source: NJGS 2002



4.1.2 Government

The New Jersey legislature consists of a senate of 40 members and an assembly of 80 members. Assembly members are elected for a two-year term and state senators are elected and serve four-year terms. The Governor and Lieutenant Governor serve a four-year term and may be re-elected once.

New Jersey sends 13 representatives and two senators to the United States Congress and has 15 electoral votes. The State is made up of 21 counties and 565 municipalities. All 565 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, or village.

4.1.3 Transportation

New Jersey has an expansive and diverse transportation network consisting of multiple forms of transportation, including vehicular, rail, light rail, bus, air, and ferry. Numerous bridges, tunnels, highway, and rail lines facilitate interstate travel. 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 including the George Washington Bridge, the Lincoln and Holland vehicular tunnels, and three bridges to Staten Island. Newark airport (operated by the Port Authority of New York and New Jersey) ranks among the nation's busiest. Shipping centers in New Jersey include the ports of the Newark Bay and New York Bay areas, notably the Ports of Newark and Elizabeth. Along the Delaware, there is a relatively minor amount of seagoing traffic. The major transportation routes are shown in Figure 4-3.

More than 71.4% of the workers in New Jersey commute to work alone in a car, while 8.7% carpool. Public transportation use accounted for 10.6% of workers, 3.4% walked to work, and 4% work from home. The average commute time in New Jersey is 29.8 minutes, the third longest commute in the United States (PlanSmart NJ 2011).

The State also has one of the most extensive transit systems in the United States, consisting of multiple operators and transit types that include bus, rail, and ferry. The operators of these transit systems include New Jersey Transit (NJ Transit), Port Authority, the Port Authority Trans-Hudson Corporation (PATH), Port Authority Transit Corporation (PATCO), and Amtrak Northeast Corridor. According to the 2012 study by New Jersey Future, *Targeting Transit*, there are 243 transit stations in New Jersey that consist of the following:

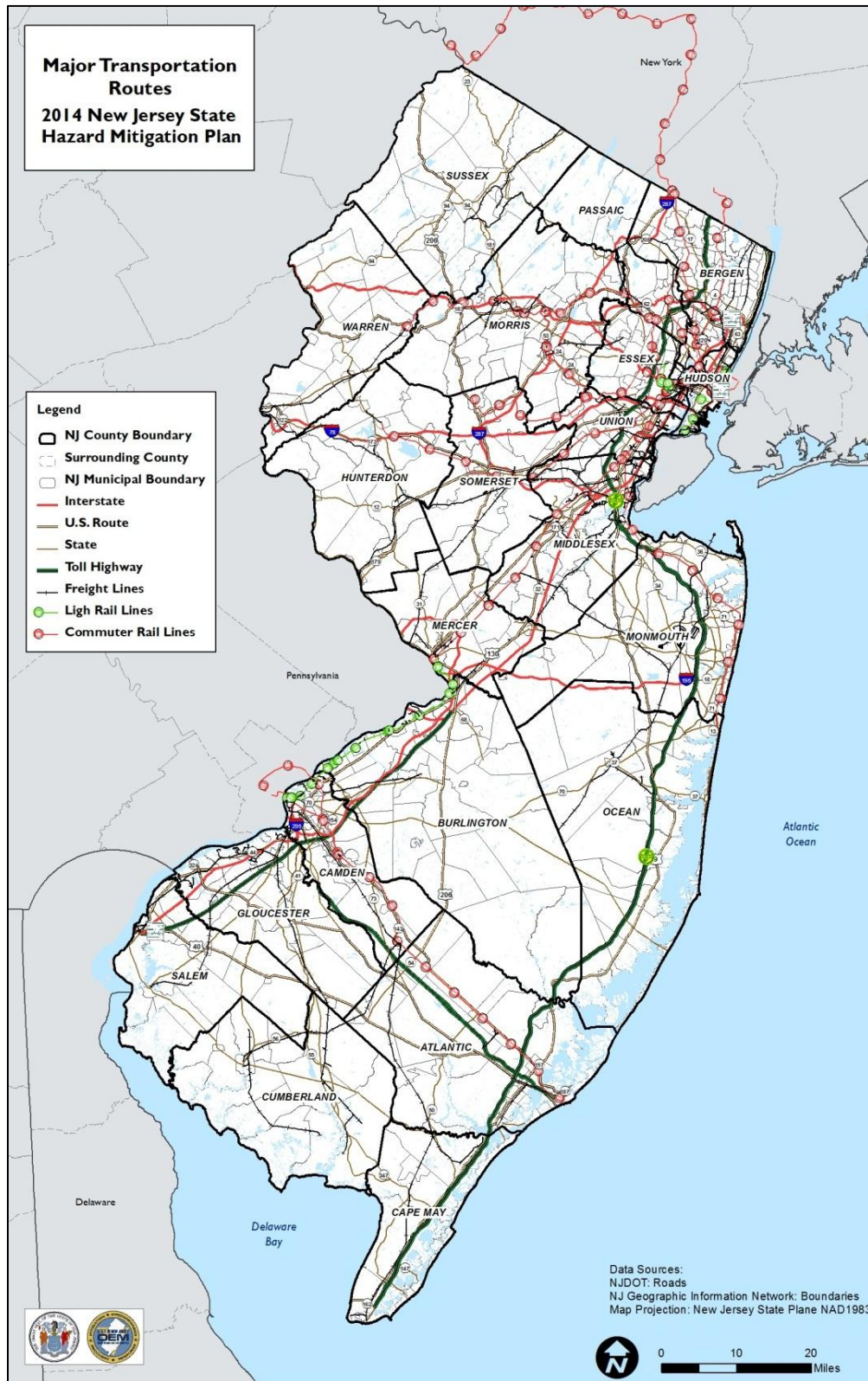
- 12 stations are ferry-only terminals
- 16 stations are major bus terminals not served by another mode of transportation
- 205 stations are served by rail only:
 - 139 commuter rail only
 - 9 rapid transit only (7 PATCO and 2 PATH)
 - 54 are light rail only (21 HBLR, 15 Newark Light Rail, 18 River Line)
 - 3 are served by multiple rail modes: Lindenwold (PATCO and commuter rail), Newark-Broad Street (commuter and light rail), and Newport/Pavonia (PATH and light rail). The Pennsauken Transit Center, currently under construction, will fall into this category as well.
- 10 are multimodal terminals
 - One (Hoboken Terminal) is served by all three rail modes and is also a bus and ferry terminal
 - One (Newark Penn Station) is served by all three rail modes and is also a bus terminal



- One (Trenton) is served by commuter rail (both NJ Transit and SEPTA) and light rail and is a bus terminal
- One (Walter R and Transportation Center in Camden) is served by light rail and rapid transit (PATCO) and is a bus terminal
- Four (Metropark, New Brunswick, Asbury Park, and Atlantic City) are commuter rail stations that also serve as bus terminals
- One (Journal Square) is a rapid transit station that also serves as a bus terminal
- One (Exchange Place PATH station) is a rapid transit station that also serves as a ferry terminal



Figure 4-3. Major Transportation Routes in New Jersey



Source: NJDOT 2013



Port of New York and New Jersey

The Port of New York and New Jersey is the largest port on the east coast and the third largest in the country. The Port handles every type of cargo – containers, roll-on-roll off automobiles, liquid and dry bulk, break bulk, and specialized project cargo. There are 54 container cranes. Three port companies supply floating derricks, including a 1,000-ton capacity Chesapeake 1000 which is the largest on the East Coast.

The Port Authority of New York and New Jersey (PANYNJ) leases most of its terminal space to private terminal operators, which manage the daily loading and unloading of container ships. In 2010, the Port of New York and New Jersey handled 5.3 million loaded and unloaded 20-foot equivalent units, a 16% increase in total container traffic from 2009. The dollar value of all cargo that moved through the Port exceeded \$175 billion.

The Port of New York and New Jersey is also one of the North American port for automobile imports and exports. In 2012, the Port handled over 700,000 vehicles, of which over 400,000 were imports and over 300,000 were exports. Vehicle terminals are located at the Auto Marine Terminal in Jersey City and at the Port Newark/Elizabeth Marine Terminal complex. Each terminal provides immediate access to major interstate highways and a number of rail services.

There are three major passenger cruise ship terminals in the Port of New York and New Jersey. The Manhattan Cruise Terminal is owned by the City of New York and operated by Ports America. It provides five 1,000-foot long berths. The Brooklyn Cruise Terminal is located in the Borough's Red Hook section. The Cape Liberty Cruise Port is located in Bayonne, New Jersey and is operated and managed by the Cape Liberty Cruise Port LLC.

PANYNJ manages Port Newark, the Elizabeth-Port Authority Marine Terminal, the Howland Hook Marine Terminal, the Brooklyn-Port Authority Marine Terminal, the Red Hook Container Terminal, and the Port Jersey Port Authority Marine Terminal. These facilities make up the marine terminal facilities of the Port of New York and New Jersey. The following describes the ports located in New Jersey:

- Port Newark Container Terminal (PNCT) is located in Port Newark, New Jersey and occupies 259 acres. It handles over 600,000 containers each year. In 2011, PNCT secured a long-term extension in its lease agrees with the PANYNJ for an additional 20 years through 2030, along with a 30 year option through 2050. PNCT is one of the largest infrastructure projects in New Jersey.
- Maher Terminals is one of the largest multi-user container terminal operators in the world. The Terminal in the Port of New York and New Jersey is North America's largest marine container terminal.
- Global Terminal is located in Jersey City and situated in Upper New York Bay. It is the closest container terminal to the harbor entrance. The Terminal has easy access to all major and rail routes. It has direct access to the New Jersey Turnpike as well.

There are also several commuter ferry routes in the New York Harbor that provide ferry transportation to commuters. There are six ferry service providers.

New Jersey Transit

New Jersey Transit (NJ Transit) is the State's public transportation corporation and includes a service area of 5,325 square miles. NJ Transit is the nation's third largest provider of bus, rail and light rail transit; linking major points in New Jersey, New York, and Philadelphia (NJ Transit 2014a).



NJ Transit serves 454,780 customers on a typical weekday. Of that number:

- 277,860 (61%) ride the bus
- 136,346 (30%) use rail
- 36,574 (8%) use light rail

NJ Transit ridership increased by 23% between 2000 and 2010.

Commuters into Manhattan (approximately 10% of all commuters) primarily use transit.

Currently, the agency operates a fleet of 2,027 buses, 711 trains and 45 light rail vehicles. Each year, NJ Transit provides nearly 223 million passenger trips, statewide, on their network of bus routes and rail lines (NJ Transit 2014a).

In 2012, NJ Transit operated 261 bus routes, 12 commuter rail lines servicing 116 municipalities, and three light rail lines serving 22 municipalities. There are 5,700 route miles of bus service, 1,001 route miles of rail service, and 107 route miles of light rail operated by NJ Transit. There are 30 passenger bus stations with 18,500 stops and 17,600 commuter parking spaces for bus service. There are 61 stations with a commuter parking capacity of 6,700 for the light rail services. The commuter rail services have 164 stations with a commuter parking capacity of

over 63,000 (NJ Transit 2014a). The rail and light rail system are shown in Figure 4-4. NJ Transit is also responsible for a tremendous amount of infrastructure in the State. The rail infrastructure includes the following:

Table 4-1. NJ Transit Infrastructure in New Jersey

Infrastructure Type	Number of Infrastructure in State
Rail Infrastructure	
Undergrade Bridges	570
Overhead Bridges	100
Moveable Bridges	12
Track Miles Maintained (not including Amtrak’s Northeast Corridor)	544.4
Interlockings	106
Signals	1,336
Grade Crossings	330
Switches	1,271
Miles of Catenary	264
Substations	51
Light Rail Infrastructure	
Undergrade Bridges	35
Overhead Bridges	52
Moveable Bridges	0
Track Miles Maintained	107
Interlockings	50
Signals	285
Grade Crossings	120
Switches	282
Miles of Catenary	51
Substations	22

Source: NJ TRANSIT 2013



Figure 4-4. NJ Transit Rail and Light Rail System Map



Source: NJ TRANSIT 2014

Impacts from Superstorm Sandy have led to continuous inspections of NJ Transit facilities, infrastructure, and equipment across all regions of New Jersey. This is part of an intensive effort to restore the State's public



transportation network to normal operations. Superstorm Sandy caused major damage throughout New Jersey, leaving behind long-term mechanical and operational challenges (NJ Transit 2013b).

In advance of the storm, NJ Transit cancelled all service on Sunday, which enabled the agency to ensure the safety of customers and employees and allowed personnel to move locomotives, train cars, buses, and other equipment to locations where they could be protected from the elements. After Sandy struck New Jersey, NJ Transit crews worked to inspect more than 500 miles of track, equipment yards, buses, and train sets. They also made repairs or cleaned up where necessary. Storm damage was severe in many areas and residual impacts from Superstorm Sandy caused many passengers to experience delays, suspensions, or cancellations (NJ Transit 2013b).

The following outlines highlights of the NJ Transit system during Superstorm Sandy:

- NJ Transit Rail System
 - NJ Transit's Rail Operations Center was engulfed in water, which damaged backup power supply systems, the emergency generator, and the computer system that controls the movement of trains and power supply
 - Numerous downed trees across the rail system damaged overhead wires and signal wires
 - There were rail washouts across the system, include the North Jersey Coast Line and the Atlantic City Rail Line
 - Several rail stations were flooded, including the Hoboken Terminal
 - Morgan Drawbridge on the North Jersey Coast Line in South Amboy sustained damage from boats and a trailer that collided into the bridge
- NJ Transit Bus System
 - Power outages in local communities resulted in the loss of traffic control devices critical to safe operation
 - Downed tree limbs and power lines made roads impassable
 - Many bus garages were operating on back-up generator power
- NJ Transit Light Rail System
 - Newark Light Rail sustained flooding at Newark Penn Station, as well as major debris damage between Newark Penn and Branch Brook Park stations
 - Hudson-Bergen Light Rail experienced track washouts at Port Imperial and West Side Avenue stations, as well as trees in the overhead wires at Weekhawken and Flooding at Hoboken
 - River Line sustained no significant damage to equipment or infrastructure; however, due to loss of power in Camden, there was no power to operate signals and switches (NJ Transit 2013b)

Highways

New Jersey has more miles of highway per square mile than any other state. Most of the State's interstate system is operating at or above capacity during peak periods of use (New Jersey Planning Commission 2001). New Jersey has 38,835 miles of highways (31,557 miles urban and 7,278 miles rural). Of the total miles of highways, 431 miles are Interstate, 404 miles are other freeways or expressways, 5,757 miles are arterial, 4,151 miles are collector, and 28,092 miles are local. New Jersey also has 6,520 bridges located throughout the State.



Rail

The New Jersey rail system is an extensive network that dates back to the early 19th century. Today, it transports people and freight through some of the most densely populated areas in the United States. Three Class I railroads, one Class II railroad, and 15 Class III (or short line) railroads operate in New Jersey. Each of the railroads are privately owned and operated. Two major passenger rail companies also operate in the State: New Jersey Transit (NJ Transit) and Amtrak. New Jersey Transit is a State-run agency that provides commuter rail services. NJ Transit serves New York Penn Station and operates into other New York State locations through an agreement with Metro-North. Amtrak provides intercity passenger rail service, connecting New Jersey's major metropolitan areas with cities in the northeast United States and throughout. The Northeast Corridor, a rail line owned by Amtrak, passes through New Jersey between Trenton and the Hudson River. It is the most traveled passenger rail in the United States. In 2011, more than 375,000 passengers traveled the Northeast Corridor every day.

Freight rail in New Jersey plays a vital role in the State's economy. The State acts as both a distribution center and a throughway for freight originating or destined for the rest of the country. Some of the main industries in New Jersey that rely on freight rail include waste disposal, power generation, and chemical manufacturing. For these businesses, rail has been more efficient than highway or air transport.

New Jersey has the second highest rate of transit ridership in the nation. New Jersey is serviced by several rail transit agencies. Heavy rail transit includes: MTA New York City Transit, Port Authority Trans-Hudson Corporation, and Port Authority Transit Corporation. Commuter rail transit includes: MTA Long Island Rail Road, MTA Metro-North Commuter Railroad Co., and New Jersey Transit Corporation. There are 224 rail stations in New Jersey. Based on the most recent United States Census data, approximately 70% of the State's residents live within five miles of a train station (New Jersey Future 2011).

4.1.4 Climate

The Office of the New Jersey State Climatologist (ONJSC) summarizes the climate of New Jersey as presented in the section below.

According to the ONJSC, the State of New Jersey is located approximately halfway between the equator and the North Pole, resulting in a climate that is influenced by wet, dry, hot and cold airstreams, making a highly variable environment. The southern portion of New Jersey 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.

The northern and southern portions of the State experience a difference in temperatures, with the greatest differences during the winter months and least in the summer. All weather stations across the state have registered readings of 100 degrees Fahrenheit (°F) or higher and as well as 0°F and below. The average number of freeze-free days is 163 days in the northern Highlands, 179 days in the central and southern interior, and 217 days along the Atlantic Ocean coast.

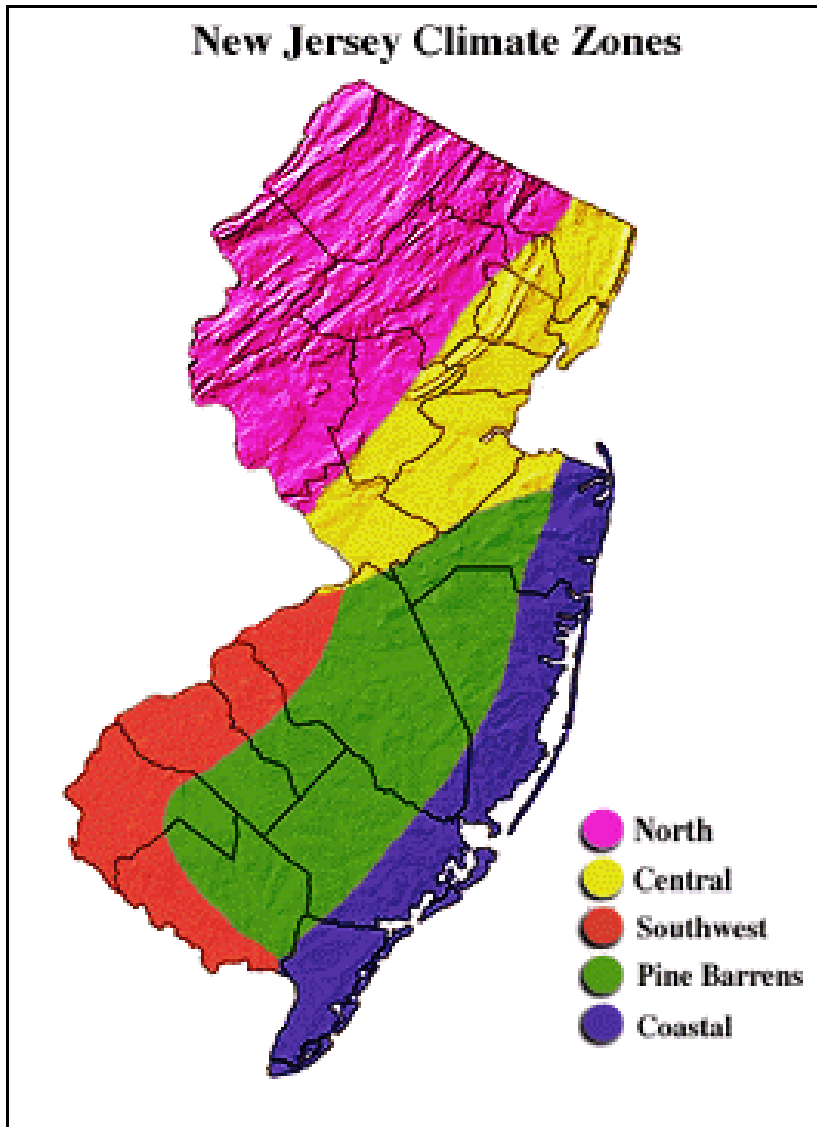
Average annual precipitation ranges from approximately 40 inches along the southeast coast to 51 inches in the north-central portion of the State. Most areas in New Jersey average between 43 and 47 inches of precipitation annually. Snow typically falls from about October 15 to April 30 in the Highlands and from around November 15 to April 15 in the southern counties. Most locations in New Jersey receive between 25 and 30 thunderstorms each year, with fewer storms near the coast than inland. New Jersey experiences measurable precipitation about 120 days each year. The fall months are typically the driest, with an average of eight days



of measurable precipitation. Other seasons average between nine and twelve days each month with measurable precipitation. New Jersey also has approximately five tornadoes each year, which generally tend to be weak.

