4.0 STATE OF NJ PROFILE

SECTION 4 STATE OF NEW JERSEY PROFILE

4.1 PHYSICAL SETTING

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

4.1.1 GEOGRAPHY

New Jersey 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 8,904,413 (ACS 5yr Estimates, 2015). 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 (American Community Survey 5yr Estimates, 2015). 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 279,793 (ACS 5yr Estimates, 2015). The capital of New Jersey is the City of Trenton, located in Mercer County, which is also the approximate geographic center of the State. New Jersey is situated between the two metropolitan areas of New York City and Philadelphia.

Figure 4-1 State of New Jersey Counties and Municipalities

Source: NJDEP, NJOIT-OGIS, NJGS

4.1.2 PHYSIOGRAPHIC PROVINCES

New Jersey is occupied by four physiographic provinces: Valley and Ridge, Highlands, Piedmont, and Coastal Plain (Harper, 2013). 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 geographic location and extent of each province is identified in Figure 4-2.

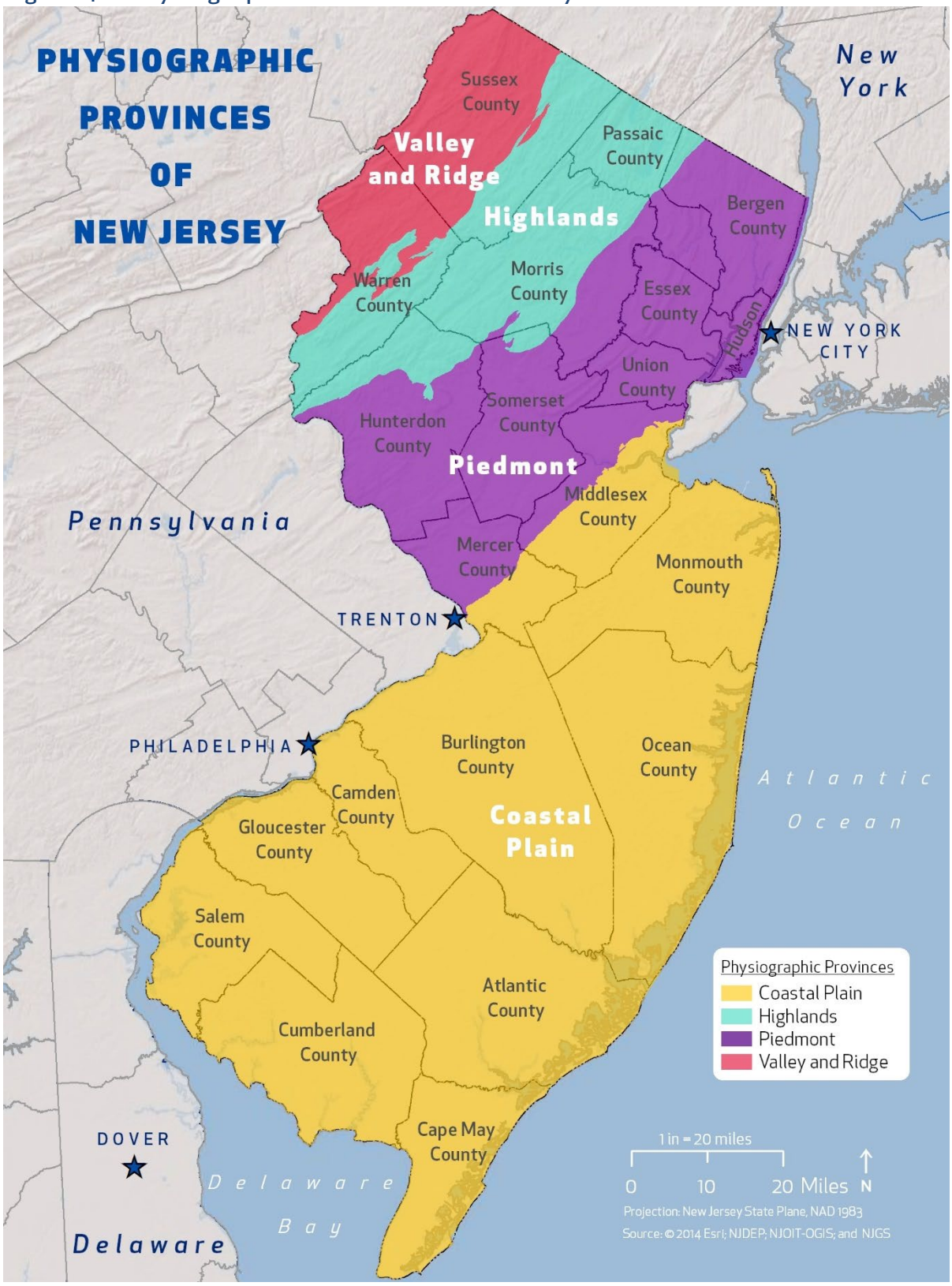
The Valley and Ridge Province is approximately 536 square miles. It is characterized by steep-sided, linear ridges and broad valleys (Dalton, 2006). The rocks in this province are the second oldest, ranging between being 400 and 540 million years old (Harper, 2013). The Kittatinny Valley forms the eastern segment of the Province, and Kittatinny Mountain is the ridge that 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, 2006).

The Highlands Province is approximately 980 square miles (Dalton, 2006). This province contains the oldest rocks in New Jersey, dating as far back as being between 980 and 1,363 million years old (Harper, 2013). Wawayanda Mountain is the highest point in the Highlands at 1,496 feet above sea level. (Dalton, 2006).

The Piedmont Province is approximately 1,600 square miles (Dalton, 2006), most of which can be identified as being located in the Newark Basin (Harper, 2013). The province is classified as being mainly a low rolling plain divided by a series of higher ridges (Dalton, 2006). It consists of sedimentary sandstone, shale, diabase, mudstone and igneous basalt that date back to being between 195 and 225 million years old (Harper, 2013).

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 (Dalton, 2006). This province makes up the southern half of the state and contains sand, gravel, clay and greensand formations. Deposits along the Atlantic Ocean between 10 and 120 million years ago have lead to the development of this province. The Coastal Plain is often divided into the Inner Coastal Plain, which is made mostly of sand and clay formations, and the Outer Coastal Plain, which can be identified as having more sandy soil (Harper, 2013). 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, 2006).

Figure 4-2 Physiographic Provinces of New Jersey



Source: NJDEP, NJOIT-OGIS, NJGS

4.1.3 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 (New Jersey Legislature, 2002). The Governor and Lieutenant Governor serve a four-year term and cannot serve more than two consecutive terms (The State of New Jersey, 2017). New Jersey sends 12 representatives and two senators to the United States Congress and has 14 electoral votes (USA.gov, 2016). The State is made up of 21 counties and 565 municipalities. All 565 New Jersey municipalities belong to one of five forms of municipal government: Borough, Township, City, Town, or Village as authorized by the Faulkner Act (New Jersey State League of Municipalities, 2010).

4.1.4 TRANSPORTATION

New Jersey's transportation network consists of multiple forms of transportation, including vehicular, rail, light rail, bus, air, and ferry. Numerous bridges, tunnels, highway, and rail lines facilitate interstate travel. 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, 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.

More than 71.9% of the workers in New Jersey commute to work alone in a car, while 8.1% carpool. Public transportation use accounted for 11.1% of workers, 3.1% walked to work, and 4% work from home. The average commute time in New Jersey is 31 minutes (ACS 5yr Estimates, 2015).

The State's transit system is extensive, consisting of multiple operators and transit types that include bus, rail, and ferry. 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. The 2012 study by New Jersey Future, *Targeting Transit*, outlines a comprehensive list of transit. Since that study, the Pennsauken Transit Center has been completed (NJ TRANSIT). In total, there are 243 transit stations in New Jersey that consist of:

- 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)
- 4 are served by multiple rail modes: Lindenwold (PATCO and commuter rail), Newark-Broad Street (commuter and light rail), Newport (PATH and light rail), and The Pennsauken Transit Center (commuter and light rail).
- 10 are multimodal terminals
- Hoboken Terminal is served by all three rail modes and is also a bus and ferry terminal
- Newark Penn Station is served by all three rail modes and is also a bus terminal.
- Trenton is served by commuter rail (both NJ Transit and SEPTA), light rail and bus
- Walter R and Transportation Center in Camden is served by light rail, rapid transit (PATCO) and bus
- Metropark, New Brunswick, Asbury Park, and Atlantic City are commuter rail stations and bus terminals
- Journal Square is a rapid transit station that also serves as a bus terminal
- Exchange Place PATH station is a rapid transit station and a ferry terminal

Figure 4-3 Major Transportation Routes in New Jersey

Source: NJDOT, 2013

Highways

New Jersey has more miles of highway per square mile than any other state. New Jersey has 39,065 miles of highways (33,381 miles urban and 5,684 miles rural). Of the total miles of highways, 432 miles are Interstate, 453 miles are other freeways or expressways, 5,455 miles are arterial, 3,330 miles are collector, and 23,756 miles are local (NJDOT Public Road Mileage by Area Type, 2015). New Jersey also has 7,878 bridges located throughout the State (NJDOT, 2017).

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 2015, more than 750,000 passengers traveled the Northeast Corridor every day (Northeast Corridor Infrastructure and Operation Advisory Commission, 2015).

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 in 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.

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 (PANYNJ, 2016). It leases most of its terminal space to private terminal operators, which manage the daily loading and unloading of container ships. In 2016 79,844,000 tons of cargo moved through Port facilities. This included over 6.25 million boxes (PANYNJ Port Planning Summit, 2017). The dollar value of all cargo that moved through the Port exceeded $200 billion (PANYNJ, 2016).

Capital investment in the Port has expanded. In 2016, a 10 year, $1.6 billion project to deepen the shipping channel to 50 feet was completed. There is a further $1.1 billion of planned capital investment for the port over the next ten years, and a 30-year Port Master Plan project is underway (PANYNJ, 2017).

The Port of New York and New Jersey is the North American port for automobile imports and exports. In 2016, the Port handled over 600,000 vehicles, of which over 400,000 were imports and around 200,000 were exports (PANYNJ Trade Statistics, 2016). Vehicle terminals are located at the Auto Marine Terminal in Jersey City and at the Port Newark/Elizabeth Marine Terminal complex in Newark Bay. 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 180 acres. Its primary cargo is containers. 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, at 445 acres.
- Global Terminal is located in Jersey City and situated in Upper New York Bay and is 350 acres. 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.

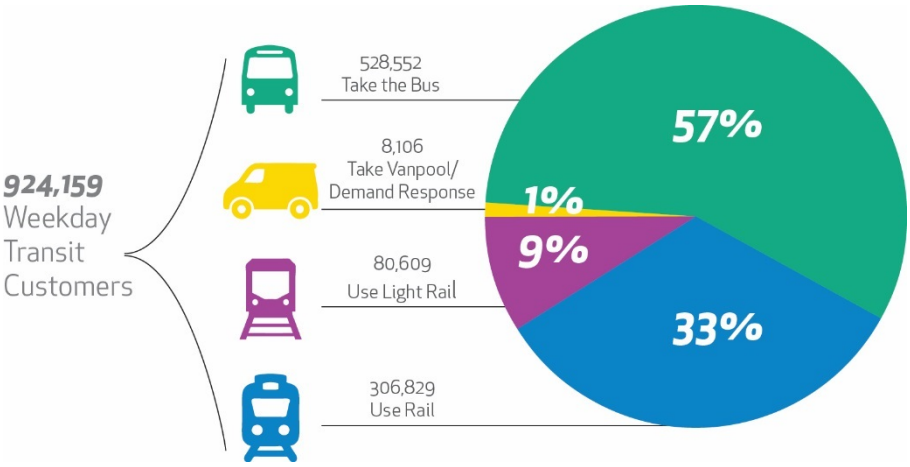
There are also several commuter ferry routes in the New York Harbor that provide ferry transportation to commuters. There are six ferry service providers.

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, 2017).

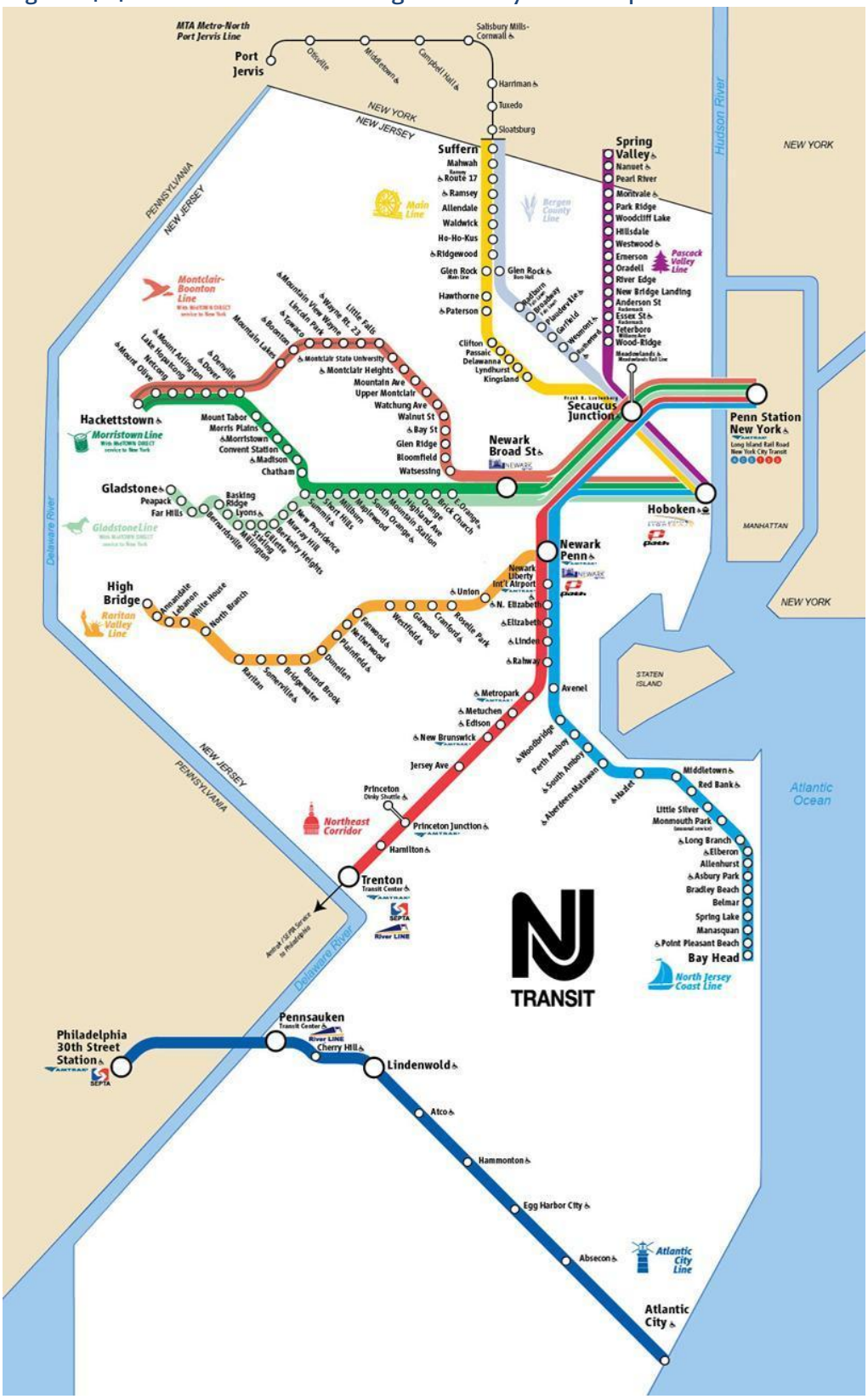
"11.1% of workers rely on public transit to get to their job daily".

-American Community Survey



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 on their statewide network of bus routes and rail lines (NJ TRANSIT, 2017). In 2017, NJ TRANSIT operated 255 bus routes, 12 commuter rail lines servicing 116 municipalities, and 3 light rail lines serving 22 municipalities. There are 6,305.3 route miles of bus service, 1,001.8 route miles of rail service, and 116.2 route miles of light rail operated by NJ Transit. There are 30 passenger bus stations with over 18,698 stops and over 18,400 commuter parking spaces for bus service. The commuter rail services have 166 stations with a commuter parking capacity of over 65,600. For the light rail services there are 62 stations with a commuter parking capacity of over 8,500 (NJ TRANSIT, 2017). The rail and light rail system are shown in Figure 4-4.

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



Source: NJ TRANSIT 2014

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 THE STATE
RAIL INFRASTRUCTURE	
Undergrade Bridges	575
Overhead Bridges	103
Moveable Bridges	12
Track Miles Maintained (not including Amtrak's Northeast Corridor)	544.4
Interlockings	106
Signals	1336
Grade Crossings	318
Switches	1290
Miles of Catenary	264
Substations	52
LIGHT RAIL INFRASTRUCTURE	
Undergrade Bridges	35
Overhead Bridges	52
Moveable Bridges	0
Track Miles Maintained	108
Interlockings	52
Signals	293
Grade Crossings	120
Switches	282
Miles of Catenary	51
Substations	22

Source: NJ TRANSIT 2016

4.1.5 CRITICAL INFRASTRUCTURE AND RESILIENCY INITIATIVES

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 in 2012, leaving behind long-term mechanical and operational challenges (NJ TRANSIT, 2013).

NJ TRANSIT cancelled all service one day prior to the storm hitting New Jersey 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, 2013).

The following outline highlights resiliency initiatives taken by the State of New Jersey and the Governor's Office of Recovery and Rebuilding since Superstorm Sandy (NJ Governor's Office of Recovery and Rebuilding, 2017).

- State Departments and Agencies have incorporated strategy and planning to encourage better,

more resilient development than before

- The State established that best available data from FEMA's latest flood maps, plus one foot of freeboard, as the general rebuilding standard to adapt to changing flood hazard risks and corresponding federal flood insurance rates
- NJOEM launched a planning initiative under FEMA's Hazard Mitigation Grant Program to provide eligible counties with grants to develop multi-jurisdictional hazard mitigation plans
- Efforts to study the State's energy vulnerabilities in order to identify opportunities for improvement have been taken in order to advance energy resiliency, especially at critical facilities
- The State created the Office of Flood Hazard Risk Reduction Measures within NJDEP in order to create projects
- Many flood hazard mitigation initiatives including beach and dune projects, acquisition of properties in flood loss area and building more resilient homes have been encouraged

4.1.6 CLIMATE (FOR STATE CLIMATOLOGIST TO UPDATE)

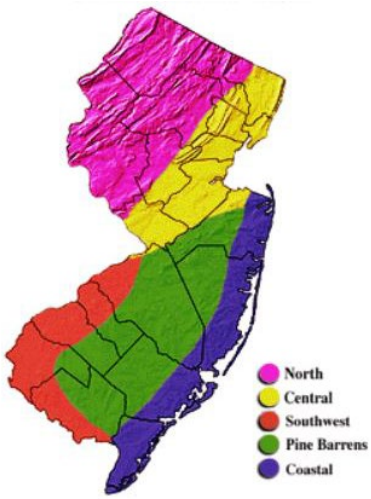
The Office of the New Jersey State Climatologist (ONJSC) summarizes the climate of New Jersey as presented in the section below.

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.

Figure 4-5 Climate Regions of New Jersey



Source: ONJSC

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.

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.

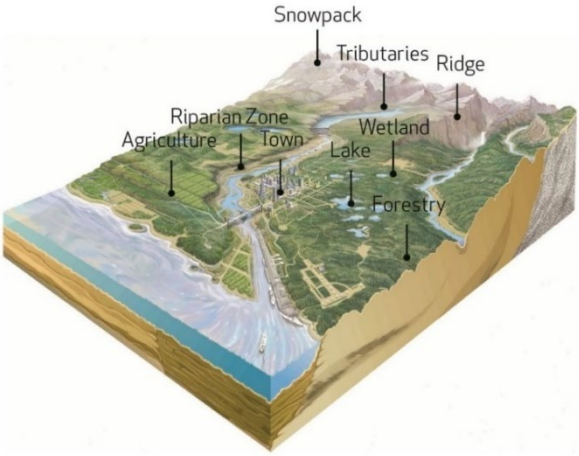
Sea breezes play a major role in the coastal climate. When the land is warmed by the sun, heated air rises, allowing cooler air at the ocean surface to spread inland. Sea breezes often penetrate five to 10 miles inland, but under more favorable conditions, can affect locations 25 to 40 miles inland. 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 ten. Tropical storms and hurricanes are also a special concern along the coast. In some years, they contribute a significant amount to the precipitation totals of the region. Damage during times of high tide can be severe when tropical storms, hurricanes, or Nor'Easters affect the region.

4.1.7 HYDROGRAPHY AND HYDROLOGY

Numerous ponds, lakes, creeks, and rivers make up the waterscape of the State of New Jersey. According to the United States Geological Survey 1,368 square miles, or 15% of New Jersey's total area is made up of water (USGS, 2016). 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 is only partially located within New Jersey. The Barnegat Bay is the largest bay located completely within New Jersey.

4.1.8 WATERSHEDS

Figure 4-6 Hydrologic System of a Watershed



Source: USGS

This section has been updated for the 2019 Plan to provide a high-level summary of the watersheds located in the State of New Jersey. A watershed is the area of land that drains into a body of water such as a river, lake, stream, or bay. Figure 4-6 depicts the hydrologic system of a watershed.

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. When Flooding Occurs, it impacts and entire watershed.

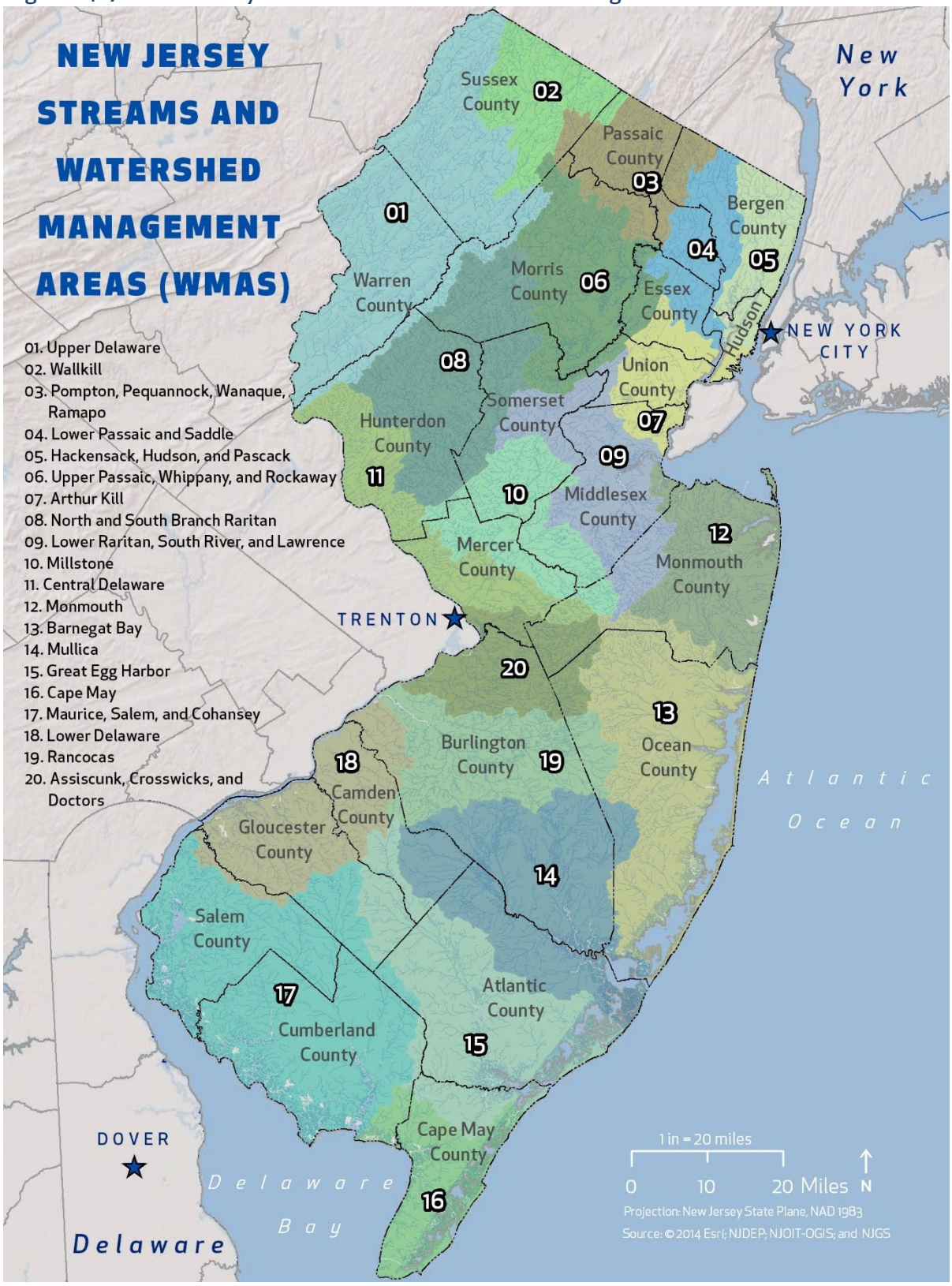
Watersheds come in all shapes and sizes and can cross municipal and county boundaries. Twenty watersheds are in the State of New Jersey, and all 20 are listed by county in Table 4-2.

Table 4-2 Watershed Management Areas (WMA) of New Jersey

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

Source: NJDEP, 2012

Figure 4-7 New Jersey Streams and Watershed Management Areas



Source: NJDEP, 2012

4.2 POPULATION AND DEMOGRAPHICS

Most of the data analyzed in this section was taken from the United States Census and from the American Community Survey. The American Community Survey (ACS) is conducted annually by the United States Census Bureau, providing social, economic, and housing characteristics for the United States. The five-year estimates were used to provide data for all counties and the State because the data is more precise than one and three year estimates. Since the data represents all areas and has the largest sample size it is the most reliable of the estimates available. Where appropriate the margin of error of the estimate is reported. Where it is not included, a statistical test for sampling variability is not appropriate (United States Census Bureau).