The State of New Jersey is divided into five distinct climate zones. Distinct variations in the day-to-day weather between each of the climate zones is due to the geology, distance from the Atlantic Ocean, and prevailing atmospheric flow patterns. The five climate zones in New Jersey, illustrated in Figure 4-5, are: Northern, Central, Pine Barrens, Southwest, and Coastal. Each climate zone is described below.

Figure 4-5. Climate Regions of New Jersey



Source: ONJSC

Northern Zone

The Northern 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 is characterized 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, or along the St. Lawrence Valley. Coastal storms, with precipitation shields reaching inland, add to the precipitation totals. The highlands and mountains in this area make the Northern Zone distinct from the rest of the State. Clouds and precipitation are enhanced by cold frontal passage as the air, forced to rise over the mountains, produces clouds and 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 near the City of Trenton. The northern edge of the Central Zone is often the boundary between freezing and non-freezing precipitation in the State.

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 by the sandy soils 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 to 20 °F cooler than the Atlantic City Marina on the Absecon Inlet 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 these conditions make 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 the Delaware Bay adds a maritime influence to the Southwest Zone. The Southwest Zone has the highest average daily temperatures in the State and, due to the lack of sandy soils, tends to have higher nighttime temperatures than the neighboring Pine Barrens.

This zone receives less precipitation than the Northern and Central Zones of the State as there are no orographic features and it is farther away from the Great Lakes-St. Lawrence storm track. The Southwest Zone is inland, avoiding the heavier rains from some coastal storms. Therefore, this zone 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 Delaware Bay 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.

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, which has a high heat capacity (compared to land); seasonal temperature fluctuations in the Coastal Zone tend to be more gradual and less prone to extremes.



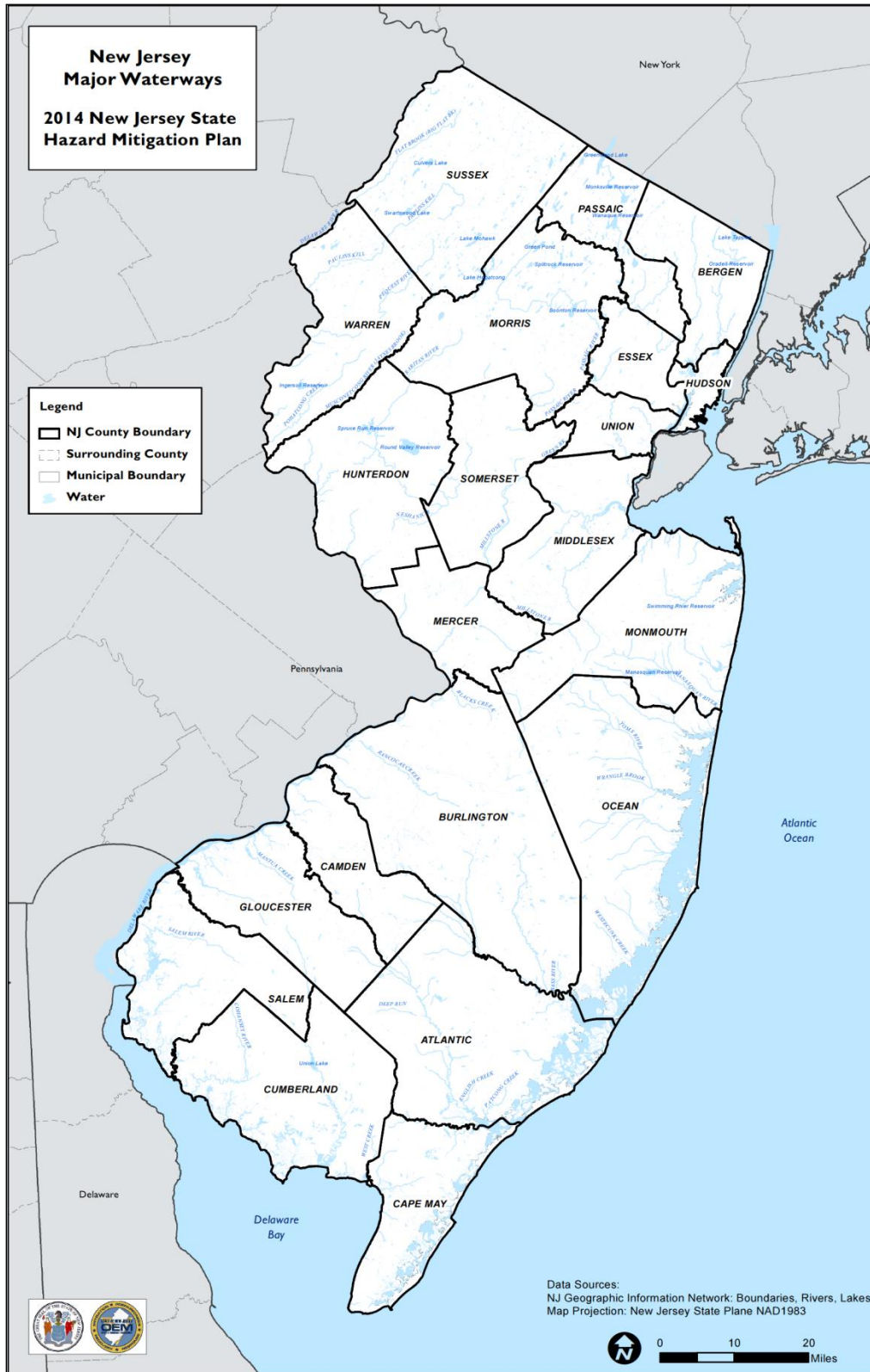
Sea breezes play a major role in the coastal climate. When the land is warmed by the sun, heated air rises, allowing cooler air at the ocean surface to spread inland. Sea breezes often penetrate five to 10 miles inland, but under more favorable conditions, can affect locations 25 to 40 miles inland. Sea breezes 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. Each winter there is usually at least one significant coastal storm and some years see upwards of five to 10. 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, hurricanes, or Nor'Easters affect the region.

4.1.5 Hydrography and Hydrology

Numerous ponds, lakes, creeks, and rivers make up the waterscape of the State of New Jersey. The State of New Jersey and Montclair University states that nearly 700 square miles of New Jersey's total area is made up of water. There are more than 800 lakes and ponds, more than 100 rivers and creeks, and 127 miles of Atlantic Ocean coastline in the State. The major rivers of New Jersey include the: Delaware River, Hudson River, Raritan River, Passaic River, Rancocas Creek, Mullica River, Manasquan River, Great Egg Harbor River, and Maurice River. The Passaic River system, with its main stem approximately 80 miles long, is the longest river system within the State of New Jersey. Major lakes and reservoirs in the State include: Lake Hopatcong, Budd Lake, Culver Lake, Spruce Run Reservoir, and Round Valley Reservoir. Lake Hopatcong, which is approximately four square miles in size, is the State's largest lake. New Jersey also has large bays, including the Delaware Bay, which is the largest bay in the State but only partially located within New Jersey. The Barnegat Bay is the largest bay located completely within New Jersey. Figure 4-6 illustrates the major waterways located in the State of New Jersey.



Figure 4-6. Major Waterways of New Jersey



Source: NJGIN 2013



Watersheds

This section has been updated for the 2014 Plan to provide a high-level summary of the watersheds located in the State of New Jersey. For further detailed information regarding each of the 20 watershed management areas (WMA), please refer to Appendix P.

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. Figure 4-7 depicts the hydrologic system of a watershed.

Figure 4-7. Watershed



Source: Environmental Protection Agency (EPA) 2012

Urbanization (or development) can have a great effect on local water resources. Water quality in New Jersey is extremely important since the majority of the State's drinking water is housed within its boundaries.

As a watershed becomes developed, the rate of stormwater runoff can increase. Less stormwater is able to soak into the ground when sidewalks, roads, parking lots, and rooftops block this infiltration. This means a greater volume of water can reach the waterway more quickly and less of that water is able to infiltrate to groundwater. This can lead to more flooding after storms, with the potential of a reduced flow in streams and rivers during dry periods.

Watersheds come in all shapes and sizes and can cross municipal and county boundaries. Twenty watersheds make up the State of New Jersey. When flooding occurs, it impacts an entire watershed. Figure 4-8 displays the watersheds found in New Jersey. Table 4-2 identifies each of the watershed names and the New Jersey Department of Environmental Protection (NJDEP) assigned number that corresponds with each of the watersheds on Figure 4-8.



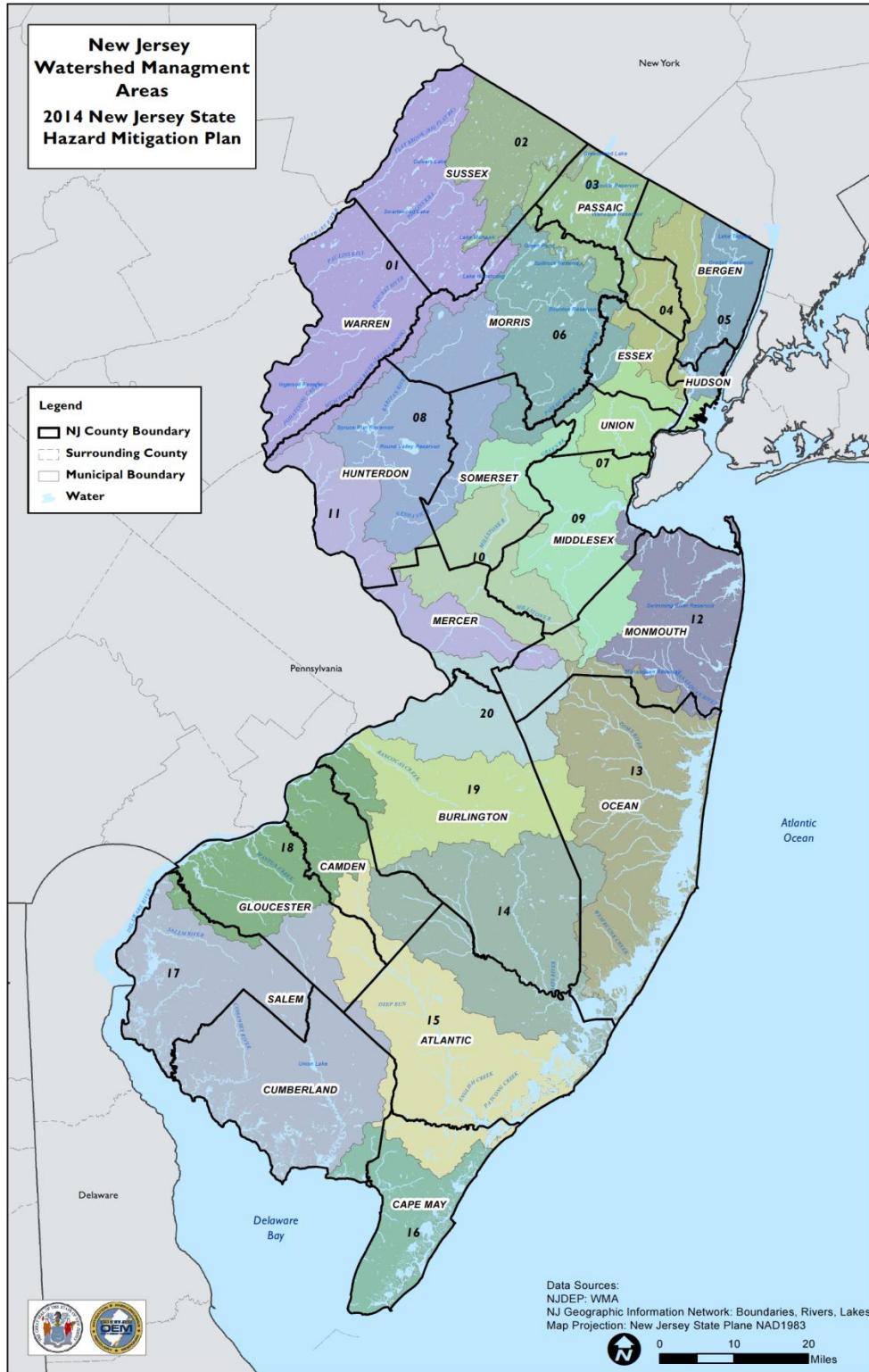
Table 4-2. Watersheds of New Jersey

Watershed Number	Watershed Name	Watershed Number	Watershed Name
1	Upper Delaware	11	Central Delaware
2	Walkill	12	Monmouth
3	Pompton, Pequannock, Wanaque, Ramapo	13	Barnegat Bay
4	Lower Passaic, Saddle	14	Mullica
5	Hackensack, Hudson, Pascack	15	Great Egg Harbor
6	Upper and Mid Passaic, Whippany, Rockaway	16	Cape May
7	Arthur Kill	17	Maurice, Salem, Cohansey
8	North and South Branch Raritan	18	Lower Delaware
9	Lower Raritan, South River, Lawrence	19	Rancocas
10	Millstone	20	Assiscunk, Crosswick, Doctors

Source: NJDEP 2012



Figure 4-8. Watershed Management Areas (WMA) of New Jersey



Source: NJDEP 2012



The following table identifies which watersheds are located within each county.

Table 4-3. Watershed Management Areas and County Locations

County	Watershed Management Areas (Watershed Number)	County	Watershed Management Areas (Watershed Number)
Atlantic	Great Egg Harbor (15) Maurice, Salem, Cohansey (17) Mullica (14)	Middlesex	Arthur Kill (7) Lower Raritan, South River, Lawrence (9) Monmouth (12) Millstone (10)
Bergen	Hackensack, Hudson, Pascack (5) Lower Passaic, Saddle (4) Pompton, Pequanoek, Wanaque, Ramapo (3)	Monmouth	Assiscunk, Crosswick, Doctors (20) Barnegat Bay (13) Lower Raritan, South River, Lawrence (9) Millstone (10) Monmouth (12)
Burlington	Assiscunk, Crosswick, Doctors (20) Barnegat Bay (13) Lower Delaware (18) Mullica (14) Rancocas(19)	Morris	North and South Branch Raritan (8) Pompton, Pequanoek, Wanaque, Ramapo (3) Upper and Mid Passaic, Whippany, Rockaway (6) Upper Delaware (1)
Camden	Great Egg Harbor (15) Lower Delaware (18) Mullica (14) Rancocas (19)	Ocean	Assiscunk, Crosswick, Doctors (20) Barnegat Bay (13) Rancocas 19) Mullica (14) Monmouth (12)
Cape May	Cape May (16) Great Egg Harbor (15)	Passaic	Lower Passaic, Saddle (4) Pompton, Pequanoek, Wanaque, Ramapo (3) Walkill (2)
Cumberland	Cape May (16) Great Egg Harbor (15) Maurice, Salem, Cohansey (17)	Salem	Lower Delaware (18) Maurice, Salem, Cohansey (17)
Essex	Arthur Kill (7) Lower Passaic, Saddle (4) Upper and Mid Passaic, Whippany, Rockaway (6)	Somerset	Lower Raritan, South River, Lawrence (9) Millstone (10) North and South Branch Raritan (8) Upper and Mid Passaic, Whippany, Rockaway (6)
Gloucester	Great Egg Harbor (15) Lower Delaware (18) Maurice, Salem, Cohansey (17)	Sussex	Pompton, Pequanoek, Wanaque, Ramapo (3) Upper Delaware (1) Upper and Mid Passaic, Whippany, Rockaway (6) Walkill (2)
Hudson	Hackensack, Hudson, Pascack (5) Lower Passaic, Saddle (4)	Union	Arthur Kill (7) Lower Raritan, South River, Lawrence (9) Upper and Mid Passaic, Whippany, Rockaway (6)
Hunterdon	Central Delaware (11) Millstone (11) North and South Branch Raritan (8) Upper Delaware (1)	Warren	Upper Delaware (1)
Mercer	Assiscunk, Crosswick, Doctors (20) Central Delaware (11) Millstone (10)		



4.2 Population and Demographics

New Jersey is the most densely populated state in the United States and the eleventh most populated. The estimated 2012 population of New Jersey was 8,864,590 (United States Census 2012). This is an increase of 0.82% (72,696 persons) from the 2010 Census population of 8,791,894.

In the 1940s, New Jersey's population density was centered in the more urbanized areas in close proximity to New York and Philadelphia, with limited expansion into the rest of the State. In the 1950s the development of the interstate highway system and other major roadway infrastructure projects facilitated faster travel times between the less developed portions of the state and the major employment hubs within and around New York and Philadelphia. This stimulated expansive suburban development starting in the 1950s. The population of New Jersey has been steadily increasing since 1970, but has slowed over the last few years.

The top five most populated counties in New Jersey are clustered together in the northeastern section of the State adjacent to New York City: Bergen, Middlesex, Essex, Hudson, and Monmouth Counties (United States Census 2010). The most populous county in New Jersey is Bergen County, with a 2010 Census population of 905,116. Salem County, with a population of 66,083, is the least populated county. As of 2010, the population density of New Jersey was 1,195 persons per square mile, making it the country's most densely populated state. The United States average of persons per square mile is 87.4. Between 1980 and 2010, the population density in New Jersey increased by 20%, from 1,001.4 persons per square mile to 1,195 persons per square mile. New Jersey has been the most densely populated state for more than 40 years (Wu 2010; New Jersey DataBank 2012). The average household size in New Jersey is 2.68 persons, and the average family size is 3.22 persons.