Population Statistics and Density

New Jersey is the most densely populated state in the United States and the eleventh most populated. The estimated 2015 population of New Jersey was 8,904,413 (American Community Survey 5yr Estimates, 2015). This is an increase of 1.28% (112,519 persons) from the population of 8,791,894 in 2010 (United States Census, 2010).

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). Urban areas tend to be more prone to hazard since they have larger populations and numbers of structure. These areas tend to experience greater loss during hazard events since they have more to lose.

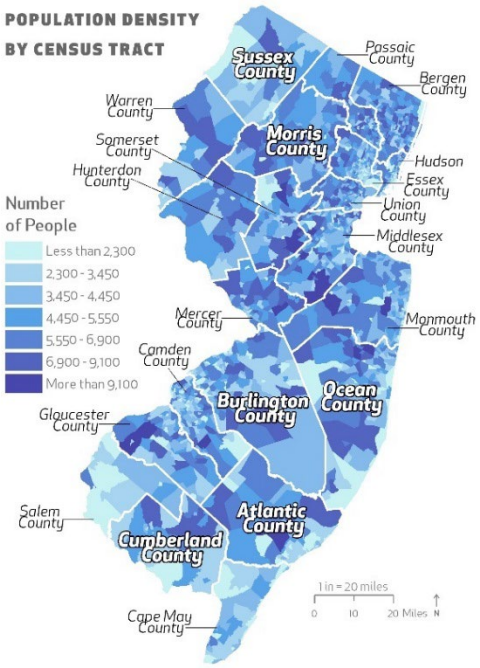
The top five most populated counties in New Jersey are clustered together in the northeastern section of the State adjacent to New York City: Bergen, Middlesex, Essex, Hudson, and Monmouth Counties (American Community Survey 5yr Estimates, 2015). The most populous county in New Jersey is Bergen County, with a population of 926,330, and Salem County is the least populated county, with a population of 65,120 (American Community Survey 5yr Estimates, 2015). As of 2015, the population density of New Jersey was 1,210 persons per square mile (American Community Survey 5yr Estimates, 2015), making it the country's most densely populated state. For comparison, it is one of only five states that have a density greater than 500 people per square mile (NJ Data Bank, 2013). Between 1980 and 2010, the population density in New Jersey increased by more than 20%, from 1,001 persons per square mile to 1,210 persons per square mile (NJ Data Bank, 2013). The densest county is Hudson County with 14,345 people per square mile, followed by Essex County with 6,272 people per square mile. The least dense county is Salem County with 196 people per square mile (American Community Survey 5yr Estimates, 2015). A detailed list of population, size and density of each county is provided in Table 4-3.

Table 4-3 County Population, Density and Area

COUNTY	2010 POPULATION COUNT (CENSUS)	2015 POPULATION ESTIMATE (ACS)	DENSITY (PERSON PER SQUARE MILE, 2010)	DENSITY (PERSON PER SQUARE MILE, 2015)	TOTAL AREA (SQUARE MILES)
Atlantic	274,549	275,376	494.1	495.55	555.7
Bergen	905,116	926,330	3,884.50	3,975.49	233.01
Burlington	448,734	450,556	561.9	564.20	798.58
Camden	513,657	511,998	2,321.50	2,314.01	221.26
Cape May	97,265	95,805	386.9	381.04	251.43
Cumberland	156,898	157,035	324.4	324.65	483.7
Essex	783,969	791,609	6,211.50	6,272.16	126.21
Gloucester	288,288	290,298	895.3	901.52	322.01
Hudson	634,266	662,619	13,731.40	14,345.51	46.19
Hunterdon	128,349	126,250	300	295.10	427.82
Mercer	366,513	370,212	1,632.20	1,648.61	224.56
Middlesex	809,858	830,300	2,621.60	2,687.84	308.91
Monmouth	630,380	629,185	1,344.70	1,342.15	468.79
Morris	492,276	498,192	1,069.80	1,082.60	460.18
Ocean	576,567	583,450	917	927.91	628.78
Passaic	501,226	507,574	2,715.30	2,749.74	184.59
Salem	66,083	65,120	199.1	196.20	331.9
Somerset	323,444	330,604	1,071.70	1,095.40	301.81
Sussex	149,265	145,930	287.6	281.17	519.01
Union	536,499	548,744	5,216.10	5,334.86	102.86
Warren	108,692	107,226	304.5	300.42	356.92
State Total	8,791,894	8,904,413	1,195.49	1,210.79	7354.22

Source: United States Census 2010, American Community Survey 2015

Figure 4-8 Population Density in New Jersey



Most Dense Counties in New Jersey

(Persons Per Square Mile)

1. Hudson: 14,345
2. Essex: 62,72
3. Union: 5,334
4. Bergen: 3,975
5. Passaic: 2,749

Source: United States Census 2010, American Community Survey 2015

Seasonal Population

Along New Jersey's 1,729 miles of shoreline (NOAA, 2011) there are 130 miles of beaches, many boardwalks, and casinos in Atlantic City. These amenities make New Jersey a popular tourist destination, especially during the summer season. Monmouth, Ocean, Atlantic, and Cape May Counties all see large summer population increases, especially along the coastline.

Tourism has a huge influence on the County, especially in the summer months. According to the 2008 Summer Coastal Population Study prepared by the Monmouth County Planning Board, 750, 000 people were recorded visiting Monmouth County on an average summer day and 900,000 were recorded visiting on a peak day (Monmouth County Planning Board, 2008). According to the 2010 United States Census, over 11,000 housing units in the county are meant for seasonal, recreational or occasional use.

Cape May County has a tourism-based economy, making the leisure and hospitality industry the largest employment sector in the County. The hospitality industry employment sector includes providers of lodging, food services, recreation, and amusements. In 2013 the County Planning Department recorded as many as 812,000 visiting Cape May County on any given weekend in the summer months, fueling their tourism based economy. There are also almost 49,000 housing units meant for seasonal use in the County, catering to this visiting population (United States Census, 2010). Year round, there are 95,805 residents (American Community Survey 5yr Estimates, 2015), and currently, 50,763 people, or 53% of these residents live in the County floodplain (NOAA, 2017).

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 with 6,965 and the Borough of South Toms River had the smallest number of seasonal homes with just four (United States Census, 2010).

Atlantic County, however, has less of a seasonal fluctuation, since the casinos in Atlantic City draw visitors year-round.

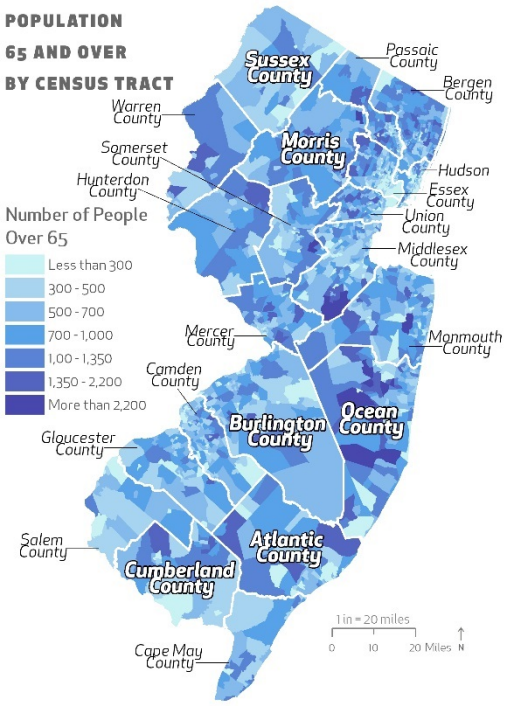
Race and Ethnicity

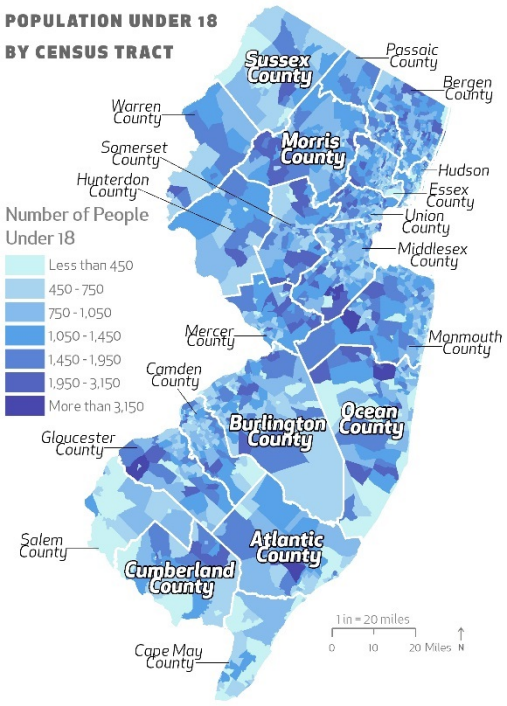
New Jersey is an ethnically diverse state. Caucasians make up 67.7% of the population, which is below the national percentage of 73.1%. New Jersey's minority percentage is correspondingly higher than the national trend. The State is also above the national percentage for foreign-born persons and language other than English spoken at home. The percentage of foreign-born residents is 21.6%, while the national percentage is 13.1%. More than 30% of households in New Jersey reported speaking a language other than English, while the national percentage is over 21% (American Community Survey 5yr Estimates, 2015).

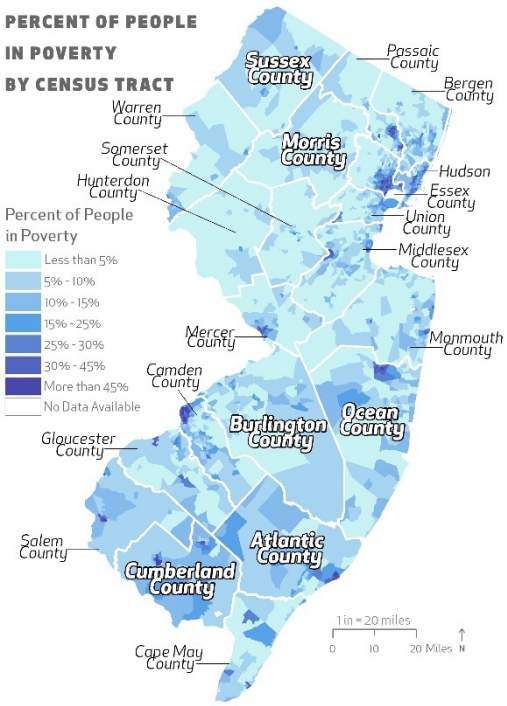
4.2.2 VULNERABLE POPULATIONS

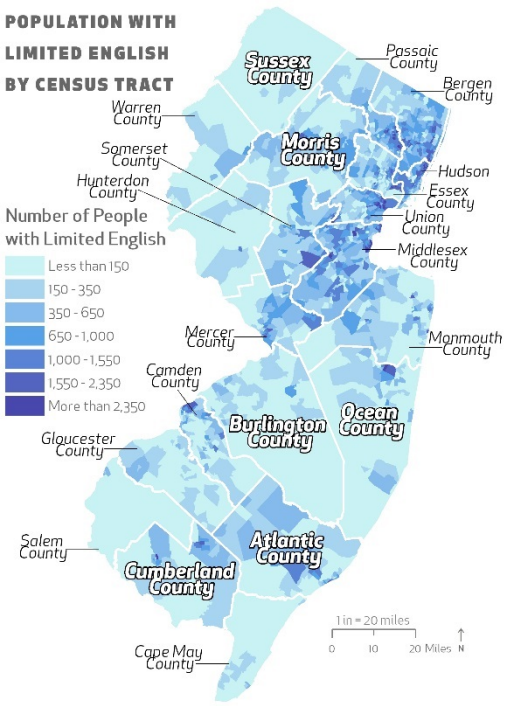
The Disaster Mitigation Act of 2000 (DMA 2000) requires that Hazard Mitigation Plans (HMPs) consider socially vulnerable populations. These populations can be more susceptible to hazard events, based on a number of factors including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. The next couple of pages analyze certain vulnerable populations in New Jersey.

Figure 4-9 Vulnerable Populations in New Jersey









Source: American Community Survey 5yr Estimates, 2015

Population Over 65

The growth of the population aged 65 and over from 2000 to 2010 (6.5%), was faster than the State's total population growth (4.5%) during the same time period (United States Census, 2010). Table 4-4 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. Salem County has the smallest number of persons aged 65 and older, while Hudson and Essex counties have the smallest percentage of persons aged 65 and older (American Community Survey 5yr Estimates, 2015).

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

COUNTY	POPULATION 65+	MARGIN OF ERROR	PERCENT OF COUNTY POPULATION	PERCENT OF STATE POPULATION
Atlantic	42,282	53	15.35%	0.47%
Bergen	146,053	47	15.77%	1.64%
Burlington	67,930	39	15.08%	0.76%
Camden	70,952	71	13.86%	0.80%
Cape May	22,281	78	23.26%	0.25%
Cumberland	20,987	47	13.36%	0.24%
Essex	96,129	88	12.14%	1.08%
Gloucester	39,699	46	13.68%	0.45%
Hudson	70,391	61	10.62%	0.79%
Hunterdon	19,070	108	15.10%	0.21%
Mercer	49,699	40	13.42%	0.56%
Middlesex	108,827	64	13.11%	1.22%
Monmouth	95,076	65	15.11%	1.07%
Morris	74,801	44	15.01%	0.84%
Ocean	126,352	35	21.66%	1.42%
Passaic	64,986	38	12.80%	0.73%
Salem	10,772	99	16.54%	0.12%
Somerset	45,114	36	13.65%	0.51%
Sussex	20,472	95	14.03%	0.23%
Union	70,913	77	12.92%	0.80%
Warren	16,437	92	15.33%	0.18%
State Total	1,279,223		N/A	14.37%

Source: American Community Survey 5yr Estimates, 2015

Population Living Below Poverty

Table 4-5 provides poverty information from the 2015 ACS 5-year estimate. The table includes the number of persons with an income below poverty and the associated margin of error, the total population used to determine poverty status with the associated margin of error, and the percent of persons below the poverty level for different geographies.

The data indicates that Hudson County has the highest number of persons with an income below poverty, with 17.31% of the County's population. Hunterdon County had the least number of people with an income below poverty, with 4.40% of the County's population. Overall, 10.82% of the State's

population, or 944,847 persons, have an income below poverty (American Community Survey 5yr Estimates, 2015).

Table 4-5 Population Below Poverty in New Jersey, 2015

COUNTY	PERSONS WITH INCOME BELOW POVERTY (2015)	PERSONS BELOW POVERTY MARGIN OF ERROR (+/-)	TOTAL POPULATION USED TO DETERMINE POVERTY STATUS	TOTAL POPULATION MARGIN OF ERROR (+/-)	PERCENT OF PERSONS BELOW POVERTY LEVEL
Atlantic	40,868	866	269,407	2,480	15.17%
Bergen	67,959	725	915,596	3,080	7.42%
Burlington	27,881	757	438,211	1,704	6.36%
Camden	66,802	635	505,061	2,548	13.23%
Cape May	9,744	441	93,500	1,128	10.42%
Cumberland	25,760	996	144,303	1,946	17.85%
Essex	133,788	873	772,698	3,562	17.31%
Gloucester	23,200	561	286,000	1,706	8.11%
Hudson	114,900	490	656,054	3,363	17.51%
Hunterdon	5,379	643	122,125	813	4.40%
Mercer	40,354	1023	351,951	2,494	11.47%
Middlesex	70,908	1,400	802,875	3,041	8.83%
Monmouth	46,492	542	622,799	2,484	7.47%
Morris	22,068	594	490,485	1,796	4.50%
Ocean	64,795	621	575,934	3,446	11.25%
Passaic	83,203	644	499,431	3,109	16.66%
Salem	8,602	308	63,755	822	13.49%
Somerset	16,479	540	327,057	1,382	5.04%
Sussex	8,237	309	144,415	860	5.70%
Union	59,034	596	541,847	3,020	10.89%
Warren	8,394	273	105,364	928	7.97%
State Total	944,847	13,837	8,728,868	45,712	10.82%

Source: American Community Survey 5yr Estimates, 2015

Other Socially Vulnerable Populations

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 4-6 provides the number of persons for each of these population types per county.

Table 4-6 Other Socially Vulnerable Populations in New Jersey

COUNTY	PERSONS UNDER 18 (2015)	PERSONS WITH DISABILITIES (2015) [a]	PERSONS WITH LIMITED ENGLISH (2015) [b]	PERSONS LIVING IN NURSING HOMES (2010)	PERSONS LIVING IN DORMS (2010)	PERSONS LIVING IN PRISONS (2010)
Atlantic	61,661	35,047	29,806	1,460	2,370	953
Bergen	202,687	76,409	126,412	3546	3913	732
Burlington	99,340	47,864	16,831	2,245	0	5,857
Camden	120,280	67,549	40,590	3,017	423	1,816
Cape May	17,273	13,559	3,480	868	0	248
Cumberland	37,220	22,072	16,060	900	3	10,194
Essex	192,129	97,111	107,942	4,510	4,972	7,347
Gloucester	67,455	35,884	7,682	948	2,001	427
Hudson	135,337	62,051	156,430	2,403	2,503	1,843
Hunterdon	27,232	10,400	4,403	351	0	2,516
Mercer	81,473	36,848	39,410	2,699	11,254	3,279
Middlesex	184,867	71,843	131,283	3,665	13,766	3,965
Monmouth	142,396	60,922	39,463	2,963	1,583	1,305
Morris	112,811	38,290	42,810	2,628	3,529	411
Ocean	137,090	76,121	24,736	4,277	1,261	540
Passaic	124,208	44,963	97,061	2,088	5,476	1,068
Salem	14,634	9,766	2361	634	3	287
Somerset	78,098	25,709	31,810	1,810	479	273
Sussex	32,229	14,153	3,662	1,093	0	174
Union	131,582	50,029	101,753	2,591	1,266	1,098
Warren	23,311	11,898	4,996	816	681	135
State Total	2,023,313	908,488	1,028,981	45,152	55,483	44,468

Source: United States Census, 2010; American Community Survey 5yr Estimates, 2015
Notes: N/A Not available; Margin of error is available for the 2015 estimates and are publicly available through American FactFinder
a Based on 2015 statistics for the civilian non-institutionalized population
b The Census indicates this number as those persons who speak English less than "very well"
c Includes those persons living in emergency shelters, traditional housing and hotel/motel paid for by an agency

4.2.3 POPULATION TRENDS

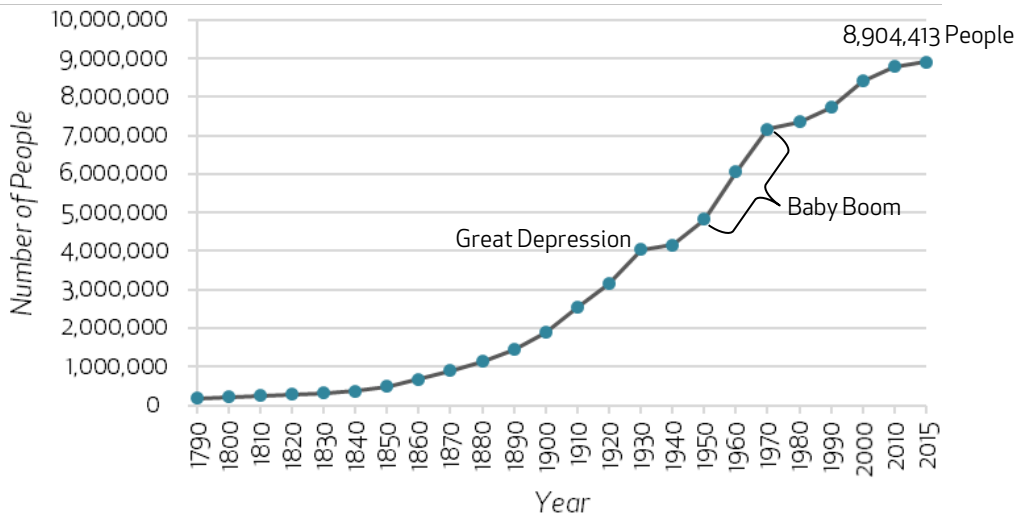
The following section provides information regarding population trends for the State of New Jersey and its counties.

Statewide Population Trends

The first United States Census was conducted in 1790 and New Jersey's population was 184,139. Currently New Jersey's population is estimated to be 8,904,413 (American Community Survey 5yr Estimates, 2015). Population growth was relatively slow in New Jersey during the first half of the 19th century. From 1790 to 1850 there was minimal population change. From 1850 to 1930 there was a steady population increase, until the Great Depression hit. New Jersey's largest population growth was experienced during the era known as the Baby Boom between 1850 and 1870 when the population increased by over 50,000 people per decade. Since the end of the Baby Boom the population has continued to grow, however, not quite as at a dramatic rate.

Between 1790 and 2010, New Jersey has never experienced a decrease in population. Between 2010 and 2015, the New Jersey population is estimated to have grown by 1.28% or 72,696 persons. The population of New Jersey is projected to be 9,338,000 persons by 2024, which is a 4.87% increase from the 2015 estimated population (NJLWD, 2014).

Figure 4-11 Population Trends in New Jersey, 1790 to 2015



Source: American Community Survey 5yr Estimates, 2015; Wu, 2010

Population Trends by County

In the 15 years between 2000 and 2015, the highest growth occurred in Middlesex County, whose population grew by 80,138 persons (10.68%). Cape May County experienced the largest decrease in population during this time frame, decreasing by 6,521 persons (-6.37%). In the five years between 2010 and 2015, the most significant growth occurred in Hudson County, with a population increase of 28,353 persons (4.47%). The largest decrease in population between 2010 and 2015 occurred in Sussex County, with a loss of 3,335 persons (-2.23%). Population has been estimated for all New Jersey counties for the year 2024. Hudson County is anticipated to have the most significant growth, increasing by 8.46%. Cape May, Hunterdon, Salem, Sussex and Warren Counties are all anticipated to decrease in population. The state is anticipated to grow in population by 4.87% overall, as shown in Table 4-7 (American Community Survey 5yr Estimates, 2015; NJLWD, 2014).

Table 4-7 Population Growth Projections by County

	POPULATION			POPULATION CHANGE				2024 PROJECTION		HOUSING UNITS		
COUNTY	2000 (Census)	2010 (Census)	2015 (ACS)	2000 TO 2015 (Census & ACS)	2010 TO 2015 (Census & ACS)	PERCENT CHANGE 2000 TO 2015 (Census & ACS)	PERCENT CHANGE 2010 TO 2015 (Census & ACS)	POPULATION (NJLWD)	PERCENT CHANGE FROM 2015 (NJLWD)	2010 (Census)	2015 ESTIMATE (ACS)	2015 MARGIN OF ERROR (ACS)
Atlantic	252,552	274,549	275,376	22,824	827	9.04%	0.30%	278,900	1.28%	126,746	127,435	365
Bergen	884,118	905,116	926,330	42,212	21,214	4.77%	2.34%	998,700	7.81%	352,497	353,978	300
Burlington	423,394	448,734	450,556	27,162	1,822	6.42%	0.41%	460,400	2.18%	175,781	177,058	301
Camden	508,932	513,657	511,998	3,066	(1,659)	0.60%	-0.32%	519,400	1.45%	205,067	205,768	254
Cape May	102,326	97,265	95,805	(6,521)	(1,460)	-6.37%	-1.50%	94,400	-1.47%	98,361	98,747	200
Cumberland	146,438	156,898	157,035	10,597	137	7.24%	0.09%	159,700	1.70%	55,883	56,216	336
Essex	793,633	783,969	791,609	(2,024)	7,640	-0.26%	0.97%	819,100	3.47%	313,091	313,824	384
Gloucester	254,673	288,288	290,298	35,625	2,010	13.99%	0.70%	301,200	3.76%	109,991	111,445	219
Hudson	608,975	634,266	662,619	53,644	28,353	8.81%	4.47%	718,700	8.46%	270,677	274,423	280
Hunterdon	121,989	128,349	126,250	4,261	(2,099)	3.49%	-1.64%	123,200	-2.42%	49,544	49,816	256
Mercer	350,761	366,513	370,212	19,451	3,699	5.55%	1.01%	388,900	5.05%	143,216	143,833	400
Middlesex	750,162	809,858	830,300	80,138	20,442	10.68%	2.52%	900,000	8.39%	295,010	297,940	493
Monmouth	615,301	630,380	629,185	13,884	(1,195)	2.26%	-0.19%	649,500	3.23%	258,581	259,823	252
Morris	470,212	492,276	498,192	27,980	5,916	5.95%	1.20%	523,700	5.12%	189,937	190,765	272
Ocean	510,916	576,567	583,450	72,534	6,883	14.20%	1.19%	624,200	6.98%	278,189	279,989	287
Passaic	489,049	501,226	507,574	18,525	6,348	3.79%	1.27%	528,100	4.04%	176,018	176,433	228
Salem	64,285	66,083	65,120	835	(963)	1.30%	-1.46%	62,600	-3.87%	27,441	27,619	124
Somerset	297,490	323,444	330,604	33,114	7,160	11.13%	2.21%	354,800	7.32%	123,211	124,672	200
Sussex	144,166	149,265	145,930	1,764	(3,335)	1.22%	-2.23%	140,400	-3.79%	62,090	62,184	138
Union	522,541	536,499	548,744	26,203	12,245	5.01%	2.28%	588,300	7.21%	199,580	200,708	258
Warren	102,437	108,692	107,226	4,789	(1,466)	4.68%	-1.35%	104,100	-2.92%	44,959	45,266	115
State Total	8,414,350	8,791,894	8,904,413	490,063	112,519	5.82%	1.28%	9,338,000	4.87%	3,555,870	3,577,942	5,662

Source: United States Census 2000 & 2010; American Community Survey 5yr Estimates, 2015; NJLWD, 2014
Note: The current best available data for population projections for New Jersey is from the Department of Labor and Workforce Development. Projections are based off of 2014 data using the Economic-Demographic Projection Model

4. STATE PROFILE

4.3 AGRICULTURE

The most recent agricultural data for New Jersey is from 2012. According to the 2012 data, New Jersey has a total of 9,071 farms and 715,057 acres in farmland. The average size of New Jersey farms is 79 acres. In 2012, crop sales totaled $890,767,000, or 88.5% total market value of products sold. Livestock sales totaled $116,169,000, or 11.5% total market value of products sold (United States Department of Agriculture, 2012). Hunterdon County has the largest number of farms out of all the counties in New Jersey, followed by Sussex County. Salem County has the largest amount of land in farms with 101,847 acres, as well as the highest average farm size. Refer to Table 4-8 for more details.