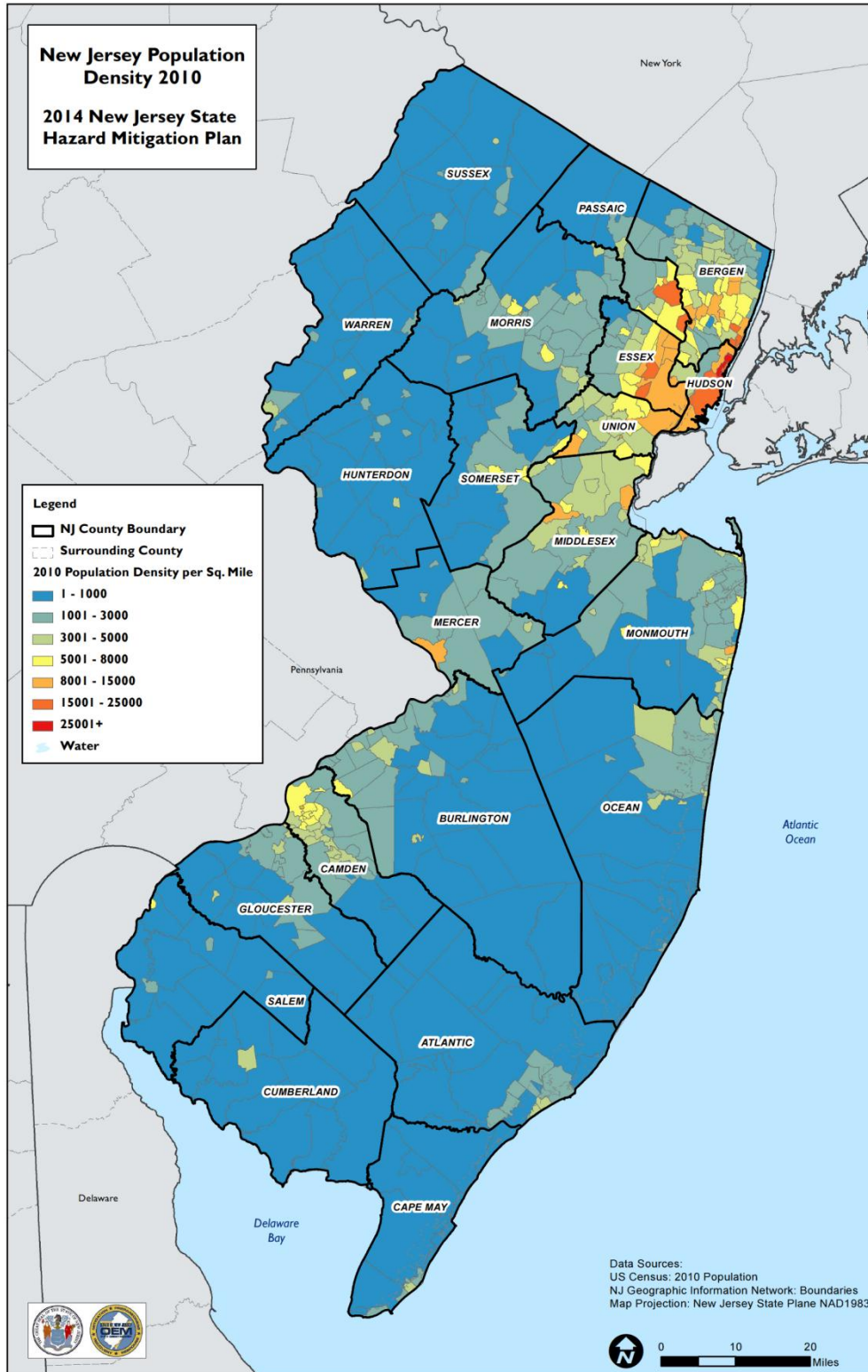
The City of Newark is the largest city by population in New Jersey, accounting for 3.1% of the State's total population. Newark is one of the principal cities in the New York-Newark-Jersey City, NY-NJ-PA Metropolitan Statistical Area. The 2010 population for this Metropolitan Division was 2,471,171 (United States Census 2010; United States Census 2013; New Jersey Department of Labor and Workforce Development [NJLWD] 2012).

Figure 4-9 illustrates the population density across the State. Table 4-4 lists the population, density and size of each county and Table 4-5 lists the largest and smallest municipalities in New Jersey.

Population density has a strong correlation with hazard vulnerability and loss. Urban areas tend to have larger populations and numbers of structures; therefore, these areas tend to experience greater loss during hazard events.



Figure 4-9. New Jersey Population Density



Source: United States Census 2010; NJGIN 2013



Table 4-4. County Population, Density and Area

County	2010 Population	Density (persons per square mile)	Total Area (square miles)
Atlantic	274,549	494.1	555.7
Bergen	905,116	3,884.50	233.01
Burlington	448,734	561.9	798.58
Camden	513,657	2,321.50	221.26
Cape May	97,265	386.9	251.43
Cumberland	156,898	324.40	483.7
Essex	783,969	6,211.50	126.21
Gloucester	288,288	895.30	322.01
Hudson	634,266	13,731.40	46.19
Hunterdon	128,349	300.00	427.82
Mercer	366,513	1,632.20	224.56
Middlesex	809,858	2,621.60	308.91
Monmouth	630,380	1,344.70	468.79
Morris	492,276	1,069.80	460.18
Ocean	576,567	917.00	628.78
Passaic	501,226	2,715.30	184.59
Salem	66,083	199.10	331.9
Somerset	323,444	1,071.70	301.81
Sussex	149,265	287.6	519.01
Union	536,499	5,216.10	102.86
Warren	108,692	304.50	356.92

Source: United States Census 2013

Table 4-5. Smallest and Largest Municipalities in New Jersey, By Population

Smallest Municipalities			Largest Municipalities		
Municipality	County	2010 Population	Municipality	County	2010 Population
Tavistock Boro	Camden	5	Newark City	Essex	273,546
Pine Valley Boro	Camden	12	Jersey City	Hudson	240,055
Walpack Twp	Sussex	16	Paterson City	Passaic	149,222
Teterboro Boro	Bergen	67	Elizabeth City	Union	120,568
Loch Arbour Village	Monmouth	194	Edison Twp	Middlesex	97,687
Cape May Point Boro	Cape May	291	Woodbridge Twp	Middlesex	97,203
Mantoloking Boro	Ocean	296	Toms River Twp	Ocean	89,706
Harvey Cedars Boro	Ocean	337	Hamilton Twp	Mercer	87,109
Millstone Boro	Somerset	418	Trenton City	Mercer	85,403
Corbin City	Atlantic	492	Lakewood Twp	Ocean	60,352

Source: United States Census 2013

Note: Boro Borough
Twp Township



The Disaster Mitigation Act of 2000 (DMA 2000) requires that Hazard Mitigation Plans (HMPs) consider socially vulnerable populations. These populations can be more susceptible to hazard events, based on a number of factors including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. For the purpose of this Plan update, vulnerable populations include the elderly (persons aged 65 and older) and those living below the poverty line.

The growth of the population aged 65 and over during the past 10 years (6.5% from the 2000 Census to the 2010 Census), was faster than the State’s total population growth (4.5%) during the same time period (NJLWD 2013). Table 4-6 shows the elderly population for each county in New Jersey. Cape May County has the largest percentage of persons aged 65 and older, followed by Ocean County. Bergen and Ocean counties have the largest number of persons aged 65 and older (NJLWD 2013). Salem County has the smallest number of persons aged 65 and older, while Sussex and Passaic counties have the smallest percentage of persons aged 65 and older.

Table 4-6. Elderly Population of New Jersey, Age 65 and Older

County	Population 65+	% of County Population	% of State Population
Atlantic	38,902	14.20%	0.44%
Bergen	137,103	15.10%	1.56%
Burlington	62,190	13.90%	0.71%
Camden	65,725	12.80%	0.75%
Cape May	20,977	21.60%	0.24%
Cumberland	19,795	12.60%	0.23%
Essex	90,287	11.50%	1.03%
Gloucester	35,699	12.40%	0.41%
Hudson	66,066	10.40%	0.75%
Hunterdon	16,344	12.70%	0.19%
Mercer	46,347	12.60%	0.53%
Middlesex	99,462	12.30%	1.13%
Monmouth	86,691	13.80%	0.99%
Morris	68,155	13.80%	0.78%
Ocean	121,104	21%	1.38%
Passaic	60,324	12%	0.69%
Salem	9,917	15%	0.11%
Somerset	40,002	12.40%	0.45%
Sussex	17,850	12%	0.20%
Union	67,761	12.60%	0.77%
Warren	15,292	14.10%	0.17%
Statewide Total	1,185,993	N/A	13.5%

Source: NJLWD 2013

Note: The percentage was calculated using 2010 Census data.

The American Community Survey (ACS) is conducted annually by the United States Census Bureau, providing social, economic, and housing characteristics for the Census. The five-year levels were used to provide poverty data for all counties and the State. Table 4-7 provides the poverty information for the ACS from 2006-2010. The table includes number of persons with an income below poverty, the total population



used to determine poverty status, the percent of each county’s population below poverty and the percent of the State’s population below poverty in each county.

Table 4-7 shows that Essex County has the highest number of persons with an income below poverty, with 14.56% of the County’s population and 1.3% of the State’s population. Hunterdon County had the least number of people with an income below poverty, with 3.97% of the County’s population and 0.06% of the State’s population. Overall, 9.11% of the State’s population, or 777,968 persons, have an income below poverty (NJLWD 2013).

Table 4-7. Population Below Poverty in New Jersey, 2006-2010

County	Persons with Income Below Poverty (2006-2010)	Total Population Used to Determine Poverty Status	% of County Population	% of State Population
Atlantic	30,757	261,002	11.78%	0.36%
Bergen	51,639	886,798	5.82%	0.60%
Burlington	23,840	435,105	5.48%	0.28%
Camden	56,608	505,340	11.20%	0.66%
Cape May	8,776	95,686	9.17%	0.10%
Cumberland	22,519	144,832	15.55%	0.26%
Essex	110,725	760,726	14.56%	1.30%
Gloucester	20,009	280,462	7.13%	0.23%
Hudson	93,152	615,220	15.14%	1.09%
Hunterdon	4,947	124,603	3.97%	0.06%
Mercer	35,376	349,830	10.11%	0.41%
Middlesex	57,406	774,106	7.42%	0.67%
Monmouth	38,952	621,520	6.27%	0.46%
Morris	19,400	481,484	4.03%	0.23%
Ocean	50,712	561,988	9.02%	0.59%
Passaic	73,506	485,579	15.14%	0.86%
Salem	6,595	65,115	10.13%	0.08%
Somerset	11,235	316,393	3.55%	0.13%
Sussex	7,125	148,398	4.80%	0.08%
Union	47,406	522,858	9.07%	0.55%
Warren	7,283	107,258	6.79%	0.09%
Statewide Total	777,968	8,544,303	N/A	9.11%

Source: NJLWD 2013
 N/A Not applicable

Other socially vulnerable populations in New Jersey include persons with disabilities, persons without automobiles, persons with limited English proficiency, children, and persons living in nursing homes, dormitories, prisons, and shelters. Table 4-8 provides the number of persons for each of these population types per county.



Table 4-8. Other Socially Vulnerable Populations in New Jersey

County	Persons Under 18	Persons With Disabilities ^a	Persons With Limited English ^b	Persons Living in Nursing Homes ^c	Persons Living in Dormitories ^c	Persons Living in Prisons	Persons Living in Shelters
Atlantic	63,888	33,576	30,254	1,460	2,370	953	N/A
Bergen	204,405	75,113	126,337	3,546	3,913	732	N/A
Burlington	104,243	49,925	19,398	2,245	0	5,857	N/A
Camden	125,117	32,563	43,830	3,017	423	1,816	N/A
Cape May	18,349	14,311	N/A	868	0	248	N/A
Cumberland	37,705	24,140	17,095	900	3	10,194	N/A
Essex	194,918	102,736	108,069	4,510	4,972	7,347	N/A
Gloucester	70,261	33,726	6,979	948	2,001	427	N/A
Hudson	131,162	59,142	159,750	2,403	2,503	1,843	N/A
Hunterdon	30,217	9,797	4,850	351	0	2,516	N/A
Mercer	82,982	36,985	37,491	2,699	11,254	3,279	N/A
Middlesex	185,457	66,033	139,822	3,665	13,766	3,965	N/A
Monmouth	150,299	60,545	39,806	2,963	1,583	1,305	N/A
Morris	117,695	36,706	47,247	2,628	3,529	411	N/A
Ocean	134,919	73,932	25,483	4,277	1,261	540	N/A
Passaic	124,613	44,729	112,904	2,088	5,476	1,068	N/A
Salem	15,510	9,046	N/A	634	3	287	N/A
Somerset	80,835	26,203	36,011	1,810	479	273	N/A
Sussex	35,773	13,405	4,183	1,093	0	174	N/A
Union	131,258	48,026	104,537	2,591	1,266	1,098	N/A
Warren	25,608	9,622	N/A	816	681	135	N/A
Statewide Total	2,065,214	895,912	1,073,312	45,152	55,483	44,468	6,731^d

Source: United States Census 2013

N/A Not available

^a Based on 2012 statistics. Includes those non-institutionalized disabled population.

^b The Census indicates this number as those persons who speak English less than “very well”; based on 2011 American Community Survey (ACS)

^c 2010 Census data

^d Based on 2013 statistics. Includes those persons living in emergency shelters, traditional housing and hotel/motel paid for by an agency

4.2.1 Population Trends

The following section provides information regarding statewide population trends and population trends by county for the State of New Jersey and its counties.

Statewide Population Trends

The first United States Census was conducted in 1790 and New Jersey’s population was 184,139. According to the most recent 2010 Census, New Jersey’s population was 8,791,894 (Wu 2010).

Population growth was relatively slow in New Jersey during the first half of the 19th century when the country was expanding rapidly from 18 states in 1790 to 38 states by 1850 (Wu 2010). The State experienced large increases in population between 1860 and 1910. From 1920 to 2010, population growth dramatically slowed



down as compared to the 1800s and early 1900s. New Jersey’s largest population growth was experienced between 1850 and 1860 when the population increased by more than 37%. The smallest population growth was experienced between 1970 and 1980 when the population increased by 2.7%. Between 1790 and 2010, New Jersey has never experienced a decrease in population. Refer to Table 4-9.

Table 4-9. Population Changes in New Jersey, 1790 to 2010

Year	Population	Change in Population	% Growth
1790	184,139	-	-
1800	211,149	27,010	14.67%
1810	245,562	34,413	16.30%
1820	277,575	32,013	13.04%
1830	320,823	43,248	15.58%
1840	373,306	52,483	16.36%
1850	489,555	116,249	31.14%
1860	672,035	182,480	37.27%
1870	906,096	234,061	34.83%
1880	1,131,116	225,020	24.83%
1890	1,444,933	313,817	27.74%
1900	1,883,669	438,736	30.36%
1910	2,537,167	653,498	34.69%
1920	3,155,900	618,733	24.39%
1930	4,041,334	885,434	28.06%
1940	4,160,165	118,831	2.94%
1950	4,835,329	675,164	16.23%
1960	6,066,782	1,231,453	25.47%
1970	7,171,112	1,104,330	18.20%
1980	7,364,823	193,711	2.70%
1990	7,730,188	365,365	4.96%
2000	8,414,350	684,162	8.85%
2010	8,791,894	377,544	4.49%
2012	8,864,590	72,696	0.83%

Source: United States Census 2013; Wu 2010

Note: Change in population and percent in population change was calculated from available data

Between the 2010 Census and the estimated 2012 population, New Jersey grew by 0.83% or 72,696 persons. The population of New Jersey is projected to be 9,241,900 persons by 2020, which is a 4.26% increase from the 2012 estimated population (NJLWD 2013).

Population Trends by County

Table 4-10 summarizes population growth projections by county. In the 12 years between 2000 and 2012, the highest growth occurred in Middlesex County, whose population grew by 72,879 persons (9.72%). Cape May County experienced the largest decrease in population during this time frame, decreasing by 6,022 persons (-5.89%). In the two years between 2010 and 2012, the highest growth occurred in Hudson County, with a population increase of 18,036 persons (2.84%). The largest decrease between 2010 and 2012 occurred in Sussex County, with a loss of 1,823 persons (-2.27%).



Population has been estimated for all New Jersey counties for the year 2020. Bergen County is expected to have the largest increase in population, growing by 949,600 persons, a 3.34% increase from its 2012 population. Salem County is expected to have the smallest increase in population, growing by 67,700 persons, a 2.93% increase from its 2012 population.



Table 4-10. Population Growth Projections by County

County	Population			Population Change				2020 Projection		Housing Units		
	2000	2010	2012	2000 to 2012	2010 to 2012	% Change 2000 to 2012	% Change 2010 to 2012	Population	% Change from 2012	2010	2011	2012
Atlantic	252,552	274,549	275,422	22,870	873	9.06%	0.32%	288,800	4.86%	126,746	126,782	127,360
Bergen	884,118	905,116	918,888	34,770	13,772	3.93%	1.52%	949,600	3.34%	352,497	352,478	354,671
Burlington	423,394	448,734	451,336	27,942	2,602	6.60%	0.58%	473,700	4.96%	175,781	176,098	176,875
Camden	508,932	513,657	513,539	4,607	-118	0.91%	-0.02%	530,200	3.24%	205,067	204,923	205,706
Cape May	102,326	97,265	96,304	-6,022	-961	-5.89%	-0.99%	98,600	2.38%	98,361	98,017	98,649
Cumberland	146,438	156,898	157,785	11,347	887	7.75%	0.57%	165,200	4.70%	55,883	55,921	56,227
Essex	793,633	783,969	787,744	-5,889	3,775	-0.74%	0.48%	805,400	2.24%	313,091	312,952	313,356
Gloucester	254,673	288,288	289,586	34,913	1,298	13.71%	0.45%	310,300	7.15%	109,991	110,814	111,155
Hudson	608,975	634,266	652,302	43,327	18,036	7.11%	2.84%	677,000	3.79%	270,677	272,798	272,827
Hunterdon	121,989	128,349	127,050	5,061	-1,299	4.15%	-1.01%	132,500	4.29%	49,544	49,724	50,034
Mercer	350,761	366,513	368,303	17,542	1,790	5.00%	0.49%	386,100	4.83%	143,216	143,390	144,029
Middlesex	750,162	809,858	823,041	72,879	13,183	9.72%	1.63%	863,900	4.96%	295,010	296,076	297,505
Monmouth	615,301	630,380	629,384	14,083	-996	2.29%	-0.16%	654,000	3.91%	258,581	258,987	259,618
Morris	470,212	492,276	497,999	27,787	5,723	5.91%	1.16%	522,200	4.86%	189,937	190,659	190,740
Ocean	510,916	576,567	580,470	69,554	3,903	13.61%	0.68%	630,600	8.64%	278,189	278,862	279,549
Passaic	489,049	501,226	502,885	13,836	1,659	2.83%	0.33%	512,100	1.83%	176,018	176,264	176,102
Salem	64,285	66,083	65,774	1,489	-309	2.32%	-0.47%	67,700	2.93%	27,441	27,464	27,579
Somerset	297,490	323,444	327,707	30,217	4,263	10.16%	1.32%	345,000	5.28%	123,211	123,487	124,285
Sussex	144,166	149,265	147,442	3,276	-1,823	2.27%	-1.22%	154,800	4.99%	62,090	62,265	62,427
Union	522,541	536,499	543,976	21,435	7,477	4.10%	1.39%	560,500	3.04%	199,580	199,684	200,593
Warren	102,437	108,692	107,653	5,216	-1,039	5.09%	-0.96%	113,800	5.71%	44,959	44,908	45,271
Statewide Total	8,414,350	8,791,894	8,864,590	450,240	72,696	5.35%	0.83%	9,241,900	4.26%	3,555,870	3,564,917	3,574,558

Source: United States Census 2013

Note: Change in population and percent in population change was calculated from available data



Race and Ethnicity

New Jersey is an ethnically diverse state, with Caucasians making up 73.7% of the population, which is below the national percentage of 77.9%. New Jersey's minority percentage is correspondingly higher than the national trend. The State is also above the national percentage for foreign-born persons and language other than English spoken at home. The percentage of foreign-born residents is 20.6%, while the national percentage is 12.8%. More than 29% of households in New Jersey reported speaking a language other than English, while the national percentage is just over 20% (United States Census Bureau 2013).