Table 4-8 2012 Census of Agriculture for New Jersey, by County

COUNTY	OPERATED FARMLAND (acres)	NUMBER OF FARMS	AVERAGE FARM SIZE (acres)	MEDIAN FARM SIZE (acres)
Atlantic	29,479	402	73	20
Bergen	1432	60	24	7
Burlington	95,899	838	114	17
Camden	7,143	175	41	17
Cape May	7,352	152	48	22
Cumberland	64,526	583	111	28
Essex	128	13	10	6
Gloucester	43,265	584	74	17
Hudson	N/A	N/A	N/A	N/A
Hunterdon	96,025	1,447	66	20
Mercer	19,744	272	73	23
Middlesex	17,261	198	87	17
Monmouth	38,961	823	47	12
Morris	14,458	366	40	13
Ocean	7,969	178	45	13
Passaic	1,454	78	19	10
Salem	101,847	825	123	32
Somerset	34,735	400	87	23
Sussex	61,033	885	69	23
Union	96	8	12	10
Warren	72,250	784	92	24
State Total	715,057	9,071	79	20

Source: USDA, 2012

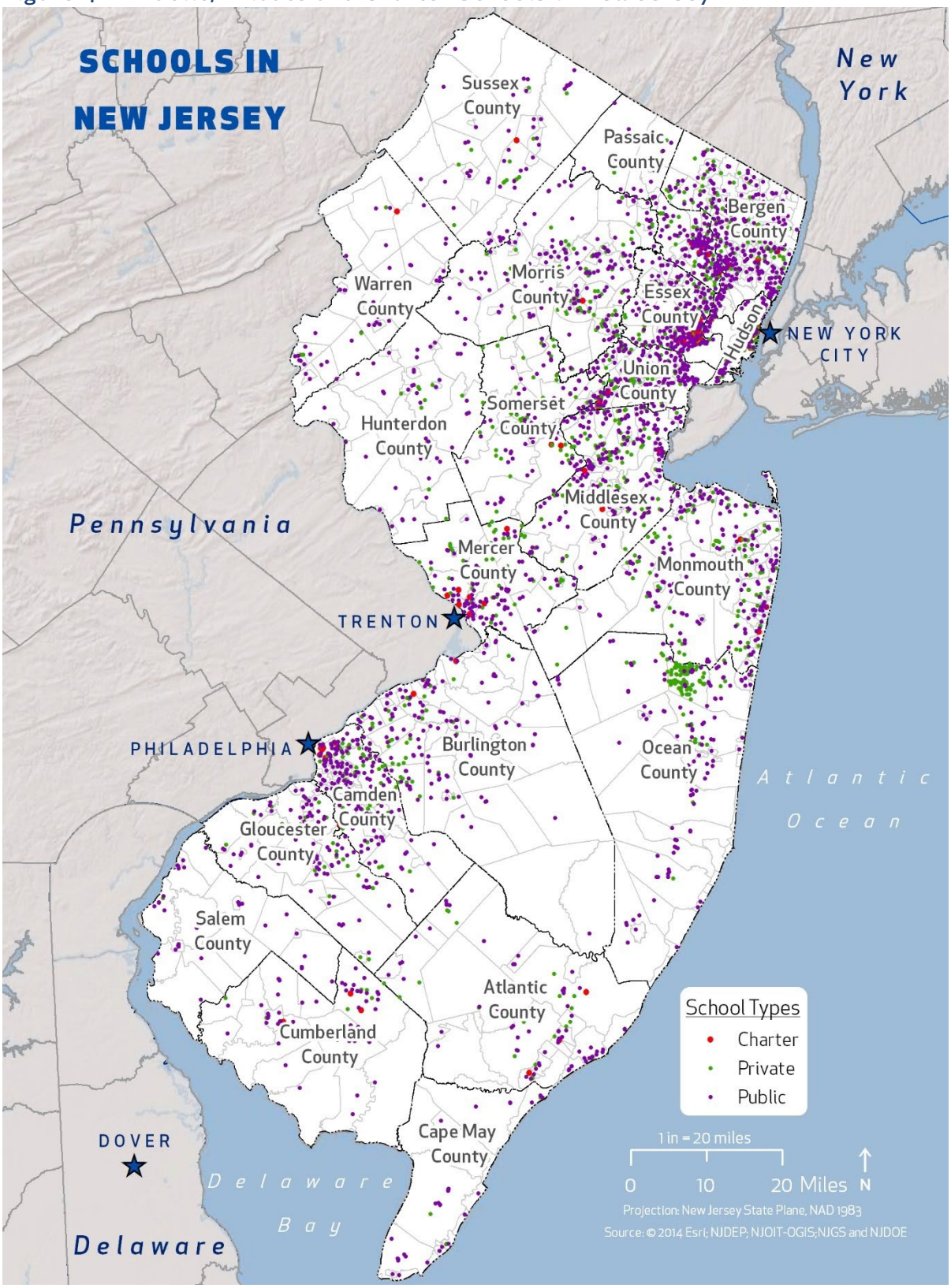
4.3.2 EDUCATION

According to the 2015 American Community Survey 5-year Estimates, of people 25 and over, 88.6% of the State's population received a high school diploma, and approximately 37% of the State's population have a Bachelor's degree or higher.

New Jersey Schools

The State is home to 2,005 public elementary schools, 511 public secondary schools, 132 private high schools (State of New Jersey, 2017). Figure 4-10 shows the location of public, private and charter schools in New Jersey.

Figure 4-12 Public, Private and Charter Schools in New Jersey



Source: State of New Jersey Department of Education, 2003

New Jersey Higher Educational Institutions

New Jersey is home to a variety of higher educational institutions. There are 26 four year colleges/universities, 19 community colleges and 27 Talmudic Institutions and Theological Seminaries. The four-year colleges and universities include:

Table 4-9 Higher Education Institutions in New Jersey

Institution Name	Institution Type	Year Established	Number of Students
Bloomfield College	Private College	1868	2,000
Caldwell University	Private University	1939	938
Centenary University	Private University	1867	2,680
College of Saint Elizabeth	Private College	1899	1,200
Drew University	Private University	1867	2,000
Farleigh Dickinson University	Private University	1942	12,000
Felician University	Private University	1923	2,130
Georgian Court University	Private University	1896	2,122
Kean University	Public University	1855	15,221
Monmouth University	Private University	1933	4,693
Montclair State University	Public University	1908	21,000
New Jersey City University	Public University	1927	9,150
New Jersey Institute of Technology	Public University	1881	11,400
Pillar College	Private College	1908	421
Princeton University	Private University	1746	7,979
Ramapo College of New Jersey	Public College	1969	6,008
Rider University	Private University	1865	5,150
Rowan University	Public University	1923	16,155
Rutgers University	State University	1766	68,942
Saint Peter's University	Private University	1872	3,400
Seton Hall University	Private University	1856	10,000
Stevens Institute of Technology	Private College	1870	6,913
Stockton University	Public University	1969	8,728
The College of New Jersey	Public College	1855	6,580
Thomas Edison State University	Public University	1972	17,500
William Paterson University	Public University	1855	11,000

Source: State of New Jersey Office of the Secretary of Higher Education, 2017

4.4 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 Area, Highlands Region, and Meadowlands District (New Jersey Future, 2011).

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 towns.

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 third stage is characterized by the advancement of an interconnected network 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.

Since the mid-2000s there has been growing demand for housing in urban centers like Jersey City and Hoboken due to their proximity and accessibility to employment hubs in Manhattan (Urban Land Institute, 2014). This has led to the redevelopment of many of the urban cores and revitalization of many of the State's older cities. The continued redevelopment of the State's urban centers will likely remain an important component of the future development of the state.

4.5 URBANIZATION

New Jersey has 26 urban areas and 7 metropolitan 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 Bureau, 2010).

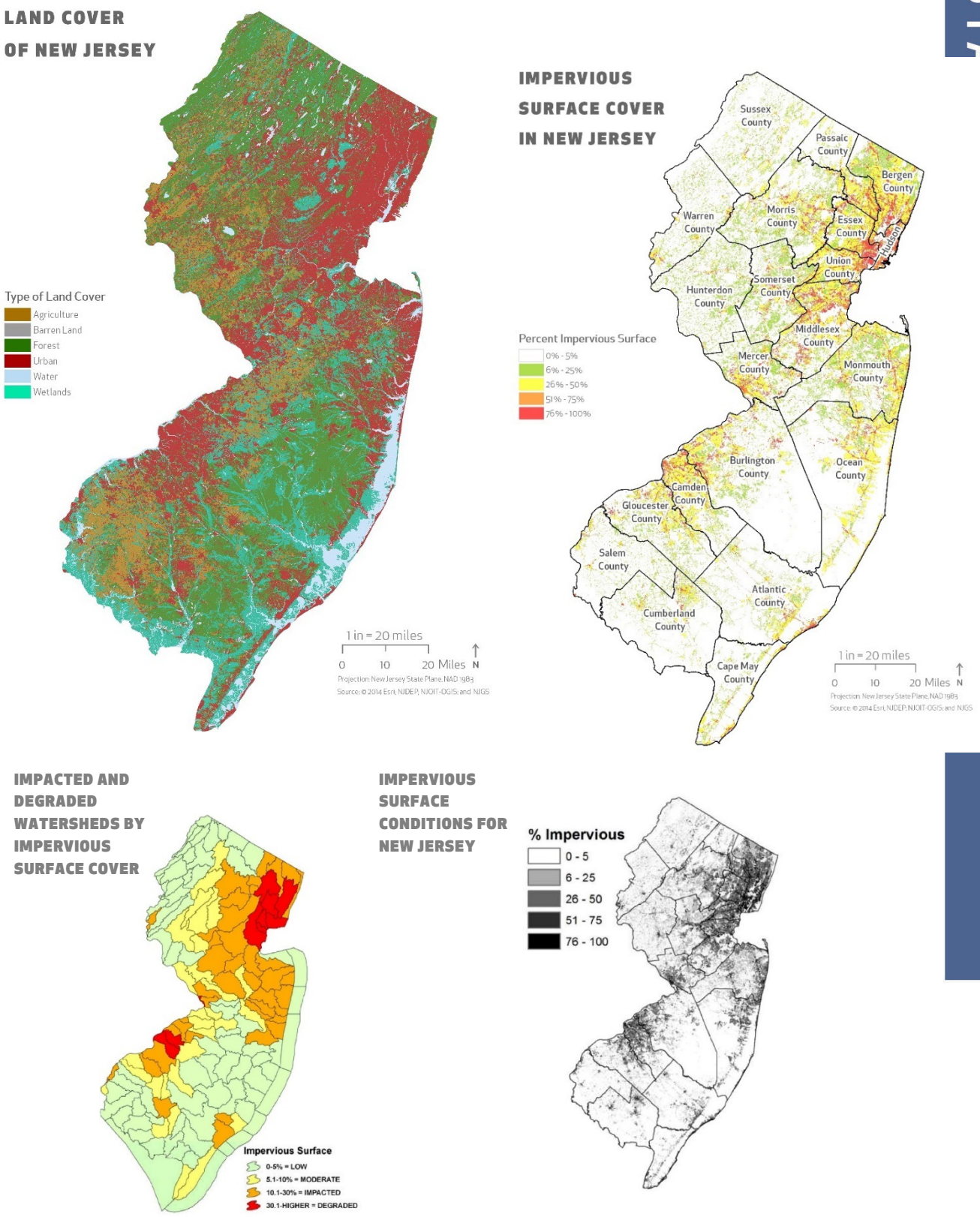
Rowan and Rutgers universities have studied New Jersey's urban growth and land use change. Between 2007 and 2012 New Jersey has increased its amount of urban land by 24,250 acres, which creates a statewide total of 1,558,862 acres of urban land. Urban land makes up 31% of New Jersey's land area, which makes it the states most significant land use type. (Hasse and Lathrop, 2012).