Seasonal Population

New Jersey's 130 miles of beaches, many boardwalks, and casinos in Atlantic City, make New Jersey a popular tourist destination, especially during the summer season. The eastern portions of Monmouth, Ocean, Atlantic, and Cape May Counties all see large summer population increases.

According to the 2008 Summer Coastal Population Study, prepared by the Monmouth County Planning Board, on an average summer day Monmouth County's population reached more than 750,000, representing a population increase of approximately 300,000 or 73% more than the year round population (Monmouth County Planning Board 2008). On a peak day it would reach more than 900,000 representing an increase of 450,000 or 107% more than the year round population. Ocean, Cape May, and Atlantic counties all see similar increases in the summer months. The population of Atlantic City in Atlantic County has less of a seasonal fluctuation, since the casinos draw visitors year round.

Cape May County has a tourism-based economy, making the leisure and hospitality industry the largest employment sector in the County. This includes providers of lodging, food services, recreation, and amusements. In 2012, Cape May County's winter population was 96,304 increasing to 812,015 during the summer (Cape May County Planning Department 2013).

In 2010, Ocean County had a total of 42,056 seasonal housing units throughout the County. The Township of Long Beach had the highest number of seasonal units in the County (6,965 units) and the Borough of South Toms River had the smallest number, with just four seasonal use homes (Ocean County Department of Planning 2013).

4.3 Economy

The County Business Patterns (CBP) is provided by the United States Census Bureau and is an annual series that presents subnational economic data by industry. The CBP includes the number of establishments, employment during the week of March 12, first quarter payroll, and annual payroll. The CBP covers most of the country's economic activity based on establishments (United States Census Bureau 2011).

According to the 2010 CBP for New Jersey, the State had a total of 226,878 business establishments. The retail trade has the highest number of establishments in the State, making up 14.3% (32,053 establishments) of all businesses. Following retail trade is professional, scientific and technical services, making up 13.02% of all businesses (29,530 establishments). The third highest industry in 2011 was health care and social assistance, making up 11.65% (26,424 establishments) of all businesses. Table 4-11 provides the 2011 industry and employment information for the State of New Jersey.



Table 4-11. 2011 Economic Census for the State of New Jersey

Industry	Number of Establishments	Annual Payroll	Number of Employees*
Accommodation and food services	19,606	\$5,498,448.00	276,848
Administrative and support and waste management and remediation services	13,271	\$9,621,313.00	265,808
Agriculture, forestry, fishing and hunting	221	\$36,440.00	1,832
Arts, entertainment, and recreation	3,426	\$1,615,906.00	53,698
Construction	20,295	\$8,062,240.00	127,730
Educational services	3,392	\$3,434,977.00	95,866
Finance and insurance	12,085	\$18,383,353.00	188,812
Health care and social assistance	26,424	\$24,344,542.00	535,404
Industries not classified	282	\$6,273.00	250-499
Information	3,759	\$8,169,887.00	93,646
Management of companies and enterprises	1,358	\$15,591,994.00	127,459
Manufacturing	7,896	\$14,450,421.00	234,139
Mining, quarrying, and oil and gas extraction	85	\$89,378.00	1,206
Other services (except public administration)	22,856	\$4,134,060.00	144,659
Professional, scientific, and technical services	29,530	\$25,247,529.00	316,803
Real estate and rental and leasing	8,438	\$2,793,601.00	55,286
Retail trade	32,053	\$12,372,674.00	434,372
Transportation and warehousing	6,856	\$7,047,309.00	155,704
Utilities	403	\$1,956,242.00	18,639
Wholesale trade	14,642	\$20,650,799.00	249,652

Source: United States Census 2011

* This number only includes paid employees

4.3.1 Key Industry Clusters of New Jersey

There are six industry clusters that contribute to New Jersey’s economy and have statewide and regional importance. New Jersey, including the industry clusters, is located between New York City and Philadelphia; the State is located within a day’s drive of 40% of the United States population who purchase \$2 trillion in merchandise annually. They represent 61% of New Jersey’s total employment and approximately 64% of the total wages earned. Table 4-12 describes these industry clusters.

Table 4-12. New Jersey Industry Sector Employment and Wages (2011 Annual Averages)

Industry Cluster ^{1,2}	Employment	% of NJ Employment	Total Wages (billion)	% of NJ Wages
Bio/Pharma and Life Sciences	121,655	3.90%	\$15	8.10%
Finance	183,754	5.80%	\$20	11.00%
Manufacturing	251,454	8.00%	\$19	10.50%
Technology	311,869	9.90%	\$32	17.90%
Transportation, Logistics and Distribution	355,349	11.30%	\$24	13.20%
Health Care	426,178	13.50%	\$22	12.20%
All Cluster Industries³	1,466,584	45.8%	\$132	59.8%



Source: *New Jersey State Planning Commission 2012*

- 1 *Industry Cluster component industries are not mutually exclusive and therefore may be included in more than one Industry Cluster*
- 2 *Industry Cluster component industries do not include all New Jersey industry sectors*
- 3 *"All Cluster Industries" totals are the sum of all mutually exclusive component industries. That is component industries are only counted once in the "All Cluster Industries" totals. Therefore, the sum of individual industry cluster annual averages will not equal "All Cluster Industries" annual averages. In addition, the sum of individual industry cluster percentages of totals will not equal the "All Cluster Industries" percentage of total.*

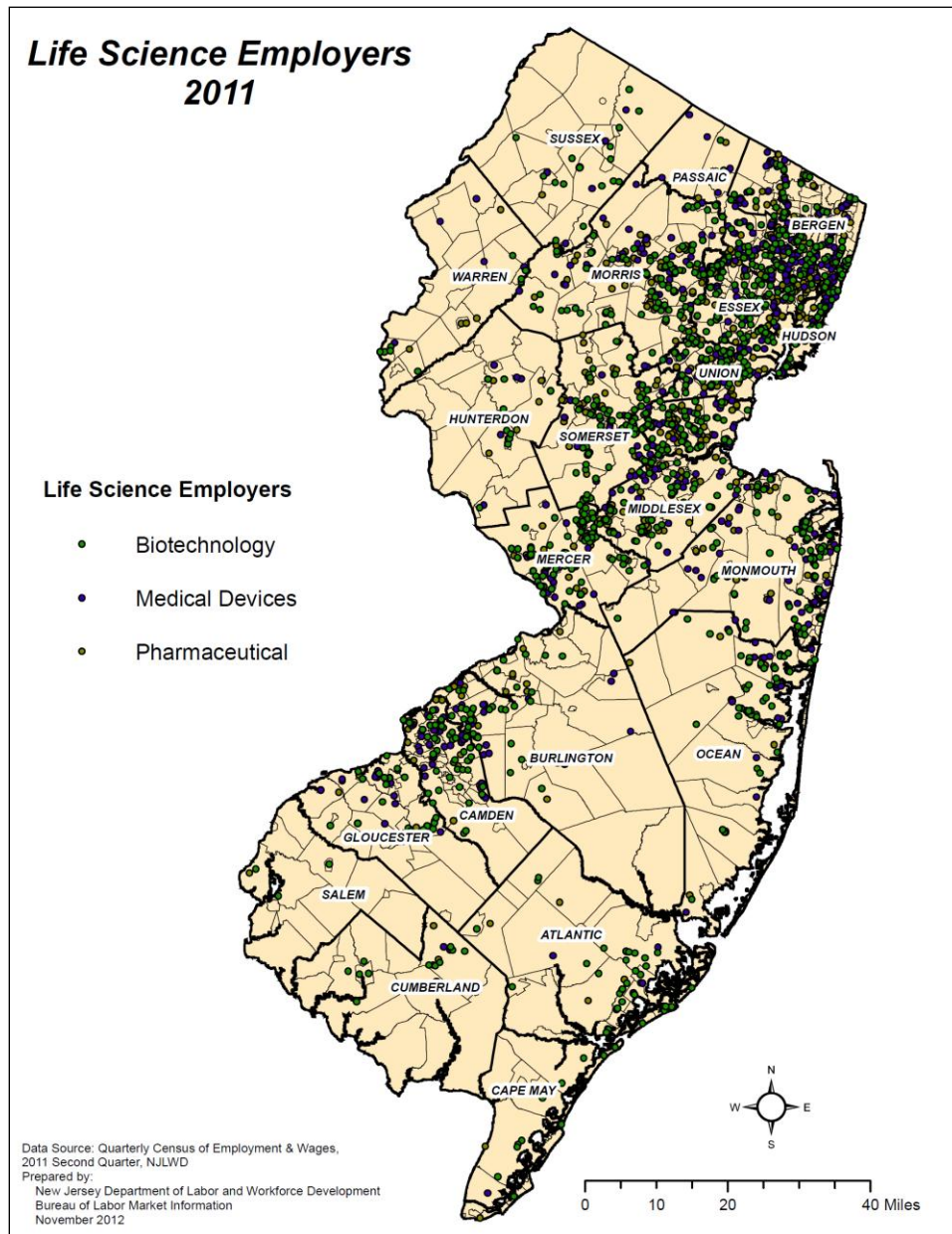
Bio/Pharmaceuticals and Life Sciences Industry Cluster

According to the Office for Planning Advocacy, New Jersey is "the world's medicine chest" and is home to 17 of the 20 largest pharmaceutical companies. New Jersey ranks third in bioscience venture capital investments and is home to more than 300 biotech companies. This industry cluster includes companies that produce medicinal products; make medical devices, manufacture equipment or supplies; and participate in research and development or analytical and diagnostics (PlanSmart NJ 2013).

In 2011, the bio/pharmaceutical life sciences employed 121,655 people, which comprise 3.9% of the State's private sector workers. This cluster is made up of three primary components: pharmaceutical sector (42.8%), biotechnology (35.7%) and medical device manufacturing (21.5%). From 2006 to 2011, the number of establishments in this cluster grew by 8.1%. Employers in the bio/pharmaceutical and life sciences cluster paid more than \$14.5 billion in wages during 2011. More than three-fifths of workers in this cluster hold at least a Bachelor's (31.2%), Master's/Professional (22.3%) or doctoral (8.2%) degree (New Jersey State Planning Commission 2012). Figure 4-10 illustrates the location of the bio/pharmaceutical and life sciences industry clusters throughout the State.



Figure 4-10. Bio/Pharmaceuticals and Life Sciences Employers in New Jersey, 2011



Source: New Jersey State Planning Commission 2012

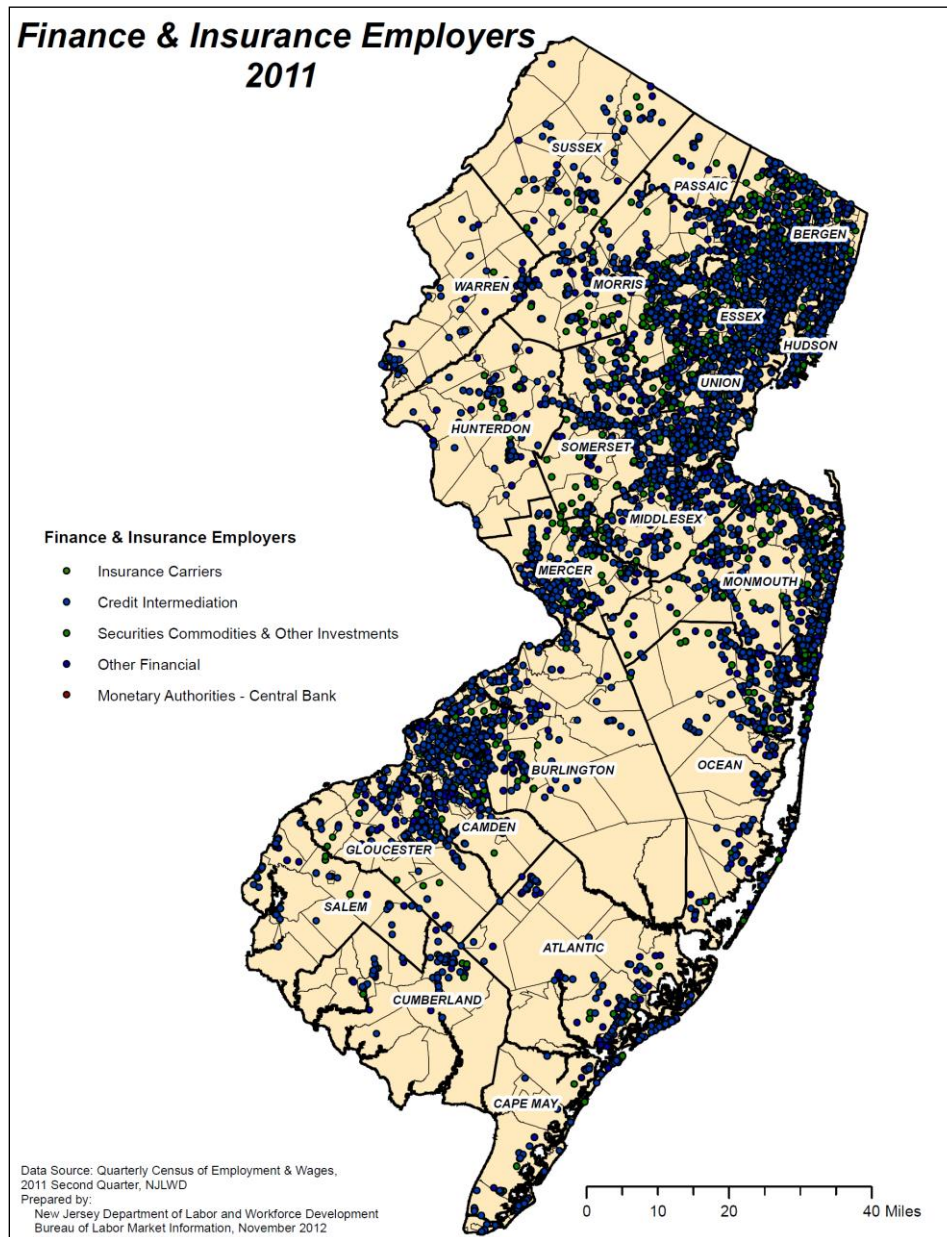
Financial Services Industry Cluster

The financial services industry cluster has a relatively small employment base (5.8% of total employment in 2011); however, the cluster contributed almost \$37 billion (approximately 9%) of the State's GDP in 2011. Sixteen of New Jersey's top 100 employers are finance and insurance firms whose combined employment represents 40% of jobholding in finance and insurance. The financial services industry relies heavily on information and technology. The State has remained in the forefront of technological advancement by becoming the national leader in developing data centers to support the industry. The Township of Edison, located in Middlesex County, has become home to one of the largest modular data centers in the world. In 2011, nearly \$19.7 billion was paid in total wages by New Jersey's employers in the financial services



industry. The greatest concentration of jobs within this industry cluster is found in Hudson County (18.3%) (New Jersey State Planning Commission 2012). Figure 4-11. illustrates the location of the financial services industry clusters throughout the State.

Figure 4-11. Financial Services Employers in New Jersey, 2011



Source: New Jersey State Planning Commission 2012

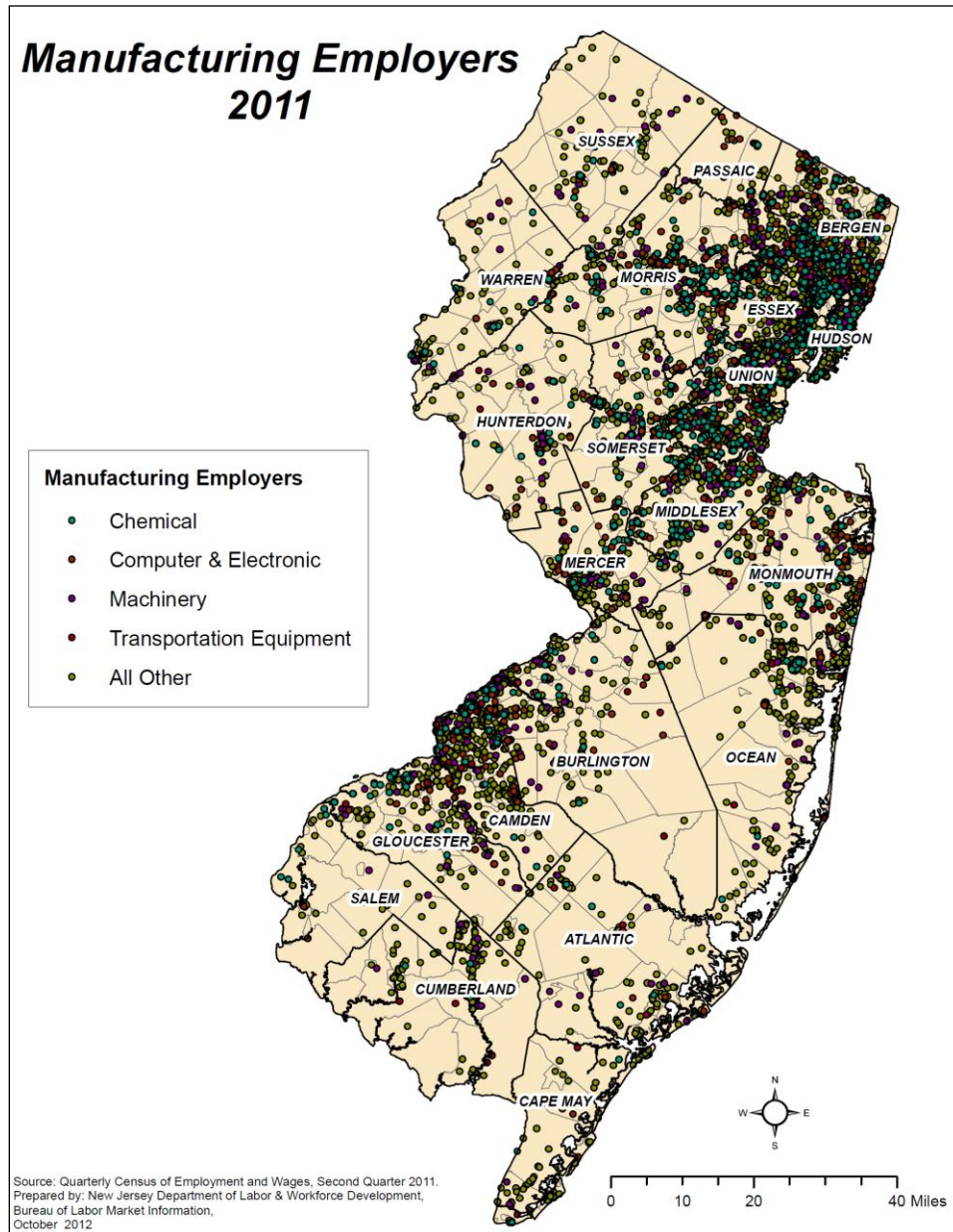
Manufacturing Industry Cluster

The manufacturing industry contributed over \$33.3 billion (8.7% of all state output) to New Jersey's GDP in 2011. Nearly 254,100 people were employed in 2011 in manufacturing industries in New Jersey, which represents approximately 7.9% of all private sector employment in the State. Chemical manufacturing industries employed almost 53,000 people in 2011 (21% of all manufacturing workers in the State). New



Jersey is home to 6.7% of all chemical manufacturing employment in the United States. The average annual wage earned by employees in the manufacturing industry exceeded \$75,000 in 2011, nearly 32% higher than the average annual wage for the total private sector (\$56,888). In 2011, the manufacturing industry cluster paid more than \$18.8 billion in wages (New Jersey State Planning Commission 2012). Figure 4-12 illustrates the location of the manufacturing industry clusters throughout the State.

Figure 4-12. Manufacturing Employers in New Jersey, 2011



Source: New Jersey State Planning Commission 2012



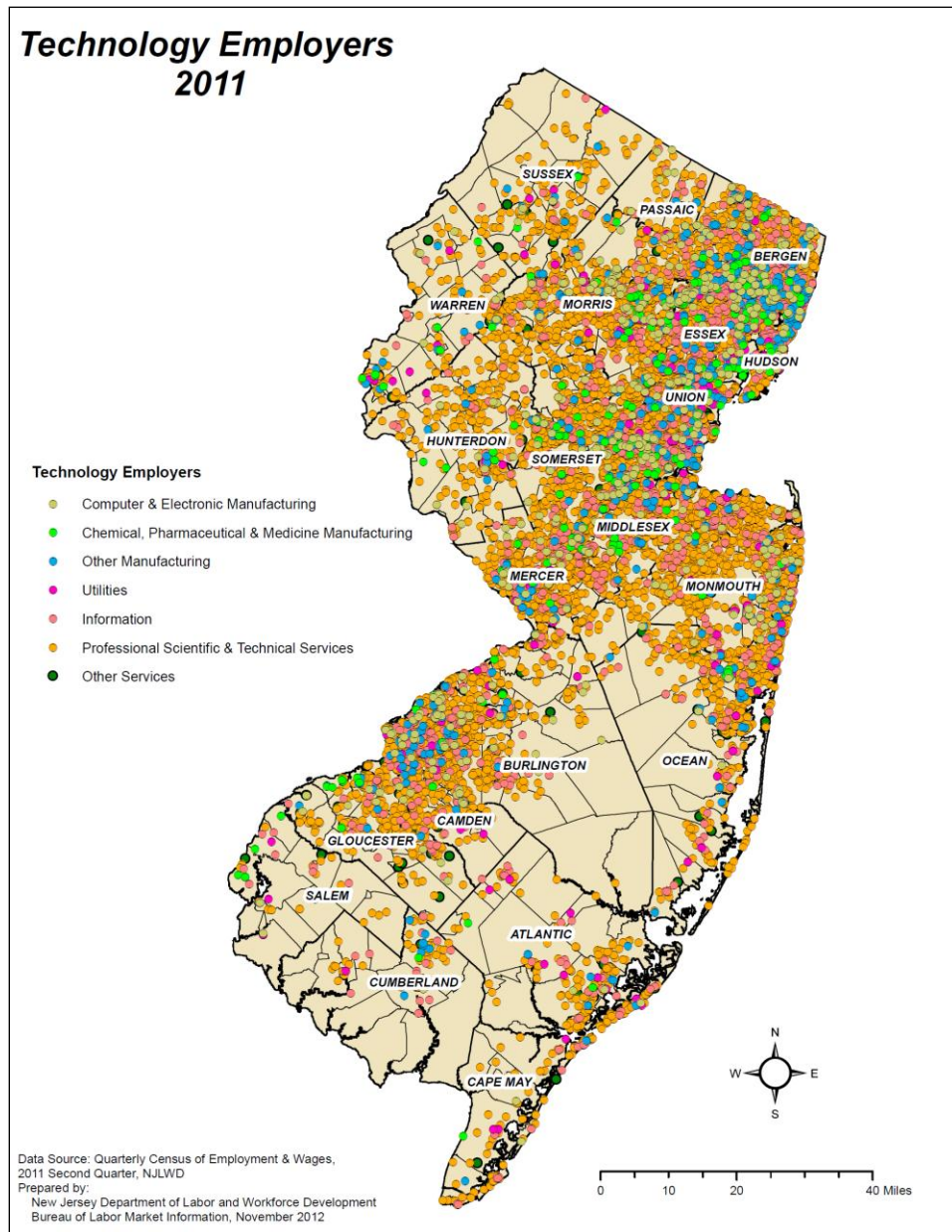
Technology Industry Cluster

The technology industry cluster includes those companies that are typically associated with the 21st century information and knowledge economy such as: data providers, processors, and hosts; Internet services; telecommunications; information technology; and IT research and development (PlanSmart NJ 2013).

In 2011, New Jersey's technology cluster accounted for 312,000 jobs (10%) of private sector employment statewide. Employment within the technology industry cluster can primarily be found within four industry sectors: utilities (3.6%), manufacturing (26.3%), information (15.6%), and professional, scientific and technical services (53.6%). This cluster is supported by an educated workforce, with over 80% of employees have some college or higher degree, and 63% having a Bachelor's degree or higher. In 2011, the annual average wage for the technology cluster was \$103,215 and employers paid over \$32 billion in wages (New Jersey State Planning Commission 2012). Figure 4-13. illustrates the location of the technology industry clusters throughout the State.



Figure 4-13. Technology Employers in New Jersey, 2011



Source: New Jersey State Planning Commission 2012

Transportation, Logistics, Distribution Industry Cluster

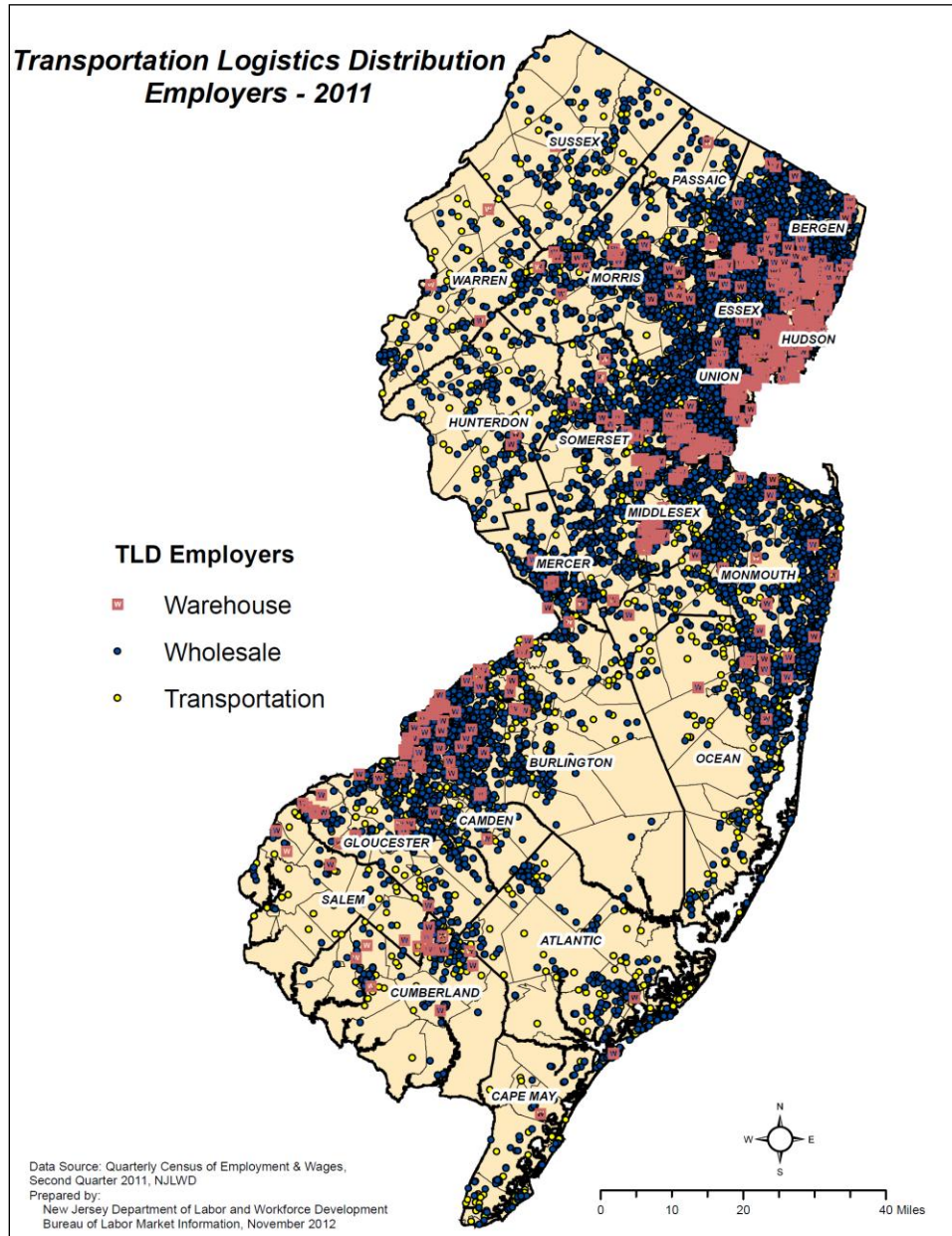
New Jersey is within a 24-hour drive of 40% of the United States population. The State has approximately 38,000 miles of roadway, 628 miles of passenger rail, 225 miles of commercial navigation channels, three commercial airports and 46 general airports. The Port of New York and New Jersey ranks third in the United States in terms of commerce statistics as calculated by the United States Army Corps of Engineers. In addition, New Jersey has more than 585 million square feet of warehousing space (PlanSmart NJ 2013).

In 2011, transportation, logistics and distribution (TLD) employed 355,349 workers in New Jersey. The cluster employed 11.3% of the State’s private sector workers. TLD contributed \$45.8 billion to the State’s



gross domestic product (GDP) in 2011. Employers in the TLD industrial cluster paid a total of \$24 billion in wages in 2011. New Jersey offers access to the nation’s freight rail network and is also home to several key transportation facilities necessary for a strong TLD industry cluster. This includes three major seaports and a large international airport. According to 2010 statistics from the United States Army Corps of Engineers, New Jersey’s shipping activity accounts for 6.6% of the United States’ tonnage of total cargo volume (New Jersey State Planning Commission 2012). Figure 4-14 illustrates the location of the TLD industry clusters throughout the State.

Figure 4-14. Transportation, Logistics, Distribution Employers in New Jersey, 2011



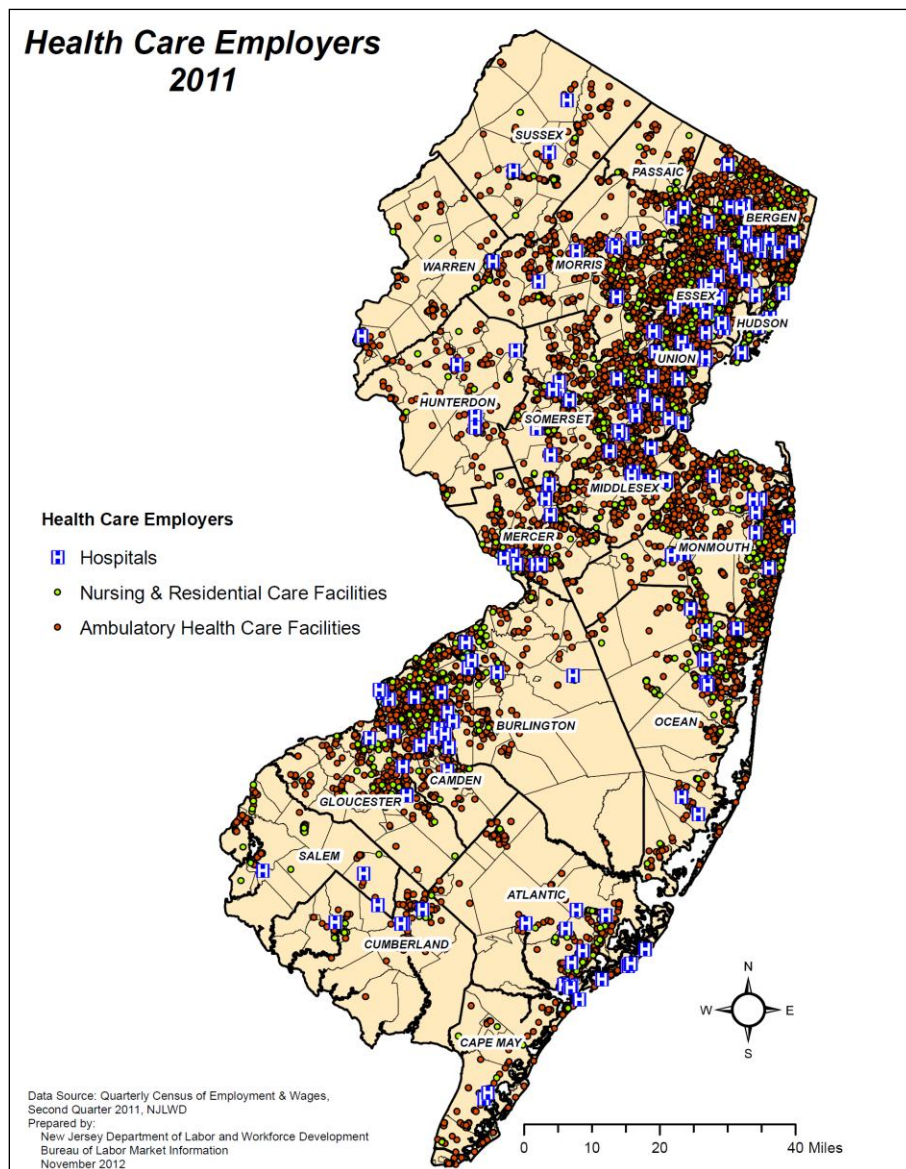
Source: New Jersey State Planning Commission 2012



Health Care Industry Cluster

The health care industry contributed \$30 billion to New Jersey’s GDP in 2010, or approximately 7% of all state output. Health care employment is found in three industry groups: ambulatory health care services (45%), hospitals (35%), and nursing and residential care facilities (20%). Between 1990 and 2011, the health care industry created 171,100 new jobs in New Jersey, while other industries, combined, had a net gain of 50,000 new jobs. Health care is the only industry that has added jobs in New Jersey every year since 1990, while increasing its share of jobholding from 7.5% in 1990 to 11.5% in 2011. The health care industry is projected to add more than 61,700 jobs in New Jersey between 2010 and 2020. In 2011, the health care industry paid more than \$21.9 billion in total wages in New Jersey (New Jersey State Planning Commission 2012). Figure 4-15 illustrates the location of the health care industry clusters throughout the State.

Figure 4-15. Health Care Employers in New Jersey, 2011



Source: New Jersey State Planning Commission 2012



PlanSmart NJ and the New Jersey Chamber of Commerce include two additional industry clusters in their report *What Will It Take to Support New Jersey's Industry Clusters?* These include the Tourism and Aerospace & Defense clusters.

Tourism Industry Cluster

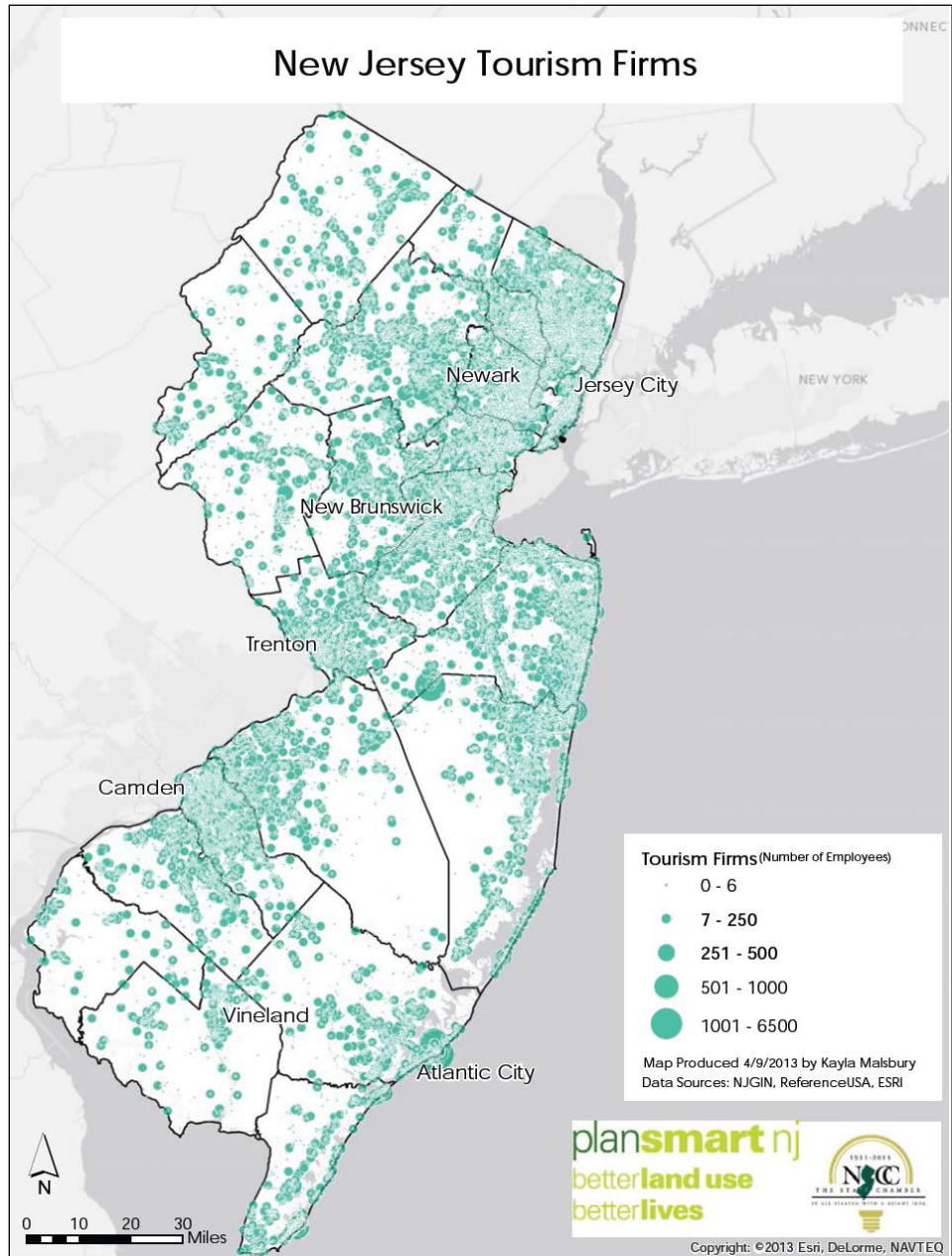
Tourism in New Jersey extends beyond the shore areas and exists in all corners of the State. In the northern region, tourists can ski and snowboard, or go whitewater rafting on the Delaware River. The Meadowlands was the site of the 2014 National Football League Super Bowl. Numerous art venues are located in Newark, Morristown, New Brunswick, and Red Bank. Throughout New Jersey, the wine tourism industry is growing, especially in the coastal plains of Atlantic and Cape May Counties (PlanSmart NJ 2013). Figure 4-16 shows the location of the tourism firms in New Jersey.