Between 1986 and 2012 New Jersey has experienced a steady growth in urban land development, and a steady decline in agriculture land use, forest and wetlands. Approximately 41,437 net acres (64.7 square miles) of forest lands were lost statewide between 2002 and 2012. Similarly, the rate of agricultural land loss has declined over the same period of time. Between 2002 and 2012 there has been a net loss of 48,883 net acres (76.4 square miles). Wetlands were also lost between 2002 and 2012 due to urban growth with the net acreage of wetlands loss totaling 13,070 net acres (20.4 square miles) (Hasse and Lathrop 2010). These trends indicate that urban growth has been encouraged, while the preservation of natural resources has been declining.

4.5.1 IMPERVIOUS SURFACES

Water quality and environmental conditions of a watershed are related to the amount of impervious surface within the watershed because impervious surfaces can cause depletion of groundwater resources, flooding of local streams and rivers, non-point source pollution and more. It is estimated that there are 515,117 acres of impervious surface cover New Jersey (NJDEP, 2012). Figure 4-12 illustrates 2012 land use and impervious surface cover, and how it has changed over time.

Figure 4-12. Land Use and Impervious Surface in New Jersey



Source: NJDEP, 2012; Hasse and Dornisch, 2009

Note: Maps to the left are from a study titled Integrating Impervious Surface Management and Smart Growth Development in New Jersey completed by Hasse and Dornisch in 2009. They were used for analysis in the 2012 plan.

4.5.2 BUILDING PERMITS IN NEW JERSEY

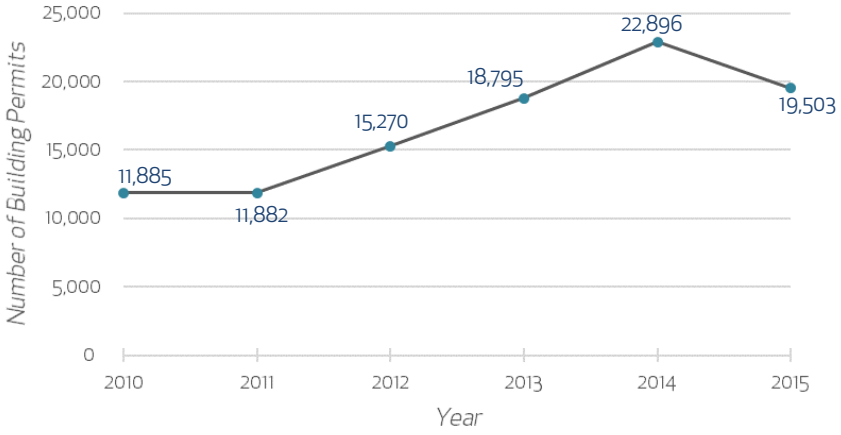
Local construction officials issue building permits for new construction, additions, and alterations. New construction permits authorize new buildings. Permits for additions authorize work that adds space to an existing structure and make up about 3% of total building permits issued throughout New Jersey between 2010 and 2015. Table 4-10 and Figure 4-13 show the total number of housing units authorized by building permits for 2010 through 2015.

Table 4-10 Housing Units Authorized by Building Permits, by County

COUNTY	2010	2011	2012	2013	2014	2015	TOTAL
Atlantic	444	372	420	415	782	353	2,786
Bergen	879	1,903	2,054	1,557	1,620	1,213	9,226
Burlington	418	546	488	553	977	748	3,730
Camden	332	493	539	425	236	308	2,333
Cape May	432	445	517	683	646	639	3,362
Cumberland	201	144	133	147	130	129	884
Essex	419	465	885	849	2,220	1,612	6,450
Gloucester	643	517	470	634	397	660	3,321
Hudson	901	1,446	2,604	3,240	5,660	4,097	17,948
Hunterdon	97	74	91	76	223	164	725
Mercer	648	422	447	862	280	708	3,367
Middlesex	1,642	958	1,087	1,587	1,809	1,588	8,671
Monmouth	806	806	1,034	1,425	1,367	1,176	6,614
Morris	400	421	605	899	691	948	3,964
Ocean	1,768	1,455	1,517	2,467	3,328	2,934	13,469
Passaic	380	344	327	658	333	300	2,342
Salem	63	54	58	36	41	22	274
Somerset	575	469	1,060	1,061	689	848	4,702
Sussex	95	67	129	59	74	46	470
Union	649	347	744	1,043	1,323	925	5,031
Warren	93	134	61	119	70	85	562
State Total	11,885	11,882	15,270	18,795	22,896	19,503	100,231

Source: NJDCA Building Permit Yearly Summary Data, 2010 to 2015

Figure 4-13 State Total Housing Units Authorized by Building Permits



Source: NJDCA Building Permit Yearly Summary Data, 2010 to 2015

Figure 4-14 Housing Units Authorized by Building Permits, by County

Source: NJDCA Building Permit Yearly Summary Data, 2010 to 2015

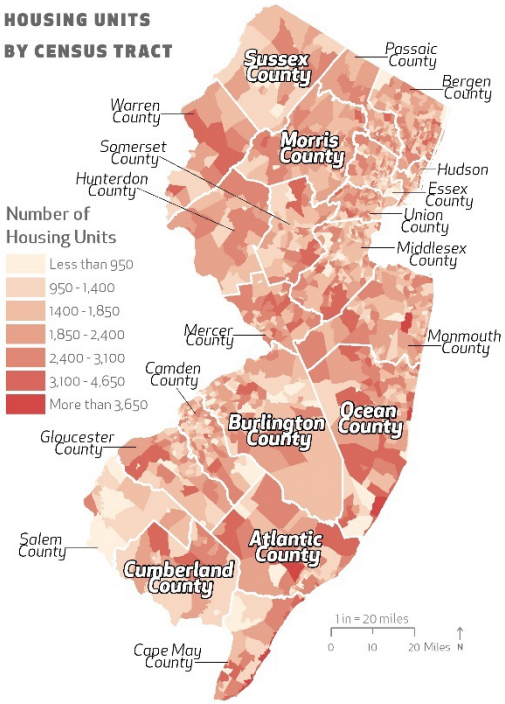
Note: Red underline of a County in Northern NJ graph means County is part of The New York City Metropolitan Statistical Area, and in the Southern NJ graph means County is part of the Philadelphia Metropolitan Statistical Area.

Table 4-11 Housing Units in New Jersey by County, 2010 to 2015

COUNTY	2010	2015	AVERAGE UNITS PER SQUARE MILE (2015)	NUMBER OF HOUSING UNITS GAINED 2010 TO 2015	% CHANGE 2010 TO 2015
Atlantic	125,826	127,435	229	1,609	1.28%
Bergen	351,122	353,978	1,519	2,856	0.81%
Burlington	174,382	177,058	222	2,676	1.53%
Camden	204,435	205,768	930	1,333	0.65%
Cape May	98,394	98,747	393	353	0.36%
Cumberland	55,406	56,216	116	810	1.46%
Essex	311,738	313,824	2,487	2,086	0.67%
Gloucester	108,337	111,445	346	3,108	2.87%
Hudson	264,844	274,423	5,941	9,579	3.62%
Hunterdon	49,159	49,816	116	657	1.34%
Mercer	142,377	143,833	641	1,456	1.02%
Middlesex	292,495	297,940	964	5,445	1.86%
Monmouth	256,504	259,823	554	3,319	1.29%
Morris	188,329	190,765	415	2,436	1.29%
Ocean	275,793	279,989	445	4,196	1.52%
Passaic	175,223	176,433	956	1,210	0.69%
Salem	27,293	27,619	83	326	1.19%
Somerset	122,244	124,672	413	2,428	1.99%
Sussex	61,567	62,184	120	617	1.00%
Union	198,668	200,708	1,951	2,040	1.03%
Warren	44,897	45,266	127	369	0.82%
State Total	3,529,033	3,577,942	487	48,909	1.39%

Source: American Community Survey 5yr Estimates, 2010 and 2015

Figure 4-15 Housing Density in New



Counties with the Most Housing Density

(Housing Units per Square Mile)

1. Hudson: 5,941
2. Essex: 2,487
3. Union: 1,951
4. Bergen: 1,519
5. Middlesex: 964

Table 4-12 lists the number of permits issued for residential construction as well as the square footage of permits for non-residential construction in New Jersey for 2010 through 2015. Both residential and non-residential construction experienced a gradual growth in issued permits between 2010 and 2014 but experienced a decrease in 2015.

Table 4-12 Issued Building Permits by Use, 2010 to 2015

	2010	2011	2012	2013	2014	2015	TOTAL
RESIDENTIAL (UNITS)							
One and Two Family	6,934	6,236	6,700	9,666	10,678	9,470	49,684
Multifamily	4,733	5,184	8,527	8,998	11,909	9,989	49,340
Mixed Use	218	462	43	131	309	44	1,207
Issued Permit Total for State	11,885	11,882	15,270	18,795	22,896	19,503	100,231
NON-RESIDENTIAL (SQUARE FOOTAGE)							
Hotels, motels, guest houses	181,533	566,059	283,946	317,695	461,114	991,959	2,802,306
Business / Office	5,496,579	4,915,544	7,395,704	5,830,508	5,426,729	5,751,737	34,816,801
Education	793,531	777,265	748,064	952,585	3,494,118	1,289,204	8,054,767
Hazardous uses	15,151	26,186	-	227,553	12,063	55,128	336,081
Industrial	338,104	394,992	646,978	1,453,059	498,513	641,621	3,973,267
Institutional	654,868	334,504	1,138,474	901,979	793,991	1,197,161	5,020,977
Retail	2,192,231	1,680,445	2,088,658	2,240,758	3,536,522	3,544,141	15,282,755
Storage	3,722,203	3,880,713	4,682,197	9,549,177	18,574,552	11,368,650	51,777,492
Signs, fences, miscellaneous	4,812,689	2,229,216	5,134,715	2,881,840	2,722,430	2,349,635	20,130,525
Issued Permit Total for State	18,206,889	14,804,924	22,118,736	24,355,154	35,520,032	27,189,236	142,194,971

Source: NJDCA Building Permit Yearly Summary Data, 2010 to 2015

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.

4.6 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, 2015).

According to the 2015 CBP for New Jersey, the State has a total of 2,306,506 business establishments. The retail trade industry has the highest number of establishments in the State, making up 13.7% (315,570 establishments) of all businesses. Following retail trade is the professional, scientific and technical services industry, making up 12.7% of all businesses (293,510 establishments). The third highest industry is health care and social assistance, making up 11.9% (274,580 establishments) of all businesses. Table 4-13 provides 2015 industry and employment information for the State of New Jersey and Figure 4-16 provides details about the top industries in the State.

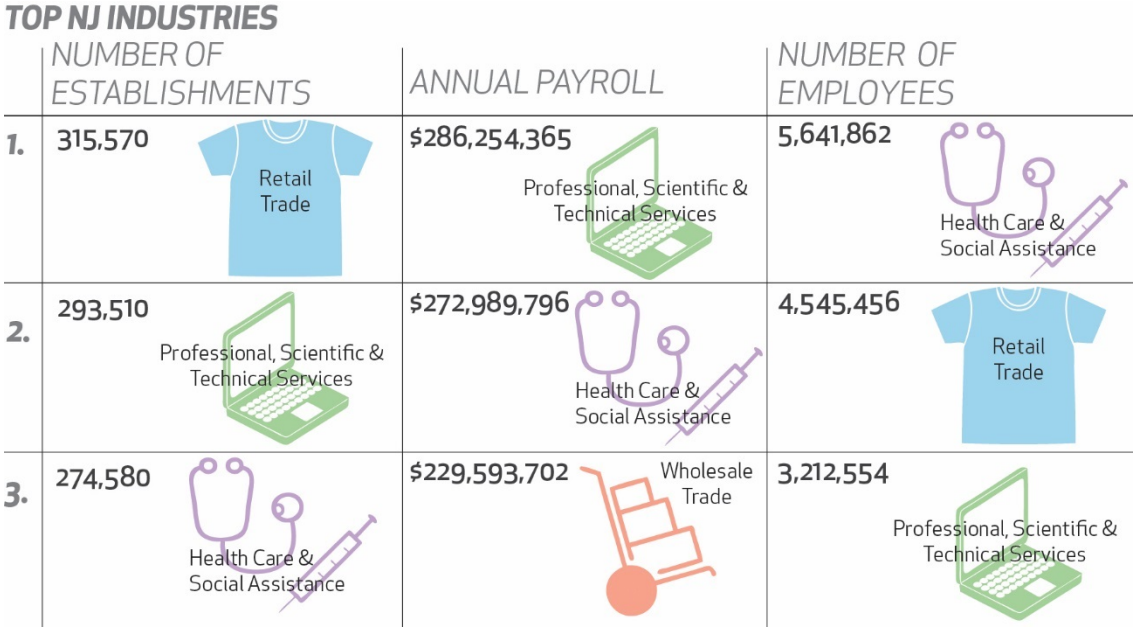
Table 4-13 2015 Economic Census for the State of New Jersey