The economy of the tourism industry clusters includes direct, indirect, and induced impacts, generated gross domestic product (GDP) of \$34.7 billion in 2012 and accounted for 7% of the State's entire economy. Tourism spending directly supports 318,560 jobs in the State and 503,000 jobs including indirect and induced impacts. All sectors of the State's economy benefit from tourism activity. Tourism is the third largest industry in New Jersey. Beach tourism in Atlantic, Cape May, Monmouth, and Ocean Counties, and arts and cultural tourism are nationally-recognized parts of the State's tourism industry. New Jersey generates millions of dollars in revenue annually, supporting local and regional hospitality, retail and food industries (Division of Travel & Tourism 2013).

Leisure, hospitality, and retail (LHR) is composed of four components: retail trade (56.8% of employment), food services/drinking places (29%), accommodation (7.4%) and arts/entertainment/recreation (6.9%). Many of the businesses within LHR directly and indirectly support the State's tourism industry. The LHR industry contributed \$43.4 billion to New Jersey's GDP, or approximately 8.9% in 2010. Over 28.1% of all employment in the LHR cluster is concentrated in three counties: Bergen, Monmouth, and Middlesex. Atlantic County ranks fourth for LHR due mainly to the presence of its casino hotel industry. Over half of private sector employment in Atlantic (55.5%) and Cape May (54.2%) Counties are concentrated in the LHR industry cluster. In 2011, the LHR industry employed 772,680 people, accounting for 24.5% of the State's private sector employment. LHR employers paid more than \$20 billion in wages during 2011 (New Jersey State Planning Commission 2012).



Figure 4-16. Tourism Firms in New Jersey



Source: PlanSmart NJ 2013

Aerospace and Defense Industry Cluster

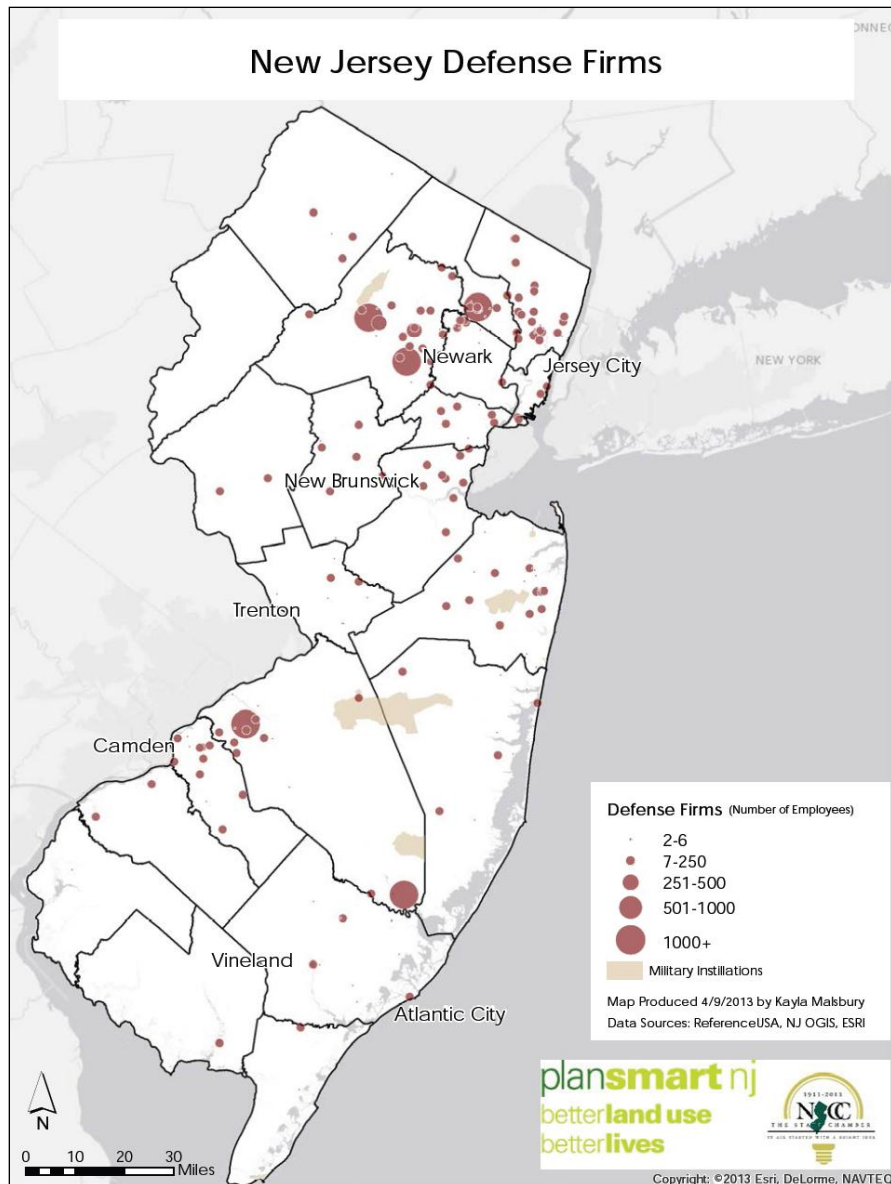
The aerospace and defense industry cluster (a subset of the technology industry cluster) is made up of businesses manufacturing weapons, guidance systems, and military armored and aeronautical craft. In 2011, this industry employed 11,957 workers outside of military installations. In 2009, there were 21,890 Department of Defense personnel in New Jersey. In March 2012, a financial and economic impact study of the industry in the United States was performed by Deloitte. It estimated that 70,797 workers were employed in direct, indirect, and induced employment in the aerospace and defense industry in New Jersey. When compared to the rest of the country, New Jersey ranks sixteenth in volume of direct employment in this



industry cluster. New Jersey ranks sixth in the nation for wages in this industry, with the average wage at \$93,310. The \$5.4 billion in revenues within this cluster generated \$28.5 million in business income and gross receipts taxes, as well as \$50.7 million in state individual income tax. In 2010, this industry contributed 1.12% to the state GDP, creating \$1.5 billion in exports and \$1.2 billion in imports (PlanSmart NJ 2013). Figure 4-17 shows the location of aerospace and defense firms in New Jersey.

The partnership between the State and the national and homeland security sectors is substantial and mutually beneficial. Many of the military and civilian jobs related to military and homeland security installations in New Jersey are technology, advanced manufacturing, and logistics related. These sectors contribute to an estimated \$4 billion in income to State residents (New Jersey Department of State 2011).

Figure 4-17. Aerospace and Defense Firms in New Jersey



Source: PlanSmart NJ 2013



4.3.2 Other Key Industries in New Jersey

Other than the eight industry clusters, New Jersey has other key economies that provide additional growth opportunities for the State. These include the following:

- Green Energy Economy – The State of New Jersey is ranked second in the country for installed solar, with 689 megawatts (MW) as of February 29, 2012, powering over 14,000 homes and businesses. Over 200 solar energy businesses contribute an estimated 3,000 jobs to the local economy. The State has invested in the redevelopment of ports to enable “build-to-suit” manufacturing and supply chain facilities that could complement other advanced manufacturing, technology, and transportation sectors.
- Farming, Fishing and Food Economy – New Jersey has more than 10,000 farms, which produce \$1 billion worth of products each year. Food production and processing contribute approximately \$2 billion annually to the State’s economy. Agricultural producers in the State help maintain over half of New Jersey’s remaining unrestricted land. New Jersey’s commercial and recreational fishing industries include five large ports (Atlantic City, Barnegat Light, Belford, Cape May, and Point Pleasant) and smaller ports and inlets that span the entire shoreline. These allow for easy access to fishery resources.
- The United States Bureau of Economic Analysis estimates that the total state product for New Jersey in 2012 was \$508 billion. In terms of median income, four of New Jersey’s counties are in the top 25 wealthiest counties in the nation. (United States Census American Community Survey 2013).

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 United States Superfund sites in the nation, 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. This has, to a large extent, reversed New Jersey's onetime role as a suburb for commuters to New York City and Philadelphia.

4.4 Agriculture

According to the 2007 Census of Agriculture, New Jersey had a total of 10,327 farms and 733,450 acres in farmland. The average size of New Jersey farms was 71 acres. Crop sales totaled \$851,653,000, or 86% total market value of products sold. Livestock sales totaled \$135,233,000, 14% total market value of products sold (United States Department of Agriculture [USDA] 2007a). Hunterdon County had the largest number of farms out of all the counties in New Jersey, as shown in Table 4-11, followed by Sussex County. Hunterdon County also had the largest amount of land in farms with 100,027 acres, while Salem County had the highest average farm size. Refer to Table 4-13.



Table 4-13. 2007 Census of Agriculture for New Jersey, by County

County	Number of Farms	Agricultural Land (acres)	Average Farm Size (acres)	Median Size of Farm (acres)
Atlantic	499	30,372	61	19
Bergen	89	1,177	13	6
Burlington	922	85,790	93	15
Camden	225	8,760	39	14
Cape May	201	7,976	40	15
Cumberland	615	69,489	113	27
Essex	13	184	14	10
Gloucester	669	46,662	70	15
Hudson	N/A	N/A	N/A	N/A
Hunterdon	1,623	100,027	62	19
Mercer	311	21,730	70	22
Middlesex	236	18,717	79	12
Monmouth	932	44,130	47	11
Morris	422	17,028	40	13
Ocean	255	9,833	39	11
Passaic	103	1,981	19	10
Salem	756	96,530	127	28
Somerset	445	32,721	74	20
Sussex	1,060	65,242	62	20
Union	15	128	8	6
Warren	933	74,975	80	22
Statewide Total	10,327	733,450	71	17

Source: USDA 2007b
 N/A Not applicable

The most recent agricultural data for New Jersey is from 2012. According to the 2012 data, New Jersey had 10,200 farms totaling 730,000 acres, a slight decrease from the 2007 figures. Farm size in New Jersey averages 72 acres (USDA 2013).

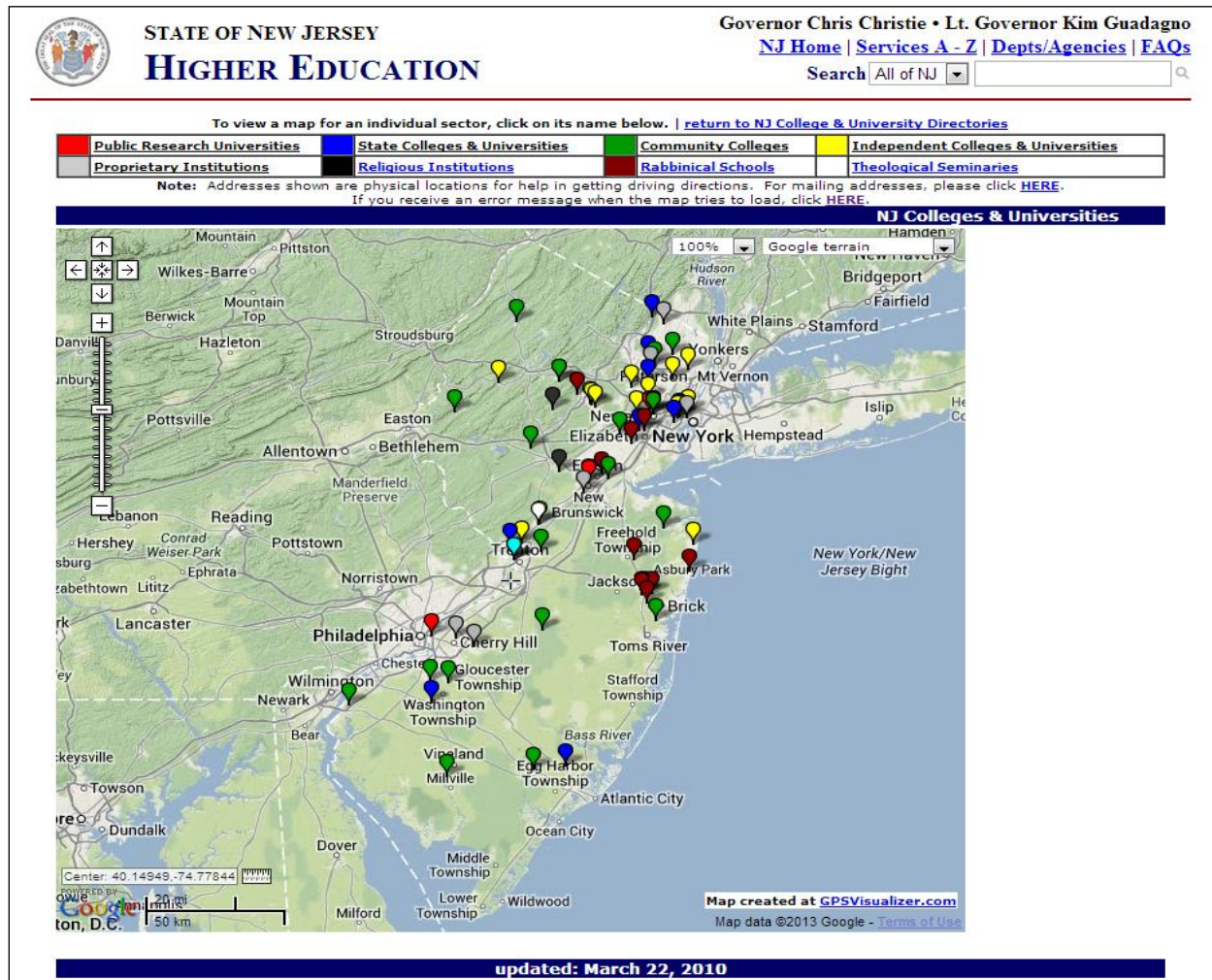
New Jersey is a leading State in agricultural income per acre. The scrub pine area of the southern inland region is used for cranberry and blueberry culture. North and west of the pine belt, the soil is extremely fertile and supports a variety of crops, most notably potatoes, corn, hay, peaches, and 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 now almost one third of New Jersey is developed.



4.5 Education

According to the 2010 Census, 87.6% of the State’s population received a high school diploma, based on persons age 25 and older. Approximately 35% of the State’s population (age 25 and older) have a Bachelor’s degree or higher. The State is home to 1,866 public elementary schools, 398 public secondary schools, 132 private high schools, 20 four-year colleges, 21 two-year colleges, four medical schools, a dental school, and several theological colleges (State of New Jersey 2013). Figure 4-18 shows the location of the higher education facilities in New Jersey.

Figure 4-18. State of New Jersey Higher Education Facilities



Source: State of New Jersey Higher Education 2010

New Jersey has long been recognized as a state rich in talent and educational opportunities. There are approximately 4.6 million people in the labor pool, with approximately 1.7 million individuals holding college degrees. New Jersey is ranked sixth in the nation for managerial, professional, and technical jobs. The State is ranked seventh in the nation in the number of Ph.D. scientists and engineers per 1,000 workers. New Jersey is among the top 10 states for the attainment of Bachelor degrees in the population ages 25 to 44. It is sixth in the nation for residents with an advanced degree. New Jersey’s higher education system is composed of 57



universities, colleges and technical schools, which award over 75,000 degrees each year (New Jersey State Planning Commission 2011).

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

- Princeton University is the fourth oldest college in the United States and was established in 1746. Princeton's Nassau Hall was the temporary capitol of the United States in 1783. Today, there are 1,177 faculty members, 5,264 undergraduates, and 2,648 graduate students (Princeton University 2013).
- Rutgers has more than 65,000 students and is one of the nation's major public institutions for higher education. Founded in 1766, the university has a unique history as a colonial college, a land-grant institution, and a state university. The University offers over 100 undergraduate majors and more than 200 graduate programs and degrees (Rutgers University 2013).

Other colleges and universities can be found on line at: http://www.nj.gov/highereducation/colleges/schools_alfa.htm

4.6 Land Use and Development

New Jersey is the most developed state in the United States, with large portions of land that are either protected open space or part of one of the three regional planning areas: the Pinelands, Highlands, and Meadowlands (New Jersey Future 2011).

According to the 2006 report "The Future of the New Jersey Economy", New Jersey has experienced three main stages of economic development and land use. The first stage was characterized by the development of a few large cities, including Newark and Camden, and numerous independent and sometimes isolated small, rural towns. The economy was largely agriculture based with some natural resource extraction activities. A network of arterial roads connected these towns between New York City and Philadelphia (PlanSmart NJ 2011).

The second stage started in the 1930s, when the economy was driven by urban industrial centers, later shifting to manufacturing and technological innovation laboratories. After World War II, New Jersey developed rapidly through suburban expansion outward from its urban centers. This was largely aided by the construction of super highways that facilitated circulation in and out of these centers. The suburban growth coincided with the creation of the Northeast Corridor, large investments in the interstate highway system connecting Washington D.C. to Boston, and the development of the rail system in the second half of the 20th century. The construction of the urban beltways crossing the new and existing freeways and transit lines further pushed development out of the urban cores. Employment centers followed the construction of these loops (PlanSmart NJ 2011).

The third stage is characterized by an interconnected 'lattice-like' networking linking urban and suburban centers. The expansion of the transportation networks in the 1980s (Interstates 287, 280 and 80, and Garden State Parkway) defined the shift in the provision of economic functions, decentralizing development and dispersing employment, housing, retail, health, cultural, and recreational activities throughout the State. Eighty percent of all office space in New Jersey was constructed in the 1980s. The service sector grew from this expansion of office space inventory, built up in central-northern New Jersey (PlanSmart NJ 2011).