INDUSTRY	NUMBER OF ESTABLISHMENTS	ANNUAL PAYROLL	NUMBER OF EMPLOYEES *
Agriculture, Forestry, Fishing & Hunting	2,020	$ 342,764	8,323
Mining, Quarrying, and Oil and Gas Extraction	780	$ 828,011	11,318
Utilities	3,780	$ 23,100,029	191,760
Construction	210,790	$ 101,396,877	1,461,060
Manufacturing	74,130	$ 138,139,395	2,132,567
Wholesale Trade	140,600	$ 229,593,702	2,537,632
Retail Trade	315,570	$ 132,528,607	4,545,456
Transportation and Warehousing	74,820	$ 83,016,298	1,634,998
Information	37,150	$ 85,771,028	850,045
Finance and Insurance	118,250	$ 220,386,982	1,884,556
Real Estate and Rental and Leasing	88,600	$ 32,747,367	564,524
Professional, Scientific, and Technical Services	293,510	$ 286,254,365	3,212,554
Management of Companies and Enterprises	15,030	$ 167,311,023	1,267,091
Administrative and Support and Waste Management and Remediation Services	139,910	$ 126,267,276	3,160,287
Educational Services	38,250	$ 41,509,603	1,088,604
Health Care and Social Assistance	274,580	$ 272,989,796	5,641,862
Arts, Entertainment, and Recreation	36,030	$ 16,922,724	588,503
Accommodation and Food Services	206,100	$ 59,192,009	2,956,814
Other Services	235,830	$ 46,695,066	1,523,363
Public Administration	776	$ 20,616	924

Source: United States Census County Business Patterns, 2015

* This number only includes paid employees

Figure 4-16 New Jersey Top Industry Details



Source: United States Census County Business Patterns, 2015

4.6.2 KEY INDUSTRY CLUSTERS OF NEW JERSEY

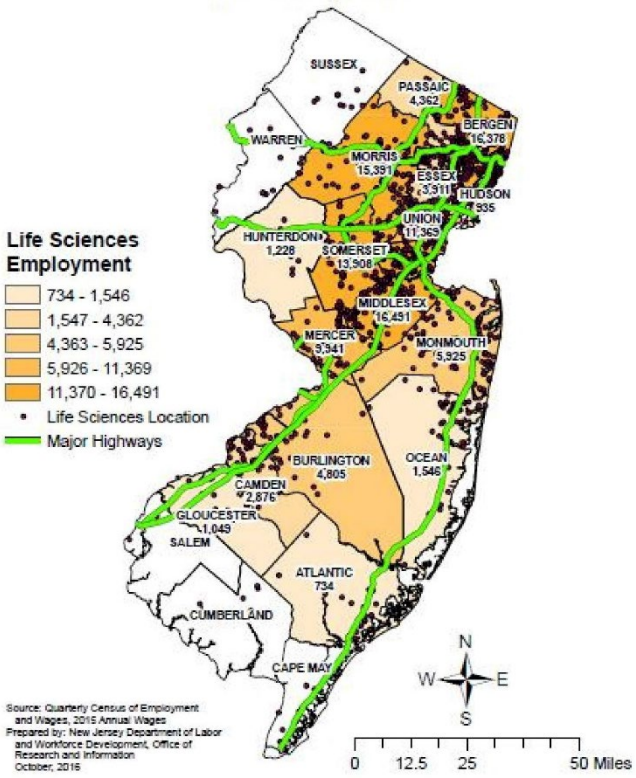
There are seven industry clusters that contribute to New Jersey's economy and have statewide and regional importance. These seven industries represent 61% of New Jersey's total employment and approximately 64% of the total wages earned. These industry clusters are bio/pharmaceuticals and life sciences, health services, transportation, logistics and distribution, advanced manufacturing, technology, finance, and leisure, hospitality and retail trade. The following are descriptions of each cluster

Bio/Pharmaceuticals and Life Sciences Industry Cluster

New Jersey is home to more than 3,100 life science establishments. This industry cluster includes companies that produce medicinal products, make medical devices, manufacture equipment or supplies, and participate in research and development or analytics and diagnostics (NJLWD, 2015).

The bio/pharmaceutical life sciences industry employs 116,700 people, which makes up 3.5% of the State's private sector workers. This cluster is made up of three primary components: pharmaceutical sector (41.0%), biotechnology (38.3%) and medical device manufacturing (20.7%). From 2010 to 2015, the number of establishments in this cluster grew by 8.2%. Employees in the bio/pharmaceutical and life sciences cluster made an average wage of $144,410 in 2015, which is almost a 12% increase from 2010. More than three-fifths of workers in this cluster hold at least a Bachelor's (32.2%), Master's/Professional (23.5%) or doctoral (7.1%) degree (NJLWD 2015). Figure 4-17 illustrates the location of the bio/pharmaceutical and life sciences industry clusters throughout the State.

Figure 4-17 Bio/Pharmaceuticals and Life Sciences Employers in New Jersey

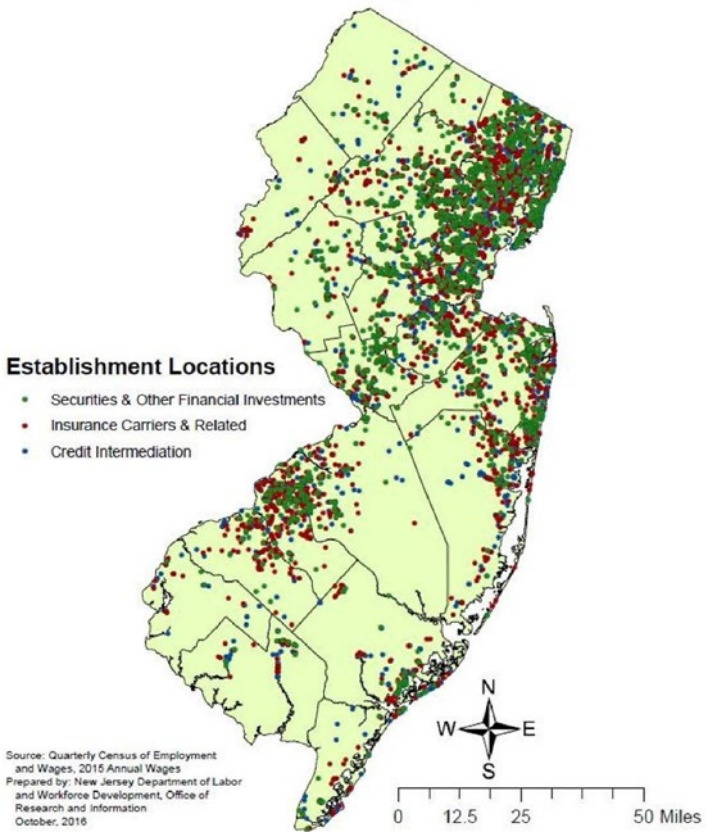


Source: New Jersey Department of Labor and Workforce, 2017

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 contributes almost $30 billion, or approximately 2.8% of the entire nation's GDP. The financial services industry employe around 177,000 people, and makes up 5.3% of all private sector jobs in the State. From 2010 to 2015 the cluster experienced a 6% decline in employment. Despite this employment decline, the State has remained in the forefront of financial advancement by becoming the national leader in developing data centers to support the industry. The average annual wage for workers in the financial cluster is over $120,000. The greatest concentration of jobs within this industry cluster is found in Hudson County (more than 17.5%) (NJLWD, 2015). Figure 4-18 illustrates the location of the financial services industry clusters throughout the State.

Figure 4-18 Financial Services Employers in New Jersey

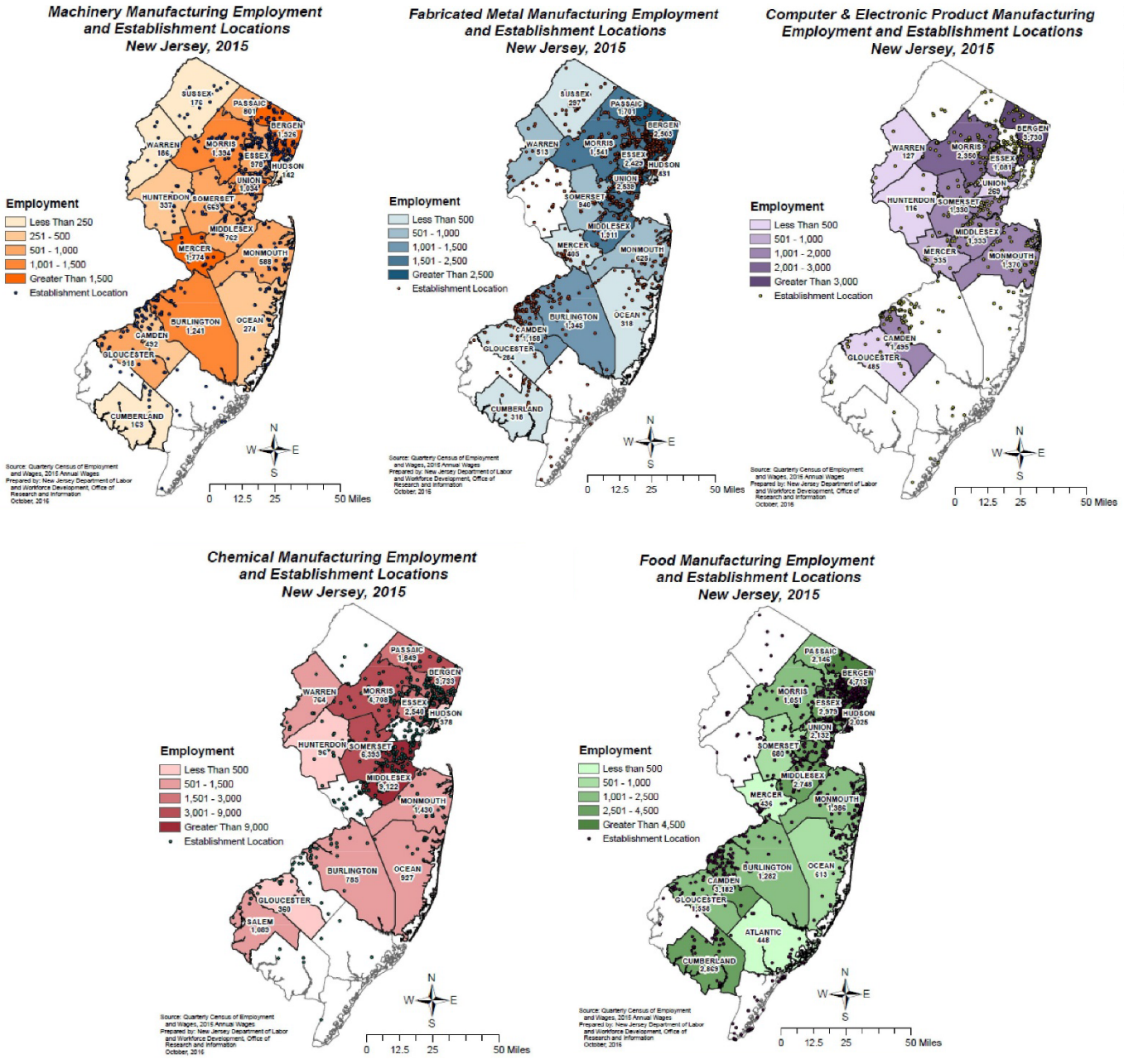


Source: New Jersey Department of Labor and Workforce, 2017

Advanced Manufacturing Industry Cluster

The advanced manufacturing industry contributed over $33.1 billion (6.6% of New Jersey's output) to the GDP in 2014. Nearly 157,000 people are employed in the advanced manufacturing cluster in New Jersey. Chemical manufacturing industries employed almost 44,000 people in 2015, which is a decrease from 53,000 people in 2011. The average annual wage earned by employees in the advanced manufacturing industry exceeds$85,000 in, which is 21% higher than the national average wage for the industry cluster. In 2015, the manufacturing industry cluster paid more than $13.5 billion in wages (NJLWD, 2015). While advanced manufacturing is still a prominent cluster, it has experienced a steady decline over the past couple of decades. Figure 4-19 illustrates the location of the advanced manufacturing industry clusters throughout the State.