Since 1950, thousands of acres of rural and agricultural lands have been converted to sprawling subdivisions, contributing to increased housing prices in the State (New Jersey Planning Commission 2001). Beginning in



the 1950s through the early 2000s, New Jersey had a shift in its development pattern spurred in part by generational demographics. This led to decay and decline in many of the urban areas around New Jersey through the 1990s.

Since the mid-2000s there has been growing demand for housing in urban centers like Jersey City and Hoboken spurred by the emergence of the millennial's demand for housing. This has led to the redevelopment of many of the urban cores and revitalization of many of the state's older cities. This trend of urbanized living with proximity to a diversity of cultural activities and public transportation options has also enticed older generations like the baby boomers to urban centers further increasing the demand for housing in these areas. The continued redevelopment of the state's urban centers will likely remain an important component of the future development of the state.

4.6.1 Urbanization

New Jersey is highly urbanized. The State has 26 urban areas. Of those 26, 10 are urbanized areas and 16 are urban clusters. New Jersey also has seven metropolitan statistical areas (MSA), five metropolitan divisions, and two combined statistical areas. A majority of the State's population is concentrated in the New York-Northern New Jersey-Long Island, NY-NJ-PA and Philadelphia-Camden-Wilmington, PA-NJ-DE-MD MSAs (United States Census 2013).

Rowan and Rutgers universities have studied New Jersey's urban growth and land use change. This 2010 study looked at data between 1986 and 2007. Between 1986 and 2007, New Jersey's land development rate was nearly twice as fast as its population growth rate. There was a 7% increase in development rate, converting approximately 16,061 acres to urban use each year by 2007. This is up from the previous rate of 15,123 acres per year between 1995 and 2002. Between 2002 and 2007, the per capita consumption of land for each person was 0.76 acres (33,311 square feet) per person (Hasse and Lathrop 2010).

The sprawling development patterns in New Jersey have led to the loss of important land resources. During the 20 years of the schools' study, New Jersey lost substantial amounts of agricultural lands, wetlands, and forests. Forest loss has been so significant during this time period that by 2007, urban land had surpassed forest land as the most prominent land type covering the State (30% of the State's total land area was urbanized). As of 2007, New Jersey had more acres of subdivisions and shopping centers than it has of upland forests, including forests in the Pinelands and all of New Jersey's parks and reserves combined (Hasse and Lathrop 2010).

The study also showed that the land category that lost the greatest number of acres was forest. Approximately 42,452 net acres (66.3 square miles) of forest lands were lost statewide between 2002 and 2007. Of these 42,452 acres, 38,823 acres were lost specifically due to urbanization. Between 1986 and 2007, New Jersey lost a net of 114,921 acres (180 square miles) of upland forest, representing a 7% loss (Hasse and Lathrop 2010).

The rate of agricultural land loss has declined over the same period of time, from 9,485 acres per year (1986-1995), to 7,933 acres per year (1995 to 2002), to 5,730 acres per year (2002 to 2007). This trend is closely related to less farmland consumed by urbanization and less farmland being abandoned and allowed to regenerate to forest. Wetlands also continued to be lost due to urban growth with the net acreage of wetlands loss totaling 8,652 acres statewide between 2002 and 2007 (Hasse and Lathrop 2010).

As discussed above, the growing demand for housing in urban areas along with the generational demand for urbanized living stimulating redevelopment of existing urban areas may help ease the outward expansion of urbanized land uses.



Impervious Surfaces

The construction of impervious surfaces is one of the more significant landscape impacts attributed to urbanization. Impervious surfaces are areas of the earth that have been covered by any material that impedes the infiltration of water into the soil. Concrete, asphalt, rooftops, and even severely compacted areas of soil are considered impervious (Hasse and Lathrop 2008).

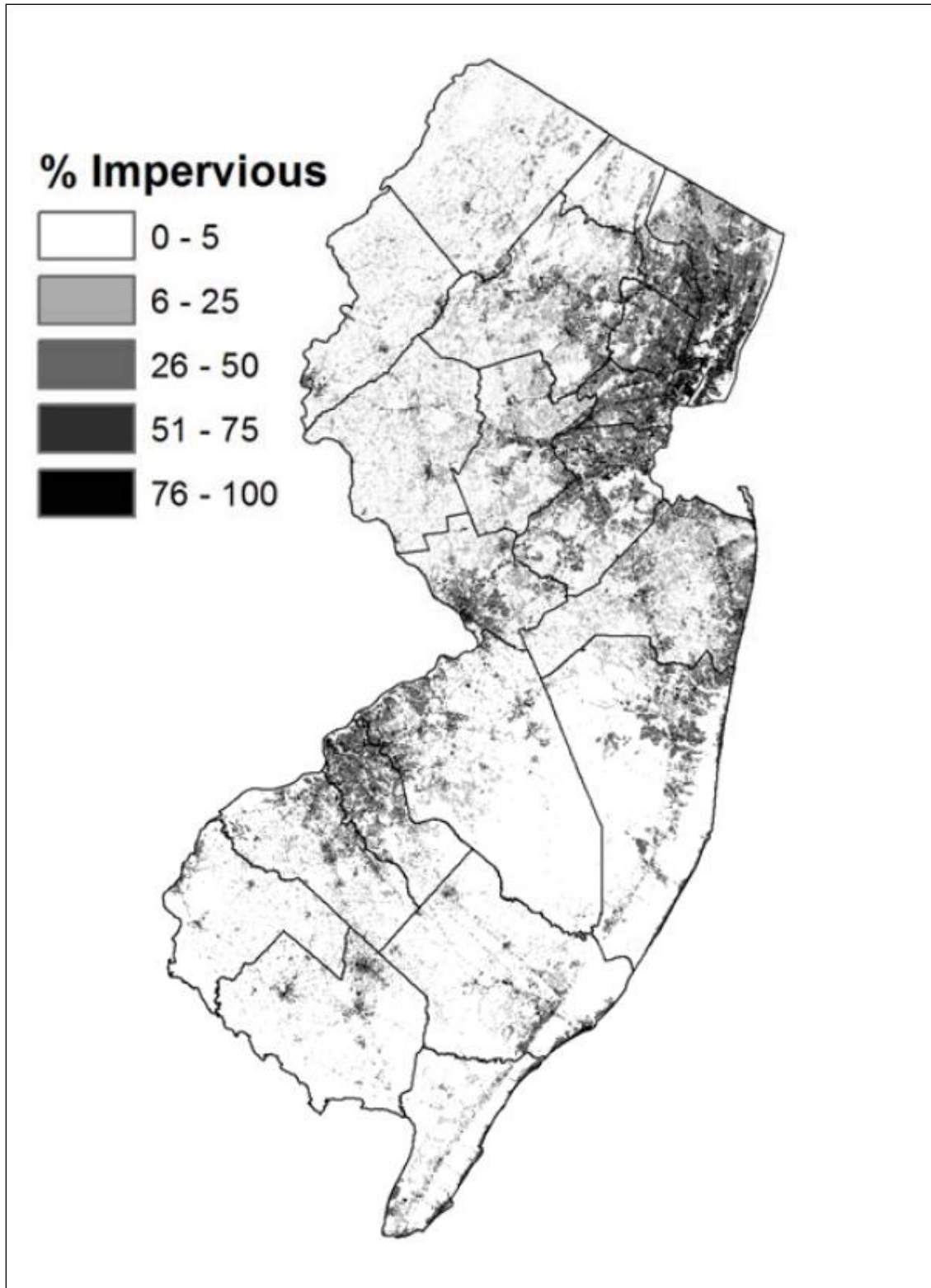
In nature, water is constantly moving between the atmosphere, groundwater aquifers, lakes, and rivers. When land becomes developed, impervious surface cover is created. The creation of this impervious surface changes the natural hydrologic cycle and decreases the amount of groundwater recharge and increases the amount of stormwater runoff. This can cause depletion of groundwater resources and flooding of local streams and rivers. Impervious surfaces can also cause stormwater to carry non-point source pollution directly into storm drains that empty to local waterbodies. Stormwater runoff can erode streambanks and cause siltation of the downstream waterbodies (Hasse and Lathrop 2008).

Water quality and environmental conditions of a watershed are related to the amount of impervious surface within the watershed. Watersheds with less than 10% impervious surface cover are typically considered not impacted. At levels greater than 10% of impervious surface, watersheds show signs of impact. As impervious surface reaches 30% and greater, water quality has typically become seriously degraded. As of 2002, it was estimated that 490,000 acres (10%) of impervious surface cover New Jersey. Figure 4-19 illustrates the impervious surface conditions in New Jersey (Hasse and Lathrop 2008).

Figure 4-20 illustrates the impervious surface conditions for the watersheds of New Jersey. Ten watersheds, representing 6.4% of watershed area, currently have 30% or greater impervious surface cover. These watersheds are located in the highly urban areas of New Jersey, adjacent to New York City and Philadelphia. Forty watersheds, representing 1,372,189 acres of New Jersey's waterland area have between 10% and 29.9% impervious surface cover. Twenty-nine watersheds, representing 1,006,060 acres of New Jersey's watershed area have between five and 9.9% impervious surface cover. The remaining 73 watersheds, representing 3,015,159 acres of watershed area, have less than 5% impervious surface cover.



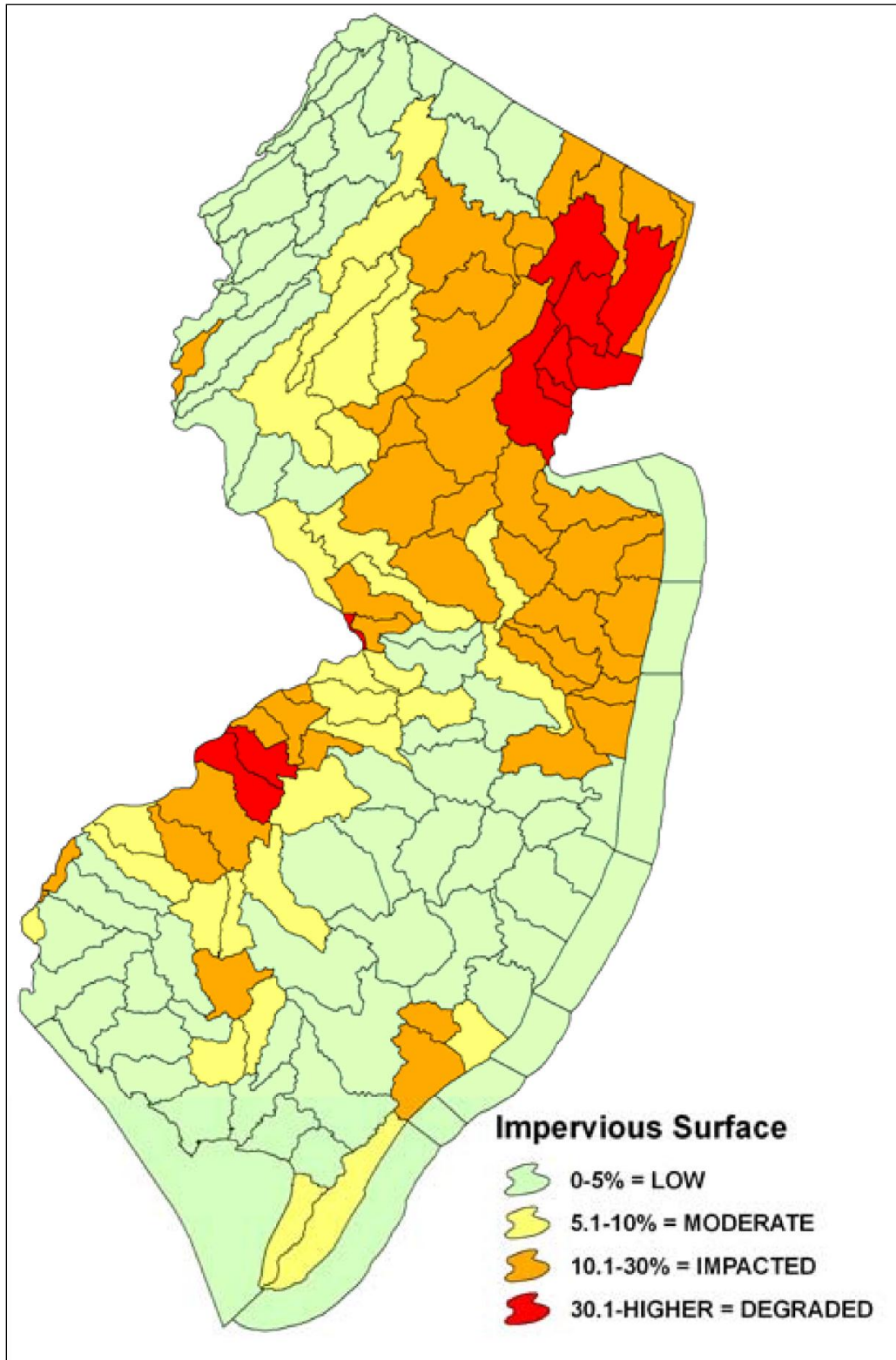
Figure 4-19. Impervious Surface Conditions for New Jersey



Source: Hasse and Dornisch 2009



Figure 4-20. Impacted and Degraded Watersheds by Impervious Surface Cover



Source: Hasse and Dornisch 2009



4.6.2 Building Permits in New Jersey

Local construction officials issue building permits for new construction, additions, and alterations. New construction permits are for new buildings. Permits for additions authorize work that adds space to an existing structure. Alterations also are for renovation work on existing buildings, but no new space is added. Examples of alterations includes tenant fit ups, new roofs, and repairs to existing structures (New Jersey Department of Community Affairs [NJDCA] 2013).

Table 4-14 and Figure 4-21 show the number of housing units authorized by building permits for 2010, 2011, and 2012. Between 2010 and 2011, New Jersey saw a decrease in the number of building permits for housing units. Between 2011 and 2012, New Jersey experienced an increase in the total number of building permits. In particular, Hudson and Somerset Counties experienced a large increase in permits between 2011 and 2012. Bergen, Hudson, and Ocean Counties had the largest number of issued permits between 2010 and 2012 (New Jersey Department of Community Affairs 2013). Hudson, Essex, and Union Counties have seen the highest increase of housing development since 2011 and a substantial amount of that housing is multi-family housing. This is indicative of general increase in demand for housing in the urban centers of the state in the last few years.

Table 4-14. Housing Units Authorized by Building Permits, by County

County	2010	2011	2012	Total
Atlantic	444	372	420	1,236
Bergen	879	1,903	2,054	4,836
Burlington	418	546	488	1,452
Camden	332	493	539	1,364
Cape May	432	445	517	1,394
Cumberland	201	144	133	478
Essex	419	465	885	1,769
Gloucester	643	517	470	1,630
Hudson	901	1,446	2,604	4,951
Hunterdon	97	74	91	262
Mercer	648	422	447	1,517
Middlesex	1,642	958	1,087	3,687
Monmouth	806	806	1,034	2,646
Morris	400	421	605	1,426
Ocean	1,768	1,455	1,517	4,740
Passaic	380	344	327	1,051
Salem	63	54	58	175
Somerset	575	469	1,060	2,104
Sussex	95	67	129	291
Union	649	347	744	1,740
Warren	93	134	61	288
State buildings	0	0	0	0
Statewide Total	11,885	11,882	15,270	39,037

Source: NJDCA 2013



Figure 4-21. Housing Units Authorized by Building Permits, by County

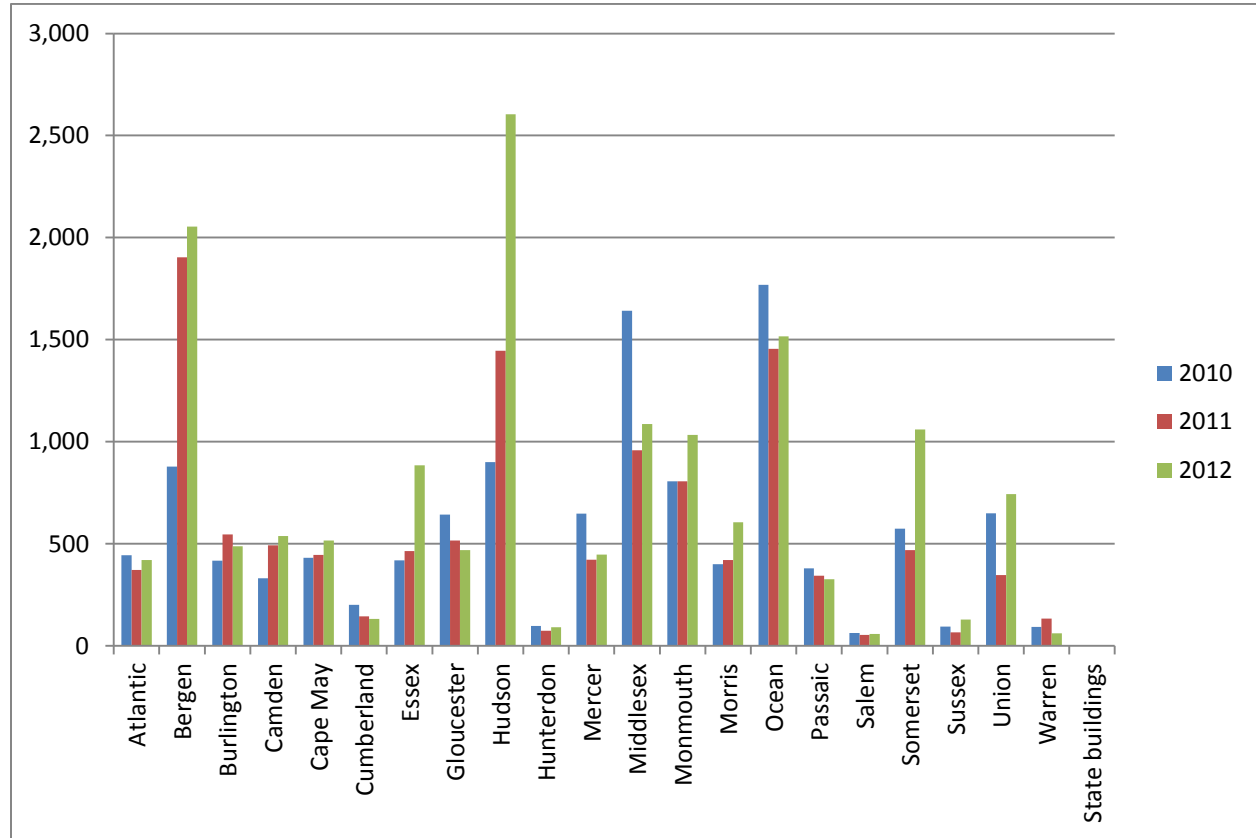


Table 4-15 and Figure 4-22 show the number of housing units authorized by building permits for new construction in 2010, 2011, and 2012. Between 2010 and 2012, New Jersey experienced an increase in the number of building permits for new construction of housing units. Hudson County experienced a large increase in permits between 2011 and 2012. Bergen, Hudson, and Middlesex counties had the largest numbers of authorized building permits for new construction between 2010 and 2012.