Figure 4-19 Manufacturing Employers in New Jersey, 2015



Source: New Jersey Department of Labor and Workforce, 2017

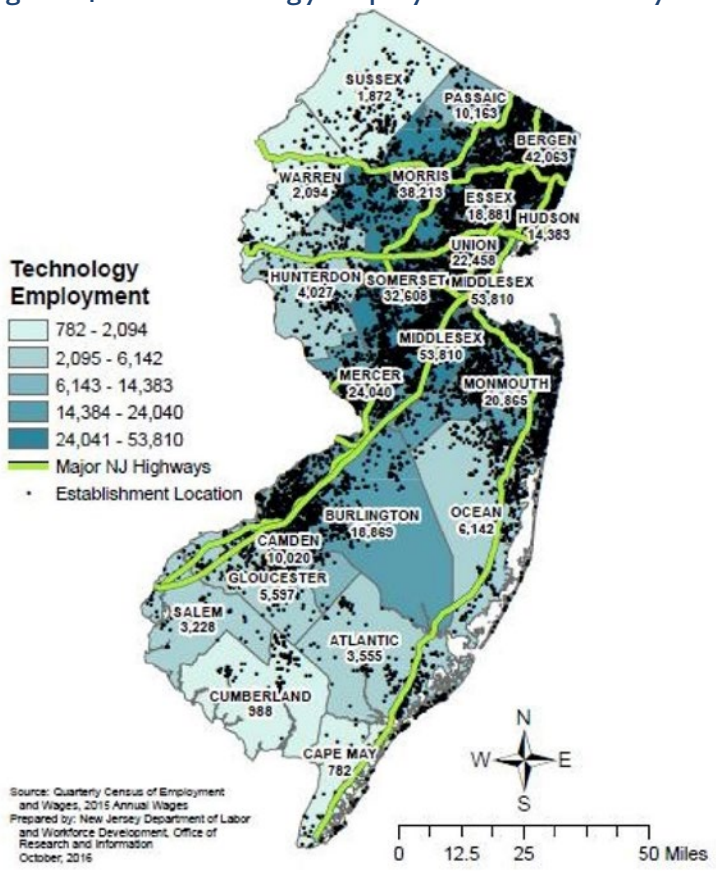
Technology Industry Cluster

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).

New Jersey's technology cluster accounts for 362,730 jobs (10.9%) of private sector employment statewide. Employment within the technology industry cluster can primarily be found within four industry sectors: wholesale trade (16.3%), manufacturing (17.5%), information (13.9%), and professional, scientific and technical services (50.1%). This cluster has an educated workforce, with over 85% of employees

having some college or higher degree, and 66% having a bachelor's degree or higher. The annual average wage for the technology cluster is $118,430 and employers pay over $43 billion in wages (NJLWD, 2015). Figure 4-20 illustrates the location of the technology industry clusters throughout the State.

Figure 4-20 Technology Employers in New Jersey

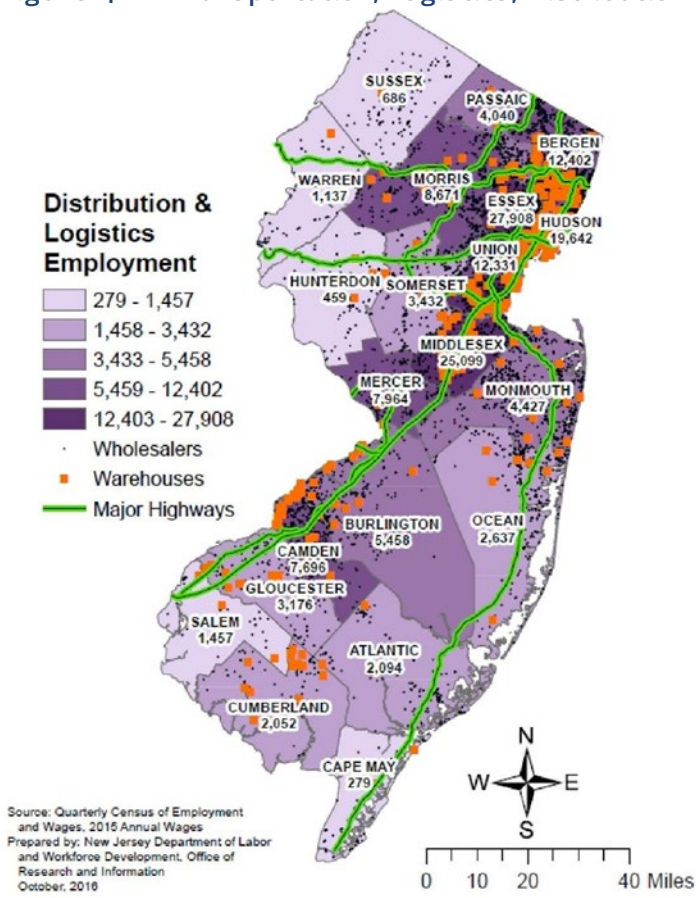


Source: New Jersey Department of Labor and Workforce, 2017

Transportation, Logistics, Distribution Industry Cluster

The transportation, logistics and distribution (TLD) cluster employs 370,260 workers, 11.2% of the State's private sector workers. TLD contributes $56.8 billion to the State's GDP. Employees in the TLD industrial cluster made an average wage of $73,325 (NJLWD, 2015). Figure 4-21 illustrates the location of the TLD industry clusters throughout the State, and the transportation section above provides detail about the State's transportation network.

Figure 4-21 Transportation, Logistics, Distribution Employers in New Jersey

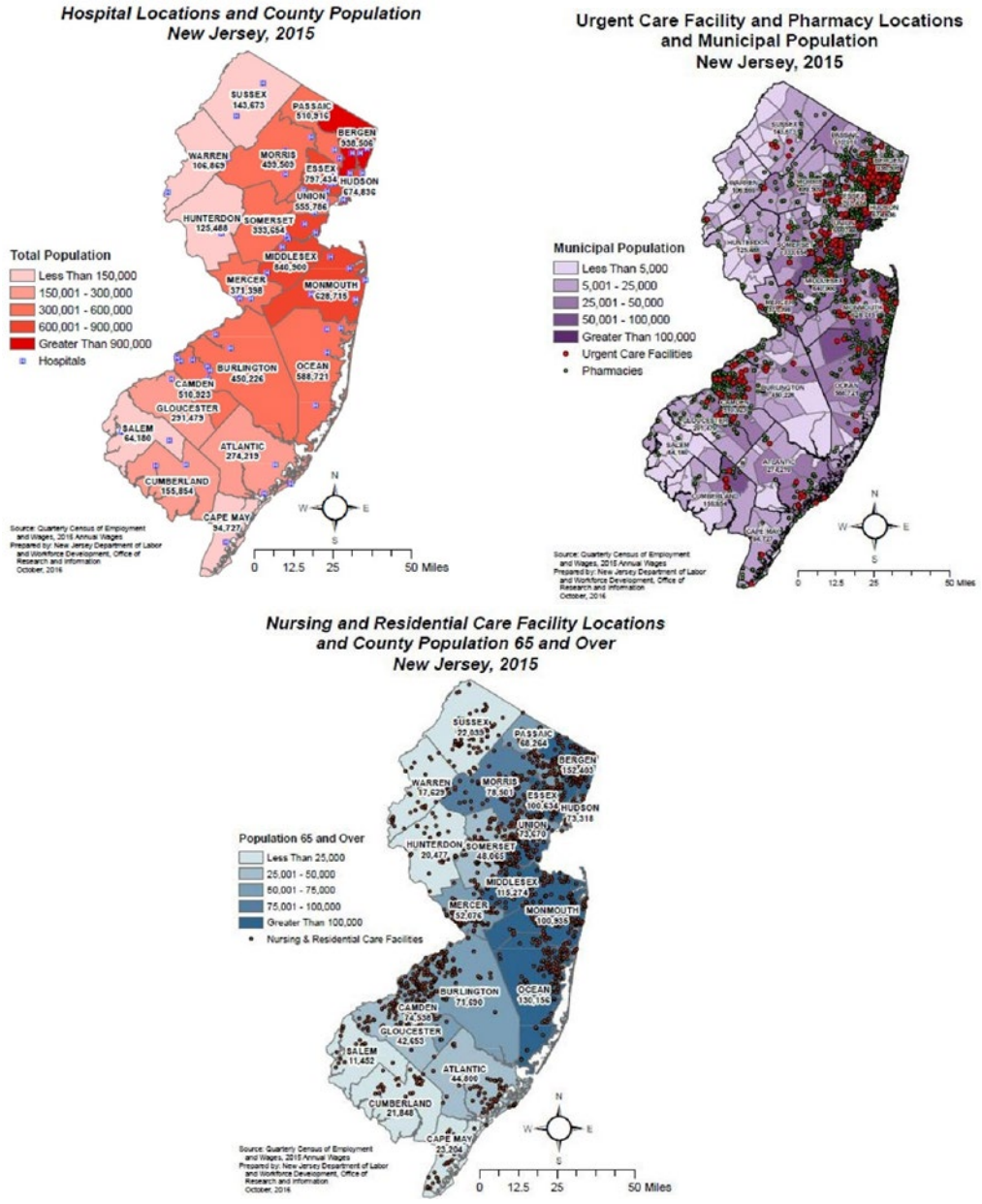


Source: New Jersey Department of Labor and Workforce, 2017

health care industry cluster

The health care industry contributed $36 billion to the GDP in 2015, or approximately 7.2% of all state output. There are about 21,520 health care establishments in New Jersey. Health care employment is found in three industry groups: ambulatory health care services (47%), hospitals (33%), and nursing and residential care facilities (20%). Between 1990 and 2016, the health care industry created 190,100 new jobs in New Jersey, increasing its share of jobholding from 7.5% to 11.9%. The health care industry is projected to add more than 85,300 jobs in New Jersey between 2014 and 2024. The health care industry paid more than $25.5 billion in total wages in New Jersey (NJLWD, 2015). Figure 4-22 illustrates the location of the health care industry clusters throughout the State.

Figure 4-22 Health Care Employers in New Jersey, 2015



Source: New Jersey Department of Labor and Workforce, 2017

Leisure, Hospitality and Retail Industry

Leisure, hospitality, and retail (LHR) is composed of four components: retail trade (56% of employment), food services/drinking places (30%), accommodation (6%) and arts/entertainment/recreation (8%). Many of the businesses within LHR directly and indirectly support the State's tourism industry. The LHR industry contributed $46.9 billion to New Jersey's GDP, or approximately 9.2% in 2015. Over 28.6% 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 (51.4%) and Cape May (54.8%) Counties are concentrated in the LHR industry cluster. In 2015, the LHR industry employed 814,979 people, accounting for 24.6% of the State's private sector employment. LHR employers paid more than $23 billion in wages during 2015 (NJLWD, 2015).

Figure 4-23 Leisure, Hospitality & Retail

New Jersey's Leisure, Hospitality & Retail Trade Cluster (2015)			
Industry Components	**Employment**	**Establishments**	**Average Annual Wage ($)**
LHR Cluster	814,979	53,130	29,009
Retail Trade	457,920	30,340	32,927
Arts/Entertainment/Recreation	61,481	3,618	33,999
Accommodations	49,423	1,345	35,310
Food Services & Drinking Places	246,155	17,827	19,211
Private Sector Employment, NJ Total	**3,318,030**	**254,483**	**61,981**

Source: New Jersey Department of Labor and Workforce, 2017

Other Facts About NEw Jersey Industries to COnsider

The State of New Jersey is at the forefront of innovation on a variety of levels. Here are some facts to consider that may influence industry in the State in the near future.

- New Jersey's green energy economy is growing. The State 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. In 2015 the New Jersey Energy Master Plan was updated to encourage more solar installations and usage (New Jersey Board of Public Utilities & NJDEP).
- Farming, Fishing and Food industries are vital to the State. Food production and processing contribute approximately $2 billion annually to the State's economy. 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 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.
- 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 has also become important to the State's economy, attracting corporations and shoppers.

4.6.3 NEW JERSEY OFFICE FOR PLANNING ADVOCACY

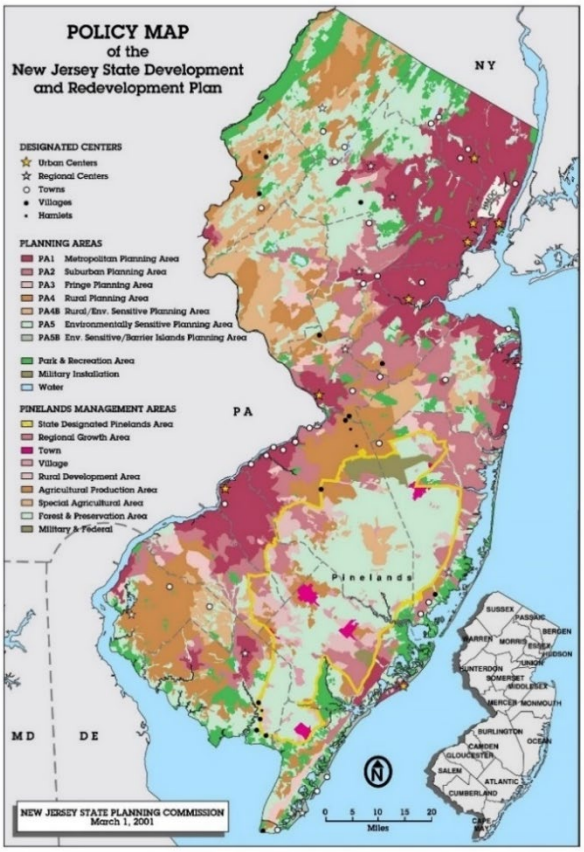
The New Jersey State Development and Redevelopment Plan

The SDRP was adopted in 2001 and establishes a policy framework for the future development of the State.

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 cost
- 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

Figure 4-24 Current State Planning Areas



Source: NJ OPA

The Plan identifies the following planning areas for 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 shows the locations of these Planning areas in the state.

Future Development, 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.