Table 4-15. Housing Units Authorized by Building Permits for New Construction, by County

County	2010	2011	2012	Total
Atlantic	435	362	412	1,209
Bergen	832	1,896	1,925	4,653
Burlington	408	539	481	1,428
Camden	323	487	532	1,342
Cape May	424	427	499	1,350
Cumberland	178	133	117	428
Essex	407	375	882	1,664
Gloucester	634	515	469	1,618
Hudson	898	1,442	2,581	4,921
Hunterdon	91	74	90	255
Mercer	645	419	445	1,509
Middlesex	1,639	943	1,080	3,662



Table 4-15. Housing Units Authorized by Building Permits for New Construction, by County

County	2010	2011	2012	Total
Monmouth	791	791	964	2,546
Morris	393	420	602	1,415
Ocean	1,743	1,426	1,496	4,665
Passaic	319	335	325	979
Salem	61	53	57	171
Somerset	574	469	1,058	2,101
Sussex	92	66	128	286
Union	529	347	731	1,607
Warren	93	132	61	286
State buildings	0	0	0	0
Statewide Total	11,509	11,651	14,935	38,095

Source: NJDCA 2013

Figure 4-22. Housing Units Authorized by Building Permits for New Construction, by County

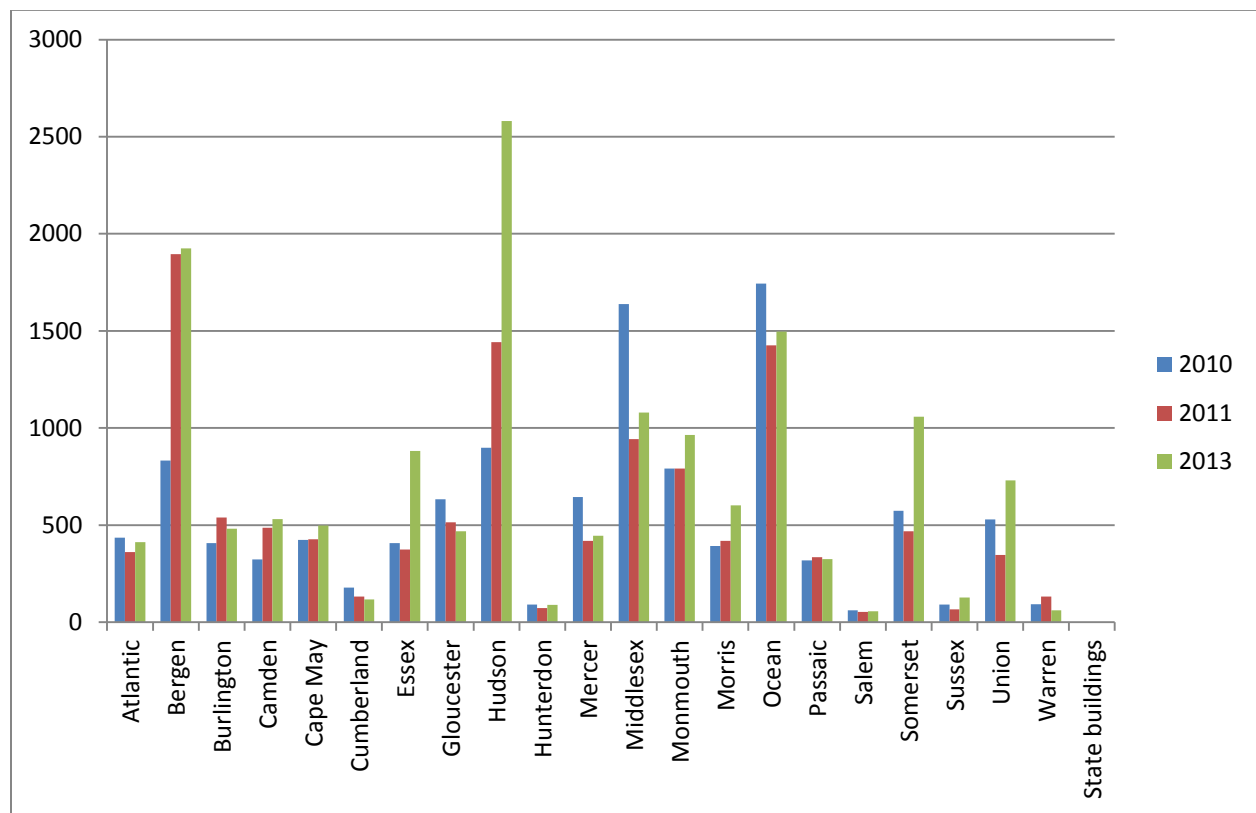


Table 4-16 and Figure 4-23 show the total housing units, by county, and the total number of housing units gained between 2010 and 2012. Bergen County maintained the largest number of housing units in the State, followed by Essex and Middlesex counties. Middlesex County experienced the highest gain in housing units. Overall, New Jersey gained a total of 18,688 housing units between 2010 and 2012.



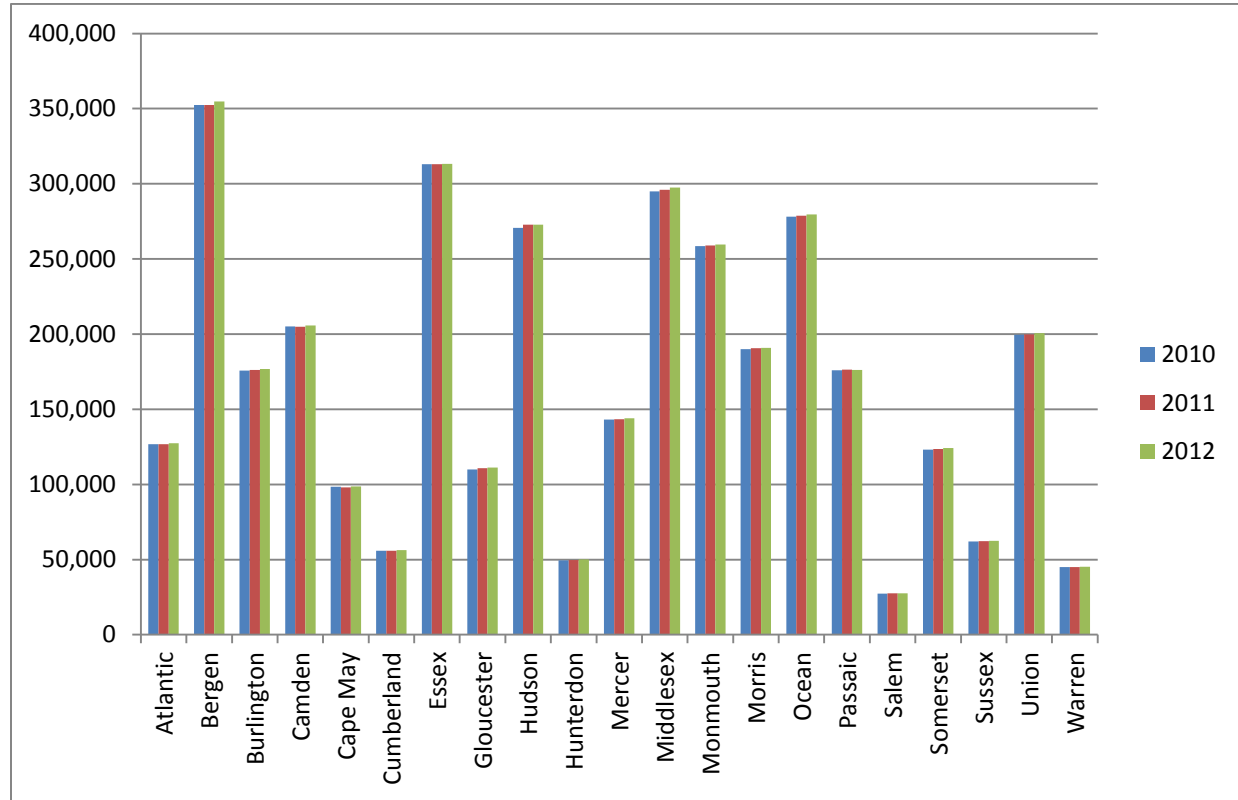
Table 4-16. Housing Units in New Jersey by County, 2010 to 2012

County	2010	2011	2012	Number of Housing Units Gained 2010 to 2012	% Change 2010 to 2012
Atlantic	126,746	126,782	127,360	614	0.48%
Bergen	352,497	352,478	354,671	2,174	0.62%
Burlington	175,781	176,098	176,875	1,094	0.62%
Camden	205,067	204,923	205,706	639	0.31%
Cape May	98,361	98,017	98,649	288	0.29%
Cumberland	55,883	55,921	56,227	344	0.62%
Essex	313,091	312,952	313,356	265	0.08%
Gloucester	109,991	110,814	111,155	1,164	1.06%
Hudson	270,677	272,798	272,827	2,150	0.79%
Hunterdon	49,544	49,724	50,034	490	0.99%
Mercer	143,216	143,390	144,029	813	0.57%
Middlesex	295,010	296,076	297,505	2,495	0.85%
Monmouth	258,581	258,987	259,618	1,037	0.40%
Morris	189,937	190,659	190,740	803	0.42%
Ocean	278,189	278,862	279,549	1,360	0.49%
Passaic	176,018	176,264	176,102	84	0.05%
Salem	27,441	27,464	27,579	138	0.50%
Somerset	123,211	123,487	124,285	1,074	0.87%
Sussex	62,090	62,265	62,427	337	0.54%
Union	199,580	199,684	200,593	1,013	0.51%
Warren	44,959	44,908	45,271	312	0.69%
Statewide Total	3,555,870	3,564,917	3,574,558	18,688	0.53%

Source: NJDCA 2013



Figure 4-23. Housing Units in New Jersey by County, 2010 to 2012



These tables and figures show development has continued throughout New Jersey. The areas experiencing the largest increase in new housing development are the areas that have experienced an overall increase in population.

Table 4-17 lists the number of permits issued for both residential and non-residential construction in New Jersey for 2010, 2011, and 2012. Both residential and non-residential construction experienced a gradual growth in issued permits between 2010 and 2012.

Table 4-17. Issued Building Permits by Use, 2010 to 2012

	2010	2011	2012	Total
Residential				
One and Two Family	286,019	298,139	309,948	894,106
Multifamily	21,549	19,706	21,517	62,772
Residential Total	307,568	317,845	331,465	956,878
Non-Residential				
Hotels, motels, guest houses	905	888	926	2,719
Assembly	5,832	6,106	5,903	17,841
Business / Office	26,405	28,145	27,805	82,355
Education	2,547	2,714	2,765	8,026
Hazardous uses	76	93	72	241
Industrial	786	827	806	2,419



Table 4-17. Issued Building Permits by Use, 2010 to 2012

	2010	2011	2012	Total
Institutional	1,075	1,054	938	3,067
Retail	4,934	5,227	5,215	15,376
Storage	2,202	2,220	2,133	6,555
Signs, fences, miscellaneous	30,313	29,602	29,889	89,804
Non-residential Total	75,075	76,876	76,452	228,403
Issued Permit Total for State	382,643	394,721	407,917	1,185,281

Source: NJDCA 2013

4.6.3 New Jersey Office for Planning Advocacy and the State Plan

The New Jersey State Development and Redevelopment Plan

In 1985, the approval of the State Planning Act (SPA) (NJSA 52:18A-196 et seq) established state-level planning policy and led to the adoption of the New Jersey State Development and Redevelopment Plan (SDRP) in June 1992. This plan was adopted by the State Planning Commission and was most recently updated and adopted in 2001. The SDRP established a policy framework for the future development of the State. The SDRP includes eight State Planning Goals that are founded SPA mandates.

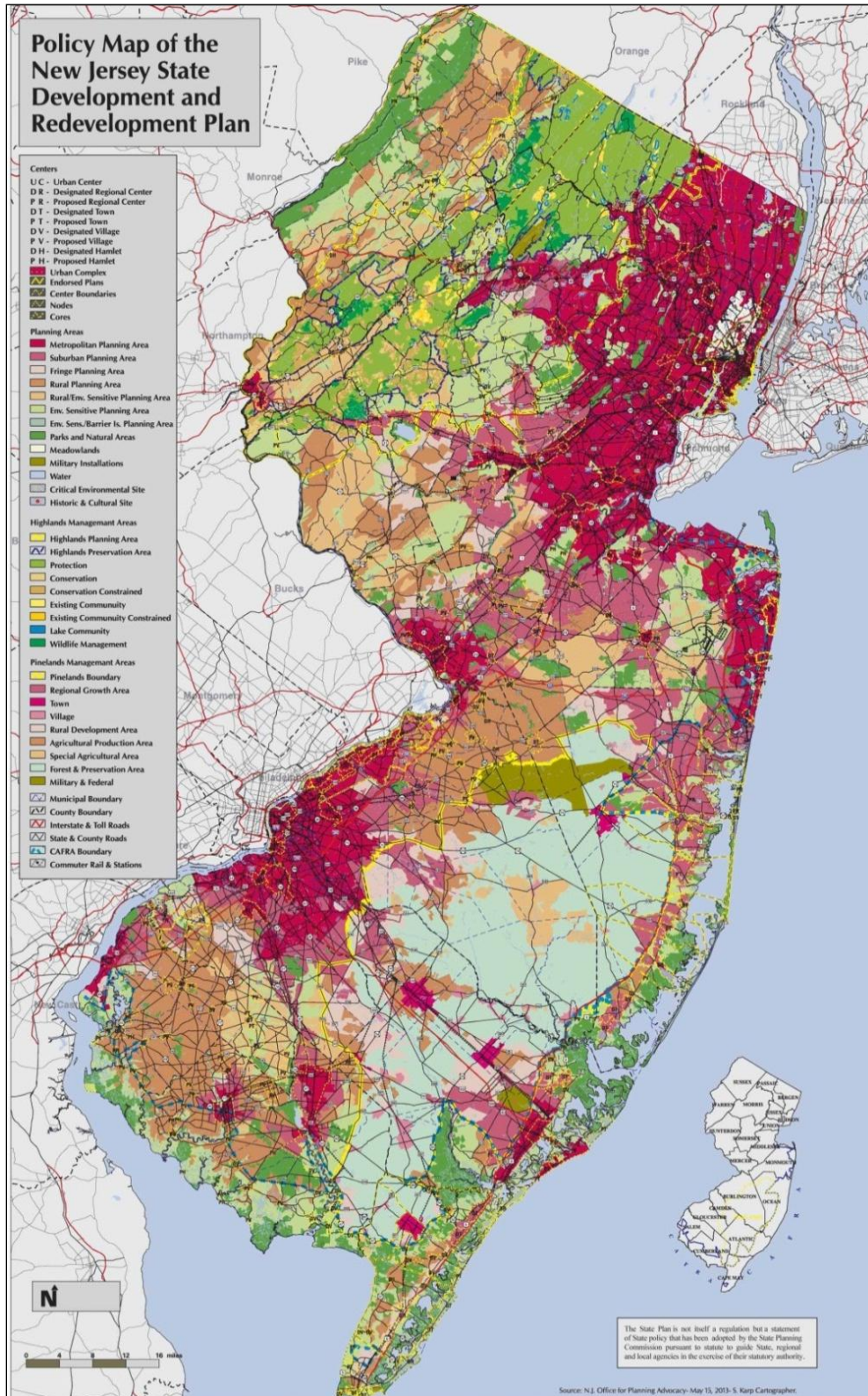
The SDRP’s Goals and Strategies are as follows:

- Revitalize the State’s cities and towns
- Conserve the State’s natural resources and systems
- Promote beneficial economic growth, development, and renewal for all resident of New Jersey
- Protect the environment, prevent and clean up pollution
- Provide adequate public facilities and services at a reasonable costs
- Provide adequate housing at a reasonable cost
- Preserve and enhance areas with historic, cultural, scenic open space, and recreational value
- Ensure sound and integrated planning and implementation statewide

The State Plan also included five Planning Areas that correspond with the State Plan Policy Map. The intent was to create a spatial correlation Plans, Goals, Strategies, and Policies while providing a geographic guide for development in the State. The Plan identifies the following planning areas growth: Metropolitan Planning areas (Planning Area 1), Suburban Planning Areas (Planning Area 2), and Designated Centers in any planning area. The Plan also identifies the following areas for limited growth: Fringe Planning Areas (Planning Area 3), Rural Planning Areas (Planning Area 4), and Environmentally Sensitive Planning Areas (Planning Area 5). Finally the Plan defines the following area for conservation: Fringe Planning Area (Planning Area 3), Rural Planning Areas (Planning Area 4), and Environmentally Sensitive Planning Areas (Planning Area 5). Figure 4-24 below shows the locations of these Planning areas in the state.



Figure 4-24. Current State Planning Areas



Source: NJ OPA



Planning at the State Level

The New Jersey Office of State Planning, which was responsible for the development of the State Development and Redevelopment Plan and housed in the Department of Community Affairs (DCA), is now known as the New Jersey Office for Planning Advocacy (OPA) and housed in the Department of State.

Future Development, Redevelopment and Post-Sandy Planning

The following section provides information regarding the future of development, redevelopment, and post Superstorm Sandy planning.

Development and Redevelopment

In New Jersey, the development of undeveloped land, as well as the redevelopment of developed land takes into consideration mitigation of hazards and planning for recovery after a disaster. The majority of the previously undeveloped land that is available for development is located in the suburban-rural fringe. Often times, the properties will be in low-lying areas adjacent to wetlands making them more vulnerable to flooding. Many properties that remain undeveloped can have steep slopes making them vulnerable to landslides or other geologic hazards. Some remaining undeveloped properties, especially in southern New Jersey, are in close proximity to the Pinelands or are located in areas that are prone to wildfires.

Similar issues affect redevelopment in older urban communities throughout the State that are located adjacent to or in close proximity to major sources of water, making them vulnerable to flooding.

Post-Sandy Planning

Since Hurricane Sandy hit New Jersey in October 2012, there has been an increased awareness of the potential impacts to the State's infrastructure, homes, and businesses from hazards. In addition to the legislative efforts to help integrate Hazard Mitigation Planning into local level planning as described in Section 4.4.3 above, the State's Department of Community Affairs has started to administer Post Sandy Planning Assistance Grants. The initial grant round will distribute \$5 million in Community Development Block- Disaster Recovery funds. The purpose of the grant is described below:

“The purpose of the Post Sandy Planning Assistance Grant Program (the “Program”) is to support long range planning for community redevelopment in the municipalities and counties sustaining damage from Hurricane Sandy. Due to the damage caused by the storm, many New Jersey municipalities and counties face a myriad of recovery challenges. Among them is the need for planning support to develop community recovery plans that strategically address the issues that now confront them. In furtherance of its mission to provide local government officials with the tools needed to efficiently manage municipal operations, the Department of Community Affairs (DCA) has created a local planning assistance program that will supplement the ongoing efforts of storm impacted local and county governments to rebuild and revitalize”

For more information refer to the DCA's Post Planning Assistance Grant Program's website at: <http://www.nj.gov/dca/services/lps/pspag.html>.